



WORKING PAPER

ASSEMBLY — 37TH SESSION

TECHNICAL COMMISSION

Agenda Item 25: Follow-up of the High-level Safety Conference (2010)

**REPORT ON THE IMPLEMENTATION OF THE HIGH-LEVEL SAFETY
CONFERENCE (HLSC) 2010 RECOMMENDATIONS ON TOPIC 3.2
(SAFETY INITIATIVES ARISING FROM RECENT ACCIDENTS)**

(Presented by the Secretary General)

EXECUTIVE SUMMARY

This paper presents in the appendix, a report on action taken on the recommendations framed by the High-level Safety Conference (HLSC) 2010 on Agenda Topic 3.2 (Safety initiatives arising from recent accidents). These recommendations are addressing three major topics:

- a) securing access, in all circumstances, to flight data necessary to support accident and incident investigations (*Recommendations 3.2.a) and d)*);
- b) improvement of surveillance, flight monitoring and communications of aircraft operating in oceanic/remote areas and of the provision of timely and adequate search and rescue services in areas of need (*Recommendations 3.2.b) and e)*); and
- c) review of existing requirements on flight deck activities, checklist and standard operating procedure design (*Recommendation 3.2.c)*).

Action: The Assembly is invited to note the report, endorse the planned ICAO activities contained therein and to urge States and other stakeholders to take the measures called for in State letter AN 12/53.1-10/56 as well as in upcoming recommendations.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objective A.
<i>Financial implications:</i>	The activities referred to in this paper will be undertaken according to priority with the resources available in the approved budget 2011 to 2013 complemented by voluntary contributions to the SAFE Fund.
<i>References:</i>	Doc 9935, <i>Report of the High-level Safety Conference 2010</i> http://www2.icao.int/en/HLSC/default.aspx

APPENDIX

REPORT ON THE IMPLEMENTATION OF THE HIGH-LEVEL SAFETY CONFERENCE (HLSC) 2010 RECOMMENDATIONS ON TOPIC 3.2 (SAFETY INITIATIVES ARISING FROM RECENT ACCIDENTS)

1. Securing access to data necessary to support accident and incident investigations

General comments			
<p>1) Although it is rare that the wreckage of a public transport aircraft accident and associated recorders cannot be localized, it does happen. There have been at least four occurrences since 1973 where an aircraft disappeared over the high seas and could not be located. The High-level Safety Conference (HLSC) 2010 concluded that it is not acceptable that an accident cannot be completely investigated due to the lack of recorded data.</p> <p>2) Even when it is possible to recover the recorders and investigate the wreckage, the operations are often lengthy (up to a year and more) and very expensive (several million dollars). The latter has to be taken into account when assessing the cost/benefit of the solution being envisaged to address the issue.</p> <p>3) While the primary focus of most of the activities is to secure recorded data, they would also help to locate the wreckage which is also a primary focus of any accident investigation.</p>			
Objectives	Action under consideration and comments	Status	Timeline
1.1 Underwater locator beacons (ULB)			
<p>Increasing the likelihood of locating aircraft underwater through the following improvement of ULBs:</p> <p>a) increasing the operating life of the locator signal from 30 days to 90 days through improved ULBs and batteries; and</p> <p>b) increasing the range of the ULB signal from 2 km to 8 km. (nominal range) by requiring the carriage of another ULB operating on 8.8kHz.</p>	<p>90-day ULBs</p> <p>a) 90-day ULBs are currently available on the market. Their unit cost is currently \$100 USD higher than a 30-day ULB unit but the price difference should disappear once production increases.</p> <p>b) The specifications for 37.5 kHz ULBs are established by SAE and contained in SAE (AS) 8045. They are being revised and should be finalized in early 2011. They would require a minimum operating life of 90 days.</p> <p>8.8kHz ULB</p> <p>a) The technology is mature as it is in use on military aircraft but 8.8 kHz ULBs need to be certified for use on civil aircraft.</p> <p>b) Most ships have the capability to receive a 8.8 kHz signal contrary to the current 37.5 kHz ULB which requires specialized listening equipment.</p> <p>c) The cost of 8.8 kHz ULB is estimated at \$2 000 USD excluding installation.</p> <p>d) The 8.8 kHz ULB will be attached to the aircraft rather than to the recorders as for the 37.5 kHz ULBs.</p>	<p>The ICAO Flight Recorder Panel (FLIRECP) has developed Standards and Recommended Practices (SARPs) requiring:</p> <p>a) a 90-day operating life for 37.5 kHz ULBs; and</p> <p>b) the carriage of a 8.8 kHz ULB.</p> <p>The proposal will be reviewed by the Air Navigation Commission during the fall 2010 session and should then be circulated to States for comments.</p>	<p>The adoption of the new SARPs by Council is planned for 2012 with a proposed applicability of 1 January 2018.</p> <p>ICAO has sent a State letter (SL10/56) urging States to encourage air operators under their oversight to use ULBs with a 90-day transmission time (“90-day ULB”). It is suggested that 90-day ULBs be recommended as soon as possible and be mandated when new ULBs are purchased or when there is a need to change batteries in ULBs at the end of their certified life (6 years).</p>

