



Flight Screening of Military Pilots in Poland

Dariusz BOGUSZ

Military University of Aviation, Dęblin, Poland;
d.bogusz@law.mil.pl, ORCID: 0000-0001-7755-0949

DOI: <https://doi.org/10.37105/sd.120>

Abstract

This article diagnoses and evaluates the process of selecting and preparing candidates for military pilots in Poland. The presented changes in the screening training system are to help with understanding the principles of organizing an effective system of recruitment and selection of military pilots at present. It also indicates directions for improvement. The organization of initial flight screening contributes to improving the efficiency of flight training and can serve as a model for use by flight training systems in other countries. The purpose of the article is to diagnose and evaluate recruitment and selection of candidates for military pilots in Polish Armed Forces. The problem that the author addresses is expressed in the following question: in what directions should the current solutions in the selection and training of candidates for military pilots, be improved in order to reduce the attrition rate at subsequent stages of flight training in the future? The research has been conducted at the Military University of Aviation using case study methods. The theoretical research methods, such as analysis and synthesis of information contained in literature and source materials, conclusions and comparison were used to develop the article. In order to confirm the conclusions drawn with the use of theoretical methods, an empirical method was used, which consisted in examining the opinions with the use of expert interviews. Experts were selected from the group of commanders of training units and military pilots involved in selection training, who had an impact on the applicable aviation training and recruitment system in Polish Armed Forces. The results shows main directions of military pilots initial flight screening improvement.

Keywords

air force, aviation training safety, flight screening, military pilots, safety

Submitted: 29.04.2021 Accepted: 04.08.2021 Published: 20.10.2021

This work is licensed under the Creative Commons Attribution International License (CC BY). <http://creativecommons.org/licenses/by/4.0/>



1. Introduction

The system of aviation training for military pilots in Poland is constantly evolving. A good example to support this statement is the training that checks flight predispositions before admission to the Military University of Aviation (MUA). Since 2017 significant changes have been made in the system of candidates' selection for military pilots. The ordinance of the Ministry of National Defense of December 28, 2016 changed the way of training organization. The Rector-Commandant of the MUA became responsible for the implementation of such training and he/she is the one to determine the conditions and procedure for admitting candidates in pilot specialties. The method of financing the flight screening has also changed. Currently, the funds for the implementation of the training come from the budget of the Ministry of National Defense, and not as before, from subsidies which were awarded after winning the tender offer competition. The transformations were so important that the name of the training has also been changed – from selective training to flight screening (Regulation, 2017).

Changes made in the system of selecting candidates for military pilots resulted in a decrease in the number of hours spent in the air during training which aimed to test flight predispositions. At this stage, the changes contribute to making savings and enable more candidates to be trained. During the selection training which was carried out until 2016, the candidates had 20 hours of practical training on airplanes, currently, during the check-up training they fly from six to ten hours. The ability to train more than twice the number of candidates compared to the previous selection training is a huge advantage. As a result, we can speak of a positive selection, i.e. the selection of the right candidates from among the many willing to practice the profession of a military pilot.

This article aims to diagnose and evaluate the recruitment and selection of candidates for military pilots in the Polish Armed Forces. The flight screening implemented since the 2017/2018 academic year consists of three stages: theoretical, simulator and practical training. Reducing the number of hours for training in the air and increasing the importance of training on simulators is intended to train more candidates for military pilots and increase the effectiveness of this training.

The problem which the author wanted to draw attention to is expressed by the following question - in what directions should the current solutions in the selection and training of candidates for military pilots be improved in order to reduce the attrition rate at subsequent stages of flight training in the future?

The research was conducted at the Military University of Aviation using case study methods. The theoretical research methods, such as analysis and synthesis of information contained in literature and source materials, conclusions and comparison were used to develop the article.

In order to confirm the conclusions drawn with the use of theoretical methods, an empirical method was used, which consisted in examining the opinions with the use of expert interviews. The implementation of research with the participation of experts seems appropriate in relation to those areas of social life that are currently undergoing the process of advanced professionalization.

