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ELEVENTH AIR NAVIGATION CONFERENCE

Montreal, 22 September to 3 October 2003

Agenda Item 2: Safety and security in air traffic management (ATM)

THE ROLE OF HUMAN FACTORS IN ENSURING AIR TRAFFIC SAFETY

(Presented by the Russian Federation)

SUMMARY

The purpose of this working paper is to define more precisely the place and role of human factors in ensuring air traffic safety.

Action by the conference is in paragraph 3.

1. INTRODUCTION

1.1 Considering the operational technology of the future ATM system for the period up to the year 2025, one must take into account the changes that may affect the principles of the human-machine interface, as well as the place and role of the human being in this system

1.2 In most cases at the present time, the role of the human being in ensuring air traffic safety is a determining role and it is established according to the results of statistical data on serious aircraft accidents.

1.3 Account must be taken of the fact that most of the aircraft accidents that occur are in one way or another related to human activities since the quality of the operation of the hardware and its software directly depend on human capabilities. Human errors introduced into the ATM system or into airborne systems in the phases of design, development and preparation for operation either contribute to accidents or are themselves the causes of accidents.

1.4 From this point of view, it is important to separate these spheres of human activity, bearing in mind that an increase in air traffic safety requires constant efforts both in improving the work of the

controller and flight personnel and in increasing professionalism in developing future hardware and technology, and safety systems in particular.

2. DISCUSSION

2.1 It is well known that 70 to 80 per cent of aircraft accidents occur through the fault of the human beings who are in the navigation and ATC processes control loop. In spite of the reduction of the relative risk of accidents every 10 to 15 years by a factor of almost two, the proportion of the risk caused by human errors remains practically constant. It may be assumed that as long as the human being remains the final link in decision-making in the ATC and flight process, this tendency will not change.

2.2 If such a situation is also maintained in the future, for example by 2025 for which the global ATM operational concept is designed, then it is not excluded that scientific and technical progress in the air navigation field may require the development of intelligent systems that are able to assume responsibility for decision-making in critical situations in order to exclude human errors.

2.3 The problem of ensuring automatic control of an aircraft's flight from take-off to landing is no longer today an insuperable problem. Research work is under way to develop software to automate the process of taking and implementing the decisions that are presently within the sphere of responsibility of the controller who in this case will actually perform the functions of monitoring the operation of the system.

2.4 It appears obvious that in the phases of the design, development and testing of the new hardware and technology with elements of artificial intelligence, one must provide for large amounts of modelling of the new ATM and navigation systems under different operational conditions, and extreme conditions in particular, in order, before the implementation of the new systems that have a high level of automation, to exclude possible errors made during the design of the systems.

2.5 Progress in the studies on the problems raised in this working paper will to a large extent depend on how the matter of reducing the role of human factors in ensuring air traffic safety will be addressed in the global ATM operational concept. A suitable place should therefore be found for this matter in the corresponding programme of studies of ICAO.

3. ACTION BY THE CONFERENCE

3.1 The conference is invited to decide on the inclusion, in the ICAO programme of studies, of matters related to the need to reduce the role of human factors in the process of the design, development, testing and commissioning of ATM systems using elements of artificial intelligence and to increase the role of modelling in the development of such systems.

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