International Civil Aviation Organization

ICAO ATN/AMHS Overview, Relevant SARPs and Regional Implementation issues

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ICAO/FAA Workshop/Meeting on the Follow-up to the Implementation of the ATS Message Handling System (AMHS) in the NAM/CAR Regions
(Miami, Florida, USA, 10 to12 April 2012)

Objective

1. **Present ICAO guidance and SARPS for AMHS implementation within the global operational concept framework, ASBU methodology and regional agreements;**
2. **provide knowledge on the current and future status of the AMHS implementation issues in the NAM/CAR regions**
3. **Pending issues for States to review**

OUTLINE

- **ICAO Global Implementation Overview**
  - Performance Based Approach (PBA) /Global ATM Operational Concept
  - Aviation System Block upgrade Methodology
  - Global Air Navigation Plan (GANP)
  - CNS/AIM + Avionics Roadmaps
- **ATN/ AMHS relevant SARPs**
  - Annex 10
  - Guidance Material
- **ATN/AMHS Regional Implementation Issues**
  - CAR/SAM Regional References
  - ATS Messaging Management Centre
  - GREPECAS Activities
  - NAM/CAR Implementation Activities

ICAO Global Implementation Overview

Performance based
Global Air Navigation Systems
(2008)

Aviation System Block Upgrade
(ASBU) Methodology
(2012)

Global ATM system
(2006)

CNS/ATM systems
(1994)

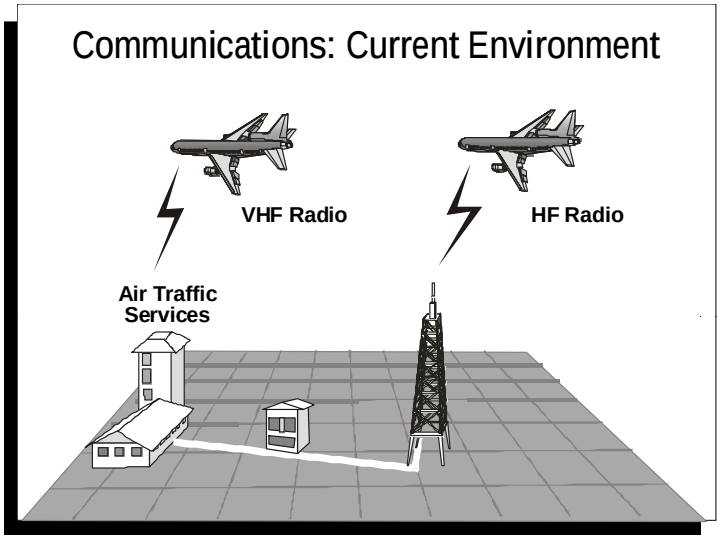
Future Air Navigation Systems
(1992)

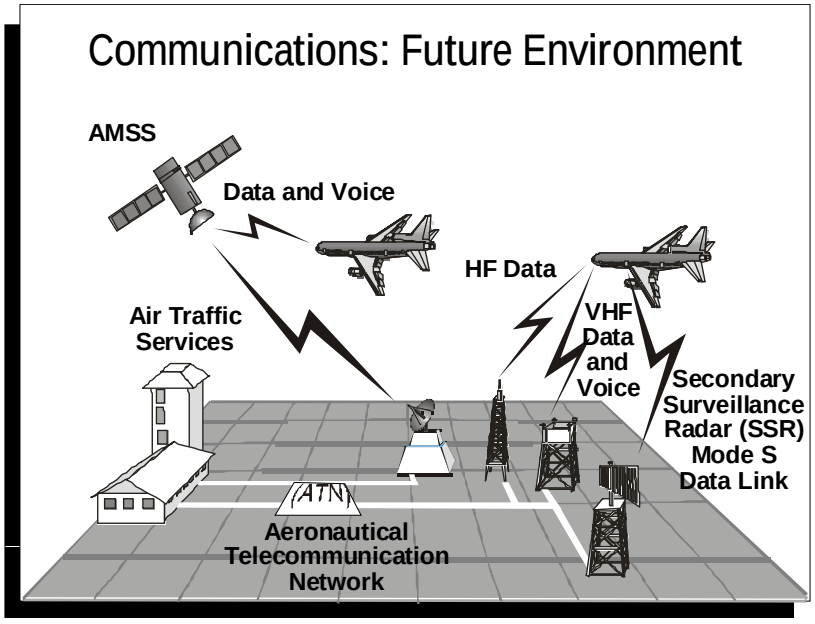
Ground based
Air Navigation systems
(Before 1992)

EVOLUTION TO A PERFORMANCE BASED GLOBAL AIR NAVIGATION SYSTEMS WITH ASBU METHODOLOGY

ICAO Global Implementation Overview

Communications





a) have a mix of satellite and ground-based systems
b) provides global coverage
c) uses interoperable systems
d) provides seamlessness
e) employs air/ground data link
f) employs digital technologies
g) comprises various levels of automation

ICAO Global Implementation Overview

Eleventh Air Navigation Conference (ANC/11) September 2003

- endorsed the global ATM operational concept
- Noted that corporatization and a more structured regulatory environment were placing increasing pressure on accountability
- Urged ICAO to develop a **performance framework for Air Navigation Systems**

35th Session of the ICAO Assembly September 2004

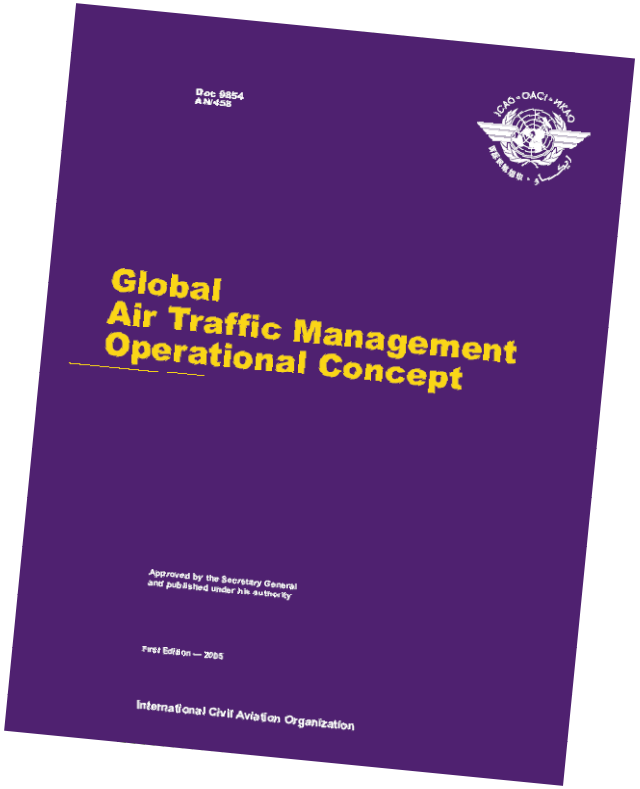
- Called upon States, PIRGs and the aviation industry to use the ICAO Global ATM Operational Concept as the common framework
- Requested ICAO to develop the transition strategies, ATM requirements and SARPs necessary to support implementation of a global ATM system
- Urged ICAO to ensure that the future global ATM system is performance based and that the performance objectives and targets for the future system are developed in a timely manner

ICAO Global Implementation Overview

Global ATM Operational Concept

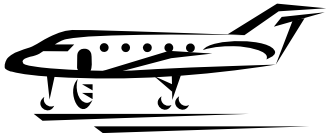
- The Global Air Traffic Management System Operational Concept;
  - describes how an integrated global air navigation system should operate
  - describes what is envisaged on the basis of services
  - describes how the services form an integrated system
  - utilizes an information rich environment, that solves most problems strategically, through a collaborative process
  - provides States and industry with clearer objectives for the design and implementation of ATM and supporting CNS systems

- ATM user expectations are drivers for change, requiring:
  - Safety case
  - Business case



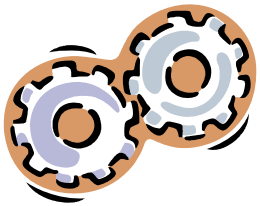
ICAO Global Implementation Overview

Vision



The concepts to implement the safety and sustainability /efficiency strategic objectives (Global ATM Operational Concept)

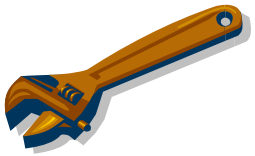
Strategy



Global Air Navigation Plan

Global Aviation Safety Plan

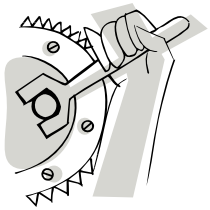
Tactics



Global Performance Initiatives (GPI)

Global Safety Initiatives (GSI)

Action



Global and regional work plans as part of the business plan for ICAO led activities

