



TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 6: Future Direction

6.1: Implementation plans and methodologies

RESULTS OF THE ELEVENTH AIR NAVIGATION CONFERENCE (AN-CONF/11) 2003 – FOLLOW-UP ACTION TAKEN

(Presented by the Secretariat)

SUMMARY

This Information paper reports on the actions taken by the Council of ICAO, States and International Organizations on the Recommendations of the Eleventh Air Navigation Conference held in Montréal from 22 September to 3 October 2003. The actions initiated on the Recommendations provide continuity between the conferences and also reflects how the civil aviation community has progressed those recommendations.

1. INTRODUCTION

1.1 The Eleventh Air Navigation Conference (AN-Conf/11) was held at ICAO Headquarters in Montréal from 22 September to 3 October 2003 and was attended by 686 participants from 122 Contracting States and twenty-four observer delegations. The Conference, while focusing its attention on global air traffic management (ATM) systems, developed sixty-one recommendations enveloping a wide range of issues.

1.2 On 10 March 2004, during the eleventh meeting of the 171st Session, the Council of ICAO considered, taking into account the comments of the Air Navigation Commission, and approved the AN-Conf/11 report. The Council, in confirming ICAO's role in the follow-up to recommendations, called upon States, all planning and implementation regional groups (PIRGs) and all CNS/ATM partners to initiate necessary action on specific recommendations. The follow-up initiated on various recommendations is detailed in the Appendix attached hereto.

2. CONCLUSION

2.1 The follow-up actions taken on the recommendations of AN-Conf/11 provided continuity between the conferences and also reflects how the civil aviation community has progressed those recommendations.

APPENDIX

RECOMMENDATIONS OF AN-CONF/11 FOLLOW-UP ACTIONS TAKEN BY ICAO/PIRGs/STATES/INTERNATIONAL ORGANIZATIONS (IOs)

Item #	Recommendation	Action taken
AGENDA ITEM 1 → INTRODUCTION AND ASSESSMENT OF A GLOBAL AIR TRAFFIC MANAGEMENT (ATM) OPERATIONAL CONCEPT		
1/1	Endorsement of the global ATM operational concept That: a) ICAO, States and planning and implementation regional groups (PIRGs), consider the global ATM operational concept as the common global framework to guide planning for implementation of ATM systems and to focus all ATM development work; b) the global ATM operational concept be used as guidance for development of ICAO CNS/ATM related provisions; c) States with the support of the other members of the ATM community undertake work to validate the seven components in the global ATM operational concept; d) ICAO, States and PIRGs develop transition strategies for implementation of ATM systems based on the global ATM operational concept; and e) ICAO align its technical work programme to facilitate future work related to the global ATM operational concept	Completed. The Global ATM operational concept is considered as the common global framework and being used by PIRGs/States as guidance for the planning and implementation of air navigation systems and formed the basis for modules contained in the Aviation System Block Upgrades (ASBUs). PIRGs/States developed transition strategies based on the global ATM operational concept. The transition to ASBUs will complete the process.
1/2	Coordination with military authorities That States take appropriate action to coordinate the global ATM operational concept with their military authorities with a view to achieving maximum cooperation and integration in an effort to implement a flexible and cooperative approach to airspace organization and management.	Ongoing. Promotion of civil and military cooperation through PIRGs continues. ICAO Circular 330 as a guidance on civil/military cooperation published. First Global ATM Forum on Civil/Military Cooperation was held in 2009 and second one is scheduled for 2014.

Item #	Recommendation	Action taken
1/3	Development of ATM requirements That ICAO as a high priority develops a set of ATM functional and operating requirements for a global ATM system on the basis of the global ATM operational concept.	Completed. <i>Manual on ATM System Requirements</i> (Doc 9882) developed and published by ICAO in 2009. The Meteorological Aeronautical Requirements and Information Exchange Project Team (MARIE-PT) is assisting the Air Traffic Management Requirements and Performance Panel (ATMRPP) to define ATM requirements for meteorological (MET) information, and MET capabilities to fulfil the ATM requirements.
1/4	Development of Standards and Recommended Practices (SARPs) from the global ATM operational concept That ICAO, when developing CNS/ATM-related SARPs, ensure that such SARPs are traceable to ATM requirements	Completed. All panels were advised to develop SARPs that are traceable to ATM requirements. The ASBUs will now guide the process.
1/5	Interoperability and seamlessness That ICAO, when developing ATM requirements, define a corresponding minimum set of requirements for interoperability and seamlessness	Ongoing. The Meteorological Aeronautical Requirements and Information Exchange Project Team (MARIE-PT) is defining functional requirements and capabilities necessary to foster the future integration of meteorological information into the globally interoperable, digital system-wide information management environment.

