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ASSISTING VETERANS FROM THEATERS OF OPERATIONS – A COMPARATIVE APPROACH IN OTHER NATO COUNTRIES

Răzvan-Lucian ANDRONIC

Faculty of Psychology and Education Sciences Brasov, „Spiru Haret" University, Romania (rla_bv@yahoo.com)

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Abstract: *The participation of personnel from the defense, public order and national security structures of the Romanian state in international missions to combat terrorism, support peace or humanitarian began in 1993 and continues today (being involved so far over 55,000 soldiers, according to official sources). Only this year, the Ministry of National Defense (MApN) will participate with a staff of 1940 military and civilians in missions and operations outside the Romanian state, and the Ministry of Internal Affairs (MIA) will contribute 841 soldiers and police. In all these years, at least 1500 people / year were involved, who performed missions in at least 3 different locations around the world.*

Deployment in a theater of operations is equivalent to carrying out complex missions, with a high degree of risk and exposure to extreme dangers, which left wounds seen and unseen. A number of 30 soldiers fell on duty, and another 177 soldiers were seriously injured in the theaters of operations, most of them being classified as disabled. Unseen wounds acquired as a result of exposure to potentially traumatic events take the form of post-traumatic stress disorder and comorbid conditions (PTSD, which affects between 5% and 18% of those participating in such missions in partner countries).

1. INTRODUCTION

The paper presents the way in which the assistance of veterans is organized in NATO's state that sent most soldiers on missions (namely USA), as an inter- and transdisciplinary approach (starting from the definition of this category, the institutional framework created, the main categories of services offered, etc.)

The United States of America have the most developed assistance system for veterans in the world, organized in the form of U.S. Department of Veteran Affairs, a government agency subordinated to the United States Congress [1]. It was established in its current structure in 1989, but the preoccupation with assisting veterans is much older and it goes back to 1636, when pilgrims from Plymouth Colony were fighting with the Pequot Indians. There was a law passed by pilgrims which stated that soldiers with disabilities would be supported and helped by the colony.

In 1776, the Continental Congress encouraged enlistment during the Revolutionary War, by offering pensions to soldiers with disabilities. From the earliest years after the founding of the United States, states and individual communities provided veterans with direct medical and hospital care.

The federal government authorized in 1811 the first medical and veterinary unit for veterans. Also, in the 19th century, the national assistance program for veterans was developed in order to include benefits and pensions for veterans and for their widows and dependents as well.

After the American Civil War (1861-1865), many veterans' state homes were set to provide medical treatment and ancillary hospitalization for all injuries and illnesses, whether or not they were on duty. Veterans of the Indian Wars, the Spanish-American War, and regular members of the army were also taken care of in these homes.

After the United States joined World War I in 1917, the Congress established a new system of benefits for veterans, including programs for disability compensation, insurance for service personnel and veterans, and vocational rehabilitation for people with disabilities. In the 1920s, these benefits were administered by three federal agencies: The Office of Veterans Affairs, the Office of Pensions of the Department of Internal Affairs, and the National House of Volunteer Soldiers with Disabilities.

The first reorganization of federal programs for veterans happened in 1921, when the Congress combined all the programs for World War I veterans to establish the Office of Veterans Affairs. Veterans' hospitals in the public health service were transferred to its subordination, and an ambitious program of construction of hospitals for veterans of the First World War began. World War I was the first complex war through its effects on veterans. A very large number of psychiatric victims or of the chemical war were registered and they required post-war specialist care.

Tuberculosis and neuropsychiatric hospitals have been opened to house veterans that experienced respiratory or mental health problems.

In 1928, the National Houses also accepted women, the National Guard, and veterans of the inner troops. Further consolidation of federal programs for veterans emerged on July 21, 1930, when President Herbert Hoover signed the Executive Order no. 5398 and transformed the Veterans Office into a federal administration - creating thus the Veterans Administration (VA) - to "strengthen and coordinate government activities that had affected war veterans. ” Back then, the National House and the Pension Office joined VA as well. The three agencies became offices in the Veterans Administration (VA).

After World War II, amid growing veterans, Congress passed a large variety of new benefits for war veterans – such as World War II Veterans Bill, signed in June 1944 (known as GI Bill).

This law has had a major impact. For example, between the end of World War II and 1966, one-fifth of all single-family homes built in America were funded by this bill for World War II veterans or Korean War veterans. From 1944 to December 1993, the VA guaranteed $ 13.9 million in home loans worth more than $ 433.1 billion.

VA was transformed into to a cabinet by President Ronald Reagan in October 1988. The change happened on March 15, 1989, and there were administrative changes at all the levels.

The Veterans Administration was renamed the U.S. Department of Veteran Affairs, but continues to be known to the general public under the abbreviation VA. In fact, the name of the official website is consistent with this: https://www.va.gov/.

2. THE CURRENT ORGANIZATION

The current organization of the U.S. Department of Veteran Affairs includes three major components [2]: the Veterans Health Administration (which will be presented in detail below, through examples of good practice), the Veterans Benefits Administration (where there are major differences from those mentioned in Law 168/2020) and the National Cemetery Administration (which takes care of military cemeteries in other countries and contributes to missions to recover the remains of fallen American soldiers in other territories, which are then identified and buried).

In parallel with these three major directions, there are many that follow a specific direction, simply by going through their name (available at: https://www.va.gov/about_va/organizations.asp) being suggestive of the complexity of the approach of veterans assistance in the USA.

The foundation of this organization was laid immediately after World War II, in 1946, with the creation of the VA Department of Medicine and Surgery. This component was absolutely necessary, given that almost 16 million new veterans had to be cared for. The extremely large number of veterans in need of assistance was mainly due to the scale of the conflict, but also to the improved medical care on the battlefield, which meant that several soldiers returned home with physical injuries they would not have survived before. There were also many psychiatric disorders compared to the previous wars in which the US military participated.

The development of this department was also a lesson learned from the difficulties posed by managing the wave of World War I veterans (over 5 million veterans), which required more complex care and benefits for these veterans. The establishment of the new department also meant the rapid implementation of a set of measures:

- Establishment of new hospitals for veterans to provide care for veterans of all ages and conflicts and the transforming of former military hospitals into facilities for veterans;
- Locating VA hospitals near major US medical centers for promoting research and innovation, in order to respond to the lack of doctors in the US (immediately after World War II) and to ensure training for veterans who wanted post-war medical education;
- Incorporating mental health services and facilities into the design and operation of new VA hospitals for the first time, thus reimagining the concept of a modern general hospital;
- Implementing a pilot program (known as the Michigan Plan) to allow and help veterans to be treated by local physicians, offering access to care where VA care was not available;
- Developing VA's research and development capacity, committing to spend more than $ 1 million every year. The research and development efforts started with the improvement of prostheses for veterans affected by limb loss;
- Establishing volunteer service for VA to increase and complement veterans' health professionals.

The Veterans Health Administration has had a number of names since its inception, appearing as a separate component of the VA in 1946 (as the VA Department of Medicine and Surgery) and since 1991 has had the current name, the Veterans Health Administration (abbreviated .en. VHA).

Today's VHA continues to meet the medical and surgical needs and ensure the quality of life of veterans. The new programs offer treatment for traumatic brain injury, post-traumatic stress disorder, suicide prevention, veteran women and so on. VHA operates one of the largest health care systems from the world and offers training for most healthcare professionals, healthcare, and related professionals in the United States.

About 60% of all medical residents receive part of their training in VA hospitals, and its medical research programs help society. VHA is the largest national provider of medical education and a big contributor to medical and scientific research, having more than 46,000 active volunteers, 120,000 trainee health professionals, and nearly 16,000 affiliated medical schools are part of the VHA community.

The Veterans Health Administration (VHA) is currently "the largest integrated health care system in the United States and provides care to 1,293 health facilities, including 171 VA medical centers and 1,112 complex outpatient care points. (9V outpatient clinics) to over 9 million VA Veterans enrolled in the VA Health Care Program" https://www.va.gov/health/aboutVHA.asp.

VHA centers offer a lot of services, such as traditional hospital-based services (such as surgery, critical care, mental health, orthopedics, pharmacy, radiology, and physical therapy). Also, most medical centers provide additional specialized medical and surgical services (such as audiology and speech therapy, dermatology, dentistry, geriatrics, neurology, oncology, podiatry, prosthesis, urology, and vision care). Some medical centers also provide advanced services (such as organ transplants and plastic surgery).

Also, in each VHA center there are services of representation of the interests of the patients (advocacy), provided by the professional staff in this approach. They can help veterans resolve any issues involved in the health care process, especially those issues that cannot be addressed at the point of care. Advocacy specialists are thus prepared to listen to questions, issues or special needs of veterans and address them to the staff of the Medical Center for solving.

Through all its structures, VHA provides care through committed, collaborative teams in an environment which supports learning, discovery and continuous development. This approach is intended to emphasize the prevention and health of the population and constantly contribute to the well-being of the nation (through education, research and services in case of national emergency).

The same collaborative manner is visible in the promotion of medical services by third parties, the entities with which VHA collaborates. On the VHA website are available (under the heading "Our Suppliers" - https://www.accesstocare.va.gov/ourproviders/) lists of online directories that contain authorized providers of independent practice in the following professions: doctors, dentists, nurses, specialist nurses, medical assistants, chiropractors, licensed anesthetist assistants, optometrists, podiatrists and psychologists.

Thus, any veteran can search for suppliers in the occupations aforementioned based on personal preferences and needs. For each provider, the following information is available, updated monthly: full name; gender; the line of clinical products they can provide in collaboration with VHA; data on professional training. This information will be "updated" on a monthly basis.

Additional information about physicians can also be obtained from the VHA page by using the "DocInfo" service provided by the Federation of State Medical Commissions (FSMB) at http://www.docinfo.org. The FSMB website is updated monthly and is a public website designed to provide information about any physician who is licensed in any U.S. state, territory, or district.

3. MEDICAL CONDITIONS AND TRARMENTS ADRESSED BY VHA

The VHA section (https://www.va.gov/health/) includes a first section dedicated to presenting the health benefits that can be accessed by American veterans; due to the differences between the Romanian and the American health insurance system, a detailed presentation is not required here.

The following section on medical conditions and available treatments includes an alphabetical index of them (Health Topics A to Z Index) [3] each term being described in detail, and indicating the available resources.

For example, in the case of service dogs, the article that can be accessed (at: https://www.prosthetics.va.gov/ServiceAndGuideDogs.asp) describes the legal basis for use ("Service dogs are guide dogs or prescribed to a veteran with a disability under Article 38 CFR 17.148 following the diagnosis of a veteran with a substantial visual, hearing or mobility impairment "), a list of frequently asked questions, how to access this service and reimbursable expenses, a specific information material (Fact Sheet on Service Dogs Veterinary Benefits), as well as an indication of non-VHA resources (in this case, conditions for accessing the service through dog associations).

The same information structure is found (in general) in the case of the other terms included in the alphabetical index.

The most common medical conditions and treatments and / or with a major impact on the quality of life of veterans have specific subsections on the VHA website. In addition to detailed information about medical conditions present in the general population (and therefore useful to the general public) such as hepatitis and HIV / AIDS infection, there are also subsections directly related to diseases acquired as a result of military activity.

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[2] https://www.va.gov/health/aboutVHA.asp;
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THE ADAPTATION OF THE AIR FORCE DOCTRINE TO THE ROMANIA NATIONAL DEFENSE STRATEGY

Bogdan-Cezar CHIOSEAUA

„Henri Coandă" Air Force Academy, Braşov, Romania (chiobogdan@yahoo.com)

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Abstract: *From military theorists` perspective, the airspace is an area from which objectives of strategic importance to the enemy can be effectively engaged and neutralized, in order to disorganize the command and control system at strategic level, as well as to diminish the enemy's operational potential to develop and the tactical effort in the area / areas where military actions are carried out.*

From this point of view, maintaining control of the airspace is a necessary condition for providing national security, and this can be achieved by constantly updating the doctrine of the air force, the one that manages the use of airborne vectors (aviation, missiles, artillery, drones, etc.) and supports the development of specific infrastructures, research and production elements, as well as modern structures for the educational and training needs of the Air Force.

The airspace and going beyond that, the circumterestrial space are areas where there are no physical limitations or obstacles, geographical or relief conditions as found in districts where land forces operate or in the areas of military operations carried out by naval forces. Given the lack of these restrictions, the branch that uses the airspace has a unique feature, namely ubiquity, a characteristic that outlines the special importance of air force and air doctrine in meeting the objectives of military strategy and national security.

Keywords: *Strategy, geopolitics, air power, strategic importance, air space*

1. INTRODUCTION

Romania, as state and nation, has preferred throughout history to approach a national defensive strategy as compared to the geopolitical scene actors and especially to the ambitions expressed by the great powers in order to gain economic, territorial and military hegemony, at least for two reasons. Firstly, it is due to the geographical positioning of our country, at the meeting point of states' economic and territorial interests with local leadership status, Romania being forced to adopt a cautious and diplomatic position towards the challenges to which the regional security environment has been and it is subjected to. Secondly, the size and the military potential represent a concern that is in direct connection with the political power and especially with the economic force. This is extremely important for the viability of the military and it supposes that the political decision is always in consensus and supported from an economic point of view to allow the immediate reaction of the armed forces and their decisive intervention, as a form of response to dangers and /or threats to the national security environment.

Nowadays, Romania has a different approach to the national strategy, even if it maintains the defensive tendency, it is more active and strongly anchored in the realities of the regional and global security environment, namely, a modern strategy, with clear objectives of ensuring national security, of defending national values and interests and last but not least, for the defense of the national territory and of all the citizens of the country. To achieve these objectives, Romania has joined the strongest political and military alliance, strategic partnerships have been signed and important funds have been allocated to the defense budget, with which programs and projects have been launched to equip the military with modern and high-tech modern capabilities that are able to cope with the threats of the modern battlefield.

The complexity of the current security environment is determined by the presence of unique threats, extremely dangerous, which overlap with the area of responsibility of the national security system and create pressure on society, and the uncertainty, the lack of predictability and vision, the indecision among political class, are felt in all areas and sectors and determine the population, the "voice in the street", to react to the perception of these threats and vulnerabilities.

There is more and more talk about increasing the level of resilience, about returning to normality, but the COVID-19 pandemic imposes extreme measures and the application of restrictions. Thus, exits and entrances to and from the country are conditioned, as well as the access to public and cultural institutions, the courses attendance is online, and movement in cities is no longer so free. The structures within the national defense system, public order and national security are being put to the test, and the Ministry of National Defense has an important mission and a defining role in combating the COVID-19 pandemic and especially in adapting the defense and national security systems to combat conditions, specific to the contaminated environment.

The response of the Ministry of National Defense to the current threats is firm and concretized in the adopted strategies, doctrines and measures. It is integrated both at the level of the General Staff and of subordinated headquarters, and differentiated at the level of Staff categories and of the fighting units and structures within them.

The Romanian Air Force also participates in providing national security through specific missions, being that branch that: "defends the national airspace and the common airspace of the Alliance, operationalizes and maintains the operationalization of air forces and means, supports other military forces and participates in resolving emergency and intervention situations in support of civilian authorities, as well as in fulfilling international commitments" [1].

2. SHORT RETROSPECTIVE OF THE NATIONAL DEFENSE STRATEGY

The year 2015 imposed a national strategy to defend the country with the main objective of ensuring the security of its citizens, wherever they are. „A strong Romania in Europe and in the world" [2] "A strong Romania in Europe and in the world" was the desideratum of the strategy at that time, a strategy directly influenced by the behavior and actions of the Russian Federation, which culminated in 2014 with the illegal annexation of the Crimean Peninsula and the invasion of the Donbas region. These actions have determined the outline of some particularly important strategic valences for the Black Sea region, valences with direct effect, in the form of risks, dangers and threats, on the systems that manage the assurance of the level of national security of both Romania and the countries neighboring the Black Sea Basin.

Moscow's influence in the cabinets and governments of the buffer states between the Russian Federation and the European Union (Ukraine, Moldova and Belarus) does nothing but underline Russia's intentions to destabilize the regional security environment. Therefore, Romania adopts the National Defense Strategy for 2014-2019, a document that has shown that it is attached to regional geopolitical realities, and as courses of action, our country is oriented towards developing capacities and capabilities to respond to threats present in the neighboring areas and to strengthen the relations granted by the Strategic Partnership with the United States of America and by NATO and the European Union memberships.

The pillars of the strategy and the concept of national security were built to support the objectives and courses of action and were based on the necessity and need to defend the country and its citizens. However, the complexity and dynamics of the regional security environment requires updating the concept of national security, the main causes being the threats and dangers that emerged in vast and important areas such as: defense, intelligence, counterintelligence and security, in education and health and last but not least in economic, energy, financial and environmental areas.

Thus, given the wide range of threats, the numerous areas in which they made their presence felt and the fact that they are found both nationally and internationally, common directions of approach and combat were established, which required the transformation of the concept of national security, in extended national security.

With this transformation, in the military field, the importance of the collective defense concept is developed and emphasized, at national, European and within the North Atlantic Alliance, and a large part of the responsibility for consolidating the defensive position and for organizing and the development of deterrence are in the responsibility of the Ministry of National Defense.

The current "National Defense Strategy of the Country for the period 2020-2024" continues to take into account the threats and dangers identified and detailed in the old strategy and updates the current concepts and trends with new elements, establishing new courses for action to ensure the national and regional security environment.

Globally, the situation is extremely unpredictable. There are tendencies to reconfigure the relations between the great powers, fact that launches once again the competition for strategic domination, more and more states are reaffirming themselves and are trying, in their evolution, to reach the level and status of regional leader, even if they violate the rules and regulations internationally. The implementation of modern technologies increases the complexity of the security environment, and above all, the COVID-19 pandemic acts directly on the resource management area and puts the security system under pressure in all domains and areas (political, social, economic, military, education and health).

In this new picture of the security environment, Romania continues to rely, first of all, on the national defense capability, and then on a stable and consolidated position of NATO and EU member, of the strategic partnership with the USA and last but not least, on the idea of assuming the image of a stable state from a political, economic and security point of view, according to the desideratum "Together, for a safe and prosperous Romania in a world marked by new challenges." [3]

The need for the existence and exploitation of national defense capabilities, a capability that represents an integrated set of measures, characteristics and aspects related to the technique equipment, is established by the national defense strategy. It requires the development of strategies in specific areas, doctrines, orders and regulations, it underlies training plans and it influences the forms of leading military actions, so as to represent the legal and organizational framework for actions meant to ensure national security.

The role of training and use of national defense capabilities is the prerogative of the armed forces, structures with clear objectives in terms of prevention, deterrence and prevention of threats to our country, which organizes the appropriate response and interventions necessary to limit the duration or influence of a hostile military actions, preventing its transformation into a crisis or a situation of instability and insecurity.

Another important level of the need to provide national defense capabilities is the protection of population and of the national territory, of military capabilities involved in ensuring extensive national security and which must strengthen the country's strategic credibility and develop resilience.

The Romanian Air Force has an extremely important role in providing national security and the success of the modern military operations that are undertaken against the current threats. Its means of action, the technical-tactical characteristics specific to the weapon systems, the immediate and efficient reaction of the execution elements and the capacity to act together, at the branch level and together with structures from other services are established by their own strategies in accordance with the doctrines and procedures of action developed at national level and adapted to NATO and EU partners standards.

3. AIR FORCE DOCTRINE – NATIONAL SECURITY GUARANTOR

The need to provide national security implicitly generated the need to ensure the security of spaces and areas in the composition of the national territory. Thus, divided into the three geographical dimensions (land, sea and air), the national territory was distributed to ensure its security, to categories of armed forces and elements with responsibilities in the field, within the national system of defense, public order and national security.

Thus, the Romanian Air Force has the mission of “defending the national airspace with air to air and ground to air means” [4], and if necessary or on request, it can also act in “support of other branches and local authorities in emergency situations.” [4]

The mission accomplishment confers to the air force the role of protector of the airspace, and in order to obtain and maintain the control and to ensure a management of the airspace security it is necessary to approach the action directions provided by the Romanian Military Strategy - 2021, adapted to the specifics of the Air Force, directions that aim at:

- development of structures and forces involved in conducting operations in airspace;
- consolidation and permanent updating of structures, intended for early surveillance and warning;
- operationalization of the command, control, communications, computers, information, surveillance and research system (C4ISR), at tactical, operational and strategic level [5];
-maintaining the full operational capacity of air-to-air and ground-to-air combat structures designed to carry out actions to combat air threats;
-the continuous training of personnel and the maintenance of the level of training so as to be able to exploit the equipment systems in use to ensure immediate reactions and to carry out actions meant to create discouragement and panic among hostile forces;
-achieving / maintaining the full operational capacity of the multinational structures on the Romanian territory, of those made available to the North Atlantic Alliance, as a component part of the NATO Response Force, of the Initiative to increase the level of operationalization and of the EU Tactical Battlegroups [5];

- the involvement of forces and resources to support the population and central and local public administration bodies in order to reduce and eliminate the negative effects caused by the COVID-19 pandemic [5].

The accomplishment of missions by the Air Force has a direct impact on the design and deployment of military actions developed by other branches. The role that the combat structures in the composition of this category of forces have is extremely important in the management of operations at the battlefield level, and this importance is given by the independence from the physical and geographical limitations from the surface, the speed and rapidity actions are carried out in the airspace and the effective accuracy and the extreme effect in carrying out missions and eliminating threats. The dimension and variety that we encounter today in the threats and dangers that put pressure on the airspace also aim at compromising the elements responsible for providing national security, imposes a permanent update of the doctrines of all categories of forces and constantly challenges the adaptation of forces and means to the specific new challenges.

Today's strategic reality brings to the attention new, intelligent weapons and ammunitions, produced in the research laboratories of the great powers in order to determine the winning race to obtain and hold total world supremacy.

Thus, in the aerial field, the development of hypersonic missiles that can be launched from the ground level or from ships or aerial platforms opens a new chapter of aerial threats - Hypersonic Cruise Missiles - HCM (Hypersonic Cruise Missiles) [6], and in the case of the use of hypersonic air vectors, which can carry these threats through the circumterestrial area, around the globe, the possibility of hitting strategic objectives from any area of the globe is extremely clear.

To the same extent, the development and modernization of UAVs and drones allows their increasing use in research, reconnaissance and combat missions both elements of the tactical echelon, with a direct effect on the conduct of military actions, and at the strategic level with influences the planning and organization of future military actions.

All these new and dangerous threats outline the imminence of "Massive Attacks of Disruption - M.A.D." [7], those attacks that "do not know the limitation of borders and do not make any distinction between domestic and foreign policy" [7] and can cause the start of a global conflagration.

From a geopolitical perspective, the continuation of the fight to prevent and combat the COVID-19 pandemic, together with the measures to respond to the possible energy crisis that is predicted globally, subject security systems to extreme efforts, and these cannot be planned and organized only through resilient strategies and subjective and applicable doctrines.

The coordinates of the air force doctrine are based on providing the defensive measures, necessary to maintain a higher degree of control for the airspace and, implicitly, to ensure its security and the security of the entire national space. All these measures can be implemented by the Air Force at strategic level, through forms of offensive combat such as strategic bombing, providing strategic paralysis by hitting command-control centers (C2) and by air operations with strategic effects based on strategic research and that involve all branches: aviation, artillery and ground-to-air missile subunits, radars and electronic warfare structures.

Regardless of the environment in which the target of enemy threats (land, sea or air) is located, the air force intervene through forms of response adapted to the type of threat, carrying out surveillance missions, interdiction and/or close air support and air combat, above or in the environment of the threat, ensuring superiority in the confrontation with the hostile enemy.

Consequently, the air force doctrine is extremely flexible, decisive in dealing with current threats, extremely important properties that are ensured by the characteristics of the weapon systems in the composition of the air force meant to contribute to their combat.

Thus, aviation, through its air means that define the concept of ubiquity can act anywhere and anytime, being the first force that reacts to the threat. Ground-to-air missile systems can fight threats at long distances, thus thwarting the hostile intentions of the enemy, and structures of radars and electronic warfare are the ones that discover the first possible threats and can hinder their evolutions by interfering with their control commands and electronic masking of their own objectives.

The anti-aircraft missile structures provided by the Romanian Air Force have been improved and expanded by modernizing HAWK missile systems and integrating PATRIOT missile systems, both with the capabilities which are necessary to support the AEGIS system from Deveselu military base where the NATO missile shield is implemented, a system that can be equipped with the new type of interceptor "Glide Phase Interceptor (GPI), designed to destroy the new generation of hypersonic missiles" [8].

The presence of threats such as U.A.V.s and drones is a challenge for aviation and ground-based defense systems. The use in their combat of similar systems and the development of structures endowed with such capabilities is in the attention of the decision-making structures in the field of ensuring national security, Romania starting projects aimed at the production of military drones "from the design, up to the production of parts, to the integration of all weapons systems, maintenance and training of operators"[9] that will serve these systems both from a defensive perspective, and also with missions that can be included in offensive operations.

4. CONCLUSIONS

Providing national security and safety is an extremely complex and difficult mission, and its importance is given by documents designed at the highest political level and which have effects on structures and systems at all levels of society: economic, social, education and especially military. The current complexity of the security environment imposes connections and outlines the courses of action from the general objective of the national defense strategy to the operational objectives and missions that are found in Romanian military strategy and specific doctrines of the armed forces.

The permanent adaptation to counteract and combat the types of modern threats that propagate from the airspace to elements of strategic importance from the national space, involves investments in the acquisition and modernization of combat systems, in the development of infrastructure elements and in the provision of professional maintenance of combat systems.

The strategies guidelines should define the efforts of the political class towards starting and conducting negotiations for stable partnerships and gaining economic and military support from the member nations in the alliances we have joined, developing a healthy economic and business environment to support economic effort and the allocation of more generous funds to the education sector in order to train and prepare a valuable human resource, well trained and able to act in the modern battlefield.

The national defense strategy is nothing but a great plan, built on a vision of the international geopolitical environment and its own capabilities to adapt to the characteristics of the modern battlefield.

The air force actively participates in achieving the main objective of the national strategy and through their own doctrines and their action means from strategic to tactical level support the art of organizing and conducting combat and participate decisively in providing the security climate at both national and regional and global ones.

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THE IMPORTANCE OF GOODS AND SERVICES REQUISITION PROCESS IN THE PUBLIC INTEREST

Marius MILANDRU

"Nicolae Bălcescu" Land Forces Academy of Sibiu (mnmilandru@yahoo.com)

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Abstract: *Preparing the national economy and territory for defence is an important component in ensuring national security and, in the current geopolitical and military context, it is carried out in peacetime and involves the capitalization of human, material and financial resources in order to ensure the continuity of socio-economic processes and to satisfy the need for defence resources when a state of mobilisation or war is established. Thus, defence forces must be have a full range of resources at their disposal, depending on their specific needs, so that when a crisis, threat or aggression against the state arises, they should be able to carry out their specific missions.*

Based on the need to make resources available to national defence institutions in extreme situations that endanger the integrity or proper functioning of the State, one of the ways of ensuring the provision of resources is the requisition of goods and services in the public interest.

Key words*: security, defence, territory, economy, resources, requisitions****.***

1. INTRODUCTION

In the current international and regional security environment, the emergence of classic conflicts consisting of armed attacks is less likely to materialise in Romania. Therefore, new hybrid threats will create increasingly difficult problems, which are difficult to identify and counter.

Preparing the national economy and territory for defence is a very important aspect of ensuring Romania's security and defence. There will never be enough resources to implement a comprehensive defence and security concept, regardless of the economic capacity of the Romanian state.

These statements are not intended to develop or support a pessimistic view of national security and defence, in the sense that there will never be sufficient resources to fully implement such a concept.

The current economic realities, in which the major economic operators may be multinational corporations, holdings or company conglomerates, which hold an overwhelming percentage of the national production of goods and services, lead to the idea that placing them at the disposal of a state in an extreme situation, such as general or partial mobilisation, state of emergency, or disaster intervention, is a sensitive situation that requires a careful approach, i.e. an extremely detailed and realistic legislation drawn by the institutions responsible for preparing the economy and territory for defence.

The Romanian state must develop as a European and Euro-Atlantic state and increase its efforts to modernise the military systems designed to carry out collective defence actions, without minimising the role of the military reserve and mobilisation entities/structures.

Thus, a very important aspect is the need to accelerate the process of revitalising the national defence economy in all branches and areas of activity that are intended for defence production.

These elements, to which others could certainly be added, support the assertion that planning the requisition of goods and the provision of services in the public interest are complex processes, which are always timely, in terms of aligning the national legislation with the social, economic and military realities that are manifesting themselves at national, regional, European, and global level.

The economic potential for defence must be understood and achieved in peacetime, by being legislated in line with the economic environment, so as to ensure the country's defence needs meet the standards required by the national military strategy.

2. GENERAL NOTIONS REGARDING THE REQUISITON OF GOODS AND SERVICES

The National Defence comprises *"the set of measures and activities adopted and carried out by the Romanian state in order to guarantee national sovereignty, independence and unity of the state, territorial integrity of the country and constitutional democracy"* [1].

This definition states that national defence is based on respect for the provisions of the Romanian Constitution, on the principles of the military doctrine of the Romanian state and, of course, on the provisions of the treaties to which Romania has acceded.

Experts in the field consider that national defence is the way to ensure the existence of the Romanian state, and in the event that the forces intended for defence, which are organised in accordance with the principle of defensive sufficiency, are exceeded in scale by the force of aggression, it will lead to the commitment of all human and material resources that can be made available to the responsible national authorities.

Ensuring the full range of capabilities for a military structure is the fundamental objective in achieving its combat capability, and at the same time the stage without which it cannot be able to successfully perform the missions and tasks for which it whas been designed.

Against this backdrop, we can argue that a military structure is able to carry out a mission when it has the human resources at its disposal, in accordance with the state of organisation, when it has the equipment provided at the level of all classes of material and when it has undergone a training programme tailored so as to ensure an appropriate level of operationalization.

On this basis, the military organisation must identify the sources of entry for resources, in particular for the military equipment and technique provided for in the states of organisation, in accordance with the rules of endowment of the equipment which may be subject to requisition.

In order to defend and preserve the fundamental values guaranteed by the Constitution, the Romanian State has the obligation to achieve, from an economic and military point of view, a defence potential that guarantees the deterrence of any aggression against the rule of law and the constitutional order.

In order to accomplish this defence potential under current conditions and standards, it is necessary to develop and allocate economic and financial resources that are proportionate with the defence needs.

The result would lead to the development and modernisation of the national defence industry, the preparation of the territory, the economy and the population for defence, and the development of civic spirit and attachment to the country.

We can definitely state that the economic potential has a decisive influence on the national defence capability, but not in isolation, but together with other components, namely human resources, technical-scientific potential, information potential, moral, and operational potential.

In this respect, historical experience convincingly demonstrates the accuracy of the following statement: *"Nothing depends so much on economic conditions as the army. Arming, armament, manpower, organisation, depend primarily on the respective level of production and means of communication. It is not about the free creations of the intellect of brilliant army commanders that have acted in a revolutionary manner, but about the invention of better weapons and the change of the human resource"* [2].

Thus, we can identify two main sources of input into the system that provide the required resources, namely material goods and services:

- through the public procurement system, requirements are met in relation to equipment needs and endowment;
- through requisitions, in exceptional situations.

According to the legal provisions, *"the requisition of goods and services is an exceptional measure whereby the public authorities empowered by law force economic operators, public institutions, and other legal and natural persons to temporarily transfer movable or immovable property, in accordance with the law"* [3].

The requisition process is exceptional in nature and is implemented in the event of the imminence or occurrence of a situation likely to seriously affect national security.

This measure must be seen as certifying that all the necessary resources are directed towards ensuring the maximum defence capability of the armed forces and other institutions responsible for national defence.

The requisitioned resources are allocated to the forces carrying out national security missions or to the various authorities responsible for national security in the event of the declaration of partial/full mobilisation or of a state of war, as well as when a state of siege or emergency is declared.

This process, i.e. the requisitioning of material goods and summoning natural persons for the provision of services, falls within the competence of the following institutions:

- the President of Romania, through the declaration decree issued for the situation of partial or total mobilisation;
- the President of Romania, by decree of declaration issued in the event of a state of war;
- the President of Romania, by decree of establishment, in the event of a state of siege or state of emergency;
- the Romanian Government by decree or the prefects, by order, in the case of prevention, location and removal of the consequences of disasters.

The central authority vested by law with specific powers for the execution of requisitions is the Central Requisition Commission, which is directly subordinate to the Romanian Government.

The composition of the Central Commission covers the entire spectrum of areas that are relevant to the activity of requisitioning and provision of services in the public interest and, through its organisational structure, provides the level of competence required to adopt decisions of the magnitude of those referred to.

The adoption of this legislative solution was intended to involve the highest level of state authorities and thus create the necessary framework for taking decisions based on knowledge of the real possibilities existing at a given time in the sphere of procurement and provision of services in the public interest.

The Central Commission also has the legal power to determine the prices of the main consumables required for the process of estimating the funds used to pay compensation, on the basis of proposals made by the Joint Requisitioning Commissions, concerning the limits of these prices.

Joint requisition commissions are set up at the level of each county/municipality:

- the prefect of the county or of the municipality of Bucharest, who also acts as chairman;
- the commander of the county/zonal military centre, respectively the commanders of the military centres of the sectors of the municipality of Bucharest;
- the representative of the Air Force Staff/Naval Force Staff, as appropriate;
- the representative of the County Gendarmerie Inspectorate or the General Directorate of Gendarmerie of the Municipality of Bucharest;
- the representative of the county police inspectorate or of the General Directorate of Police of Bucharest;
- the head of the legal department of the prefecture;
- the representative of the Regional General Directorate of Public Finance as a specialist in prices and valuations of goods;
- the head of the territorial structure for special issues and territorial preparation for defence;
- the director of the county or municipal trade register office;
- the representative of the territorial structure for emergency situations.

In the case of the joint procurement committees, the aim was to adopt an organisational structure that was as complex as possible, providing the appropriate organisational framework for adopting decisions based on high-level expertise in the areas of responsibility of its members.

At the same time, the legislative framework provides the possibility for other representatives of the public institutions involved in the requisition process to participate in the work of the Joint Committee as guests.

It is important to mention that the requisitioning process is very complex and can only be triggered with the approval of the highest-ranking institutions of the state, institutions which have, through their own or subordinate administrative apparatus, all the data and information necessary to support the preparation of the economy and territory for defence.

These institutions are empowered with legal rights to initiate, conduct and verify the requisitioning process through their subordinate authorities, also due to the fact that requisitioning disposes of goods and services that are in property, a form that is guaranteed by the Romanian Constitution as intangible.

In this case, it should be noted that the legislator has clarified that the owners of requisitioned goods are entitled to compensation, regardless of whether they are natural or legal persons.

According to the competences that fall to them in their area of responsibility, whether in peacetime or wartime, the central/local public administration authorities have the following duties:

- to ensure that economic operators, public institutions and individuals comply with the provisions and measures related to the preparation of the population, the economy and the territory for defence;
- to implement the necessary measures to carry out requisitions and calls for service;
- to follow up and intervene to satisfy the requests submitted by the military units within their territory for mobilisation needs.

The main goods that may be subject to requisitioning are mentioned in the national legislation, of which the following are considered important:

- motor, rail, air and sea transport and animal-drawn vehicles;
- port facilities and berths;
- power supplies of various types;
- computer technology and peripheral equipment;
- communications and telecommunications systems;
- airfield systems, installations and technology;
- buildings and land;
- surveying, printing and audiovisual technology and equipment;
- building and railway equipment and materials.

Regarding the provision of services in the public interest, we specify that those persons aged between 16-60 years - men and 16-55 years - women and who also meet the condition of being fit for work can be called.

In view of the importance of the experience acquired during a career in the exercise of the profession and the specific nature of the work performed, exceptions to this rule have been provided for in the current legislative framework – in the case of doctors, nurses, pharmacists, engineers, economists, etc.

At the same time, the relevant legislative framework also provides for a number of other facilities for staff called upon to provide services in the public interest, such as the settlement of transport, accommodation and food expenses, where the person called upon is domiciled in a place other than that of the person receiving the service, who is responsible for this settlement.

3. THE IMPORTANCE OF GOODS AND SERVICES REQUSITIONING IN THE PUBLIC INTEREST

In the case of an exceptional situation, such as the transition from a state of peace to a state of war, it can be said that requisitioning comprises a complex set of activities that are established during peacetime and whose purpose is to bring military structures, regardless of their hierarchical rank, to a level of organisation, staffing and equipment that, after the operationalisation period, will enable them to fulfil their mission, with the combat power configured to the maximum potential.

This transition period, even if not permanent, is influenced by a series of factors which determine the time and action interval, which differs according to:

- whether or not there is a period of tension preceding the change in the state of the structure;
- the level of preparedness and organisational capacity of the peace component of the military structure;
- the level of staffing, technique, military equipment and material of the military structures during peacetime;
- the provision of war stocks and resources entering the system through requisitions.

Currently, according to national legislation, the transition of the components of the national defence system from peacetime to wartime can be achieved, depending on the situation, directly through mobilisation or by going through certain steps, stages and states, with a certain timeframe. In the case of mobilisation, the most complex state is full mobilisation.

In the current military context of the Romanian military, namely as a member state of the North Atlantic Treaty Organisation, the most powerful global military alliance, the possibility that total mobilisation be decreed directly is quite unlikely.

However, we do not believe that it would be appropriate to eliminate this situation, if only for the simple reason that a strategic-level surprise can be achieved with the help of long-range strike systems with particularly high destructive power, which some potential enemy armies possess.

This view is also supported by the argument that states with medium-level economic power and a peacekeeping structure that is not very well developed in terms of numbers and equipment in relation to potential adversaries can make direct use of the concept of mobilisation using all the resources at their disposal.

Against this backdrop, we believe that the force architecture that can be created or developed and the level of military equipment can be adjusted to command level military structures, large units and combat, combat support or logistical support units.

At the same time, it is essential to ensure the necessary dynamics of the national economy to fully complement all the resources needed to adapt the level of response to the level of aggression.

In concrete terms, full mobilisation is declared in situations where there is a certainty of the outbreak of armed conflict in the short term and consists of the transition of all structures of the national defence system to a state of war, including the implementation of the plan for the mobilisation of the national economy.

In virtue of its complex nature, such a situation is determined and conditioned by a very wide spectrum of factors, one of which is maintaining the viability of the logistics of mobilisation.

A very important aspect is to ensure the viability of the logistical component of the mobilisation, particularly in the event of a declaration of full mobilisation, and it is therefore necessary to go through an organisational and planning process which will include the following stages:

a) determining the quantities of human, material and financial resources required by the structures to be mobilised, on the basis of the requests submitted. At this stage, which takes place in peacetime, the centre of gravity is located in the area of responsibility of the recipient military structure, which is required to identify the exact resources needed to achieve full combat capability, at the end of the operational training phase.

The requisition of goods and services also facilitates the provision of material goods and services. The management of military structures, regardless of echelon, but tasked with mobilising organic units, must know and correctly determine the requirements that can be met by requisitioning goods or services.

The personnel responsible for the preparation and hierarchical transmission of requests are obliged to know the legal basis in force, the resources that can be provided by requisitioning, the tasks and competences of the various institutions that are empowered by law to operate in this area of responsibility, as well as the algorithm to be followed in order to provide the necessary resources.

It is useful to be aware that incorrectly calculated requirements or requirements that are attributed to a source other than that provided for in the regulatory framework in force may generate dysfunctions that can affect the overall mobilisation process of a structure.

b) identifying the sources that have the capacity to provide resources, whatever their nature.

At this stage, we consider that the major, if not the exclusive responsibility, which is also legislated, belongs to the national entities whose main task is to identify and allocate resources that can be allocated through requisitions of goods and services to be provided through the public interest process.

In order to analyse the relationship between total mobilisation and the requisitioning of goods, it is necessary to focus on the prioritisation of resources that can be provided through this process.

Given that total mobilisation involves all the state institutions responsible for ensuring national security, and that resources are of primary importance, we believe that it is very important to coordinate the resources that can be provided through requisitions with those entities that are on the main axis of effort in fighting the aggressor.

This distinct and punctual allocation of goods and services cannot be carried out in good time if the real resources and capabilities that can be made available in the event of total mobilisation, and in particular, those that be provided through the requisitioning process, are not known during peacetime.

c) Correlation of all categories of resources required when declaring mobilisation.

Interdependence is a characteristic that can be associated with systems with a high degree of complexity within them, as well as with components that are interconnected within such a large whole.

We believe that it is necessary to look at the provision of resources through requisitioning or provision of services from a systemic point of view of the whole process and to accept the idea that a positive outcome of a military action cannot be expected unless all necessary and existing resources are made available.

Such a complex system is the logistics of mobilisation, which involves a multitude of interdependencies, particularly in the case of total mobilisation, and can only be considered effective if it is managed according to modern principles.

Mobilisation logistics management is an integral part of mobilisation management, which includes the measures carried out by the leaders both in peacetime and during mobilisation, in order to constantly coordinate the activities of drawing up, updating and adapting logistics documents, with the aim of providing military structures with integrated technique, equipment and material.

Based on these considerations, we present the main activities, measures and responsibilities that underlie the act of command and control by the personnel responsible for the requisitioning process, as follows:

- specialist training of the logistical structures and microstructures providing resources for mobilisation;
- permanent knowledge of the contents of the *Mobilisation Plan* with regard to mobilisation logistics, the identification of possible malfunctions and their timely correction;
- informing the commander within the set deadlines of the status of logistical activities, including the requisitioning of goods and services for the situation of full or partial mobilisation;
- accurately determining and informing subordinate staff of the measures and activities specific to mobilisation logistics;
- permanent cooperation with public administration institutions on the issue of taking over the resources requested through requisitions.

In the case of the structures of the Ministry of National Defence, the responsibility for drawing up, centralising, reporting, and regularly updating requisition requests or requests for the provision of services lies with the logistics department, which, in cooperation with the other microstructures of the General Staff, carries out the following activities during peacetime:

- determines requisitioning requirements for goods and services;
- prepares, centralises, and submits requisition and service requests;
- implements the decisions of the Joint Requisitioning Committees;
- allocates goods to be requisitioned.

In order to determine requisition requirements, the offices/departments in the logistics branch draw up the calculation bases for both their own entities and for the mobilisation tasks.

In order to carry out the mobilisation, the unit/major unit, through the responsible microstructure, requests through the county/area military centre the following:

- provision of transport services;
- requisition of buildings for the deployment of forces in the locality during peacetime and in the mobilisation district;

- requisitioning the land necessary for the execution of the training programme for the achievement of full combat capability;
- requisitioning / provision of services for the feeding the troops.

At present, at the level of the responsible structures, the recording and centralisation of the resources required for exceptional situations is carried out by filling in various standard documents provided for by specific regulations, on the basis of operational or working procedures.

Since these aspects are outdated from an operational and technical point of view, it is necessary to implement an IT application that integrates all national institutions and authorities involved in the process of providing resources through the requisitioning process, while respecting the principles of prioritisation on need-to-know bases.

Such an application facilitates knowing in real time the needs and the degree of assurance of resources from external sources, through requisition. Moreover, in case deficiencies are found, the necessary corrective measures can be ordered in a much shorter time.

4. CONCLUSIONS

Due to the fact that the process of requisitioning goods and services is carried out only in exceptional situations, it is very important that all the institutions in charge act in an integrated and timely manner, so that no deficiencies occur during the implementation of specific documents.

This is only possible as a result of a very good knowledge by the management of the institutions involved of the legislation, processes, timetable of activities, and actions to be carried out.

In the goods and services requisition process, institutions from several areas of society, such as economic, military, social, administrative, etc., are all part of a legislative framework. It is imperative that there be effective cooperation, a balanced and proactive approach on all parts; otherwise, the requisitioning process will be slow and dysfunctional, which in a real situation can lead to vulnerabilities to national security and safety.

The continuous improvement of legislation in this field is another aspect that should be mentioned here, as the economic, political and geo-strategic situation at regional and European level requires new performance standards for ensuring state or European security.

Thus, in the case of the requisitioning of goods and services, it is also necessary for those involved, each at their own decision-making level, to provide modern, applicable and effective legislative benchmarks that provide the military organisation with the solutions needed to achieve maximum combat capability in the shortest possible time, right after the declaration of an exceptional situation.

5. AKNOWLEDGMENT

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THE INFLUENCE OF NATIONAL SUPPORT CONDITIONS ON MULTINATIONAL INTERRELATIONATION AND INTEROPERABILITY IN NATO COALITION

Cătălin-Alin MORARU

"Henri Coandă" Air Force Academy, Braşov, Romania (moraru.catalin98@yahoo.com)

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Abstract: *National cultural differences have created obstacles to successful alliance command and control. Distributed decision-making with many operational characteristics makes those challenges even more complicated. If we have to work effectively in coalition operations, we must understand the complexity of national cultural differences.*

Keywords: *operations, interoperability, command and control, NATO*

1. A BRIEF LOOK INTO A NATO OPERATION

Operation Sea Shield represents NATO's contribution to the international effort to combat piracy off the coast of Somalia and the Horn of Africa. Somali pirates were put on the global security agenda in late 2008. More than 100 merchant ships have been attacked this year, and many have been hijacked and redeemed. For NATO and other international actors, this wave of maritime crime is seen as a threat to international peace and security because of its clear and likely implications for supply chain security, energy security, pirate-terrorist collusion, and more. Since 2007, Somali pirates operating in the waters of the Horn of Africa have attacked more than 450 ships and taken nearly 2,400 hostages. Some U.S.-flagged ships were affected. As Somalia lacks an effective government to suppress piracy in its waters, the National Security Council (NSC) in December 2008 developed the Interagency to Combat Piracy in the Horn of Africa: Partnerships and Action Plan. And work with international and industry partners to prosecute piracy in the Horn of Africa.

The operation was approved by the North Atlantic Council on August 17, 2009, as an evolution of the previous Allied Protector Operation (March to August 2009), and its purpose is to promote the safety of commercial sea routes and international navigation. In the area and help reduce the overall success rate of pirate attacks. In response to new piracy tactics, NATO has established greater synergy with other initiatives and international organizations, recognizing the continued need for regional capacity building within the scope of means and capabilities, and focusing on its support to maintain acceptable security.

Operation Ocean Shield is run by the NATO Maritime Command headquarters in Northwood, England. All allies contribute directly or indirectly to the mission through NATO's command structure and common funding. The NATO allies provide ships and maritime patrol aircraft to the NATO Permanent Maritime Group and takes turns assigning ships to the Shield of the Seas. On average, at any point in time, three to five NATO ships are part of the Shield of the Seas.

NATO's anti-piracy operations have also been supported by NATO partners. Both Ukraine and New Zealand provided ships and/or patrol aircraft. NATO hopes to welcome other non-NATO partners in the near future. Ocean Shield works closely with other naval forces in the region, including naval forces from the European Union's anti-piracy missions, the United States-led 151 Joint Task Force, and the National Navy. NATO also conducted anti-piracy training with the Japanese and Chinese navies.

By 2012, the number of attacks had suddenly dropped to a five-year low (see Figure 1). Better coordination of naval patrols improved best management practices for merchant ships, increased use of armed guards on board, and political developments in Somalia have all been praised for turning the tide of piracy.

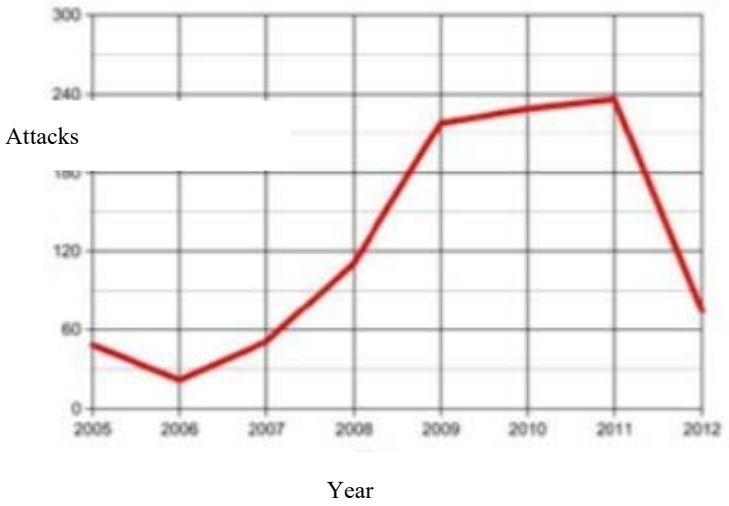

FIG. 1 Somali Pirate Attacks: 2005-2012

Over time, the operation has evolved to respond to new pirate tactics: for example, the March 2012 strategic assessment emphasized the need to weaken pirates' logistics and support bases, including the prohibition of pirate ships or boats, and additional tracking beacon mother ships, and allow the use of force to destroy or destroy ships suspected of pirates or armed robbers. Through "Operation Ocean Shield", the alliance has also expanded its methods of combating piracy, providing assistance within its capacity to requesting regional countries to help them develop their own anti-piracy capabilities. In short, NATO's role is to prevent and stop piracy by providing naval escort and deterrence, through direct actions against piracy, and to strengthen cooperation with other anti-piracy operations in the region to optimize efforts and respond to changing piracy trends and tactics.

2. THE INFLUENCE OF DENMARK NATIONAL SUPORT FOR THE OPERATION OCEAN SHIELD

As part of an international effort, Denmark has contributed to peace and stability in Somalia, which combines political, military, and humanitarian efforts, as well as development policy efforts in Somalia and the entire region. This work is carried out bilaterally and within the framework of the United Nations and the European Union and works closely with the African Union (AU) and the East African Intergovernmental Development Authority (IGAD).

The overall goal of Denmark's anti-piracy activities is to make the waters of the Horn of Africa and the Indian Ocean safe and convenient for Danish and international maritime navigation. For a long time, Denmark has been making great military, political, legal, and financial contributions to the international community to combat piracy along the coast of the Horn of Africa.

With this strategy, Denmark's comprehensive anti-piracy work will be integrated into a single political framework, aimed at enhancing coordination, consistency, and coherence between many aspects of Danish efforts. The strategy considers Denmark's contribution to combating piracy within a time frame that can be extended to the end of 2014.

The Strategy focuses on three objectives:

- Combat piracy.
- Protect Danish and international shipping.
- Building capacity in the region will enable the affected countries to deal with the challenges of piracy in the long term.

Consistent with the widespread international attention it has received, combating piracy in the Western Indian Ocean has quickly become Denmark’s diplomatic and security priority. This section discusses the main driving factors behind Denmark's strong participation. The driving factors are divided into three categories: protecting economic interests, using existing naval capabilities, and promoting multilateralism.

The Danish merchant fleet accounts for 10% of international shipping. Denmark has important economic interests in the global maritime industry, so it quickly realized the urgency of protecting international waters from piracy. An important part of the original Danish engagement story began on June 1, 2007, when the Danish cargo ship MV Danica White was hijacked. This incident stimulated the Danish public's early awareness of the problem of piracy in Somalia. It created a situation in which politicians felt pressure from the historically powerful Danish shipping industry and required them to invest national resources to find a substantive solution to the problem. The Danish maritime industry is very active in communicating to politicians and the public that protecting Danish trade interests is the key reason for military participation in the Horn of Africa.

In terms of resources, any country must prioritize when and where to deploy troops abroad. This is especially true for a small country like Denmark with relatively limited total resources. The Royal Danish Navy also has this view to financial resources, prioritization is limited to technical resources-existing strengths and capabilities. After years of Danish military intervention in Iraq and Afghanistan, the army and air force have played an important role in it. Anti-piracy has provided the navy with an opportunity to demonstrate its expertise. As a naval commander who has been involved in Somali piracy since 2006, said in an interview: “We had the military capabilities that were needed for the mission. Our ships would be able to do this job very successfully, and they really wanted to prove that”.

The final factor in participating in anti-piracy activities is that it is consistent with Denmark’s view as an active member of the international community. Although Danish anti-piracy participation was first seen as a necessary means to protect maritime transport, it was also seen as an opportunity to support the internationalist agenda, especially on the UN track. The fight against Somali piracy has a clear United Nations mandate.

From the very beginning, it was an international alliance composed of a very wide range of voluntary countries and international organizations, including key security and political alliances such as NATO and the European Union.

A team of about 20 Royal Danish Air Force officers and men operate a CL-604 Challenger aircraft at an airfield in the Seychelles. The aircraft is equipped to conduct maritime surveillance operations and is often used by the Danes to monitor fishing areas near Greenland and monitor environmental pollution.

The crew flew along the coast of Somalia, verifying shipping activity, distinguishing between legitimate maritime traffic and suspected pirate ships, and in particular identifying possible piracy off the coast of Somalia.

Major Bjorn Moller, commander of the contingent, said: "NATO has been focusing on the Somali coast this time, and so far, no piracy has been detected. Although the crews were used to conduct similar operations in Denmark, But it's another thing to be part of a coalition to protect the shipping industry, especially the men and women who work on ships in Somali waters."

As a member of the NATO alliance, Denmark uses this capability to support international efforts to combat piracy in the Horn of Africa. Denmark has contributed many naval ships and reconnaissance aircraft to NATO efforts at various times since the early days of Operation Sea Shield. Denmark's efforts are part of a larger cooperative response that includes NATO members and partners from across the region. These missions are directed from Allied Maritime Command in Northwood, England.

On November 19, a detachment of 20 officers and soldiers of the Royal Danish Air Force took off from the Seychelles for the last time. The flight and the visit of NATO Commander Andreas Vitos marked the end of the sixth deployment of the Royal Danish Air Force Air Challenger CL-604 as part of NATO's Permanent Ocean Shield operation. The Danish contingent was NATO's last counter-piracy mission in the Indian Ocean. During the month-long tour, the unit completed 17 sorties or missions and recorded nearly 90 hours of flight time.

“The work the Danish contingent has done over the years to deter attacks and provide surveillance has been admirable and has helped improve the safety of seafarers in the region. It would have been worse without our presence in the region,” Anders Major Peter said Cade, Commander.

The Danes' main task was to produce an intelligence map of Somalia's coastline, small camps and life patterns in large cities. The detachment covers 1,800 kilometers of coastline, where intelligence experts review and disseminate photo and video files to generate intelligence pictures.

As Operation Sea Shield prepares to end at the end of the year, the detachment shuts down outpost operations. Overall, the Danish Challenger fleet has completed more than 200 flights since 2011, totaling more than 1,100 hours patrolling the Somali coastline and the Indian Ocean.

3. THE INFLUENCE OF UNITED STATES NATIONAL SUPORT FOR THE OPERATION OCEAN SHIELD

More Somali Pirate Attacks Near the Horn of Africa More than 450 ships and nearly 2,400 hostages have been hijacked since 2007. The number of U.S.-flagged ships and ships is already pretentious among them. As Somalia lacks a functioning government, it cannot suppress piracy in its waters, so the National Security Council (NSC) in December 2008 developed an Inter-Agency Campaign to Combat Piracy in the Horn of Africa: Partnership and Action Plan, to prevent, cooperate in the fight against piracy in the Horn of Africa with international and industry partners.

To achieve this goal, the plan outlines three "courses of action" for U.S. policy:

1) Prevent pirate attacks by reducing the vulnerability of the oceans to pirates.
2) To combat piracy in accordance with international law and the rights and responsibilities of coastal and flag states.
3) Ensuring that those who commit piracy do so through advocacy to flag, victim, and coastal states and, where appropriate, that the United States prosecute suspected piracy and hold them accountable for their actions.

The United States has also provided strength and leadership to the Combined Maritime Forces. United Sea Power, an alliance of 25 contributor's countries committed to maritime security operations the area. In January 2009, the Maritime Joint Force was established Joint Task Force 151, a multinational naval task force, and the only mission to carry out anti-piracy operations in the Gulf Aden and the waters off the Somali coast of the Indian Ocean. That the previous role was played by Joint Task Force 150, of which continue to implement anti-terrorism and other maritime security operation since 2001. 11 countries have participated, and several others agree to send ships or aircrafts, or both participate in Joint Task Force 151. In addition, the United States has also contributed assets to the North Atlantic Treaty Organization's anti-piracy efforts since its establishment inception. Its current effort, Operation Ocean Shield, focuses on anti-piracy operations at sea and provide assistance to the region countries develop their own anti-piracy capabilities activity. In addition, as part of the maritime joint force, The United States is also cooperating with the European Union, and the European Union conducts anti-piracy operations and ships escorting the World Food Program Provide humanitarian assistance to countries in the region, and independent deployers who are not part of the Escort Ship Alliance and patrol area waters.

The 2005 U.S. National Maritime Security Strategy declared that the United States has an important national interest in maritime security. The strategy recognizes that countries have a shared interest in promoting the economic security of a vibrant maritime trade and preventing maritime-related terrorist, hostile, criminal and dangerous acts, including piracy. A national maritime security strategy also requires comprehensive and complete national and international coordination, cooperation, and sharing of intelligence information between public and private entities to protect and ensure maritime security. The 2007 Policy Against Piracy and Other Violent Crimes at Sea states that it is U.S. policy to "continue to lead and support" international efforts to combat piracy, and urges other nations to act decisively, individually and through international efforts. "

But the attack success rate is still a percentage of the total the reported attack resulted in boarding or hijacking, it dropped from about 40% in 2008 to 22% in 2009. And international officials interpret this as a sign of effort shipping industry, government, and international navy Patrols to prevent or sabotage attacks are on the condition. In addition, in the first six months of 2010, the report stated the total number of attacks dropped from 149 to about 100 Attacks in the first half of 2009. However, other data shows Piracy is still a long-standing problem.

U.S. Navy and Coast Guard has made substantial progress, contributed assets and leadership Coalition forces patrolled the Gulf of Aden and the Indian Ocean. According to defense officials, there are usually more than 30 ships from Union, European Union, North Atlantic Treaty Organization, and independent forces patrol the area at any time, The United States contributes 4 to 5 ships per day on average. In addition, according to the action plan, the U.S. military has Respond and successfully prevented the pirate attack. E.g, In April 2009, the US military successfully executed the hostages.

What happened when the pirates attacked the American flag MV Maersk Alabama and kidnapped the captain of the ship? U.S. Army Intervened after killing everyone but one of them and released the captain Pirates conducting attacks.

In April 2009, pirates hijacked MV Maersk Alabama and attacked MV Liberty Sun. The U.S.-flagged and crewed cargo ship was contracted by the World Food Program to deliver aid from AID to the southeastern coast of Somalia. On April 8, 2009, Somali pirates seized the US-flagged merchant vessel MV Maersk Alabama about 250 nautical miles southeast of the Somali town of Eyl. The Maersk Alabama has delivered food aid to the port of Djibouti and is on its way to the port of Mombasa in Kenya. It was hijacked by Somali pirates. After the ship was seized, a crew of 20 U.S. citizens chased after their Somali captives and tried unsuccessfully to rescue the captain and Vermont resident Richard Phillips, according to media reports.

In response, the U.S. Navy dispatched the U.S. Navy. Bainbridge, Arleigh Burke-class destroyers, and reconnaissance planes traveled to the area to monitor the small boat holding Captain Phillips. FBI personnel worked with Navy personnel to negotiate the release of the hostages. On April 11, after it was officially determined that Phillips' life was in danger, U.S. Special Forces launched a successful rescue operation under the authority of President Obama. Three pirates were killed by snipers during a rescue operation in the United States.

As international coordination of counter-piracy efforts at sea and in the region has improved in recent months, U.S. civilian and military officials have continued to stress the importance and difficulty of finding a solution to the instability off the coast of Somalia. The UN Security Council has committed $72 million to AMISOM. The United States has provided AMISOM with more than $135 million worth of training, logistical support and assistance over the past two years.

The US government provides small arms and ammunition to Transitional Federal Government (TFG) security forces through AMISOM partners, as well as funds to purchase weapons. According to U.S. officials, the United States has trained Transitional Federal Government security personnel and provided the Transitional Federal Government with funds to purchase weapons and ammunition. In mid-2009, the Government arranged for an "emergency" delivery of some 40 tons of small arms and ammunition to Transitional Federal Government forces in response to increasing enemy attacks. As of June 2009, U.S. officials said the total value of the program was less than $10 million.

4. THE DIFFERENCE BETWEEN DENMARK AND U.S. IN THE OPERATION OCEAN SHIELD

The implications of the two states, Denmark, and the U.S., took place during the entire 2009-2016 mission, each coming with its maritime contribution and not only that. The last attack was carried out by the Danish troops on 19.11.2016. During the period Denmark and the U.S. contributed to Operation Ocean Shield with the following ships:

Both the U.S. and Denmark had the common goal of bringing peace and stability to Somalia through political, military and humanitarian efforts.

The main reason why Denmark joined anti-piracy initiatives was the safety of Danish ships crossing the Indian Ocean as well as for international traffic. It also reflects the fact that Denmark-a small country with a large merchant fleet-is very interested in maintaining the safety of international sea lanes and is capable of making a meaningful contribution to this task.

It is well known that America is part of the three great military powers in the world, along with China and Russia.

Tabel1. Participating forces

Year	United States	Denmark
2009	USS Donald Cook USS Boone	HDMS Absalon
2010	USS Cole USS Cole USS Kauffman USS Laboon	HDMS Esbern Snare
2011	USS Laboon USS De Wert USS Carney USS Carl Vinson USS Bunker Hill USS Enterprise	HDMS Esbern Snare
2012	USS Carney USS Dewert USS Taylor	HDMS Absalon HDMS IverHuitfeldt
2013	USS Nicholas USS Halyburton USS De Wert USS Taylor	HDMS EsbernSnare
2014		HDMS EsbernSnare
2015		HDMS Absalon
2016		DNK MPA P520/P524

The maritime, air, political, strategic support of the U.S. as well as the implications in alliances to combat piracy are incomparable to the support brought by Denmark, for the simple reason that the U.S. is much better prepared and equipped with armaments. America has made an important contribution of weapons to equip and defend the military. Denmark was involved in helping the surrounding countries with food and humanitarian support, the U.S. as far as we know was not involved in such special operations but provided support where needed.

Denmark became involved in the operation in Somalia because of the negative effect that piracy had on the country's economy, because of the imports and exports that were affected because pirates attacked ships that were cracking along the Indian Ocean carrying goods.

One of the common reasons for the U.S. and Denmark is the promotion of multilateralism. Denmark wanted to defend her economy still had another purpose, which was to protect the economy of the countries with which they related. The U.S. has still offered its involvement to protect the economies of NATO countries. Thus, both countries support both the personal interests and the interests of NATO countries. The U.S. has been involved in many tactics and alliances against piracy in Somalia through strategic and political support. Both the U.S. and Denmark protected NATO's interests throughout the mission and emerged as member countries. Both countries were attacked during the operation by pirates and suffered human losses.

5. CONCLUSION

Pirates have always existed since humans traveled to sea. In the past decade, piracy off the coast of Somalia has posed a serious threat to Danish and American shipping and the safety of seafarers.

Although eradicating piracy may never happen, minimizing piracy and reducing its impact remains an important priority for the United States and Denmark. This includes not only Somali piracy, but also other forms of maritime crime, such as drug smuggling in the Indian Ocean and human trafficking in the Mediterranean. In order to minimize and mitigate the impact of maritime crime, there is no one-size-fits-all option. The legal framework, political conditions, and operational possibilities for specific areas of (cooperation) piracy and other maritime crimes vary.

Since the end of the NATO Ocean Shield operation, two ships have been hijacked within two weeks, close to the coast of Somalia-a development that has raised questions about the success of the mission. The mission is part of a highly successful coordinated international response to the threat of pirates off the coast of Somalia, which caused US$7 billion in economic losses and many casualties at its peak, but it seems that the war against piracy in the region is far from over. The mission was praised as a success and helped to significantly reduce the number of accidents in the area. Between May 2012 and the end of the operation in December 2016, no merchant ships were captured in the area.

As a member of the NATO alliance, Denmark uses this capability to support the international community's fight against piracy in the Horn of Africa. From the early days of Operation Sea Shield, Denmark has contributed a number of naval ships and reconnaissance aircraft to NATO efforts at various times. Denmark's efforts are part of a larger cooperative response that includes NATO members and partners from across the region.

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RESEARCH ON THE MAINTENANCE OF AIR SURVEILLANCE SYSTEMS MANAGEMENT IN THE CONTEXT OF TECHNOLOGICAL DEVELOPMENT INDUSTRY 4.0

Liviu GĂINĂ, Mihai-Alin MECLEA, Mircea BOȘCOIANU

”Transilvania” University of Brașov, Romania (liviu.gaina @unitbv.ro, mihai.meclea@unitbv.ro, boscoianu.mircea@yahoo.com)

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***Abstract**: Air surveillance systems (especially radars) have evolved by virtue of technological progress. In order to benefit from Industry 4.0 features, systems and their maintenance management need to be reconsidered, reinterpreted and updated. The article wants to highlight on the one hand the current status of the approach to the topic of maintenance of air surveillance systems management and on the other hand the need to implement the Industry 4.0 concept to increase efficiency and keep systems operational.*

***Keywords**: air surveillance systems, maintenance management, Industry 4.0, radars, self-maintenance, digital transformation*

1. INTRODUCTION

Air surveillance systems, in all forms in which they are designed, built and optimized, are special electronic equipment in the defense system which, when efficiently operated, is the primary source of information on in-flight aerial platforms. Target detection and location, as well as their identification, is the main goal. This would be almost impossible without proper maintenance to maintain the operating systems 24/7, as any disruption could cause security breaches in your own airspace, a vulnerability that can be exploited badly.

2. SCIENTIFIC BACKGROUND

Specialized articles that dealt with the issue of the evolution of the maintenance of systems used in industry together with the development of communication and information technologies have had an increasing trend (Fig.1.).

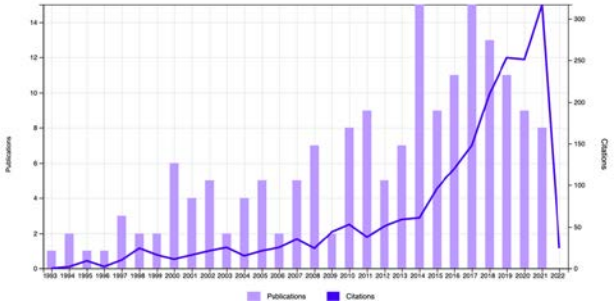

FIG.1 Trend of interest about evolution of the maintenance management

Concepts used in the past, such as corrective, preventive, electronic maintenance, and intelligent maintenance systems [1], were later developed by Industry 4.0 and related key technologies (IoT - Internet of Things, physical cyber systems, etc.). Currently, the attention of the scientific literature is focused on items such as condition-based maintenance and PHM (Prognostics and health management) [2], [3], [4], [5]. Even under these conditions, in the existing literature we have identified a lack of understanding of what it means to achieve digitized production for maintenance organizations along the hard (technical) and soft (social) dimensions [6], [7].

3. IDENTIFYING AND HIGHLIGHTING THE NEED TO TREAT / RESEARCH THE SUBJECT

Following the research of the bibliographic resources found in Web of Science [8] and the interpretation of the results with the WOSviewer software [9]. Using the keywords “air surveillance”, “management”, “maintenance” we identified the fact that the proposed topic is not adequately treated in the scientific literature. Based on the research carried out in the scientific literature, we highlight in fig.2. The links between the most used concepts of air surveillance and maintenance. The lack of the Industry 4.0 concept draws our attention. On the other hand in fig.3. We tried to associate Industry 4.0 with the topic of maintenance in air surveillance, the last term not being found in the search list.

It is obvious that the air surveillance systems are special, dedicated systems that require special maintenance both hardware, software and training of the human factor that operates and maintains it. Implementing the Industry 4.0 concept at the level of air surveillance systems is a challenge as stability and 24/7 operation are the major goals.

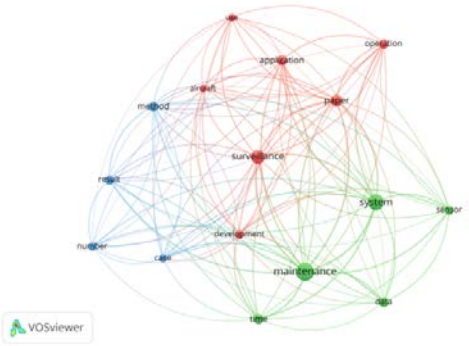

FIG.2 Links between elements of interest

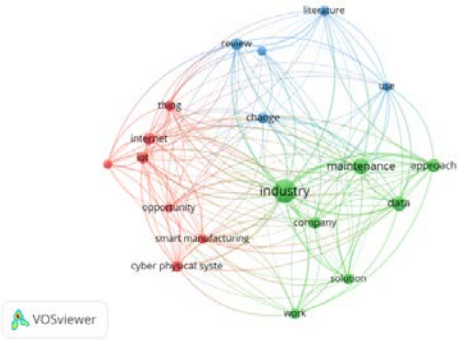

FIG.3 Industry 4.0 – maintenance connection

4. EVOLUTION OF AIR SURVEILLANCE SYSTEMS ARCHITECTURE

It is easy to understand that in order to deal with the topic of maintenance of air surveillance systems, it is extremely important to understand the evolution of its architecture. The first air surveillance systems with significant technological advances that proved to be effective were used during World War II to defend England [10] from German air raids. We identify in the past in step with the evolution of technology at that time, analogical radars that used high emission powers, with high consumption of resources, whose protection against interference was limited. Also, the data links were non-automated, the data transmission being made by telephone connections with significant delays from the observation point to the decision-making point. Technological evolution has also left its mark on air surveillance systems, so that digital and digital analogical radars are currently in operation that perform signal processing using powerful processors.

The latter using the characteristics of phased antenna systems have the advantage of using low power, high sensitivity receivers. These systems benefit from jamming protection - RF bandwidth modes, networking (automated data links/ transmissions) and secondary radar features with IFF. The future is expected to be great for air surveillance systems, using the benefits of networking multiple sensors and using AI to identify threats and make decisions about targeting cognitive radar.

