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# REQUIRED MATCO (MILITARY AIR TRAFFIC CONTROLLER OFFICER) COMPETENCIES FOR THE EFFICIENT AIR TRAFFIC MANAGEMENT AT THE AIRFIELD IN MISSION ENVIRONMENT

*The Hungarian Military Air Traffic Controller Officers (MATCOs) have already gained experiences in responsibilities of air traffic management at the airfield of mission environment and got used to the specifics of handling military traffic at the domestic airfields. Contrary to the above mentioned facts, they may find the traffic management tasks of mission airfield challenging. Among the challenges worth to emphasize the stress what the changed working environment may generate, the difficulties of handling commonly occurred civilian and military traffic, those flight procedures in managing the MATCOs are inexperienced, the dynamically changing traffic situations, or the cooperation with different nation's civilian and military air traffic controllers (ATCOs). A target training with appropriate content of profession, which otherwise harmonises with one of the international standards having regard its structure and objectives, can make the MATCOs' integration into changed working environment ease and facilitate the effective operation. In this paper recommendations taken by the results of the findings of international questionnaire and standards of civilian ATCO training.*

***Keywords**: target training, methods, airfield in mission environment, KSA[1], competence, feed-back,*

The maintenance of the air traffic controllers' skills and knowledge is one of the key factor in holding the aviation safety at an adequate level, both civilian and military air traffic controllers [1]. The training and aimed preparation have particularly important role in completing those tasks, when the controllers should work in international environment at an unknown airfield with difficult traffic situations. The starting point of the research was the so called „Kabul training" [2] theme document with its professional content, which served the preparation of the Czech and Hungarian MATCOs in early 2000's. The actuality of this training raised the first questions whether the training thematic is still serviceable, or modification required and what reasons justify the possible changes. The first source of the research was an English-language questionnaire, in which the MATCOs of those nations were asked, whom together with Hungarian MATCOs served at the airfield in mission environment many times. Another sources originated from international standards and national regulations over and above the long term experiences of the Hungarocontrol's[2] training system, which I understood through couple of interviews with the senior training referent.

Already at beginning of the civilian and military training system's comparison, a basic difference has stated. Namely until the civilian ATCO personnel are homogeneous with regard to their knowledge, skills and attitude, the military counterparts are considered inhomogeneous due to the different training background and national specifications [3]. The homogeneity in this aspect means, that there is no distinction between civilian ATCOs in regarding to their knowledge, skills, attitude, working method, they speak the same language and does not have

[1] Knowledge, skill, attitude

[2] Hungarocontrol: Hungarian Air Navigation Service Provider https://www.hungarocontrol.hu/

any cultural difference. The next question raised at base of above mentioned features, whether any knowledge or other differences can be identified within inhomogeneity, and what kind of special answers would be taken by the training.

## CIVILIAN ATCO TRAINING

The framework, structure and goal of the civilian ATCO training is regulated at level of commission regulation of the European Union [4] for the member states. The hierarchical queue of the ATCO (Air Traffic Controller Officer) training starts with initial training, which involves the basic and rating training. The basic training contains those theoretical and practical knowledge, skills and motivation, that make the student controllers capable to solve simple traffic situations. The other element of initial training is the rating training, which makes the student controller's knowledge, skills and motivation increased at the area of given rating in order to be licensed [5]. After the initial training the stage of unit training follows, it is designed to gain knowledge, skills and motivation to get the student rated for a specific unit. Those personnel can start this stage, who have student controller license in hand, with given rating. Those ATCOs, who have already licensed, also can participate in this training, in a case if they are extending their license with different endorsement for a special unit, aerodrome or working position. The unit training also has two stages. The first one is the „PRE-OJT" (Pre-on-the-job training) training, which designed to give specific knowledge of procedures, handling equipment and systems, that is necessary to start practice in simulated environment. The next stage is the so called „OJT" (on-the-job training) is designed for practicing in real working position with live traffic situations, after having acquired knowledge and skills. Both parts of the on-the-job training are supervised by instructors.

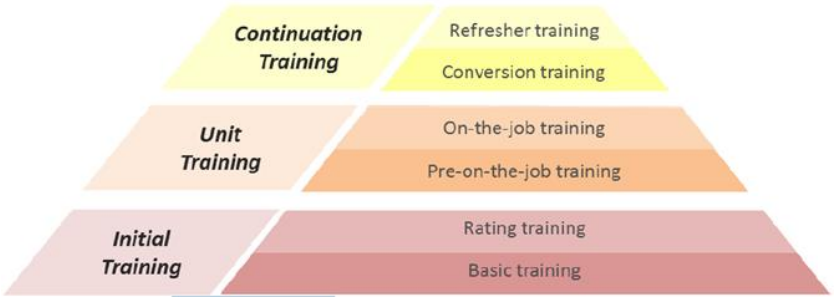


Figure 1. Civilian ATCO training system [6-16. 1.6.5]

The third stage of the civilian ATCO training system contains knowledge and practices, that is designed for the continuous validation of ATCO license and the preservation of the previously acquired competencies. The so called continuation training is also separated two different training course, but they do not have causal relationship with each other, contrary to the previously mentioned trainings. The first element of the continuation training is the conversion training that may be provided when new procedures, equipment, or system changes the accustomed working environment. The goal of the refresher training is designed to recall those competencies that are necessary for ATCO's working, but they are not applied them in regular basis at daily routine. This training stage serves ATCOs for handling emergency traffic and non-routine situations.

