

AIR TRAFFIC CONTROLLER TRAINING – REGULATORY PHRAME AND PRACTICES

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ABSTRACT

Air traffic controller training is defined with specified regulations, international and national, that prescribe minimum requirements for organizations certified for such a training. These requirements include creation of the Operations Manual, defining responsible personnel, programs of training with training objectives and financial plans. Specific characteristic of the prescribed requirements is an introduction of quality management and its procedures in air traffic controller training which have to ensure prescribed level of training provided by the certified organizations. Certification of such organizations is performed by national supervisory agencies according to national regulations. Minimum requirements are defined for all types of air traffic controller training. In this paper the minimum requirements for performing air traffic controller training will be analysed with practices in Croatia, as well as quality assurance elements for that kind of training.

Keywords: air traffic controller, training, training organizations, requirements, quality management

1 INTRODUCTION

Constant development of aviation is presented with the increased number of operations and implementation of the new strategies, ATC¹ technologies, procedures and technical solutions that have the main aim – provision of the safe, orderly and efficient flow of air traffic. The role of an air traffic controller is recognised by the international legislation as one of the most important factors that influences safety of air traffic. Adequate ATCO² training is fundamental to acquire the necessary knowledge and skills to satisfy new demands in air traffic.

In order to provide safe, orderly and efficient flow of air traffic and to ensure harmonized training process, a need for detailed regulation of the ATCO training standards, programs and learning objectives has been prescribed. These standards should increase the availability of air traffic controllers and improve overall air traffic safety. Standardisation of training and required competences should also reduce fragmentation and differences in licensing process and enable mutual recognition of licences among different countries. Establishing and implementation of the quality management system will ensure required standards and procedures in ATCO training by defining quality assurance elements and procedures. These quality procedures will give the feed-back of the training provided and enable improvement of the training process.

¹ ATC – Air Traffic Control

² ATCO – Air Traffic Controller

2 REGULATORY REQUIREMENTS

2.1 ICAO Annex 1 – Personnel Licensing

ICAO³ [1]prescribes the minimum requirements for the field of air traffic controller training through the following elements:

- student air traffic controller
- air traffic controller license
- ATC ratings
- medical requirements
- requirementsfor Proficiency in Languages used for radio-telephony communication
- requirements for approved training organizations

The more detailed requirements are left for regional or national regulations.

2.2 Directive 2006/23/EC on a Community air traffic controller licence

European Commission (EC) *Directive 2006/23 (Directive)* was brought for the Community of ATCOs licence and set competency standards for air traffic controllers [2]. The *Directive* has become an essential part of the Single European Sky (SES) legislation. It is built on existing ICAO Annex 1 standards and recommended practices [1].

The main objective of the *Directive* is issuing of a uniformed student air traffic controller licence and air traffic controller licence which are recognised for all member states. The licenses and acquired knowledge and skills are the factors which increase the safety standards and improve the ATCO operations. The *Directive* also prescribes that training shall consist of theoretical courses, practical exercises, including simulation training, which is needed for candidates to acquire and maintain the skills to deliver safe and high quality ATC services.

2.3 Guidelines for ATCO Common Core Content Initial Training

The EUROCONTROL⁴ document *Guidelines for ATCO Common Core Content Initial Training* [3] is a guideline standard for the ATCO Initial Training and is considered to be common to all ECAC⁵ Member States. *Directive* also refers to the *Guidelines for ATCO Common Core Content Initial Training* [2].

2.4 Specification for the ATCO Common Core Content Initial Training

The EUROCONTROL *Specification for the ATCO Common Core Content Initial Training (Specification)* supersedes the above mentioned *Guidelines* and it is actually a result of a *Guidelines* revision [4]. The *Specification* prescribes the minimum training requirements necessary to obtain during the Initial Training. The *Specification* requirements are prerequisites to achieve a Student ATCO Licence in accordance with *Directive* and present the minimum training requirement in accordance with ESARR⁶ [5].