5. MAINTENANCE OF INDUSTRIAL SYSTEMS, INDUSTRIAL REVOLUTIONS AND THE EMERGENCE OF INDUSTRY_4.0

The evolution of the maintenance of industrial systems is directly related to the typology of systems architecture. In the past, the equipment was robust, with few checkpoints, excessive maintenance, expensive mainly corrective. Currently, multiple sensors (stroke, vibration, lubrication quality, etc.), system computers equipped with error display software make it possible to perform maintenance especially preventive. For the future, the evolution of maintenance leads to the use of data acquisition, processing and display systems using multiple sensors, contextual, AI, optimization, maintenance focused on reliability so-called predictive maintenance.

Man and society in terms of needs have evolved, the stages being called industrial revolutions [11]. These were classified as follows:

I - mechanization with the power of water and steam;

II - mass production, with the help of electrically operated conveyor belts;

III - the digital with the use of electronic and IT products to automate production;

"4.0" - Software (Programs), which are usually called a new version in major changes, the first digit of the version number is incremented by one and at the same time the second digit starts from zero. The basic organizational principles of Industry 4.0 [12] are well known: interconnection, transparency of information, technical assistance, decentralized decisions.

6. IMPLEMENTATION AND EFFECTS OF INDUSTRY 4.0 [13] ON LOGISTICS AND MAINTENANCE OF MODERN RADARS

Logistics in general and maintenance processes in particular, have a huge gain by implementing the organizational principles of Industry 4.0. I bring to your attention a few points related to the optimized organization of logistics elements (storage, maintenance, transport, etc.), the identification of degradation/ wear of system components and those in need of repairs. IoT can automatically report system degradation and generate reports for maintenance needs. Respectively automatic generation of orders for spare parts.

The evolution of technology has brought ease in maintenance processes. Thus in modern radars are used with high performance components and redundant systems that due to miniaturization (solid state technology) are less expensive. We also identify interconnected software components (operation, identification and reporting of out-of-tolerance, mission parameters) [14] and offer the possibility to update. The organization chart distinguishes between team members [15] and outlines clear tasks (software operation/ software intervention of engineers/ maintenance) with the possibility of remote intervention. Staff training using e-learning methods, with the possibility of distance learning using AR [16]. It is obvious that the trends in the use of AI lead to a reduction in downtime.

7. THE VULNERABILITY OF RADARS AND THEIR SECURITY IN THE FACE OF TECHNOLOGICAL CHANGE INDUSTRY 4.0

The integration of air surveillance systems into the network brings with it an exposure to the data and information conveyed and creates security vulnerabilities. In Industry 4.0 via IoT, the challenges are the same, with the possibility of data being transmitted over the network through cyber attacks. This challenge requires securing: the physical communication channels used and the electronic one by encrypting the packets of data carried between the IT systems used.

CONCLUSIONS

In order to benefit from the technological advance, it is important to keep up, to achieve the development with the essential condition of maintaining the stability of the system. To achieve this goal, it is necessary to address the identified challenges: adapting the human factor to technological change, acquiring systems / interfaces that allow the use / integration of current air surveillance systems in the IoT compatible platform for Industry 4.0 and reducing system vulnerability by securing it.

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THE CURRENT STATE OF RESEARCH IN ELECTRONIC SURVEILLANCE SYSTEMS MANAGEMENT; JAMMING AND COUNTER JAMMING

Mihai-Alin MECLEA, Liviu GĂINĂ, Mircea BOȘCOIANU

”Transilvania University”, Brașov, Romania (mihai.meclea@unitbv.ro, liviu.gaina@unitbv.ro, boscoianu.mircea@yahoo.com)

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Abstract: *We all saw an important development of weapons containing electronic devices and systems. Not so many years ago, military specialists were considering that precision will make the difference in combat and that precision must be increased using electronics. First, it was stated that augmenting the explosive charge ten times, will increase the effectiveness of the hit only five times. On the other hand, the precision of weapons systems increased 10 times will increase the effectiveness of the hit 100 times. A single surgical shot will be enough to annihilate the target.*

In the same time, when considering a defensive approach, a very sensitive issue has become the management of electronic surveillance (ES) systems, not only in the military, but also in civilian use. Those ES systems must work properly, at full capacity and in a secured and private environment.

In jamming area, new techniques are developed constantly. We witness the integration of AI (artificial intelligence) in ECM (electronic counter measures) systems and the solution to bring the EW (electronic warfare) payload on UCAVs (unmanned combat aerial vehicle). Also new techniques to counter jamming are emerging.

Keywords: *electronic surveillance, jamming, electronic counter measures*

1. INTRODUCTION

We all acknowledge important developments of weapons containing electronic devices and systems. Not so many years ago, military specialists were considering that precision will make the difference in combat and that precision must be increased using electronics. First, it was stated that augmenting the explosive charge ten times, will increase the effectiveness of the hit only five times. On the other hand, the precision of weapons systems increased 10 times will increase the effectiveness of the hit 100 times. A single surgical shot will be enough to annihilate the target.

In EW (electronic warfare) domain, first you should choose correctly your target and also use a single electronic attack action against it, with one hundred percent efficiency, if possible. This should be done in order to avoid being exposed on your next possible second „shot”, to annihilate or disable the target and accomplish the mission received.

In the same time, when considering a defensive approach, a very sensitive issue has become the management of electronic surveillance (ES) systems, not only in the military, but also in civilian use. Those ES systems must work properly, at full capacity and in a secured and private environment.

We also witness the integration of AI (artificial intelligence) in ECM (electronic counter measures) systems and the solution to bring the EW payload on UCAVs (unmanned combat aerial vehicle).

2. THE MANAGEMENT OF ELECTRONIC SURVEILLANCE SYSTEMS

Very recently, Russian Federation military forces have brought to Kazakhstan, along with other tracked and wheeled light armored vehicles, an electronic warfare system that includes small drones equipped with jammers. The LEER-3 system, which consists of the KAMAZ truck and between two and three specially configured ORLAN-10 drones, is primarily intended to scramble cell phone communications. The truck serves as the ground control center for these small unmanned aircraft, which carry small electronic warfare jammers. ORLAN-10 drones also carry full-motion video cameras and, while their range is relatively limited, could be used to help monitor continued protests and otherwise provide improved situational awareness to military commanders [1].

We see here the use of both electronic surveillance (ES) systems and jamming capabilities in a crisis situation. ES systems are effective in a common Electromagnetic Environment (EME), which is not too complex or too dense and is able to produce a good electromagnetic scenario translated into a very useful EOB (electronic order of battle) for the decision making process.

In the situation described above, jamming capabilities were used to bring advantage or to precisely solve a problem in a small range (the protest area in Almaty, the country's former capital). Usually, this type of action is well hidden and covers large areas in the batlefield or the operation theatre.

The target of the jamming is also different. Those ORLAN-10 drones, a relatively new capability of the russian arsenal, were targeting cell phone communications, which is modern technology, a very powerful weapon nowadays. In the past, the common targets of the jammers were HVT s (high value targets) as command and control centers, strategic communications, information centers, EW systems, surface-based air defence systems or fighter bombers.

But ES systems are very common today also in civilian things. We talk more and more about IoT (Internet of Things), integration of AI (artificial intelligence) in everyday life and smarter and greener means of transportation. Many activities have quickly moved online, forced in some cases by the pandemic started in 2019. We study online, we use the Internet to pay bills or to protect our goods and our gadgets and smart devices ”talk” to us or with each other. In all cases, these devices must be secured and protected in order to make our life easier.

3. JAMMING AND COUNTER JAMMING TECHNIQUES

The jamming can be passive or active. The active jamming is intended against air-borne radar systems, radio networks and directions for fire command and control or HF (high frequency) or UHF (ultra high frequency) communication signals. The active jamming emitters, including those of single use, can be placed or parachuted on the ground, but they are also common on aerial vehicles (piloted or unmanned) and on naval platforms.

In communication jamming area, new techniques are developed constantly. Also new improved techniques to counter jamming are emerging. The weapon-counter weapon concept is again well applied and validated.

The communications have evolved from Morse code to wired telephony and GSM technology to the large scale use of satellites. The amount of information transmitted has grown exponentially against limitation of time needed to search and collection, analysis, processing and dissemination processes. More secured, encrypted and permanent channels are required in order to enhance the C2 (command and control) process and satellite communications bring obvious advantage. These transmissions are not time and weather affected, are hard to be jammed, covers large areas, are quick and quite discreet.

Communication jamming techniques are classified as follows [2]:

- **Noise jamming** is when jamming signal is modulated with a common noise signal. It could be **Broadband Noise** jamming or full band jamming or **Partial-Band Noise** jamming – in this case the noise energy is spread across a number of channels, but not all channels of our target. These channels could be in sequence or apart. The **Narrowband Noise** jamming uses all energy directed on a particular channel. It can affect all width of that channel or just a specific portion carrying data.

- **Pulse jamming**: the signal of jamming consists in a broadband noise for a limited portion of time. For the rest of time that signal is off. It is considered that this type of jamming is more effective than partial-band noise jamming against Direct Sequence Spread Spectrum (DSSS) targets.

- **Tone jamming:** in this case, a single tone or more are placed in the frequency spectrum. The single tone jamming (or spot jamming) is also effective against DSSS targets because it can overcome the processing gains and may cause bad effects at dispreading. Comb jamming uses tones in consecutive channels, gaining more flexibility comparing to spot jamming.

- **Swept jamming** uses a narrowband signal, similar to a tone. But in most cases, this jamming signal is a partial-band noise signal that sweeps in time across the frequency band of the target. This type of jamming is similar to barrage jamming. The difference between those two is that the power of swept jamming signal is focused in each dwell bandwidth. The speed of the sweeping process is also very important because the entire band of the signal jammed must be covered in a very short period of time.

- **Follower jamming**: in this jamming technique, also known as responsive jamming, repeater jamming, and repeat-back jamming, the jammer tries to detect the RF (radio frequency) signal to be damaged and tunes to that frequency. The time is very important here as well, as the jammer must act in limited portions of time related to the propagation and processing sequences of the signal of interest.

- **Adaptive jamming** is also a follower jamming technique used to counter more than one target at the same time. The effects of this type of jamming are similar to those of barrage jamming, but in this case, the energy radiated is more concentrated on specific targets well chosen.

- **Smart jamming,** a relatively new technique, is targeting portions of digital signals in order to deny communications. In many cases, the jamming signal is affecting paging channels, pilot channels or synchronization channels. In order to be successful, the jammer must obtain the Channel State Information (CSI) of the attacked channel.

According to the Allied Joint Doctrine for Cyberspace Operations ,,the Alliance finds itself operating in increasingly interconnected environments, in particular, cyberspace and the information environment (IE)"[3]. The free flow of data and continuous functioning of information networks have become critical for the civil society and for military forces. State or non-state entities seek to exploit vulnerabilities in military and non-military information systems to exfiltrate, corrupt or destroy data or to gain prestige, political or military advantage or profit.

Digital networks and systems, therefore, need to be safeguarded against information denial by disruption, degradation or destruction, and manipulation and exfiltration. In an interconnected world where military success may depend as much on the ability to control one's narrative as the ability to create physical effects, freedom of action in cyberspace may be as important as control over land, air and space, or sea.

In order to counter jamming, two types of actions are taking into consideration: Low Probability of Intercept (LPI) and Low Probability of Detection (LPD) techniques, which are applied when we want to avoid interception and detection, and anti-jamming (AJ) techniques, when maintaining our line of communication is needed, even while jamming is still active.

The LPI/LPD waveform design is chosen to attenuate the RFI (Radio Frequency Interference) problem with minimal distortion when RFI information is available, while providing signal security. When information is unavailable, RFI is detected, notched, and autoregressive filtering applied to recover the target signals.

Usually, some organizational and technical measures are taken to avoid being jammed: use of terrain and clutter shielding, power management, frequent changes of frequency, intermittent use of your systems, use of antennas with nulls or low energy output in the direction of jammers or highly directional ones and spoofing.

One of the most efficient ways is to jump channels. Because communication between two legitimate nodes is done through a specific frequency, the frequency can be changed if necessary. Another solution consists in engaging the jammer on the jammed channel and continuing communication in another clean channel.

4. CONCLUSIONS

The management of electronic surveillance systems has an increasingly important role in a complex information environment. Tendencies in jamming are the introduction of cross-eye jamming, new LPI/LPD techniques or more efficient single use jamming emitter and expandable decoys (chaff and flare). Emerging and innovative technologies are widely intensively integrated in Electronic Warfare.

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CRISIS, OPPORTUNITY FOR CHANGE IN LEADERSHIP

Diana CHIȘ-MANOLACHE

”Carol I” National Defence University, Bucharest, Romania
(dianamanolache88@yahoo.com)

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Abstract*: This article presents some arguments that the periods of crisis, dominated by the unknown, uncertainty and change determine the need to increase the degree of adaptability of the leader. The COVID-19 pandemic highlighted the fact that leaders need two major forces: resilience and adaptability. During this challenging period, leaders had many decisions to make, made plans and acted. With the help of the two characteristics, the leaders were able to make the optimal decisions, both in the short term and in the medium and long term. In order to cope with all the changes specific to the crisis period, leaders need communication skills, flexibility in thinking and an open mind.*

Keywords*: change, leader, adaptability, crisis.*

1. INTRODUCTION

In general, an organization is formed on two levels of structuring: the physical level, which has in common human, material, informational, financial and technological resources, and the symbolic level, which shares its mission and purpose, formal and informal relations, cultural organization. If we consider this approach of the organization, the organizational crisis can be defined as "*an interruption that physically affects the functioning of the entire organizational system and threatens its fundamental principles, identity and rationale*. [1]"

Given this approach, for an organization to enter a crisis, both of the above levels must be affected. In other words, the members of the organization find that the values and principles they have internalized are erroneous or outdated. As a result, the organization can no longer fulfill its mission for which it was built - the production of services or products. The forms in which the organizational crisis manifests are different depending on the causes that generated it. In this regard, the origin of the crisis must be analyzed very rigorously, which can be internal (poor management of resources, relations and communication) or external (any crisis of resources and relations that occurs in the proximity of the organization's interest.

2. HOW IMPORTANT IS LEADERSHIP IN TIMES OF CRISIS?

In times of crisis such as the one generated by the COVID 19 pandemic, organizations are forced to test and exercise their ability to react and adapt, where the leadership skills of managers are fully exploited, which in these times, become vital for the entire organization.

Moreover, for organizations, the crisis generated by the COVID-19 pandemic is at the same time an opportunity to verify the most important values of employees such as: loyalty, involvement, commitment, attachment to the organization and, most off all, trust. Confidence within the team, but also the trust of team members in leaders. And, obviously the opposite, the confidence of the team leaders.

Leadership is a vast field, covering a wide area of subdomains, an aspect that has been discussed a lot in the last decade, being twinned with other sciences or being considered independent, depending on the orientation of the theorist who conceptualizes the term.

However, this concept translated into different values or rather a different hierarchy of priorities before the pandemic broke out. This concept was related above all to the ability to help people go beyond the comfort zone for continuous development and evolution, but also to achieve performance on all levels. On the other hand, in the context of the crisis generated by the current pandemic, it is extremely important to support employees in adapting to the new reality, but also to manage general uncertainty in order to achieve a balance in terms of psyche and morale to each employee.

In the period we are going through, dominated by uncertainties on all levels, leadership and management skills, which can make a difference, are related to the rapid identification of changes that are required, their timely management to minimize the impact of events, negative effects on the organization and implicitly on its members. At a later stage, the ability to communicate objectively and clearly with the team is vital, as is the need to maintain a high level of positivity, to inspire courage in the team, to overcome the crisis we are going through or to appear.

Both leadership and the ability to provide a coherent vision for the organization are all the more necessary and important, as most employees work remotely, a situation with a high degree of novelty and which can create difficulties. It is obvious that this change entails a series of challenges, among which the most demanding are the permanent communication with employees, the way of pursuing and sharing tasks on teams, but also the constant transmission of the situation in which the organization is in.

Moreover, one of the most important challenges offered by the current crisis is to identify the optimal way to keep all colleagues connected and engaged in the company's objectives and mission, without the existence of a face-to-face relationship. If before the members of the organizations talked face to face with their leaders, maybe even with the main leader of the company, which created an atmosphere of safety and trust through the existence of physical closeness, through the team spirit that is created within the organization. In the previous period, this team spirit was strengthened, through informal discussions during breaks or during lunch together, but in the context of the crisis we are going through, all these things are missing. In the absence of all this aspect, one can lose the feeling of belonging to the team, but also to the organizational culture, which can be an extremely important factor in motivating and involving employees.

3. ORGANIZATIONAL COMMUNICATION IN THE CONTEXT OF THE CRISIS

In this complicated period, communication is extremely important. The ability to communicate openly, honestly, without barriers should be an asset for both leaders and employees. Of course, we have to deal with a concise, objective, transparent communication about the factual situation and as optimistic as possible, as much as the general situation of the company allows because both positive and negative exaggerations create an artificial context. which can lead to loss of credibility, and hence loss of loyalty, commitment and employee involvement.

Effective communication as well as mutual listening are elements without which the relationship in the context of the crisis can suffer major imbalances. Effective communication in the context of the crisis means reciprocity, empathy and fusion.

Internal communication is essential in crisis situations because it is able to ensure cohesion and coherence for the organization [2]. These aspects are all the more necessary as today's organizations can be deployed over large geographical areas, with undefined boundaries, with members in different locations and socio-cultural contexts.

In general, internal communication in an organization has the effect, among others, of preventing the occurrence of negative individual or collective feelings such as insecurity, fear, anger, embarrassment.[3] In the context of the crisis, the lack of internal communication and, as a result, the emergence of such emotions are all the more dangerous. The stability of the organization can easily be affected by these elements. If, in routine situations, internal communication is an important necessity, in the context of the crisis, things become extremely important, even vital for the organization.

Internal communication is essential to the success of crisis resolution processes: the most effective support the organization needs can come from employees, former members and their families if they receive timely information and are made aware that it is part of the crisis solution. A common management mistake in resolving crises: although employees are one of the most important audience segments, they are often forgotten; or, worse, management erroneously assumes that they will participate without discussion and that they will do or say whatever is required of them. Instead, the lack of correct, sufficient, timely and fluent information during a crisis dramatically affects people's confidence in their own organization, thus jeopardizing the determination with which they should cooperate in resolving the crisis. [4]

Moreover, the lack of appropriate information can make members of the organization receptive to various rumors and also disseminate unverified information, which is one of the great dangers during crisis situations. One of the fundamental reasons for internal communication is to avoid the discrepancy between the extremely high interest of members eager to find out what is happening and the small amount of information provided by the organization, a discrepancy which inevitably generates rumors. [5]

Indeed, like other audiences relevant to the organization, employees have high expectations from it, but also of its leaders, in crisis situations. The members of an organization in such a situation expect their organization to provide them with protection, to show concern for their fate, to show understanding and sensitivity to their problems. Much of this hope can be met if the organization proves to be communicative, telling them in time what is happening, what will happen next, when these trials will end. Otherwise, if the organization does not communicate, they will do so anyway, using the information they have and the perceptions they have created based on them.[6]

At the same time, it is equally important during a crisis for leaders to show flexibility in thinking in order to succeed on the winding road to success and efficiency. Leaders need an open and flexible mind to explore any type of opportunity and approach, even unconventional. They must be sufficiently enlightened and open-minded to identify the possibilities that may arise beyond the obvious, even in unfavorable contexts. Most of the time, the crisis is an opportunity to reinvent, to adapt to new situations, contexts, people.

The ability to adapt is one within human nature, with the help of which humanity has survived and evolved constantly. So, there is nothing new or unknown. Evolutionist Charles Darwin said, "It is not the strongest or most intelligent species that survives, but the one that best adapts to change." In an ever-changing context, the ability to adapt and reinvent is the only sustainable competitive advantage that an organization can have. Organizations capable of adapting will thrive in uncertainty and chaos.

Companies led by leaders with an adaptable attitude will not complain about failures, they will recognize the situation, learn from mistakes and then continue to move forward.

When we talk about the adaptability of an organization, we automatically make an analogy with a person's flexibility. This is because adaptability or flexibility means being prepared at all stages of your career to adapt to new requirements or new context. These aspects are valid, at a personal level, but leaders have a great responsibility to meet these conditions. The adaptability of leaders influences the adaptability of each team member and, ultimately, dictates the adaptability of the entire organization.

Testing human adaptability and the ability to respond to difficult situations translates into resilience. It is utopian to believe that the activities of organizations have a rectilinear path, or that the environment in which things take place is a controlled one. Our times are becoming more and more uncertain, changes are happening quickly, an aspect that equally influences organizations, organizational cultures, but also people (leaders, but also employees).

Consequently, today's leaders assume that, in the organizational environment, nothing is more constant than change.

4. ASPECTS BY WHICH ORGANIZATIONS CAN BE SUPPORTED DURING CHANGE

However, there are certainly some levers that leaders have at hand to get through this uncertain period. In the following I will present some ways in which organizational leaders support the organization to adapt to change:

4.1 Agility to perceive and respond to signals.

In order to cope with the trend of change and to adapt quickly, organizations need to detect signals from the external environment, decode them, and take steps to adapt or reinvent their own organization. Adaptive organizations need to consider customized systems to make sure they get the right information because there are multiple sources of information, and most organizations have access to them.

4.2 The power to test

There are many elements that cannot be predicted and can often be discovered through experimentation and testing. Out of the desire to develop new products and services, most organizations experiment and test various improved variants of them. However, new approaches are needed in this regard, as the traditional ones are no longer as successful in our days of uncertainty. Therefore, competitors eager to adapt use a complex range of new approaches and technologies, especially in virtual environments, to generate, test and reproduce a greater number of innovative ideas faster, at lower cost and with a higher risk. smaller than their rivals can. *A few years ago, Procter & Gamble developed a Connect + Develop experimental model, using InnoCentive and other open innovation networks to solve technical design problems. [7]*

4.3 Giving up the conservative attitude.

It is difficult for a manager to cope with change and be open to it again if he shows a conservative attitude towards organizational success. For example, when there are clear signals that a product or service is not working, it should no longer be maintained. If an idea is no longer successful, investing in it is no longer justified. The power to give up certain products, services or routines is part of the change.

4.4 Don't be attached to a product in your organization

Failure is part of life and, implicitly, of the life of organizations. To adapt and cope with change you need to be able to easily move from one product to another, from one concept to another. It is vital that you do not become attached to a single product, even if it apparently ensures your success.

4.5 Flexibility in relationships with others.

In the organizational environment, the manager's relations with the team, but also with the people outside it, are extremely important and require large doses of flexibility. Working in an entrepreneurial environment, for example, requires adaptation to the needs of customers, to the needs of the people you interact with, but also to the particularities of the economic environment.

Adaptability is, in fact, a necessary skill for every manager, constituting his ability to manage a wide variety of situations and to recalibrate the organization when things do not work out according to the initial plan. For this reason, the adaptability of management must be a natural condition of any organization today, not just in the current situation, related to the epidemic of the new coronavirus. Organizations need to create environments that encourage knowledge flow, diversity, autonomy, risk-taking, information sharing and flexibility.

A truly efficient organization works because of the manager's ability to adapt to change. The organizational environment is dominated by unpredictable events and surprises. In other words, we do not have a static event, but some that can come in an unexpected way. Adaptability allows managers to respond to emerging elements and maintain competitiveness. Adaptability keeps the organization in a state of balance, allowing its members to evolve and remain competitive.

5. CONCLUSIONS

A well-known proverb says that the blockage is always at the top of the bottle. If we relate this proverb to the organizational environment, we will find that, in most cases, employees are not resistant to change, but are inefficiently led, guided, motivated by organizational leaders. We cannot discuss organizations that are resistant to change, but we can observe leaders who, through the leadership style used, train employees who oppose and resist change. However, there are also organizations recognized as having a high degree of adaptability, whose leaders manage to inspire others to open up and support change.

In an increasingly uncertain context, in a perpetual change, adaptation and reinvention are the only variables that can make the difference between organizations and can give sustainable competitive advantages to organizations that accept them.

Organizations willing to adapt will always have something to gain from uncertainty and chaos. The challenges of the current environment are multiple, and the ability of organizations to respond effectively to them is clearly dependent on the degree of adaptability and flexibility that their leaders and managers have. The absence of these traits always translates into panic, denial, indecision, short-term and inefficiency in the medium and long term.

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LINGUISTIC GLOBALIZATION AND INTEROPERABILITY IN MULTINATIONAL MILITARY ORGANIZATIONS

Bianca CONSTANTINESCU

"Henri Coandă" Air Force Academy, Braşov, Romania (bianca.constantinescu@afahc.ro)

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Abstract: *The importance of the language level knowledge in multinational military organizations is constantly increasing, being considered, by a lot of researchers, the main factor of the interoperability.*

Keywords: *language, military, interoperability, coalition.*

1. INTRODUCTION

The purpose of this article is to reflect on the relationship between the level of knowledge of the language of communication and the efficiency of the functioning in multinational organizations, especially military ones.

Various studies regarding intra and inter-organizational communication highlight the fact that the role of communication in an organization is more than the ability of the manager to be a good speaker and to have good interpersonal communication skills, which extends to all members of that organization.

Scientific progress is inevitably accompanied by the emergence of new terms and notions. Terminology bring out an increased interest from linguists and specialists in various branches of science and professional fields. Researchers are trying to systematize, unify and standardize special lexemes, which is why we can say that terminology is characterized by dynamics and mobility.

Accessibility to this type of information is important not only for the development in a certain field, but also for the exchange between the specialists of the different fields, the accuracy of the terms used being essential for the correct exchange of information. Interdisciplinarity, a characteristic of the modern world, to which is added the speed of communication, have generated the diversification but also the standardization of some forms of the language of communication, a fact observed especially in the military environment, in multinational military missions.

More than in ordinary language, communication in specialized language requires clarity and precision. Often, new concepts move from the language in which they were created in languages of international circulation through the media (promoted by people who do not have a language or specialized training), through dictionaries (which are not always performed by translators with adequate scientific training), through foreign companies (which want to launch a certain product) and even through specialists in the fields (who, however, are only concerned with their limited space of activity). Often not even an adaptation of the foreign word is attempted, but it is simply copied in its original form, although it does not fit and cannot be adapted to the grammar and speech of the native language.

The notion of language planning, despite its apparent "opacity", has been studied and presented in detail in the studies of established socio-linguists, especially Westerners. Just mentioning of well-known names in the branch D.Ager, R.Baldauf, P.Bourdieu, L.-J.Calvet, J.-C.Corbeil, E.Haugen, J.Fishman, J.Neustupný, R.Ninyolis and others , creates a projection on the amplitude given to this subject worldwide. They demonstrate using a variety of scientific methods and arguments that language planning is a complex academic discipline, which extends its roots in various scientific fields such as politics, linguistics, psychology, pedagogy, economics, statistics, geography, sociology and others.

Chomsky [1], made a fundamental distinction (similar to Saussure's, between language and passwords), between a person's knowledge of the rules of a language and the use of that language in real situations. He referred to the first as competence, and the second as performance. Linguistics, he argued, "should deal with the study of competence and not be limited to performance" [2].

2. **MULTILINGUALISM, MULTINATIONAL ORGANIZATIONS AND GLOBALIZATION**

In linguistics, the idea of globalization appeared as a direct consequence of the situation in the economy, so it illustrates a certain face of the relationship between the dynamics of society and the needs of communication. Consequently, the concept of linguistic globalization must be understood as a deliberate acceptance of a common/unique means of communication in international economic relations. In this context, it is necessary to refer to linguistic pluralism and/or plurilingualism, which was and remains an inherent reality of humanity. The myth of the Tower of Babel, that "linguistic confusion" as a failure and drama of mankind demonstrates a failure, an impossibility to build an exceptional architectural construction, and the utopia of a universal language and/or "search for the perfect language" that would allow this realization . The babelic mixture was reduced to the rank of a divine curse, a tragic effect on mankind. Centuries of attempts to remedy it pervade the history of all cultures: from the Jewish Kabbalah, Dante, Abulafia, Lulus, Postel, Kircher to the a priori philosophical languages of Bacon, Comenius, Descartes, Mersenne and others, to the philosophical ones in the Enlightenment and the attempts to invent international languages (LIA) such as Esperanto, Volapük, etc. Europe begins with the birth of its popular languages, after Romanization and the fall of the Roman Empire. At once, appears the critical culture of Europe, which faces the drama of language fragmentation and begins to reflect on its own destiny as a multilingual civilization. Europe allowed the establishment of borders, the birth of nations and the feeling of national identity. "Confusio linguarum" becomes a historical condition for the stabilization of national values.

There are currently about 7,000 different languages and less than 200 countries, which would result in a simple mathematical calculation, more than 30 languages for each country. Plurilingualism has become common place and universally recognized in the absence of monolingual countries (and/or several forms of one and the same language).

Humanity is in a situation where the importance of supranational structures increases, while the role and independence of the nation-state, (affected by the undermining of prerogatives such as culture, way of life, language, signs of national identity, etc.) are subject to pressures of amalgamation and relativization.

The phrase *linguistic globalization* refers to the transformations of national languages in recent decades. The four spatio-temporal dimensions of globalization: extension, intensity, speed and impact represent the same criteria in the linguistic field; In particular, they are met by the use of English language.

Certainly, English is the most widespread language in the world, even if the Roman language family, especially Spanish and Portuguese, Arabic, Chinese or Hindi are used by a large number of speakers. Beyond the United Kingdom, the United States and the former British colonies, English is the language used in communication between people of different nationalities. The intensification of economic and political relations worldwide has contributed at a directly proportional rate to the intensification of the use of English.

The use of a language is also closely related to the rhythms of power, the end of the Cold War contributing to the accelerated spread of the English language to the detriment of the Russian language. The avalanche of neologisms, coming from English, in the communication in Romanian, led to the appearance of the term "Romglezã" and the mixture of American English with Spanish formed the term "spanglish". English has become the central language of communication at the international level in business, politics, administration, science and academic. Also, the main language of communication in the field of computers is English, which is the written language for Windows and Internet protocols. As a consequence of the development of information technology, we are witnessing at an avalanche of terms that are used in many languages in the English version. Thus, terms such as: business, dealer, computer, happy, marketing, management, manager, printer, know-how, target, item, trend are used in communication without translating them. This invasion of English terms has also been called *vocabulary globalization.*

Both linguistic globalization and the spread of Anglicisms in various languages are current phenomena that tend to internationalize. The facts and arguments discussed, show that linguistic globalization must be interpreted as a consequence of the globalization of the economy which, in terms of verbal exchanges, has led to the creation of a new communication situation requiring the use of a single language by economic partners as the only communication linguistic tool.

Linguistic globalization, when acting in a more limited field, does not necessarily have repercussions on the language that has adopted it. For example, the exclusive use of English at a certain point in the field of communications in navigation or in aeronautical activity did not have a decisive impact on the language system of users.

The issue related to cultural-linguistic-literary globalization is not a new one, but the approach we propose, because we choose to perceive globalization as an attempt to bring literary forms to a common form, through linguistic intermediation. That is, a transport of the literary values of a nation outside the area of direct incidence of its language through a language that has this power of action. Translation from one language to another becomes that link between different forms of culture, which, by paying due attention, will not endanger the national identity.

Personalities from the academic environment still believe in the future of the correct Romanian language but the problem is that the majority of the population does not emphasize style and form but use words with approximate meaning in order to formulate an idea. Most, however, do not constitute the intellectual layer that defines linguistic evolution, a multitude of factors contributing to the definition of linguistic forms.

This diversity of situations reveal a simple fact: even if all states were multilingual, many languages would remain outside an official status. Consequently, plurilingualism remains intrinsically a factor of stratification, even of exclusion.

There will be unrecognized languages everywhere and therefore inhabitants rejected from democratic participation in community life. Even worse, plurilingualism can also be a factor of conflict, even if the notion of language warfare is only a metaphor.

We find everywhere and in all ages the competition between languages, especially for a vehicular (traffic) supremacy.

The abundance of words of foreign origin present in the current Romanian vocabulary was determined by the advances made by science and technology (in branches such as informatics or telecommunications), by the massive entrance of economic, financial or human resources terms but also by Romania's participation in various missions/joint military activities. The cultural interference (and by it is also understood the linguistic one) of the corporations in the Romanian space is probably the best felt at the level of communication at the workplace. If in other spheres of social life, direct contact with external influences can be avoided or counteracted at work, loyalty to the company's values is often mandatory. The influence of another culture (language) on employees is greater at the higher levels of the hierarchy of a multicultural organization (at the level of managers) than at the level of workers. Due to the permanent contact that the management structures have with the "mother" organization (business correspondence, meetings, telephone conversations, etc. or even directly, in the case of a chief of another nationality), the communication is mainly done in a foreign language. The way in which the subsequent communication, in Romanian, to the subordinates, will or will not be affected by the foreign influences most often depends on the conscience of each speaker.

The level of language skills, together with professional motivation and competence, is the key to efficiency in an organization. All members of an organization spend most of their time communicating in one form or another, regardless of their position in the hierarchy. Because today the number of employees in services and offices exceeds that of production workers, there is a greater need to improve a high level of language skills, especially in a foreign language, because greater collaboration between employees, levels hierarchical and generalized teamwork cannot be effective without good collaboration between all team members. Moreover, technological changes have led to changes in the structure and activity of organizations. As a result, communication practices and technologies in different languages have become increasingly important for all types of organizations.

Multinational organizations involve a distinct form of correlation between people and goals, as well as between people and structures. The quality of human interaction is as important as the organizational goal. Acquiring membership of the organization and, consequently, assuming the organizational goal does not guarantee the achievement of the organization's goals, unless the nature of interpersonal relationships is shaped in this direction, unless human interaction takes the form of cooperation (avoidance and overcoming human conflicts). Human interaction is the foundation of the functioning of an organization, at the same time, the organizational structure decisively influencing the nature of human interaction. The size of the organization, the number of hierarchical levels, the number of departments, the functional subunits, the complexity of the activity (division of labor, specialization) make their mark on the entire organizational activity. Nowadays, communication is unanimously recognized as "the key to excellence and organizational effectiveness". No matter how powerful a company is, it cannot function properly without an effective communication system.

Learning different languages is a mandatory requirement of the modern world, because foreign languages are used in all fields, they bring people together and connect continents, countries, cultures and civilizations.

This is why multinational organizations need a level of knowledge of the languages agreed by that organization as advanced as possible.

Without the knowledge and use of foreign languages, political, diplomatic alliances or international relations between civilian or military organizations would be very difficult. The speed of the current global interrelationship requires advanced language skills.

3. STUDIES ON LINGUISTIC COMMUNICATION IN MULTINATIONAL MILITARY ORGANIZATIONS - LINGUISTIC COMPETENCES

Language communication presume the competence of communication, the ability of the individual to model his behavior in order to adapt to the context in which the interaction takes place and to communicate with maximum efficiency in the communication process. Chomsky's book, ”The Structures of Language”, published in 1957, proved to be a turning point in 20th century linguistics. He proposes the linguistic theory of generative grammar, radically delimiting itself from the structuralism and behaviorism of previous decades. Chomsky made a fundamental distinction (similar to Saussure's, between language and passwords), between a person's knowledge of the rules of a language and the use of that language in real situations. He referred to the first as competence, and the second as performance. Linguistics, he argued, should focus on the study of competence and not on performance.

Competence, according to McNeil [4], means knowing the language rules, categories, etc. which contributes to the speaker's intuitions in relation to his language. Robins stated that Chomsky defines competence as what a speaker intuitively knows about his language. In these terms, speech production and speech comprehension are both categories of language performance; both involve the expression of competence, one in the production or coding of speech, the other in the reception and decoding of speech.

Compared to Canale [5] and Swain’s [6] definition, Yoshida [7] states that "strategic competence means verbal and non-verbal communication strategies that can be used to compensate for communication interruptions due to performance variables or insufficient competence."

Michael Byram’s [8] communication competence model it is based on the theories of Canale, Swain (1980) and Van EK [9] (1986), to which he adds the competence of intercultural communication formed by the branches: linguistic, sociolinguistic, discursive and intercultural.

According to the study "Training and development of intercultural communication skills of the Romanian military participating in stability and support operations" NATO armies, include in the entire process of staff training intercultural education with an emphasis on the development of language skills.

A complex study on the factors influencing interoperability in military actions was conducted in the Afghan theater of operations, the language component being one of the items that can have major effects on it "*the most problematic aspect of mission collaboration is the language communication gap between the military of different countries. The level of linguistic competence, the experience in the international environment, the availability of the native speakers to regulate the rhythm of the speech, to formulate the ideas as simply as possible are factors that influence the communication in the coalition. The level of stress and the type of group (mixed or just one nation) imprints the type of communications”*[11] The author has also developed a very useful model of cultural knowledge, in which the linguistic factor is considered fundamental for interrelationships in multinational coalitions. [12]

Romania's status as a member of the North Atlantic Alliance imposed on the Romanian armed forces a series of new requirements, including the achievement of structural, action, technical and, last but not least, linguistic interoperability with the Alliance's forces. The acquisition by the Romanian military of language skills in English, clearly defined in STANAG 6001 (NATO standardization document), is a condition of the job description corresponding to the position in the NATO organization.

For an efficient functioning in the coalition, the amplification of the interest and the support of the instructive-educational process, at all levels of training of the military personnel, constitutes a permanent requirement. Integrated, multidisciplinary specific training (language skills, communication, cultural skills) are part of the educational curriculum but the introduction of simulation learning (VCAT) should become a priority, taking into account the interest in this type of activity of recent generations of students.

4. CONCLUSIONS

Fulfilling its identity function, language is the identity card of a nation. The language of communication reflects the culture, society, ethnicity, profession, it outlines a differentiation. And if language is a limit that gives us a spiritual identity, then giving up a language means a „changer d'identité" [14].

If the phenomenon of economic globalization is a fact that most national states accept today as a record, in terms of language globalization we would say that the main reaction is to outline the language policies to protect cultural heritage and diversity but with the understanding of the need for adaptation to ensure military interoperability and efficient inter-organizational functioning.

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POWER DISTANCE INDEX AND ITS ROLE IN THE EFFICIENT FUNCTIONING OF MULTINATIONAL ORGANIZATIONS

Adrian-Gabriel DUCU

"Henri Coandă" Air Force Academy, Braşov, Romania (gabriel.ducu@yahoo.com)

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Abstract: *Enveloping a wide-range spectrum of political, cultural, and ethical aspects, the power distance index essentially summarizes the acceptance of hierarchical structures. The number of micro ecosystems in which hierarchy and power-centered forms of organization prevail is undoubtedly large, given the fact that authoritarian regimes have been mostly abolished and invalidated during relatively recent history, and many people are still unconsciously reminiscing on their unwritten rules of conduct. This paper intends to take a closer look into the impact that various power distance index values have on organizational culture, with multinationals being the niche thoroughly studied. By analyzing official performance reports in correlation with dr. Geert Hofstede's premises, the author intends to give insight into how overall worker performance is affected by autocracy, inequality, and responsibility centralization, which are all consequences of high-power distance indexes.*

Keywords: *power distance, inequality, culture, study, organization.*

1. INTRODUCTION

Organizational culture represents the binder which brings together all the constituent pieces of the workplace atmosphere puzzle. The power distance index, or PDI as abbreviated, consequently acts as a valuable tool in measuring different behavioral patterns amidst employees. I believe that the importance of PDI analysis can't be overstated due to the fact that, if taken into thoughtful consideration, the index can reveal valuable information about doctrine-related compatibilities in workers, assess merging performance between two or more departments, and even predict long-term consequences of cultural mix-up. This is the reason why I offer a new perspective of utility for the index by unifying it with MIT Prof. E. Schein's cultural characteristics. Consequently, the newly stated binome between the two aspects previously mentioned is to give further insight into cultural aspects regarding organizations by creating a new parameter of analysis.

2. HOFSTEDE, GLOBE AND POWER DISTANCE INDEX

Generally accepted as a pioneer of psycho-sociological studies referring both to organizational culture and the way of which employees cope with authority and imbalance regarding workplace ethics, Professor Geert Hofstede managed to give insight to further researchers into the concept of cultural dimensions [1], whilst developing a whole range of tools for measuring the effects of cultural variables on organizational functionality.

The power distance index shows the degree to which inequality and power are tolerated in any micro-ecosystem (multinational organizations, government-related hierarchical structures, etc.). Regarding this dimension, inequality and power are viewed from the perspective of followers, which constitute "the lower level". A high-power distance index suggests that a culture accepts inequality and power differences as being innate, encourages bureaucracy as a form of organization and shows a high degree of respect for hierarchy and authority, both to the concept and the particular individuals who impose those characteristics. A low power distance index reveals that the studied culture emphasizes a flat organizational structure, which is characterized by decentralized decision-making responsibilities, participatory management, and great respect to meritocracy as a factor for attributing power distribution. [2]

The second important cultural framework is represented by the Global Leadership and Organizational Behavior Effectiveness (GLOBE) [3] project that provided managers with an additional lens through which they can better their understanding on how to improve overall performance whilst coordinating international environments. The central theoretical proposition of the GLOBE project states that the attributes which make a culture distinguishable amongst other cultures give predictability and valuable insight into leadership characteristics most frequently enacted, adopted and efficient in that culture. While the Hofstede framework was developed in the 1960s, the GLOBE project took finality in the 1990s, thus being a more recent attempt in cultural dimension analysis.

Regarding the Power Distance Index, the thesis on which GLOBE analyzed the matter, although based on Prof. Hofstede's initial findings, is supplemented by a new set of statements which expand PDI applications, such as "Leader acceptance influences leader effectiveness" [4], which, extrapolated, suggests that countries with a high PDI which tend to accept authority-imposing figures as being innate are likely to improve leader effectiveness by unquestionable adoption. Another difference between Hofstede and GLOBE is that the latter grouped countries into cultural clusters with common elements, and subsequently stated 21 leader characteristics related to a desirability scale of 1 to 7, with 7 being the most desirable. Generally, high PDI corresponded to least desirable features (autocratic, status conscious, autonomous) whilst low PDI cultures represented the framework for generally accepted qualities (collaborative, inspirational, visionary).

3. THE INFLUENCE OF POWER DISTANCE ON ORGANIZATIONAL MANAGEMENT AND SUBSEQUENT CULTURAL PATTERNS

Organizational management mainly refers to the adequate distribution of tasks, resources, and responsibilities to employees in accordance with their role, qualifications and area of competence within a well-defined structure. The basic principle of organizing resources in order to achieve before-stated accomplishments is to be applied within any kind of organization, whether we discuss NGO's, government institutions or business-oriented entities. [5]

One of the most important branches of organizational management is represented by organizational culture which acts as the framework for achieving performance and unity within the before-mentioned structure. Organizational culture represents a set of shared beliefs which are clearly stated and widely adopted by employees in order to gain perspective on a singular perception, understanding and behavior system. The elements of organizational culture within a multinational company are the common ground for interoperability within employees.

Organizational culture is to be defined, according to MIT professor Edgar H. Schein, by the following characteristics [6]:

- Innovation and risk taking, which comprises employee encouragement to conduct work based on these principles;
- Attention to detail, which measures employees degree of situational analysis and precision amidst problem-solving.
- Outcome orientation, a characteristic which favors the final result of a certain process rather than the process itself;
- People orientation, which states the susceptibility of key-management figures to consider their decisions based on the effect that they have on employees;
- Team orientation, a variable in correlation to the preference of group work rather than individual approaches on specific matters;
- Aggressiveness, strongly related to competition;
- Stability, or the purpose of maintaining status quo;
- Agility, which promotes flexibility in decision-making and process-shaping within an organization.

According to Ph.D. Schein, the above-mentioned characteristics are to be measured on a scale from low to high, moderate being the intermediary reference. The correlations of two or more characteristics which resemble a specific scale result in specific organizational patterns. For example, a framework for an organization which develops high ethical standards is based on a high tolerance for risk, low-moderate level of aggressiveness and focus on means of action proportionally with reaching favorable outcomes.

Being a prevalent cultural dimension, the power distance index certainly contributes to organizational culture shaping by applying its principles on different scales. Whether the whole organization falls under a dominant culture, which expresses the core values shared by most of the employees, or is separated into multiple subcultures based on department specific or ethnical affiliation, different values of power distance index in correlation with the above-mentioned organizational culture characteristics shape a whole new set of organizational patterns, which are to be analyzed and stated in the following comparative analysis:

Based on G. Hofstede's findings, the comparison will encompass two multinational organizations which provide services in the gaming sector. Organization A is based in China, a country with a PDI of 80, and has employees mainly from China, including key-figures in the decision-making process, which resemble authority and strict etiquette. Organization B, which activates in the same economical sector, is based in Denmark, a country with a significantly smaller PDI of 18 [7]. Organization B integrates employees from neighboring countries such as Germany and The Netherlands, which also encompass reduced PDI findings, creating a multicultural environment where power is distributed equally and incentive is achieved by subjective analysis and meritocracy.

The correlation of Hofstede's PDI and Schein's cultural characteristics is illustrated in the following table:

Table 1. The correlation of Hofstede's PDI and Schein's cultural characteristics

Cultural characteristics	**Organization A (*High PDI*)**	**Organization B (*Low PDI*)**
Innovation and risk taking	Low (Considering the authority involved in the management branch, innovation is not encouraged whereas strict protocol-following and compliance is preferred).	High (Innovation is encouraged, as well as risk taking in order to create a sustainable framework which values ingenuity and free thinking)
Attention to detail	High (due to class inequality amongst company members, details must be thoroughly respected in order to make ends meet)	Moderate (Product quality is encouraged, while complying certain standards is relative in order to preserve originality).
Outcome orientation	Moderate (The process is less important than the final product, but not insignificant)	High (Ethics are part of the process)
People orientation	Low (Company interests are above individual well-being, whilst power-applying purposes are irrelevant)	High (Decentralization is certainly popular, while each employee is well taken care of in terms of general well-being).
Team orientation	Moderate (Certain activities are to be made in accordance with group participation principles, but individualism is widespread in order to receive merits).	Moderate (Employees enjoy group brainstorming sessions but also value quiet and privacy)
Aggressiveness	High (Competition is chased after in order to gain credit in front of the hierarchical key-figures)	Moderate (Aggressiveness and competition is also found, but justified under the curtain of proactive behavior which facilitates innovation)
Agility	Low (Protocols are strict and are to be complied with within any circumstances, and the flexibility related to the decision-making process is rather inexistent due to unequally distributed responsibility and power privileges).	High (With innovation valued and free-thinking being an actual requirement, low-PDI Organization B is able to re-configure anything from product development to marketing schemes when necessary.

Following the detailed correlations stated above, as mentioned before, emerging patterns are to be observed with respect to the cultural dimension-cultural characteristic binomial.

The number of patterns which could emerge from combining the presented characteristics can be calculated with respect to the combinations [8] formula, which can be easily adapted based on the number of binomials taken into account in the pattern-forming process. For example, resulting from the table shown, there is a sum of 77 possible binomial organizational patterns.

$${}^{n}C_{k} = \frac{n!}{k!(n-k)!}$$

$${}^{2}C_{14} = \frac{14!}{2!(14-2)!} = \frac{12! \times 13 \times 14}{2! \times 12!} = \frac{182}{2} = 91.$$

$$91 - (7 \times 2) = 77.$$

For example, a possible binomial pattern which can define an organizational culture's niche based on the previously stated cultural characteristic – PDI correlation is a high PDI department with low people orientation which has recently merged with a low PDI department with high outcome orientation. Apart from all the other cultural misfits that a merging can impose, a pattern like this can result in a newly created department with conflicts regarding sustainable respect to ethics versus irrelevant power-applying purposes, which would certainly alter the general work performance until the uniformization takes place.

The applicability of PDI characteristics in the understanding of multinational organizations is also relevant to military structures. Particularly taking Romania into consideration, there is a visible difference between units which had not been regularly exposed to joint exercises and units which are frequently integrated into multicultural environments [9]. To be more specific, an isolated, non-operative unit which is not amalgamated with foreign military forces in joint training will tend to preserve the national PDI value, subconsciously engulfed by the majority of individuals in that specific unit, which may not reciprocate modern management principles. On the other side of the matter, there is the other category of military environments, which are mod adherent to low PDI characteristics due to prolonged exposure to western cultures in NATO operations. My unit, 256th Helicopter Group, represents a decade-long provider of air-naval security in the NATO alliance, with a rich history of multinational cooperation. As a consequence, due to being constantly exposed to low-PDI military cultures like Germany or Britain, their management tends to be inclusive and decentralized, with commanders generally portraying capable, modest team players rather than fearful, power-applying autocrats.

4. CONCLUSIONS

To conclude, we can state that a high number of patterns can be brought upon using various mathematical formulae which can predict behavioral changes in organizational culture after specific environment-altering events (f.e, merging). The power-distance index can be replaced with every other cultural dimension, depending on the results which are looked for. Foreseeing emerging patterns in a multinational organization's overall culture dynamics is highly important due to changes in general well-being, team cohesion and work performance that can occur.

A viable option for prediction can certainly be an in-depth study of PDI – cultural characteristics correlation, which can give insight in whether planned changes in terms of team/department mass augmentation are to increase or decrease productivity amongst other performance-related factors [10].

The most important fact of PDI analysis is the enormous potential of adoption. As previously stated, even NATO organizations adhere to PDI values behind the well-known rigurosity curtain. With commanders being more and more exposed to intercultural cooperation, high PDI nations are engulfed in modern management principles, steadily creating the framework for a truly homogenous alliance, in which collaboration, integrity and performance are encouraged thoroughly through respect, equity and good conduct.

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THE ROLE OF PERSONAL DEVELOPMENT IN STUDENTS ADAPTING TO THE ACADEMIC LIFE

Oana JITARU, Roxana AXINTE, Cristina VATAVU

"Gheorghe Asachi" Technical University, Iasi, Romania (oana.jitaru@academic.tuiasi.ro, roxana.axinte@academic.tuiasi.ro, cristina.vatavu@academic.tuiasi.ro)

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Abstract: *In this article we describe the results obtained in an activity of evaluation of a personal development program addressed to students in the first year of study. It was carried out within a project financed by the Scholarship Scheme for Universities, concluded between the Ministry of National Education through the Management Unit of Externally Funded Projects and the Faculty of Electrical Engineering, Energy and Applied Informatics, "Gheorghe Asachi" Technical University of Iasi. The specific objectives of the project pursued three intervention components: motivation (M), networking (R) and workload (V). These have been directly correlated with other identified aspects (individual failure, academic failure) that lead to school dropouts and low academic performance. In order to achieve the objectives, the project presented a proposed activity plan for a target group of 80 students for one year of implementation). The activities proposed within the project represent punctual educational interventions on the factors that influence school dropout and academic performance.*

The evaluated program, the results of which we present here, was subordinated to the objectives related to the motivation of the students and their relationship skills and pursued personal development through creativity and socio-emotional education in students. This dimension of the programme was chosen because a major need existing on the labour market is the need to educate young people to have the attitude of a winner and to find solutions to problems .The behavioural acquisitions of the students, within the personal development programme through creativity and social-emotional education were: flexible, generative thinking in solving problems; acquiring coping strategies; optimisation of personal and academic life.

Keywords: *personal development, motivation, relationship, social abilities, creativity*

1. INTRODUCTION

Transition, defined as the ability to "navigate" through the change that takes place in the transition from one educational cycle to another, from one way of learning to another [1] is a constant concern to analyse and develop proactive strategies to facilitate the adaptation process of students. The first year of university involves major changes in the lives of young people, both socially and in ways to learn, to interact with teachers. This period of transition from high school to faculty can be overwhelming, demanding for students, both personally (leaving the family, managing the personal budget), academic (the transition from organised, guided activity, to independent taking of notes, teamwork, time management, individual study), social (new colleagues / friends, a new locality for some of them, the adaptive cultural shock being even greater for students coming from rural areas, from families where their parents do not have higher education) [2, 3, 4].

First-year students need to feel that they are part of a supportive learning community, that they are valued, requiring qualitative interactions with academic staff and colleagues, outside of classes / seminars, to compensate for the alienation and anonymity of lectures in large amphitheatres [5, 6] in which students participate in most courses, bringing together several groups of students. The personal development programme developed is an approach made at the beginning of academic life to help integrate and adapt students and proactive support to propel them to employment in the academic process, performance, motivation and ability to meet academic requirements. Studies call this transition process to be carried out systematically from a curricular point of view as "transition pedagogy" [7], which covers both information and academic aspects, content, but also activities that facilitate socialisation, integration into student life.

The activity we carried out is part of the project "The future is electric! / STARTing" funded by the Scholarship Scheme for Universities, the Secondary Education Project (ROSE), concluded between the Ministry of National Education through the Externally Funded Project Management Unit and Faculty of Electrical Engineering, Energy and Applied Informatics, “Gheorghe Asachi” Technical University of Iasi.

2. PERSONAL DEVELOPMENT AND SELF-MANAGEMENT THROUGH CREATIVITY

This educational programme that we have developed provides, on this continuum from schooling to adulthood, concrete solutions to stimulate creative social adaptation and emotional development to generate social affirmation behaviours. It is a positive mental and social health programme that stimulates social interaction and personal expression, develops creative techniques and strategies for problem solving, strengthens high self-esteem and unconditional self-acceptance, aims to form a vocabulary of emotions, identifying the intensity of emotions, applying techniques for constructive capitalisation of emotions. The behavioural acquisitions of the students, within the personal development programme through creativity and socio-emotional education are:

- developing flexible, generative thinking skills in problem solving;
- better understanding of emotions and assimilation of their management techniques;
- the formation of a healthy conception of oneself and others, as well as the development of self-interest and social relations;
- acquiring coping strategies that will help them cope with emotional stress and educational challenges;
- release from the feeling of anxiety that appears with one's own negative evaluation or in moments when they face a difficulty;
- increasing overall satisfaction with life and improving academic performance;
- students practised how to help themselves cope with life more effectively.

The general objective of the personal development programme was the creative training of personal development skills and competencies and self-management skills. The specific objectives followed: the assimilation by the participants of the norms and working principles specific to a creative training group and the consolidation of skills in such a group; mastering by students the working methods specific to the creative group of training and personal development; training the skills and competencies of creative self-development; training students in the use of creative skills in the self-management process.

The exercises and techniques applied took into account the characteristics of the students and the specific problems that may arise at this level of development. Clear objectives have been set for each counselling session, the specific content targeting certain concepts, followed by exercises to apply these contents, exercises that offer the possibility to express the aptitude potential. The programme aimed at developing creative skills and effective emotional and social adaptation, achieving wellbeing – social, emotional and behavioural. In the application of the programme for the development of creative and socio-emotional skills we used the Brancusi model of personal development promoted by Mariana Caluschi [8].

The personal development program focused on developing communication skills, self-affirmation, emotional expression and increasing self-esteem. This programme is based on the development and activation of creative potential that provides the training of flexible problem-solving skills, increases empathic capacity and increases self-esteem. This programme was adapted by each trainer / counsellor who chose the appropriate elements in accordance with the topics proposed to the students and implicitly with their needs. The work topics communicated to the students were: Learning Techniques Seminar; Self-management workshop; Personal Marketing Workshop; Workshop Communication and management of emotions; Workshop on psychological and emotional processing of negative experiences; Responsibility for the choices made; Theatre workshop; Feedback and metacognition workshop; Seminar Building career in the virtual space; Assertive communication seminar.

3. PROCEDURE OF CARRYING OUT THE RESEARCH

We developed a research structured in three stages: initial evaluation of students; application of the educational programme that responds to the needs identified in stage 1 of evaluation; final evaluation of students.

We made an experimental design in which the group was compared with itself, in the initial and final stage of research. The questionnaires were applied to the respondents in two variants: face to face and online, depending on how the pandemic context evolved. The questionnaires were applied between November-December 2020 and June-July 2021. All 80 students from the target group were invited to participate in the initial assessment activity. Out of these, a number of 60 students completed it.

The participation criteria for the members of the target group of the project were two-dimensional and aimed at: the quality of students registered in the target group of the project; their willingness to participate in the activity of completing the proposed questionnaires. The students were informed about the usefulness and finality of the study, the participation agreement was requested and the confidentiality of the answers was ensured. The questionnaires applied in the face-to-face variant were applied during two hours, respecting the following order of completion, after being previously explained how to fill in the forms: Self-assessment questionnaire; Rosenberg scale (self-esteem assessment). The questionnaires applied in the online version were completed by each respondent in their own work rhythm, following the participation in an online counselling session where they were informed about the purpose of the study, they were asked to agree to participate, they were explained that the data provided by them is confidential (in terms of personal identity information), they were explained how to complete it and were provided with clarifications when requested.

The self-assessment questionnaire is a self-constructed questionnaire that assesses students' communication peculiarities and their training / development needs. The first scale of the questionnaire allows self-assessment of students' communication skills, their attitude towards conflict resolution, their assertive skills, perception of group membership and self-esteem. On a scale of 1 to 5 students can give values to behaviours expressed in 12 items that refer to ease of communication and expression of personal ideas, giving and asking for help, attitude to problems and the extent of involvement in solving them, attitude towards self-assessment and self-confidence, self-assertion, emotions of tension, anxiety, stress in the face generated by the need to adapt to academic life. Other items of the questionnaire assess the following dimensions: How they feel in relation to the specific activities of student life (schedule, projects, learning, work pace, etc.); What skills do they think they would need to develop in order to be successful in terms of student activities?; To what extent do they think about objectives, future projects, professional plans and if they put these thoughts into action?

Another scale investigates the training needs of students, allowing them to self-assess the extent to which they would need to develop skills to ensure their personal development and social affirmation. The need to develop the following skills / dimensions was assessed: creativity, expression of emotions, learning style, self-confidence, courage to assert oneself, independence, conscientiousness, personal efficiency.

4. RESULTS OF EDUCATIONAL PROGRAMME OF PERSONAL DEVELOPMENT

We find that the dimensions related to *communication, the willingness to engage in a discussion but also the attitude to recognise when they need help* are developed at a higher level. Significant differences from the initial test situation indicate the development of these dimensions. We find a high value in *the ability to offer help to others when you ask.*

Another concrete result obtained through the activity of personal development was the development of *assertive communication*. This involves open expression of ideas, personal thoughts, assertion of one's own point of view, taking responsibility for one's own actions, empathic involvement in relationships and self-help. The exercises, debates, assignments that took place during the counselling program determined the development of this competence in students. The size of the aid was developed and initially, what was new was the orientation of this availability towards empathic communication and the training of empathic self-affirmation. The students learned how to use this resource they had, to help others, the willingness to support, in self-affirmation, in putting limits in a constructive way. They have increased their ability to support their point of view even in conditions of opposition and the audacity to admit when they are wrong, without feeling that their self-esteem is eroded. We find that, compared to the initial situation, the capacity to ask for help has increased, which shows us that during the first year of studies students had the opportunity to validate their power of action and decision, so that asking for help is no longer a proof of helplessness but an ability to establish relationships that will help them assert themselves and achieve goals. Their self-perceived ability to solve the problems they face has also increased. This shows that they have moved from the perception of a new environment, which they cannot control, to the perception of their ability to find solutions and adapt to requirements. Also, students became more tolerant of diversity and different points of view, correlating with their increased ability to assert their own point of view.

The exercises they carried out during the activities had a strong collaborative character and stimulated the team work skills. Even for the online development, work teams, role play, activities carried out on the Jamboard interactive whiteboard were proposed, correlated with the students' determination to present tasks solved and presented individually in front of the group, which determined their better integration in the teams they were part of, but also the courage to assert themselves in new work contexts.

From the data obtained regarding these dimensions it can be concluded that the training of socio-emotional skills, as well as the successful integration of students in collaborative learning actions at the faculty have led to increased self-confidence and validation of their belief system. This is a very important aspect of student life and becoming a professional. At the beginning of the faculty, the students' interest is to be accepted in the group, to find similarities and to reduce the differences that could generate their exclusion from the group. It is observed that, with their participation in the group and due to the mutual recognition, there is a shift of interest towards differentiation and individual expression through the particularities that characterise each one. Thus, they become less sensitive to the evaluations of others and rely more on their own judgment and self-evaluation. The opinions of others have indicative value, it helps them to strengthen their self-image, but it is no longer decisive for them to agree with others, they can afford to express different perspectives. Exercises for expressing and recognising emotions help students to accept diversity and normalise their emotions, so they learn that different emotions are natural, that negative emotions also have their role, that they all go through different moments of mistrust or doubt, which leads to a decrease in tension and stress. Although the involvement in university activities increased during the year, the state of straining and tension of students decreased due to the fact that they became more familiar with the requirements of academic life, were put in situations to validate their skills, gained confidence through mutual knowledge and mutual support.

The fear of the future is, at a medium level, what may be related to the fact that students want to intensify their specialised practice and collaborate with companies that will strengthen their confidence that they will find a job easier. However, the fact that the state of anxiety about the future is at an average level shows an improvement in their ability to adapt, especially since these students worked in the conditions of the online school generated by the Covid 19 pandemic, which added elements of worry, fear and distrust in the future.

It was found that people with creative potential use their resources more time being involved in activities aimed at their training, than those who are not so creative. Also, an ideal environment for them is the accumulation of experiences as diverse as possible over time. Thus, it becomes very important for students to know the importance of involvement in as many experiences as possible - an opportunity provided by the activities proposed by the project. It is possible that some of the teaching methods that professors use in teaching-learning assessment, as well as the working methods within the project have developed students' abilities to generate multiple problem-solving ideas, the ability to adapt flexibly to new requirements, to generate new ideas to improve existing systems, to express themselves originally. Moreover, the learning experiences they went through led to the identification of strategies to make the effort more efficient and the students learned about their own personality traits and about the sensory peculiarities of their learning style.

In terms of expressing emotions, we find that it is a developing skill. Emotional intelligence develops over time and involves a period of practising the recognition and management of one's emotions, so that later the individual is able to intervene in mediating interpersonal conflicts and in the strategic use of emotionality to create collaboration and professional success. So far, students have improved their relationship with their own emotions, by increasing acceptance of emotional diversity, recognition and expression of emotions, and even mastering techniques to reduce disruptive emotions and generate wellbeing.

Self-confidence has increased considerably, and we believe that consistent exposure to problem-solving situations, coming to the foreground and self-assertion, confirmation from professors about the knowledge and skills acquired, involvement in team activities have led to this result. Also, some of the students' expectations regarding student life were met, remedial activities were made available to them, as well as other recreational activities that would open new perspectives for understanding the field. The project activities provided a contribution in self-knowledge, in the valorisation of one's own aptitude potential and in the abilities of relationship, decision making, problem solving.

5. CONCLUSIONS

Analysing the results obtained in this stage of final evaluation of the personal development programme of the investigated students we can see several dimensions that have been considerably optimised at the end of the first year of activity compared to the beginning period.

The acquisition of an important component targeted was achieved by the personal development activity - assertive communication.

This involves open expression of ideas, personal thoughts, asserting one's own point of view, taking responsibility for one's own actions, empathic involvement in relationships and helping each other. The exercises, debates, role-plays that took place during the activities determined the development of this competence in students. They have increased their ability to support their point of view even in conditions of opposition and the audacity to admit when they are wrong, without feeling that their self-esteem is affected.

Compared to the initial situation, the ability to ask for help has increased.

Their self-perceived ability to solve the problems they face has also increased. This shows that they have gone from the perception of a new environment, which they cannot control, to the perception of their ability to find solutions and adapt to requirements. It is observed that, with their participation in the group and due to the mutual recognition, there is a shift of interest towards differentiation and individual expression through the particularities that characterise each one.

40% of students feel comfortable and confident with the specific activities of student life, and 22.6% feel indifferent. □

If we understand this last percentage as being represented by intermediate level students, who do not aim at academic performance, but have personal goals, which are rather related to obtaining the diploma and fulfilling strictly professional objectives, then we could consider that they do not present risk of school dropout. A percentage of 37% of the investigated students are tense and overwhelmed by learning activities. We could conclude that academic learning is a dimension of student life, but it is not the only one that can provide confidence or tension. The state of tension and anxiety is average for the investigated group, which entitles us to say that the relational dimension and personal development alleviate the discomfort created by learning difficulties.

Over 60% of the investigated students think about objectives, future projects and put these thoughts into action.

Student activities are, in fact, concrete actions that bring them closer to the goal of vocational training. But some of the students are also interested in developing transversal skills and participate in various extracurricular activities for their training. We can also see that there is no student who has stated that he never embodies thoughts about the future in present actions, which means that everyone can find the right motivation to be stimulated in taking steps that bring him closer to the professional goal.

Expressing emotions is a developing skill.

Emotional intelligence develops over time and involves a period of practising the recognition and management of one's emotions, so that later, the individual is able to intervene in mediating interpersonal conflicts and in the strategic use of emotionality for greater collaboration and professional success. So far, students have improved their relationship with their own emotions, by increasing acceptance of emotional diversity, recognition and expression of emotions, and even mastering techniques to reduce disruptive emotions and generate wellbeing.

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We believe that consistent exposure to problem-solving situations, coming to the foreground and self-assertion, confirmation from professors about the knowledge and skills acquired, involvement in team activities have led to this result. Also, some of the students' expectations regarding student life were met, remedial activities were made available to them, as well as other recreational activities that would open new perspectives for understanding the field. The project activities provided a contribution in self-knowledge, in valuing one's own aptitude potential and in the skills of relating, making decisions, solving problems.

The courage of personal affirmation increased due to the fact that students experienced different situations in which they expressed their point of view, participated in group activities in which they were accepted and validated.

Independence is an acquisition that most students acquire because they manage their own learning process and all faculty-related activities, as well as the fact that they manage their time, budget, relationships, physical space, most of them coming to university in a locality different from their hometown. Although some of the school activities did not take place in the university spaces due to the pandemic, however, the students kept the coordinates of their independent behaviour.

Conscientiousness and personal efficiency have increased due to experiences that have confirmed that they are doing well and that their effort matters. They have certainly mastered learning techniques, time management, asking for help and collaborating, managing their goals, dosing their efforts according to the difficulty and complexity of the requirements.

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CROSS-CULTURAL KNOWLEDGE FOR INTEROPERABILITY

Virgil Florian NEAGOE

"Henri Coandă" Air Force Academy, Braşov, Romania (nflorianvirgil@gmail.com)

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Abstract: *In relationships between people, politeness is often not enough in the socialization process and in trying to avoid interpersonal conflicts. When two different cultures come into contact, frustrations and agreement can arise from the different way of perceiving respect or interpreting non-verbal language.*

Keywords: *intercultural communication, cultural differences, NATO, interoperability*

1. INTRODUCTION

Culture, in essence, is reflected in social organization and development of a society, in the institutionalized and internalized daily practices by the members of a society, which thus make them have more similarities than differences and, in the same time, individualizes them as a group among other groups that have similar characteristics. Culture is not something that belongs to or can only be found within a social class, it is not a privilege, it is ubiquitous; all societies, all civilizations of all times had a more or less developed but unique culture, which made them exist as unique and indivisible entities and assert their individuality among other societies and civilizations.

The organizational culture of the army is based on a strictly structural leadership, from top to bottom, with a chain of command organized in accordance with the principle of centralization. This ensures that the central structure will and the planning processes to develop actions of the organization as a whole. The relevant information for the action is transmitted from top to bottom, the competence to initiate the action is strongly limited at the base of the hierarchical structure.

As a rule, the armed forces are stationed in barracks and garrisons, separated from the civilian world. For functional needs the community is appreciated strongly than the individual, there is a clear priority of the community. In military culture the individual is instrumentalized and individualized in favor of the group, the soldier is expected to sacrifice his freedom and, if inevitable, his life for a collective purpose to which he may not adhere.

2. CULTURAL DIFFRENCES AND INTERCULTURAL COMMUNICATION COMPETENCE

Cultural differences are discrepancies or contrasts that are found when comparing two or more different cultures. These differences may be related to customs, religion, clothing or language, among others. A clear example of cultural differences is seen in the way people in Latin America greet, usually when they shake hands and even kiss their cheeks, compared to people in Asia, where body contact is not usual.

Cultural differences arise, in principle, due to the different ways of life that human beings have adopted in different regions of the planet. Because they were formed in different ways, and with different points of view and codes, some very far apart.

Today, cultural differences between countries are slightly less than they were a few years ago. This is due, among other things, to the level of globalization and migration that exists today on the planet. In this sense, many customs are taken and adapted by different cultures, transforming the traditions of these countries.

However, there are still many characteristics, within different cultures, that continue to make them different from each other. Here are some examples of cultural differences between countries: In Russia, for example, prolonged eye contact can be interpreted as a form of aggression or as an attempt to provoke the person being viewed. This type of behavior, which in Western culture is as natural as possible, is also considered rude and aggressive in Japan. In Arab countries, eye contact is only allowed in the case of people of the same sex, but is inadmissible if the persons are of different sexes.

In Thailand, it is considered disrespectful to cross one's legs or point the tip of one's foot at someone because this part of the body is seen as inferior and unworthy to draw attention to it.

If you receive a gift from a person of Chinese nationality, it is polite to refuse the gift several times before receiving it with the necessary thanks. In many Asian countries, including China, the act of pouring your own drink into a glass is seen as disrespectful. It is polite for the person who keeps you company at the table to do this, while you will make the same gesture. The tip is considered an insult in Japan and, most of the time, the waiters or those you offered it to will return it to you.

Most people living in the Scandinavian Peninsula value silence and consider it an integral part of a conversation, so if long breaks appear in discussions with them, there is no need to rush to fill them. In some Arab countries, holding hands between two men is seen as a sign of friendship and respect, with no other implications.

In Canada, when tea or coffee is served to guests, it may be a sign that it is time for them to prepare for departure.

Intercultural communication comes with a lot of challenges. A real intercultural communication happens only after you manage to somehow harmonize the ideas, the cultural perceptions, to transform the differences into similarities and similarities into common objectives. You cannot talk about intercultural communication until you understand each culture very well and until people from both cultures have a common goal that can determine intercultural communication.

- Ethnocentrism. Everyone looks at a different culture from a personal, subjective perspective. Ethnocentrism occurs when we believe that everything we do and what we believe in is the only way to achieve something. Everything that is not in our view is not looked upon favorably. The behavior of others becomes strange and inappropriate. There is also a clear division between us and them, between two diametrically opposed mentalities.

