

## NEED FOR UNMANNED AIRCRAFT SYSTEM

### *Abstract*

*Napjaink modern pilóta nélküli légi jármű rendszerei – Unmanned Aircraft System – egyre markánsabb szerepet töltenek be a modern hadviselésben. Egyes típusaik képességeikben megközelítik, bizonyos esetekben meg is haladják a pilóta által vezetett repülő eszközök képességeit. A szerző a cikkben arra ad választ, hogy elsődlegesen melyek azok a tényezők, amelyek szükségessé teszik az UAS-k katonai alkalmazását.*

*Today's Unmanned Aircraft System (hereinafter UAS) has increasingly become a determinant element of the modern warfare. Capabilities of some types of the systems are nearly the same or sometimes better than the capabilities of the aircraft flid by a human pilot. The Author emphasizes the primary factors of need for UAS in military operations.*

**Keywords:** *pilóta nélküli légi jármű, pilóta nélküli légi jármű rendszer, monoton, szennyezett, veszélyes, kevésbé költséges, unmanned aerial vehicle, unmanned aircraft system vehicle, dull, dirty, dangerous, less expensive.*

### Introduction

Armed conflicts, changing conditions of warfare are the reasons of the increasing need for military use of UAS, principally owing to their efficiency in reconnaissance.

Countries which have been at the cutting edge of bringing these systems into service - Canada, France, Germany, Great Britain, Italy, Russia, USA, - have applied a significant number of military forces in armed conflicts in the last decades. Beside these countries UAS are widely used in those states which have been or might be in conflict on real or presume reasons with their neighboring – such as Israel, Iran, India, Pakistan, South- Africa, and Turkey. UAS used for only military purposes are in service more than 30 countries to date. Though Europe is not considered as a conflict zone, more than 20 countries have brought into service these systems. Among them we can find some countries with similar armed forces capable than Hungary. [1] As for the countries in direct neighboring of Hungary, Romania, Croatia and Ukraine have UAS for military purposes.

For those who are familiar with UAS, these facts are not new as well as that from this year HDF also has UAS. The Ministry of Home Defense announced a tender for buying two mini UAS in 2006. The winner of this tender was the Polish WB Electronics with its SOFAR system. Owing to this tender and the bringing into service following Hungary became one of those countries which have modern battlefield unmanned vehicles.

During the last decades a significant modification and development could be observed concerning the UAS. Introducing these developments and technologies made them capable for new tasks. Today their primary missions are gathering information (air reconnaissance and monitoring), carrying out EW and communication tasks, and there is an increased need for application in armed conflicts. As a consequence, it can be seen that the technological

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development made them capable for more new tasks in a short time.

During the last few decades, need for application of UAS which is the consequence of the followings:

The essence of armed battle has been significantly changed. In among others, effect-based operations (EBO) on non-linear battlefields and rapid process of events are the reasons of this. Real-time intelligence is increasingly important in new situations, at decision making and application level as well. According to the concept of EBO and different political, social, economic, legal and humanitarian factors, precision weapons are increasingly wide range applied. The most accurate intelligence and target information are essential for the efficient application of these weapons as well. Today Unmanned Aerial Vehicles (hereinafter UAV) are able to meet the need for air intelligence, firstly on the base of their comprehensive application and network warfare capability.

Protecting human life has been reevaluated in modern warfare. Increasing protection of soldiers on mission is getting more stressed in the field of political and military planning. Contrary, according to the application of modern weapon systems, reconnaissance and destruction probability of air defense have been increased. Risk for losing aircraft and their crew in battle has been higher. Mainly due to the smaller radar cross section, it is more difficult to observe UAVs by the air defense system than aircraft with crew. Therefore, air defense activity against UAVs is less efficient.

Among others, these are the reasons why military leaders are looking for such military technology that can be applied efficiently in missions endangering human life. Relatively low cost of production, maintenance and operation has promoted their wide-range spreading.

### **Need for application**

Over the technical limits in military flying there is an other factor which has restricted and will restrict the development. This is the human factor – the human who handle and apply the aircraft.

Namely, on the one hand there is the physical capability of people which means the maximum overload, the need for relaxation, refreshing and other hygiene elements.

On the other hand there is the human psyche: afraid of danger, tend to be careful, avoid solving problems in difficult situations. Related to this there is the undertaking the minimum risk, the worrying about the life, the only one thing which cannot be replaced.

The factors listed above could probably result in the appearance of UAS in the certain of military flying, owing to being less restricted by those factors.

The aircraft is only a tool, the pilot is a human – and these two are not the same. The pilot cannot make better but worse the flying capability of modern aircraft (speed and altitude, long-term operation, the G-force and acceleration). For this human became the limit of applying new technologies and the opportunities gaining from these technologies. Nowadays UAS are so high-tech that they are more efficient and safe in carrying out tasks than aircraft flied by a human pilot. Furthermore, applying them is to prevent the unnecessary risk to endanger of human health and/or life.

