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STUDYING THE POSSIBILITY OF JOINT-USAGE OF MILITARY AIRBASES FROM LOGISTICS' POINT OF VIEW

A KATONAI REPÜLŐTEREK KETTŐS HASZNOSÍTÁSI LEHETŐSÉGÉNEK VIZSGÁLATA LOGISZTIKAI SZEMPONTBÓL

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Abstract

This publication examines the potential transformation of the Hungarian Defence Forces' military airports (henceforth referred to as HDF) into joint-use (military-civilian) airports. Briefly, it examines this conversion as a development opportunity to advance the evolution of the HDF air logistics capabilities. Moreover, this undertaking would increase the number of domestic airports suitable for accommodating NATO transport aircraft. This joint endeavour would expand the use of existing resources to the civilian sphere aircraft with cost-efficiency. As an example, the establishment of the joint-use operation of the Kecskemét military airport is a milestone indicator of the success of such an arrangement. Based on the achievements of the joint military-civilian use of the Kecskemét's military airport, it provides a model for such joint-use arrangements at other military airports (i.e. Szolnok and Pápa). This publication briefly outlines the practical examination of the prospect of the military-civil joint-use arrangement development of a military airbase and the type of impact this would have on the air logistics capabilities of the HDF.

Keywords: joint-use airport, logistic development, military airports

Összefoglalás

A publikáció a Magyar Honvédség (továbbiakban: MH) katonai repülőtereinek közös felhasználású repülőtérre alakítását olyan fejlesztési lehetőségként vizsgálja röviden, amely lehetőséget teremt egyfelől az MH

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légi logisztikai képességek fejlesztésére, másfelől a NATO légiszállítások fogadására alkalmas repülőterek számának növelésére, valamint a civil repülőgépek által igénybe vehető erőforrások megteremtésére, és mindezt költséghatékony módon. A kecskeméti katonai repülőtér közös felhasználású üzemeltetésének kialakítása, mint példa, olyan mérföldkövet jelent, ami modellként utat mutathat további repülőterek (Szolnok, Pápa) kettős felhasználásának megvalósítása felé is. A publikáció röviden rámutat arra is, hogy célszerű lenne annak a vizsgálata, hogy egy katonai repülőtér közös felhasználású repülőtérre történő fejlesztése milyen kihatással van az MH légi logisztikai képességeire.

Kulcsszavak: közös felhasználású repülőtér, logisztikai fejlesztések, katonai repülőterek

Introduction

The timeliness of this publication is attributable to two separate but interconnected events.

The first step was the Government's Regulation² issued 242/2017. (VIII. 28.) In this government regulation, the joint (military and civilian) development of the Kecskemét airport for civilian purposes was declared as a priority undertaking for development by the Government based on national economic considerations.

The other is provided by the Zrínyi HHP³ itself, since according to scientific researchers in the field of military logistics, apart from the procurement of the newly acquired transport aircraft detailed later as an increase in capacity, "*... however, there are still many factors that make the existence of this capacity increase fundamentally necessary. However, it is essential to analyze the utilization of the currently available capabilities because only with the data revealed in this way can effective decisions be made in the future.*"⁴ In order to achieve this research objective, as I mentioned, this publication points to the joint military-

² 242/2017. (VIII. 28.) Government Regulation forming part of the Modern Cities Program for the development and generation of the necessary funding investments for the development of joint-use (civilian-military) of the Kecskemét military airport by the administrative authorities to the level of a national economic priority

³ Zrínyi National Defense and Force Development Program, previously known as Zrínyi 2026 National Defense and Force Development Program

⁴ Szászi Gábor – Orosz Réka: A Magyar Honvédség légiszállító-képességének fejlesztési lehetőségei a gazdasági és a katonai tényezők figyelembevételével. Katonai Logisztika 2020. évi 3 pp. 95. o.

civilian use of the military airports of the HDF as a development opportunity, which prides an opportunity to develop the air logistics capabilities of the HDF, and the other hand to increase the number of airports capable of receiving NATO airlifts, cost-effectively.

