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SELECTED ASPECTS OF SHAPING THE COMPETENCE OF CIVIL AND MILITARY AIR TRANSPORT CREW USING CREW RESOURCE MANAGEMENT (CRM) TRAINING

Summary. In this article, the Crew Resource Management (CRM) is described as an important element of the flight safety system aimed at preparing and supplying the aircraft crews with the necessary knowledge and competencies in the area of personal and group performances and limitations (Human Factor – HF). It also presents the CRM training requirements for both flight and cabin personnel in commercial aviation, as well as selected issues regarding the training of the military aviation personnel in the field of human factors and CRM. This paper identifies the common CRM training areas in the field of civil and military, and also presents the fundamental differences and challenges faced by the military aviation in the area of CRM training, based on one of the five key factors of the "5M model" by James Reason influencing the aviation incidents – "Media" (Environment).

Keywords: flight safety, human factor, training, Crew Resource Management

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1. INTRODUCTION

The Crew Resources Management (CRM) training of the flying personnel is aimed primarily at increasing the level of aviation operations safety. Due to the scope of this analysis, a synthetic attempt was made to approach the CRM in its selected aspects. There are many documents and publications on the CRM, but there are few studies dealing with the differences affecting the scope and preparation of the flying personnel during the CRM training, among the needs arising from the military and civil aviation characteristics, narrowed in this study to very similar types of aviation, which are the civil transport aviation and military transport aviation.

From the very beginning of flying with crewed aircraft with propulsion, there has been an inherent occurrence of various aviation incidents. It was also noticed that in each case a recurring element of such air event was a man, the pilot. Therefore, the "pilot error" was perceived as the main cause. Since 1947, Fitts and Jones[3] demonstrated how the cockpit design of an aircraft had significant impact on the pilot's mistakes. It is assumed that it was then the term *human factor* originated. Until the late 1970s, the human factor remained in the domain of the aircraft engineers. It was NASA[4] which identified the "deficiency" of the human factor in the area of communication, decision-making and leadership as responsible for 70% of accidents in air transport. It is not the shortage of information, equipment failure or lack of training that turned out to be the culprit. It was then understood that even the best-trained pilot - the commander - can find himself in situations where mistakes can be made due to imperfections of the human body and psyche, as well as the negative factors related to the relationships between the crew members in the cockpit. Therefore, the Crew Resource Management training was introduced in commercial aviation in order to reduce the possibility of the pilot making errors by making better use of available human resources in the cabin.

On a global scale, the commercial air transport (CAT) can be seen as a homogeneous, standardised and predictable system in terms of organisation, tasks performed, aviation equipment used and air personnel, prepared according to the required or more correctly – recommended - standards (ICAO[5], EASA[6] or FAA[7]). Within the area of the civil aviation connected with air transport, CRM training for several decades have been an obligatory element for shaping non-technical competence of crew members (the so-called soft competencies), especially flight aircraft personnel consisting of several people (Multi-Crew) of the flight crew and cabin crew. They are carried out both as dedicated courses and training, as well as in connection with the training in the acquisition, maintenance and improvement of the typical pilot-aviation abilities, including the usage of aircraft systems and installations on the ground and in the air, as well as in the foreseeable situations in the air, both in case of normal flight and in abnormal and emergency situations. The CRM training are carried out as seminars and workshop classes, and they also include practical elements carried out during the course and training on the flight simulators.

As for military aviation, CRM training play an important role in the process of preparing the crews of aeroplanes and helicopters to perform tasks in accordance with their purpose. It should be noted that in each country there are specific and different systems in the area of crew resource management. The CRM training in the military aviation, including an approach

[3] *Analysis of factors contributing to 460 „pilot-error" experiences in operating aircraft controls.*
[4] National Aeronautics and Space Administration.
[5] ICAO – International Civil Aviation Organization.
[6] EASA – European Aviation Safety Agency.
[7] FAA – Federal Aviation Administration.

to CRM, has evolved over the last few decades and is still changing, modifications and development are being made just as in the field of the civil aviation as well. The factors having an impact on the CRM training are not only national aviation traditions but also the approach to the crew, known as a human factor in aviation, cultural conditions and experience with the tasks performed resulting from events and accidents in military and civil aviation, whose causes are related to the human factor.