- Psychological barriers. You cannot have the existence of intercultural communication if you do not show flexibility in thinking and behavior. Many times you feel that everything you do is against ethics and the results you hope for may not be what you want. An example: in France, in companies, feedback is provided based on things that did not work. You go to the USA and suddenly there is an emphasis on what you did well and not on what was bad. If there is flexibility in thinking and not letting psychological barriers dominate, there is going to be real intercultural communication

- The stereotype. It represents a rigid and superficial form of thinking, a cultural cliché, a representation of others according to a priori established categories. Prejudice is a negative attitude or a predisposition to adopt a negative behavior towards a group or towards the members of this group, based on an erroneous or rigid generalization. The stereotype and the prejudice work, most of the times, together, the stereotype representing the cognitive component, while the prejudice constitutes the affective, emotional component. The two terms undoubtedly have a strong negative charge, but it must be remembered that operating with stereotypes and prejudices is something that happens to all of us, because, being unable to fully know a reality, we have to resort to these "prefabricated schemes". Not all stereotypes are negative: there are generalizing clichés or labels, most of the time that concern ourselves or a group to which we belong, and that operate with positive appreciations. Example: “Romanians are hardworking, hospitable and generous”. Many of the stereotypes and prejudices are culturally transmitted, from one generation to another, including within the same culture..

- Language barriers. In all mixed teams, with people from several cultures, there is a common language in which communication takes place. But when some are more fluent in a language, the social distance between team members also appears. It is difficult to understand someone who speaks a language you do not master, you can no longer do your job, performance and skills are already perceived differently.

- Conflicting values. Any behavior is influenced by individual values. Intercultural communication problems occur when a behavior compromises one's own values. When you do not understand or disagree with a behavior it means that there are conflicting values there. Cultural conflict values are quite difficult to spot, they are a matter of detail, of subtlety.

In order to communicate effectively with the members of a different culture, the individual needs to develop the competence of intercultural communication.

In a general expression, this concept represents the ability of the individual to adapt to the communicative style specific to another culture, to effectively manage, successfully, the situations of intercultural communication

Intercultural communication competence is acquired through learning and is defined through three dimensions:

- The internal capacities and abilities of the individual
- Communication results
- Individual attitudes

The efficiency of intercultural communication consists in the success of individuals to achieve their goals. Also, intercultural communication is appropriate when individuals know and respect the constraints imposed on the communicative behaviors of sets various rules .

These two parameters, efficiency and adequacy, led to four styles of intercultural communication with different results (Spitzberg, 2000, according to Şerbănescu, 2007):

1. Minimal communication - has low quality, and its features are in the range [- efficiency, -adequacy];

2. Sufficient communication - although it respects socio-contextual constraints, it does not contribute to achieving (inter)personal goals, its features being in the range [- efficiency, + adequacy];

It is as if we were presenting ourselves at an interview and explaining much and well what experience and knowledge we have, and in the end we would directly receive the rejected verdict, despite everything we have explained.

3. Maximum communication - in which the individual, although achieving his personal goals, neglects the rules of socio-contextual adequacy through verbal aggression, Machiavellianism, deception, violation of the rights of others. The features of this type of communication fall within the range [+ efficiency, -adequacy];

4. Optimal communication - individuals achieve their goals by resorting to verbal and nonverbal behavior appropriate to the communication situation; its features are in the range [+ efficiency, + adequacy].

As mentioned above, the competence of intercultural communication is acquired through learning, but, in parallel, the development of this competence is favored by a series of personal skills and knowledge. In other words, intercultural communication involves the adoption of special interaction strategies. Bowe and Fernandez identified six such strategies, useful in situations of communication (according to Şerbănescu, 2007):

1) Collaboration of interlocutors - to ensure that the message was transmitted and understood correctly;

Listening in a communication is essential, but if the other person does not make a sound, then we should really ask ourselves a question mark.

2) Creating a positive team spirit - to avoid certain misunderstandings; Regardless of personal problems, we must present a state of well-being, smile as much as possible, but not in an exaggerated way, to make sure that the interlocutor does not feel embarrassed and to enjoy continuing the communication relationship.

3) Attention to possible cultural differences - differences can affect the way of communication;

We need to understand and accept that our interlocutor comes from a different culture and think that maybe the way we live or think is strange to him.

4) Interactional adaptation - the existence of interventions equal to those of the interlocutors

5) Simple speech - to avoid confusion;

We are different cultures, consequently we have different lifestyles. We will never use in communication with a Chinese, for example, a specific dialect difficult for him, but we will use a general vocabulary.

6) Avoiding ungrammatical, unnatural structures, inconsistent with the language of interaction - avoiding exaggerated simplifications.

These strategies were classified, by Byrne and FitzGerald (according to Şerbănescu, 2007), in:

•General strategies - recommended in most situations of intercultural communication;
•Additional strategies - recommended in situations where the interlocutor does not know very well the language of interaction; Moreover, the two authors made some recommendations regarding these strategies used in intercultural communication. These recommendations are summarized in the table below.

Table 1. Source: Şerbănescu, 2007, p. 292-293

General strategies	Additional strategies
Communicate any cultural communication difference to the other party that you have the impression that it could prevent efficient development of the interaction	Do not segment content units
If misunderstandings arise, reformulate the statement, do not repeat it	Repeat important or difficult messages, reassuring that the idea was understood correctly
Clarify with the interlocutor the intentions in behind your statements	Tell the other person explicitly when an important or difficult part of a message follows
Expect the interlocutor to could formulate ideas differently	Make simple and correct statements
Attenuate statements with negative effects on the interlocutor	

3. CULTURAL AWARNESS AND COMPETENCE IN MULTINATIONAL MILITARY MISSIONS

In order to highlight the role of cultural knowledge, the importance of developing cultural skills to facilitate intercultural interoperability in joint military missions, I will exemplify and analyze different cases as follows:

Table 2. Comparative presentation of cultural events in joint military actions at peace (Munster) and in the theater of operations. Source: Rita Palaghia, "Diferente culturale în teatrul de operații Afganistan"

The First Joint Corps (Germany-Netherlands Corps) at Munster	Joint Corps in Afghanistan	Multinational forces (KAIA military base)	Headquarters of the mission in Afghanistan (KABUL)
The Germans and the Dutch said in interviews that they trusted each other professionally. This finding is constant over a period of eight years. While the image of trust in German soldiers became stronger, the Dutch had to work on their own image. The same can be said about the meaning of duty. The most striking difference concerns the formal versus informal codes of conduct (the Dutch being informal and liberal in terms of rigidity, sociability and independence).	It was a case of binational cooperation, on the background of a multinational mission, but the contribution of the two countries was clearly unbalanced [12]. The camp was densely populated, the tents of Dutch soldiers were clearly isolated from the Germans. In a situation of isolation, gossip and complaints are likely to develop, which has indeed happened among the Dutch.	Airport activities are successful, staff are encouraged to report "challenges instead of problems" (a slogan made visible on banners and posters), a practice similar to how they are used in their own NATO bases. The stated attitude of the staff is the orientation towards fulfilling the duty of service: "They want to help keep the door open between Afghanistan and the world."	The very high level of training and representation of the staff in HQ Resolute Support created the premises for a top-level collaboration both professional and culturally interoperable. It is proof that long-term training and common experience in various military actions are the solution to reducing cultural frictions.

The First Joint Corps (Germany-Netherlands Corps) at Munster	**Joint Corps in Afghanistan**	**Multinational forces (KAIA military base)**	**Headquarters of the mission in Afghanistan (KABUL)**
This difference can lead to different styles of interaction which in turn could lead to friction between the Dutch military. Leadership styles differ in the Netherlands and Germany [11]. Authoritarian style is more common in the German army, while participatory style is characteristic of the Dutch.. Most of the German military showed a preference for the Dutch leadership style. Perhaps these styles are influenced by structural differences, such as the difference between an army of volunteers and an army of recruits. Minor differences lead to national stereotypes When national stereotypes become irritating, it is perceived as a phenomenon called "narcissism of minor differences." The attitude of the Dutch towards the Germans at the beginning of the study was negative, much more negative than towards other nationalities but changed over time with deeper mutual knowledge. A basic condition for successful military cooperation between two nations is communication and mutual understanding. This condition is best summed up in the concept of sympathy The progressive approach within the German-	The Dutch have constantly complained about the supply of goods (including weapons and ammunition), logistics in general, the security policies implemented by the Germans, the availability of telephones, the quality of food, and policies on alcohol consumption(which were different between Germans and Dutch [13]). In general, the Dutch criticized the way the Germans conducted the mission and the tasks they ordered to be accomplished. In addition, the Dutch did not understand why the Germans had better accommodation facilities and financial allocations different from their own. This situation did not improve even after the first rotation of Dutch units. The problems at Camp Warehouse have been heard at the Corps Command in Münster [15], and at the ISAF Command in Kabul. After the return of military personnel to Münster, the Dutch and German commanders of the corps felt the need to pay considerable attention to improving relations between the personnel participating in the mission in Kabul [14].	There have been a number of language issues since the beginning of the mission. In addition, national rules and regulations are different, sometimes causing disciplinary issues. The pace of decision-making has sometimes been criticized, with shortcomings attributed to the complex multinational chain of command and control. Despite some problems, the KAIA military is generally satisfied with the mission and sees their work in Afghanistan as "just another job." In addition, the continued increase in the number of civilian air connections to and from Kabul demonstrates the success of Operation KAIA. We consider this case a good example of international military cooperation. Standardization of communication has an essential role in ensuring efficient interoperability	

The First Joint Corps (Germany-Netherlands Corps) at Munster	**Joint Corps in Afghanistan**	**Multinational forces (KAIA military base)**	**Headquarters of the mission in Afghanistan (KABUL)**
Dutch 1st Army Corps, of the integrated binational interaction even outside the headquarters, can be considered a milestone in the process of European integration. Although there has not been much room for emotional identity between members of different military cultures involved in this bi-national collaboration process, there is common ground when it comes to profession, goals, and professional standards. In order for these standards to merge, it is necessary to increase the share of time spent together and, in particular, the time allocated to collective exercises and skills.	German-Dutch operational cooperation at Camp Warehouse ended in the autumn of 2003. Given all these processes and results, we consider this case as an example of international strain on military cooperation, and the common preparation is prerequisite, even if it is long enough turns out to be an important element, but not always enough.		

The analysis of the four case studies highlights the fact that cultural knowledge and skills development are necessary conditions for achieving cultural interoperability of coalition forces, but it must be borne in mind that the implicit stress of theaters of operations, to which are added different accommodation and remuneration of the forces contributes to the accentuation of the frictions between them and the decrease of interoperability.

4. CONCLUSIONS

Taking into account those mentioned in the article, we can conclude that, although the globe is one, it hosts hundreds of different cultures, and even within the same culture we find differences. it is impossible to learn all the cultural elements from all existing cultures, but they must be taken into account when there is an international relationship.

The indispensability of intercultural communication for a person in a leadership position must be emphasized, in a relationship it is essential to know the "language" of the interlocutor, and cultural education is paramount.

Common, long-term training generates and strengthens cultural knowledge trust between the military. Along with a level of knowledge of the English language at a considerable level, these elements automatically generate a interrelationship with minimal friction.

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THE COMMUNICATIONAL DIMENSION OF DIGITAL DIPLOMACY

Victor Adrian VEVERA[*], Sorin TOPOR[**]

[*]National Institute for Research and Development in Informatics – ICI Bucharest (victor.vevera@ici.ro)
[**]"Carol I" National Defence University, Bucharest, Romania (sorin_topor@yahoo.com)

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Abstract: *Diplomacy has emerged in interstate relations as a mechanism that facilitates the achievement of state objectives, with the task of promoting and protecting state sovereignty. It has had to be reinvented with every important discovery in world history and with every substantial change in the field of communication. The fourth industrial revolution changed the whole panoply of interpersonal and interstates relations, having an important effect on the way international relations unfolded. The emergence of 24/7 news networks, social networks, blogs and streaming has led diplomacy to enter a new stage of its transformation and adaptation to the realities of the contemporary world, giving rise to the so-called digital diplomacy. In this article cyber diplomacy is described from its communicational dimension point of view underlining its importance for assuring national interest of states.*

Keywords: *public communication, cyber diplomacy, technology, international relations*

1. DIPLOMACY – THE PAST AND THE FUTURE

The fourth industrial revolution changed the whole panoply of interpersonal and interstates relations, having an important effect on the way international relations unfolded. Diplomacy is a field that has had to be reinvented with every important discovery in world history and with every substantial change in the field of communication. Diplomatic mobility was positively influenced by the advent of steam engines and railways, and the telegraph produced fundamental changes in the way the governor, ministry and diplomatic representative communicated.

Subsequently, the advances registered in the field of information and communication technologies and the development of air transport led to infinitely more possibilities of communication between diplomats but also to the increase of the possibility of their effective interaction. Inventions such as radio and television have fundamentally changed the way states have the ability to achieve their national goals. For example, the coming to power of the Nazi regime benefited greatly from the promotion of their ideas through radio propaganda in neighboring countries, where the spread of their ideas led to the external legitimation of a deeply inhuman regime. Thus, the birth certificate of what was later called public diplomacy was signed.

Diplomacy has emerged in interstate relations as a mechanism that facilitates the achievement of state objectives, with the task of promoting and protecting state sovereignty. Invented since the seventeenth century, the practices of diplomacy have had to keep up with the times, being forced to cover various activities specific to international relations such as summits, meetings, conferences, in an extremely volatile and changing

context of the international environment and the emergence of supranational structures that have the capacity to participate in public, economic, international legal life, such as the United Nations, European Union, Nord Atlantic Treaty Organization, African Union, Association of Southeast Asian Nations. Moreover, diplomatic practices have been taken over and applied by government organizations involved in resolving issues with supranational impact.

2. THE COMMUNICATIONAL DIMENSION OF PUBLIC TRADITIONAL DIPLOMACY

Diplomacy seeks to resolve the conflicting problems and interests of states through direct communication with the public. In 1965, American career diplomat Edmund Gullion laid the foundations of public diplomacy as a mechanism that aims to promote the messages of a government among public opinion in other countries.

Thus, diplomacy has come to be understood as a specialized system of communication between sovereign states and / or other non-state international actors through which they promote and defend their interests and / or express dissatisfaction with the way in which the interaction takes place. In addition, diplomacy is that channel of contact that can be used to clarify positions, poll opinions, obtain the desired information and persuade international actors to position themselves in a certain way in the relationship between them [1].

Peter Barber defined diplomacy as the peaceful management of international relations. This definition of diplomacy has been criticized as limited, because sometimes diplomacy is part of the preparation for war, in the period of formation of coalitions and the separation of belligerents. Because of these reasons, James Der Derian will define diplomacy as a communication between foreigners [2], a mediation between foreign persons, groups or entities [3].

Hedley Bull [4] defined diplomacy as a communication that facilitates international society, the diplomatic profession being the custodian of the idea of international society. In the same year, Professor Geoff R. Berridge pointed out that diplomacy represent conducting international relations through negotiation and not by force [5]. An opposing school [6] considers diplomacy to be the conduct and content of foreign affairs as a whole.

We can conclude that diplomacy is a tool to promote the interests of state and non-state actors through official or informal representatives who use communication as the main tool to influence the decisions and conduct of foreign governments and their officials through dialogue, negotiation and other non-violent governmental means. We can notice that in its traditional form, diplomacy has a substantial component of public communication, which allows it to facilitate the achievement of state objectives.

3. THE COMMUNICATION REVOLUTION AND THE BIRTH OF DIGITAL DIPLOMACY

Globalization, through its characteristics such as the disappearance of national barriers and the global spread of trade, investment, travel and access to information, brings societies and civilizations into contact as never before, and this has produced substantial changes in the way development of international relations. The democratization of information determined by the rapid evolution of communication technologies has led to the assertion of postmodern characteristics of society, such as the compression of time

and space, but also to the exponential multiplication of mutual exchange of information between individual or state actors.

The unprecedented development of information and communication technologies has led to spectacular changes in areas that rely intensively on such processes in carrying out their specific activities. Diplomacy was not an exception, and digitalization became more and more present in the activities of negotiating, promoting national interests and in the compromise negotiation processes.

Harold Innis estimated half a century ago that, as a result of the accelerated communication between the actors of the international system appeared the germs of generating cultural disorders. Through an inductive reasoning, we can appreciate that in the conditions of a communication revolution of the present we face cultural disturbances. overall proportions, similar to that resulting from the appearance of the Gutenberg Galaxy.

Thus, since 1998, in the report Reinventing Diplomacy in the Information Age of the Center for Strategic and International Studies, Barry Fulton notes that traditional international relations were in an accelerated process of change, in which interactions in regional / global networks already it becomes a habit, capital moves quickly, and transparency becomes a preferred principle of collaboration, to the detriment of secrecy.

Moreover, the principle of transparency and accessibility of communication have determined an opening of the field to non-state actors who are increasingly involved in achieving the objectives of the state, so that traditional diplomacy becomes a diplomacy of everybody. The emergence of 24/7 news networks, social networks, blogs and streaming has led diplomacy to enter a new stage of its transformation and adaptation to the realities of the contemporary world, giving rise to the so-called digital diplomacy.

To cope with these major social changes, most states have included in their diplomatic services a number of activities and services based on digital technologies. Among the early initiatives of digital diplomacy are examples such as the US diplomatic service which has integrated a number of online tools on their website (http://www.whitehouse.gov/), and Lithuania which has modernized its service, based on the use of digital technologies [7] (Rimkunas, 2007), or as Germany, which updated its internal communication procedures in the external service after the introduction of local computer networks in 2002 [8] (Rana, 2007). The promotion of national interests today uses modern communication tools such as the websites of foreign ministries, embassies and delegations, international organizations and even specific for certain projects carried out on behalf of states [9] (Barston, 2014). Obviously, at present, features and uses characteristic of social media platforms are added for direct communication with the target audience from different states. Online diplomatic communication tools have become very powerful tools, which handled skillfully can bring multiple benefits and unsuspected opportunitiesi.

The most important change that the internet has determined is unlimited and instant access to information, and with the advent of social media there has been another revolution - instant and unlimited access to public opinion. Through these tools, the way people perceive and interpret the world has changed, but at the same time they have facilitated the interaction between people, who find it easier than ever to get in touch, to consult on various issues. Governments and embassies interact, meet general public, in order to have access to currents of opinion, but also to influence them, to set the public agenda, sometimes with a simple tweet or a Facebook comment. Therefore, the human resource working in diplomacy is necessary to complete its contingencies with solid training in the proper use of digital technologies.

Under these conditions, maintaining discretion becomes a real challenge for diplomats. It is increasingly difficult for them to keep the secret, to ensure that their thoughts or leaks of nonverbal language are not publicly disclosed and that the information that will underpin the negotiations and decision will not become public too soon.

Civic participation was, in turn, greatly favored by the way information is currently distributed. Citizens are up to date with the administration's policies, which they actively follow and comment on in digital space. Unfortunately, the anonymity offered by the activities in the digital space can be perceived by certain people as a screen behind which frustrations can be unloaded or certain situations can be manipulated with bad intentions. Anyone can assume a false name and position, behind which conflicting situations can be generated, false information can be disseminated leading to misinformation or wrong decisions. In addition, different political opinions can take the form of insults or slander against political leaders, who, because of their position, will find it difficult to defend themselves or their ideas.

The culture of digital ethics is not yet sufficiently developed among the public, as the security culture of information gatekeepers may be insufficient as everybody should ask oneself about what can and cannot be distributed on the internet before distributing information in the digital environment.

The efficiency of digital diplomacy as an instrument of foreign policy depends on how it is integrated into a foreign policy and international relations strategy. Digital first as a communication theory has been integrated into the diplomatic field with its inherent adaptations. The fundamental premise of this theory is that after the advent of the Internet, there was an inertia that characterized most of the media organizations, which paid more attention to the traditional way of organizing. Digital first refers to the decision to publish the news with priority in online editions at the expense of traditional ones. This concept has been important and adapted in other areas, including foreign policy. Therefore, the organization of the activity around the digital first concept presupposes the emphasis on the distribution of public and diplomatic communication messages on digital channels while ensuring the collection of information, knowledge management, negotiation and consular services using digital tools.

4. DIGITAL DIPLOMACY AND SOCIO-POLITICAL CHANGE

At the Earth Summit in Rio de Janeiro, the concept of digital diplomacy was first used in the e-mails of civil society that were involved in the lobby. At the same time, in Malta, a country recognized for its high rate of innovation, the Mediterranean Academy of Diplomatic Studies laid the foundations for the first unit for computer applications for diplomacy.

In 2010, the WikiLeaks scandal revealed about 250,000 catches of messages sent between US missions and Washington. It was the strongest signal that the digital age involves changing traditional methods of ensuring confidentiality, and imposed a fundamental overhaul of working procedures, methods and tools used in diplomacy.

But none of the aforementioned moments were so visible as the impact of the protest movements known as the Arab Spring, regarding the way in which digital technologies have evolved and applied in state policies.

It is estimated that even before these events, in 2008 the Internet was used to recruit about 80% of young people enrolled in jihadist movements. To combat this reality with devastating effects on democratic countries, the administration of President G.W. Bush laid the foundations of the concept of public diplomacy 2.0.

This initiative involved the proliferation of digital forms of communication by the state - the US State Department has created an account on Facebook, a departmental blog has been launched and teams have been set up to combat online propaganda carried out by Al Qaeda.

The impact of the media was visible during Arab Spring protests in the online activity of revolutionaries who made their positions known and disseminated images of their struggle through social media. Social media visibility on this occasion led to the emergence of the term Twitter diplomacy - a name generated by the use of this social network by diplomats and public authorities to support public communication.

Gradually, digital diplomacy overlapped semantically with terms such as diplomacy 2.0, e-diplomacy, Twitter diplomacy, computerized diplomacy. Gradually, the associated activities were decanted and there are three important and specific dimensions for the symbiotic relationship between ICT and diplomacy, in the specialized literature:

1. changes in the environment in which diplomatic activities are carried out due to the use of ICT in the environment in which diplomacy takes place (geo-political, geo-economic, sovereignty, interdependence);

2. the emergence of technological topics on diplomatic agendas (internet governance, cyber security, privacy and more);

3. the emergence of new tools for diplomatic practice facilitated by technology (social media, big data and more).

5. CONCLUSIONS

In this article, we have focused upon the changes of international relations that emerged in the contemporary period under the influence of modern technologies which had caused a true revolution in the communication field. Diplomacy was a profoundly affected by these changes and web 2.0 technologies have managed to change significantly the way diplomatic negotiations are conducted today. Diplomatic communication had to be changed in response to the way everybody is using new technologies. Today it is much easier for regular people to actually manage to change the world and diplomacy has to deal with this.

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RISK MANAGEMENT IN REDUCING THE OCCURRENCE OF AVIATION EVENTS

Mădălina DUMITRU[*], Adrian STOICULETE[**]

[*]"Transilvania" University Brașov, Romania (imdldumitru@gmail.com)
[**]"Carol I" National Defence University, Bucharest, Romania
(stoiculete.adrian@yahoo.com)

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Abstract*. The aim of this paper is the evolution of system safety approach in aviation, which consists in three main research areas: technical factors, human factors and organizational factors. As the airline traffic has risen rapidly in the last years, in countries around the world, there is a need to employ new methods and programs to drive down accident rates. Related to safety, major airlines have employed programs and activities to ward off accidents, in order to make better their records. This difficulty to assess the risk focuses in searching an equilibrium between reality and measurements and also in deciding which settlements have to be made, to reach the objectives.*

Keywords*: safety managements systems (SMS), human factor, safety risk management, management of change, safety performance indicators (SPIs), crew resource management (CRM), safety performance measurement (SPM).*

1. INTRODUCTION

With the emerging of air traffic growth, we are witnesses of great errors and even human losses. Most of the countries across the globe persists into fighting against these errors and to improve their rates. There are many regions which have high rates of fatal accidents, like those from Central Asia, Africa, Eastern Europe, and America. Considering all of these, it was identified the need of a common initiative at a national and international level to keep air transportation in a both safely and sustainably manner. For the last decade, important airlines have begun to use safety management activities such as preventing accidents and flight safety programs, desiring to have better records regarding safety.

The *Safety management systems (SMS),* has deep roots in the theory of organizational behavior. *SMS* is based on the principles of *quality management systems (QMS)*. Stolzer (Stolzer et al, 2010) define SMS as *"a dynamic risk management system based on quality management (QMS) principles in a structure scaled appropriately to the operational risk, applied in a safety culture environment*".

There has been identified differences between quality and safety. Quality according to International Standards Organization (ISO) 9000:2005, defined as "*the degree to which a set of inherent characteristics fulfils requirements*".

These principles are in a strong relationship but not identical. While quality refers to accomplish requirements, safety is looking out to prevent people and property from harm (Mario Periobon in *Aerosafetyworld* June 2012 p. 46-47).

Quality system (QS) is to ensure safe operations, and the approach is Safety Assurance /Compliance Monitoring. Safety management System is to reduce or maintain risk of injuries to persons or property damage at or below an acceptable level, and the approach is risk-management & Safety Assurance / Compliance Monitoring (ICAO, 2009).

Reason (2009), say that a SMS provides the administrative structures necessary to drive good safety practices. It focuses upon the technical and managerial factors associated with hazards.

The airline traffic has risen rapidly in the last few years; therefore, there is a need to employ new methods and programs that can drive down accident rates. It is also vital to develop methods that not only maintain the current safety records but also to be cost-effective. Furthermore, there are airline operations and still many countries that are struggling with bad safety records that now have the option of adopting a more integrated system. The increase of airline departures naturally means an increased in volume and capacity for the other sectors of the airline industry. It is also important service providers are involved and they meet the business demands and safety standards that the airliners are operating.

2. EVOLUTION OF SYSTEM SAFETY APPROACH IN AVIATION

In aviation three main research areas have influence the development in system safety. It can be divided as studies in technical, human and organizational factors. The development in research areas can be divided into three time periods:

- 1940s -1970s the focus was on technical factors.
- 1970s- 1990s, the focus was on Human Factors.
- from the early 1990s the focus was on Organizational factors. Today, it is a combination of the three factors.

Technical factors

From the very first appearance of the aviation until the 70s, most of the safety issues were connected to technical related factors. It was an era described as being a technical one. Although aviation took its place in the industry of in mass transportation, technology that supported the operations did not keep the pace, and did not reach the level necessary to eliminate the repetitive factors that induced malfunctions into the safety area. Focusing safety on technical factors, brought improvements in recognizing and investigating technical factors.

Human factors

The 70s made multiple steps in major areas such as, airborne and ground radar, navigation and communication, autopilots, FD (flight director) and other similar technologies that were centered on human, to improve performance, and to develop automation. This started an era oriented on human, and also safety turned its attention to human, with the appearance of line training, automation, CRM (crew resource management). The time period between the 70s until the 90s was identified as being a golden one of Human Factors, according to the strive of controlling the evasive and omnipresent human error. Although it is well known the huge investment of money and resources in error prevention, by the second half of the 90s, human performance still was a repetitive element malfunctioning safety mechanisms.

From the beginning of the 1990s it was first realized that persons are not acting in a void, but within specific operational context. Although scientific information was accessible regarding how characteristics of such a context can give shape to events, outcomes and influence human performance, people in aviation industry acknowledged that fact only from 1990s. This announced the start for the organizational context, and therefore safety was seen from a systemic view, encompassing all the other factors technical, human and organizational [5].

Organizational factors

The idea of organizational accident, aviation-wide accepted, was materialized by an explicit model demonstrated by Professor James Reason [6], that made possible the understanding of the way that aviation works in a successful manner or it is failing. This model describes the fact that accidents could happen if there are met a series of enabling elements which, taken alone could not break the system. Single point failure is infrequent in complicated domains like aviation and extremely well protected by walls of protection. Equipment breakdown or operational errors are not the source of breaks in safety defenses, but the activation. Breaks in safety defenses are consequences of solutions taken at the top levels of the system, that stays latent until the destructive capability is triggered by a series of circumstances. Taking those facts at the operational level, human or active failures work as an activator of the latent conditions favorable to ease a break of the system's safety defenses [2].

In the concept promoted by the *Reason* model, an accident involves a mixture of both latent and active conditions (*ICAO 2009*).

SMS has different interpretation specific for different organization or industry. From the perspective of civil aviation, the SMS components may include general characteristics allocated to it. Taken from SMS manual built up by ICAO (International Civil Aviation Organization) in 2009, SMS is constructed around four basic pillars. Each basic pillar is divided by segments, that enclose particular tasks or processes to run the safety management. They are [3]:

- Safety risk management
  - hazard identification
  - risk evaluation and reduction

- Safety assurance
  - measurement and safety performance monitoring
  - MOC - the management of change
  - continuous upgrade of the SMS

- Safety objectives and policy
  - responsibility and commitment
  - safety accountabilities
  - engagement of the essential safety personnel
  - coordination of emergency response planning
  - SMS documentation

- Safety promotion
  - training and education
  - safety communication.

EPAS (European Plan for Aviation Safety) is an important part of the SMS, continuously improved and reviewed at the European level. It is introduced voluntary by the *European Aviation Safety Agency (EASA) Member States* through their *State Programs* and *Plans*.

On the last ten-year period, the number of fatal accidents has slightly decreased and the number of fatalities varies more. This is because the number of fatalities is principally related to the size of the aircraft implicated and the type of flight, cargo or passenger, and therefore the occupancy of the aircraft (FIG. 1) [1,7].

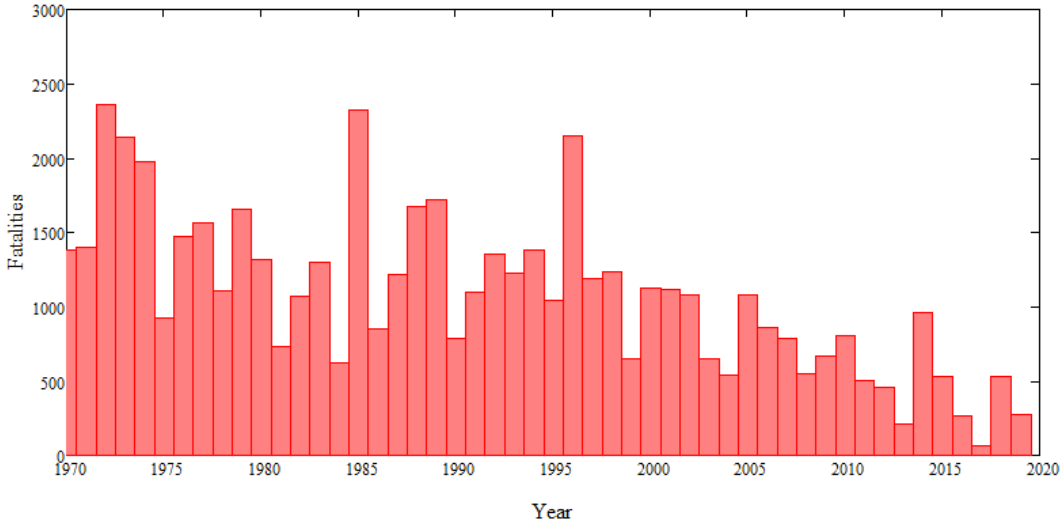

FIG. 1 Fatalities over years for global airline

The evolution of *EPAS* has been made possible by the *European Safety Risk Management (SRM)* process, and can be found described in five particular steps below [1].

***Recognizing of Safety Issues*:** Primary step in the SRM process is identifying of safety issues and it is developed by analyzing the occurrence data and contributing information by the Collaborative Analysis Groups (CAGs). The identified issues regarding safety get the attention of the Agency and after that analyzed for the first evaluation. The evaluation shows the way on how this safety issue must be formally introduced in the relevant safety risk database or prone to something else. Guidance is given by the NoA (Network of Analysts) and *CAGs*. The result of this particular segment of the process are the domain safety risk database. In this database are sorted by importance the principal areas of risk and most issues regarding safety.

***Evaluation of Safety Issues*:** As soon as identified and included in the safety risk database, a safety issue is prone to an initial safety evaluation. These evaluations are sorted by importance in the database. The evaluation is conducted by *EASA*, and aided by the *NoA* and the *CAGs*. Additionally, group members are invited to take part in the evaluation itself; this outer aid is essential to reach the greatest results. In conjunction they are forming the *SIA (Safety Issue Assessment)*, that is giving guidance to EPAS to take the action.

Immediately after this, is the *Best Intervention Strategy (BIS)* evaluation, which takes into consideration the larger interest, the involvement of the indicated actions and gives information for the appropriate measures that must be included in the EPAS.

***Programming and Defining Safety Actions*:** Using the mixt *SIA/ BIS*, the advisory bodies receive formal proposals action from *EPAS*.

As soon as established and settled, the actions are introduced into the newer form of *EPAS*. Before publishing it, *EPAS* gets approval through EASA Board of Management. Actions that are low cost or require more rapid intervention, are often fast-tracked and appear in the next available update of the *EPAS*. In some cases, more immediate actions are needed that may be completed before the next *EPAS* would be published, naturally these are not included within *EPAS*. Such actions could include a *Safety Information Bulletin (SIB)* or *immediate Safety Promotion activities.*

***Implementation and Follow Up*:** The succeeding move in the process implies the execution and the constant review of the actions or activities to be introduced into *EPAS*. We can enumerate several distinct types of actions that can be found within the EPAS, encompassing exploring, safety, promoting, rulemaking and focused oversight.

Quantification of Safety Performance: Quantification is the last phase in the process of safety performance. It is done for the following reasons, in the first place to surveil the changes that have derived from the introduction of safety actions. In the second place, it also serves to surveil the aviation system in order to identify the new safety issues. A *Safety Performance Framework* has been introduced that identifies distinct layers of *Safety Performance Indicators (SPIs)* to establish that there is a step by step work in this step of the *SRM* process.

In parallel, EASA is also reviewing systemic issues that may have contributed to the accidents so as to identify improvements that will contribute to a more resilient European and international certification framework. Under requirements laid down by ICAO, aviation accidents must be investigated with a view to understanding the causes and preventing similar accidents in the future. Based on the information from accident reports and from preliminary information where the investigations are ongoing, the accidents between 2015 and 2019 had the following characteristics:

- aircraft upset, terrain collision and runway excursion were the most common accident outcomes. Runway excursion is most common during the landing phase of flight.
- the most common underlying cause to these accidents is associated to the flight crews' management of challenging circumstances created by technical failures or poor weather conditions, including wind shear, during approach. Safety management continues to emerge as a key factor in preventing accidents.
- cargo flights formed a third of the fatal accidents, forming a greater proportion of fatal accidents than commercial air transport flights.

3. CONCLUSIONS

The difficulty to assess the risk focuses in searching an equilibrium between reality and measurements and also in deciding which settlements have to be made, to reach the objectives. [4].

Reaching a thorough knowledge of human and technical behavior and influences that govern such behavior, qualitative analysis is necessary before measuring any risk type.

This paperwork presents a view of where measurements need to be developed to tell us what the highest risks are. The aviation system has many distinct but interrelated parts.

Developing efficient measurements requires a proper comprehension of the aviation system and the risks in individual processes in the domain of manufacturing, operations, air navigation, and training. Quantifications should conduct to identifying the existing and emerging risks in each of these parts and to see whether regulatory actions have the expected effect on controlling or eliminating hazards. Although there is regulation to control the risk, there are hazards that cannot be identified. Development in safety aviation have to rely on structured and systematic hazard recognition and control, to monitor and understand what are those causes and the factors that lead to failure in aviation.

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MEDITERRANEAN CYCLONES TRACKS IN EUROPE WITH SPECIAL VIEW OVER ROMANIA (1985-2015)

Vlad-Alexandru ILIE, Adina-Eliza CROITORU, Titus-Cristian MAN

"Babeș-Bolyai" University, Faculty of Geography, Cluj-Napoca, Romania
(vlad.alexandruilie74@gmail.com, adina.croitoru@ubbcluj.ro, titus.man@ubbcluj.ro)

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Abstract. *Mediterranean cyclones (MCs) affect not only the countries neighboring the Mediterranean basin, but also the weather conditions in regions that are not in direct contact with the Mediterranean basin such as Central, Eastern and South-Eastern Europe, including Romania. They are associated, in general, with extreme weather events. This study considered data over a 30-yr. period (December 1, 1986 – November 30, 2015). For MCs identification and their track tracing, the mean sea level pressure, 500 hPa geopotential heights, 500-1000 hPa relative topography and 850 hPa pseudo-equivalent potential temperature were employed. The European spatial domain was delimited as 30°-60° N latitude and as 20° V - 45 ° E longitude. To select those cyclones influencing the weather in Romania a square-shaped area whose external limits are located about 500 km from the center of Romania was used. For tracing the trajectory, the low-pressure center position at every 6 hours was considered. Frequency of occurence and track density were analyzed considering two temporal approaches: i. for the entire period and for three 10-yr subperiods; ii. the annual and seasonal scale for the entire period. For track density, the anomalies for each 10-yr sub-period and for each season were calculated. The main findings of this study are: the most exposed area to MCs are central and eastern Mediterranean regions, 43.39% of the cyclones generated in the Mediterranean basin crossed the region of Romania; seasonally, the highest occurrence frequency is specific to winter and the lowest to summer; no significant changes in the annual or seasonal occurrence was detected; during the second 10-yr sub-period weak to moderate positive anomalies were detected, whereas during the first and the last ones, positive and negative anomalies were found depending on the season and region; seasonal average position of the MCs tracks revealed the largest shift from one sub-period to another in winter and the smallest in autumn.*

1. INTRODUCTION

The semi-enclosed Mediterranean basin is one of the main cyclogenesis regions in the world (Akhtar et al., 2014, Ragone et al., 2020) with a large number of cyclones different in structure, lifetime and intensity forming every year (Lionello et al., 2016). Mediterranean Cyclones (MCs) are climate determinants for the southern and south-eastern regions of Europe and are one of the most important factors generating severe meteorological and hydrological events in the crossing regions (Jansa et al., 2001a; Lionello et al., 2006). They affect, mainly by producing extreme precipitation or heavy dust transport from Africa towards Europe (Fita and Flaounas, 2018), not only the countries neighboring the Mediterranean basin, but also the weather conditions in regions that are not in direct contact with the Mediterranean basin such as Central, Eastern and South-Eastern Europe.

The important variation in the tracks density (TD), position, frequency, and intensity of the Mediterranean lows determines frequent changes in weather conditions, generating drought, flash floods and persistent floods, wind storm events in the crossed regions (Șorodoc, 1962; Bordei, 1983; Radionović, 1987, Jansa et al., 2001a,b, Nissen, 2010, Nissen et al., 2013, Dobri et al., 2017, Catrina et al., 2018, Gvoždíkováa and Müller, 2021). For this reason, topics like the density, frequency and position of the MCs tracks got the attention of many researchers at European level (Lionello et al, 2006; Ulbrich et al., 2009; Zappa et al, 2013 and 2015; Nissen, 2010; Nissen et al., 2013). Cyclones originated in the Mediterranean Sea basin followed a large variety of tracks, but the most frequent are those towards east and northeast (Radionović, 1987). One of the most recent finding was a north-easterly migration of Atlantic and Mediterranean cyclones track, generally agreed upon as an expected result of climate change in this region (Bonaldo et al., 2020).

Some other studies focused on analyzing the intensity of MCs, such as those describing the statistics of Medicanes in the Western Mediterranean basin based on a set of multidecadal simulations performed with WRF in different model setups (Ragone et al., 2018), or simulating the deepening rate and exploring the role of sea surface heat fluxes for some specific cases of explosive cyclogenesis in the eastern Mediterranean (Kouroutzoglou et al., 2018). It is estimated that in a warming climate, the intensity and duration of the Mediterranean Tropical-Like Cyclones will increase, while their number (occurrence frequency) will remain constant (Dafis et al., 2020).

To detect the occurrence and follow the MCs tracks the information provided by geostationary satellites with high temporal and spatial resolution is very important as it allows the use of infrared brightness temperature to better estimate the presence of convective clouds associated to the MCs. Although some limitations were observed in discriminating convective clouds from high-level clouds the infrared remote-sensing observations is still the most common approach in literature (Dafis et al., 2020).

For the Romanian territory, the depressions originated over the Mediterranean Sea represent an important source of precipitation, mainly for the south, south-east and east of the country as well as a factor generating extreme meteorological events such as heavy rainfall, massive snow and snow storms, long-lasting drought events, and sometimes, upper dust transport. (Șorodoc, 1962; Bordei, 1983; Gogu, 2007, Dobri et al., 2017).

The main aim of this paper is to investigate the low-pressure systems originated over the Mediterranean Sea in terms of their TD and frequency for a 30-yr period (1986-2015) over the Romania's region. The data and methodology used for the identification and tracking of the MCs and the methods used in the study are described in section 2, the results obtained and discussions are presented in section 3 over the considered region. The last section is dedicated to Conclusions.

2. DATA AND METHODES

2.1. Data used

To create the database, the spatial domain for further analysis was delimited as latitude between 30° N and 60° N and as longitude between 20° V and 45 ° E (FIG. 1a). We identified all the low-pressure systems that crossed over the European region over a 30-yr the period, from December 1, 1985 to November 30, 2015. We consider the December 1985 data in order to catch the seasonal features, too. In order to select the MCs influencing the weather in the region of Romania following the trans-Balkan tracks, the average radius of these cyclones was established at 520 km (Gogu, 2007).

This way a square-shaped area whose external limits are located about 500 km from the center of Romania resulted: a cyclone with a radius of 500 km located with the center on one of the 4 sides covers about 50% of the country's territory (Fig. 1b).

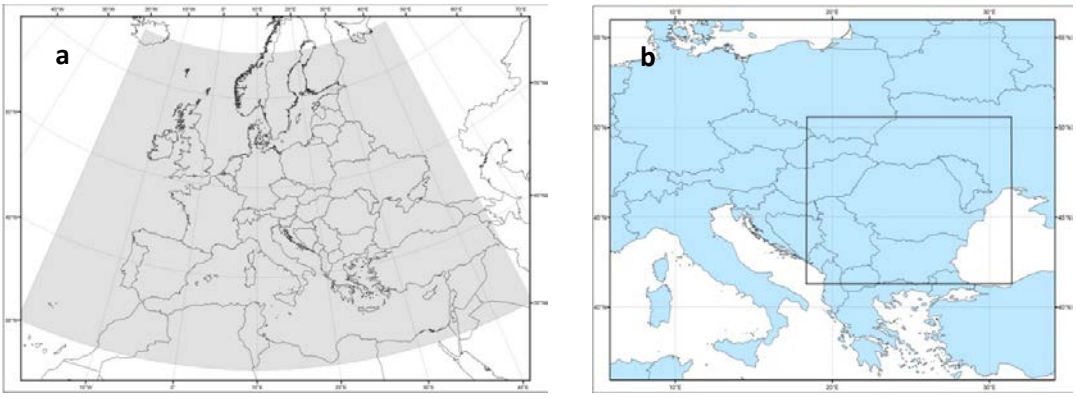

FIG. 1 Study area (a). Romania (b)

For MCs identification and their track tracing, the mean sea level pressure (MSLP), 500 hPa geopotential heights, 500-1000 hPa relative topography and 850 hPa pseudo-equivalent potential temperature were employed. The MSLP field data used in this study were extracted from the re-analysis data set, ERA-interim (Dee et al., 2011) with a spatial resolution of 0.75°×0.75° and a 6-hour temporal resolution, made available by the European Center for Medium-Range Weather Forecast (ECMWF). The other data are available at http://www1.wetter3.de/archiv_gfs_dt.html. (WASA 1998; Alexandersson et al. 2000; Gulev et al 2001; Hoskins and Hodges 2002; Almazroui et al, 2014). The 6-hour temporal resolution has the disadvantage of increasing TD in the case of stationary and quasi-stationary low-pressure systems (Serreze et al, 1997), but it is the optimal time-step to capture cyclogenesis process over the Mediterranean Sea and its neighboring regions. Using the center position for a 12- or 24-hour time step (resolution) would lead to ignore or to later identification of the MCs.

The cyclones developed over the island of Cyprus that did not followed a northward track were excluded from this study because they left the study region after a short time from their occurrence (less than 24 h from their identification).

2.2. Low-pressure systems detection and tracking

Low-pressure systems were identified based on the minimal principle in the MSLP field, surrounded by at least one closed isobar. It was intended that the minimum pressure at the center be less than 1010 hPa. The tracks of the Mediterranean lows were derived from the center position points identified at every 6 hours. All lows detected based on MSLP and confirmed by the mid-troposphere data, including those stationary, were maintained for further analysis. When a cyclone, in its initiating phase developed two centers (two centers-cyclone), we consider the track of the center with the lowest pressure and the longest displacement. If the second center had a life-time longer than 24 hrs, it was registered as a new individual starting from the first closed isobar.

A MC identified based on the previously described method was considered to have the initial position at time t_0, and the next position corresponds to its 6-hr later location, at time t_1. The track of the cyclone is given by all locations corresponding to consecutive time-steps where the low-pressure center was identified during its life-time.

2.3. Analysis of the MCs activity

The activity of the low-pressure systems originated over the Mediterranean Sea was analyzed by their occurrence frequency and by the track density (TD) with a special focus on the second issue.

The occurrence frequency analysis was performed for the entire period (1985-2015), but also for three shorter sub-periods, of 10 years each (1985-1995, 1996-2005, 2006-2015), as well as considering the entire year and the seasonal values.

The analysis considered the MCs occurrence, but also the frequency of the tracks crossing each grid established as described below.

Low-pressure systems track density (New et al., 2013) is the measure of the spatial distribution of a low-pressure center activity (Nissen et al, 2010). For density analysis polynomial interpolation was used, for centroids of each 3° x 3° grid. This method of interpolation was chosen given the homogeneous distribution of points at the level of the studied area. To highlight the evolution of average TD over the considered period, the difference between a specified decade and the average of the three 10-yrs sub-periods (considered as the reference value) was obtained as rasters:

$$M_3 = \frac{(D_1+D_2+D_3)}{3} \quad (1)$$

Where,

M_3 – mean decadal number of cyclone tracks (TD) calculated for annual value or for each season;

D_1 - TD for the period 1986-1995 (1985-1995 for winter season);

D_2 - TD for the period 1996-2005 (1995-2005 for winter season);

D_3 – TD for the period 2006-2015 (2005-2015 for winter season).

Further on, we calculated the anomaly for each sub-period over the entire period:

$$TN_{Dn} = D_n - M_3 \quad (2)$$

Where,

TN_{Dn} – anomaly of the TD for a specified sub-period;

D_n – TD for each subperiod, n=1; 2; 3 as given in equation (1);

M_3 – mean decadal number of cyclone tracks calculated for each season.

The spatial analysis was performed both on an annual and seasonal basis. We have chosen to focus also on the seasonal analysis, first because of seasonal occurrence of the MCs, with a maximum frequency during the cold half of the year and because different TD has been found for each season (winter - DJF, spring - MAM, summer - JJA autumn – SON).

In order to determine the mean position of the MCs' tracks, we used the latitude and longitude coordinates values and for each decade a linear regression function was applied. The resulting coordinates were first converted to points using ESRI ArcGIS v.10.8 software and then converted to lines marking the general trend of cyclones over the analysed (sub-)period. Thus, the mean trajectory (average position of the tracks) of the MCs in the study area were obtained.

2.4. Trend analysis

The trend analysis was performed based on annual and seasonal frequency data. We used Mann-Kendall test to detect de trend, whereas for the magnitude of the trend, Sen's slope method was employed (Mann, 1945; Kendall, 1975, Sen, 1968).

They are commonly and largely used methods for detecting changes in hydro-climatic variables (Zhang et al., 2005; Choi et al., 2009; Croitoru et al., 2012a; Tabari et al., 2012). The significance level was established at α=0.05.

The data were processed by employing XLSTAT software, Premium version.

3. RESULTS

3.1. Frequency of the MCs occurrence

3.1.1. Frequency of MCs occurrence over the entire year

Using the data and methods described above, 779 closed lows-systems have been identified and traced based on MSLP, originating from the Mediterranean Sea basin between December 1, 1985 and November 30, 2015, to which we added 95 cyclones generated over the Atlantic Ocean or in the region of Iceland, but following the Vb track, established by van Bebber (van Bebber, 1891 cited by Messmer et al., 2015). It resulted in a total of 868 tracks. More than 43 % of them ended up influencing the weather in Romania (Table 1).

Table 1. Frequency of the MCs occurrence over the period 1986-2005 and over the 10-yr sub-periods

Decade	Frequency of MCs* occurence	Frequency of MCs crossing Romania	Frequency of MC crossing Romania (%)
1986-1995	272	116	42.64
1996-2005	312	136	43.59
2006-2015	290	127	43.73
Total	**874**	**379**	**43.36**

For the 10-yrs sub-periods, one can see that the most intense cyclonic activity characterized the second sub-period both in terms of general occurrence over the Mediterranean basin and on crossing Romania's territory, whereas the least intense was specific to the first 10-yrs sub-period (Table 1).

As multiannual average, more than 28 cyclones occur each year, but their number varied over the entire period from 15 to 45. Less than half followed tracks crossing our focus region (Tables 1 and 2).

No change was detected for the annual frequency of cyclones occurrence over the Mediterranean Sea or of those crossing Romania (Table 3).

Table 2. Frequency of the MCs occurrence by seasons over the period 1985-2015

Value	Total MCs occurrence									
	Winter		Spring		Summer		Autumn		Annual	
	No	%*	No.	%	No	%	No	%	No	%
Total number	**349**	**39.93**	**261**	**29.86**	**65**	**7.44**	**199**	**22.77**	**874**	**100**
Minimum	4	-	6	-	0	-	3	-	15	-
Average	11.6	39.8	8.7	30.1	2.2	7.3	6.6	22.8	29.1	100
Maximum	19	-	13	-	8	-	14	-	45	-
	MCs crossing Romania									
Total number	**127**	**36.39**	**129**	**49.43**	**39**	**60.0**	**84**	**42.21**	**379**	**43.36**
Minimum	0	-	1	-	0	-	1	-	6	-
Average	4.2	33.3	4.3	34.1	1.3	10.2	2.8	22.3	12.6	100
Maximum	12	-	8	-	5	-	7	-	22	-

*The percentage value for the *Total MCs occurrence* represents the share of the total annual number and for the *MCs crossing Romania* represents the share of the total MCs occurrence for the corresponding season

Table 3. Trend test results for the frequency of the MCs occurrence and those crossing Romanian territory by seasons over the period 1986-2015

Series/ Test	Frequency of MCs occurrence in the Mediterranean Basin			Frequency of MCs crossing Romania		
	Kendall's tau	p-value	Sen's slope	Kendall's tau	p-value	Sen's slope
Winter	0.204	0.131	0.118	0.230	0.092	0.083
Spring	-0.124	0.372	0.000	-0.056	0.699	0.000
Summer	-0.183	0.192	0.000	-0.173	0.228	0.000
Autumn	0.066	0.637	0.000	0.010	0.956	0.000
Annual	0.028	0.844	0.000	0.047	0.733	0.000

3.1.2. Frequency and trends of the MCs occurrence by seasons

a. Winter

As expected, the frequency of cyclones developed over the Mediterranean basin is the highest in winter when 349 individuals were identified (39.93 %), out of which 127, representing 36.39%, passed with their central point over different areas of the focus region. The multiannual average frequency for winter season for the occurrence over the 30-yrs period is more than 11 cases/season, with extreme values ranging from 4 to 19 CMs/season. For the Romanian region a mean value of 4.2 cyclones/season was identified, but their number varied from one year to another from 0 to 12 (Table 2).

The trend analysis indicated a slight increase, yet not statistically significant, in the number of cyclones both in terms of those generated over the Mediterranean Sea and those crossing Romania (Table 3).

b. Spring

In spring, the frequency of cyclones in the Mediterranean basin is much lower than in winter, registering 261 cyclones out of which, 129 cyclones (49.43%) passed through the region of Romania. The mean seasonal occurrence frequency of the MCs is 8.7 whereas 4.3 MCs/season crossed the focus region during spring. Extreme values varied between 6 and 13 for the total number of cyclones generated over the Mediterranean, and between 1 and 8 for those crossing Romania (Table 2).

The trend test did not indicate any change (Table 3).

c. Summer

Summer season was characterized by the lowest number of cyclones (65), much lower compared to the other seasons. The multiannual average was calculated to be 2.2 cyclones/season, ranging from 0 to 8 MCs/season. Weather in Romania, during summer was affected by a total number of 39 cyclones over the entire period (60 % of active MCs in summer), with a multiannual average of 1.3 MCs/season, but from one year to another the seasonal number varies from 0 to 5 (Table 2).

The trend indicates a slight decrease in the number of cyclones (Table 3).

d. Autumn

During the autumn, the number of cyclones generated in the Mediterranean basin increased to 199 cyclones, with a multiannual average of 6.6 cyclones/season, and 84 of them (42% of the total and with a multiannual average of 2.8 MCs/season) influenced the weather conditions in the focus region (Table 2).

For this season the trend detected are slightly different for the two categories discussed in this section: for the total number of low-pressure centers generated in the basin a slight increase was registered, whereas stationarity characterized those crossing the region of Romania (Table 3).

3.2. TD spatial analysis at European scale

The TD spatial analysis followed two approaches: first, we considered the TD spatial distribution at annual and seasonal scale over the entire period, and second, we focused on the entire period and the three 10-yrs sub-periods.

3.2.1. TD analysis over the entire year

Thus, the average distribution of TD is higher over the Mediterranean basin and in the eastern and south-eastern European countries. The most affected regions are the Central Mediterranean basin (the Italian Peninsula, the Tyrrhenian Sea, and the Adriatic Sea) with up to 560 tracks, followed by the Eastern Mediterranean (Greece, the Ionian and Aegean Seas) with an average of 281-350 tracks. A much lower TD (71-140) characterized the south-eastern France, Germany, and Poland, most of Ukraine and Belarus as well as the southwest of the European Russia. In other regions of Europe, especially in western and northern regions of the continent, TD averages between 1 and 70 MCs over the entire period. Throughout the study period, the largest Romania's territory was crossed by 141-210 tracks/sub-period over the southern and central regions, whereas the northern third of the region was characterized by a density of 71-140 tracks (Fig. 2).

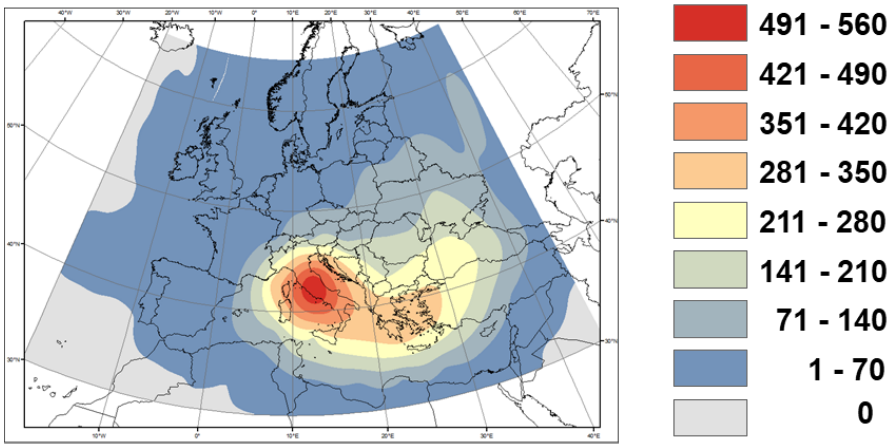

FIG. 2 Spatial distribution of MCs TD over the 30-yr period

Analysis of the MCs TD by 10-yr sub-periods revealed an increase of the frequency from the first sub-period to the next two. However, the highest density characterizes the central Mediterranean and central Italy followed by Eastern Mediterranean region for all three sub-periods.

Romania's territory was affected by 25-50 MCs /sub-period in the northern regions and by 51-75 MCs/sub-period in the southern ones during the first and the last sub-periods, whereas over the second sub-period, the entire country was crossed by 51-75 MCs/sub-period (Fig. 3).

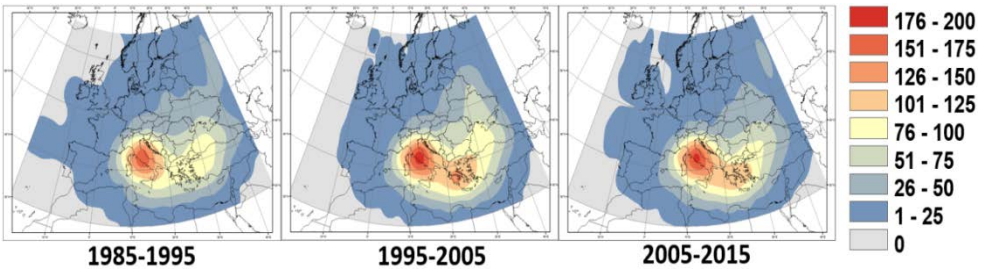

FIG. 3 Spatial distribution of MCs TD over the period 1985-2015 by 10-yrs sub-periods

3.2.2. TD analysis by seasons

The seasonal distribution shows that most tracks were recorded during winter (December, January and February), followed by autumn, spring, and summer.

a. Winter

Among the three sub-periods, the last one was characterized by the most intense cyclonic activity in terms of TD, followed by the second one and by the first one. The highest density over the first sub-period (1985-1995) was identified in the centre of the Italian Peninsula (52-60 tracks/sub-period), followed by Southern Italy and the Ionian Sea (46-51 tracks/sub-period). Beginning with the second sub-period one can notice a decrease in the TD in the Italian Peninsula and an increase in their number in the eastern Mediterranean (southern Greece and Aegean region), where the highest TD was specific during the last sub-period (61-71 tracks/sub-period) (fig. 4). This finding is in agreement with that previously obtained by Zappa et al. (2015).

To better emphasize this feature, we calculated the difference between the TD of each sub-period and the average of the entire 30-yrs period. Results indicated the strongest negative anomaly (-14…-11 tracks/sub-period) during the first 10 years of the study period in the central and Eastern Mediterranean basin (Greece and the Aegean Sea) and the strongest positive one, of 6-14 tracks/sub-period, over the last sub-period in the same region (Fig. 5).

The Romanian region was crossed in winter by 4.2 tracks / season, as an average value. Over the first sub-period (1985-1995), the TD is lower (less than 10 tracks/sub-period in the nordic regions; 10-18 tracks/sub-period in most of the territory and 19-27 tracks/sub-period in the extreme southeast of the country (southern Dobrogea region). Similarly to the situation described for eastern Mediterranean, an increase of the tracks number over Romania was detected over the second decade (10-18 tracks/sub-period over the largest area of the country and 19 - 27 tracks/sub-period in the south and south-east) (Fig. 4).

In terms of anomaly calculated by sub-periods, during the first decade, the negative anomaly of TD is low (2-5 tracks). Over the second sub-period, the TD increases, leading to a low positive anomaly (2-5 tracks) over almost the entire country and to a moderate one, of 6-10 tracks in the extreme north of the country. During the third decade no important changes from the average were found, excepting a narrow region in the south of the country where a low positive anomaly (2-5 tracks) was detected (Fig. 5).

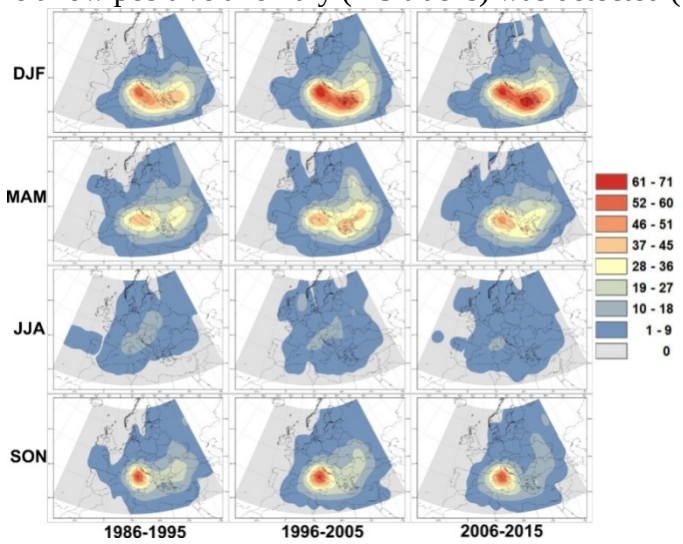

FIG. 4 Seasonal spatial distribution of MCs TD over the 10-yrs sub-periods (for winter season, the period begins for each sub-period in December month of the previous year)

b. Spring

In spring (March, April and May), the average annual number of cyclones generated in the Mediterranean basin over the entire period was 8.2. Over the first sub-period, the most affected region was the central Mediterranean including the Italian Peninsula (37 - 45 tracks). During the second one (1996-2005), the TD increased in the same region to 46-51 tracks, and to 37-45 tracks in the Greek Peninsula, the Aegean Sea, eastern basin of the Mediterranean Sea, the basin of the Marmara Sea, to 28-36 tracks in the central and western regions of the Black Sea, and to 19-27 tracks/sub-period in central and northern Ukraine (Fig. 4).

The anomaly of the TD during the spring revealed that closed lows-systems of Mediterranean origin recorded strong and moderate negative anomalies for the first sub-period (1986-1995) affecting Greece and the Aegean basin (with 14-10 and, respectively 6-9 tracks/decade), whereas Bulgaria, eastern Romania and central Ukraine experienced weak positive anomalies (2-5 tracks/decade) (fig. 5). During the second decade (1996-2005), positive moderate anomalies characterized Greece and the Aegean Sea, the Black Sea basin, the central Anatolian Plateau (6-10 tracks/decade), and strong positive anomalies were detected for central Ukraine, the eastern half of Belarus and western Russia (11-14 tracks / decade) (Fig. 5).

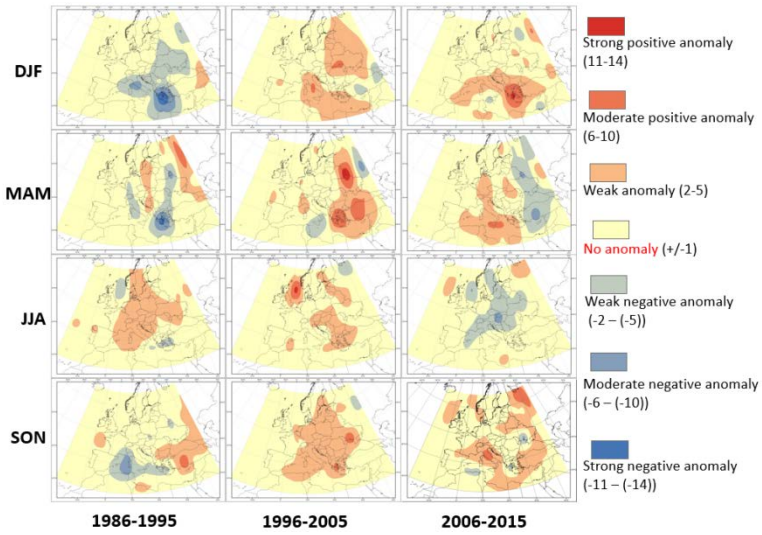

FIG. 5 Seasonal spatial distribution of MCs TD anomaly over the 10-yrs sub-periods (for winter season, the period begins for each sub-period in December month of the previous year)

During the last sub-period (2006-2015), the TD indicated moderate anomalies only over a small area in Italy, whereas weak positive anomalies (2 to 5 tracks/decade) characterized the largest part of the Mediterranean basin, Italy, Greece, Central Europe and more restricted areas in the central and eastern regions of the continent (East of Hungary and Slovakia, South-eastern Poland, western Ukraine). Weak negative anomalies were specific to the eastern Mediterranean Sea, Black Sea, Anatolia Plateau, Ukraine, Eastern Belarus and Western Russia (Fig. 5).

In the focus region, the TD during the spring is comparable to that recorded in winter. During the first two decades (1986-1995 and 1996-2005), the density is 19-27 tracks/decade in the northern half of the country and lower in the northern regions (10-18 tracks/decade). During the last sub-period considered (2006-2015) the number of tracks in the range of 19-27 expanded throughout the entire country (Fig. 4).

In terms of anomalies, during the first 10-yrs period a weak negative anomaly characterized the eastern third of Romania, whereas during the second sub-period, a weak positive anomaly was detected for almost the same region affected by the negative anomaly during the first sub-period. The last 10 years considered for this study indicated a weak positive anomaly in the central and northern regions of Romania (Fig. 5).

c. Summer

Summer season was characterized by the lowest frequency of MCs as indicated by our analysis and by some previous studies (Flocas et al, 2010). The maximum values of TD was in the range of 10-18 for the first two sub-periods in the northern Mediterranean basin, the northern Italian regions, the northern half of the Adriatic Sea, Austria, Hungary, Slovakia, Southeastern Poland and Western Romania. The area characterized by the same frequency considerably decreases from one sub-period to another one for the following ones. The TD did not exceed 9 tracks/sub-periods for the rest of the continent (Fig. 4).

The TD evolution shows a greater number of tracks during the first decade in the Western Mediterranean basin and in the central and eastern regions of the European continent (2 to 5 tracks / decade) (Fig. 5).

In the second decade, the density of the tracks increases in smaller areas in the Central Eastern Mediterranean region (Greece, the Aegean Sea, West Anatolia and Southwest of the Black Sea) and in the eastern and south-eastern regions of the continent (Austria, Hungary, Serbia, Bulgaria and most of Romania with 2 to 5 tracks/sub-period). During the third decade the TD decreases by 2 to 5 tracks/sub-period in the western Mediterranean region, the central, southern and eastern regions of the European continent (Fig. 5).

The Romania's territory was characterized by no more than 1 MCs/year, as average value. Their number decreased from 12 tracks/decade (over the period 1986-1995) and 14 tracks/decade (during the period 1996-2005), to 4 tracks/decade for the last sub-period (Fig. 4).

In terms of anomaly detected for each sub-period, the first two were characterized by weak positive anomalies, whereas over the last one a weak negative anomaly extended over almost the entire country (Fig. 5).

d. Autumn

In the autumn, the TD of MCs increases compared to that in summer, with the maximum values specific to the Italian Peninsula (more than 46 tracks/sub-period), a region where no significant changes were recorded throughout the study period. Thus, the spatial distribution over the three sub-periods is quite similar. The first one was characterized by 10-18 tracks/sub-period crossing the greatest part of Greece and the Aegean Sea, whilst northern Greece, Bulgaria, north-western Turkey, the Marmara Sea, and the Western Black Sea are impacted by 19-27 cyclones/decade. During the second sub-period, the TD increased in southern Greece and the Aegean Sea to 19-27 tracks/sub-period, and Hungary and Ukraine were crossed by 10-18 MCs. Over the third decade, the TD in the Greek, the Aegean and Western Black Sea regions decreased to less than 20 (10-18 tracks/sub-period) (Fig. 4).

The anomaly analysis of closed-low systems TD over the average value indicated moderate negative values during the first 10-yr sub-period in the Western Mediterranean (6 - 9 tracks/sub-period). Weak negative anomalies were identified for the Sicilian, Ionian and southern regions of Greece (2 - 5 tracks/decade). Weak positive anomalies were detected in Bulgaria, the Marmara Sea, Cyprus and the Black Sea and moderate positive anomalies were identified in central Anatolian Plateau. The second 10-yr sub-period was characterized by weak positive anomalies in Central and Eastern Europe as well as in the western and central Mediterranean Sea.

During the last sub-period, the TD increased in the central and southern regions of the continent, the central region of the Mediterranean Sea, the Adriatic Sea Basin, the Anatolian Plateau, the eastern half of the Black Sea, eastern Poland and Belarus indicating weak positive anomalies (Fig. 5).

The spatial distribution of the annual number of the MCs crossing the Romania's region in the autumn revealed higher values for the first sub-period, and lower for the second and the third ones (Fig. 5).

Regarding temporal anomalies detected in the focus region, a weak positive anomaly characterized the southern Romania during first sub-period, followed by an extension at the entire country level during the second sub-period. No anomalies were detected in the last sub-period considered (Fig. 5).

3.2.3. Analysis of the average position tracks

MCs impacted usually the southern and western regions of Romania. The average position of the tracks over Romania, established for each season is a good indicator of their frequency.

During the winter there is a shift of the mean track position 285 km towards northwest of the country in the second sub-period compared to the first ones, when the mean position crossed the country through its central regions, and then it moves 260 km back to towards south-east in the last sub-period (Fig. 6). This oscillation indicates an increase of track number crossing the focus region on the western side and a decrease of those crossing on the southern edge.

In spring, the average position of the MCs tracks over the first 10-yr sub-period crosses the studied region from southeast to northeast through the center of the country and in the second decade it moves northward with about 119 km and then moves slightly southward again during the last sub-period (Fig. 6).

During the summer the average position of the tracks crossed the extreme north-western Romania. Then, in the second decade, it shifted southward with about 126 km and moved only a few tens of km southward too, during la last sub-period. However, the summer mean position was located over the northwestern half of the country all over the entire period considered (Fig. 6).

In autumn the average position of the MCs tracks crossed the country from south-west towards north-east without significant changes from one sub-period to another (Fig. 6).

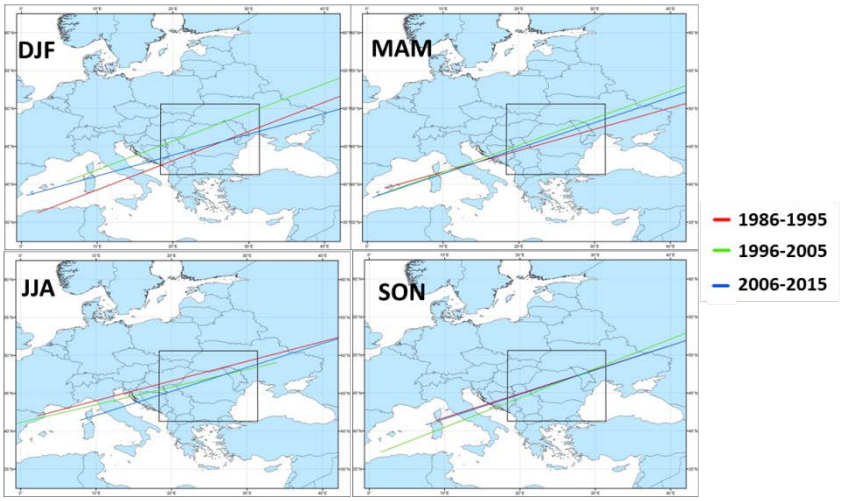

FIG. 6 Seasonal average position of the MCs tracks (for winter season, the period begins for each sub-period in December month of the previous year)

4. DISCUSSIONS AND CONCLUSIONS

Using the horizontal pressure gradient detected based on MSLP, a number of 874 cyclones originated over the Mediterranean were identified between December 1, 1985 to November 30, 2015 and about 43% of them followed a north-east trajectory, which is in agreement with findings obtained by a different approach reported by Radinovic (1987) and Linello et al. (2016).

