

# Advanced aerospace management of integrated education and training towards comprehensive security

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***Abstract:** The aviatic integrated education and training based on the progressive technologies towards comprehensive security will be necessary for the future specialized preparation and training of the personnel in civil and military aerospace management and aviation, especially for expeditionary missions. The integrated pilot flight preparation and training based on the modern methodology of situational control would be used for improving our general system of present preparation and training, within the framework of the Armed Forces of the Slovak Republic.*

***Key Words:** Aerospace Management, Flight Preparation, Education and Training, Situational Control, Comprehensive Security, Sophisticated Techniques and Technologies.*

## 1. INTRODUCTION

The high quality and professionally advanced personnel is the highest value for each flight operator. That is why the involved controllers, as an operator, pay attention to the development of education and training system and change it into high quality, effective and safe task fulfilment. The specific mission and variety of air activities influence the prior trend, content and forms of air personnel preparation. At the same time, we manage to control and secure the complex preparation only through the close co-operation of available aviation educational institutions and training centres in compliance with aviatic educational sources.

## 2. COMPREHENSIVE SECURITY BASED APPROACH

The national system of education and professional development of personnel in the Armed Forces of the Slovak Republic (AF SR) is built in accordance with the strategic “ Long term plan of structure and development of personnel in the Armed Forces of the Slovak Republic – Model 2010“ [3], approved by the National Council of the Slovak Republic. The main goal of the national education system and professional development of the Armed Forces of the Slovak Republic, controlled by the Ministry of Defence of the Slovak Republic (MOD SR) and General Staff AF SR, is to provide the complex professional preparation of personnel on the base of building and development of their competencies to fulfil the tasks of the armed forces, as guaranty of national safety, in accordance with the Constitution and the Slovak Republic laws, as well as with international state commitments.

Under the term of professional soldier competencies, we understand his psycho-physiological and social–psychological qualities and activities in accordance with his professional qualification to function. Building and development of personnel competencies

of professional soldiers significantly influences building and development of required abilities of armed forces by themselves, which we perceive as a total, complicated system. The Air Force of the Armed Forces of the SR, in accordance with the tasks and international commitments of the Slovak Republic, need to prepare, within the aviatic education, a military professional who should fulfil the following requirements:

- To be motivated, educated, theoretically and practically prepared to function in a domestic and international environment, with skills in informatics and simulation technologies;
- To be technically skilled, psychically strong, physically able, capable to take independent decisions and practise (or to be „a team player“ in a flight crew and military unit), critical to himself and the environment;
- To be a personality with the system approach and viewpoint concerning events and processes;
- To be capable of activities in all meteorological and tactical conditions of flight activities, night and day.

The effective tool of building and development of required personnel competencies, with the emphasis on pilots, is AVIATIC EDUCATION. The central term is the term EDUCATION, a system of educational activities and conditions which have cultivating tendency and effect in the entire human education. The word EDUCATION is derived from Latin EDUCARE – to train but also from Latin EDUCERE – lead, guide other or others, which provides space in this process for leaders, who can sweep people and create space for managers who then achieve aims by an effective control process. The process of education helps in developing a personality within cognitive, social and perceptive – motoric learning.

### 3. EDUCATION AND TRAINING INTEGRATED MANAGEMENT

The result is the required education, breeding and level of training which in compliance with psycho – physical abilities of an individual generate his COMPETENCE for the certain activity: as a complex abilities to perform special tasks, especially in performance of professional functions and other life activities and social roles including practical knowledge, skills, proficiency, attitude and other qualities. Application of education processes in the sphere of flight personnel preparation is AVIATIC EDUCATION, perceived as aviation specialized education, breeding and aviation training of specialists for building and development of their professional competencies.

Considering the AVIATIC EDUCATION as a DIDACTIC SYSTEM, we can say that, depending on a mission and required professional competencies of aviation personnel – pilots, it is specified in:

- Breeding-education and breeding- training OBJECTIVES of aviatic education as an intended, required result and projected output of an education process;
- CONTENT is understood as a procedure determined to achieve defined objectives of aviatic education in the theoretical and practical sphere of pilot training;
- Aviatic education is realised generally in a school and after school FORM, that is a breeding - education process and training in a school and off school system which presents organised teaching, training and socializing which develop a personality;
- METHODS of aviatic education present ways to the defined breeding – education and breeding – training objectives, that means teaching methods, training, scientific methods and others;

- In the process of education there are used: various didactic FACILITIES, computer and audiovisual aids to support teaching, multimedia classrooms with computerised training support, aviation technologies and simulators, working models of systems, machines and facilities and similar.