The issue of preparation of the military aircrews seems to be more complicated and all the more difficult to unify and systematise given the aviation for the entire armed forces in a country, essentially consists of all types of aviation(aircraft and helicopters) from the school, through supporting and surveillance aviation in multi-crew air platforms, up to single-crew multirole aircraft. In addition, the scope of tasks carried out, even narrowed only to the so-called transport and supporting aviation on aeroplanes with multi-crews, extends from the typical transport and airdrop tasks in the scope of metering and transporting people and cargo, patrol and reconnaissance flights, through air-to-air refueling tasks, to the mission in favour of special forces or anti-ship missions.

Despite a common and similar approach to the preparation of the crews, it can be defined that the CRM trainings within the military aviation provides the crews of aircraft with knowledge and skills[8] allowing for the optimal use of the human resources, equipment, weapon systems, external environment and procedures, and thus for the effective, successful and safe implementation of the assigned tasks or missions ,– minimising in this way potential own losses and the unintentional losses of the enemy.

2. THE CRM TRAINING IN THE CIVIL AVIATION - LEGAL GROUNDS AND SCOPE

Since the late 1970s, the aviation authority for the European countries which have volunteered to join this association was an organisation named the Joint Aviation Authorities (JAA). It issued documents detailing the duties and rules of conducting aviation activities by aviation operators, as well as defined the rules and area of required training of flying personnel, including, among others, the CRM training, named the Joint Aviation Requirements (JAR). However, the regulations developed by JAA, which in fact do not have legal force, were adopted and applied by the associated countries on a voluntary basis and began to be replaced by the provisions of European Union (EU) law. In 2002 the European Aviation Safety Agency (EASA) was established and during the subsequent years, it overtook all the functions of JAA.

Under the EU law, the regulations created by EASA applied only to EU member states, however, EASA cooperates closely with corresponding institutions around the world, including the ICAO and FAA in the United States and other countries. The regulations developed by JAA and the regulations adopted by EASA define extensively in detail the standards for CRM training. According to these regulations, that is, the Commission Regulation (EU) No 965/2012 and 1178/2011, the CRM training should be carried out by suitably qualified personnel, and its programme, included in the Operational Manual of the air operator, should have the following points therein:

– human factors in the aviation, general instructions on the CRM principles and objectives, human performance and limitations, threat and error management.

[8] The components of competencies.

- personality awareness, human error and reliability, attitudes and behaviours, self-assessment and self-critique, stress and stress management, fatigue and vigilance, assertiveness, situation awareness, information acquisition and processing.
- automation and philosophy on the use of automation.
- specific type-related differences.
- monitoring and intervention.
- shared situation awareness, shared information acquisition and processing, workload management, effective communication and coordination inside and outside the flight crew compartment, leadership, cooperation, synergy, delegation, decision-making, actions, Cultural differences.
- resilience development, surprise and startle effect.
- operator's safety culture and company culture, Standard Operating Procedures (SOPs), organisational factors, factors linked to the type of operations.
- effective communication and coordination with other operational personnel and ground services.
- case studies connected with the human factor.

Training modules selected from the list presented above should also be included in the training programme of new types of aircraft, transitional training programme (when there is a change of the employer or the air operator), command training programme (for candidates for commanders of the aircraft) and refreshing annual training programme. It is important that the operator should provide joint CRM training for the flight crew members along with the cabin crew. Such training should reflect the organisational culture of the given operator, while the theoretical and practical forms of the conducted classes should guarantee the opportunity to conduct discussions and exchange experiences, primarily in the context of shortcomings and negligence in the flow of information and errors in the communication process of crew members.

In the context of the carried out analysis, it is necessary to note here that the CRM training for the flying personnel is the only training to be carried out by the operators in commercial air transport. The flight crew employed by the operator must comply with the aviation legislation and EASA regulations with formal requirements regarding the age and the appropriate pilot license, acquired airworthiness and experience, or necessary certificates of qualification of the other crew members. As part of the courses to obtain an Air Transport Pilot License (ATPL), the pilot participates in the classes on the subject of "Human Performance and Limitations", which is also one of the obligatory subjects to pass during the exam. The next step is the necessity to pass the MCC[9] training, that is, to obtain the permission to fly in multi-person crews. The scope of such training covers the basic issues concerning the importance and role of communication, mutual support, leadership, the influence of personality traits on the way the task is carried out, etc.

