NAT SPG/42

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SUMMARY OF DISCUSSIONS AND CONCLUSIONS OF THE

FORTY-SECOND MEETING OF

THE NORTH ATLANTIC SYSTEMS PLANNING GROUP

Paris, 13 to 16 June 2006

PREPARED BY THE EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO JUNE 2006

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FOREWORD

i. Introduction

i.1 The Forty-Second Meeting of the North Atlantic Systems Planning Group (NAT SPG) was held in the European and North Atlantic (EUR/NAT) Office of ICAO from 13 to 16 June 2006.

i.2 The Meeting was chaired by **Mr Ásgeir Pálsson**, the Member for Iceland. Mr Karsten Theil was the Secretary of the Meeting and was assisted by Mr Jacques Vanier from the EUR/NAT Office of ICAO. Assistance was also provided by Mr John Begin, the Deputy Director of the Air Transport Bureau (DD/ATB) and Mr Herman Pretorius from the Regional Affairs Office (RAO), both from ICAO Headquarters. Additional assistance was provided by Mrs Nikki Goldschmid from the EUR/NAT Office of ICAO.

i.3 In the opening session, Mr Ásgeir Pálsson informed the Group that the new Member for Canada was **Mr Randy Speiran,** who replaced Mr Don Harris.

i.4 In addition to the Members of the NAT SPG, the International Air Transport Association (IATA), the International Business Aviation Council (IBAC), the International Federation of Air Line Pilots Associations (IFALPA), the International Federation of Air Traffic Controllers' Associations (IFATCA) and Inmarsat on behalf of the International Mobile Satellite Organization (IMSO), attended the meeting. A list of participants is at **Appendix A** to this report.

i.5 The Mathematicians' Working Group (MWG) had met at the EUR/NAT Office of ICAO from 27 April to 4 May 2006 to consider the mathematical and statistical aspects of the safety of separation minima applied in the NAT Region. The Rapporteur, **Mr Stephen Kirby** of the United Kingdom, presented the MWG report in support of the assessment of current system safety performance in terms of lateral, vertical and longitudinal risk.

i.6 The Safety Management Co-Ordination Group (SMCG) had met from 14 to 17 November 2005 and 24 to 27 April 2006. To facilitate more timely consideration of NAT system safety matters the former Scrutiny Working Group had evolved into the Safety Management Co-ordination Group in accordance with NAT SPG Conclusion 40/19. The Rapporteur, **Mr David Nicholas** of the United Kingdom, provided the NAT SPG with the group's report.

i.7 The Aeronautical Communications Group (ACG) had not met in 2006. Nevertheless, the Rapporteur, **Mr Jose Cabral** of Portugal, provided the Group with a report.

1.8 The NAT Operations Managers (OPS MNG) had met in Prestwick from 10 to 11 January 2006 and presented the Group with a report.

i.9 The NAT Traffic Forecasting Group (NAT TFG) had met in Paris from 18 to 28 April 2006 and presented their report.

i.10 The NAT Implementation Management Group (NAT IMG) had met twice since NAT SPG/41 and a report on their activities was presented to the Group.

i.11 The NAT Economic and Financial Group (NAT EFG) had met twice since NAT SPG/41 and a report on their activities and findings had been presented to the Group.

i.12 The NAT SPG expressed its appreciation to all those who had worked within the above mentioned groups for the quality of the material that they had produced.

i.13 The Group approved the following Agenda.

Agenda Item 1: Developments

1.1 ICAO Global activities
1.2 Adjacent Regions
1.3 NAT Provider States

Agenda Item 2: Planning and implementation

2.1 NAT Implementation Management Group Report
2.2 NAT Economic and Financial Group Report
2.3 North Atlantic Traffic Forecasting Group Report
2.4 Other issues

Agenda Item 3: Air navigation system review

3.1 Review of system safety performance
- a) Scrutiny matters
- b) Mathematical matters
- c) Safety management

3.2 Review of systems operations
- a) Air Traffic Management
- b) Communications
- c) System efficiency

Agenda Item 4: Documentation update

4.1 Document management office report
4.2 NAT Basic ANP and FASID
4.3 Other documentation

Agenda Item 5: Any other business

5.1 Next meeting
5.2 Farewells

1. DEVELOPMENTS

1.1 ICAO global activities

ICAO Strategic Objectives

1.1.1 The Group was provided with information on ICAO's decision to use a Business Plan approach to management and that this would have an impact on how the NAT SPG itself would be managed. Activities would now have to be linked to the Council approved ICAO Strategic Objectives; otherwise it may be difficult to support proposed programmes.

Follow up of the Director(s) General of Civil Aviation (DGCA) and All Planning and Implementation Regional Groups (ALLPIRG) meetings

1.1.2 The Group was informed that the Director(s) General of Civil Aviation had met in Montreal from 20 to 22 March 2006 to discuss safety related matters. It was pointed out that the report of the Conference was available on the ICAO web site (www.icao.int). As regards regional safety management, it was noted that the NAT Region had a maturing system in place, although some adjustments would be required to meet the evolving global requirements. It was proposed that the NAT Region could play an important role in paving the way for regional safety management programmes for other regions of the world.

1.1.3 The Group was provided with information regarding the Fifth All Planning and Implementation Regional Groups Meeting which had taken place in Montreal from 23 to 24 March 2006. It was noted that it had decided to include the framework for global planning in the work programme of the individual Planning and Implementation Regional Groups (PIRG). It was also noted that the outcome of the DGCA's meeting mentioned above had also been addressed by the ALLPIRG in the context of Air Traffic Management (ATM) safety management. The outcome of the ALLPIRG regarding global coordination of Reduced Vertical Separation Minimum (RVSM) monitoring requirements and especially the need for coordination between Regional Monitoring Agencies (RMA) was noted. In this connection, the Group was informed that the ICAO EUR/NAT Office would act as the focal point for this activity and that they intended to convene a meeting in the second half of 2006. Finally, the Group noted the decision that, the implementation either Area Navigation (RNAV) or Required Navigation Performance (RNP) should be done on the basis of the evolving performance based navigation concept. It was noted that this had already been included in the NAT IMG work programmes.

Implementation of ICAO provisions with a special applicability date

1.1.4 The Group was provided with information on how the applicability date of provisions adopted by ICAO was determined, including specific applicability dates when a provision was likely to require significant changes. The Group recognized that specific applicability dates could be overlooked or forgotten and expressed its appreciation for the information and for the detailed listings which drew attention to provisions having future applicability dates. In particular, it was noted that the information was listed by applicability date as well as by subject matter. It was recognised that the list greatly facilitated tracking of changes to ICAO provisions and provided a tool to ensure that these changes would not be overlooked. The Group considered that the listing should be kept up-to-date and be made available on the web site.

1.1.5 The Group noted that, in the case of some provisions having a future applicability date, a number of States might experience difficulties in achieving timely implementation. The Group agreed on the importance of implementing adopted provisions in a timely manner. For this reason, the importance of providing States with adequate time to carry out necessary regulatory changes was stressed. This was particularly relevant in the context of the expanded Universal Safety Oversight Audit Programme (USOAP). In this connection, it was stressed that the "Blue Cover" edition of Amendments, whether they be Standards

and Recommended Practices (SARPs) or Procedures for Air Navigation Services (PANS), needed to reach States at least four months in advance of the applicability date in order to allow sufficient time to enact and publish the changes. The Group indicated that implementation of amended provisions would be facilitated if the information was provided electronically in a format from which the information could be copied and transposed in national documents. It was agreed that States should also indicate whether they anticipated any difficulties in achieving timely implementation of new or amended ICAO provisions so that support to assist them can be organised in a timely fashion.

Conclusion 42/1 - ICAO provisions with specific applicability dates

That:

a) States be invited to take appropriate action to achieve timely implementation of the ICAO provisions having a specific applicability date;

b) States experiencing difficulties to achieve timely implementation of those provisions be invited to seek assistance and advice from the Regional Office with a view to overcome the difficulties; and

c) the ICAO Regional Director identify means to provide assistance and advice as appropriate as provided for in the unified strategy.

Commenting on amendment proposals

1.1.6 Through the discussion, the Group reiterated the importance for States to provide timely comments on amendment proposals circulated by ICAO, including those related to PANS. The Group felt that timely comments could play a significant role in the early identification of implementation difficulties. However, to ensure that the consultation provided the necessary inputs from States, it was stressed that the time for comment had to be consistent with the complexity of the proposed changes considering that the regulator may have to consult with service providers. The Group noted that the NAT SPG working structure was being provided with copies of draft changes to ICAO provisions so that they could ensure that their inputs could be made through the State concerned.

1.1.7 The Group noted that the NAT IMG had examined a proposal to monitor evolving ICAO provisions in order to determine the potential effects that such changes could have on NAT operations. It was pointed out that by anticipating changes, it would facilitate the implementation planning process.

1.2 Adjacent Regions

North American (NAM) and Caribbean (CAR) Regions

1.2.1 The Group noted that the implementation of distance-based longitudinal separation in Oakland Flight Information Region (FIR) had given rise to some procedural issues at the interface between Oakland and Vancouver FIRs, which used time-based longitudinal separation. This experience had demonstrated some of the difficulties that may arise at the interfaces between two areas that utilise different systems.

1.2.2 The Federal Aviation Administration (FAA) reported that Ocean 21[1] became fully operational in New York and Oakland FIRs in June 2005 and October 2005 respectively.

1.2.3 The Group was informed that the Government of The Bahamas had indicated to the United States that it intended to establish its own FIR and contract with a third party service provider for control of

[1] New automated Air Traffic Control system implemented in New York FIR

the airspace. In March 2006, the FAA had met with the Ministry of Transport and Aviation to propose a government-to-government agreement to establish a mutually acceptable FIR and share responsibility for the control of Bahamian airspace. The FAA continued to work with the Government of the Bahamas to meet ICAO's requirements for global airspace management to preserve the safety, efficiency and capacity and provide a seamless operational environment for users.

1.2.4 The FAA had recently set up an Automatic Dependent Surveillance-Broadcast (ADS-B) programme office in order to support plans to create the Next Generation Air Transportation System (NGATS). Canada indicated that it was giving consideration to the implementation of ADS-B in its Northern airspace in order to cope with increasing traffic levels. Both States agreed to share information about implementation plans so as to ensure harmonisation within North America but also with the NAT and EUR Regions.

Northern Trans-Regional Coordination

1.2.5 The Group was reminded of the air-to-ground communication constraints over the high seas areas of the Arctic Ocean and the need to transit between the Annex 2 compliant flight level allocation system (used by Canada, Iceland and the United States) and the non-compliant system used by the Russian Federation in Murmansk and Magadan FIR. It was recalled that NAT SPG/41 had noted the information and further noted that these issues were being addressed by existing groups, such as the Russian-American Co-ordinating Group for Air Traffic Control (RACGAT), which had worked very effectively and productively in the past but had not met for over a year.

1.2.6 In this respect, NAT SPG/41 had invited the Russian Federation, the United States and other stakeholders to take all necessary steps to ensure the continuation of RACGAT meetings.

1.2.7 Since NAT SPG/41, significant changes took place in the Russian Federation Civil Aviation Administration and therefore it was not possible to convene a RACGAT meeting. These changes concerned the establishment of the Federal Air Navigation Authority (FANA) on 5 September 2005. FANA was a specially authorised federal body of executive power, subordinate to the Government of the Russian Federation carrying out state regulation, control and oversight in the field of utilisation of the Russian Federation's airspace; provision of state services in relation to air navigation servicing of users of the Russian Federation's airspace; establishment of a unified aeronautical search and rescue system; certification of types and aids to navigation, air traffic control facilities as well as production means thereof; establishment of air navigation charge rates and collection procedures, disposal of revenues from the above charges; and issuance of over-flight permissions for foreign aircraft operation through the Russian Federation's airspace and crossing the state boundary of the Russian Federation.

1.2.8 It was noted that a continuation of the "historical" RACGAT meetings would be highly improbable, considering the changes that affected/affects the Russian Federation Civil Aviation Administration. These changes have made the provision of the government to government Memorandum of Understanding (MOU) of 1992 obsolete.

1.2.9 Although the RACGAT meeting, as requested by NAT SPG/41, was not held, the Group noted that two other meetings had been held to discuss issues of interest in the area. Firstly, a Special ATS Coordination Meeting Cross-Polar and Russian Far East Air Traffic Services (ATS) Routes had been held in Bangkok, Thailand, from 15 to 16 November 2005. The meeting reviewed the existing operational and technical aspects related to the increase in traffic on the Cross-Polar and Russian Far East routes. Secondly, a Trans-East and Polar Track ATS Providers Meeting had been held in Anchorage, Alaska from 14 to 16 March 2006 with the objective to implement procedures and technologies to ensure maximum utilisation of the Russian Far East and Polar Routes. The meeting had been attended by experts from NavCanada, the FAA and the Russian State ATM Corporation.

1.2.10 The Group recalled the successful outcome of the ICAO Informal Trans-Asia/Trans-Siberia/Cross Polar Routes High Level Steering Group (ITASPS) and the ITASPS Contributory Working Group (ICG). Their meetings, held from 1998 to 2001, co-ordinated the requirements of international civil aviation for a coherent and economically viable and operationally optimal structure of ATS routes, linking city-pairs in Europe and Asia, Europe and North America and Asia and North America. The ITASPS Group promoted improvements for the safety and efficiency of the Trans-Asia/Cross-Polar route structure and the supporting ATM systems within the States affected, based on the existing IATA Trans Siberian Route Study, which was expanded and complemented to adequately cover the Cross-Polar element.

