

EDUCATION AND TRAINING SYSTEM OF AIR PERSONNEL IN THE POLISH ARMED FORCES

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The purpose of the article is to present a synthetic analysis of current system of education of flying personnel in the Polish Air Force Academy (PAFA) and the 4th Air Training Wing (4th ATW) and changes introduced in the frame of the "Concept of Polish Armed Forces Air Personnel Education" in terms of current air equipment technical capabilities and also relation to existing economic conditions. However, the most important aspect is related to air personnel' training level and quality. Presented changes in the air training system are also the result of parallel changes in national legislation, which adjusted the military training system, under which PAFA is subordinated, to the nation-wide criteria of the civil academic education. The problems with the implementation of these requirements, especially in terms of changing existing curriculums and timetables, are the main focus of the article.

K e y w o r d s: air training, aviation studies, PAFA, Polish Armed Forces Personnel Education System

1. INTRODUCTION

The purpose of the following research is to present a synthetic analysis of current education system of the air personnel in the Polish Air Force Academy (PAFA)¹ and in the 4th Air Training Wing (4th ATW)². It is related to changes introduced in the "The Concept of the Polish Armed Forces Air Personnel Education" [1] connected with current air equipment and its technical characteristics and also corresponding to current economic conditions, and finally in relation to provisions of air personnel training level and quality.

Currently, the armed forces of the leading countries are enjoying technological development and are acquiring new equipment and modern weapon systems, including fifth and sixth generation combat aircrafts. At the same time, diminishing national budgets has lead to reduction of air fleets in numbers and it caused the need to change the training systems and develop their optimal models depending on operational needs, possessed and implemented equipment, as well as training capabilities. The tendencies in this matter are similar in all countries - to implement the most efficient training system, meeting the growing demands for air training with maximum cost reduction. This also applies to Poland. The qualitative transformations in combat, transport and helicopter aviation in the country, along with the introduction of new laws in the field of higher education and aviation legislation, has created the need to make significant changes in currently existing air training system of the Polish Armed Forces.

Reorganization of existing training structures has been carried out for a few years. Especially important was year 2008, when 4th ATW was formed based on the air units of the PAFA with the main task to provide the practical training for cadets educated in the PAFA.

The analysis of current training system revealed that "The School of Eagles" (the informal name of the

PAFA and co-existing the 4th ATW) has guaranteed adequate preparation of the air personnel. It is related to requirements of transport and helicopter aviation, but also the tactical aviation equipped with analogue avionics (Su-22, MiG-29). However, the capabilities of air education based on PZL-130 and TS-11 airplanes are not sufficient for the efficient preparation of modern multipurpose aircrafts pilots. This requires developing new solutions that will enable safe and effective preparation of personnel to carry out tasks using the F-16 airplane, as well as on all other types of aircrafts used by the Polish Armed Forces. This process requires the Air Forces to acquire new capabilities to train military air personnel implementing modern advanced training aircrafts, which should possess the characteristics and equipment necessary to prepare them to operate a highly manoeuvrable combat fighter.

2. CURRENT EDUCATION AND TRAINING SYSTEM

Principles of training, existing until now, are the result of many years of experience of the "School of Eagles"; dating back to the interwar period, intensive flight training from the times of "Cold War" and the seventies of the previous century, when the air school received its university status. The last normative document according to which the practical training and education of cadets is carried out is the earlier mentioned "the Concept of Polish Armed forces air personnel education" approved by the Minister of National Defence. It has been the basic document for developing the integral training system of the PAFA.

The concept assumes that studies at the PAFA are carried out in alternating system, e.g.: theoretical training in autumn – winter period, during which cadets undertake the engineering studies program, followed by the practical air training in summer. The air training is carried out to meet the needs of combat aircrafts that are in service, including basic training on PZL-130 "Orlik" airplane and advanced training on TS-11 "Iskra". Training for the transport aviation is based, in its basic part, on An-2 or PZL-130 "Orlik" airplanes (according to a separate program), and on target airplane

¹ The Polish Air Force Academy in Deblin, for details see the Website of the Academy (in English): http://www.wsosp.deblin.pl/index.php?option=com_content&view=frontpage&Itemid=1&lang=en

² The 4th Air Training Wing in Deblin is coo-located with the Polish Air Force Academy, for details see the Website of the 4th ATW: <http://www.4slsz.wp.mil.pl/> in Polish language.

M-28 "Bryza". Helicopter pilots training is based on basic type of SW-4 helicopter and also Mi-2 helicopter.

