THE PROCESS OF FLIGHT TRAINING IN AN AVIATION ORGANIZATION

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Summary. The article pertains to the role of aviation organization in the aviation personnel training. The authors presented conclusions concerning three basic areas affecting the correct implementation of aviation personnel training, that is training infrastructure, instructors, training programs and desirable practices in theoretical classes, and, to a lesser extent, simulator as well as practical training. The role of e-learning together with the rules of its application as a modern training tool have also been presented.

Keywords: aviation, aviation training, aviation organizations

1. INTRODUCTION

The modern process of professional training of the pilot should be conducted while taking into account the dynamic changes in all areas related to aviation, with a particular emphasis on the challenges of new technologies and aviation safety, from the perspective of the human factor. Similarly to other areas of professional training, these activities should prepare the pilot to "handle" the challenges specified by daily tasks, through the improvement of such characteristics as proactivity, creativity or ingenuity. These qualities are of particular significance for a future crew member, among others, due to a high degree of unpredictability of the environment of the task execution. An additional factor which supports this conviction is the necessity of air personnel to operate in an international environment. In order to achieve goals, defined in such a way, in relation to each candidate/staff member of the flight crew, aviation organizations which are involved in the training and professional development of pilots should comply with certain standards, including those resulting directly from the rules as well and those arising from new challenges put by the areas connected with the preparation and execution of aviation tasks. It is important that these new standards, which are related to the organisation of air training, do not exclude, in any way, the existing ones that are clearly defined in the provisions of international and national aviation law. Thus, one may ask the following question: what are the qualities of every aviation organization, dedicated to the training/professional development of pilots? What principles should be applied by those involved in the creation of aviation training programmes? What are the things that instructors involved in ground, simulator and practical training should pay particular attention to? The authors intend to answer this and several other questions in this article.

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2. TRAINING BASE OF AIR ORGANIZATION - FUNDAMENTAL ELEMENTS

An aviation organisation is considered today as one of the principal elements which affect the shaping of the safety level in areas associated with the preparation and execution of air tasks. One of the areas of activity of aviation organization, which exerts a major impact on air safety is the training and professional development of flying personnel. In order to achieve the essential training objectives, every aviation organization should possess or have access to the training base which is suited to the nature of the conducted training activities. The experience gained by the authors, in the framework of the conducted investigation, indicates that the essential elements of the base are as follows:

- *classrooms and workshop rooms (laboratories)* for the execution of activities within theoretical training and professional development training, lectures, classes, laboratories, workshops, including computer rooms and language laboratories,

- *trainers and flight simulators* which should be treated as essential equipment supporting the process of flight training with regard to its three main areas, namely:

- *theoretical training* – regarded as a synthetic training tool to demonstrate the principles of operation, construction, operation and maintenance and use of a number of devices and onboard aircraft systems, e.g. instruments and radio/navigation systems.

- *simulator training* - used for the practical implementation of training exercises within the training programme,

- *practical air training* – in this case the flight simulator is treated as a device allowing practice training of all elements associated with the task scheduled for its execution. In order to fully exploit the benefits of trainers and flight simulators in the process of aviation training, each aviation training centre should possess unrestricted access to these devices. Due to the currently applied rule that an air training centre should have access to these devices, including the purchase of such a service in another air training centre, they are currently used to a limited extent,

- *tools and equipment supporting the process of theoretical training* - the visualization devices (projectors, computer systems); specialist computer programmes to transfer and record the computer contents; representative models and cutaways of devices (systems) in relation to the content of the training and aircraft used during practical air training; school laboratory kits for the explanation of fundamental rights and phenomena occurring during the movement of aircraft in the air, the principle of operation of certain devices and aircraft systems,

- *the library database, including the electronic one* - in the Polish and English language, allowing the trainees to fully understand and consolidate the knowledge referred to by individual training modules. Moreover, library collections which are at the disposal of an aviation organization should allow their students to improve knowledge with regard to all modules covered during the training as well as deepening knowledge in areas related to broadly understood air safety,

- *equipment for practical training* - it is advisable for each aviation organization to have a full spectrum of air equipment necessary for carrying out the tasks specified in the certificate of the organization.