The selected FORMS, METHODS and FACILITIES create „the MODUS OPERANDI“ of the educational process in the particular environment which we perceive as a two side interactive relation of educators: a pedagogue-instructor on one side and a student-pilot on the other.

A part of all processes is a feedback, some analyses and quality control of education process outputs which enable to innovate forms, methods and facilities of education as well as content to achieve the defined objectives of aviatic pilot education. The significant fact is the complex and systematic aviatic education of aviation personnel which is a value oriented process of professional preparation. Our tendency is not „only“ to prepare a pilot-professional but „a flight personality“ respecting flight regulations and principles of a company aviation culture which he accepted and, in reality, he shows himself in his behaviour, activities, attitudes and work operations.

The significant tendency in aviatic education from the state point of view (represented by air force) is a distribution of responsibilities for professional preparation of air force personnel between military and general, civilian education and training system. This fact significantly changes up to now philosophy of aviation personnel preparation within MOD SR and we accept it as over branch realization of the social state order, in the all state dimension. The practical realization of this education side, we can see in social study programs relevant military and civilian, educational and training organizations, approved for required activities.

To fulfil the requirement of the qualitative and safety preparation system, we work, in addition, on application designs of a situation control progressive method in the sphere of aviatic pilot education as cyclically repeated all life process of aviation professional education and training. The partial solution is still worked realization project of the situation system control Integrated Flight Preparation and the pilot Training (IFPaT) methodology in the AF SR.

The following software solution of already worked conception of control IFPaT of pilots being a complex adaptive system will create assumes on the application base of information and simulation technologies, especially for:

- the „transfer“ of vertical flight preparation control hierarchy and training of air force pilots and aviation units into a horizontal platform C2 (Command and Control) in the net environment,
- situational predominance of managers in taking decisions comparing with classical linear control of air force pilot (or flight units) flight preparation and training,
- shortening of decisive and control processes in the flight preparation and training control of air force pilots (flight units),
- improvement of action interference effectiveness to a flight preparation and training system in a case of departure from plans or if required abilities of pilots and flight units are not achieved,
- securing of an actual information (feedback) about conditions of building and development of pilot competencies and flight unit capabilities for C2 process participants,
- quality improvement of inside processes and mutual interactivity of AF SR,

- exploitation effectiveness of available human, financial, material and technical sources within the national system of military educational and professional development of the AF SR personnel in cooperation with civilian education and training subjects.

The situational control conception of the integrated flight preparation and AF SR pilot training accepts new trends in aviatic education—flexibility, integration and innovation processes with the emphasis on effective application of:

- potentials of civilian and military educational institutions,
- civilian and military training capacities,
- modern information and simulation technologies in aviatic education,
- national and European requirements on qualitative pilot aviation education and training, accepting changes and needs of the learning informative society,
- state source frame for armed forces and public universities (or relevant training organizations), with the potential of private subjects.

The methodology of situational control of integrated flight preparation and training of military pilots is also applicable in conditions of commercial, civilian aviation organizations.

Together with an empiric survey of pilots' opinions in the sphere of flight safety and other science—research, educational and training activities in the sphere of enhancement of civilian and military aviation safety, the introduced problem of aviatic education represents the vast dimension for work and breeding of doctorands, cooperation of academic—pedagogical personnel, instructors of ground and flight training and similar.

#### **4. CONCLUSIONS AND RECOMMENDATIONS**

According to our last theoretical and practical experience, results of empiric research of pilot's opinions in the field of flight safety and research-pedagogical work in the aviation education of personnel we can state that:

- The improvement of professional preparation of pilots and the conception of situational control of their aviation education and training, in a context of integration and using of civilian, military, educational and training subjects, is our perspective agenda.
- The central point among professionals is searching for ways how to develop competencies during the flight service which would respect the achieved phase of pilot training (as key crew players) and new trends in conditions of civilian and military aviation.
- The flight safety is especially the knowledge and situational realization, expressed by obtained and trained competencies of a pilot (or a crew) of an airplane in the process of flight preparation and training.

The development control of pilot (crew) competencies, for example through situational control of integrated pilot flight preparation and training (creating a root of aviatic education), distinguishes the limitation of competencies in solving problems of flight safety by narrowing and modifying known images of situational breaks, in which a plane crew can generate errors during the flight.

Our attention also have to be focused on the ground personnel, air organization's managers, personnel of aeronautical works, aviation technology maintenance and repair organizations and aviation companies within the aviation education as a complex system of long life education cycle. It is long way to fulfil the European Union and national

requirements in the certified system of aviation education for specialized workers who provide the aviation safety and security.

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