Air training performed by PAFA is preceded by the first phase of training, so-called "selection flights", carried out by candidates of all specialties in certified Civil Aviation Training Centres (CATC). During the training every candidate is flying about 20 hours. For the duration of the first phase general predispositions of the candidates for further training are determined. According to the adopted concept, after graduating, the pilots should achieve the level of training equivalent to third class military pilot along with 250 hours of flying time for combat aviation pilots, 200 hours for transport aviation pilots and 180 hours for helicopter pilots. Since 2010, due to insufficient number of aircrafts and changes in training standards, to obtain third class of military pilot status the flying time for all types of aviation has been reduced to 180 hours.

Currently existing training system has been the result of many years of military experience. It differs from a typical system of aviation training, which is implemented in the majority of countries having their own aviation schools, which is alternating education system based on gradual mastering of theoretical knowledge and practical skills in the air. The main cause for choosing this kind of training is that it is favourable for air training performed during weather conditions prevailing in the period from late spring to early autumn. The remaining period of the year (autumn-winter lasting about five months), in case of year-round training, should be considered as lost due to climate conditions. The air training conditions are also influenced by pilot-navigation capabilities of used training aircrafts (helicopters) due to inadequate radio-navigation equipment or lack of possibility to perform flights in icing circumstances.

3. GENESIS OF THE NEW TRAINING CONCEPT

Discussion on changing the air training system (alternating vs. continuous) began in 2005, as a part of higher military education reform, in which the military colleges were excluded from subordination of the Armed Forces (in year 2008). The subject of the discussion was the studies timetable, principles of air training and prospects for the use of aircrafts.

During that period of time it was decided to purchase a new training helicopter, modernize the basic training airplane, and equip training units with transport airplanes which could allow resuming, after many years, training of transport pilots. As part of modernization, during the implementation of the programme the discussion was also launched in relation to acquisition of a new training aircraft and modernization of the existing Dęblin airfield (navigation systems and airfield infrastructure).

The implementation of the new act – „Aviation law” [2] caused a new division of the Polish airspace,

according to the classification of the International Civil Aviation Organization (ICAO)³. Under this act a uniformed air traffic management in Poland was introduced, which integrated previously separated military and civil air traffic management cells. The conditions mentioned before resulted in the need to operate under unified rules by both the civil and the military air space users. Differences in the air training rules in the military, forced the modification of the training programs of the military pilots in order to incorporate the ICAO standards. This solution was also backed up by findings and recommendations prepared by the Aviation Accidents Investigation Commission, which investigated crashes of CASA – M 295⁴, An-28 "BRYZA"⁵ and Tu - 154 M⁶ airplanes. It included guidance necessary to improve the situation in the military aviation (especially in the transport aviation). One of those recommendations was to train pilots according to civil regulations⁷. These conditions and recent years' experiences has proved that military pilots' air training requires them to be familiar with the appropriate procedures and that they should possess pilot skills identical to the civil aviation. This involved the necessity to introduce into studies plans and education procedures such elements as: knowledge in the area of civil air regulations, aviation law and uniform procedures.

PAFA, since 2008, has introduced into its education programmes a range of subjects required by the Civil Aviation Office for flying personnel, as it was necessary to obtain by them also a commercial pilot licence in accordance with the standards (ICAO). Military pilots should have an appropriate level of civilian pilot licence vested in accordance with international ICAO regulations (it also applies to other aviation specialists).

The most controversies aroused around the concept of changing the studies timetable (elimination of the alternating studies system). The current alternating training system, formed over the years, has many advantages that allow compensating many shortcomings of existing equipment and aviation training status. The decision had to be based on real conditions. Airmen, however, were not convinced by the arguments that in the majority of NATO countries the flight training takes places only after the completion of theoretical education process (both aviation and officer's). Nevertheless, the main reason why the process of changing the education system began was that, since 2005, the act on military higher education [3] ceased to be valid, and was replaced by a uniform act [4]. The act was introducing the

³ ICAO –International Civil Air Organization.

⁴ The crash of CASA -295 M aircraft took place on 23 January 2008 near Miroslawiec, Poland.

⁵ Crash of An-28 "BRYZA" aircraft took place on 31 March 2009 at the „Babie Doly" Navy Airfield.

⁶ Crash of Tu-154 M aircraft took place on 10 April 2010 near Smolensk (Russian Federation).

⁷ Wherever the air training (practical or legislation, it is related to gaining additional skills, not limited to typical military air training,theoretical) is mentioned in terms of civil

education process related to first and second degree studies, levelling them for both the military and civil education, and empowering uniform teaching regimes.

