International Civil Aviation Organization

Communication Navigation and Surveillance Sub-Group (CNS SG)

Fourth Meeting
(Cairo, Egypt, 25 – 27 September 2011)

Agenda Item 5: Developments in CNS

GLOBAL AIRNAVIGATION INDUSTRY SYMPOSIUM (GANIS) AND TWELFTH AIR NAVIGATION CONFERENCE (AN-CONF/12)

(Presented by the Secretariat)

SUMMARY

This paper provides information on Global Air Navigation Industry Symposium (GANIS) scheduled for 20 to 23 September 2011 in Montreal and Twelfth Air Navigation Conference (AN-Conf/12) proposed for 19 to 30 November 2012 in Montreal.

Action by the meeting is in Paragraph 2.

1. INTRODUCTION

1.1 ICAO is organizing Global Air Navigation Industry Symposium (GANIS) which is scheduled for 20 to 23 September 2011 in Montreal and Twelfth Air Navigation Conference (AN-Conf/12) is proposed for 19 to 30 November 2012 in Montreal.

1.2 Alongside the GANIS three-day Symposium will be an industry exhibition/workshop of current and emerging technologies. ICAO is organizing this event in an effort to facilitate greater integration and harmonization of air navigation system improvement programmes of States and service providers. The Symposium, while emphasizing the need for global harmonization, will identify ways and means to ensure interoperability, to maximize utilization of available and emerging technologies and to support an ongoing global discussion.

1.3 ICAO has developed an approach to achieve this objective in the form of a series of "aviation system block upgrades" (ASBU), which will be introduced at the symposium. The "block" upgrades are based on clearly identified operational improvements; however, this new approach to improvements also includes the associated procedures for both air and ground to support the block upgrade, the identification of required technologies, the regulatory requirements and approvals process, evaluation of the business case and the carrying out of validation.

1.4 Details on this event are given in ICAO State letter Ref.: AN 7/59-11/15 dated 25 March 2011 which is provided in the **Attachment 1** to this paper for easy reference. All further information related to the Symposium, including agenda/programme, general information, registration fees and procedures, and hotels and rate will soon be available on the Symposium website at http://www.icao.int/ganis.

1.5 The Air Navigation Commission, at the fifth meeting of its 185th Session on 1 December 2010, agreed that Contracting States and appropriate International Organizations be consulted on the convening of an air navigation conference to discuss subjects related to air navigation systems. This Conference to be held in Montréal from 19 to 30 November 2012, will address the aviation system block upgrades that will be introduced to the international community at the GANIS in September 2011 and will consider the communication, navigation, surveillance and avionics roadmaps for the Global Air Navigation Plan.

1.6 The purpose of the AN-Conf/12 is to gain consensus, obtain commitments and formulate recommendations to achieve a harmonized global air navigation system for international civil aviation. The objective is to optimize the opportunities in technology and maturing work programmes toward common global objectives. Special consideration would be given to utilization of existing capacity of enabling systems and planning for their expansion, taking into consideration user requirements.

1.7 The theme of the AN-Conf/12 is ONE SKY – *To achieve an integrated global ATM system in a progressive, cost-effective and cooperative manner*: The One Sky concept revolves around conceiving the notion globally, developing the implementation plans regionally, and implementing the infrastructure locally. It addresses international traffic flows from end to end with the purpose of increasing overall capacity, efficiency and improving safety, while also reducing the impact on the environment. The One Sky high-level global architecture should enable the digital environment, integrate aerodromes with a block-to-block strategy, facilitate trajectory-based ATM and support performance-based technologies.

1.8 An initial list of subjects, focusing on harmonization and efficiency leading to operational improvements, has been prepared which might be considered by the AN-Conf/12. Details on the proposal are given in ICAO State letter Ref.: ST 13/1-11/10 dated 31 March 2011 with a tentative list of subjects for inclusion in the Twelfth Air Navigation Conference (2012) agenda, background information on the origin and purpose of the subjects and a questionnaire on subjects for discussion by the Twelfth Air Navigation Conference. The State Letter reproduced at **Appendix A** to this information paper.

2. ACTION BY THE MEETING

2.1 Note the information in this information paper and its Appendix.

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Tel.: +1 514-954-6711

Ref.: ST 13/1-11/10

31 March 2011

Subject: Proposed Twelfth Air Navigation Conference

Action required: Comments to reach Montreal by 30 June 2011

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, at the fifth meeting of its 185th Session on 1 December 2010, agreed that Contracting States and appropriate international organizations be consulted on the convening of the Twelfth Air Navigation Conference (AN-Conf/12) to discuss subjects related to air navigation systems. The details of the proposed AN-Conf/12 are elaborated in Attachment A.

