

ELEVENTH AIR NAVIGATION CONFERENCE

Montreal, 22 September to 3 October 2003

**REPORT OF COMMITTEE A TO THE CONFERENCE
ON AGENDA ITEM 2**

The attached report has been approved by Committee A for submission to the Plenary.

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Chairman
Committee A

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

2.1 INTRODUCTION

2.1.1 Under this agenda item, the meeting addressed the issues identified in the air traffic management (ATM) operational concept relating to safety management, the existing ICAO provisions for safety management in air traffic services (ATS), certification of ATS service providers, safety regulation, the ICAO Global Aviation Safety Plan (GASP) and safety and security of the ATS infrastructure.

2.2 SAFETY MANAGEMENT SYSTEMS AND PROGRAMMES

A global framework for safety

2.2.1 The ATM operational concept presented under Agenda Item 1 established a strong link between the key concepts of performance and safety, and identified safety performance as the most important performance indicator for the ATM system. The operational concept also identified the need for a system safety approach, i.e. an integrated, system-wide approach to safety.

2.2.2 Noting that there was already a significant degree of interdependence between ground-based and airborne components in current air traffic management systems, and that it was expected that this interdependence would become even more significant in future systems, the meeting agreed that the adoption of a uniform approach to safety management, as proposed in the operational concept, would be beneficial, and should be studied further.

2.2.3 The meeting recalled that safety management provisions for aerodromes had already been introduced in Annex 14, and was advised that harmonization of the guidance material on safety management for air traffic services and aerodromes was envisaged.

2.2.4 The adoption of a system safety approach would require that each element of the system be the subject of a safety analysis as an individual element, and as a component which interacts with others as part of a larger system. The meeting noted that the operational concept provided the following definition:

System safety approach. A systematic and explicit approach defining all activities and resources (people, organizations, policies, procedures, time spans, milestones, etc.) devoted to the management of safety. This approach starts before the fact, is documented, planned and explicitly supported by documented organizational policies and procedures endorsed by the highest executive levels. The system safety approach uses systems theory, systems engineering and management tools to manage risk formally, in an integrated manner across all organizational levels, across all disciplines and all system life cycle phases.

2.2.5 The meeting was advised that ICAO had established GASP as a means of coordinating the many safety initiatives underway worldwide, and that this was not a separate activity in its own right; rather, it was a mechanism which allowed consolidated reporting on safety-related activities, and presented an overview of all safety-related activities in one document. Further information on GASP would be provided under Agenda Item 2.4.

2.2.6 The meeting noted that, while existing mechanisms within ICAO provided for consolidated reporting of safety-related activities, there were, as yet, no provisions requiring a uniform approach to the management of safety. In order to achieve a uniform approach, the operational concept had proposed the establishment of a global framework for the assessment and management of safety. The meeting noted that this was in accordance with the objectives of Assembly Resolution A33-16: ICAO Global Aviation Safety Plan (GASP) and supported the need for such a framework.

2.2.7 The operational concept indicated that the global framework for safety management should address issues such as:

- a) harmonization of safety indicators to be used across the aviation system, with particular emphasis on the development of predictive or “leading” indicators in addition to those which express the achieved level of safety;
- b) the setting of safety targets for the system as a whole;
- c) guidelines for determining the acceptable level of safety for system components and appropriate metrics for expressing this;
- d) guidelines concerning the way in which accountability for safety should be addressed within an organization and the need for documentation of safety-related decisions;
- e) suitable mechanisms for monitoring of safety indicators and ensuring that there are formal feedback learning/control loops, such as the universal safety oversight audit programme (USOAP), to ensure that mitigation measures are implemented in areas where safety concerns are identified; and
- f) the importance of all organizations developing a positive safety culture, recognizing that accidents result not just from the mere coincidental occurrence of multiple undefended failures, but also from the migration of organizations toward unsafe behaviour.

2.2.8 The meeting recalled that the operational concept had proposed the adoption of a holistic approach (i.e. an approach which considered the “whole made of interacting parts”) which, it stated, was considered by many safety authorities to be the most effective and efficient approach to the management of safety. The meeting agreed that the adoption by ICAO of a uniform safety framework, as proposed in the system safety approach, would significantly enhance the effectiveness of the safety management process.

