

Compilation of an Algorithm for the Activity of an Air Traffic Service Controller as a Source of Optimization of the Flight Safety Management

Shamsiev Zair Ziyayevich¹, Sharipova Alsu Rafikovna²

¹Doctor of Technical Sciences, Professor of the Tashkent Transport University, Tashkent, Uzbekistan

²PhD Student of the Tashkent Transport University, Tashkent, Uzbekistan

ABSTRACT

The article discusses the importance of building the logical activity of the air traffic service controller, consisting of a set of actions and operational units of information, to reduce the negative impact of errors on their activities. A table has been compiled showing the role of the controller in the aviation system. In particular, all the negative factors that affect the mental activity of the air traffic controller from the moment of receipt of information to the adoption of a decision are considered.

KEYWORDS: *flight safety, air traffic control, psychology, algorithm, errors, factors, air traffic controller, aviation, aviation incidents, automated systems*

The practical mechanism of the safety management conception is based on a purposeful search of factors causing the occurrence of aviation events in order to protect their impact. Detection of hazardous factors can be implemented in the form of regular monitoring, collection, processing and accumulation of information on the factors causing aviation incidents [1].

Man is the most flexible, adaptable and important element of the aviation system [2]. In turn, the air traffic controller is an obligatory link in the intelligent control system in the aviation system, who has a unique ability to make the right decisions in an environment of incomplete and fuzzy information, but who is also the most vulnerable from the point of view of the possibility of a negative influence of factors on his activity, which in its turn gives rise to such a theory as the human factor. Attempts to solve the problem of the human factor through the introduction of automated ATC systems, of course, contributed to the solution of the level of flight safety in ATM, but could not completely solve this problem since the efficiency of functioning of intelligent systems in air traffic control depends not only on the automation of the ATM system, but also on successful performance of air traffic services personnel [3]. Human activities in the aviation system have been the cause of accidents in many cases. These failures are usually classified as "error". Mistakes are often made by qualified employees, although it is obvious that they did not plan any incident [1]. Errors are not a kind of abnormal behavior; they are a natural by-product of almost all human efforts. An error must be perceived as a normal component of any system in which a person and technology interact since an error can be the result of insufficient professional training and is an unintentional act. It is well known that every three out of four accidents are the result of a malfunction in human performance, which means that any improvement in this

area, i.e. improving the efficiency of activity of both a person and a control system can significantly contribute to an increase in the level of flight safety. To achieve a reduction in the number of accidents, it is necessary to understand better the role of the human factor in aviation and to apply the accumulated knowledge for preventive purposes [2] [4]. In the course of studying the causes of errors on the part of the ATC controller, the task was set to identify factors that affect the safety of flights at ATC, as well as to analyze the causes of errors of specialists in this field since there is such a theory that ATC controller errors are often the result of deficiencies in the system itself air traffic management [1]. The following is a diagram of the deficiencies of the ATM system affecting air traffic control.

- Shortcomings in the organization of work of controllers' shifts
- Equipment design flaws
- Insufficient level of professional training
- Flaws in regulatory documents

The above theory is confirmed by the fact that during investigating aviation events associated with deficiencies in ATC or ATM, it provides a thorough analysis of not only the event itself, but also the environment in which the controller works, for example, how much the controller was loaded at the time of the development of the aviation event, how much crews were in touch at a specific moment and on average for one hour, how well the ATC area was planned.

Likewise, in order to be able to determine in advance the capabilities and limitations of air traffic service personnel and to reduce the negative impact of factors and errors on their activities, an algorithm was created since in the modern concept of ensuring safety, human error is the starting point, not the final point. Safety management system initiatives seek to find ways to prevent human errors that can jeopardize flight safety and to minimize the adverse consequences of those errors that inevitably occur. The characteristics of a person have a significant impact on the stability and quality of functioning of the automated system. The impact of the ATS controllers on the stability and quality of the system functioning can be assessed by drawing up an algorithm for their activities. When creating an algorithm for the activity of an ATS dispatcher, it is necessary to take into account the psycho physiological characteristics of a person, as well as the influence of various kinds of external factors on the activity of the controller and its results [4].

Construction and use in practice of an algorithm for the activity of an air traffic service controller, i.e. the

construction of his logical activity, consisting of a set of actions and operational units of information, in engineering and psychological design allows to optimize his activities, and is also the basis for the correct construction of training for the personnel of the ATS service [5]. fig. 2.

For this case, a table is presented below, which shows the role of the air traffic services controllers, as a subject in the aviation system, possessing certain qualities, skills and knowledge, designed to process information and make decisions for air traffic services. fig. 1.

As you can see, the air traffic services controller is an intellectual link in the aviation system, which, based on its experience, knowledge, character, processes information and makes decisions in the range of tasks assigned to him. The tasks of the air traffic services dispatcher are outlined in the regulatory and governing documents, as well as in the work technology document.