Since the last decade of the twentieth century, other dynamic growths of commercial air transport have been dated. There has been significant development of aviation technologies and reliability of aircraft have increased, including modern and pilot-friendly electronic systems, displaying navigation and on-board data (glass cockpit technology). This influenced the decision to construct and produce passenger aircraft with cockpit crews consisting of two pilots. The increase in the number of aircraft was not kept up by the "supply" of appropriately trained, but above all - experienced pilots.

[9] MCC - Multi Crew Cooperation.

According to ICAO, between 2001 and 2011 the tragic accidents of passenger aircraft caused by Loss of Control in Flight (LOC-I) were the main cause of fatalities in commercial aviation[10]. The analysis of the data related to accidents, including LOC-I, indicated that the contributing factors could be classified as caused by aeroplane systems, the environment, the pilot/human factor, or any combination of these three factors. According to the analyses, accidents caused by the pilot were the most frequent reasons for an event caused by one or more of the following reasons that are part of the CRM area:

- the use of improper procedures.
- loss of spatial orientation by one or more flight crew members (that is, loss of situational awareness of level I).
- improper management of aircraft energy.
- the distraction of one or more flight crew members.
- improper training.

Therefore, besides the typical LOFT missions on flight simulators, including techniques of deriving situations contributing to the loss of control in flight, additional topics to be introduced during the CRM training were recommended by the aviation authorities. Since 2016, in accordance with the Decision of the Executive Director EASA No. 2015/022 / R (Table) and 2015/023/R amending AMC/GM to the Regulation of the Commission (EU) No. 965/2012 and 1178/2011, further changes have been implemented in the CRM training in CAT in Europe[11]. New elements have been introduced to the existing procedures and the CRM training programme for the flight crews and cabin crews, including topics on improving the competencies in resilience development and preparing crew members in responding to surprise and startle effect.

3. CRM TRAINING IN THE MILITARY TRANSPORT AVIATION - SELECTED ASPECTS

The analysis concerning causes of accidents in the military air transportation in many countries made the officers in charge of aviation aware that just as in civil aviation as many as 70% of these accidents were caused by human error. The implementation of mandatory training programme on the so-called “human factor” in the UK military aviation was the first in Europe. The CRM training in the Royal Air Force (RAF) began in the mid-1990s. The training programme covering many aspects under the common term "Human Factor" was implemented, that is, "factors that affect human work". It has been assumed that the concept of the "human factor" extends well beyond the cockpit and applies to all people involved in aviation activities. However, conclusions from the available source materials[12] show that the first attempts to introduce this type of training lasting over 2 years, were not fully successful.

[10] Tragic Air France Flight 447 (AF447/AFR447) was a scheduled passenger international flight from Rio de Janeiro, Brazil, to Paris, France, which crashed on 1 June 2009. The Airbus A330, operated by Air France, stalled and did not recover, eventually crashing into the Atlantic Ocean at 02:14 UTC, killing all 228 passengers and crew on board the aircraft (https://en.wikipedia.org/wiki/Air_France_Flight_447).

[11] Annex to ED Decision 2015/022/R - Decision 2014/025/R of the Executive Director of the Agency of 28 July 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ARO of Commission Regulation (EU) No 965/2012 and repealing Decision 2014/014/R of the Executive Director of the Agency of 24 April 2014 (AMC and GM to Part-ARO - Issue 3).

[12] Based on *Defence Aviation Safety Centr Journal 2008* (RAF_UK).

Since 1997, further attempts have been made to provide training in the “human factor” in the RAF, including the employment of civilian instructors accepted by the UK Civil Aviation Authority (CAA), for the implementation of basic CRM courses at flying units level.

In the US Air Force (USAF), the first steps regarding the implementation of CRM programme were also undertaken in the first half of the 1990s, due to the postulates of pilots and commanders who noticed the need for a new approach to the human performance and limitations of the military aviation. The need for a regular approach to training and procedures was noticed in the context of the flight crews, and also the need to actively engage a wide range of airmen and other people supporting air operations. The US Air Force accepted the systemic approach to the CRM and in 1994 the first document was issued - *Air Force Instruction 11-290* under the name *Cockpit / Crew Resource Program.* The scope of the training programme concerning the "human factor" in military aviation did not initially find a fertile ground due to a different approach to the place and role of a soldier as a military pilot, especially of a single-seat aircraft pilot or multi-role combat aircraft. In general, this approach meant the feeling that every military pilot should first of all take up the challenge of unconditional implementation of the task, always bearing in mind its "missionary" and direct impact on the lives and health of other citizens and the impact on achieving the strategic objectives of the military operation.