2. The AN-Conf/12 will address the aviation system block upgrades that will be introduced to the international community at the Global Air Navigation Industry Symposium (GANIS), see State letter AN 7/59-11/15, in September 2011 and will consider the communication, navigation, surveillance and avionics roadmaps for the Global Air Navigation Plan.

3. Focusing on harmonization and efficiency leading to operational improvements, an initial list of subjects has been prepared which might be considered by the AN-Conf/12 in 2012. This list is reproduced in Attachment B and background information on the origin and purpose of the subjects is contained in Attachment C. To facilitate the preparation of your reply, its subsequent consolidation with other replies and their analysis and prioritization by the Commission, it is suggested that you complete the questionnaire in Attachment D, amplified, as necessary, by narrative comments.

4. Security and environment will be addressed within the various technical committees of the AN-Conf/12 as they have an important influence on the air navigation system. Please recall, however, that the larger issues related to security and the environment are addressed in other dedicated fora and events specifically related to these fields of expertise such as the Committee for Aviation Environmental Protection (CAEP), the proposed High-level Security Conference and the Aviation Security Panel (AVSECP). There will be no specific committees addressing solely security and the environment at the AN-Conf/12, nor will the AN-Conf/12 take decisions regarding these fields but refer them to the appropriate bodies for consideration. The primary expertise required are air navigation experts in the fields of aerodromes, air routes and ground aids (AGA), aeronautical information management (AIM), air

999 University Street
Montréal, Quebec
Canada H3C 5H7

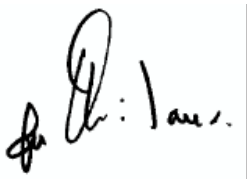
Tel.: +1 514-954-8219
Fax: +1 514-954-6077

E-mail: icaohq@icao.int
www.icao.int

traffic management (ATM), communications, navigation, and surveillance (CNS), meteorology (MET), operations (OPS) and search and rescue (SAR). The Conference would also benefit from expertise in air navigation related security and environment issues.

5. May I invite you to send the views of your Government/Organization to reach me not later than 30 June 2011 to assist the Commission with its further consideration on this matter. In light of the comments received, the Commission will consider the need for convening the Twelfth Air Navigation Conference in November 2012 and, if the need is established, will agree on an agenda, convening date, site, duration and organizational plan.

Accept, Sir/Madam, the assurances of my highest consideration.



Raymond Benjamin
Secretary General

Enclosures:

A — Details of the proposed conference
B — Tentative list of subjects for inclusion in the Twelfth Air Navigation Conference (2012) agenda
C — Background information on the origin and purpose of the subjects
D — Questionnaire on subjects for discussion by the Twelfth Air Navigation Conference (2012)

ATTACHMENT A to State letter ST 13/1-11/10

DETAILS OF THE PROPOSED CONFERENCE

1. NEED FOR THE CONFERENCE

1.1 *Developments in air navigation systems*: The last air navigation conference (AN-Conf/11) was held in 2003. The main outcomes of that conference included the endorsement of a Global Air Traffic Management Operational Concept (operational concept), the establishment of the Global Air Navigation Plan (GANP) and the initiation of the performance-based planning framework. Further to AN-Conf/11, a number of important developments took place offering many opportunities to integrate global activities and work toward harmonized global air navigation system architecture. Many of these evolving technical work programmes reached maturity in an independent manner and, therefore, it would be advantageous to integrate and provide greater focus to the many implementation programmes towards globally harmonized objectives.

1.2 *Purpose*: The purpose of the AN-Conf/12 is to gain consensus, obtain commitments and formulate recommendations to achieve a harmonized global air navigation system for international civil aviation. The objective is to optimize the opportunities in technology and maturing work programmes toward common global objectives. The Conference will consider proposed aviation system block upgrades and the communications, navigation, surveillance and avionics roadmaps of the Global Air Navigation Plan. The Conference would also provide stakeholders with an opportunity to coalesce around major themes, set priorities and refine the way forward based on lessons learned. Special consideration would be given to utilization of existing capacity of enabling systems and planning for their expansion, taking into consideration user requirements.

