



INTERNATIONAL AVIATION AND ENVIRONMENT SEMINAR

Dubai, UAE, 10 - 12 March 2015

Operational improvements and Environment

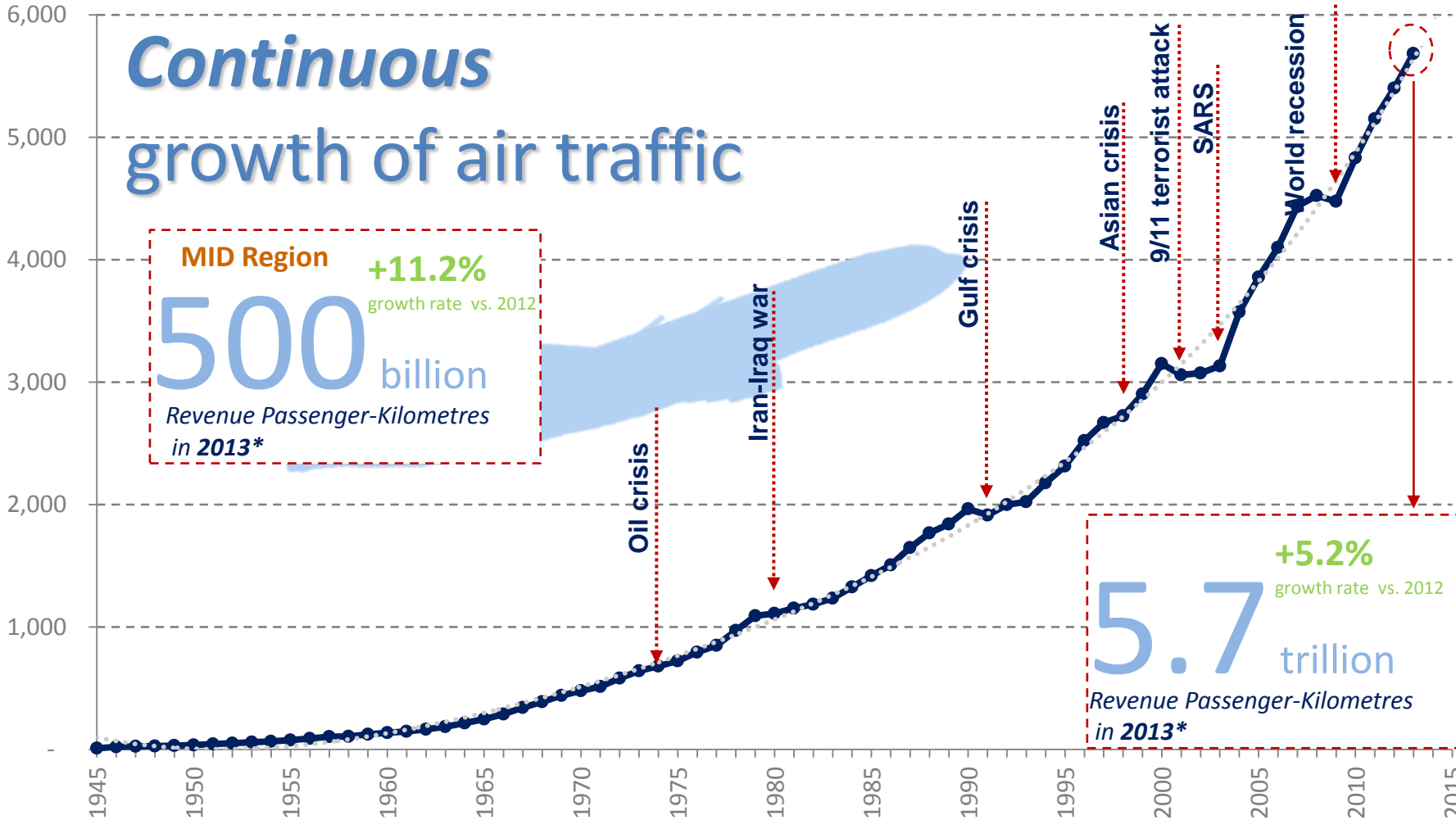
**Mohamed Smaoui, Deputy Regional Director
ICAO MID Office, Cairo**



Growth of Air Traffic

Continuous growth of air traffic

Revenue Passenger-Kilometres (billion)



Note: world total scheduled services

3/2/2015



- *Whereas* many of the adverse environmental effects of civil aviation activity can be reduced by the application of comprehensive measures embracing **technological improvements, more efficient air traffic management and operational procedures** and the appropriate use of airport planning, land-use planning and management and market-based measures



- *Declares* that ICAO, as the lead United Nations (UN) Agency in matters involving international civil aviation, is conscious of and will continue to address the adverse environmental impacts that may be related to civil aviation activity and acknowledges its responsibility and that of its Member States to achieve maximum compatibility between the **safe and orderly development of civil aviation** and the **quality of the environment**. In carrying out its responsibilities, ICAO and its Member States will strive to:
 - a) limit or reduce the number of people affected by significant aircraft noise;
 - b) limit or reduce the impact of aviation emissions on local air quality;** and
 - c) limit or reduce the impact of aviation greenhouse gas emissions on the global climate.**



- *Recognizing* that **air traffic management (ATM) measures** under the ICAO's Global Air Navigation Plan contribute to **enhanced operational efficiency and the reduction of aircraft CO₂ emissions**
- *Resolves* 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



32. Requests States to:

...

e) accelerate the development and implementation of **fuel efficient routings and procedures to reduce aviation emissions**