The track selection for the region of Romania followed the principle of the average radius of the MC, so that the most distant tracks are located 500 km from the center of the country (Gogu, 2007). Thus, 374 cyclones resulted, which is 30% less, compared to the number obtained by Catrina et al. (2019). This difference was generated by the identification method. The MCs tracks inflame the weather in all regions of Europe, but the significant density (more than a tracks/season), occupies a limited area (the Mediterranean basin and the southern and eastern regions of the continent). Some changes were detected in the central Mediterranean basin, where it is worth noting the significant increase in the density of the trails over Greece and the Aegean Sea during the winter. Also, the spatial distribution of the cyclones number for each sub-period indicates a continuous increase in frequency during winter from one sub-period to another in the central and eastern Mediterranean. This finding is in agreement with that reported by Maheras et al (2001) for the period 1958-1997. The increase in TD in the central and eastern regions of the Mediterranean Sea can be attributed to the intensification of the cyclogenesis processes in those regions and to the increase in frequency of tracks towards east-south-east. However, the trend test did not reveal any statistically significant change.

Although in the spring the TD decreases over the central Mediterranean basin, over the non-neighboring countries the TD is comparable to wintertime. A decrease in the number of low-pressure systems during the first and second sub-period and an increase in the third sub-period during the spring was found.

Regarding the region of Romania, a multiannual average of about 12 tracks/yr. was identified, most of them crossing the region during spring and winter, respectively. The minimum frequency was recorded during summer with a multiannual average of 1.3 tracks / season. During the entire period considered, the transition seasons (spring and autumn) were characterized by a constant number of cyclones passing through, whilst in winter, their number slightly increased.

The average seasonal position of the tracks was located in the middle with a south-west towards north-east orientation in relation to the Romanian region with significant shifts northward during winter and spring.

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CALCULATION BY PROBABILISTIC METHODS OF LOCATING PIN ASSEMBLY OF ROTOR BLADES IN THE CONSTRUCTION OF AIRCRAFT COMPRESSORS AND TURBINES

Doru LUCULESCU[*] Ştefan MUSTAŢĂ[**]

[*] "Henri Coandă" Air Force Academy, Braşov, Romania (doru.luculescu@afahc.ro)
[**] "Ferdinand I" Military Technical Academy, Bucharest, Romania
(stefan.mustata@mta.ro)

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Abstract: *Compressor and turbine blades, used in the construction of aircraft turboprop engines, are very important constructive elements, by their functional role, and complex by geometric parameters, mechanical and gas-dynamic factors. This paper aims to present a method of probabilistic design of the assembly between the rotor disk and the compressor and turbine blades.*

Keywords: turboprop engine, compressor, turbine, removable assembly.

1. INTRODUCTION

The way of assembling and fixing the rotor blades is one of the many factors that must be taken into account in calculating their strength, in addition to the design of the blade resulting from gasodynamic and technological conditions, pressure variation during engine operation, due to conditions of gas flow through the engine, the operating time imposed on the blade and the variability of the operating mode of the aircraft engine.

The rotor blades of the compressors and turbines can be assembled on the disc by means of removable, trapezoidal, "dovetail", "T"- shaped or by means of cylindrical pins (Fig.1).

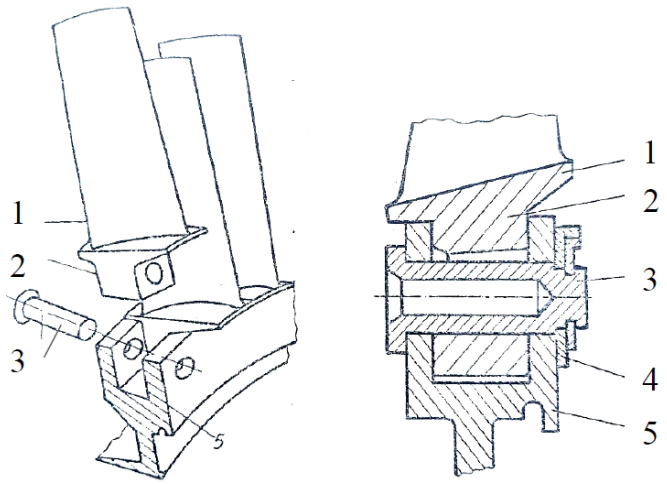

FIG. 1. Assembling and fixing the rotor blades by cylindrical pins [4]
1 – rotor blade, 2 – base of blade, 3 – cylindrical pin, 4 – lock washer, 5 - disk

2. CALCULATION BY PROBABILISTIC METHOD OF LOCATING PINS ASSEMBLY

In the constructive variant in which the assembly of the rotor blades is done by means of the locating pins, they are stressed during shear operation, the predominant stress and respectively crushing. The shear stress occurs due to the centrifugal force, which has a maximum value in the maximum engine speed.

The centrifugal force at the base of the blade, if the blade is of constant section, (FIG. 2) is determined by the relation [7]:

$$F_c = \frac{\rho\omega^2 A}{2}\left(R_e^2 - R_i^2\right) \tag{1}$$

$$F_c = \rho\omega^2 A\left(R_e - R_i\right)\left(\frac{R_e + R_i}{2}\right) \tag{2}$$

or,

$$F_c = \rho\omega^2 A R_m l \tag{3}$$

where:

ρ - density of the blade material,
ω - angular velocity;
A - area of the section at the base of the blade;
R_m - average radius of the blade;
R_e - outer radius of the blade;
R_i - radius from the center of the disc to the base of the blade;
l - length of the profiled body of the blade.

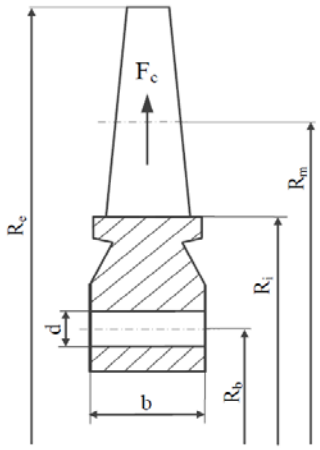

FIG. 2. Primary geometric parameters of the rotor blades [4]

The centrifugal force has a maximum value if the engine speed is maximum, respectively at operating mode with maximum air flow.

In the sizing calculations of the analyzed assembly, the intervening random variables are identified, namely:

- stress characteristic to which the blades are exposed, during operation;
- mechanical characteristics of the material used in the construction of the blades;
- execution tolerance of the pins used;
- charges to which the rotor blades of the compressors or turbines are subjected.

The probabilistic design of the analyzed assembly is made starting from the imposition of a certain value as high as possible of the reliability, *R(t)=k*, knowing that the actual stress that appears during operation and the allowable stress hold known distribution laws.

The shear stress of the full section cylindrical pin is described by the relation [6]:

$$\tau_f = \frac{F}{n \cdot A} \tag{4}$$

where,

τ_f - the actual shear stress of the pin;
F - centrifugal force at the base of the blade;
A_1 - the shear section of the pin;
n - number of shear sections.

Based on the recommendations of the specialized literature [3], a certain value of the coefficient of variation of the outer diameter of the pin is adopted:

$$C_{vd} = \frac{\sigma_d}{m_d} = k_1 \tag{5}$$

resulting:

$$\sigma_d = k_1 \cdot m_d \tag{6}$$

The standard deviation of the shear stress of the blade pin σ_{τ_f} is determined by the relation:

$$\sigma_{\tau_f} = \frac{1}{n}\sqrt{\left(\frac{\partial \tau_f}{\partial F}\right)^2 \cdot \sigma_F^2 + \left(\frac{\partial \tau_f}{\partial A}\right)^2 \cdot \sigma_A^2} \tag{7}$$

$$\sigma_{\tau_f} = \frac{1}{n}\sqrt{\frac{m_F^2 \cdot \sigma_A^2 + m_A^2 \cdot \sigma_F^2}{m_A^2}} \tag{8}$$

or: $$\sigma_{\tau_f} = \frac{1}{n m_A}\sqrt{\sigma_F^2 + \left(\frac{m_F}{m_A} \cdot \sigma_A\right)^2} \tag{9}$$

the pin displaying a circular section, there results:

$$\sigma_{\tau_f} = \frac{1}{n\frac{\pi m_d^2}{4}}\sqrt{\sigma_F^2 + \left(\frac{m_F}{\frac{\pi m_d^2}{4}}\frac{\pi}{4}2m_d\sigma_d\right)^2} \tag{10}$$

$$\sigma_{\tau_f} = \frac{t}{m_d^2} \tag{11}$$

where, t represents a constant of known values.

The reliability of the cylindrical pin, generally of a constructive element, is given by the relation [2]:

$$R(t) = P(\sigma_{\tau_{adm}} - \sigma_{\tau_f} \rangle o) \tag{12}$$

$$R(t) = \frac{1}{\sqrt{2\pi}}\int_0^{\infty} e^{-\frac{z_0^2}{2}} dz \tag{13}$$

where z_0 is expressed by:

$$z_o = -\frac{m_{\tau_{adm}} - m_\tau}{\sqrt{\sigma_{\tau_{adm}}^2 + \sigma_\tau^2}} \tag{14}$$

$$z_o = -\frac{m_{\tau_{adm}} - \frac{m_F}{m_A}}{\sqrt{\sigma_{\tau_{adm}}^2 + \sigma_\tau^2}} \tag{14'}$$

or: $$z_o = -\frac{m_{\tau_{adm}} - \frac{4m_F}{\pi m_d^2}}{\sqrt{\sigma_{\tau_{adm}}^2 + \sigma_\tau^2}} \tag{14''}$$

By imposing a certain value of reliability, as high as possible, $R(t)=k$, according to the regular given distribution, the value $z_0=k_2$ is obtained, thus resulting:

$$k_2 = -\frac{m_{\tau_{adm}} - \frac{4m_F}{\pi m_d^2}}{\sqrt{\sigma_{\tau_{adm}}^2 + \sigma_\tau^2}} \tag{15}$$

Analyzing the relation above, it is observed that the terms $m_{\tau_{adm}}, \sigma_{\tau_{adm}}, m_F, \sigma_\tau$ have known values, resulting in a quadratic equation in m_d:

$$m_d^2 \pi (k_2 \sqrt{\sigma_{\tau_{adm}}^2 + \sigma_\tau^2} + m_{\tau_{adm}}) = 4 m_F \tag{16}$$

The solutions to this equation are:

$$m_d^2 \pi (k_2 \sqrt{\sigma_{\tau_{adm}}^2 + \sigma_\tau^2} + m_{\tau_{adm}}) = 4 m_F \tag{16}$$

$$m_{d_{1,2}} = \pm \sqrt{\frac{4 m_F}{\pi k_2 \sqrt{\sigma_{\tau_{adm}}^2 + \sigma_\tau^2} + m_{\tau_{adm}}}} \tag{17}$$

Only the positive solution is adopted, since it represents a positive geometric magnitude.

Considering that the distribution of dimensions follows, in the most probable case, a regular law, then the values of the diameter of the pin, *d* fall in the domain [5]:

$$T_d = 6\sigma_d = \left(m_d - 3 \cdot \sigma_d ; m_d + 3 \cdot \sigma_d\right) \tag{18}$$

and the required diameter of the rotor blade assembly pin can be determined:

$$d = m_{d_1} \pm \frac{T_d}{2} = m_{d_1} \pm \frac{a_{s_d} - a_{i_d}}{2} \tag{19}$$

where a_{s_d} and a_{i_d}, represent the upper and respectively, lower, deviations of the nominal dimension of the pin diameter.

3. CONCLUSIONS

The use of probabilistic methods in the design of resistance structures, including aviation ones, ensures the optimal dimensioning of the constructive elements that have an important functional role. As a side effect of applying this method, there are also constructive elements with a lower mass, as well as savings of materials and time for their realization.

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STUDYING THE COHERENCE VALUES FOR UHI: A CASE STUDY OF IASI

Paul MACAROF, Paul-Marian GHERASIM, Ioana AGAPIE (MEREUTA)

"Gheorghe Asachi" Technical University, Iasi, Romania (macarofpaul@yahoo.com)

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Abstract: *Thermal properties of surface, Earth's surface energy balance and atmospheric conditions effect the land surface dramatically. Local and global change continues in the Earth's climate since the industrial era continues. The urban heat island (UHI) represents the phenomenon of higher atmospheric and surface temperatures occurring in urban area or metropolitan area than in the surrounding rural zones due to urbanization. UHI is most noticeable during the summer and winter. The main cause of the UHI effect is from the modification of land surfaces. In this research was using MODIS and SENTINEL data. From SENTINEL images was extracted coherence maps to determine values of this parameter in areas where UHI was notice. Coherence for SUHI range from 0.20 to 0.89 for day and varies for night between 0.23-0.89.*

Keywords: *MODIS, SENTINEL, UHI, coherence*

1. INTRODUCTION

LST (Land surface temperature) can provide crucial information about the climate and the properties of physical surface, which plays a role in many environmental processes [3, 16].

The accelerated urbanization has led to a substantial increase in the number of urban population worldwide and led to the significant development of UHI (Urban Heat Island). Natural landscape was transformed to an impervious surface due to the rapid and important growth of urban areas that was result in the diminution of green cover and, consequently, an intensification and development in LST [2, 9].

The urban heat island (UHI), according to Voogt et al. (2005) describes the "episode" (phenomenon) of higher atmospheric and surface temperatures occurring in urban zone and/or metropolitan zone than in the surrounding rural zones due to urbanization. The Surface of urban heat island (SUHI) depends on impervious surfaces, variation of vegetation cover and climatic conditions like season, wind and rainfall. Occurrence of UHI is one attribute of the transformation of the nature lands from urban areas into impervious built-up lands. That process had an important impacts on the ecosystem, biodiversity, hydrologic system and local climate [12]. LST, acording to numerous researches [10, 11], is as parameter for detecting UHI phenomenon. While surface temperatures is used as both higher and more variable than concomitant air temperatures due to the complexity of the different land surface classes in urban environments and variations in urban topography [13, 15]. The mainly reason of the UHI is the increase of artificial environments which has led to the important changes of land use (LU) and land

cover (LC), creates a great amount of anthropogenic waste heat, and in consequences in a series of changes in the urban environment [8].

An important approach to urban heat island research was the development of remote sensing technology. In earlier thermal remote sensing researches, much weight has been placed on using NDVI as the mainly indicator of urban climate. Remotely sensed (RS) data of LST, LU/LC and other surface characteristics have been widely used to study UHI phenomenon [1, 6, 7; 16]. The mainly advantages of using RS data are the availability of high resolution, consistent and repetitive coverage and capability of measurements of earth surface conditions [1].

Coherence is the fixed relationship between waves in a beam of electromagnetic (EM) radiation. Two wave trains of EM radiation are coherent when they are in phase. That is, they vibrate in unison. In terms of the application to things like radar, the term coherence is also used to describe systems that preserve the phase of the received signal [17].

2. MATERIAL AND METHODS

2.1. Study Area

Study Area (fig.1) is geographically situated on latitude 47°12'N to 47°06'N and longitude 27°32'E to 27°40'E. Iași is the seat of Iași County and the largest city in eastern Romania, the capital of the historical region of Moldavia. Iași is positioned on the Bahlui River, affluent of Jijia that flows into the Prut River. Summer is hot and it lasts from the end of the month of May up to the half of September. Autumn is a short season, of transition. In the second half of November there is usually frost and snow. Winter is a freezing season with temperatures dropping to –20ºC [19].

FIG.1. Study Area [20]

2.2. R.S. Data

2.2.1. Modis Data

The MOD11A1 product provides daily perpixel Land Surface Temperature (LST) with 1 kilometer (km) spatial resolution in a 1,200 by 1,200 km grid. The pixel temperature value is derived from the MOD11_L2 swath product. Above 30 degrees latitude, some pixels may have multiple observations where the criteria for clear-sky are met. When this occurs, the pixel value is a result of the average of all qualifying observations [18]. In this paper were used MYD11A1, for day time, and MYD11A1, for night time.

2.2.2. Sentinel Data

Sentinel SAR has a dual polarisation radar. Sentinel system can transmit a signal and receive him in both polarisation vertical (VV) and horizontal (HH). Dual polarisation SAR products covering complex values and inter-channel phase informations allow for measurement of the polarisation properties of terrain moreover to the backscatter that can be measured with one polarisation [17]. In this paper was used Sentinel SAR sata, with SLC product type, IW sensor mode for period 01.01.2017-31.12.2018.

2.3. Data Processing

Modis data, MOD11A1 and MYD11A1, for day and night time was process in ArcMAP. Was select just images that had a clear sky.

Based on a network of sensors (fig.2) for monitoring ground-level temperatures on period 01.01.2013-31.12.2018 were selected, days which the temperature exceeded 35 °C (tab.1), respectively 25° C during the night (tab.2).

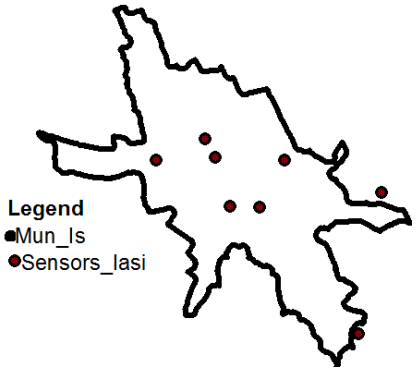

FIG.2. Network of sensors

Table 1. distribution of day selected

Nr. crt.	Year	Month					total
		may	june	july	august	september	
1	2013	2	3	5	11	0	21
2	2014	1	3	4	10	3	21
3	2015	0	7	13	18	6	44
4	2016	0	6	12	10	10	38
5	2017	0	5	5	17	4	31
6	2018	9	5	3	19	4	40

Table 2. distribution of night selected

Nr. crt.	Year	Month					total
		may	june	july	august	september	
1	2013	0	0	0	2	0	2
2	2014	0	1	0	4	2	7
3	2015	0	0	7	7	5	19
4	2016	0	6	8	3	1	18
5	2017	0	1	2	9	1	13
6	2018	6	0	2	9	2	19

To create maps coherence were used SNAP and ArcMAP. For period 2017-2018 was taken Sentinel SAR images for ascendent and descendent position.

3. RESLUTS AND DISCUSSION

3.1. LST Statistics

For earth and environmental studies, land surface temperature is now considered as very important parameter. Figure 3 show LST maps for period 2013-2018 for selected days and table 3 show statistical data of LST.

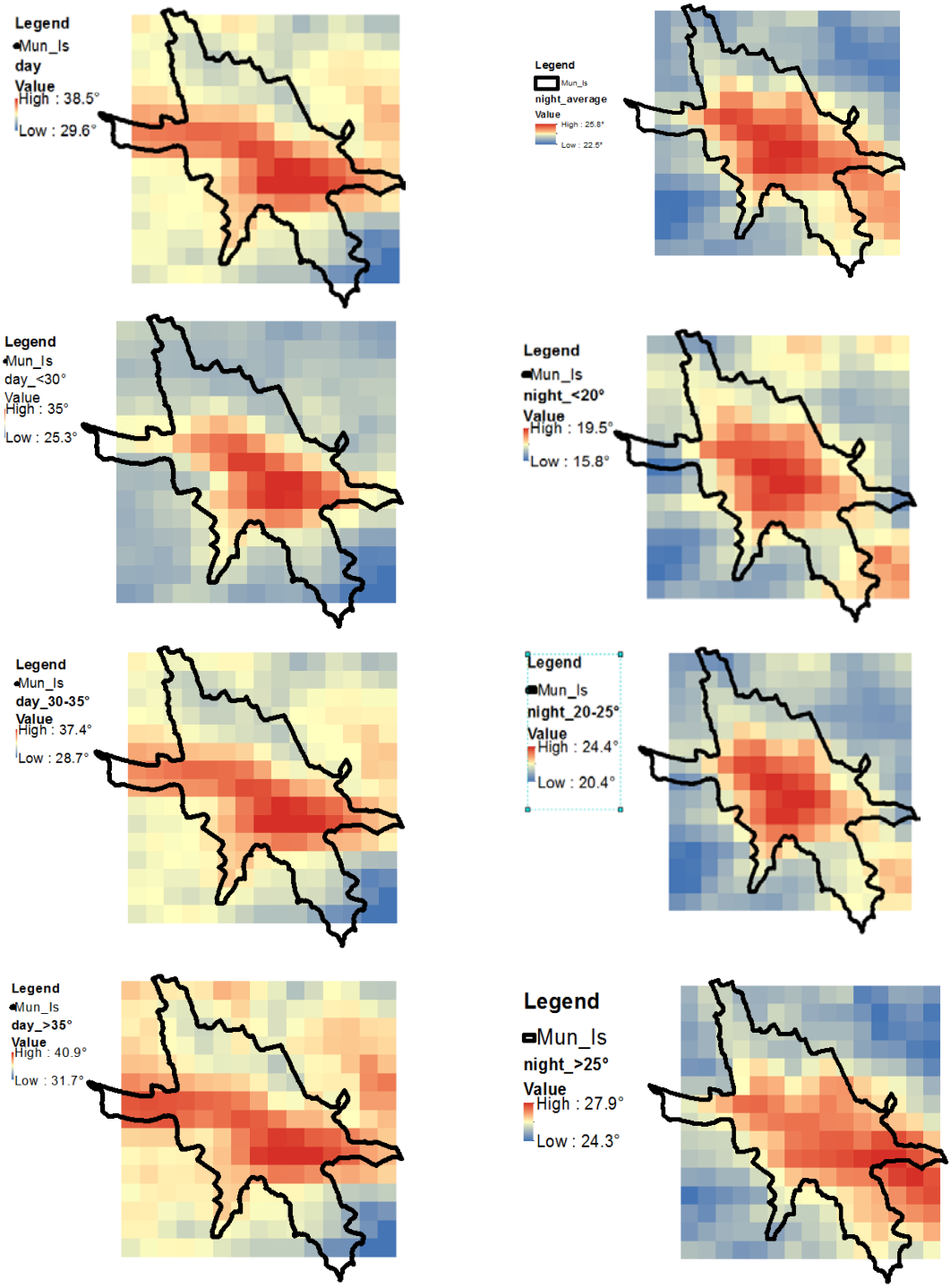

FIG.3. LST maps

Table 4. Statistics data-LST

Nr. crt.	Mode	Minimum (°C)	Maximum (°C)	Variations (°C)	Mean (°C)	Standard deviation
1	DAY	38.5	29.6	8.9	34.1	1.468
2	NIGHT	25.8	22.5	3.3	24	0.825
3	NIGHT <20°C	19.5	15.8	3.7	17.4	0.794
4	NIGHT 20-25°C	24.4	20.4	4	22	0.816
5	NIGHT >25°C	27.9	24.3	3.6	25.9	0.887
6	DAY <30°C	35	25.3	9.7	29.1	1.927
7	DAY 30-35°C	37.4	28.7	8.7	33	1.425
8	DAY >35°C	40.9	31.7	9.2	36.7	1.488

Mean and variations are the parameters with an significant importance. These two parameters reflect change extent of the LST. The mean value for study area for days selected, where MODIS images was available, for 2013-2018 period was 24°C for night time and 34.1°C for day time. The variation is more significant during the day time, 8.9°C, comparative with night time, 3.3°C.

3.2. Coherence Data

Coherence represents the fixed relationship between waves in a beam of EM (electromagnetic) radiation. When two wave trains of EM radiation are in phase they are coherent (Feretti et al. 2000 & 2007).

Coherence value range between 0 and 1. A interferogram has a good coherence if value is over 0.6. Coherence values between 0 and 0.3 indicate presence of vegetation and water.

Figure 4 show coherence maps for period 2017-2018 for images that was taken in ascendent and descendent position.

Table 4 shows statistical data for coherence maps for study area, Iasi city, for period 2017-2018.

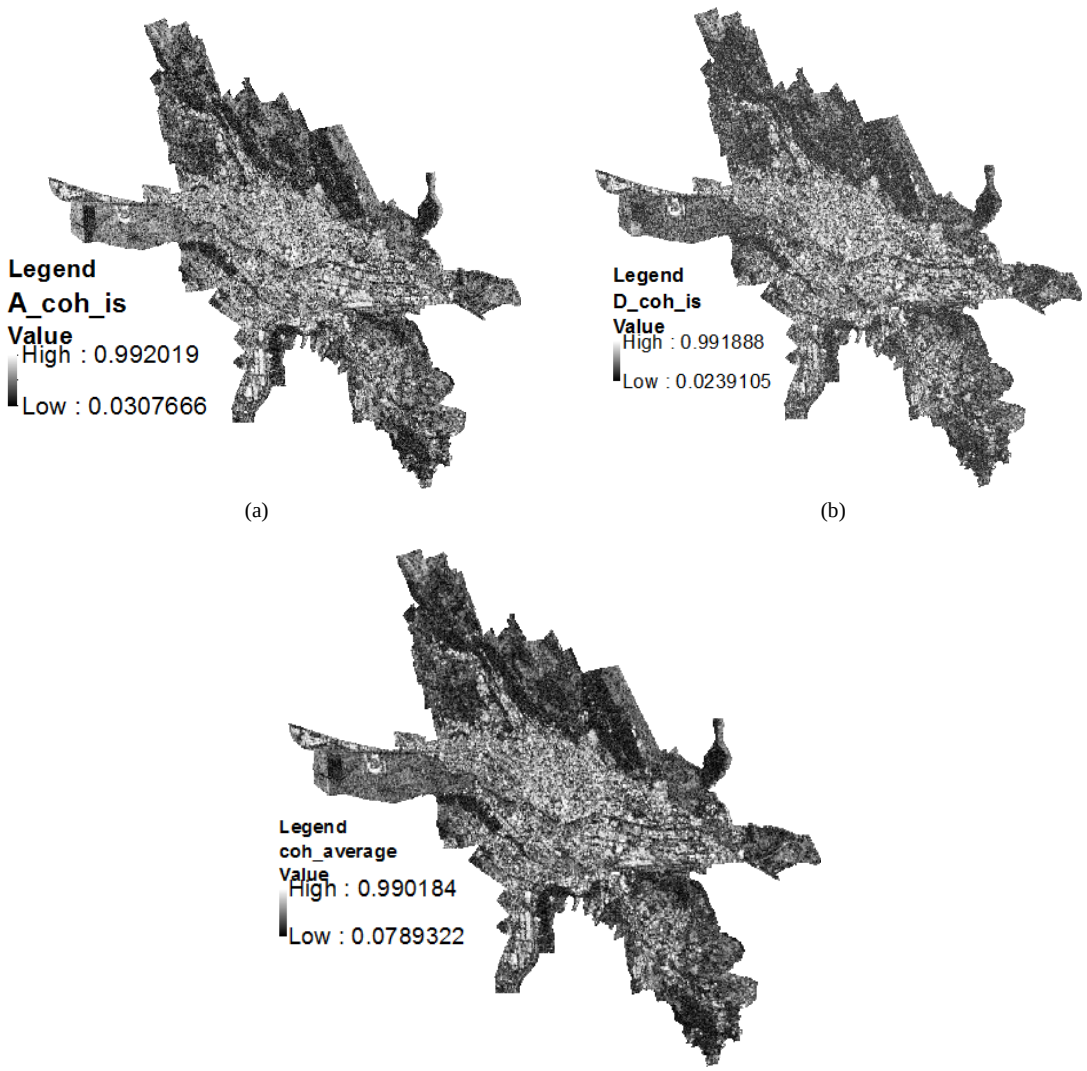

FIG.4. Coherence maps: a - Ascendent position; b - Descendent position; c - Mean coherence map

Table 4. Statistics data-coherence

Nr. crt.	Coherence map	Minimum	Maximum	Mean	Standard Deviation
1	Ascendent	0.030	0.992	0.487	0.19
2	Descendent	0.023	0.991	0.418	0.18
3	Average	0.079	0.990	0.453	0.17

It can be seen from the statistical data and the coherence maps that the study area presents for large areas values below 0.3 for the parameter determined from the Sentinel images.

3.3. Discussion

From LST maps for day and night time was extracted zones with temperature over 35°C respectively 25°C that indicate SUHI. For these areas, the coherence values were extracted. Maps for these processes are show at figure 5, and data statistics for coherence is found at table 5.

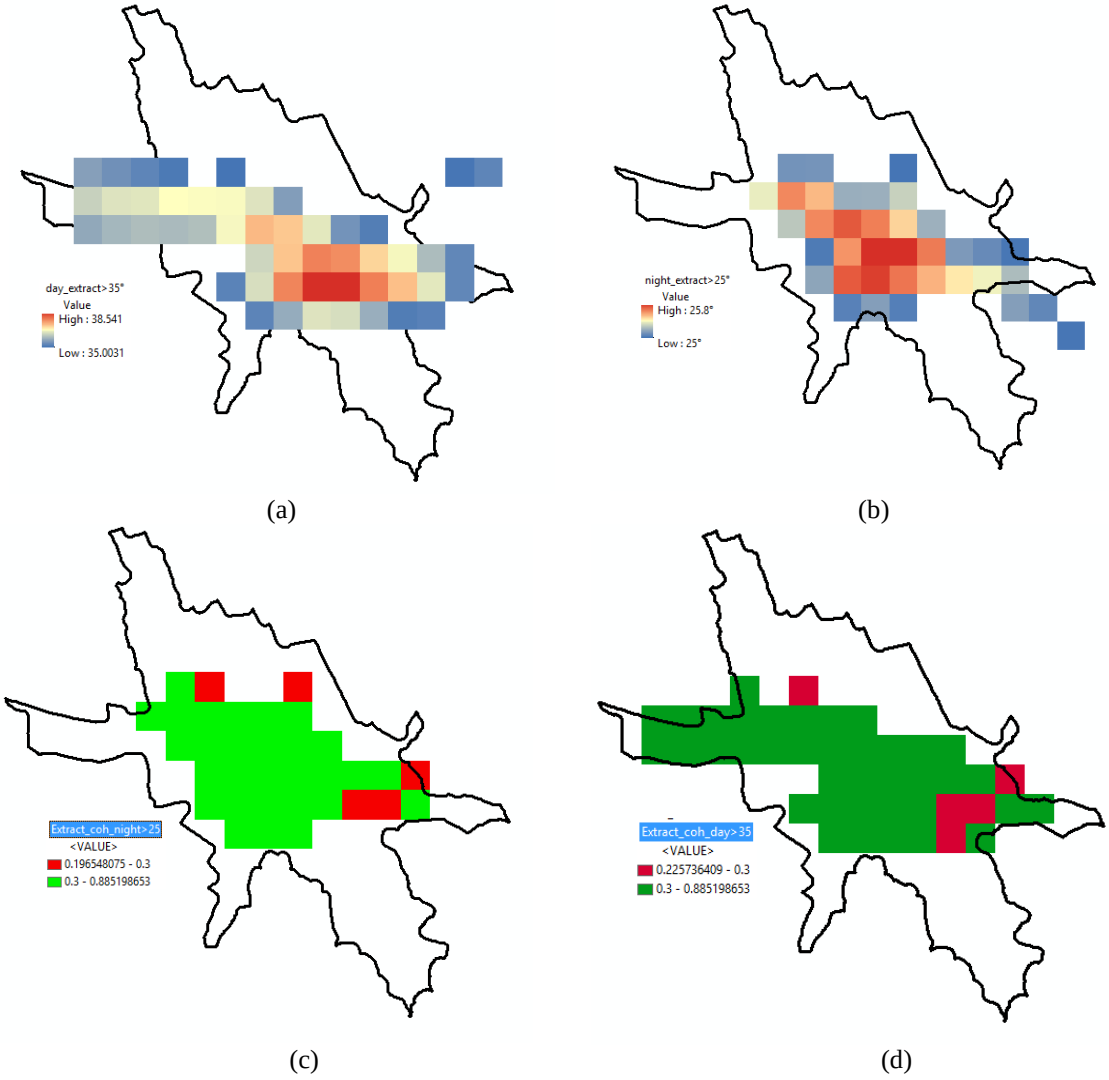

FIG. 5. LST map extract: a – Day map; b – Night map;
c - Coherence night extract; d - Coherence day extract

Table 5. Coherence data statistics-SUHI

Nr. crt.	Type	Minimum	Maximum	Mean
1	Night	0.23	0.89	0.54
2	Day	0.20	0.89	0.55

The parameter “mean” has high value, over 0.5, that indicate study area presents highly built-up area. SUHI is usually detected in built-up areas of cities, therefore coherence values confirmed that.

The increase of the built-up areas and the reduction of the green spaces in the study area lately can be an explanation for the constant increase of the temperatures and the extension of the UHI.

4. CONCLUSIONS

UHI represents the phenomenon of higher atmospheric and surface temperatures occurring in urban areas than in the surrounding rural zones due to urbanization. Coherence could be used to detect areas where this phenomenon could occur.

Consistency could be used to detect areas where this phenomenon could occur. However, without monitoring the temperature of terrestrial surfaces performed with satellite technology and temperature monitoring with ground sensors, it is difficult to determine the magnitude of the UHI.

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UAV APPLICATION IN HIGHRISE BUILDING FIRES

Ovidiu-Petruț NICOLAE[*], Dragoș-Iulian PAVEL[**], Cătălin PAVEL[***]

[*]"Țara Bârsei" County Inspectorate for Emergency Situations of Brașov County, Romania (nicolaeovidiu82@yahoo.com)
[**]"Alexandru Ioan Cuza" Police Academy, Faculty of Fire, Bucharest, Romania (pavel_dragos@yahoo.co.uk)
[***]Security analyst, Romania (cpavel@outlook.com)

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Abstract: *With the development of society, tall and very tall buildings became a common form of architecture. To extinguish the fires that occur in these types of buildings, special vehicles and newer drones are needed, the latter facilitating a much more effective reconnaissance, a much more successful intervention and the elimination of dangers (requesting and exposing crews to work at height) . Saving the lives of people and animals, respectively material goods are the main objectives that firefighters must meet in any type of intervention.*

Keywords*: building, height, fire, intervention, special vehicle, drone.*

1. INTRODUCTION

For working at height, firefighters use intervention vehicles that allow the rescue of stranded people, locating and extinguishing fires that broke out on the upper floors of tall and very tall buildings. Recently, drones/UAV(Unmanned Aerial Vehicle) have also started to be used for fire detection (eg forest fires in Greece, this summer), equipped with thermal imaging cameras, respectively drones for extinguishing fires.

2. USE OF HEIGHT INTERVENTION TRUCKS

According to the Fire Safety Regulations of buildings, indicative P 118 of 1999 [1], a tall building is an above-ground civil (public) construction, in which the floor of the last usable level is located more than 28 m from the land (roadway) accessible to vehicles firefighters on at least two sides of the building.

According to the Fire Safety Regulations for Buildings, indicative P 118 of 1999 [1], a very tall building is a civil (public) building in which the floor of the last usable level is located at a height of 45 m or more from the land accessible to motor vehicles. firefighters.

The operations for height intervention performed by firefighters on the spot consume time and are limited by the position of the truck in the field. In order to be able to intervene, it is necessary to ride the truck, provide rescuers and perform work at height.

In order to work with the escalator, it is necessary to maneuver the control panel for the operation of the riding supports.

FIG. 1. Escalators used by firefighters in intervention

FIG. 2. Control panel with remote control for the operation of riding supports

The mounting brackets can be positioned freely according to the working situation, using the bearing control buttons or levers. The system takes into account the position of the supports and immediately shows the maximum possible range of action regardless of the direction of the work platform, for the selected load [2].

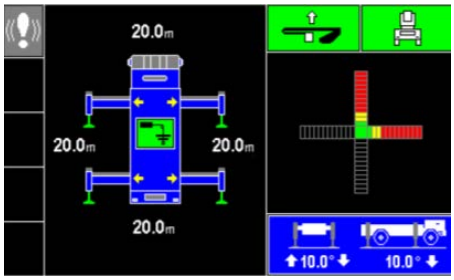

FIG. 3. Riding support window

FIG. 4. Control panel for arm operation

After running the truck, the crane arm is maneuvered using the control panel so that rescue personnel can reach the area affected by the fire.

After performing the operations presented above, you can start working on the truck itself, but unfortunately all this requires significant time, the rescuers being limited in terms of working at height.

FIG. 5. Rescue intervention using escalator

FIG. 6. Positioning of the escalator in order to use

The positioning of the truck in order to perform the work at height is performed according to a simple procedure based on Pythagoras' theorem.

Using Pythagoras' theorem, the relationship between these three variables is:

$$C^2 = A^2 + B^2 \tag{1}$$

Working at height becomes a challenge once the maximum height to which an intervention escalator can operate is exceeded, thus creating difficulties for rescuers.

MAGIRUS has designed the world's tallest lifeline, the Magirus M68L, which can reach a height of 68 m [3].

FIG. 7. MAGIUS M68L escalator

According to the European standards EN 1846 and DIN EN 14043 this special vehicle complies with all the requirements necessary to fulfill its duties: rescue people from heights, extinguish fires and provide technical assistance [3].

FIG. 8. Lifting and stretching the ladder package of the MAGIRUS M68L escalator

FIG. 9. MAGIRUS M68L escalator mounting system

This escalator is equipped with an XLL VARIO riding system, specially designed by MAGIRUS to offer maximum stability to escalators that rise more than 55 m [3].

The truck also has an RC 300 type platform that withstands a load of 300 kg and has various systems necessary to work at height [3].

FIG. 10. MAGIRUS M68L6 escalator platform

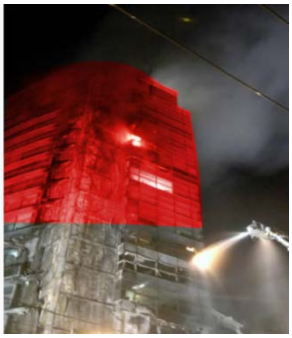

FIG. 11. Height from which it is no longer possible to intervene with the intervention escalator (red color)

But a very important detail is the presence of the RE300 rescue lift that allows the evacuation of a maximum of 3 people from a height, with a load capacity of up to 300 kg [3].

Although this escalator reaches an impressive height, there are constructions that exceed it, making the intervention of firefighters much more complex.

Tall and very tall buildings are a big challenge in terms of extinguishing fires, because firefighters cannot always control them because of the height at which they occur.

FIG. 12. High altitude fire

FIG. 13. Sky Tower Building

The tallest building in Romania, Sky Tower with a height of 137 m in Bucharest, is a good example of a building in which intervention becomes difficult when a fire occurs on the upper floors exceeding the lifting limit of the intervention escalators used by firefighters [4].

To solve this problem, various technologies have been developed for locating and extinguishing fires, in order to reduce risks and increase the level of efficiency. In order to ensure the intervention at high altitudes, drones for fire detection and drones for firefighting were developed.

3. USE OF DRONES FOR FIRE DETECTION AND EXTINGUISHING

The drone is an unmanned aerial vehicle (UAV). Drones can be completely or partially autonomous, but most often they are controlled remotely by an operator. As a result of research, various uses of UAVs have been developed in various areas of study [5].

FIG. 14. Drone (UAV) [17]

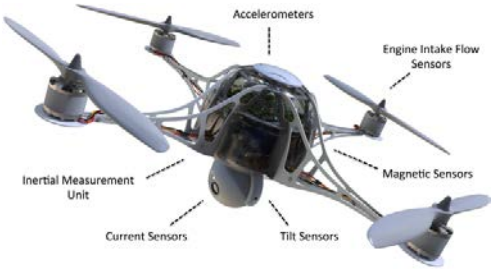

FIG. 15. The equipment of a drone

The front or back of the drone is where all the sensors and navigation systems are present. The technical materials used to build the drone are extremely complex composites, designed to absorb vibrations, which are very light [6].

The drones are controlled by a remote ground system (GSC). A UAV has two parts, the drone itself and the control system [7, 15].

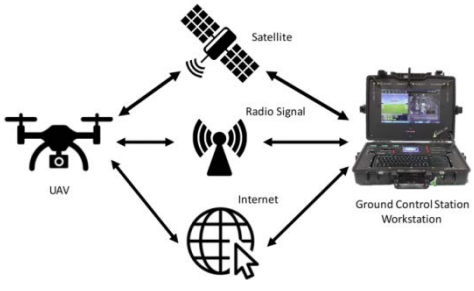

FIG. 16. Drone control

3.1. Drone classification

3.1.1. Fundamental classification

At the basic level according to [7], drones can be classified into: fixed wing drones; multirotor drones; hybrid drone.

Fixedwing drones need more space to launch, because their wings need speed to generate lift.

FIG. 17. Fixed wing drone [18]

FIG. 18. Multirotor drone

Multirotor drones use rotating wings to lift and do not need much space to launch because they are capable of vertical take-off and landing (VTOL)and they can also float vertically, but have autonomy and limited flight time.

Hybrid drones have the characteristics of both fixed wing and multirotor drones, for example rotor to perform VTOL and wings to navigate longer distances.

FIG. 19. Hybrid drone

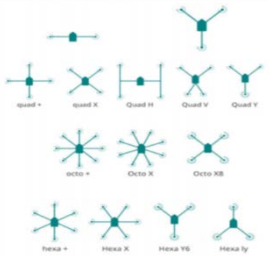

FIG. 20. Methods of assembling the shape of drones

The most used, multirotor drones, can be classified according to the number of propellers: bicopter - 2 propellers; tricopter - 3 propellers; quadcopter - 4 propellers; hexacopter - 6 propellers; octocopter - 8 propellers.

3.1.2. Classification by weight

As there is currently no internationally recognized system for drone categories, they are classified by weight according to different country-specific criteria. For example, the Australian Civil Aviation Safety Authority (CASA) classifies drones by their weight into: micro: weight equal to or less than 100 g; very small: weight between 100 g and 2 kg; small: weight between 2 kg and 25 kg; averages: weight between 25 kg and 150 kg; large: weight greater than 150 kg.

3.1.3. Classification by level of autonomy

Depending on the level of autonomy, drones can be classified into:

- system piloted by an operator, the operator has full control over the system;
- system delegated by an operator, the system may perform certain actions alone that the operator can activate or deactivate;
- operator-supervised system: actions based on certain data that can be initiated by the operator or the system;

• fully autonomous system: the system converts (transforms) the commands given by the operator into actions, the actions can be modified by the operator.

3.2. Concept

The added value of using drones is given by the significant improvement of the analysis of the situation by obtaining accurate, geo-referenced and real-time information, access to difficult areas for intervention, thermal / spectral assessment of fire and intervention area, firefighting actions, search and rescue [8, 16].

At the third conference "International Conference for Convergence in Technology" held in Pune, India, in 2018 it was proposed the conceptual design of a "Fire Brigadier Quadcopter" that can be used to find people caught in the fire and save them. in a safe way. The concept describes a four-rotor drone, built on an X-shaped housing with 3 wing propellers or 4 wing propellers, on which a fireproof carrier is mounted.

FIG. 21. Concept Fire Brigadier Quadcopter

FIG. 22. Forest fires in Greece in 2021

The concept uses a USB webcam for directional control and live video streaming, while the thermal camera aims to find people in danger due to low body temperature compared to hot surroundings. The conveyor can be used for various accessories, such as fireproof blanket or fire extinguisher. This concept was designed to help potential victims in an emergency, not necessarily to extinguish the fire itself [9].

This year, Romanian firefighters were seconded to help extinguish forest fires in Greece. They were provided with a drone for fire detection.

Similar to the drone used by Romanian firefighters in Greece, the T60 drone produced by the JTT company is equipped only with a fire detection and search-and-rescue system, being specially designed in case of forest fires. Thus, rescuers can easily identify the burned areas and people within range of the fire development area.

FIG. 23. JTT T60 drone

FIG. 24. Detection of fire risk areas using JTT T60 drone

These UAVs have reliable performance: flight control, GPS positioning, data recording, digital communication systems through ground control systems, mounting equipment next to conventional aerial speakers, high definition cameras, UAV capture network, image Infrared thermal, powerful light reflector and other functions, can be equipped with microwave, 3G / 4G and other transmission equipment, performs the transmission of high-definition analog or digital images.

The detection of the burned areas is performed on the basis of the mounted camera, obtaining a detailed recognition on the indicated area [10].

On July 31, 2020 the Chinese company, EHang announced the launch of the world's first fully autonomous high-load UAV EHang 216F, based on an older model EHang 216, designed to fight high flames. This model was developed with the increasing appearance of tall and very tall buildings, the company plans to distribute these UAVs in most fire departments in China and globally [11].

FIG. 25. EHang 216F fire extinguishing drone

At the launch ceremony in Yunfu, China, the company demonstrated the drone's functionality and efficiency. The EHang 216F model has a maximum flight height of up to 600 m and can carry up to 150 l of aeromechanical foam,respectively6 dry powder based fire extinguishers. The aircraft uses a light zoom camera to locate the exact position of the fire and then begins moving to the established location. Using a laser device, it triggers the window breaker after which it activates the fire extinguishing module by dropping the extinguishing bombs and pushing the aeromechanical foam from the equipment to the place affected by the fire [11].

Aeromechanical foam is the extinguishing agent that neutralizes the fire by separating the ignition source from the burned surface and cooling the flammable material. It is advantageous for extinguishing class fires (A, B).

Depending on the nature of the materials or combustible substances, fires are classified according to the European standard SR EN 2-2004 in fire classes.

In Romania, fire classes are divided as follows [12]:

- Class A - combustible solid materials (wood, paper, rubber products);
- Class B - flammable liquids (oil, gasoline, alcohol);
- Class C - flammable gases (butane, methane, hydrogen);
- Class D - combustible metals and their alloys (sodium, potassium, aluminum);
- Electrical equipment (formerly called Class E);
- Class F - vegetable or animal oils and fats from cooking media.

FIG. 26. EHang 216F drone intervention scenario at a tall building

FIG. 27. EHang 216F aircraft at a fire station in China

These UAVs were distributed to fire stations in China, and are used for intervention in the district of each station, over a distance of 5 km.

Using the advanced technology of this concept, a "swarm of drones" can be launched to the intervention site by remote maneuvering, which can reach the intervention site before firefighters [11].

The extinguishing method used for this drone is performed by automatically removing the aeromechanical foam from the tank to cover the affected area in about 3.5 s through the discharge hose provided.

FIG. 28. EHang 216F drone extinguishing hose

3.3. Drone specifications

The aircraft has the following technical specifications [11]:

Table 1- EHang 216F drone characteristics

Length	7.33 m	Battery power time	120 min
Width	5.61 m	Flight time	21 min
Height	2.20 m	The volume of aeromechanical foam	150 l
Maximum flight speed	130 km/h	Number of projectiles	6

3.4. Drone construction

When designing a drone specially designed to extinguish fires, the main risk factor that may impose difficulties in achieving the objective, namely fire, must be taken into account.

Fire is the process of rapid oxidation with light emission. When a fire breaks out, it forms the basis of the burning triangle.

The fire breaks out when the three factors (energy source, fuel, oxidizer) come together and create a chemical reaction that favors the beginning of the combustion process.

FIG. 29. The burning triangle

FIG. 30. Drone melted due to excessive heat, [19]

The strategy by which the fire can be annihilated is to eliminate one of the three factors: material cooling; decrease in oxygen concentration; removal of the ignition source.

The fire affects the drone by changing the air currents that cause turbulence and potential damage caused by the drone's heat.

The turbulence is generated by the fire, because the hot air of the fire creates the air flow upwards towards the drone. Drones are traditionally light and fragile, so turbulence can have a major impact on its navigation process. Heat can also cause damage to mechanical and electrical components if overexposed.

Most drones have a plastic frame and body, as the plastic provides a strong enough and lightweight base. However, plastic has a lower melting point (70 - 1200C) compared to other materials, such as metals, and this can cause problems if the drone stays around the fire for too long.

There are several ways to solve the problem of turbulence. An example would be the solution of the Navier-Stokes equations, with conservation of mass [13]:

$$\frac{\partial}{\partial t}(\rho u_x) + \nabla(\rho \vec{u} u_x) = \nabla(\mu \nabla u_x) - \frac{\partial p}{\partial x} + \rho g_x \quad (2)$$

$$\frac{\partial}{\partial t}(\rho u_y) + \nabla(\rho \vec{u} u_y) = \nabla(\mu \nabla u_y) - \frac{\partial p}{\partial y} + \rho g_y \quad (3)$$

$$\frac{\partial}{\partial t}(\rho u_z) + \nabla(\rho \vec{u} u_z) = \nabla(\mu \nabla u_z) - \frac{\partial p}{\partial z} + \rho g_z , \quad (4)$$

where:

μ - *dynamic viscosity;*

ρ - *density;*

g - *gravitational acceleration in each direction.*

3.4.1. System architecture

When designing a drone, different situations that may arise when using it are taken into account. All calculations are performed using a series of normal parameters.

Table 2 - Air parameters

Property	Value	Property	Value
Air density ρ	1,205 (kg/m^3)	Air temperature T	293 (K)
Kinematic viscosity v	15.11e-6 (m^2/s)	Thermal conductivity λ	0.0257 ($W/(m \cdot K)$)
Specific air heat cp	1,005 ($J/(kg \cdot K)$)	Acceleration g	9.81 (m/s^2)

Most often, drones are equipped with a water-based extinguishing system because it is easy to purchase, cheap and has a high capacity to neutralize the fire by cooling the materials.

When designing the extinguishing system for a drone, the most important element for its efficiency is the value of the critical flow of water used.

Critical flow of water(CF) is the water flow required to neutralize the fire on a certain number of linear meters or on the entire surface of the fire.

For example, this flow rate can be calculated according to the size of the fire, using Hansen's method [14]:

$$CF = \frac{1}{\eta_{water} \cdot L_{v,water}} ((\phi \Delta H_c - L_v) \cdot \dot{m}''_{cr}) + \dot{q}''_E - \dot{q}''_L , \quad (5)$$

in which:

CF - critical water flow;

η_{water} *- applied water efficiency;*

$L_{v,water}$ *- enthalpy of water exchange at 283 K and vapor at 373 K;*

ΔH_c *- effective ignition heat;*

L_v *- heat when vaporizing the fuel;*

$\dot{m}''_{cr}$ *- speed of mass combustion on a unit surface of the fuel at the critical point;*

$\dot{q}''_E$ *- external heat flow;*

$\dot{q}''_L$ *- heat loss at the surface.*

Through this formula it is possible to establish and design an extinguishing system, finding out the minimum capacities that it must present.

4. PROBABLE EVOLUTIONS

According to [14], theoretical and experimental studies conducted in the United States and the European Union show that although the hand-operated drone model has certain benefits, it is often limited in efficiency, the concept requiring improvements taking advantage of technological developments in communications and IT.

More advanced concepts consider the intervention with "swarms of drones" able to interact with each other and to coordinate the intervention by using artificial intelligence algorithms, with the ground support of an operational center; automation in the supervision of fire risk areas; rain simulation by using multiple „swarms of drones"; automated response to fire detection based on predictive analysis that includes elements of topology, meteorology, probabilistic calculation, etc.

Vulnerabilities such as the low speed of data transfer from the UAV human operator to the intervention team, the impossibility of real-time compilation of data from several drones to raise awareness, as well as their saving for further audit of the intervention can be overcome by use of integrated drone control software platforms.

5. CONCLUSIONS

From the experience of the interventions it was found the good complementarity of the two variants of extinguishing at height, by using the intervention vehicles and drones, special results are obtained. Their use provides special support to firefighters in order to extinguish fires in tall and very tall buildings, by providing an overview of the affected area and coordinating a much more effective intervention by the intervention commander.

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CONSIDERATIONS ABOUT CONSTRUCTION OF UAV GROUND CONTROL STATIONS

Vasile PRISACARIU[*], Mircea BOȘCOIANU[**], Dănuț BĂLOS[*], Cătălin CIOACĂ[*], Sebastian POP[***], Luige VLĂDĂREANU[****], Victor VLĂDĂREANU[****], Ana-Maria TRAVEDIU[****]

[*]"Henri Coandă" Air Force Academy, Brașov, Romania (prisacariu.vasile@afahc.ro, danut.balos@gmail.com, catalin_cioaca@yahoo.com),
[**]"Transilvania" University of Brașov, Romania (boscoianu.mircea@yahoo.com),
[***]Aerodrone Ltd. Brașov, Romania (aerodrone.uav@gmail.com)
[****]IMSAR București, Romania (luigiv2007@yahoo.com.sg, vladareanuv@gmail.com ana.travediu@yahoo.com)

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Abstract: *The safety levels of the flight have determined the operating standards of the UAS which are transposed into the operating capabilities and the high levels of reliability of the ground command and control systems / ground equipment. The ground control station (GCS) or C3 is a subsystem of the UAS that has its own command and control technologies in flight and communications with high speeds of data transfer over long distances. The ground control stations (GCS) of unmanned aerial vehicles allow a single operator to handle all flight-related tasks simultaneously with the acquisition of data from areas of interest.*

The article contains an overview of the construction stages of an experimental model of the portable ground station for the command and control of unmanned aerial vehicles on board.

Keywords: *ground control station, unmanned aerial vehicles UAS, experimental model.*

Acronyms

BNC	*Bayonet Neill-Concelman (connector)*	*C5I*	*Command, Control, Communications, Computers, Collaboration and Intelligence*
GCS	*Ground control station*	*EASA*	*European Union Aviation Safety Agency*
FAA	*Federal Aviation Administration*	*HALE*	*High Altitude Long Endurance*
ITAR	*International Traffic Arms Regulations*	*ISTAR*	*Intelligence surveillance target acquisition*
MALE	*Medium Altitude Long Endurance*	*OS*	*Operating system*
RCA	*Radio Corporation of America (connector)*	*RC*	*Radio Control*
RJ	*Registered Jack (connector)*	*MCS*	*Mission control System*
NDAA	*National Defence Authorization Act*	*NCW*	*Network Centric Warfare*
UCAV	*Unmanned combat aerial vehicles*	*NVG*	*Night Vision Google*
		WLAN	*Wireless local area network*

1. INTRODUCTION

1.1.Overview

The intensive use of UAS technologies in various military and civilian fields has raised the level of complexity of (ground) command and control equipment on hardware and software components.

Flight safety levels have determined UAS operating standards that translate into operational capabilities and high levels of reliability of GCS/ equipment, depending on the complexity of the air system from a simple phone or smart tablet PC, for the operation of commercial UAVs up to the control systems (mobile or fixed) of the HALE/MALE/ UCAV UAS.

The ground control station (GCS) or C3 is a subsystem of the UAS that has its own command and control technologies in flight and communications with high speeds of data transfer over long distances [1, 2]. The C3 infrastructure involves complex capabilities, such as: human-machine interface, C3 multivector, voice control, operation of mission sensors (eg in ISTAR concept). These capabilities allow operators to control air carriers for the safe and efficient conduct of flight operations through: planning, logistics functions, personnel and technical procedures [2, 3].

According to the references [4, 5] we have a series of categories and constructive examples regarding the ground control stations (see Fig. 1.1) that serve the unmanned aerial systems on board, such as: tablet PC, laptop, and fixed GCS.

(a) (b) (c)

FIG. 1.1 Ground control system (at the ground). (a.laptop, b. GCS portable, c.GCS virtual cockpit), [4, 5]

1.2. GCS risk analysis

The design and development of a ground control station must follow all the specific stages of the systems engineering process. The initiation of a risk analysis is based primarily on the identification of operational, functional and performance requirements (table 1.1).

Table. 1.1 Requirements list

Operational	Hardware and software	Performance
• operating environment conditions (eg. day/ night; radio interferences; electromagnetic restrictions) • use conditions (eg. ergonomics; vibration/ shocks; mobile/ stationary/ shipboard; transportability) • technical operating requirements (eg. operating system; joysticks; switches and buttons; display) • security requirements (eg. cyber-attacks protection)	• integrating COTS equipment and/ or custom technologies (eg. open system architecture) • Modularity and interoperability (eg. computing solution) • redundancy items (eg. power supply)	• Time operation • Size and dimensions • Easy to operate • Setup time • Reliability • Serviceability

In order to finalize the technical solution, the identification of the requirements categories is completed with system analysis and control. This stage balances requirements, costs and risks in a top-down, iterative and recursive manner. Adopting the technical solution also involves the analysis of risks that are associated with software, hardware and communications elements.

The operating system and the software applications are susceptible to cyber-attacks. Once it takes control of the operating system, it also translates into control over hardware resources [8]. As a central node, the intentional or natural risks associated with the communications field should not be ignored. The main risks and solutions identified for their mitigation are represented in table 1.2.

Table. 1.2 GCS risks register

Domain	Risks	Mitigation solutions
Software	– disrupt the service – loss control – loss data	– updated software – antivirus software – network firewall
Hardware	– disrupt the service – malfunction – reduce performance	– testing in-house – redundant architecture – standard protocols
Communication	– disrupt the service – loss control – loss data	– control access – resource management – encryption common

1.3.Criteria for the construction of command and control stations (GCS)

The design, construction and use of GCS are based on critical criteria, such as regulations and standards for design, construction (technology, materials) and operating (performance, C2, human resources), [16]. The construction of the GCS starts from the compliance of the civil and/or military aeronautical regulations (updated and consolidated variants), regulations valid for the international area where the GCS equipment will be used, [17, 18, 19].

The design concept of the GCS can determine both the functional performance of the final model and the capabilities of the controlled units (UAVs), therefore the following aspects must be considered from the design phase [20]:

a. the environment and operating conditions that may affect the reliability of GCS, day / night / NVG operation or radio interference;

b. the duration of the flight operations/missions involves the performance of the accumulators / energy sources and the GCS ergonomics (shape/ dimensions, weight);

c. on screen display requirements (monitor size) involving values of image data processing performance or operation under natural solar lighting conditions;

d. the number and type of switches and IT peripherals, they influence the performance of the operator and the security of the flight operations;

e. setting time, it has an impact on the results of flight missions, integrated software solutions are recommended;

f. operating systems, it is recommended to use fully functional OS that reduces operator stress and advanced and efficient control of the GCS unit;

g. maintenance level, refers to the options regarding spare parts/ IT products for maintenance;

h. compliance aspects, designs, manufacturers/ integrators and GCS users are required to meet compliance requirements by areas of competence (NDAA standard, ITAR [21], UAV-GCS operator licensing regulations / standards), [17, 18, 19];

i. the security level of the GCS platform, involves the issue of hijacking, blocking, GCS availability, encryption / data loss, cyber security policies;

j. software integration, involves the level of assignment of the firmware interface with the GCS equipment (GCS specific integration, input device integration protocols, input hardware modules, communications modules / USB/ COM).

1.4. Research and development directions

The research-development and operation directions of the GCS are focused on both manufacturing technologies and operationalization in civilian and military activities.

According to the references [11, 12, and 13], GCS technologies already incorporate some robotic functions based on artificial intelligence (AI) and machine learning (neural network).

FIG. 1.2 Pipistrel eVTOL cargo, [14]

FIG. 1.3 VTOL cargo drone, [15]

The preoccupation of researchers and specialists in the field of civil uses have been oriented for several years towards the field of transport (UAS cargo), see Fig. 1.2 /1.3 and integrated uses for the acquisition of data on atmospheric and environmental monitoring, [14, 15].

Military uses are primarily focused on Network Centric Warfare (NCW) approaches, which involve swarm coordination of UASs through the possible use of wireless local area networks (WLANs) based on WLAN hubs and two-way broadband. of satellite communications [9]. The command and control functions available on GCSs can be developed up to C3I or C6ISR [10].

International research focuses on GCSs that can use three-dimensional maps for 3D transposition of operational situations and smart peripherals for real-time data and command input (from flight stick / switch to verbal and gesture commands), [26 , 27].

2. EXPERIMENTAL MODEL OF GROUND CONTROL STATION

2.1. GCS operation

The ground control station (GCS) of unmanned aerial vehicles allows a single operator to handle all flight-related tasks simultaneously with the acquisition of data. The developed GCS is based on 3 interconnected hardware platforms (two tablets and a laptop PC) being integrated in a shock and water resistant transport box [25], see Fig. 2.1. The control station offers a standard autonomy of 3 hours in terms of portability and modularity depending on the type of mission.

FIG. 2.1 GCS, computer layout and startup panel and connections.

2.2. Technical data and performances

The most significant data on construction and operating performance are shown in Table 2.1. The ground control station consists of structural and transport elements, hardware, software tools and data connections, as follows:

Tabel 2.1. GCS technical data and performances

Parameter	Value	Parameter	Value
Dimensions	820x540x510 mm	Autonomy	3 h
Mass	10 kg	Software system	Android / Windows
Connectivity	USB, RJ, Ethernet, RCA, BNC	Software management	Mission planner / Qground control

a. structural and transport elements: sealed box and panels for the arrangement and fixing of control elements and connections, see Fig. 2.2, [25];

FIG. 2.2 Sealed box, [25]

Table 2.2 Technical data and performances - Tablet Samsung Tab S5e, [22]

DISPLAY		MEMORY / STORAGE	
Parameter	**Value**	**Parameter**	**Value**
Display	10.5 inch	RAM	4 Gb
Resolution	2560x1600	Internal / external memory	64 / 512 Gb microSD
CONECTIVITY		**SENZORS**	
Wired	microUSB	Video	13/8 MPx
Wireless / Bluetooth	802.11/ 5.0	GPS/gyroscope/accelerometer	yes/ yes/ yes
BATTERY		**DIMENSIONS / MASS**	
Capacity	7040 mAh	Dimensions	245x160x5,5 mm
Type	LiIon	Mass	400 g

b. connected hardware: two Samsung Tab S5e tablets (Table 2.2) with Android operating system [22, 23], Fig. 2.3; an HP Probook 450 G6 laptop companion computer with Windows 10 operating system (Fig. 2.4. and Table 2.3); control panel and in / out panel;

FIG. 2.3 Samsung Tab S5e, [22]

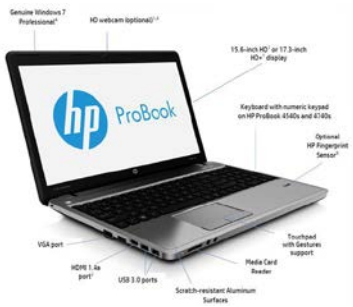

FIG. 2.4 Laptop HP Probook 450 G6 [24]

c. data connections: radio control system on the 3D trajectory (2.4 GHz), telemetry data transmission system (data link telemetry, 433 MHz), graphic data transmission system (image / video), storage system and data transmission from environmental sensors, see Fig. 2.5.

Data transmission can import / export specific signal both physically via USB, RCA, Ethernet, video and radio signal via Wi-Fi / Bluetooth standard via the two tablets and the laptop.

Table 2.3. Technical data and performances - laptop HP Probook 450 G6 [24]

DISPLAY		**CPU**	
Parameter	**Value**	**Parameter**	**Value**
Display	15.6 inch	Tipe / model / cores	Intel i5 / 8265U / 4
Resolution	1920x1080	Nominal /turbo frequency	1,6 / 3,9 GHz
MEMORY / STORAGE		**VIDEO**	
RAM / Frequency	8 Gb / 2400 MHz	Tipe	nVidia Gforce MX 130
HDD type / storage	SSD 256 Gb	Memory	2048 Gb
CONECTIVITY		**GEOMETRIE / MASA**	
USB / HDMI / RJ / Audio	Yes/ yes / yes / yes	Geometry	364.9 x 19 x 256.9 mm
Wireless / bluethooth	802.11 / 5.0	Mass	2 kg

Starting from the GCS concept from Fig. 2.5 we have the functional UAS architecture from Fig. 2.6.

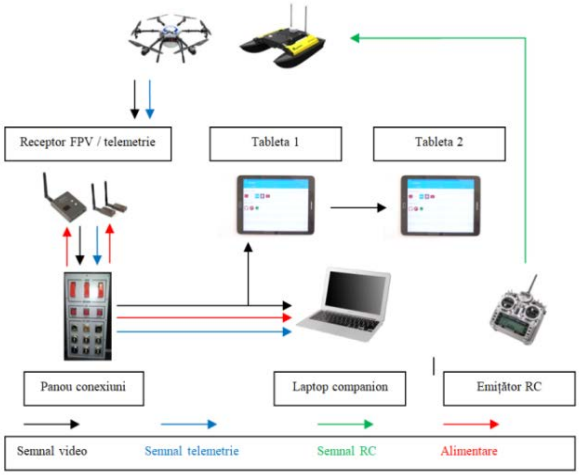

FIG. 2.5 Data and power diagram

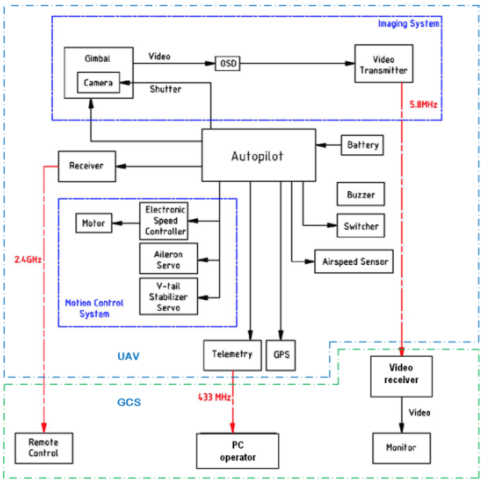

FIG. 2.6 UAS architecture, V-tail plane

Modules and connection diagram. The UAS architecture contains the two functional entities: the air vector (UAV) and the ground control station (GCS).

Air vectors (drone 1 and drone 2). It transmits telemetry (ex 433/915 MHz) and video (ex 5.8 GHz) data on flight and navigation performance. Receives RC routing signal for trajectory maneuvering from the RC transmitter (which can be integrated into GCS or standalone), frequencies used 2.4 GHz.

RC transmitter. Transmits the signal on the trajectory (optional depending on the degree of level equipment, receives telemetry data on the operation of air vectors).

FPV-GCS module. It receives telemetry and imaging data from aerial vectors (RCA port) and transmits it to display devices (companion laptop / tablet monitor) using the graphical interface of the Qground control software tool (USB port).

Laptop companion (PC operator). It offers the operator GCS (Qground Control), a series of facilities regarding the calibration, operation and simulation of the UAV flight. It receives image and telemetry data (USB port) on the mission management user interface.

Tablet PC. These provide the operator with visual data by navigation sensors (eg. navigation camera) and / or mission-specific sensors (FLIR / NIR camera, atmospheric sensors) via the microUSB port.

GCS management module. It consists of the connection and control panel that offers connection and management functions of the component electronic devices (receiver modules, laptop companion, tablets PC). This module also provides energy management with overvoltage protection to all GCS consumers.

3. ASPECTS REGARDING THE CONSTRUCTION OF THE GCS EXPERIMENTAL MODEL

The constructive stages of the experimental model are: establishing the GCS operating requirements (pre-design), design (in detail), manufacturing the structure and spare parts, bench running tests of the component systems, assembling and equipping the GCS, operating tests in real conditions of use, see Fig. 3.1.

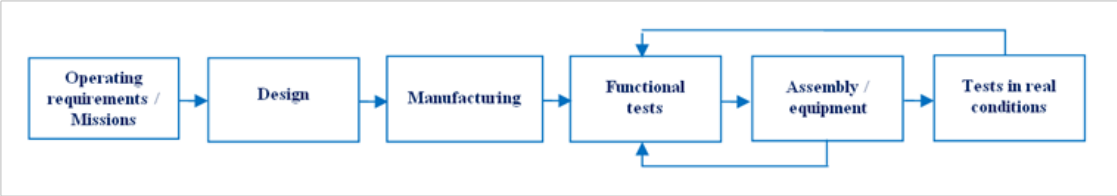

FIG. 3.1 Stage of GCS

a. starting from the selected concept [6], the requirements / missions of GCS determine the management of data connections from the air vector and the surface vector. Requirements for the implementation of the GCS are determined by design, operational and technological limitations see Fig. 3.2, [7].

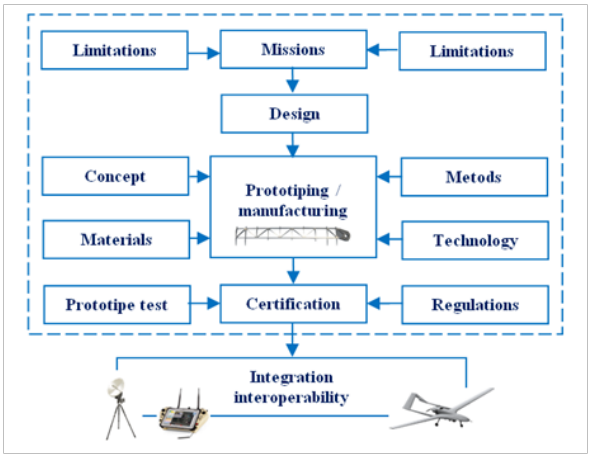

FIG. 3.2 GCS implementation management stage, [7]

b.GCS design is limited by the concept of low cost and portability, see Fig. 3.3. CAD tools (Solidworks, Autocad) were used for the design stage for geometric and functional aspects.

c. GCS manufacturing/realization is performed with the help of CAD / CAM technologies (3D and CNC printing), see Fig. 3.4;

d. the functional tests considered the verification of the functionality for connections and of the equipment.

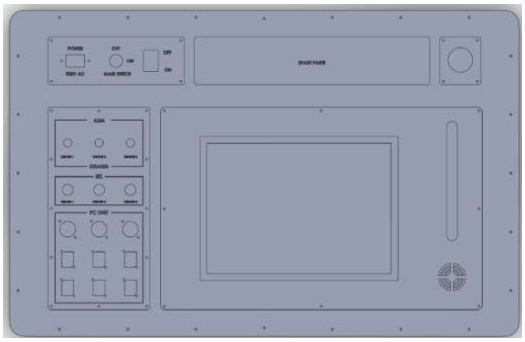

FIG. 3.3 Aspects regarding of the GCS main panel (design image)

FIG. 3.4 Realization of the upper signaling panel through CNC technology

e. assembly and equipment of the GCS, considered the portability conditions without affecting the operating performance (anti-vibration/anti-shock mounts), see Fig. 3.5;

f. the tests in real operating conditions were performed in normal weather conditions (without precipitation) during the day with temperature values in the range of 10^{o}C-22^{o}C, and included a series of aspects, the most relevant being: the preparation operations/ completion of missions; operation / acquisition of data within the mission;

(a)

(b)

(c)

FIG. 3.5 GCS equipment, a. lower panels, b. upper panels, c. Power management panel.

