

**NATIONAL UNIVERSITY OF PUBLIC SERVICE**

**Doctoral Committee**

**by Mechanical Engineer Colonel Imre Pogácsás**

**EXAMINATION OF THE AERONAUTICAL TECHNICAL SUPPORT AND  
MAINTENANCE OPERATION OF AIRCRAFT IN THE CONTEXT OF  
ARMAMENTS TRANSFORMATION**

The author's words  
to PhD thesis

**Budapest**

**2012**

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The author's review  
of the PhD thesis entitled

**Academic mentor:**

**Prof. Dr. Gyula Óvári CSc**

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## DESCRIPTION OF THE ACADEMIC PROBLEM

One of the main problems of the modernization process of the armed forces in Hungary for years - in parallel with joining NATO- is to meet the national and allied regulations, specificities in a cost effective manner. Because of the underfunding lasting for years, the air force units exhausted their reserves, which caused the stop of the operation of the still functioning aircraft and further reduction of the flying hours.

In the Hungarian military aviation the predominantly Soviet-made equipment – purchased in the 70s and 80s – have become out of date, obsolete by now and according to the capability development objectives they are ready to be replaced or to be modernized.

Basically, there are two important principles, which get high priority: meeting the national defense capability requirements and the expectations within the NATO system.

Part of the already existing transportation and combat helicopters have reached their technical operational life cycle, another part is waiting for overhaul or life cycle extension in order to be operational until 2020. The Hungarian Defense Forces withdrew its L-39 aircraft of his service in 2009 because they reached the end of their life cycle. In 2010 we said good bye to the MiG- 29 fighters, which Hungary received in compensation of the public debt in 1993 from Russia.

During the overhaul of the 5 AN-26 transportation aircraft the modernization and integration of the avionics systems have been carried out according to the civil aviation regulations. In the Hungarian Air Force the replacement of the currently operational aircraft – except for the Gripens – is listed in the capability development plans, however it is postponed year-by-year because of its huge resource demand. At the same time, the budgetary support of the Ministry of Defense have been established until 2015 by the 2012 level, so it is very likely that the acquisition of new aircraft (helicopters, transportation aircraft) can be realized just after 2015.

The Ministry of Defense have indicated in its 10 year development plan since the 90s - beyond the replacement of the tactical aircraft – the acquisition of the transportation and training aircraft, as well as the medium transport helicopters. After careful analysis of the above mentioned requirement systems and available budgetary resources, regarding the mid- and long-term development of tactical aircraft the Hungarian Air Force elaborated its proposal for the minimum modernization of the MiG-29 aircraft; the lease of western-made aircraft and for long-term the acquisition of western-made aircraft. During this procedure the withdrawal of MiG-29 was the main reason for the purchase of the new tactical aircraft. The

modernization concerning the helicopters was planned to be carried out according to a joint initiative within the V4<sup>1</sup> framework.

Out of the above mentioned plans a single one, the replacement of the tactical aircraft was realized. This is the reason why I analyze in my thesis the effects on the operation in connection with this armament replacement, since the „technical cultural change” regarding the Gripens has not been fully realized. In the current military aviation system the so-called „western” and „eastern” armament necessitates the maintenance and establishment of different operation strategy, as well as supply, C2 and infrastructure systems beside their armament incompatibility. This duplicity is present in the regulations regarding the operation system, the necessary training and re-training as well as in the system of organizational elements and education.

## HYPOTHESIS

During the modernization and replacement of the aircraft it is necessary to analyze and rework the earlier applied technical support and operation system.

During the planned replacement of the aircraft regarding the new tactical aircraft entering into service an objective method can be elaborated for all complex military equipment.

During the so-called „technical changes” some elements of the existing operation system with the application of the NATO standards can meet the new requirements, however it is necessary to change the environment (structure, regulations, education, etc.).

## RESEARCH OBJECTIVES

In this thesis, I have set the following objectives of research:

1. During the preparation of my thesis I set an objective to examine the connections of the changes of the operation order and the related changes of the tasks concerning the technical support. To provide objective picture with scientific analysis, to emphasize the similarities and differences between the current and new systems.
2. It is necessary to analyze the effect of the replacement of armament system in connection with the existing technical support and operating system.

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<sup>1</sup> V4 countries: Poland, Czech Republic, Slovakia, Hungary

3. Regarding the replacement of aircraft my further objective is to show which theoretical selection aspects can be used in practice taking into account the NATO requirements for Hungary and factors affecting our national defense capability.

## RESEARCH METHODS

In order to achieve the research objectives:

In my thesis general and special research methods, during the processing of the scientific bibliography analysis, synthesis, induction and deduction were used. I applied the method of comparison during the analysis of the operating systems in the NATO member states.

Regarding the replacement of the tactical aircraft, during my research using the historical method I analyzed the history of the past 10 years.

In consequence of the characteristics of the chosen topic, I used analytical method during my research in the libraries and archives, then after systemizing the material I synthesized the available information.