2. Selection, recruitment and assessment of aviation predispositions

The system of candidate selection in the military pilot profession is a very important element of the flight education and training process as it directly affects flight safety. The first stage of flight training is flight screening carried out before admission to the MUA. The proper preparation of pilots for the subsequent stages of training and the performance of tasks in combat units depend on well-conducted flight screening. However, a poorly functioning recruitment system contributes to an increased attrition rate¹ and often results in belated decision to drop out of the training. Poland has long and proven traditions in preparing candidates for military aviation. Checking the air predispositions of future military pilots has a long tradition of more than 80 years. The preparation of flight personnel before joining the school, earlier and now is referred to by pilots as Initial Flight Screening.

In Poland, this type of undertaking has been organized since the 1930s. The aviation training system was then based on the extensive cooperation of military aviation with civilian entities such as aeroclubs and the Airborne and Antigas Defense League. At the time, American for Polish Aviation Military Adaptation was being introduced to later become Initial Flight Screening. Completing the pilot course was one of the conditions for admission to the Officers' Aviation School. If the candidate did not have the required training, he was directed to a qualifying course at the Military Gliding Centre in Ustianowa, also called the elimination gliding course (see: Celek, 1979). Currently, Polish Aero Club, High School of Aviation and Military University of Aviation's Academic Aviation Training Centre (AATC) are responsible for preparing candidates for military aviation (Figure 1).

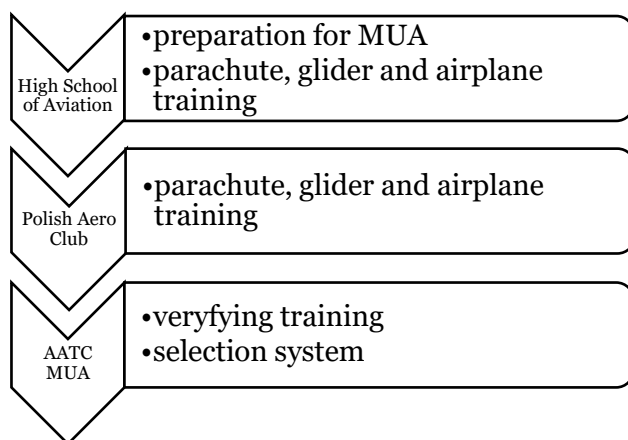


Figure 1. The tasks of institutions responsible for candidate preparation and air selection for military aviation. Author's own work.

In accordance with the demands made by the management of the MUA, the training assessing aviation predispositions of candidates for military pilots has been fulfilled by the entity responsible for further aviation education and training since 2017. The flight screening will bring the expected results if it is implemented by a specialized training centre, which has specific aviation equipment, technical facilities and instructor staff with useful experience in training candidates for military pilots (most reputable aviation schools in the world have this type of academic aviation training centres). Earlier, verifying (selection) training was carried out in Regional Aero Clubs which represented a level that did not always meet

¹ An attrition rate is the percentage of cadets who, for various reasons, did not graduate from an aviation university.

the requirements of the aviation school. Currently, the MUA Academic Aviation Training Centre is responsible for this training. The organisation and functioning of AATC in the current structure, together with experienced instructors, airplanes equipped with the MUA AATC and the "Selector" simulator, on which the training is carried out, ensure a high level of checking the flight predispositions of pilots.

Before recruits are selected for flight screening during recruitment to the MUA, a candidate for military pilot must successfully undergo MIAM (Military Institute of Aviation Medicine) aero-medical examination. The first stage of selection is an examination in the District Military Medical Commission. After obtaining a positive test result and sending the medical examination documents by Army Recruiting Command to the MUA, the school directs the candidate for examination to the MIAM in Warsaw. As a result of these tests, candidates receive health groups assigning them to a given volatile group, after which they are qualified for selection flights (Fig. 2).