## The competency based ATCO training

The NGAP (next generation of aviation professionals) initiatives were launched by ICAO (International Civil Aviation Organization) in 2009, to provide competent and enough qualified personnel to maintain, manage, operate the future international aviation system. The purpose of the NGAP was to revise the aviation personnel training systems, in this case ATCO's, and make suggestions to use the modern training and learning technologies, that prefer the evidence-based training system, with increased use of simulations. The evidence based training contains those training elements, that facilitate the learning method with the understanding of the lessons learnt in practice, and make the student be capable to improve their professional manner. An important part of the creation the training system, was to define those competencies that are necessary and also observable during the ATCO personnel' work. „Competency is manifested and observed through behaviours that mobilize the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions." [6-13. p]. The competency-based training and its assessment should define with standard performance criteria, that assigned to the stages or milestones of the training, and when a person achieve the defined criteria, given competency standard is completed. The competency elements are defined with a behaviour which is observable between the start and the end of the controller's work shift. A competency element contains range of performance criteria that should be achieved by the end of the training. The performance criteria contain a set of statements which involve the required results and actions that the personnel should be taken, and help the instructor or assessor to judge whether the required performance has reached. A detailed guidance helps the instructors or assessors work, with the range of aspect, views in order to judge that the student controller should be competent or not.

The competencies (see 1. table) make the ATCO capable to find the best solutions in complex and difficult traffic situations, even though they are experiencing at the first time. In such case the ATCO should take effective actions and at the same time ensure that doing it in a safe and secure manner. The knowledge that included in the definition of competency, manifested as a result of learning process, which makes the ATCO capable to find suitable solution, to recall lessons learnt, to apply adequate rules and principles and to use creative thinking in their work. The skill by its definition means, that the ATCO owns the ability of doing necessary practices and actions during their work. The skills can be divided in three groups, namely the motor-, cognitive- and metacognitive one. The motor skills of the ATCO contain those ingrained direct actions, motions and activities which are the result of a learnt and practiced behaviour. The ATCO applies the motor skills in using the tools and the equipment of the working position, when does scanning the aerodrome manoeuvring area or different monitors to gain information or in a case of emergency takes the learnt actions automatically. The cognitive skill is the ability of intuition, perception and reasoning. The ATCO uses this ability to find and apply solutions to manage complex and difficult situations, and to prevent those situations, may lead to confliction. The process, which starts with the situation recognition, continues with analyzation and risk assessment and results the solution finding, is becoming automatically owning to the cognitive skills. The metacognitive skill is the „thinking about thinking", that make the learner able to form his own learning process and use the information the most effective way. It helps the learner how to approach a given task, comprehend it, evaluate the progress toward the com-

pletion of the task. All skills can be developed with numbers of practises. As the ATCO's working methods becoming the more automatically, the more capacity the ATCO remains for solving complex traffic situations. The attitude, or manner means that mental behaviour of the ATCO how approaching and solving the given task. Appropriate attitude is that, when the ATCO takes actions with safe manner, uses the learnt rules and works as a member of team [6]. The knowledge, skills and attitude together is known as KSA by the scientific references.

## ATCO competency elements [7]

The development of the ATCO competency framework serves for the purpose of improvement the ATCO practice standardization, finding out the best solutions, working methods and manners in the competency based ATCO training and its assessment. Within the competency framework the CU (Competency Unit) is defined with its explanation, after those CEs (Competency Elements) that features the competency unit, and the PC (Performance Criteria) which are manifested in the observable behaviour. Each ATCO competency is adaptable in the optional working environment. The training organization, even the ANSP (Air Navigation Service Provider) is able to choose among the best practices, and create its own training manual for unit and continuation trainings at base of competency framework elements. As the competency framework describes the ATCO's action with general statements, so that they can substitute into whichever training course. Within the given training, according to the the level of knowledge should describe the achieved performance criteria. As the training goes on, the higher performance criteria is achieved, which means the higher level of competency is completed. Particular competencies are concerning to different ATC functions, that why they could be define more properly detailed with regards to the given operational environment. There are several competency units, that have not been detailed yet by the ATCO competency framework, like the CM (Crisis Management), CDM (Collaborate Decision Making), or ATFM (Air Traffic Flow Management).

| COMPETENCY UNIT | DEFINITION |
|---|---|
| Situational awareness | Comprehend the current operational situation and anticipate future events |
| Traffic and capacity management | Ensure a safe, orderly and efficient traffic flow and provide essential information on environment and potentially hazardous situations |
| Separation and conflict resolution | Manage potential traffic conflicts and maintain separation |
| Communication | Communicate effectively in all traffic situations |
| Coordination | Manage coordination between personnel in operational positions and with other affected stakeholders |
| Management of non routine situations | Detect and respond emergency and other non routine situations related to aircraft operations and manage degraded mode of ATS operations. |
| Problem solving and decision making | Find and implement solutions for identified hazards and associated risk |
| Self management and continuous development | Demonstrate personnel attributes that improve performance and maintain an active involvement in self learning and self development |
| Workload management | Use available resources to prioritize and perform tasks in an efficient and timely manner |
| Teamwork | Operate as a team member |