What are the solutions that enable the implementation of cost-effective air logistics capacity development? According to my hypothesis, such a solution could be:

- Develop the methodology for placing currently decommissioned airports for suitable emergency military use during armed conflicts (to establish lists of equipment requirements, air traffic control services, security arrangements, and to organize and deploy logistics support, etc.);
- wider introduction of joint use of military airports;
- the systematic development of partial and periodic use of civil airports' by the military (economic structure, logistics processes and equipment, etc.).

The transformation of the military airport in Kecskemét into a joint use, as a precedent, can show a model for the dual use of the other two currently operating military airports. Domestically, the number of out-of-service airports with paved runways is significant. The sequence of the future development of airports and the prediction of the profitability of investments is a scientific research task that has occupied scientific researchers in the past, and pointing out the timeliness of this research task is also the primary objective of my present article. During this research, it is advisable to examine the operational processes of global logistics networks, taking into account their impact on the operation of regional airports to be developed.⁵ As indicated by the legislative considerations, currently, it is considered a domestic and national priority to place a concerted effort into creating joint use of military airports. Dr. Gyula Keszthelyi, Brigadier General (retired), published his paper in 2014 describing this process as follows: "EUROCONTROL carried out a comprehensive study, focusing on the conditions required for placing military airports as part of the civilian air traffic system. Of course, it is not enough for military airports to be capable of receiving civilian aircraft; they must also offer competitive pricing and the ability to provide

⁵ Novoszáth, Péter - Szilágyi, Balázs: The importance of overseas flights in the development of Central European regional airports. Aviation Science Bulletins 32: 105-124., 2020.

adequate services to potential customers."⁶ However, in addition to economic concerns, there are many legal, standardization, logistical and technical - air traffic control, radio-technical and radar, communication and IT, security-technical, etc. issues briefly listed in later chapters in connection with the creation of joint-use airports which, raise questions and should be resolved.⁷

1. The current HDF's Fixed Wing Air Transport Capabilities

In terms of military aviation, the Zrínyi HHP represents such a qualitative and quantitative development milestone, which could not go unnoticed in military transport aviation.⁸ Prior to the implementation of the force development program, the HDF did not have its air transport capability, which could have carried out the full range of logistical support for operational tasks. During its 46 years of service, the An-26 aircraft, retired from service in 2020, represented the only fixed-wing airlift capability. These aircraft partially performed government VIP transport tasks, and commensurate with their range and payload capacity, they were regularly used for mission support tasks. Several times, they performed "well above their limits" in providing support to tasks in Iraq and Afghanistan. Still, these and the ever-decreasing operational capability pointed out the need to acquire new fixed-wing transport aircraft in line with the HDF's operational objectives.

As a supplement to its capabilities, the HDF ensured its operational and strategic airlift needs were met through numerous bilateral military agreements, civil contracts, such as the ATARES⁹ and SALIS¹⁰ programs, airlifts, the American Lift & Sustain program and the NATO

⁶ Dr. Gyula Keszthelyi: EUROCONTROL's policies for the joint use of military airfields, the evolution of airport usage fees at airports with varied traffic volumes. Military Logistics, Edition 1, page 59, 2014.

⁷ Dr. János Csengeri: Presentation of the domestic legal background of the civil-military use (operation) of military airports. Aviation Science Bulletins, No. 2 of 2014. and István Rai: The necessity of dual use of Hungarian military airports, the possibility of implementation, with particular regard to the IT system of radio navigation and commercial aviation, as well as joint air traffic control Military Logistics Edition 1, p. 7, 2014 and Oszvald Juhász: Mobile security technical protection of equipment offered to NATO. Thesis work, Óbuda University, Donát Bánki Faculty of Mechanical and Safety Engineering, 2014.