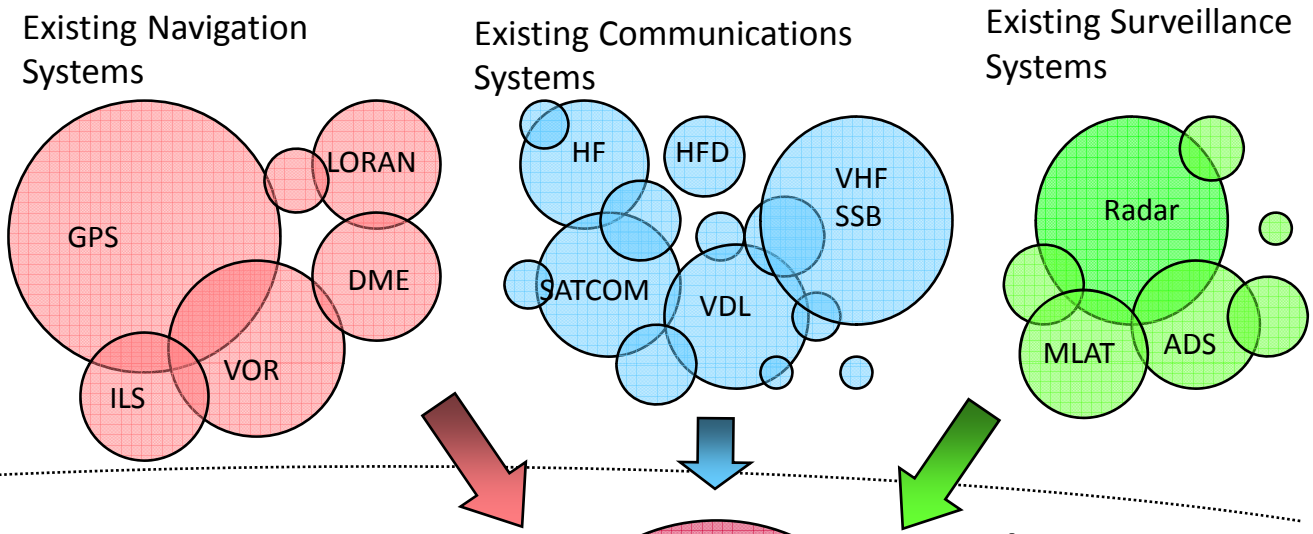
ICAO Global Implementation Overview

- **Technical Enablers** of the operational concept are technologies like the Air Navigation infrastructure to meet following conditions:
  - They meet properties required to implement the element/ Based on Performance Standards rather than specific technologies or equipment
  - that they can become operational in the element, during the proposed time frame/ Recognizes the ability of modern aircraft to operate safely and efficiently using an integration of on-board systems and external signals
- Operational Enablers procedures supporting the operational concept are global operational procedures, rules of the air, standards, meeting all the following conditions:
  - They are consistent with the element
  - It is realistic to consider that they can be officially approved early enough to be operational in the element, during the proposed timeframe
  - Selection of staff, training to these procedures can be achieved early enough for application during the proposed timeframe
- Socio-economic Enablers of an element of the operational concept are decisions taken by stakeholders (including airlines), and agreements between them to make the operational concept possible, and everything that makes these decisions actually possible

ICAO Global Implementation Overview

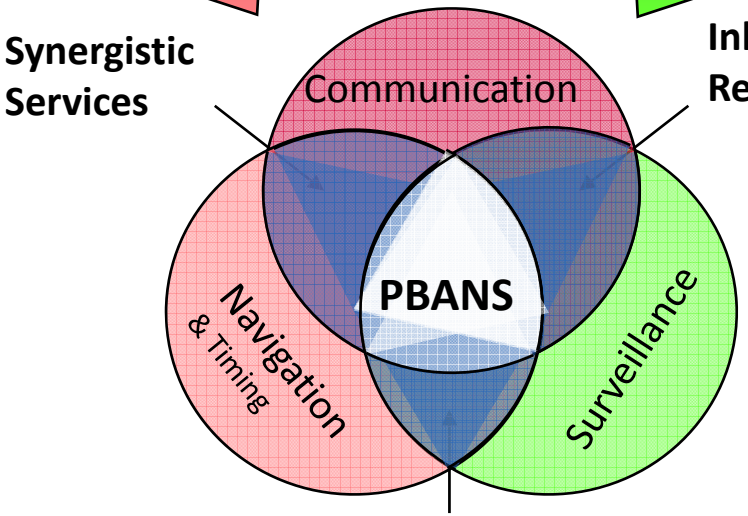
Today

- Plethora of Disjoint CNS Technologies
- Regional solutions
- Many standards
- Regional service variations



Performance Based Air Navigation System

- Integrated CNS
- Global utility
- Global standard
- Uniform levels of service



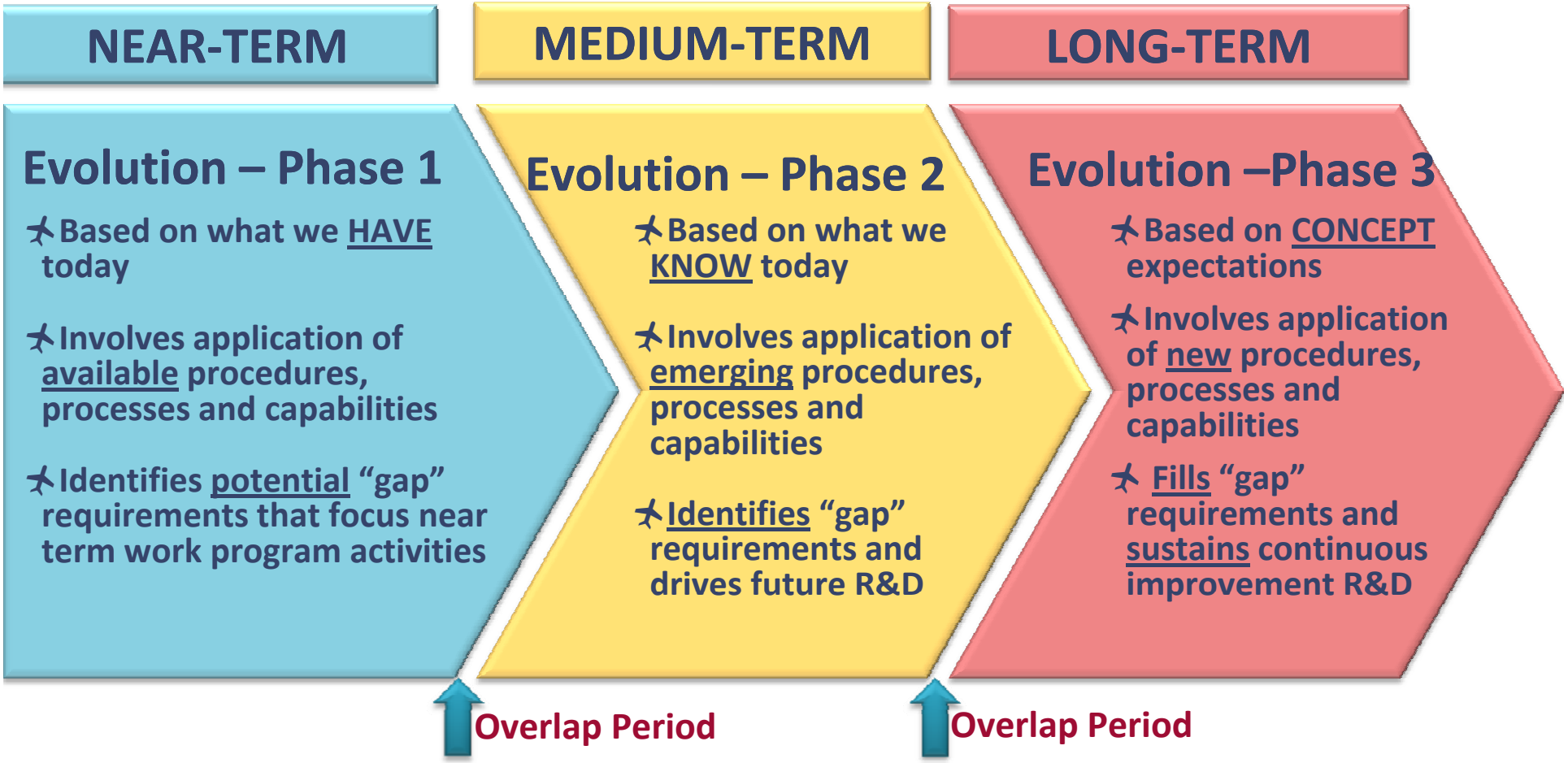
ICAO Global Implementation Overview

Global Air Navigation Plan (GANP)

- The Global Plan was updated on the basis of
  - Recommendations of AN-Conf/11
  - Global ATM Operational Concept, which provides the target system
  - Industry Roadmap, which provides the near and medium industry requirements
  - Assembly Resolution A35-15
- Global Plan provides guidance on environment, business case, costs, human resources, etc.
- A core element in the strategic plan of ICAO is to focus efforts on those activities that facilitate implementation.
- Result Areas are targeted efforts towards facilitating implementation.
- HQ & Regional Offices have established a process framework that will allow for measurable impacts based on ICAO controlled deliverables and external activities directly influenced by ICAO's role in the international aviation community.

ICAO Global Implementation Overview

GANP Transition Strategy



The "Overlap Period" indicates that there is no set date by which the objectives of each transition should be met – other than within a time band of perhaps 2-3 years. It also recognizes that some States or Regions may not have a specific performance requirement that would need the application of changes identified in the transition maps at the same time as another State or Region.