2. THEME OF THE CONFERENCE: ONE SKY

2.1 *Vision – To achieve an integrated global ATM system in a progressive, cost-effective and cooperative manner*: As the air navigation system gains maturity, ICAO continues to address the challenge of the integration, interoperability and harmonization of the systems leading to the concept of "One Sky" for international civil aviation. The One Sky concept revolves around conceiving the notion globally, developing the implementation plans regionally, and implementing the infrastructure locally. It addresses international traffic flows from end to end with the purpose of increasing overall capacity, efficiency and improving safety, while also reducing the impact on the environment. The One Sky high-level global architecture should enable the digital environment, integrate aerodromes with a block-to-block strategy, facilitate trajectory-based ATM and support performance-based technologies.

2.2 *Application*: It is envisioned that the streams for discussion at the Conference will be presented as proposed operational improvements for international civil aviation rather than as aviation disciplines. Elements such as security and the environment can then be addressed within the context of air navigation. It is expected that operational improvements will be outlined in logical stepwise block upgrades that at a minimum: identify the operational benefit; determine the necessary procedures; nominate the required technology; develop the business case; and propose a preliminary strategy for regulatory approval.

3. EXPECTATIONS OF THE CONFERENCE

3.1 *Expectations*: The Conference is a formal ICAO meeting that provides opportunity to work together toward establishment of a global strategy for air navigation planning and implementation. Furthermore, it would set priorities, coalesce around major operational objectives to bring the global aviation community into agreement on an agenda to drive the next ten years of air navigation planning and implementation. It would allow ICAO to plan work programmes of panels and PIRGs toward finalization of operational improvements objectives and provide a stimulus to air navigation planning and implementation.

4. TIMING AND ORGANIZATION OF THE CONFERENCE

4.1 *Timing, organization and expertise required*: As the Conference would deal with all of the air navigation operational and infrastructure elements: AGA, AIM, ATM, CNS, MET, OPS and SAR, as well as relevant environmental and security aspects, it will probably need to meet in several committees dealing with specific operational improvements. Consequently, it is estimated that the Conference would require ten working days. Based on the foregoing, it is proposed that the Twelfth Air Navigation Conference be convened in Montréal in November 2012.

— — — — — — — —

ATTACHMENT B to State letter ST 13/1-11/10

TENTATIVE LIST OF SUBJECTS FOR INCLUSION IN THE TWELFTH AIR NAVIGATION CONFERENCE (2012) AGENDA

1. **Strategic Issues**

   a. Aviation system block upgrades
   b. Safety – Maintaining or increasing safety of Global ATM system
   c. Efficiency – Performance framework for global planning on the basis of the Global Plan and online format of regional plans
   d. Environment –Minimizing impacts through ATM operational efficiencies and measuring improvements
   e. Security – Ensuring continuity and efficiency of ATS
   f. Civil/military cooperation

Disciplines: AGA, AIM, ATM, CNS, MET, OPS

2. **Enablers**

   a. Availability of frequency spectrum for aeronautical use
   b. Data-driven environment
   c. System-wide information management (SWIM)
   d. Satellite services for aeronautical use
   e. Communication roadmap
   f. Navigation roadmap
   g. Surveillance roadmap
   h. Avionics roadmap
   i. AIM roadmap
   j. Meteorological information for aeronautical use

Disciplines: AGA, AIM, CNS, MET, OPS

3. **ATM & flight operations**

   a. Airspace organization and management
   b. Air traffic services
   c. Demand and capacity balancing
   d. Search and rescue
   e. Aerodrome operations
   f. Performance-based navigation

