International Civil Aviation Organization

MIDANPIRG CNS/ATM/IC Sub-Group (CNS/ATM/IC SG)

Seventh Meeting
(Cairo, Egypt, 07-09 October 2013)

Agenda Item 4: Performance Framework for MID Region Air Navigation Planning and Implementation

MEAUSE SURVEYS

(*Presented by IATA and CANSO*)

SUMMARY

One of the main aims of the Middle East Airspace Users and Stakeholder Engagement Initiative is to gather data and conduct analyses of ANSPs, Airspace Users and stakeholders' requirements and future plans, through surveys.

IATA and CANSO launched regional surveys in 2013 to gauge the current and future ATM/CNS technology capabilities for ANSPs and Users' requirements and expectations.

This working paper outlines the results from the MEAUSE surveys.

Action by the meeting is at paragraph 3.

1. INTRODUCTION

1.1 Pursuant to the launched surveys, IATA MENA Office consolidated the responses received from airlines and ANSPs.

1.2 The results were then mapped to ASBU modules.

2. DISCUSSIONS

2.1 Two surveys were launched under the MEAUSE initiative within 2013:

1) The airlines expectations questionnaire
2) ANSPs capabilities questionnaire

2.2 Analysis of the received responses along with the mapping to ASBU modules is at **Appendix A** to this working paper**.**

2.3 Pursuant to the initiative under ICAO MID Office to develop a MID Air Navigation strategy, MEUASE surveys results be were also used to set targets for the Region.

3. ACTION BY THE MEETING

3.1 This meeting is invited to:

a) review the attached analysis document and provide input or comments;

b) endorse the attached analysis document as a reference for ANSPs-users gap analysis and use it as input to the MID Air Navigation Strategy; and

c) encourage MID States to attend MEAUSE events, including the MEAUSE Conference in November 2013.

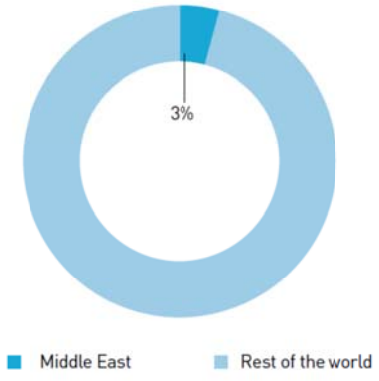
APPENDIX A

I. Introduction

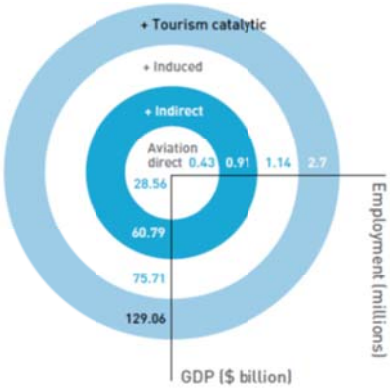
The aviation industry plays an essential role in economic growth, business connectivity, and tourism. Airlines transport over 2.6 billion passengers annually. This figure is expected to grow to 6 billion passengers in 2030. Nearly 48 million tonnes of cargo were carried by air in 2010. The total value of transported goods by air represents 35% of all international trade.

In the Middle East, air transport supports 1.1 million jobs and contributes nearly $76 billion to GDP.

Middle East's share of global passenger traffic, 2010

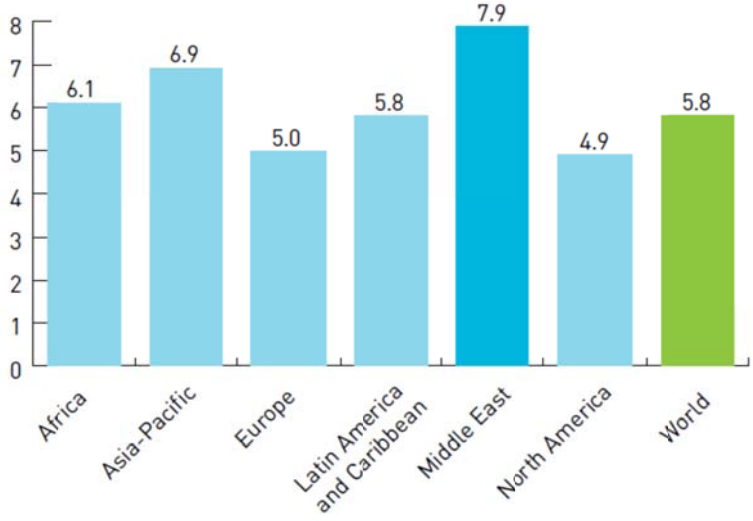


Middle East's jobs and GDP generated by air transport, 2010



Recent studies by Oxford Economics have quantified significant economic impact that aviation generates across some of the major markets in the Middle East. Moreover, this impact is set to grow rapidly over the next 20 years. Passengers' numbers are expected to grow from 77.1 million in 2010 to 220.4 million in 2030. Aviation's direct contribution to GDP is expected to increase by 6.3% per annum over the next 20 years.

Projected annual growth rate for international traffic by region, 2010 - 2015



Supporting such growth will require substantial investment in infrastructure.

Furthermore, emerging global standards and requirements dictate accelerated development in infrastructure and investments by airline operators to meet global objectives under the Global Air Navigation Plan (GANP) and ICAO Aviation System Block Up-grades (ASBU).

The ICAO *Global Air Navigation Capacity & Efficiency Plan* (Global Plan) represents the Fourth Edition of the Organization's Global Air Navigation Plan. It is designed to guide complementary and sector-wide air transport progress over 2013-2028.

The ASBU modules present a strategic direction towards Communications, Surveillance, and Navigation to achieve interoperability and harmonization in Air Traffic Management on a global scale.

In the MID Region, several initiatives were launched to address airspace congestion and bridge the gaps between airlines and ANSPs. The Middle East Airspace User & Stakeholder Engagement (**MEAUSE**) Initiative was inaugurated in 2010 in partnership between CANSO, IATA, and regional ANSPs and airlines with the aim to establish a constant and regular engagement mechanism among the various members of the aviation value chain in the Middle East. Under this initiative a survey was launched in 2013 to assess the gaps between investments of ANSPs in technology and aircraft capabilities in fleets of airline operators. The statistics referred to in this document are based on the results of this survey exercise.

This document takes into consideration current situation in the MID region, where the MID region should be in reference to the GANP and ASBU Modules and proposed action plans to achieve the set targets and objectives.