Summing up, it should be emphasized that the training base of the organization should be treated as one of the essential elements of achieving the training tasks. Aviation regulations set only minimum requirements to certify an organization in order to provide certain types of training, which is why those in charge of the organization should keep this in mind and aim at its constant improvement. However, even the best training base will not provide the desired level of quality training without a properly prepared instructor personnel.

3. AIR PERSONNEL OF AN AVIATION ORGANIZATION

The organization should have a highly-skilled instructor personnel, representing a high level of specialist experience, which is fully prepared to conduct the full training process, according to the powers of the training centre. In the 21st century, which is characterised with a high level of commercialisation of professional air training, Polish air training centres have been put in an extremely difficult situation. With a limited training base and limited financial resources for its development, they are forced to meet the requirements of normative documents regulating the requirements for the air training for specific pilot licences. Due to high competition on the air training market, at present the prices for this type of service are close to the breakeven. For this reason, most of the air training centres conduct theoretical courses, regardless of the level of training, on the basis of a narrow group of available academic instructors who do not always demonstrate the level of training and skills appropriate to the type of conducted classes. It needs to be stressed that a vast majority of them have not been prepared in a targeted and structured way to conduct this type of training activities. As a rule, the instructors who decide to conduct this type of activities, execute them in a manner that they are acquainted with from their own experience, when they assumed the role of a student or a trainee. Few of them enrich their didactic base by elements referred to as modern methods, forms or teaching techniques. Taking into account the fact that each of them had to do with the different levels of teaching and methods of teaching which are perceived today as not particularly modern, it may happen that the instructors will be copying the patterns which are incongruent with the modern system of air training. Currently the reality is that during air training, quite often, there is a situation of the so-called "passing the time" by excessive developing the contents of one part of module training at the cost of others.

A separate issue is the e-learning training method, including the presented level of preparation of aviation organisation specialists who design e-learning trainings and implement this type of activities at a level which ensures the achievement of the set objectives. In the light of contemporary views expressed in the subject literature, the process of designing e-learning courses should be teamwork. Therefore, an aviation organization should have, in its human resources, personnel who is capable of acting as course designers, namely a media didactic experts, meritorical experts and a designers of the course contents. In the absence of the possibilities of obtaining specialists to design an e-learning course, an aviation organization should rely on training which is available on the market, including often costly e-learning materials for air training. It is also advisable for an aviation organization to periodically update the material contents by those resulting from changes in individual training modules and air regulations.

The results of the analyses of the subject literature relating to an e-learning course, experts' opinions and conclusions from previous training activities of the authors indicate that an instructor who is properly prepared for this type of activities should have:

- competencies in proficient operation of programmes and tools used in e-learning activities,
- the psychological and pedagogical competencies - they possess qualities and attitudes which enable them to exert a proper impact on a group of students, including organizing the work of the group; they should know the basics of psychology to communicate in the net, be able to motivate the trainees to work, and have a high level of empathy, tolerance, etc.,
- diagnostic competencies related to the recognition of the trainees and changes in the implementation of the e-learning environment - restricted to possessing knowledge in the field of the subculture (training youths), cultural taboos (training multi-ethnic and multicultural groups), systems of values represented by the group members as well as the skills to apply this knowledge in their daily educational activity,
- competency in planning and designing of training – they are capable of creating and implementing course syllabuses, tests which diagnose the level of knowledge, training schedules which allow the achievement of the set objectives in a virtual training environment, taking into account the standards specified in the rules;

