



INTERNATIONAL CIVIL AVIATION ORGANIZATION

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only¹

ASSEMBLY — 35TH SESSION

TECHNICAL COMMISSION

- Agenda Item 24: ICAO Global Aviation Safety Plan (GASP)**
24.2: Progress of the ICAO programme for the prevention of controlled flight into terrain (CFIT)

INFORMATION ON THE REALIZATION OF THE ICAO PROGRAMME ON THE PREVENTION OF CONTROLLED FLIGHT INTO TERRAIN (CFIT)

(Presented by the Interstate Aviation Committee)

SUMMARY

This working paper presents information on the realization of the ICAO CFIT prevention programme.

Action by the Assembly is in paragraph 3.

1. INTRODUCTION

1.1 CFIT problems still exist. According to the results of the statistical analysis in the USSR and CIS for the period from 1958, 15 per cent of the total number of accidents resulted from the collision of aircraft heavier than 10 tonnes with heights. According to the ICAO data, the same factor became the reason for about 23 per cent of the total number of accidents for the analogous aircraft types. Notwithstanding the gradual reduction of the total amount of such air accidents in the world, the CFIT rate still remains considerable. The last accidents involving the Yak-40, Tu-154, An-140 aircraft in Iran; Il-76 aircraft in Eastern Timor, Yak-42 in Turkey once again accentuate our attention on this factor as being extremely dangerous and requiring constant attention for further prevention of CFIT-related air accidents.

1.2 According to the research data, carried out by the Interstate Aviation Committee, and the generalization of the materials of accident investigations it was revealed that the major part of these accidents

¹ English and Russian versions provided by IAC

was caused by an insufficient level of professional training received by the crew members and air traffic controllers and insufficient equipment of high-level aerodromes with ATC facilities. Almost all collisions with heights resulted from a combination of errors in the work of the flight crew as well as the work of air traffic controllers.

1.3 Main errors of the crew in the course of the development of abnormal situations were the following:

- non-complex use of airborne and ground aeronavigation facilities by the crew;
- incorrect work of the crew with the deviation warning systems;
- poor knowledge by the crew of the relief in the area of high-level aerodromes, flight pattern, especially on the alternate aerodrome;
- not taking emergency measures when getting into cloud cover under VFR approach conditions;
- not taking by the crew, measures on the immediate climb at the indication of the ground proximity warning system;
- attempts by the crew to carry out the flight and approach operations, aligning the route in violation of the approved flight pattern; and
- careless cooperation by members of the crew when performing the flight in low weather.

1.4 The reasons for the above-mentioned errors of the flight crew were:

- failure to comprehend or estimate the danger and consequences of the emergency situation, created as a result of incorrect actions;
- lack of self-discipline, organization, attention and confusion;
- haste during preparation for the flight;
- recruiting the crew without taking into account the experience of each flight crew member and psychological compatibility, coherence of the flight crew;
- insufficient amount of full crew trainings with the simulation of possible flight complications; and
- poor control of the level of training and of the activity of the flight crews in the air unit.

1.5 Main errors of air traffic controllers were the following:

- giving the flight crew descent clearance during approach operations without the correction of aircraft location using the available ATC facilities;
- lack of the air traffic controller's demands for the necessity of reporting by the flight crew of check points' clearance, reaching the altitude of flight and other information;
- giving clearance to the flight crew to perform the flight with the violation of the approved flight pattern;
- receiving the aircraft on a high-level aerodrome in below minima weather conditions;
- receiving the aircraft by the air traffic controller of the neighbouring area without receiving information about its position from the air traffic controller, transferring the aircraft, at non-designated control transfer points, without analyzing the aircraft movement and failure to take measures on the elimination of deviations from the flight pattern;

- passive control of the aircraft movement;
- receiving aircraft on a high-level aerodrome when ground air traffic surveillance aids have failed or were switched off; and
- switching off the radar by the air traffic controller when the aircraft was approaching a high-level aerodrome.

1.6 Generalization of accident-rate statistical data showed that in spite of the measures taken to exclude air accidents on account of the errors of the flight crew and air traffic controllers, the same deviations conditioned by Human Factors tend to recur in flight operation.

2. **RECOMMENDATIONS AIMED AT THE REDUCTION OF THE NUMBER OF AIR ACCIDENTS RELATED TO HUMAN FACTORS**

2.1 The Interstate Aviation Committee has worked out the following recommendations:

2.1.1 In order to prevent aircraft collisions with heights, air navigation and pilotage aids need to be improved, and the priority measures in this direction are:

- activization of work on the establishment and implementation of global international satellite communications, navigation and surveillance system GPS-GLONASS, excluding aircraft deviations from the assigned flight route;
- equipping aircraft with the flight track electronic display system for the flight crew; and
- equipping aircraft with TAWS (terrain awareness and warning system) – a more perfect than GPWS ground proximity warning system with imaging the earth's surface on the display of the pilot's instrument panel.

2.1.2 It is possible to essentially reduce the number of aircraft collisions with heights, first of all, by means of taking the following measures, which do not require substantial investments:

- development and introduction of the flight crew's pre-flight action computer programmes, reproducing the peculiarities of flight to the specific principal and alternate aerodromes with the attached location of all simulated and natural obstacles in the area of flights, including heights;
- improving the quality of the flight crew's pre-flight action and control of it with the obligatory analysis of possible complications of the flight conditions on the high-level aerodrome, peculiarities of a go-around procedure and missed approach;
- improving the level of the flight crew's knowledge about the algorithms of the ground proximity warning indicators' work, about the consequences of distrust and disregarding their signals;
- ensuring sufficient amount of the flight crew's trainings with the use of simulator to work through the actions to be taken in case of the ground proximity warning indicators' signals;
- improving the quality of the air traffic controllers' training with the use of simulators, imitating aircraft flight in the area of natural and simulated obstacles, and evaluation of the danger presented by possible abnormal situations created by the flight crew, air traffic controller, environment;

- enhancing demands of controlling ATC dispatcher services;
 - improving the quality of candidate selection during the training of the flight and dispatcher personnel, assessed to be fit for high complicacy tasks;
 - prohibition of flights on high-level aerodromes, not equipped with the radio-technical and radar facilities required to ensure flight safety, at night and in low weather, when the heights are covered with clouds;
 - prohibition of takeoff operations in the direction of the mountains and landing operations from the direction of the mountains on the aerodromes, surrounded by mountains on one side;
 - specification of the system of selecting approach facilities on a high-level aerodrome with the obligatory requirements to the flight crew and air traffic controller for the necessary use of all available airborne and ground facilities. In case of the flight crew ordering limited approach facilities, air traffic controller should prompt to the crew that all the facilities are switched on and should be taken use of;
 - prohibition to use a high-level aerodrome for landing operations if VOR-DME (short distance radio-navigation aids), radar and radio direction finder are not working;
 - use by the airlines of the methodical developments of the International Flight Safety Foundation, related to the estimation and reducing the risk of air accidents caused by controlled flight into terrain (CFIT); and
- C increasing the level of the air traffic controller's responsibility for keeping by the crew to the approach pattern in what concerns obligatory taking joint actions (mutual exchange of information) by the flight crew and air traffic controller on the control of the actual position of the aircraft during any manoeuvres in the horizontal and vertical surfaces after taking the decision to commence descent from the level.

3. ACTION BY THE ASSEMBLY

3.1. The States are invited to ensure control of the implementation of measures aimed at the prevention of air accidents, caused by controlled flight into terrain.

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