II. The Current Situation

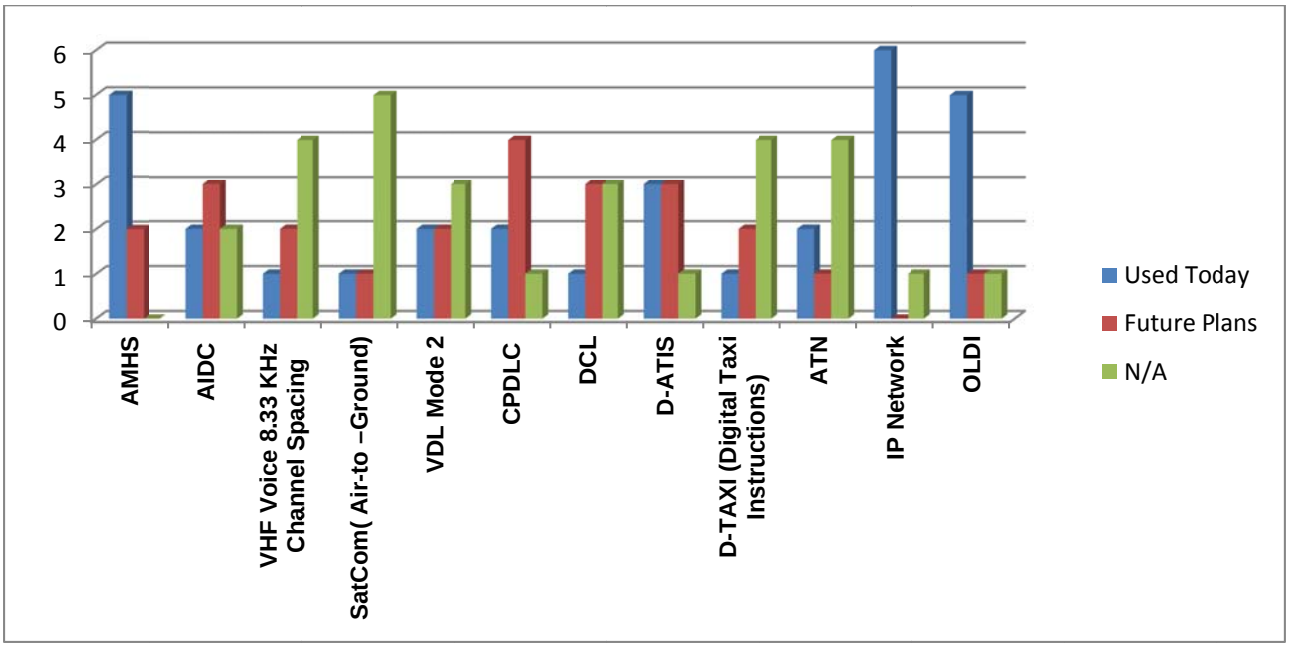
i. Investments Plans of MID ANSPs

a) Overview of Survey

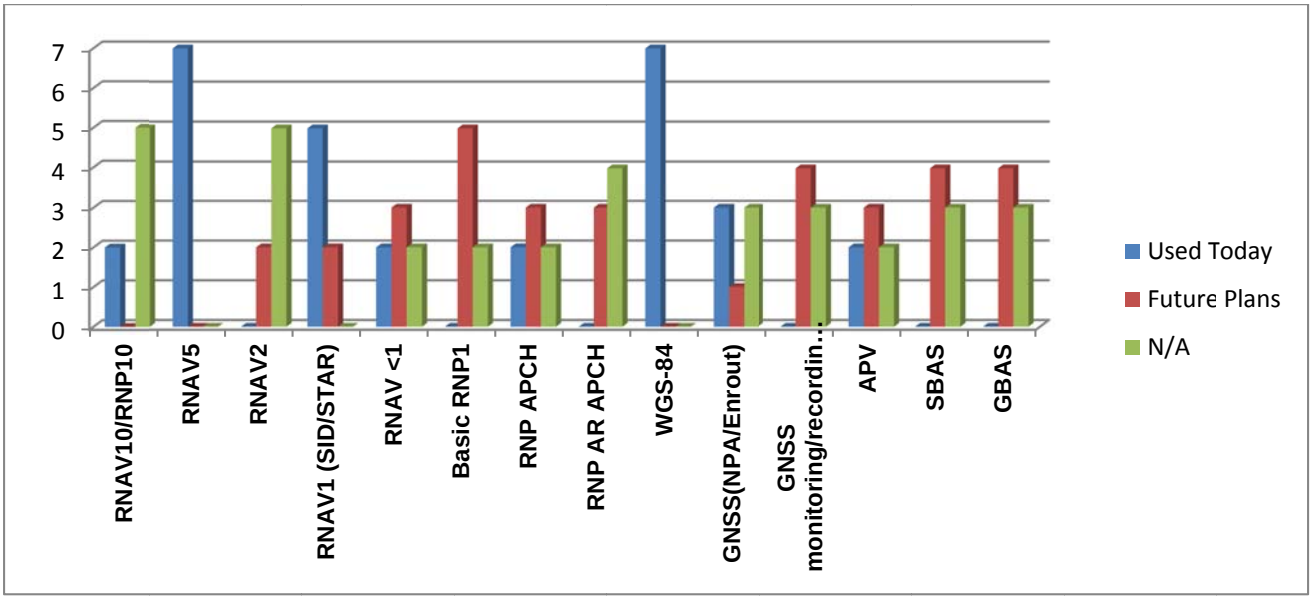
- Survey was launched in 2013
- Responses were received from 7 States
- Level of response is 47%
- The used questionnaire is attached to this document under **Appendix A**

b) Responses

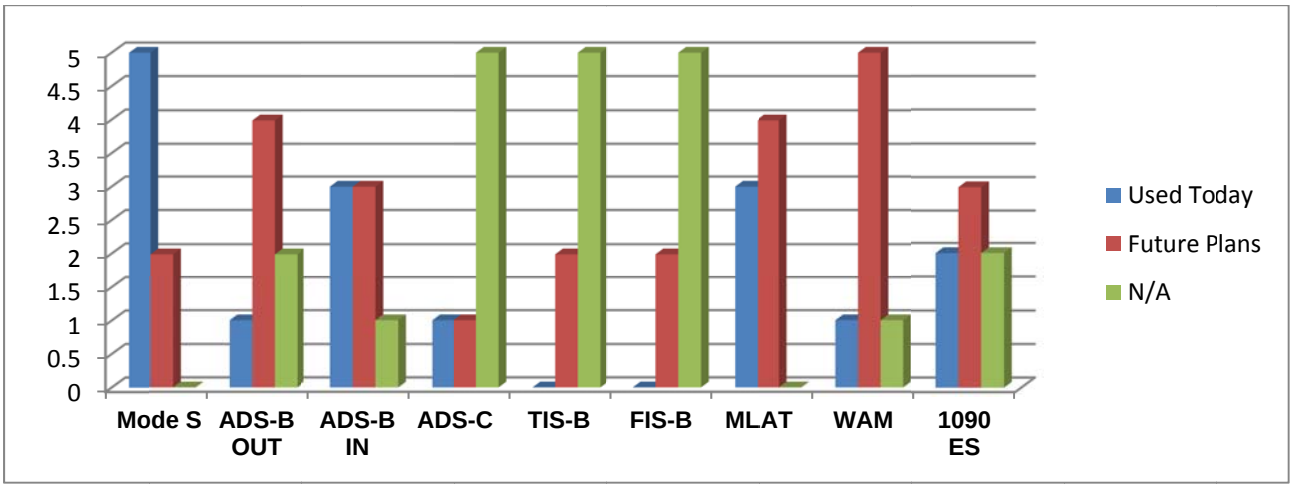
- Communication:



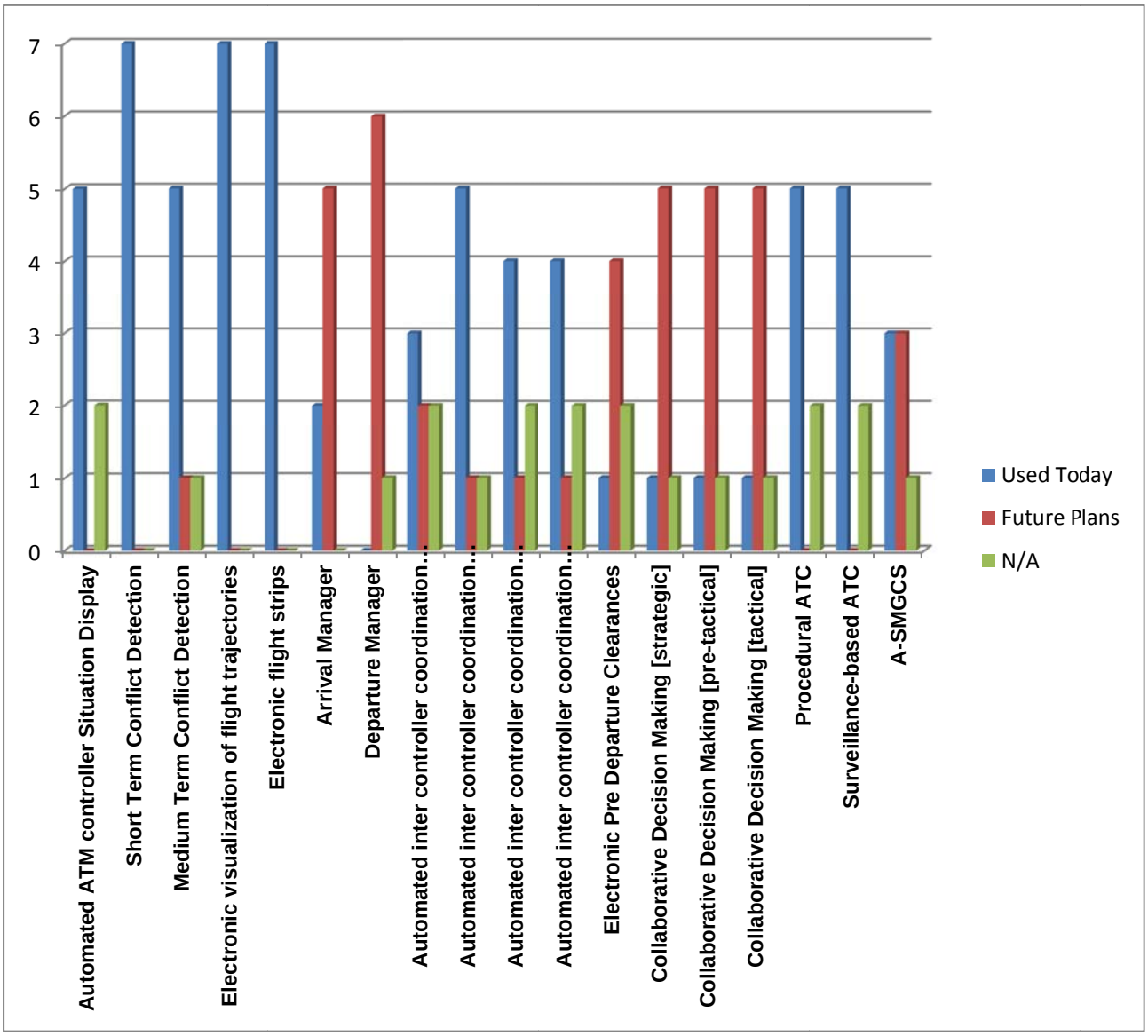
- Navigation:



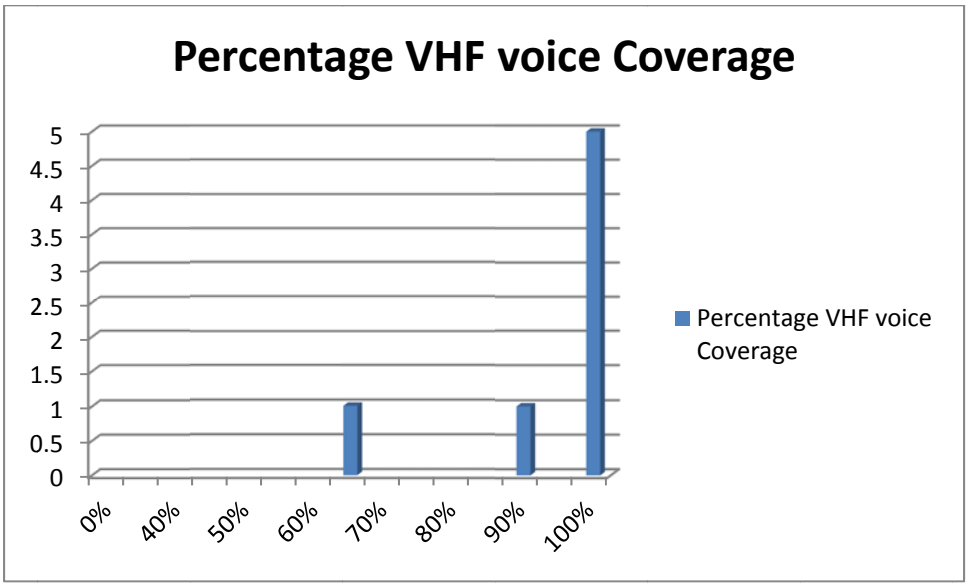
- Surveillance:

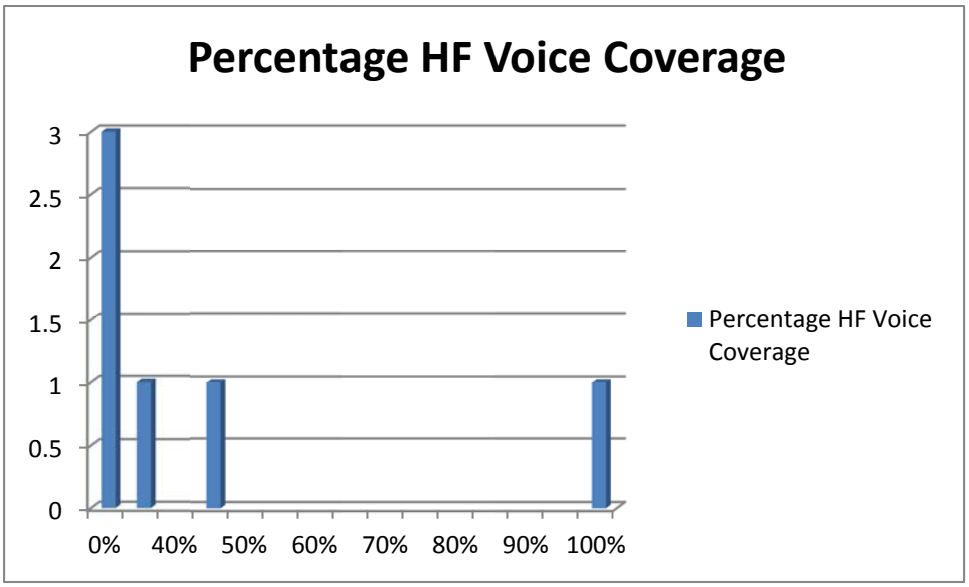


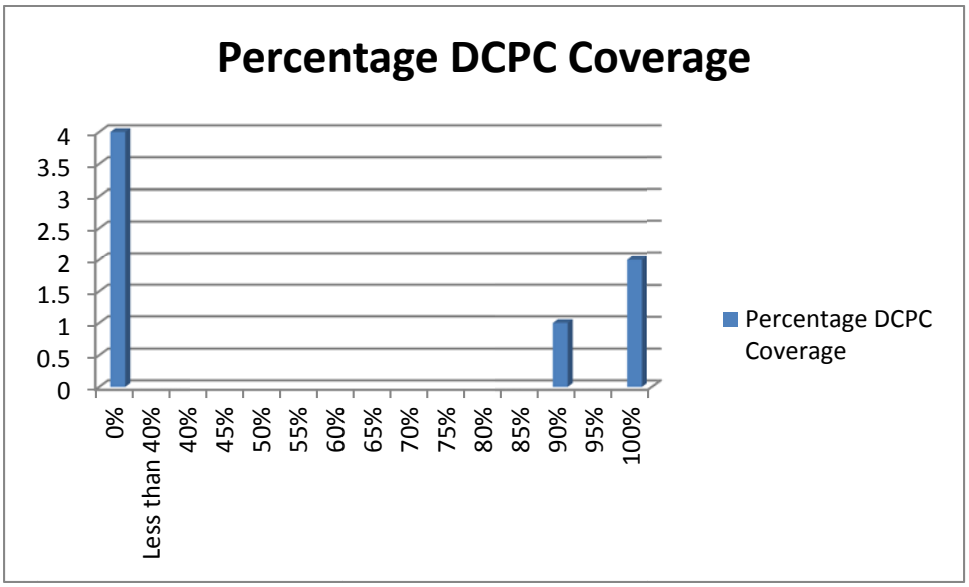
- ATM Operation:

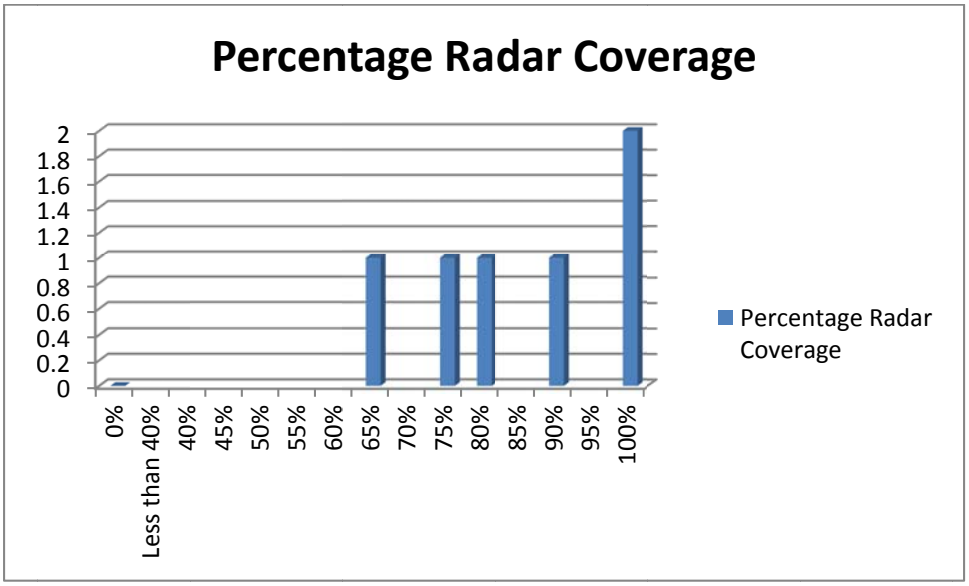


- COM/SUR Coverage:






Percentage DCPC Coverage
4
3.5
3
2.5
2
1.5
1
0.5
0
0%
Less than 40%
40%
45%
50%
55%
60%
65%
70%
75%
80%
85%
90%
95%
100%
Percentage DCPC Coverage


Percentage Radar Coverage
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1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
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0%
Less than 40%
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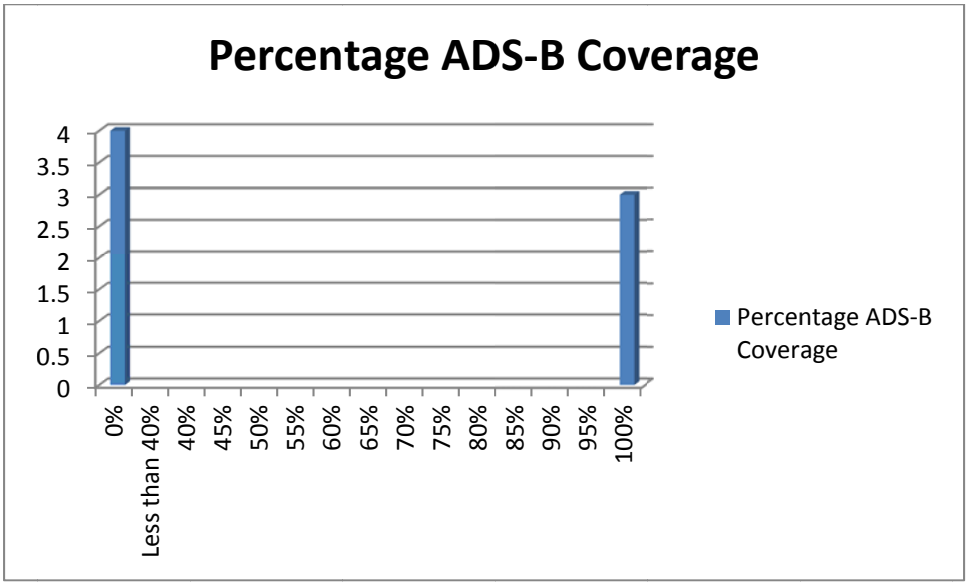
100%
Percentage Radar Coverage


Percentage ADS-B Coverage
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3.5
3
2.5
2
1.5
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0.5
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0%
Less than 40%
40%
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75%
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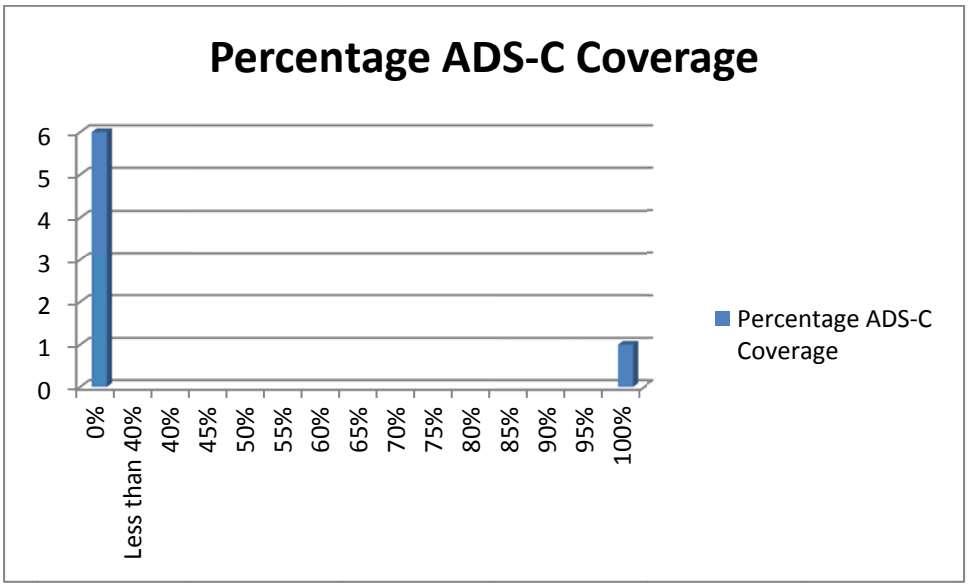
100%
Percentage ADS-B Coverage


Percentage ADS-C Coverage
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0%
Less than 40%
40%
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75%
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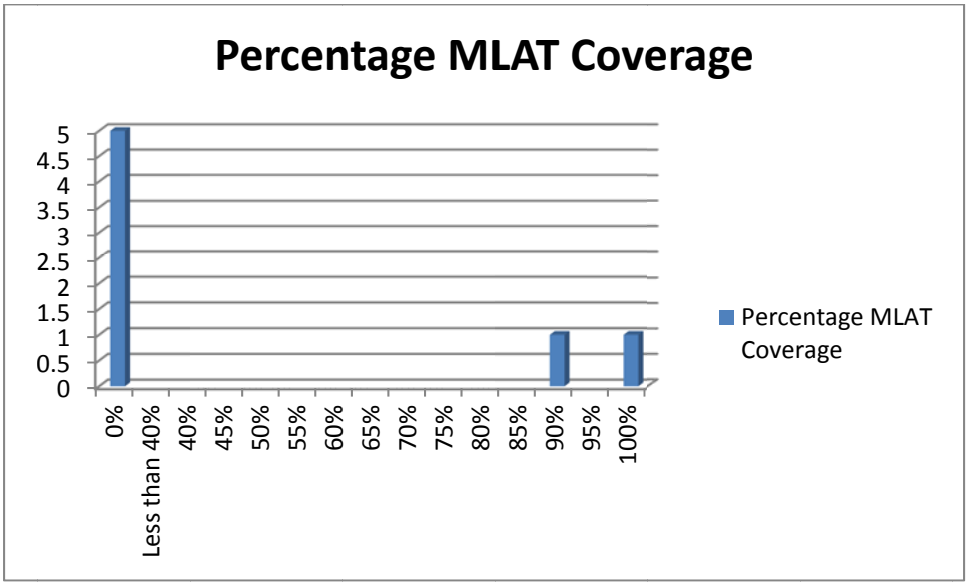
85%
90%
95%
100%
Percentage ADS-C Coverage