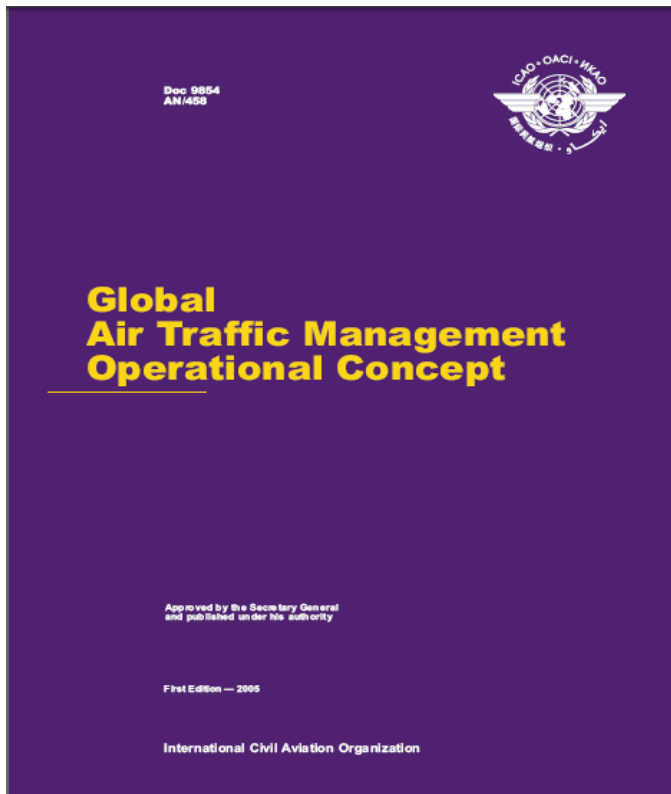
f) accelerate efforts to achieve environmental benefits through the application of **technologies that improve the efficiency of air navigation** and work with ICAO to bring these benefits to all regions and States, taking into account the **Aviation System Block Upgrades (ASBUs) strategy**

...



Vision Statement

To achieve an **interoperable** global air traffic management system, for all users during **all phases of flight**, that meets agreed levels of safety, provides for optimum economic operations, is **environmentally sustainable** and meets national security requirements.