Table 1. ATCO competency framework [7-188 p]

Through an example bellow, I would like to introduce what does the ATCO's observable behaviour could be, and why does this method could ease the assessor or instructor judgement.

| Competency unit | Competency element | Performance Criteria<br>Observable behaviour of ADC* (Aerodrome Controller) |
|---|---|---|
| Situational awareness | Anticipate the future situation | Analyses the actual situation based on information acquired from monitoring and scanning<br>*Recognizes that the landed aircraft vacate the runway and issue take off clearance for the departing traffic. |

Table 2. Example for SA of ADC [7.-188 p]

## The necessity of competency based ATCO training

In accordance with the maintenance of the ATCO's rating and related competencies, at specified time of ATCO's working hours, when major changes occure in daily operation or in case of the improvement ATCO's career, training should be taken. The type of training reasoned by the nature of changes, it can be an additional rating endorsement, conversional training for additional rating, different operational enviroment or the promotion in ATCO's career. The last one means that the ATCO is planned to gain instructor and assessor rating endorsement, which means a kind of promotion in their career. In order to determine the necessity and type of training, the so called ADDIE model applied, which is an acronym that means: 1 analyze, 2. design, 3. develop, 4. implement, 5. evaluate. The different level of ANSP's safety management is responsible to make decisions whether the changes or safety gap require to take any training or a safety briefing is enough.

In that case a training needs arises, a five-step workflow gets started. In the first workflow all data, information, facts and changes are gathered for analization to determine whether the training necessary or not. Those elements, like the technical and operational enviroment, current regulation getting under investigation to realize what the purpose of the training could be. The training request should contain all information and data which prove the training needs. After that evaluation the type of training can be identified. Important to define that after succesfull compliance, what qualification the trainees receive. It could be a rating or a rating endorsement, language endorsement, or insrutctor/assessor endorsement. Task list contains the result of analization, tasks and relating reasponsibilities. The task list also conatins the competencies should be practiced within simulations. Operational requirement contains ATCO procedures, local operational procedures, letter of agreements, AIP data. Working enviroment specifies the training, namely contains the airspace classification, climatological situation, terrain, runway configuration that are going to be established in simulated enviroment. If the training taken in real enviroment, usually the LOP (Local Operational Procedures) serves for reference. Analization expanded for the specifications of traffic element, type of aircraft, turbulence categories, traffic coplexity and consistency and the conflicts could occure. It is also important to collect non routine situations, and type of emergency that should be practiced in training. Technical requirement contains training technical conditions, like the type of simulator or simulated equipment. The endurance of training, assessment methods, milestones and related working hours depending on the results of analization. Under organizatinal requirements mentioned the other purposes of training, like reducing delays, fullfilment SES (Single European Sky) strategic goals etc. Finally, the language of the training is determined.

The second workflow is divided into three parts. The first one is the development of competency model, which is consistent with the purposes determined at the beginning. The next step is the development of assessment plan, it contains the assessement methods of the training. Finally

the training plan is established, which can be developed, transformed and ammended during the training. The competecy model established on the basis of ATCO TRG (ATCO Training) [7]. This guidanance contains the competency framework of ATCO personnel, those general statements that feature the ATCO work. Among the competencies those ones sorted out, which are relevant in training. The extent of the practice difficulty is featured by the conditions, which can affect the ATCO's performance. Conditions are those elements of the simulation, which make the situation complicated. For example an equipment that went out of work, different traffic intensity and coplexity, wheather situation or other enviromental effects. The training and assessement plan can be edited in the same document. The different stages of the learning process logically built in each other and marked with milestones. The milestone is that point when a training part ends and in case of assessors positive decision, the next stage of training starts. Different assessment methods can be applied, depending on the type (theoretical, practical, language) and part of the training. The promotive assessment is used during simulation practices, it is a supportive assessing method, its purpose to motivate the student, identify strenght- and weakpoints and faciliate the learning process.

The third workflow contains the detailed training documents at the basis of competency model. The fourth workflow is the conduction of the course which finishes with status of competent or incompetent student. The fifth workflow is the evaluation, this period is at the end of the training, when the student, instructors and assessors provide feedback according to their postive and negative findings.

## MATCO TRAININGS

After the introduction of ATCO trainings that may featured by modern training methods, the specifics of MATCO trainings introduction follows, to find out those facts that reasoning the raised question of this research, namely while the ATCO personnel are homogenous, the MATCO personnel are inhomogenous. Through the answers of questionare [10] in which I interviewed Bulgarian, Czech and Hungarian MATCOs, I wanted to get acquainted with those training systems they go through to get rated. I supposed that in each country, the MATCO licenses are authorized by their own MAA (Military Aviation Authority), which procedures laid down their own national military regulations. Respecting to the fact that the mentioned nations are member states of European Union, it can be also stated, that their ATCO personnel's training system, and licenses must meet the relevant EU (European Union) regulations. Under the relevant EU regulation I mean the 216/2008 EC regulation, about establishing EASA, which includes the responsibilities of the NSA (National Supervisory Authority), the training organizations and training equipment. The 805/2015 EC regualtion about ATCO licences, which has replaced by the 340/2015 EC regulation that laying down technical requirements and administrative procedures relating to air traffic controllers' licences and certificates. The reason why I found it important, because NATO (North Atlantic Organization Treaty) in 7204 stanag orders the member states to adapt the regulations of ICAO Annex 1 in licensing ATS personnel, in such a case when they are participating in a NATO led mission. This Stanag also says, that beside the Annex 1, the NATO acknowledges those MATCO licenses, that can comply with EU regulation. According to the recent status of ICAO and EU regulations of ATCO licenses,

the table (3. table) bellow shows the ratings that covers same authorization by the ICAO and EU. This table also shows those ratings, and administrative details, that the nations' MATCO licenses should conform to.