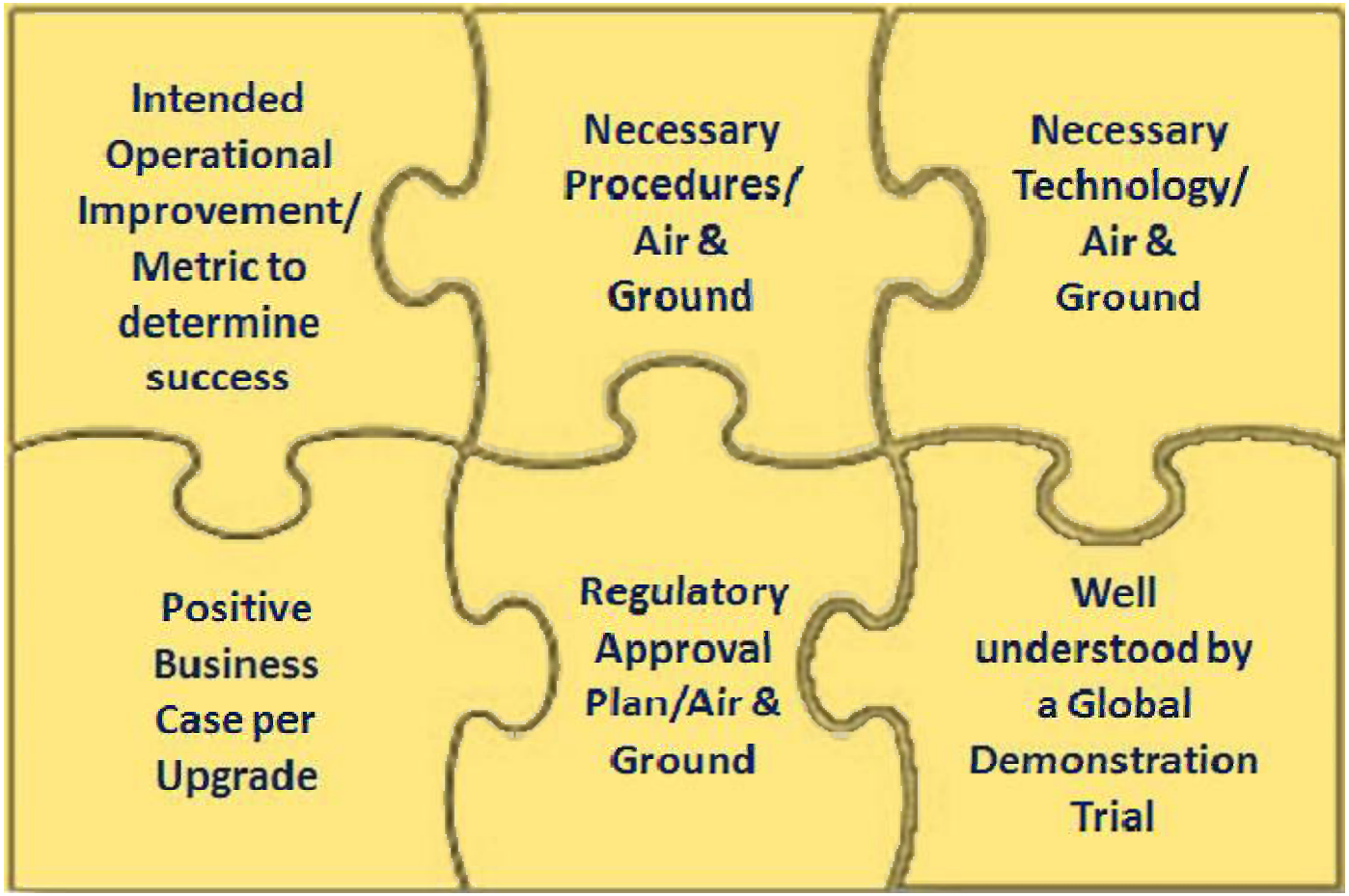
ICAO Global Implementation Overview

GANP GPI-22 – *Communication infrastructure*

- To evolve the aeronautical mobile and fixed communication infrastructure, supporting both voice and data communications, accommodating new functions as well as providing the adequate capacity and quality of service to support ATM requirements.
- the common objective is to seek the most efficient communication network service providing the desired services with the required performance and interoperability required for aviation safety levels at minimum cost.

ICAO Global Implementation Overview

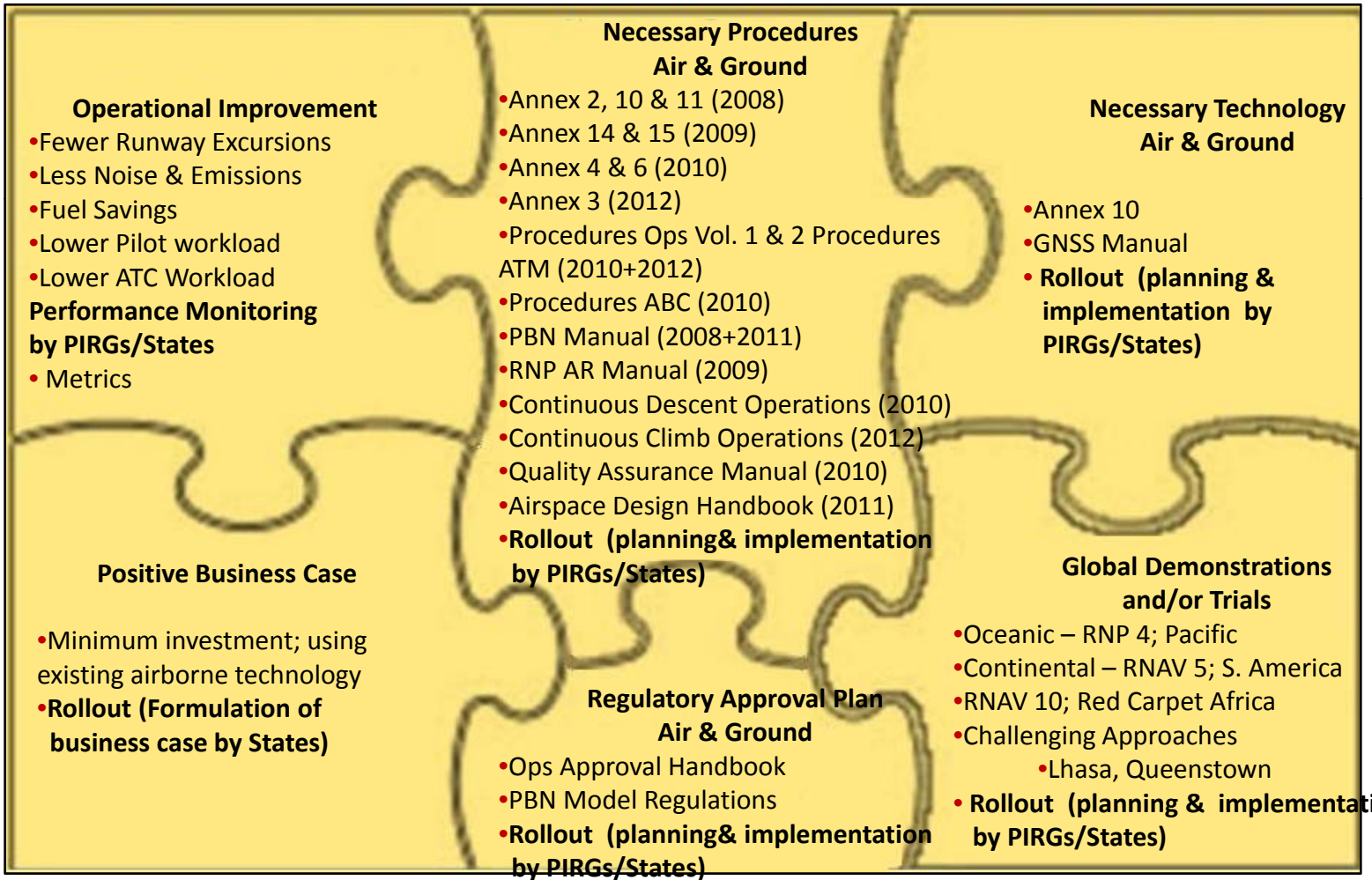
AVIATION SYSTEM BLOCK UPGRADE (ASBU) METHODOLOGY



ICAO Global Implementation Overview

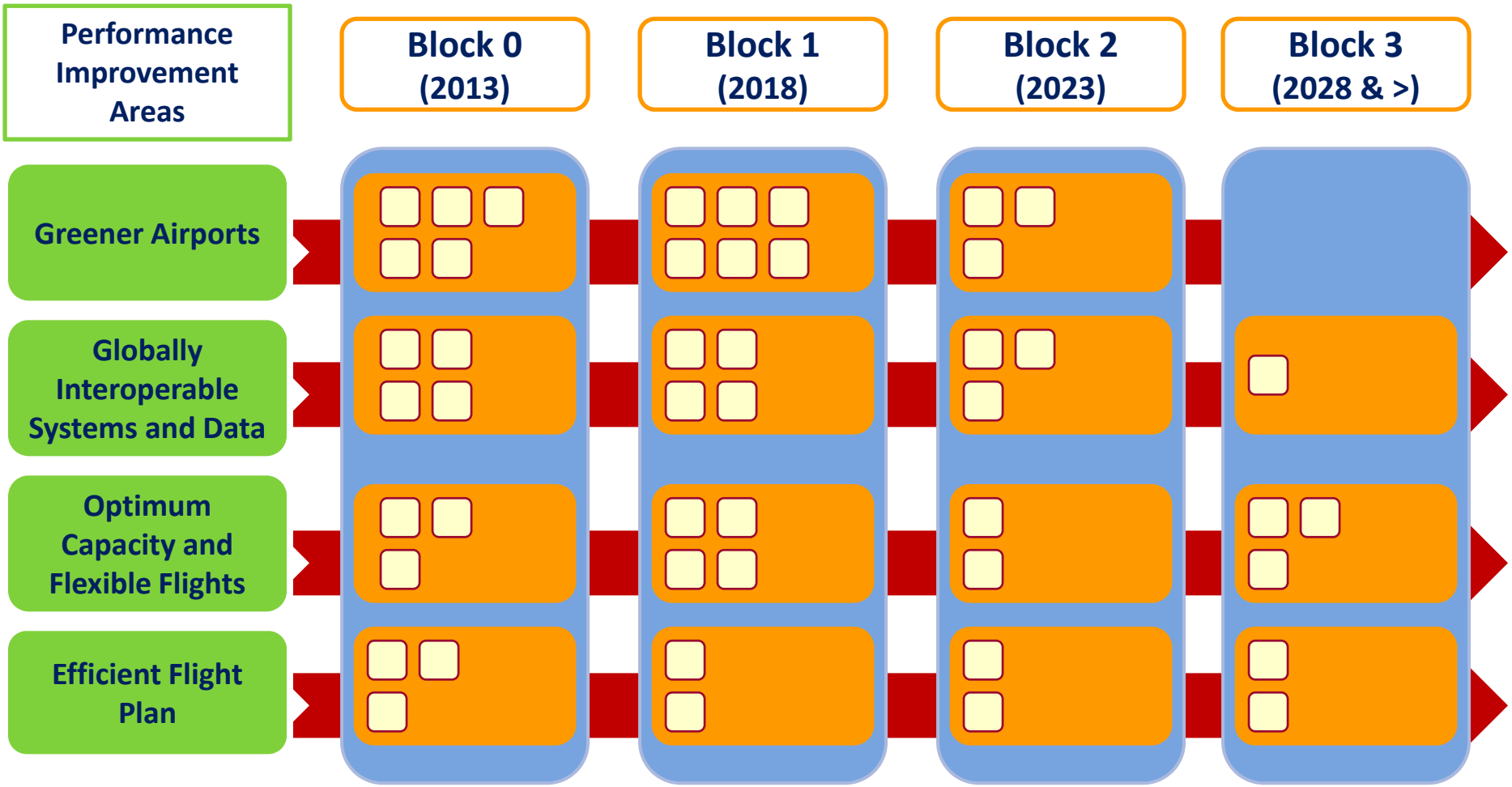
AVIATION SYSTEM BLOCK UPGRADE (ASBU) METHODOLOGY