2.2.9 It was noted that a “system”, under this concept, was composed of people, procedures, technologies and information interacting to perform a task. The elements of the total system extended beyond

the scope of any one Annex. Factors related to, *inter alia*, meteorology, aeronautical charts, aircraft operations, airworthiness, aeronautical information and the transport of dangerous goods could have an impact on total system safety. It was recognized that it may therefore be necessary to broaden the current ICAO requirement for safety management to additional Annexes.

2.2.10 The meeting expressed strong support for the system safety approach, and the need to ensure a harmonized approach to safety management across the whole aviation system. It also emphasized the importance of ensuring that the safety management principles and practices embodied in this approach were actually adopted, and became an integral part of the on-going operations of the organizations concerned, since a safety management system which existed only on paper would do nothing to enhance safety.

2.2.11 After consideration of the foregoing, the meeting agreed to the following recommendation:

Recommendation 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).

Requirements for ATS safety management

2.2.12 The meeting recalled that provisions for ATS safety management had already been introduced in amendments to Annex 11 and the *Procedures for Air Navigation Services — ATM* (PANS-ATM), both of which had become applicable on 1 November 2001, and that these provisions required States to implement systematic and appropriate safety management programmes to ensure that their ATS systems achieved an acceptable level of safety, and to establish such levels of safety and safety objectives for their air traffic services by 27 November 2003.

2.2.13 The meeting noted that the PANS-ATM expressed the objectives of safety management as being to ensure that the established level of safety applicable to the provision of ATS within an airspace or at an aerodrome was met, and that safety-related enhancements were implemented wherever necessary. The provisions of the PANS-ATM required that an ATS safety management programme should include, *inter alia*:

- a) monitoring of overall safety levels and detection of any adverse trend;

- b) safety reviews of ATS units;
- c) safety assessments in respect of planned implementation of airspace re-organizations, the introduction of new equipment, systems or facilities, and new or changed ATS procedures; and
- d) a mechanism for identifying the need for safety enhancing measures.

2.2.14 The meeting was advised that, as it had been recognized that many States would require further assistance in the implementation of safety management, ICAO had developed further guidance material, to be published as the *Manual on Safety Management for Air Traffic Services*. The manual addressed the basic principles of safety management including, *inter alia*:

- a) factors affecting system safety, with a particular emphasis on human error;
- b) the importance of organizational issues, including responsibility and accountability for safety performance, and the need for a positive safety culture;
- c) the responsibilities of the State regulatory authority, and the need for separation of the safety responsibilities associated with the regulatory function, and the ATS service provision function;
- d) safety assessment procedures; and
- e) assuring the on-going safety of the system through audits and monitoring.

2.2.15 While the document was yet to undergo final editing, the latest draft version was presented to the meeting. The meeting agreed that States should be encouraged to make use of this as preliminary guidance, pending publication of the document. The meeting expressed its satisfaction with the new manual, and urged ICAO to facilitate its translation in as short a time as possible.

2.2.16 The meeting was presented with an overview of the principles of safety management. The meeting noted that implementation of a safety management system would not eliminate all risk. However, it would enable risk to be controlled and reduced to a level as low as reasonably practicable. The purpose of a safety management system was stated to be: to provide an ATM service-provider with a management tool which would ensure a systematic and pro-active approach to safety throughout the whole ATM organization.

2.2.17 A view was expressed that over-reliance on mitigating arguments, particularly those involving air traffic controllers, could have a detrimental effect on the risk management process. The meeting was advised that the procedures for the conduct of safety assessment described in the manual should ensure that this would not happen, since they required that, when mitigation measures were proposed, a further hazard analysis of the system be conducted, to assess both the effectiveness of the mitigation measures, and to ensure that any new hazards associated with the mitigation measures were identified, and the mitigation methods modified if necessary.

2.2.18 Noting the lack of knowledge on the part of many States concerning safety assessments and the setting of acceptable levels of safety, it was suggested that there would be a need to support training to enable States to introduce effective safety management systems.