Item #	Recommendation	Action taken
1/6	Endorsement of the automatic dependent surveillance-broadcast (ADS-B) concept of use and recommendations for further work That ICAO: a) follow research and development work in the area of ADS-B applications, and update/maintain the ADS-B concept of use as necessary; b) work cooperatively with other international bodies to ensure that the ADS-B concept of use is properly aligned with existing operational and technical documents; c) utilize the ADS-B concept of use, in its current form and as it matures, as a basis for development of SARPs and guidance material for air to air and air to ground surveillance applications; and d) ensure that all future work on the ADS-B concept of use is aligned with the ATM operational concept and meets the emerging ATM requirements that emanate therefrom.	Ongoing. Aeronautical Surveillance Panel and Air Borne Surveillance Task Force are progressing the work which is slated for completion by 2018.

Item #	Recommendation	Action taken
1/7	Ground and airborne automatic dependent surveillance-broadcast (ADS-B) applications for global interoperability That ICAO and States: a) recognize ADS-B as an enabler of the global ATM operational concept bringing substantial safety and capacity benefits; b) support the cost effective early implementation of packages of ground and airborne ADS-B applications, noting the early achievable benefits from new ATM applications; and c) ensure that implementation of ADS-B is harmonized, compatible and interoperable with respect to operational procedures, supporting data link and ATM applications.	Completed. ADS-B is included in the Global Air Navigation Capacity and Efficiency Plan (Global Plan). Completed. Ongoing task by PIRGs. Regional plans for ADS-B are developed by PIRGs in coordination with neighbouring regions to ensure harmonized implementation.

Item #	Recommendation	Action taken
1/8	Global aeronautical information management and data exchange model That ICAO: a) when developing ATM requirements, define corresponding requirements for safe and efficient global aeronautical information management that would support a digital, real time, accredited and secure aeronautical information environment; b) urgently adopt a common aeronautical information exchange model, taking into account operational systems or concepts of data interchange, including specifically, AICM/AIXM, and their mutual interoperabilities; and c) develop, as a matter of urgency, new specifications for Annexes 4 and 15 that would govern provision, electronic storage, on line access to and maintenance of aeronautical information and charts.	Ongoing. The concept of flight and flow information has been developed. The flight information exchange model (FIXM) is under development. Both are enablers of a system-wide information management concept that will be ready by 2013. Requirements to enable digital aeronautical data exchange have been developed for the next amendment to Annex 15 (Amendment 37). The requirement to enable digital aeronautical data exchange will be supported by performance requirements for the aeronautical information model used. Automation requirements were expanded in Amendment 36 to Annex 15 and further developed for Amendment 37. Provisions relating to electronic charts have been introduced in Annex 4 and are under further development.
1/9	Raising the status of the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750) That ICAO develop a formal review and agreement process for the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750).	Completed. New version of the Global Air Navigation Capacity and Efficiency Plan will be presented to the Twelfth Air Navigation Conference (AN-Conf/12) with a proposed review process.

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1/10	Status of the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750) That States and planning and implementation regional groups (PIRGs) consider the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750) as a catalyst for change, providing a global safety and interoperability framework while allowing regional or local adaptation to efficiently meet regional and local needs.	Completed. PIRGs/States were advised accordingly. The revised Global Plan presented to the AN-Conf/12 will be a significant step forward.
1/11	Publication of the Global ATM Operational Concept That ICAO publish the global ATM operational concept as a new ICAO manual.	Completed. The <i>Global ATM Operational Concept</i> (Doc 9854) was published in 2005.
1/12	Amendment of Chapter 4 of the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750) That ICAO take action to amend Chapter 4 of the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750), clearly establishing the linkage to the Global ATM Operational Concept.	Completed. The Global Plan has been significantly upgraded for the AN-Conf/12.
1/13	Harmonization of air navigation systems That ICAO and the ATM community explore the possibility of developing a mechanism for implementing the interregional interface applications with a view to facilitating the harmonized implementation of air navigation systems giving rise to a global ATM system in an evolutionary fashion.	Ongoing. PIRGs are addressing this issue as a part of regional planning for air navigation systems.
1/14	Development of an ICAO air navigation plan database and associated web based information and charting service That ICAO develop and maintain a database containing all tabular material from all the regional air navigation plans, both Basic Operational Requirements and Planning Criteria (BORPC) and the Facilities and Services Implementation Document (FASID), together with the major traffic flows and other regional data from Part II of the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750), and make this database and associated charts available through the Web.	Ongoing. Regional electronic air navigation plan (eANP) version 1.0 has been developed. It includes updated versions of the text and tables of ATS routes, CNS, AIM, AOP and MET, which can be accessed through the Web. This web-based regional eANP will be presented under WP/19 to AN-Conf/12.