- teaching and methodological competencies – they are capable of applying the presented qualities of a good teacher and a methodologist associated with traditional training in a virtual training environment;
- communicative and media competencies - the present high skills in verbal and nonverbal communication, making a dialogue with a group by means of media tools; they also remain open to the arguments of the trainee group;
- competency in monitoring achievements of trainees and the quality measurement of self-study- they systematically monitor the progress of trainees and assesses their progress periodically, they regularly make changes in the contents and forms of e-learning based on enriching the knowledge and experiences of training conducted in a virtual environment;
- competencies relating to the design and evaluation of the programmes and teaching aids - they are capable of designing an e-learning course, also suggesting forms of training and training materials which are necessary for its implementation; they also present the knowledge and skills to evaluate programmes that are created by others;
- self-study competencies - they actively execute the process of self-study in relation to areas related to the latest trends in their field of training, pedagogics as well as e-learning in its broad sense.
It is insufficient to act as an observer of others to be able to conduct activities in a methodical way, which guarantees the achievement of the set goals. Therefore, the managers of air training centres should pay particular attention to the proper selection of instructors who will be conducting classes in the framework of theoretical, simulator and practical training. An ideal situation is such where an instructor participating in the air training process will possess high didactic and specialist skills as well as experience in flight training activities, including the ones relating to the training of young flying students. Another element which has a major influence on the quality of the conducted training are educational programmes used in aviation organizations.

4. TRAINING PROGRAMMES - DESIRABLE PRINCIPLES OF DESIGN

Under current regulations, every organization should have access to aviation programmes of theoretical, practical and simulator training to achieve the assumed teaching aims. Irrespective of the level of training, the authors of the programmes should address a number of rules governing the creation of this type of programmes, such as:
- *the principle of purposefulness* - the teaching programmes should be geared towards the achievement of the learning objectives in relation to knowledge, skills and professional competence of a trainee, according to the level of training. The issues related to aviation safety, regardless of the volume of the programme and the number of hours conducted within a particular training module, should take a special place in the training programme.
- *the principle of coherence of education and upbringing* - every instructor/lecturer participating in the process of implementation of air training, should take into account educational objectives which result from the principles of aviation safety, culture of an aviation organization, compliance with procedures and standards in force in aviation activities, mutual respect regardless of the function performed in the crew and the aviation organization, the level of air training, the age of colleagues, etc. Moreover, one of the essential conditions of achieving the desired level of safety and efficiency of the implementation of air tasks of air is teaching such values as: sincerity, loyalty and honesty. Therefore, in the contents of the training programme, there should be clearly emphasized educational elements, which exert a major impact on the manner of daily functioning of members of an aviation organisation, and thus its ability to maintain the desired level of flight safety.
 - *the principle of regularity and gradation of difficulty* - the time of increased attention of the trainee is not unlimited. Therefore, the content of individual modules and sub-modules should be divided with regard to the difficulty of the training material and the time spent on its implementation. Yet, it

should be emphasised that it is necessary to avoid repetition of giving the training material, except when it is an introduction to a new module/sub-module.

-the principle of correlation- this principle in the case of flight training programmes is restricted to making mutual links among the software contents of individual training modules on the stage of their design and scheduling. Every instructor who conducts classes should be aware which parts of the material should be focused on due to the fact that they had already been mastered under another subject. For example, a teacher who conducts classes on aircraft anti-icing systems (general knowledge about the aircraft) should discuss the impact of anti-icing on the aerodynamic characteristics of the aircraft (aerodynamics and flight mechanics) and the conditions under which the pilot can face an icing phenomenon (meteorology). The application of the principle of correlation, on the one hand, "forces" the trainees to continuously track and prepare for certain portions of theoretical classes, however, on the other hand, it is an excellent way to deepen and consolidate knowledge by students in a specific area. The application of this principle by persons responsible for the design of programmes and schedules of training course should allow the students to better understand the full spectrum of phenomena related to aviation activities in the task environment.