2.2.19 The meeting was advised that ICAO was planning to conduct two seminars, which would address ATS safety management, in December 2003. These were to be held in Singapore and Cairo. While the main topic was to be runway safety, it had been considered this would be a good opportunity to introduce some information on general safety management issues as well. It was emphasized that these would not, however, be comprehensive seminars on safety management principles and techniques.

2.2.20 The meeting supported the need for the introduction of effective safety management programmes by all States, and agreed to the following recommendation:

Recommendation 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.

2.2.21 The meeting was then presented with an overview of the European strategy for implementation of safety management by air navigation service providers. The meeting noted that a method for the elaboration of safety cases had already been applied to a number of projects in Europe, including the introduction of the reduce vertical separation minimum above FL 290 (RVSM), and 8.33 kHz channel spacing. The presentation stressed the importance of the sharing of safety-related data, and in particular, information concerning the lessons learned from the analysis and investigation of safety occurrences among all relevant organizations. This would include regulators, air navigation service providers, and where appropriate, aircraft operators and aerodrome operators. The meeting agreed that the sharing of safety data should be encouraged at both the regional and global levels.

2.2.22 The meeting was also presented with information on the work of the European high-level group on ATM safety (AGAS), and the action plan which they had developed, entitled *One safe sky for Europe — A strategic action plan for enhanced ATM safety in a single pan-European sky*. AGAS had concluded that, if forecasts were correct and European traffic doubled by 2020, a sustainable delivery of capacity would be reliant on a sustainable investment in safety. The action plan which they developed had presented a detailed assessment of what needed to be done to improve European ATM safety in the short to medium term, and set out indicative timescales for successful completion of each action.

2.2.23 One of the issues identified by AGAS was the need for provisions and guidance for the sharing of ATM incident and accident data between States. The meeting agreed that this was a necessary activity, in order to ensure that lessons learned from the investigation of safety occurrences were made available as widely as possible. The meeting was advised that the enhanced ICAO accident and incident reporting data base (ADREP 2000) could provide one mechanism for the sharing of safety related data, it incorporated an enhanced taxonomy for the classification of incidents, with more categories relevant to ATS-related occurrences than had been contained in the original ADREP taxonomy. The meeting noted that, in Europe, a directive had already been implemented to share the data on accidents and incidents.

Recommendation 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.

2.2.24 The proposals from AGAS also included a suggestion that there was a need to consider the applicability of the minimum equipment lists (MEL) concept for ATM systems and CNS infrastructure. The meeting noted that the MEL concept was applied in the determination of the airworthiness of aircraft to manage aircraft operation under technical outages and system degradation. It was proposed that the principles used in determining aircraft MELs could also be applied to managing technical outages and system degradation in ATM ground systems.

2.2.25 The meeting was advised that the draft *Manual on Safety Management for Air Traffic Services* had addressed certain aspects of this issue. The safety assessment process described in the manual included provisions requiring that the assessment consider the effects of failures and degradations, in addition to normal operations, in order to ensure that an adequate level of safety could be maintained during periods of non-normal operations. The meeting supported the need to address these issues, and to ensure that an adequate level of safety was maintained at all times.

2.2.26 The meeting noted that the work done by AGAS could have relevance to States outside Europe, and agreed it could be a useful source of information for the development of the global framework for safety. Therefore the meeting suggested that the European States should ensure the distribution of the results of the work of AGAS to relevant ICAO bodies and other States.

2.2.27 The need to take into account future safety requirements and the impact of increases in traffic density in the initial assessment of safety requirements for new ATM systems was stressed, in order to ensure that the systems would continue to meet appropriate levels of safety. The meeting noted the comment, and the fact that the system safety approach proposed in the ATM operational concept included the need to consider safety over the whole life cycle of a system.

Human factors issues in safety management

2.2.28 The meeting discussed a number of issues concerning the role of organizational culture in achieving safety in ATM, and the concept of a *safety culture*. The meeting agreed that development of a safety culture was an important element in safety management, and noted that the role of the human had been identified in the ATM operational concept, and had also been addressed in the draft *Manual on Safety Management for Air Traffic Services* presented to the meeting.