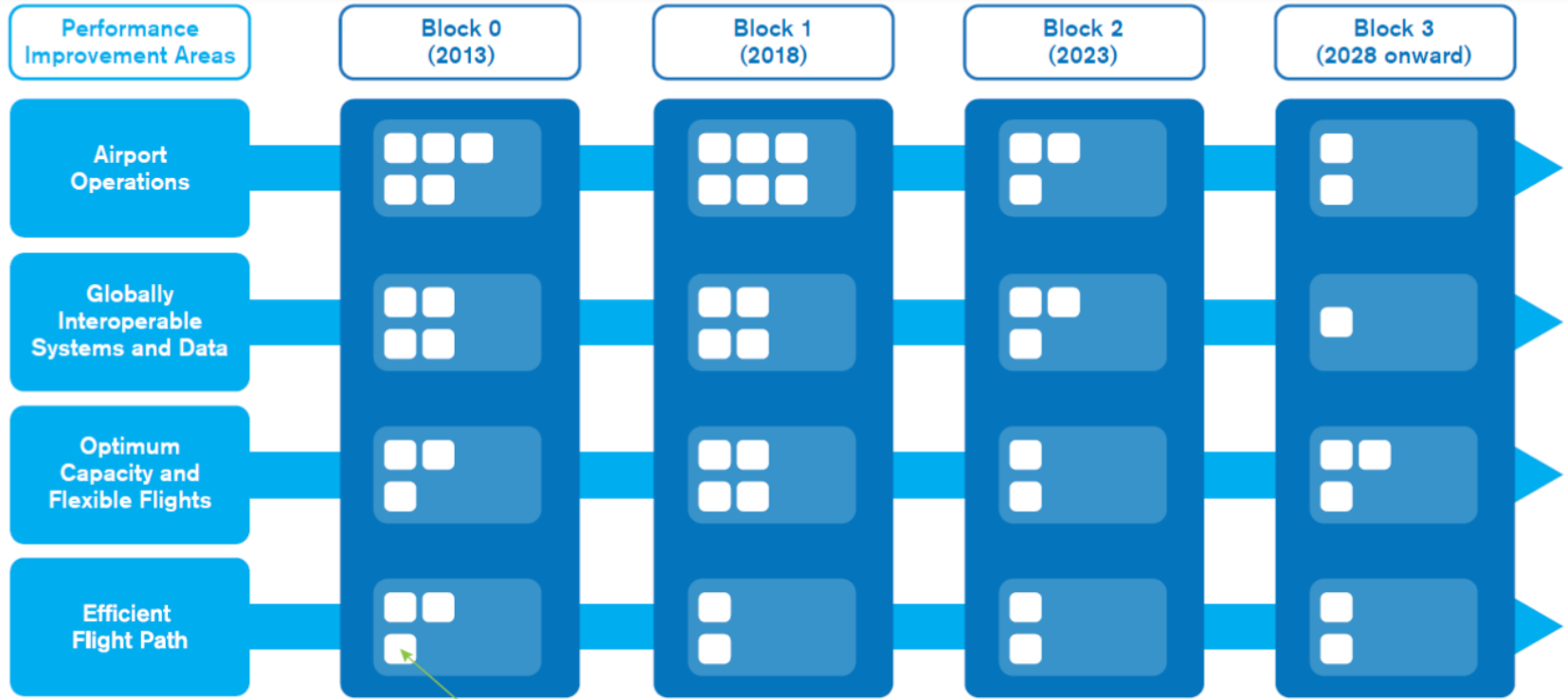


- The ICAO GANP is an overarching framework that includes key civil aviation policy principles to assist ICAO Regions, sub-regions and States with the preparation of their Regional and State air navigation plans.
- The objective of the GANP is to increase capacity and improve efficiency of the global civil aviation system whilst improving or at least maintaining safety. The GANP also includes strategies for addressing the other ICAO Strategic Objectives.
- The GANP includes the ASBU framework, its modules and its associated technology roadmaps covering inter alia communications, surveillance, navigation, information management and avionics.
- The ASBUs are designed to be used by the Regions, sub-regions and States when they wish to adopt the relevant blocks or individual modules to help achieve harmonization and interoperability
- by their consistent application across the Regions and the world.
- The GANP, along with other high level ICAO plans, will help ICAO Regions, sub-regions and States establish their air navigation priorities for the next fifteen years.
- The GANP outlines ICAO's ten key civil aviation policy principles guiding global, regional and State air navigation planning





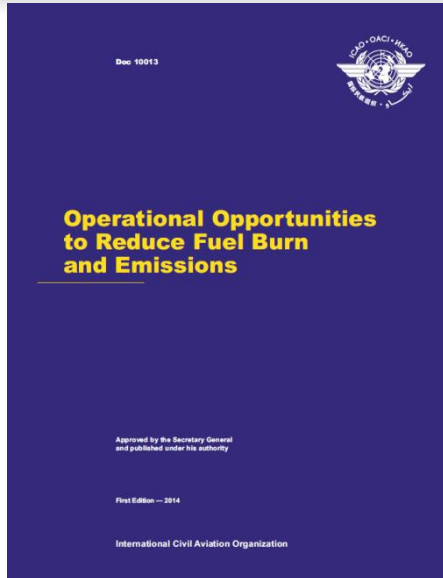
GANP Objectives and Priorities



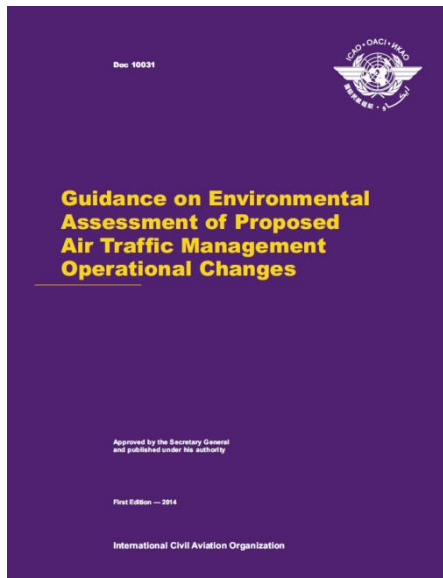
PRIORITIES

- PERFORMANCE BASED NAVIGATION (PBN)
- CONTINUOUS DESCENT AND CLIMB OPERATIONS (CDO/CCO)
- COLLABORATIVE DECISION-MAKING (CDM & A-CDM) & ATFM





- 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;
- Identify improvements that could result in measurable fuel savings; and
- 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.



- Provide all stakeholders with environmental assessment guidance to support sound and informed decision making when analyzing proposed ATM operational changes;
- High-level principles extracted from the environmental assessment best practices related to the quantification of changes in aviation-related environmental impacts associated with air navigation service changes
- Assist with recognizing any environmental benefits associated with operational changes.



CONCLUSION 14/29: ESTIMATING AND REPORTING ENVIRONMENTAL BENEFITS

That, in order to follow-up the implementation of the ATM operational improvements and estimate the accrued fuel savings and associated CO₂ emission reduction from the corresponding improvements on regional basis:

- a) States be encouraged to develop/update their Action Plans for CO₂ emissions and submit them to ICAO through the APER website on the ICAO Portal or the ICAO MID Regional Office;
- b) States be urged to:
 - i. identify the operational improvements which have been implemented within their FIR and/or international aerodromes;
 - ii. collect necessary data for the estimation of the environmental benefits accrued from the identified operational improvements;
 - iii. use IFSET to estimate the environmental benefits accrued from operational improvements; and
 - iv. send the IFSET reports/the accrued environmental benefits to ICAO on bi-annual basis; and
- c) IATA to:
 - i. encourage users to support the APM TF in the development of the MID Region Air Navigation Environmental Reports; and
 - ii. consolidate users' inputs and report the accrued environmental benefits to the ICAO MID Regional Office on bi-annual basis.



AIR TRAFFIC MANAGEMENT PERFORMANCE MEASUREMENT TASK FORCE (APM TF)

1. Terms of Reference

1.1 The Terms of Reference of the APM Task Force are:

- a) develop the MID Regional Air Navigation environmental Reports based on the benefits accrued from operational improvements, using IFSET;
- b) provide regular progress reports to the ANSIG and MIDANPIRG concerning its work programme; and
- c) ~~review~~ periodically its Terms of Reference and propose amendments, as necessary.