-the principle of combining theory and practice - an essential part of the preparation of the programme and schedule of flight training is proper linking theory with practice, taking into account the relevant methods and training techniques. In the subject literature relating to training in technical specialties [9], such as flight training, the ratio of lectures to labs/classes/ workshops should equal 50% to 50%, with an indication to extend the latter up to 60%. This thesis is confirmed also in the conclusions resulting from the illustrated so-called Dale's theory. According to this theory, the least effective lecture consists in the passive transfer of information (listener-verbal presentation) - the student remembers 10-20% of the given information Therefore, each session should be enriched with a multimedia presentation, practical activities - classes, labs. The teacher should seek to engage the trainee in a discussion to solve a particular problem, which in turn should result in memorizing the information given during the lecture, by the listener, up to approximately 50%. On the other hand, allowing the listener to prepare and give a talk, a presentation or to participate in a discussions during a class or a lab, increases the retention of the memorized material up to approximately 90%. It should be noted that in the case of e-learning, a lecture should be a way of preparation for work "online", in close cooperation with the lecturer/instructor.

- the principle of lifelong learning - each programme relating to training flight crews should take into account the level of knowledge and special skills presented by the trainees, and also contain elements that indicate areas for self-study. The programme makers should not forget that, regardless of the stage or level of flight training at stake, each of them is part of a major system referred to as lifelong learning of air personnel. This is particularly significant due to the fact that flight training is to prepare the pilot to perform tasks in a dynamic air task environment, which is burdened with a high level of risk occurrence of an undesirable air event. Moreover, due to the dynamic development of the air technologies, the interruption of the process of professional development on any of its stages may result in a significant reduction of the level of the candidate's capability to realize the tasks which he faces.

Also, experience with aviation activities of the authors indicates that the cessation of implementation of activities related to the consolidation of knowledge and skills acquired so far by the pilot and those to supply the pilot with new elements and specialist knowledge and skills, resulting from daily operations, significantly raises the risk of committing an error by him, which in turn may result in an undesirable air event.

-the principle of activation- every air training programme should include elements giving space for improvement of characteristics related to independent actions, including:

-effective self-awareness - encouragement of the trainees for self-study in such a way that it supports the presented level of knowledge and skills. Similar activities should also be conducted in

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[9] Part-66 - Licensed maintenance personnel.

areas related to the development of knowledge and skills, which are particularly important from the standpoint of the effectiveness of the executed tasks and air safety,

- strengthening independence – improvement and support of students whenever they manifestations the initiative to act independently,

- readiness to effectively solve problems - encourage the students for individual and group solving of research problems by means of the introduced knowledge and skills[10],

- responsibility for one's own words and actions - skilful shaping and developing, in students, the ability to take responsibility for one's own words and actions, regardless of the expected consequences. Such an attitude has a major impact on the teacher's ability to actively participate in the process of training and professional development. This feature is also of great importance for the ability of a trainee to present the desired attitude, required from a member of an aviation organization,

- operational risk management during the preparation and execution of an air task, using modern methods,

- independent acquisition of knowledge and skills by the student, with a particular emphasis on the elements which are fundamental in shaping the pilot's competences ,

- learning through experience, particularly focusing on areas which result from adverse air events on an aircraft[11] which is in operation,

- improvement of methods of creative thinking, including joint problem solving in specialist areas[12].

- selectivity - in extreme situations the instructor should be able to exclude, from the group, trainees who represent characteristics excluding them from a group of air personnel.

In conclusion, the system of flight training should be based on an internally consistent process which is executed on the basis of modern methods, techniques and tools applied to theoretical, simulator and practical training in the air. The necessity of selection of theoretical, simulator and practical training and their programme schedule is one of the fundamental dilemmas faced by the authors of aviation training programmes. The normative documents define the content of training at a large level of generality, in accordance with the level of training - licenses and authorisations. An appropriate clarification of the contents and timing of training, taking into account the training objectives, is one of the key factors affecting its efficiency.

5. SELECTED ASPECTS RELATING TO THE PRINCIPLES OF AIR TRAINING

Regardless of the above-mentioned organizational elements, including those related to the creation of air training, the proper selection and implementation of training methods which are applicable during the theoretical training, are particularly important for achieving the training objectives. The analysis of the current methods of air training indicates that lectures, classes, labs and e-learning are the most popular ones, widely used in daily training activities and also accepted by national and international aviation authorities.

