



International Civil Aviation Organization

AIR NAVIGATION SYSTEMS IMPLEMENTATION GROUP

First Meeting (ANSIG/1)
(Cairo, Egypt, 10 –12 February 2015)

Agenda Item 3: Air Navigation Global and Regional Developments

GLOBAL AND REGIONAL DEVELOPMENTS RELATED TO ENVIRONMENT

(Presented by the Secretariat)

SUMMARY

This paper presents the Global and Regional developments related to environment.

Action by the meeting is at paragraph 3.

REFERENCES

- Guidance on the Development of States' Action Plans on CO₂ Emissions Reduction Activities (DOC 9988)
- ICAO CAEP Portal ([http://www.icao.int/environmental - protection/Pages/default.aspx](http://www.icao.int/environmental-protection/Pages/default.aspx))
- MIDANPIRG/14 Report
- APM TF/2 Report
- State Letters Ref. AN 1/17 – 14/56&57 dated 10 Sep. 2014

1. INTRODUCTION

1.1 The meeting may wish to note that environmental protection to minimize the adverse environmental effects of civil aviation activities is one of the five strategic objectives of ICAO.

1.2 In general the environment issues are addressed by the Committee on Aviation Environmental Protection (CAEP), which is a technical committee of the ICAO Council established in 1983. CAEP assists the Council in formulating new policies and adopting new Standards and Recommended Practices (SARPs) related to aircraft noise and emissions, and more generally to aviation environmental impact. However, the ATM Performance Measurements Task Force (APM TF) is tasked to estimate the environmental benefits accrued from the implementation of ATM operational improvements in the MID Region.

1.3 The APM TF/2 meeting was held in the ICAO MID Regional Office Premises, 10-11 November 2014. The meeting was attended by a total of fifteen (15) participants from five (5) States (Bahrain, Egypt, Kuwait, Saudi Arabia and Sudan) and one (1) International Organization (IATA).

2. DISCUSSION

Action Plans on emissions reduction

2.1 The meeting may wish to note that the 38th Assembly highlighted the importance of reinforcing the voluntary nature of States' action plans on CO₂ emissions reduction. It encouraged Member States to voluntarily submit more complete and robust data in their action plans to facilitate the compilation of global emissions data by ICAO, and to make their action plans publically available. It also encouraged the partnerships among ICAO, States and other organizations to support the preparation of action plans, and emphasized the need for the Secretariat to provide further guidance and other technical assistance.

2.2 An action plan is a means for States to communicate to ICAO information on activities to address CO₂ emissions from international aviation. The level of information contained in an action plan should be sufficient to demonstrate the effectiveness of actions and to enable ICAO to measure progress towards meeting the global goals set by Assembly Resolution A38-18. Action plans give States the ability to: establish partnerships; promote cooperation and capacity building; facilitate technology transfer; and provide assistance.

2.3 At a minimum the following information should be contained in the plan:

- Contact information;
- Baseline (without action) fuel consumption and traffic (2010 or earlier to 2050);
- List of measures proposed to address CO₂ emission from international civil aviation;
- Expected results (fuel consumption and traffic with the actions being taken 2014 to 2050); and
- Information on any assistance needs (financial, technological, training, etc.).

N.B: States are invited to update and submit their action plans at least once every three years.

2.4 The meeting may wish to note that five (5) MID States (Bahrain, Iraq, Jordan, Sudan and UAE) have provided their action plans:

2.5 The meeting may wish to note that, the 38th Assembly through the Resolution A38-18, resolved that States and relevant organizations will work through ICAO to achieve a global annual average fuel efficiency improvement of 2 per cent until 2020 and an aspirational global fuel efficiency improvement rate of 2 per cent per annum from 2021 to 2050, calculated on the basis of volume of fuel used per revenue tonne-kilometre performed.

2.6 The meeting may wish to recall that, MIDANPIRG/14 meeting (Jeddah, Saudi Arabia, 15-19 December 2013), through MIDANPIRG Conclusion 14/29, encouraged States to develop/update their Action Plans for CO₂ emissions and submit them to the ICAO MID Regional Office or through the APER website on the ICAO Portal:

<http://www.icao.int/environmentalprotection/Pages/action-plan.asp>

2.7 The meeting way wish to note that, in order to provide assistance to States in developing/updating their Action Plans for CO₂ emissions, a Seminar on International Aviation, Environment and States' Action Plans is planned to be held in Dubai, UAE in **10-12 March 2015**.

2.8 The meeting may wish to note that the State Letter Ref. AN 1/17 – 14/57 at **Appendix A** was issued by ICAO on 10 September 2014, requesting States to provide CAEP with information and data related to environmental benefits, by 31 December 2014.