As was earlier pointed out, the first attempts to implement training in the field of human factors in the military aviation took place in the armed forces of Western countries, although training programme in this area were implemented later than in civil aviation. Since the second half of the 1990s some of the Eastern Europe countries (that is, Poland) joining NATO had an impact on a different approach to the place and role of the "human factor" in aviation. The natural and dominant role of the commander, whether on the ground or in the cockpit of the aircraft, was not and still is not conducive to full acceptance of the implementation of the CRM principles. This process needs to be long-lasting and spread over the years. It is not possible to implement short-cuts of system solutions brought in earlier in the armed forces in other countries for several years, since this concerns the area related to the personality factors influenced, among others, by the cultural factors, tradition or attitude.

The changes taking place at the turn of the 20th and 21st centuries in the Polish Air Force resulted in the need to verify the existing aviation training system and the preparation of the flying personnel, particularly the pilots. Challenges related to the introduction of the new types of aircraft and helicopters adopting the NATO-approved procedural solutions had to influence changes in the approach to the training and education of the flying personnel. Organisational and qualitative changes resulting from the aviation development and conclusions derived from the tragic experiences related to aviation accidents[13] have significantly influenced the perception of the role of the human factor in aviation, along with its performance and limitations, and management of the available resources on board the aircraft and outside. Polish flying personnel during the training in European and American training centres and air bases (both civil and military) being thus prepared for flying the newly acquired aircraft to the Polish Armed Forces (F-16 and C-130 in the USA, as well as the C-295M in Spain), have participated in the compulsory CRM training. At the same time, efforts were made in the Polish military aviation to introduce system-based improvement solutions in the area of CRM based on the global experience. Since 2008, a specialised combined course for the flying personnel in the field of the Multi-Crew Cooperation (MCC), Crew Resource Management(CRM) and Operational Risk Management (ORM) in aviation

[13] C-295 in Mirosławiec Air Base, January 21, 2008 and Tu-154M with President of Republic of Poland in Smolensk Airfield (RU) on 10th of April 2010.

has been introduced in the syllabus in the Air Force Academy in Dęblin, Poland. The basic regulations in the field of military aviation of the Polish Armed Forces contain provisions on mandatory training for the flying personnel in the field of ORM and CRM. The "Methodology of risk management in aviation of the Polish Armed Forces (MZR-2010[14])" has been implemented, and it has become a helpful tool for both the flying personnel and commanding staff in the process of risk assessment at the planning and decision-making process before the flight operations.

The military flying personnel are familiarised with the limitations of the physiological aspects of the human body that can affect the performance in flying tasks, as a part of the aviation medicine training at the Military Institute of Aviation Medicine (WIML). They also train practically in conditions simulating flights in normal and emergency situations. The aim of these training is to increase the operational capabilities of the crews, that is, the use of the aircraft in the full range of acceptable operating parameters, reducing the number of errors made and increasing the flight safety level. The aeromedical training (basic and complementary) includes both theoretical classes conducted by the specialists and physicians, as well as practical, including the training aiming at familiarising the trainees with the effects of altitude hypoxia on the body in the low-pressure chamber, and taking into account the impact of the flight conditions and overload on physiology and psyche, preparation and training for flights using night vision devices (NVG).

In accordance to the military medicine requirements[15], the pilots can train in the Dynamic Flight Simulator (DFS) during the medical training, that is, in fact, one of the crucial functions of the Polish Human Training Centrifuge, which gives plenty of opportunities for using it in operational, training and diagnostic character. It allows for the performance of intensive pilot training, providing a proper performance of anti-G manoeuvres and familiarisation of the aircrews with the effects of high accelerations activity with longitudinal time and push-pull phenomena. Moreover, the centrifuge provides a safe alternative in raising the awareness of aircrews in case of possibilities of unwanted effects of accelerations, such as G-LOC loss of consciousness or spatial disorientation.