2.2.29 The meeting noted that the outstanding safety record of international civil aviation was primarily due to three key factors:

- a) the dedication to safety by aviation organizations and their people;
- b) a continuous learning process, based on free flow of safety information; and
- c) the ability to turn errors into preventive actions.

2.2.30 The meeting recognized that information from safety monitoring and data collection systems had allowed international civil aviation to develop an understanding of errors, and was being increasingly used to develop and implement corrective actions, and proactive long-term strategies. The meeting noted that monitoring based on submission of reports of safety occurrences was an important element of such systems, and that for these to be effective, the culture of the organization must encourage staff to submit reports.

2.2.31 It was recognized that the majority of operational errors in aviation were inadvertent, and that the way in which such inadvertent operational errors were handled had an impact on the willingness of staff to submit reports of safety occurrences. In the rare situations where operational errors were the result of wilful acts, substance abuse, sabotage, violations or similar acts, disciplinary or enforcement action was appropriate and necessary. However, it was also recognized that there was a need for an enlightened understanding of inadvertent operational errors, which moved beyond a “blame culture” that singled out individuals and criminalized errors.

2.2.32 It was noted that organizational culture in many sections of the aviation industry had moved towards the concept of a “just culture” with respect to the treatment of unintentional errors. Attention had shifted from determining who made the error, to identifying the circumstances under which the error was made. The purpose was twofold: first, by understanding the circumstances, it might become possible to introduce changes that could make it less likely that similar errors would be made again (error prevention); and second, understanding the circumstances might make it possible to develop strategies to minimize the negative effect of the error (error recovery). It was further noted that safety occurrence reporting programmes were a cornerstone for identifying these circumstances.

2.2.33 The meeting noted that there had been cases in international civil aviation where information from accident and incident records, and safety monitoring and data acquisition systems, had been admitted as evidence in judicial proceedings. In some cases, this had resulted in criminal charges being brought against individuals involved in occurrences. It was noted that this could hinder the free flow of information, and thus adversely affect aviation safety.

2.2.34 The meeting recalled that issues related to the protection of sources of safety information had already been addressed within ICAO in a number of different places. These included Assembly Resolution A33-17, *Non-disclosure of certain accident and incident records*, Assembly Resolution A33-16, *ICAO Global Aviation Safety Plan (GASP)*, Annex 13 — *Aircraft Accident and Incident Investigation*, paragraphs 5.12 and 8.3, and Annex 6 — *Operation of Aircraft*, paragraph 3.2.4. It was noted, however, that giving effect to these provisions required that each State enact appropriate legislation.

2.2.35 The meeting supported the need for these issues to be addressed in the implementation of safety management systems, and agreed the following factors should be taken into account in determining an organization's policy on disciplinary action.

- a) No group or workforce should be above the law.
- b) There is a need to strike a balance between the protection of sources of safety information, with a view to enhancing the safety of civil aviation, and the public interest in the availability of evidence in judicial proceedings.
- c) Judicial proceedings related to actions by operational personnel should primarily be based on evidence other than that obtained from sources of safety information.
- d) Protection of sources of safety information is not intended to provide operational personnel with undue protection from prosecution, but to preserve the sources.

2.2.36 The meeting supported the need for further action on this issue, and agreed to the following recommendation:

Recommendation 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.

2.2.37 The meeting was advised that a further source of safety information could be found in programmes for observation of normal operations by appropriately trained observers. Programmes of this type, known as Line Operations Safety Audits (LOSA) had been implemented by a number of airlines.

2.2.38 The meeting noted that LOSA was based on the threat and error management (TEM) model, which proposed that threats and errors were an integral part of daily flight operations, and that they must be managed by the flight crews to ensure the safe outcome of flights. The TEM model provided a quantifiable framework to collect and categorize safety data. In LOSA, trained observers recorded and coded potential threats to safety, and how the threats were addressed during the flight. They also recorded and coded the errors such threats generated, and how flight crews managed these errors.

2.2.39 The meeting was informed that the Air Navigation Commission had requested that the Secretariat explore the extension of LOSA to ATS, under the activities of the Flight Safety and Human Factors Programme. However, as with other safety initiatives that originated in the airline environment, an adaptation of LOSA would be required.