In the process of functioning of the controller's intellectual activity in a certain active space, that is, in the range of receiving and transmitting information more errors are made. The reason for the vulnerability of this range can be

proved in fig. 2, where the algorithm for receiving and processing information by the air traffic service controller is described, where dangerous moments are highlighted in red, on which attention must be paid.

The picture perceived by the air traffic controller during work changes under the influence of the most significant active and spiritual values that activate the intellectual activity of the controller, since knowledge, experience, motivation, attitude, fatigue, emotions affect the organization and productivity of his intellectual activity.

Confronting negative factors under the influence of the educational and professional environment in the field of psychological training, transforming volitional qualities, motivation, and values of the dispatcher, will allow performing the assigned tasks at a professional level and serve as a signal and stimulus for more active intellectual activity, since mobilizing intellectual capabilities, focusing on goals, The ability to recover in the face of intense intellectual activity plays a leading role in the activities of air traffic services personnel.



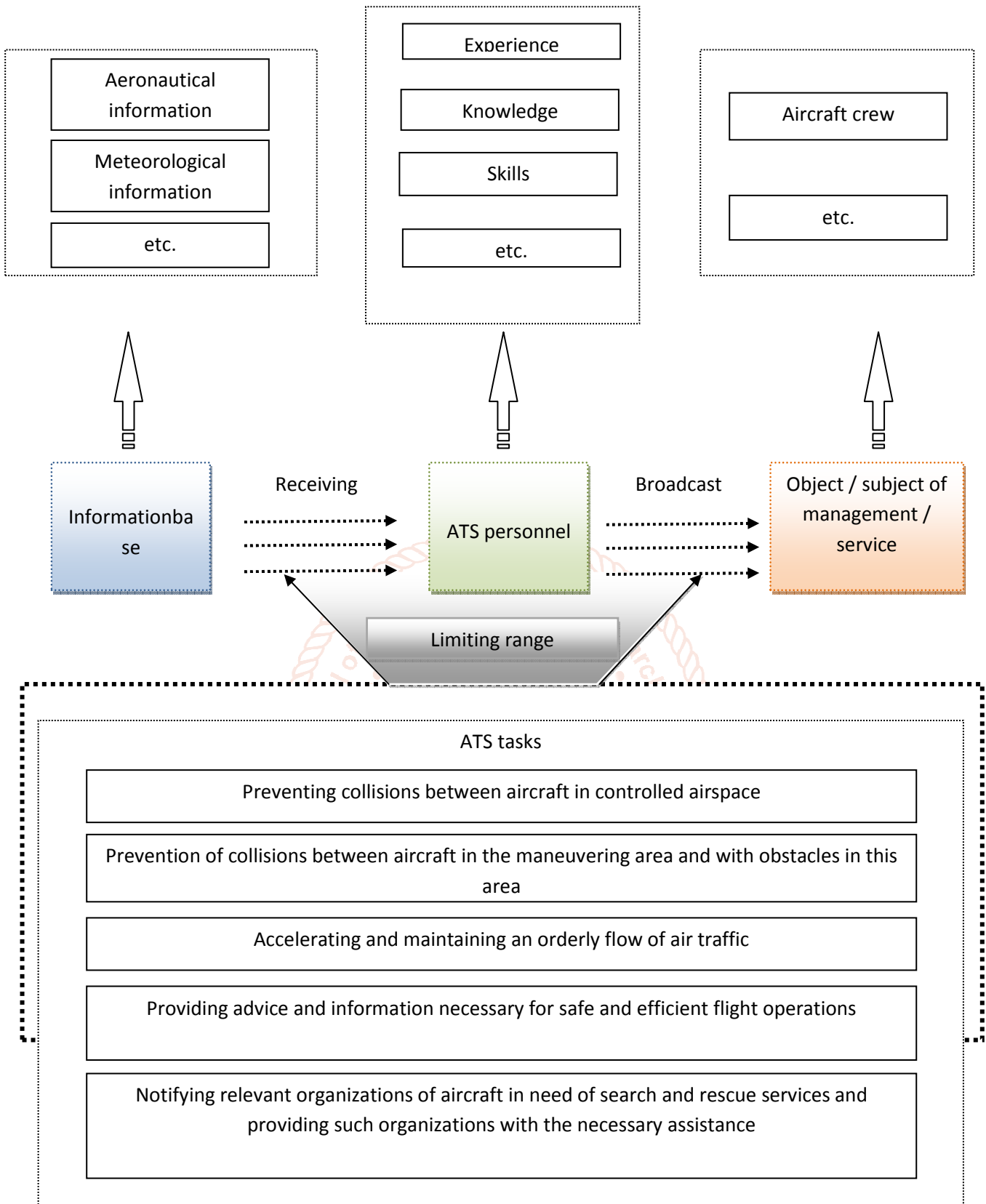


Fig 1: The role of ATS personnel in the aviation system

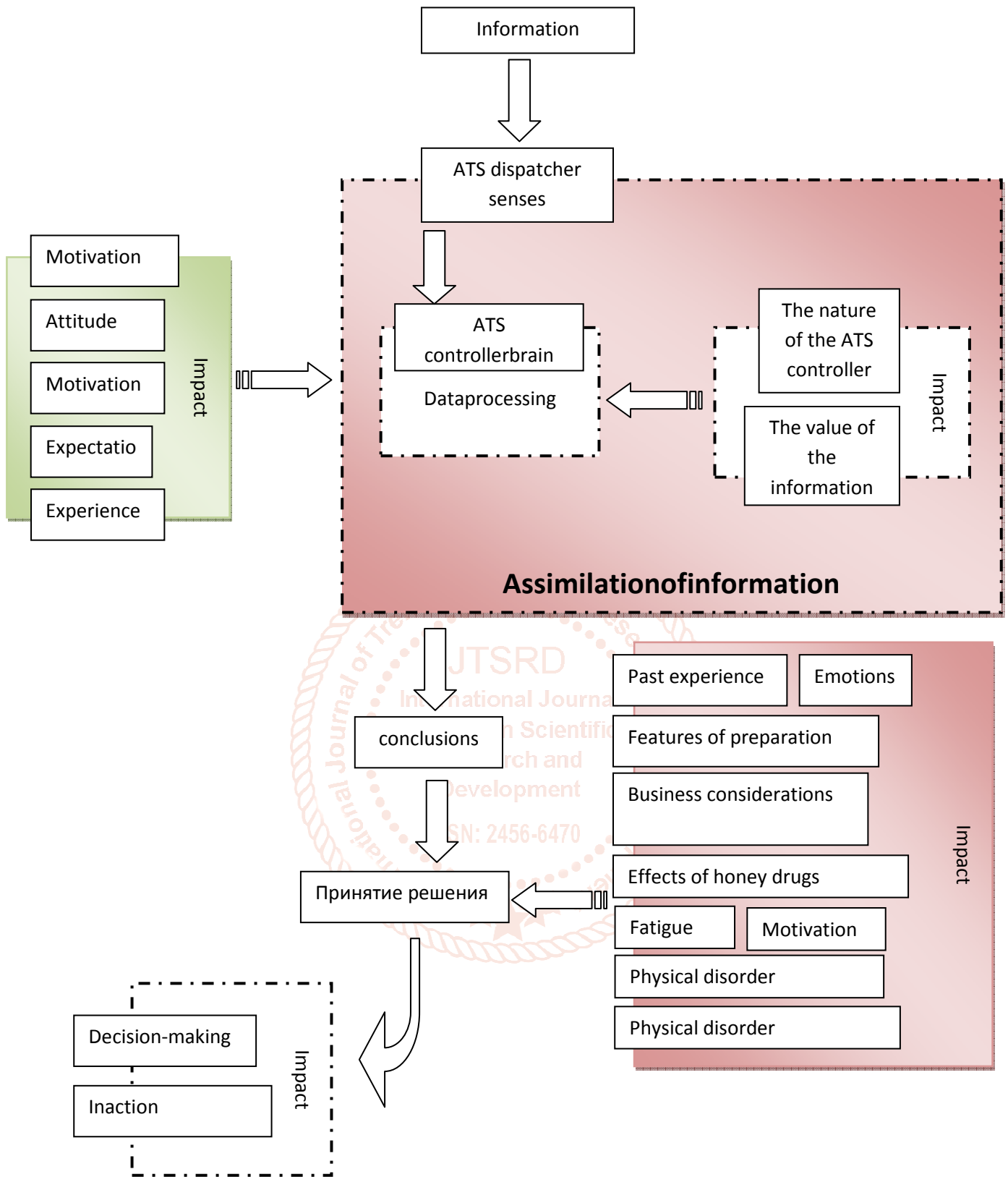


Fig. 2: Algorithm for receiving and processing information by the air traffic service controller

List of used literature:

[1] Don Harris, Improving aircraft safety, february 2014.
 [2] Titz S. N. Human factor: electron, textbook. Allowance / Ministry of Education and Science of Russia, Samar, state. Aerospace, un-t them. S. P. Korolev (national research university). Samara, 2012.
 [3] N. M. Novikova, S. L. Podvalny Voronezh State Technical University: Mathematical model of the work of a human operator as an element of an intelligent control system, 2010
 [4] N. M. Novikova, A. G. Moiseev Assessment of the stability of the mathematical model of a human operator in a control system
 [5] Dushkov B. A., Korolev A. V., Smirnov B. A. Encyclopedic Dictionary: Labor Psychology, Management, Engineering Psychology and Ergonomics, 2005