2.9 The State Letter contains two (2) questionnaires on Noise certification of unmanned aircraft systems and fuel availability and composition of commercial fuel. Moreover, the State Letter includes two (2) requests for information about Radar data and Alternative Fuels.

Operational Improvements

2.10 The meeting may wish to recall that the 38th Assembly urged States to take into consideration the Global Air Navigation Plan (GANP) guidelines as an efficient operational measure for environmental protection. The GANP includes the Aviation System Block Upgrades (ASBU) global framework, developed by ICAO, to ensure that aviation safety will be maintained and enhanced, that ATM improvement programmes are effectively harmonized, and that barriers to future aviation efficiency and environmental gains can be removed at reasonable cost.

2.11 The technologies and procedures for each Block have been organized into unique ‘Modules’ which have been determined and cross-referenced based on the specific performance improvement area to which they relate. ICAO has produced the systems engineering for its Member States so that they need only consider and adopt the Modules appropriate to their operational need.

2.12 The meeting may wish to note that ICAO recognized the difficulty faced by many States in assessing the environmental benefits of their investments in operational measures to improve fuel efficiency. Accordingly, ICAO, in collaboration with subject matter experts and other international organizations, has developed the ICAO Fuel Savings Estimation Tool (IFSET).

1.1

2.13 IFSET helps to harmonize State fuel-savings assessments consistent with more advanced models already approved by the CAEP. It will estimate the difference in fuel mass consumed by comparing a pre-implementation (i.e. baseline) case against a post-implementation case (i.e. after operational improvements).

2.14 IFSET was rolled out to ICAO Member States through a series of workshops during 2012. It was developed not to replace the use of detailed measurements or modelling tools regarding fuel savings, but rather to assist those States without the facility to estimate the benefits from operational improvements in a straightforward and harmonized manner. It is to be highlighted that during the First meeting of the ATM Measurements Task Force (ATMM TF/1), Cairo, Egypt, 8-9 September 2013, participants had the opportunity to practice the IFSET and estimate the amount of fuel saved for their identified operational improvements. IFSET is available on the ICAO website through the following link: <http://www.icao.int/environmental-protection/Pages/Tools.asp>

2.15 In connection with the above, ICAO developed the Operational Opportunities to Reduce Fuel Burn and Emissions Manual (ICAO Doc 10013) and the Guidance on Environmental Assessment of Proposed Air Traffic Management Operational Changes Manual (ICAO Doc 10031).

2.16 ICAO Doc 10013 identifies and reviews various operational opportunities and techniques for minimizing fuel consumption, and therefore emissions, in civil aviation operations. It is based on the premise that the most effective way to minimize aircraft emissions is to minimize the amount of fuel used in operating each flight. This manual updates and replaces information previously provided in ICAO Circular 303 — Operational Opportunities to Minimize Fuel Use and Reduce Emissions published in 2004. This document contains information on current practices that are followed by aircraft operators, airport operators, air navigation services providers (ANSPs), other industry organizations and States, which are intended to minimize fuel use and reduce emissions from

civil air transport. The manual is therefore aimed at airlines, airport operators, air traffic management and air traffic control service providers, airworthiness authorities, environmental agencies and other government bodies and interested parties.

2.17 The objectives of ICAO Doc 10013 are to:

- a) document industry experience and the benefits, in terms of emissions, resulting from optimizing the use of current aircraft and infrastructure, and the related benefits of infrastructure improvements;
- b) identify improvements that could result in measurable fuel savings; and
- c) demonstrate that a more efficient use of infrastructure is an effective means of reducing civil aviation emissions and therefore promote enhanced use of the capabilities inherent in existing aircraft, ground service equipment and infrastructure.

2.18 On the other hand, the purpose of the ICAO Doc 10031 is to provide States, airport operators, air navigation service providers (ANSPs) and other stakeholders with environmental assessment guidance to support sound and informed decision making when analyzing proposed air traffic management (ATM) operational changes. High-level principles related to the quantification of changes in aviation-related environmental impacts associated with air navigation service changes are collected in order to ensure a consistent approach to the analysis of the changes, while minimizing the risk of common assessment errors. This provides a framework within which specific, detailed assessment methodologies can be developed that meet local requirements, while facilitating global compatibility of results. It is also intended to assist with recognizing any environmental benefits associated with operational changes. While the guidance is intended to be applied broadly, it also highlights areas of priority that may need to be considered at the local level.

2.19 The ICAO Doc 10031 includes high-level principles extracted from the environmental assessment best practices of air navigation service providers, State governments and other advisory bodies. These high-level principles are not intended to override existing or future State-specific guidance, but can be used to support their development, or evolution.

2.20 The meeting may wish to note that, in 2013, a high-level analysis of the potential environmental benefits from seven ASBU Block 0 modules was undertaken by the CAEP, which estimated that up to 4 million tonnes of fuel savings could be achieved from planned Block 0 module implementation.