2.2.40 To distinguish the ATS tool, ATS organizations involved in the development of the concept tentatively adopted the name “normal operations safety survey (NOSS)”. It was expected that NOSS would share most of the operating characteristics of LOSA, with modifications where necessary.

2.2.41 The meeting agreed that ATS organizations needed to explore all available sources of safety data when establishing their safety management programmes, and that in this regard, ATS organizations could benefit from the experience of airlines, and agreed to the following recommendation:

Recommendation 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.~~

2.2.42 The meeting also discussed a broad range of issues related to other aspects of human factors and their importance in the achievement of safety, and agreed that human factors was an important issue in the establishment of effective ATM safety management systems .

2.2.43 The discussions identified a range of human factors considerations, in addition to the issues of organizational culture addressed earlier, which could affect the safety of an ATM system. These included, *inter alia*, the interaction of human operators with automated systems, interface design, workplace issues such as lighting, temperature and noise levels, and the provision of adequate rest facilities. The meeting noted that ICAO guidance was available in *Human Factors Guidelines for Air Traffic Management (ATM) Systems* (Doc 9758), and that considerable emphasis had also been placed on human factors considerations in the draft *Manual on Safety Management for Air Traffic Services*.

2.2.44 The meeting noted that in the development of some of the options proposed in the ATM operational concept, there would be a need to clearly identify the proper allocation of tasks between air traffic controllers, pilots and automated systems.

2.2.45 The meeting recognized that there would be a need to address issues of responsibility and liability, for example, in situations where a controller would not be able to intervene if pilots or automated systems were not able to maintain separation.

2.2.46 The meeting was presented with information concerning the potential impact on safety of differing understandings of terms, definitions and phraseologies. It was noted that many languages were spoken by more than one State, and that regional differences in the meanings associated with particular words could exist between native speakers of a language who came from different countries. The meeting further

noted that the ATM Committee of the CAR/SAM Planning and Implementation Regional Group (GREPECAS) had established a Phraseology Task Force which was developing a methodology, which involved participation by aeronautical operational personnel at the end-user level, for addressing this problem. The intent was to apply the methodology to a review of the Spanish phraseology in the PANS-ATM.

2.2.47 The meeting agreed that it was essential to have a common understanding of terms, definitions and phraseologies, and expressed its support for the initiatives being taken by GREPECAS. It also supported the application of this methodology, once fully developed, to reviewing other language versions of the PANS-ATM to identify any similar problems.

Expansion of the ICAO Universal Safety Oversight Audit Programme (USOAP)

2.2.48 The meeting was presented with information on the expansion of the ICAO Universal Safety Oversight Audit Programme (USOAP) to Annexes 11, 13 and 14 as of 2004. The presentation briefly explained the historical background to the expansion of the USOAP, the status of the preparatory work and the procedures for conducting the audits. It also emphasized the need for cooperation from all Contracting States to ensure the achievement of the objectives of ICAO in respect to conducting safety oversight audits.

2.2.49 The meeting was informed that the audits would, in general terms, follow the process which had been utilized during the previous audits relating to Annex 1 — *Personnel Licensing*, Annex 6 — *Operation of Aircraft* and Annex 8 — *Airworthiness of Aircraft* and that the *Safety Oversight Manual*, Part A, *The Establishment and Management of a State's Safety Oversight System* (Doc 9734) was being amended to cover all audit areas. Additional guidance material, the *Safety Oversight Manual*, Part B — *The Development and Management of Regional Safety Oversight Systems*, was also being developed to provide guidance to Contracting States which wished to establish a common safety oversight management system. Both manuals were expected to be available by late 2003.

2.2.50 The meeting was further advised that all safety oversight-related documents would be available in electronic format and that States would be provided with the ability to access, complete and submit the SAAQ and the CC electronically. It was emphasized that the full cooperation of States for the timely completion and submission of all required documentation pertaining to the preparation, conduct and reporting of the audits will be essential for the effectiveness of the programme and the fulfilment of the mandate given to the Organization by the Assembly.