CONCLUSIONS

The design, construction, testing and operation of unmanned aerial systems (GCS-UAS) involve a number of limitations that govern the life cycle of specialized technical systems. The GCS design provides an optimized approach to information on both the operating environment and data on the behavior of aerial vectors connected to the GCS, an optimized approach that determines the speed and accuracy of the operator by reducing cognitive load per unit time.

The paper exposed in the first part aspects regarding the theoretical considerations for the low cost design of a GCS-UAS and in the second part the concrete constructive stages are revealed, starting from the structure to the radio electronic equipment.

Future activities include the development of the Mission Control System (MCS) together with the Payload Control System (PCS) and the Communication System (CS).

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SUPERSONIC AIR INLET FOR A HIGH VELOCITY PROPULSION SYSTEM

Alexandru-Nicolae TUDOSIE[*], Vasile PRISACARIU[**]

[*]University of Craiova, Romania (atudosie@elth.ucv.ro)
[**]"Henri Coandă" Air Force Academy, Brasov, Romania (prisacariu.vasile@afahc.ro)

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Abstract: *The paper aims to determine the optimal geometry, the control law and the operational limits of a supersonic air inlet; its operation control consists of its central cone positioning, with respect to the flight Mach number, keeping in sight the necessity of a suitable parameters' distribution into engine's combustion chamber. Inlet's optimal architecture shall be determined (based on an algorithm regarding the maximization of the total pressure recovery), using basic planar geometry principles. Based on the optimal geometry of the inlet, its flow rate characteristic and its control law, as well as inlet's operation limits were calculated and graphically represented.*

Keywords: *air inlet, shock-wave, supersonic, detonation, cone, engine, pressure, limits.*

1. INTRODUCTION

Flying at very high speeds is one of the most important challenges today for aerospace engineers and manufacturers, not only for military purposes, but also for civilian purposes. After supersonic flight became almost commonplace, obviously, hypersonic flight has become the new challenge for specialists, both for atmospheric missions and for suborbital and orbital missions.

The military's interest in hypersonic flight is obvious for several reasons: a very fast and maneuverable weapon is difficult to detect and difficult to counteract, due to its short detection time and speed, leaving little time for defense systems to react. [3] . Requirements that have become more urgent in recent years are shortening response times and rapidly attacking mobile targets. While drones, satellites and the like can easily locate all types of targets, highly mobile enemy units will not be "waiting" for the inevitable counterattack; a very fast weapon platform with the ability to maneuver (given its speed) means that, once found, a target will have little time and fewer opportunities to escape [19].

Regardless of the mission of such a high-speed vehicle, a lot of specific issues and challenges must be overcome before it can be put into operation and perform its tasks. First, the effect of aerodynamic viscous friction and shock waves give the body temperatures so high that no conventional material can withstand them ([7], [12]), so that new heat-resistant materials are designed and resistant and new manufacturing appropriate concepts and techniques to be implemented; ionization of the air around the vehicle body also disrupts the propagation of radio waves and interferes with radio frequency sensors and communications. On the other hand, very high air temperatures reduce the pressure of conventional air-breathing engines ([7], [2]), thus requiring new

concepts and means of propulsion (such as scramjets, rockets, detonation engines or those almost fictitious plasma engines).

Last but not least, new body structures, new propulsion systems and new flight techniques require new sensors, new equipment and appropriate command and control architectures.

Among the new high-performance propulsion options for high-speed vehicles are detonation engines, which use a wide range of fuels, from conventional kerosene to cryogenic fuels (hydrogen, methane etc.).

2. ABOUT DETONATION ENGINES AND DETONATION PHENOMENA

From historical point of view, the detonation process was firstly described and studied by Berthelot, Vieille, Mallard and Le Chatelier, around 1880; at the beginning of the 20th century, Chapman and Jouguet have presented independently the zero-dimension detonation theory [19].

From the point of view of reciprocating piston engines, detonation represents a dangerous and undesirable phenomenon (also known as “knock of the engine”); it occurs when the injected fuel ignites before the piston reaches the programmed spark ignition and causes a sudden increase of the pressure inside the cylinder (up to 10 times higher than normal) and extreme temperature rises. The consequences could be serious damages to the engine pistons, rings, rods, gaskets, bearings and even cylinder heads and crankcases. Knock can be caused by incorrect ignition timing (due to incorrect ignition preset), poor air-fuel ratio, inadequate fuel octane, exhaust backpressure, incorrect presetting of the turbocharger and/or of the intercooler, as well as ambient heat. Even the best engine components cannot withstand severe detonation for more than a few seconds at a time, the results being severe engine damage (destroyed pistons, bent connecting rods, cracked housing, engine fire etc).

Early attempts to use the detonation for jet propulsion were reported at the University of Michigan (by J.A. Nicholls, in the sixth decade of the 20th century [19]); since this achievement, many researchers from different countries (USA, Russia, China, Japan etc) have brought their contribution to the domain. Last decades have brought new concepts of detonation jet engines, such as Pulsed Detonation Engine (PDE) ([13], [19], [22]), Rotating Detonation Engine (RDE), Continuous Detonation Engine (CDE) [20] or Continuous Rotation Detonation Engine (CRDE) [21].

These engines use conventional or unconventional fuels, from kerosene to liquid hydrogen; the necessary oxygen for the burning reaction may be obtained from the atmosphere by air breathing (only for atmospheric high speed aerial vehicles) or may be carried on board in high-pressure special tanks (suitable for sub-orbital and orbital vehicles).

All these engines are designed to propel high or very high speed aerospace vehicles; most of them are “air breathing type”, so for them it is mandatory to have adequate air inlets, which must ensure both the engine required air mass flow and the required downstream parameters (temperature, pressure, density etc).

For detonating burning to take place, several thermodynamic and kinematic conditions must be met. Fig. 1 [13] contains the curves which describes the thermodynamic process of detonation burning; as example, cycles for a scramjet (curve 1234) and a standing detonation engine (curve abC-J) are presented; comparing to Hugoniot curves for the detonation wave (with its Chapman-Jouguet C-J point) and for the shock wave, the curve of the detonation engine cycle (continuous line) assure the parameters correlation in order to obtain the detonation, as determined in [2], [11] and [13].

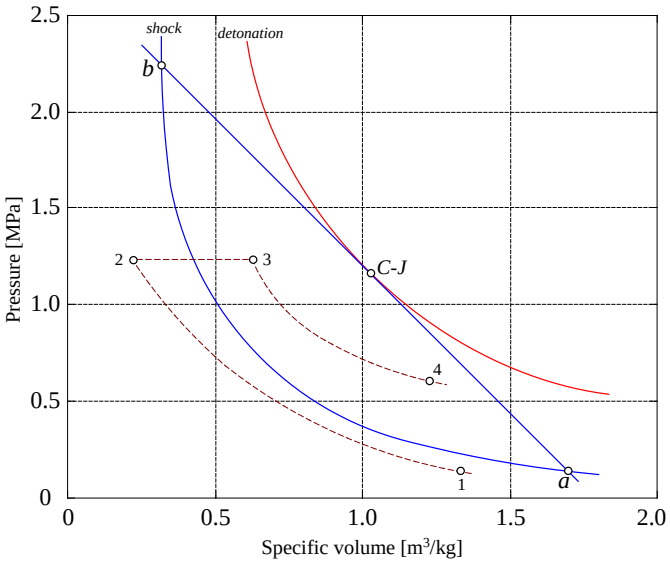


FIG. 1. Thermodynamic general process of detonation, particularly for two different engine cycles

The slope of the detonation line, obviously, is not a constant; from the tangent in the C-J point one obtains, from an isenthropic line passing through C-J point:

$$\left(\frac{p_2}{p_1}-1\right):\left(1-\frac{\rho_1}{\rho_2}\right)=\chi\frac{p_2}{p_1}\frac{\rho_2}{\rho_1}, \tag{1}$$

where χ – isenthropic exponent, assumed as constant (the ratio of the specific heats).

The propagation velocity of the detonation wave U_D is

$$U_D=\left(\frac{p_2-p_1}{\rho_2-\rho_1}\frac{\rho_1}{\rho_2}\right)^{\frac{1}{2}}, \tag{2}$$

proportional to the slope's square root.

As far as the isenthropic transformation gives $\frac{p_2-p_1}{\rho_2-\rho_1}\frac{\rho_1}{\rho_2}=\chi\frac{p_2}{\rho_2}$ and one consider the flow velocity as w, it results that, in the domain between S and D curves in fig. 1, one obtains

$$\left(U_D-w\right)^2=\chi\left(\frac{p_2}{\rho_2}\right)=a_2^2, \tag{3}$$

a – sound velocity of the gas.

Thus, for the C-J point on obtains

$$\frac{p_{CJ}}{p_1}=1+\frac{U_D^2}{\frac{p_1}{\rho_1}}\left(1-\frac{\rho_1}{\rho_{CJ}}\right), \tag{4}$$

and having in mind that the detonation Mach number is $M_D^2=\chi p_1U_D^2/\rho_1$, one obtains

$$\chi M_D^2=\left(\frac{p_{CJ}}{p_1}-1\right):\left(1-\frac{\rho_1}{\rho_{CJ}}\right), \text{ then} \tag{5}$$

$$\frac{\rho_1}{\rho_{CJ}} = \left(\chi M_D^2 + 1\right)/\left(\chi + 1\right)/M_D^2, \tag{6}$$

$$\frac{w}{U_D} = 1 - \left(\chi M_D^2 + 1\right)/\left(\chi + 1\right)/M_D^2, \tag{7}$$

Considering the energy equation applied for the burning gas (assumed as perfect gas)

$$\frac{1}{2}U_D^2 + \frac{p_1}{\rho_1} + \Delta Q = \frac{1}{2}\left(U_D - w\right)^2 + \frac{p_2}{\rho_2}, \tag{8}$$

where ΔQ is the reaction heat per mass unit of mixture gas, one obtains

$$\frac{p_2}{p_1} = -\left(\frac{\chi+1}{\chi-1} - \frac{\rho_1}{\rho_2} - \frac{2\chi\Delta Q}{a^2}\right)/\left(\frac{\chi+1}{\chi-1}\frac{\rho_1}{\rho_2} - 1\right), \tag{9}$$

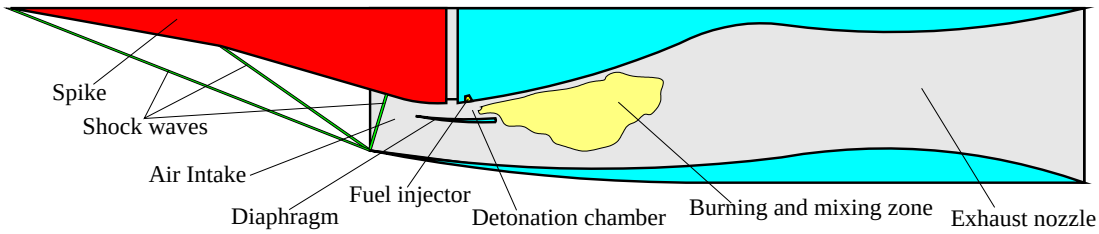
which gives for the detonation Mach number next solutions:

$$M_D^2 = \left[1 + \left(\chi^2 - 1\right)\Delta Q/a^2\right] \pm \left\{\left[\left(\chi^2 - 1\right)\Delta Q/a^2\right]^2 + 2\left(\chi^2 - 1\right)\Delta Q/a^2\right\}^{\frac{1}{2}}. \tag{10}$$

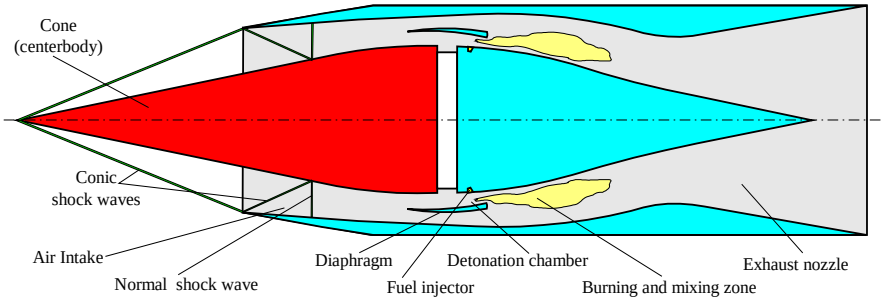
The appropriate solution is those using the + sign ([3], [13]), which associates the propagation velocity to the detonation conditions, while else one obtains the deflagration solution. So, one can observe that the extreme points of the detonation line will give the limits for the free stream velocity, determined with respect to the pressure and density values.

3. PROBLEM DESCRIPTION AND FORMULATION

An air inlet for an aircraft engine must assure the necessary air parameters to keep it in a stable operating mode (air mass flow rate, velocity and pressure) ([5], [7]), whatever the flight regime and the engine speed. The bigger the flight speed is, more important problems are issuing, so the supersonic air inlets are the most important in their class, especially if the engine is of the detonation type.



a) Engine with rectangular air inlet with mobile spike [18]



b) Engine with axis-symmetrical air inlet with translation cone

FIG. 2. Schematics of a high velocity propulsion system based on detonation engine

Some aspects regarding supersonic inlets are presented in [1], [4], [14], [15]; however, the problems solved by those references consider as assisted engine a classical-one, but in this paper one has to solve both the velocity and the pressure distribution problems, in order to keep the detonation process stable.

In [18] a similar problem was solved; as fig. 2.a) shows, the engine was designed to use a subsonic flow of high speed, so the inlet was designed 2D, with a mobile spike. This paper deals with an axis-symmetrical inlet, as in fig. 2.b).

The inlet has very important roles: both connection and correlation, by transforming the air parameters outside the engine into suitable parameters inside the engine, in front of the compressor, especially when it's about the pressure and velocity. Improper pressure condition inside the burning zone can transform the detonation into deflagration and "destroy" the detonating burning, which leads to a significant thrust decrease, without mentioning the thermal overload and the danger of explosion.

Consequently, air parameter configuration inside the detonating burning chamber must be assured at suitable values (pressure and temperature parameters kept within the permissible range ([7], [8] and [12])), no matter the flight regime; that means that the inlet should permanently adapt to the flight regime, which is given by the flight Mach number.

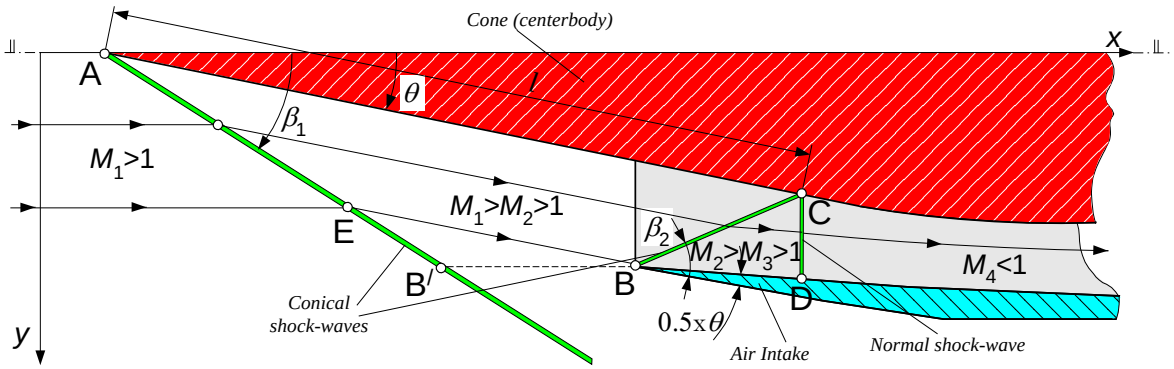


FIG. 3. Supersonic axisymmetric air inlet's geometry

As shown in Fig. 3, the air inlet is an axis-symmetrical -one (with circular cross-section), equipped by a conical centerbody for external compression (which generates a conic shock wave), while the intake's lip generates another shock wave – an internal conic wave, followed by a normal-one, inside the intake. This intake has also a specially profiled sidewall to contain the air flow compression. The inlet adapting to the flight regime should be realized by the central cone translation along the intake's axis, in order to keep the external shock-wave outside the intake ([1], [7], [12], [15]); the nominal flight regime is the most used regime (most used flight Mach number) and corresponds to the situation when the external shock-wave meets the intake's cowl lip D ([8], [12]).

This work aims to determine the optimal architecture (the exact shape of the central cone - section angle and ramp length), as well as the control law of the air inlet (the dependence of this central cone's position on the flight Mach number, in order to assure suitable parameters after the inlet, in the detonation chamber).

4. INLET OPTIMAL ARCHITECTURE ISSUING

Air inlet geometry design is usually based on two categories of methods, which are: a) aerodynamic methods – based on analytical and numerical procedures; b)geometric methods – based on planar geometry elements.

Optimization criteria might be: a) the total pressure recovery maximization (Oswatitsch condition); b) the drag minimization and/or c) the inlet flow rate correlation. Optimization studies for such external compression type inlets usually uses "carpet search method" (described in [8] and [12]), or the "method-of-characteristics" (presented in [2]).

Inlet's optimal configuration determination consists of cone's angle and cowl lip's angle calculus, as well as the dimensionless architecture issuing, based on the determined angle(s). Similar algorithms, but for 2D (planar) inlets, were presented and applied in [8], [9], [12] and [18], while algorithms for 3D inlets' optimal configurations were described in [2], [4] and [8].

As optimization criterion one has chosen the inlet's total pressure recovery σ_i^* maximization. Inlet's total pressure recovery (also known as inlet's perfection coefficient, or inlet's total pressure loss coefficient) σ_i^* is given by

$$\sigma_i^* = \sigma_{csw1}^* \sigma_{csw2}^* \sigma_{nsw}^* \sigma_d^* , \tag{11}$$

where σ_{csw1}^* is the total pressure ratio for the conic shock-wave triggered by the centerbody, σ_{csw2}^* – total pressure ratio for the conic shock-wave triggered by the cowl lip, σ_{nsw}^* – total pressure ratio for the normal shock-wave and σ_d^* – total pressure ratio into intake's duct (assumed as constant, no matter the flight regime or the engine regime would be).

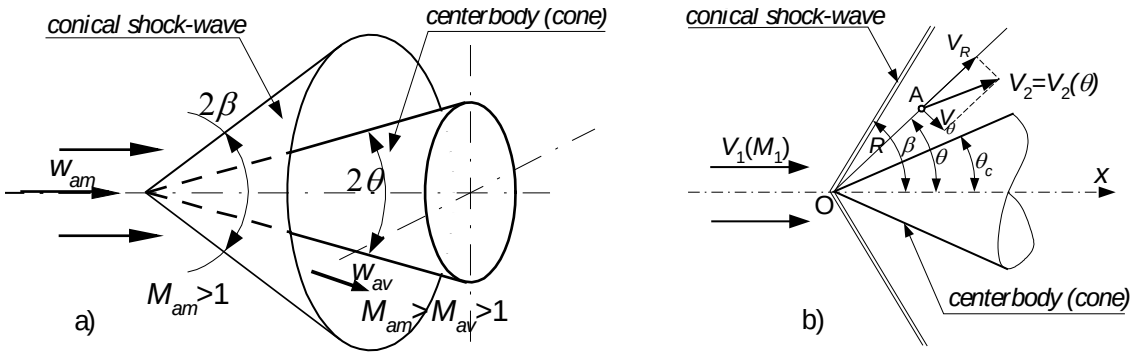


FIG. 4. Conical shock wave's geometry

The first and the most important issue of a conical shock wave (fig. 4) is the calculation of its angle β, with respect to the freestream Mach number M_1 (in front of the wave) and the cone angle θ_c. It might be calculated using an implicit non-linear equation (presented in [2] and in [5]):

$$\sin^2\beta = \frac{1}{M_1^2}\frac{1.2}{\cos\beta}\left(\frac{1}{\cos\beta} - \frac{1}{\cos\theta_c} + \ln\frac{\operatorname{tg}\frac{\beta}{2}}{\operatorname{tg}\frac{\theta_c}{2}}\right)^{-1} , \tag{12}$$

while the other parameters may be calculated very similar to the oblique shock-wave. Thus, the normal Mach number in the front of the wave M_{1n} is

$$M_{1n} = M_1 \sin\beta , \tag{13}$$

while the normal Mach number behind the wave M_{2n}:

$$M_{2n}=\sqrt{\left(0.4M_{1n}^{2}+2\right)\cdot\left(2.8M_{1n}^{2}-0.4\right)^{-1}}\,; \tag{14}$$

the tangent Mach number value remains the same before and behind the shock-wave , $M_{2t}=M_{1t}$:

$$M_{2t}=M_{1t}=M_{1}\cos\beta\,, \tag{15}$$

so the Mach number behind the wave becomes

$$M_{2}=\sqrt{M_{2n}^{2}+M_{2t}^{2}}\,; \tag{16}$$

this Mach number will be the front Mach number for the next shock-wave.

Total pressure recovery coefficient becomes

$$\sigma_{csw}^{*}=\left[\frac{2.4M_{1n}^{2}}{2+0.4M_{1n}^{2}}\right]^{3.5}\left[\frac{2.4}{2.8M_{1n}^{2}-0.4}\right]^{2.5}, \tag{17}$$

which, obviously, depends on the values β and θ_c as long as $M_{1n}=M_1(\beta,\theta_c)$.

Inlet's optimal configuration is given by the situation when the external conical shock-wave are tangent to the cowl lip (point B in Fig. 3).

Cowl's lip angle is significantly smaller than centerbody's flare angle; it's value is a fraction k of centerbody's angle $(\theta_l=k\times\theta)$, usually equal to $(0.15\div0.6)$. The algorithm meant to inlet's optimization must determine the value of θ which assures the maximum value of total pressure recovery coefficient σ_i^*, when the air freestream's velocity is the maximum one, imposed by the aircraft's maximal flight regime.

If the aircraft has the engine(s) inside its body and the inlet(s) on the fuselage behind its nose, as far as aircraft's flight velocity corresponds to a Mach number $M_v=4.5\div5$ aircraft's nose gene-rates a conical shock-wave, so the Mach number in front of engine's inlet is around 3.0÷3.5.

However, if the aircraft has a single engine and its inlet is mounted in the front of the fuselage, the front stream velocity is exactly the flight velocity.

For the present situation one has assumed that the air velocity is constant and it may be considered at an average value of the air free-stream, so the Mach number in front of the supersonic inlet is $M_H=3.2$.

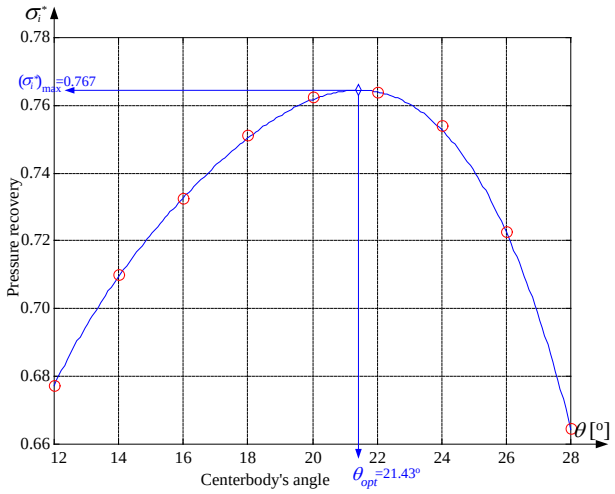


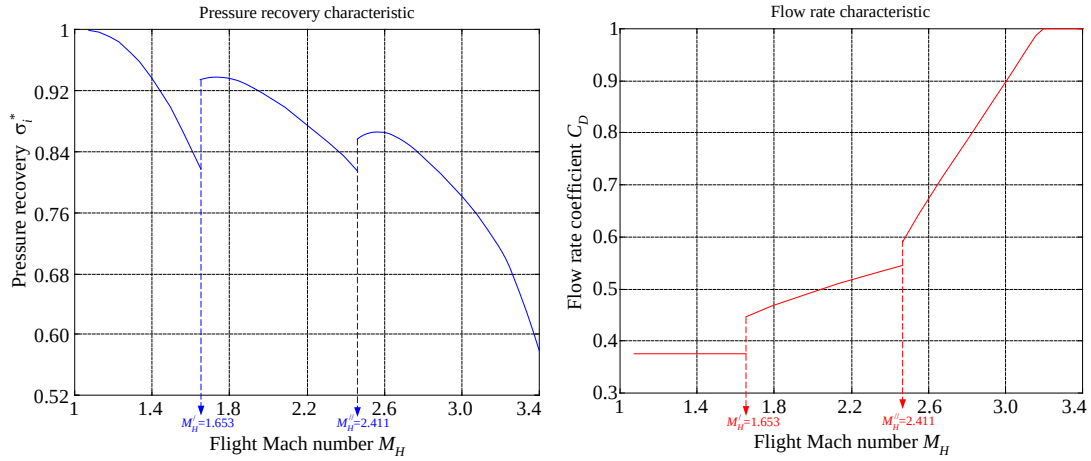
FIG. 5. Total pressure recovery coefficient versus the centerbody's angle

One has chosen $(\theta_l = 0.5 \times \theta)$ and considered a suitable interval for θ. Applying the algorithm in [17], using equations (11) to (17), one has obtained the dependence $\sigma_i^* = \sigma_i^*(\theta)$, as depicted in Fig. 5. The curve in this figure has a peak, a maximum value for σ_i^*, which corresponds to the optimal value of θ – angle; this optimal value is $\theta_{opt} = 21.43^\circ$.

Considering that cowl's lip B coordinate represents the unitary coordinate $(y_B = 1)$, one can determine inlet's dimensionless geometry. With the above determined optimal values of centerbody's and cowl lip's flare angle, one obtains the co-ordinates for the characteristic points in Fig. 3, as follows: A (0,0); B (1.536; 1); C (2.087; 0.819); D (2.087; 1.096). Moreover, based on these coordinates, the length of the center body's ramp results as: $l = 2.242$.

5. INLET CHARATERISTICS

Inlet's optimal architecture was determined for a Mach number when the external shock-wave is attached to the intake's cowl lip and the air flow rate through the inlet is maximum (the flow coefficient C_D is equal to 1); if the flight Mach number decreases, both the oblique shock-waves are depleting, so both β_1 and β_2 angles are growing, which means that air flow rate becomes smaller ($C_D < 1$). If the flight Mach number increases, the oblique shock-wave tends to enter inside the air intake, to interfere with the internal conic wave and to generate reflected shock waves, which will alter the flow and, consequently, the pressure and temperature distribution inside the inlet, which might make impossible the detonation.



a) Inlet pressure recovery characteristic map b) Inlet flow rate characteristic map

FIG. 6. Inlet's characteristic maps (fixed geometry architecture)

Characteristic charts are graphically presented in Fig. 6. The pressure recovery characteristic lays in Fig. 6.a), while flow rate characteristic – in Fig 6.b). It is noteworthy that both curves are not continuous, but they have some discontinuity points, corresponding to some occurred phenomena, such as shock-wave detaching: a) for Mach numbers under $M_H^{//} = 2.411$ the conic shock-wave triggered by the cowl lip detaches and becomes a normal – one, in front of the air intake, so the intake operates in a subsonic flow; b) for Mach numbers under $M_H^{/} = 1.653$ the conic shock-wave triggered by the centerbody detaches and becomes a normal – one, so the whole inlet operates in a subsonic flow.

6. INLET CONTROL LAW

In order to grow the C_D-value, a suitable solution is to keep the conical shock-wave attached to the cowl's lip, progressively displacing longitudinally the centerbody, which means that the inlet should be tuned with respect to the flight regime. As Fig. 3 shows, when the flight regime is less intense than the nominal-one, the conical shock-wave is depleting and moving away from the cowl's lip. Consequently, in order to bring back the conical wave on the cowl's lip, the distance BB$^{/}$ should be cancelled; it could be achieved only by retracting the centerbody. On the contrary, if the flight regime becomes more intense than the nominal-one, the centerbody should be pulled out of the intake (the distance BB$^{/}$ has become negative), to keep the conical shock-wave outside the intake.

This is, basically, the ground of the inlet's control law calculus, consisting of centerbody's displacement along its symmetry axis, with respect to the flight Mach number; Fig. 7 presents the shape of the control law.

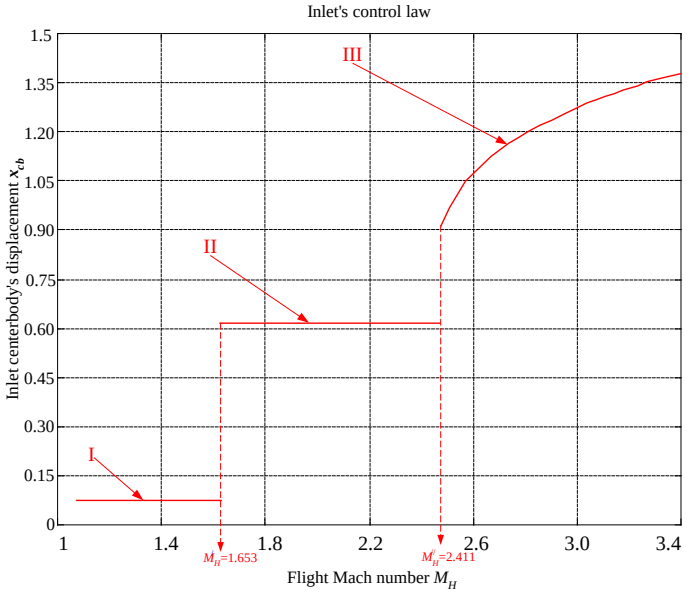


FIG. 7. Supersonic inlet's control law

The control law has three stages: **a) stage I**, corresponding to the low supersonic flight speeds, when the flight Mach number is under $M_H^{/}=1.653$ and the centerbody's tip triggers a detached normal shock-wave. Centerbody's position is fixed, the distance x_{cb} being constant $(x_{cb}=0.172)$. In fact, this might be the centerbody's position even for subsonic flights; **b) stage II**, corresponding to the medium supersonic flight speeds, when the Mach number is between $M_H^{/}=1.653$ and $M_H^{//}=2.411$. The centerbody's tip triggers a conical shock-wave, while the cowl lip triggers a detached normal shock-wave. Just as in the first stage, centerbody's position is fixed, the distance x_{cb} being constant $(x_{cb}=1.364)$; **c) stage III**, corresponding to the high supersonic flight speeds, when the Mach number is bigger than $M_H^{//}=2.411$ and both the centerbody and the cowl lip trigger conical shock-waves. The control law third slice is obviously non-linear; it might be mathematical described by the polynomial:

$$x_{cb}(M_H)=0.0729\times M_H^4-0.801\times M_H^3+2.4167\times M_H^2-2.9098\times M_H+1.511. \quad (18)$$

However, the characteristics in figures 6, as well as the inlet's control law in fig. 7, correspond to the entire range of supersonic air velocities; this configuration is suitable for an inlet assisting a classical jet-engine (operating based on a Brayton cycle), with classical combustor and exhaust nozzle. Such combination inlet+engine might be useful for a classic (conventional) aerial vehicle.

Regarding a detonation engine, the condition in the detonation chamber, as well as in the burning and mixing zone, are totally different; the pressure, density and velocity conditions must be strictly met, as fig. 1 shows. According to the detonation limits (points a and b on the tangent line, curve S), pressure and density limits are established. However, the right side domain (a-point zone, point 4 of the ramjet cycle) are corresponding to weak detonation, therefore this zone is to be avoided. Considering the equation (10), which gives the detonation Mach number and the useful range of wave velocities, as well as the fact that, according to this range, its minimum value correspond to a free stream velocity of $M_{H_{\inf}} = 2.503$ (see point b), while the maximum value is $M_{H_{\sup}} = 3.315$ (see point C-J), one may determine the useful flight regime range. Therefore, the range of flight regimes becomes significantly narrower, between $\left\lfloor M_{H_{\inf}}; M_{H_{\sup}} \right\rfloor$, which narrows the useful adjustment range, restraining the control law to a part of its third stage, as fig. 8 shows. This part is nonlinear and covers a significantly reduced distance of spike movement (around 0.32).

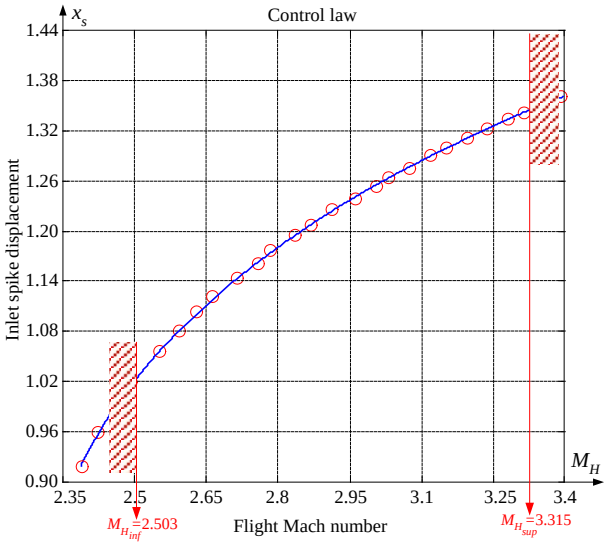


FIG. 8. Inlet's effective control law

7. CONCLUSIONS

High speed flights' nowadays challenge is how to obtain enough thrust with less constructive and operational efforts. Among the current modern solutions to this issue, detonation engines are at the forefront, but still in their infancy. This kind of engine needs special thermo-hydro-dynamic conditions of pressure, air density and velocity inside the detonation chamber, no matter the flight regime, which are very difficult to met, the stabilisation of detonation phenomena being a very challenging task.

Present work has determined one of these conditions: the speed limits of a supersonic propulsion system, based on its inlet optimal design, in order to assure the above-mentioned conditions for the detonation engine (established and given by the Chapman-Jouguet equations and Hugoniot curves); one has determined the domain of existence of

the continuous detonation inside engine's combustion room, from air pressure and density points of view, as well as the velocity condition.

Inlet's optimal architecture issuing was performed based on inlet's total pressure recovery coefficient maximization algorithm. Inlet's flow rate characteristics and the extended control law (as if the inlet would operate in the entire supersonic flight speeds interval) were issued. Control law has some discontinuity points, corresponding to the critical regimes, when the shock-waves are to be detached. The last part of the control law is a strong nonlinear and continuously growing with the flight regime.

Overlapping the curve of variation of air parameters behind inlet's shock waves one has obtained the limits of the flight regime which makes possible the detonation.

One can also conclude that such a propulsion system based on detonation burning is possible only for high supersonic flight speeds, but an aerial vehicle equipped with such a system cannot take-off and it should be firstly carried out and launched at a suitable flight regime (altitude and speed).

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TRAIAN VUIA AMONG THE LIMITS OF INTELLIGENCE, PASSION AND OPTIMISM. VUIA ENGINES AND THE AFFINITY FOR THE WIDE FIELD OF AERONAUTICS

Denisa–Ana BALEA

"Henri Coandă" Air Force Academy, Brașov, Romania

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Abstract: *Traian Vuia, a complex personality often linked to the father of mechanical flight, was, is and definitely will be one of the most debated names of the huge aeronautical sphere of all times. The path that the inventor chose without hesitation proved to be an axis mundi of his future destiny, which gained wings and, at the same time, gave him wings. Even though they seem to be fairytales, his unstoppable progress and life were sometimes paved with obstacles and slips. However, the symbiosis between the continuous desire to become the best version of himself and the need to make valuable contributions to the aviation field has resulted in his philosophy, which still provides us with remarkable achievements.*

Keywords: *aeronautics; flight; inventor; patent; perseverance*

1. INTRODUCTION

There were a lot of personalities from different thematic areas that tried to identify a single word that embodied what Traian Vuia was. Inventor, lawyer, aviation passionate, physicist, modest person, son of a priest, Romanian legend or personal developer were just a few of the titles attributed to the one and only Traian Vuia. In this way, the future statement, which belongs to Elie Carafoli, both national and international personality, emphasizes the impact of Vuia's activity in the aviation field: ,,the Romanians are among the first peoples of the world to participate in this wonderful manifestation of human intelligence that would definitely lead, in approximately half of a century, to an amazing development of air navigation" (Benea: 1-2).

Regardless of the chosen word or structure, one aspect is definitely seen as a certainty: Traian Vuia was the perfect example of intelligence, real passion, desire to become the best version of himself and continuous optimism.

2. TRAIAN VUIA'S SHORT BIOGRAPHY

2.1 Childhood and aviation as an early passion

Traian Vuia was born on the 17th of August, 1872 in Surducu Mic, a small village located in the south-west of Romania in Caraș Severin county (historia.ro). Over time, Surducu Mic has been given the name Traian Vuia, currently belonging to Timiș county.

The inventor spent the first years of his life in his family, during which he learnt values such as modesty, confidence, honesty, perseverance and last, but not least, faith.

Moreover, the patriarchal environment gave him true life lessons, which further materialized both in his attitudes towards people and in the courage to overcome all the obstacles arising in his way (biblacad.ro). Even though his family's income was modest or sometimes insufficient, Vuia was the supporter of his own dream: to get "wings" and to fly. Since the beginning of his studies, Traian Vuia was seen as an eminent student, fact emphasized by his brilliant mind, agility, perseverance and desire to accomplish more and more objectives.

From a fairly young age, the inventor started to be interested in applied mechanics, any subject related to sciences catching his attention and intriguing him. In addition to this, at the age of 10 Traian Vuia participated in various aviation events, thus becoming passionate about kites and the ways they moved into the wind. Furthermore, the inventor started to analyze them in a detailed manner, thus discovering that they presented a series of aspects that made their handling more difficult than expected (traianvuia.ro).

In this way, the brilliant child managed to change the classic structure of a kite, substantially improving its performance by introducing changes that were never seen before.

2.1 Aviation becomes a latent state

After attending primary and secondary school in Făget and Bujor, Traian Vuia decided, from a purely educational perspective, to leave his hometown and study at the Lugoj High School. Making a comparison between childhood and teenage years, the high school period was the one which offered him the best reason to want more and more from himself; while at the age of ten he wanted to make kites look and act in a perfect manner, high school life made him pay attention to the phenomenon which actually makes keeping them in the air possible. In this way, the future inventor managed to move the framework to different equilibrium conditions and types of forces that act during kites' movements, all of these being guaranteed by his dedicated and intelligent physics and mechanics teachers (Antoniu, Buiu, Hadîrcă, Homescu & Cicoş, 2013: 24-55).

In 1892, Traian Vuia graduated from the Lugoj High School and passed the final exams with very good marks. Since he wanted to stick to the science path, he decided to study mechanics at the Budapest Polytechnic Faculty. Although his goal seemed to take shape every day, financial instability determined Vuia to drop out of college shortly after completing his first year of study. Detached from his passion, the inventor became a law student, fact that allowed him to ensure a decent living by practicing law in famous firms during his spare time. In 1902, Vuia obtained the PhD title in law, fact that emphasized the continuous desire to become the best version of himself.

3. BACK TO WHERE IT ALL BEGAN. AVIATION, THE DREAM THAT CAME TRUE

3.1. Going to Paris and wishing for a change

At the beginning of the 20th century, Vuia came back to Lugoj, where he started to build his first aircraft, the famous *aeroplan-automobil*. Being aware of the huge costs that such a project would entail, he realized that designing the aircraft would not be possible without external support. Hoping that he would find different people interested in his lifetime project, the inventor decided to go to Paris in 1902. After presenting the drawings and the project in miniature, the foreign engineers were not as enthusiastic as expected. In this way, they were very skeptical about the possibility of an aircraft with a higher density than air to fly, fact that resulted in completely rejecting Vuia's idea (Magazin istoric).

Realizing that there was no external support left, the inventor decided to work on his own and to become more and more ambitious. Traian Vuia revised his project and adjusted it in small details, activities which were followed by promoting it as much as possible. Even though his ambition was bigger than expected and he started to construct the aircraft without financial support, he had to stop somewhere on the road. So Vuia asked for help for the second time, but unfortunately the Paris Science Academy did not agree with his point of view.

3.2. The double patent and the Montesson flight

Disappointed by the representatives of one of the most important aviation institutes of the entire world, Traian Vuia made a decision regarding his future objectives: he would not ask for help anymore and he would keep his expectations and ambition level as high as possible. In this way, in 1903 Vuia obtained the aircraft patent, which was commonly known as patent no. 332106, and in 1904 he got another patent, this one related to his first engine (historia.ro).

From 1904 until 1906 the project has been refined and permanently adapted to the needs. On the 18th of March, 1906 Traian Vuia made history: on a field located in Montesson, Paris, the inventor has succeeded in realizing the first flight in the entire history of mankind using an airplane heavier than air and capable of detaching from the ground using its own means. After an acceleration of about 50 meters, the aircraft was able to take-off and fly from approximately 1 meter above the ground. Moreover, the project in its final state has travelled a length of approximately 12 meters, after which it was forced to land due to a problem which occurred at the propeller blades. The international press, especially the British, French, German and American one, brought into attention the success under the auspices of Vuia: the first mechanical flight of the history of mankind (biblacad.ro).

4. LIFE AFTER MONTESSON AND VUIA'S NEW HORIZONS

Despite all the speculation and criticism following the Montesson event, Traian Vuia knew the value of his work and was aware of the fact that the flight was indeed a success (Ucrain & Crăciun, 1986: 14-20).

Seen as a huge step for the worldwide aviation, Vuia's idea led to other successful projects. In this way, he identified the problems which made a longer flight impossible, improved the initial structure of the aircraft and released the updated version of it as soon as possible. Furthermore, he managed to create and build other models of aircraft, which were very appreciated by both national and international aviation personalities.

During the second decade of the 20th century, the inventor focused on projects related to both helicopters and parts of helicopters, especially propellers and rotary wings.

Between 1925 and 1946, Traian Vuia paid attention to engines, especially those which had been already integrated in his models of aircraft and helicopters. In this way, he updated the engines which were already in use and then created new ones. Moreover, he studied in detail steam generators and supported their introduction in various fields such as railway, naval or road transport. The hot air and closed cycle engines, the single acting-cylinder and valve distribution engines and the "Vuia-Yvonneanu" steam engines were among the most popular engines created by Vuia (Antoniu, Buiu, Hadîrcă, Homescu & Cicoș, 2013: 20-22).

Unfortunately, in 1946 Vuia's health condition deteriorated, the inventor being unable to dedicate himself to his lifetime passion anymore.

Moreover, he suffered a severe stroke, after which he was permanently dependent on a person. 4 years later, he came back to Romania, where he was transferred to a nursing home. On the 2nd of September, 1950 Vuia died at the age of 78 and a few days later was buried at the Bellu Cemetery in Bucharest.

His work is still alive and his brilliant and innovative ideas definitely led to various successes in the aviation field. Traian Vuia was, is and will be a pioneer for both the national and international aeronautics.

CONCLUSION

Traian Vuia, engineer, scientist, law PhD, dreamer and modest human being was the example of a multilaterally developed personality. Through his plurivalent creation, the Romanian inventor managed to conquer and aim for peaks that many of his contemporaries did not even dare to dream of. Wanting to end on an atypical note, one of the most popular aphorisms says that: "The people who changed the world were those people the world could not change".

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BIRTH, DEVELOPMENT AND CONCEPTS FOR THE USE OF AVIATION IN WARFARE BEFORE THE FIRST WORLD WAR

Plamen BOGDANOV

University of Library Studies and Information Technologies, Sofia, Bulgaria
(p.bogdanov@unibit.bg)

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Abstract: *The following paper examines the emergence of the world's first ideas and attempts to create aircraft and master the third dimension. The creation and first use in warfare of aircraft lighter than air is analysed. The paper further studies the creation and development of the first aircraft heavier than air, as well as the first concepts for the use of aviation in warfare before the period prior to the First World War.*

Keywords: *aircraft, aviation, concepts, warfare*

1. INTRODUCTION

Man's dream to break away from the Earth is a millennia old one. The legend of Daedalus and Icarus, written more than twenty centuries ago by the Roman poet and historian Ovid, is one of the first known written accounts of the human idea to take to the skies. Chinese strategists in ancient times also understood the benefits of the third dimension and invented kites 2,300 years ago. They were even then considered as means of lifting people into the air to observe the actions of the enemy.

The first ideas for creating aircraft heavier than air, and the first practically developed projects and constructed models of such aircraft; however, did not apply to airplanes, but to the embryonic concept of the helicopter. A manuscript of Leonardo da Vinci with a drawing of the first helicopter (Fig. 1) dating from 1475 was found in the library of Milan.

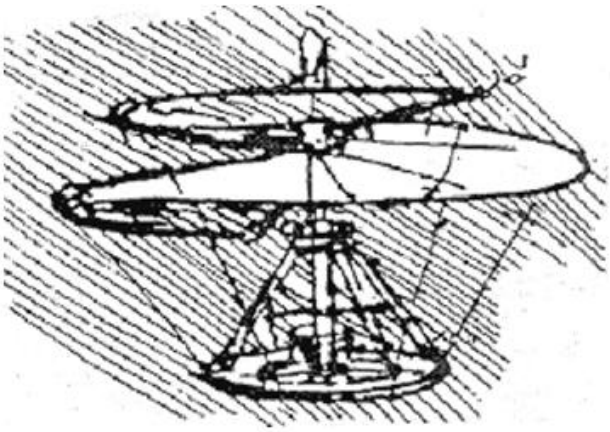

FIG. 1 Leonardo da Vinci's drawing of the first helicopter (1475)

Of great interest from a technical and scientific point of view are the works of Leonardo da Vinci in the field of flight. For about 30 years he studied the flight of birds and presented the results of his observations in an extensive treatise "Codex On the Flight of Birds". Leonardo da Vinci described three types of bird flight, explaining each of them scientifically and supporting his observations with drawings. He also began to build an ornithopter - an aircraft heavier than air, with wing movements like those of a bird. In his project, the wings are set in motion through the motion of the hands and feet. There is no information whether this project had been implemented in practice. In 1475, Leonardo da Vinci made his project for a helicopter and, as mentioned in his notes, managed to lift it into the air, albeit without specifying how he set the propeller in motion.

Whilst the idea of flight is indeed an ancient one, the procedural development of the concept and consequently its application to the military sphere only came centuries later. The following paper has as its ***main objective to examine and establish the chronology of the key moments in the birth, development and evolution of key concepts for the utilisation of aviation in the military realm*** prior to their full implementation in the First World War. The paper thus examines the contribution of pivotal pioneers in the development of aeronautics and aerial warfare, their work and the general framework of evolution and development of military flight starting from the 17th century henceforth and concluding just prior to the outbreak of the First World War. The paper provides a continuous chronology that encompasses a variety of source material from the respective epochs, visual references and analysis, expressing and affirming the ***primary thesis that the understanding and concepts for the use of aviation in warfare existed thoroughly since the French Revolutionary Wars, into the 19th century and going through the rapid advancements in technology and classes of aerial vehicles***, from balloons to airships and finally into the ultimate example of manned flight – the airplane. This evolution of military aviation is expressed in diverse and perspective concepts for their utilisation, albeit with limited implementation, that would later expand into the first Global industrial conflict, which however is beyond the scope of the present paper.

2. BIRTH, DEVELOPMENT AND FIRST USE OF AVIATION IN WARFARE

In 1643, the Italian physicist Evangelista Torricelli proved the existence of air pressure. In 1654, the discovery was confirmed by the inventor of physical instruments, Otto von Guericke. He concluded that light spheres of diluted air could rise into the sky.

Based on Guericke's findings, in 1680 the Italian explorer Francesco Lana de Terzi published a treatise describing an aircraft design. According to Terzi, such an aircraft would have been able to launch projectiles and sink enemy vessels and to bombard enemy cities. [1, 2] It can thus be stated that with Terzi's project came the idea of utilising airspace to achieve superiority in warfare.

The Russian scientist Mikhail Lomonosov also designed a helicopter in 1754. His "aerodynamic machine", which was built on the principle of Leonardo da Vinci's helicopter, was designed to raise measurement instruments to great heights. However, Lomonosov's flight experiments were unsuccessful. With this failed attempt, further ventures to create aircraft heavier than air in the next half century were limited to the construction of models.

A turning point in man's attempts to overcome gravity was achieved by Henry Cavendish in 1766 with the separation of hydrogen and the creation of a method for extracting it in large quantities. This was followed by successful experiments and the development of ***lighter-than-air aircraft.***

In 1783, the Montgolfier brothers of France lifted hot-air balloons to an altitude of 2,000 meters, which flew for a distance of 2 kilometres, with the same year Jacques Charles building and lifting a sphere filled with recently discovered hydrogen to an altitude of 1,000 meters. [3]

In November 1783, Jean-François Pilâtre de Rozier and the François Laurent d'Arlandes made the first flight with a man-made construct. It had a diameter of 14 m and could fly 8 km in 25 minutes. On January 7, 1785, the Frenchman Jean-Pierre Blanchard flew across the English Channel in a flight that lasted 12 hours.

The balloon also became the first aircraft used for military purposes. In the early 1890s, the eminent French chemist Louis-Bernard Guyton-Morveau set out the basics for using tethered balloons in aerial reconnaissance. On June 2, 1794, the French captain Jean-Marie-Joseph Coutelle made the first reconnaissance of the battlefield and Austrian artillery positions from the air at an altitude of 300 metres. [4] Two days later, with the active help of air observers, the battle was won. Despite the heavy equipment, some of which was stationary and required on-site construction, the balloon proved to be an effective tool, especially when adjusting artillery fire. [1] However, those which are not tethered depended to a large extent on the direction and strength of the wind.

Balloons continued to be used extensively in combat throughout the 19th century, including during the rest of the Napoleonic Wars, mainly for reconnaissance and aerial surveillance, but also for aerial bombardment, artillery fire adjustment and postal services. It was not until the end of the 19th century that the first self-propelled aircraft appeared – the airplane and the airship.

In Germany, after leaving the army, General Ferdinand von Zeppelin began to develop a lighter than air steerable aircraft, which could partake in hostilities. Thus, in 1900, his airship (zeppelin) with a 5-man crew flew for 18 minutes. As early as the advent of the first rigid airships, the German General Staff saw in them a powerful new strategic tool for warfare. The operational plan for conducting combat operations on the Western theatre, developed in 1906 by Alfred von Schlieffen, provided for the use of airships to solve operational and strategic tasks related to conducting airstrikes, conducting aerial reconnaissance and for transporting troops and combat equipment.

The first serious attempts to overcome gravity with ***heavier than air aircraft*** were made in the second half of the 19th century.

At the end of the 19th century and even before the advent of the airplane, science fiction authors predicted the revolutionary nature of aerial weapons. Albert Robida in his 1883 novel “The War of the Twentieth Century”, and later H. G. Wells in his 1908 book “The War in the Air”, provided for a terrifying description of the destruction that could come from the air. Moreover, the former – artist and illustrator Albert Robida, in 1882, expected that at the beginning of the XXI century the sky would be filled with flying cars and duly presented them in his painting "One Night at the Opera" (Fig. 2) [5].

FIG. 2 The painting "One Night at the Opera" by Albert Robida, 1882

As early as the end of the 19th century, the first experimental flights of man with a device heavier than air had begun.

In 1866, the French engineer Clément Ader built his first aircraft, called the Éole Ader. The device, resembling a bat, had a lightweight steam engine with 4 cylinders and 20 horsepower (15 kW), a 4-bladed propeller and a total weight of 300 kilograms (Fig. 3).

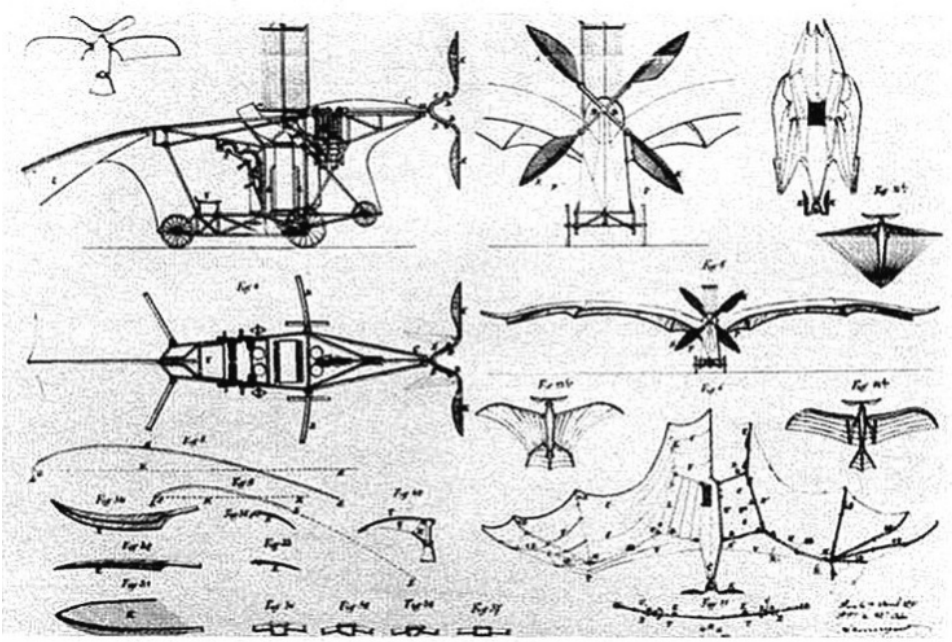

FIG. 3 Drawings of Clement Ader's Éole aircraft

On October 9, 1890, with the Éole, Clément Ader managed to detach himself from the ground by a few centimetres and fly 50 meters in 5 seconds. This is considered as the first take-off of an aircraft in history, made under the power of its own power. However, Ader failed to achieve maneuverability and flight stability. The Wright brothers succeeded 13 years later.

According to some reports, Ader also built the Éole II aircraft (also called the Avion II), with which he flew for 200 metres in August 1892, as well as the Avion III (Fig. 4), with which on 14 October 1897 he flew 300 metres. Information about these flights is contradictory and unconfirmed. [6]

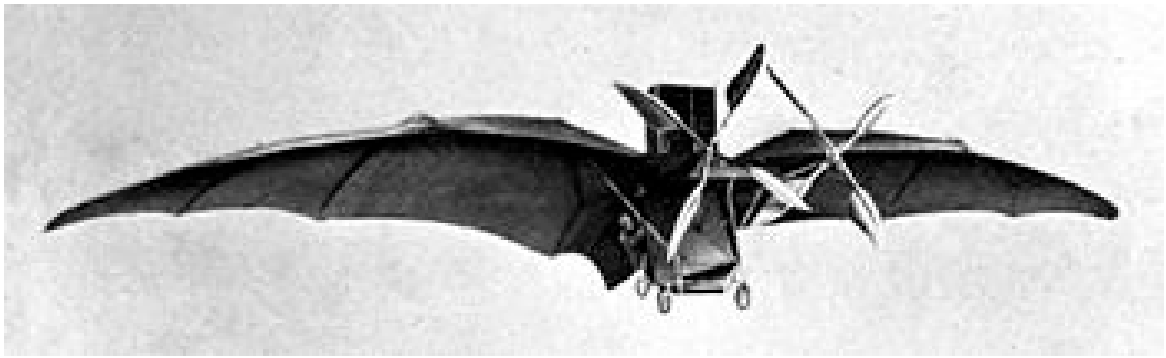

FIG. 4 Avion III aircraft (illustration from 1897)

It is officially accepted that the airplane itself was created by American aeronautical designers and pilots, brothers Wilbur and Orville Wright. They constructed Wright Flyer (Fig. 5 a, b, c), with which Orville made the first controllable steady flight at an altitude of 2.5-3.5 metres on December 17, 1903. It lasted 12 seconds and flew a distance of 37 metres. In the fourth flight, Wilbur succeeded in keeping the aircraft in the air for 59 seconds and flying 250 metres. The aircraft had a gasoline engine with 12 horsepower.

FIG. 5 (a) The first flight of Wright Flyer on December 17, 1903

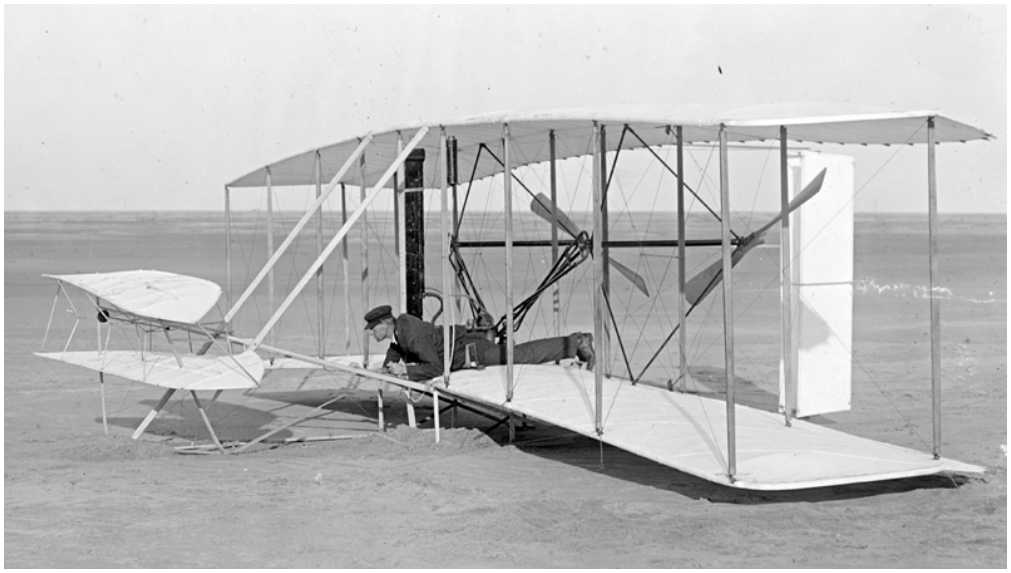

FIG. 5 (b) Wilbur Wright on Wright Flyer in 1903

In 1905, after repeated improvements to the glider and engine, the Wright brothers' plane flew for 38 minutes and 3 seconds and a distance of 39 kilometres. [3]

In 1906, the brothers received a patent for the aircraft, and in 1908 they sold their model to the US military, and associated licenses for it to several other countries. In 1909, they founded the Wright Company, which manufactured aircraft and trained pilots.

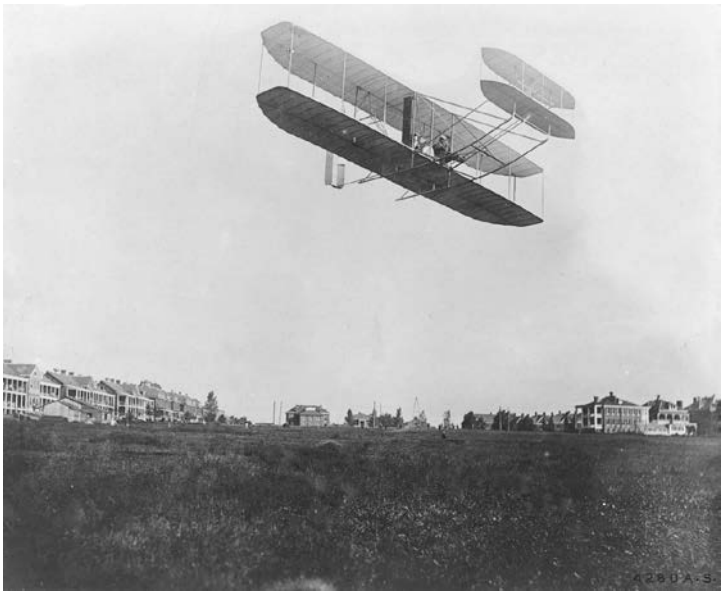

FIG. 5 (c) Demonstration flight of Orville Wright in September 1908

The first successful flight attempt in Europe with a heavier than air aircraft was made by the Romanian inventor and aviation pioneer Traian Vuia, who lived in France, and created the so-named "flying car" – the first monoplane with an engine. On March 18, 1906, the aircraft constructor flew for the first time with Vuia I (Fig. 6) and managed 12 meters, rising one meter above the ground. [7,8]

FIG. 6 Trajan Vuia in his flying machine Vuia I in 1906

The tense political situation at the beginning of the 19th century forced the military to more realistically assess the capabilities of the not-yet-reliable aircraft. An important sign of the potential of states was expressed in the constant efforts in ever-expanding achievements and record setting in the field of aviation. In January 1909, Louis Bleriot completed work on the creation of the Blerio-11 aircraft, with which on July 25th of that year, he flew over the English Channel. This flight is considered an important moment in the development of aviation, as it proved in practice its great future potential.

Serious successes in aircraft construction before the First World War were the creation of the high-speed monoplane Duperdusin (reaching a speed of 203 km/h), the multi-purpose biplane "Albatross" (which flew 1400 km without landing) and the four-engine Russian large strategic reconnaissance aircraft Sikorsky Ilya Muromets, which provided the baseline of possibilities for future use in armed combat of aircraft heavier than air.

Also of importance is the contribution to the development of aviation of the Romanian aviation engineer Henri Coandă, who after a series of aerodynamic studies in 1910, built the first reported jet aircraft called the Coanda-1910. The aircraft was presented at the Second International Air Show in Paris in the same year.

3. FIRST CONCEPTS FOR THE USE OF AVIATION IN WARFARE

Although the plane was still viewed with a certain level of distrust, in all countries the military was willing to use it for military purposes - especially for intelligence. This is how the first airplane services were formed.

Undoubtedly, the ***pioneers of aerial weapons*** were ***Giulio Douhet*** (1869-1930), ***Clément Ader*** (1841-1925) and ***William Mitchell*** (1879-1936). They saw the new opportunities offered by the aerial dimension and saw the aeronautical factor as a key tool for the implementation of global strategy. Breaking with centuries old for when the war was fought purely on land or at sea, they proceed from two axioms – the superiority of the air factor and the need for independence of the air force.

One of the greatest theorists in the field of military science, who has stated his view on the great changes that are to take place in the conduct of hostilities precipitated by the advent of aircraft, is the then unknown Italian artillery major ***Giulio Douhet***.

In 1909, he wrote: "It may seem incredible that the sky should become a battlefield, no less important than the land and the seas. But it is better from now on to seize this opportunity and prepare our services for the new conflicts that lie ahead. The struggle for dominance in the air will be tough…" [1]

Giulio Douhet predicted that aviation would be a decisive weapon in the offensive role. According to him, there was no effective protection against aviation and that bombings can seriously degrade the spirit of the population ("Command of the Air", 1921). [9]

The aforementioned Frenchman ***Clément Ader*** was another individual actively involved in the development of aviation. In 1909 he published his work "Military Aviation", which became extremely popular and was published in no less than 10 editions in the five years preceding the First World War. The work is of especially high importance with its presented views on air warfare and the presented concept of modern aircraft carriers with a flat deck for takeoff and landing. Ader maintained that aviation will radically change the foundations of the existing strategy. According to him, the time of land battles had passed and in the future great victories or great defeats will take place in the air. Ader was convinced of the defensive strength (unlike Douhet) of a powerful air fleet.

His concept of an aircraft carrier was handed over to the American naval attaché in Paris, and the first attempts to create an aircraft carrier in the United States began in November 1910.

In the United States, General ***William "Billy" Mitchell*** believed that aviation could be the primarily means of an attack. At the conclusion of the First World War, he also proposed the idea of a large air landing operation in the rear of the German armed forces.

Although they spared no small amount of effort, the efforts of these aviation pioneers were often either limited or wholly fruitless, and they themselves had profound troubles with the higher echelons of command. Ader's loan was suspended. Mitchell ended up in court. Douhet, having criticized the Italian army and its high command too much, was deprived of any command functions. As a result, the actions of the Italian Air Force were completely traditional and in line with those of other states of the period. Thus, bombing forces were limited in quantity and quality.

The ideas of these pioneers were difficult to impose at the time, facing the administrative sluggishness, the conservatism of the military corps, and especially the desire of other branches of the army to keep aviation in a subordinate, auxiliary position.

To illustrate the opposition that military aviation faced in its early development, a few examples from France can be examined. "It's all a sport, but for the army the plane is a zero," said then-General Ferdinand Foch, commander of the Higher Military School, in 1910. According to him, aviation could only play an auxiliary role in war. In 1914, Captain Faure, who reported on his experiments with a 37-millimeter cannon on a Voisin aircraft, said that "this is something interesting, but more in common with Jules Verne than with reality." Only aviation for direct assistance was of any interest to the ground forces, which saw aviation not as a weapon, but as supplementary asset, at best. When it comes to eliminating bomber aircraft, infantry and sailors further justified their position. For General Maurice Gamelin and Vice Admiral Georges Durand-Viel, "the removal of the air force for bombing would not affect the conduct of land and sea operations." Admiral Raoul Castex and the academia at the Naval School did not question the effectiveness of the massive air attacks, but were sceptical about the decisive nature of the air war concept. [10]

Unlike Ader, who had limited followers, Douhet's influence was significant in France and Germany. His doctrine aroused the fear of the French (they applied the Douhet model to their eventual opponents, Italy and Germany) and the admiration of the Germans. His ideas strongly influenced the development of the future Luftwaffe in Germany.

Since 1909, there had been a strong interest in England in the ability to carry out air strikes and bomb strategic sites and cities.

Despite resistance, as early as 1910 in France, England, Russia and the United States created the first formations of military aviation, armed with airplanes.

The formation of larger structures followed, and in 1911 an air battalion was established in England, and in 1912 – the Royal Air Corps. [11] In 1914, the French Directorate of Military Aviation was founded. [10]

Aviation was quickly attracting the interest of the military with the opportunities it provided.

During the ***Tripolitan War (1911-1912) and the Balkan War (1912-1913), the aircraft was first used in military operations.*** Thus, shortly after its appearance, aviation filled specific military roles.

In 1913, Giulio Douhet, now a lieutenant colonel, defended the view that there should be an independent air force and stated: "The airspace will be independent. A new weapon is born - the weapon of the air. A new battlefield opens - the air. The history of war is filled with a new factor, the principle of air warfare is born".

4. CONCLUSION

The development of industrial technologies and motorisation in the early twentieth century gave a powerful impetus to the evolution of land and naval forces and led to the creation of a new kind of armed forces brunch – the Air Force. The capabilities of armies by land, sea and air lead to changes in perceptions of their use, which also changed the nature of war.

As soon as they appeared, the first aircraft quickly found application in armed struggles. Balloons had been used since the end of the 18th century, with the later arrival of airships at the conclusion of the 19th century. The creation of the airplane caused a kind of revolution in the conduct of the war with the provision of indisputable advantages from the utilisation of the third dimension.

Simultaneously with the birth of aviation, the first theories of air warfare appeared, where the airplane was considered a weapon crucial to the battle on the ground.

Later in the 1920s, the tactical characteristics and armament of aircraft, the organizational structure and combat use of aviation were to be improved and refined. Military theory developed the problems of gaining supremacy in the air as a prerequisite for successful military action on land and sea. Some of the basic principles for the use of aviation were also to be substantiated.

By the end of the 1920s, aviation in the leading countries would begin the process of becoming a branch of the armed forces.

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HISTORICAL LANDMARKS REGARDING THE ACTIONS OF ATTACKING IN THE AIR OF THE AERONAUTICAL PERSONNEL THAT ARE SAVED BY PARACHUTING DURING THE WORLD CONFLICTS OF THE XXTH CENTURY

Mihai DEAŞ

”Henri Coandă” Air Force Academy, Braşov, Romania (mihai_deas@yahoo.com)

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Abstract: *The use of the parachute as a means of rescuing pilots and aerospaces has become an increasingly used practice, with the progress of aeronautical technology.*

This article brings to the readers the problem of treating those who used this means of rescue in the periods of conflict since the beginning of aeronautics, more precisely in the first and second world wars.

The question that this article tries to answer is whether the one who saves himself with the parachute during the states of conflict can be attacked in the air, and this attack can be considered legitimate and / or moral

Keywords*: parachute, pilot, balloon observer, rescue*

1. INTRODUCTION

This article is designed to answer this question: "Must an observer or pilot be attacked during the parachute descent?" In order to provide an answer, a brief history of the use of the parachute as a means of rescue and belligerents practice towards this process are required. Before raising this point for the aviator, it should be tackled with priority for the aerospace guards. The aerospace guards were equipped throughout the war with parachutes. Whenever balloons were attacked, most of the time they were attacked with incendiary cartridges, they would catch fire, and the observers would jump with parachute to save their lives.

Many times, however, it happened that the balloon engulfed in flames, collapsing at higher speed, was falling over the parachute-jumping observer, who descended more slowly, thus causing the parachute to burn and leading to the paratroop's death. That is is why in France, for example, the use of the parachute by the balloon observers had begun towards the end of the war to no longer be so much appreciated.[1]

Aviation as a combat weapon is developing exponentially and, given its offensive spirit (incomparably greater than that of the aerospace that increasingly remained as a defensive weapon) led the parachute to be improved in order to adapt to airplanes.

2. THE BALOON OBSERVERS AND THE PILOTS

Air battles were very frequent, and the need for the aviator to have a rescue tool was increasingly necessary. The cases in which both balloon observers and pilots managed to save themselves were very numerous at that time.

First of all we must see what are the reasons that cause the balloon observer or the aviator to jump. No doubt when his apparatus has broken down due to the blows received from the opponent, he must jump no matter over which territory he is in order to save his life.

However, it has been noticed that the balloon observer and aviator can also jump in other situations than those in which their apparatus becomes unsuitable for flying, due to opponent caused damage. The balloon observer, for example, being at a disadvantage against the attack of an airplane, jumps before the enemy's tracer bullets set his balloon on fire. In this case, no apparatus defect occurred and yet the observer jumps. It can be said, however, that his leap is not made for rescue purpose. It is not true because, as we have shown, if the jump had been made after the balloon being set on fire, it could have happened that its flames would be set on the observer parachute as well, during the descent.

It can also happen that the captive balloons plucked by the storm are carried away into enemy territory, and their occupants jump with parachute without being attacked or the balloon failing to function. [2]

Towards the end of the war, both the Germans and the French built parachutes that saved the entire balloon nacelle, with the observation apparatus, the observer, and the results of aerial observation when the balloon was set on fire. [3]

Just like the balloon observer the aviator can encounter different cases when he has to leave the plane by jumping with parachute. He has to jump either because the plane becomes unsuitable for flying or unsuitable for combat. Improper to the flight means that it received blows from the opponent that destroyed a part of aircraft, so the flight can no longer continue. But the apparatus can fail during combat or without a fight, not because of enemy strikes, but from other causes, independent of the enemy, consequently the aviator finds himself in other situations when he has to leave the plane.

