

## INVESTIGATION OF THE POSSIBILITIES TO EXTEND THE CONCEPT OF STABILITY TO MILITARY AIRCRAFTS

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*Abstract:* The stability of military vehicles is a new concept that was analyzed in detail in my doctor's degree paper. In this work, we will try to apply this concept at the level of military aircrafts. The concept, the definition and the stability factors are presented in the first part, whereas their interdependence will be analyzed in the second part. Because it is a new concept, we had difficulties in translating it. The word "stability" will be used in spite of the fact that sometimes the word "durability" (or "viability") can also be met. This term could be confused with the older exploitation characteristic "durabilitate" that has more the meaning of reliability. "Viability" has been used in the fields of cybernetics and electronics.

*Keywords:* stability, military aircrafts, stability factors.

### 1. THE STABILITY OF MILITARY AIRCRAFTS – CONCEPT, DEFINITION, STABILITY FACTORS

In the NATO Romanian Army, taking into account the alliance partners' expectations, it is necessary to improve the ways of intervention by increasing the stability of act capabilities of the specialized squads. The improvement of the global stability of the military technique assets can be accomplished only by borrowing and adapting some data taken from other fields.

These details and the other existing ones related the act tactic and combat management technology have as a result the improvement of initial data in the system of the act capacity, and through a proper algorithm, the result will be the optimization of the combat stability factors and, finally, the success of military actions.

Applied to the Air Force, the stability is the reliability of the military technique aviation to which a practical and tactical assembly of measures and preoccupations is added (the capacity of military aircrafts and people to avoid the wastage, to avoid in time the enemy's gun strikes and their ability to fast recover their strike, fire, maneuvers and

protection capacities) that guarantee the fulfillment of the intervention. In order to analyze and understand the concept of stability the stability factors are studied thoroughly: the performances of military aircrafts, the reliability, the efficiency of maintenance and maintainability works, air traffic specifications, combat service, combat service support (logistics), the quality of the infrastructure, the management of the human resources and the co(-)operation for support. After that, their interdependency is studied. In other words, it could be said that the possibility of a military system to accomplish its mission as good as possible, could be better expressed by studying thoroughly the stability factors taking into account their reciprocal influence.

In conclusion, analyzing the behavior of military system related to its stability, it could be expressed to what extent the act system technically suits its missions.

Conclusions drawn from the analysis of stability factors:

- **The performances of military act systems** (military aircrafts in this situation)

The maximum performances which can be reached by a military system are very important, especially in bad acting conditions.

The promptness of the intervention, its quality, the way the people who fulfill it are protected and supported depends on the maximum level of the performances of the military aircrafts. For instance, this is the reason why the larger and high acting capacity military aircrafts are widely used (large capacity of targets strike especially for the combat area).

- **The reliability**

The second important factor of stability is the reliability because of its direct influence on the performances of the military systems. As we know, during exploitation, the technique assets change their performances in a negative way because of the worn out of their parts and ageing of some component materials. It is important for the technique assets not to undergo a major malfunction during intervention because these would compromise the mission.

- **Maintenance**

Maintenance represents all the organizational and technical activities done in order to maintain and re-establish the technical state of a product so that this product could fulfill all the functions it was created for. The optimization of the exploitation of the military technique assets in military activities can be done only if the maintenance work was very well organized during the period of peace.

- **Traffic specifications** (flight tracks rules of organization)

The planning of flight tracks to interventions is one of the most important parts of air missions' organization activity and it is done following the orders of the superior echelons.

Many times the reconnaissance missions are very important. The initial reconnaissance of the field in order to take into account the real flight conditions to choose the best track, military aircraft, its position into a possible flight formation as well as applying some coefficients which consider some unexpected elements becomes vital.

- **Combat service**

It represents all the measures taken in order to protect the troops from the surprising attack of the enemy, in order to give them the possibility to engage on time and in an organized way in a fight, in order to keep

combat capacity and to fulfill their missions. The most important part of combat service is the reconnaissance. To draw up an intervention plan an initial detailed reconnaissance of the main access routes is needed. These could be done with the support of civilian factors. During fighting, a permanent air supervision, which keeps under surveillance the area, is obviously necessary.

- **Combat service support** (logistics)

It has an overwhelming importance during training the fight, but a small one during the actual fighting. The supplying of the logistics resources on time and in a sufficient quantity is necessary in order to assure a quick and prompt intervention.

- **The quality of the airport infrastructure and flight tracks**

The choice of a suitable route and airports in combat conditions is decisive for the fighting. It can bring about an important advantage but, in the opposite situation, it can provoke the failure of the mission. That is why the theoretical study of the field on the map, its practical study and by using other means must be done in detail.

- **The management of the human resources**

Many times the supplying of human resources is done to complete the necessary personnel of the units, because the fighting casualties or because personnel deficit caused by other reasons.

This requires monitoring, centralizing and analyzing the data concerning casualties and the level of personnel employment, drawing up and sending the personnel request, receiving, repartition and, the permanent connection with military local offices.

The handling of military aircrafts can be very difficult, stressing to the maximum both the technique asset and the operator (the pilot) because of difficult conditions of the mission. The last one has to know very well the theoretical notions about the operation of the technique asset and, that is why the decision of the manager of the mission, regarding the choice of the operator, is very important too. The operator's training level as well as his partners (the co-pilot or the flight crew) can influence in a decisive way the operating mod

of the technical system. That is why, it is necessary, for the very important missions, to use only very well trained personnel, capable of fulfilling the mission without any problems.