³ ICAO – International Civil Aviation Organization

⁴ EUROCONTROL – European organization for the safety of air navigation

⁵ ECAC – European Civil Aviation Conference

⁶ ESARR 5 - Eurocontrol Safety Regulatory Requirement - ATM Services' Personnel

Specification, among general requirements, contains seven separate Annexes where Annex 1 corresponds to the Basic training while the other six correspond to the different Ratings. Annexes contain a complete syllabus with the learning objectives for the following Ratings:

- Annex 1: Basic syllabus - details the training objectives;
- Annex 2: Aerodrome Control Visual Rating syllabus;
- Annex 3: Aerodrome Control Instrument Rating with Tower (TWR) Endorsement syllabus;
- Annex 4: Approach Control Procedural Rating syllabus;
- Annex 5: Area Control Procedural Rating syllabus;
- Annex 6: Approach Control Surveillance Rating with Radar Endorsement syllabus;
- Annex 7: Area Control Surveillance Rating with Radar Endorsement syllabus.

3 TRAINING REQUIREMENTS

ATCO training is divided into four different phases which are:

- a) aining.
- b) Initial Training
- c) Unit Training
- d) Continuation Training

The Figure 1. shows progression of the ATCO training.

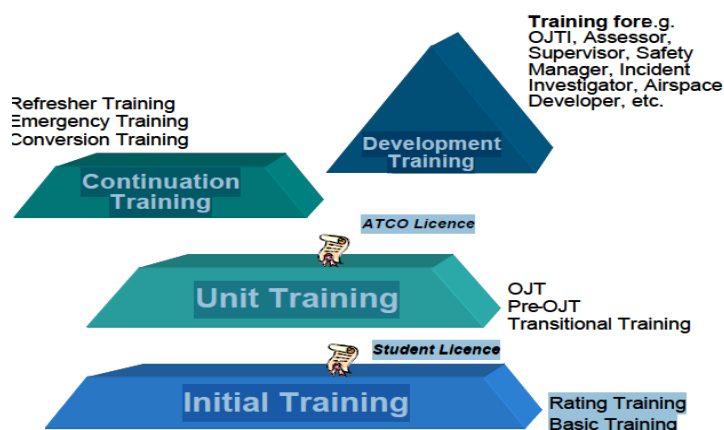


Figure 1: Progression of ATCO Training [4]

As it can be noticed Initial Training comprises Basic and Rating Training. After successfully finishing the Initial Training, candidates obtain Student ATCO License and continue Unit Training after which they obtain ATCO License. During the next stage of training, an air traffic controller must attend Refresher and Emergency Trainings or, in some cases, Conversion Training. This part of Training is known as Continuation Training. After this training, possible Development Training can be attended [4].

3.1 Initial Training

The Initial Training is the first phase of ATCO training. Training is designed for *ab initio* candidates who must satisfy prescribed level of knowledge and skills to become capable to continue further training at an ATC unit. Initial Training is divided into two parts - Basic and Rating Training and leads to the acquisition of the student ATCO licence.

The first part, Basic Training, provides theoretical knowledge and practical skills to enable an *ab initio* candidate to progress to more specialised Rating Training. The Rating Training provides knowledge and skills related to a job category and appropriate to the discipline to be pursued in the ATS⁷ environment [4]. Learning objectives for Basic and Rating Training are described in *Specification*. After reaching these objectives, every candidate will be capable of handling air traffic in a safe, quick and efficient way [4].

The duration of the Initial Training depends of the proposed training plans and the rating type. It consists of theoretical and practical subjects, including simulation exercises. There are 11 different subjects in the Initial Training which should be provided in such way to prepare the candidates for the different types of air traffic services. Acquired skills must ensure candidate's competence to handle complex traffic situations and a larger number of aircraft. The competences must be assessed after Initial Training and during the training by continuous assessment.

Initial Training comprises the following subjects:

1. Introduction to the Course;
2. Aviation Law;
3. Air Traffic Management;
4. Meteorology;
5. Navigation;
6. Aircraft;
7. Human Factors;
8. Equipment and Systems;
9. Professional Environment;
10. Unusual/Degraded/Emergency Situations;
11. Aerodromes.

3.2 Unit Training

The Unit Training contains three parts of the training: Transitional Training, Pre-OJT⁸ and OJT. After successful completion of the Unit Training a candidate acquires an air traffic controller license with the appropriate rating, then rating endorsements and unit endorsements.

Transitional Training follows Initial Training during which site-specific theoretical knowledge will be transferred using a variety of methods and during which skills will be developed through the use of site-specific simulations [4]

Pre-On-the-Job Training (Pre-OJT) is locally based training during which extensive use of simulation using site-specific facilities will enhance the development of previously acquired routines and abilities to an exceptionally high level of achievement [4].