| **ESSAR 5 rating** | **ICAO rating** |
|---|---|
| Aerodrome Control Visual ADV | Aerodrome Control |
| Aerodrome Control Instrument ADI | Aerodrome Control |
| Approach Control Procedural | Approach Control |
| NIL | Approach Precision Radar Control |
| Approach Control Surveillance | Approach Control |
| Area Control Procedural | Area Control |
| Area Control Surveillance | Area Radar Control |

Table 3. ESSAR és ICAO licenses [11-Appendix 1, tab 1]

In the English-language questionare the answers of Question 2. and 3. demonstrate that within the same nation's responders different answers were given. Among responders were Czech, Bulgarian and Hungarian MATCO representatives overall 14 one, who have served at airfields in mission enviroment. Unfortunatelly the invited Polish and Italian MATCOs did not fill my questionnare. It contains fifteen questions, which helps to figure out the specifics of an optimal training, that faciliates the MATCO personnel to get rated within a short period of time at the airfield in mission enviroment. Beyond this, my goal was to find out the differences and sameness of the surveyed nations' MATCO training system.

The first couple of questions concerning the training system of the responder nation, and the qualifications that the military aviation authority authorizes for the issuance of MATCO license. The Question 2 sounded: "Through what type of training system did you get your MATCO licence?" Responders may mark one from the answers below:

1. Initial Training taken at a Military Academy, Unit (Rating) Training taken at an air-field;
2. Initial Training taken at an International Military ATC course (e. g. IMET), Unit (Rating)Training at an airfield;
3. Initial Training taken at an International Civilian ATC course, Unit (Rating) Trai-ning at an airfiled;
4. Initial Training taken at a National Military ATC Course, Unit (Rating) Training at an airfiled;
5. Initial Training taken at a National Civilian ATC Course, Unit (Rating) Training at an airfiled;
6. Other.

Answers showed that even the same nation's personnel qualifications can be different, which confirmed the statement of inhomogeneity. A part of Bulgarian responders took the inintial training at a Military Academy, the other part of responders completed it in Military ATC course. Both of them took the unit training at an airfiled. Hungarian responders took the inintial training at a military academy, and the unit training at the airfield. According to the Hungarian national regulations, the MoD (Ministry of Defence) is responsible for providing the training conditions. The recent Hungarian regulation also determines that the trainings regarding to the issuance or continuance of the MATCO licences, can be taken by the named institute[3] of the

[3] Zrínyi Miklós Nemzetvédelmi Egyetem Bólyai János Katonai Műszaki Főiskolai Kar Repülőműszaki Intézet [8-102 §]

Military Academy. The Czech responders similar to the Bulgarians partly took the initial training at military academy and military ATC course, and unit training at the given airfield.

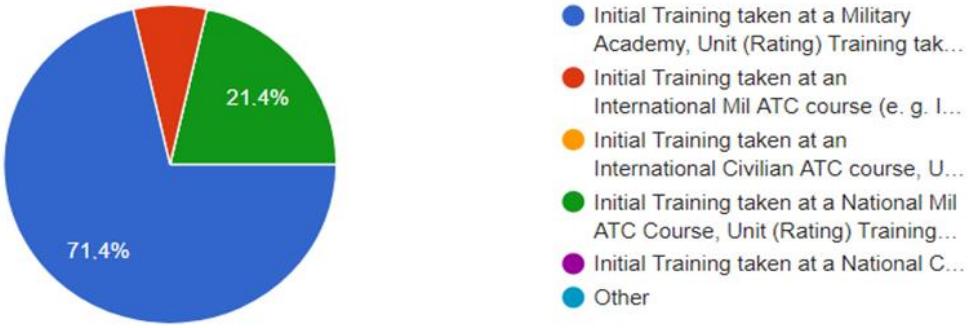


Figure 2. Training background of MATCO licences [10]

According to the evaluation of individual answer sheets and illustrated by the above pie chart (2. figure), it is also confirmed that the reason of inhomogenety originated from the different training background. It is also stated, that MATCO personnel are qualified mainly in the military academies in the investigated countries.

The Question 3. logically closly connected to the previous one, in which I wanted to prove that despite of the different training background, the MATCO licenses can be competent to one of the international standards. The Question 3 sounded:"According to which of the international standards below does the competent national authority accredit MATCO license?" Responders could mark more options, and I inspire them to share their own comments which always valuable for the research. Optional answers were the followings:

1. ICAO;
2. FAA (Federal Aviation Administration);
3. Eurocontrol, EU;
4. „No, MATCO licences are issued exclusively by national law";
5. Other optional answer.