1.2.11 It was noted that aircraft operators have been underlining their continued need for improvement of the route structure and supporting infrastructure in the area. In this respect, several issues had already been identified as requiring future attention. A non-comprehensive list of these issues includes:

a) opening of more routes and improved efficiency of the current routes;

b) implementation of RVSM in the Russian Federation and China;

c) improvement of the ATC coverage and hours of operations;

d) Area Control Centre (ACC) consolidation;

e) development of improved Air Traffic Flow Management (ATFM) tools that could be shared amongst States;

f) communications in Northern Airspace;

g) airport availability for Extended Range Operations Of Twin-Engined Aeroplanes (ETOPS) aircraft;

h) improved access to China airspace; and

i) simplified and more flexible access requirements to the Russian airspace (form "R").

1.2.12 In order to continue the work already done and respond to the new requirements for increased efficiency and further developments, co-ordinated efforts of the international civil aviation community would be required. It would involve States and Organisations from four of the ICAO Regions: EUR, ASIA, NAT and PAC. The Group noted the proposal to establish a "Trans-Regional Airspace and Supporting ATM Systems Steering (TRASAS) Group". Such a Group would work under the auspices of ICAO and be composed of representatives with operational and technical expertise from Canada, China, Democratic People's Rep. of Korea, Denmark, Finland, Iceland, Japan, Mongolia, Norway, Republic of Korea, Russian Federation, United States and from aircraft operators' international organisations (e.g. IACA, IATA, IBAC). The draft terms of reference are in **Appendix B**. The Group requested the Secretary to commence the required co-ordination process in order to organise the first meeting of TRASAS, before the end of 2006/first quarter of 2007.

European (EUR) Region

1.2.13 The Group noted that, in the context of the harmonisation and simplification of implementation of ICAO airspace classes below FL 195, it had been decided that as of 13 April 2006, airspace classification utilisation in portions of the EUR Region would be limited to airspace classes C, D, E and G, with agreed exceptions for some busy airport environments currently classified as A.

1.2.14 The Group was informed that Ireland and the United Kingdom were discussing ways and means of establishing a Functional Airspace Block (FAB) in the context of the Single European Sky (SES) programme. It was noted that the project was still relatively new and that developments were under review.

1.2.15 The Group noted the update on the European Commission's (EC) activities related to the implementation of the SES. In particular, note was taken about the plans to create a Europe Upper Flight Information Region (EUIR) and a single Aeronautical Information Publication (AIP) for the EUIR. These developments should not affect the NAT Region airspace, but the ICAO EUR/NAT Office would follow these developments and will report developments. It was also be noted that the EC had launched a programme called Single European Sky ATM Research (SESAR), which was similar to the United States' NGATS and that coordination was being carried out between the two entities.

1.2.16 It was noted that planning was well advanced to reduce the floor for the area of application of 8.33 KHz channel spacing down from FL245 to FL195. It was expected that the change would be implemented in March 2007. This change would have an effect on flight planning, including aircraft arriving from the NAT Region.

Data Link Steering Group

1.2.17 The Group recalled that a data link steering group had been set up in order to harmonise data link applications between the NAT and the EUR Regions. The steering group had met twice and it had, as a first step, established a task force to determine whether the Link 2000+ (Aeronautical Telecommunication Network (ATN) equipped aircraft could be accommodated in oceanic airspace where Automatic Dependent Surveillance-Contract (ADS-C) was a requirement and if the Controller Pilot Data Link Communications (CPDLC) message sets were compatible. The work was ongoing and it was noted that progress reports were being provided to the NAT IMG.

1.3 NAT provider States

1.3.1 The Group recalled that the West Atlantic Route System (WATRS) was completely redesigned in 1995 for more efficient operation. This revision had been extremely successful and resulted in the elimination of many restrictive routing requirements, and prepared the airspace for the introduction of RVSM. Now, with improved aircraft navigation and ground ATC capability using the Ocean21 automation system at New York Oceanic Area Control Centre (OAC), the United States was examining the opportunity to implement horizontal separation reductions and to reorganize the route system to again dramatically increase capacity and efficiency.

1.3.2 The structure of WATRS was based on a lateral separation requirement of 90 nautical miles that did not lend itself to adding additional fixed routes. Additional fixed routes in the current structure would conflict with existing heavily travelled North/south routes. This conflict would cause undue restrictions on all aircraft in the airspace and result in unfavourable altitude assignments and fuel penalties. Accordingly, the FAA had established a preliminary goal of reducing lateral separation from 90 nautical miles (nm) to 50nm in conjunction with a redesign of WATRS Plus[2]. The FAA estimated that this project could be implemented in approximately two years. In pursuit of this goal, the FAA would conduct risk analysis to ensure that the Target Level of Safety (TLS) would be met when 50nm lateral separation is applied.

1.3.3 Since a portion of WATRS Plus airspace is in the ICAO NAT Region, the FAA planned to develop an amendment to NAT Regional Supplementary Procedures (SUPPs) to enable 50nm lateral to be applied in that airspace. In preparation for submission of the amendment, the FAA planned to start coordination this year with the appropriate NAT SPG planning machinery and operators to inform them on the developing WATRS concept of operations.

1.3.4 To progress the project in an international forum, the FAA planned to work with the ICAO Paris and Mexico City Offices to establish a NAT/CAR ATS Routes Working Group. The FAA was

[2] WATRS Plus comprises the Oceanic airspace of New York, Miami and San Juan

planning on holding the first meeting of the group from 19-21 September 2006 in Miami. The meeting was being planned to include Air Traffic Service providers, technical experts and operator representatives. In accordance with Global Plan Initiative 1, in addition to the actual configuration of the airspace, the remit of the group included harmonizing the WATRS Plus airspace redesign with adjoining ATS route structures to optimize the ATS route structure in both terminal and en-route airspace.

Conclusion 42/2 - Redesign of the West Atlantic Route System (WATRS)

That the EUR/NAT Office of ICAO, in collaboration with the NAM/CAR Office, support the work relating to the redesign of the WATRS area

1.3.5 The Group was informed that within the context of the implementation of the Northern Oceanic Transition Area (NOTA), France, Ireland and the United Kingdom had been requested to examine the viability of exempting those flights not Minimum Navigation Performance Specifications (MNPS) approved from the MNPS airspace requirements whilst operating in the Brest Oceanic Transition Area (BOTA), NOTA and the Shannon Oceanic Transition Area (SOTA) if they did not plan to operate in the rest of the Shanwick Oceanic Control Area (OCA). It was recalled that at the moment the NAT MNPS airspace encompassed the whole of the Shanwick OCA, including the areas of delegated ATS contained within the BOTA and SOTA and, from October 2006, the NOTA as well.

1.3.6 Due to the continuing development of the European route network, together with the expanding amount of tactical re-routeing of domestic flows in order to maximise the traffic throughput of the European ATM network, an increasing number of flights wish to access the BOTA and SOTA who do not have an MNPS approval. It was stressed that aircraft operating in the NOTA, as well as the SOTA and the BOTA, were under radar control, which allowed the application of a much more flexible control service, as well as the dynamic checking of navigational accuracy.

1.3.7 Additionally, with the full introduction of the NOTA in October 2006, flexible alternative routes may be developed through the NOTA for flights that wish to operate between the Irish and Scottish Upper Flight Information Regions (UIR), thus avoiding the busy Northern London ATC sectors. The Group therefore agreed that those flights operating in the NOTA, SOTA and BOTA not subject to an Oceanic Clearance could be exempted from the MNPS requirements subject to the satisfactory completion of a safety management process. Suitable wording would be developed to ensure such operations meet Oceanic RNP requirements (currently 12.6) and the necessary communication requirements. The United Kingdom would co-ordinate this development in concert with France and Ireland.

Conclusion 42/3 - Amendment to Doc 7030 regarding Minimum Navigation Performance Specifications (MNPS) airspace exemptions

That, subject to the satisfactory completion of a safety management process, the United Kingdom:

a) co-ordinate with France and Ireland the development of an amendment proposal to the NAT *Regional Supplementary Procedures* (SUPPS) (Doc 7030) that would allow operations by non MNPS approved aircraft not subject to an oceanic clearance in the Brest Oceanic Transition Area (BOTA), Northern Oceanic Transition Area (NOTA) and the Shannon Oceanic Transition Area (SOTA); and

b) submit the proposal for amendment to the ICAO EUR/NAT Office for processing.

2. PLANNING AND IMPLEMENTATION

2.1 Report on NAT Implementation Management Group programmes

Updates to NAT Region service development roadmap

2.1.1 The Group was informed that the NAT IMG had updated its NAT Service Development Roadmap, based on inputs that it had received from the various working groups. As a result of ICAO's decision to focus its work programme on the Strategic Objectives that had been set by the Organisation, it agreed that it was necessary to make some linkage between the Strategic Objectives and the Roadmap. Furthermore, it was recalled that ICAO had endorsed the Global Air Navigation Plan (ANP) and that within the ANP, Global Planning Initiatives (GPI) had been defined. Taking this into account as well as ALLPIRG/5 Conclusion 5/2, the NAT IMG had agreed that the Roadmap should also be linked to the Global ANP.

2.1.2 The Member for France indicated that the NAT Service Development Roadmap, managed under the auspices of the NAT IMG, was an essential tool to be used for planning purposes and for implementation decisions. Updates to the Roadmap must be based on the development of the various trials and on the data regarding the rate of equipage of the various categories of aircraft. The Group agreed that, in order to guarantee that the NAT Service Development Roadmap was used to its potential, it was imperative that all airspace users actively cooperate in the provision of all necessary data regarding the rate of equipage. Such data was an essential element for the development of a business case before establishing any mandatory equipment status.

Conclusion 42/4 - Importance of data regarding the rate of aircraft equipage

That airspace users provide all necessary data as identified by the NAT Implementation Management Group, regarding rate of equipage (including trends), for the benefit of the NAT Service Development Roadmap.

2.1.3 Taking all of these changes into account, the Group noted that a new draft of the document was being produced by the Secretariat and that it would be posted on the NAT Programme Coordination Office (PCO) web site (www.paris.icao.int).

The implementation of Reduced Vertical Separation Minimum

FINANCIAL ASPECTS RELATED TO THE PROJECT TO MAINTAIN THE STRUMBLE HEIGHT MONITORING UNITS (HMU)

2.1.4 In follow up to NAT SPG Conclusion 40/2 and Conclusion 41/9 concerning the need to maintain the HMU at Strumble, the financial aspects had been examined. The Group recalled that the current HMU system at Strumble was reaching the end of its effective life cycle and needed major maintenance in order to ensure continued reliable service. The Group was informed that NATS, in its capacity of programme manager, had addressed the issue of suitable enhancements based on operational experience of the current system. These would include upgrades to the current hardware and software, operating maintenance costs, spares and any training required. Therefore, the basic scope of the project would include:

a) project management;

b) maintenance and spares; and

c) training.

2.1.5 After evaluating the options that had been presented, the Group agreed that the United Kingdom should proceed with the refitting of the existing HMU in such a way that it be modified to work on a current COTS hardware platform. However, in order for the Joint Financing Section to advise on the most effective financing mechanism, it was agreed that the United Kingdom should provide ICAO with a break down of the costs involved by 15 July 2006. On the basis of the information received, ICAO would then co-ordinate with the five signatory States to obtain their approval. This should be completed by 1 September 2006 so as not to delay the project.

Conclusion 42/5 - Financing of the Strumble HMU

That:

a) the United Kingdom provide ICAO with a breakdown of the costs needed to ensure the continued reliable service of the Strumble Height Monitoring Unit (HMU) by 15 July 2006;

b) ICAO co-ordinate with the five States that are signatory to the agreement on the preferred financial mechanism.

STABILITY OF ALTIMETRY SYSTEM ERROR (ASE)

2.1.6 The Group was informed that the current work regarding the stability of ASE indicated that further monitoring was required. It was noted that the ICAO EUR/NAT Office would be circulating a State Letter to bring this issue to the attention of all concerned.

Implementation of reduced horizontal separation minima

2.1.7 The Group was informed that the NAT IMG had examined the results of some initial work that had been carried out with respect to the implementation of RNP to support reductions in horizontal separation minima. As regards reductions in lateral separation, it was noted that the NAT IMG had agreed that a reduction to one-half degree from one degree, whilst retaining the requirement to meet the gentle slope rule, could meet the intent of 30 NM lateral separation minimum. Considering that RNP provisions were being finalised, the Group supported the NAT IMG decision that it was premature to make any decision on the RNP type to be applied.

2.1.8 As regards reductions in longitudinal separation, the Group noted it may be possible to reduce separation between pairs of ADS-C equipped aircraft. However, additional data collection and analysis would be required to sustain a reduction. It was noted that the United Kingdom agreed to carry out the necessary data collection and analysis and that Canada agreed to support the study if required. Bearing in mind NAT SPG Conclusion 41/3, the Group endorsed the NAT IMG decision to look for reductions in separation minima using any methods available and not rely entirely on distance based separation, which was proving to be very difficult to implement.

Data link initiatives for the NAT Region

2.1.9 The Group was pleased to be informed that the ADS-C and Flight Management Computer (FMC) Waypoint Position Reporting (WPR), as well as the CPDLC trials, were proceeding successfully. It was expected that Phase 4 [3] of CPDLC would be implemented throughout the NAT Region by mid 2007. Approximately 40% of NAT traffic were using data link. It was also noted that the FANS Central Monitoring Agency's (FCMA) role would be expanded to provide assistance to the safety management programme. NAT SPG/43 will be provided with an update.

2.1.10 It was noted efforts had been undertaken to meld the NAT and Pacific Region data link guidance materials into one document to be called the *International Data Link Operations Manual* (IDLM). It was recognised that differences between the regions would exist and that provisions had been made to document such differences within the IDLM. The Group supported this activity as it felt that common procedures were required on a global basis, not a regional one.

Draft policy to move from an operational trial to an operational system

2.1.11 In follow up to NAT SPG Conclusion 41/6, the assumptions for planning High Frequencies (HF) regression, and taking into account that the ADS WPR and CPDLC trials provided better communications than the current HF communications, the Group agreed that the ADS WPR and CPDLC trials be declared operational with the following provisos:

a) phase 4 [3] CPDLC has been implemented;

b) the current strategic operating concept remains the basis for service provision;

c) the current HF system remains;

d) continuous monitoring of system performance is carried out by the FCMA, with at least an annual report being provided to the SMCG.