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1/15	Implementation of airborne collision avoidance system (ACAS) provisions That States take immediate action to implement, in appropriate national documentation, the ACAS provisions contained in Amendment 28 to ICAO Annex 6 — Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes, and in Amendment 12 to the Procedures for Air Navigation Services — Operations (PANS OPS, Doc 8168), Volume I.	Completed. Action taken by States.
1/16	Provisions related to airborne collision avoidance systems (ACAS) That ICAO review current provisions and investigate the need to develop new provisions to enhance the effectiveness of ACAS as follows: a) provisions in Annex 6, Part II concerning training of general aviation pilots in the operation of ACAS; b) provisions in Annex 10, Volume IV concerning performance of the ACAS II collision avoidance logic; c) provisions concerning the training of air traffic control personnel; d) the registering by the parametric flight recorder of resolution advisory commands; and e) air traffic control provisions in ICAO Annexes 2 and 11 and the PANS ATM.	Ongoing. Work in progress. Part d) of the recommendation requested that the Surveillance and Conflict Resolution Systems Panel (SCRSP) develop relevant proposals for review by the ANC.

Item #	Recommendation	Action taken
AGENDA ITEM 2 → SAFETY AND SECURITY IN AIR TRAFFIC MANAGEMENT (ATM)		
2/1	A framework for system safety That ICAO investigate appropriate mechanisms for the development and implementation of a framework for a uniform and system-wide approach to safety, and the application of this framework to: a) the harmonization of provisions relating to safety assessment and safety management in relevant Annexes and Procedures for Air Navigation Services (PANS); and b) the harmonization of the approaches to safety assessment in the development of safety-related standards and recommended practices (SARPs).	Completed. A new Safety Management annex has been developed and is scheduled to become applicable in Nov 2013. Annex 19 includes frameworks for the State safety programme and safety management systems to be implemented by States and the providers of aviation products and services under their responsibility.
2/2	Implementation of ATS safety management programmes and establishment of acceptable levels of safety That States which have not already done so, take action in accordance with Annex 11, 2.26 to: a) implement systematic and appropriate ATS safety management programmes to ensure that safety is maintained in the provision of ATS within airspaces and at aerodromes; and b) establish the acceptable levels of safety and safety objectives applicable to the provision of ATS within airspaces and at aerodromes.	Ongoing. States are implementing as a part of their State safety programmes.
2/3	Sharing of ATM accident and incident data That ICAO: a) develop guidance material on the use of the ADREP 2000 data base; and b) encourage States to share information on ATM accidents and incidents.	Completed. Accident/Incident Data Reporting (ADREP) contains existing occurrence categories covering aspects of the ATM domain (e.g. MAC: Airprox/near-miss/mid air collision). Methodologies to integrate ATM-specific data in the ADREP data are under development.

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2/4	The protection of sources of safety information That ICAO develop guidelines which will provide support to States in adopting adequate measures of national law, for the purpose of protecting the sources and free flow of safety information, while taking into account the public interest in the proper administration of justice.	Ongoing. Attachment E. Legal guidance for the protection of safety data collection and processing systems, was introduced in Annex 13 in November 2006. A multidisciplinary Safety Information Task Force was established in 2011 and is scheduled to provide its recommendations for SARPs or guidance material to appropriately protect sources of safety information in January 2013.
2/5	Monitoring of safety during normal operations That ICAO initiate studies on the development of guidance material for the monitoring of safety during normal air traffic service operations, taking into account, but not limited to, the line operations safety audit (LOSA) programmes which have been implemented by a number of airlines.	Completed. The <i>Normal Operations Safety Survey (NOSS) Manual</i> (Doc 9910) published in 2008 and being rolled out as part of the RVSM safety monitoring programmes.
2/6	Safety certification of ATM systems That ICAO investigate the need for the development of provisions for safety certification of ATM systems and service providers.	Ongoing. Standards pertaining to implementation of safety management systems by ATS providers have been adopted for Annex 11. Such Standards have been proposed for transposition to the future Annex 19, which was the subject of consultation with States and international organizations, State letter 8/3-12/42 (June 2012) refers. The draft Annex 19, Appendix 1, Paragraph 6 refers specifically to requirements associated with approvals, authorizations, licensing and also certification.