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[10] An analysis of an aircraft accident - a scenario exercise - searching, by the trainees, for causes of an undesirable air event and searching for a procedure/solution to avoid it, exploiting the possessed knowledge and skills. Seeking solutions in specialist subject literature, application of specific tools, such as choosing the best possible solution to a dangerous situation from the viewpoint of safety and efficiency of the executed air task.

[11] At every stage of the flight training - academic, simulator, or a practical one - the student should be practically acquainted with elements which are particularly relevant for aviation safety, for example allowing for a misinterpretation of the phenomena in the areas of aerodynamics, and then attempting to lead the student to a correct solution through deduction; disabling the artificial horizon in the training cabin and instrument flying, flying on subcritical angles of attack during a training, etc.

[12] for example:

- within the subjects of Aerodynamics and Flight Mechanics - the determination of the impact of aircraft manoeuvrability using common rights, principles and formulas;

- within the subjects of Meteorology, Aerodynamics and Flight mechanics - determination of the effect of certain types of hazardous weather phenomena (icing, wind shear, Cb cloud, etc.) on the safety of air tasks, including determining the probability of occurrence of these phenomena in a particular weather situation.

The findings of the analysis of the subject literature [13] indicate that the forms of training which allow the realization of the training goals should:

- *be derived from a scenario* which addresses all objectives stemming from the programme contents of a module. Creating a scenario containing the contents of individual lectures in the framework of a particular module allows avoiding a situation in which the teacher is forced to an excessive extension of one sub-module at the cost of other ones. This method allows a more efficient use of time spent on individual lectures as well as their arrangement in a single unit, appropriate from the methodological and specialist viewpoint. It also allows a correct combination of scenarios of particular training modules in such a way that they form one logical process of specialist training in relation to individual training issues. These issues, particularly in relation to the case of professional training, are easier to assimilate when combining areas of knowledge of several specialist modules.

- *apply modern complementary tools*, i.e. multimedia presentations, cutaways of devices, aircraft units and onboard installations, movies or photos. It needs to be stressed that a media presentation should take into account, among others, the following standards: it should be closely tailored to a specific part of the lecture and enriched with photos or short videos relating directly to the subject at stake, the design of slides should be limited to short sentences (entries) and clear illustrations. The use of cutaways of devices, aircraft units and onboard systems facilitates a better understanding of the issues by the student, especially those related to the understanding of the principles of operation of a given installation or a device. This type of knowledge is essential for the operation of the pilot in case of an emergency onboard an aircraft. Videos and photos are a special type of tools supporting a lecture, among other things, which allows the trainees to present the discussed issues (knowledge areas) using examples taken from a real air task environment. The use of the above-mentioned combination of tools to support the lecture can increase its efficiency with regard to knowledge retention of the student up to approximately 70% [14].

- *ensure that the presented training issues should be given in a clear and understandable manner.* It is important for the person conducting a lecture on a particular module to have experience and knowledge to be used in such an extent that he is capable of providing better explanation and illustrations of the discussed issue. It is difficult to imagine a situation that person who does not have aviation experience could naturally remember examples of air events which complement a given part of a lecture or to explain a certain air event and its effects from the point of view of expertise which is often outside programme contents of the discussed training module.

- *be suited to the time that is available to the lecturer.* A careful preparation of the lecturer should enable them to skilfully plan and adjust the time spent on discussing individual training issues, without affecting the scope of the material and its understanding by the students.

- *take into account the fact that, before starting activities with a training group, they should possess knowledge relating to the level of education and air experience of the training group members.* Such an approach should allow them to customize the manner of rendering various concepts of training to the level of knowledge and skills presented by the group. Thus, it seems unacceptable to adjust the pace of teaching to students who present the highest level of education and expertise. A characteristic feature of a good lecturers is preparation and conduct of the lecture in a clear and interesting way for all group members, regardless of the level of preparation of its members for a particular level/ phase of training.