PBN Example

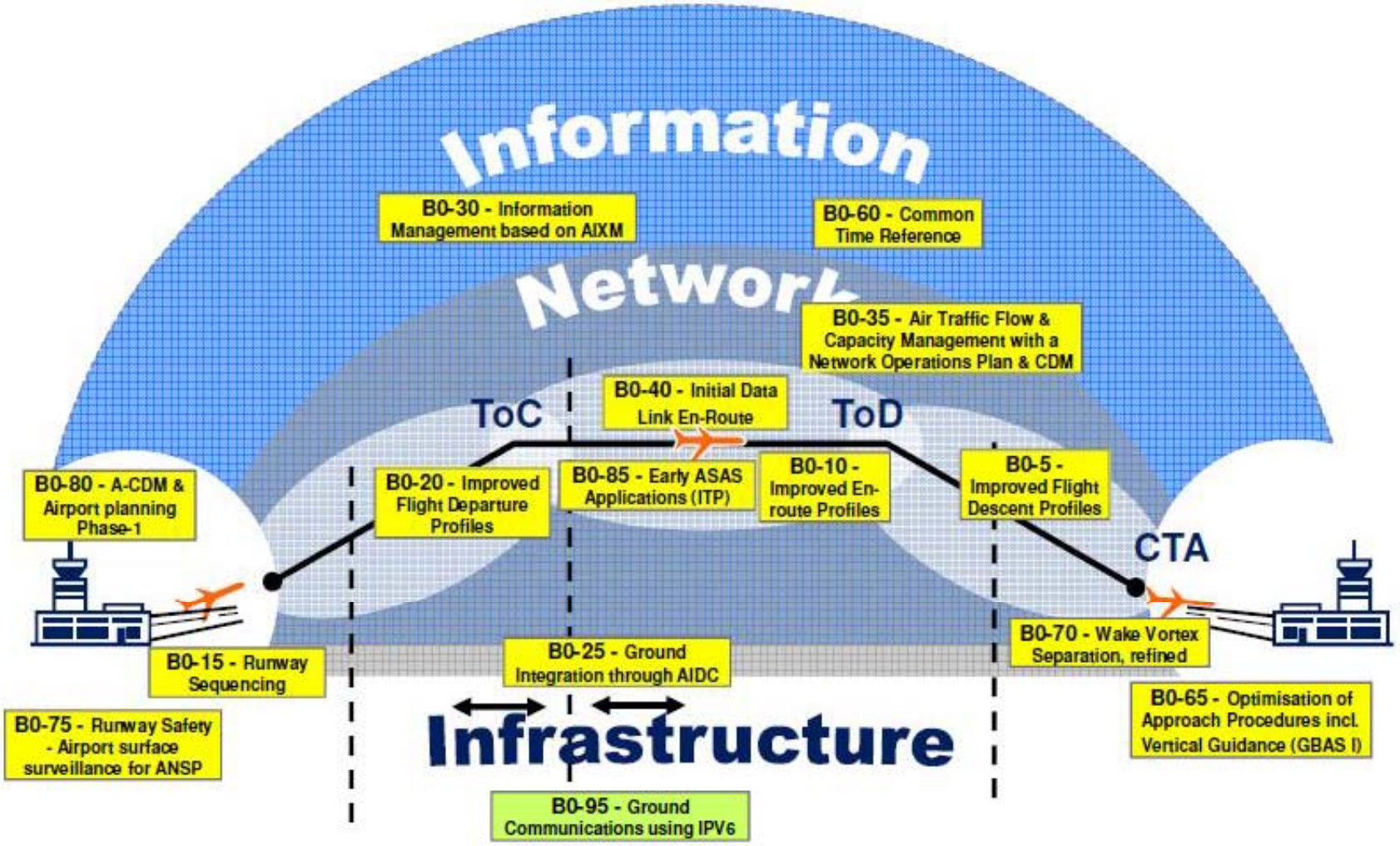


ICAO Global Implementation Overview

AVIATION SYSTEM BLOCK UPGRADE (ASBU) METHODOLOGY



Improvements for Phases of Flight
Example: Block 0



ICAO Global Implementation Overview

AVIATION SYSTEM BLOCK UPGRADE (ASBU)

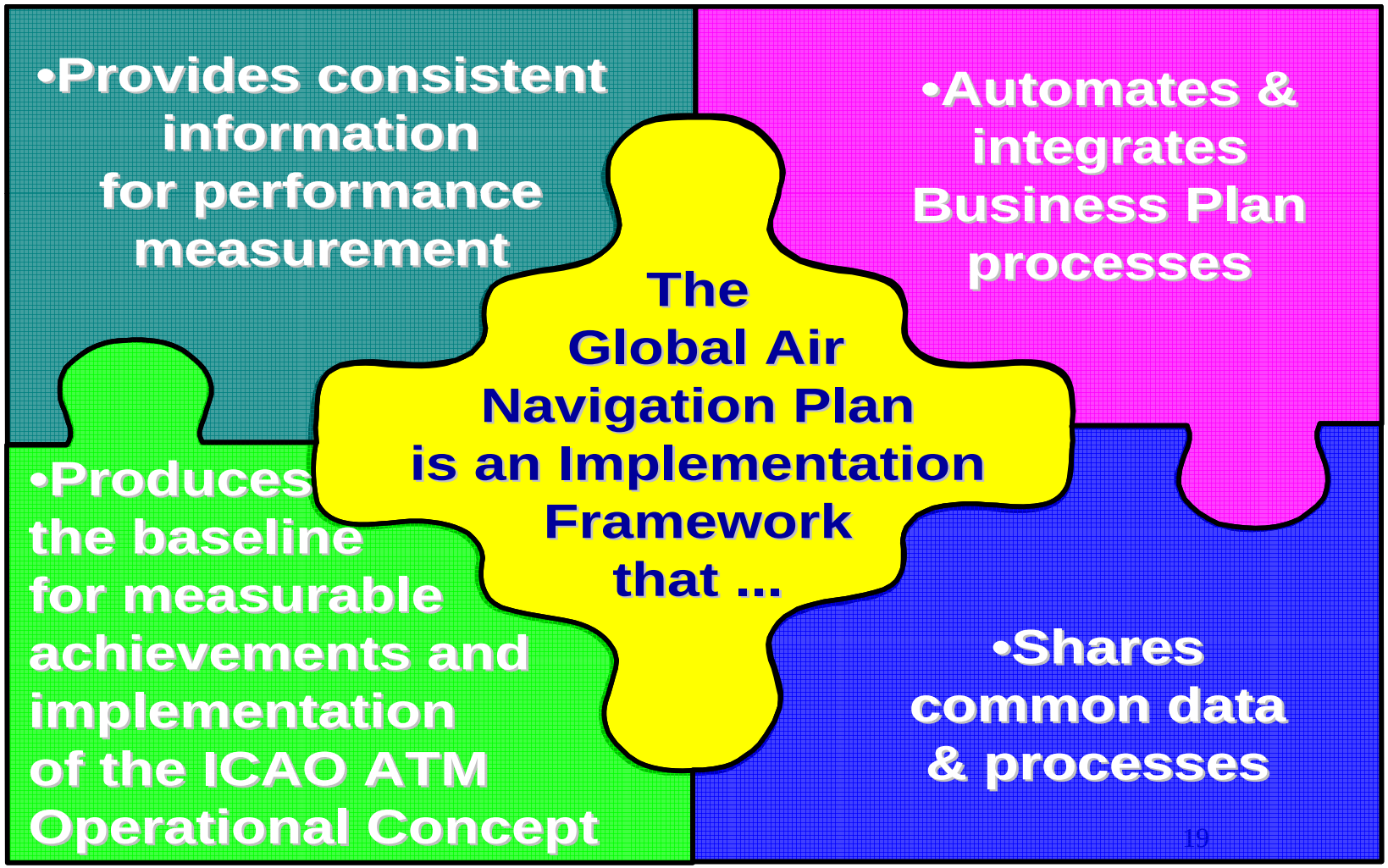
ANCONF/12

Montréal, 19-30 Nov 2012

- Opportunity to formalize future of infrastructure & equipage
- Strategies for longer-term requirements
- Agreement of first series of block upgrades
- Encourage more efficient implementation