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2/7	Safety oversight capabilities and procedures That ICAO encourage States to develop ATM safety oversight capabilities and procedures.	Ongoing. Under the Universal Safety Oversight Audit Program (USOAP) and its new initiative, the continuous monitoring approach (CMA), ICAO has made significant progress in supporting the continued development of States' oversight capabilities not only in the ATM specialty but across all areas. The USOAP CMA provides a mechanism by which ICAO collects safety oversight information from Member States on a dynamic basis through its interactive website encouraging two-way exchange of information thus promoting the improvement of safety oversight capabilities on the part of States. In addition, ICAO sponsors several USOAP/CMA seminars a year designed to disseminate new developments on safety oversight and to improve States' capabilities in that area.
2/8	That ICAO encourage States to develop ATM safety oversight capabilities and procedures. Harmonization of aviation safety and aviation security That ICAO: a) continue its efforts to encourage and monitor the harmonization of aviation safety and aviation security; and b) encourage States to monitor the impact of aviation security measures on aviation safety, and to take action as necessary.	Ongoing. Safety and security issues are coordinated on a regular basis. Noted and action taken by the States.

Item #	Recommendation	Action taken
2/9	In-flight emergency response procedures for air traffic controllers That, consistent with the ICAO Aviation Security Plan of Action and the ATM operational concept, ICAO consider developing in-flight emergency response and coordination procedures for air traffic controllers, together with training guidance, related to the distinctly different types and phases of unlawful interference. These procedures and guidance material should allow for the different conditions which exist in States.	Completed. The 15th Edition of the PANS-ATM promulgated relevant provisions which became applicable in November 2007. Relevant guidance has also been developed and is included in the ICAO <i>Air Traffic Management Security Manual</i> (Doc 9985, Restricted), expected to be released in the 4th Quarter of 2012.
AGENDA ITEM 3 → AIR TRAFFIC MANAGEMENT (ATM) PERFORMANCE TARGETS FOR SAFETY, EFFICIENCY AND REGULARITY AND THE ROLE OF REQUIRED TOTAL SYSTEM PERFORMANCE (RTSP) IN THIS RESPECT		
3/1	Required communication performance (RCP) That ICAO: a) continue the development of Standards and Recommended Practices (SARPs), procedures and guidance material on RCP; and b) investigate areas for further work to determine the relationship of the RCP concept to separation studies and interoperability, the standardization of RCP types and allocations, the adequacy of ATS functions and procedures for new CNS/ATM environments, as well as requirements for safety performance monitoring.	Completed. The <i>Manual on Required Communication Performance (RCP)</i> (Doc 9869) was published in 2008.
3/2	Standardization of minimum reporting requirements That ICAO continue its work in the field of economic performance of ATM and benchmarking, and assess the need for world-wide standardization of minimum reporting requirements in relation to information disclosure.	Ongoing. The economic performance of ATM is being addressed as a part of developing business cases for ASBU Block 0 Modules. Also, ICAO will be addressing this issue for ASBU Block 1 Modules in the next triennium 2014-2016.

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3/3	Performance framework That ICAO, in consultation with the other members of the ATM community: a) formulate the performance objectives and targets for a future global ATM system; b) continue the definition of related performance metrics and elementary characteristics in the context of the overall behaviour of the ATM system; and c) coordinate and harmonize all related contributions within the overall performance framework initiated by the Air Traffic Management Operational Concept Panel, including definitions, standards for reporting requirements and guidance for monitoring.	Ongoing. The <i>Manual on Global Performance of the Air Navigation System</i> (Doc 9883) published in 2009 defines performance objectives, indicators, targets and metrics and provides guidance on the monitoring of the air navigation system applying a performance-based approach. PIRGs and Regional Aviation Safety Groups (RASGs) will be asked to establish regional targets by 2014 during ALLPIRG/6 and ALLRASG/1 in 2013.

Item #	Recommendation	Action taken
AGENDA ITEM 4 → CAPACITY-ENHANCEMENT MEASURES		
4/1	Harmonization of air navigation systems between regions That ICAO: a) maintain, and develop further, a coordination mechanism between regions for planning and implementation of capacity enhancing measures and ATM performance improvement between regions for a harmonized evolution aimed at enhancing aviation efficiency and safety; b) be systematically involved in any regional initiatives aiming at enhancing ATM capacity and performance; and c) urge States, who have not already done so, to establish national CNS/ATM coordination and implementation committees, with a point of contact to be made known to the respective ICAO Regional Office, so as to facilitate harmonized transition to CNS/ATM systems.	Ongoing. Interregional coordination is an essential task of the ALLPIRG mechanism and is used for enhancing ATM performance improvement between regions. The next Meeting of ALLPIRG is scheduled for 2013. States have been notified.
4/2	Investigation of performance driven planning and implementation methods That States study the approach to planning and implementation commonly adopted by European States, with a view to the possible application of its elements in their respective regions.	Completed. All PIRGs, in 2008, have adopted performance-based approach (PBA) to air navigation planning and States in turn are in the process of transition to PBA. To support States, ICAO developed the ICAO fuel savings estimation tool (IFSET) to assess efficiency and corresponding environmental benefits due to operational improvements. ICAO conducted a series of regional workshops under the SIP mechanism to train States on performance driven planning.