⁸ László Nagy - Miklós Szabó: The development of the combat air transport capability in the Hungarian Defence Forces. The introduction of the KC-390 Millennium aircraft LV – 2021/2 MILITARY TECHNOLOGY pp. 27–33. DOI: 10.23713/HT.55.2.05

⁹ Air Transport & Air-to-Air Refuelling and other Exchanges of Services (ATARES): Agreement on the exchange of air transport, air refuelling and other services

¹⁰ Strategic Airlift Interim Solution (SALIS)

SAC¹¹ program. Lieutenant Réka Orosz and Colonel Dr. Gábor Szászi analyzed the decreasing trends of participation in these programs in their publication entitled "Development possibilities of the air transport capability of the Hungarian Armed Forces Taking into account the economic and military factors." They pointed out the need to re-evaluate the available opportunities and, on the need, to make the necessary decisions about their future retention.

Taking all of this into account, the main basis of the publication is the fact that the number of transport aircraft used by HDF within the framework of the Zrínyi HHP began to increase dynamically. Both military transport aircraft and civilian aircraft used for military transport tasks were purchased. During the development of the Air Force, new transport aircraft appeared in Hungary, which currently two Dassault Falcon 7X, two Airbus A319-112, and two Embraer KC-390 (at the time of publication, with planned arrival in the second half of 2024).

The two Dassault Falcon 7X long-range, multi-purpose connecting and transport aircraft are not often involved in the provision of HDF's tasks (at the same time, it is also capable of performing some special military transport tasks). Still, due to its capabilities, it replaces the governmental functions that are provided by HDF threads.

The most significant capability development was the appearance of two Airbus A319-112 troop transport aircraft. These are suitable for the fast, safe and efficient transport of HDF personnel and non-palletized personal equipment. Still, it is also available for Hungarian and allied citizens in the event of an air evacuation task. Thanks to its modular interior design, it can also be suitable for air medical evacuation tasks.

With two KC-390 aircraft, the HDF will be able to deliver large loads weighing up to 26 tons¹², including military equipment, vehicles, and personnel, to their destination, even under operational conditions. Thanks to its special design, the plane is suitable for take-off and landing in poor-quality terrain (e.g. rammed grass or soil-stabilized airports) outside concrete airports, as well as for parachute airborne operations. Its equipment can enable emergency evacuation, large numbers of sick and wounded transport tasks, and aerial refuelling.

Let's look at the combined air transport capabilities of the six aircraft. It can be said that, in accordance with the current level of ambition, the

¹¹ Strategic Airlift Capability (SAC)

¹² <https://defense.embraer.com/global/en/c-390> 05/03/2024)

requirements for the full fixed-wing air transport capability of the HDF can be met both in civil airspace and in the operational area. The long-distance air transport needs of tasks arising from allied or international commitments - such as transport of troops or medical evacuation tasks, etc. - the Hungarian Air Force will thus be able to solve with its means.

Of course, in addition to the acquisition of the aircraft, the operating staff carried out training, and the equipment and systems necessary for the ground service were also purchased. The purpose of my present publication is not to present them either, but they also contributed significantly to the development of air logistics capabilities. In addition to all this, the Kecskemét airport is undergoing a comprehensive infrastructural development.

2. Trends in domestic civil aviation in terms of air passenger and cargo transport, taking into account the development processes of industrialization, tourism and the national economy

All of what is described in the previous chapter represents the appearance of a capability whose use by the civil industry or residential sector that is present in the region or that will develop in the near future is recommended.

The development of air passenger transport and freight forwarding shows an increasing trend worldwide, to which our country is no exception¹³ - think here of the dynamic development of "discount" passenger flights in recent years and decades. Here, in line with the demand, the supply also increases significantly, but in order to reduce costs, these airlines try to operate their flights from smaller airports. This increasing passenger traffic allows airlines to expand their route networks and fleets. Low-cost airlines are becoming more and more popular among domestic travellers as well and are generating competition with traditional airlines on certain route sections. This arrangement usually results in lower prices and a wider range of services, which attract a wider range of travellers.

Due to climate change, the shift towards green technologies has also appeared here. Among the forms of transport, air transport has the highest carbon footprint per passenger kilometre¹⁴ (nine times that

¹³ <https://www.ksh.hu> (03/10/2023)

¹⁴ <https://ourworldindata.org/travel-carbon-footprint> (03/10/2023)

of buses and seven times that of diesel trains). Thus, due to the growing need for environmental awareness and sustainability, the aviation industry is increasingly developing its green technologies, such as fuel-efficient aircraft and alternative fuels. Many specialists are engaged in researching these in Hungary as well.