It should be added that the flying personnel within the Polish Armed Forces are also involved in training related to the causes of the occurrence, recognition of the symptoms and preventing the occurrence of spatial disorientation in flight, dedicated to the planes or helicopters pilots, using a unique spatial disorientation simulator[16].

After 2010, the systemic solutions in the field of the CRM training were developed in the Polish military aviation, taking into account its specific character. Compulsory CRM courses and training for the flying crews were implemented. Each member of the flight crew participates in the basic CRM training, and then in periodic improvement classes in the air units. Systemic solutions for the preparation and improvement of CRM instructors have been implemented, including training in foreign training centres. According to the "*Instruction of training of flying personnel in the field of CRM (Crew Resource Management) in the Polish air force*" and its amendment effective from January 1, 2018, the CRM courses and trainings are an integral element of the military pilot's training system, and other cabin crew members;

[14] *Metodyka zarządzania ryzykiem w Siłach Zbrojnych Rzeczpospolitej Polskiej (MZR-2010).* Sygn. WLOP 439/2010

[15] „*Instrukcja szkolenia specjalistycznego w zakresie medycyny lotniczej w Siłach Zbrojnych Rzeczypospolitej Polskiej*", implemented by Polish MoD in 1 January 2014. Document is in compliance with STANAG 3114 - AEROMEDICAL TRAINING OF FLIGHT PERSONNEL and STANAG 3827 - MINIMUM REOUIREMENTS FOR TRAINING OF AIRCREW IN HIGH SUSTAINED "G" ENVIRONMENT.

[16] Located in Military Aviation Academy in Dęblin

navigators, technicians / flight engineers, as well as the cabin crew members (operators, loadmasters, aeromedical personnel, etc.) of the military aircraft. The manual specifies types of CRM courses and training for the flying personnel, including the rules of education and professional development of military CRM instructors.

The assumption of training in the field of CRM in military aviation is to optimise the operational efficiency and combat capability of the flight crews and ensure the safety of the flight personnel and used material resources. The goals of these trainings should be achieved through a systematic training in improving the effective skills of and reliable (safe) use of all available resources (both human and material), including technical and non-technical competence (NOTECH) of the crew members and available systems and installations of the aircraft, as well as all information helpful in a safe and efficient flight.

The CRM training in the military aviation starts simultaneously with the commencement of the basic flight training of the flying personnel, to be later continued and expanded throughout the entire military career. The CRM training are focused on improving practical skills more than acquiring only theoretical knowledge. The basic CRM training with candidates for air service (cadets) is carried out at the military academy before the practical training on the military aircraft. In the next stage, the trainees learn the practical application of theoretical knowledge and essential CRM skills related to the type of aircraft, when special attention is paid to proper preparation for flights, briefings, cabin operations during the flight, as well as the use of necessary rules and procedures during the completion of the task summary - debriefings. During such training, it is established that an essential element of CRM training is the use of simulators and other training devices in a comprehensive manner, which should simulate operational conditions as close as possible to the real ones, at the same time taking into account the specificity of missions.

In addition to the training in the form of a course, all flight crew members in military units are required to attend a refreshing training of the CRM conducted in a three-year cycle. Additionally, as required flying personnel participate in type I CRM training, related to conversion type of aircraft and type II CRM training connected with the new assignment in other military unit and the commencing of practical training in mock-ups or aircraft cockpits during flight preparations. The purpose of the practical implementation of CRM training is teamwork, which is getting used to flying together as a crew or tactical group.

Apart from the CRM training, the military flying personnel participates in the tasks related to evaluating the operational risk management before the essential stages of aviation training, a group of tasks or types of flights (for example, display flights, night training, instructor training, flights in mountainous, NVG flights, etc.). Additionally, the commander of the aircraft is obliged to assess the risk of the planned task (mission) and draw up a "risk assessment card" (KSR[17]) before each flight (except combat and SAR flights). At each stage of the military aviation training, issues such as communication, flight coordination, task/mission analysis, risk management and decision-making, situational awareness and task/mission management are included.

[17] In Polish: Karta Szacowania Ryzyka.