2.21 In view to support a comprehensive ASBU Block 0 global environmental analysis currently underway by CAEP, a questionnaire was circulated through the ICAO State Letter Ref AN 1/17 14/56 dated 10 September 2014 at **Appendix B**, requesting States to submit the completed questionnaire by 31 December 2014.

2.22 The questionnaire is divided into questions per ASBU Performance Improvement Area. For each module, the operational improvement is detailed along with questions designed to obtain the information required related to possible fuel savings to advance the work described above.

2.23 It is to be highlighted that the global environmental benefits are published in the annual ICAO Air Navigation Report, which could be accessed through the following link: <http://www.icao.int/airnavigation/pages/Air-Navigation-Report.aspx>. However, the environmental benefits accrued from the implementation of operational improvements in the MID Region are published in the MID Region Air Navigation Environmental Report, which are posted on the MID Office website.

2.24 The meeting may wish to note that the APM TF/2 was apprised of the global developments related to environment. The meeting reviewed the above-mentioned questionnaires and urged States to provide their inputs, information and comments to ICAO by 31 December 2014. It is to be noted that only Egypt, Sudan, and UAE replied to the above-mentioned questionnaire.

2.25 A quick analysis of the replies received shows that States are planning to implement the ASBU ‘elements’ by 2018 and they are expecting environmental benefits to be accrued from these implementations. However, States were unable to answer several questions due to the lack of required information (difficulty to measure).

3. ACTION BY THE MEETING

3.1 The meeting is invited to encourage States to:

- a) develop/update their Action Plans for CO₂ emissions and submit them to the ICAO MID Regional Office or through the APER website on the ICAO Portal;
- b) attend the Seminar on International Aviation, Environment and States’ Action Plans (Dubai, UAE, 10-12 March 2015);
- c) provide ICAO with their data and information requested by the State Letters Ref. AN 1/17 – 14/56 and AN 1/17 – 14/57 dated 10 September 2014, as soon as possible, if not yet done so;
- d) encourage States and Users to use the guidelines provided in ICAO Doc 10013 and Doc 10031, when planning for the implementation of operational improvements; and
- e) urge States to use the IFSET for the estimation of the amount of fuel saved (CO₂ emissions reduction) from the implemented operational improvements.



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Ref.: AN 1/17 – 14/57

10 September 2014

Subject: International Civil Aviation Organization
(ICAO) Committee on Aviation Environmental
Protection (CAEP) Request for Data and Information

Action required: Submit completed questionnaires to
ICAO by 31 December 2014

Sir/Madam,

Global demand for air travel is estimated to increase significantly in the future. While this growth will deliver global economic and social benefits, its negative impact on the environment from aircraft noise and emissions is to be minimized. In this regard, the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP) is the body responsible for undertaking specific technical analyses related to control of aircraft noise and gaseous emissions from aircraft engines. The work of CAEP is undertaken by Working Groups, each tasked with a specific work programme related to a particular technical area, including aircraft noise, operations, aircraft engine emissions, modelling and data analysis, alternative fuels, and market-based measures.

The Working Groups rely on the cooperation of all ICAO Member States to provide the data and information required to accurately complete the studies and analyses with which they have been tasked. At the request of States, in order to reduce the burden of responding to multiple requests on the same topic, this letter includes a consolidated request for all information and data required by CAEP this year. Each attachment to this letter serves as a stand-alone request for information that can be provided to the appropriate departments within your Government.

I encourage your Government to submit to ICAO the data and information requested herein, no later than 31 December 2014.

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

Raymond Benjamin
Secretary General

Enclosures:

- A — Questionnaire on Noise Certification of Unmanned Aircraft Systems (UAS)
- B — Questionnaire on Certification Fuel Availability and Composition of Commercial Fuel
- C — Request for radar information and data
- D — Request for alternative fuels information and data

ATTACHMENT A to State letter AN 1/17 – 14/57

CAEP WORKING GROUP 1 – AIRCRAFT NOISE, TECHNICAL

**QUESTIONNAIRE ON NOISE CERTIFICATION OF
UNMANNED AIRCRAFT SYSTEMS (UAS)**

CAEP Working Group 1 - Aircraft Noise Technical (WG1) is tasked with keeping ICAO noise certification Standards (Annex 16 – *Environmental Protection*, Volume I – *Aircraft Noise* to the *Convention on International Civil Aviation*) up to date and effective, while ensuring that the certification procedures are as simple and inexpensive as possible.

CAEP WG1 has been tasked to review the status of Unmanned Aircraft Systems (UAS) and inform CAEP if there is a need for work on the noise certification of UAS. The first action by WG1 will be to make an inventory of the current status of rules and practices, and any experiences and plans States may have, with respect to UAS noise certification. This is the purpose of this questionnaire.