Improper to the fight means that the aircraft on board weapons have broken down, so the plane can no longer defend itself or attack. It can still happen, as we have seen for balloon observer case, that the aviator jumps without a malfunction of the apparatus or of the armament, but only by autosuggestion he imagines that something is no longer working or seeing himself unable to continue the fight because of the numerical inferiority or inferiority of the material or armament, or that he loses his judgment.

To these multiple possibilities, the historian and theorist Riesch said: "Since there are no rules of international law that expressly concern the legitimacy of the attack of the balloon observers or aviators who descend with parachute, the belligerents of the First World War were uneasy about the attitude they had to adopt. The practice of belligerents was uneven. Some airmen attacked the paratroopers without investigating why they ended up in this situation, and even used tracer and incendiary cartridges to fire on the unfortunate airmen and balloon observers; others just riddled with bullets the veil of those who were trying to save themselves. We also know many cases in which the pilot refrained from any attack when his enemy's aircraft was on fire. It can be said that most of the aviators of the First World War spared their opponents who were parachuted down." [4]

If Riesch draws these conclusions that accurately convey the belligerents' positions towards the airmen and balloon observers who were saving themselves with parachutes, Spaight even cites concrete cases during the World War, among which we recall:

First an order of attack of a French aviation patrol:

"The plane No. 1 will attack the balloon first. If it fails it will also attack the plane No. 2. If plane number 1 succeeds, then plane number 2 will attack observers who save

themselves with the parachute. If the planes no. 1 and 2 succeed, then plane number 3 will attack the observers."

"The French Corporal Leverrier was shot in the head while jumping out of the balloon that had caught fire. Sergeant Mathieu on whom a plane opened fire, escapes with his life on March 17, 1917."

"An American pilot in the service of the English aviation tells how a plane from the Richtoffen squadron fired on a balloon that had caught fire."

"The German aviator was firing short bursts at the unfortunate observer who jumped out of the balloon and swayed as he walked toward the ground. The Germans were the first to provoke such senseless attacks on paratroopers. The English air force retaliated against these attacks, so Cpt. H.G. Watson of the Australian Flying Corps opened fire on the lines that connected the paratrooper to the parachute."

"Captain Rickenbacker refrained from firing at a pilot who had jumped out of the burning plane." [5]

I rendered these quotes to show that the practice of war varied. As long as there is no international convention on these cases, it was natural that the way the belligerents behaved should be at their discretion, having to appeal only to chivalry, to the laws of humanity or to other moral considerations. What characterizes this issue throughout the First World War is the personal choice of those concerned.

What does "aircraft that can no longer be used" mean? From the cases presented above, in which the aviator or balloon observer is forced to jump, we have seen that not only the apparatus itself can become unsuitable for flying, but there are also other causes. How can one appreciate then, especially in the air being and still during the fight, the true cause of the jump? Moreover, the cases mentioned above are not the only ones.

Since 1915, spies of the French and English intelligence services, equipped with parachutes, were launched behind German lines. [6]

These are other circumstances in which someone can leave an aircraft with the help of a parachute. If, referring only to the first series of cases and we have seen how difficult the cause of each of them was to distinguish, intervening this new series of significant circumstances of the jumps, a fair distinction of each action of this kind seems totally impossible. That is why another theorist of the air war laws, Kroell, seeks to impose another distinguishing criterion of these numerous cases, in order to legitimize or not the attack during the descent by proposing the following approach: "any person who leaves the board of an aircraft with the help of a parachute in order to save his life, cannot be the subject of an attack." [7]

The name "aircraft that can no longer be used" is rather vague and sometimes impossible to establish, especially for defenders who are found on the ground. For them it will be even harder to know the reason that caused the jump. Riesch admits that: "the military interests of a belligerent to kill balloon observers and enemy aviators are greater than the interests of destroying their aircraft." Spaight makes the same observation. The aviators are also convinced of this, so the impossibility of knowing precisely the cause of leaving the board, as well as the fear of sparing an enemy that can jump for reasons other than those of rescue, will almost always lead to the attack of those who jump with parachute, even when the jump is made due to force majeure causes. There are also cases in which airmen from a humanitarian consideration do not attack opponents who try to save themselves with the parachute.

However, whenever the attacker has the slightest doubt about the reason for that jump, he will not spare the one who jumped. Even more so will be done by enemies on the ground, who can realize even less the reality of the facts sometimes occurring at high height.

Thus, the aviator who thinks himself saved, is received with a destructive fire a few hundred meters before reaching the ground. Cases of chivalry in the air are common, but ground troops always fire on enemy aviators for the reasons below: lack of exact knowledge of the situation, lack of humanitarian spirit. However, there have been cases when such airmen, after they managed to save themselves, jumping with the parachute, could not be caught on the ground and, sneaking through the enemy troops, managed to cross their own lines, sometimes this behavior of the ground troops appears legitimate. [8]

To detail this issue we must distinguish between the aviator and the balloon observers. Observation is generally used for defense, so balloons will always be raised above their own territory. Which means that the balloon observer, in any situation will be found, if it jumps with the parachute, it will fall into the lines or behind its own lines. As Riesch observes "it is more important for the opponent to kill the observer than to destroy the balloon", he will almost always seek to kill the balloon observer, either before the destruction of the balloon or after. Whether the bullets will be directed at the parachute or the one who pilots it, the goal pursued is the same, the annihilation of the observer.

FIG.1 Baloons during the First World War [9]

In this situation, the attack seems legitimate from other perspectives as well. Perhaps the balloon observer who stood up for a while in the air, could observe certain troops movements, could deduce certain opponent intentions, which, by writing them down, he could take with him, even if he jumped with parachute, and these once used, could be very dangerous for the enemy. That's why enemy aviators rarely spared such an observer. The attack of the balloon observer who saves himself with the parachute seems even more legitimate, when the entire nacelle descends with the parachute. [10]

This process used, both by the French and the Germans during the war, was aimed at bringing in good conditions to the ground, with the help of the nacelle parachute, the entire observation material: apparatus, maps, notes on the balloon board, and with them also on the observer.[11] In this case, the attack of this nacelle parachute is legitimate, both because the destruction of the material on board constitutes a loss for the adversary and because the observer and his notes once on the ground would represent a danger by communicating what was observed.

A situation could also arise for balloons, being plucked from their ties, they would be carried away by the wind away in enemy territory, and the balloon observer would try to save himself by parachute over this territory.

There is no doubt that in such a case, the incident does not constitute any preliminary act of an impending battle, no phase of enemy aggression, and though the presumption that this observer could reach back into its own lines to the ground is very small, consequently its attack during the descent, either from the air or from the ground, is inadmissible, not so much for reasons of chivalry and or humanity, but for the fact that he is nothing more than an enemy who has ceased the fight, who surrenders himself by the force of things, who is but a prisoner of war, from the moment of the leap.

The observation was not used as much in World War II. Its role was more passive, protective. The balloon observers situation was not better, although the cases were rarer, but not because of a change in the legal condition, but because of the small number of balloons used. [12]

As for the plane in the Second World War it was not a uniform practice; one attitude or another of the air or ground fighters depended not so much on legal or moral considerations, but on the circumstances in which such a case occurred. That is why some airmen forced to jump were not attacked in the air, others were attacked, and others were killed only after they had successfully reached the ground.

The plane, an apparatus excellently mobile, can be found either above its own territory or above enemy territory. We will necessarily have to take into account the territory over which the jump is executed. If the jump is made over the territory of the state to which the one who is forced to jump belongs, for one of the reasons stated, rarely his opponent will spare him. This is because this aviator, saving his life, although the fight ceases, this cessation is only an interruption, he can not be captured, because once he gets down, he will pilot a new apparatus and will be able to resume the fight. Even if the enemy destroyed her device, this loss of material, no matter how great it may be, is less important than the loss of the aviator that is harder to form.

If the one who jumps with parachute, in order to save himself, is found above the enemy territory, far behind the contact line, the situation changes. This aviator is a loser who has stopped fighting and can no longer escape. He will certainly be captured and this capture is more useful to the enemy than his death during the descent. In this way the enemy achieved its goal, that is, by destroying the apparatus, reducing the logistical power of the opponent, and by removing the pilot from the battle, reducing the personnel forces of the same opponent. Almost always, it is sought to capture live airmen, who are saved by parachute so that they can be interrogated and obtain certain information from them. As you can see, it is not so much chivalry that prevents the parachute from attacking, but its own interest.[13]

Since the aviator surrendered, he is no longer a prisoner of war, enjoying the same rights as all prisoners under the Geneve Convention 1906, art. 1 para. 2, “To all persons belonging to the armed forces of belligerents who are captured by the enemy in the course of operations of maritime or aerial war, subject to such exceptions (derogations) as the conditions of such capture render inevitable. Nevertheless, these exceptions shall not infringe the fundamental principles of the present Convention; they shall cease from the moment when the captured persons shall have reached a prisoners of war camp”.[14]

In addition, the 23rd Article of the Hague Regulation says that "it is forbidden to kill or injure an enemy who, by laying down his weapons or having no means to defend himself or surrender." [15]

There is no need to prove that paratroopers who save themselves above enemy territory fit perfectly into this paragraph, even the most restrictive interpretation. In fact, lately, not so much moral considerations or the desire to apply the texts of international Regulations and Conventions, have led the belligerents to respect the right to prisoners who cease the fight, but all their own interest, because for the most part these prisoners

are used to saddle different jobs, thus increasing the productive force of the nation engaged in war and making available large herds for own troops.

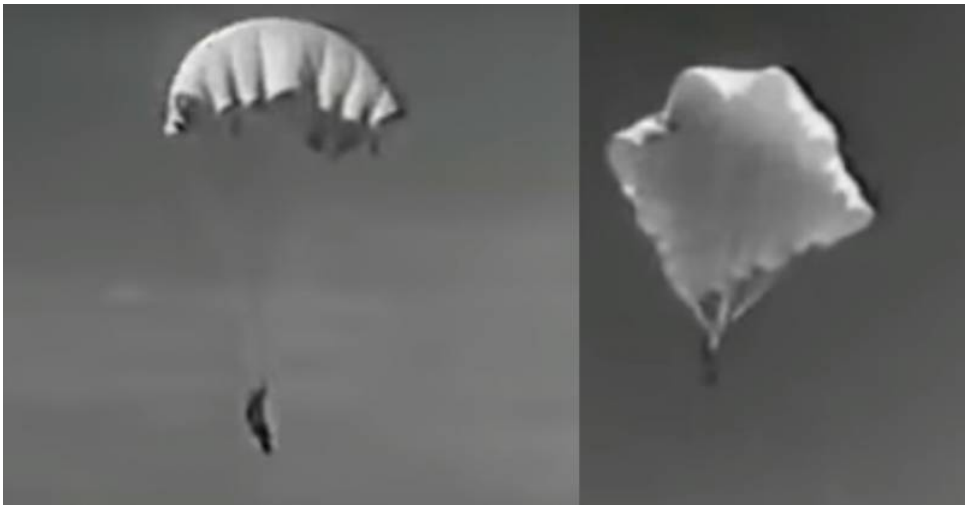

FIG.2 Rescue parachute on the WWII [16]

It can also happen that air battles are fought just above the contact lines. The aviators whose aircrafts are taken out of battle, will also jump with the parachute. For them, however, there is the possibility of falling very close to the contact line, so even if the enemy planes do not attack him while he is in the air, as soon as it approaches the ground they are received with fire by the ground troops. In no case they will let an enemy aviator fall unharmed, only a few hundred meters away, but will open fire with all their weapons. Moreover, sometimes it happens that the belligerent land troops to whom the aviator performing the parachute jump belongs to, and it is noticed that he will fall into enemy territory at a short distance from the line of contact, initiate a destructive attack, and often a battle is fought more fiercely than ever.

Neither chivalry nor humanity are effective in such cases anymore. If, however, this aviator is not attacked with fire by the ground troops, the cause can only be the admiration that they could have even in the bloody moments in the trenches, for the greatness of the air battle and the courage of those who fly. Such cases are very rare, however, because even if orders were given to prohibide these attacks, it is enough for a weapon to fire somewhere, so that the entire front can unleash its fire on the one who saves himself. If we refer to the purpose of the war we must admit that such an attack is legitimate because the ground troops do not have the certainty that the enemy aviator who saves himself with parachute will fall into their hands.

They are not sure that this enemy aviator is a prisoner of theirs from the very moment he left the plane out of battle, and this is all the more so because air currents can also sometimes carry the pilot to one side or the other. The problem becomes even more interesting today, when the parachute enjoys some of its own mobility. Of course, the aviator who tries to fly his parachute to land in his own lines will be attacked with fire by the ground troops, even if he will not be attacked by enemy planes. A rule on this issue cannot be established without regard to reality. Nor is the appeal to chivalry and humanity. All the legal resolution of this problem is only according to the measure of certainty that the belligerent forces that are face to face have, that the one who saves himself will or will not be captured by them. [17]

But leaving the board by parachute can also be done with the aim of taking a military action, and this action can be executed by 1, 2 or more people. Aircrafts can carry 40-80 people. How can it be known whether such a parachute descent is made for the purpose of rescue or for the purpose of carrying out a military action? For a single case, it is provided for by the text of the Hague Commission, that of the plane taken out of combat, and this represents only 25% of the cases of parachute descent for rescue purposes. As a result, 75% of rescue cases remain outlawed. We cannot know whether the jump is for the purpose of rescue or for any other purpose. What, then, would be the criterion for assessing the reasons for a parachute jump to qualify it "for rescue purposes"?

Can it be, for example, the number of those who jump? It is known today that there are planes that have a crew consisting of 1, 2, 3 or more servants. It may also happen that this crew, varied in fact, is in a position to jump, in order to save themselves, without any operational intention. Likewise, it may happen that 1, 2, 3 or 4 transported on board jump with parachute, but with operative intent. The plane may also be visibly taken out of combat, or not, or it may have nothing. Marcel le Goff says "individual descents from an unseazy aircraft in battle are suspicious and those who make them can be annihilated", and regarding the jumps of several people says "Group descents always justify attack and destruction." So the attack of a single airman who jumps with parachute is legitimate if the plane he left is not taken out of the fight, but we have seen how hard it is to know when a plane is taken out of battle or not. [18]

Of course, if the plane crashes into flames immediately, then it is clear that it is an apparatus taken out of combat. This attitude of sparing the one who saves himself with the parachute is recommended by le Goff if there is only one. But if there are several of them at once, they can be attacked, regardless of whether they jump out of a plane out of battle. We believe that the author is of this opinion based on the fact that 3, 4, 5 or more airmen who leave the plane, even to save themselves, once well down, can sustain a fight, if they have a very brief weaponry. This reasoning seems correct to us. It is enough that these, spared during their rescue jump, have each of an automatic pistol and ammunition, which is quite possible, so that they constitute a combat team that can do enough harm in the middle of enemy territory and can even get back into their own lines.

In addition to the criteria for assessing the determined reasons for the parachute jump, specified so far, there is another one, which seems to us to be of more practical importance, namely the territory over which this jump occurs. As we have already seen, if the one who jumps with the parachute is far inside the enemy territory, this enemy will not attack him either from the air or from the ground and will not attack him all the more so as he has the opportunity to capture him. The enemy will have this attitude towards 2 or 3 aviators who save themselves, without seriously wondering why they jump, because he is sure that he will get his hands on them. Their attack in the air will therefore depend not so much on the appreciation of the reasons that caused them to jump, but on the possibilities of the enemy to capture them or not.

Of course, catching them alive is more important to this enemy than killing them while still being in the air. These possibilities relate to local ground defense, because the friendly aviators will repeatedly spare enemy aviators who parachute over the friendly territory, being sure that they will be captured by the local forces, unless they have an express order to attack them. Such orders are not given for cases where the enemy aviators that are saved are above the friendlyy territory, but only when they are above the enemy territory.

3. CONCLUSIONS

We conclude, therefore, that there can be not only one criterion to assess when it is legitimate and when it is not legitimate to attack the aviators who save themselves by parachute, but several criteria

- The plane out of combat;
- The territory over which he jumps;
- The possibilities of local defense;
- The self-interest of the belligerents.

However, these criteria cannot determine with absolute precision when it is appropriate to attack the airmen who have jumped with the parachute, but it seems to us that they better individualize each situation, without restricting the number, or rather, if some restrict it, others increase its applicability.

The observations I have made on each of them remain valid. These four criteria, which are contained in a text, could be able to give a better solution to this problem. We could be accused of removing humanitarian and moral considerations altogether. This accusation would be well-founded, but we should say it clearly and precisely that morals, chivalry and humanitarianism play a very small role in the operations of today's war. Why give them an importance that they do not have? [19]

In conclusion, if we analyze the "attack during the parachute descent" or the aerial shipwreck we find that there are no great differences between the conflicts of the XXth century. The cases when parachute-rescuers were attacked were more common in First World War than in the second. The causes of these fate changes during operations, of the aviators rescue are due to the progress of the local defenses organization and the higher understanding of self-interest because it is more important for the nation to capture an enemy aviator in order to obtain precious information, than the more or less unreational lust to have fun shooting at him while he is in the air.

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PRISONERS' CAMP FROM TIMIȘU DE JOS AND THE HUMANITARIAN TREATMENT APPLIED BY THE ROMANIAN STATE TO AMERICAN AVIATION WAR PRISONERS DURING THE SECOND WORLD WAR, AN EXAMPLE OF THE GOOD PRACTICES IN COMPLIANCE WITH THE LAWS AND CUSTOMS OF WAR

Elena-Laura ION

”Henri Coandă” Air Force Academy, Braşov, Romania

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Abstract: *The preasent essay is meant to present a teadious analysis concerning not only the way that the american POW were treated, but also the existing conditions within the camp that accommodated the american and british officers and NCOs captured after the Bucharest bombings and the ones over the refinery situated on Valea Prahovei.*

Keywords: *prisoner of war (POW), bombing, Timişu de Jos.*

1. INTRODUCTION

Between June 22, 1941 and May 12, 1945, Romania took part in World War II, fighting both on the Eastern Front with the German army and on the Western Front with the United Nations. During all this time, a number of approximately 125,000 enemy soldiers were interned in the Romanian POW camps.

Prisoners of war captured by the Romanian Army were treated in accordance with the provisions of the Geneva Convention of July 27, adopted by Romania on September 15, 1931. The operation and organization of the camps was done according to the provisions of *„Instructions on prisoners of war and interns of 1926 ”*, but also in accordance with the *„Prisoner Camp Regulations ”*.

The Anglo-American bombings mainly targeted the refineries in Ploiești, the factories in Brașov, the port of Drobeta Turnu Severin and the North Railway Station in Bucharest. The capital and the cities of Pitesti and Craiova were also bombed, despite the fact that they did not represent military or economic targets and, being „open cities", their attack was forbidden. The bombings in Bucharest were overwhelming and the fighter planes of the Royal Romanian Air Force were insufficient. Calls for additional military supplies went unanswered.

A very important detail related to the Second World War is the fact that air supremacy was extremely important in order to take the initiative. Whoever held the air supremacy had a better chance of victory.

Statistically speaking, Romania produced only one military aircraft for every 750 aircraft produced by the United States of America. Of course, the Romanians received hundreds of planes from the Germans, and the Americans did not fight with all the planes in our airspace.

The intense bombing began when American fighter jets were able to transport the bombs to Romania, which meant a distance of more than 1,000 km (these having the base of the 15th Air Force in southern Italy).

Table 1. The bombings that took place in April

Date	Place
April 4th	Bucharest
April 5th	Ploiești
April 15th	Bucharest and Ploiești
April 15th -16th	Experimental night attacks: Turnu-Severin
April 16th	Brașov and Turnu-Severin
April 21st	Bucharest and Turnu-Severin
April 24th	Bucharest and Ploiești

2. OPERATION "TIDAL WAVE" AND THE CAPTURE OF AMERICAN AVIATORS

Romania has been a major power in the oil industry since the 1800s. It was one of the largest producers in Europe. The oil refineries in Ploiești provided about 30% of all oil production for the Axis powers.

The air raid that took place on August 1, 1943 on Ploiești had an ambitious goal: to shorten the Second World War, eliminating a large part of Germany's oil production in one fell swoop. Called Operation Tidal Wave, the attack by five U.S. Air Force bombers on refineries was well planned and repeated.

The 9th Air Force (Group 98 and Group 376) was responsible for the overall conduct of the raid, and the partially formed 8th Air Force provided three additional groups of bombers. All the bombers engaged in combat were B-24 Liberators.

However, the attack was undermined by an incorrect premise. The United States Army Air Force operated under the illusion that a single attack could cause irreparable damage to a major target. The Americans totally underestimated the power and skill of the German-Romanian resistance. The city of Ploiesti has been surrounded by seven major refineries that have produced about a third of Germany's oil and a third of its aviation fuel. The bombing planners recognized from the outset that they were an extremely difficult target.

The attack was also approved by Prime Minister Winston Churchill and President Roosevelt at the January 1943 Casablanca Conference.

Colonel Jacob E. Smart, a trusted adviser to General Henry H. "Hap" Arnold, was the one who proposed a mission at a lower altitude, which meant an extraordinary deviation from the precious doctrine of precision bombing at height. The analysis indicated that at least 1,400 heavy bombers were needed to achieve the success of a high-altitude raid, and they were not available. He opted for the only tactic that could work - a low-level surprise attack. He was shot down during the raid and spent 11 months as a prisoner of war. Eventually, he retired as a four-star general. A prisoner of war revealed to the Americans that Ploiesti was strongly defended, but the mission was so important that they themselves confessed that "if no one returns, the results will be worth the cost" [4].

On June 12, 1942, 12 B-24s attacked Ploiești - the first American bombing of an European target. Damage to refineries was minimal, but all 12 bombers landed safely - six in Iraq, two in Syria and four in Turkey, where the planes were confiscated and crews were interned.

Colonel Alfred Gerstenberg, a German officer, commanded the defense of the city. It established a radar interception network together with an efficient signal detection unit in Athens. Then, the route of the "secret mission" was followed shortly after takeoff.

However, for American pilots, things went wrong from the beginning: an aircraft was lost immediately after takeoff, so that only 177 of the 178 planes left safely; a plane began to fly uncontrollably, ending in the sea; an aircraft broke away from the formation to search for survivors, unable to return to the formation and the list goes on.

All these things were aggravated by the inability to regain their cohesion due to the orders to maintain a strict radio silence, not knowing that the Germans had already come to the conclusion that the target was Ploiești. Chaos was raging, and some pilots broke the radio silence to draw attention to navigation errors, which threw these two groups directly into the rain of heavy anti-aircraft artillery fire.

Two aircraft of the 93rd Group, led by two future U.S. Air Force leaders, Major George S. Brown (later Chief of Staff) piloting Queenie and Major Ramsay D. Potts piloting the Duchess, attacked the Astra Romana refineries, the Orion Union and Columbia Aquila in the southern part of the city.

The attack by the two Bombing Groups paralleled Gerstenberg's train line, where the camouflage disappeared to reveal a mixture of batteries firing incessantly into the aircraft, covering the sky with smoke. Amid artillery fire and bomb blasts, some damaged planes crashed to the ground, while others, already destroyed by the defensive operation, flew to try to make a forced landing in rural areas. The losses were heavy.

The Steaua Română refinery was so damaged that it did not resume production during the war.

SSgt. Zerrill Steen was a survivor of that battle. After his plane crashed, killing the rest of the crew, Steen remained at his post, firing all the ammunition left in enemy aircraft. Only then did he ascend to safety. He received the "The Distinguished Service Cross" while still in captivity, being a prisoner of war in a romanian POW camp [4].

In total, 30% of the aviators did not arrive home that day. Of the 1,765 aviators who took-off for the raid, 532 were either dead, prisoners, missing or hospitalized: 310 members of the air crew were killed, 108 were captured and hospitalized in Romanian hospitals or imprisoned in POW camps , 78 were interned in Turkey and four were taken by Tito's supporters in Yugoslavia. Three of the five medals of honor (most for any aerial action in history) were awarded posthumously.

While the damage to the refineries was not as severe as expected and the German ability to repair the facilities was underestimated, Gerstenberg used forced labor on the military to quickly restore Ploiești to its entire production. Most of the damage was repaired in a few weeks, after which the net fuel production was higher than before the raid [5].

Given the loss of a large number of aircraft and the limited damage to the targets, Operation Tidal Wave is considered a strategic failure of the US side.

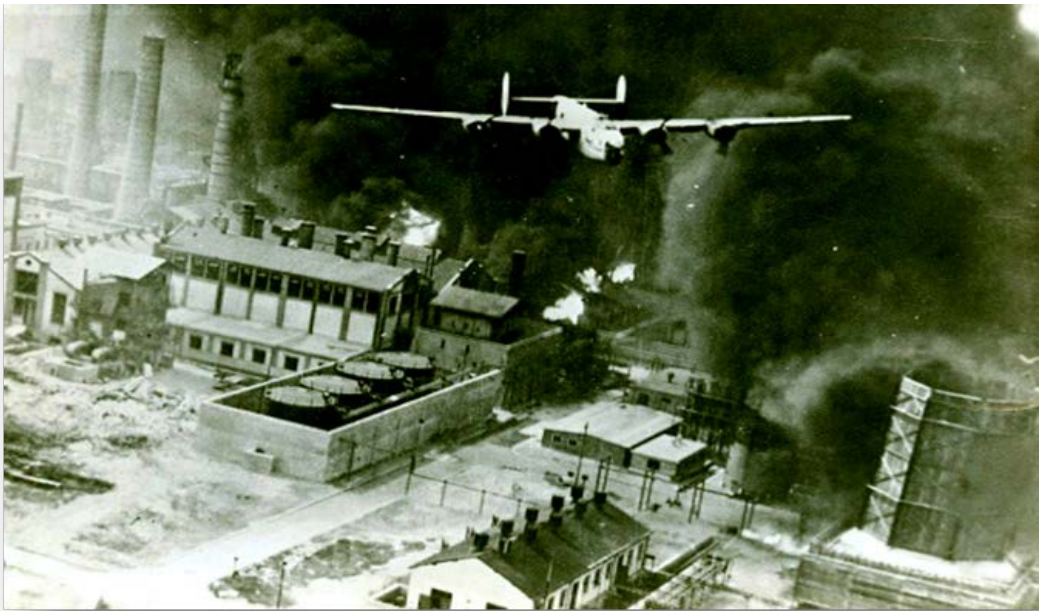

FIG. 1 The refineries in Ploiești under attack

When the 15th Air Force was established in Italy, the bombing planes returned over Romania starting with April 1944 [6]. Then, however, the oil fields were within range of fighter jets. More than 5,400 heavy bombers, along with almost 4,000 fighter jets, targeted Ploești, turning it into ash. The missions ceased when the Soviet army moved to the area in August 1944. More than 2,800 airmen were wounded or killed in an effort to stop the Nazi fuel source.

3. THE HUMANITARIAN TREATMENT APPLIED BY THE ROMANIAN STATE TO AMERICAN AVIATION WAR PRISONERS

Following the American raid of August 1, 1943, the captured aviation personnel were interned in the following locations: at the Central Seminary in Bucharest where 41 able-bodied prisoners were interned and at Sinaia, where 69 wounded prisoners were interned. The prisoners of war in Bucharest were transferred to camp no. 14 in Timișul de Jos and housed in two buildings positioned 250 meters apart. The salary received by the prison officers corresponded to the existing ranks in the Romanian army. They also benefited from a separate canteen, the cost of the meal being deducted from the balance. The amount of money they had left was also used to buy irrationalized food. Article 11 of the Geneva Convention did not contain for the granting of balances to non-commissioned officers, but in Romania they were allocated sums of money equal to those of Romanian soldiers in order to purchase food, tobacco, hygiene items, etc. Subsequently, the Romanian government decided to build a dining hall for them and pay their balances, spending 120 lei per day for each prisoner.

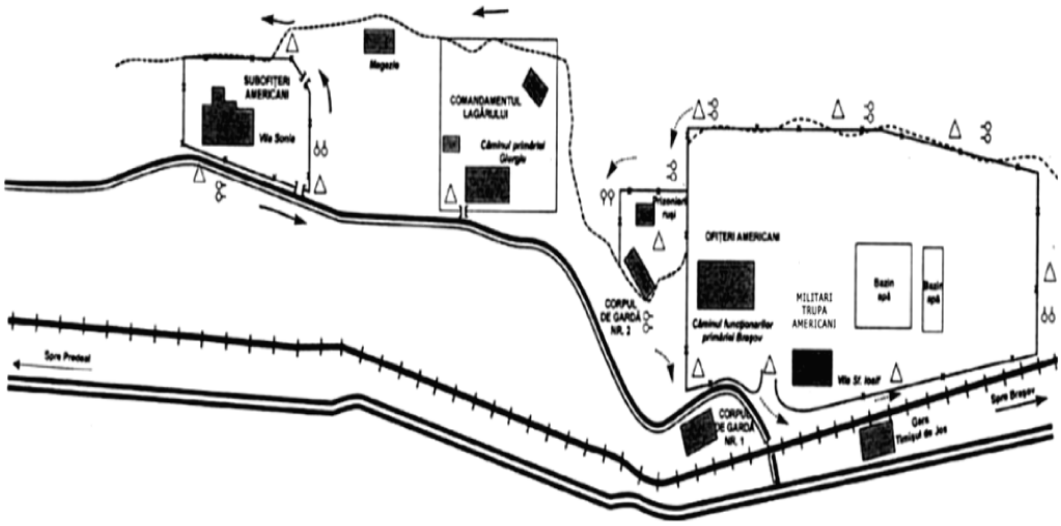

FIG. 2 Disposition of the POW camp in Timișu de Jos

In Fig. 2 you can see how, to the left, were the barracks where the American non-commissioned officers lived, the building in the middle was the camp command, and on the right, close but different in size, were the buildings where the Russian prisoners (small building) and American officers (the big building) lived.

Due to the fact that Timișu de Jos is so close to the city of Brașov, where I studied, I had the opportunity to go to the old prison camp and to see, more closely, the way the buildings were located and their current condition. To present the study done in the field, I will present in the following pages some pictures taken with the drone.

AMERICAN NCOs **AMERICAN OFFICERS**

FIG. 3. The left side of the Timișu de Jos camp seen with a drone. Personal contribution

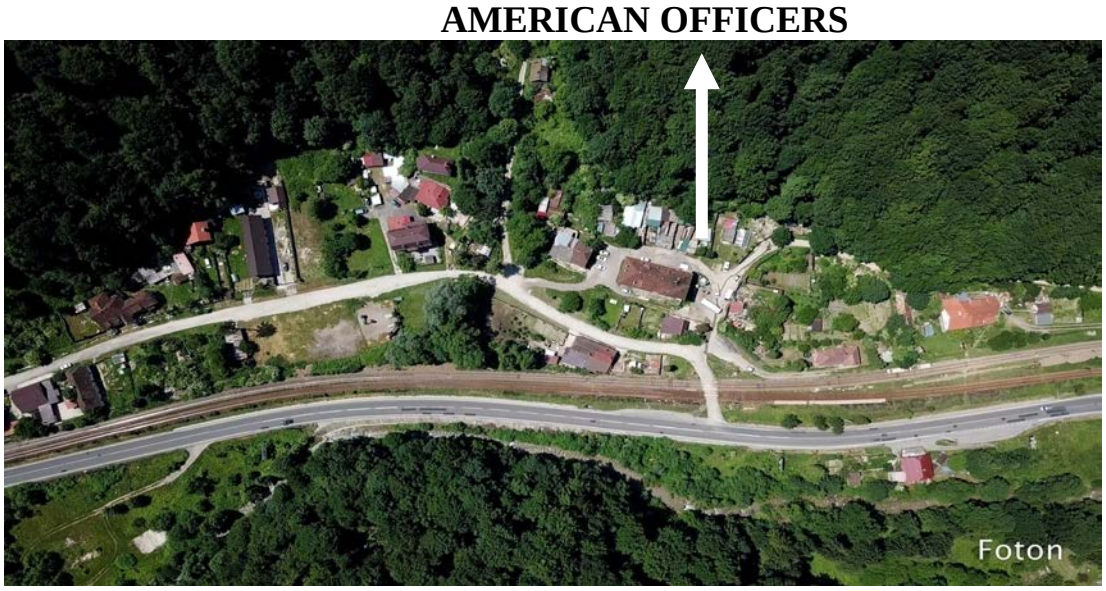

FIG. 4 The right side of the Timișu de Jos camp seen with a drone

In the following image you can see more closely the building in which the American officers were imprisoned. At that time it was a fairly modern, storey building, with less accommodation than the building where the American non-commissioned officers lived.

FIG. 5. The building in which the American officers were imprisoned

The builduing in which the American NCOs were imprisoned, however, had a grander appearance. The architecture was more special, being designed on several floors.

FIG. 6 The building where the American non-commissioned officers lived

FIG. 7 The back of the building where the American non-commissioned officers lived

FIG. 8 The landscape that the prisoners of war could enjoy all the time

FIG. 9 The church near the building where the non-commissioned officers lived

The barracks had individual beds, pillows and mattresses (made of straw for non-commissioned officers and wool for officers), bed linen, etc. In a document of the General Staff were recorded the following things*: "Accommodation is provided in very good condition for the winter, all rooms have terracotta stoves, bathrooms and toilets inside"* [7].

The accommodation conditions in the Timișu de Jos camp were strongly appreciated by the Romanian and International Red Cross delegations. Following a visit, US Major Jaeger said the prisoners were *"satisfied with the way they were treated and accommodated"* and asked for winter equipment. The non-commissioned officers, on the other hand, expressed their dissatisfaction with the food and accommodation, contrary to the fact that the amount of money provided for their food was equivalent to that of a Romanian soldier. The camp program was easy, with the days being spent *"playing bridge and reading various books,"* as Donald R. Falls put it.

In a report of the Superior Sanitary Directorate, the conditions that the prisoners of war had in the Timișu de Jos camp are described:

"The officers - prisoners of war - live in the former Rest House of officials in Brasov, a very beautiful building, with clean, well-lit rooms. They have a casino room, a games room, a bathroom, a well-equipped kitchen, where food is cooked according to the menu they prepare themselves. The food is bought by the supply officer according to a list given by the officer prisoners. The kitchen is very clean and the food very good, prepared by a captive Russian chef, former chef at restaurants in Moscow. All rooms are clean as well as bed linen.

The lower ranks are in a neighboring building. They have a 60 lei daily allowance for food, just like the soldiers in our troop. Prisoners have a sports field where they play Wolley-ball. On Sundays and on Catholic holidays, they are taken to a Catholic church near the camp.

As there is a distance of about 10 km between the camp and Brasov, and about 40 km to Sinaia, the sick prisoners who cannot be treated in the camp infirmary, were hospitalized at the Brasov Military Hospital, which is the closest, and at the same time their security should also be ensured "[8].

In 1944, due to the resumption of raids on Romania and due to bombings, the number of American and British prisoners increased. Following this increase, Camp no. 13 was set up in Bucharest.

After the German bombing of Bucharest, the prisoners asked the Minister of War to be organized in a military unit outside the capital, led by Romanian officers, in order to participate in the battles against German aviation. General Mihail Racoviță approved that 896 prisoners be evacuated to the barracks of the 4th Hunters Regiment, which was on the Bucharest-Alexandria highway.

The following list containing the treatment and conditions of prisoners of war in Romanian camps was drawn up from interrogations of prisoners, the Military Intelligence Service and reports written by International Red Cross delegations:

POWER: 543 aviation officers and non-commissioned officers.

LOCATION: Prisoners of war were held in the following places: Bucharest, Sinaia, Regina Maria Military Hospital in Brașov, Timișul de Jos.

TREATMENT: The treatment was excellent. Some say they are treated more as guests than prisoners. All Americans were taken to Dulag Luft for up to 2 weeks for questioning. After the interrogations, they were brought back to Romania. Marshal Antonescu and the Prime Minister of Romania, accompanied by their wives and a small group of friends, visited the camp in Timișul de Jos. The party did an inspection tour and suggested several improvements.

Prisoners were asked if they had any complaints or suggestions. The marshal brought gifts, including a box of his specially made cigarettes with his autograph written on it, for each prisoner of war.

FOOD: The Romanian ration is completed by packages from the Red Cross and is satisfactory.

CLOTHING: Prisoners have enough clothing. They wore, at first, the uniforms they had during the capture, later, the General Staff decided to equip them with Romanian effects, aviation type.

MEANS OF TRANSPORT (Timișul de Jos): A van with a driver and a driver's assistant.

HEALTH: A Romanian military doctor visits the camp daily, and a civilian dentist visits it twice a week. Prisoners are allowed weekly hot showers. The sanitary facilities in the non-commissioned officer blocks are not satisfactory, but the Swiss delegate addressed the issue with the Romanian authorities.

RELIGION: No American chaplain, but Catholics can participate in the services held by Romanian priests once every 2 weeks. However, no Protestant services are organized.

PERSONAL:

– Senior American officer: Major William Yaeger;
– The most trusted American: Sgt. Fred Randallr;
– Romanian commander (of camp no. 18): Major Cavaropol.

LETTERS: Prisoners receive a letter and four greeting cards per month. Letters from America arrive in two and a half months. The letters from the camp arrive in the US in 3 to 4 months.

RECREATION: Prisoners are allowed to stay outdoors all day. They play volleyball and table tennis and build their own games, roulette, chess and checkers. They spend a lot of time playing bridge and other card games. A good library is available for them and there are sailing courses in French and German. Prisoners have a recreation room and a radio.

WORK: They do not work in the camps at all, although they have asked to be allowed to do so. The Russian prisoners were the ones who took care of the cleaning and the food, being: 10-12 staffs and servants, a cook and an assistant cook and four waiters among them.

PAYMENTS: American prisoners were paid in cash until November 1943. Since then, both officers and non-commissioned officers have received salaries according to rank. Expenditure on food and other items is deducted from these appropriations. Officers' credits are at the following rate (old money):

– Major: 18,000 lei per month;
– Captain 13,000 lei per month;
– Lieutenant 11,400 lei per month;
– Second lieutenant 9,400 lei per month.

The camps were generally considered troop corps. At the beginning, in Timișul de Jos, 40 officers and 70 troops were assigned to guard the prisoners and to carry out the activities of the camp.

In June 1943, the camps throughout Romania were staffed with administrative and security forces as follows: 216 officers, 197 non-commissioned officers and 3,797 military troops.

Due to the fact that there were more and more prisoners imprisoned in the camps, the security guards proved to be insufficient and the efficiency of their surveillance weakened, which led to the continuous increase in the number of escapees [9].

The Red Cross in Geneva visited some of the camps in Romania and, after talking to some prisoners, found that the treatment applied to them is good and even exceeds, to some extent, the one provided by the conventions.

Following this control, the delegation also noted the fact that Romanians have a merciful soul, animated by those hit by fate [10].

Major Donald R. Falls concluded: "The humanity of the military institution and the administration of the camp has shown true respect for the adversary. On many occasions, Americans have been treated the same or even better than their recruits. "[10]

Even prisoners of war testified that they were treated well, especially in the letters they sent to their families [11]:

- Lieutenant Paul A. Lahr specifies that the Romanian government is doing everything in its power to make their stay as comfortable as possible: *"Everything is splendid"*;
- Lieutenant John J. Roades claims the same thing mentioned above, the fact that the government is doing everything possible to make them as comfortable and happy as possible: *"Romanians are really splendid people. I never thought they could be so hospitable to their enemies. They are very human with their prisoners, they feed and dress them well and the world takes us food, cigarettes and sweets. I feel like any American who destroys their beautiful cities, especially now when I hear the terrible losses among civilians. Even if I returned home, I would vigorously refuse to take part in such a thing. This is the misfortune of the war with the airstrikes. It is so impersonal and you cannot realize the disasters done until you see them with your own eyes "*[12];
- Lieutenant James C. Lambardi specifies that they are treated very well, even if they are deprived of some (few) freedoms, which seems completely normal to him due to the fact that they are prisoners;
- Lieutenant W. A. Kine says that the Romanian camp can be compared in all respects with the American one*: "Romanians do everything possible to make us as happy and comfortable as possible. We no longer call our camp a prison because it is not run like a prison. The food was good from the beginning and is becoming more Americanized. They have broad views and try everything we suggest "*[12];
- Lieutenant John Aleins says in a letter to the family that the government treats them better than they treat their own soldiers;
- Lieutenant James W. Stone: *"It's a vacation for our crew";*
- Lieutenant Anthen W. Mack attests that they are treated more like guests.
- James E. Mann: *"The world treats us as if we were theirs"*;
- Thomas Falion tells the family that they were allowed to attend the Catholic religious service every Sunday, which meant a lot to them.
- Lieutenant Ros N. Buzzard: "I fell in love with Romania. It is a very beautiful country, with almost everything you want, from forests to rivers "[12];
- Lieutenant Harold W. Brazier: *"I am in a prison camp in Romania and they treat us very well. I do not say this because they tell us so, but because it is a camp like you have not even read in any book or newspaper "*[12];

- Lieutenant Jackson F. Dunn: *"What amazes me the most is that even though we are legally at war with this people, they still don't bother us, or so it seems. Even the gendarme who caught me arrived with an air of business, greeted me and said comrade, shook my hand in a very friendly way and said that he was sorry that he had to search me for a weapon. "* [12];
- Sergeant John V. Szezun: *"Romanians treat us very well and cannot understand why we are bombing their cities"* [12];
- Sergeant Stanley Kochnover: *"If I didn't miss you so much, I wouldn't be sorry to wait for the end of the war, staying in Romania. People here treat us well and over time the treatment will be even better "*[12];

The crews of the American aviators were well taken care of and the Romanians made sure that they were not taken over by the Nazis. They were fed by Romanian peasants with bread, cheese, milk, eggs and fruit before being taken and imprisoned in Timișu de Jos.

N. Saviou, a teacher and former officer in the prison camps, specified: *"I treated them like princes, because above all I wanted to have good relations with America"*. The 76-year-old recalled how "wagons full of drinks and cigarettes" were transported to the camp that had its own pool and was nicknamed "The Golden Gate" by the Americans. The former officer also recalled that women in society regularly visited American prisoners: *"They liked to see the handsome boys and listen to their stories about their adventures as pilots."* One of the reasons why American prisoners were treated well is the fact that their air attack spared Romanian houses near the refineries, but another reason would have been the chance meeting between Princess Catherine Caradja of Romania and the American pilot Richard Britt, who landed. accidentally on her estate [13].

4. CONCLUSIONS

When we think of history, we can also think of the phrase "collective memory", because this helps humanity to understand itself. The world usually promotes the expression "carpe diem" as a way of life, but in order to live the present in harmony, I consider it necessary to know history. Without reading about the great wars of the world, we do not realize how bloody they really were, how much harm they did to humanity and how they destroyed and mutilated not only physically, but also mentally, millions of people. Without knowing the situation of prisoners of war we cannot realize the brutality of the human being and the limits that certain people can overcome just to do harm, not understanding how important that person can be for his family, friends, comrades and his homeland.

The Second World War was a black chapter in the history of Romania. Unfortunately, territorial losses cannot be compared to the loss of human lives, both civilian and military. Only one thing was not lost during the war in our country and that was the goodness of the Romanians. Sense of responsibility, discipline and well-being were present especially after the American air raids, in which the Romanians helped as much as they could the American and British soldiers after the hostilities. The damage caused by them did not alter in any way the good treatment they received from the moment of their capture, when they officially became prisoners of war, until the moment they were released.

From the treatment offered by our country to the American prisoners of war and the conditions they had in Romania, I consider that we have a lot to learn. Our ancestors, through the prism of history, taught us how to be human, including with the enemies we

fought against. The way in which not only the Romanian soldiers, but also the civilians behaved towards the American prisoners after the raids in Ploiești and Bucharest, in which in the latter they destroyed houses and killed the civilian population, shows that the Romanians had respect for the uniform the prisoners and for their families and understood the conditions under which they attacked (the fact that they acted on order, not on their own initiative).

Contrary to the fact that the American aviators were prisoners of war in the camps in Romania, they still managed to build a strong connection with the Romanian guards and officers. Through the testimonies of the prisoners interned both in Timișu de Jos camp and in the hospitals in Bucharest and Sinaia, I wanted to prove that the treatment that the Romanians applied to the enemy prisoners was not only comparable to that applied by the great powers of the world, but it surpassed all international standards, being an example of the application of the customs and laws of war and demonstrating once again the high and noble features of the Romanian people and its army.

I believe that this paper offers readers an in-depth picture of the character of this nation, highlighting the humanity shown by Romanians in precarious conditions for them. The strong point of this work is the field research, the images captured with specialized drones bringing an overlap after almost 80 years of what was the camp in Timișul de Jos in 1944 and the degrading state today.

I appreciate that the information and conclusions resulting from the accomplishment of this topic represent a consistent contribution to the deepening of this subject within the didactic activities, but especially in the activities of promoting the Romanian Military Aviation in the national and international environment.

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CAPTAIN COMMANDER MICLESCU GHEORGHE, KNIGHT OF THE ROMANIAN WINGS

Mihail -Cătălin LĂȚCAN

General Staff of the Land Forces, Bucharest, Romania (lcm1080@yahoo.com)

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Abstract: *Descendant of a large family of Moldavian boyars, Lieutenant Commander Miclescu Gheorghe represents in the history of Romanian aeronautics a complex personality, the spirit of the perfect soldier, endowed with an boundless love of country and people, tireless in his desire to improve continuously, his career beginning as cavalry, later aerial observer and pilot, specializing as a fighter pilot.*

With an exceptional training, with studies and specializations at the great aviation schools in France, England, Germany, fearless and bold defender of the sky of his homeland Romania, he participated in all the battles for the defense of airspace in the Second World War , the liberation of Bessarabia and the defense of the Black Sea airspace, the defense against the Anglo-American bombings, the fight against the German bombings of Bucharest.

Through the position he held as commander of Hounter Group in the operations on the front, he gave an admirable personal example to his comrades through his courage, patriotism and spirit of initiative.

Keywords: *fighter pilot, flight, courage, patriotism, erudite, daring.*

1. INTRODUCTION

The origin of the Miclescu family is a topic in full debate, the most distant member of the Miclescu family being considered Dragomir Albu, contemporary with the dismount of DragoșVodă, originally from Maramureș [1].

Original family from Călinești village, Botoșani county, with an old tradition, but which, perhaps, does not sound as well known, in our memories, as the Cantacuzino or Rosetti family.

The Miclescu family, a family of Moldovan boyars, gave the country many high-ranking governors, lawyers, heavy politicians, metropolitans, and large landowners.

"If Romania is conceived as recent and revolutionary, its less exalted makers have been writing history through their ambitions and pride for many centuries. As Radu Miclescu recalls: "We are here before the dismount". In the story of the mansion from Călinești and of the successive generations of boyars who inhabited it, there are several pages of history, spent at a distance worthy of the much too passionate scene of the modern Kingdom of Romania, but very important for those who want to understand the shadows. and the shadows of an official history" [2].

The prominent representative of Micleşti was "*pan Giurgiu staroste*" or "*Giurgiu de la Frătăuți*", a member of the Royal Council (1404-1409), under the reign of Alexandrucel Bun and his sons, Iliaș and Ștefan [3]. Another important member of the Moldavian nobility, Gavril Miclescu, held various important positions in the royal divan (postman, grand cupbearer, vornic, staroste, logophat), under the rulers of the Cantemir family, Constantin Duca, Mihai Racoviță, Nicolae Mavrocordat, GrigoreGhica. The Miclescu boyar family is also mentioned in the work *"DescriptioMoldaviae"* [4], written by DimitrieCantemir.

Like any famous boyar family, the Micleşti had their own coat of arms, about which Octav George Lecca said: *"this coat of arms recalls the fortress of Hotin, where once there were Castilians and where tradition says that a Miclescu defeated the Turks"* [5].

Source: (https://ro.wikipedia.org/wiki/Familia_Miclescu)

In 1842, General Mavros [6] (Gheorghe Miclescu's great-grandfather), he hosted the secret society "Brotherhood" at his home [7], which included the revolutionaries Ion Ghica and Nicolae Bălcescu, a place where the Pasoptist Revolution was prepared, which opened the way for the Romanian people to modernity.

Among the personalities who opposed the reform of AlexandruIoanCuza regarding the secularization of monastic fortunes was the high prelate, deputy in the Ad-hoc Divan in 1857, supporter of the Union, of a recognized morality and love of country, Metropolitan Sofronie Miclescu. He was humiliated from the metropolitan seat, was arrested while serving the holy liturgy and sent, under the escort of the gendarmerie, into exile at the Slatina monastery [8].

Another eloquent example of the importance of this boyar family is another member, Ioan G. Miclescu (1857-1920), the father of Captain Commander Gheorghe Miclescu, a scholar with a law degree at the "Academy of Nancy" in France, where he had a colleague and friend, the future Prime Minister of France, Raymond Poincare.

IoanMiclescu, *Jean* as he was known, but also under the name given by his contemporaries, *„ the boyar from Călineșt"* [9], he held important positions in the judiciary, later becoming a lawyer, conservative politician, deputy, playwright, publicist, polyglot, being fluent in Latin, French, English and German. In 1900, TituMaiorescu appointed Jean Miclescu Secretary General of the Ministry of Justice, being appreciated by IG Duca and Nicolae Iorga who characterized him as *„om cu vastecetiri*" [6].

He was decorated by King Carol I with national orders and medals, including the Star of Romania in the ranks of officer and commander, thus predestining the career of his son, Gheorghe Miclescu. Also, Alina Miclescu, mother of Capt. Gheorghe Miclescu was a friend and confidant of Queen Maria of Romania" [10] who visited several times the Mansion from Călinești, the residence of the Miclescu family. Both spouses died in 1918.

Jean Miclescu's eldest child was Radu, born in 1893, who had a remarkable military career, mobilized on the front as a Red Platoon commander in the Battle of Oituz, where he was seriously wounded. received several decorations for his bravery. Subsequently, he was appointed commander of the 8th Calarasi Regiment. In 1968, General Charles de Gaulle, President of France, during a state visit to Romania, asked to meet with former colleagues at the „École spécialemilitaire de Saint-Cyr" [11], including Colonel Radu Miclescu.

2. CAPTAIN COMMANDER MICLESCU ION GHEORGHE

The one who would become Captain Commander MiclescuGheorghe , better known as George Miclescu, descendant as we anticipated from the branch of the great ruler Stephen the Great, on various lines of descent in the family tree of the Miclescu family, was born on April 14, 1908, in Bucharest, Ilfov County, baptized in the Orthodox religion.

Gheorghe Miclescu married on April 26, 1934 Magda Elena Tzaicu, with marriage certificate no. 359 of April 26, 1934, following the marriage a boy was born, Miclescu Radu Alex, born on June 23, 1936.

Miclescu Gheorghe was raised in a trilingual family environment where parents, grandparents and children spoke perfect French and German, in addition to the Romanian mother tongue, without omitting English, which is usually used in government contacts.

The Miclescu family was surrounded by intellectual and cultural emanations everywhere, even the children's governesses were German speakers.

Having an increased appetite for learning, the teenager Miclescu Gheorghe graduated from the Theoretical High School of 8 classes in 1922, in France (Sorbonne) [12], where he spent the whole time as a host at Anatole France.

On December 13, 1922, Gheorghe Miclescu passed all the exams and was admitted to the Military Infantry and Cavalry School in Bucharest.

Ever since the Cavalry School, Miclescu Gheorghe was characterized, as follows"*his civic education is distinguished, his military education is impeccable. Very intelligent, has good judgment and memory. He is serious, calm and conscientious in carrying out the tasks assigned to him, always showing a lot of good will and determination"* [13].

He distinguished himself as a good student, possessing real qualities to become a skilled instructor and a perfect cavalry officer. As mentioned by the commander of the troop corps, the student Miclescu had, *a pleasant physical appearance, an implicit, healthy demeanour, showing compassion and camaraderie towards his colleagues*" [13].

At the same time, the commanders characterize him in the service rating as *" a good hunter, a good motorist, he has his own car that he drives personally "*, he has a *" very chosen general culture, up to date with everything that is new and useful in civic life"*, *„Military education in great progress, being a platoon commander in the machine gun squadron, as a liaison officer, he showed a rare energy, a good rider and a projectile launcher"* [13].

He adapted very quickly to the military rigors of a knight, graduating from the prestigious Military Cavalry School "King Ferdinand I" on July 1, 1924, with the rank of lieutenant, according to High Decree no. 2220 and the Agenda no. 340 and assigned to the 6th Roșiori Regiment from Tecuci. In the qualifying sheet at the graduation of the military school, the commander of the educational institution noted: "He has a loyal and chivalrous character. He is a very good comrade and animated by generous feelings for good deeds. Good performer in all categories of training, being passionate about weapons".

In his new capacity as an officer, commander of a cavalry platoon, Lieutenant Miclescu Gheorghe confirmed the appreciation of his teachers and commanders during his military studies, constantly evolving and asserting himself as a very skilled officer [13].

In his new capacity as an officer, commander of a cavalry platoon, Lieutenant Miclescu Gheorghe confirmed the appreciation of his teachers and commanders during his military studies, constantly evolving and asserting himself as a very skilled officer.

Subsequently, between 01.08.1924 and 01.10.1926, he was seconded to the 8th Roșiori Regiment in the Botoșani garrison, where, wanting to improve, he began to study diligently to fulfill a dream, that of becoming a military pilot.

Starting with 11/14/1926, Lieutenant Miclescu Gheorghe was admitted to the Piloting and Training School Courses, in his qualification sheet for the period 01.11.1926 - 31.10.1927, the commander of the Aeronautical Schools and Centers, Colonel Stoicescu, mentioning the following about the lieutenant Miclescu: *"Healthy, resilient, he tolerated the School regime well. Although a cavalry officer brought his knowledge closer. An officer with a chosen culture and education, conscientious, hardworking, good and full of flying energy, he deserves to be promoted in his seniority"* [13].

On April 1, 1928, he was moved from the 8th Roșiori Regiment, by High Decree no. 763 and the Agenda no. 242, following a predetermined course for exceptional pilots, Pilot School, Battle Flotilla, Buzau Training School, Special Aeronautical School.

In the Qualifying Sheet, corresponding to the period 01.11.1927- 31.10.1928, the commander of the Schools, mentioned the following:*„Pilot 1927, came to the Flotilla on April 1, 1928, from the Pilot School and on May 22 left for Buzău from where he returned on September 3. Patented Fighter Pilot. Healthy and resilient. With high school education in France (Sorbonne). Conscientiously at work and with a love of fighter pilot weapon. It flies correctly, precisely in motion and without brutalizing the plane or engine. Total flight hours for 1927 - 1928, 64 hours "* [13].

After graduating from the Warfare Training School in the Buzau garrison, between May 31, 1928 - September 3, 1928, Lieutenant Miclescu was praised in the Certificate of Skills for Fighter Pilot, as follows: *"Calm and with a lot of cold blood, heart and with a lot of love for flying; Definitely a great driver to rely on. Outstanding landings in terms of safety and finesse. Relaxed and confident in movement, supple and fine. He noticed the consistency and regularity of his flights. Weighted and yet very calm, it meets all the qualities of a great class pilot. Fighting always constant and admirably executed"* Flight training for the fighter jet was conducted on Fokker D11 and Spad 61 aircraft. [13]

This educational-applicative journey was crowned with the promotion to the rank of lieutenant on 01.10.1928, based on the High Royal Decree no. 2294.

In the Qualifying Sheet, corresponding to the period 01.11.1928 - 04.06.1929, the commander of the School stated *"Physically healthy - pleasant appearance, intelligent officer, with a beautiful general and military culture at a high level. Chosen character - very good with people. Perfectly trained, he is one of the well-prepared pilots for the war. I think he will also be a valuable officer who will honour the army.*

Healthy and resilient - withstands the demands of a confrontation. Disciplined, serious, modest, and very well developed. Good comrade, he really likes flying and especially aviation.

He flies correctly, calmly, meticulously on the fighter jet, he performed during the raids carried out during this year, he is a pilot who can be counted on" [13].

Later, after graduating from courses and specializations, Lieutenant Miclescu stopped his secondment and returned to the Battle Flotilla.

As a result of the outstanding results, the most deserving officers were seconded for specialization and training in renowned military schools in Western Europe, in this position being Lieutenant Miclescu. Thus, between 1931 and 1932, he attended aerial observatory courses and obtained a license from the „*Lecole Militaire de L Aeronautique* Versailles" in France. Miclescu enjoyed a real appreciation among his French colleagues, being a fluent speaker of the French language, but also through the chosen education he possessed, becoming an exceptional air and cultural ambassador of Romania in the French capital. [13]

After completing his studies in France, Lieutenant Miclescu was seconded, starting with 15.10.1932, to the "Mircea Cantacuzino" Aviation School" [14], where, once again, he distinguished himself by his high qualities as a fighter pilot. The distinguished aeronaut managed to pass on his aeronautical knowledge to future pilots who will later take part in defending the freedom of Romania's airspace in the Second World War [15].

After completing his secondment to the Cantacuzino Aviation School, Miclescu continued his training as a fighter pilot in the Battle Flotilla, until 12.11.1933, when he passed the admission competition at the School of Aerial Observers within the Training Centre of Aeronautics, obtaining the certificate of qualification of Air Observatory.

On 16.12.1934, after taking the special flight tests, Lieutenant Miclescu Gheorghe was declared Pilot category III.

In the period 1935-1936, he will continue his activity in the Special Squadron of the Battle Flotilla, being appreciated by his superior for his *"great intellectual capacity and the work force he shows, ... guarantees that the officer will soon become one of the squadron's commanders. Tireless on the Airfield, he led with great intelligence and perseverance the completion of the training of the new pilots in the Flotilla"* [15].

For the remarkable activity carried out, on 16.10.1936, Lieutenant Miclescu was promoted to the rank of captain and promoted to the command of the 1st Bombardment Squadron.

In 1937, when the Battle Flotilla was transformed into the 1st Hunting Flotilla, he took command of the Special Squadron, where he distinguished himself by the outstanding results obtained in training and applications. He performed very well in combat, asserting himself through authority, methodical work, fairness, and conscientiousness.

Participant in the Battle of the Royal Maneuvers in August 1938, he was praised by his commanders for his *"conscientious exercise of his command, is authoritarian and imposed on his subordinates, knows how to organize his work and plans his actions in the smallest detail. accept unclear situations and improvisations"* [15]. For special merits he was rewarded with the decoration of the Romanian Crown in the rank of Knight, by the High Royal Decree no. 1843/938, published in the Official Gazette no. 106/1938.

In the position of Squadron Commander, he manifested and was appreciated as having a "*vast general culture, intelligent, easily assimilates professional knowledge, has developed a great sense of honor and duty. Calm temperament has a lot of energy and strong will. He has initiative and a great sense of procedure. He is methodical in his work, he acts with vigor, he knows how to organize his work and especially he knows how*

to stimulate his subordinates, he is a good coach "[15]. At the same time, he was commissioned by the commanders to carry out air transport missions on the route Bucharest - London.

At the beginning of 1939, Captain Miclescu was awarded the Honorary Service for 25 years of service, by the High Royal Decree no. 648/939 of 06.02.1939, and after graduating the Information course, on 23.03.1940, he was promoted to the rank of lieutenant aviator commander based on the High Royal Decree no. 886 of 23.03.1940, published in the Official Gazette no. 79/1940 [15].

Characterized as "*an officer with a lot of heart, having a dignified and modest character, ... passionate about flying* " [15] On June 1, 1940, he was appointed Assistant Commander of the 1st Fighter Fleet.

Due to the aviator's participation in the suppression of the legionary rebellion in January 1941, the family of Lieutenant Commander Miclescu was threatened with reprisals by supporters of this movement.

3. ACTIONS ON THE FRONT IN WORLD WAR II

Near the start of the war for the liberation of the lost territories in the summer of 1940, Lieutenant Commander Miclescu was mobilized on 29.06.1940 and appointed commander of the 5th Hunting Group, within the Air Combat Group, in accordance with the provisions of the Royal High Decree no. 2195/1940.

For the high deeds of arms, by the High Royal Decree no. 1861 of 06.07.1941 was decorated with the Order "Aeronautical Virtue" class Golden Cross, and by the High Royal Decree no. 1952 from 01.08.1941, Star of Romania with Swords and ribbon of Military Virtue class V [15].

His unit totalled 2,000 hours of combat flight with outstanding results [15].

One of his comrades-in-arms stated that Lieutenant Commander Miclescu *"was so polite in his position as commander that he sometimes gave the impression that he was amused as a scientist, but with a sense of humor, who liked to be surrounded by people."* [16].

During the participation in the air campaign for the liberation of Bessarabia and the conquest of Odessa, the 5th Hunting Group totaled a number of 2000 flight hours in combat missions with remarkable results [16].

Through the Agenda no. 304/1942, on July 5, 1942, Miclescu was appointed second commander of the 1st Fighter Fleet Base, also exercising the position of Commander of the 3rd Fighter Group.

For his skill, King Michael decorated him with *the "Golden Cross of Aeronautical Virtue"* by High Decree no. 1932 of 1942, *„ for the skill with which he led the action of the Hunt that had it subordinated, ensuring in the best conditions the protection of the sensitive points. He has carried out numerous interdiction missions at sea, as well as several missions to protect ship convoys at sea. By conducting these actions, the unit under his command shot down seven Soviet bombers. 2 enemy seaplanes that had attacked a convoy of ships shot down in flames 35km from Constanța* " [13].

In 1942, on a mission to study in Germany, he was decorated by Aldof Hitler with the high distinction, the Iron Cross class II.

Through the Agenda no. 421/1942 was appointed to the command of Group 1 Hunting, and for the determination and heroism with which he fought to command his unit to defend the capital and important economic objectives on the national territory against Anglo-American bombing, along with German aviation, was decorated and with the Order "German Eagle" class II [15].

In the heroic battles of defending the airspace of Bucharest lt. cdor. Miclescu selflessly and bravely flew a Messerschmitt Typhoon plane [13].

Between 18.11.1943 - 06.04.1944 to return to the command of Group 5 Fighter, following that, between 06.04.1944 - 02.12.1944, to occupy the function of tactical assistant of the commander of the 1st Fleet Fighter, so that later, in the next 3 months, to hold the position of commander of the 1st Fighter Fleet Base.

On 22.07.1944 for his deeds of heroism Gheorghe Miclescu by High Decree 1028/1944 and OZ Nr. 222/1944 was promoted to the rank of captain-commander.

Between August 23, 1944, and September 1944, he fought, together with his comrades, against the German bombing of Bucharest and Ploiești.

Until the end of the war and later he was seconded to the General Secretariat of the under secretariat of State for Air, a detachment ended brutally on 22.08.1946, when he was forced to hand over the position of second commander of the 1st Hunting Flotilla and based on the Royal High Decree no. 2498/1946 was placed in reserve [13].

3. AFTER LEAVING THE ARMY

After the forced transfer of the officer to the reserve, the Stalinist regime imprisoned both Gheorghe Miclescu and his son, Radu Miclescu, and was also forced to divorce his wife in 1952. Magda Miclescu was repeatedly harassed and threatened by the repressive security forces eventually succumbed to the pressure and committed suicide in 1953.

In his memoirs, Ioan Dragoș Stinghe, an aviation officer in the 1941 class, stated that, after the war, he met his former commander on a construction site where he worked as a day labourer, however, he remained unchanged, with the same nobility in conduct, with the same good mood. "[16].

In 1992, **Captain Miclescu Ion Gheorghe** died, Romania's sky losing one of its important defenders.

4. CONCLUSIONS

Hailing from a boyar family who practiced xenodochia, evergetism, calophilia, reader of churches (the church from Cervicești and the one from Călinești), lovers of country and nation, who had hoisted in their place of honor the flag of Moldova on the Mansion from Călinești village, Captain Commander Miclescu Gheorghe did not give up the holy legacy of his predecessors and made unimaginable sacrifices to defend his nation and country from all those who came to subjugate it and to all foreigners who wanted to invade it be they Russians, Germans, English, Americans.

This exceptional soldier teaches us an invaluable lesson in patriotism and sacrifice, being appreciated by both subordinates and commanders.

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STUDY ON THE INSTITUTION OF THE LAW INSURANCE OF MILITARY AIRCRAFT STAFF IN THE PRE-PRINCIPLE OF THE WAR OF NATIONAL REUNION

Cristian MANOLACHI

Air Force Staff, Bucharest, Romania (manolachicristi@yahoo.com)

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Abstract: *Aviation in all countries, as in our country, from the moment it began to rule the sky, paid for this victory with great blood sacrifices! These sacrifices were much higher at that time in terms of flight time and performance. It was found that no matter how rigorous the selection of personnel, the human factor, along with other factors, aeronautical and meteorological material, was a major cause, and accidents could be largely reduced, but not eliminated.*

Appreciating the sacrifice of the aviators and their material disinterest in this ideal, the "FLIGHT", the highest forums, have taken measures in all countries to ensure the lives of disabled aviators or their descendants due to flight accidents.

In line with this unanimously implemented trend at the international level, the system of insurance premiums was first legislated in our country by the Law of the Undersecretary of State for Air of June 5, 1932 and continued later, by the laws that followed, with various amendments. to this day.

Keywords*: military aviation, flight accidents, right insurance, human factor, insurance premiums.*

1. INTRODUCTION

The emergence and evolution of goods, life and risk insurance have represented and represent a very complex process in the evolution of mankind, being influenced by both social, economic and political factors, as well as factors generated by technological progress, with the related uncertainties.

The emergence of aviation, with the major easements involved in the conduct of aviation activities, necessitated the involvement of the state and the establishment of a viable system of legal assurance of air navigation personnel, a system that was imposed as a functional principle to cover, at least in part, the risks. assumed by this category of personnel of the Romanian Army, but also the moral recognition of the immense sacrifices required for this specific category of personnel of the Romanian Army.

2. REGULATION OF LEGAL INSURANCE FOR MILITARY AIRCRAFT STAFF IN ITS PIONEERING PERIOD

Aviation, in all countries and in our country, from the moment it began to rule the sky, paid for this victory with great blood sacrifices. These sacrifices were initially much higher in terms of flight time and technical performance of the aircraft.

Everyone remembers that at the beginning of aviation the flight was measured in minutes, distances in tens or hundreds of kilometers, and height in tens and hundreds of meters. However, accidents were encountered on all airfields and with the most important pilots.

A little later, the performance of the flight quickly reached days of uninterrupted flight, thousands of kilometers away and over ten thousand meters in height. However, the crossing of the seas and oceans, the mountains, the equator, the poles of the earth, has always had their accidents, with their great lessons [1]. The causes of aviation accidents have been discussed a lot, there has been even more discussion about personnel liability, mistakes or negligence, force majeure or sabotage, but the causes of these accidents are of three categories: aircraft; meteorological elements; the pilot. (***Victor Anastasiu*** *(b. 5 october 1886, Huși - d. 4 august 1972, Bucharest). The first Romanian pilot doctor and the second pilot doctor in the world. In 1920 he founded the Center for Aeronautical Medicine, among the first such institutions in the world, his research based on his own experience in flight being decisive for the health of aviators. The Ministerial Decision on the rules of operation of the Sanitary Service for Military Aeronautics and the examination of the navigating personnel were published in the Official Gazette of August 21, 1920, this being the birth certificate of the Aeronautical Medical Center. The study of the behavior of pilots during flights was a world premiere, an aspect recognized at the International Air Navigation Congress in Paris in 1921).*

Of course, we are talking about peacetime accidents, not war accidents, to which are added air combat and other elements of a campaign, which are inherent and inevitable.

The sacrifice of world aviation pioneer Aurel Vlaicu remains memorable in the history of aeronautics. His dream, the most ardent desire was to fly the Carpathian Mountains, a flight that was then a heroic attempt [2].

On September 13, 1913, he took off with the Vlaicu II plane, with the intention of flying over the mountains, in Brașov.

Aurel Vlaicu's daring act of trying to fly over the mountains with his own airplane cost him his life, being among the first aviation daredevils who sacrificed themselves for the dream of flying.

And because the risk of flying at the beginning of aviation was very high, and human sacrifices were commensurate, the legislature regulated the way in which aviation personnel were insured against aviation accidents.

The first legal reference regarding the legal insurance of the military aeronautics personnel was provided in the *Law on the organization of the military aeronautics*, promulgated by the sovereign of Romania, King Carol I by the High Royal Decree no. 3199 of 18/30 April 1913 [3].

This law indirectly regulated the institution of legal insurance for military aeronautical personnel. Thus, at art. 12 of the law provided that any incurable disability arising during and due to service in the military aeronautics entitles the disabled officer to the pension provided in art. 4 of the General Law on Pensions, on pensions for sickness acquired during and because of the war [4].

It was also legislated that non-commissioned officers' and lower-ranking invalidity pensions be determined in accordance with the Special Law of March 25, 1894, on the pensions of those who became disabled during and because of the war (*Law on Pensions and Military Aid, Weakened in War and Due to Peaceful Service*). If the accident was followed by death, the survivor's pension was determined in accordance with the above provisions.

From the perspective of ensuring the risks to which the aeronautical personnel was subjected and the granting of some compensations, this law represented a first step in the regulation of the institution of legal insurance of the military aeronautical personnel.

Aviation accidents were treated with the utmost care, and accidents with human casualties were brought to the direct notice of King Ferdinand I by the Minister of War [5].

3. INTERWAR ADOPTION OF THE AERONAUTICAL PERSONAL INSURANCE SYSTEM

The institution of legal insurance of military aeronautical personnel was completely regulated, for the first time, in 1932 by ***Law no. 174/1932 for the Organization of Aeronautics and the establishment of the Undersecretariat of State for Air***, voted by the Senate on April 18, 1932 and by the Assembly of Deputies on April 19, 1932, promulgated by the Royal High Decree no. 1890 of 31 May 1932 [6].