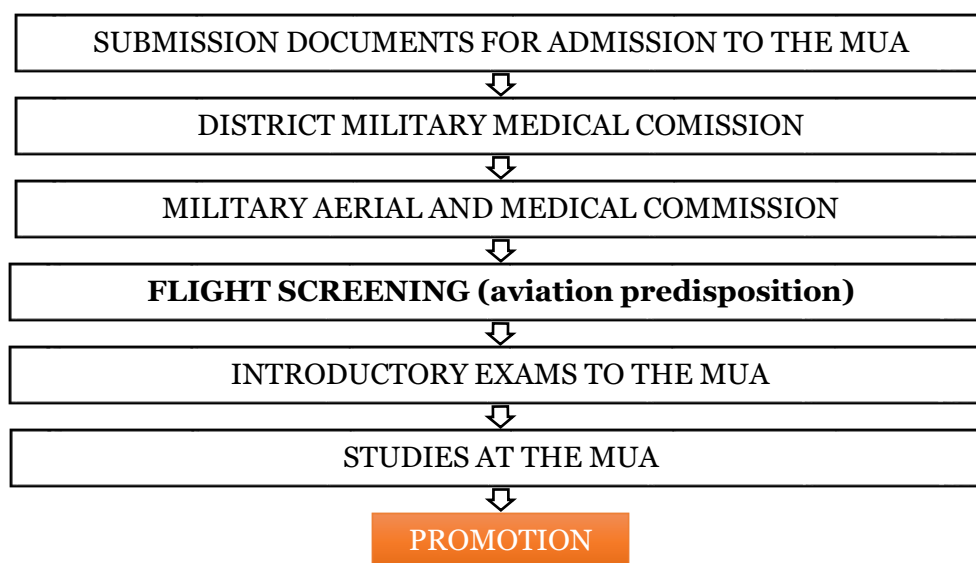


Figure 2. The stages of recruiting candidates for the Military University of Aviation. Author's own work

Flight screening is the first stage inextricably linked to the subsequent stages of aviation training and is intended for the initial verification of candidates for the military pilot profession. Technical progress has forced changes in the way aviation works and has created ample opportunities for the development of pilot flight training systems around the world. The use of simulators from the very beginning of flight training, already at the recruitment stage is an example. The training system in Poland is based on Polish experience, but it also uses solutions used in most countries that make up the North Atlantic Treaty Organisation. In recent years, the training system has changed many times, but its characteristic feature, its phased nature, has stayed the same. Currently, many countries use a unified flight training system, consisting of four stages: flight screening, basic flight training, advanced and tactical (combat) flight training (Fig. 3).

I - FLIGHT SCREENING	II - BASIC TRAINING	III-ADVANCED TRAINING	IV- COMBAT TRAINING
<ul style="list-style-type: none"> •AATC MUA •DA-20, Cessna 150 	<ul style="list-style-type: none"> •AATC MUA •DA-20, DA-42, CABRI,... 	<ul style="list-style-type: none"> •4th Air Training Wing (4 ATW) •TC-130, M-346, SW-4, Mi-2, Bryza,... 	<ul style="list-style-type: none"> •combat units of Polish Armed Forces •F-16, Mig-19, Sokół , Bryza,...

Figure 3. The stages of flight training in Poland. Author’s own work.

In order for the flight training system to function efficiently, first and foremost, it is necessary to ensure the proper recruitment and selection of candidates. It has a decisive impact on the implementation and effectiveness of such training. As part of the selection, in addition to a number of medical and psychomotor tests, it is necessary to carry out flight screening. This training aims to determine the elementary flight predispositions of the candidates for pilots and in addition:

- familiarize the candidates with the capabilities of the aircraft;
- check manual and psychophysical skills before starting basic flight training;
- test one's skills to properly distribute attention during the flight;
- assess the proper operation of the aircraft;
- determine the suitability of the student-pilot, as a candidate for pilot of military aircraft (pilot of transport aircraft, pilot of jet aircraft, helicopter pilot) (Grenda, 2012).

A well conducted check-up training should ensure the best possible check of aviation skills and selection of appropriate candidates for aircraft pilots.

The level of pilot's knowledge and skills depends on the quality of ground preparation. Furthermore, the number of practical flights can be decreased, and thus the time and costs of training in the air can be reduced (Bartnik, et all, 2012). The development of information technology has created new opportunities not only in the construction of aircraft, but also in devices supporting the science of piloting them. Therefore, it is currently difficult to imagine pilot training without the use of simulators - this also applies to flight training (fig. 4). Tal-leur, Taylor, Emanuel, Rantanen and Bradshaw have shown in their paper that the simulator training is effective for all aspects of aviation training e.g. maintaining instrument currency, and their findings suggest that it is also effective in enhancing instrument proficiency (2003).



Figure 4. Candidates for military pilots during the screening training on „Selector” simulator with F-16 module at Military University of Aviation in Dęblin. Author’s own work.