For the military helicopter, in Romanian Army, the assignment of the second pilot should be more important helping the main pilot to overcome the difficult situations. The helicopters flying intervention capacity used into combat missions depends a lot by the human factor.

The training level of the pilot and of the second pilot can influence in a decisive way the operating mod of military helicopter. That is why, it is necessary to use in combat areas only the personnel very well trained for military aircrafts in these kinds of conditions. The role of the second pilot should be more important helping the pilot to overcome the difficult situations.

#### - **Co(-)operation for support**

The co-operation represents an activity used to ensure the working together of the forces taking part in the mission (in time, space and actions), cooperation based on the plan of the action and on the coordination done by the commander in order to concentrate and total their efforts, the aim being the success of the mission.

Eventually, we could say that the possibility for a military aircrafts to fulfill its mission in perfect conditions could be better expressed by the thoroughgoing study of the stability factors taking into account their reciprocal influence.

## **2. THE INTERDEPENDENCE OF THE STABILITY FACTORS**

The explanation of connections (Fig. 1):

1. The higher or lower maintainability indirectly influences the rapidity and the quality of the execution for maintenance operations and, sure, in an indirect way, the stability.

2. The decrease, sometimes very low, of aircrafts performances, happens because of the reliability of global system. If the reliability is higher, the performances will decrease less and in a longer period of time.

3. At the same time with the increase of the easiness and the rapidity of maintenance the reliability parameters increase too, and the inverted phenomenon is true because if the reliability is high, the maintenance interventions are more rare, easier and faster; that means the maintenance parameters are higher.

4. If the management is a modern one, the operators are well trained, the performances of technical systems can be used to maximum; it is obvious that the manager of the pilots has to apply the principle "the adequate person at the adequate place", because, it is not necessary only the pilots to be very well trained, but, through joining more factors, the professional experience, the training level, behavior features, the decision factors must choose the fit people to accomplish the specific assignments (Popa, 1994).

5. This thing has to be applied in the case of maintenance teams; moreover, they have to be trained in order to be specialized in some domains to increase the workmanship and the rapidity of the execution; also, during the training program of workmen and operators, the teaching of principles and systems will be underlined at first and after that each of them will be specialized in one domain (Arie, 1979).

6. The general level of training increases because of the change of experiences between different domains.

7. The maintenance could be easier by cooperation with the superior echelons especially for difficult situations.

8. A high combat service support could be ensured by co(-)operation, especially for missions abroad but only when the frictions caused by the differences between civilizations and cultures do not appear.

9. During reconnaissance missions, the reconnaissance of the field could be executed and with the support of the obtained data the decisions about air traffic specifications will be made.

10. The method to execute the maintenance depends on the rapidity and the quality of the supply with tools, devices, spare parts and POL.

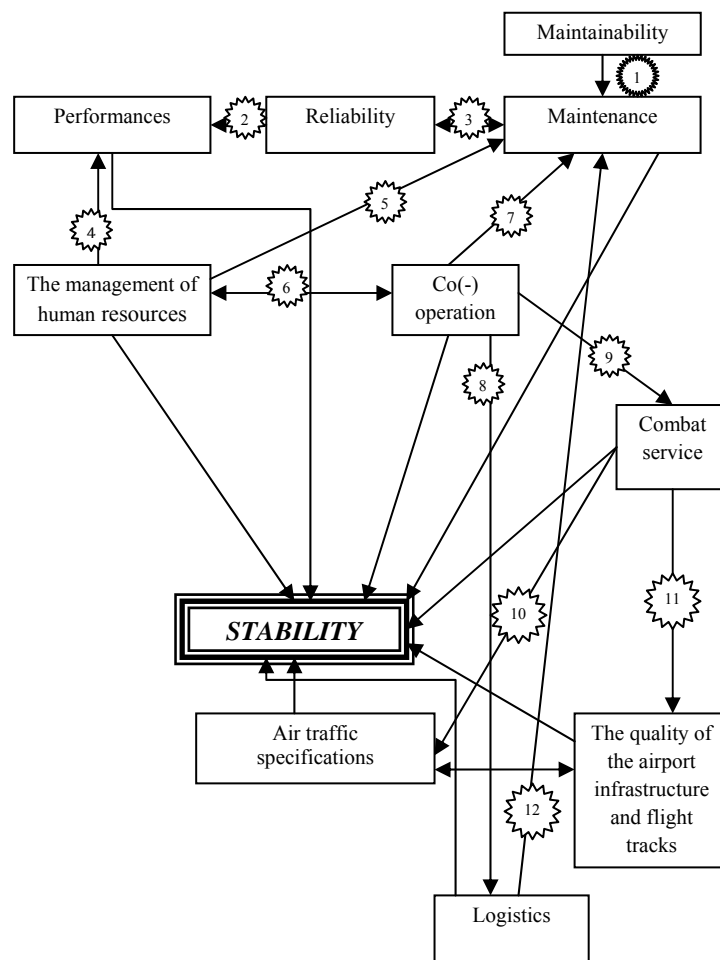


Fig. 1 The chart of interdependence of the stability factors (Aramă, 2006)

### 3. CONCLUSIONS

The stability of military vehicles is a new concept. In this work, we tried to apply this concept at the level of military aircrafts. Because it is a new concept, we had difficulties in translating it. The word *stability* will be used in spite of the fact that sometimes the words *durability*, *sustainability* (or *viability*) can also be met. This term could be confused with the older exploitation characteristic “durabilitate” (in Romanian language) that has more the meaning of reliability.

Finally, we can say that the possibility of a vehicle to execute the mission in the best conditions can be expressed best by deepening the stability factors and taking into account their mutual influence.

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