Maintaining of these regimes settled the conditions for graduating with engineer or master degree, thus the completion of studies. The act has defined minimum curriculum requirements and factual range of taught subjects, which combined with military requirements has been creating over 3 500 didactic hours. The act also specified the minimum number and duration of the semesters. All those rules make it rather very difficult to plan and implement into air teaching practices. The given teaching load allowed conducting three air practices, each lasting four months – on the second, third and fourth year of studies. This has been definitely not enough to meet the requests of expected training plan. Presented analysis would be incomplete without taking into account other responsibilities of military studies, resulting from military service (military training). Circumstances presented above were forcing to introduce the average load of military student as much as approximately 10 hours a day⁸. New legal conditions, on which the new education concept is based, has been allowing promotion to the first officer rank (first lieutenant) after finishing first degree studies, would make the studies (including the air training) to last 4 years and 3 months. In case of continuation of education to achieve master degree, there would be a two year break in the process of air training, which would have a negative impact on flight safety and preservation of pilots habits.

4. EDUCATIONAL TOOLS

Requirements adopted in the concept made it necessary to create conditions appropriate to implement both the teaching process and air training, ensuring the possibility to perform them at an appropriate level. It also required changing the organizational structure of the university. It was mainly driven by the need to improve the conditions for the implementation of training process, which would guarantee:

- ensuring a high level of theoretical knowledge in the field of studies' programme and military training;
- opportunity for specialized training (certified) in the field of aviation knowledge;
- certified practical air training;
- possibility to obtain appropriate permissions (certificates, licences, specialist classes, etc.).

For this purpose the PAFA in the period of 2008-2009 established, and then submitted to certification by the Civil Aviation Office, the following organisational structures:

- the Air Training Academic Centre;
- the Air Traffic Controllers Training Centre;

- the Language Training Centre;
- the Air Mechanics Training Centre (temporary structure - not foreseen in the budget);
- the Forward Air Controllers Training Centre (military structure not certified by CAO).

During the current year additionally the Air Personnel Training Centre has been established, with the main task to coordinate efforts of individual centres. All centres have highly qualified teaching and instructors' staff as well as professional equipment allowing carrying out specialised training at very high level.

Air Training Academic Centre.

It has the CAO certificate No: PL/FTO-1/2009/1, and is currently equipped with three basic training airplanes Diamond DA-20 and three advanced training airplanes Zlin (2 x Zlin-143 and 1 x Zlin-242). At present there is also an on-going process of purchasing two more basic training aircrafts, and for year 2013 there are plans to purchase three single engine aircrafts and one twin-engine. The school has also raised funds, under research projects, to purchase two basic training helicopters, which will be launched in 1st quarter of the 2013. There is also a plan to buy five more helicopters also the in 2013. The centre is equipped with high class simulators to support the training for all kinds of aircrafts used in aviation training.

Air Traffic Services Training Centre

It has been certified in year 2009, PL-81/CTO/2009, and it has wide scope of permissions, of which the highest is related to the training of candidates to a level of "intern controller" to further fulfil air traffic control positions. It should be pointed out that it is the only centre in the country to train such specialists on the basis of higher studies. It cooperates very closely with the similar training centre, which is operated by the Polish Air Navigation Services Agency - PANSNA (those are the only two centres in Poland). It is equipped with a specialized "tower" simulator and also "precise approach" simulator.

Forward Air Controllers Training Centre.

It is one of a few such centres in the world, which is preparing forward guidance navigators. It is operational since 2008 and at the moment is ready for the NATO certification process. The required precondition for its successful completion is to create an adequate system of official oversight at the Armed Force level (in progress). The centre is equipped with two modern target guidance simulators (one of them is mobile), command vehicle and complete individual navigator gear used on the contemporary battlefield. For many years, it has been training navigators who have successfully operated in Iraq and Afghanistan, both in national and allied combat structures.

Air Mechanics Training Centre.

Currently, certified centre operations (according to civil legislation) are limited to aviation equipment mechanics training. The university, as the only school in Polish Armed Forces, has the capabilities to train technical personnel for F-16 and C-130 airplanes

⁸ Approved requirements and flying time standard cause the whole studies to last about 5,5 years.

(practical training is carried out in units by qualified instructors, on the basis of signed agreements). The centre is equipped with two F-16 and M-28PT service simulators; additionally the simulator for tactical aircraft weapons handling is under development.

Language Training Centre

It is functioning on the base of the Foreign Language Study unit, within which English and Russian language courses (STANAG 6001) are available. The centre cooperates with such centres as OISE Language Training Centre Bristol (UK), the Institute of Advanced Language Training DLI in Lackland (USA), ULC Aviation Examination Board, the Ministry of Defence Central Examination Board, academic centres of advanced language training (Military University of Technology, Land Forces Academy, National Defence University). The centre is competent to carry out courses and perform English language exams on the fourth operational level, specialized courses in technical terminology in English, and so called air-language (aviation communication).

A new concept for training and education was created in mid-2009 and it contained two variants for studies timetable implementation and practical air training (continuous system and alternating system); however the requirements to additionally perform civilian certified air training were clearly suggested. Hereafter, it is followed by the system of training and education that is in force since the beginning of the 2012.