For the purpose s of this exercise, a UAS is defined as an aircraft and its associated elements which are operated with no pilot on board.

Question	Answer
1) Annex 16, Volume I currently has no lower weight limits and is not limited to manned aircraft. Thus some Chapters therein may be applicable to some types of UAS. Does your State currently apply (or would apply if there was an application) the requirements of ICAO Annex 16, Volume I (or equivalent) for noise certification of UAS?	
If so, under what regulatory regime were they certified? (e.g. flight operations, design, airspace or airways usage, crew license, etc.)	
2) If your State does not apply Annex 16, Volume I, does your State apply any alternative requirements, guidance, procedures or policies for UAS with regard to the general purpose of noise management at the source or noise certification¹?	

¹ The purpose of noise certification is defined here as: "to ensure that the latest available noise reduction technology is incorporated into aircraft design demonstrated by procedures which are relevant to day to day operations, to ensure that noise reduction offered by technology is reflected in reductions around airports".

<p>3) If your State did apply noise management at the source or a certification scheme of any kind for UAS, what was your experience? (Please indicate problems, recommendations, lessons learned.)</p>	
<p>4) Did your State take into account specific operational features or particular uses (e.g. environmental monitoring, firefighting, etc.), how UAS are operated, and/or any operating restrictions applicable when establishing the noise management at source or certification scheme?</p>	
<p>5) Does your State issue noise certificates for UAS? Is your State interested in issuing noise certificates for UAS?</p>	
<p>6) Do you consider UAS a noise problem in your State? Please describe your State's experience.</p>	
<p>Does your State have any plans to introduce or remove (specific) noise management at source or certification schemes for UAS?</p>	
<p>If your State is considering the introduction of schemes, please share details or the main characteristics of these schemes with ICAO (e.g. applicability, procedures, metric, regulatory limit values).</p>	

7) Do you foresee any problems in the future linked to noise of UAS in your State? Please explain.	
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This questionnaire can be completed online at <https://portal.icao.int/surveys/En/Lists/QuestionnaireWG1/overview.aspx> or sent in hard copy to:

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Fax: +1 514-954-6744

CAEP WORKING GROUP 3 – EMISSIONS TECHNICAL

**QUESTIONNAIRE ON CERTIFICATION FUEL AVAILABILITY AND
COMPOSITION OF COMMERCIAL FUEL**

CAEP Working Group 3 – Emissions Technical (WG3) is tasked with keeping ICAO emissions certification Standards (Annex 16 – *Environmental Protection*, Volume II – *Aircraft Engine Emissions* to the *Convention on International Civil Aviation*) up to date and effective, while ensuring that the certification procedures are as simple and inexpensive as possible.

CAEP WG3 has been tasked with monitoring trends in aviation kerosene fuel supply composition and assess the consequences for emissions. The purpose of this questionnaire is to collate fuel composition data to help progress this task.

1. Certification fuel availability

The fuel specification bodies establish limits on the properties of the fuels for commercial use so that aircraft are safe and environmentally acceptable in operation. For engine emissions certification, the fuel specification is regulated for fuel properties with more stringent limits (Annex 16 – *Environmental Protection*, Volume II – *Aircraft Engine Emissions*, Appendix 4 refers). For example, the certification fuel specifications in Annex 16, Volume II set a minimum 1 per cent volume of naphthalene content and a maximum content of 3 per cent. It has been highlighted by the aerospace manufacturing community that it is challenging to source fuels for certification emission testing that meet this requirement. This raises the wider question on the availability of fuels compliant with the requirements of Annex 16 for fuel emissions testing.

Where information is available, please provide data on the composition of fuels available for emissions testing by completing Table 1. This information could be available from aircraft engine manufacturers or aviation fuel suppliers.

2. Composition of commercial fuel uplifted

ICAO continues to monitor trends in aviation kerosene fuel supply composition and assesses the potential consequences on engine emissions. This includes a global survey of fuel sulphur content to support the estimation of global and regional Sulphur Oxide gasses (SOx) emissions.

Where information is available, please provide data on the composition of commercial fuel uplifted for aircraft operations by completing Table 1. This information could be available from aircraft operators or aviation fuel suppliers.