There is a rapid digital revolution in many other areas of life, including the aviation industry. The travelling public and airlines alike demand digital solutions such as online ticket bookings, mobile applications and automated services.

Thanks to the investments of both Western and Far Eastern countries, the regional development in some focal points of Hungary has become permanent. Regional airports and airlines play an increasingly important role in transport networks, especially for larger cities and industrial regions.

The constant growth of tourism and the increase in the number of foreign visitors have a significant impact on the development of domestic regions, as well as on air travel and subsequent requirements for regional airports. The opening of new tourist destinations (travel interests) and the development of tourist infrastructure drive this trend.

Technological innovation in the aviation industry has also seen leaps and bounds in recent years. Robotics, artificial intelligence, and automation, which have been around for a long time but are being completely transformed based on them, are becoming more and more important, making operations more efficient and improving the passenger experience, for example, in the areas of self-service checkpoints or machine maintenance.

In addition, the air cargo transport business is constantly undergoing significant advancements. This progress is due to the advancement of domestic industry and the increasing number of industrial companies engaged in production demands of "just-in-time/just-in-sequence" as dictated by the logistics needs. In today's industrial installation processes, the proximity of an airport is usually taken into account, which is related to "just in time" logistics, international relations, the necessary movement of highly qualified industrial specialists and the management as well as the operation of multinational companies. This principle negates the requirement for large local warehouses but stipulates that the materials needed for the production process arrive at the right time/in

the right order. In case of a need for fast transport deliveries, the existence of smaller airports in close proximity is one of the best methods, even from the environmental protection perspective, as well as for reducing overcrowded road networks and cost efficiency.

Of course, in certain regions of Hungary, the construction and maintenance of even a small airport is not cost-effective for some industrial companies; however, there is a growing requirement for the capacity to provide rapid transport services. It can be observed that the small aircraft traffic¹⁵ between cities and airports located on the outskirts of cities is also increasing worldwide, and there is also a demand for this domestically. Taking these into account, one of the economic options seems to be the conversion of existing military airports into joint-use military-civil airports.

In accordance with all of these trends, Government Regulation 242/2017. (VIII. 28.) directed the development of Kecskemét airport into a joint-use (military and commercial) facility, to be realized within the framework of the Modern Cities Program and as a priority matter from a national economic perspective.

Pursuant to the referenced legislation, all administrative authority considerations for the implementation, commissioning, and start-up of operation, as well as directly related road construction, utility connections, and utility development works, must be considered as being related to the investment. Among the public administrative authority cases related to investment and considered to be of priority importance from the national economy's perspectives are as follows:

- construction authority's reception and approval;
- environmental protection and natural resources conservation authority's approval;
- approval of the surface road and railway authorities:
- approval of the water and water protection authorities:
- land development authority's approval;
- official land survey procedures;
- real estate registration procedures;

¹⁵ Global Air Travel Demand Continued Its Bounce Back In 2023,
<https://www.iata.org/en/pressroom/2024-release/> 01/31/2024 (03/18//2024)

- fire protection procedures;
- compliance with communication procedures;
- construction licensing procedures for authorizing particular types of buildings are within the jurisdiction of the technical safety authority;
- forest protection procedures;
- weight and measurements technical safety authority licensing;
- military aviation authority procedures;
- civil aviation authority procedures;
- regional planning authority procedures; and
- procedures for cutting woody plants.

The non-exhaustive list also indicates how many facets of public administration and the national economy of a planned airport opening to commercial air traffic in a region can impact and how an operating airport further logrolls a trend that may trigger other entire processes.

The possibility of a proximity airport is a significant step forward in improving the accessibility of the region. This new airport will facilitate travel to and from the area and will have a positive influence on tourism and business activities. Simpler and quicker travel helps develop tourism and business relations and can attract new investors and businesses to the region. The appearance of the airport usually generates an increasing demand for accommodation, restaurants, tourist attractions and various services. These changes generated by a new-use airport can result in the creation of new jobs in these areas, which will stimulate the local economy and quality of life.