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4/3	Collaborative decision making and global demand/capacity balancing That ICAO: a) develop SARPs and procedures for global air traffic flow and capacity management based on the concept of demand/capacity balancing as described in the operational concept; and b) develop guidance material for States to implement global demand/capacity balancing techniques based on collaborative decision making processes, and sharing of aviation information in accordance with the operational concept.	The Manual on <i>Collaborative Air Traffic Flow Management</i> (Doc 9971) with its two Parts (Part I: <i>Collaborative decision-making (CDM)</i> and Part II: <i>Air traffic flow management</i>) has been developed and will be presented to the AN-Conf/12.
4/4	Investigation and analysis of the “Single European Sky” approach to global harmonization That ICAO follow the progress of the “Single European Sky” project for possible use in other homogeneous regions or at the global level.	Ongoing as Single European Sky matures.
4/5	Runway safety programmes That States: a) take appropriate actions to improve runway safety worldwide through the implementation of runway safety programmes; b) collect and share runway incursion incidents in accordance with Annex 13 — Aircraft Accident and Incident Investigation, Chapter 8, Accident Prevention Measures; and c) take into consideration that part of the ICAO Manual on Advanced Surface Movement Guidance and Control Systems (A SMGCS) related to surveillance and control functions, when implementing such systems at airports.	Ongoing. ICAO has published a <i>Manual on the Prevention of Runway Incursions</i> (Doc 9860) and a CD toolkit and has joined with IATA on the development of a runway incursion toolkit. ICAO is in the process of promoting the establishment of multidisciplinary runway safety teams through a series of regional seminars, online tools and new guidance material. This task is addressed in partnership with international organizations.
4/6	Capacity enhancing procedures That States, when considering capacity enhancing procedures at aerodromes, conduct appropriate safety studies and take due consideration of the effect on runway safety.	Ongoing task by States.

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4/7	Global runway incursion risk management That ICAO: a) urgently progress the development of a formal definition for “runway incursion” as a prerequisite for further actions to be taken in this domain; and b) enhance the Accident/Incident Data Reporting (ADREP) to incorporate a common categorization taxonomy of runway incursion severity, error type and/or factors that contribute to incursions.	Completed. The formal definition is included in the <i>Manual on the Prevention of Runway Incursions</i> (Doc 9860) and CD toolkit. Ongoing. ADREP taxonomy is under development.
4/8	Rectification of air navigation deficiencies That ICAO: a) urge States to: 1) review their respective lists of identified deficiencies and inform the ICAO Regional Office of those that have been eliminated; 2) formulate and forward an action plan and time table for rectification of outstanding deficiencies to the respective ICAO Regional Office for review; and 3) identify areas, if any, where the establishment of multinational agreements or informal coordination groups may contribute to the resolution of deficiencies; b) encourage users of air navigation facilities and services to report to the respective regional office once they note that the remedial action on the deficiency they had reported has been taken; and c) continue to provide assistance to States for the purpose of rectifying deficiencies.	Ongoing. PIRGs have been urging States to resolve identified deficiencies on priority. In the meantime, ICAO has developed a unified air navigation deficiency database in iSTARs platform and will be fully operational by December 2012. This approach will enhance transparency of information and thus encourage States to address their deficiencies.

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4/9	Harmonization of flight level assignment methodology across flight information boundaries That relevant States, when planning for the introduction of reduced vertical separation minimum (RVSM) at interfaces between airspaces where different units of measurement are used, taking into account relevant operational and technical considerations, should apply a common cruising levels structure in accordance with the tables of cruising levels expressed in metres or feet, as outlined in Annex 2 — Rules of the Air, Appendix 3.	Completed. With the completion of RVSM implementation worldwide, all States are applying the cruising levels as described in Annex 2, Appendix 3.
4/10	Tables of cruising levels That ICAO continue to study the common cruising levels structure, as outlined in Annex 2 — Rules of the Air, Appendix 3.	Completed.