1.2 Deployable and free floating recorders			
Facilitate the recovery of flight data recorders (FDRs) and cockpit voice recorders (CVRs) through the use of recorders which are ejected at the time of impact.	<ul style="list-style-type: none"> a) The technology is mature and is used on military aircraft. Certified civilian equipment should become available soon. b) The use of deployable/free floating recorders has the potential to significantly improve the recovery of FDR and CVR data. It will also bring improvement when it comes to the actual location of the wreckage since the recorder is combined with an emergency locator transmitter (ELT). c) Cost of equipment and installation for existing aircraft is high but is likely to be slightly lower in comparison to current recorder and ELT for new type of aircraft. 	The various options continue to be assessed through the Flight Data Recovery Group (FDRG) established under the auspices of the French BEA and to which ICAO is associated.	The ICAO FLIRECP will review the conclusions of the FDRG during its next meeting in the second quarter of 2011 and should decide then whether to propose SARPs.
1.3 Continuous and triggered transmission of flight data			
<ul style="list-style-type: none"> a) Provide access to flight data immediately after an accident. b) Provide flight data even if the FDR and CVR are not recovered. c) Can provide an earlier indication that an accident has occurred and can facilitate the localization of the wreckage and the flight recorders. 	<ul style="list-style-type: none"> a) Continuous transmission of the full set, or of a subset of the most important flight recorder data, and whenever available, airborne image recorder data does not appear to be a realistic approach in the short and medium term for several reasons, including installation, operational costs, operational bandwidth and spectrum constraints of the communication network. b) Triggered transmission of flight data, which could include data collected before the triggering events is a more realistic option but would still require significant installation in case of retrofit. However, this installation could also be used to perform flight data monitoring with operational benefits. c) A third option under consideration is the incorporation of basic parameters (such as position, altitude, speed, heading and acceleration) in AOC ACARS messages. d) An international working group, under the auspices of the French BEA, is assessing the most effective implementation methods, including the criteria to be used to trigger the transmission and the impact of unusual aircraft attitudes on triggered communication. It is expected that the review will be completed by the end of September and that the report will be forwarded to ICAO for further action. 	<ul style="list-style-type: none"> a) The FLIRECP has developed SARPs requiring that aircraft operating in long-range over-water flights and with a maximum certificated take-off mass of over 27 000 kg be equipped with a means of automatically transmitting sufficient information to determine the position of an accident over water within 4 NM. b) The proposal will be reviewed by the ANC during the fall 2010 session and should thereafter be circulated to States for comments. c) Guidance material on means to meet this requirement will be developed using the results of the work conducted on continuous and triggered transmission of flight data. 	<p>The adoption of the new SARPs by Council is planned for 2012 and the proposed applicability dates are:</p> <ul style="list-style-type: none"> a) 1 January 2018 for new type of aircraft; and b) 1 January 2020 for new aircraft of a type first certificated before 1 January 2018.