3. Flight screening

In the years 2006 – 2016, flight screening (then called selection training) was conducted in aeroclubs throughout the country. In those years, most of the competitions for the implementation of selection training on airplanes for candidates for cadets at the MUA were won by the Academic Aviation Training Center of the MUA's Aero Club in Dęblin.² Due to the high intensity of flight training provided by the 4th Wing of School Aviation on military aircraft and limited access to the airport in Dęblin, practical training was also carried out at the airport in Radom.

Currently, flight screening is carried out at the MUA Academic Aviation Training Center on light piston planes and is to ensure the preparation of pilot candidates for further training. Verification training occupies an important place in the recruitment process of which it is part. It is a modification of the selection training implemented in the years 2006 - 2016, when the candidates carried out theoretical training in the amount of 130 hours and flew 20 hours in the air.

For candidates who have successfully passed the Military Aerial and Medical Commission in Warsaw and obtained a certificate of the ability to perform the duties of pilots, the next stage related to the qualification to become a military pilot is a training to check flight predispositions. While at the stage of submitting documents it is difficult to assess the applicant's aviation predispositions effectively, the flight screening carried out during the recruitment to the Military University of Aviation gives such an opportunity and should ensure initial selection.

² The advantage of the Dęblin Aero Club is having the right number of aircraft and instructors with military aviation experience. Most of the instructors were former military pilots with considerable air raids, who served at the Military University of Aviation in Dęblin as instructors and in their careers trained hosts of military pilots.

Pursuant to the Ordinance of the Minister of National Defense of December 28, 2016 amending the ordinance on the military service of candidates for professional soldiers, the condition for writing the entrance examination to the Military University of Aviation (formerly: Polish Air Force Academy) is graduating with a positive result, and training verifying predispositions to perform service in pilot positions (Regulation, 2016).

The verification training at the Military University of Aviation is carried out in three stages (Fig. 5) and includes simulation training, theoretical and practical training in the air, implemented in accordance with the applicable flight training program approved by the Civil Aviation Office. An additional criterion in flight screening is the division of candidates into those with and without experience.

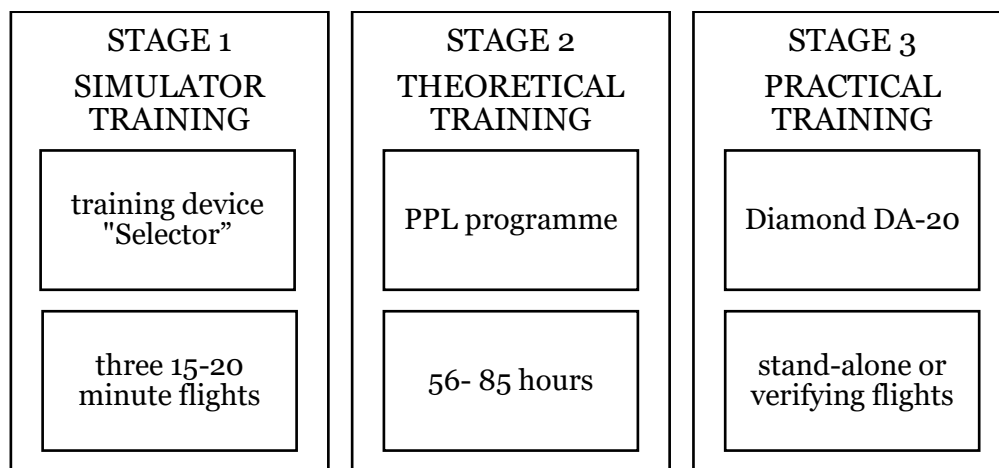


Figure 5. The stages and main objectives of the flight screening. Author's own work.

Stage 1, is a verifying training on the flight simulator "Selector", in which the candidate performs three flights in approximately 20 minutes each (Fig. 6.). The first flight, which precedes check flights, is a non-evaluable familiarization flight that aims to familiarize the candidate with the simulator and its piloting capabilities. The flight components performed there depend on the candidates themselves. The next two flights are verification flights and are performed according to scenarios previously known to the candidate. The training includes two exercises. The first exercise is designed to test the skills of piloting technique, i.e. the implementation of basic pilotage figures, such as straight flight, turns, ascent, descent. The second exercise is to check the piloting technique combined with psychological examination, which involves performing simple arithmetic operations, remembering symbols and recognizing shapes. During this exercise, commands are displayed on the monitor screen in the simulator's cockpit and are spoken by a speech synthesizer (Annex to the Resolution of the Senate of the Polish Air Force Academy, 2017).