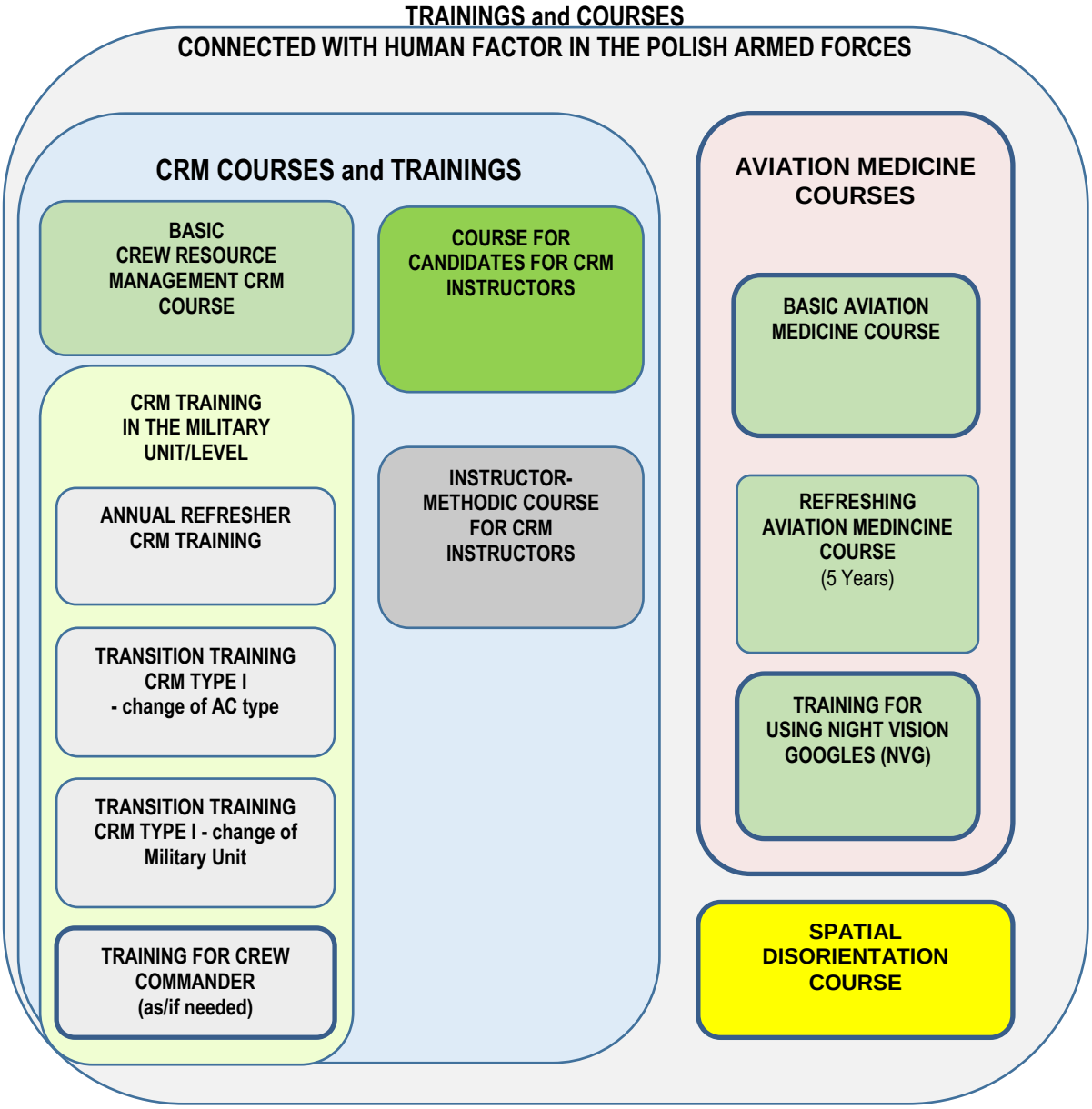

Fig. 1. A general scheme of training in the human factor in Polish military aviation (own study)

The expected effect of the CRM training is the acquisition of knowledge and skills, depending on the type of aviation, the specificity of the tasks performed and the composition of the crew, in the following areas:

- cooperation in a team, mutual understanding and coordination of activities inside and outside the cockpit,
- effectiveness in recognizing the critical flight moments in which the greatest threats may occur,
- reducing the number of errors made by the crew, increasing the accuracy of tasks and reducing the overloading during flight,
- optimising the time used to prepare for flights, planning and debriefing after task/mission,

- effectiveness of managing stress and fatigue,
- operation in standard, abnormal and emergency situations,
- building a positive atmosphere in a team/crew/group,
- effectiveness in decision making.