The industrial sector can also enjoy significant benefits from the presence of the airport. It becomes easier for industrial enterprises to reach global markets and facilitate import-export processes. The new airport encourages industrial activities and business growth, which can result in long-term economic prosperity for the region. In addition, the construction of the airport can contribute to the development of the local infrastructure. New roads, railway connections and other transport networks can be built to serve the airport, which can bring further economic and social development to the surrounding areas.

However, it is also important to take notice of the environmental effects of a new airport, and it must be planned and operated to be sustainable in order to minimize the stress on the environment and to preserve the natural values.

3. The number of domestic airports with the capability to accommodate HDF and NATO allies' fixed-wing air transport operations and their degree of utilization

Compared to the territory of our country, it has a considerable number of non-operational hard-standing (paved runways and taxiways) airports. In contrast, the number of international airports in active use is small.

Airports with hard-standing facilities are valuable infrastructural elements of the national economy; their degree of utilization is an important factor from an economic point of view as well as from a military perspective. The success of the deployment of NATO reaction forces to the eastern border – as a military operation – depends to a large extent on how quickly the deployed forces reach their designated (operational) positions.

NATO responded to the recently significantly changed geopolitical situation by developing completely new strategic plans, one of the key elements of which is the new airports of embarkation/debarkation. These new plans are indicators of the significantly increased importance of capabilities to move forces. József Venekei and Gyula Szajkó pointed out in their article "Hungary's possible role in NATO's RSOM operations" that:

*"the reception, staging and onward movement of forces (RSOM) has also increased in value for the allies, which the new security challenges can explain. The operations carried out by Russia (annexation of Crimea, large-scale mobilizations and exercises, and the conflict in eastern Ukraine) prompted the North Atlantic Treaty Organization to indicate as a response its ability to increase the use of forces and by maintaining and implementing various exercises, training and developments. The experience so far shows that Hungary can play an active role in the movement of forces from the assembly area to the location of the exercise."*¹⁶

¹⁶ József Venekei, Gyula Szajkó: Hungary's possible role in NATO's RSOM operations. Military Review, Volume 13, Number 4

This time factor regarding air transport and the speed of deployment is what, among many others, highlights the importance and necessity of air transport capability in the defense of our country, which is implemented in the circle of NATO allies.

A significant element of Hungary's infrastructural establishments (as a valuable national asset) is the fifty-five small and large airports (with runways, taxiways and hangars, railway lines, fuel storage facilities, etc.).

In addition to the three military airports, there are five public international airports, three public airports and several non-public airports in the country. It is also worth noting that four of the five non-operating airports have longer than 2,000 m and - with the exception of Csákvár airport - 60 and 80 m wide concrete runways.

At present, the following airports function operationally in Hungary^{17,18}:

Public international airports:

- Budapest Ferenc Liszt International Airport;
- Debrecen International Airport;
- Győr-Pér international airport;
- Hévíz-Balaton International Airport;
- Pécs-Pogány International Airport.

Public airports:

- Meidl Airport Fertőszentmiklós;
- Nyíregyháza Airport;
- Siófok-Kiliti Airport.

Military airports:

- HDF Sir Szentgyörgyi Dezső Aviation Brigade (Kecskemét);
- HDF 47. Air Base (Pápa);
- HDF József Kiss 86th Helicopter Brigade (Szolnok).

¹⁷ Source : https://legifoto.com/magyar/oldalak/magyarorszag_i_repuloterek/ (03/12/2024)

¹⁸ <http://www.hungaryairport.hu/airport.php> downloaded: 03/05/2023.

Airports with paved runways longer than 1000 meters:

- Békéscsaba;
- Kalocsa;
- Kiskunlacháza;
- Szeged;
- Tököl.

Until its closure in 2004, the Taszár Airbase was still in exceptionally good condition, thanks to the fact that the Hungarian and American forces used it, so it was not characterized by a large degree of deterioration.