1.2 In order to meet the Terms of Reference, the APM Task Force shall:

- a) follow-up the implementation of the ATM operational improvements required in the MID Air Navigation Strategy and Regional Air Navigation Plan (ANP) or in national plans and to place special emphasis on identifying and estimating the fuel savings accrued from the corresponding improvements;
- b) carry out permanent coordination with various MIDANPIRG contributory bodies in order to ensure appropriate integration of all tasks contributing to the estimation of environmental benefits related to the implementation of the ANP or national operational improvements;
- c) harmonize, at a regional level, the estimation of the environmental benefits from operational improvements in order to reach consistent results;
- d) collect and analyse the data related to the implemented operational improvements provided by States and users;
- e) use the IFSET to generate the MID Regional Air Navigation environmental Reports;
- f) develop proposals to keep and upgrade the ICAO Fuel Savings Estimation Tool (IFSET) as necessary; and
- g) ~~keep~~ under review the MID Region ATM performance objectives/priorities related to environmental benefits, and propose changes through the ANSIG, as appropriate.

1. COMPOSITION

2.1 The Task Force is composed of:

- a) MIDANPIRG Member States;
- b) concerned International and Regional Organizations as observers; and
- c) ~~other~~ representatives from provider States and Industry may be invited on ad hoc basis, as observers, when required.





INTERNATIONAL CIVIL AVIATION ORGANIZATION

MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)

MID REGION
AIR NAVIGATION STRATEGY



Version 1
November, 2014

Strategic Air Navigation Capacity and Efficiency Objective

To realize sound and economically-viable civil aviation system in the MID Region that continuously increases in capacity and improves in efficiency with enhanced safety while **minimizing the adverse environmental effects** of civil aviation activities.

MID Air Navigation Objectives

The MID Region air navigation objectives are set **in line with** the global air navigation objectives (i.e. **GANP**) and address **specific** air navigation **operational improvements** identified within the framework of **MIDANPIRG**





ASBU BLOCK 0 MODULES PRIORITIZATION

PIA 1 – Airport Operations

Module Code	Module Title	Priority	Monitoring		Remarks
			Main	Supporting	
Performance Improvement Areas (PIA) 1: Airport Operations					
B0-APTA	Optimization of Approach Procedures including vertical guidance	1	PBN SG	ATM SG, AIM SG, CNS SG	
B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation	2			
B0-RSEQ	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	2			
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	1	ANSIG	CNS SG	Coordination with RGS WG
B0-ACDM	Improved Airport Operations through Airport-CDM	1	ANSIG	CNS SG, AIM SG, ATM SG	Coordination with RGS WG





PIA 2 – Globally Interoperable Systems and Data (SWIM)

Module Code	Module Title	Priority	Monitoring		Remarks
			Main	Supporting	
Performance Improvement Areas (PIA) 2 Globally Interoperable Systems and Data Through Globally Interoperable System Wide Information Management					
B0-FICE	<u>Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration</u>	1	<u>CNS SG</u>	<u>ATM SG</u>	
B0-DATM	Service Improvement through Digital Aeronautical Information Management	1	AIM SG	-	
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	1	MET SG	-	





PIA 3- Optimum Capacity and Flexible Flights

Module Code	Module Title	Priority	Monitoring		Remarks
			Main	Supporting	
Performance Improvement Areas (PIA) 3 Optimum Capacity and Flexible Flights – Through Global Collaborative ATM					
B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	ATM SG		
B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view	1	ATM SG		
B0-ASUR	Initial capability for ground surveillance	2			
B0-ASEP	Air Traffic Situational Awareness (ATSA)	2			
B0-OPFL	Improved access to optimum flight levels through climb/descent procedures using ADS-B	2			
B0-ACAS	ACAS Improvements	1	CNS SG		
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	2			





PIA 4- Efficient Flight Path through TBO

Module Code	Module Title	Priority	Monitoring		Remarks
			Main	Supporting	
Performance Improvement Areas (PIA) 4 Efficient Flight Path – Through Trajectory-based Operations					
B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO)	1	PBN SG		
B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	1	ATM SG	CNS SG	
B0-CCO	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)	1	PBN SG		