4. CONCLUSION

In the field of military aviation, it is very difficult to talk about uniformity or standardisation of the personnel, due to the purpose of military aviation, use of various flying platform, both planes, helicopters and other aircraft (for example, tiltrotor military aircraft, etc.), crew composition and configuration (single-person or multi-crew), including different configurations in the cockpit from two up to even four airmen[18]. Despite commencing tasks/missions during peacetime, most of them are carried out in formation of at least several aircraft (up to several dozen aircraft – for example, COMAO[19]), often in dangerous and/or not friendly and threatened environmental, and also to protect combat air forces in their operations and support other types of aviation and types of armed forces as part of training or combat flights. However, the most important challenge faced by military aviation is to maintain an appropriate level of safety flights and significant unpredictability of the flight operations environment, not only in terms of the weather conditions, terrain or time of the day, but each time requiring consideration of the enemy's influence from the ground or from the air to accomplish own tasks and missions.

Although the aircraft operations in the commercial air transport, performed by ~~a~~ typical operator, appeared to be similar to the military ones, they are primarily characterised by a smaller number of factors affecting flight safety and efficiency, including:

- definitely more predictability, the ability to plan flights and crews in advance,
- a larger number of available and trained crews, more than three trained crews per aircraft (the typical crew ratio is 4-6 per aircraft),
- commencing the typical passengers or cargo flights to the destination airport, where service and handling are fully organised,
- the flight preparation process belongs to operational personnel and appropriate services (including dispatchers) together with the division of pre-flight tasks, not involving the flight crew - the crew prepares directly for a given flight,
- properly prepared landing and take off airports with certified ATS, well maintained and equipped with air navigation assets,
- not flying to dangerous areas and unpredictable or threatened by combat activities,
- flights are performed in controlled airspace as IFR flights,
- full standardisation of flight preparation.

Flights of the military transport aircraft may be carried out, apart from typical mission performed by commercial aviation, also depending on the type of aircraft as:

- flights for the transport of cargo or passengers with landing at a destination aerodrome or other improvised place for take-off and landing (including contaminated runways),
- air drop flights in day and night from low, medium or high altitude,

[18] Commander of aircraft, co-pilot, navigator and flight engineer on C-130E.

[19] COMAO - *Composite Air Operation* - different kind of military aircraft in one formation – fighters, bombers, supporting aircraft (AAR), cargo aircraft, reconnaissance and others.

- formation flights composed of two to a dozen aircraft of the same or similar type,
- tactical flights within COMAO,
- NVG flights, single and group flights,
- flights to dangerous and endangered areas,
- flights to the airports where there are no air traffic services certified by ICAO or EUROCONTROL,
- to every airport, depending on military and political needs, in every place in Europe and in the world, while meeting the minimum, necessary operational requirements for the plane and crew.

It can be assumed that the crews of the military aircraft must be prepared for standard and repetitive tasks and missions, and done every time in unique circumstances. In addition, in military aviation, during the planning process, the intended negative impact of the enemy on the effectiveness and safety of its own air mission is calculated.

Taking into account the considerations described above, the implemented aviation training systems and CRM training system, should ensure an appropriate level of preparation of the military transport aviation crews to carry out all transport tasks in accordance with the unit's combat purpose, often in short time, with limited communication and navigational resources, in an unfavourable terrain. However, it is a *human - crew - aircraft - formation* system, in which the weakest element is a man and his preparation and resilience, having a direct impact on the quality, efficiency and safety of the aviation mission.

Used and applied global solutions in the field of flying personnel preparation to perform the tasks in the civil commercial aviation, constitute a very valuable source for the preparation of the military aviation personnel. Newly introduced, for example, in the Polish Armed Forces, is a system of pilot training, which considers the need to acquire the necessary knowledge and aviation experience during studies by candidates for military pilots prior to the commencement of flight training in military aircraft, including familiarising with the human capabilities and limitations at the basic stage of the aviation career, is valuable and useful, but most importantly, it positively affects the level of flight safety.

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