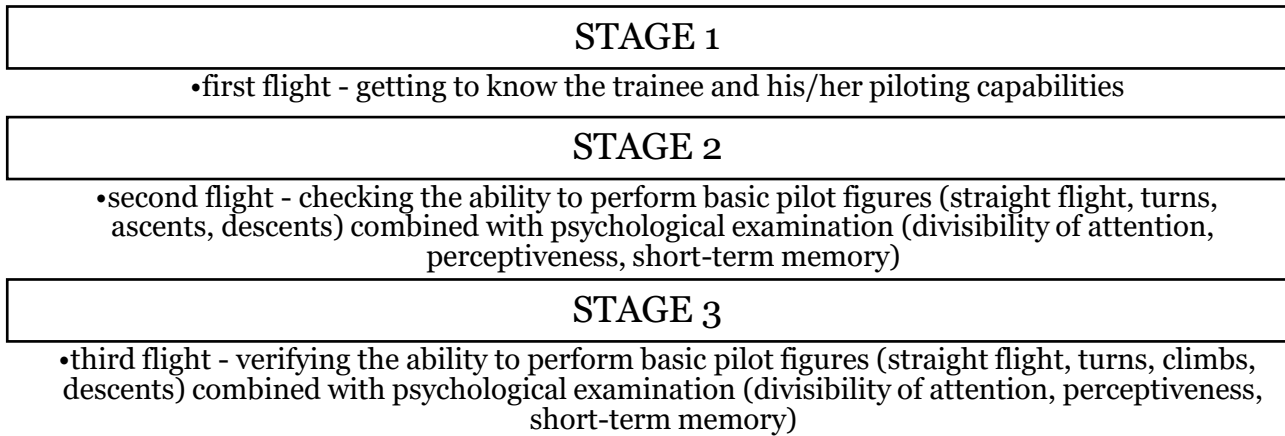


Figure 6. The stages and main objectives of simulator flight screening. Author's own work.

The simulator automatically counts errors made by the candidate, and after the flight is completed, a graph is created showing the rate of errors made. Then, as a result of the analysis of the flight performed and based on the assessment scale introduced to the system for maintaining the prescribed flight parameters, the system generates a numerical rating, and the final result of individual tests is generated in the form of an overall rating. In the case of a negative result, after consulting the Military Aviation and Medical Commission at Military Institute of Aviation Medicine, the candidate may be considered a person with no predisposition to the profession of a pilot. Obtaining a positive grade is necessary for the candidate to enter the second stage of the training.

Stage 2 of the flight screening includes theoretical training that is carried out in accordance with the applicable flight training program approved by the Civil Aviation Authority (CAA) (Table 1). The second stage ends with an exam. However, this stage of the training does not apply to candidates with aviation experience, i.e. with PPL(A) tourist pilot license, or the ones who completed selection training in previous years (Annex to the Resolution of the Senate of the Polish Air Force Academy, 2017).

Table 1.

The subjects and hours of the theoretical training.

Role name	number of hours
Human - possibilities and limitations	7
General knowledge about the aircraft	20
Flight performance and planning	4
Flight rules	10
Aviation law	10
Connection	7
TOTAL	58

Source: Author's own work

Obtaining a positive result from the first and second stages is a prerequisite for admitting the candidate to the third stage, i.e. practical training on airplanes.

Stage 3 is conducted differently depending on the applicant's aviation experience. A person with aviation experience implements this training according to an individual program. In this case, the training includes resumption flights and verifying flights. In turn, for people without aviation experience, practical air training is conducted in accordance with the applicable flight training program approved by the Civil Aviation Authority and the flight lasts

six hours at the most. During practical training, elements such as piloting technique, radio communication, spatial orientation, behavior in special (emergency) situations, situational awareness are assessed (Annex to the Resolution of the Senate of the Polish Air Force Academy, 2017).

The training is carried out on Diamond DA20 aircraft and Cessna 150. After completing the training process, the aviation predisposition with a positive result, the Rector-Commandant issues an appropriate certificate confirming the qualification of a given person for the recruitment procedure. The training is carried out on a Diamond DA20 aircraft and Cessna 150. After completing the training the aviation predisposition with a positive result, the Rector-Commandant issues an appropriate certificate confirming the qualification of a given person for the recruitment procedure.