ICAO Global Implementation Overview

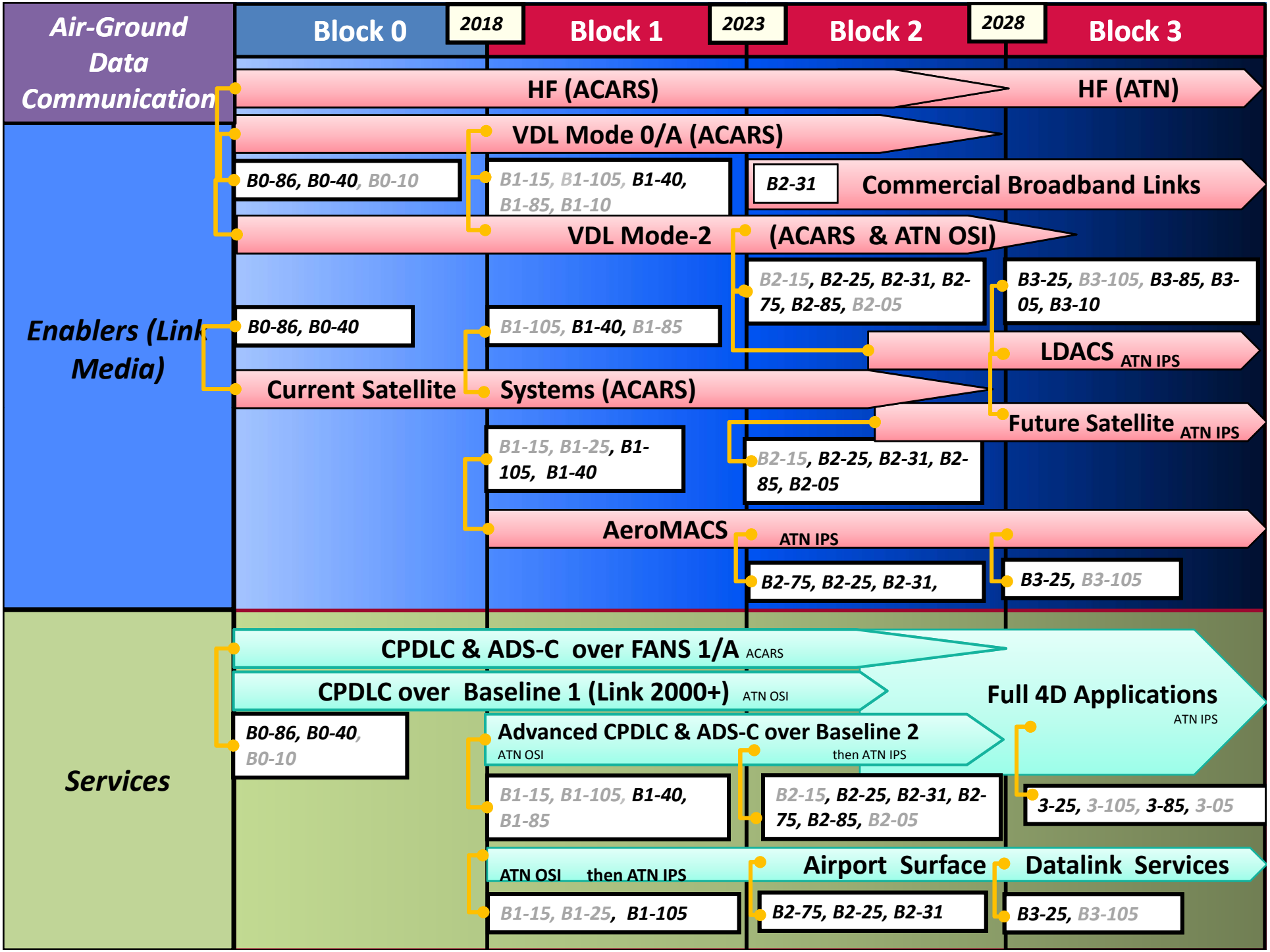
GANP: Review and update in ANCONF/12

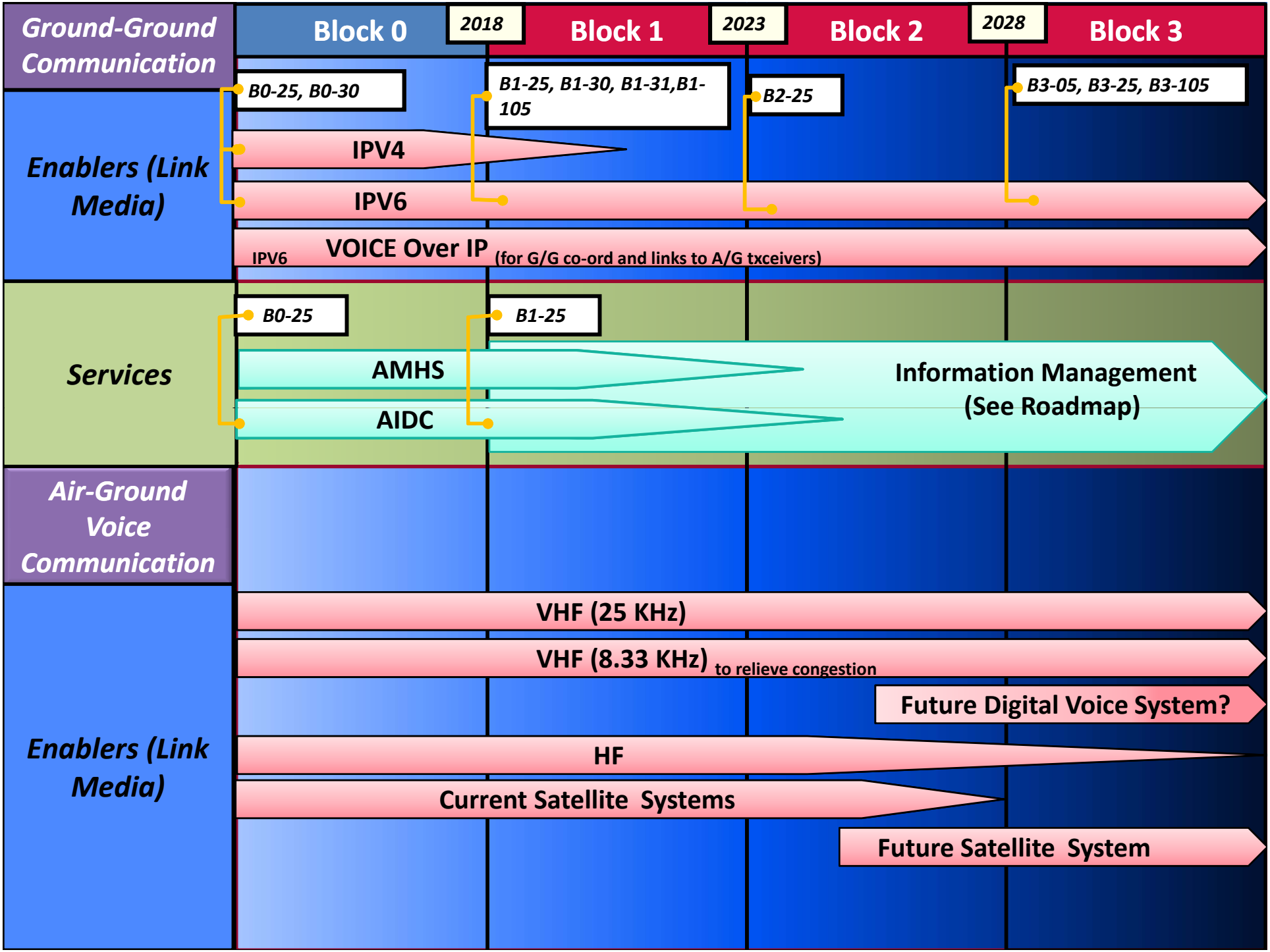


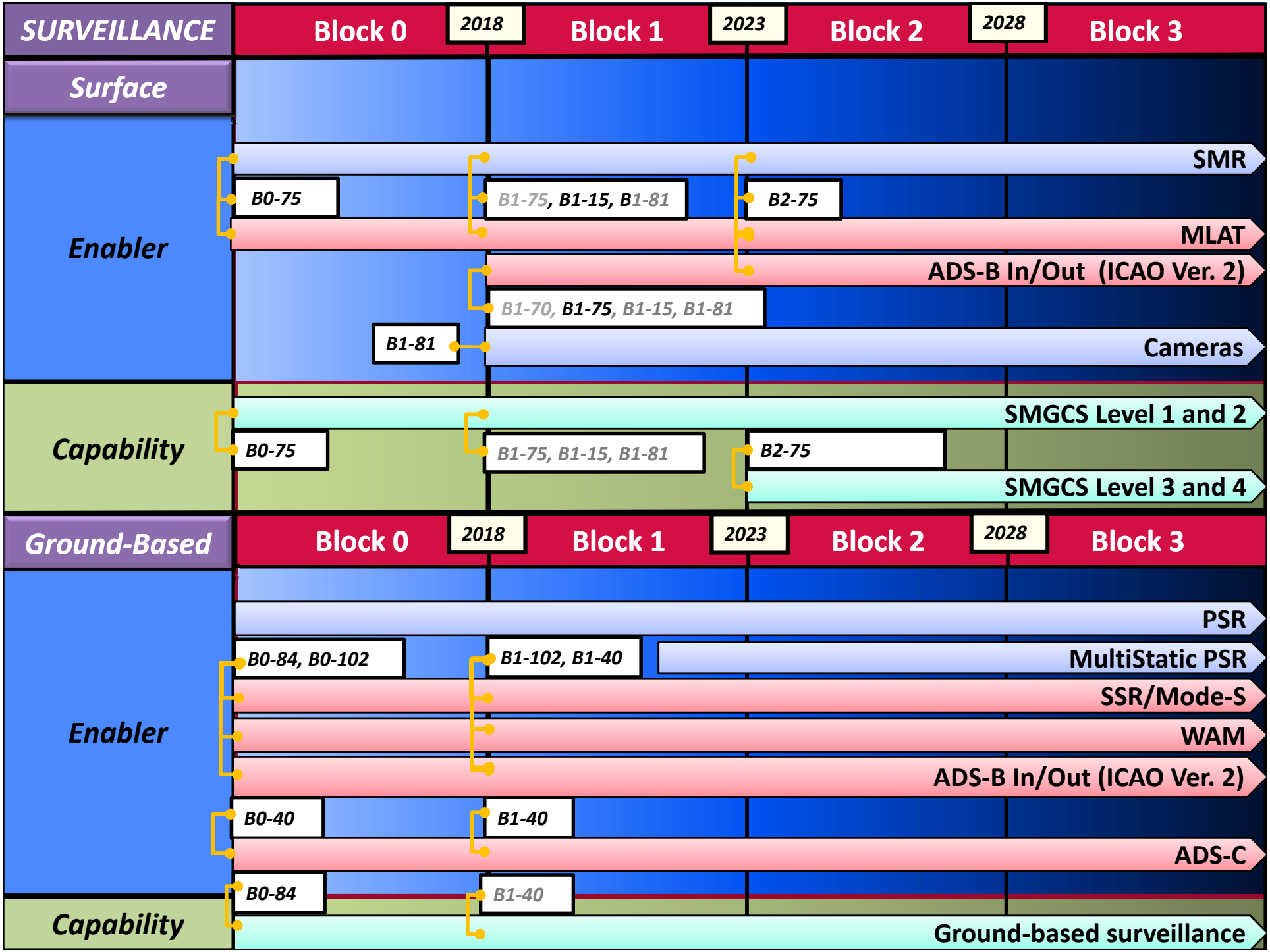
ICAO Global Implementation Overview

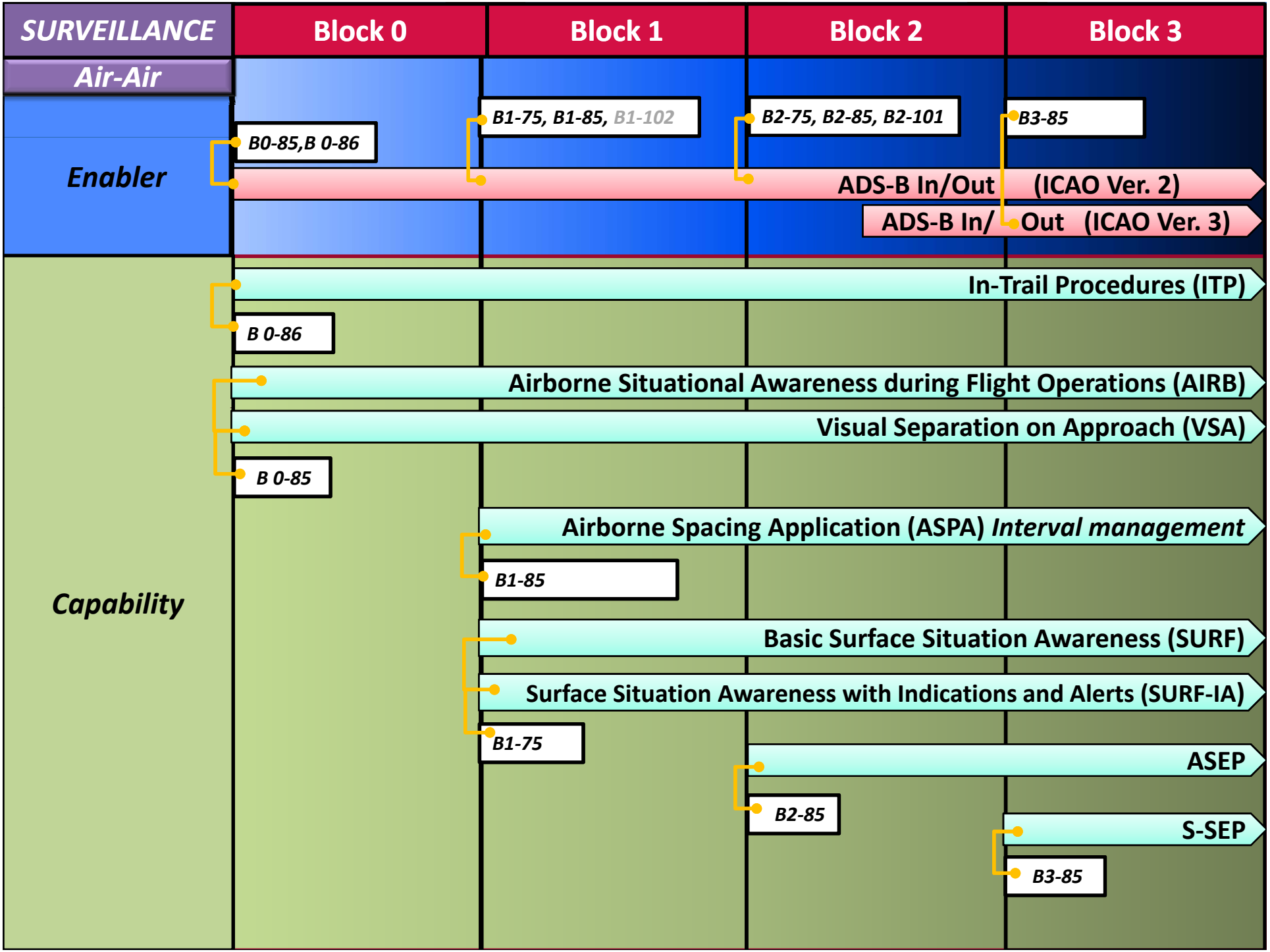