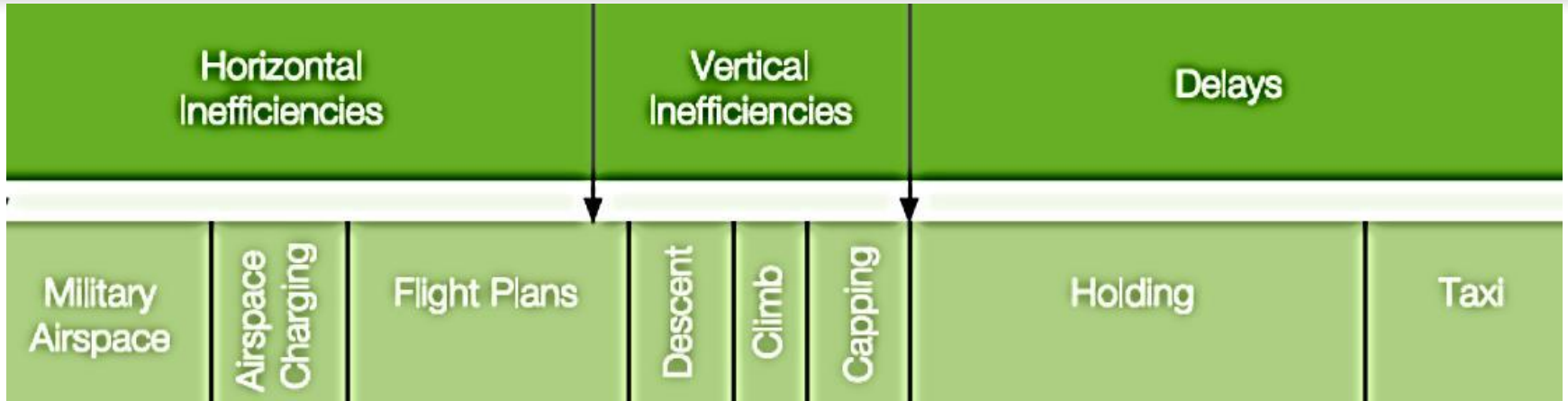


- **Direct routing particularly for short segments**
- **Multiple routes to provide flexibility – long sectors**
- **Predictable availability of optimum flight levels**
- **Cruise climb in certain airspaces**
- **Navigation through/by special use airspace**
- **Flexible Use of Airspace (FUA)**
- **Avoidance of noise sensitive areas**
- **Enabling Continuous Climb Operations (B0-CCO)**
- **Enabling Continuous Descent Operations (B0-CDO)**
- **etc.**