Disciplines: AGA, ATM, OPS, SAR

4. **Institutional issues**

   a. Multidisciplinary working methodologies

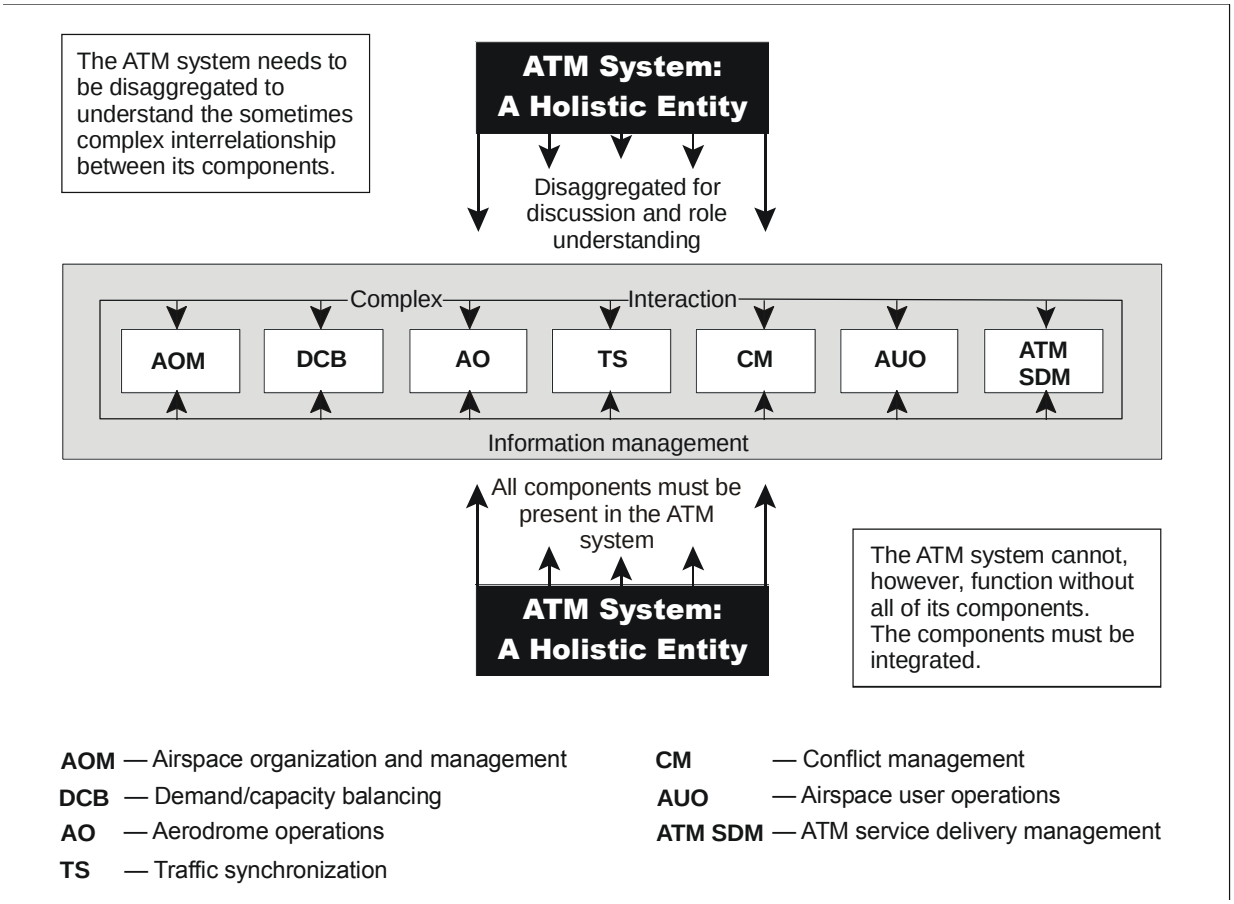
— — — — — — — —

ATTACHMENT C to State letter ST 13/1-11/10

Background information on the origin and purpose of the subjects

1. DEVELOPMENTS IN AIR NAVIGATION SYSTEMS – CONCEPT COMPONENTS

1.1 *Introduction.* The operational concept defines seven interdependent concept components that will be integrated to form the future air traffic management (ATM) system. They comprise airspace organization and management, aerodrome operations, demand and capacity balancing, traffic synchronization, conflict management, airspace user operations, and ATM service delivery management. The order of these components implies no priority. The management, utilization and transmission of data and information are vital to the proper functioning of these components. The air navigation system will be based on the provision of integrated services. The figure below depicts the interrelationship of the system components and their convergence into a single system.



1.2 *Operational Improvement – Balance and optimize user preferred trajectories: Project – Development of flight and flow information for a collaborative environment (FF-ICE) concept.* The FF-ICE supports all the ATM Operational Concept components requiring flight information and refines the Global ATM Operational Concept document in the area of flight information management. It constitutes the necessary basis for the most advanced ATM systems and the development of four dimensional (4D) trajectory management. While it is recognized that the transition to FF-ICE will involve significant operational and financial considerations, there would also be consequences associated with inaction or delay. With significant growth projected in air transportation, it is necessary for early and orderly transition in order to reap the benefits of the operational concept as soon as possible. The

Conference will be presented with a draft version of the FF-ICE concept and be requested to agree upon next steps and to make recommendations to support its ongoing development and implementation.