2.1.12 The Group noted the additional work that the NAT IMG had engaged in to provide guidance on moving from a trial system to an operational one. In this connection, the Group endorsed the NAT IMG decision that it was imperative that a functional hazard assessment to sustain the use of data links as a primary means of communications be carried out.

Conclusion 42/6 - Operational status of the FANS 1/A ADS and CPDLC trials

That the Future Air Navigation Systems (FANS) Automatic Dependent Surveillance (ADS) Waypoint Position Report (WPR) and Controller Pilot Data Link Communications (CPDLC) trials be declared operational with the following provisos:

a) phase 4[3] CPDLC has been implemented;

b) the current strategic operating concept remains the basis for service provision;

c) the current HF system remains;

d) continuous monitoring of system performance is carried out by the FCMA, with at least an annual report being provided to the SMCG.

HF regression

2.1.13 The Group was informed that the NAT HF Regression Task Force had not met because little had changed. Nevertheless, it was recalled that HF remained the primary means of communications in the NAT Region and was still a requirement in order to meet the provisions of Annex 2 regarding two-way communications. It was felt that the only way out of the current impasse was to establish that data link could become the primary means of communications and that some other medium, such as SATCOM voice, could be used to meet the requirements of Annex 2. The only means to do this would be to carry out a supporting safety case to sustain an operational data link system as a primary means of communication combined with a

[3] Phase 4 CPDLC is defined as support for all data link messages deemed necessary for the provision of Oceanic ATS

suitable back-up communications system such as SATCOM voice. The Group was however advised of a potential impediment to using SATCOM voice as the backup for data link, namely the fact that both are reliant on the same communications infrastructure and thus might fail concurrently. In the future this impediment might however be eliminated by the development of other SATCOM voice technologies. The Group noted that the NAT IMG had launched an initiative to carry out the safety case and would report its findings to NAT SPG/43.

2.1.14 The Group was informed that, in connection with HF regression, Iceland and Ireland had entered into an agreement to jointly provide HF services in Reykjavik Control Area (CTA) and Shanwick FIR and that operational trials had commenced.

The use of SATCOM voice for routine ATS communications

2.1.15 In follow up to NAT SPG Conclusion 40/8, the Group was informed that work had been initiated on developing a roadmap for the implementation of SATCOM voice for ATS purposes. Additional work was required before a recommendation could be made to the NAT SPG. Outstanding tasks included refining the roadmap for the implementation of SATCOM voice in the NAT Region; propose technical changes to the existing system and define the necessary trials to validate the operational procedures and technical solutions. It was recalled that, proving the viability of SATCOM voice as a suitable means of providing routine ATS was an important cog in the HF regression programme. The Group endorsed the NAT IMG decision that a trial should have a high priority and noted that progress would be reported to NAT SPG/43.

NAT IMG Cost Effectiveness (NICE) Group

2.1.16 The Group was informed that the NICE Group continued to collect data in order to keep all the data bases updated so that the facilities could be used when required.

Programme Co-ordination Office (PCO)

2.1.17 The Group was informed that the United Kingdom continued to support the NAT PCO website (www.nat-pco.org). The web site was important especially as it provided access to certain documents such as the MNPS Operations Manual and the different Guidance Materials. The web site also provided a cost effective way of carrying out business between meetings and provided an area to carry out discussions relating to emerging issues. The Group noted with appreciation that the United Kingdom would continue to manage and support the web site. The Group also noted that a gradual transfer of the management of the NAT PCO website would take place so that the ICAO EUR/NAT Office would assume full management responsibility in the future.

2.2 NAT Economic and Financial Group

Incentive pricing schemes under the Single European Sky (SES)

2.2.1 The Group was informed that the European Commission had initiated the development of an Implementation Rule for a Common Charging Scheme for Air Navigation Services. There had been considerable discussions over this regulation and there remained essentially one item still to be resolved. This centred on the transparency of data to be provided by those airports that were considered to be in a contestable market for the provision of air navigation services. The latest draft of the regulation contained a proposal to cover this matter but it was still to be agreed. The plan was to obtain agreement by July 2006 and the regulation would come into operation on the 1st of January 2007 and would apply to charges for services from 1 January 2008; although there was a proposal to delay the implementation of the airport charges. This Implementation Rule should not have any adverse effects on the NAT Region.

Issues related to costs associated with the provision of data link services

2.2.2 In follow up to the discussions at NAT SPG/41 concerning the transparency of data link related costs, the Group noted that the NAT EFG had been provided with an update on this matter on the basis of information provided by the users. It was pointed out that the contracts between the airlines and the Communications Service Providers (CSP) were confidential and included non-disclosure clauses and therefore could not be revealed, even on a non-attributable basis. The Group noted that the NAT EFG was also informed that it had been determined that less than 5% of all data link messages were attributable to ATC. If Automatic Terminal Information Service (ATIS) and Pre-Departure Clearances (PDC) were added, this would increase to approximately 10% of total traffic. The remaining traffic was attributable to Airline Operations Control (AOC). On the basis of the information provided, the Group endorsed the NAT EFG decision that it would no longer pursue this matter.

Review the study on cost comparison of air traffic and communications service provision in the NAT Region

2.2.3 The Group noted that the NAT EFG had completed the cost comparison exercise in respect of all NAT service providers. It was also noted that it now planned to carry out an analysis of the cost comparison reports and then to review the findings. In this connection, efforts would be made to harmonise this work with the benchmarking model being developed by the Civil Air Navigation Services Organization (CANSO) and IATA. A report on the outcome of the analysis would be provided to NAT SPG/43.

Presentation on Joint Financing Agreement

2.2.4 The Group was informed that IATA had presented information to the NAT EFG regarding its organisation's views on how the Joint Financing Arrangement should be modernised in order to ensure a more equitable distribution of costs. The information was noted and it was further noted that the ICAO Joint Support Committee would be examining a proposal prepared by Denmark and Iceland in this respect and that the outcome of the Committee's deliberations would then be reviewed by the Council of ICAO for formal action. The Group endorsed the NAT EFG decision that this matter should be kept under review and should be added to its work programme.

Financing the expansion of regional safety management

2.2.5 The Group noted that the NAT EFG had examined the issue of the responsibility of the NAT SPG in determining the financing and cost recovery of safety management systems in the NAT Region. It was recalled that certain technical matters such as the financing of the RVSM monitoring infrastructure and running costs had been addressed through the Joint Financing Arrangement. However, as safety management systems were being expanded, it was noted that the NAT EFG felt that some uncertainty surrounded the limit between the State and the NAT SPG's remit. In particular, questions were raised concerning how much responsibility the State has devolved to the NAT SPG in terms of financing and cost recovering of safety management to be borne by the State versus the customers.

2.2.6 As regards the expansion of the Joint Financing Arrangement to include regional safety management, it was noted that a State Letter had been sent on 18 July 2005 by the Secretary General of ICAO to the six States who were party to the Height Monitoring System (HMS) joint financing arrangement to seek their consent in principle to the extension of the scope of the arrangement to include regional safety management related issues. ICAO had not received a response from all States concerned. The Group was however informed that in follow up to the State Letter, the Chairman of the NAT SPG and the Chief of the ICAO Joint Financing Section were co-ordinating in order to ensure that this issue moved forward. It was noted that the NAT EFG would be informed of developments.

2.2.7 In follow up to NAT SPG Conclusion 41/11, it was noted that the NAT EFG had acknowledged the requirement that the Central Monitoring Agency (CMA) resources be increased to deal

with the expanded work load. It was also noted that this would involve an increase of the current human resources by 50%, or one-half a person-year. It was agreed that this be included in the cost of running the CMA from 2006 onwards. This information was provided to the Chief of the Joint Financing Section so that it could be taken into account when calculating the 2006 RVSM user charge (paragraph 2.1.15 above refers).

The future work of the Group

2.2.8 The Group endorsed the following future work programme of the NAT EFG:

a) complete the cost comparison of service provision in the NAT Region;

b) assist the NAT IMG HF Regression Task Force with the financial implications of its work;

c) analyse financial and cost recovery issues related to regional safety related initiatives;

d) monitor the financial aspects of replacing the Strumble HMU;

e) analyse possible harmonisation of charging formulae in the NAT Region; and

f) review the outcome of the Joint Support Committee of the proposed changes to the Denmark and Iceland Agreement.

2.3 NAT Traffic Forecasting Group

2.3.1 The Group expressed their gratitude for the long service and outstanding contributions of Mr Bob Duclos from Transport Canada and Mr Bob Bowles from the FAA, who had both been members of the NAT TFG since 1984. The Group also expressed their appreciation to Ms Alexina Mason, NATS, who had been an expert adviser since 1988.

General overview

2.3.2 The Group noted that the estimated 2004 and forecast 2005 passenger count (derived at the April 2004 meeting) had been revised upwards. 2004 was revised from 65.1 to 67.0 million, up 2.9 percent compared to the previous forecast. 2005 was revised only slightly from 70.6 to 70.7 million, up 0.03 percent compared to the previous forecast.

2.3.3 All detailed information relating to the forecasts is available in the NAT TFG report which has been posted on the ICAO web site (www.icao.paris.int).

2.3.4 It was noted that the upward revision in the 2004 passenger estimates reflected overall stronger growth performance than anticipated due to a resurgent global economy and optimism following the end of the Iraq War in 2003. However, this additional growth did not follow through into 2005. Oil prices rose substantially due to unprecedented demand from the fast growing Asian economies coupled with problems in oil supply caused by continuing unrest in Iraq/Middle East and damage to oil rigs in the Gulf of Mexico due to Hurricane Katrina. Although the global economy continued to grow strongly, high oil prices forced carriers to impose fuel surcharges, which have had some impact on passenger demand in the North Atlantic. Whilst growth in North Atlantic passengers remains strong and was estimated to be 5.4% in 2005, this is half of what was seen in 2004 and less than that which was forecast previously. In the latest forecast, the much stronger growth seen in 2004 combined with the weaker growth seen in 2005, have meant that passenger levels have returned close to the previous base case forecast.

2.3.5 The Group noted that the NAT TFG had updated its estimate of 2004 aircraft movements and compiled what it considered to be a reasonable estimate of 2005 aircraft movements. The estimated

2004 and forecast 2005 aircraft movement count (derived in April 2004) were revised upwards. 2004 was revised from 372,900 to 382,000 flights, up 2.4 percent compared to the last forecast. 2005 was revised from 398,500 to 400,600 flights, up by 0.5% compared to the last forecast. The larger upward revision seen in 2004 compared to the smaller upward revision seen in 2005 reflected the similar changes seen in the passenger estimates.

2.3.6 The revised 2004 total count of 382,000 flights was the same as was seen in 2000, indicating a return to pre-9/11 traffic levels. The annual estimate for 2005 had shown that flights in the North Atlantic had exceeded 400,000 for the first time. A doubling of traffic had occurred in 17 years, with 200,000 movements exceeded for the first time in 1988. The previous doubling took 24 years with 100,000 movements first exceeded in 1964.

ANNUAL FORECASTS

Base Forecasts

2.3.7 It was noted that the NAT TFG had projected that passenger demand would grow from 70.7 million passengers in 2005 to 135.2 million passengers in 2020, with successive five year average annual growth rates of 4.9%, 4.4% and 4.0%. Flight forecasts for the same period were projected to grow from 400,600 flights in 2005 to 727,600 flights in 2020 with successive five year average annual growth rates of 4.7%, 3.9% and 3.6%.

High and Low Forecasts

2.3.8 Passenger demand in the low case (pessimistic scenario) was forecast to grow from 70.7 million passengers in 2005 to 114.2 million in 2020, with successive five year average annual growth rates of 3.3%, 3.4% and 3.1%. Passenger demand in the high case (optimistic scenario) was forecast to grow to 157.1 million by 2020, with successive five year average annual growth rates of 6.4%, 5.3% and 4.7%. In the low case, passenger levels in 2020 are forecast to be 15.5% below the baseline forecast; in the high case 16.2% above.

2.3.9 Total North Atlantic flights in the low case (pessimistic scenario) were forecast to grow from 400,600 flights in 2005 to 635,400 in 2020, with successive five year average annual growth rates of 3.4%, 3.1% and 2.9%. Flights in the high case (optimistic scenario) were forecast to grow to 818,400 by 2020, with successive five year average annual growth rates of 5.9%, 4.6% and 4.1%. In the low case, flights in 2020 were forecast to be 12.7% below the baseline forecast; in the high case 12.5% above. The forecasts for aircraft movements are summarized **Appendix C**.

Comparison with 2004 forecasts (NAT TFG/34)

2.3.10 The Group noted that the NAT TFG's flight forecasts were more optimistic than those produced at the previous meeting with the new base case flights forecast predicting 5.7% more flights in 2020 than previously forecasted. Of this 5.7% difference, 2.3% was due to higher forecast flights between Europe and North America, 1.1% due to higher flights between Europe and Central America/Caribbean and 2.0% due to higher forecast general aviation flights.

FORECASTS BASED ON SAMPLE DATA

Average day forecasts

2.3.11 Daily North Atlantic Traffic was processed by Transport Canada for 2004 and 2005 based on the sample week data for July (1-7) and November (1-7) by route. Average daily traffic forecasts for the years 2006, 2010, 2015 and 2020 were produced for July and November by route.

Aircraft type forecasts

2.3.12 Since NAT TFG/34, the forecasting process has been modified to more explicitly incorporate fleet data forecasts. New aircraft type forecasts were produced for 2010, 2015 and 2020 which may be of particular use for the NAT IMG for data link planning purposes.