During practical training, elements such as piloting technique, radio communication, spatial orientation, behavior in special (emergency) situations, situational awareness are assessed (Table 2).

Table 2.

The subjects and hours of the theoretical training.

Task/exercise	Number of flights - duration	Performed elements
Task 1 exercise 1	1 flight in 40 seconds	Familiarization flight
Task 1 exercise 2	3 flights in 1:30	Learning the basic elements of flight – zone
Task 1 exercise 3	20 flights in 2:00	Learning flights in circle
Task 1 exercise 4	10 flights in 1:00	Correcting errors at take-off and landing
Task 1 exercise 5	5 flights in 0:50	Verifying flight (with an instructor other than the learner)

Source: Author's own work

The program of practical training in the air on these types of aircraft provided for 38 daily flights in normal atmospheric conditions, for a total of six hours. In the years 2017-2018, practical training was carried out at the airport (airstrip) in Nowe Miasto.

Flight screening in 2019 only included flights on the "Selector" simulator - practical training in the air of MUA candidates was abandoned. Predispositions to the profession of pilot were assessed on the basis of points obtained after training on the "Selector" simulator (Table 3). During the flight screening on the simulator, the candidate was evaluated on a scale of 0 to 100 points, which were then converted into recruitment points. The trainee's reaction during psychological tests and the maintenance of prescribed flight conditions were included in the process of automatic assessment of the candidate. Based on the grading scale entered into the system, the final result was generated in the form of an overall grade. A prerequisite for taking the entrance exams is obtaining at least a satisfactory overall grade from the training. After completing the training process testing the aviation predisposition with a positive result, the Rector-Commandant of the Military University of Aviation issues an appropriate certificate confirming the qualification of the given person for the recruitment procedure.

Table 3. *Candidates' scoring after simulation training*

Lack of predisposition to serve as a pilot	
From 0 to 49 points SELECTOR	0 recruitment points
Basic predisposition to perform service as a pilot	
From 50 to 62 points SELECTOR	10 recruitment points
Medium predisposition to perform service as a pilot	
From 63 to 75 points SELECTOR	20 recruitment points
High predisposition to serve in as a pilot	
From 76 to 88 points SELECTOR	30 recruitment points
Very high predisposition to perform service as a pilot	
From 89 to 100 points SELECTOR	40 recruitment points

Source: Author's own work

In the years 2017-2019, 422 candidates were referred for flight screening (then still known as selection training) in the new formula. The training with positive assessment was completed by 377 candidates. There were 45 trainees who did not complete the training with a positive grade, and so were not able to apply for pilot specialization (Fig. 7). The effectiveness of this form of checking the air predispositions of candidates for military pilots can be analyzed only after the number of candidates promoted to the first officer rank and directed to air units with military pilot title has been determined.

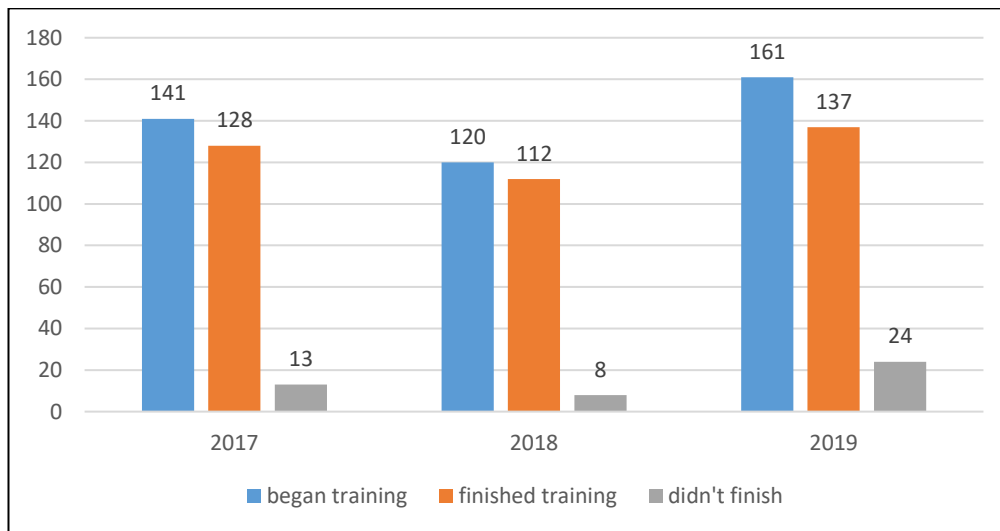


Figure 7. The results of verification training (flight screening) in 2017-2019. Author's own work.