1.3 *Performance-based approach to planning and implementation.* Members of the ATM community will have differing performance demands of the system. All will have either an explicit or implicit expectation of safety. Some will have explicit economic expectations, others efficiency and predictability. For optimum system performance, each of these sometimes competing expectations will need to be balanced. Furthermore, explicit safety outcomes will need to be met and demonstrated. The operational concept outlines a total system performance framework, including a system safety approach that will support both the "end-state" concept and the various evolutions to that end-state. Following the adoption of a performance-based approach to air navigation planning and implementation by regions and States, the next step entails performance monitoring through an established measurement strategy. This strategy should provide a set of measures in terms of performance indicators and performance metrics.

1.3.1 *Operational Improvement – Enhance efficiency of air navigation planning and implementation: Project – Revision to Global Plan.* To facilitate a uniform approach toward interoperability and air navigation systems development and, at the same time, help to ensure that benefits rather than penalties will be had by all stakeholders, it is necessary to strengthen and modify the ICAO planning framework so that it provides optimum benefits at the most appropriate level within the larger global framework. Taking into account these developments, GANP will be revised and *the Conference will be requested to endorse the revised GANP and modified planning framework; to recognize GANP as the central global planning document and its evolving role in the global planning process, to provide further guidance to PIRGs/States in this respect and to commit to use GANP as the basis for air navigation systems implementation programmes. Also, the Conference will be apprised of ICAO efforts for transition from paper-based regional air navigation plans to web-based electronic versions.*

2. AIRSPACE ORGANIZATION AND MANAGEMENT

2.1 Airspace organization will dynamically establish flexible airspace structures to accommodate the different types of air activity, volume of traffic and differing levels of service. Airspace management is the process by which airspace options are selected and applied to meet the needs of the ATM community.

2.2 Airspace will ideally be organized and managed in such a way as to facilitate the use of full self-separation and autonomous flight, unless safety or efficiency assessment requires the provision of separation services. This must be achieved in conjunction with, or in anticipation of, demand and capacity balancing techniques to ensure that the potential for aircraft-to-hazard conflict is reduced to a level where it is expected that such self-separation can be conducted to an accepted level of safety.

2.2.1 *Operational Improvement – Enhance airspace capacity and efficiency: Project – Flexible use of airspace.* One of the key conditions for increasing the effective use of available airspace, while maintaining safety and security, is a commitment from both civil and military authorities to improve cooperation and coordination. The Global Air Traffic Management Forum on Civil/Military Cooperation (Montréal, 19 to 21 October 2009) emphasized that a flexible and efficient use of the airspace for both civil and military operations would provide benefits in terms of more efficient aircraft operations and improvement of the environment. Civil/military cooperation was also addressed at the 37th Session of the ICAO Assembly to ensure the momentum gained at the Forum was strengthened at high levels within States' administrations and international organizations. Assembly Resolution A37-15, Appendix O, Cooperation and coordination of civil and military air traffic, was also agreed to by the Assembly and is aimed at strengthening States' commitment to enhancing cooperation between civil and military authorities. A campaign of regional seminar/workshops in civil/military cooperation will be conducted to

create the awareness and conditions to improve this cooperation among civil/military authorities with the aim to create the conditions for better use of the airspace. *The Conference will be presented with proposed provisions to improve the flexible use of airspace.*

3. AERODROME OPERATIONS

3.1 As an integral part of the ATM system, the aerodrome operator must provide the needed ground infrastructure and services including, inter alia, visual aids for navigation, aprons, taxiways, runways, surface movement guidance and control systems, rescue and fire fighting, and apron management services to improve safety and maximize aerodrome capacity in all-weather conditions. The ATM system will enable the efficient use of the capacity of the aerodrome airside infrastructure.

3.2 The ATM environment will become increasingly integrated as surface movement decision support systems provide real-time data to the ATM environment-wide information system. Conflict management on the airport surface will benefit from increased information which will improve situational awareness, support taxi planning and improve ramp management to match surface movement with the departure and arrival phases of flight.

3.2.1 *Operational Improvement – Enhance aerodrome safety: Project – Runway safety programme.* Data indicates that runway-related accidents and serious incidents continue to be a serious safety concern. While runway incursions (RI) remain a significant problem, runway excursions (RE) are shown to greatly exceed all other occurrence categories in the ICAO Accident/Incident Data Reporting (ADREP) system. To address these issues, ICAO has embarked upon a runway safety programme. As part of the programme, ICAO is developing new aerodrome provisions to realize the benefits that new systems and technologies could bring. Also, ICAO is working with the International Air Transport Association (IATA) and other industry partners to develop a RE risk reduction toolkit. The Conference will be briefed on the current and expected future efforts of the ICAO Runway Safety Programme that includes, among others, provisions for a global reporting format for runway surface conditions using common taxonomies, technological solutions to RI, the convening of a global runway safety symposium from 24 to 26 May 2011 and several regional events in follow-up to the symposium.