2.2.51 The meeting was informed that the long-term objective was to transform the audit programme from audits on an Annex-to-Annex basis into a systemic and comprehensive audit programme which would address the overall safety oversight management system established in States and determine its ability to ensure the effective implementation of SARPs and the critical elements of a safety oversight system.

2.3 SAFETY CERTIFICATION OF ATM SYSTEMS

2.3.1 The meeting discussed a number of issues concerning the need for certification of ATM service providers and systems, and the need for coordination and cooperation between safety regulatory authorities with regard to certification standards and procedures. The meeting recalled that certification requirements existed for aircraft and aircraft equipment. Provisions requiring certification of aerodromes had become applicable on 1 November 2001. However, there were no existing ICAO requirements for certification of ATM systems, or ATM service providers.

2.3.2 The meeting noted that a significant number of States were moving to a situation where air traffic services were provided by an organization separate from the State body responsible for the regulatory function. However, irrespective of whether or not the service provision is the responsibility of the State or a separate body, it was the State which was responsible for ensuring compliance with the provisions of ICAO Annexes. Certification had been seen, by some States, as an important element of the regulatory and oversight functions, and it was noted that a number of States had already implemented requirements for certification of ATM service providers.

2.3.3 The meeting expressed strong support for the concept of certification. It was recognized that there was more than one way in which this could be approached. Certification requirements could be introduced for ATM equipment, or for ATM service providers, or for both.

2.3.4 The meeting noted that safety of ATM system operations depended on a great number of criteria including, *inter alia*, the competency of personnel, the quality and reliability of the aeronautical data, operational procedures, navigation communications and surveillance equipment, and the interactions between these elements. It was further noted that in modern ATM systems, it was possible that ATS providers could be relying on facilities or services, such as satellite navigation and communications, which were outside the jurisdiction of the State concerned. All these factors would need to be taken into account in the development of certification criteria.

2.3.5 While recognizing that States could introduce, and in some cases had introduced, certification requirements for ATM service providers in spite of the absence of ICAO SARPs, the meeting considered that it would be preferable, in order to achieve harmonization of certification criteria, to have these specified as ICAO provisions. The meeting agreed to the following recommendation:

Recommendation 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.

2.3.6 One organization raised the need to consider air traffic electronics personnel in the overall debate on safety and certification, and to introduce licensing provisions for such personnel in Annex 1. The meeting recognized the importance of such personnel to the safety of operations, and agreed that were certification of ATS service providers to be introduced, having competent electronics staff would be one of the criteria to be considered in the certification process. However, it was pointed out that there were specific requirements to be satisfied in order to justify the inclusion of provisions requiring licensing in Annex 1, and

that competency could be assured without licensing. The meeting was of the view that the need related more to training than to licensing, and did not support the inclusion of licensing requirements. However, it did express the view that the needs related to training, qualification and competency of air traffic safety electronics personnel required further investigation.

2.4 SAFETY REGULATION

2.4.1 The meeting recognized that both the State and ATS service providers had responsibilities for the safe, regular and efficient provision of ATS. It was recalled that the responsibility of a Contracting State was implicit in its acceptance of the SARPs for the safety of air navigation to which Article 37 of the Convention on International Civil Aviation refers.

2.4.2 The ATS service provider had a responsibility for the safe provision of services, and for compliance with the laws and regulations promulgated by the State. These laws and regulations were the means by which the State implemented the provisions of the Annexes, and fulfilled its obligations under the Convention.

2.4.3 Recalling the previous discussions on certification, the meeting noted that the regulatory function should, to the extent possible, be separated from the service provision function, even where both functions were the responsibility of a single State civil aviation authority. Compliance with the regulatory provisions should be monitored by a safety oversight mechanism, to ensure that the regulatory objectives and requirements were effectively met. The methods of safety oversight should include safety regulatory approval, audit and/or inspection.

2.4.4 The meeting noted that the implementation of safety regulation would be a new task for many States, as there had not been the same emphasis on the need for a separate regulatory function in the era when the provision of ATS was generally the direct responsibility of the State civil aviation authority. The meeting also emphasized the need for the establishment of coordination mechanisms between regulators, for the purposes of harmonization of procedures and sharing of information.