Inefficiency vs. Efficiency



PBN

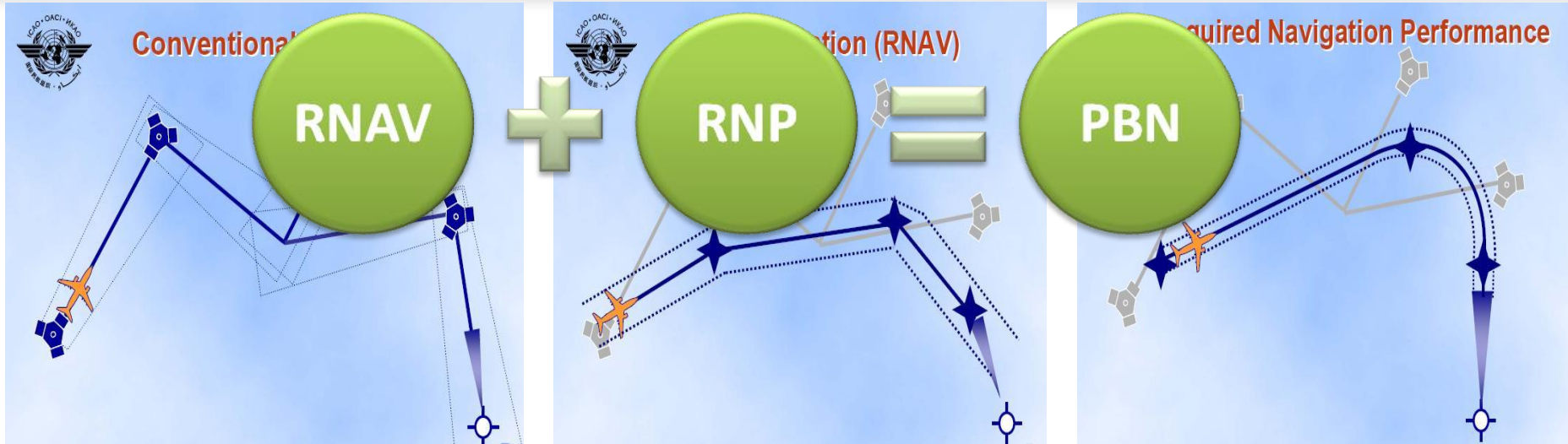
ATFM

CDM

FUA

CDO/CCO





⇒ **RNP adds to RNAV**

- ⇒ On Board Monitoring & Alerting
- ⇒ May Incorporate Radius to Fix Turns

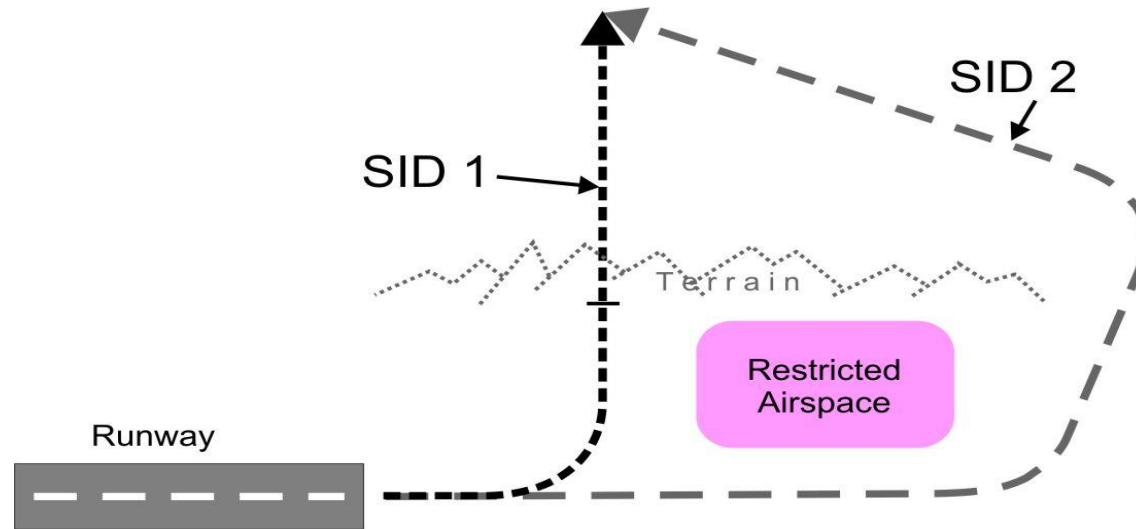
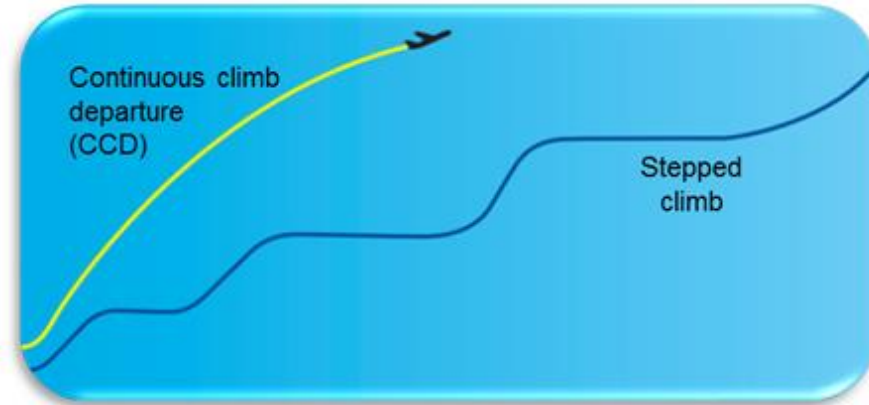
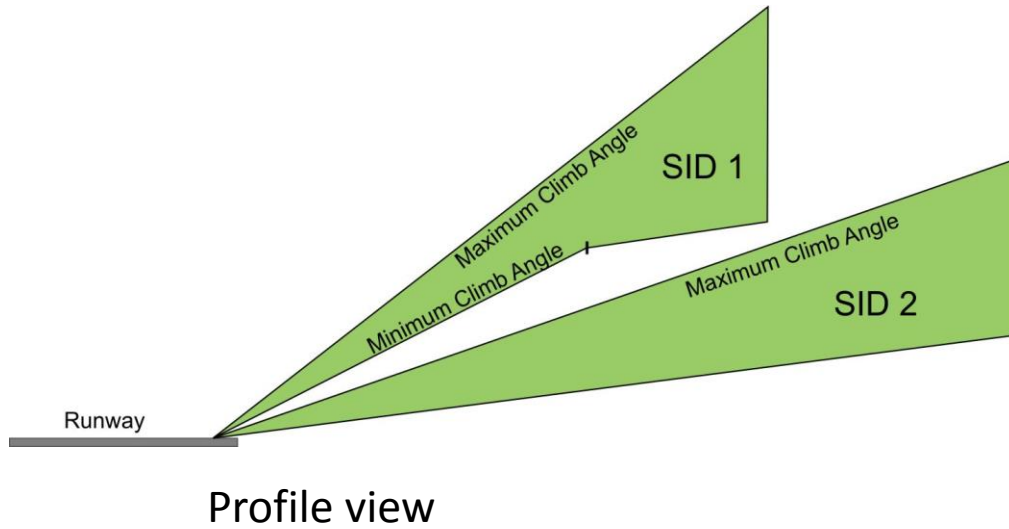
= **Operational efficiencies – Savings and environmental protection**



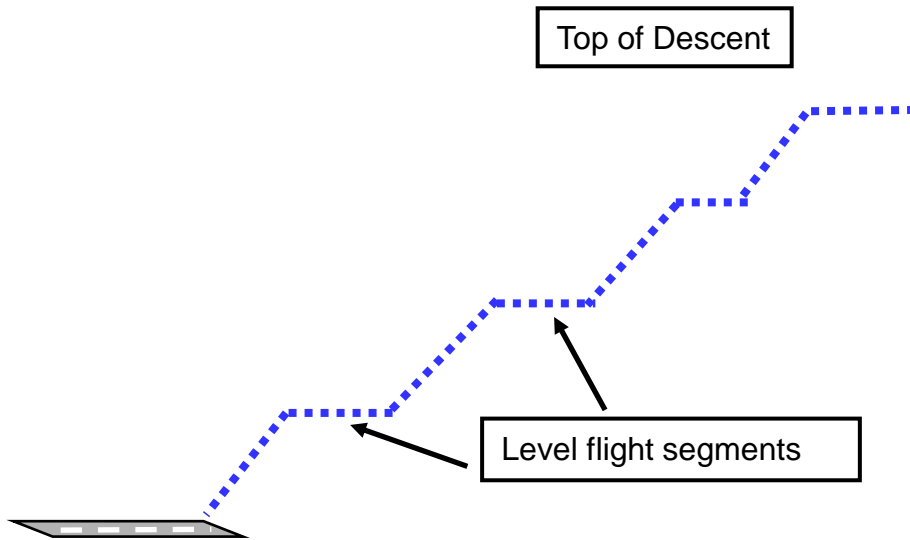
- **PBN is helping the global aviation community**
- **Reduce aviation congestion**
- **Conserve fuel**
- **Protect the environment**
- **Reduce the impact of aircraft noise**
- **Maintain reliable, all weather operations**
- **Offers greater flexibility**
- **Gives better operating returns**
- **Increases safety**