Further Activities

2.3.13 Until 1994, the NAT TFG had met annually to update their forecasts, but since then they have met biennially, supplemented by interim meetings, when needed. The next formal NAT TFG meeting will be held in Montreal in 2008. However, considering the likelihood of the implementation of the United States-European Union open skies policy, it may be necessary to convene an extraordinary meeting to take account of this political development. It was also pointed out that the implementation of the open skies agreement could lead to an influx of operators that have little or no experience of NAT operations with concomitant effect on safety. The Group felt that this should be kept under review until such time as a clearer picture emerges.

2.4 Other issues

The Replacement of Non-Directional Radio Beacons (NDB) in the NAT Region

2.4.1 It was recalled that the NAT ANP stated that ground based navigation aids should be progressively replaced with satellite based navigation systems. It was recognised that a transition period would be required before de-commissioning the ground-based system. To this effect, the NAT SPG, Conclusion 31/10, stipulated that the NAT IMG develop a policy for the gradual withdrawal of ground based navigation aids. It was also be recalled that, as part of the process to update the ICAO Radio Frequency Manual, the Air Navigation Bureau (ANB) needed to know the current policy.

2.4.2 The current requirement for NDBs in Greenland and the Faroe Islands was essential to maintain the Blue Spruce routes and to provide navigation aids to international aviation that require reference to ground based navigation aids. It was recognised that the Blue Spruce routes remained a requirement and some alternative navigation capability would need to be put in place or the requirements to operate on these routes in MNPS airspace would need to be changed prior to the removal of the NDBs. Portugal indicated that they still had a requirement for NDBs in the Azores. Considering the uncertainties, it was agreed that no change to the existing policy was needed and that the NDBs should remain until such time as the aforementioned issues were resolved and that Conclusion 31/10 was considered obsolete. The Secretary agreed to inform the ANB accordingly.

Conclusion 42/7 - Policy regarding Non-Directional radio Beacons (NDB) in the NAT Region

That:

a) Denmark and Portugal review their requirements for NDBs to support international civil aviation; and

b) on the basis of the identified requirements, an amendment to the NAT Air Navigation Plan (ANP) be prepared and circulated for approval.

NAT Region volcanic ash contingency plan

2.4.3 The *"Contingency plan for handling traffic in the event of Volcanic Ash penetrating the airspace of the North Atlantic Region*" had been finalised and posted on the NAT PCO web site. It was noted that a full scale exercise involving ATM, that would test the contingency plan, was planned to be held in the first or second quarter of 2007.

EUR/NAT Volcanic Ash Exercise

2.4.4 The Group was informed that, as a result of Grimsvötn volcano eruption during the period of 1-5 November 2004, a task force had been set up to develop an ATM volcanic ash contingency plan for the EUR and NAT Regions. In order to assess the volcanic ash contingency plan and to ensure its smooth implementation in case of an actual volcanic eruption, an exercise was carried out from 8 to 9 February 2006 in order to evaluate, with the Volcanic Ash Advisory Centres (VAACs) London and Toulouse, States' preparedness.

2.4.5 The results of the exercise had shown that problems continued to be encountered concerning the headers for the issuance/routing of Volcanic Ash Advisories (VAAs)/SIGMETs and NOTAMs which showed the need for further tests.

2.4.6 The Group was informed that, in order to improve the dissemination of VAAs/SIGMETs and NOTAMs, the following issues needed to be further evaluated:

a) a test of the communications routings of a single VAA with no meteorological content would be performed in early September 2006;

b) an eruption simulation in Iceland to test the capacity of reaction of VAACs London and Toulouse would be carried out in September 2006; and

c) it is necessary to define a scenario for an exercise, whose goal would be to check all the interfaces between the MET and ATM units and operators using the volcanic ash Contingency Plan. This was planned for February 2007.

2.4.7 The Group noted the information and further noted that an update would be provided to NAT SPG/43.

NAT Region contingency plan

2.4.8 Because the NAT IMG had more resources at its disposal, it had proposed that it should maintain the NAT contingency plan as a web based document. Considering that the NAT Operations Managers, the current owners of the document, have not been meeting on a regular basis and that the expertise to maintain the contingency plan exists within the NAT IMG planning machinery, it was therefore agreed that the NAT IMG should maintain the NAT Region contingency plan.

Conclusion 42/8 - Management of the NAT Contingency Plan

That the NAT Implementation Management Group (NAT IMG) manage the NAT Contingency Plan and maintain it as a web-based document.

3. AIR NAVIGATION SYSTEM PERFORMANCE REVIEW

3.1 Review of system safety performance

SCRUTINY AND SAFETY MANAGEMENT

3.1.1 The Group noted that the SMCG, which had evolved from the former Scrutiny Working Group (NAT SPG Conclusion 40/19 refers), had met twice since NAT SPG/41 in order to facilitate the more timely consideration of NAT system safety matters. This enabled the examination of reported occurrences for a 12 month period.

3.1.2 It was noted that the SMCG, in the context of its scrutiny and safety management tasks, had considered the following subjects:

a) conclusions of NAT/SPG41 regarding navigational performance in the NAT Region, and a review of subsequent progress;

b) vertical navigation performance in the NAT Region during the period 1 January 2005 to 31 December 2005;

c) lateral navigation performance in the NAT Region during the period 1 January 2005 to 31 December 2005;

d) additional proposals to improve the observed standard of navigational performance in the NAT Region; and

e) safety management matters (paragraph 3.1.45 below refers).

3.1.3 The Group noted that the SMCG had taken action on all NAT SPG/41 Conclusions related to scrutiny and safety management that had been addressed to it.

SCRUTINY MATTERS[4]

Vertical navigation performance accuracy achieved in the NAT Region

3.1.4 It was noted that the number of incidents as a result of entry into oceanic airspace at the incorrect level had increased and had accounted for 22 (8) of the 40 (31) events in b) above. As noted in previous reports, the issue of joint crew/ATC responsibility for ensuring that an aircraft enters oceanic airspace at the oceanic clearance level was discussed by the SMCG and further consideration was given to means of reducing the incidence of failure to receive, or in some cases to request, a clearance from domestic ATC, to achieve the cleared oceanic level. The SMCG considered that it was the dual responsibility of pilots and controllers to ensure that an aircraft enters the NAT at the cleared level. Although addressed by the "On the Right Track" DVD this matter continued to cause concern and the responsibilities of pilots and controllers in this regard continued to require emphasis in operational documentation and briefing materials and that regulatory bodies be advised.

3.1.5 The Group was informed that continuing instances of misinterpretation of CPDLC messages by crews had given concern to the SMCG. Such occurrences evolved from unfamiliarity with the CPDLC conventions and consequent misunderstanding. This was expected to become worse as more aircraft use CPDLC and the full message set is gradually implemented. As indicated in paragraph 3.1.4 above, this

[4] For the detailed discussions and analysis of vertical and lateral navigation performance, reference should be made to the report of the SMCG which had been presented to NAT SPG/42.

seemed to be an awareness problem and it would therefore be necessary to enhance awareness of the effects that errors attributable to CPDLC misinterpretation could have. Furthermore, the Group was advised of instances of controllers delaying the issue of a CPDLC climb clearance because they were concerned that misinterpretation might occur. Recalling Conclusion 41/15, the Group agreed that this matter, as well as the matter of ensuring that aircraft enter the oceanic airspace at cleared level remained extant and that it should be further addressed by the NAT IMG.

3.1.6 The Group was informed that reports of non-adherence to restrictions in clearances continued to be received by the CMA. It appeared that this was due to pilot confusion between North and West coordinates. The Group agreed with the SMCG recommendation that full and specific positions stating North and West degrees, as appropriate, be stated in clearances and required in read-backs in an effort to mitigate such errors. It was also suggested that such consideration be given to the adoption of time-based (rather than positional) conditional clearances unless such positions were completely clear and not subject to possible misinterpretation.

Conclusion 42/9 - Usage of time based conditional clearances

That the NAT Implementation Management Group evaluate the feasibility of using time rather than position in formulating clearance restrictions.

3.1.7 Instances of ineffective co-ordination between adjacent OACs and domestic ACCs continued to be observed, resulting in aircraft crossing a boundary at an uncleared level, or even without a clearance at all. This continued to be observed at the Madrid/Shanwick/Santa Maria boundaries. Considering the success that had been achieved through the dialogue between Brest and Shanwick, it was agreed that inviting a representative from Madrid ACC to participate in the work of the SMCG could help mitigate the risk that arose because of this problem. Considering that Spain is an Observer in the NAT SPG, the Secretary undertook to ensure that Spain would be invited to future SMCG meetings (Conclusion 42/14 below refers).

3.1.8 The Group was informed that instances were regularly reported that both commercial and International General Aviation (IGA) aircraft were flight planning or requesting unrealistic levels, and then failing to achieve or maintain these levels when cleared accordingly. In the commercial field this may have dispatch implications whereas in the IGA arena, issues of poor aircraft performance were frequently observed as were instances of late advice to ATC when difficulties were experienced in achieving a cleared flight level. The Group endorsed the proposal that the MNPS Operations Manual and the evolving flight planning manual should reflect these concerns.

Lateral navigation performance accuracy achieved in the NAT Region

3.1.9 The Group noted the scrutiny of observed Gross Navigation Errors (GNE) in the NAT Region and found that a total of 26 (24[*]) errors had been reported during the period under review. Of these errors, 8 (9) occurred outside MNPS airspace and were classified as Table "Charlie" errors. From the remaining 18 (15), 15 (14) were not eligible for inclusion in the risk analysis as defined at NAT SPG/17 (amended by NAT SPG/23) and were classified as Table "Bravo" errors. The remaining 3 (1) errors were classified as Table "Alpha" errors.

3.1.10 The number of reported errors in MNPS airspace compared with the previous 12 month period (2004) had increased. It was noted that the overall number of reported GNEs in the whole NAT Region had increased by two compared with the previous period. Overall, the effect of the reported GNEs in 2005 produced a slight increase in the estimated lateral risk compared with 2004.

[*] Note:- Figures in brackets refer to 2004

3.1.11 In accordance with monitoring procedures, follow-up action had been taken for any reported error in excess of 50NM. The Group noted that this had to be undertaken for 18 of the reported occurrences. The Group also noted that action that had been taken by OACs to contain the number of GNEs through timely intervention to prevent incorrect routing. During the monitoring period, Gander and Shanwick OACs advised the CMA of 147 (118) occasions when action had been taken to prevent a GNE. The Group noted that this was 29 more than reported during the previous 12 month period. The following information was extracted from the available data:

a) 114 (81) cases of crew error, or probable crew error, including 92 (54) where a filed flight plan route was followed instead of the cleared route;

b) 29 (11) cases were considered to be attributable to ATC or Clearance Delivery Operator (CDO) errors; and

c) 4 were considered attributable to flight dispatch errors.

3.1.12 The overall number of reported interventions was significantly greater than in the previous reporting year. Specifically, the Group noted an increase in the number of errors attributable to flight crews.

3.1.13 With regard to the application of 10 minutes longitudinal separation, it was noted that the CMA had received 9 (5) reports of erosions of longitudinal separation in excess of three minutes.

3.1.14 The Group noted that the SMCG had reviewed NAT SPG Conclusion 41/5 concerning the use of the Organized Track System (OTS) track message or plotting charts as vehicles for publicising safety alerts. The Group noted that the SMCG had concluded that the addition of further wording to already crowded documents was not likely to prove productive and that an Operation Errors Safety Bulletin (OESB) be used as the principal means of communicating oceanic system safety issues to operators. The OESB would be a valuable tool as it would provide a readily available means of promulgating current areas of concern, highlighting observed errors and providing advice to mitigate future recurrence. It was noted that the track message would benefit from a thorough revision and refinement, during which the notes and comments contained therein should be minimised and refreshed. The track message could then carry a highlighted reference to the OESB which would not be lost among the many unchanging notes that the track message currently contains. The Group noted the proposal and agreed that Conclusion 41/5 remained extant.

3.1.15 The Group noted that several GNEs may have been detected much earlier or may not have occurred at all had aircrews adopted good navigational practice, in particular, by using plotting charts and track and distance tables to check their routes. The advent of Electronic Flight Bags (EFB) and progress towards a paper-free cockpit environment directly threatens this established practice and therefore the SMCG strongly recommended once again that pilots use all available means to cross check waypoints while en route and to maintain a plotting chart, which is a cheap, simple and proven aid to avoidance of lateral error.

3.1.16 The Group noted that a State Letter was in preparation to highlight root causes of oceanic navigation and height-keeping errors. The letter would be circulated by the ICAO EUR/NAT Office as soon as the necessary coordination was carried out with the CMA. The letter would include a cautionary notice recommending the continued use of a properly plotted navigation chart as a standard oceanic operating procedure.

Further recommendations to improve the observed standard of navigational performance in the NAT Region

3.1.17 The Group was informed that, when carrying the scrutiny of navigation performance, consideration was given to methods whereby the observed standards of navigational performance might be improved. It had been noted that ADS overdue reports were becoming more prevalent for CPDLC-equipped aircraft, leading to the implementation of overdue action and lack of a “known” position for the subject

aircraft. In addition, the Group was informed that, when an incorrect forward position was received by ADS, the crews were not always advised of this error in time for them to verify correct FMC waypoint entry before the aircraft departs from cleared track. It was suggested that ADS Waypoint Reports always be cross-checked by the receiving OAC against the cleared route and any inconsistency resolved before an actual route deviation occurred. The Group recalled that the NAT IMG was developing continuous data link monitoring requirements and felt that these matters should be taken into account (paragraph above refers.

3.1.18 Once again the CMA had received information concerning ferry flights in NAT airspace where the aircraft's MNPS/RVSM approval status was in question. The Group noted that the SMCG was examining the possibility of carrying out spot-checks where possible on potentially non-approved aircraft.