The 50% of responderes confirmed that their MATCO license is competent with the ICAO standards, namely the Annex 1. According to the 14.3% of responders, their MATCO license meets the regulations of Eurocontrol and EU. The MATCO license of 64.3% responders were issued only by national law. According to the evaluation of individual answer sheet, the majority of Bulgarian responders chose the Answer 4., so their license is exclusively issued by national law. One of them marked the standards of ICAO, this answer may reasoned that through different training system can the personnel be licensed. The majority of Hungarian responders also marked the Answer 4., and couple of them marked the ICAO as well. If we want to find the reason behind the answers of Hungarian MATCOs, it is practical to look through our national regulation. The table bellow contains those subjects from which the MATCO candidates should take exams. These subjects should compare against the ICAO Annex 1. requirements.

In the table above those subjects are listed next to each other, which have almost the same content. The only subject that exists in ICAO standard, but is missing in Hungarian one is the „human factor". This conclusion is contrary to the answers of Hungarian reponders, whose 57% thought, that their license is competent with the ICAO standards.

| ICAO Annex 1 | 16/1998 MoD regulation |
|---|---|
| Air law | Air law |
| Operational procedures | Civilian and military flight rules, air traffic control procedures |
| Air Traffic Control equipment | Knowledge of communication and navigation equipment |
| Navigation | Navigation |
| Meteorology | Meteorology |
| General knowledge | Civilian and military aircraft types and their operational features |
| Human factor | - |

Table 4. Comparison of ICAO and Hungarian MoD regulation[4] [8][9]

The Czech responders also marked that they have their own national regulation for MATCO licensing, in comments they supplemented with statement, that their national law is competent with ICAO and EU regulations. The figure below shows the overall answers of nations.

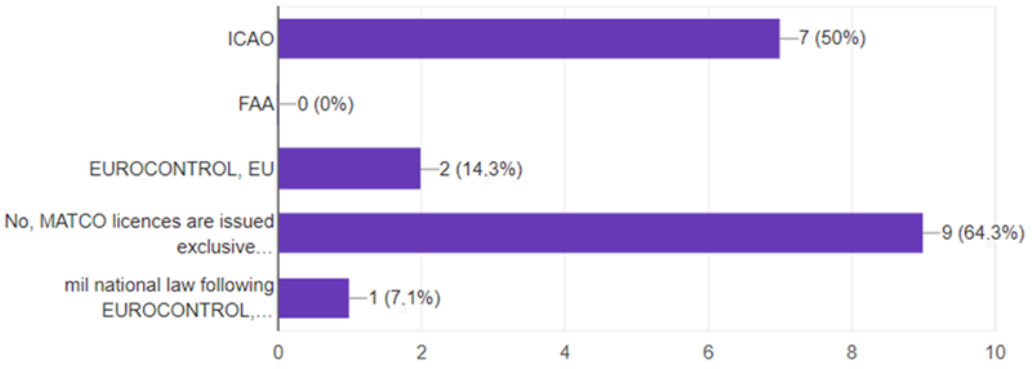


Figure 3. Answers of Question 3 [10]

The answers of Question 2 and 3 confirm the statement, that the MATCOs seemed inhomogeneous, firstly due to the different language, national affiliation, cultural environment and secondly because of their training background.

This investigation resulted, that there are NATO member nations, whose MATCOs have already served in NATO led missions, but their licenses do not comply with the order of Stanag 7204. In order to verify the actuality of the question raised at the beginning of this research, namely the „Kabul training" conversion's necessity, the following conclusions proved from the results of Question 2. and 3. Each nation's military aviation authority approves those trainings that comply their own regulation. After the compliance of that training, the MATCO or student controller can take licensing exam. The authorities' accreditation procedure evaluates the training thematic, content, instructors' professional background, and the training infrastructure. So that the „Kabul training" is reviewed by the mentioned conditions, and listed features would be transformed by the international standards, this training may be accredited by the military aviation authorities.

## The necessity of the training

Before the specific training plan is composed, the following question formulated if this type of target training is necessary and may be introduced into national training system. The Question 5. sounded: „Is it necessary to embed a target training course for such a mission in the national training system?" The responders can mark the following answers:

[4] Edited by the author

1. „No, because our controllers serve at domestic airfields only”;
2. „No, because our controllers' capabilities are fully maintained in the national training system”;
3. „Yes, that would serve the purpose of target training before international exercises”;
4. „Yes, because controllers' capabilities are not maintained continuously, and their knowledge is not homogeneous”;
5. Yes, because it is necessary to become familiarized with AIP date of the target airfield”;
6. „Yes, because it is necessary to become familiarized with the local procedures of the target airfield”;
7. „Yes, because preliminary practical simulations can be useful”.

More answers could be marked. The 14.3% of responders thought the training was unnecessary, because their MATCOs serve only at domestic airfields. This option chosen by a Hungarian responder, however our MATCOs regularly participate in NATO led missions as ATS personnel. Nobody marked the answer 2, which assumed that statement, this course can be necessary and adaptable in national training system. The third option was preferred mostly by Bulgarian and Hungarian responders, and the 42.9% of overall answers proved that this kind of training can serve as the preparation of MATCOs for the traffic situations of an international exercise, because the traffic conditions of an international exercise is similar to the traffic situations at the airfield in mission environment. The fourth option was preferred by 28.6% of responders, who thought that the maintenance of the MATCOs' capabilities and the difference between the knowledge may reasoned the necessity of the course. The fifth option was marked by 42.9% of responders, who admit the necessity of the training due to the reason of getting acquainted AIP data. The following two options also supported the existence of training, because the 57.1% of responders said that the knowing of LOP and special procedures seemed essential. The seventh answer was preferred the 42.9% of responders, who also stand up for the necessity of this training but emphasize the importance of practices in simulated environment.