Item #	Recommendation	Action taken
AGENDA ITEM 5 → REVIEW OF THE OUTCOME OF THE ITU WORLD RADIO CONFERENCE (2003) (WRC 2003) AND ITS IMPACT ON AERONAUTICAL ELECTROMAGNETIC SPECTRUM UTILIZATION		
5/1	Preparation for WRC 2007 That ICAO; a) urge States and international organizations to continue their efforts on implementation of the relevant elements of Assembly Resolution A32 13 and in particular participate in the preparatory work of the ITU and the regional telecommunication organizations for WRC 07; and b) continue to assign high priority to the tasks relating to the protection and availability of radio frequency spectrum allocated to aeronautical services and in particular actively participates in the relevant activities of the ITU R and of the regional telecommunication organizations.	Ongoing. Outcome of WRC-07 and WRC-12 satisfactory, in large part due to early awareness, development and coordination of a common ICAO position, the inclusion of aeronautical experts in national delegations, and the active participation of international organizations and ICAO in the preparatory work for the conferences as well as the conferences themselves. It is to be noted that the pressure on the spectrum resource keeps mounting, and the WRC's continue to expand in size (over 3 000 participants at WRC-12). The development of the ICAO position for WRC-15 is underway, and relevant activities of the ITU-R and Regional Telecommunication Organizations are supported.

Item #	Recommendation	Action taken
5/2	ICAO activities on interference That ICAO: a) intensify its activities to secure protection of aeronautical communication, navigation and surveillance systems from the adverse effects of electromagnetic interference and develops guidance material, as necessary; b) develop material to assist States in assessing interference from FM broadcasting stations; c) support the relevant activities of the ITU and regional telecommunication and standards making organizations; and d) develop guidance material on the control and removal of interference to aeronautical systems.	Ongoing. Activities increased and ongoing through the development of detailed, globally harmonized, compatibility criteria, including the development of relevant software. Significant deliverable in 2013: “Frequency assignment planning criteria for aeronautical communication and navigation systems”. Implementation of the updated planning criteria will be coordinated through the PIRGs. Completed. Incorporated under a). The development of procedural and technical material to assess and prevent harmful interference from FM broadcasting now also includes consideration of interference from the new/planned digital broadcasting. Ongoing. Support of the relevant activities in the ITU and regional telecommunication organizations, largely driven by changes in the use of spectrum by non-aeronautical services. Ongoing. Incorporated under a). Guidance on the control and removal of harmful interference to aeronautical CNS systems is under development. ICAO is focal point on interference between aeronautical services (mainly through the PIRGs). ITU and Regional Telecom Organizations are focal point on interference issues involving non-aeronautical services.

Item #	Recommendation	Action taken
AGENDA ITEM 6 → AERONAUTICAL NAVIGATION ISSUES		
6/1	Transition to satellite-based air navigation That: a) ICAO continue to develop as necessary provisions which would support seamless GNSS guidance for all phases of flight and facilitate transition to satellite based sole navigation service with due consideration of safety of flight, technical, operational and economics factors; b) air navigation service providers move rapidly, in coordination with airspace users, with a view to achieving, as soon as possible, worldwide navigation capability to at least APV I performance; and c) States and airspace users take note of the available and upcoming SBAS navigation services providing for APV operations and take necessary steps towards installation and certification of SBAS capable avionics.	Ongoing. The relevant panels are continuing the development of SARPs, procedures and guidance material in line with part a). To be completed by 2015. Ongoing. Navigation capability to at least APV I performance has been implemented in North America (WAAS) and Europe (EGNOS). Implementation is underway in other regions. Ongoing for States. SBAS capable avionics have been certified and are commercially available. They have been installed on a large number of aircraft (mainly general aviation).

Item #	Recommendation	Action taken
6/2	Guidelines on mitigation of GNSS vulnerabilities That States in their planning and introduction of GNSS services: a) assess the likelihood and effects of GNSS vulnerabilities in their airspace and utilize, as necessary, the mitigation methods as outlined in the guidelines contained in Appendix A to the report on Agenda Item 6; b) provide effective spectrum management and protection of GNSS frequencies to reduce the possibility of unintentional interference; c) take full advantage of on board mitigation techniques, particularly inertial navigation; d) where determined that terrestrial navigation aids need to be retained as part of an evolutionary transition to GNSS, give priority to retention of DME in support of INS/DME or DME/DME RNAV for en route and terminal operations, and of ILS or MLS in support of precision approach operations at selected runways; and e) take full advantage of the future contribution of new GNSS signals and constellations in the reduction of GNSS failures and vulnerabilities.	Completed. The guidelines contained in Appendix A to the report on Agenda Item 6 were included in the first edition of the <i>Global Navigation Satellite System (GNSS) Manual</i> (Doc 9849). Updated guidelines, including an assessment of the likelihood and effects of GNSS vulnerabilities, will be included in the second edition of the manual to be released in 2013. Ongoing task for States. Ongoing task for States. Ongoing task for States. All RNAV and RNP (PBN) ICAO provisions are based on GNSS and DME/DME and DME/DME/IRU. Development of SARPs for new GNSS signals and constellations is underway. To be completed by 2015.
6/3	Assessment of atmospheric effects on SBAS performance in equatorial regions That ICAO, in order to aid the work on mitigation of ionospheric effects on SBAS performance in equatorial regions, assess the results of data collection being carried out in States and develop appropriated guidance material.	Completed. The Navigation Systems Panel (NSP) has developed guidance material on the matter in Doc 9849.
6/4	Automated means for reporting and assessing the effects of outages on GNSS operations That ICAO consider standardization of an automated means of monitoring and reporting scheduled and unscheduled GNSS outages and assessing their effects on GNSS operations and develop, as necessary, the requisite provisions.	Completed. The relevant tools have been developed by industry/States and are currently available to GNSS users (Doc 9849).