3.2.2 *Operational Improvement – Enhance aerodrome operational management: Project – Development of PANS-Aerodrome.* Considering that Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations* is mainly used as a design document and does not sufficiently address aerodrome operational management, ICAO has initiated the task of developing a PANS-Aerodromes document. This PANS-Aerodromes document will be complementary to Annex 14, Volume I and will provide operational practices that are beyond the scope of the Standards and Recommended Practices (SARPs) but with respect to which a measure of international uniformity is desirable. *It is envisaged that the Conference will endorse the PANS-Aerodromes which will be ready by the time of the Conference.*

4. DEMAND AND CAPACITY BALANCING

4.1 Demand and capacity balancing actions aimed at ensuring safety, equity and access will be a collaborative decision-making process in which the collection, collation and analysis of data to produce an accurate picture of the demands and constraints that will affect any particular airspace volume will begin long before the day of operations. Through the use of system-wide information management (SWIM) this collaborative process will allow for the efficient management of the air traffic flow.

4.1.1 *Operational Improvement – Enhance efficiency of air traffic flow management: Project – Development of information concept.* As a key enabler of a global air navigation system that will see a

higher degree of interoperability, *the Conference will be requested to endorse an information concept* that will provide for a greater exchange and integration of information across multiple domains. This will be articulated through concepts of operations involving AIM and MET elements integrated with the FF-ICE concept in order to address ATM requirements.

4.1.2 *Operational Improvement – Enhance efficiency of air traffic flow management: Project – Development of collaborative decision-making (CDM) concept.* Collaborative decision-making is defined as an explicit supporting process in pursuit of articulated objectives between two or more community members. Through this process, community members affected (in all ways) in a decision, share information related to that decision and agree on and apply a decision-making approach and principles. The overall objective of the process is to maximize performance for community members and/or the ATM system as a whole. *The Conference will be presented with draft version of CDM concepts, to agree upon next steps and to make recommendations to support their ongoing development and implementation.*

5. TRAFFIC SYNCHRONIZATION

5.1 Traffic synchronization refers to the tactical establishment and maintenance of a safe, orderly and efficient flow of air traffic. Traffic synchronization, conflict management and demand and capacity balancing are interrelated and will become fully integrated, leading to a continuous and organized flow of traffic. No specific projects are envisaged under this component.

6. AIRSPACE USER OPERATIONS

6.1 The airspace user operations concept recognizes the mutual interrelationship between aircraft design and ATM performance. The ATM system will be designed to accommodate a wide variety of mission requirements, including a wide range of aircraft types and performance. Some efficiency in the ATM system can best be achieved through aircraft design, as indicated by system-wide safety and business cases.

6.1.1 *Operational Improvement – Enhance safety and efficiency of flight operations: Project – Airspace concept development supported by performance-based navigation (PBN).* Implementation of PBN is fundamental to allow the development of an efficient airspace concept, making the best use of the CNS/ATM infrastructure. Nevertheless, transition from a sensor-based to performance-based navigation has been facing some barriers, the lack of a harmonized regulatory framework being the main one. The ICAO Secretariat is updating the *Performance-based Navigation (PBN) Manual* (Doc 9613) and related provisions to encompass the adequate regulatory framework material. *The Conference will be requested to endorse ongoing development of required SARPs and guidance material.*

6.1.2 *Operational Improvement – Enhance safety and efficiency of flight operations: Project – Development of framework for operations of unmanned aircraft systems (UAS).* On-going tasks of the UAS Study Group include harmonization of terms and development of the SARPs, Procedures for Air Navigation Services (PANS) and guidance material needed for the integration of remotely-piloted UAS into non-segregated airspace and at aerodromes. States are seeking guidance on issuance of operating certificates, registration, licensing and other regulatory issues. The study group has been assisting the Secretariat in developing the regulatory framework and in coordinating global bandwidth and frequency spectrum requirements, necessary to support a safe, secure and efficient integration of UAS into non-segregated airspace. Close coordination with standards-making organizations facilitates development of performance-based SARPs, ensuring safety and uniformity in international airspace as contained in the Unmanned Aircraft Systems (UAS) (Cir 328). *The Conference will be requested to review the guidance material and any other work which reaches maturity by the time of the Conference, agree upon next steps*

and to make recommendations in support of the ongoing work for the operation of UAS in non-segregated airspace.