The advantage of flight screening is the use of simulators that allow the trainees to safely check their flight skills, analyze their concentration and perceptiveness. The purpose of this training is to check basic aviation skills, select the best and stop training non-predisposing candidates. Campbell, Castaneda and Pulos made an important finding that different personality constructs possess different relationships with military aviation training success (2009). The Selector simulator allows carrying out tests to assess aviation predisposition of candidates at the recruitment stage. It seems that currently conducted training saves money on aviation training, which is the most expensive type of training in the world. However, the question arises whether six hours is sufficient training in the air to check flight predispositions and how effective it is to perform only simulator training to check flight predispositions.

At this stage, effectiveness can only be assessed on the basis of a comparison of how many trainees started the training and how many completed it with a positive result - which is associated with a high risk of error. Ultimately, it will be possible to make conclusions on the impact of the checking training on the effectiveness of aviation training based on the results of how many cadets will be promoted as a military pilot. It will be possible to evaluate when the first group graduates from the air force academy. As experts note, the results of the training may also interfere with the adaptation of young people to function in the digitized world. Young people do well in a virtual environment, and after getting off the ground, most people cannot cope with stress. Taking up in the air ultimately verifies the suitability for aviation (fear of heights and other barriers disrupting the rational functioning of the human body).

In addition, the implementation of continuous training, approved by the Minister of National Defense on December 13, 2011, allows for obtaining a higher level of pilot training by achieving a greater raid on a single pilot (Fig. 8). This is possible due to the raid obtained in AATC, including during training to check flight predispositions. As a result of this and training on military aircraft in the 4th Air Training Wing (4th ATW), cadets of pilot specialties before reaching the combat units are to achieve number of flying hours ensuring better preparation for service in positions in the Polish Armed Forces.

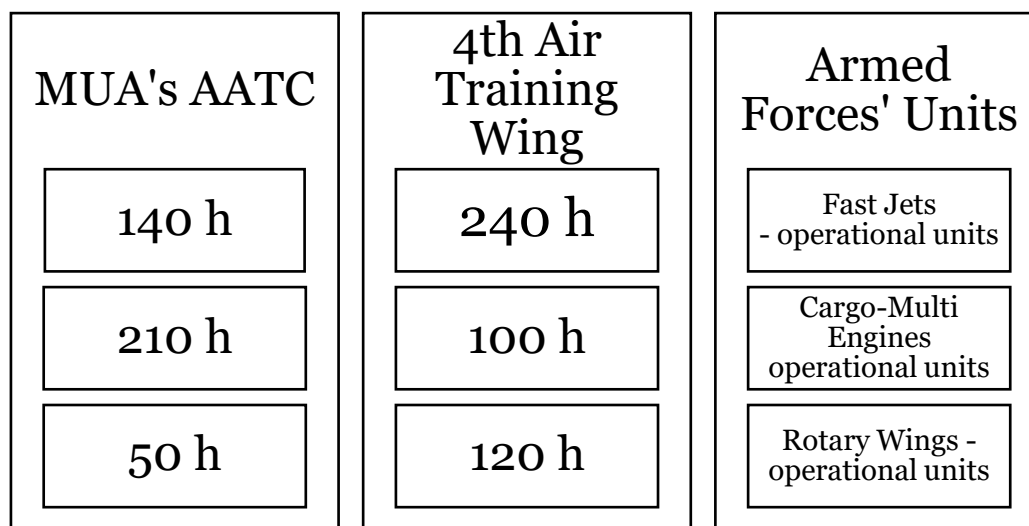


Figure 8. Raid on a single pilot by specialty Adopted from: “Training of aviation personnel for the needs of the air force and the related future challenges” by P. Krawczyk Copyright 2018, War Studies University, Scientific Quarterly.