According to the provisions of art. 148 of the law, the entire navigating personnel of the Aeronautics, the provisional personnel, as it was classified in art. 42 of the law, respectively: all aeronautical personnel, other than navigating personnel, students of flight schools and preparatory schools, were to be legally insured for all cases of death, total or partial disability, as well as for cases of serious illness, resulting from the flight or ascent service, ascertained by the medical commission of the Aeronautical Medical Center, the consequences of which were to make it impossible to perform a service of any kind in Aeronautics. The officers or the specialized military or civilian personnel, who performed missions in flight or ascent in the ordered service, also benefited from this legal assurance.

The only condition required by law to benefit from legal insurance was that the personnel be recorded in the command agendas of the Air Force Command or similar orders of the Civil Aviation, and the other categories of personnel have a service order signed by the direct chief, the military aeronautical personnel being considered legally insured only for the fact of his presence in those agendas.

The law also set the share of insurance, as follows [7]:

a) For death or total invalidity: 100 times the gross pay of the respective rank, for officers, non-commissioned officers and civilians; for military servicemen, warrant officers and specialists of any category, 50% of the insurance quota due to a second lieutenant is granted; for the students of the preparatory schools, the salary of an aviator lieutenant was taken as a calculation basis.

b) Cases of partial invalidity were grouped into two categories: partial degree I disability, which had a share of 75% of the above quotas; partial degree II disability, which had a 50% share of the above quotas.

At the same time, the law provided that, in case of death, the beneficiary of the insurance was the widow, or, in absence, the children. If after the deceased or the total invalidity classified person, in addition to the widow, there were also under-aged children, these received a share of 10% of the quotas established above. If, however, the deceased was unmarried, 50% of the insurance went to the parents. The widowed mother of the deceased married person received a 20% share of the insurance that belonged to the widow or children.

Also, in art. 151, the law provided that the insurances were paid through an *Aeronautical Insurance House*, which was created ad hoc and which operated next to the *Credit and Assistance House of the Officers*.

The house was funded by the budget allocated by the annual budget of the Army, the Undersecretariat of State for Air and intended for this purpose, funds calculated on the basis of the average accidents in the last 5 years, as well as possible extraordinary funds to guarantee insurance payments in cases exceptional, when the number of accidents exceeded the initial estimates.

After the payment of all the annual insurances, the surplus of the ordinary budgetary funds of the House was paid to the reserve fund of the Aeronautics Insurance House.

According to art. 153 of the law, the Insurance House was obliged to make voluntary (optional) insurances on the basis of deposits made by monthly deductions from the balance or salary, according to the quotas that were established annually, in addition to the legal insurances. Deductions were made directly from payroll or salary, just as pension deductions were made.

At the same time, according to the provisions of art. 154, aid could be granted for the medical treatment of aeronautical personnel who, during and due to the flight or ascent service, suffered an accident or contracted an illness without being followed by any disability, aid which was granted according to the severity of the accident. suffered or contracted the disease, with a medical opinion, under the conditions stipulated in the law enforcement regulations. This law also regulated the right to health care for personnel serving in the Air Force.

Thus, navigating officers and non-commissioned officers were entitled to a leave of absence of between 6 and 12 months if they fell ill due to flight wear and tear. In the event of an accident or illness during flight, seafarers may receive specialist medical care for more than 6 months, depending on the severity of the situation, while fully maintaining the specific rights of seafarers to a period of 2 years.

The pension received by the aeronautical staff who suffered an accident during the flight activity, as a result of which he remained invalid or incurably crippled, was equivalent to the salary and all the grades offered to the next rank. When entering the reserve status, flying personnel was promoted to the next rank, ex officio.

If during the flight activity the death of the navigating personnel occurred, this was equivalent to the situation of the soldiers killed in the war, and the survivor's pension that belonged to the widow, orphaned children or parents was established as follows: 75% of the value of the pension was received by the widow and 25% the parents of the deceased, when the deceased had no children; 50% of the amount of the pension was received by the parents, if the deceased did not have a wife or children; 100% of the value of the pension was received by orphaned children, until the age of 18, when the widow remarried; 50% of the value of the pension was received by the parents, if the deceased had no children and the widow remarried.

In cases of incurable invalidity or death that might occur during the flight training of students in the schools of navigating officers, the pension was calculated in relation to the rank of lieutenant aviator regardless of the year of study [7].

By the way it was conceived and elaborated, *Law no. 174/1932 for the Organization of Aeronautics and the establishment of the Undersecretariat of State for Air* represented for the Romanian Air Force a huge step forward in the regulation of this extraordinary complex area of aviation.

In the evolution of Military Aeronautics, another moment of special importance was the adoption by the Romanian Parliament, in 1936, of the ***Law for the establishment, organization and functioning of the Ministry of Air and Navy***, promulgated by the Royal High Decree no. 2620 of November 14, 1936, published in the Official Monitor [8].

Regarding the institution of legal insurance of the personnel of the Romanian Royal Air Force, which is the object of the study, we can see that this institution was regulated keeping the principles and provisions of *Law no. 174/1932, for the Organization of Aeronautics and the establishment of the Undersecretariat of State for Air*, with some necessary improvements and completions.

Among other things, the law established the insurance quota, as follows [8]:

a) For death or total invalidity: 100 times the gross salary of the respective rank, for officers, non-commissioned officers, civilians, warrant officers and specialists of any category; for the students of the preparatory schools, the salary of an aviator lieutenant was taken as a calculation basis; for the military servicemen, 50% of the insurance quota due to an adjutant is granted.

b) Cases of major partial invalidity were grouped into two categories: first degree partial partial invalidity, which had a share of 75% of the above quotas; partial major degree II invalidity, which had a 50% share of the above quotas.

Disability of any category was established every year by a commission established annually by the Ministry of Air and Navy by Ministerial Decision. The commission also included a delegate from the Ministry of Finance and one from the Officers' Pension House.

Also, in art. 154 the law provided that the insurances would be made from the *Aeronautical Insurance Fund*, which was created when needed and which operated next to the *Credit and Assistance Officers' House.* The house was funded by the budget allocated by the annual budget of the Army, the Undersecretariat of State for Air and intended for this purpose, funds calculated on the basis of the average accidents in the last 5 years, as well as possible extraordinary funds to guarantee insurance payments in cases exceptional, when the number of accidents exceeded the initial estimates. After the payment of all the annual insurances, the surplus of the ordinary budgetary funds of the House was paid to the reserve fund of the Aeronautics Insurance House.

At the same article, paragraph 3 [8], the law also provided that insurances were paid on the basis of a decision taken unanimously by a vote of a Council. This simple and effective procedure was in support of the disabled or the descendants of the deceased who, in principle, needed money immediately, and for the state, it was also advantageous because, in addition to fairness to the injured party, it reserved the right to bearable compensation. , avoiding lawsuits with enormous sums and, on the other hand, in case of dissatisfaction, this Council, acting as a court, initiated the action according to the law, in relation to the amount already granted [1].

These rights granted to the personnel of the Air Force, which arose by virtue of the legal assurance, were complementary to other rights granted to the personnel also provided by law.

Thus, according to the provisions of art. 153, flying personnel of all categories in the Royal Air Force who were entitled to a flight bonus and suffered an accident or contracted an illness due to flights or ascents, being stopped from flying, were entitled to a monthly medical allowance, for officers of 40% and for non-commissioned officers of 30% of the gross balance of the rank of second lieutenant.

This medical assistance allowance is granted until recovery, the staff in this category being obliged to go every six months to the medical commission, which established the state of health.

This medical assistance could be granted for a maximum of 2 years, during which time the medical commission definitively classed the personnel in this category, either it remained in activity, or it was proposed to transfer to the reserve or to retire.

During its application, period 1936-1940, the *Law on the establishment, organization and functioning of the Ministry of Air and Navy* [8] has undergone several changes and additions to address situations that were not originally foreseen or to improve the law.

A first change was made by the *Law for the modification of art. 154* [9], published in the Official Monitor no. 239 on 14 october 1938, which established the *Aeronautics Personnel Compensation Fund*, which was financed by the Ministry of Air and Navy, but also with possible extraordinary funds, the necessary amount being calculated according to the average compensation paid in the last 5 years and was provided in the ministry budget. This amount was deposited by the ministry with the National Bank of Romania in the first quarter of the budget year, and the amounts not committed at the end of a budget year (surplus) were an additional fund that fed the fund.

In order to comply with the provisions regarding the compensations, the *House of the Compensation Fund of the Aeronautics Personnel* was set up. The house was run by a director, appointed or delegated by the Ministry of Air and Navy. The payment of the compensations decided by the council was made to those in law based on the approval of the ministry, through checks signed by the director and manager of the fund, drawn from the National Bank of Romania, within the available funds.

It should also be noted that no fees or taxes were paid for the amounts that represented compensation. The amendments to the law also provided for the procedures for verification and control of payments made from the fund, which were established by the High Court of Auditors.

Another important change introduced by this law was the one provided in art. II of the law, which provided that **the notion of insurance and insured** regarding the aeronautical navigating personnel for the cases provided in art. 151 of the law of the Ministry of Air and Navy, **was replaced by the notion of compensation and compensated** [9].

A second important amendment and completion was adopted by the Law amending art. 151, 152 and 153, on June 6, 1939, which provided that the right to compensation was suspended in time of war or by royal decree, at the proposal of the Ministry of Air and Navy, when the situation requires participation in war operations [10].

Also, the categories of compensation granted to staff were modified and supplemented, the categories of beneficiaries were extended (parachutists - instructors and students of parachute schools were introduced for the first time), and the amounts increased or decreased depending on other factors which were not taken into account in the elaboration of the initial law, respectively: level of education - holder of an academic degree, marital status - married or unmarried (eg unmarried lieutenant, rank to which it was reported and the calculation basis-gross balance of this rank) , the state of war in which the country was.

As a result of the historical context in which Romania finds itself, by the Decree-Law of October 16, 1940 [11], The Ministry of Air and Navy was abolished, followed by the Ministry of National Defense, the Undersecretariat of State for Air. In this context, new rules have been developed and management institutions have been set up to ensure the legal assurance of Military Air Force personnel, as well as granting them rights to support the military and their families, the legislature considering the need to establish other specialized institutions. to contribute to the material and moral support of military personnel.

After only two years of operation, the Army House, established by the Royal High Decree no. 1258 of March 23, 1939, published in the Official Monitor no. 71 of March 24, 1939, was reorganized and adapted to the new historical context by the Decree-Law for the organization of the Army House of February 6, 1941 [12].

According to the provisions of art. 1, The Army House was a legal entity under private law, placed under the control and supervision of the Ministry of National Defense, and the purpose of the house was to improve the material condition of its members and their families by: fructifying members' savings and deposits; lending; insuring their family members; setting up and maintaining care or similar institutions for members of the household [11].

The House members belonged to two categories: rightful members and admitted members (art. 3). All officers, non-commissioned officers and warrant officers, of all the weapons and services of the Romanian Army in activity were members by law, and the admitted members could be: retired officers from the activity, permanent officers of the Army House, permanent civil servants from the Army service, and admission these members were made on request.

The Decree-Law also regulated the organization and administration of the house, the means and operations of the house, the insurance of members, the rights granted to the descendants, the granting of loans, the operations of assistance, as well as the manner of establishing the fund of the house.

4. CONCLUSIONS

During the analyzed period, the governing bodies of the Romanian Royal Air Force, the Government and the Romanian Parliament had the administrative and legal capacity to identify the complex issue of the existence of this elite weapon, but especially the special servitudes of a special category of soldiers. regarding the special aspects of selection, training, functioning on high moral and professional principles.

The regulations adopted, the institutions created, the foundation of this unique insurance system in the interwar period, represent an exceptional legal creation in the improvement of labor relations and, implicitly, of the aviation law, no better or even more valuable than similar constructions in other states with a developed aeronautical system, a system that can be used in the current landmarks of reconstruction of the existing legislative framework, with valuable and positive implications in the development of the spirit of the weapon, stability and coherence in the formation, improvement and use of the most valuable resource.

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TEHREEK-E-LABBAIK PAKISTAN (TLP): A RISING EXTREMIST FORCE, OR JUST THE TIP OF A LARGER RADICALISED ICEBERG IN THE *AFPAK REGION*?

Ecaterina MAȚOI

Faculty of Humanities and Social Sciences, Basel University, Switzerland
(matoiecaterina@gmail.com)

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Abstract: *As if Afghanistan's recent takeover by the Taliban was not a sufficiently significant development in the AfPak region, reports indicate that Pakistan's largest sect, the Barelvi, becomes increasingly militant and aggressive by the day. Since another important movement for the history of Pakistan - the Deobandi - has generally dominated the violence scene in Pakistan starting with the Soviet invasion of Afghanistan, this trend within the Barelvis is a rather new one, and deserves extensive attention keeping in mind the recent regional developments.*

Taking a brief look at the history of the region to identify possible causes that may underlie the radicalization of the Tehreek-e-Labbaik Pakistan group, it is noticeable that emergence of Barelvi and Deobandi sects in the first part of 19th century was part of a larger movement to revive Islam in the Northern part of India, but in different manners: while the Deobandi kept close to the Hanafi Sunni teachings in a strictly manner, the Barelvi sect – developed itself mostly on a Sufi legacy, as part of a larger Folk Islam inherited from the Mughal Empire, despite being itself affiliated with the Hanafi school. The differences between the two movements became critical from a political, security and social point of view, especially after the division of British India in 1947, into two states: a Muslim one – present day Pakistan, and a Hindu one - present day India, of which, the first, became the state entity that encompassed both Hanafi revivalist movements, Deobandi and Barelvi.

Therefore, this research is aiming to analyse the history of Barelvi movement starting with the British Raj, the way in which Pakistan was established as a state and the problems that arose with the partition of the former British colony, the very Islamic essence of the new established state, and the potential for destabilization of Barelvi organisations in an already prone to conflict area. Consequently, the current research aims to identify the patterns of latest developments in Pakistan, their historical roots and causes, main actors active in religious, political and military fields in this important state-actor from the AfPak region, in order to project Barelvi recent in a defined environment, mainly by using a historical approach.

Keywords*: Barelvi sect, Deobandi sect, Pakistani madrassas, Pakistani Directorate of Inter-Services Intelligence (ISI), Tehreek-e-Labbaik Pakistan (TLP), British Raj*

1. INTRODUCTION

Pakistan as a country is situated in an extremely complicated region from all points of view, an area where conflicts and tensions seem to have found their home for at least the last four decades. Therefore, any further potential destabilisation of this nuclear state could lead to a greater destabilisation of the region, which has already been hit hard by the situation in Afghanistan, with consequences difficult to predict on short, medium and long term as well.

Relations between Iran, China and the United States are in constant distress, fuelled by ongoing events/alliances/agreements in the wider Middle East region. The Taliban are in control of power in an Afghanistan almost suffocated by an economic and political crisis on the brink of the endurance of an otherwise hard-fought society. Iran is on the verge of war with Israel, at least at the discourse level, both as neighbours of Persian Gulf countries.

Against this regional political-military background, in a seemingly security-stable country, namely Pakistan, a relatively new party has increasingly incited protests and radicalization of a society that identifies itself strongly with Islam: Tehreek-e-Labbaik Pakistan (TLP). In a short period of time, TLP obtained 7 agreements with the government, following 7 protests(Geo News, 2021). A closer look reveals that this party organisation is ideologically associated with the Barelvi movement that emerged in the British Raj, when Pakistan, India and Bangladesh formed a colony under British control. Given the violence caused this organisation's protests, the situation in Afghanistan, and the tensions between Pakistan and India, increasingly visible in the virtual space at least, an investigation of the context in which such an extremist political party emerged is necessary, meant to reveal the causes, connections and its place within the Pakistani society, etc.

Consequently, this research is aiming to analyse the history of Barelvi starting with the British Raj, the way in which Pakistan was established as a state and the problems that arose with the partition of the former British colony, the very Islamic essence of the new established state, and the potential for destabilization of Barelvi organisations in context. The historical background of Barelvi sect is closely related to that of the Deobandi, a competitor for Muslim legitimacy in the Islamic Republic of Pakistan.

The historical approach has been selected as research method due to a series of reasons. Firstly, the apparently fast radicalisation of certain Barelvi groups is not easily explicable. Secondly, the role of Barelvi in nowadays Pakistani political environment and government is apparently still marginal, despite the fact that the sect encompasses a larger number of adepts than the dominant Deobandi. Finally, historical research would enable establishing whether the developments are completely new or anchored in long-term processes and who are the main direct and indirect actors that contributed to recent outcomes.

2. THE BRITISH RAJ AT A GLANCE

Following the Battle of Plassey from 1757, won through bribe offered to Mir Jafar Ali Khan Bahadur – a Nawab from Bengal, *the East India Company* instated British rule upon India, under a royal charter from 1600 that mandated them to trade with the Indies. The trade referred to Indian goods that became popular in Britain, but in the first part of the 19th century the East Indian Company became notorious for the *Opium Wars*. The competition to sell poppies to China was increasing at time, with entrepreneurs like the American John Jacob Astor challenging the dominant British role. Among many sources that document the monopoly sought by the company in opium trade(Downs, 1968), a BBC article from 2019, entitled "*How Britain's opium trade impoverished Indians*"(Biswas, 2019) explains that 1.3 million peasants from Northern India, nowadays Uttar Pradesh and Bihar, and by the end of the century approximately 10 million people were depending on this industry for survival.

Coincidently or not, the impoverished population from these two Indian states was Muslim and the two prominent movements that are relevant for Pakistan's Muslim heritage, the Deobandi and the Barelvi, were founded in Uttar Pradesh.

Literature(Hussain, 2017, pp. 9-12) mentions that in the first part of 19th century, Muslim influence was decreasing in India: they had to pay more land tax, the British were favouring Hindu population, and before the 1857 mutiny from Uttar Pradesh, there took place 40 rebellion. In terms of religion, from the 47 million total population of North West Frontier, at least 40 million were Hindus and 6.5 million Muslims, the small rest encompassing Christians, Jainas and Sikhs. The alleged *"benevolent neutrality"* of the British meant that following any religion was ensured, but in 1950, the *"Freedom of Religion Act"* overruled religious prescriptions from Hinduism and Islam with respect to inheritance, in the name of human right to inheritance. Hussain's study mentions that starting with the 1850s, the British became involved in religious affairs and started to modify the educational system, calling the Muslim teachings "barbaric". This determined a change in attitudes of population and the 1857 rebellion from India ended the rule of *East Indian Company* over this territory.

The British Raj, i.e. the direct rule of the Crown over India, was instituted in 1858 through the "*Government of India Act"* and lasted theoretically until 1947 partition. The Raj was enlarged through the annexation of Upper Burma in 1886. The British council running the territory was consisting of representatives for home affairs, law, finance, revenue and military affairs. The Suez Channel was inaugurated in 1869 and steam ships encouraged trade between the British Empire and the Indies. While business was booming for the British, the poorer local populations started to build resistance and later liberation movements. Among these initiatives, the following two are relatively important: the *Indian National Congress* (political party established in 1885*), the All-India Muslim League* (political party established in 1906). At the beginning of World War I, British India had already sent 300'000 people on different fronts, local politicians hoping to obtain concessions from the Crown later. The migration of Muslims from India towards West started before the partition. In a rise against the British rule, the Ali Brothers founded the *Khilafat Movement*. On this background, in 1920, the Indian Muslims started to consider India ruled by the British - *Dar-ul-Harb* (*the House of War*), and Afghanistan, the only country in the region free from European rule, as *Dar-ul-Islam/the House of Islam*(Ali, 1982). The migrants had chosen Afghanistan for their "*Hijrat"* because Persia, Turkey and the Arab states were dominated by Europeans.

Along with India, Burma (nowadays Myanmar) and Bangladesh, nowadays Pakistan used to be part of the British Raj until 1947, when the alleged independence of Pakistan translated into the creation of the Dominion of Pakistan (also Federation of Pakistan, 1947 – 1956), which included nowadays Pakistani territory (West Pakistan in the 1956`s Constitution) and that of Bangladesh (*East Pakistan*). In 1971, Bangladesh won its independence after violent repression from (West) Pakistan, a development that crushed Pakistan's aspirations towards a larger Muslim state and prompted questions related to United Kingdom (UK) and United States (US) neutrality in the regional competition between India and Pakistan. However, the US government (in a split from US Congress) at that time had a visible interest in preserving the relation with Pakistan and strengthen the relations with China, in a bid to contain that time USSR's influence/expansion in the region. The UK was also concerned with maintaining a foothold in the rich region and kept a certain neutrality, less interested in the outcomes of the conflict, but in relations with future power holders. The exchange of population between India and the new Pakistan (including nowadays Bangladesh) was one of the most intense throughout history, different accounts mentioning millions displaced. Khaldi mentions: "*When Pakistan did actually come about in August 1947, its formation was accompanied by a horrific human disaster, even by the standards of a world grown accustomed to genocide*".(Khaldi, 1998, p. 339).

3. THE ESTABLISHMENT OF PAKISTAN IN A BRIEF

The only state at the global level *created with the purpose of being Muslim was meant to host all Indian Muslims and have Islam as official faith*. The British Raj ceased to exist on the 15th of August, 1947, when the Dominion of Pakistan and the Dominion of India became "independent nations". The negotiations on post-colonial arrangement evolved under pressure of civil war: the Direct-Action Day (16.08.1946) resulting in the *Calcutta Killings*, among other conflicts, and *The Week of Long Knives* were just some of the large-scale incidents that pressured the British rule.

1.1.Relevant institutions of the" secular state". The fundamental law and population

Mountbatten Plan, or the "*Indian Independence Act, 1947*"(UK Gov., 1947), coined the names of the two dominions, established their territories, the roles of the new governors-general, legislation, Secretary of State's services, (Indian) armed forces and other provisions. After the plan was announced, the Sikhs, present in both new India and Pakistan, concluded that they did not receive anything from the partition. The first Governor-General of Pakistan, Mohammad Ali Jinnah, was called "*Quaid-i-Azam*", the *Great Leader* in Urdu, and he represented the sovereign Crown in Pakistan.

3.1.1. Pakistani Army. The army came into being officially on the 15th of August, 1947, as well. On the institution's official page(Pakistan Army, 2021) it is mentioned that arrangements to split the Indian Army in 1947, were started in June. In the period 1939 – 1945, the Indian Army reached a maximum of 2.018 million, but the day before the partition, there were 11'800 officers and 450'000 other ranks, without approximately 50'000 forces of princely states. Besides mixed combat units, there were two complete Muslim units and more complete Hindu and Sikh units. The Pakistani Army complains on the website that while troops were relocated, 53 trains with personnel and families were attacked and massacred, leading to the establishment of the Bombay – Karachi Sea route for this purpose. Seven million Muslims are said to have migrated to Pakistan, and five million Sikhs and Hindus to India, a million of them perishing during migration.

The same source indicates that the 2'300 Pakistani officers active at the beginnings of Pakistan were completed by a group of 484 British officers, who voluntarily helped developing the Pakistani army, while more Polish and Hungarian officers also offered their services. The first Commander in Chief of the Pakistani Army was Field Marshal Mohammad Ayub Khan, but he assumed command only in 1951, when Sir Douglas Gracey renounced at the command of Pakistan. After the dissolution of the Dominion of Pakistan and adoption of the Constitution in 1956, Ayub Khan became the second president of the Islamic Republic of Pakistan (1958-1969), after removing the first president, Major General Iskander Mirza (1956-1958). Both Ayub Khan and Iskander Mirza, but also other important officers like Admiral Mohammed Siddiq Choudri were educated at Sandhurst, were awarded with "Most Excellent Order of the British Empire" and influenced political environment: the list of governors-general and presidents of the subsequent Pakistani Islamic Republic(Pakistani Government, 2021) indicates that as of 2021, many military officers held offices: Major General Iskander Mirza (1955/1956, 1956 - 1958), Field Marshal Mohammad Ayub Khan (1958 – 1969), General Agha Mohammad Yahya Khan (1969 – 1971), General Mohammad Zia-ul-Haq (1978 – 1988), known for the accelerated Islamisation of the Pakistani Army) and General Pervez Musharraf (2001 – 2008).

Pakistan's short history has been marked by many coups, coup attempts and periods with martial law enforced. Additionally, a constant tension between Pakistan and India led to successive armed conflicts and Pakistan becoming a nuclear power in 1998.

The US joined the British in developing the Pakistani Army starting with 1954, in the endeavour of curbing the *expansion of communist influence*, assisting not only with equipment and training, but also providing substantial financial aid to Pakistan.

***3.1.2. The Directorate of Inter-Services Intelligence (ISI*) of Pakistan** - ISI became known relatively late, especially for its role against the Soviets in Afghanistan. Founded in 1948 by two-star General Sir Robert Cawthome, ISI was/is a military institution in charge with gathering and processing internal and international intelligence for Pakistan. It is probably the most relevant intelligence structure in terms of relations with various faith-based groups from Pakistan. The *Operation Cyclone* is discussed in literature and media under different circumstances, and the role of the Central Intelligence. Agency (CIA) or British intelligence in financing, founding and training the Taliban and other *mujahedeen* with the help/through ISI to fight against the Soviets is questioned. For example, the book "Ghost Wars" by Steve Coll, managing editor at the Washington Post(Wilson Center, 2004) is revealed as source in other studies. At the same time, the website "Verify USA" may confuse the reader with the question "Did the U.S. directly fund the Taliban?". The answer provided is "no", but it refers to direct founding, not founding in general(Verify USA, 2021). In a 2016 article(Jaffrelot, 2016), Jaffrelot supports many views expressed by Indian government and intelligence agencies in media and studies, by stating "*The ISI has constantly promoted new jihadi groups to counter or balance those going out of hand. The JeM was sponsored by the security establishment after it lost control of the Harkat nebula. Azhar remained close to the establishment while other Harkat operators distanced themselves from Musharraf after he became "too close" to the US*". JeM – *Jaish-e-Muhammad* and LeT – *Lashkar-e-Taiba* are some examples of organisations supposedly supported by ISI to destabilise India in Jammu and Kashmir region. The alleged connections between extremist groups and intelligence services appear repeatedly in literature, the other important development related to current research topic being the islamisation of Pakistan's Army, that will be discussed later.

3.1.3. Pakistani Government`s structure - Islamic Federal Republic of Pakistan's government is organised in *three branches*(National Democratic Foundation, 2021)*: executive, bi-cameral legislative (known as the Parliament) and judicial*. Within the judicial branch, *the Federal Shariat Court* examines whether the laws of the country comply with *Sharia*, while *Mohtasib* (Ombudsman) is an institution meant to enforce administrative accountability, a function described as typical in previous Muslim states.

3.1.4. The fundamental law - The Constitution of Pakistan as of 31.05.2018(National Assembly of Pakistan, 2021) exhibits different particularities of the federation, with respect to Islam as religion: article 2 mentions that Islam is "State religion", defines Muslim and non-Muslim in article 260, the entire Part IX of the constitution (articles 227 – 231) introduces "Islamic Provisions", etc. The Islamic Council, functioning as described in article 230 of the Constitution, will advise assemblies, presidents, governors "*… on any question referred to the Council as to whether proposed law is or is not repugnant to the Injunctions of Islam*". Hence, the Islamic Council and Federal Shariat Court ensure a rigorous harmonisation of legislation and government work with the Holy Quran, Sunnah and Sharia.

3.1.5. Population - The population of Pakistan exceeded 220 million in 2020(United Nations, 2021), had a GDP of 282.35 billion, and a GDP per capita of only 1330 per year. Its trade balance deficit and current account deficit are rising. As of 2017, there were 3.4 million migrants living in Pakistan, coming mainly from India and Afghanistan(UN IOM, 2019). Territorial disputes of Pakistan relate mainly to *Durand Line*, between Afghanistan and Pakistan and the territories *Jammu and Kashmir*, administered by India.

4. PAKISTAN'S RELIGIOUS ENVIRONMENT AFTER 1947 INDEPENDENCE

As in other parts of the world, during previous centuries, the population in AfPak/former British Raj region was experiencing divisions along different religious, ethnic, ideologic/political lines. The most relevant for this research will be initially *the religious split*. In terms of religion, a clear division between Hinduism and Islam resulted in the 1947 Indian and Pakistani states. The self-determination principle however, was applied and understood differently: the founders of Pakistan envisioned a Muslim state, based on religious criteria, when applying self-determination, whereas the Indian side was more receptive to the ideas of a secular entity accommodating religions, at least initially.

From a British perspective, the split was probably meant to allow higher local autonomy within a British Commonwealth, but the 1947 division was not ideal, at least on long term: Kashmir region was contested, the Northern part of India was inhabited by Muslims, while its ethnic composition was relatively diverse. The same situation occurred in Pakistan: ethnic groups like Punjabi, Pashtun, Sindhi, Urdu, Balochi, Bengali found themselves united in a common state, in which religion was supposed to play a unifying role. However, supported by foreign powers or not, the Bangladeshi secession appears to have followed primarily ethnical lines, a development direction that is theoretically encompassed in the nationalist ideology, although a large majority of the population was and is Muslim. *The difficulties of former Western Empires to seed nationalism outside Europe are not visible only in Africa or the Middle East, but also in the former British territories:* a different cultural and historical context did not allow the implementation of the (secular) nationalist ideology as easy as in other parts of the world, neither by the West, nor by at that time the *Union of Soviet Socialist Republics* (USSR). The struggle to reshape societies on current territory of Pakistan did not translate into an easily recognizable win, and since this ideology has already been affected by other ideological directions like neoliberalism, globalization, protection of environment, etc., its chances to succeed in the future are diminishing by the day. From this perspective, following aspects should be retained: the solid cultural foundations of communities in AfPak region allowed currents like nationalism or socialism to penetrate, but the well-established symbiosis between Islam and pre-Islamic customs appears to have survived, in a way or another. Furthermore, the post-World War II order and foundation of post-colonial states appear more and more to remain a short instance in history of humanity, as the ideologies promoted during 20th century have apparently proven their limits: the preconditions for democracy appear to be impossible to replicate in all parts of the world, the question on how self-determination should work generally has not been fully answered in its prominent age, e.g. first half of 20th century.

Researchers point out that the Pakistani state was envisioned as one based on Islam from its very foundation according to both British view(Debnath, 2021) and Pakistani view(Roach, 2013). But this perspective represents only a side of the coin: the Partition of Bengal in 1905 under Lord Curzon, cancelled after 6 years, determined (then Indian) Muslim leaders in 1906 to form the *All India Muslim League* in Dacca(Ziring, 2003, p. 21) (the British name at that time for Dhaka, Bangladesh). On both Pakistani and Indian sides, two types of political forces could be observed: progressive, that hoped the British India could become independent and remain intact, under a nationalist government, and (ethnically and religiously) conservative, that tended to seek separate independence for Muslims and Hindus. The strong reaction of Hindus against Bengal's partition helped raising legitimacy of the *Muslim League* (a political party), and Mohammad Ali Jinnah, considered the founder of Pakistan, joined the Muslim League in 1913.

Ziring mentions that although both Jinnah and Mahatma Gandhi were educated as British barristers, Jinnah was addressing educated Indians while Gandhi was trying to unite less literate or middle class against the British Empire. Although Jinnah joined the League, he was acting as a moderate (Muslim), a good negotiating position from two perspectives: the British did not perceive him as a direct threat and he was able to address moderate Hindus. But Gandhi's bold political stance against what he saw as Jinnah's accommodation of foreign interests, including also his support for (Ottoman) Khilafat movement in India managed to successfully counter Jinnah, that moved temporary to England. Although Jinnah was not awarded a *"Khan Bahadur"* or *"Sir"* title, in the political landscape of 1920s India he was associated with the political camp that accommodated relatively well British interests. The situation changed during the next decade, as Jinnah started to increase his support for an independent Muslim Pakistan, but his relations with the British were maintained as he received the Governor-General of the Dominion of Pakistan in 1947 after the partition. The Muslim League maintained power after Jinnah's death, but lost governance to the *All-Pakistan Awami League* in 1954, another Muslim party.

The most relevant characteristic of this period vis-à-vis the direction of this research is the polarisation of religious establishment along two main lines: a camp that accommodated British interests, be it in the name of a moderate/tolerant religious approach or accommodation of the secular progress, obviously connected to British presence and interests, and a reactionary, anti-colonial camp, that came in direct conflict with the British and indirect conflict with the moderate camp. One can consider in this context that the moderate camp envisioned initially a united India, if possible, multi-ethnic, encompassing the two main religious directions, while the anti-colonial camp tended more towards secession on ethnic and religious lines. These general tendencies cannot be confirmed in every case or on long term, as most of the involved actors changed their positions constantly and sought short-term advantages over long-term consistency. From a British perspective, the general outcomes of self-determination became secondary as long as main interests could be preserved, especially in the context of a global decolonization. Additionally, the British realized that the agreements they stoke with important actors like *the All-India Muslim League, Members of the India National Congress,* or representatives of the Hindu secessionists, were neither stable nor reliable, since the representatives of these large communities did not exert far-reaching authority over their claimed group. The British do not appear to have driven the events, since this would have been probably expensive, but to preserve certain interests through various instruments of power: they neither pushed for a full secession, that would have led to a more divided Pakistan (Balochi and Punjabi groups have many elements in common, but they do not form a fully homogenous society), nor for a fully preserved India. This research will not pursue the development of Pakistani politics after independence, or army's interference in government of the country, although the latter appears to have dominated the political stage. These topics, along with the interplay between politics, army and religion, are very large, complex and might require special research designs in order to produce conclusive results.

4.1. Main developments related to relevant sectarian groups from Pakistan. These groups were subjected to many dynamics, with factions joining and leaving, many conflicts, and last but not least a strategic post-colonial presence of the British challenged by new actors - at that time - like the United States (US), USSR and China. The characterization of these developments will be performed through analysis of selected episodes from Pakistan's history and of relations between events.

The study will be focused on characters and their actions at certain time points, in order to recognize patterns in development of religious organizations. An additional complexity factor is introduced by the dynamics of individuals within and among organizations: for example, Jinnah appears to have inherited an Ismaili Shia religious family, studied within the Twelver Shia community and is said to have died as a Sunni Muslim. Another typical situation may refer to legitimacy of organizations and their spinoffs: for example, Tehreek-e-Labbaik Pakistan was initially considered associated to Barelvi sect, but as soon as it became a militant separate entity, the Barelvi relinquished them officially, but helped the Pakistani government to strike a deal with them. All these events take place in a grey legitimacy zone, that carries a short-term excuse due to acute needs, but the chronic problems appear to be very difficult to address. In order to understand the level of fragmentation among religious but also political organisations, the observation from a 2003 Canadian study will be mentioned: the number of religious parties in Pakistan increased from 30 in the year 1979, to 245 in 2003. From the total 245 in 2003, 48 were Barelvi and 45 were Deobandi(Canada, 2003). The way in which the *All-India Muslim League* represented Muslim interests from a religious and political perspective is also relatively difficult to characterize from a secular perspective, as the political structure "party" is part of secular terminology, while in Pakistan, it acts in a political, religious and possibly other dimensions, simultaneously.

Pakistan is said to have been built by the "*muhajir*", Muslim migrants arriving from North part of India. The cited Canadian study(Canada, 2003) mentions that many Deobandi migrants coming from Punjab and Haryana were speaking Punjabi and Seraiki languages, integrating easily in their new homes from Pakistan in which these languages were common. On the contrary, the Barelvi muhajirs did not spoke the local language when they arrived in Pakistan, Urdu language, and "*did not immediately identify themselves with the native inhabitants of Pakistan*".

The confederation of Muslim educational/religious associations from Pakistan for the period 1988 – 2000 is introduced in *Figure 1***.** The source cited(Khawaja, pp. 161-162) states that in 1988, there were a total of 2'861 madrassas, their number increasing to 6'761 in 2000. According to a later study(Tempelin, 2015), the number of madrassas reported by the five members of ITMD increased further to 11'700 in 2008 and 19'366 in 2011. In 2011, 65% of madrassas were Deobandi. In terms of population, 20% of population was adhering to Deobandi sect while Barelvi represented approximately 80% of Pakistan's Sunni population. Hence, the number of madrassas is not reflected by the distribution of population within the Sunni faith. Finally, Templin's study mentions that as of 2012, 1 – 1.7 million Pakistani students were attending madrassas in Pakistan, from which approx. 65 % enrolled in Deobandi Madrassas.

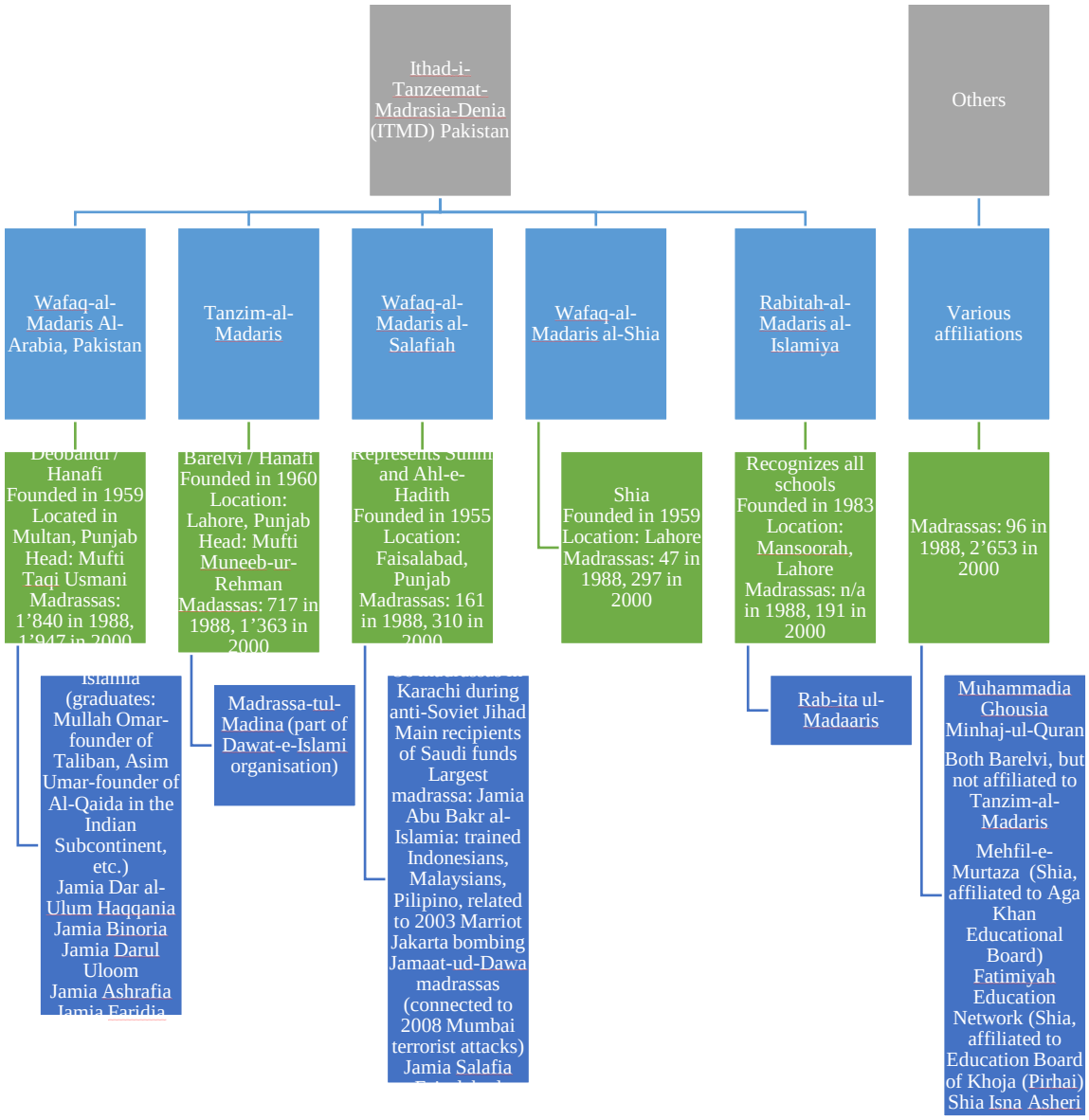

FIG. 1 Confederation, boards of madrassas and selected madrassas from Pakistan (sources in text).

The Deobandi and Salafi madrassas appear to have trained students that were involved in extremist attacks after 1990s, while the Barelvi and Shia appear to be rather victims than perpetrators in the historic religious aggression throughout Pakistan. The five associations do not govern all religious educational institutions from Pakistan and while some may not be accredited by Ministry of Federal Education and Training, some apply for licenses under supervision of other boards, some try to affiliate themselves to reputed educational institutions, while others are not even declared. A series of madrassas, organised independently or in education networks supervised by independent boards, do not appear to have been involved in major violent events.

In Fig.1, the list of madrassas from the lowest level of the graph is not an exhaustive one. It represents a small compilation of representative madrassas from different literature sources(Gulzar, 2020)(International Crisis Group, 2007), cross-checked. The complex formation and transformation of different Islamist or militant organisations, their role in founding or running madrassas may represent itself a separate research topic.

The names utilised tend to follow the sources in which they were observed, but two main notations were noticed: a transliteration that tends to pursue local/Pakistani wording while another transliteration tends to use Arabic wording. Furthermore, certain literature sources indicate that Deobandi and Barelvi sects may be part of the Hanafi School, while others present them as independent. This difference of opinions requires further study.

The 2001 Pakistani Madrassa Ordinance and 2002 Dini Madrassa Ordinance aimed to increase control on madrassas, initially by obliging them to register, but this initiative was not very successful(Borchgrevink, K., NOREF, 2011, p. 8). The new laws asked them to disclose financing sources, but this was also perceived as a part of foreign agendas for Pakistan. A US Program from 2002 meant to help secularise madrassa curriculum through a $ 225 million funding, but after five years, only 250 schools accepted the secular program(Tempelin, 2015, p. 18).

The short overview on madrassas and their historic evolution reveals that declared education networks, well-known for the religious violence of some graduates, are public institutions under scrutiny of state institutions. They trained Pakistani, but also foreign students and received funds from abroad, especially from the Gulf states in an era in which the number of madrassas was increasing exponentially in Pakistan. The talks between government and ITMD are meant to harmonize curricula and introduce more transparency in madrassas, but they are progressing slowly and a relatively long time might be needed to achieve significant results. Nowadays, the educational system from Pakistan is evolving towards a secularised one. However, the madrassas still represent an important part of the educational system and this is proved by the high-level meeting from 2020 in which the Ministry of Federal Education and Professional Training met ITMD. During this meeting, ITMD apparently agreed to "abide by the decisions of government"(The Nation, 2020). This decision indicates that it ITMD did not abide by government's decisions, terms were probably negotiated and if they will really abide both formally and informally remains to be seen.

The study of madrassas and their development in recent history of Pakistan has revealed connections with larger/other organisations, active in different spheres from Pakistan and abroad. Such faith-based entities exhibit activism and even extremist behaviour in certain circumstances, confirming or rather expanding the questionable directions of education from madrassas. Data from *Table 1* has been compiled from sources utilised for *Figure 1*, as well.

Table 1. Organisation connected directly or indirectly to madrassas' activity or faith-based organisations.

Organisation	Affiliation	Founded in	Observations
Dawat-e-Islami	Barelvi	1981, Karachi	Worldwide Islamic movement, basic education system, Madani TV Channel
Tablighi Jamaat	Deobandi	1926 India, 1947 Lahore	Banned in Russian Federation, Uzbekistan, Tajikistan, Kazakhstan(Times Now News, 2020)
Jamaat-e-Islami Party	Political Islam, legal/ lawful approach	1947, Lahore	Pakistani successor of movement Jamaat-e-Islami from Aurangabad, India, 1941. Sponsor of Hira School System, Rab-ita ul-Madaaris madrassa network
Jamiat Ulema-e-Islam (JUI)	Deobandi	1945	Deobandi political party, run the Deobandi madrassas ran by Pashtun in Karachi. Maulana Sami-ul-Haq sometimes mentioned as "Father of the Taliban" and assassinated in 2018(Anadolu, 2018)

Organisation	Affiliation	Founded in	Observations
Siphane Sabaha Pakistan (SSP)	Deobandi	1985	Anti-Shia and Barelvi, banned in 2001, reorganized as Millat-e-Islami
Lashkar-e-Jhangvi	Deobandi	1996	Branch of SSP, tried to assassinate PM Nawaz Sharif (1999), PM Benazir Bhutto (2007)
Jamaat Ahl-e-Sunnat (or Ahle Sunnat wa Jamaat)	Barelvi		Bombed by Lashkar-e-Jhangvi in 2006 event, advised against attending the funeral of Salman Taseer, governor of Punjab assassinated in 2011 allegedly for his stance against blasphemy laws(Georgy, Michael (Reuters), 2011)
Lashkar-e-Tayyaba (LT)	Salafi / Ahl-e-Hadith	1990	Militant organization, armed faction of Markaz al-Dawa al-Irshad from Muridke, Punjab. Renamed as Jamaat-ud-Dawa
Tehreek-e-Jafaria (TJP)	Shia	1979	Banned in 2002 by Pervez Musharraf's government

Pakistan's religious environment after 1947 is a dynamic one, and appears to be dominated by *the muhajir*, i.e. the migrants arriving from India after 1947, and their organizations. The Deobandi and Salafi groups appear to drive most of the violence in Pakistan. The Deobandi are not leading in terms of adepts' number, but they do in terms of number of madrassas and students. A study claims that a "neo-fundamentalism" is based on Deobandi fundamentalism, but influenced by Wahabi and Salafi ideologies(Borchgrevink, 2010). The level of (religious) extremist violence reached in Pakistan can be exemplified through a 2020 newspaper article(Gabol, 2020): a guard shot dead a bank manager for alleged blasphemy and when victim's uncle tries to demonstrate that this was not the case, he mentioned that their family is Muslim, "not Ahmadi". In another blasphemy case, a US citizen of Pakistani origin was shot dead in a courtroom, while standing trial for blasphemy, by a teenager. While religion appears to be the reason for such assassinations, data from the article suggests that personal reasons could add to the main excuse: Pakistan is one of the poorest countries in terms of income per capita, ranking lower than India and Bangladesh. One can presume that the number of reasons for extremism and extreme manifestations can be relatively high.

Yasser Latif Hamdani, an author featured on the "*Tony Blair Institute For Global Peace*" website (as of 17.11.2021), engages in an exchange, probably with the Deobandi and Barelvi, in which he defends the Ahmadi (sect) against of accusations of supporting British rule(Hamdani, 2014). In his argumentation, Hamdani claims, among others, that the founder of Barelvi sect, Ahmad Raza Khan declared in his treatise *Al-Mohajat, Al Mohtamanat Fi Ayat-al-Mumtahanat* that jihad against the British rule was "*unlawful*". While the dispute is obviously polarized, literature about the relations of British with different Pakistani groups indicates indeed that Barelvi-British relations have been maintained, but the number of Deobandi mosques is the highest, with 797 in 2017. On second place, the Barelvi mosques come with 459 in the same year, and the Salafi with 182 mosques(Naqshbandi, 2017). The fact that Britain hosts so many Deobandi mosques may indicate that, at least its intelligence services have a good idea about certain Deobandi groups. If the working hypothesis of the British would have been to support more peaceful groups like the Ahmadi or the Barelvi, this would have been a logical choice. But the numbers of mosques in the UK does not indicate any preference for the Barelvi sect. The fact that Deobandi and Barelvi mosques dominate the chart reflects that colonial heritage, but also post-colonial ties that outlived independence.

Given the tense situation in/among Pakistan and India, the observing position of the UK is probably a privileged one, but maintaining it might require further impartiality with respect to internal religious conflicts, and probably in the conflict between Pakistan and India.

The claim that Pakistani blasphemy laws were initiated by the British was analysed(CRSS, 2010, p. 6). While Christian blasphemy laws might have appeared previously in Britain, and Indian Penal Code from 1860 protected religious institutions, activities and "religious feelings", it does not mention death penalty. The turns taken by such legislation after 1947 in Pakistan were determined also by the fact that Pakistan was envisioned as a Muslim country and mobilising the population in conflicts like the one in Afghanistan against USSR or against India in Kashmir required apparently also concessions even from theoretically secular institutions like the army. What appears to be very significant is the instrumentalization of blasphemy laws by various Pakistani actors in order to incriminate either political or even religious competitors.

4.2. Instrumentalization of faith by General Mohammad Zia ul-Haq

Pakistan's Islamic trajectory was predictable. After 1947 independence, the foundation of the Islamic Republic was a natural step. But in terms of Islamisation, a major acceleration was noticed during the presidency of General Mohammad Zia ul-Haq (1978 – 1988). A study from the Middle East Institute, Washington (Ed. Middle East Insitute, 2021) collected articles from different authors on the topic of Pakistan's Islamisation. Aasim Sajjad Akhtar claims in his article "Moving beyond Islamic" that Zia ul-Haq "*made Islamization the raison d'être of his regime*". Nasim Ashraf explains in his article "The Islamization of Pakistan's Educational System 1979-1989" that Arab states were asked to found the fight against communism and at the same time contain Khomeini's Islamic Revolution. He suggested to use *Zakat* for to improve learning conditions in madrassas, took steps to employ graduates of these schools, approved modification of the curriculum in public schools to refocus on *jihad* and Islamisation. His article cites a source mentioning that University of Nebraska was funded with $ 5.1 mln. by USAID to "*develop and design textbooks to promote jihad*" for the period 1984 – 1994. the author concludes that the educational policies from the decade 1979 – 1989 actually destabilised Pakistan and the effects are to be seen nowadays.

Fahrat Haq's article "*Jamaat-e Islami*" claims that Zia ul-Haq instrumentalized Jamaat-e-Islami in his Islamisation of Pakistan as a civilian counterpart for his programs. The members of this political party received places in government, Islamic organisations that he created and funds/opportunities channelled from Arab states. At the same time, Jamaat-e-Islami strongly supported Khomeini before and after the 1979 Islamic Revolution.

Citing various sources, Roach mentions that Zia ul-Haq (Roach, 2013):

a) *Changed army's motto from "Unity, Faith, and Discipline" to "Faith, Piety, and Jihad for the sake of Allah";*
b) *Declared himself as "soldier of Islam";*
c) *Introduced religious evaluation in all officers' performance;*
d) *Made military academies more accessible to Deobandi groups;*
e) *Recruited more from regions with Deobandi madrassas.*

Although General Zia ul-Haq's rule ended in 1988, the dynamics he initiated were continued by the structures and power groups he created. Winning the Cold War was achieved by his Western allies, but the cost of methods employed will become visible only approx. one decade later.

5. **MAINSTREAM CONTEMPORARY BARELVI ORGANISATIONS**

The consensus in the Sunni tradition is that interpretation of Islamic Law ended with the four schools: *Hanafi* (founded by Imam Abu Hanifa 699 - 767), *Maliki* (founded by Imam Malik 711 - 795), *Shaafi* (founded by Imam al-Shaafi 767 – 820) and *Hanbali* (founded by Imam Ahmad bin Hanbal 780 – 855). Delhi Sultanate and then the Mughal Empire supported the spread of Islam, under various forms over centuries. In the AfPak region, the original Hanafi teachings were complemented by *Sufi orders* and *Folk Islam*.

Especially when the Muslim empires and states began to lose ground worldwide in the 18th and 19th centuries, a series of revival/reform movements began to appear. Relevant for AfPak region, following can be mentioned: *Faraizi Movement* (founded by Haji Shariatullah), *Wahabi Movement*, *Aligarh Movement* (Syed Ahmad Khan received the Star of India award from the British Crown), *Ahmadiya Movement* (Mirza Ghulam Ahmad declared himself Mahdi and his movement is not considered Sunni), *Deobandi Movement* and *Barelvi Movement*, among others.

The Barelvi and Deobandi movements are presented in literature either as part of or completely separate from the Hanafi School. Due to their Sufi influences, the Barelvi are not considered part of the Sunni Hanafi School of Law. Naki Ali Khan, the father of Ahmed Raza Khan (founder of Barelvi Movement in the 19th century) was also an Islamic Scholar, and Hassan Raza Khan, the brother of Ahmed Raza Khan, was also an Islamic scholar and Sufi poet. Literature mentions that Ahmed Raza Khan might have been polarised against the Wahabi by Ahmed Zayni Dahlan, the Grand Mufti of Mecca at that time that was in conflict with the Wahabi Movement (Hussain, 2017, p. 36). The same source mentions that various works suggest the British were using Ahmed Dahlan in the Arabian Peninsula and Ahmed Raza Khan in the Indian subcontinent to weaken Muslims. Taking into account that the European powers were striving to divide and conquer the Ottoman Empire at that time, and that the French were also advancing their colonial agenda in other parts of the world, this hypothesis cannot be fully excluded and requires further research.

Hussain analyses the writings of Ahmed Raza Khan in order to extract beliefs that he considers suitable for a comparison to Christianity, among these: the Messenger was created from light and light came from the essence of God, the Messenger had divine ability and was capable to relieve calamities and affected people, the Messenger could be in more places at the same time and in charge of what occurs in our world. He also believed that saints had divine powers. Ahmed Raza Khan was very convinced of his beliefs and according to Hussain, he would make *takfir* anyone who disagreed with his views(Hussain, 2017, p. 44).

5.1. Main groups of Barelvi Movement - From the perspective of political organisation, the Barelvi appear to have acted in a reactionary manner rather than based on initiatives: the *All-India Sunni Conference* was created by Barelvi leaders in order to compete with the Deobandi *Jamiat Ulema-e-Hind*, *Sunni Tehreek* was created to prevent Deobandi from taking over the Barelvi mosques, etc. The Barelvi ***All India Sunni Conference (AISC*)** was created in 1925 and was not part of the Muslim secessionist coalition formed by the Deobandi Jamiat Ulema Islam Hind (JUIH), together with Jamaat-e-Islami (JI) and Ahrar Movement. Both AISC and its successor from 1947, ***Jamiat Ulema*** Pakistan (JUP), did not play an important role in Pakistan's politics according to literature, although it was supporting activism against Ahmadiya and General Ayub Khan (second president of Pakistan)(Paracha, 2021).

Ahle Sunnat wa Jamaat, another Barelvi organisation founded by Maulana Okarvi characterizes itself on the webpage of Maulana Okarvi University as "*the largest group of Muslims and the only group whose beliefs and teachings are accordance with the Holy Quraan and Sunnah. The Holy Prophet"*(Maulana Okarvi Academy , 2021).

5.2. (Pakistani) Sunni Tehreek (ST) - ST is an organisation founded in 1990 and characterized as "the radical expression of the Barelvi school"(Roy, Oliver / UNHCR, 2002). Maulana Salim Qadri, ST's leader in 2001 was assassinated in Karachi in 2001. His son, Bilal Qadri formed his own faction, while Ejaz Qadri formed Pakistani Sunni Tehreek (PST). The 2006 Nishtar Park bombing, allegedly organised by the Deobandi Lashkar-e-Jhangvi group, killed leaders of both PST and Ahle Sunnat wa Jamaat plus other Barelvi representatives, while they were celebrating the birthday of Prophet Muhammad in a *mawlid* ceremony(Tanoli, 2014). The objectives of the Sunni Tehreek described in literature are casting light upon the Barelvi reactions to possible changes in Pakistan's blasphemy laws: protecting the sanctity of Prophet Muhammad, his companions, saints, protecting mosques, "controlling the Department of Oqaaf (Islamic Affairs) and protecting the two-nation theory(Nabeel, Fahrad et all - CSRC Pakistan, 2016, p. 5). Cited report mentions that ST was involved in criminal and terrorist activity starting with 2011 and in 2014, ST registered a blasphemy case against Junaid Jamshed and organised protests for his arrest. Along with ***Tehreek-e-Labbaik Pakistan***, Sunni Tehreek staged massive rallies in 2016, after the hanging of Mumtaz Qadri, that carried out the assassination of Salman Taseer in 2011, former governor of Punjab, alleging breaches of blasphemy laws.

The 2011 assassination of Punjab's governor by the Barelvi follower Mumtaz Qadri reveals a radicalisation path initiated by the Barelvi relatively recently. The political and ideological steps taken by this initially peaceful sect appear, once again, to be a continuation of the reactive behaviour: after starting activism against the Deobandi and Salafi expansion in Pakistan amid the end of the cold war in the 1990s, it started to position itself as a defender of the blasphemy laws and gain political legitimacy. The assassination and call towards followers to abstain from attending governor's funeral was only one aspect of Barelvis' increasing political force. In 2014, before the condemnation and hanging of the assassin Mumtaz Qadri in 2015/2016, the Barelvi inaugurated the Mumtaz Qadri Mosque. In a normal secular state, obtaining an authorization for such a mosque would probably be impossible under similar circumstances, but the special structure of secular institutions of the Islamic Republic with religious authorities might be more complex than expected. The Mumtaz Qadri Mosque needed funds to double its capacity immediately after its opening in 2014(Boone, John, 2014).

In October 2018, Asia Bibi, the Christian that was supported by Punjab's governor when she was accused of blasphemy, was released, questioning the purpose of assassination in the first place.

5.3. Tehreek-e-Labaik Pakistan (TLP). TLP it is a political party created in 2015 by Khadim Hussain Rizvi, whose political platform is focused on preservation of blasphemy laws. His biography(Pakpedia, 2021) reveals that in 2009 he suffered a car accident and remained paralysed. TLPs political agenda includes, among others: stopping interference "of the enemy" from inside and outside of Pakistan, meeting all basic needs of people through *zakat, usher kharaj, jizyah* taxes, abolishing mixed education system (separating religious and secular education), foundation of a ministry to promote Islam, treatment at doorstep and industrial and trade education for the entire nation. This agenda appears to capitalise on the weakness of Pakistani society rather than political goals.

Rizvi transformed his political capital into a weapon to exert pressure on state institutions several times after founding TLP, mobilising large crowds of protesters relatively fast and effective. He made international headlines when declaring that he would have wiped out Netherlands if he had an atomic bomb, after Geert Wilders announced that he would hold a competition with cartoons depicting Prophet Muhammad. The competition was eventually cancelled.

The TLP is associated with recent extremism and violence(Pakpedia, 2021): the killing of Sareed Ahmad, a college principal by a student on alleged blasphemy charges. The discussion occurred due to principal's complaint on student's absence for participating at TLP rallies. In 2019, associated professor Khalid Hameed was killed by student Khateeb Hussein in Bahawalpur, after apparently receiving approval from senior TLP member Zafar Gillani on Tinder. After Khadim Hussain Rizvi's death in November 2020, his son Saad Hussain Rizvi became president of TLP. Geo News mentions that TLP staged 7 protests and received 7 agreements from the government: in November 2017, April and October 2018, November 2018, November 2020, January and April 2021, as the government tried to ban the movement. Saad Hussain Rizvi, TLP's leader arrested in April 2021 was released in November, amid an agreement through which PM Imran Khan had agreed to release further 2000 members of TLP against their commitment to stop the policy of violence and abstain from asking to expel the ambassador of France(Reuters, 2021).

In November 2018, a newspaper article claims that Sunni Tehreek and allies distanced themselves from TLP's calls for protest(Dawn, 2018), condemning hate speeches from Rizvi. While this development should have indicated that Sunni Tehreek does not support extremism, other instances, presented previously, indicate otherwise. TLP came third in 2018 elections for the Punjab region and emerges as a mainstream political force(Janjua, 2021). During recent years, ISI and the Army appear to have been supporting Barelvi movements and their protests. For example, Major General Faiz Hameed, that took office June 2019 and was substituted in November 2021, was accused of supporting the TLP in the 2017 Farizabad protests in a Supreme Court case finalised in 2019(Samaa, 2019). The English translation of the decision does not point out at Major General Faiz Hameed(Supreme Court of Pakistan, 2019), but it criticises in strong terms political and military/intelligence actors for their approach to the protest and to court proceedings. A 2017 BBC article, which contains information similar to other websites, mentions that Punjab Rangers Major General Azhar Navid was filmed when distributing envelopes with 1'000 rupees to participants at the same 2017 Farizabad protest organised by TLP(Khan, 2017).

Finally, it is worth noting that Pakistan's government is not challenged only by the Barelvi in recent period. At the beginning of November 2021, an agreement between Pakistani government and the Deobandi Tehreek-e-Taliban Pakistan (TTP) was signed(Gul, 2021). Imran Khan's government received critique in the media fort its soft stance on extremist groups, but such claims require better substantiation. Besides the punctual challenges that the Pakistani government faces nowadays from either Barelvi or Deobandi groups, other long-term threats emerge from organisations like Balochistan Liberation Army.

6. CONCLUSIONS

The research on development of Muslim sects Barelvi (and partially Deobandi, for comparison purposes) revealed that Muslim roots of Pakistan are well anchored in history. The British colonial empire was seeking to consolidate its power over the Indian subcontinent, due to various direct and indirect reasons: in Europe, it was competing with other colonial powers, on the American continent it had already lost control and in the Middle East it was working to abolish the Ottoman Empire and eventually win possessions. Its policies to contain Islam in British India were motivated by both the threat of re-emerging Mughal centres of power and a need to increase control over relevant capitalist production systems. *However, its intervention in the balance between Hindus and Muslims polarised communities, and its preference for loyal subjects from different Muslim sects antagonised even further*. The British rewarded especially peaceful leaders with either support, concessions, education in Britain or different distinctions and awards, in a bid to gain support in the confrontation with hostile groups like the ones from Afghanistan. Its then-internal policies reflect in partitions like the Durand Line or Radcliffe Line, and the effects they produced, will be assessed in history along with other delimitations that influenced communities in former British colonies. Although the UK maintained influence after the apparition of the United Nations, its position in the AfPak region was challenged by different actors like the US or the Soviet Union and its manoeuvring space reduced. Beyond religious grievances, the *muhajir* left North of India to resettle in Pakistan due to poverty as well.

Pakistan's state structure and institutions were inherited from the British. Many members of the Pakistani military were trained at Sandhurst, ISI was the concept of a British national, many Pakistani politicians travelled to the UK and this continuous contact with the elites maintained a good connection with Pakistan's decision centres. It was the recent case of Nawaz Sahrif's visa extension refusal that shed light on a long-term connection between the two countries.

But the British influence was gradually limited by the very Islamic essence of Pakistan. Attributed to General Zia ul-Haq, the Islamisation of the Pakistani Army starting with the 1970s had a long-term impact: as of 22.11.2021, the three fundamentalist messages on institution's website were: "*Imaan*" (Faith and Trust in Allah), "*Taqwa"* (The Fear of Allah) and "*Jihad"* (Fight for the lordship of Allah)(Pakistan Army, 2021). The translations were already available on the website, they are not adapted. While it can be argued that General ul-Haq accelerated Islamisation of the army, the development does not appear as an exception to the rule of Pakistan, but rather a step in the long process of a continuously sustained Islamisation process. Religious individuals gained more access to the Army, bit probably the same can be claimed about ISI, government, justice system, etc.

Current research has employed a deductive method to attempt establishing relations between state institutions and religious establishments, from the perspective of Western secular or Westphalian states. Historical development of Muslim centres like the madrassas and related organisations should have revealed processes, key developments, achievements and key promoters. While the assessment managed to identify key episodes and their consequences in Pakistan's history, a proper characterisation of the entire political and/or religious system as such became difficult to a series of factors: the religious and ethnical fragmentation of Pakistan may be eventually compared to that of other regions like the Middle East or North Africa, but its state and non-state institutions and organisations, its history and the speed at which events occur are probably unique. Likewise, its unquestioned Islamisation, which remains a goal and a process it is

undertaking since its very beginning, is comparable only to that from Afghanistan nowadays. Hence, an analysis mainframe closer to Pakistani realities may be required in order to characterise properly historic developments in Pakistan. ITMD and other expressions of politically powerful organisations are testimony to the fact that the Pakistan's government has possibly a more complicated mission than others.

Should one compare the attempt of the British to favour peaceful Muslims more than one century ago, with the attempt of the Coalition to "deradicalize" Afghanistan, it can be concluded that the retreat, portrayed as failure by the fundamentalists that claim victory, strengthened hardliners from Afghanistan but also the ones from Pakistan or from trans-border groups like some of the Deobandi. This indirect contribution to strengthening religious fundamentalists, along with questionable practices, like, for example, the ones revealed by the case of Kamran Faridi (double agent, former FBI operative), raise questions about a chronical problem: how can relevant global powers help in regions where they historically did not succeed?

The systemic roots of violence from Pakistan are often connected to Islamic fundamentalism in literature, but in terms of mobilisation for concrete action, the Jammu and Kashmir problem facilitated militancy and US's interest to counter i.e. the Soviet Union favoured violent action. The violence landscape in Pakistan reached unimaginable limits: many persons carry out assassinations allegedly in the name of blasphemy laws, substituting the legal process and without even carrying out due diligence in advance. The blasphemy laws, a niche mobilisation factor discovered by the Barelvi resemble with the Islamisation of the army by General Zia ul-Haq in terms of political gains when promoting Islamic endeavours that the population understands and is ready to follow. However, a solution to regress army's Islamisation has not become visible yet, and the question related to blasphemy laws is whether there is a way back to the pre-2011 assassination of Punjab governor and the entire instrumentalization of these laws by various Barelvi firebrands.

Barelvi evolution towards militantism and violence can be associated to a series of factors: rising number of their adepts, the perception by other sects of Barelvi as representatives of a distorted Islam and the repression from assertive groups like the Deobandi. The Nishtar Park bombing may signalise an extreme act of violence coming from a terrorist organisation, but also the fact that Barelvi may have become an important political factor and competitor to traditional power centres While the Barelvi managed to rally adepts in an ever higher political force demonstrations, their political platforms can be characterised as utopic from a secular perspective. Promising healthcare at doorstep sounds very promising, especially in a stage in which a party is not in power, but implementing such a system is probably very difficult.

The nuclearization of Pakistan is a clear message that *the Jammu and Kashmir issue* will remain at least alive for the decades to come. The two historical problems that appear to have contributed significantly to rising violence of the Barelvi groups were instrumentalization of faith to help carry out wars by Pakistanis or foreigners against India and Soviet Union throughout entire Pakistan, and particularly the violence of historically dominant religious groups like the Deobandi.

Taking into consideration what a hypothetical destabilisation of Pakistan can signify for the region now, after the Taliban takeover of Afghanistan, main global actors that can influence the balance between Pakistan's state intuitions and extremists that promote violence should constantly asses the directions and steps taken. UK's decision to add Pakistan to the list of high-risk countries in the first part of 2021 under the "Money Laundering and Terrorist Financing" regulations, instead of blacklisting organisations that carry out attacks might produce results, but has also the potential to empower indirectly

organisations other than the state. However, such an assessment is theoretical, since relations between state and non-state actors in Pakistan appears to be very complex and requires further analysis. Regarding a potential answer to the question from the title of this research, at first sight TLP could be interpreted as both a rising extremist force and as well a tip of a larger radicalized iceberg in the AfPak region, but not limited to these two labels, given that Pakistan is a nuclear power, and that keep in mind the geographical position of the Pakistani state where the potential for both ethnic and religious conflict is extremely high, a complete and firm answer is difficult to formulate in such a complex context.

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THE EVOLUTION OF THE CONCEPTS OF USE OF ROMANIAN AVIATION IN THE TWO WORLD CONFLAGRATIONS AND IN THE INTERWAR PERIOD

Florian RĂPAN

”Dimtrie Cantemir” Christian University, Bucharest, Romania
(rapan_florian@yahoo.com)

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Abstract: *Romania has dedicated to world aviation top personalities such as Traian Vuia, Aurel Vlaicu and Henri Coandă, being among the first countries in the world not only in the construction of aircraft lighter or heavier than air, but also through the procedures of conquest of airspace. Romania - as a country with significant possibilities in the field of aeronautical construction and the use of aviation for military purposes - has paid the necessary attention to capitalizing on its own and international experience. Thus, between the two world wars, in our country the concept of aviation use in combat experienced an evolution corresponding to the policy of that period of the Romanian state.*

Keywords: *Romanian aeronautics, military airfield, reconnaissance, air bombardment, air corps*

1. INTRODUCTION

Romanian historiography mentions the establishment of the first military air subunit in 1893 in Bucharest, the inauguration of the first acrodrome (with related structures) of the Romanian aviation on June 11, 1910, in Chitila, on October 10, 1914 the first participation of the Romanian aviation in military maneuvers - with missions reconnaissance, observation and aerial photography and the first combat mission on August 16, 1916, south of the Danube, immediately after Romania's entry into the war, a mission that aimed to recognize the enemy device.

An important date in the history of Romanian aviation is the day of August 10, 1915, when based on Decree no. 305, the Romanian Air Force is created, consisting of three groups and a reconnaissance squadron, which will total, until Romania's entry into the war, 44 aircraft and 97 patented pilots. This is the reference point that marks the beginnings of the organization of modern Romanian military aviation.

2. ROMANIAN AERONAUTICS IN THE CAMPAIGNS FROM THE FIRST WORLD WAR AND INTERWAR PERIOD

In the first part of the campaign from 1916, the Romanian aviation fulfilled missions in accordance with the way of organization and endowment, but also with the flight experience of the flight personnel. Predominant were the missions of reconnaissance and observation of the enemy device, of the concentrations of troops and of the activity of the ships on the Danube. They were followed by liaison missions.

The bombing missions were reduced, because in the first months of the war the aviation did not have airplanes capable of fulfilling such a mission. However, those that were executed were well prepared and performed with sufficient precision at the target. The beginning of the war also highlights the beginning of the air battles with the enemy's fighter aviation.

The second part of the campaign highlights - with the arrival in the country of the French mission - essential changes in the equipment, organization and conception of the use of military aviation in combat. The new aircraft, of French production, were equipped with improved flight equipment, with weapons and bombing installations diversified according to its purpose, in other words, the technical-tactical characteristics of the aircraft were close to those then existing in the endowment of belligerent countries.

From an organizational point of view, the subordination of squadrons or aircraft formations to ground command commands for observation and reconnaissance missions in distinct areas of responsibility should be noted.

Novelties are also found in the concepts of use. Thus, for the defense of Bucharest, forces are assigned (a squadron of 8 aircraft) with a distinct mission in achieving this goal and which anticipates the future fighter aviation. Aviation maneuver ("retreat") from the southern area on new Moldova airfields is frequently and widely used, imposed by the unfavorable evolution of the front line and facilitated by the fact that the new landing grounds did not require infrastructure and special arrangements.