Table 1: Used to record (1) certification fuel availability and (2) composition of commercial fuel uplifted

	(1) Certification fuel availability	(2) Composition of commercial fuel uplifted
Volume of Fuel (litres)		
<i>Fuel Property</i>	<i>Property Value</i>	<i>Property Value</i>
Density kg/m ³ at 15°C		
Distillation temperature, °C		
10% boiling point		
Final boiling point		
Net heat of combustion, MJ/kg		
Aromatics, volume %		
Naphthalenes, volume %		
Smoke point, mm		
Hydrogen, mass %		
Sulphur, mass %		
Kinematic viscosity at –20°C, mm ² /s		

This questionnaire can be completed online at <https://portal.icao.int/surveys/En/Lists/QuestionnaireWG3/overview.aspx> or sent in hard copy to:

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 999 University Street
 Montréal, Quebec
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 E-mail: env@icao.int
 Fax: +1 514-954-6744

CAEP MODELLING AND DATABASES GROUP (MDG)

REQUEST FOR RADAR INFORMATION AND DATA

ICAO Member States and international organizations make models available to ICAO/CAEP to support its work programme to achieve greenhouse gas (GHG) emissions reductions. Analytical models used to support the ICAO/CAEP modelling needs provide annual fuel burn and emissions inventories, and as well, create future projections of fuel burn and emissions, providing transparency in the data used to inform decisions. The current and future scenarios are then compared against future goals to identify gaps, thus enabling improvements in identifying and prioritizing the mitigation solutions that could be pursued (e.g. technology, operations, alternative fuels, market-based measures as gap fillers, etc.). As aircraft and fuels technology evolves and operational patterns change, the intention is to use this improved knowledge base to refine mitigation solutions to achieve maximum benefit and avoid or minimize negative and unintended consequences.

With regard to the current level of radar data geographic coverage, major gaps exist and additional radar-based operations data is necessary to enhance modelling and analysis efforts within ICAO/CAEP to support the development of a global market-based measure for aviation, as well as other efforts.

The following States/regions provide approximately 75 to 80 per cent global coverage based on 2010 data:

- a) Argentina
- b) Australia – (Pending final agreement)
- c) Brazil
- d) Europe – Source: EUROCONTROL
- e) North and Central America – Source: U.S. Federal Aviation Administration (FAA)

Major gaps in coverage exist in Asia, Africa and the Middle East. Although these regions account for approximately 20 to 25 per cent coverage in 2010, their operational share will increase disproportionately in future years. There are ways of filling these data gaps through the use of commercially available data, but additional radar data would enhance and refine analytical capabilities.

In order to improve modelling and analysis capabilities to better understand the environmental impact of international aviation, including climate impacts, it would be helpful for the radar data to include those regions identified with gaps in raw radar-based operational data. Modelling and analysis efforts to support the development of a proposal for a global market-based measure for aviation, as well as other efforts, can be enhanced with increased radar-based operational data.

The data requested for FLIGHTS includes: The unique flight identifier (internal identifier used to link to position data), the departure airport (preferably ICAO code), the arrival airport (preferably ICAO code), the departure time (Coordinated Universal Time (UTC)) and arrival time (UTC), the carrier flight

number (or this and the above combined (e.g. BAW506), tail number/registration, and finally the ICAO service type (S, N, G, M, X) cargo indicator.

The data requested for POSITIONS includes: The unique flight identifier (link to flight level data), the sequence number (i.e. flight level position ordering), the position time (UTC), the latitude and longitude position, the altitude (hundreds of feet), and finally the position speed (knots).

In order to facilitate the integration of the data provided, please provide a file or series of files containing the data requested, with the fields in the same order as either a comma separated text file (CSV) or extensible markup language (XML) file. Since the data sets are likely to be large, it is preferable to send the data on DVDs or on a USB hard drive by post to the address below.

Alternatively, instructions for securely uploading the data to ICAO are available at:
<https://portal.icao.int/surveys/En/Lists/QuestionnaireMDG/overview.aspx>.

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ATTACHMENT D to State letter AN 1/17 – 14/57

CAEP ALTERNATIVE FUELS TASK FORCE (AFTF)

REQUEST FOR ALTERNATIVE FUELS INFORMATION AND DATA

The CAEP Alternative Fuels Task Force (AFTF) is mandated to assess the potential range of emissions reductions from the use of alternative fuels in aviation up to 2050.

The AFTF has developed a methodology to carry out the assessment, which considers a combination of approaches to develop projections for the near, medium and long term. For the short term, the projection will use announcements from industry and States regarding plans and targets for alternative jet fuels production.

States are invited to provide the information listed in the following table.

For the purposes of this questionnaire, alternative jet fuels are defined as all jet fuels that are produced from sources other than petroleum. This includes synthetic fuel made from coal, gas, biomass or waste.

Question	Answer
1) Has your State defined a target for alternative fuel in aviation?	Yes/No
If yes, please provide the targets (million metric tons per year) and corresponding year.	
Is the target defined for production or for use?	
Is the target for commercial aviation or for all types of aviation (including military)?	
In this target, what is the estimated share of the feedstock that could be produced nationally?	
2) Has your State defined a blending mandate for alternative fuel in aviation?	Yes/No
If yes, please provide the mandatory blending ratio (percentage).	
Is the mandate for commercial aviation or for all types of aviation (including military)?	
3) Has your State defined an incentive policy for the use of alternative fuels in aviation?	Yes/No
If yes, what are the incentives for alternative fuel use in aviation?	