2. Improvement of surveillance, flight monitoring and communications of aircraft operating in oceanic/remote areas and of the provision of timely and adequate search and rescue services (SAR) in areas of need

General comments			
<p>Timely and adequate SAR services are dependent on timely and effective notification of emergencies, and proper implementation of SAR alert procedures. These dependencies are themselves dependent upon effective air traffic services communication and surveillance facilities. Recent accidents indicate that substantial improvement is needed in order to ensure appropriate monitoring of air traffic in oceanic and remote low density airspace. There is also a need to optimize the coordination between air traffic services (ATS) and SAR services in these oceanic areas. Action under this section is about a more efficient use of the interface between the aircraft and ATC while the action under 1.3 focussed on transmission of flight data for accident investigation purposes.</p>			
Objectives	Action under consideration and comments	Status	Timeline
2.1 Improvement of surveillance, flight monitoring and communications of aircraft operating in oceanic/remote areas			
<p>Provide timely and adequate search and rescue services through improved surveillance, flight monitoring and communications.</p>	<p>Extensive areas still exist over the ocean and remote areas where neither real time presentation of aircraft position nor direct air-ground communications are available. And yet a variety of mature technological mechanisms are being utilized to downlink more frequently, position and other information to various entities on the ground. These mechanisms use data link in some form, as well as SATCOM in most cases. The use of ADS-C and CPDLC is becoming common in some areas, however, their primary purpose is to allow for the reduction of separation minima and consequent efficiency gains. The extent that existing data links might also offer benefits in terms of providing more timely and adequate search and rescue services needs to be assessed.</p>	<p>The Operational Data Link Panel (OPLINKP) has completed the SARPs, procedures and guidance material to support implementation of ADS-C and CPDLC. Its work programme is now, in part, designed to encourage the use of these applications and includes a further assessment of changes which might be necessary to improve surveillance, flight monitoring and communications in oceanic/remote areas, in light of more recent concerns. This assessment will include:</p> <ol style="list-style-type: none"> a review of existing SARPs and guidance material; technological alternatives to ADS-C and CPDLC; and a review of ongoing research programmes, such as the SESAR Joint Undertaking-sponsored Oceanic Position Tracking Improvement and Monitoring Initiative (OPTIMI) which is expected to provide recommendations sometime this winter. 	<p>OPLINKP proposals for improved surveillance, flight monitoring and communications will be presented to the ANC in mid-2011.</p> <p>The Secretariat will propose during the fall 2010 session to the ANC that a mechanism be established to review ICAO radio communication failure procedures in the light of recent accidents and regional disparities.</p> <p>A State letter is being prepared urging States to take measures to utilize available technology to improve communication and SAR over oceanic and remote areas. This letter relies on the work under way by OPLINKP and the ICAO/IMO Working Group on Harmonization of Aeronautical and Maritime SAR and should be ready in early 2011.</p>