ASBU: CNS/AIM and Avionics Roadmaps

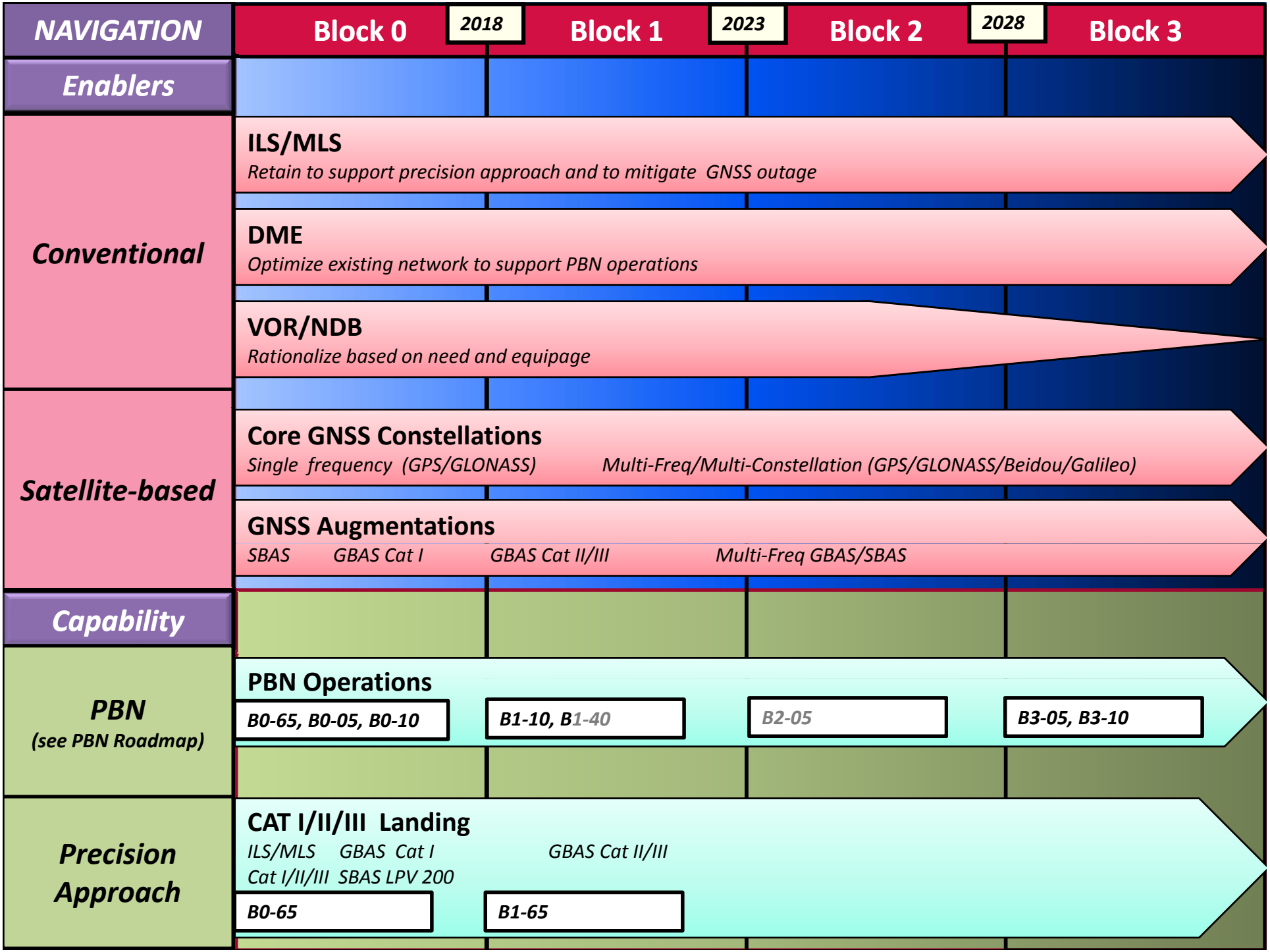
- CNS/AIM (Future Aviation Systems & Technology)
  - Aeronautical Information Management
  - ATM Information Management
  - System-Wide Information Management (SWIM)
- Avionics (Part of COM/NAV/SUR infrastructure)