On-the-Job Training- OJT is integration in practice of previously acquired job-related routines and skills under the supervision of a qualified On-the-Job Training Instructor (OJTI) in a live traffic situation [4].

3.3 Continuation Training

Continuation Training is given to the licensed or certificated personnel designed to increase existing knowledge and skills. It includes refresher, emergency and conversion training [4].

⁷ ATS – Air Traffic Services

⁸ OJT – On-the-Job-Training

3.4 Development Training

As defined in *Specification*, Development Training is the last phase of ATCO training, designed to provide additional knowledge and skills demanded by a change in job profile (new licence endorsement (OJTI) or any other career development like assessor, supervisor, safety manager, incident investigator, airspace developer, training manager, traffic flow manager etc.).

4 REQUIREMENTS ON TRAINING ORGANIZATIONS

The requirements for the training organizations are based on the technical and operational competence and possibility to organise training courses. The provision of training is subject to certification by the national supervisory authority which issues certification if all requirements are fulfilled. According to the *Specification* these requirements are:

- Efficient management structure and sufficient staff with adequate qualifications and experience;
- Facilities, equipment and accommodation appropriate for the type of training offered;
- Provision of the methodology to be used to establish details of the content, organisation and duration of training courses, unit training plans and unit competence schemes and the way examinations or assessments will be organised. For examinations related to initial training, including simulation training, the qualifications of the examiners must be indicated in detail;
- Proof of the quality management system in place to monitor compliance with the adequacy of the systems and procedures;
- Sufficient funding to conduct the training according to the standards and to cover activities in accordance with the nature of the training provided.

ATCO training organization which provides Initial Training must create Operations Manual as the main document with proposed procedures and defined training programmes which include training objectives; the duration of training in which candidates must achieve the aims of training and the process of assessment and examining to see candidates' progress, the final success and quality management system.

5 QUALITY ASSURANCE ELEMENTS

As mentioned before in chapter 4, documented, implemented and maintained quality management system is mandatory in ATCO training organizations. It is stated that this system has to ensure surveillance of all training procedures. Procedures and activities are conducted as stated in organization operation manual. Other important goal of the quality management system is to ensure correct application of corrective and preventive measures in order to meet standards set up in regulation as well as in community recognized good practice.

The above mentioned current common content and prescribed specification do not specify elements of quality management system that have to be implemented. It is left to the training organization to decide how it will reach prescribed surveillance obligation and on the national supervisory authority to consider and approve the scope and applicability of the established quality system.

The quality philosophy in the aviation field is not new despite the fact that quality requirements implemented in reference aviation regulation are. In aviation everything revolves around safety and improvement of the aviation culture. There is one more element which obligates top management of the aviation organization to be aware, informed and responsible for quality planning, especially from the financial point of view. Another reason

for implementing this requirement in regulation framework is to facilitate surveillance for aviation authorities which are obliged to authorize all aviation organizations. The illustrated view of this surveillance facilitation is shown in Figure 2.

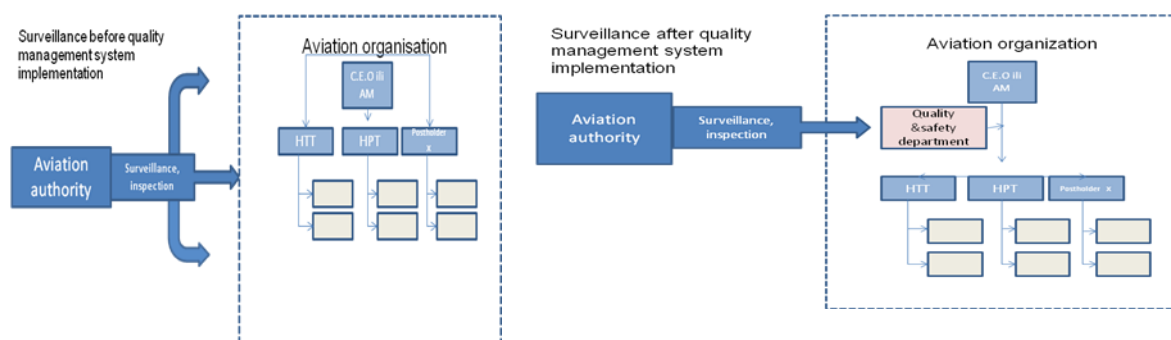


Figure 2: Changes in authority scope of surveillance under operations of organization