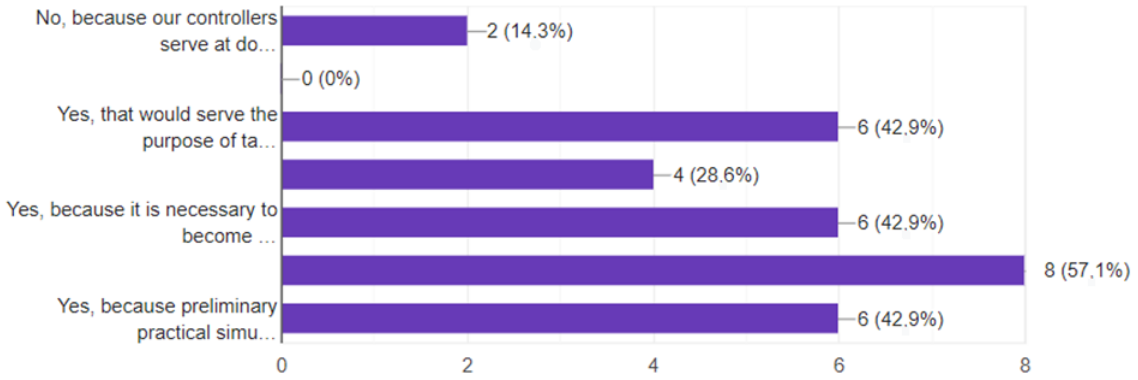


Figure 4. The necessity of the training [10]

## Content of theoretical training

This question focus on the demands of MATCOs, because the responders have to sort out and priories those subjects, they find useful and essential for preparation. The Question 9. sounded: „Mark those subjects the classroom training should contain!” More answer may be marked among the following:

1. Meteorology;
2. Navigation;
3. Aircraft Type and Category;
4. Aerodrome AIP Data and Local Operational Procedures;
5. Standard ATC Practices and Procedures;
6. ICAO Radio Phraseology;
7. Emergency procedures;
8. Air Law;
9. Team Resource Management;
10. Human factors.

The 71.4% of responders found the meteorological knowledge important and 42.9% voted for the navigation. The 85.7% of responders would welcome lectures on type and categories of aircraft. Almost everybody, 92.9% of responders, highlighted the subject that involves AIP data and LOP The 100% found essential to refresh and review the standard ATC practices and procedures in theoretical training. The 64.3% of responders put a mark for ICAO radio phraseology, while 92.9% preferred to look through the emergency procedures. The air law got only 57.1%, and finally the TRM (Team Resource Management) and Human factor got 35.7%-35.7% of votes. At the review of the "Kabul" training's theoretical subject I will take into account the ratios.

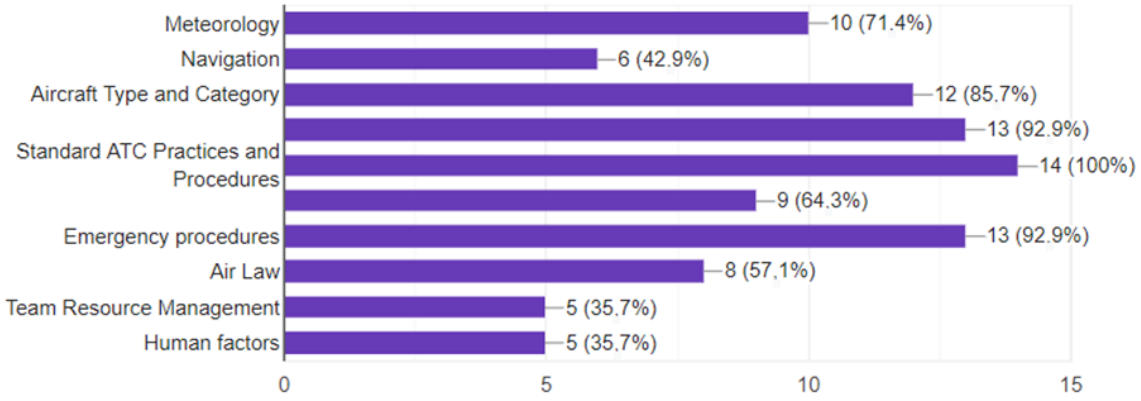


Figure 5. Subjects of theoretical training [10]

## MATCO competencies

The practical simulations serve to strengthen, make measurable and observable those competencies, which existence is essential for provision Air Traffic Control Service at the airfield in mission environment. The Question 10, asked the MATCOs, who have served and experienced in an above mentioned airfield to sort out the most important ones among bellow listed competencies. The Question 10. was: „Mark the competencies to be strengthened with practical simulated exercises!", the following answers were available with **more** choice:

1. Situational awareness;
2. Traffic and capacity management;
3. Separation and conflict resolution;
4. Workload management;
5. Willingness for self instruction;
6. Teamwork.