4. Conclusions

The modifications in the system of selection and selection of candidates for military pilots resulted in a decrease in the number of hours spent in the air during training testing aviation predispositions. At this stage, it brings savings and the opportunity to train more candidates. During the selection training implemented until 2016, the candidates had practical training on airplanes composed of 20 hours. Currently, during the flight screening, they fly from six to ten hours. This has the advantage of training more than twice the number of candidates compared to the previous selection training. Through this, it is possible to talk about positive selection, i.e., selecting the right candidates from among many willing to practice the profession of a military pilot. However, the question arises whether this is enough

hours to check the flight predisposition. With such a minimum flight time, verifying airworthiness is virtually impossible. The idea of flight screening is to select candidates with predispositions for particular types of aviation and to eliminate at the initial stage people who do not have such predispositions. The recruitment and selection system ensures the selection of candidates at a good level. A decision to abandon practical training is a contradiction to the idea of this training. Moreover, in the future, it will have negative effects in the training of military pilots. Therefore, it is necessary to return to practical training at the recruitment stage.

Experts appointed for the study from the MUA and Aeroclubs are responsible for conducting the selection training of candidates for military pilots. Meanwhile, experts from the training aviation bases who train cadets in subsequent stages of aviation training and have the opportunity to assess the level and quality of selection training directly, indicate a small number of hours to assess candidates.

However, experts consider it justified to introduce simulator training to check future pilots' aviation predispositions.

The effectiveness of this form of checking the air predispositions of candidates for military pilots can be analyzed only after it can be counted how many of them are promoted to the first officer rank and directed to air units with military pilot title. After introducing changes to flight screening, the training cycle was not closed. Good results at this stage can be verified in further stages of practical training at the air force academy and units of the 4th School Aviation Wing, accomplished until the officer promotion is obtained. This will be the reason for the continuation of the research.

Taking into account the research results and, in particular, the opinions of aviation training experts, a proposal has been made to improve the training process in two areas:

- carrying out simulator training along with conducting psychological research thanks to the possibilities offered by the Selector simulator developed in MUA.
- increasing the number of hours of flight training and the completion of a solo flight by the applicant in order to clearly determine the aviation suitability.

Improving the system of selection and flight screening of candidates for military pilots should be aimed at a greater selection number of flying hours at the recruitment stage. In the future, in order to reduce extensibility at subsequent stages of aviation training, the optimal solution would be to return to acquiring future candidates in cooperation with non-governmental organizations that have an agreement with the Ministry of National Defense. Such solutions operated in the interwar and post-war years until the 1990s. In addition to popularizing aviation in society, it provided hundreds of pre-trained pilots for the armed forces and the national economy. A return to these best practices would contribute to a reduction in attrition rate at later stages of the career of military pilots.

Declaration of interest The author/authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

References

1. Regulation of the Minister of National Defense of December 28, 2016 amending the regulation on the military service of candidates for professional soldiers §1 (Dz. U. 2017, Poz. 71).
2. Annex to the Resolution of the Senate of the Polish Air Force Academy No. 67/2017 of October 16, 2017. *Conditions and procedure for admission to the Polish Air Force Academy for studies for candidates for professional soldiers for the academic year 2018/2019.*
3. Bartnik R., Grenda B., Galej P. (2013) *Symulatory lotu oraz symulatory ruchu lotniczego w szkoleniu lotniczym*, AON, Warsaw, p. 9.
4. Campbell, Castaneda, Pulos, (2009), *Meta-Analysis of Personality Assessments as Predictors of Military Aviation Training Success*, The International Journal of Aviation Psychology, 20(1), 92–109, Northeastern University, London, pp. 106-107. DOI: <https://doi.org/10.1080/10508410903415872>.
5. Celek J. (1979) *Wyższa Oficerska Szkoła Lotnicza im. Jana Krasickiego. Dzieje dęblińskiej Szkoły Lotniczej*, Wojskowy Instytut Historyczny, Warszawa, p. 52.
6. Grenda B. (2012) *Szkolenie personelu latającego na potrzeby Sił Zbrojnych Rzeczypospolitej Polskiej*, AON, Warsaw, p. 44.
7. Krawczyk P. (2018) *Training of aviation personnel for the needs of the air force and the related future challenges*, War Studies University, Scientific Quarterly no. 4(113) 2018, Warsaw, p. 8.
8. Talleur, Taylor, Emanuel, Rantanen, Bradshaw, (2003), *Personal Computer Aviation Training Devices: Their Effectiveness for Maintaining Instrument Currency*, The International Journal of Aviation Psychology, Northeastern University, London, p. 397. DOI: https://doi.org/10.1207/S15327108IJAP1304_04.