MATHEMATICAL MATTERS

General

3.1.19 The Rapporteur of the MWG provided the NAT SPG with a presentation on collision risk estimation. The Group expressed its appreciation for the presentation which gave a clear insight into the mathematical modelling that underpins the risk calculations used to determine the health of the NAT ATM system.

Introduction

3.1.20 In introducing the MWG report, the rapporteur informed the Group that it was with regret that there had been no participation from IATA, whose input was considered to be valuable when calculating the risk. To assist the NAT SPG in reviewing system safety performance, the MWG had carried out the following tasks:

a) provided the NAT SPG with the estimates of lateral and vertical collision risk for the 2005 calendar year;

b) reviewed the ongoing monitoring of the risk in NAT MNPS airspace, including the height keeping performance and large height deviations of aircraft approved to fly in that airspace; and

c) proposed methods to improve estimates of lateral and vertical risk.

Re-estimating some modelling parameters

3.1.21 The Group noted that in order to provide the best collision risk estimates that can reasonably be achieved, it was important to maintain truly representative values for the collision risk model parameters. This is achieved through re-estimation, at appropriate intervals in time, of parameters that may change over time. It was noted that the MWG had carried out separate studies to re-estimate the mean aircraft dimensions of the NAT population and the mean crossing time of the NAT. Both were considered to change slowly over time. The Group noted that the MWG had carried out a study that re-confirmed that the average crossing time of the NAT remained 3 hours and 15 minutes. The Group endorsed the use of the revised aircraft parameters and mean crossing time values determined by the MWG for calculating risk in the future.

2005 LATERAL AND VERTICAL COLLISION RISK ESTIMATES

Lateral Risk

3.1.22 2005 was the third calendar year of full RVSM operations in NAT MNPS airspace. The occupancy estimates for the year were based on the full twelve months of 2005, as were the error rates used in the risk estimates. During 2005, both the OTS and random same direction occupancy values (and hence

also the combined occupancies) had increased compared to the previous year (2004). There had been a 4.9% increase in NAT traffic over the year (assuming 400,600 flights for 2005 and 382,000 flights for 2004).

3.1.23 The Group noted that the MNPS airspace GNEs, reported in 2005, had been examined in conjunction with the SMCG immediately prior to the MWG with the MWG. This ensured that the two groups were in agreement over the categorisation and weighting of the events for risk assessment purposes.

3.1.24 The Group noted that, in accordance with NAT SPG Conclusion 41/18, the monitoring windows for 2005 had been extended to include the boundary between Iceland domestic and Reykjavik oceanic areas. This enabled a more representative sample of GNEs in the NAT to be obtained. As a result of the addition to the monitoring windows, one extra GNE was included in the sample. In total, there had been three risk-bearing GNEs that were measured at the monitoring windows.

3.1.25 The Group noted that all lateral collision risk estimates between 1999 and 2005 were below the Target Level of Safety (TLS) for the lateral dimension, which was 20×10^{-9} fatal accidents per flight hour. Lateral collision risk has reduced since the late 1990s and had levelled off.

Additional details on using Reykjavik reported GNEs

3.1.26 The Group noted that, because an Eastbound error observed at the Reykjavik window has three opportunities to make a waypoint insertion error, as compared to four for a full crossing, the appropriate weight was 3/4 of a normal weight, and similarly 1/4 for Westbound flights crossing the Reykjavik radar window from Shanwick. As errors observed at the Reykjavik radar window were considered to be representative of all oceanic behaviour and not just flights into Reykjavik airspace, the weights did not need to be reduced due to the shorter flight times between waypoint reporting longitudes at higher latitudes.

3.1.27 In the same way, the weights assigned to GNEs, observed by Gander or Shanwick radar, which had been made by flights which also flew through Reykjavik airspace were not reduced because the Gander and Shanwick radars provided another opportunity to observe errors for a flight which had made the full oceanic crossing before being sampled.

3.1.28 The traffic base used to determine the lateral error rate had been the total number of flights seen in Gander and Shanwick FIRs, which was the same airspace from which GNEs are observed and reported. Adding GNEs observed by flights crossing the Reykjavik radar window required the addition of any flights seen by Reykjavik but not also flying in Gander or Shanwick FIRs. A review of the data sources revealed very few flights in this category. The Group agreed that the MWG take an action to detail any differences with a view to making the estimate more precise.

Conclusion 42/10 - Need to detail differences between different sources of Gross Navigation Errors (GNE)

That the Mathematicians Working Group obtain the number of aircraft that transit Reykjavik Oceanic airspace but do not enter Gander or Shanwick Oceanic airspace.

Lateral Overlap Probability, Py(0)

3.1.29 A key parameter that is used in calculations of vertical and longitudinal operational and technical risk is the lateral overlap probability, Py(0). Risk increases in direct proportion to this value. Thus, halving Py(0) would halve vertical and longitudinal operational collision risk (everything else being equal). The Group noted consistent increases of Py(0) had occurred over the years. An increase in Py(0) also reflects improvements in lateral navigational performance occasioned by the use of current-technology navigational systems such as Global Navigation Satellite Systems (GNSS). As aircraft tend to concentrate

more closely in the vicinity of the route centreline, the chance that two aircraft similarly flown will overlap in the lateral dimension increases Py(0) commensurately.

New Estimate of Py(0)

3.1.30 The Group endorsed the MWG decision to use the Empirical Distribution Method to estimate Py(0). It was noted that a new estimate was made using a 12-month (January to December 2005) sample collected from Irish radar at the oceanic boundary. The data were filtered so that only measurements that were at or further West of 15°W and less than 17°W, were at RVSM flight levels and were Westbound, were considered. This produced 12,272 data points, which is a large sample. By applying the Empirical Distribution Method, Py(0) was estimated to be 0.1172, which was nearly double 0.0601, the most recent value that had been adopted at NAT SPG/39. The Group felt that this trend would continue because of the increasing use of GNSS and that subsequent re-estimates of Py(0) were likely to show increases. Accordingly, it was agreed to adopt 0.1172 as the new value for the lateral overlap probability for the 2005 risk estimate. The Group also agreed that the lateral overlap probability be re-estimated annually until the value stabilises over a longer period of time.

3.1.31 In this context, and recalling that a significant proportion of current NAT aircraft still utilise inertial Reference System (IRS) based navigation systems, some members of the Group expressed concern whether the use of cross track error data, recorded solely at entry to oceanic airspace, could lead to an estimate of Py(0) that was not truly representative of the lateral navigation performance of the NAT fleet throughout the entirety of the NAT MNPS airspace.

Conclusion 42/11 - Estimation of the probability of lateral overlap

That:

a) the value of 0.1172 be adopted as the revised estimate of the probability of lateral overlap (Py(0)); and

b) the mathematicians working group carry out an annual estimate of the probability of lateral overlap until the value stabilises.

The Effectiveness of the Strategic Lateral Offset Procedure (SLOP)

3.1.32 The Group noted the study that had been carried out by the MWG concerning the effectiveness of the application of the SLOP to mitigate risk due to the probability of lateral overlap. Comparing the results from 2005 to previous years, the group believed that it was unlikely that there would be a significant take-up of strategic lateral offsets in the NAT in 2006. Thus, once again, the potential benefits of SLOP in terms of reduced vertical and longitudinal risk were unlikely to be realised (paragraph 3.1.56 also refers). The Group was informed that if one-third of aircraft flew the SLOP, the risk due to Py(0) would decrease by 50%. This is an interesting result because a disproportionate large benefit could be achieved with a relatively modest proportion of aircraft offsetting.

Vertical Risk

3.1.33 The Group noted the vertical occupancy estimates for the twelve months of 2005 based on the traffic weighted average of the United Kingdom 20°W estimates, the Canadian 40°W estimates and the traffic weighted average of both Canadian and United Kingdom 30°W estimates. The estimates were based on data for the 4th and 15th days of each month. Data for 15th April 2005 were unavailable from the United Kingdom, but the weightings were not adjusted to reflect this. Total vertical risk was estimated by summing technical risk and operational risk. In the past, technical risk had been a small proportion of the total vertical risk and operational risk was larger. Both technical and operational risks are presented below.

3.1.34 The estimate of vertical technical risk for 2005 was 1.4 x 10^{-9} fatal accidents per flight hour against the TLS for vertical technical risk of 2.5 x 10^{-9}. The estimate used the Pz(1000) value from NAT SPG/34, and 2005's occupancy estimates. The estimate was less than the vertical technical TLS.

3.1.35 The Group recalled that the operational element of vertical collision risk was determined from two components. The first component was the estimate of time spent by aircraft at uncleared levels or when incorrectly cleared to a flight level. The second component was for uncleared level changes, which took account of the number of levels crossed without clearance or without following published contingency procedures whilst taking account of the speeds at which the levels were crossed.

3.1.36 As with the lateral GNEs, the vertical Large height Deviations (LHD) reported to the CMA during 2005 were examined in conjunction with the SMCG to agree on the classification for risk estimation purposes. The Group noted that there had been 301 minutes spent at uncleared levels compared to 228 in 2004 and the total number of deviations reported had slightly increased.

3.1.37 The Group was informed that there were several reasons for the increase of the estimated vertical operational collision risk in 2005. An increase in the number of minutes spent at the wrong flight level, a doubling of the lateral overlap probability (paragraph 3.1.31 refers), Py(0), and a 10% increase in same direction vertical occupancies had all contributed. Of these three factors, the doubling of Py(0) has had the greatest effect. However, the two factors have helped limit the increase in vertical risk were the downward revision of aircraft dimensions and the slight reduction in opposite direction random occupancy.

3.1.38 The Group noted that the estimated risk for random traffic was much higher than the risk measured for traffic on the OTS. It was agreed that additional granularity should be included in the table of LHDs and time spent at wrong levels to differentiate between random and OTS traffic. This should provide an additional tool to determine the source of operational errors and to develop mitigation as required.

Conclusion 42/12 - Added granularity to the table of large height deviations and wrong levels

That:

a) the Mathematicians Working Group differentiate the Large Height Deviations and wrong altitudes between random and Organized Track System (OTS) traffic; and

b) the Safety Management Co-ordination Group determine the cause of the difference between the LHDs on random and OTS routes.

3.1.39 In concluding its discussions on vertical risk estimates, the Group recalled that it had examined the issue of the higher than expected vertical risk estimates for 2004 and had agreed on some mitigation. The random and combined vertical collision risks due to operational errors for 2005 was estimated above the TLS and was double that of 2004's. The risk estimate has been above the TLS for 6 of the previous 7 years and efforts to contain and reduce vertical operational risk were therefore strongly encouraged. NAT SPG/41 had agreed to Conclusion 41/20 and the Group agreed that this Conclusion remained extant. The issue would be reviewed again a t NAT SPG/43.

Vertical Monitoring Pack

3.1.40 The Group noted that the MWG had reviewed the 'vertical monitoring pack', which was a collection of tables and graphs used for assessing the combined Altimetry System Error (ASE) performance of the aircraft sample captured. It was produced twice yearly with the intent of providing quality assurance data relevant to individual aircraft, aircraft groups and operators. The source of the data used for generation of the pack was the CMA's database of HMU and Global Positioning System (GPS) -Based Monitoring System (GMS) ASE measurements. The global RVSM guidance material contained ASE performance

specifications and the pack was used to ensure that individual aircraft, aircraft groups and operators continue to meet those specifications.

3.1.41 All apparently non-compliant height measurements (those of 300ft or more) were scrutinised and appropriate action was taken. The Group noted that airframes with consistently poor performance (e.g., having a high proportion of aberrant height measurements, or having a clearly defined upward or downward trend) were flagged up to the CMA for follow up. It was also noted that efforts would be made to identify and monitor carefully those airframes that had a consistent record of aberrant ASE measurements of 200ft or more.

MWG status and composition

3.1.42 As a result of an informal ad-hoc meeting regarding the current membership of the MWG and the planned changes in participating personnel within the group, the following summary is presented. It was reiterated that the MWG was an important group that continued to provide excellent guidance to the NAT SPG by forecasting the collision risk in the system and using that as a basis to recommend changes that would maintain system safety under the influences of increasing traffic growth and changing technologies. The Group also noted that the MWG had an important role to play in assessing the safety and facilitating the introduction of reduced separation standards in the NAT Region. It was recognised that all member States had a shared obligation to ensure continued safe operations throughout the NAT, as reference in ICAO Annex 11 and other published documents. It was further encouraged that States with air navigation responsibilities in the NAT, who could participate in the MWG, should also do so. Canada stated that it would be looking into replacing their current retiring member. The United Kingdom also indicated that they would be appointing another member, however would not be in a position to retain the Chairmanship of the Group, however they would continue, to the degree possible, to provide the current level of support. The United States then agreed that they would be in a position to take over the Chairmanship of the MWG in the interim. The ad-hoc group also agree that it would be important that the MWG undertake a review of all the analytical data currently being provided and recommend changes as necessary.

3.1.43 The Group expressed its gratitude for the long service and outstanding contribution of Bill Stilwell, the MWG member for Canada, and the outstanding contribution of Steve Kirby, the outgoing rapporteur from the United Kingdom.

MWG Work Programme

3.1.44 The Group endorsed the MWG work programme and further noted that the next annual risk assessment would be performed by April 2007.

SAFETY MANAGEMENT MATTERS

Global initiatives

3.1.45 The Group noted that ICAO, at the highest levels, was stressing the importance for States to implement Safety Management Systems (SMS) in order to achieve the safety goals of aviation. In support of the above, ICAO had developed a harmonized set of safety management provisions and was prepared to assist States in their implementation activities. As one of many steps, ICAO was in the process of developing a draft ICAO Safety Management Manual (Doc 9859), which will be made available on ICAO web sites in order to assist States in achieving a harmonized approach to SMS. This Document would be a living one and would therefore go through several changes before it was considered mature. States and Air Navigation Service Providers (ANSP) were invited to provide ICAO with comments and feedback on the Document.