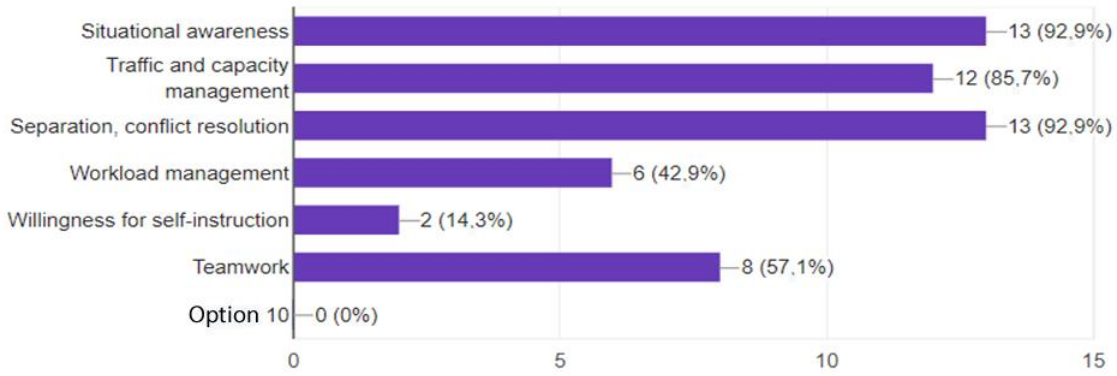


Figure 6. Strengthened competencies [10]

According to the responders' opinion the „situational awareness" and „separation, conflict resolution" are those competencies, which involves the entirety of knowledge, skill and attitude for handling situations that may occur at the examined airfield environment. The 92.9% of responders agreed these two competencies. The „traffic capacity and management" was marked by 85.7% of responders and only 42.7% of responders chose the „workload management". The strengthen of „teamwork" and the ability of cooperation considered important by 57.1%. I take into account the result of questionnaire in planning of practices.

## Traffic elements of simulations

The purpose of simulations is to prepare the MATCOs for the most common traffic situations, that's why the MATCOs were asked about, what kind of traffic elements have to practice. The Question 11 was: „What kind of traffic elements should be practiced throughout the training?" More options were available to mark, out of the below listed:

1. huge amount of helicopter traffic;
2. high speed traffic and their special procedures;
3. civilian traffic;
4. integrated drone/UAS (Unmanned Aircraft System) operation;
5. huge amount of VFR (Visual flight Rules) traffic.

However, the "civilian traffic" as an optional answer appeared below point 3, nobody marked this one, the 50% of responders marked this option as an additional answer. The 64.3% of the responders thought that it would be practical to built in simulations the huge amount of helicopter traffic. To practice handling of the high speed traffic and their special procedures is important according to 71.4% of responders. The airfields of mission environment is usually offered for common civilian and military operations, so the management of the civilian traffic operations becomes a daily routine. As it was stated above, the 50% of responders marked it. At the airfield in mission environment the integrated unmanned aircraft operations are taking part of daily movements, that's why 64.3% of responders found important to practice their procedures and general operations. Finally, the majority of responders agreed the fact that the most common flight rule is VFR 78.6% so that this element should built in practical simulations.

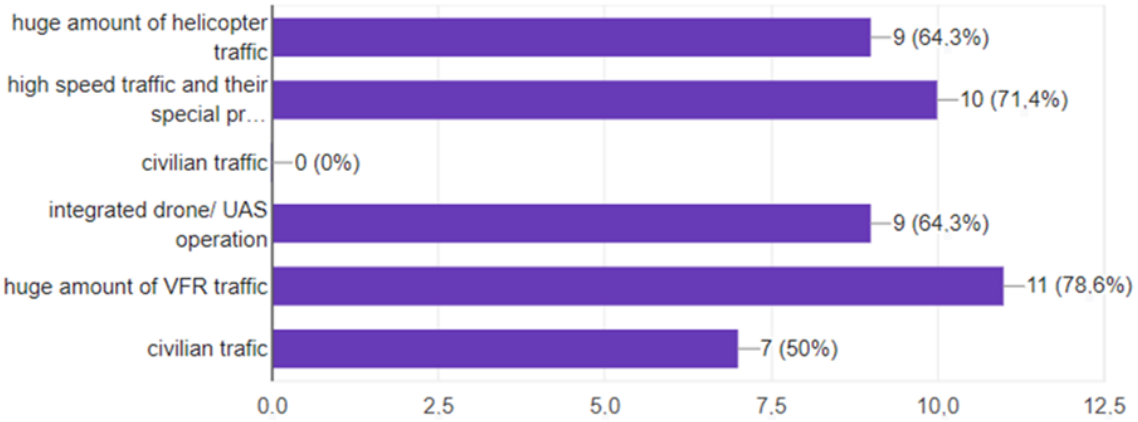


Figure 7. Traffic elements [10]

## Findings of questionnaire research

However just few questions of the English-language questioner were introduced in this paper, bellow I gathered the most important findings, which proving the statements of the research, namely the following:

1. The revision of the „Kabul training" is proven and
2. The MATCOs seemed inhomogeneous because of different training background.