- *ensure that the lecturer should take care of the continuity of the modular training* by careful and a clear transition to new issues of training. It is also justified to refer to, especially in discussions with

[13] B. Kożusznik, J. Polak (red.), *DOBRZE SIĘ UCZĘ – Zarys systemu dobrych praktyk dydaktycznych w uczelni wyższej*, Oficyna Wydawnicza, Katowice 2012, pp. 115-172; W. Furmanek, *Podstawy edukacji zawodowej*, FOSZE, Rzeszów 2000, pp. 11-28; W. Okoń, Nowy słownik pedagogiczny, Żak, Warszawa 2004, pp. 470; R. Hać, J. Ślusarski, *Relacje nauczyciel zawodu (pilot-instruktor) – uczeń (pilot) w procesie szkolenia współczesnego pilota wojskowego (operatora informacyjno-decyzyjnego)*,pp. 222-228, M. Burek, A. Marciniuk, J. Ślusarski, *Kompetencje interpersonalne nauczycieli i ich znaczenie w tworzeniu środowiska ograniczającego przestrzeń popełnianych w szkole błędów wychowawczych*, pp. 118-129, J. Grzesiak, *Założone a rzeczywiste kompetencje nauczyciela wobec poprawy jakości kształcenia*, pp. 35-46.
[14] Dale's Cone of Experience – quoted. B. Kożusznik, J. Polak (red.), *Dobrze się uczę ...*, p. 111.

group members, the knowledge conveyed at earlier lectures, especially when this knowledge relates directly to the contents of the conducted training.
- *ensure that a summary of the lecture should include key findings, definitions and comments which enable the student to understand which of* the discussed issues are particularly relevant from the perspective of the set objectives of the lecture. Finally, the lecturer should refer to the topic of the next lecture.
- *The lecturer should not "be reluctant" to use the simplest methods* i.e., writing and drawing on the board in connection with a discussion, especially when these actions are aimed at a broader look on the issue in question, allowing the group to fully understand the phenomena or the training problems.

Moreover, the teacher should also bear in mind the fact that the lecture should serve, first and foremost, knowledge transfer, which in the case of flight training is often difficult and is continued apart from the inevitable decreased attention. Therefore, lecturers/instructors should attach great importance to the fact that they need to speak to and towards listeners and not "to the ceiling or a window"; they should speak loudly particularly in halls without microphones; they should show a high interest in the transferred knowledge without showing boredom; also they should stick to time constraints since the lecturer who extends lectures during a break times generally achieves contrary aims than the ones which are intended. The application of air instructors of the above-mentioned tips relating to the preparation and conducting of a lecture certainly does not exhaust the subject, however, applying them will have a positive influence on the effectiveness of the talk and memorizing the contents of the lecture by students.

Classes and labs in training/personnel development, on a daily basis, should be regarded as forms which allow better understanding and consolidation of the transferred material during lectures, also providing an opportunity to shape manual and mental skills of trainees. Their key advantage is the fact that they are one of the activities which motivate training participants to independently solve research problems.

Another very important element from the point of view of checking efficiency of theoretical training is a way of controlling knowledge of trainees, both with regard to partial knowledge during various stages of training as well as examinations and on completion of the training. The conclusions of the teaching practice of the authors, as well as the observation of practices in aviation training centres and on the level of national aviation authority indicate that the most common form of checking knowledge is a multiple choice questions test. It appears to be an appropriate form of assessing the level of knowledge of trainees at particular stages. On the other hand, the use of tests for final exams is inefficient, as quite often they do not reflect the actual knowledge of students. It is a well-known habit that trainees, while preparing for this kind of tests, use online sets of questions and answers which are specially tailored for final examinations. Therefore, the students undergoing training do not attempt to comprehend material relating to a specific training module, since their main goal is to remember the response to specific questions, which are related to a particular process or a procedure, etc. In consequence of such an approach, although students pass the final part of the theoretical exam for pilot licenses (regardless of the level taken into account), they are often unable to describe the phenomena, or processes in the field of, for instance, aerodynamics or flight mechanics, which are extremely important for the safety of executed air tasks. Therefore, the conventional method, i.e. an oral examination and/or a written one to solve problem issues are regarded as more efficient forms of checking knowledge and examining students. Such an approach does not exclude the use of testing as a form of periodic knowledge checkups. A rational solution seems to use more time-consuming forms of oral and written examinations, from the standpoint of the examiner, at the stage of an aviation organization, where a positive result could be a condition of admitting the student to the final examination at a level of an aviation authority in the form of the so-far used single choice test. Such a solution would require the introduction of changes in the national legislation. However, according to the authors, these changes would be contrary to the obligations set out in the international documents of aviation law, and greatly contribute to raising the awareness of the knowledge of trainees.