Item #	Recommendation	Action taken
6/5	Early resolution of issues arising from implementation of RNAV and RNP That ICAO as a matter of urgency address and progress the issues associated with the introduction of RNP and RNAV.	Completed. Resolution of the issues is being provided through the ongoing development of a performance-based navigation (PBN) framework. PBN programme established which produced a comprehensive framework of ICAO provisions and leads a coordinated effort of implementation of RNAV and RNP.
6/6	Advanced GNSS procedure design That ICAO develop RNAV procedures supported by GNSS for both fixed and rotary wing aircraft, enabling lower operating minimas in obstacle rich or otherwise constraint environments.	Completed. The relevant provisions have been included in the <i>Performance-based Navigation Manual</i> (Doc 9613). PANS-OPS has been updated and a second update will be submitted to the ANC in 2012.
6/7	Curved RNAV procedures That ICAO develop RNAV procedures supported by GNSS for fixed wing aircraft, providing high track and velocity keeping accuracy to maintain separation through curves and enable flexible approach line ups.	Completed. The relevant provisions have been included in the <i>Performance-based Navigation Manual</i> (Doc 9613). PANS-OPS has been updated and a second update will be submitted to the AN-Conf/12 in November 2012.
6/8	GNSS/INS integration That ICAO develop provisions for the integration of GNSS/INS in order to reduce the vulnerability of GNSS to RF interference and aid the development of advanced GBAS capabilities.	Completed. The Navigation Systems Panel (NSP) investigated the implementation of this recommendation and concluded that no additional ICAO provisions were necessary, as existing industry provisions for GNSS/INS integration were sufficient.

Item #	Recommendation	Action taken
6/9	Support of and participation in SBAS pre operational implementation activities That: a) States that develop and introduce satellite based augmentation systems and other SBAS service providers commence or continue to provide their technical and financial support and participation in the activities leading to the extension of their SBAS service areas into neighbouring States and Regions; and b) States participating in SBAS implementation activities coordinate with other participating States to optimize their effort, minimize duplication of service and facilitate participation of service providers.	Ongoing activity for States and SBAS service providers.
6/10	Amendment to Annex 10, Volume I, Attachment B — Updating the strategy for introduction and application of non-visual aids to approach and landing That Attachment B to Annex 10, Volume I be amended as shown in Appendix B to the report on Agenda Item 6.	Completed.
6/11	Amendment to the Global Plan — Navigation That: a) the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750) be amended as shown in Appendix C to the report on Agenda Item 6; and b) updated CNS/ATM systems implementation time lines contained in Part II of the Global Plan be reviewed by the Regional Implementation Group and consolidated for incorporation in the next edition of the Global Plan.	Completed.
6/12	Development of guidance material on applications of new GNSS elements and their combinations That ICAO, in developing standards for new GNSS elements and signals, address the issues associated with the use of multiple signals and their combinations, and develop guidance on the most promising combinations of GNSS elements.	Taken into account the use of multiple signals in the development of ICAO provisions for new GNSS elements and signals and will be completed by 2015.