2.2 Provision of timely and adequate search and rescue services in areas of need			
<p>Improvement of the provision of timely and adequate search and rescue services.</p>	<p>a) ICAO and the International Maritime Organization (IMO) have determined that “in many areas of the world, the fastest, most effective and practical way to achieve a global SAR service is to develop regional systems associated with each ocean area and continent”. This is supported by the results of the safety oversight audits which indicated some significant shortcomings in SAR activities. Of the 113 States audited up to the end of 2008:</p> <ul style="list-style-type: none"> • 70% had not coordinated their respective SAR organizations with those of neighbouring States; • 65% of audited States have not concluded bilateral SAR agreements with neighbouring States; • about 50% of audited States had no framework for their SAR system, nor adequate availability of a workforce skilled in coordination and operational functions; and • about 50% of audited States had not prepared detailed plans of operation for the conduct of SAR operations. <p>b) The 16th Session of the Joint ICAO/International Maritime Organization (IMO) Working Group on Harmonization of Aeronautical and Maritime SAR (ICAO/IMO JWG SAR/16) held in 2009 recognized the inadequate application of SAR alerting procedures as an aspect of air traffic management that needed addressing and made several recommendations dealing with alerting procedures, ELTs and the need to update the International Aeronautical and Maritime SAR (IAMSAR) Manual. The ICAO/IMO JWG SAR/17, Bremen, 27 September to 1 October 2010, will continue consideration of issues.</p> <p>c) A manual on in-flight emergency response (IFER) dealing with security and safety emergencies is being developed.</p>	<p>Several initiatives are underway to advance the sub-regionalization of SAR services in Africa, Middle East and Pacific.</p> <p>An ICAO Global Civil Aviation SAR Forum hosted by UAE was held in Abu Dhabi, 21 to 22 June 2010. Two regional SAR seminars were held in the MID and WACAF SAR Regions (Cairo, May and Niger, June 2010, respectively).</p>	<p>The publication of the manual on in-flight emergency response (IFER) is scheduled for the end of 2010.</p> <p>The ANC should consider the recommendations of the ICAO/IMO JWG SAR in 2011.</p>

3. Review of existing requirements on flight deck activities, checklist and standard operating procedure design

General comments			
Following the HLSC 2010, the ICAO Secretariat conducted a review of ICAO SARPs, PANS and guidance material to identify requirements which should be amended to better reflect current best practices in the areas of flight deck activities, checklist and standard operating procedure design. This review has identified two areas, described below where amendment would be warranted.			
Objectives	Action under consideration and comments	Status	Timeline
3.1 Flight deck activities			
Introduction of the concept of critical phases of flight in ICAO provisions and definition of activities which are acceptable during critical phases of flight.	<p>a) Some States have introduced the concept of critical phases of flight (often defined as “<i>all ground operations involving taxi, takeoff and landing, and all other flight operations conducted below 10 000 feet, except cruise flight</i>”) and limit crew members activities to those required for the safe operation of the aeroplane during critical phases of flight.</p> <p>b) The concept of critical phases of flight does not exist in ICAO provisions and should be introduced.</p>	<p>The Secretariat will recommend during the fall 2010 session of the ANC that the Operations Panel (OPSP) review the issue and make recommendations.</p> <p>It is expected that the OPSP would start the review, subject to ANC concurrence, during its November 2010 meeting.</p>	Initial review of the proposed amendment by the ANC is planned for 2011.
3.2 Checklist and standard operating procedure design			
Update of the provisions related to checklists and standard operating procedures in Annex 6 — <i>Operation of Aircraft</i> , and the <i>Procedures for Air Navigation Services — Aircraft Operations</i> , Volume I — <i>Flight Procedures</i> , Part III (Doc 8168, PANS-OPS)	<p>a) Existing provisions on checklists and standard operating procedures are fairly extensive and are contained in Annex 6, PANS-OPS, Volume I, Part III, Doc 9376 – <i>Preparation of an Operations Manual</i> and Doc 9683 – <i>Human Factors Training Manual</i>.</p> <p>b) Areas which are under review include:</p> <ol style="list-style-type: none"> Better cross reference between the various provisions mentioned in a) above. Introduction of the concept of “Pilot Flying” and “Pilot Monitoring” with respect to the use of checklists in PANS-OPS applying industry best practices and human factors considerations. Guidance on the requirements for standard operating procedures (SOPs) for each phase of flight and the use of normal checklists respectively should be expanded to address appropriate activities/checklists for the critical phases of flight. This guidance will be developed taking fully into account safety management principles and in particular hazard identification and analysis. 	<p>The Secretariat will recommend during the fall 2010 session of the ANC that the OPSP review the issue and make recommendations.</p> <p>It is expected that the OPSP would start the review, subject to ANC concurrence, during its November 2010 meeting.</p>	Initial review of the proposed amendment by the ANC is planned for 2011.