6 TRAINING PRACTICES IN CROATIA

6.1 Regulatory framework for training providers

Croatian Regulation of ATCO licensing and ratings, in accordance with the Croatian Air Traffic Law and *Directive* provides requirements for certification of training organisations. Organisation has to demonstrate its capability to provide ATCO training and create an Operations Manual (OM) as one of the material proofs of its compliance with the Community standards. Operations Manual contains four main chapters which are: Part A-Organisation and personnel, Part B-Training plans and programmes, Part C-Quality system and Part D-Finances [6].

In Part A organisation is to provide organisational structure, list of personnel with their adequate qualifications and experience for the provision of specific phase of the training, identification of managers' responsibilities and duties, description of facilities, accommodation and equipment appropriate for the type of training offered.

In Part B content, organisation and duration of training, unit training plans, unit competence schemes, examinations or assessments timetables, training objectives, entry requirements for the training, simulation devices and training reports are to be given in detail.

In Part C organisation is to provide quality management system to monitor compliance with standards as well as systems and procedures which ensure that training procedures satisfy the standards. Quality management system policy and strategy include defining the quality manager, auditing, irregularity reports, corrective actions and quality management system records.

In Part D the financial plan and financial insurance are to be defined for the conduction of the training on the approved level to cover all activities in accordance with the nature of the training provided.

Croatian Civil Aviation Agency (CCAA), which is a national supervisory authority, assesses and examines the compliance with the requirements for the certification/prolongation of training providers certificate based on the given proof and in place audit of the organisation. If organisation fulfills requirements it gets certificate for a period of three years. Authorized training organizations shall obtain approval from the Agency for any changes in the conditions under which the authorization was issued before the changes included in the training system. If during the validity of the authorization training organization ceases to meet some of the conditions under which the authorization is granted, the Agency may partially or completely abolish the authority. The Agency will perform continuous monitoring (auditing)

of the authorized training organizations in order to determine compliance with regulations, standards and training on which the authorization is issued.

6.2 Integrated and modular training at The Faculty of Transport and Traffic Sciences

In 2009 a unit called Croatian ATC Training Centre (HUSK) was established as an ATCO training provider at the *Faculty of Transport and Traffic Sciences*. CCAA has approved HUSK and its programmes and it is certified as an ATCO training organization (ATCTO/001) for the first part of the Initial Training – Basic Training. HUSK has two programmes: integrated and modular ATCO basic training programmes.

Integrated programme is integrated in the Study of aeronautics, ATC modul according to Bologna process and lasts for three years. Modular programme is provided as an organized individual course and lasts for 14 weeks. Both programmes are harmonized with the *Croatian Regulations of ATCO licensing and ratings from 2010* which is in accordance with *Specification*. In 2010 the first modular ATC basic training was provided by HUSK for Croatia Control Ltd. (12 candidates for the following ACS⁹ Rating). Both programmes are part of the HUSK's Operations Manual [7]. After attending modular or integrated programmes candidates acquire Certificate of successful finishing Basic ATCO Training [7].

6.3 Quality assurance elements at HUSK

HUSK is an organization approved by the Croatian Civil Aviation Agency, thus having documented and implemented quality system. Good aviation community practices were used to develop its framework which is quite different from the well known international quality standard ISO 9000. Considering its scope of business and quantity of operations HUSK is a small organization, so the elements for ensuring satisfactory quality of operations are set to its minimum. Fundamental, well known “Plan –Do- Check- Act” or PDCA cycle of quality was basic in describing and documenting quality activities in HUSK, which is shown in figure 2. Section “Plan” represents all the activities planned before financing to achieve quality goals. Section “Do” considers execution of all planned activities of the organization. This is section where the organization creates its added value in training. Section “Check” presumes that the organization conducts its internal audit once a year and quality control activities every three months. All is done by checking the prescribed check lists which include all external and internal requirements expected to be achieved by organization.