Worth to emphasize the last statement, because at the beginning of the training important to clarify if there was any difference between participants' level of knowledge. Additionally, how deep were that differences and whether were they set back the successful fulfilment of the training and the individual working at the unit of given airfield in mission environment.
According to the answers of the Questions 2. and 3. I put the following statements:

1. The majority of responders got different initial trainings.
2. The initial training was the military academy's specific faculty, national MIL ATC and international MIL ATC training.
3. The MATCO license of the majority of responders neither competent ICAO's, nor the European Union's or the FAA's standards, these licenses were launched by effective national military regulations. This finding should be recorded, because the NATO requires ATS personnel of member states who participate in a NATO led mission, to have an ICAO competent license, according to the 7204 Stanag.
4. If the license is not compliant with any international standards and recommendations of ICAO, then an accredited course can be the solution. The course can be accredited on the basis of the above-mentioned international standards and is compiled in accordance with the principles of ICAO competence-based ATC training.

Questionnaire 9-10-11. answers mentioned the subjects of theoretical training and the competencies should be strengthening, during exercises of simulations and asked for the traffic elements and those conditions that should practice in a simulated environment. Based on the answers, the following can be stated:

1. All the subjects of the theoretical training were marked by the respondents, the summarized answers showed according to the ratio of marked subjects, that what extent

the responders consider the theoretical knowledge important. It is worth to review the subjects of „Kabul Training" at the basis of resulted ratios.

2. In the research of the practical simulations the competencies of „situational awareness", „traffic and capacity management" and the „ separation and conflict resolution" were promoted by the majority of responders, these competencies were followed by the „teamwork" and „workload management". Only negligible amount of responders found important to be strengthen the competencies of „self instruction"
3. In the simulations, from the largest amount of votes to lowest in order, the following elements were identified: 1. high volume VFR traffic, 2. high speed traffic and special procedures, 3. helicopter traffic, 4. integrated unmanned traffic and 5. finally civilian traffic.

## CONCLUSION

The goal of this research is to create a training theme by the basis of „Kabul training", that follows the suggestions of responders and the model of ATCO competency–based training method. This training theme can serve for the preparation of those MATCOs, who are going to work at a mission airfield and also can be practicable at the time of preparation for an international exercise. My idea was that, if the training follows the ICAO standards and recommended practices laid down in ICAO Doc 10056, it can be accredited by the nations' MAA. The point is that, what kind of procedure this training should get through to become accredited. As I mentioned in beginning of my paper, each country is EU member. It means, that their NSAs, or CAAs (Civilian Aviation Authority) have established, and do their work by the rules of EASA and they are authorized for conducting audit over the ATCO (MATCO) training organizations, their training equipment, instructors and thematic. So that this training could not be accredited by the ICAO standards, because the authority, who permitted to authorize a training by international civil regulations follows the EU regulations.

In that case this training should reviewed and changed by the rules of ICAO, concerning its training structure, theoretical subjects, practical simulations, assessors and instructors, training infrastructure, that should meet the principles of competency-based ATC training. This training should be identified, according to the training guidance as the „PRE OJT" part of the airfield unit training, which is followed by „OJT" at real traffic environment at the airfield of mission environment. The training documentation should involve the training and the assessment plan, which can be the basis of accreditation. It would be also useful to receive feedback from the airfield side, after the completion of „OJT", whether any changes were required in the „PRE OJT" part of the training. This part of research is going to be completed at the basis of the questionnaire and the available training documents of airfield in Afghanistan [11] [12].

If there is a demand for a training that makes the MATCOs of different nations capable to be rated in a short period of time at a remote airfield in mission environment or going to be among participants of NDAB (NATO Deployable Airfield) ATC working group, the NATO authorized agency entitled to enrol this training into accredited courses.

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## *A KATONAI LÉGIFORGALMI IRÁNYÍTÓK (MATCO) HADMŰVELETI REPÜLŐTEREKEN VALÓ HATÉKONY MUNKAVÉGZÉSÉHÉEZ SZÜKSÉGES KOMPETENCIÁK*


*A magyar katonai légiforgalmi irányítók a missziós repülőterek légiforgalmi irányításában már szereztek tapasztalatokat, és a hazai katonai repülőtereken hozzászoktak az elsősorban katonai forgalom kezelésével együtt járó sajátosságokhoz. Ennek ellenére a hadműveleti repülőtereken való munkavégzés kihívásokat jelenthet számukra. A kihívások között érdemes megemlíteni a megváltozott környezet okozta stresszt, a közös civil és katonai forgalom kezelésével járó nehézségeket, azoknak a repülési eljárásoknak az előfordulását, melyek kezelésében nem rendelkeznek elegendő tapasztalattal, illetve más nemzetek légiforgalmi irányítóival való együttműködést. Egy megfelelő szakmai tartalommal bíró célfelkészítés megkönnyítheti a megváltozott munkakörnyezetbe való könnyebb beilleszkedést és elősegítheti a hatékony munkavégzés sikerét, mely egyebek mellett tartalmát és struktúráját tekintve összhangban van a nemzetközi szabványok valamelyikével. A szerző a cikkeben ajánlásokat forgalmaz meg az optimális célfelkészítéssel kapcsolatban, ami egyrészt egy nemzetközi kutatáson és a civil ATCO képzés jelenlegi szabványain alapul.*



***Kulcszavak:*** *célfelkészítés, módszertan, hadműveleti repülőtér, KSA, kompetencia, visszajelzés*

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