The listed airports are in varying conditions of infrastructure, hangars, fuel storage facilities, railway lines, etc. It should be noted that the connectivity of airports to the road and railway networks is not uniform - these areas in themselves are the subject of current scientific areas of studies conducted by civil and military logistics organizations.¹⁹

In accordance with the relevant legal requirements, the following services, among others, operate at the three currently operational military airports:²⁰

- air traffic control service;
- redundant telecommunications;
- ground flight control systems;
- aviation meteorology service supervised (maintained) by a certified aviation meteorology service provider, regular METAR (Meteorological Aerodrome Report) and TAF (Terminal Aerodrome Forecast) preparation;
- controlled airspace;
- precision instrument guided runway (minimum CAT I - category);
- partial ground aircraft and fuel servicing;

¹⁹ Gábor Szászi: Examination of the current situation of the transport infrastructure related to Hungary's military airports in the light of the new Allied Strategic Concept. Aviation Science Bulletins 14: 2 pp. 23-28., 2002. and Gábor Szászi: The situation of the railway connection of airports is important from a defence point of view in Hungary. Aeronautical Bulletin 21: Special issue pp. 1-22. 2009

²⁰ XCVII of 1995. Air Transportation Act, as well as 141/1995. (XI. 30.) Government Regulation No. XCVII of 1995 Air Transportation Act Implementation

- rescue, technical rescue and fire-fighting service corresponding to the level prescribed by ICAO²¹;
- AFTN²² connection;
- Snow removal equipment and
- armed security service (guards).

In addition to all of this, the following procedures, inter alia, have been established:

- air navigation;
- flight safety;
- noise reduction and environmental protection;
- emergency response; and,
- military-related procedures.

All these systems and services, the necessary equipment, and the personnel to operate them are not always actively used by the military on a 24-hour-a-day basis, but their existence is essential. Thus, there is the possibility of supplementing these services with civil resources in the development of these airports so that the available human and technical resources can be fully utilized.

4. Joint military-civilian use of the HDF's military airports as an opportunity to develop air logistics capabilities

Nowadays, the issue of the most economical use and operation of military airports is receiving a lot of attention, and joint (military-civilian) utilization can be a key to this solution. According to Dr. Gyula Keszthelyi, Brigadier General (retired)²³: "The most important conclusion that can be drawn from international experience is that the development of air transport makes it indispensable not to include military airports in civilian traffic, as the construction of new airports usually runs into en-

²¹ International Civil Aviation Organization

²² Aeronautical Fixed Telecommunication Network

²³ Dr. Gyula Keszthelyi: International experiences of the joint civilian-military use of military airports, Hungarian opportunities Military Logistics, Edition 1, Pg 40, 2014

vironmental obstacles." This solution can, on one hand, reduce the military airport maintenance costs and create new sources of income, and, on the other hand, add new airfields to existing commercial airports.

The joint, military-civilian design of the military airport in Kecskemét also marks an era - as a kind of joint civil-military air logistics and economic model that other airports can follow in the future.

Many spectacular elements of the ongoing developments in Kecskemét have already appeared, and the development of the joint-use airport concept will follow suit in time. With these resources belonging to the civilian or other ministries, the HDF acquires capabilities that it can use to fulfill its domestic defence as well as those obligations arising from its alliance membership. Thus, HDF, as an operator, in addition to significant cost savings, could achieve a spectacular increase in capabilities and may even create additional sources of income.

At this time, in some large domestic cities – Kecskemét, Debrecen, Győr, Szeged, etc. - the extent of its industrialization is significant (e.g., the building of manufacturing facilities of Audi, Mercedes, BMW, etc. companies). Thus, it is appropriate to examine how existing military airports in operation or were previously in operation can be turned into joint-use airports. Colonel György Grécs investigated this topic in his article entitled "The issues raised by a mixed-use military airport."²⁴ Here, he pointed out that this transformation and development is a long process, and in addition to economic, social and regional interests - all of which favour the joint use concept - the decision-makers must take into consideration the changes in the geopolitical environment, the increasing military alliance presence and the resulting interests.

The legal stipulations of the joint-use as defined by the Air Transportation Act and the relevant Government Regulation on its implementation. The establishment, development and termination of an airport, as well as the designation and utilization of the safety and anti-noise protection zone, among others, are regulated by separate legislation. In the case of a joint-use airport, the majority of these processes also require the authorization of the Minister of National Defence.