The above-mentioned rules and, in the authors' opinion, desirable practices should be applied by the organisers of air training, irrespective of the level of training and air experience possessed by students. They have been defined on the basis of an analysis of literature relating to training and professional development, including the air professional development as well as the experience and research findings conducted by the authors. Despite the fact that the authors mainly addressed theoretical training, on the whole, they should also apply to simulator and practical training during flight training. This is due to the fact that each of the elements of flight training (simulator training and practical flight training) should contain elements of theoretical training. The implementation of these stages of air training without such training methods as a lecture, a class, briefing, or knowledge assessment should be considered inappropriate from the position of methodology of their execution as well as the likelihood of attaining the set training objectives.

6. CONCLUSIONS

The dynamic development of aviation technologies, a constant increase in the intensity of air flows in the sky causes higher and higher requirements for air personnel, and also for aviation organisations responsible for proper preparation of this group of personnel. Regardless of the type of aviation and aircraft type applied for the execution of an air task, the human factor still dominates in the process of ensuring an appropriate level of task execution in terms of quality and safety. Therefore, contemporary flight training regardless of its stage and the form puts very high demands on aviation organisations which hold the trainings as well as on instructors involved in this process. Only proper understanding and a deep commitment of an aviation organisation personnel, with a particular focus on the managerial and instructor staff should facilitate the achievement of the intended training aims, and thus create the right conditions for the air tasks on the desired level of aviation safety. It should also be stressed that, as it used to be the case so far, air personnel training will continue to undergo changes alongside new experiences resulting from changes in the task environment in the execution of tasks by air personnel.

References

[1]   Baylis J., Witz J., Gray C.S., Cohen E., Strategia we współczesnym świecie. Wprowadzenie do studiów strategicznych, Wyd. UJ, Kraków 2009.

[2]   Friedman G., Następne 100 lat. Prognoza na XXI wiek, AMF+, Warszawa 2010.

[3]   Friedman Th., Świat jest płaski, czyli historia XXI wieku, REBIS, Poznań 2009.

[4]   Furmanek W., *Podstawy edukacji zawodowej*, FOSZE, Rzeszów 2000, s. 11-28; W. Okoń, Nowy słownik pedagogiczny, Żak, Warszawa 2004.

[5]   Hać R., Kozub M., Rurak A., Udział lotnictwa w operacjach połączonych pierwszych dekad XXI wieku, Wydawnictwo WSO SP, 2012.

[6]   Kaku M., Fizyka przyszłości. Nauka do roku 2100. Prószyński i Spółka,Warszawa 2011.

[7]   Kerns S.Z., E-learning In aviation, ASHGATE, Farnham 2010.

[8]   Kożusznik B., J. Polak (red.), *DOBRZE SIĘ UCZĘ – Zarys systemu dobrych praktyk dydaktycznych w uczelni wyższej*, Oficyna Wydawnicza, Katowice 2012.

[9]   Okoń W., Nowy słownik pedagogiczny, Żak, Warszawa 2004.

[10]   Rajchel J., Rurak A., Model funkcjonowania profesjonalnych sił zbrojnych w społeczeństwie XXI wieku, Zeszyty Naukowe Wyższej Szkoły Oficerskiej Wojsk Lądowych, Wydanie Specjalne, Wrocław 2012.

[11]   Tekst U.S. Army Technical Manual (1941) – źródło – P. Renshaw , ATSB Materiały z Kursu
        Czynnik ludzki, Cambera, Australian Transport Safety 2006.
[12]   Furmanek W., *Podstawy edukacji zawodowej*, FOSZE, Rzeszów 2000.