⁹ ACS – Area Control Surveillance

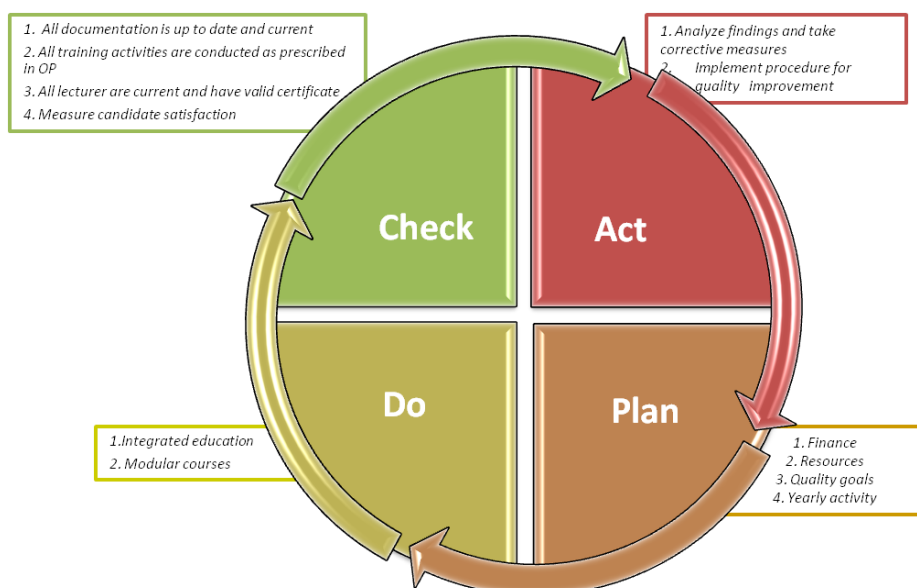


Figure 3: Quality PDCA cycle implemented in HUSK

Finally, section “Act” represents implicit analysis of the achieved level and implementation of the corrective and preventive measures in standard organization procedures. Advantages of the implemented quality system is that everyone in HUSK is aware of their liabilities and knows what they are asked to do and how to respond if any misunderstanding or unsafe situation occurs. Basic framework of liabilities thought system elements is shown in Table 1.

Table 1.: Framework of liabilities for quality

Element system	Liability	Explanation
Policy	AM	<ul style="list-style-type: none"> • safety and quality determination
Strategy, Resources Annual goals	AM	<ul style="list-style-type: none"> • strategy re-examination during September on grounds of management system evaluation • defining annual budget and goals
Training	HTT HPT	<ul style="list-style-type: none"> • defining internal standards • ensuring compliance with set requirements and standards through daily testing and activity audit • report and feedback information analysis • audit of outsourcing partners • initializing and audit of applied actions
Reporting and feedback information	ALL	<ul style="list-style-type: none"> • identifying and reporting on divergences, discrepancies, and possibilities
Audit	QM Auditors	<ul style="list-style-type: none"> • identifying and reporting on divergences, discrepancies, and possibilities
Quality control	AM, HTT, HPT QM, Teachers	<ul style="list-style-type: none"> • ensuring compliance with set requirements and standards through daily and/or monthly testing and activity audit
Data evaluation	HTT HPT QM	<ul style="list-style-type: none"> • data collecting and evaluation from specified areas in order to set trends and define system gaps • defining conclusions after evaluation of collected data
Managing and management system evaluation	AM (in cooperation with HTT, HPT, QM)	<ul style="list-style-type: none"> • evaluation of overall company efficiency and achieved goals

Source: HUSK Operation manual

Since HUSK is a small organization that mostly conducts theoretical training, majority of the quality assurance elements refers to surveillance of settled learning objectives outcome. Final exams scores are part of the quality analyses as well as of student satisfaction with the teachers.

7 CONCLUSION

At the end it can be summerized that ATCO training is a specific kind of training which must be certified by the national authorities according to the prescribed international legislation. ATCO training programmes are under the constant supervision of the national authorities and are harmonized with the specific requirements

It should be emphasised that ATCO training in every phase requires defined quality assurance elements which will ensure that training plan, programme and learning objectives, training organization and provision, training syllabus and qualified personnel are harmonized to the required regulations and that required level of knowledge and skills is achieved after the training. Quality procedures ensure that audit and inspection are used at every level of training and result with the improvement of the whole training process.

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