4) Has your State initiated a national plan for the development/deployment of alternative fuels in aviation (including initiatives to develop national value chains, feedstock production or processing facilities)?	Yes/No
If yes, please list the initiatives with their purpose (feedstock production/processing facility/entire value chain) and the expected production (thousands metric tons per year of alternative jet fuels).	
What is the range of feedstock considered for deployment?	
What is the range of processes considered for deployment?	
For conversion facilities, what is the share of the feedstock that is to be sourced from domestic resources?	
5) Does your State have a projection related to the national future production of alternative fuels?	Yes/No
If yes, please provide the volume of fuel expected and the corresponding year (thousands metric tons per year of alternative jet fuels).	
What is the range of feedstock considered for deployment?	
What is the range of processes considered for deployment?	
In this projection, what is the estimated share of the feedstock that could be produced nationally?	

This questionnaire can be completed online at <https://portal.icao.int/surveys/En/Lists/QuestionnaireAFTF/overview.aspx> or sent in hard copy to:

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Ref.: AN 1/17 – 14/56

10 September 2014

Subject: ASBU Block 0 implementation questionnaire

Action required: Submit completed questionnaire to ICAO by 31 December 2014

Sir/Madam,

The fourth edition of the ICAO Global Air Navigation Plan (GANP, Doc 9750) represents a rolling fifteen-year strategy to guide complementary and sector-wide air transport improvements over the period 2013 to 2028. The GANP addresses required solutions by introducing a consensus-driven Aviation System Block Upgrade (ASBU) methodology.

In 2013, a high-level analysis of the potential environmental benefits from seven ASBU Block 0 modules was undertaken by the ICAO Committee on Aviation Environmental Protection (CAEP) which estimated that up to 4 million tonnes of fuel savings could be achieved from planned Block 0 module implementation. I am grateful for the positive State response to the 2013 survey on the implementation of ASBU Block 0, the results of which were published in the 2014 Air Navigation Report available at: <http://www.icao.int/airnavigation/pages/Air-Navigation-Report.aspx>.

The attached questionnaire will support a comprehensive ASBU Block 0 global environmental analysis currently underway by CAEP. The questionnaire is divided into questions per ASBU Performance Improvement Area, with each module with possible fuel savings individually targeted. For each module, the module's operational improvement is detailed along with questions designed to obtain the information required to advance the work described above.

The questionnaire is intended only to collect information on planned future actions in line with your current plans; your replies do not imply a firm commitment on your part to implement those actions.

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

Raymond Benjamin
Secretary General

Enclosure:

CAEP ASBU Block 0 Implementation Questionnaire

ATTACHMENT to State letter AN 1/17 - 14/56

Name:

State/Organization:

Email Address:

Performance Improvement Area 1: Airport Operations				
B0-APTA	B0-WAKE	B0-RSEQ	B0-SURF	B0-ACDM

Block 0-APTA: *Optimization of Approach Procedures including vertical guidance*

Operational Improvements:

- a) Performance-based navigation (PBN) approaches: Radius to fix
- b) Reduced missed approaches and diversions due to lowered approach minima

Questions

		Current	2018 (additional)
1	List of airports* with implementation of radius to fix final approach.		
2	What percentage of operations in your State/region fly this procedure?		
3	List of airports* in your State/region with PBN final approaches implementation in order to provide improved access through improved minima (leading to a reduction in missed approaches/diversions).		
4	What percentage of operations benefit from a reduction in missed approaches at the aerodromes identified in question 3?		
5	How many commercial service airports in your State/Region do not have at least one Instrument Landing System (ILS) installed?		
6	What percentage of commercial operations in your State/region occur at the airports included in your response to question 5?		

*Please list international aerodromes published in the ICAO regional air navigation plans using their ICAO code.

Block 0-WAKE: Increased Runway Throughput through Optimized Wake Turbulence Separation**Operational Improvements:**

- a) Wake vortex separation standard re-categorisation (RECAT)
- b) Reduced wake vortex separation for closely spaced parallel runways ((CSPRs)

Questions

1	At which airports* in your State/region do you plan to implement RECAT prior to the end of 2018?	
2	What percentage of arrival and departure traffic would benefit from reduced wake vortex separation?	
3	Which airports* in your State/region have closely spaced parallel runways (CSPRs) with a non-aligned landing and departure zone (i.e. the wake of departures impacts the arrivals as the landing zone is in front of the departure zone)?	
4	Do these airports plan to implement reduced wake vortex separations on the CSPRs prior to the end of 2018?	