Today concerning the tasks carried out by UAS, the „D<sup>3</sup>” expression is well-known. The three words **“Dull, Dirty, Dangerous”** mean the tasks in which UAVs can operate more efficient than the aircraft flied by a human pilot. **„Dull”** means monotonous, referring for long-time, tired missions such as strategic air reconnaissance, long-range air transport and air attack. The specification of these tasks is that the attention and the concentration of the crew are reduced after a certain time of the mission which endangers the success of the mission and the safety of the crew. The continuous flying hours of a U-2 reconnaissance aircraft can be 12 hours. [2] The pilot, the only one person on board is sitting in a small cockpit full with special

machines and tools and bad conditions of view. In the Kosovo Conflict, 1999, the American B-2 bombers took off from Missouri, flew over the Atlantic then after attacking their targets in Kosovo, returned back to the homebase. The flying hours reached the 30 hours in every case, and 40 hours in one case. [3] It was clear after the first missions that the crew of the B-2 flying with two pilots was overloaded by those long-term missions required serious concentration, although the fact that B-2 is one of the best aircraft equipped with digital computer-assisted integrated fly control system, and the „only” task of the pilot is the continuous control of the aircraft systems. To carry out these monotonous and tired missions UAS are more appropriate. Namely, USA has applied for years Global Hawk UAS which is able to fly 34 hours continuously. [4]

The other expression is the „**Dirty**”, that is contaminated, infectious, radioactive, referring to those missions which have to be carried out in radioactive, biologically or chemically contaminated area. Mass destruction weapons and the vehicles delivering them mean a potential threat. That is the reason why the leading countries of the world try to prevent it. Nowadays this threat primarily relates to the nuclear program of Iran, the nuclear tests of North-Korea, the relationship of India and Pakistan, and the unstable internal status of the former Soviet Union member states. [5] Furthermore, the unintentional or intentional catastrophes in nuclear power stations or vehicles operating with nuclear material (aircraft carriers, submarines), in chemical factories, biological laboratories result in serious contamination. After such a catastrophe in rescue activities, elimination of damages air reconnaissance has an important role. Most of the tasks can be carried out with UAS as well in order to avoid the unnecessary risk to endanger pilots’ health.

„**Dangerous**” can be read in two ways from the point of my analysis. The first approach refers to the danger waiting for the participants of the air missions, primarily in those cases when air surveillance has not reached the appropriate level yet. In these cases enemy air defense means the highest risk for our friendly air forces. Some of the most dangerous tasks are the air reconnaissance carried out over enemy territory, the SEAD - Suppression of Enemy Air Defense - and the air-to-ground attack.

According to the second approach „Dangerous” refers a possible political risk which must be taken into account by decision makers in the case of handling a conflict. In such a situation losing the pilot of the aircraft or being caught by the enemy might significantly influence the result of the mission. In contrary, shooting down a UAV can be easily explained and does not necessarily lead to a more dangerous situation.

The backers of widespread using of UAS apply the „**LE**” - „**Less Expensive**” – expression for showing that UAS are cheaper than aircraft flired by a human pilot. But this statement is not necessarily true for every UAS. There is a close relation between the weight and geometric size of the UAVs. The sizes determine the place for useful load, so in consequence if the UAV is simpler and lighter it is cheaper as well. The manufacturers determine the price of the UAV as the followings: 1500 USD/pound (without useful load), 8000 USD/pound for useful load. [6] That means, the price of a tactical UAV with useful load can be 130 000 USD - 6 million USD, while the price of a strategic UAV (Global Hawk) can reach the 60 million USD.

The price of tactical aircraft is similar to the strategic UAV – price of a Gripen without useful load (2006) is 13 345 USD/kg (29420 USD/pound, totally 68.9 million USD/aircraft. [6] It can be seen that the price of the UAS up to tactical level is lower than the price of the modern tactical aircraft. The relatively low price of UAS is influenced by several factors such as simple and cheap technologies used for manufacturing, high-numbered series and integration only of the most essential on board systems required for carrying out the mission. There is no need for large, expensive tools ensuring the comfort and essential life conditions for the pilot, so the final cost of UAS is significantly reduced.

As for the strategic UAS and UCAV - Uninhabited Combat Air Vehicle - under testing this is not true. Due to their large size and useful load and high-tech requirements these vehicles are not cheaper than the aircraft flired by human pilot. This is the reason why only the countries with the most stable economy are able to buy and keep them in service.

Concerning the operation, according to the experts emphasizing the low cost of the systems, maintenance indicators of the UAS are better than the aircraft flired by a human pilot. UAS do not require difficult infrastructure for operation, shelter, take off and land. No need for expensive and long-time pilot trainings. Those pilots who are not fit for flying anymore can be retrained as UAV operators; cost of training flights can be reduced due to the possibilities provided by the simulators.

### **Summary**

Research and Development has created such equipment and asset-systems on the field of military technology, which had been only fantasy before.

Due to the appearance and integration into the services of the UAS, participants of decision preparation, decision making and execution gained a new capability. The benefit of using UAS is justified in peacetime, conflict and war. However, the main benefit is to be a deputy of human force in the most dangerous missions. During the development UAS has reached the point where they can directly help strategic decisions.

It is clear those efforts for using UAS in those missions where possibility of D<sup>3</sup>LE is the highest are to be in focus. Reduced cost of production, maintenance and operation promote their wide scale spreading.

According to the facts listed above armed forces of the world keep in service a large number of UAS which expect to be continuously developed and brought into service.

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