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Information technologies and human factor in civil aviation

The article makes the philosophical analysis of correlation of information and communication systems, modern means of communications and navigation, and the role of the human factor in increasing the safety of aircraft flying in civil aviation.

At the beginning of the third millennium the information technology as an innovative form of communication, penetrate into all spheres of human activity and provide the expansion of information flows in society. New information technologies provide new forms of relationships between people, change the scheme of social interdependence, and become an integral part of education and science, and they intervene in every aspect of our personal lives. The origin of technical means that provide access of the biggest part of human to the information reality enables us to characterize this process as an intellectual "information and communication revolution" [5]. Of course, the aviation industry, which has always been at the cutting edge of high technology, could not avoid the "information and communication revolution".

When the first aircraft soared into the air, communication between pilots and ground services was not possible due to lack of appropriate technical means of communication. The process of human interaction with the aircraft was limited by simple pilot`s movement responses. However, today because of permanent development of aircraft, the pilot has to work with complex information system. This system combines the operation of all aircraft maintenance services and the airport together. Nevertheless, the role of information technology in the aviation industry is not restricted by this factor, especially when we talk about the civil aviation. However, if transportation services are offered by the airlines identical, the introduction of new services, that enhance passenger comfort, is impossible without the use of advanced information technologies. They are the automated sales and booking of air tickets through the Internet and registration system, and even the possibility of mobile communications on board. However, the usage of high-tech information systems, as well as in the area of safety and creation of comfortable conditions for passengers does not diminish the role of human factors in aviation.

In the aviation industry the concept of "human factor" includes many elements related to human behavior and his/her efficiency, the ways of decision-making, uninterrupted information operation of navigation systems work and others. According to the definition adopted by ICAO "human factors is about people in their living and working situations; about their relationship with machines, with procedures and with the environment about them; and also about their relationships with other people" [6]. One definition of Human Factors, as proposed by Professor Edwards, declares that "Human Factors is concerned to optimize the relationship between people and their activities, by

the systematic application of human sciences, integrated within the framework of systems engineering. So, if the quality of passenger service is low (e.g., lost luggage, delayed flights, service on board and so on) none of the newest information system can`t change the negative passenger impression from the flight caused by human factor. Therefore, the safety of flights and handle of emergencies depends on the human factor, the understanding and communication between crewmembers, the organization of work of ground services. Thus, the origin of the information and communication systems in aviation requires the availability of professionals, which corresponds to the level of new technical capabilities of modern aircraft. These professionals throughout their professional activities must be able to work with high-tech means of communications and navigation, to learn quickly and use their new knowledge, to be able to handle large amounts of information and so on.

The usage of ground and airborne information satellite vehicle for communication and multifunctional space systems, avionics, that is based on satellite technologies for communication, navigation, control and organization of air traffic will improve the level of aviation security in several times in future [3]. As you can see, information and communication systems are closely related to flight safety. And such qualities as: the ability to communicate, to cooperate in a team, the responsibility and the initiative are necessary for aviation industry professionals, especially for pilots and flight operations officers. The crew members, flight operations officers and pilots must be quick to understand each other, because their interaction, intuition and ability to resolve conflicts can save many lives. Therefore, all messages should be clear, understandable and unambiguous. And the cultural differences, language barriers, inattention, fatigue, stress and so on can prevent this. In this regard, some researcers have noted the need not only the professional, but also psycho-physiological and mental training of professionals.

We should not underestimate the special place of information technology in the training of aspirant pilots. In particular, when we talk about professional language training of pilots for conduction of the radio communications on international routes; the development of new methods of training of the aspirant pilots of flying aircraft operating on international routes; about the methods of training aspirant flight operations officers of air traffic control in extreme situations on international air routes and so on [2]. The above-mentioned abilities reveal some aspects of usage of information and computer technologies in aviation industry training, including air comunicators. It is referred to the field of aviation industry where engineers work and their activity involved to the development, production, testing, repairing or disposing of aircrafts; the design engineers that design aircraft and aircraft engines, mechanical engineers which are responsible for production, maintenance and repair of aircrafts; wireless engineers which are the specialists in the field of development, production and operation of aircrafts etc.

Among these are aviation specialists and operators – pilots and air towermen, and from their ability to work with information systems, the possessiveness of the necessary communication skills depends not only the success of professional work and career, but also the safety and life of the participants of the communicative process. Because flight activity is one of the most difficult, and the modern aircraft crew managed "not the physical object itself, but its information model" [2]. Therefore, the safety of flight depends on the reliability, accuracy and efficiency of receiving the

information by aviation operator and reduces the risk of accidents, related to the human factor. As V. Tsvetkov noted, the missunderstanding of the information and its transmission can cause many difficult situations in the air, which can cause the accidents [8]. We can find the confirmation of this point of view in B. Alyakrynskyi`s works, who notes that the lack of practical skills and abilities during the providing of wireless communication, bad articulation, lack of literacy teams, the using of words in the message, that allow semantic distortion, is one of the causes of aviation accidents [1].

To sum up, we can conclude that aircraft operators often have some lack of needed skills while working with the newest information and communication and navigation systems, and it negatively reflected on the safety of aircraft flights. Today one of the most important component in the providing of the security of planes overhead lines is highly` professional activities of air carriers. The effective and reliable pilot`s communication with the flight operations officers who accompanying the aircraft in all phases of flight, from the moment of takeoff to the moment of landing, is one of the factors of flight safety. In addition, according to statistics, the most incidents of aircraft in international air routes happens because of poor cooperation between the flight operations officers and the pilots of aircrafts. Therefore, some scientists offer to examine the pilots` professional reliability through the prism of aviation system, each of its component, which has its own specific characteristics. Thus, the scientists focus on one of the most important features of the pilot profession, namely that the pilot`s activity in normal situations and in extreme cases, are two different activities. As in "... an extraordinary situation not stereotypes are needed, but new forms of reaction" [7]. The hope that only pilot`s own experience will allow him to cope successfully in difficult conditions of the flight is almost reasonable. However, the complexity and diversity of the human factor cause the need to explore everything ... in philosophical analysis of the interaction between human and technical devices [4, p. 31]. Taking into consideration that flight safety is largely dependent on flight operations officer`s and pilots` language training and training skills in information and communication systems, the special attention to the problems of communication in the air are taken not only by the scientists, but also by the world organizations, such as the International Civil Aviation Organization.

Conclusions

The aviation industry plays an increasing role in the system and passenger carrying operations in the world. The quality of provided services and the level of safety of passengers depend on the spread of information technology in the aviation. Because the way of their usage ensures the implementation of communicative exchange between airports, access to global aviation systems and networks for information exchange that contributes not only the increasing of flight safety, but also the improvement the passengers` level of comfort. We talk about the using of the Distributed Control System SDCs, the SITATEX (the leading operational mail service in the air transport industry) delivery, the World Tracer (the *world's* only global bag-tracing and matching system) and others.

The improvement of the technical capacities of flight, the emergence of *Airplane Information Management System* does not completely eliminate the risk of dangerous

accidents. New information and communication technologies and satellite-based aviation communication system modify qualitatively the whole process of pilots` professional activity; change the mechanism of interaction between machine and human. As a result, the using of multimedia resources in training of aviation professionals, including interactive tools and software, Internet resources and simulators, will have a positive impact on the level of training of airline operators. Although we can't certainly predict the pilot`s reaction in situation, we do not have to forget that the current level of technology doesn`t completely eliminate human intervention at the stage of decision-making and any computer can`t replace the human being.

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