In the case of a joint-use airport, in addition to domestic laws, it must also meet the requirements of the European Union and ICAO; in the

²⁴ György Grécs: Issues of mixed use of a military airport. National Defense Review, No. 4, 2018

case of a military alliance collaboration offer, it must meet NATO requirements. Compliance is checked not only during the design and accreditation phases by the organizations listed above and competent authorities but also continuously during its time of operation.

During the establishment, conversion, and development phases, the applicable standards for airport facilities, utilities, and public roads must be complied with. As I have indicated previously, the Kecskemét Airport is experiencing a comprehensive infrastructural development. The overarching aim of the planning is to coordinate domestic, NATO Alliance, and other development, energy, and procurement programs in such a fashion that they are built on each other. Still, the allied and national interests and requirements are considered to be of primary importance.

With the involvement of financial resources from other sources, many of the skills listed in the previous chapter can be developed, but new skills could also be developed. Most of these are the developments in air logistics capabilities.

The development of the airport will offer the military the possibility to expand its infrastructure, including runways, taxiways, parking aprons, terminals, warehouses and other facilities. These developments will increase the airport's capacity and ability to accommodate a variety of aircraft and storage space to house other equipment and supplies. The surplus storage base capacity at the airport can serve as a logistics base in support of military operations. This may include storage of equipment and materials, refuelling services, medical services and other miscellaneous support services. The increased capabilities of the airport could enable the military to respond more rapidly and efficiently to various situations, including short-notice military operations, humanitarian assistance or emergencies.

One of the results of the airport development area could be the increase in fuel and refuelling capacities. This can contribute to and form the basis for the storage of the stocks and, if necessary, supply the refuelling needs of allied forces at the airport. Improved transport capacity can support the military supply chain by enabling rapid and efficient transport of military supplies within the airport. This may include the transportation of equipment, supplies, and other necessary resources.

During the operational use of military airports, one of the outstanding tasks is the support of the RSOM operations already mentioned in Chapter 3. Thus, the road and rail network surrounding the airports and connecting to them must be taken into account.

Previous research²⁵ in this direction has already pointed out that the quality and redundancy of railway connections at airports cannot be said to be good. In addition, Tamás István Arдай and Dr. Bence Tóth pointed out in their study "Mathematical modelling of the capacity constraints of the Hungarian railway network with special regard to the transport tasks of the Hungarian Armed Forces" that in the case of maximum distance to be travelled and time-restricted transports - which are required, for example, during RSOM operations - the Hungarian railway track capacity is insufficient²⁶.

These studies have pointed out the need for serious improvements for the entire railway network in order to increase the total transit capacity, which could also serve the military airports. However, ongoing research and completed studies²⁷ show that the interests of the HDF must be taken into account when planning these developments and that it is necessary to develop not only the railway network but also the rolling stock that runs on it. This joint military-civilian development co-operation could result in a serious increase in military capabilities, the utilization of which is in the national interest.

Moreover, this type of development can provide an opportunity for military health care and the establishment of an operational support health organization. This may include the establishment of a mobile medical hospital, the availability of medical equipment and personnel that can respond quickly and efficiently to the care of the wounded, and medical assistance at the airport if appropriate contracts are in place.

The above list is only a very short list of examples of how the conversion of a joint-use airport and related developments can be included to increase existing military air logistics capabilities.

²⁵ Levente Kerényi, Bence Tóth: Qualification of alternative railway routes for the transport tasks of the Hungarian Defense Forces. *Military Logistics* 28 (1-2), 79-99.

²⁶ Tamás István Arдай, Dr. Bence Tóth: Mathematical modelling of the capacity constraints of the Hungarian railway network, with particular regard to the transport tasks of the Hungarian Armed Forces. In: Balázs Horváth, Gábor Horváth (ed.): XIII. International Transportation Science Conference /XIII. International Conference on Transport Sciences, Győr, Transport Science Association, Győr, 2023, 270-279

²⁷ Bence Miklós Somogyvári, Dr. Bence Tóth: The role of the V0 railway line in fulfilling the transport tasks of the Hungarian Defense Forces In: Balázs Horváth, Gábor Horváth (ed.): XIII. International Transportation Science Conference /XIII. International Conference on Transport Sciences, Győr, Transport Sciences Association, Győr, 2023, 335-346.