6.1.3 *Operational Improvement – Increase the use of data link applications: Project – Development of data link applications.* Tasks of the Operational Data Link Panel (OPLINKP) include the development of SARPs, procedures and guidance material for existing data link implementations as well as paving the way for future equipage. They are also tasked with the development of amendments, where necessary, on the subjects of SATCOM voice, ATS interfacility data communications (AIDC) and required communication performance (RCP). This performance-based development process is expected to incorporate a global communications harmonization plan incorporating a convergence strategy, a high level roadmap, guidance for operational improvement blocks, and performance metrics. In the context of the panel supporting global implementation, the panel will also consider the feasibility of a global issues/resolution database for State and regional implementations of data link operations and associated procedures, as well as facilitating interregional exchange of information. *The Conference will be requested to review that part of the panel work which reaches maturity by the time of the Conference, agree upon the next steps and make recommendations in support of the ongoing work to facilitate data link implementation as part of the global ATM system.*

7. CONFLICT MANAGEMENT

7.1 Conflict management will consist of three layers: strategic conflict management through airspace organization and management, demand and capacity balancing, and traffic synchronization; separation provision; and collision avoidance. No specific projects are envisaged under this component.

8. ATM SERVICE DELIVERY MANAGEMENT

8.1 The ATM service delivery management (SDM) component will address the balance and consolidation of the decisions of the various ATM components and their related processes and services, as well as the time horizon at which, and the conditions under which, these decisions are made.

8.2 SDM will be composed of three main functions which are executed in a collaborative manner: ATM performance management; ATM services management; and ATM assets management. It will manage the optimized performance of the ATM system.

8.3 SDM will manage, plan and coordinate the provision of ATM services. Services to be delivered will be established on an as-required basis subject to ATM system design. Once established they will be provided on an on-request basis.

8.4 SDM will manage, plan, monitor and coordinate all the assets required for the provision of the ATM services. These assets will cover the need for airspace as well as the need for and usage of human assets and airborne, space- or ground-based infrastructure. Airspace is considered an asset subject to planning and management. No specific projects are envisaged under this component.

8.4.1 *Operational Improvement – Balance and optimize user-preferred trajectories: Project – Development of communications, navigation and surveillance (CNS) global roadmap.* CNS technologies serve to support ATM operations and form one of the core elements of the global air navigation systems architecture described above. There has been a proliferation of technologies over the years and a degree of divergence has become apparent. Because of the large scale and complexity of some ATM operational improvement programmes, and considering the interoperability mandate, the need to avoid penalizing other stakeholders, and a desire to ensure that benefits are widespread, ICAO has been developing a CNS

global roadmap that will assist States and other stakeholders with their implementation decisions. *The Conference will be requested to endorse the CNS global roadmap.*

8.4.2 *Operational Improvement – Balance and optimize user-preferred trajectories: Project – Development of communication systems.* Airport surface communications data link systems based on internet protocol (IP) are planned for 2014. Additionally, future satellite systems for aeronautical telecommunications will be IP based. VHF data link, on the other hand, has no choice but to continue to be based on open systems interconnection (OSI) until late in this decade. This system will be used in parallel with various IP-based communications links. In terms of air-ground voice communications, the new system, termed the future communications infrastructure (FCI), is being developed jointly within the SESAR and NextGen programmes. The FCI will be a system of systems, facilitating both terrestrial and satellite communications within the same box. *The Conference will be requested to endorse ongoing development of required SARPs and guidance material.*

8.4.3 *Operational Improvement – Balance and optimize user-preferred trajectories: Project – Development of navigation systems.* Navigation developments in recent years have been characterized by the increasingly central role of the global navigation satellite system (GNSS) in modern aircraft navigation as the key enabler for performance-based navigation. Modern avionics typically support the use of global positioning systems (GPS) and its augmentations (predominantly aircraft-based augmentation but increasingly also satellite- and ground-based augmentation), potentially in all phases of flight. More satellite constellations are in place or being developed (GLONASS, Galileo and COMPASS). The current widespread use of GNSS creates opportunities for rationalization of the current conventional navigation infrastructure, but also reinforces the need for a careful analysis of the intrinsic vulnerabilities of the system. With the introduction of new constellations and signals, the extent of ICAO standardization that will be required to maximize the benefit of multi-constellation operations for aviation will need to be determined in order to help industry meet the challenges that will be faced in avionics development and integration. *The Conference will be requested to review the issues associated with the ongoing global introduction of GNSS operations and technology developments and endorse ongoing development of required SARPs and guidance material.*