Percentage MLAT Coverage
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3
2.5
2
1.5
1
0.5
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Less than 40%
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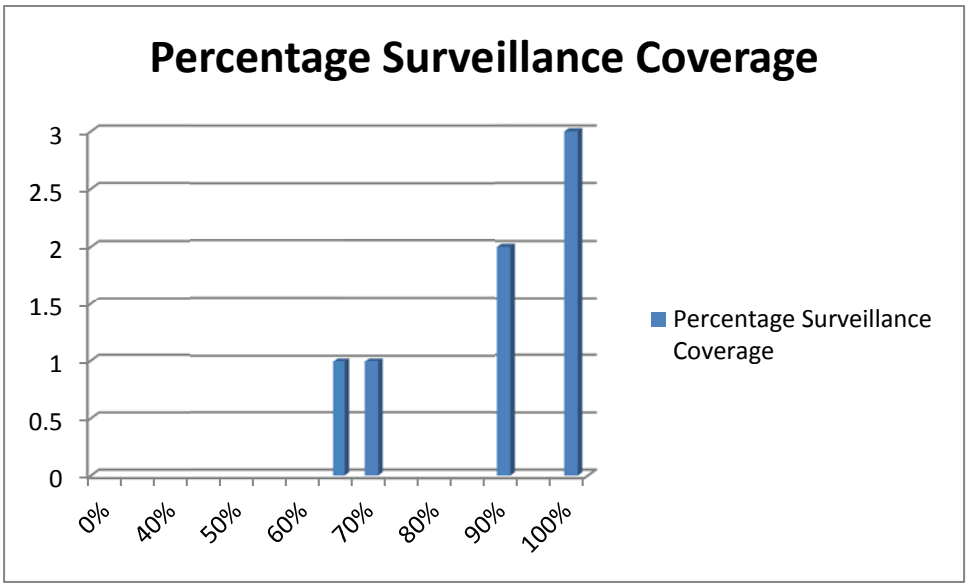
50%
55%
60%
65%
70%
75%
80%
85%
90%
95%
100%
Percentage MLAT Coverage



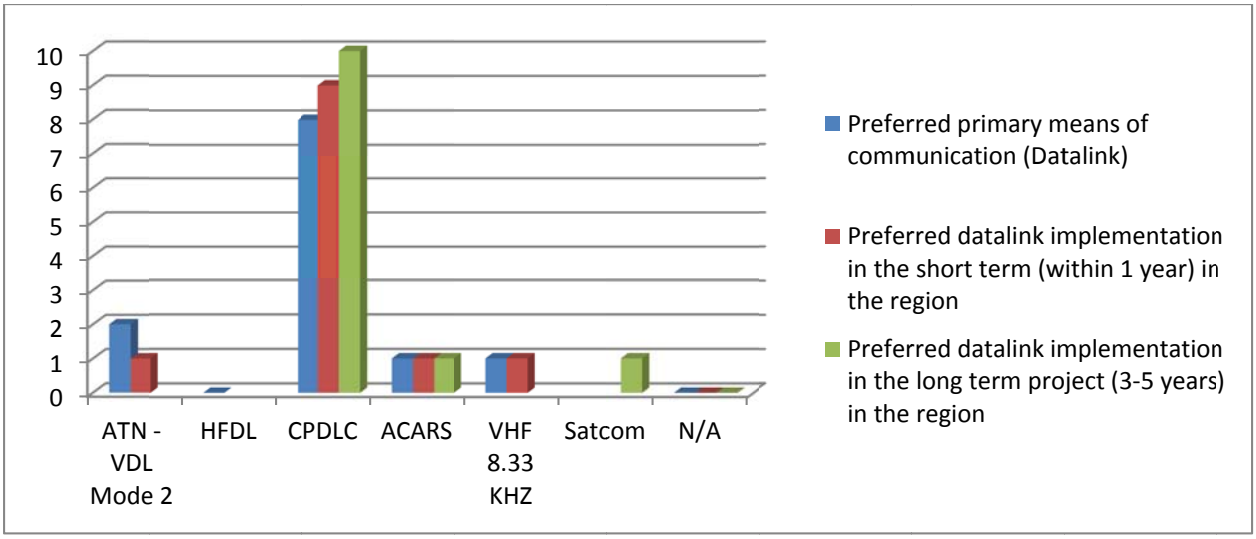
ii. Airline Requirements for CNS/ATM

a) Overview of Survey

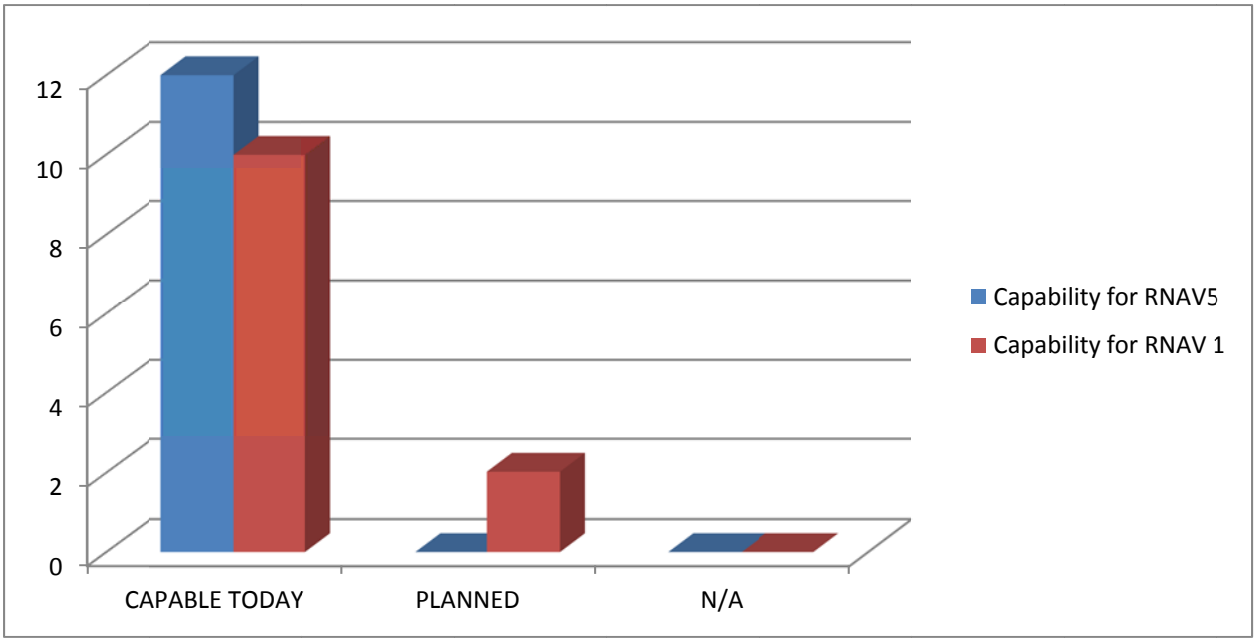
- Survey was launched in 2013
- Responses were received from 11 airlines
- Level of response is 40%
- The used questionnaire is attached to this document under **Appendix B**