5. ORGANIZATIONAL ASSUMPTIONS OF STUDIES

The first degree military full-time studies are carried out under the "Aviation and Cosmonautics" branch for candidates to become professional soldiers. The studies are lasting 7 semesters based on homogenous first degree studies, and candidates are obtaining the title of an engineer, after which air training in training unit is continued.

Total number of hours for military student, trained as a candidate for jet plane, transport or helicopter pilot, will reach almost 3800 hours, which aims to provide 210 ECTS (European Credit Transfer System) points. The requirements for graduation must meet all the didactic rigors of the studies curriculum and the pass of the final exam. After graduation a student receives a degree in engineering and is prepared to study at the second level in "Aviation and Cosmonautics".

The "Aviation and Cosmonautics" branch offers education in the field of most technologically advanced structural systems using innovative technologies and solutions based on advanced materials, computer technology, electronics and extensive diagnostic systems providing safety and reliability of flying objects. Studies are aimed at obtaining knowledge and practical skills in designing, manufacturing and maintenance of aircrafts and space objects.

The education standards for "Aerospace and Cosmonautics" branch is based mostly on technical subjects such as: mechanics, materials and aviation technologies, basics of electronics, basics of microprocessors technology, basics of automation, basics of electrical engineering and computer science basics.

Programme of the first degree studies allows cadet-students to put their knowledge into practice in the course of studies of the following modules:

- military module (officers) has defined "military" qualifications and skills that a future officer should gain, and specifies minimal requirements in terms of content and education effects required to gain proper competence, providing minimal scope of knowledge needed to perform duties on first position (1451 hours);
- branch module enables cadets to gain knowledge necessary to obtain degree in engineering (1380 hours);
- specialized module enables cadets to gain knowledge necessary to perform future profession in accordance with specific military specialty: pilot, navigator, air traffic controller (935 hours).

After performing the analysis of military and civil regulatory documents related to aviation training, the studies curriculum and teaching program has been developed. It is a compilation of teaching standards of "Aviation and Cosmonautics" branch and requirements for theoretical training needed to obtain a professional pilot licence with permissions to operate IFR (CPL/IR) flights and officer standard. The program includes HAR FCL-1 (for airplane pilots candidates) and JAR FCL-2 (for helicopter pilots) and is higher than 900 hours. Programme scope and time span allows to obtain CPL/IR licence, as well as to fulfil the criteria in terms of requirements of hours on the civil legislation and criteria arising from the teaching standard. Development of the new training concept has been dictated by the changes in legislation, which in turn has led to abandoning alternating studies, and therefore enforces the change in studies and aviation practices' timetable.

6. CONCLUSION

Implementation of education system based on continuous variant allows obtaining higher level of pilots training. The advantage its related to gaining some 20-30% of flying time due to lack of necessity to regain pilot habits after long time breaks and no need to conduct a theoretical preparation before each training phase in the air. This time can be spent on extending practical training program. Continuous variant allows also more efficient use of the air practice. Practical training in the air is focused, at all times, on the same training group, which is characterized by a uniform and constant level of theoretical and practical training. The advantage of new training concept is also that cadets can begin air training

as engineers, with full specialist knowledge needed for training in the air (in alternating variant they expand their knowledge in subsequent theoretical semesters).

Training to the level allowing achieving appropriate licences, in the frame of the training at the Air Training Academic Centre will provide a programmatically consistent skills and knowledge level for trained pilots, necessary to prepare them for the advanced training on military aircrafts. Selection training performed by AATC will also provide the opportunity to make objective and professional choice of proper candidates for pilots, carried out by PAFA staff.

PAFA graduates will have a licence and permissions to operate flights by instruments (IR-A) issued by national aviation office (CAO), and in the case of transport aircraft pilots, also permission to pilot multi-engine aircrafts (MEP-L). It will be possible to implement air training on civil aircrafts, equipped with modern avionics (glass cockpit comparable to modern multipurpose aircrafts and airliners.) Such training level is a professional base for further specialised training on military aircrafts. In the new training and education system pilots graduated from PAFA will have significant amount of the flying time, respectively: 290 hours for jet pilots; 260 hours for transport pilots and 220 hours for helicopter pilots.

Variant of continuous education and training in the air will provide possibility for flexible and constant monitoring and adjustment of trained pilots' number for the needs of the Armed Forces. In the previous system

effectiveness. The presented material was focused on flying personnel and is only selected part of a broader concept, so it does not include all the assumptions of personnel education in other specialties, which are also included in PAFA curriculum of education.

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forecasting the needs for training pilots was taking place in 6,5 year period, while the continuous training system gives the ability to manage the needs in the period of just 1,5 year. It will be possible to verify the assumptions of new system after full completion of first training cycle, it means about year 2017, and then the final assessment of implemented changes will be carried out. Until then, the training and education system is open for introduction of all kinds of solutions that could improve training