## INSPECTIONS

In order to reach the goals that I have set, the inspections I have made are described in the following chapters:

In the introduction I listed those important factors, which inspired me to write this thesis. Emphasizing its actuality, I described the chosen research methods and objectives.

**Chapter 1.** I described and analyzed the system of the current technical support, during which I emphasized the possible problems concerning the operation of the traditional aircraft. I examined the human and materiel resource demands with the aid of describing the technical support used nowadays.

**Chapter 2.** Accepted in the bibliography and according to the aspects elaborated by myself I analyzed the available methods to be applied during the selection with contrastive method. I compared the selection method for Gripen aircraft with the methods proposed by the specialized literature.

**Chapter 3.** I carried out the analysis of the operating principles of the predominantly Soviet-made and 4<sup>th</sup> generation aircraft used in the Hungarian Air Force as well as the NATO interoperability tasks.

**Chapter 4.**Based on the armament replacement according to NATO requirements, I showed the effect on the system operation; the current strategic experiences and the operating concept meeting the Swedish and Hungarian requirements of Gripen aircraft; as well as outlined the structure of the operating organization and the requirement system concerning their activities.

In the summary of the research results of my thesis – in accordance with my objectives – I put my new scientific results in thesis listing the final conclusions and the expected scientific results. Furthermore, I made proposals for possible adaptability.

## SUMMARY OF CONCLUSIONS

In order to prove the actuality of my topic I outlined the scientific problem, which justifies the necessity of the planned armament replacement in the Hungarian Air Force. According to my objectives I described the technical support system, the concept and organizational elements of the current military aviation. In parallel with the changes in the allied system and the drastic reduction of the quantity of the equipment, I analyzed the problems related to operation of our Soviet-made aircraft. Processing the scientific literature I outlined the necessary changes in the human resources and technical support.

I described those differences and criteria, which the transport and training helicopters have to comply. To compare in practice I described the widely applicable methods, I pointed out the importance of the appropriate weighting and evaluation procedure, which can be used during the possible acquisition procedures.

I elaborated and carried out a so-called comparing analysis according to NATO standardization system, during which I outlined the modernization possibilities for the MiG-29 as well as the capabilities of the 3<sup>rd</sup> and 4<sup>th</sup> generation JAS 39EBS HU aircraft.

I proved that the direct servicing of the Gripen EBS HU fighter does not demand that kind of specification at the operating company level, which is usual in the operation at the aviation units of the Hungarian Defense Forces nowadays. In practice, it means that less experts are needed for the direct servicing of the flights, however for the periodic works so-called “specialists” are still needed.

As the synthesis of my analysis, I proved the necessity for changes of the operating system, and I described the operating strategy proposed by myself and the appropriate structure of the operating organization.

I proved that the direct servicing of the flights can really demand less experts personnel, since these are limited to the replenishment of liquids and other material, equipment, in addition the built-in self-monitoring system continuously controls the aircraft.

## NEW ACADEMIC RESULTS

The new scientific results of this thesis are the following:

1. Regarding the replacement of tactical aircraft **I revealed** the connections between the establishment of the organizational structure and operating practice during the aviation technical support of the newly applied armament systems and at the same time **I proved** the validity of these regarding the Hungarian Defense Forces.
2. **I elaborated a selection procedure** for the Ministry of Defense and the high level organizations of the Hungarian Defense Forces, which can be used in practice based on economical and efficiency aspects. This may serve as theoretical basis for future replacement of aircraft.
3. **I elaborated a comparative analysis** according to the NATO standardization system. **I carried out the analysis**, during which I described the modernization possibilities of the MiG-29, and the capabilities of the 3<sup>rd</sup> and 4<sup>th</sup> generation Gripen.
4. **I proved** that there are usable elements of the operating system of aircraft meeting NATO requirements in the Hungarian Defense Forces. Based on my theoretical proposal these elements can be applied in our national operating system using appropriate organizational structure.

## PROPOSALS ON THE USE OF THIS THESIS

I do believe that my thesis can be utilized in curriculum the aviation technology department of the National University of Public Service to teach operating procedures of aircraft. With the aid of this the cadets will be able to fully analyze the complex technical systems of the aircraft and could get a good picture in order to better understand the life cycle management aspects.

Some parts of the thesis can be used in the education system of the NCO Academy of the Hungarian Defense Forces, as well as by the Working Group established by the 128/2012 (HK 4.) regulation of the General Staff.

The experiences gained during the entering into service of the Gripen aircraft and the conditions of the establishment of this complex program can help simplify the decision making process of the replacement of other military equipment not only for the Air Force, but other special fields as well.

My research results and proposals regarding the selection principles and characteristics can be utilized in the renewal and modernization of the defense capabilities of the Ministry of Defense. As a result of this the Hungarian Defense Forces will have a force with high qualities meeting all aspects of military requirement to fulfill our national and allied requirements.

Meanwhile, I recommend my thesis to my colleagues who deal with planning and analysis of the modernization of aviation. In order to have a successful tendering these experts may use this knowledge to solve the problems during the preparation of the procurement procedures.

Budapest, 21<sup>st</sup> August 2012

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