b) Responses

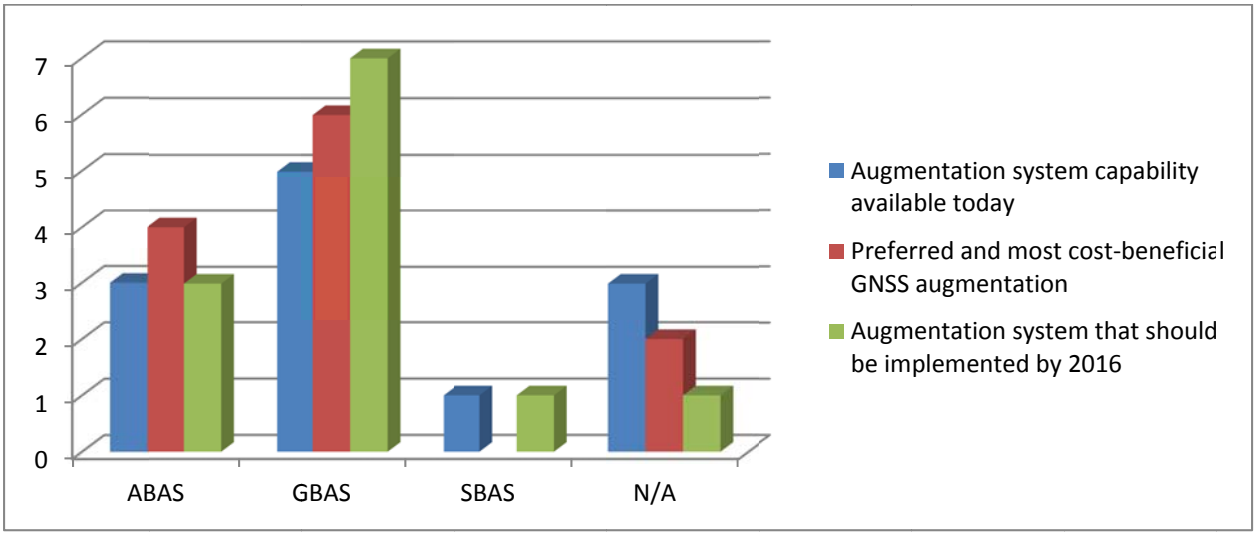
- Air to Ground Communication:



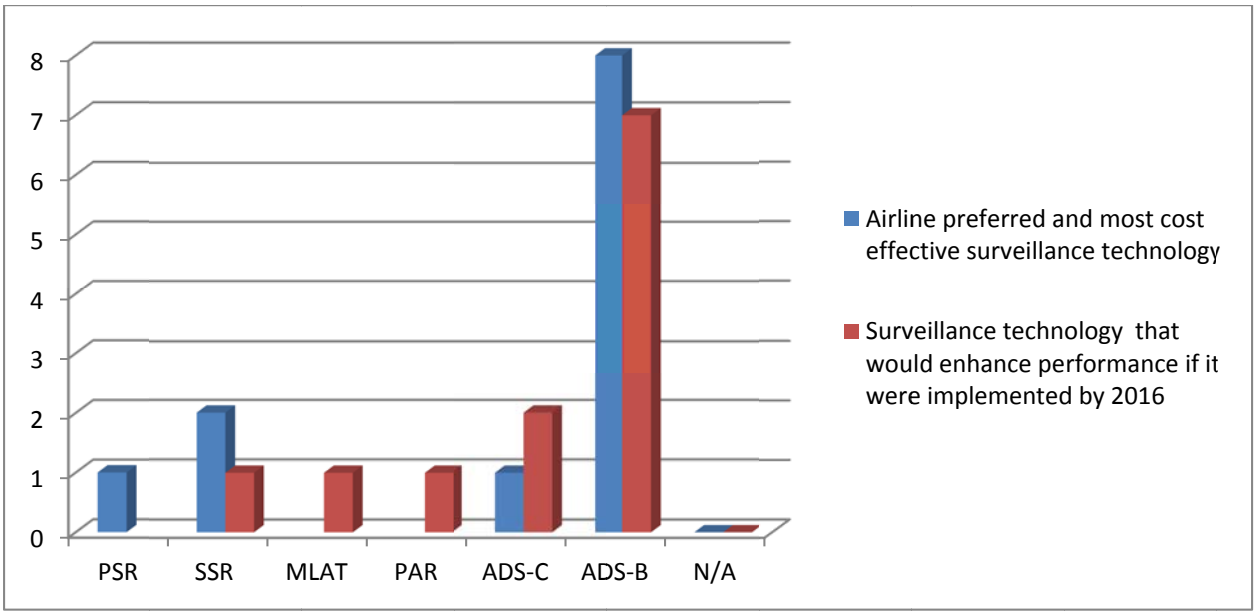
- PBN:


12
10
8
6
4
2
0
CAPABLE TODAY
PLANNED
N/A
Capability for RNAV5
Capability for RNAV 1

- GNSS:


7
6
5
4
3
2
1
0
ABAS
GBAS
SBAS
N/A
Augmentation system capability available today
Preferred and most cost-beneficial GNSS augmentation
Augmentation system that should be implemented by 2016

- Surveillance:



III. Surveys Gaps Analysis:

- Communication:

➢ CPDLC:

- 72% of airline respondents indicated CPDLC as a preferred data link in the short term, and 81% of the respondents indicated CPDLC as the preferred data link in the long term.
- Only 29% of the ANSPs respondents are capable of offering CPDLC today, and 57% have plans to implement CPDLC. Only one of the ANSPs respondents indicated that they will not implement or have no current plans for CPDLC.

➢ VDL Mode 2:

- 18% of airline respondents indicated VDL Mode 2 as a preferred data link in the MID Region, and only 9% of the respondents indicated that VDL Mode 2 should be implemented and used in the short term.
- Only 29% of the ANSPs respondents are capable of offering VDL Mode 2today, and another 29% have plans to implement VDL Mode 2. 43% of the ANSPs respondents indicated that they will not implement or have no current plans for VDL Mode 2.

➢ Communication Difficulties Identified by Airlines:

- All airline respondents indicated that they face communication difficulties in the following locations in the MID Region:

1. Iraq
2. Libya
3. Sudan
4. Saudi Arabia – the Empty Quarter

Summary of Finding:
Implementation of CPDLC is a user preferred technology, while ANSPs are not all planning on using or having CPDLC implemented in the short term.

States with Communications difficulties can overcome such problems by implementing CPDLC.

Lack of adequate communication infrastructure is causing safety incidents that are continuously being reported by air crew. Therefore, addressing communication difficulties is a safety requirement in addition to being an efficiency requirement.

- Navigation:

  - RNAV 5 Capability:

- 100% of airline respondents indicated that are RNAV 5 capable today.
- 100% of the ANSPs respondents indicated that are RNAV 5 capable today.

  - RNAV 1 Capability:

- 82% of airline respondents indicated that are RNAV 1 capable today, and 18% indicated that they plan on becoming RNAV 1 capable.
- 71% of the ANSPs respondents indicated that are RNAV1 (SID/STAR) capable today, and 29% indicated that they have plans to become RNAV1 (SID/STAR) capable.
- At the moment, the only published RNAV 1 routes are between UAE and Bahrain which will be available end of May 2013.

Summary of Finding:
Although the survey results show PBN capabilities on both ANSPs and airlines side, but the actual use and benefit of PBN is still limited in the MID Region.

Some of the airline respondents highlighted that difficulties and challenges still hinder an accelerated wide spread of PBN implementation, including training, awareness, communication and coordination, and the need for PBN implementation mandate to ensure commitment on regional and national level .