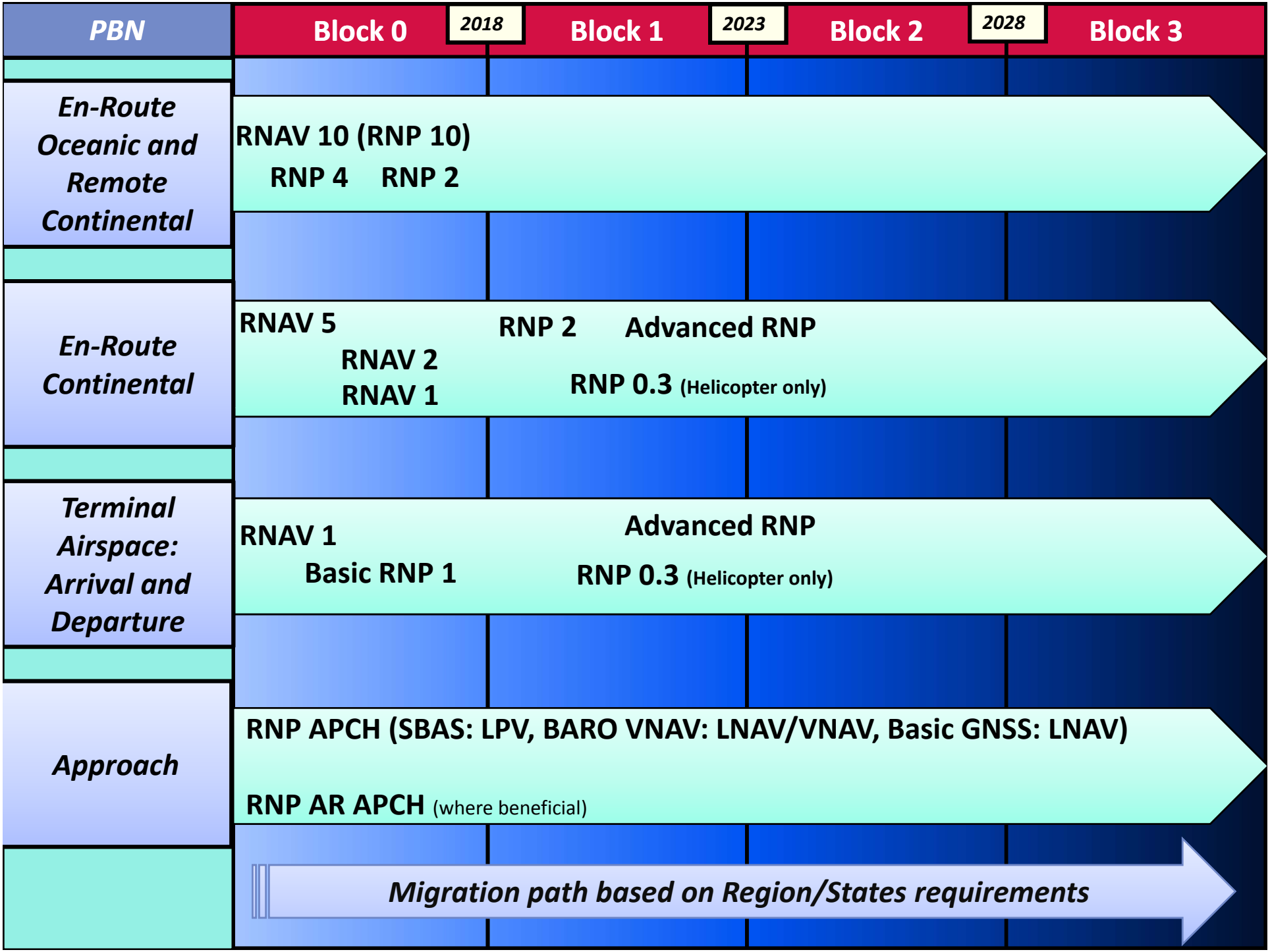

Air-Ground Data Communication
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
HF (ACARS)
HF (ATN)
VDL Mode 0/A (ACARS)
B0-86, B0-40, B0-10
B1-15, B1-105, B1-40, B1-85, B1-10
B2-31
Commercial Broadband Links
VDL Mode-2
(ACARS & ATN OSI)
Enablers (Link Media)
B0-86, B0-40
B1-105, B1-40, B1-85
B2-15, B2-25, B2-31, B2-75, B2-85, B2-05
B3-25, B3-105, B3-85, B3-05, B3-10
LDACS ATN IPS
Current Satellite
Systems (ACARS)
Future Satellite ATN IPS
B1-15, B1-25, B1-105, B1-40
B2-15, B2-25, B2-31, B2-85, B2-05
AeroMACS
ATN IPS
B2-75, B2-25, B2-31,
B3-25, B3-105
CPDLC & ADS-C over FANS 1/A ACARS
CPDLC over Baseline 1 (Link 2000+) ATN OSI
Full 4D Applications
ATN IPS
Services
B0-86, B0-40, B0-10
Advanced CPDLC & ADS-C over Baseline 2
ATN OSI
then ATN IPS
B1-15, B1-105, B1-40, B1-85
B2-15, B2-25, B2-31, B2-75, B2-85, B2-05
3-25, 3-105, 3-85, 3-05
ATN OSI then ATN IPS
Airport Surface
Datalink Services
B1-15, B1-25, B1-105
B2-75, B2-25, B2-31
B3-25, B3-105

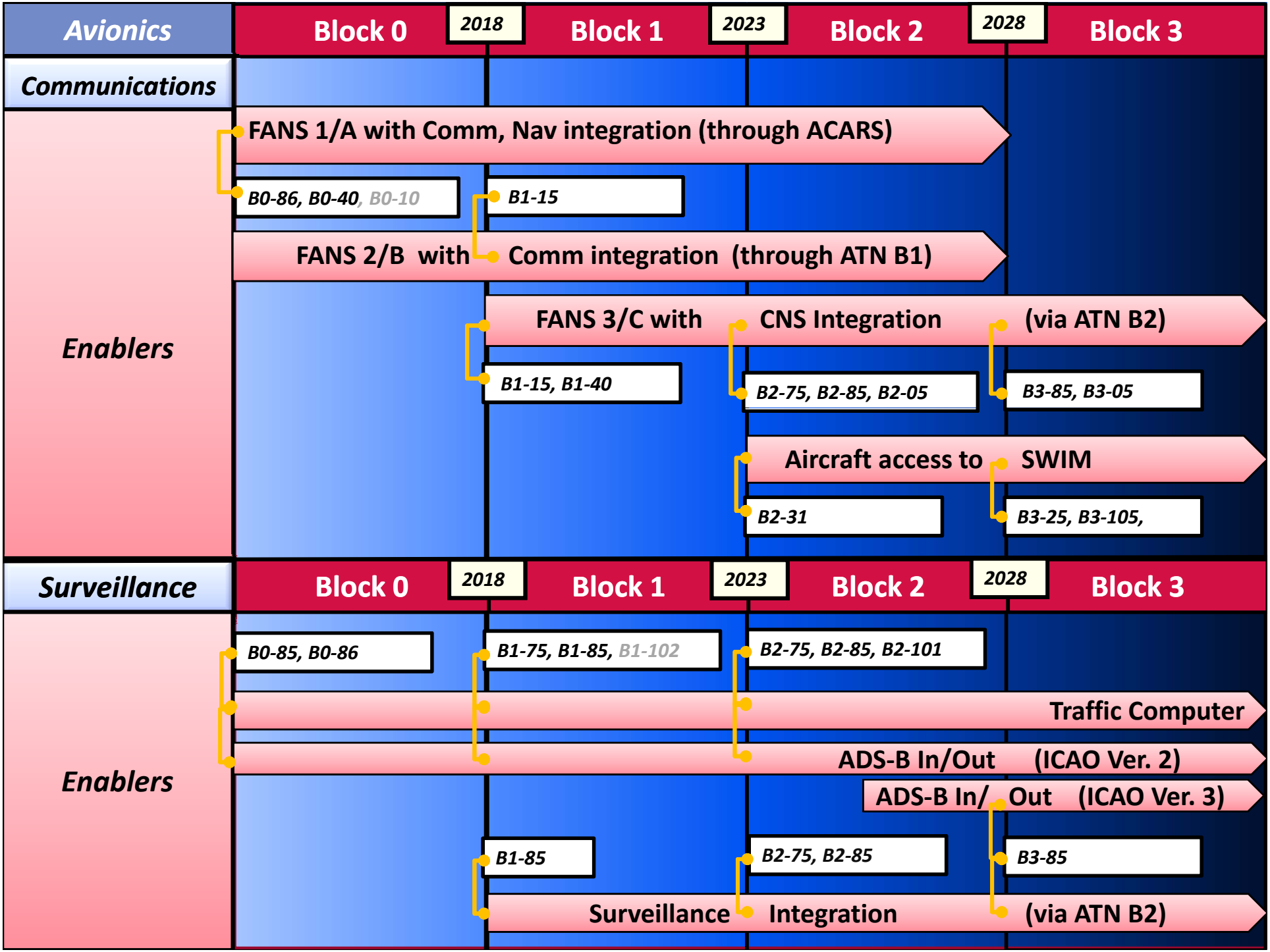

Ground-Ground Communication
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
B0-25, B0-30
B1-25, B1-30, B1-31,B1-105
B2-25
B3-05, B3-25, B3-105
Enablers (Link Media)
IPV4
IPV6
IPV6
VOICE Over IP (for G/G co-ord and links to A/G txceivers)
Services
B0-25
B1-25
AMHS
AIDC
Information Management (See Roadmap)
Air-Ground Voice Communication
Enablers (Link Media)
VHF (25 KHz)
VHF (8.33 KHz) to relieve congestion
Future Digital Voice System?
HF
Current Satellite Systems
Future Satellite System

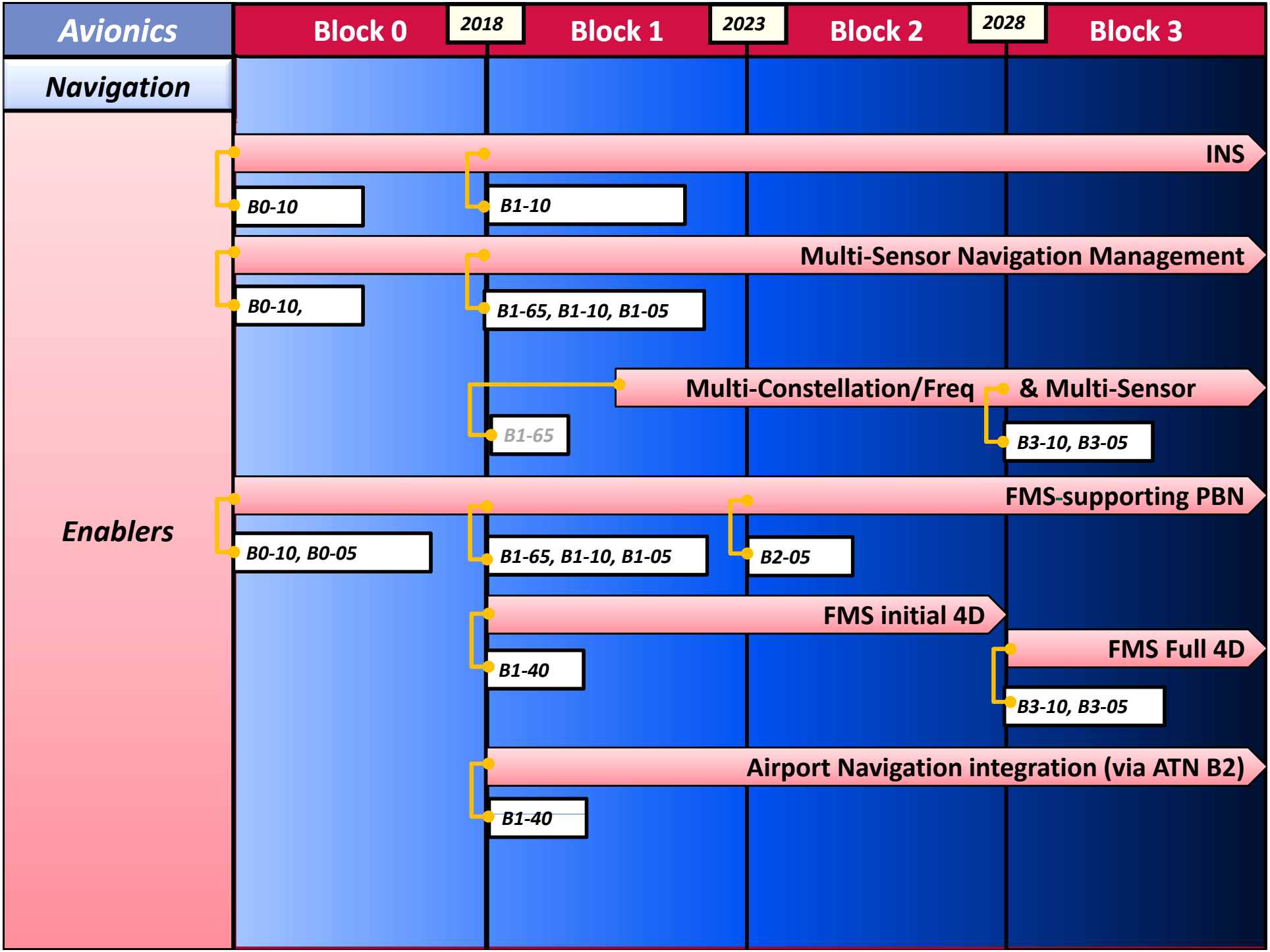

SURVEILLANCE
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Surface
Enabler
SMR
B0-75
B1-75, B1-15, B1-81
B2-75
MLAT
ADS-B In/Out (ICAO Ver. 2)
B1-70, B1-75, B1-15, B1-81
B1-81
Cameras
Capability
SMGCS Level 1 and 2
B0-75
B1-75, B1-15, B1-81
B2-75
SMGCS Level 3 and 4
Ground-Based
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Enabler
PSR
B0-84, B0-102
B1-102, B1-40
MultiStatic PSR
SSR/Mode-S
WAM
ADS-B In/Out (ICAO Ver. 2)
B0-40
B1-40
ADS-C
B0-84
B1-40
Capability
Ground-based surveillance