3.1.46 In addition to the provisions related to safety management, ICAO had finalised amendments to Annex 6, Annex 11 and Annex 14 that would reinforce current provisions related to safety management. At the same time, ICAO was carrying out comprehensive audits of States' safety oversight systems. These audits will cover all safety-related provisions of the ICAO Annexes, (excluding Annexes 9 and 17). Furthermore, ICAO was developing a process to link safety related work to the regional planning groups' work programmes and that the NAT SPG and its working groups would be provided with an update as soon as available. Finally the availability of the regional safety network forum on the ICAO EUR/NAT web site (www.forum.paris.icao.int) was noted.

Expansion of occurrence reporting

3.1.47 The Group was informed that New York now participated in the work of the SMCG therefore enabling the SMCG to carry out better NAT safety assessments. New York had also begun occurrence reporting in 2006. The quantity and type of reports received since January 2006 by New York confirmed that this activity would augment the occurrence data collected by the CMA and support the future work of both the SMCG and the MWG in determining a more complete estimation of NAT system risk.

Central Monitoring Agency resource requirements

3.1.48 The increase in workload as a result of the increase in incident reporting had caused resource shortcomings within the CMA. Canada had noticed an increase in workload; much of this was due to the implementation of NAT SPG Conclusion 41/22. The Group endorsed the NAT IMG decision that there was a need to increase the CMA human resources by 50%. This would amount to increasing the cost of the CMA by approximately USD 15 cents per crossing.

Composition of the SMCG

3.1.49 The Group was informed that as presently constituted, the SMCG was unbalanced against representation from the pilot community. It was therefore agreed that IFALPA or the user community would endeavour to ensure wider pilot participation in the work of the SMCG. It was noted that the preference would be for an Airbus or an IGA pilot. The Group was also informed that at least one additional safety manager was required so as to reinforce the objectives and processes of the SMCG. Considering the importance of this programme, the Group agreed that they should provide the SMCG with additional safety managers in order to ensure that the programme was run effectively. The Group noted with appreciation that the United States would ensure the participation of a Safety Manager in the work of the SMCG.

Conclusion 42/13 - Composition of the SMCG

That:

a) the ICAO Regional Director invite Spain to participate in the work of the Safety Management Co-ordination Group (SMCG);

b) States support the work of the SMCG by providing additional safety management expertise; and

c) IBAC and IFALFA seek greater pilot participation in the SMCG.

Review methods of risk reporting

3.1.50 The Group recalled the problems associated with expressing risk in the vertical dimension and noted that the SMCG had undertaken a review of the preparation and presentation of both vertical and lateral risk estimates. It was proposed that a 12 month rolling total of number and /or magnitude of errors

would be compiled and that more indicators would be used so as to compare more usefully safety performance over a 36 month timeframe. The Group endorsed this suggestion and noted that an update would be made as the work progressed.

3.1.51 To better accomplish its safety management remit, the SMCG had reviewed and compared the event classification systems of the States and NAT Region ANSPs. The information collected was used in a comparative analysis exercise whereby a number of 2005 occurrences were each reviewed, assessed and classified according to each national system to assist in determining supplemental methods of occurrence analysis and classification for the future. The existing classification system, which had been used by the SMCG, had been developed to reflect the operational characteristics that existed in the NAT Region. It was also used to provide the information necessary for the risk estimates conducted by the MWG. The intent of the exercise was to provide a further step in the safety management work by considering the various ways national systems categorise and extract information on deficiencies, to determine causal factors with a view to reducing the number of errors, or mitigating their effects. It was expected that this would enable to SMCG to:

a) provide indicators that were of more value to operational staff;

b) extract more operationally useful information from occurrence reports;

c) establish a more formal and systematic collection and analysis of data; and

d) identify and compare present trends with those of the past

3.1.52 The Group was informed that, following detailed discussions at both meetings of the SMCG, its evolution into a Safety Management Group was still very much in the early stages. The SMCG view was that a framework for Safety Management needed to be created which was manageable, credible and proactive rather than reactive and that the primary objective of the SMCG, in its eventual form, was to quantify risk in order to devise proactive strategies for mitigation.

Future of the SMCG

3.1.53 There were no published ICAO regional requirements regarding safety management systems. The Group was informed that the SMCG therefore needed to demonstrate how safety could be managed systematically. This left open many issues which the SMCG was not able to address. It was nevertheless recognised that the NAT SPG required a certain level of reporting and investigation, which was at the current limit of SMCG resources. It was pointed out that further investigation and/or analysis were beyond current resources.

3.1.54 The Group noted the request that it define the policy, scope and objectives for the future SMCG and revise their terms of reference accordingly. It was noted that documentation should reflect procedures, the risk assessment process and both safety and quality management elements. A review of reporting systems, competency and internal audit process also needed to be fulfilled. The Group agreed that the SMCG should call for urgent corrective action when required. The Group also agreed with the need to provide the SMCG with clear guidelines and tasked the NAT IMG to undertake this work and to report to NAT SPG/43.

Conclusion 42/14 - Evolution of the SMCG

That the NAT Implementation Management Group:

a) define the policy, scope and objectives for the evolution of the Safety Management Co-ordination Group (SMCG);

b) revise the terms of reference of the SMCG taking account of the need to provide urgent corrective action when required; and

c) report to NAT SPG/43.

3.1.55 Pending the foregoing, the Group noted that the SMCG would continue with current error analysis and classification; continue to refine the methodology to highlight error causal factors, while continuing to provide information in a form suitable to meet the requirements of the mathematicians. This would be used to highlight the areas of greatest risk and propose remedial actions. Classification may need to be revised, perhaps, by adopting the Accident & Incident Classification System in ICAO Annex 13. Classification allows understanding of the event and shows that something is wrong. Action can then be identified and implemented, and the loop closed, which is the primary function of a safety management system.

The application of the Strategic Lateral Offset Procedure (SLOP)

3.1.56 The Group noted that the correct application of the SLOP was necessary in order to mitigate the risk that arises because of the increased probability of lateral overlap which was caused to a large extent by the increased performance of navigation systems. The lack of utilisation of the SLOP appeared to be due to insufficient awareness by the users. It was noted that the NAT IMG had endorsed proposals to increase awareness and in particular, had agreed that NAT user meetings be convened from time to time to explain to those directly involved with operations in the NAT Region current and future developments. It was also pointed out that the main reason for the application of the SLOP was to mitigate risk and that it was not a contingency procedure. It was noted that efforts would be undertaken to ensure that all inferences to the SLOP being a contingency would be identified and corrected. The Group agreed with the need to raise awareness, not only of the SLOP but of other issues such the effects that the misuse of data link applications could have on risk. The Group therefore supported the convening of NAT user meetings from time to time.

Conclusion 42/15 - Convening NAT user meetings to discuss safety related matters

That ICAO, with the assistance of NAT service providers, occasionally convene meetings to explain to those directly involved with operations in the NAT Region current and future developments, especially those that affect safety.

3.2 Review of System Operations

AIR TRAFFIC MANAGEMENT

North Atlantic Operations Managers

3.2.1 The Group noted that the 35th meeting of the NAT OPS Managers had been held at Shanwick OAC from 10 to 11 January. The Group noted the review carried out by the Operations Managers regarding turn back procedures. The Group also noted the review of HF blackout/communications failure procedures and further noted that this matter was on the NAT IMG's work programme.

3.2.2 With reference to Conclusion 41/22, ii), use of a common form to report ATM related issues to the CMA, the Group noted the efforts that were being made to implement the Conclusion and also noted that efforts were being made to develop electronic reporting.

3.2.3 It was recalled that the NAT OPS Managers had been tasked to review an IATA proposal to reduce publication of some of the levels available on the OTS. The Flight Level Allocation Scheme (FLAS) was reviewed and some operational problems were identified at the interface between Gander and Santa Maria. Trials would be carried out to determine the feasibility of adjusting the FLAS at that interface. It was

noted that the NAT OPS Managers had agreed that FL380 and FL390, at and North of ERAKA, not be published on the Westbound OTS, but released for Eastbound traffic. The procedure would be introduced on a permanent basis. Reykjavik would continue to leave the level released for their OTS with landfall PRAWN and North at FL340.

3.2.4 In connection with the FLAS, it was recalled that IATA had requested that FL 380 and FL 390 within the OTS be made available for random traffic. It was noted that the OPS Managers were continuing to study whether this was feasible. The Group would be informed of developments.

3.2.5 It was noted that the NAT OPS Managers had carried out a review of all Letters of Agreement (LOA). It was further noted that the mandatory read-back of clearances would be inserted in all LOAs. There was also a need to reflect boundary changes and increased use of ground automation. It was noted that applicable NAT Regional documentation would be updated as required.

3.2.6 The Group noted that due to the impact of Hurricanes in the United States in the summer of 2005, large portions of airspace had been delegated to the military authorities and that this would be the process in the future should this be required. It was also noted that there was an increasing push for Unmanned Aerial Vehicles (UAV) within the civil system for military contingency situations.

COMMUNICATIONS

Aeronautical Communications

3.2.7 It was recalled that, as agreed in NAT SPG/38 (paragraph 3.2.7 refers), the Aeronautical Communications Group (ACG) should meet every two years and it was noted that the last ACG meeting had been held in 2005 and the next meeting was scheduled to 2007.

Review of HF Network Operations

3.2.8 In accordance with NAT SPG Conclusion 29/13, every year a data consolidation report containing the air-ground contacts for the previous year is prepared and presented to the NAT SPG. Since NAT SPG/41, no major issues have been reported by the radio stations and therefore the air-ground network operations were to be considered operating normally.

Traffic analysis

3.2.9 The total amount of air-ground contacts (including HF, GP VHF and SATCOM) for the year of 2005 was 3.343.766 messages, distributed amongst all Aeronautical Stations: 72.86% was by HF, 27,04% was by VHF frequencies and 0,10% was by SATCOM. For each Aeronautical Station, the percentage of traffic was Gander (32.8%), Shanwick (25.78%), Iceland (13.88%), Portugal (13.12%), United States (13.89%) and Norway (0.54%).

3.2.10 Comparing the total number of messages between 2004 and 2005, the overall increase was 1.12% in communications traffic. For each of the radio stations, the communications traffic increased: in Bodo (2.59%), Gander (2.35%), Iceland (6.63%) and Santa Maria (3.35%), and a decrease in New York (-4.84%) and Shanwick (-0.94%) was noted.

3.2.11 The Group noted information that the HF air-ground voice communications network was approaching values similar to those of 2000 (3.7million communication messages per year), despite the introduction of data link applications and that this should be considered a critical point in terms of network capacity. It was also noted that a number of NAT Operators, although their aircraft were equipped with data link, they did not make use of their capabilities. The representative of IATA proposed the introduction of incentives to airlines in order to increase the use of data link applications, thus speeding up the HF regression

process. The Group agreed that this issue should be studied by the NAT IMG and that a report should be submitted to the next meeting of the NAT SPG.

Conclusion 42/16 - The use of incentives to increase the use of data link applications

That the NAT Implementation Management Group and the NAT Economic and Finance Group:

a) determine if incentives could speed up the implementation of Future Air Navigation Systems (FANS) avionics to support data link applications and support HF regression; and

b) report their findings to NAT SPG/43.

Traffic analysis (one week study results)

3.2.12 In follow up to NAT SPG Conclusion 41/25, each of the radio stations carried out a one week traffic analysis to identify possible causes for the increasing number of messages over the last years despite the implementation of data link applications. It was considered that a causal factor was that some of the radio stations do not have access to ATS data information about flights and data link messages and because the service is provided by different entities. However, some conclusions could be made based on the results of this preliminary study and several leads should be followed in order to determine the exact causes for the increase in traffic.

3.2.13 With this in mind and considering the importance of reducing HF traffic, the Group agreed that the study should continue and that the ACG should report their findings to NAT SPG/43. It was also agreed that the radio stations and the respective ATS unit involved should coordinate between themselves in order to supply the required information to achieve the objectives of the study. Included in the data that should be provided to Portugal, would be the amount of communications traffic that was handled by data link. This would provide a better method of determining the reasons for the increase in HF traffic.

Conclusion 42/17 - Determine the cause of increased communications traffic despite the implementation of data link applications

That:

a) all NAT radio stations carry out an analysis of one week traffic in order to determine the cause in the increase in communications traffic;

b) all NAT radio stations coordinate with the correspondent ATS Provider in order to obtain all the information required to do an in-depth analysis of the voice and data link traffic;

c) all NAT radio stations report their findings to Portugal; and

d) Portugal report the findings to NATSPG/43.

NAT Region Communication Strategy

3.2.14 In concluding its discussions on the report of the ACG, the Group agreed that a complete review of the communications strategy was necessary to ensure future planning. With this in mind, it was agreed to task the NAT IMG with such a review that would take into account the role of the ACG, HF regression, the use of SATCOM voice as well as the application of data link technologies.

Conclusion 42/18 - Review of the NAT Region communications strategy

That the NAT Implementation Management Group:

a) carry out a review of the future NAT Region communications strategy that would take into account the role of the ACG, HF regression, the use of SATCOM voice as well as the application of data link technologies; and

b) report their findings to NAT SPG/43.

4. DOCUMENTATION UPDATE

4.1 NAT Documentation review

Establishment of a NAT Document Management Office

4.1.1 The Group noted that, in follow up to discussions during NAT SPG/41 (paragraph 4.1.4 refers), the Icelandic Civil Aviation Administration (ICAA) had taken steps to engage an experienced resource to undertake the task of maintaining of the NAT MNPS Airspace Operations Manual as well as other relevant NAT documents. It was also noted that the financial aspects had been provided for and that it was estimated that the costs would be based on two days work per week and the occasional travel to NAT related meetings. The Group noted that the NAT IMG had endorsed the proposal for the establishment of a NAT Document Management Office (DMO) that would be administered by the ICAA along the same lines as is done for the NAT PCO. The Group, recognising the importance of keeping documentation up to date, expressed its appreciation to the ICAA for having taken the initiative to establish a NAT DMO and for assuming its management on behalf of the entire NAT community.