  - GNSS:

- 45% of airline respondents indicated that they are GBAS capable today, while 27% of the respondents indicated that they are ABAS capable today.
- 45% of airline respondents indicated that GBAS is the most cost-beneficial GNSS augmentation, while 36% indicated that ABAS is the most cost beneficial augmentation.
- 55% of airline respondents indicated that they would like to see GBAS implemented by 2016, while 27% preferred to see ABAS implemented by 2016.
- Only one airline out of the 11 supported SBAS implementation by 2016.

- 57% of the ANSPs respondents indicated that have plans for GBAS implementation.

Summary of Finding:
Although airlines see most benefit in GBAS and ABAS, ANSPs in the region are more looking into GBAS and SBAS.

- Surveillance:

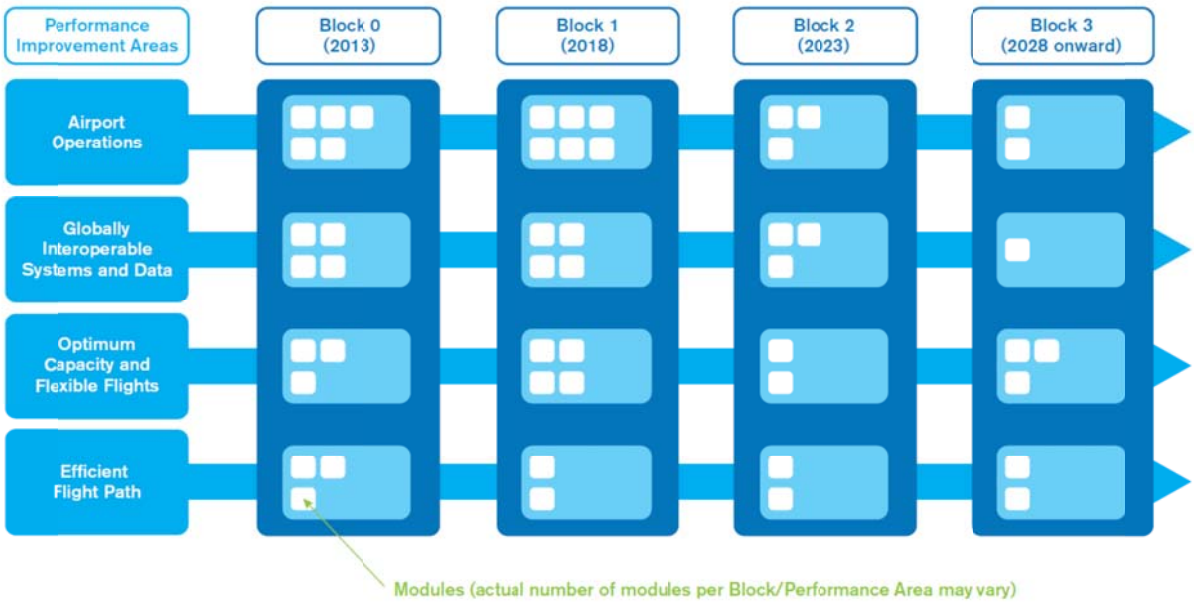
  - ADS-B:

- 64% of airline respondents indicated that their preferred and most cost effective surveillance technology is ADS-B, and 55% of the respondents indicated that they would like to see ADS-B implemented by 2016.
- 43% of the ANSPs respondents indicated that are ADS-B IN capable today, while another 43% have plans to implement ADS-B IN.

Summary of Finding:
Although ADs-B is a technology that can be used today, the MID Region still does not have a region-wide spread of use of ADS-B.

IV. GANP and ASBU Overview:

a) ICAO Block Upgrades Methodology:



The core of the Block Up-grade concept is linked to four specific interrelated aviation performance areas;

1) Airport Operations
2) Globally-interoperable systems and data
3) Optimum capacity and flexible flights
4) Efficient flight paths

V. Mapping ASBU Modules applicable to the MID region:

The following ASBU Modules have selected as a priority for the MID region under the auspices of ICAO MIDANPIRG;

1) B0 – APTA: Optimization of Approach Procedures including vertical guidance
2) B0 – SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)
3) B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration
4) B0 – DATM: Service Improvement through Digital Aeronautical Information Management
5) B0 – MET: Meteorological information supporting enhanced operational efficiency and safety
6) B0 – FRTO: Improved Operations through enhanced en-route trajectories
7) B0 – CDO: Improved flexibility and efficiency in descent profiles (CDO)
8) B0 – CCO: Improved flexibility and efficiency departure profiles – Continuous Climb Operations (CCO)

The following ASBU Modules still remain as a requirement for the MID Region from the perspective of the airlines and ANSPs;

1) B0 – ACDM: Improved Airport Operations through Airport-CDM
2) B0 – ASUR: Initial capability for ground surveillance
3) B0 – TBO: Improved Safety and Efficiency through the initial application of Data Link En-Route
4) B0 – WAKE: Increased Runway Throughput through Optimized Wake Turbulence Separation
5) B0 – RSEQ: Improve Traffic flow through Runway Sequencing (AMAN/DMAN)

Modules under Blocks 2 and 3 will be re-visited after Blocks 0 and 1 are addressed in the region.

To identify gaps between current status based on MEAUSE surveys and strategic targets set for the region in accordance with the GANP and ASBU modules, the following represents a mapping between MEAUSE results and aforementioned ASBU Modules.

Block 0 (2013):

- ***B0 – APTA: Optimization of Approach Procedures including vertical guidance***
  - 29% of ANSPs respondents to the MEAUSE survey indicated that they can use APV today. While, 43% of the respondents indicated that have plans to use APV in the future.
  - 55% of airlines respondents indicated that their preferred augmentation by 2016 is GBAS.

- ***B0 – SURF: Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)***
  - 43% of ANSPs respondents to the MEAUSE survey indicated that they use A-SMGCS today. While, 43% of the respondents indicated that have plans to use A-SMGCS in the future. Only one ANSP indicated that they have no plans for A-SMGCSA use.

- ***B0 – FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration***
  - 29% of ANSPs respondents to the MEAUSE survey indicated that they have AIDC today. 43% of the respondents indicated that plan to have AIDC implemented.

- 71% of ANSPs respondents to the MEAUSE survey indicated that they have OLDI implemented today, while only one ANSP indicated that it has plans for OLDI implementation in the future.

- ***B0 – DATM: Service Improvement through Digital Aeronautical Information Management***

  - Work under this module will be based on work progress under MIDAD. Therefore, it will not be addressed under this document.

- ***B0 – MET: Meteorological information supporting enhanced operational efficiency and safety***

  - Work under this module will be mainly addressed under the ICAO MET SG. Therefore, it will not be addressed under this document.

- ***B0 – FRTO: Improved Operations through enhanced en-route trajectories***

  - The use of airspace which would otherwise be segregated (i.e. special use airspace) along with flexible routing (Off-Airways & point-to-point) adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight length and fuel burn.

- ***B0 – CDO: Improved flexibility and efficiency in descent profiles (CDO)***

  - All airlines respondents to the MEAUSE Survey indicated that they are capable for RNAV 5. 82% indicated that they are capable for RNAV 1.
  - 100% of ANSPs respondents to the MEAUSE survey indicated they are capable for RNAV 5 today.
  - 71% of ANSPs respondents to the MEAUSE survey indicated they have RNAV1 (SID/STAR)
  - 71% of ANSPs respondents to the MEAUSE survey indicated that they have plans to implement Basic RNP 1
  - 29% of ANSPs respondents to the MEAUSE survey indicated that they have RNP APCH today, while 43% indicated that they have future plans to implement RNP APCH
  - 43% of ANSPs respondents to the MEAUSE survey indicated that they have future plans to implement RNP AR APCH

  Work is required in Terminal airspace to implement RNAV STARs, then Air Traffic needs to work on allowing the aircraft to continue its descent unimpeded by ATC. This will require ATC training & perhaps the implementation of Sequencing Tools & CPDLC to support this in real operations.