Block 0-RSEQ: Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)**Operational Improvements:**

- a) Arrival manager (AMAN)
- b) Departure Manager (DMAN)

Questions

		Current	2018 (list additional)
1	List of airports* in your State/region operating an AMAN?		
2	List of airports* in your State/region operating an DMAN?		

*Please list international aerodromes published in the ICAO regional air navigation plans using their ICAO code.

Block 0-SURF: *Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)***Operational Improvement:**

- a) Advanced Surface Movement Guidance Control System (A-SMGCS) Level 1 and 2

Questions

1	Which airports* in your State currently have implemented A-SMGCS level 1 and 2?	
2	Estimate the percentage of aircraft movements which are operating with A-SMGCS in your State/organization?	
3	Which additional airports* in your State/organization will implement A-SMGCS Level 1 and 2 in 2018?	
4	What percentage of aircraft movements do you estimate will be operating with A-SMGCS in your State in 2018?	

Block 0-ACDM: *Improved Airport Operations through Airport-CDM***Operational Improvement:**

- a) Airport Collaborative Decision Making

Questions

1	Which airports* in your State currently have implemented A-CDM?	
2	Which airports* in your State plan to implement A-CDM prior to 2018?	

*Please list international aerodromes published in the ICAO regional air navigation plans using their ICAO code.

Performance Improvement Area 2: Global Interoperable Systems and Data		
B0-FICE		B0-DAIM

Block 0-FICE: *Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration*

Operational Improvement:

- a) ATS inter-facility data communication(AIDC)

Description:

This module is to improve coordination between air traffic service units (ATSUs) by using ATS inter-facility data communication (AIDC). The transfer of communication in a data link environment improves the efficiency of this process particularly for oceanic ATSUs.

Questions

1	Has your State/ANSP implemented, or does it plan to implement, the FICE module (AIDC) prior to 2018?	
2	Will the implementation of AIDC result in reduced separation standards that can be applied between Air Traffic Service Units?	
3	Will the application of reduced separation result in the offering of more efficient flight levels to aircraft?	
4	To what percentage of aircraft could a potential more efficient level be offered?	
5	Has any estimation been undertaken of potential fuel-saving benefits that could be achieved as a result of the ability to offer aircraft more efficient flight levels due to the reduced separation being applied?	

Block 0-DAIM: *Service Improvement through Digital Aeronautical Information Management***Operational Improvement:**

- a) Digital NOTAM

Description:

The initial introduction of digital processing and management of information, through aeronautical information service (AIS) / aeronautical information management (AIM) implementation.

Questions

1	In your State, what percentage of aeronautical information, based on paper publications and NOTAMs, have moved from traditional provision of paper to electronic support?	
2	What percentage of operations in your State/region currently benefit from improved pre-flight briefing and from dynamic in-flight profile changes due to digital NOTAMs?	
3	Has any estimation been undertaken of the potential fuel saving benefits that could be achieved from dynamic in-flight profile changes due to the benefits identified in question 2?	
4	What percentage of aeronautical information, based on paper publications and NOTAMs, do you estimate in your State/Organization will have moved from traditional provision of paper to electronic AIP in 2018?	
5	What percentage of operations in your State/region do you estimate would benefit from improved pre-flight briefing and from dynamic in-flight profile changes due to digital NOTAMs in 2018?	

Performance Improvement Area 3: Optimum Capacity and Flexible Flights		
B0-FRTO	B0-NOPS	B0-ASUR

Block 0-FRTO: *Improved Operations through Enhanced En-Route Trajectories*

Operational Improvements:

- a) Flexible Use of Airspace (FUA)
- b) Flexible Routes

Questions

1	Is FUA currently implemented in your State/region (please specify the geographical extent in terms of FIR) ?	
2	Is there a plan to implement or increase FUA in your State/region (please specify the geographical extent in terms of FIR) prior to 2018?	
3	How many track miles annually do you currently save as a result of FUA implementation or changes to validity periods for restricted airspace? What percentage of operations does this represent annually?	
4	How many track miles annually do you expect to save in 2018 as a result of FUA implementation or changes to validity periods for restricted airspace? What percentage of operations does this represent annually?	
5	Are flex routes (non-fixed) currently used in your State/region (please specify the geographical extent in terms of FIR or city pairs)?	
6	What is the estimated percentage of annual movements in your State/region (please specify) that currently fly on flex routes?	
7	Is there a plan to implement flex routes in your State/region (please specify the geographical extent in terms of FIR or city pairs) by 2018?	
8	What is the percentage of annual movements in your State/region (please specify) that it is estimated will fly on flex routes in 2018?	