Although in the first phase of its evolution, the analysis of the organization of military aviation actions in the 1916 campaign gives contemporaries conclusions of a topical and introspective nature:

• the number of units and aircraft in their composition was very small in relation to the need for operational command commands;

• the lack of a domestic aeronautical industry was acutely felt, the completion of the squadrons with aircraft being possible only after France or the allies made the planes available, according to the concluded military convention;

• the planes that our country had, at the beginning of the war, belonged to the old types and were not armed; the navigating personnel did not have the experience of war, but neither did the combat training that the pilots of the belligerent countries had;

• the aviation activity was also burdened by the use of improvised airfields, without the necessary arrangements.

In the second half of the war, *in the 1917 campaign*, an extensive process of reorganizing aviation took place. As a result, each army had an aviation group, and at the level of the General Headquarters a reserve of two squadrons. Each group had in structure 2-3 homogeneous squadrons as type and destination: observation (Farman squadrons), hunting (Nieuport squadrons), bombing (Breguet-Michelin squadrons). In the distribution of the hunting and bombing squadrons, the principle of the importance of the front that the army had to defend was taken into account, and in the observation of the number of Army corps that were subordinated to the respective army. In essence, each group consisted of 2-3 squadrons of different categories. This conception led to the increase of the efficiency of the aviation actions, and on the other hand to the possibility of delimiting the airspace affected to each group, as an area of responsibility.

At the same time, the range was diversified and the number of missions performed increased. The largest share of actions was held by: studying the positions and devices of the enemy through systematic reconnaissance; making adjustments to artillery fire on enemy targets placed in depth; remote research behind the enemy front (up to a depth of 80-100 km) to identify reserves; aerial bombardments on enemy concentrations and airfields.

During the first great world conflagration, the Romanian aviators totaled a number of 8160 flight hours materialized in the following missions: 703 adjustments for the benefit of the Romanian and Russian artillery, 6981 aerial photography, the engagement of 560 aerial battles, dozens of bombing missions in which an impressive amount of bombs totaling 61871 kg, over 80 liaison missions and 6 special missions (manifesto launches) was launched on the opponent's targets.

In the almost two years of war, the enemy lost 41 aircraft, of which 31 were shot down by Romanian, English and French aviators, and 10 by anti-aircraft artillery. [1]

The First World War allowed the accumulation of a rich experience on the possibilities of using aviation in combat for the execution of various missions of research, bombing, to cover one's own troops against enemy air strikes. There were also some servitudes such as: a high degree of physical and moral wear and tear of the technique; vulnerability to anti-aircraft artillery fire; high technical costs and training of pilots and technical staff.

During the interwar period, the Romanian military aviation experienced a complex process of development and organization, corresponding to the needs arising from the new administrative configuration of the national territory, the experience gained in the war, as well as the new combat techniques that come with it, a process that took place in many stages. Technically, worldwide, aircraft production has seen a huge quantitative and qualitative leap. Lightweight and durable materials, powerful engines that increase flight speed and altitude, are increasingly used in aircraft construction. At the same time, special equipment, on-board equipment, photographic equipment, radio and radionavigation are being developed.

The flight range and, implicitly, the tactical range of the aircraft, which allow to hit targets located hundreds of kilometers behind the enemy front line, considerably increase.

The achievements in the field of aeronautical constructions determined that in the conceptual sphere to crystallize and develop new principles of aviation use in combat, which were later reflected in numerous formulas for organizing military aviation.

Large aviation units of the "*air division*" and "*air flotilla*" type were set up, some of them having in their structure also anti-aircraft artillery for the defense of the airfields.

The endowment of the units included airplanes from one or more categories of aviation, instead the squadrons, as basic subunits, were homogeneous in terms of destination and endowment. Depending on the destination, aviation included the following categories: fighter aviation, bombing aviation, dive bombing aviation, search aviation. Globally, the share of development of these categories of structure was influenced by several factors, but the most important but the most important was the military policy of that state.

The doctrine of the use of military aviation in modern warfare had three main currents at that time. One of them, promoted by the Italian General Giulio Douhet, supported the development of a strong strategic aviation for the destruction of important objectives from the depths of the enemy territory, especially the war industry. A second current, supported by the German General von Seeckt, which also gave a decisive role to aviation, especially for the early phase of the war when it was desired to neutralize the enemy's objectives, but also for the conquest and maintenance of air supremacy. The third current, inspired by the French military doctrine, attributed preponderance to the actions of fighter and bombing aviation to the detriment of other categories (reconnaissance, assault, etc.). The Spanish Civil War of 1936-1939 allowed some European countries to clarify the principles of the use of aviation in combat, to verify its qualities and to better analyze its easements.

Initially, after the end of the First World War, the military doctrine of Romania was under the influence of the French one, including on the organization of aviation, training of pilots and specialized technical personnel and material equipment.

Starting with 1926, our military doctrine begins to detach from the French one, the studies are directed towards the war of movement in which the offensive and the battle of envelopment can represent frequent situations of a possible armed conflict. Normally, compared to this new orientation, new organizational principles and endowment of the Romanian military aviation were substantiated in accordance with the new perspectives from the battlefield.

Romanian military theorists conceived that aviation actions would amplify the losses caused and be closely correlated with those of other weapons. All these are found in the Directives elaborated by the General Staff and in which it was emphasized that: "*The Romanian Air Force must thus be organized and equipped with types of aircraft, in order to be able to act on the battlefield in direct support of ground troops and perform aerial research in the depths of enemy concentration areas. At the same time, the aviation must cooperate in defending the economic centers and the Prahova Valley oil area "*.[1]

In order to achieve these objectives, in addition to the process of organization and preparation, measures were taken to revise the Regulations of Combat, and at the Higher War School, starting with the school year 1939, an aviation department was established in which they were admitted for to be trained as staff officers only aviation officers. Perhaps this fact should be a reason for reflection for those who decide today the fate of Romanian military education.

Also as an evolutionary process, it should be appreciated that, at the level of the Ministry of War, specialized bodies for aviation management were set up: Superior Directorate of Aeronautics (1919-1923), General Inspectorate of Aeronautics (1924-1932, command and instruction body with its own staff), the Undersecretariat of State for Air (1932-1935), so that during 1936-1940 the Ministry of Air and Navy could function, then returning to the Undersecretariat of State for Air (1940) integrated in the organization scheme of the Ministry of War.

Two aspects of this period are to be appreciated. The first is organizational. The financial and industrial possibilities of Romania did not allow the realization in that period of large tactical and strategic aviation units, as they were realized in some Western European states, where the Douhet doctrine was applied. Instead, the air divisions that make up the aviation flotillas are established, characterized by a high degree of mobility and flexibility not only by definition but also by functionality.Their endowment was supported by short- and medium-term endowment plans, in relation to the requirements, financially supported with all the economic vicissitudes of the moment. At the same time, in 1936, the Iaşi, Cluj and Bucharest Air Regions were established as distinct areas of operations and responsibilities, with a balanced distribution of aerodromes and aviation categories in the territory.

The second aspect circumscribes the ability to predict the decision-makers. Immediately after the outbreak of World War II on September 1, 1939, "*Hypothesis 32*" is initiated. According to the stipulations of *"Hypothesis 32",* aviation commands were organized - for the needs of large units of other categories of forces - and aviation units. Based on the provisions contained, 84 squadrons were to be established with the following structure: 5 reconnaissance (of 8 aircraft each), 20 observation of 10 aircraft each), 24 fighter jets (12 aircraft each), 16 bombing (8 each). aircraft), 6 assault (10 aircraft each), 6 connection (9 aircraft each), 2 remote connection (8 aircraft each), one transport (10 aircraft), one sanitary (16 aircraft), one torpedo bombardment (with 8 seaplanes), 2 hydroinformation (of 9 seaplanes each).

According to the provisions, the operational units had to total 838 aircraft. To these were added 332 reserve aircraft for maintaining combat capability and 350 aircraft of various types in schools for the training of aircrew.

In 1940, the Romanian military aviation had 1520 aircraft in units and in different stages of manufacture, 5 aerostation companies, 2617 pilots, 267 aerial observers, 218 on-board radiotelegraphers and 239 on-board snipers. [1]

The analysis of this period leads to the obvious conclusion that Romania was a regional air power. The main arguments of this statement are:

• military aviation developed rapidly, which allowed it to have the categories, infrastructure and aircraft (including the famous IARs built in the country), which existed in most armies, around the Second World War. modern;

• the aeronautical personnel was well trained for individual flights, in formation and for use in combat according to weather standards;

• the forces and means were sufficient to carry out the support missions of the land and sea troops and to cover their airspace and territory.

3. ROMANIAN MILITARY AVIATION IN THE SECOND WORLD CONFLAGRATION

On June 22, 1941, Romania entered the second world conflagration in the known complex domestic and international conditions, but with the express specification that the territorial abductions of 1940 led to a decrease in the mobilization capacity for the Air Force by about 25%. In October 1940, the German Air Force Mission was installed in Bucharest.

As a result, the organic structure of all categories of aviation has undergone changes, usually inspired by the German Luftwafe model.

Since 1941, the Air Force Undersecretariat has established the Air Force Command - for aviation, aerostation and aeronautical engineering - and the Air Defense Command - for air defense of airfields, land armies and national territory (important areas).

In the subdivision of the national territory there are also three air Regions, with the role of command structures that carried out the command, instruction and administration of the units and formations of aviation, aerostation and air defense in the area of responsibility. They were subordinated and were in direct contact with the Air Staff and the Undersecretariat of State for Air.

The Air Forces were organized as before, by aviation categories (fighter, bombing, reconnaissance, connection, transport, sanitary) within the aviation flotillas (fighter or bombing), and these on 2-3 aviation groups that had at turn 2-3 squadrons.

However, each Fleet is now subordinated to an Air Base, a structure that achieves the technical functionality of the units as well as the services in the composition.

This form of organization within the flotilla allowed, in various phases of the campaigns of 1941-1944, a greater mobility of the fighting forces. The flight echelon comprising the crews and aircraft was directly subordinated to the fleet commander, and the escalator, which included all technical and administrative personnel and related means were under the command of the mechanical officer (engineer) of the Base. This form of organization allowed the fleet commander to relieve himself of direct administrative tasks, leaving him time to prepare actions or coordinate combat missions.

Another significant organizational element is the reorganization of fighter aircraft, according to the German model, where the smallest organic combat subunit - the cell - included two aircraft instead of three, as it had been until then.

"This organizational formula proved to be superior to all the previous ones. It has remained unchanged today, both in fighter and fighter-bomb aviation ".[2]

In World War II, the Air Force acted due to the circumstances in two distinct campaigns: the first on the Eastern Front, between June 22, 1941 and August 23, 1944, the second on the Western Front, between August 23, 1944 and May 12, 1945.

Aviation engaged in military actions at the beginning of the Eastern campaign included 50 aviation squadrons, of which 15 bombing (8 heavy bombing, with S-79, He-111, Bloch and Los aircraft; 3 light bombing, with IAR aircraft -39), 17 fighter squadrons (with IAR-80, Me-109E, He-112, Hawker Hurricane aircraft), the others being Liaison (6), Transport (1), Reconnaissance (3), Sanitary (1).

a. The Combat Air Group as a large combat unit, was the main force for action for the initial phase of operations. It included the entire bombing aviation (3 fleets), most of the fighter aviation, reconnaissance and liaison squadrons, ie 253 aircraft of which 205 were available and were provided by 208 crews. It is worth mentioning the deployment of the aviation units in the Buzău - Tecuci - Focşani area, since the preparation phase of the actions.

b. The Aviation of the 3rdand 4thRomanian Armies included a reconnaissance squadron, 2-3 observation squadrons and a liaison squadron, destined to act both for the benefit of the armies and the army corps. Their missions were coordinated by an Army Air Command.

The enemy air forces in the area of the actions of the Combat Air Group were substantially equal to those of the Romanian aviation, respectively 2 fighter aviation regiments and 2 bombing aviation regiments.

Conceptually, the outbreak of hostilities and the subsequent deployment of aviation actions followed the plans of any air operation in a modern war, valid even today.

The campaign began with an offensive air operation, which was launched according to the Operative Directive on the morning of June 22, 1941 at 04.00, capturing the enemy. The border - the Prut River - was flown over by 124 aircraft (56 bombing, 64 fighter and 4 reconnaissance).

The purpose of Bessarabia's military air actions was to conquer air supremacy, based on which the air force could later carry out missions in support of its own land troops, especially in critical moments, so that later air strikes could be concentrated on enemy troops.

The balance of air operations for the liberation of Bessarabia and Northern Bukovina (June 22 - July 26) includes, among others, 8706 flight hours performed in 5108 aircraft outings (of which 1032 bombing and 2162 fighter aircraft), 242 enemy aircraft destroyed (83 in air battles, 108 destroyed on the ground and 51 shot down by anti-aircraft artillery) and 43 own aircraft lost.

The stage for the conquest of Odessa (August 8 - October 16, 1941) was imposed as a political and military necessity. Within it, aviation actions were lower in intensity but particularly important in the subsequent economy of ground operations. The fighter jet carried out the aerial cover of the ground groups, the bombing hit the enemy aerodromes, the railways, the concentrations of forces and means, the transport and combat vessels. The efficiency of the use of aviation in extreme situations for the other forces was highlighted once again.

Among other things, it intervened to repel the landing of the enemy that was to be made by surprise near Odessa and, at another time, the air force's intervention banned the enemy's counter-offensive in the Dalnic sector. On the Odessa front, the air force initially operated with 24 squadrons totaling 223 aircraft, to which were later added 116 reconnaissance and observation aircraft.

In the campaign of 1941 (June 22 - October 16), the actions of aviation materialized in 6626 combat missions executed in 12108 aircraft outings and 21077 flight hours in which 2354 tons of bombs were dropped, 349 tons of ammunition were consumed. and 257 enemy aircraft were damaged in air battles or destroyed on the ground.

In this campaign, the aviation proved a viable functional structure, able to solve complex combat situations at strategic, operational and tactical level, asserting itself once again as an indispensable force in modern armed combat.

After this stage, a large part of the air force was withdrawn to the country for recovery. The 1942 campaign focused on military operations in the Caucasus, the Stalingrad area and the Elbow of the Don, beginning with the usual - at war - command organizations and redistributions of forces, depending on operational needs.

The main missions performed by the Romanian aviation were:

• covering the German bombing squadron with fighter aircraft during air operations in the Stalingrad area;

• the direct support of the German 6th Army in its offensive on Stalingrad and then in the defense between the Volga and the Don;

• the support of the 3rd Romanian Army in the defense operation on Don and the Elbow of the Don; bombarding communications in the depths of the opposing device; aerial observation and photography.

The Romanian Air Force in the area of military operations Stalingrad and Elbow of the Don included 26 aviation squadrons (6 fighter jets, 2 fighter-bombers, 7 bombers, 2 reconnaissance, 2 transport, one medical). The result of the actions materialized in 2728 aircraft outings (1430 fighter jets, 1298 bombings) with 4327 flight hours in which 1478 tons of bombs were dropped, mainly in the Stalingrad area and 48 air victories were obtained. But also the own losses were big both in personnel (473 people) and in technique (72 airplanes) to which other unavailabilities were added.

The year 1942 meant for the Romanian aviation, as for all the forces of the Romanian army in the areas of operations, a difficult moment due to the development of military actions deep in the enemy territory, at thousands of kilometers away from the national territory, with all the unfavorable consequences that have occured for the supply system with ammunition, food, etc., to which were added the totally unfavorable atmospheric conditions of the flight in the last part of the year and the difficulties of maintaining the morale of the troops after the launch of the Soviet offensive, on November 19, 1942.

Starting with February 1943, the air force reorganized into the 1st Romanian Air Corps and completed its means until June, the same year, with 106 modern German aircraft (40 Me-109G fighter jets, 15 dive bombers Ju 87 Stuka, 29 Henschel 129 assault aircraft and 2 reconnaissance aircraft). The corps became operational under German command (German 4th Air Fleet) on June 16, 1943, when it began to carry out actions in support of Romanian and German ground operations in particularly complex and difficult conditions.

These were due primarily to the large disproportions in the amount of air available to the size and needs of the front and secondly to the superiority of the opponent, especially in fighter aviation and anti-aircraft artillery, which were extremely numerous and active.

Under these conditions, the human effort of the Romanian Air Corps was extraordinary, reaching 5-7 and even 8 plane/man/day departures, that is almost three times the normal intensity in war conditions.

During a year of war (June 16, 1943 - June 16, 1944), the Air Corps carried out missions in 16,766 aircraft outings, destroyed 339 aircraft on the ground or in the air and dropped 6970.5 tons of bombs on the enemy.

The own losses registered during this period were of 109 destroyed planes plus 391 damaged (repairable) ones out of a total of 500 run physical planes, and as personnel 84 military.

In mid-1944, it found aviation retreating to southern Bessarabia and Moldova.

The analysis of the Romanian aviation campaign on the Eastern Front must also be connected with its actions on the national territory, when the allied aviation carried out massive bombings on Romania: June 12, 1942, August 1, 1943 and April 4 - August 20, 1944.

On June 12th, 1942, the *"Halpro"* action took place in which a group of 23 American B-24 Liberator bombers took off from the base in Khartoum (Sudan) to bomb the Ploiești - Prahova Valley oil area. It was the first U.S. Air Force mission on the European continent, but which has been a total failure. Of these, only 13 retreated, the others being shot down by the Romanian-German air defense.

The situation is repeated on August 1, 1943, but in other conditions. At the beginning of the year, the air operation *"Tidal Wave"* is planned simultaneously with the landing in Sicily. The purpose of the air operation was to destroy the most important source of natural oil in the Axis: the Ploiești - Prahova area. 162 B-24 Liberator aircraft were affected, with a range of 12 hours of flight, which took off from the base in Benghazi (Libya) unaccompanied by fighter aircraft.

The attack of the objectives was carried out with formations of 8-12 planes, with bombs of 250-500 kg and incendiaries, from horizontal flight at low altitudes (100 - 150 m). The oil refineries and buildings in the city of Ploiești were partially destroyed, the damages amounting to 4.6 billion lei and 121 deaths. The Americans lost 35 bombers (20 shot down by Romanian and German fighter aircraft, and 15 by anti-aircraft artillery), proving the effectiveness of the area's air defense system.

Between April and August 1944, a series of air raids took place, practically aiming to get Romania out of the war. Of these, the most large were those of April 4 and 5, 1944.

On April 4th, 1944, 170 B-24 bombers took off from the air base in Foggia (Italy) bombed Bucharest from a high altitude (6500-7000 m) causing great material damage and over 1500 casualties. The reaction of the fighter aircraft was prompt, shooting down 11 bombers. The next day, about 200 B-24 Liberator and B-17 Flying Fortus bombers, accompanied by fighter jets, bombed the Ploiești area in five successive waves, launching loads of 10-12 explosive bombs of 250 kg. During the raids, 15 aircraft were shot down.

In the following months there were several raids, day and night, of lower intensity, on the oil mains but also in order to maintain a certain degree of uncertainty among the population.

The increased degree of mobility was also due to the fact that large units and units were subordinated directly to the General Headquarters (Air Headquarters) and not to great units of land troops, as in the Soviet army.

It also turned out that in campaign conditions the air forces and means are rapidly depleted physically and morally, constantly requiring large reserves to compensate for unavailability and losses.

The comparative and detailed analysis of the evolutionary process of military aviation would certainly highlight the fact that the period 1940-1944 represents the maximum of the air forces in terms of quantity, quality, organization, conceptual and action throughout their existence. [3]

The Campaign on the Western Front covered the period from August 23, 1944 to May 12, 1945, and went through several stages: actions for the liberation of the national territory, actions on the territory of Hungary and then those on the territory of Czechoslovakia and Austria.

The act of August 23, 1944 left its mark on the development of the military actions of the Romanian army through the unprecedented situation created: in only a few hours, the opponent becomes a friend, and the ally the enemy. At that time, the Air Staff consisted of about 2 air corps and a hunting flotilla assigned to the defense of the territory. The initial actions took place in a great state of confusion and uncertainty, not knowing the conditions of Romanian aviation participation in the war against Germany. Relocations were ordered from Moldova to Muntenia, actions for the conquest of aerodromes that were mostly defended by the Germans.

At the beginning of September, the Romanian Air Corps was set up and deployed in Transylvania, totaling 20 squadrons with 210 aircraft and 233 crews. From an organizational point of view, the Romanian Air Corps was established as a large operational unit with all aviation categories, with German aircrafts (Messerschmitt 109 G, Henschel, Junkers 87 and 88, Heinkel 111) and Romanian aircrafts(IAR 38, 39, 80, 81).

The main mission of the Air Corps, right from its inception, was to support the operations carried out by the Romanian and Soviet ground troops for the liberation of Romania's territory. In the context of the situation, he was entrusted with far more missions than usual to execute units of this level in other armies. As a rule, an air corps was intended to support ground troops in a single army. Or, the Romanian Air Corps had the mission to simultaneously support both Romanian armies (Army 1 and Army 4) in the operative device of the Ukrainian 2nd Front. He was later asked to support the Soviet armies in the direction of the main blow of the Ukrainian 2nd Front or in other directions important from an operational point of view, by covering up destroyed concentrations or disorganizing by heavy bombardment the transport of troops behind the enemy front.

In the first stage of the campaign (September 20 - October 25, 1944) the activity of the Romanian Air Corps is statistically materialized in 990 missions during which 2240 aircraft departures and 3295 flight hours were executed. 340 tons of bombs were dropped on the enemy, about 15 tons of ammunition and 693 tons of fuel were consumed.

The results of the actions materialized in the destruction of 40 enemy aircraft, 50 tanks, 90 trucks, 29 trains totaling over 1000 wagons with troops, materials and ammunition, 8 stations with crowds of troops, artillery positions, columns of troops on communications, etc.[1]

In the stage on the territory of Hungary (October 25 - December 22, 1944) the Air Corps operated, after the reorganization, with 15 squadrons, with 174 aircraft and 197 crews. The actions of the aviation were weighted by observation and liaison missions, but bombing missions were also carried out to block the enemy on the retreat routes or on the train sets.

The opponent's reaction was weak, and the weather conditions had become unfavorable, which required that almost all missions be carried out exclusively at low altitudes. 612 missions were executed with 805 aircraft departures in 1335 flight hours, consuming over 70 tons of bombs. As a result, some German-occupied airfields, a large number of tanks, vehicles and military trains loaded with troops, materials, ammunition and fuel, artillery pieces and columns on the roads were destroyed. The Romanian Air Corps lost 13 planes and 61 personnel. [1]

In the last stage of the Western Campaign, carried out on the territory of Czechoslovakia, the Romanian Air Corps initially acted with 14 squadrons, with 176 aircraft, and after completions with 20 squadrons, with 252 aircraft and 297 crews.

The characteristic of this stage is that, in general, the missions of the Romanian Air Corps, within almost 9 months, aimed at supporting the combat troops on the offensive, hitting targets from close range of enemy devices, especially with assault and dive bombing aircraft, disorganization of rail transport by hitting communications nodes,

railway stations, depots and marshalling yards, hitting retreating or overflowing columns, bridges, crossing points, remote research missions to discover aerodromes, deployment districts, reserves, research close in favor of ground troops, correcting artillery fire, launching manifestos in resistance districts.

Throughout the operations, the Air Force supported only the Soviet armies, the Romanian 1st and 4th Armies directly benefiting only from observation aviation. During the fighting on the territory of Czechoslovakia, a total of 2578 missions were carried out in 4981 aircraft departures with 6304 flight hours. During them, 946 tons of bombs were dropped on the enemy. The losses caused to him were particularly significant: 29 tanks, 20 artillery batteries of different types, 448 vehicles and 238 carts with materials and troops, 6 bridges, 40 military trains, 27 factories with war production, columns, aerodromes, points of support, etc.[1]

Even in the given conditions: regime change, change of alliances, operative subordination to foreign commands, aviation demonstrated in the Western campaign its combat capability and professionalism in planning, executing and leading actions.

4. CONCLUSIONS

The major conclusion drawn from participating in the campaigns of the two world wars is that aviation played an important role in the conduct of military actions, with decisive combat effects. These campaigns revealed the role and importance of aviation in modern warfare**.**

It was pointed out that an aviation that depends on input from abroad - from neutral or allied states - has no lasting chances. It must be based mainly on domestic production of at least 85%, and the stock of raw materials, the adaptation of the industry, the creation of specialists and pilots must be done in peacetime. The methods and procedures of action in combat used by all categories of aviation (research, heavy bombardment, dive bombing, assault and hunting) highlighted the degree of professionalism and the ability of aeronautical personnel to adapt to the complex conditions of the theater of operations**.**

The campaigns carried out by the Romanian Air Force during the Second World War can be the subject of a whole cycle of military aviation art, many conclusions and current lessons can be drawn, regarding the concepts and structure of air operations, ways of organization and cooperation, procedures and methods of action in battle. We do not always have to appeal or refer to the actions of others in various local conflicts or wars. We can have our own examples.

But the victories are also bitter. As a result, by the Peace Treaty of Paris of February 10, 1947, the allied and associated powers practically abolished the Romanian aviation, annulling its level of force of the army. The total number of aircraft is limited to 150, of which only 100 fight, reactive aviation is banned, bombing aviation is abolished, the aeronautical industry, etc. is liquidated.

February 15th, 1949, the Military Aviation Command was established, moving from fleets to divisions, to aviation regiments and aerodrome service bases (later, technical). There have been several structuring and restructuring processes that mark the beginning of the recovery of military aviation and the assertion of its operational capacity.

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SOVIET AERONAUTICS IN THE ANALYSIS OF ROMANIAN INTELLIGENCE SERVICES (SEPTEMBER 1940 - JUNE 1941)

Alin SPÂNU

The Faculty of History, University of Bucharest, Romania (alinspanu@yahoo.com)

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Abstract: *The Romanian intelligence services have closely monitored the Soviet forces that occupied Bessarabia and northern Bukovina in June-July 1940. Between September 1940 and June 1941, special attention was paid to Soviet aviation (aerodromes, aviation units, types of aircraft, doctrine, etc.) located on Romania's borders. On June 22, 1941, when the conflict between Germany and allies (including Romania) and the USSR began, the Romanian army had pertinent information about the Soviet armies in Bessarabia and Bukovina, especially about the air force. These data were used by Romanian-German forces to take by surprise the Soviet aeronautics and annihilate them.*

Keywords: *Romania, Soviet Union, aircraft, intelligence, analysis*

1. INTRODUCTION

The Romanian-Soviet diplomatic relations were broken in 1918 and resumed in 1934, at the initiative of the great national and European politician, then Minister of Foreign Affairs, Nicolae Titulescu (Nicolae Titulescu (b. 4 martie 1882, Craiova – d. 17 martie 1941, Cannes) law Phd in Paris, professor at the Law Faculty in Iaşi (1904-1909), then in Bucharest (1910-1927). Deputy (1912) from the Conservative Democratic Party, participates in the government as Minister of Finance (july 1917-january 1918 and june 1920-december 1921). Minister Plenipotentiary in London (december 1921), permanent delegate to the Society of Nations (april 1924), he is appointed Minister of Foreign Affairs (july 1927-july 1928), position which he will take again in the period october 1932-august 1936) [1]. Despite a resurgence of bilateral relations, the fact that the Soviet Union did not recognize the union of Basarabia with Romania (March 27, 1918) was a difficult obstacle to overcome and kept Bucharest's distrust and suspicion of any statement by Moscow. The Romanian army was constantly considering a possible attack by the Red Army and, consequently, most of the resources were allocated to large units in the north and east of the country. At the same time, the main objective of the intelligence services was to obtain anticipatory data on the organization, deployment and endowment of Soviet military forces, especially those near the common border.

Despite the information provided by the Second Intelligence Section of the General Staff and the Special Intelligence Service (SSI), in the summer of 1940 the Romanian political leadership decided not to react militarily to the Soviet ultimatum of June 26, 1940, which demanded retrocession of Basarabia and, as compensation for the exploitation of the region for 20 years, northern Bucovina [2].

Also by the decision of the political leadership of the state, the army did not react either against the Vienna Dictate (August 30, 1940), by which over 43,000 km2 were assigned to Hungary by Germany and Italy, or against the surrender of the Quadrilateral to Bulgaria. Against this background, King Carol II, who assumed the leadership of the country in February 1938, was forced to find a solution to the existing crisis and decided to appoint General Ion Antonescu to lead the government (September 4, 1940). Two days later, under pressure from the entire Romanian society, King Carol II abdicated in favor of his son, Mihai, and left the country with his mistress, Elena Lupescu, and his trusted man, Ernest Urdăreanu.

2. THE SOVIET AERONAUTICS IN THE ATTENTION OF ROMANIAN INTELIGENCE SERVICES FOR THE PERIOD OF NEUTRALITY

The new prime minister was a well-known name both in the army, where he stood out during the War of Integration (1916-1919) and in later managerial positions - military attaché in France and England, commands of large units, the Higher War School, the Great General Staff (1933-1934) and Minister of National Defense (1937-1938). Obviously, among other qualities, Ion Antonescu knew and appreciated the power of information at its fair value, being one of the beneficiaries with a solid security culture. That is why, since taking office as prime minister, he has demanded exact information on the military forces of all neighbors near Romania's borders, but with an emphasis on the northern and eastern border area, where it is most dangerous. enemy - USSR. For this he needed competent people to lead the information structures, which he chose personally, based on personal qualities and professional results. Colonel Polihron Dumitrescu - September 1940-May 1941, (b. 1893, Milcov-Olt-d. 1977, Craiova, attended the Higher War School in France between 1922 and 1924, being a colleague of Charles de Gaulle. As President of France, he gave the report to him in Craiova, in May 1968, on the occasion of his visit to Romania) [3] and Colonel Radu Dinulescu - June 1941-May 1942, (b. 20 january 1898, Cândeşti-Buzău – d. 6 february 1984, Bucureşti, became first lieutenant (1 july 1916), participated in the War of Integration, attended the Higher War School (1923-1925) and the Infantry Application School at Versailles (1929-1930). He was appointed assistant military attaché in Paris (1930-1932), then, in 1937, moved permanently to the Second Intelligence Section, which he led (1941-1942). He was appointed military attaché in Stockholm and Helsinki (1942) until the end of the war, when he was recalled and placed in reserve on March 26, 1945. In 1953 he was sentenced to 15 years of forced labor, and in 1957 his sentence was reduced to 5 years. In 1998 the Supreme Court of Justice accepted the appeal for annulment and acquitted him post-mortem) [4] took over the leadership of the Second Intelligence Section, while Colonel Ioan Nicolaid (September- November 1940), followed by Eugen Cristescu - November 1940-August 1944, (b. 3 april 1895, Grozeşti-Bacău – m. 12 june 1950, Văcăreşti prison, graduate of the Faculty of Law in Iaşi, entered in 1921 the Directorate of Police and General Security (since 1929 General Directorate of Police), led the Directorate of General Security (1925-1927), the Directorate of Security Police (1927-1934) and the Directorate of Administrative Police (1934-1940). From November 12, 1940, he was appointed general director of the Special Intelligence Service, a position he held until August 23, 1944. Arrested, investigated in Moscow (1944-1946), tried in the trial of the great national betrayal (May 1946) he was sentenced to death, but his sentence was commuted to life imprisonment) [5].

On September 20, 1940, the Head of State received from the SSI - Eastern Front a folder containing the "probable military situation" [6] of the USSR forces. The identification was carried out on five areas (Bukovina, northern Basarabia, central Basarabia, southern Basarabia and the Danube), with large units staggered in the first and second lines (**Sketch 1**).

Sketch 1

A total of 25 large units were identified, of which 17 infantry divisions, three cavalry divisions, four mechanized divisions and one large naval unit. On this material, General Antonescu noted: "Maps of the enemy's situation must be placed on the walls of my office. We need a map of the old borders and the current borders. A map or maps with battle fronts" [6].

At the same time, the Head of State received another folder, entitled "The Soviet Air Force and Aerodromes of Basarabia and Northern Bukovina" (**Sketch 2**), which presented the Red Army air force. Thus, the Romanian intelligence services identified three fighter aviation brigades, two heavy bombing brigades, two light bombing brigades and an air landing brigade. Based on the deployment of the aerodromes, it was found that the "bulk" [7] of the air units are located in northern Bukovina and northern Basarabia.

Sketch 2

Also, many airfields with 3-5 aircraft were pushed forward and provided "dispersion and offensive spirit" [7], but were rudimentarily arranged and without complex machinery or equipment.

The aircraft were classified in two categories: old-fashioned, which included I-16 (fighter, monoplane), DI-6 (fighter, two-seater) and ANT (four-engine, for bombing, parachute and medical troops transport), respectively modern, which included Savoy - 79B (three-engine, for bombing) and SB-3 Katuș (twin-engine, for bombing and reconnaissance), (The data provided contains an inaccuracy, as there was no SB-3 Katușka aircraft, but SB-2 Katușka. It was probably confused with the TB-3, or ANT-6, one of the best devices of the Red Army: „But Tupolev unveils a heavier and more powerful bomber in 1930: the TB-3, the world's first four-engine monoplane with a free support wing. TB-3 was the largest aircraft in the world, whether military or civilian. No one, nowhere, had such aircraft in production or even in the design phase. Several world records have been set with TB-3, including 5, 10 and 12 tonne high-altitude flights") [8]. However, the conclusion of military analysts was that these aircraft have "poor performance and even those considered modern are not the size of aircraft operating on the Western Front" [9].

Another briefing on Soviet forces in Basarabia and northern Bukovina was prepared by the Second Intelligence Section, the 1st Intelligence Bureau, the Eastern Front Agency, on October 25, 1940. Based on data obtained and analyzed in the last two weeks, it was found "a resurgence" [10] of the activity of Soviet units (**Sketch 3**). On November 11, 1940, another material from Section II found that enemy forces in Bukovina and the Prut area continued the "same activity" [10] of reconnaissance, vigilant patrols, defensive work, transport of materials, etc. **(Sketch 4).**

Sketch 3

Sketch 4

At the same date, a large and well-documented material was presented, named "Information Synthesis on USSR Aeronautics", divided into commands (deployment and names of commanders) and units, which are structured on the military districts of European Russia and Asian Russia. In the European part, six air corps and 34 independent aviation brigades were identified, totaling 6,500 aircraft (2,500 for hunting and assault, 2,000 for bombing and 2,000 for observations and information). Of these, 900 were deployed in Basarabia and northern Bukovina, attesting to the Soviet leadership's interest in the region. Two air forces and 15 independent brigades were stationed in Asian Russia, totaling 3,000 planes.

How accurate were the data obtained and the analyzes elaborated by the Romanian intelligence services we find out after the opening of the archives and bringing to light the documents. The Russian military historian Mikhail Meltiuhov published in his book *The Lost Opportunity of Stalin* (Vece Publishing House, Moscow, 2005) and some comparative tables with the Soviet and German troops, respectively, existing on June 22, 1941. In Table 47, Meltiuhov shows that on June 22, 1941, the Soviet Air Force had 10,743 aircraft, compared to only 4,846 of the Axis forces, with a ratio of 2.2: 1 in favor of the Red Army. Thus, we can appreciate that the data of SSI and of Section II were correct, well documented and transmitted in advance to the legal beneficiaries.

3. THE SOVIET AERONAUTICS IN THE ATTENTION OF ROMANIAN INTELIGENCE SERVICES FOR THE PREVIOUS PERIOD TO RELEASE OF THE BASARABIA AND BUCOVINA DE NORD ELIBERATION

In April 1941, SSI - Section I Foreign Intelligence, Eastern Front developed a complex material named "*USSR - Synthesis on war preparation"* [11], structured on issues, and these on chapters. In *The Military Situation - the Army*, the material contains 10 chapters, from generalities to the battle order of the army. In Chapter VI, *Ideas from the doctrine of the Red Army*, the following points are provided:

1. The army as an instrument of war. (...)

2. The purpose of the war and the possibilities of realization. (...)

3. Principles for the use of different weapons and means of combat: Infantry (...). Artillery (...). Cavalry (...). Large mechanized units (...).

Large aviation units: "In addition to independent and collaborative missions, they can receive destruction missions, acting on columns, means of transport, concentrations of troops and equipment (with light bombers), bridges (with bombers), aviation located on the aerodrome (with fighter jets, assault and light bombardment). In collaboration with the actions of the front units it can bring the decision in a certain direction".

Also in Chapter X, *Aeronautics. Aviation*, it is mentioned: "Soviet leaders did not spare any effort to equip the red military forces with aviation. Aviation was a very important issue, which attracted the attention of drivers much earlier than any other technical issue.

At the beginning of June 1941, the Central Intelligence Service submitted to the Prime Minister a material on the existing forces of the Red Army throughout the USSR, based on data provided by Section II and SSI (**Sketch 5**). It should be noted that the sketch states that the data were provided by a "trustworthy" source [12]. Near the Romanian borders there were 24-25 infantry divisions, four cavalry divisions and 18 battle brigades. Another sketch includes the "probable [12] deployment of large enemy units at the western border (**Sketch 6**), and an annex shows the existence of units and large units on which the garrison was unknown, which were moved or in temporary garrisons. Among them were, in the Leningrad Military District, the 3rd Fighter Aviation Division, the 7th Fighter Aviation Regiments, the 3rd Heavy Bombardment, the 53rd Rapid Bombardment, and the 82nd, 20th and 20th Airborne Regiments, all without establishing a garrison. The garrisons of the 43rd Fighter Aviation and 136th Rapid Bombardment Regiments had not been identified in the Kiev Special Military District, and the 17th Fighter Aviation Regiment had left its base in Welisk. Also, from the Odessa Military District were deployed in other areas, unknown, the 22nd Air Division, with the 8th, 11th and 21st Regiments, the 243rd Aviation Brigade, the 131st Hunting Aviation Regiments, 228th and 161/178th. Another regiment - 146 Fighter Aviation - had already been deployed to Ketscha.

On June 22, 1941, with the outbreak of hostilities between Germany and its allies, including Romania and the USSR, Romanian troops had at their disposal the organization and disposition of enemy forces. In the first days of the confrontations, the Romanian aviation was confronted with "a hunting regiment and a bombing regiment on the Chisinau North field, a hunting regiment on the Bolgrad field and a bombing regiment on the Cetatea-Albă field. In the Ismail Chilia area - Arciz were, at that time, unidentified aviation elements" [13].

Sketch 5

Sketch 6

4. CONCLUSIONS

The Romanian intelligence services had real and anticipatory information on the Soviet military forces as a whole, with a focus on the western border and, especially, in Basarabia and Bukovina. The data were obtained / cross-checked between the General Information Section of the General Staff and the SSI. Secondly, the types of aircraft, the deployment of units and large aviation units throughout the USSR, of the landing grounds, as well as the doctrine of the Red Army in the field of air forces were identified. The data obtained have been used by combat units since June 22, 1941 to annihilate the enemy. During the air battles, the Romanian forces had, from the beginning, the initiative and the supremacy, based both on the information held and on the qualities of the equipped planes.

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THE LIEUTENANT COMMANDER POPIȘTEANU ALEXANDRU, COMMANDER OF THE HEROICAL 7th FIGHTER GROUP IN THE AIR BATTLE FOR THE LIBERATION OF BASARABIA AND THE CONQUEST OF ODESSA

Jănel TĂNASE

"Henri Coandă" Air Force Academy, Brașov, Romania (tanase_janel@yahoo.com)

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Abstract: *Called by his qualities to become a flyer, a personality with a complex aeronautical training, being a graduate of the Romanian Higher War School and the French War School, with a unanimously recognized activity in military aviation in the interwar period, aviator commander Alexandru Plopișteanu, commander of the elite group of the fighter aviation, the 7th Fighter Group of the 1st Fighter Flotilla, fell in the whirlwind of aerial combat facing the enemy, in the sky of Odessa, on August 21, 1941, by his deeds at the head of his unit that executed in 60 days of combat 233 missions to the enemy, with 40 air battles, from which 55 victories resulted, he constituted and constitutes for the generations of aviators the perfect war aviator commander and a legendary figure of the Romanian wings.*

Keywords: *military aviation, aviation group, air mission, air combat, air victory.*

1. INTRODUCTION

August 21, 1941 was a great day of mourning for the Romanian wings. On that day, in the hot sky of Odessa, where two worlds were facing each other, one of true faith in God and the other of paganism [1], the book of the life of an elite fighter aviator ended. He fell on the field of honor, facing the enemy, in the midst of his subordinates, in the whirlwind of air battles with Bolshevik aviation. The deed of the commander of the 7th Fighter Group, Lieutenant Commander Aviator Popișteanu Alexandru, was inscribed in blood in the Golden Book of Aviation and will always remain a living example for all pilots. Under his leadership and impetus, his valiant Fighter Group covered himself with glory in the holy struggle for the liberation of Bessarabia, giving epic elements to our young aviation, shining with admiration forever, His very death as a hero [1].

2. VOCATIONAL TRAINING AND MILITARY CAREER

Lieutenant Commander Popișteanu Alexandru was born on January 3rd, 1903, in the commune of Bucharest, Ilfov County, the son of Iulian, a military doctor by profession and Elvira, assigned to the first position of officer on July 1, 1922, being a graduate of the Military School of Engineering. He married Stefania T. Atanasiu on September 12, 1940 [2].

Built on a positive and honest working life, trained and steeped in the harsh flying schools that operated in the interwar period, with a superior tactical instruction mastered at the highest war schools in the country and abroad, the officer's career is a constant ascent and well-deserved, to the commander of the 1st Fighter Group equipped with modern German war material [2].

During 01.07.1920-01.07.1922, he completed his first military studies at the Military School of Engineering and, according to the regulations in the training of army personnel, he continued his initial training, during 01.11.1922-01.10.1924, at the Special School of Engineering.

After graduating the Military School of Engineering Officers with the rank of lieutenant, on July 1, 1922, he was assigned to the Engineering Specialties Regiment. His special qualities were nicely highlighted by the school's student commander during the school period: „character - very lively, constitution - very strong, healthy, education - beautiful, springing from a neat growth and love with which military education was built, well-trained social and military education, strong character, honest, knight, noble soul, is intelligent, has a lot of common sense, has a sense of duty, initiative and strength of work, courage-giving will, dignified and decent attitude, is a very a good performer, he will become a good instructor, he will become a good officer" [2]. The commander of the specialties regiment, Colonel Fomescu, also noticed him as: "Serious, kind-hearted, promising officer" [2], "Intelligent, with good qualities, pretty good military education, he has qualities, he will become a good officer" [2].

During his initial service training at the Special Engineering School, 01.11.1922-31.10.1924, the commander of the Engineering Schools and Training Centers, General Amza, praised him as an "intelligent officer with very good career skills, he promises to become a good officer" [2], "1st Lieutenant Popișteanu has the moral and intellectual faculties for any hard work and he has high hopes for the future. He has a great love for the Air Force Army", with the proposal to advance to the rank of lieutenant" [2], the ratings obtained rising up to these assessments.

During the period 01.11.1924-31.10.1926, he carried out his activity at the Aeronautics Arsenal and the Aeronautics Training Center, the assessments being in line with the desire to improve the officer and transfer to the category of navigating personnel, respectively: "Character and high education, passionate at work, he carries out most difficult tasks impeccably, being keen in mind and endowed with a remarkable spirit of observation, he will become a distinguished officer of the army and trustworthy, very eager to become a navigator and at the same time highly trained physically and intellectually, he entered the school of aerial observers on May 11, 1926, where he passed among the leading students" [2].

Attracted by flying, he requested the transfer to the Military Aeronautics, obtaining the approval to attend the School of Air Observers (11.05-24.11.1926), and as a result of the remarkable results obtained he carried out his activity until October 1, 1931, at the training applicative institution of the aeronautical personnel, Aeronautics Training Center.

The commander of the Aeronautics Training Center, the pilot with patent no. 3 in Romania, Lieutenant Colonel Negrescu Gheorghe remarks, for the period 01.11.1927-

31.10.1928 [2], the passion of the officer for flight: „With a lot of love for flying, very good pilot, bold, calm, enthusiastic, very good officer", aspects also highlighted by Major Vasiliu who followed him at the command of the center: „He flies on any plane and has remarkable qualities for aviation, an officer which can be counted on and in which the Aeronautics will have to hope a lot" [2], „He has a special love for flying, which he practices with skill and mastery, for which he was also awarded an award, an excellent officer and a pilot" [2].

The deep knowledge of the secrets of flight and the mastery in the use of fighter jets was achieved by going, step by step, through the complex aeronautical education system of that time:

- Air Observers School, 11.05-24.11.1926;
- Flying School, 01.11.1926-31.10.1927 and the granting of the pilot's license on Morrane 80HP, Proto, Brandenburg and Morrane 38 (180 HP) aircraft, in accordance with the Order of Command of the General Inspectorate of Aeronautics no. 88 of November 30, 1927 [3];
- War Plane Advanced Training School, 31.05-03.09.1928 [2], followed by confirmation as a fighter pilot on Fokker D. 11 and Spad 51 aircraft on 03.09.1928, in accordance with the Agenda of Command of the General Inspectorate of Aeronautics no. 56 of September 22, 1928 [3];
- Military Prep and Special Schools of Aeronautics, „Regele Carol al II-lea"/Special Aeronautics School - complementary course, 01.11.1930-01.07.1931, the assessments being as high as the recorded progress.

Noted for his flying qualities, he was enlisted on June 1, 1930, with the rank of lieutenant, as a pilot at the School of Air Observers, and later on October 1, 1931, in the Battle Flotilla.

At the suggestion of the flotilla commander, "a very good officer, well trained and a good war pilot, deserves to be promoted", he was promoted to the rank of captain on April 1st, 1932, and promoted to flotilla flight instructor.

Given the career prospects, thanks to the talent and remarkable professional qualities, the commander of the Battle Flotilla, the aviator commander Stoicescu and the commander of the 1st Air Division, General Hentzescu supported the officer's participation in the entrance exam to the highest military education institution in Romania: "The value of this officer is exceptional, which ensures a straight and clear path in our aeronautics, admirable flying skills, capable of activity that goes beyond the ordinary training and will always know how to cope with exceptional events, one of the elite elements of our aeronautics. He deserves to be presented at the Higher War School" [2].

The commander of the Battle Flotilla, the famous aviator commander Negrescu Gheorghe, who knew him very well, noticed the ascent and the progress made, appreciating him in the spirit of those times: "An excellent fighter pilot, he flies with a lot of love on all types of planes and knows how to be a good example for his subordinates. He has carried out numerous raids in the country, he is a distinguished aviation officer" [2].

In 1931, in a crew with Captain Gheorghe Iacobescu, he competed with the Italian and Romanian pilots in the competition for the "Bucharest-Rome Cup", the two pilots obtaining the best time of the year, after crossing the distance between the two capitals five times.

At one of the crossings, the engine suffered a major breakdown off the Adriatic and only the dexterity of the crew prevented the emergency landing on the water [4].

Four years later, in August and October, together with the crew of Lieutenant Constantin Perju and Major Gheorghe Davidescu, in the crew with Captain Alexandru Papană, the famous acrobat of the ”Red Devils” Squadron, carried out the raid on the route Bucharest- Tel Aviv [2].

He completed his training as a staff officer at the Higher School of War, between 01.11.1933-01.10.1936 and the Higher School of Air War in Paris, between 01.09.1937-01.10.1939 [2].

In the Higher War School, with internships at the “Mihai Viteazul” Guard Regiment, 1st Aircraft Defense Regiment, 1st Aircraft Flotilla, Aeronautics Training Center, for the period 01.11.1933-31.10.1936, Director of the Higher War School , General Spiroiu, characterized him as follows: “Very generous military education, a passionate aviator, a very knowledgeable connoisseur and a perfect pilot, a very good officer” [2].

To the remarks of the commander of the Superior Air War School in Paris, for the period 01.09.1937-01.10.1939 [2], of the military attache of Romania in France, captain commander Nicolau added the following description: ”Smart officer, made a good impression in the professional environment of the School. Extremely dynamic personality, eager to fly, having up-to-date training on modern devices, good navigator and trustinghis own knowledge, he’ll be a good unit commander, imposing himself by determination and dynamism”.

On April 1, 1937, with the transformation of the Battle Flotilla into the 1st Fighter Flotilla, having the rank of captain, he was appointed commander of the 2nd Fighter Squadron, a year later, by High Royal Decree no. 1899 of 10.11.1938, being promoted to the rank of lieutenant commander.

The commander of the Air Region, General Benoniade, characterized him for the period 01.11.1936-31.10.1937: “Very good officer, excellent pilot for all categories of aircraft. Intelligent, educated, he proved during the year a serious specialized training. At the command of the squadron, he proved to be a good instructor, educator and administrator. Officer of hope and future” [2].

For his qualities and special training, on October 1, 1939, he was assigned to the Air Force Command, and later, on May 1, 1940, he was seconded to the 1st Fighter Flotilla with service in the Air Force Command and was a staff officer on May 28, 1940..

In the run-up to the dismantling of Greater Romania, on June 1, 1940, he was appointed commander of the 7th Fighter Group, the first fighter group in the Romanian Royal Air Force to be equipped with the modern German Messerschmitt 109 fighter jet. In the days of the Soviet ultimatums at the end of June, he was mobilized with his group on June 29, 1940, according to the Royal High Decree no. 2175/1940, being demobilized on November 15, 1940 based on the High Royal Decree no. 3798/1940.

For this period, the commander of the 1st Fighter Flotilla, Captain Commander Tătulescu, characterized him as follows: ”When Messerschmitt 109 arrived, he was given the command of the 7th Fighter Group to be formed and moved to the oil area. Hard working, he sought to fulfill the task entrusted to him and succeeded fully after two months” [2].

On June 22, the 7th Fighter Group of the Air Combat Wing was mobilized in the area of operations according to the Royal High Decree no. 1798/1941. When the take-off order was issued, the commander of the 7th Fighter Group, led by his fighters, took off in the first mission of the Air Battle for the liberation of Basarabia.

The exceptional activity of this great commander of the air unit was beautifully highlighted by the commander of the 1st Fighter Flotilla, the great air hunter, Captain Commander Mihail Romanescu: ”On June 22, 1941, the holy day of the nation, he took off first at the head of the group for the first enemy mission.

A wonderful leader, an example of courage, he carried the fame of his unity to the Prut, Basarabia, the Nistre and Ukraine, always being an example. He has carried out 36 enemy missions on the front. On August 21, 1941, he fell in the air as a hero. He was post-mortem decorated with Michael the Brave, 3rd class, the Golden Cross of Aeronautical Virtue and the Star of Romania with swords and ribbon of Military Virtue. His name remains written on the frontispiece of his unit as a sign of admiration and love from his bosses, comrades and subordinates" [2].

For the activity of peace support he had been Knight of the Cross "Aeronautical Virtue" (High Royal Decree no. 1813/1932), Knight of the "Crown of Romania" of peace (High Royal Decree no. 1403/1933), holder of the Decoration "Poland Restituta" and the Cross Gold of the Aeronautical Virtue with swords with two straps [2].

In the Operations Journal of the Air Combat Wing of August 21, 1941, it was written: "On this day we had the pain of losing one of our most valuable fliers, Lt-Cdor. Av. Popișteanu Al., Commander of the 7th Fighter Group, acting under the direct orders of the 4th Army.

In an air battle - after 8 planes had been shot down by his unit - Lt-Cdor. Av. Popișteanu had to give the most uplifting example of sacrifice.

For all this, His Majesty the King granted him, post mortem, the Order of Michael the Brave, and was summoned by the following agenda on the Air Combat Wing:

AGENDA No. 7 of 22.VIII.1941

At the end of the day of August 21, 1941, in the Battle for the Conquest of Odessa, Lt-Cdor. Popișteanu Alexandru - Commander of the 7th Fighter Group - summoned for his actions by agenda no. 2/941 on the 4th Army and the agenda No. 1/941, on the Air Combat Wing fell.

Distinguished with the Order "THE GOLDEN CROSS OF THE VIRTUES OF AERONAUTICS with swords" by the HEAD OF STATE AND THE COMMANDER OF THE COMMAND OF THE ROMANIAN-GERMAN FORCES, because on two occasions he landed in front of the battle lines to save his rescuers land in the immediate vicinity of enemy lines - thus showing the highest example of camaraderie and sacrifice.

Lt-Cdor. Av. Popișteanu Alexandru fought and fell heroically, leading his fliers with unsurpassed momentum and exemplary bravery in the fight for the reunification of the Fatherland and for the glory of the Romanian wings.

For these acts of arms and for his unsurpassed activity on the enemy...

I CALL BY ORDER IN THE AIR COMBAT WING

LT-CDOR. AV. POPIȘTEANU ALEXANDRU" [5].

At his hearse, King Mihai himself, accompanied by Marshal Antonescu, knelt down and awarded him posthumously the highest distinction of war, the Order of Michael the Brave, and General Aviator Emanoil Ionescu delivered the following report:

" Your Majesty,

The Commander of the Air Force reports today to Your Majesty the fulfillment of the duty, for some of his groups, for the heroic 7th Group under the command of Lt-Cdor. Popișteanu Alexandru.

In 60 days of fighting, the fliers of this group in front of Your Majesty carried out:

- 59 bombing missions.
- 11 enemy scout missions.
- 144 free hunting missions.

Totally 233 missions, in 40 de air fights, with the following results:

- 55 wins.

- 20 surface hit airplanes.

At the head of this group was the example of courage and sacrifice Lt-Cdor. Popișteanu Alexandru, who has 35 enemy attacks at the head of his fliers and two landings in the ground battle line, to save two of his fliers, hit by enemy bullets in the plane" [1].

4. CONCLUSIONS

In the original file of the officer, it was written briefly: "Deleted from the controls, being killed in the air battle with the enemy aviation in the area of Vasilevha commune, Ukraine, according to the extract from the Register of the Dead no. 2/1941 issued by the officer of the civil war status of the 57th Fighter Squadron and PV no. 2 of 22.VIII.941, OZ 445/941" [2].

Built on a career as an aviator based on hard work and an exceptional vocation for flying, the commander of the 7th Fighter Group was an example of an aviator and commander, who managed to turn his unit into a granite block in front of the enemy air, for example alive in war for Romanian pilots, vivid memory for generations of aeronauts who have found and will find their professional ideal in his deeds of legend.

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ROMANIAN MILITARY PARATROOPERS - 80 YEARS OF HISTORY FOR ROMANIA (PERIOD 1941-1945)

Mircea TĂNASE[*], Alexandru Mihail TĂNASE[**]

[*]"Nicolae Bălcescu" Land Forces Academy Sibiu, Romania,
"Marshal Alexandru Averescu" Foundation Buzău, Romania
[**]"Titu Maiorescu" University Bucharest, Romania

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Abstract: *In 2021, the military paratroopers celebrated 80 years of existence, since their establishment as a specialty, within the Romanian Aeronautics, later as a distinct weapon and generating, in turn, new military specialties, so necessary for an army that wants to be modern and performant.*

This specialty, established in the Romanian army at the beginning of the Second World War, was an attempt to respond and align with the needs and, why not, the modernity of the time.

Passed through the fire of August 1944, disbanded immediately after the war and reborn from its own ashes in 1950, it managed, despite many hardships and sacrifices, some particularly painful, to impose itself as an elite weapon in the panoply of a modern Romanian army.

Side by side with the military aviators, who always supported them with aircraft and aerodrome infrastructure, the paratroopers wrote history for Romania.

Keywords*: military paratroopers, aeronautics, aerodrome, elite weapon.*

1. INTRODUCTION

The emergence and development of parachuting, first as a means of rescuing pilots and airstrikes in difficulty, then as a military specialty, has been closely linked to the evolution of air transport and their ability to provide opportunities to launch people, materials and fighting technology.

Initially used to rescue pilots, then to set altitude records, the parachute would become, at the beginning of World War II, the means by which fighters of special units would leave the board of transport aircraft to reach, along with weapons and materials from endowment, in the enemy's field or behind it. This is how airborne troops were born.

Among the first special airborne missions can be mentioned, those executed in the First World War. In November 1914, the French "deposited" a "customs officer" south of Cotelet in order to obtain information about German troops, followed by 12 other similar missions [1]. Similar actions were executed by the Italians of the 25th "Young Italy" Squadron. Among the pioneers of this kind of actions were the Romanians who submitted agents and launched manifestos behind the German front, in Nămoloasa and Mărăşeşti. The Germans, in turn, carried out the same kind of special missions in 1916 and 1917. In 1918, the Italians carried out several other similar missions [2].

2. ROMANIAN PRIORITIES IN PARACHUTING. SPORTS SKYDIVING - FORERUNNER OF MILITARY PARACHUTING

After Romania's entry into the First World War, in 1916, together with the Entente states, the war materials that France sent to Romania included those necessary for the endowment and modernization of captive balloons. The parachute suit also included parachutes, made of cotton cloth and linen pendants. If we consider that the airmen used the parachute during some combat missions to save themselves from the damaged balloons, we can consider them as the first Romanian military paratroopers. Thus, on July 2, 1917, the lieutenant aviator Gheorghe Demostene Rally, in the nacelle of a captive balloon at an altitude of 1200 meters as an aerial observer during the battles on the Mărăşti-Mărăşeşti-Nămoloasa alignment, was attacked by a formation of enemy aircraft and parachuted, saving himself with the documents on board [3]. In the same year, he was rescued for the second time with a parachute during a storm, when he was thrown out of the balloon nacelle. Lieutenants Dan Bădărău, who will later be noticed as a great philosopher, Mihai Mihalcea and Aurel Secărescu [3] also jumped from the nacelle. These airmen may be joined by aircraft crew members who, for various reasons, have been forced to leave their aircraft and rescue themselves with parachutes.

In 1937, the first parachute school in Romania was created, in order to prepare pilots for parachuting. In that year, the company IRVIN AIRCHUTE, Co. from Bufallo, USA, won the tender for the manufacture of parachutes that were to be equipped by the Romanian Aeronautics. The IRVIN parachute factory was installed on Măgurele Road, and at 1st Aerostatics Fleet from Pantelimon the same company also installed an 80 meter parachute tower, for the training of pilots. In the first series of students, trained by the American Robert Kokrill, was also the mechanical lieutenant of aviation Ştefan Şoverth, who remained an instructor within the school.

Simultaneously with the improvement of the parachute as a means of rescuing pilots in difficulty on board planes or balloons, there was also the concern to set records in the field of parachuting, so that a new branch of aeronautical sports emerged: sports parachuting.

On July 5, 1928, in Germany, Smaranda Brăescu performed the first parachute jump, together with the engineer Otto Heinecke (the inventor of the parachute of the same name), becoming the fourth patented parachutist in the world and inscribing Romania's name on the list of world priorities in this field next to France, Czechoslovakia and Switzerland. On October 21, 1931, she made a jump from 6000 meters, from a plane piloted by the Romanian aviation ace Alexandru Papană, and landed 28 km west of Slobozia. The jump was approved as a world record by the International Aeronautical Federation, and King Carol II decorated it with the order "Aeronautical Virtue", Golden Cross class. On May 19, 1932, Smaranda Brăescu performed, in Sacramento, California, a world record jump, from 7223 meters, a result approved by the Washington Aeroclub (surpassed only in 1951 by a Romanian, Traian Dumitrescu-Popa, who jumped from 7250 meters). Her name is also linked to several other priorities in the field: in October 1932 she was the first European to receive a US pilot's license, attending a US Army pilot school, on April 27, 1936 she flew through the mountainous area of Yugoslavia, to cross the Mediterranean Sea from Rome to Tripoli (1100 km) on May 19 of the same year after a flight of 6 hours and 10 minutes [4]. Along with Traian Dumitrescu – Popa, Smaranda Brăescu was hired in 1941 as a parachuting instructor in the first subunit of military paratroopers in the Romanian army, actively contributing to their training.

3. ESTABLISHMENT OF THE FIRST SUBUNIT-SCHOOL OF MILITARY PARATROOPERS. PREPARATION AND ENDOWMENT OF THE PARACHUTE BATTALION

The diminution of the country's territory and military potential as a result of the territorial abductions in the summer of 1940 and the inclusion of the Romanian state in the Axis powers system, required the adoption of a reorganization plan of the army, which took into account, among other things, the adequacy of organizational structures and the financial resources of the country and equipping large units with modern means of combat. In the spring of 1941, the establishment of the first subunit of paratroopers in the Romanian army proved more than necessary, given that most European states had established parachute units, and the efficiency of the German and Soviet ones, after the rapid successes achieved in 1940 and 1941 in Denmark, Norway, the Netherlands, Belgium, France, Crete, Finland and Romania were just as many arguments for the attention paid to the air landing military structures in the Romanian army.

General Ion Antonescu notified in time the role that the air landing forces can play on the eastern front, simultaneously with the "sabotage" missions behind the enemy lines. The victories of the German paratroopers in the spring of 1940 determined him to consider the creation of paratrooper and air infantry structures, following the German model, but adapted to the specifics and, especially, to our possibilities of endowment and training.

In this sense, in June 1941 General Ion Antonescu signed *Decree-Law no. 93/1941* [5] for the establishment, organization and operation of air infantry units (transported infantry units and parachute units, organized by companies, battalions and regiments) within the Military Aeronautics. The Decree-Law entered into force on June 10, 1941, marking the birthday of military parachuting in Romania.

The conditions of recruitment and admission in these units, the promotion of officers, non-commissioned officers and troops, salaries and special allowances were rigorously argued and highlighted the special attention that the head of state pays to the establishment of this category of troops.

With *Order no. 12910/3 October 1941*, the Air Staff ordered the "discharge" of the parachute company from the Aeronautics Training Center (located in Popeşti-Leordeni) to the 1st Flotilla Aerostation from Pantelimon, as a task to mobilize it. At the command of the company, Lieutenant Gheorghe Iordăchescu was appointed. Shortly afterwards, Lieutenant Ştefan Şoverth was appointed commander of the company.

At the beginning of September 1942, Aviator Squadron General Gheorghe Jienescu, Undersecretary of State for Air, supported the maintenance of the parachute battalion within the Air Force, arguing that “the training and instruction of parachute personnel can only be done in close connection with Aviation, parachute elements and airplane being the basis of the training of paratroopers, as means of transport in the air environment, indispensable for fulfilling the missions that can be entrusted to this weapon; the use of parachute units in operations, for most of their missions, can only be done in a system of combined air operations, in which all categories of air weapons are called to compete - information, hunting, bombing; the transfer of parachute units to the staff of the State Chief of Guard's Regiment would dislodge this weapon from its natural environment of development and use, would entail the deployment of other units - transport and training aircraft, parachuting, technical echelons - which today serve and Aeronautics, so it would lead to a dispersion of means - and so few - instead of keeping them centralized.

Consequently, both in peacetime and in war, the life of these units cannot be detached from the life of the air weapon, and the same spirit, with the same mentality, characterizes this weapon as the air weapon. In fact, wherever it exists, the parachute and air infantry units are part of the Air Force" [5].

At the beginning of 1942, the Air Force General Staff was ordered to organize a parachute battalion. On March 31, 1942, the second parachute company was established, and in June 1942, the 4th Parachute Battalion was formed, within the 1st Aerostation Fleet. Captain Enea Bordan was appointed commander of the battalion. He was followed by Major Ion Ghita and Major Teodor Dobre.

The patent as a military parachutist was made by performing 3 parachutes, but it was considered completed only after completing the entire period of specific training. The uniforms, equipment rights and money (balances and special allowances) were those of the Air Force flight crew.

The combat training of the subunits focused on parachute tactics (tactical training of the soldier, group, platoon, parachute company), specialized air training, parachute knowledge and folding, training in aircraft silhouettes and ground launch tower, meteorology and aviation equipment, parachuting theory, topography, pioneering (destruction), special means of combat (intelligence, sabotage, terrorism), geography, transmissions, public administration. Particular attention is paid to physical training (running speed and endurance, gymnastics, boxing and jiu-jitsu) and driving different categories of vehicles (tanks, cars, mopeds, motorcycles).

The tactical applications were executed with or without parachute launches, with or without combat firing, in August 1942 being experienced the possibility of resupplying the troops by air, at an exercise by parachuting in the Bucegi Mountains. In fact, special emphasis was placed on specific instruction in the mountains, mountaineering, orienteering, use of access roads in the mountains in low visibility conditions. The platoon with special missions was prepared through specific actions (diversion, sabotage, etc.) to real civilian and military objectives.

At the order of the upper echelons, soldiers from the battalion were sent to the front, to carry out special missions behind the enemy device. Within the battalion, cadres from other categories of forces were also trained to carry out special missions.

4. CONCERNS FOR THE ESTABLISHMENT OF A PARACHUTE CORPS AND AN AIR CORPS. THE PARTICIPATION OF THE ROMANIAN PARATROOPERS IN THE DEFENSE OF THE NORTHERN PART OF THE CAPITAL (AUGUST 24 - 28, 1944)

Carrying out a detailed study, in comparison with the bases of organization and functioning of the parachute units from other countries, the General Staff of the Air submitted, in March 1943, to the Undersecretariat of State for Air a "Study on the constitution of the Romanian Parachute Corps" [5] in which he proposed the doctrine of the use of Romanian parachute units (combat units of paratroopers and special paratroopers), to adopt the German methods and procedures of action, the organization of a parachute battalion and two air infantry battalions, in the structure of an air corps).

It should be noted in this study the distinct position and status established for special paratroopers, who will be recruited, trained and constituted secretly and separately from the General Staff or State Security, participating with the unit only in parachute training. As an essential condition for the recruitment of these fighters was mentioned the need for a perfect knowledge of the language and environment of neighboring countries.

On this study, the Undersecretary of State for the Air, Squadron General Gheorghe Jienescu, recommended, in the resolution, that the parachute units continue to join the Air Force, showing that "for the beginning we are only interested in paratroopers - as fighters, infantry "in the near future" [5], arguing that "Romanian realities do not allow the organization of large air units with strategic missions; we will fight in the immediate vicinity of the battle line in the tactical field" [5].

It was also believed that by creating airborne infantry, it could come to the aid of paratroopers and save paratroopers and transport aircraft. However, this, in turn, was dependent on the transport capacity of the gliders, on the safety of the landing field, on the fact that the transport could only be done during the day, protected by the hunting aviation.

Decree-Law no. 3188 of December 11, 1943 provided for the establishment within the Romanian Royal Aeronautics of a Corps of Military Paratroopers, comprising combat units (battalions, regiments, large units) and a Parachute Training Center with the necessary specialized schools.

In the conditions in which the material base was more and more difficult to achieve, and the recruitment of volunteers did not give the expected results, the regiment expected to be created in the spring of 1944 remained in the intention stage. So is the Corps of Military Paratroopers and the Airborne Infantry Corps.

Until August 23, 1944, the Romanian army had managed to have only a parachute battalion ready for battle (a platoon of special missions, two parachute companies, a heavy weapons company and a rolling stock). Although he had an adequate level of training and equipment, it was not used in combat until the summer of 1944.

After the events of the evening of August 23, due to the danger posed by the German troops in the northern part of the Capital, it was necessary to engage in combat and the Parachute Battalion. The way he acted for the victory of the Romanian troops in the Bucharest area remains emblematic for the history of this weapon.

The "Captain Mihai Ţanţu" Operational Detachment was sounded the alarm around 23.00 and its entry into the device was ordered, with a platoon of paratroopers at Băneasa airport, a platoon at Boteni (Titu) aerodrome, where the General Staff of Air, a platoon to guard the Undersecretariat of State for Air (Bucharest) and a platoon at the Anti-Aircraft Artillery Command (ACA/Aircraft Defense) in Carol Park. The other forces of the detachment, under the command of the paratrooper captain Mihai Ţanţu, were waiting, ready for action.

The German attack on the Romanian capital began on the morning of August 24, with a massive bombardment of the Royal Palace and other targets in the city center. At the same time, the German subunits in the camp in the Băneasa forest, trying to occupy the city, opened fire on the Romanian soldiers who entered the defense device. For the defense of the northern area of Bucharest (Băneasa-Pipera-Herăstrău) the Military Command of the Capital constituted the "Comandor Marin Anton" Detachment, initially formed by two companies of students of the Aviation Training Center, to which were later added the Parachutists of the Detachment Operative "Captain Mihai Ţanţu", a Brandt launcher platoon and a 57 mm cannon section. Only on August 24, around 19.00, the Military Command of the Capital made available to the group an infantry battalion from the recruits of the 27th and 10th Infantry Regiments, and on the evening of August 25, the Instruction Guard Division. Other subunits entered the battle in the following days: an aviation platoon (Aero Transport Group), a gendarmerie battalion (on the evening of August 26), a battery from the 13th Artillery Regiment.

In this composition, the "Comandor Marin Anton" Detachment, having as main protagonists the fighters of the Parachute Battalion, successfully participated in the rejection of the group of German forces from Băneasa-Pipera-Herăstrău area, contributing together with the other units of the Romanian army to defend Bucharest, where the Germans were determined to reissue the reprisals, they inflicted on Warsaw in early August 1944.

On the morning of August 28, the Parachute Battalion was ordered to regroup on Pipera airfield, in order to return to the barracks of the 1st Air Station in the Pantelimon forest.

In these battles, the paratroopers captured several prisoners, 5 planes, weapons and several vehicles, noting in this sense the paratrooper lieutenant Ioan Ţetcu who, together with 6 subordinate soldiers, captured 25 cars and 150 German soldiers [6].

In the battles for the defense of the northern part of the Capital, the Romanian paratroopers paid their blood tribute, the battalion having 19 dead, 59 wounded and 3 missing. For the acts of weapons committed, the officers, non-commissioned officers and the troop were summoned by agenda and proposed for decoration. The commander of the Parachute Battalion, Major Teodor Dobre, was decorated with the "Mihai Viteazul" Order, 2nd class, with swords.

5. CONCLUSIONS

Following the restructuring (disbandment) ordered by the Allied Control Commission (Soviet), on December 15, 1944 the Parachute Battalion was transformed into a guard battalion, and on March 1, 1945 the Air Force ordered its disbandment, along with other units of the Air Force. . Thus, the existence of a military structure was suddenly stopped, which the Romanian army considered an elite unit, whose high degree of training was proved in the actions of defense of the north of Bucharest. Many of the paratroopers chose the armed struggle against the communist regime imposed by the Soviets, joining the National Resistance Movement, taking the risk of being arrested and sentenced to years in prison.

The spirit of the body and the feeling of belonging to an elite weapon were preserved and transferred to the new parachute unit, re-established in November 1950.

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