8.4.4 *Operational Improvement – Balance and optimize user-preferred trajectories: Project – Development of surveillance systems.* Multimode surveillance is emerging as a surveillance strategy and a key technology enabler. Multimode elements include radar, automatic dependent surveillance — broadcast (ADS-B) and multilateration. There are various applications which may take advantage of the different modes of surveillance depending on several factors. *The Conference will be requested to endorse ongoing development of required SARPs and guidance material.*

9. INFORMATION MANAGEMENT

9.1 While information is not articulated as one of the seven concept components, it is nevertheless, a thread that runs through all of them. When considering a global air navigation system and architecture, information can be considered as the glue that binds all of the other elements together. The cohesion and linkage between the processes and services that will deliver the evolving system capabilities is highly dependent on the provision of accredited, quality-assured and timely information. In particular, key operational enablers such as collaborative decision-making and dynamic management of resources and capabilities will require information sharing mechanisms among ATM community members and across information domains.

9.1.1 *Operational Improvement – Enhance safety and efficiency of flight operation: Project – Develop global AIM requirements.* The transition from traditional publication-focused aeronautical information service (AIS) to information-centric aeronautical information management (AIM) is already

underway. There is, however, a need to ensure that the capabilities and transitions occurring globally result in a harmonized and increasingly interoperable information system capable of delivering the necessary data and information describing the air navigation services (ANS) infrastructure to a diverse group of users. In this connection, the Conference will review an AIM operational concept which will outline the scope of AIM and define its relationship with the other concept components. With regard to annexes and PANS, the Conference will review an outline containing the reorganization of the provisions in Annexes 4 — *Aeronautical Charts* and 15 — *Aeronautical Information Services*. Furthermore, the Conference should discuss and make recommendations to provide direction with respect to the need for new proposed PANS-AIM and PANS-MET. High-level SARPs that have been completed with particular emphasis on those that will enable net-centric information exchange will be presented for endorsement for further circulation to States and international organizations. The endorsement of this work will be a crucial outcome to enable the completion of the restructured annexes and PANS to be presented at the MET/AIM Divisional Meeting to be held in 2014 conjointly with the World Meteorological Organization (WMO) and the Commission for Aeronautical Meteorology (CAeM). *The Conference will be requested to endorse ongoing development of required SARPs and guidance material.*

9.1.2 *Operational Improvement – Enhance safety and efficiency of flight operation: Project – Develop requirements for system-wide information management.* The ATM improvements and modernization efforts will rely on the exchange of vast amounts of information in real time, across a wide array of entities. The CNS elements support both ATM and information requirements. Information across the ATM system will be acquired, aggregated, pooled and shared across multiple information domains including: ATM, surveillance, FF-ICE and MET information. Developing a cohesive strategy for global interoperability across and within these domains is crucial to the goal that the evolving ATM system can be assured of timely and quality-assured information and data.

— — — — — — — — —

ATTACHMENT D to State letter ST 13/1-11/10

QUESTIONNAIRE ON SUBJECTS FOR DISCUSSION BY THE AIR NAVIGATION CONFERENCE (2012)

State/Organization _____

1. Maturity of subjects

Subjects as per Attachment B	**Questions**								**Remarks**
	a) mature and requiring resolution		**b) priority for consideration**				**c) intend to contribute documentation**		
Subjects	Yes	No	Essential	Desirable	Useful	Exchange of views	Yes	No	
1. Global Air Navigation Plan									
2. Frequency spectrum for aeronautical use									
3. Information management concept (SWIM)									
4. Satellite services for aeronautical use									
5. Communication, navigation, surveillance roadmaps									
6. Avionics roadmap									
7. Aeronautical information management roadmap									
8. Meteorological information for aeronautical use									
9. Performance-based navigation									
10.Search and rescue									

2. Additional subjects proposed

a) Description of the subject

b) Proposal for action to be taken by the conference

c) Justification supporting its inclusion in the agenda

3. Need for the conference

In view of the foregoing, is there a need for an air navigation conference in November 2012?

Yes ☐ No ☐

— END —