Block 0-NOPS: Improved Flow Performance through Planning based on a Network-Wide view**Operational Improvement:**

- a) Air Traffic Flow management (ATFM)

Questions

1	Is strategic traffic flow management currently used to manage runway/airspace slot allocation in your State/region? At all airports/airspace? Please specify where.	
2	How many flights are subject to the ATFM process?	
3	How much en-route delay did the ATFM measures save in 2013?	
4	How much airport arrival delay did the ATFM measures save in 2013?	
5	Will strategic traffic flow management be used to manage runway/airspace slot allocation in your State/region by the end of 2018? At all airports/airspace? Please specify where?	
6	How many flights will be subject to the ATFM process?	
7	How much en-route delay is it estimated that the ATFM measures will save in 2018?	
8	How much airport arrival delay is it estimated that the ATFM measures will save in 2018?	

Block 0-ASUR: ADS-B Ground-Based and Satellite-Based Surveillance and MLAT**Operational Improvement:**

- a) Ground and Satellite-based surveillance through ADS-B leading to improved access to optimal flight levels

Questions

1	Is surveillance of en-route aircraft with ground-based ADS-B currently implemented in your State/region (please specify the geographical extent in terms of FIR)?	
2	Approximately what percentage of your State's/region's current operations would you estimate to operate in areas identified in question 1?	
3	Is the implementation of surveillance of en-route aircraft with ground-based ADS-B planned in your State/region by 2018 (please specify the geographical extent in terms of FIR)?	
4	Approximately what percentage of your State's/region's projected 2018 operations would you estimate to be operations that will operate in areas identified in question 3?	

Performance Improvement Area 4: Efficient Flight Path		
B0-CDO	B0-TBO	B0-CCO

Block 0-CDO: *Improved Flexibility and Efficiency in Descent Profiles (CDOs)*

Operational Improvements:

- a) Continuous Descent Operations (CDO)
- b) PBN standard terminal arrival routes (STARs)

Questions

1	How many aerodromes in your State have currently published CDO procedures OR have CDO procedures tactically applied?	
2	What is the estimated percentage of arrival movements in your State that currently operate the CDO procedures OR have CDO procedures tactically applied?	
3	How many airports in your State do you estimate will have published CDO procedures OR have CDO procedures tactically applied in 2018?	
4	What is the estimated percentage of arrival movements in your State that will operate the CDO procedures in 2018 OR will have CDO procedures tactically applied?	
5	How many airports with PBN STARs currently operate in your State and how many do you estimate will do so in 2018?	
6	What is the estimated percentage of yearly traffic movements that currently fly on the published PBN STARs, and what is the estimated number expected to do so in 2018?	
7	For what reason were PBN arrival routes implemented (e.g. reduced track miles / increase capacity)?	

Block 0-TBO: Improved Safety and Efficiency through the initial application of Data Link En-Route**Operational Improvement:**

- a) En-route application of Data link

Questions

1	What proportion of your State's airspace is procedurally controlled, such as airspace in remote or oceanic areas?	
2	Is Data-link in operation in these areas?	
3	If Data-link is not in operation in these areas, is implementation planned prior to 2018?	
4	Is reduced horizontal separation minima planned to be implemented into the airspace identified prior to 2018?	
5	What is the estimated percentage of annual movements in your State that will operate in the area with reduced separation?	
6	Has your State identified any savings in fuel burn through the optimization of flight level due to reduction of horizontal separation?	
7	What percentage of airframes are/will be (by 2018) equipped with FANS 1/A+ avionics?	
8	How much delay is it estimated that CPDLC saved/will save (in 2018)?	

Block 0-CCO: Improved Flexibility and Efficiency in Departure Profiles**Operational Improvements:**

- a) Continuous Climb Operations (CCO)
- b) PBN standard instrument departures (SIDs)

Questions:

1	How many airports in your State have currently published CCO procedures OR have CCO procedures tactically applied (i.e. have an uninterrupted climb profile from take-off to the top of climb)?	
2	What is the estimated percentage of departure movements in your State that currently have an uninterrupted climb profile from take-off to the top of climb?	
3	How many airports in your State do you estimate will have published CCO procedures OR have CCO procedures tactically applied in 2018 (i.e. have an uninterrupted climb profile from take-off to the top of climb)?	
4	What is the estimated percentage of departure movements in your State that will have an uninterrupted climb profile from take-off to the top of climb in 2018?	
5	How many airports with PBN SIDs currently operate in your State and how many do you estimate will do so in 2018?	
6	What is the estimated percentage of yearly traffic movements that currently fly on the published PBN SIDs and what is the estimated number to do so in 2018?	
7	For what reason were PBN departure routes implemented (e.g. reduced track miles/increase capacity/reduce population exposed to noise)?	

This questionnaire can be completed online at <https://portal.icao.int/surveys/En/Lists/QuestionnaireASBU/overview.aspx> or sent in hard copy to:

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