4.1.2 The Group was informed that it was now important that all concerned ensure that the DMO be made aware of planned changes so that the relevant NAT documentation could amended accordingly. The DMO would not involve itself in the decision of the States but would try to ensure consistency amongst all States.

4.1.3 The Group was informed that the DMO would now undertake to update the MNPS Operations Manual in the light of recent changes and would further concentrate on updating the Guidance Material and the Flight Planning Manual. A progress report would be provided to NAT SPG/43.

4.1.4 The Group noted that the NAT IMG had tasked all of its working groups to provide the DMO with information that may affect NAT documentation. The DMO would then take this material into account when updating the relevant documents.

MNPS Operations Manual

4.1.5 The Group was informed that the revision to the MNPS Operations Manual had been completed and that the document had been posted on the web site in English only. It was available for download and no hard copies would be produced by ICAO.

NAT Air Navigation Plan (ANP) and Facilities and Services Implementation Document (FASID)

4.1.6 The amended NAT Basic ANP and FASID have been posted on the NAT PCO web site for comment. They had been submitted to the President of the Council for approval and a non-trial version of the ANP will be produced. In the meantime, the updated version will be maintained on the web site.

Implementation of a regulated system for the promulgation to NAT documentation

4.1.7 The Group noted that the NAT IMG had agreed that a regulated system be put in place to announce changes to the NAT air navigation system and/or procedures which were not covered by the provisions of Annex 15. Considering that the ICAO Annex 15 provisions regarding the AIRAC system were known by all, the Group endorsed the NAT IMG decision that the procedures for promulgation and notification be based on Annex 15. This would also apply to NAT specific documentation such as the MNPS Operations Manual.

5. ANY OTHER BUSINESS

5.1 Next meeting

5.1.1 The Group agreed that NAT SPG/43 be held in the ICAO EUR/NAT Office, from 12 to 15 June 2007. Considering the benefit of starting the meeting on Tuesday, the same procedure will be applied for the next meeting.

5.2 Farewells

5.2.1 The Group expressed its sincere appreciation to Mr Carlos Monteiro, the Member for Portugal, who joined the Group in 1995 (NAT SPG/31). The Group wished Carlos and his family all the best in their future adventures.

5.2.2 The Group was informed that Mr Bill Voss, the Director of the Air Navigation Bureau (D/ANB) would be leaving the Organisation. Accordingly, the Secretary was requested to express on its behalf of the NAT SPG its appreciation for the guidance and support that Mr Voss provided. It was felt that significant achievements had been made under his leadership, specifically in the areas of improving aviation safety and the development of the Global Air Navigation Plan and the associated Global Plan Initiatives – both of which will be drivers for the activities of the Group in the future.

5.3 Remembrance

5.3.1 The Group was informed that Mr Lincoln Lee had died on the 1st of May 2006 at the age of 84. It was recalled that, in 1965 Lincoln had joined IATA as its first Regional Technical Director for the North Atlantic & North America and had represented the airline industry on the ICAO North Atlantic Systems Planning Group for twenty-two years. During this time he became the guru of Atlantic operations, writing both the IATA Handbook and the ICAO 'North Atlantic MNPS Airspace Operation Manual' - both indispensable documents for North Atlantic flight operations. The Group was informed that the ICAO EUR/NAT Office had forwarded the NAT SPG's condolences to Lincoln's family.

5.3.2 The Group was also informed that Mr Paul Frantz who had represented the user community within IATA for several years had passed away. The Group expressed its condolences to Paul's family and asked that the Secretary inform the family accordingly.

APPENDIX A -

LIST OF PARTICIPANTS

(Paragraph i.4 refers)

CHAIRMAN

Mr Asgeir PALSSON*

CANADA

Mr Randy SPEIRAN*
Mr Ross BOWIE

DENMARK

Mr Knud ROSING**
Mr Kurt ANDREASEN

FRANCE

Mr André BERMAN *
Mr Didier EVEN
Mr Kamel REBAI #
Mr Philippe TANGUY

IRELAND

Mr Pat RYAN*
Mr Donie MOONEY

ICELAND

Mr Leifur HAKONARSON

PORTUGAL

Mr Carlos MONTEIRO*
Mr Carlos ALVES
Mr Jose CABRAL
Mr Jose SOUSA

UNITED KINGDOM

Mr Ben BENOIST*
Mr Bob THOMSON
Mr David NICHOLAS
Mr Stephen KIRBY

UNITED STATES

Mr Luis RAMIREZ*
Ms Carey J. FAGAN
Mr David MALOY
Mr Gerald L. RICHARD
Mr Anthony FERRANTE

IATA

Mr Peter LAY
Mr Cees GRESNIGT

IBAC

Mr Brian BOWERS

IFALPA

Mr Mark SEAL

IFATCA

Mr Edward WALLACE

INMARSAT

Mr Gary COLLEDGE

DMO

Mr Alan R.L. GILBERT

ICAO

Mr Karsten THEIL
Mr Jacques VANIER
Mr John BEGIN
Mr Herman PRETORIUS
Mr Robert KRUGER
Mr Michel BELAND
Mr Victor KOURENKOV
Mrs Nikki GOLDSCHMID
Ms Patricia CAVISTON

* Member ** Alternate Member # Part time

APPENDIX B -

DRAFT TERMS OF REFERENCE OF THE

TRANS-REGIONAL AIRSPACE AND SUPPORTING ATM SYSTEMS STEERING GROUP (TRASAS)

(Agenda Item 1, Paragraph 1.2.12 refers)

Introduction

In order to continue work already done concerning the traffic in the Northern area and to respond to the new requirements for increased efficiency and further developments, co-ordinated efforts of the international civil aviation community is required. It would involve States and Organisations from four of the ICAO Regions: EUR, ASIA, NAT and PAC. A Trans-Regional Airspace and Supporting ATM Systems Steering (TRASAS) Group shall respond to these requirements under the following Terms of Reference.

Purpose and objectives

The ICAO Trans-Regional Airspace and Supporting ATM Systems Steering (TRASAS) Group shall co-ordinate the requirements of international civil aviation for a coherent and economically viable and operationally optimal structure of ATS routes, linking city-pairs in Europe and Asia, Europe and North America and Asia and North America. The route network shall have sufficient flexibility to plan different flight paths, day-by-day, to take advantage of prevailing upper winds.

The Group shall work in close co-operation with aircraft operators' international organisations in order to ensure that known and expected requirements for international and domestic routings and cost-effective implementation are taken into account. The Group will also take account of the requirements for adequate feeder and connection routings to enable optimal access to the route network from points of departure and points of destination, upstream, downstream and from within its vicinity. The scope of the work will respond to the global objectives of the ICAO operational concept and support the new ICAO Global Air Navigation Plan Initiatives: GPI-1 (flexible use of airspace), GPI-2 (reduced vertical separation minima), GPI-3 (harmonised level system), GPI-5 (performance-based navigation), GPI-6 (air traffic flow management), GPI-7 (dynamic and flexible ATS route management), GPI-8 (collaborative airspace design and management), GPI-17 (implementation of data-link applications), GPI-20 (WGS-84 implementation), GPI-21 (navigation systems) and GPI-22 (communication network infrastructure).

Scope of work

The TRASAS Group shall make proposals and promote improvements for the safety and efficiency of the Northern area route structure and the supporting ATM systems within the States affected by such proposals. It shall base its work on aircraft operators' requirements, which may be expanded and complemented, as necessary.

The Group shall take into account modern space based technology (GPS/GLONASS/GNSS and ADS) in accordance with the ICAO CNS/ATM system concept and plan for an orderly transition period. This transition period should enable a seamless migration of current aircraft fleets to full CNS/ATM compliance on such routes in the future. TRASAS shall consider an equitable cost

recovery scheme for the established route system in accordance with ICAO provisions in line with Article 15 of the Chicago Convention.

The Group shall not substitute itself for other existing bodies which are active under the auspices of ICAO (e.g. European Air Navigation Planning Group (EANPG), North Atlantic Systems Planning Group (NAT SPG), ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG), etc.) or bodies operating as bilateral/multilateral State initiatives. It may provide guidance as well as a co-ordinating function for these Groups working on the various technical and operational aspects related to the intended transit route network and to combine the results into one coherent overall plan. This will lead to the amendment, if and when required, of the ICAO Regional Air Navigation Plan (ANP) in accordance with procedures established by the ICAO Council.

In addition to its technical work on the newly established route system, the TRASAS Group shall explore proposals for financing and cost recovery for this system.

Activities

- To promote a modern, efficient and cost-effective international ATS route network linking city-pairs in Europe, Asia and North America, taking into account the recognized requirements of the airspace users, taking advantage of seasonal wind patterns, and making use of space-based technology in accordance with the ICAO CNS/ATM system concept.

- To promote efficient air traffic management and associated systems to improve safety, increase capacity and enhance operational and economic efficiency.

- To promote the provision of sufficient capacity so as to avoid the need for air traffic flow management (ATFM).

- To develop a coherent transition plan enabling a seamless migration of current aircraft fleets to full CNS/ATM compliance on such routes in the future.

- To promote the establishment of a minimum number of suitably equipped Area Control Centres (ACC) and an infrastructure adequate to provide the required air traffic services along the proposed ATS route structure.

- To promote suitable financing and cost recovery mechanisms for the newly established route system in accordance with the applicable ICAO provisions and in line with Article 15 of the Convention on International Civil Aviation (Chicago, 1944).

- To analyse the costs and benefits achieved by individual ATS routes of the newly established route system to determine their eligibility for inclusion into the ICAO Regional Air Navigation Plan.

TRASAS may establish Contributory Working Bodies (CWB) that shall work on its behalf on specific expert issues (route network developments, RVSM implementation, communications, airport issues etc).

Composition

The TRASAS Group shall be composed of representatives with operational and technical, expertise from Canada, China, Democratic People's Rep. of Korea, Denmark, Finland, Iceland, Japan, Mongolia, Norway, Republic of Korea, Russian Federation, United States and from aircraft operators' international organisations (e.g. IACA, IATA, IBAC).

The TRASAS Group shall work under the auspices of ICAO. The EUR/NAT Office shall provide full secretarial support to the Group.

The Group may invite participation from other States which may be concerned during the progress of its work (e.g. States in Central Asia, in the South Caucasus area, and others) and international organizations which may provide useful input during its deliberations.

Reporting

Reports of the TRASAS shall be prepared by the ICAO Secretariat in the usual standard fashion. As reports of an informal group, this documentation will be made available to participating States and international organization(s) and shall be distributed to the Regional Planning Groups [in particular the European Air Navigation Planning Group (EANPG), the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG), the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) and North Atlantic Systems Planning Group (NAT SPG) for their information and to facilitate co-ordination which may be required within their respective work programmes.

Communication

As far as possible, members and participants in the work of TRASAS shall correspond by electronic mail. Their communications should be as informal as possible to ensure rapid progress of the work programme.

Target dates and deliverables

TRASAS shall establish a comprehensive work programme containing target dates and milestones to be achieved. It should strive to complete its tasks in the shortest possible time.

APPENDIX C -

FORECASTS OF AIRCRAFT MOVEMENTS

(Agenda Item 2.3, Paragraph 2.3.9 refers)

Table 1
FORECASTS OF AIRCRAFT MOVEMENTS
IN THE ICAO NORTH ATLANTIC REGION
(THOUSANDS)

	ACTUAL						FORECAST						
SCENARIO	**2000**	**2001**	**2002**	**2003**	**2004R**	**2005e**	**2006**	**2007**	**2008**	**2009**	**2010**	**2015**	**2020**
OPTIMISTIC							424.1	445.8	472.4	503.7	533.2	668.8	818.4
BASELINE	382.0	368.9	345.5	360.1	382.0	400.6	418.8	435.3	456.9	480.7	503.5	609.6	727.6
PESSIMISTIC							414.8	420.0	437.5	456.4	473.0	552.0	635.4