- ***B0 – CCO: Improved flexibility and efficiency departure profiles – Continuous Climb Operations (CCO)***

  - All airlines respondents to the MEAUSE Survey indicated that they are capable for RNAV 5. 82% indicated that they are capable for RNAV 1.
  - 100% of ANSPs respondents to the MEAUSE survey indicated they are capable for RNAV 5 today.
  - 71% of ANSPs respondents to the MEAUSE survey indicated they have RNAV1 (SID/STAR)
  - 71% of ANSPs respondents to the MEAUSE survey indicated that they have plans to implement Basic RNP 1

VI. Air Navigation Objectives and Targets for MID Region:

The MID Region air navigation objectives and targets are detailed in the table below;

B0 – APTA: Optimization of Approach Procedures including vertical guidance			
Applicability: Aerodromes			
Metrics	KPI	Target	Actions
LNAV Approaches	Number of airports with LNAV approaches	PBN and APV operations (Approaches with Vertical guidance) regional operator implementation to be complete: - 30% by Dec 2015 - 70% by Dec 2018 - 100% by Dec 2020 The following Runway ends in the MID Region have been identified where APV with Vertical guidance are a priority: - Najaf ORNI/NJF Rwy 10 - Alexandria HEBA/HBE – Rwy 14 - Tripoli HLLT/TIP – Rwy 09 - Amman OJAI/AMM – Rwy 08R - Benghazi HLBN/BEN - Rwy 15L, 15R, 33R	1) Consultation meetings jointly driven by IATA, CANSO, and ICAO in conjunction with MEAUSE 2) PBN Workshops in 2014 3) MPST Go-Team visits
LNAV/VNAV Approaches	Number of airports with LNAV/VNAV approaches		
Precision Approach	Number of airports with precision approaches		
GNSS Augmentation	- Number of ANSPs implementing GNSS	ANSPs/States to implement GBAS in a phased approach as follows; - 30% implementation by 2014 - 60% implementation by 2016 - 100% implementation by 2018	1) Consultation meetings jointly driven by IATA, CANSO, and ICAO in conjunction with MEAUSE 2) GNSS/GBAS Workshop in 2014 3) Pilot projects and trials

B0 – SURF: Safety & Efficiency of Surface Operations (A-SMGCS Level 1-2)			
Applicability: Aerodromes			
Metrics	KPI	Target	Actions
Number of airports with Level I A-SMGCS implementation	1) Improve the control of runway and taxiing operations by implementing incursion alerts and tools to predict, detect and resolve conflicts	1) Non-visual Aids: - All airports in the MID region to be equipped with functional and reliable ILS by 2014 2) Visual Aids: All airports in the MID region to comply with Annex 14 photometric requirements by 2013 including: - Markings - Lights - Signs	1) Airport technical missions jointly driven by IATA, CANSO, and ICAO 2) Airport infrastructure surveys 3) consultation meetings jointly driven by IATA, CANSO, and ICAO in conjunction with MEAUSE
Number of airports with Level II A-SMGCS implementation	1) Enhance the surveillance function at all MID aerodromes to ensure that controllers receive all necessary information on all aircraft and vehicles on the movement area down to the AVOL 2) Enhance the situation awareness of pilots, particularly in low visibility conditions — when the "see and be seen" principle is not applicable 3) Develop routing facilities in order to make full use of aerodrome capacity	1) Use of primary and secondary radar with Human Machine Interface (HMI) to complement SMR image by 2018 2) Use of CPDLC data link to complement radiotelephony by 2018 3) Non-visual Aids: - All airports in the MID region to be CAT II capable by 2016 - All airports in the MID region to be CAT III capable by 2018 -	

B0 - FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration			
Applicability: States/ACCs			
Metrics	KPI	Target	Actions
Use of AIDC to replace ATS Messages under Annex 3 of Doc 4444	Number of ANSPs implementing AIDC	- 100% AIDC implementation in the MID region by 2014.	
Use of OLDI to replace ATS Messages under Annex 3 of Doc 4444	Number of ANSPs implementing OLDI	OLDI implementation in a phased approach as follows; - 50% of all Mid States by 2015 - 100% of all MID States by 2016	

B0 - FRTO: Improved Operations through enhanced en-route trajectories			
Applicability: States/ACCs			
Metrics	KPI	Target	
Flexible Use of Airspace	Level of access to restricted airspace: 1) Percentage of airspace accessed 2) Duration of accessibility of airspace	1) Reduce military restricted airspace in the MID region by 10% by 2014, through: - Allowing timed routes to be available through military restricted airspace; or - Reducing portion of airspace restricted 2) Reduce military restricted airspace in the MID region by an additional 10% by 2016, through: - Allowing timed routes to be available through military restricted airspace; or - Reducing portion of airspace restricted 3) Reduce military restricted airspace in the MID region by an additional 10% by 2018, through: - Allowing timed routes to be available through military restricted airspace; or - Reducing portion of airspace restricted	1) Civil-Military Go-Team visits
Point-to-Point Navigation	Number of Stated implementing off-airways point-to-point navigation	Implement off-airways point-to-point navigation in a phased approach as follows; - 10% by 2014 - 50% by 2016 - 100% by 2018	1) Consultation meetings jointly driven by IATA, CANSO, and ICAO in conjunction with MEAUSE 2) Workshops 3) Pilot projects and trials
	Number of States implementing free route airspace	Implement off-airways point-to-point navigation in a phased approach as follows; - 10% by 2014 - 50% by 2016 - 100% by 2018	1) Consultation meetings jointly driven by IATA, CANSO, and ICAO in conjunction with MEAUSE 2) Workshops 3) Pilot projects and trials

B0 - CDO: Improved flexibility and efficiency in descent profiles (CDO)			
Applicability: States/ACCs			
Metrics	KPI	Target	Actions
Continuous Descent Operations (CDO)	Number of airports supporting CDO operations	Phased implementation of CDO in the MID region; - 10% implementation by 2014 - 50% implementation by 2016 - 100% implementation by 2018	1) Pilot projects 2) PBN Workshops

B0 - CCO: Improved flexibility and efficiency departure profiles – Continuous Climb Operations (CCO)			
Applicability: States/ACCs			
Metrics	KPI	Target	Actions
Continuous Climb Operations (CCO)	Number of airports with revised departure routings in support of continuous climb operations	Phased implementation of CCO in the MID region; - 10% implementation by 2014 - 50% implementation by 2016 - 100% implementation by 2018	1) Pilot projects 2) PBN Workshops

Additional Targets and Priorities			
Metrics	KPI	Target	Actions
Ground-to-Air Communication in conjunction with B0 - TBO	- Number of ANSPs using data link communication	1) ANSPs/States to ensure 100% VHF coverage within their airspace by 2013 2) ANSPs/States to implement CPDLC (using Satcom or VDL Mode 2) in a phased approach as follows; - 30% implementation by 2014 - 60% implementation by 2016 - 100% implementation by 2018	Technical and operational support for datalink trials
Surveillance in conjunction with B0 - ASUR	- Number of ANSPs utilizing new aircraft technology to enhance surveillance	1) ANSPs/States to implement ADS-B OUT (aircraft out) as follows; - 30% implementation by 2014 - 60% implementation by 2015 - 100% implementation by 2016 2) ANSPs/States to implement MLAT as follows; - 30% implementation by 2015 - 60% implementation by 2016 - 100% implementation by 2017	1) ADS-B/MLAT Workshop in 2014

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