2.4.5 The meeting agreed that, with the introduction of requirements for safety management, the establishment of a safety regulatory function had assumed even greater importance. While it had been noted during the discussions on safety management under Agenda Item 2.1 that the ongoing management of safety was the responsibility of the ATS service provider, it was agreed that there was a need for independent oversight of the safety management practices and safety performance of the provider.

2.4.6 The meeting was advised that one chapter of the draft *Manual on Safety Management for Air Traffic Services* had been devoted to safety regulation, and that in this chapter, the importance of the separation of the regulatory and ATS service provision functions had been emphasized.

2.4.7 The meeting noted that for a safety oversight system to be effective, it must have adequate resources. The meeting agreed that States should be encouraged to establish ATM safety oversight capabilities and procedures, and to ensure that the necessary resources to perform the task, including an adequate number of competent staff, were provided. Therefore the meeting agreed on the following recommendation:

Recommendation 2/7 — Safety oversight capabilities and procedures

That ICAO encourage States to develop ATM safety oversight capabilities and procedures.

2.4.8 The meeting agreed that, with regard to new ATM/CNS developments, there was a need to adopt a more formalized approach to the development of SARPs and Regional Supplementary Procedures with respect to their safety assessment and validation. The safety validation of new SARPs and Regional Supplementary Procedures undertaken at ICAO level should be documented as a reference for future developments and could provide the foundation for safety assessments conducted by individual States.

2.4.9 The attention of the meeting was drawn to a related problem concerning notification and publication of differences between national regulations and practices and ICAO SARPs and Procedures. Safety oversight by the safety regulatory authority would identify non-compliance by an ATS service provider with regulations and practices of the State. However, it was recognized that there were a significant number of instances of State regulations and practices being different from those specified in ICAO SARPs and PANS.

2.4.10 The meeting noted the requirements of Article 38 of the Convention concerning notification of differences to ICAO, and the requirements of Annex 15 concerning publication of differences. The meeting was informed that the existence of differences which had not been notified to ICAO or published in national AIPs was considered to be a significant safety issue by pilots operating internationally. It was recognized that the introduction of provisions requiring mandatory notification of differences for other than Standards would require an amendment to the Convention. However, the existing Standard in Annex 15 concerning this did require States to publish, in their AIPs, significant differences between national regulations and practices, and ICAO Standards, Recommended Practices and Procedures.

2.4.11 The meeting noted that a truly seamless operational environment, as envisaged in the ATM operational concept, would require that phraseologies and operating procedures did not change when crossing boundaries. Thus, while publication of differences would contribute to safety by raising pilot awareness of the differences, the long term aim should be to achieve standardization.

2.5 THE GLOBAL AVIATION SAFETY PLAN

2.5.1 The meeting was provided with information on the scope and status of the ICAO Global Aviation Safety Plan (GASP). It was noted that through GASP, ICAO was able to perform a coordinating role with respect to the various safety initiatives underway worldwide. ICAO's role within the GASP included facilitating the communication of safety-related information between governments and industry, endeavouring to ensure that the various safety programmes being undertaken worldwide were complementary rather than competitive, and ensuring that they addressed regional as well as global aviation safety concerns in a comprehensive and systematic manner.

2.5.2 The meeting recalled that the objectives of the GASP were to:

- a) reduce the number of accidents and fatalities irrespective of the volume of air traffic; and
- b) decrease worldwide accident rates, particularly in those regions where they remain high.

2.5.3 The meeting noted that GASP was not a single programme, but acted as an umbrella document for the safety-related activities of the Organization. Because aviation is a dynamic industry with constantly emerging technologies which often introduce new problems and safety challenges, it was recognized that at any given time, there could be known safety issues which had not yet been adequately addressed, and identified safety fixes that had not been widely implemented. To reflect these realities, the GASP needed to be periodically reviewed to ensure it remains relevant.

2.5.4 The meeting was advised that the Air Navigation Commission met with leaders of the aviation industry periodically. The interchange of ideas and information at these meetings helped identify emerging safety issues and possible responses thereto. These meetings also provided an opportunity for the aviation industry to review the GASP and to provide inputs towards its further development. The Air Navigation Commission also carried out a formal review of the GASP annually and updated it as required. Progress reports on the development of the GASP are also presented to regular Sessions of the Assembly.