5. The propensity to deploy fixed-wing aircraft of the Air Force on public roads and domestic airports in case of emergency

Experiences gained in World War II, then in the Cold War and the First Gulf War have indicated – that at the outbreak of hostilities, the first attacks are aimed at airports by the adversary – thus, it is advisable to disperse air assets in the event of a war. As a result of technical development (the creation of "smart" weapons and the development of rocket artillery nowadays), the threat to military airports has increased significantly.

It was then that they began to develop the conditions for operation from highways.²⁸ Many improvements have been made to reduce take-off and landing distances in the combat aircraft category. Various STOL²⁹ and VTOL³⁰ /STOVL³¹ combat aircraft have been created and are still being developed; for example, the latest F-35 aircraft also has this variation (F-35B and F-35C).

The Swedish defence doctrine includes the operation of aircraft from emergency airfields and highway sections. An important element of Swedish military thinking is the special "Air Base Concept." Based on this, in a war situation, all military aircraft are quickly dispersed to a large number of temporary bases, where national roads are also used as runways, thereby making the air force less vulnerable in the event of an enemy attack. This strategy places special demands on the aircraft's capabilities by enabling its combat use from a short and particularly narrow runway.

When designing the fourth-generation JAS-39 Gripen, it was therefore of primary importance that the type of aircraft could be operated from emergency airports and public highway sections on a temporary, case-by-case basis. An important role in reducing the landing distance of the type is played by the duck-shaped control planes, which can be used as brake pads when deflected by 90 degrees, as well as by the effective, anti-locking carbon disc brakes equipped with nose wheels. Thus, the Gripen can stop within 800 meters with a normal landing

²⁸ Hennel, Sándor: Military limitations, applicability, and circumstances of the formation of aircraft emergency landing sites outside the airport. Aviation Science Bulletins 22: 2. no. 2010

²⁹ Short Take-Off and Landing

³⁰ Vertical Take-Off and Landing

³¹ Short Take-Off Vertical Landing

mass. In order to facilitate short landings, the aircraft's three-point undercarriage is designed to withstand higher-than-average loads, as point landings without levitation are often performed to reduce the taxiing distance after landing.

Therefore, the Gripen, although it is not a classic STOL design, is structurally capable and suitable for operations from a short section of highway. Such road sections exist in our country. However, their number is limited, so the possibility of resettlement can be favourably supported by the large number of domestic airports available - including the abandoned airports that are no longer in operation (Kunmadaras, Csákvár, Taszár, Kiskunfélegyháza, Orosháza, Balassagyarmat, Kisköre, Mezőkövesd, Érsekcsanád).

The possibility of pre-deployment of combat aircraft during offensive operations determined the success of the battle forward-located advanced forces based on the constant air support provided by the disbursed aircraft. For this reason, a more in-depth examination of which airports, currently in operation or out of operation, can be included in military use is also recommended.

Summary and Conclusions

There used to be several military airbases in Hungary, of which only three are currently in operation. In addition, there are many airports with concrete runways which could be used for military operations.

In order to make increased use of the existing airport capacities, it is advisable not only to develop the currently active large airports but also to ensure the joint military-civilian use of the military airbases (Kecskemét, Pápa, Szolnok).

A large number of airports that can be placed into domestic, commercial use - even by re-commissioning abandoned military airfields - could enable the dynamic development of several sectors of aviation (international passenger traffic, cargo traffic, domestic passenger traffic, sport aviation, pilot training centers) in the future.

The aim of my article was not to examine all the logistical aspects of the transformation into a joint-use of airports. I only wanted to point out that it is advisable to examine more thoroughly the impact of the development of military airbases into a joint-use airport or the developmental

impact of some civilian airports on the Hungarian Defense Forces' air logistics capabilities.

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