Item #	Recommendation	Action taken
6/13	Potential constraints on using multiple GNSS signals That States, in their planning for implementation of GNSS services, take full advantage of future benefits accrued from using independent core satellite constellations, other GNSS elements and their combinations, and avoid limitations on the use of specific system elements.	Ongoing recommendation for States implementing GNSS.
6/14	GNSS services in the 960 1 215 MHz band That: a) States be encouraged to take into account the need to minimize potential interference to GNSS services in their planning of the deployment of DMEs; and b) an appropriate ICAO body be tasked to review the issues listed in paragraph 6.4.2.4 of the report on Agenda Item 6.	Completed.
6/15	Updating of SARPs for radio navigation aids in Annex 10, Volume I That ICAO undertake a review of SARPs and guidance material in Annex 10, Volume I in the areas identified in paragraph 6.4.3.4 of the report on Agenda Item 6.	Completed.
6/16	Completion of guidance material on application of data quality SARPs in Annex 15 That ICAO give high priority to the completion of guidance material for the data quality assurance including the data processing from origination to end use.	Completed. A Quality Management System Manual for AIS/MAP Services has been developed and is being processed for publication and will be available in 2013. Also, the <i>Quality Assurance Manual for Procedure Design</i> (Doc 9906) has been developed.

Item #	Recommendation	Action taken
AGENDA ITEM 7 → AERONAUTICAL AIR-GROUND AND AIR-TO-AIR COMMUNICATIONS		
7/1	Strategy for the near term introduction of ADS-B That States: a) note that a common element in most of the approaches currently adopted for early implementation of ADS-B is the selection of the SSR Mode S extended squitter as the initial data link; and b) take into account this common element to the extent possible in their national and regional implementation choices in order to facilitate global interoperability for the initial introduction of ADS B.	Noted. Ongoing for States. States are taking into account this SSR Mode S extended squitter as a common element in their national and regional implementation choices for the initial introduction of ADS-B.
7/2	Support of longer term ADS-B requirements That: a) States recognize that in the longer term the current SSR Mode S extended squitter technology may not be able to fully satisfy all of the requirements for ADS-B services in all airspace; and b) ICAO continue development of technical standards for ADS-B link technologies, including SSR Mode S extended squitter, VDL Mode 4 and UAT, with special attention being paid to ICAO ADS B operational requirements, frequency spectrum availability and aircraft integration issues.	Ongoing. Standards have been developed for ADS-B data link technologies and published in the relevant annexes.

Item #	Recommendation	Action taken
7/3	Evolutionary approach for global interoperability of air-ground communications That States: a) continue the use of currently implemented ICAO standardized systems for VHF band voice and data communications until such time as either saturation of the VHF band is approached or significant cost/benefit or safety advantages are expected from the implementation of other ICAO Standards; b) continue efforts in maximizing efficient use of existing aeronautical spectrum allocations through spectrum management measures c) continue the progressive deployment of data communications on the basis of applicable ICAO Standards such as aeronautical telecommunication network (ATN) using VDL Mode 2 as dictated by evolving operational requirements with a view to complementing or replacing voice communications for most routine communications; d) provide a forecast of anticipated VHF band saturation in high-density regions; e) in view of the anticipated saturation of the VHF band for voice communication, consider transition to spectrally more efficient ICAO systems, and/or make increased use of data communications; and f) investigate multi-mode avionics as a transitional method of achieving interoperability of air/ground communications, where global harmonization has not been achieved.	Ongoing for States. States were urged to take action through State letter and PIRG meetings.

Item #	Recommendation	Action taken
7/4	Investigation of future technology alternatives for air-ground communications That ICAO: a) investigate new terrestrial and satellite-based technologies, on the basis of their potential for ICAO standardization for aeronautical mobile communications use, taking into account the safety-critical standards of aviation and the associated cost issues; b) continue evolutionary development of existing standardized ICAO technologies with a view to increasing their efficiency and performance; and c) assess the needs for additional aeronautical spectrum to meet requirements for increased communications capacity and new applications, and assist States in securing appropriate additional allocations by the ITU.	ICAO ACP is progressing with this work in a), b) and c) which is slated for completion by 2018 in Annex 10, Volumes III and V and supporting guidance material and manuals.

Item #	Recommendation	Action taken
7/5	Standardization of aeronautical communication systems That, for new aeronautical communication systems, ICAO: a) continue to monitor emerging communication systems technologies but undertake standardization work only when the systems meet all of the following conditions: 1) can meet current and emerging ICAO ATM requirements; 2) are technically proven and offer proven operational benefits; 3) are consistent with the requirements for safety; 4) are cost-beneficial; 5) can be implemented without prejudice to global harmonization of the CNS/ATM systems; and 6) are consistent with the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750) b) include in Annex 10 provisions ensuring that the introduction of mandatory carriage of new equipment be based only on appropriate ICAO regional and interregional coordination; and c) further limit SARPs for complex aeronautical systems to broad, system level, functional and performance requirements and better capitalize on the work of other standard making organizations so as to reduce the complexity/size of technical provisions.	Completed. SATCOM Voice Guidance Manual published in 2012.