ANNUAL PERCENTAGE CHANGE IN AIRCRAFT MOVEMENTS

	ACTUAL						FORECAST							
SCENARIO		**2001/00**	**2002/01**	**2003/02**	**2004/03**	**2005/04**	**2006/05**	**2007/06**	**2008/07**	**2009/08**	**2010/09**	**2010/05***	**2015/10***	**2020/15***
OPTIMISTIC							5.9%	5.1%	6.0%	6.6%	5.9%	5.9%	4.6%	4.1%
BASELINE		-3.4%	-6.3%	4.2%	6.1%	4.9%	4.5%	3.9%	5.0%	5.2%	4.8%	4.7%	3.9%	3.6%
PESSIMISTIC							3.5%	1.3%	4.2%	4.3%	3.6%	3.4%	3.1%	2.9%

e = Estimate
R = Revised
* Average annual percentage growth rate

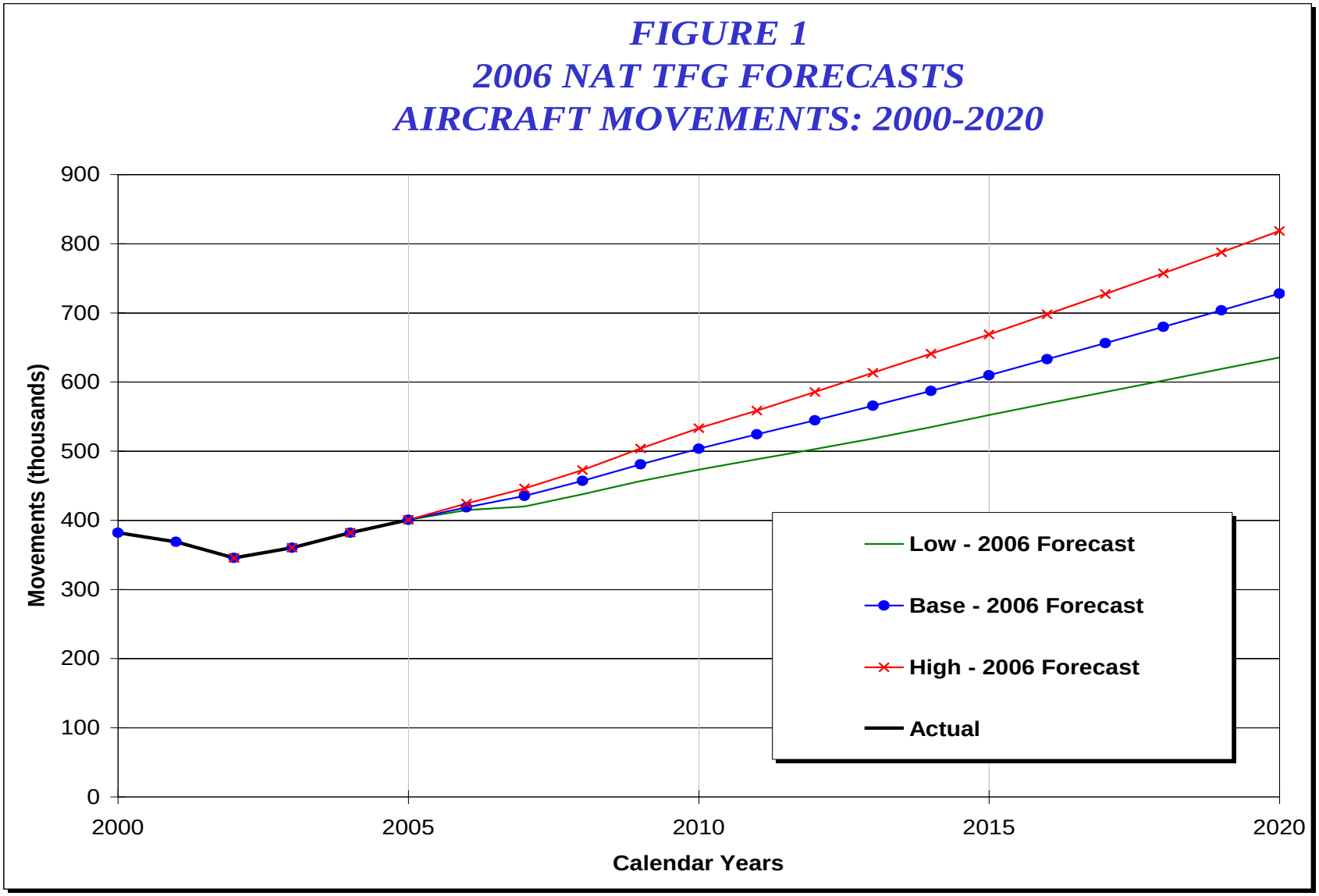
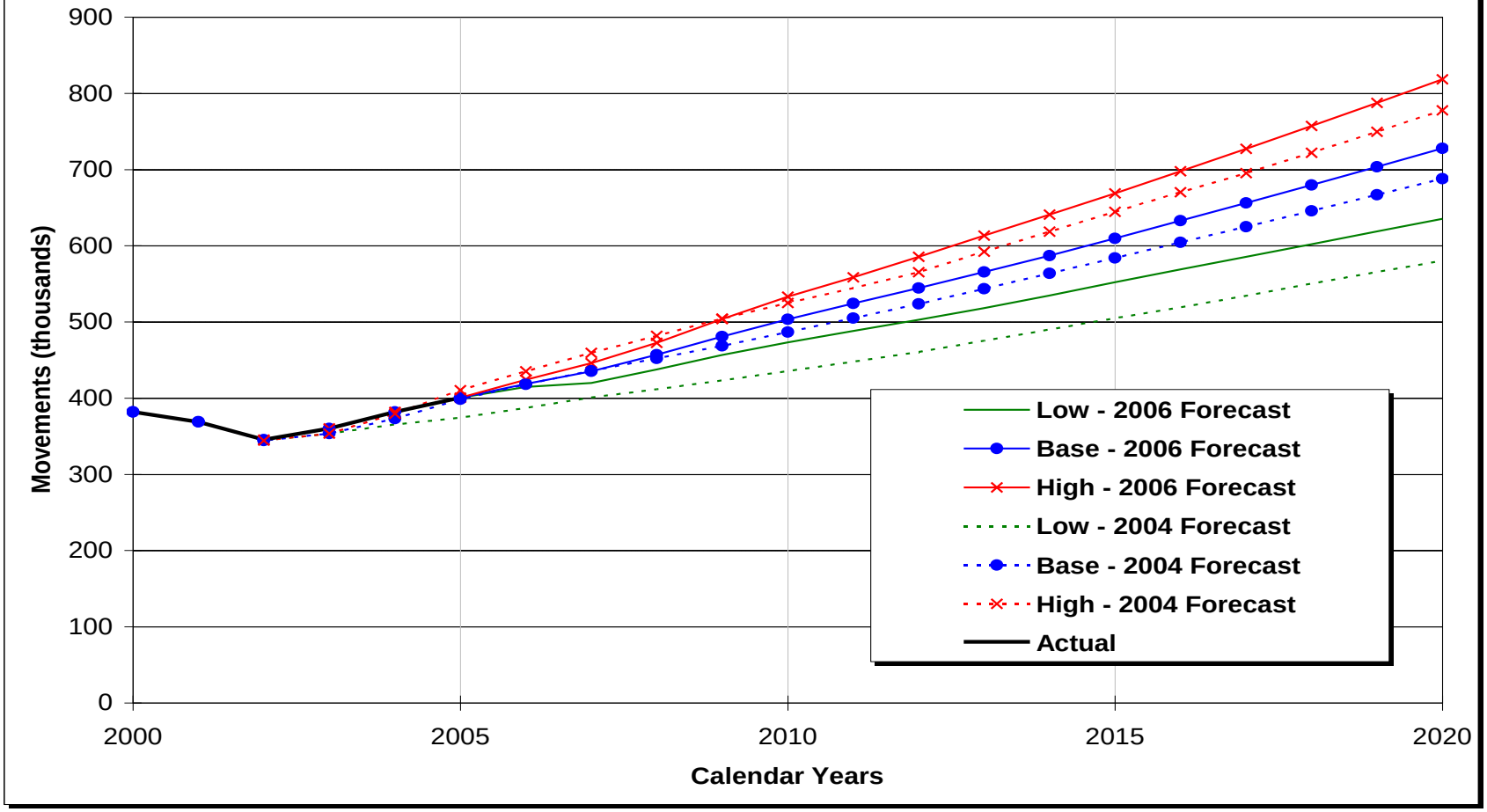


FIGURE 1
2006 NAT TFG FORECASTS
AIRCRAFT MOVEMENTS: 2000-2020
900
800
700
600
500
400
300
200
100
0
Movements (thousands)
2000
2005
2010
2015
2020
Calendar Years
Low - 2006 Forecast
Base - 2006 Forecast
High - 2006 Forecast
Actual

FIGURE 2
COMPARISON OF 2004 AND 2006 NAT TFG FORECASTS
AIRCRAFT MOVEMENTS: 2000-2020



LIST OF ACRONYMS

AAD	assigned altitude deviation
ACARS	Aircraft Communication Addressing and Reporting System
ACAS	Airborne Collision Avoidance System
ACAS II	Airborne Collision Avoidance System – Phase 2
ACC	Area Control Centre
ACG	Aeronautical Communications Group
ADS	Automatic Dependent Surveillance
AFI	African
AFTN	Aeronautical Fixed Telecommunications Network
AIC	Aeronautical Information Circular
AIDC	ATS Inter-Facility Data Communication
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
ALLPIRG	All Planning and Implementation Regional Groups
AMSS	Aeronautical Mobile-Satellite Service
ANP	Air Navigation Plan
ANSP	Air Navigation Service Provider/s
ASE	Altimetry System Error
ASM	Application of Separation Mininima (Document)
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATMG	Air Traffic Management Group
ATMIP	Air Traffic Management Implementation Plan
ATN	Aeronautical Telecommunications Network
ATOP	Advanced Technologies and Oceanic Procedures
ATS	Air Traffic Services
BOTA	Brest Oceanic Transition Area
CAA	Civil Aviation Authority
CADAG	Communications, Automation and Data Link Applications Group
CADS	Central Automatic Dependent Surveillance
CAR	Caribbean
CDM	Collaborative Decision Making
CFMU	Central Flow Management Unit (Eurocontrol)
CMA	Central Monitoring Agency
CNS	Communications
CNS/ATM	Communications, Navigation and Surveillance/Air Traffic Management
COM	Communication
CONOPS	Concept of Operations
CPDLC	Controller Pilot Data Link Communications
CRM	Collision Risk Model
CTA	Control Area
EATCHIP	European Air Traffic Control Harmonization and Integration Programme
EATMP	EUROCONTROL Air Traffic Management Program
ECAC	European Civil Aviation Conference
EFG	Economic and Financial Group
EGNOS	European Geostationary Navigation Overlay Service
ELT	Emergency Locator Transmitter
ETMS	Enhanced Traffic Management System (US)
EUR	European
EUR/NAT	European and North Atlantic
EUROCAE	The European Organization for Civil Aviation
FAA	Federal Aviation Administration
FANS	Future Air Navigation Systems

FASID	Facilities and Services Implementation Document
FCMA	FANS Central Monitoring Agency
FDE	Fault Detection and Exclusion
FDPS	Flight Data Processing System
FIG	FANS 1/A Implementation Group
FIR	Flight Information Region
FIS	Flight Information Services
FMC	Flight Management Computer
FMS	Flight Management System
FTE	Flight Technical Error
GAATS	Gander Automated Air Traffic System
GAT	General Air Traffic
GLONASS	Global Orbiting Navigation Satellite System
GMS	Global Positioning System Monitoring System
GMU	Global Positioning System Monitoring Unit
GNE	Gross Navigation Error
GNSS	Global Navigation Satellite System
GP	General Purpose
GPS	Global Positioning System
HF	High Frequency
HFDL	HF Data Link
HMS	Height Monitoring System
HMU	Height Monitoring Unit
IACA	International Air Carrier Association
IAOPA	International Council of Aircraft Owner and Pilot Associations
IATA	International Air Transport Association
IBAC	International Business Aviation Council
ICD	Interface Control Document
IFALPA	International Federation of Air Line Pilots' Associations
IFATCA	International Federation of Air Traffic Controllers' Associations
IGA	International General Aviation
Inmarsat	International Maritime Satellite Organization
INS	Inertial Navigation System
IOC	International Oceanic Conference
IRS	Inertial Reference System
ITASPS	ICAO Informal Trans-Asia/Trans-Siberia/Cross Polar Routes High Level Steering Group
ITU	International Telecommunications Union
JAA	Joint Aviation Authorities
KPI	Key Performance Indicators
LHD	Large Height Deviation
LIM NAT RAN	Limited North Atlantic Regional Air Navigation
LOA	Letter of Agreement
MAS	Message assurance
MASPS	Minimum Aircraft System Performance Specification
MEL	Minimum Equipment List
MET	Meteorology
MIG	Mathematicians Implementation Group
MNPS	Minimum Navigation Performance Specifications
MNPS OPS	Minimum Navigation Performance Specifications Operations
MNT	Mach Number Technique
MOC	Memorandum of Cooperation
MOPS	Minimum Operational Performance Standards
MOU	Memorandum of Understanding
MSSR	Monopulse Secondary Surveillance Radar
MWG	Mathematicians Working Group
NAM	North American
NAT	North Atlantic

NAT EFG	North Atlantic Economic and Financial Group
NAT IMG	North Atlantic Implementation Management Group
NAT SPG	North Atlantic Systems Planning Group
NAT TFG	North Atlantic Traffic Forecasting Group
NICE Group	NAT Implementation Management Cost Effectiveness Group
NOAA	National Oceanic and Atmospheric Administration
OAC	Oceanic Area Control Centre
OCA	Oceanic Control Area
OCD	Oceanic Clearance Delivery
ODAPS	Oceanic Display and Planning System
OLDI	On Line Data Interchange
OPS MNG	NAT Operations Managers
OPS/AIR	Operations/Airworthiness
OTS	Organized Track System
PCO	Programme Co-ordination Office
R&D	Research and Development
R/T	Radio Telecommunication
RAIM	Receiver Autonomous Integrity Monitoring
RCP	Required Communications Performance
RHSM	Reduced Horizontal Separation Minima
RMA	Regional Monitoring Agency
RNAV	Area Navigation
RNP	Required Navigation Performance
RSSIG	Reduced Separation Standards Implementation Group
RTCA	Radio Technical Commission for Aeronautics
RVSM	Reduced Vertical Separation Minimum
SAR	Search and Rescue
SARPS	Standards and Recommended Practices (ICAO)
SARSIG	Safety Analysis and Reduced Separation Implementation Group
SASP	Separation and Airspace Safety Panel
SATCOM	Satellite Communications
SLOP	Strategic Lateral Offset Procedure
SMCG	Safety Management Coordination Group
SOP	Standard Operating Procedure
SOTA	Shannon Oceanic Transition Area
SSR	Secondary Surveillance Radar
SST	Supersonic Transport
SUPPS	Regional Supplementary Procedures
SWM	NAT Mid-Level Significant Weather Forecast Chart
TA	Traffic Advisors
TCAS	Traffic Alert and Collision Avoidance System
TIBA	Traffic Information Broadcast by Aircraft
TLS	Target Level of Safety
TOR	Terms of Reference
TVE	Total Vertical Error
UIR	Upper Information Region
VAAC	Volcanic Ash Advisory Centers
VHF	Very High Frequency
WAAS	Wide Area Augmentation System
WATRS	West Atlantic Route System
WGS-84	World Geodetic System – 1984 Standards
WPR	Waypoint Position Report
WWW	World Wide Web

– END –