2.5.5 The meeting noted the information on GASP, and expressed its appreciation for the fact that it had been provided, and re-affirmed, on behalf of the States and organizations represented, a commitment to GASP.

2.6 SAFETY AND SECURITY OF THE ATM INFRASTRUCTURE

2.6.1 Under this agenda item, the meeting discussed security of the aviation infrastructure, focussing particularly on response procedures for air traffic controllers in the various phases of unlawful interference.

2.6.2 The meeting was informed that ICAO had developed numerous Standards and Recommended Practices (SARPs), together with supporting guidance material, that had implications for security and that in its review of security requirements in the air navigation field, the Air Navigation Commission concluded that there was a need to ensure the development of safety and security provisions to be fully coordinated.

2.6.3 The meeting was also informed of ICAO's work on an Aviation Security Plan of Action which had the objective of strengthening aviation security. The plan, approved by the Council in June 2002, contains an air navigation programme which, *inter alia*, included a comprehensive review of the sixteen Annexes under the responsibility of the Air Navigation Bureau (ANB). The meeting was advised that during its last session of 2003, the Air Navigation Commission would undertake a review of the air navigation part of the ICAO Aviation Security Plan.

2.6.4 The meeting noted the action undertaken by ICAO on security issues in the air navigation field and expressed its strong support for the objective that the Air Navigation Commission had set out for

the harmonization of aviation safety and aviation security. The meeting therefore agreed on the following recommendation:

Recommendation 2/8 — 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.

2.6.5 Recognizing that air traffic controllers could play an important role in dissemination of critical information among other things, and that the interaction between flight crew and air traffic controllers was critical during unlawful interference events, the meeting agreed on the need for ICAO to develop in-flight emergency response procedures for air traffic controllers as a counter to the threat of unlawful interference to aircraft. This need had arisen from the realization that the international civil aviation support services system was not designed to cope with the extreme form of unlawful interference perpetrated in September 2001.

2.6.6 The meeting noted that although there were clear security-related demands on air traffic controllers specified in several ICAO documents, it could be concluded that they lacked specificity. Guidance material directly related to management of in-flight emergencies was also lacking. Therefore, there was a need to develop response procedures that differentiated between emergency circumstances where a flight crew was or was suspected of being in control of an aircraft and where hijackers were known to have taken over in-flight control. The need for air traffic controllers to be properly trained on relevant procedures, which should take into account human factors principles, was stressed. Additionally, the issue of legal responsibility of the individual controller and of the service provider and associated liability concerns were raised. The meeting agreed that these issues would have to be addressed as work was progressed.

2.6.7 The meeting noted that there would be a need for coordination between all parties involved, including civil, military and other security authorities of the State. The meeting also agreed that the establishment of a regional focal point for ATM-related security matters would help ensure effective coordination.

2.6.8 The meeting observed that rapid and effective information transfer was necessary between ATS units and rescue coordination centres (RCCs) that may have to assume operational responsibility if the affected aircraft impacted terrain or water. This could require an extension to the existing provisions of Annex 12 — *Search and Rescue*, to broaden the role of RCCs in emergency response.

2.6.9 In consideration to the above, the meeting agreed on the following recommendation:

**Recommendation 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.

2.6.10 While not detracting from the need for more comprehensive provisions for ATC as described above, the meeting noted that it was important not to lose sight of the underlying problem. Security began on the ground, therefore the most important focus for security needed to be on identifying security threats before the aircraft became airborne.

2.6.11 The meeting was also informed of the criticality of maintaining the integrity of computer and communications systems used in aviation and the efforts made in several States to address these issues. It was noted that there was a need for coordination between all parties involved and it was proposed that there would be merit in establishing regional focal points for collecting and disseminating information on computer and communications system security as a means of improving overall security of these systems. The meeting was supportive of all these efforts and agreed that the Air Navigation Commission should take them into account when updating the air navigation part of the ICAO Aviation Security Plan of Action.

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