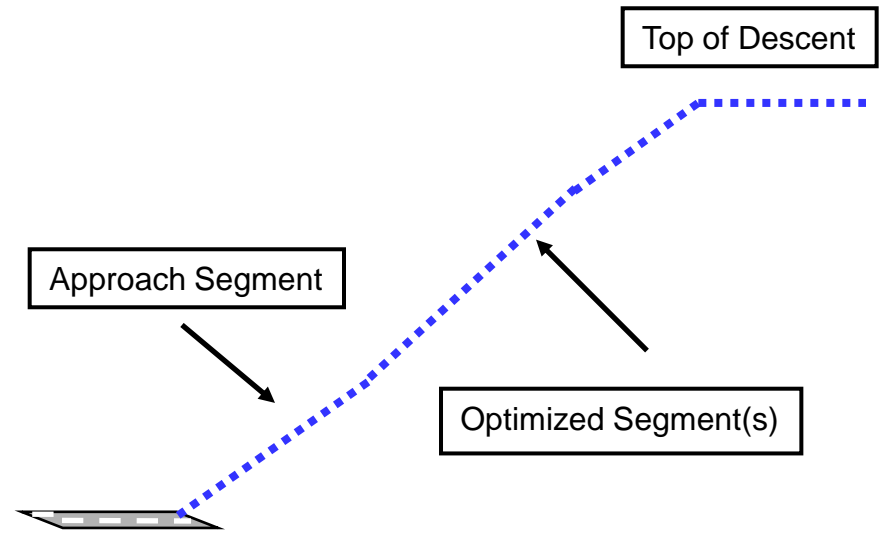
Design with multiple climb gradients

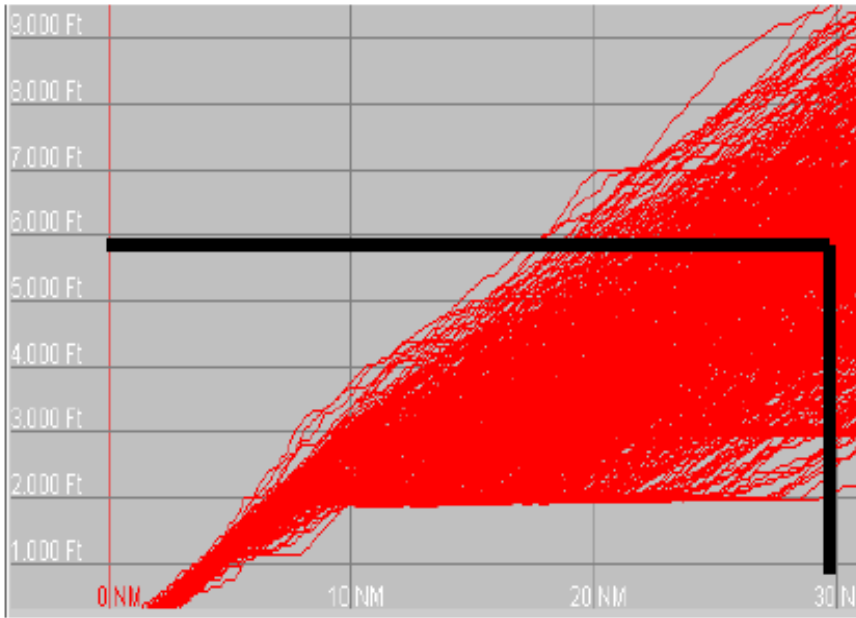


Conventional Step-down

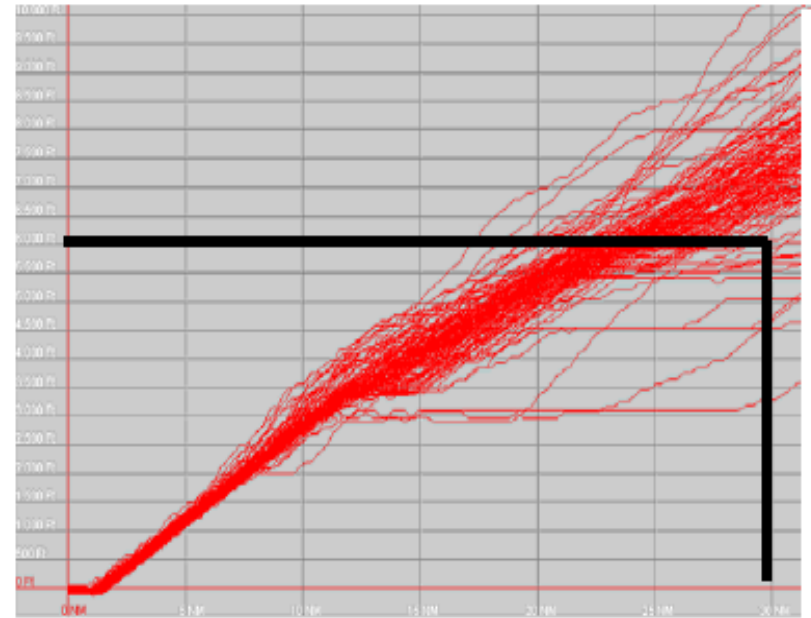


Continuous Descent Operations





Flight tracks before CDO



Flight tracks after CDO





MIDANPIRG/14-REPORT
APPENDIX 4.6F

MIDANPIRG/14

Appendix 4.6F to the Report on Agenda Item 4.6



INTERNATIONAL CIVIL AVIATION ORGANIZATION

THE MIDDLE EAST AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP
(MIDANPIRG)

FIRST MID REGION AIR NAVIGATION ENVIRONMENTAL REPORT

(December 2013)

*Developed based on the
inputs received from
Bahrain, Egypt, Jordan,
Lebanon, Kuwait, Saudi
Arabia and UAE*



PART I – LIST OF OPERATIONAL IMPROVEMENTS IMPLEMENTED DURING YEAR 2009-2011

TABLE I-1: IMPLEMENTED OPERATIONAL IMPROVEMENTS 2009-2011

State	Implemented Operational Improvements 2009-2011
Bahrain	<ol style="list-style-type: none"> 1- New Eastern Apron established for 9 code E aircraft or 19 code C. This apron Ramp services are all underground such as APU etc. 2- Reducing the final approach separation to 3NM, due to newly established rapid. TWY D. 3- Using EUROCAT system. 4- New ATS & NOTAM Management System Installed and operational. 5- eAIP is available on Web. 6- Full Airport aeronautical Survey was done up to annex 15 Ch 10 requirements. 7- ISO 9001:2008 certified. 8- New VISALA automatic weather observation system (Aerodrome station). 9- New weather radar system. 10- Climate database upgrade CLDB. 11- Terminal area forecast TAF verification. 12- New messages switch (Moving Weather). 13- Competency Assessment System for Aeronautical Meteorological Personnel (CAS). 14- Radar winds and temperature profiler system. 15- First weather radar link interface between Bahrain and UAE. 16- New VISALA automatic weather observation system Backup (Aerodrome station).
Egypt	<ol style="list-style-type: none"> 1- Ban of air traffic over Sidi Krair and P18 & P19 is cancelled 2- Ban of air traffic over Ras El Hekma P20 is cancelled. 3- Ban of air traffic between FYM & CVO via R778 is partially suspended. 4- Restrictions regarding landing on 05L and departure on 23R are cancelled 5- Establishing route Q680 between DBA & SALUN 6- Traffic between Cairo and Arish via V602-ISM-V606 is permitted. 7- Establishing route L315 between CVO & HGD
Iraq	<ol style="list-style-type: none"> 1- RVSM Implementation 2- <u>implementation</u> of ATS route UP975 to increase the traffic flow capacity from Turkey to the Gulf through Baghdad FIR.
Jordan	<ol style="list-style-type: none"> 1- METSA- MAZAR-ZELAF (UM690) 2- GRY-BUSRA-DAM (G662) 3- ZELAF DCT QAA (A412) 4- GRY DCT QAA (UN318)
Kuwait	SIDs and STARs implementation
Lebanon	RNAV STARs implementation



Table II-2: IFSET REPORT

BAHRAIN												
UM677												
Aircraft	Baseline_Ops	MidProc_ops	NewProc_ops	ASL								
Twin Aisle Jet	3418	399	3019	3050								
ID	Action	Frm_Alt	To_Alt	ASL	Time							
136	Level	29000	29000	289								
ID	Action	Frm_Alt	To_Alt	ASL	Time							
60	Level	35000	35000	289								
Scenario	Old Climb Fuel in Kg	New Climb Fuel in Kg	Climb Savings in Kg	Old Descend Fuel in Kg	New Descend Fuel in Kg	Descend Savings in Kg	Old Level Fuel in Kg	New Level Fuel in Kg	Level Savings in Kg	Old Taxi Fuel in Kg	New Taxi Fuel in Kg	Taxi Savings in Kg
UM677	0	0	0	0	0	0	14331200	12592400	-1738800	0	0	0
UP975												
Aircraft	Baseline_Ops	MidProc_ops	NewProc_ops	ASL								
Twin Aisle Jet	3802	554	3248	3050								
ID	Action	Frm_Alt	To_Alt	ASL	Time							
137	Level	29000	29000	159								
ID	Action	Frm_Alt	To_Alt	ASL	Time							
61	Level	35000	35000	159								
Scenario	Old Climb Fuel in Kg	New Climb Fuel in Kg	Climb Savings in Kg	Old Descend Fuel in Kg	New Descend Fuel in Kg	Descend Savings in Kg	Old Level Fuel in Kg	New Level Fuel in Kg	Level Savings in Kg	Old Taxi Fuel in Kg	New Taxi Fuel in Kg	Taxi Savings in Kg
UP975	0	0	0	0	0	0	8770400	7741200	-1029200	0	0	0
UL602												





- **Date & Venue: Cairo, 10-12 Nov. 2014**
- **Attendance: 15 participants from 5 States (Bahrain, Egypt, Kuwait, Saudi Arabia and Sudan) and 1 Organization (IATA)**
- **Bahrain, Jordan, Kuwait, Lebanon, and UAE provided a list of operational improvements (implemented or planned)**
- **No IFSET Report**
- **APM TF/2 Report reviewed by ANSIG/1 meeting**

***DRAFT CONCLUSION 1/6: SECOND MID REGION AIR
NAVIGATION ENVIRONMENTAL REPORT***

*That, States and Users be urged to provide their inputs/IFSET Reports to the ICAO MID Regional Office, before **1 April 2015**, for the development of the Second MID Region Air Navigation Environmental Report to be consolidated by the Secretariat for presentation to the MIDANPIRG/15 meeting, for endorsement.*



Reporting period and Format

- **2009-2011: just a listing of the operational improvements which have been implemented during this period and which had environmental benefits;**
- **2012-2014: period to be used for the generation of the Second Regional IFSET Report; and**
- **2015 and beyond: listing of planned operational improvements which will have environmental benefits.**



- Technological improvements, more efficient ATM/operational improvements reduce the adverse environmental effects of civil aviation
- **Challenge**: to **collect necessary data and measure** the benefits accrued from the implementation of operational improvements
- States and IATA to implement MIDANPIRG Conc.14/29 and ANSIG/1 Draft Conc. 1/6.





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and Caribbean
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Mexico City

South American
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Lima

ICAO
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Western and
Central African
(WACAF) Office
Dakar

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Southern African
(ESAF) Office
Nairobi

Asia and Pacific
(APAC) Office
Bangkok

Thank You