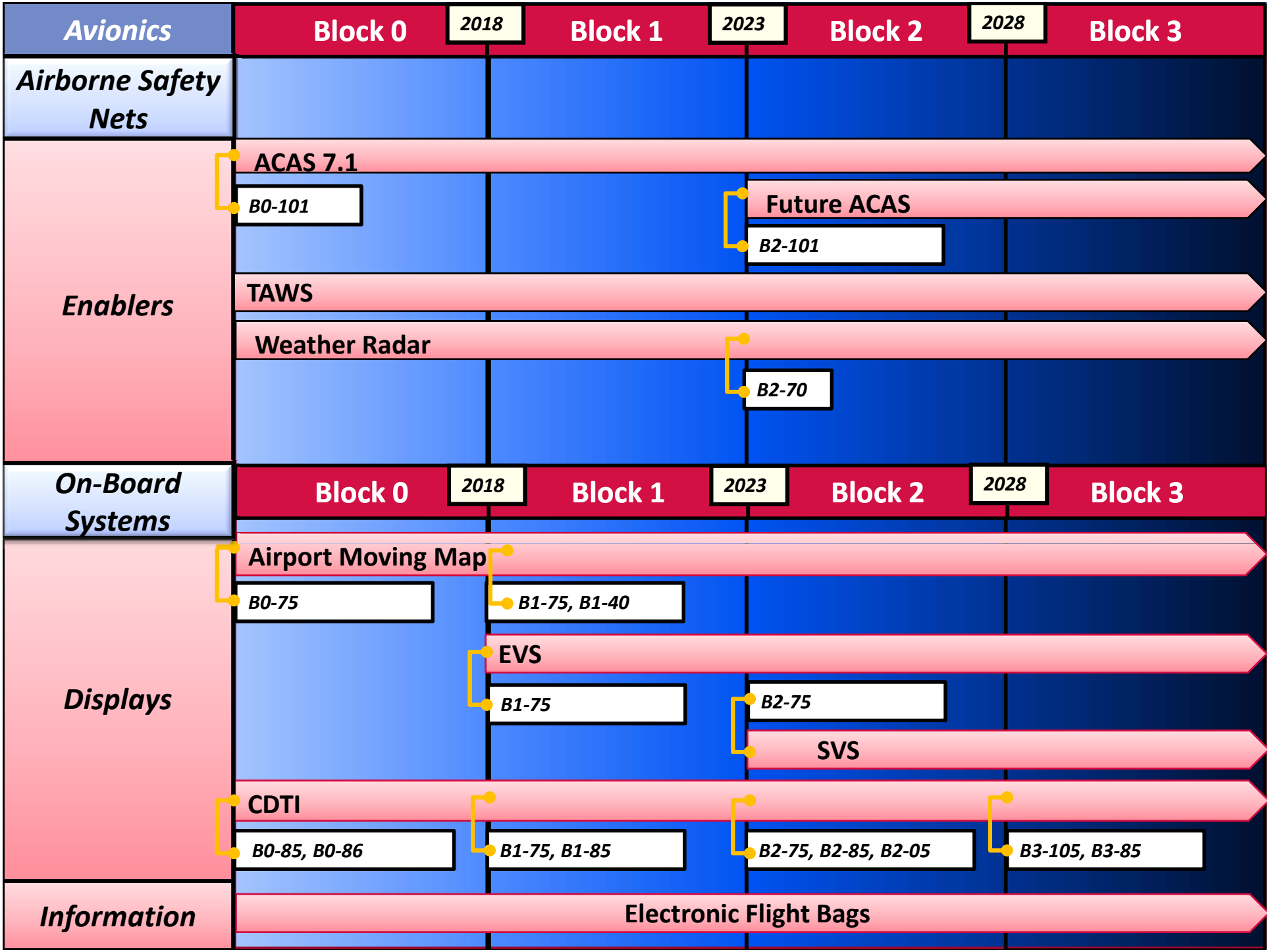

SURVEILLANCE
Block 0
Block 1
Block 2
Block 3
Air-Air
Enabler
B0-85,B 0-86
B1-75, B1-85, B1-102
B2-75, B2-85, B2-101
B3-85
ADS-B In/Out (ICAO Ver. 2)
ADS-B In/ Out (ICAO Ver. 3)
Capability
In-Trail Procedures (ITP)
B 0-86
Airborne Situational Awareness during Flight Operations (AIRB)
Visual Separation on Approach (VSA)
B 0-85
Airborne Spacing Application (ASPA) Interval management
B1-85
Basic Surface Situation Awareness (SURF)
Surface Situation Awareness with Indications and Alerts (SURF-IA)
B1-75
ASEP
B2-85
S-SEP
B3-85

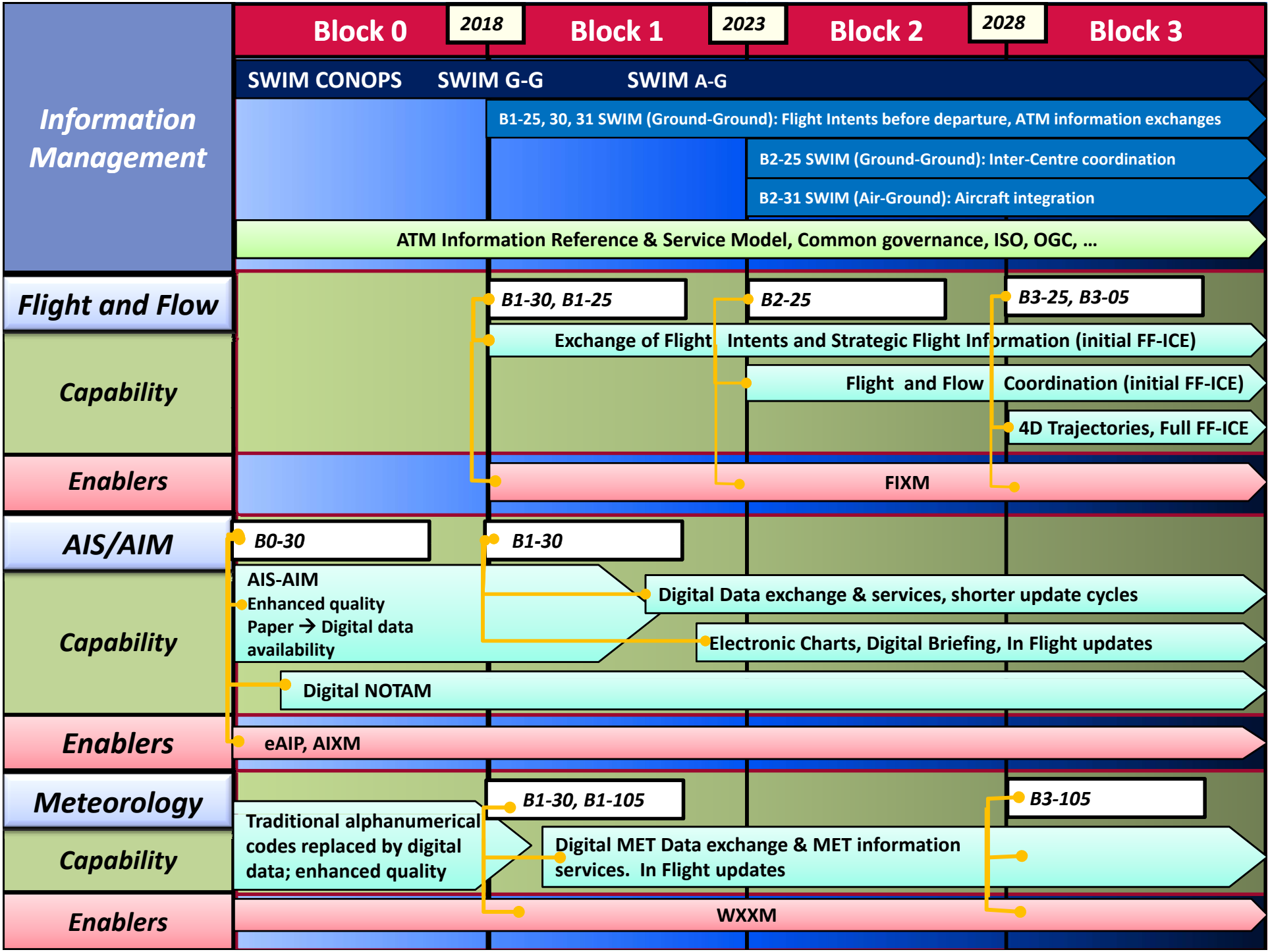

NAVIGATION
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Enablers
Conventional
ILS/MLS
Retain to support precision approach and to mitigate GNSS outage
DME
Optimize existing network to support PBN operations
VOR/NDB
Rationalize based on need and equipage
Satellite-based
Core GNSS Constellations
Single frequency (GPS/GLONASS)
Multi-Freq/Multi-Constellation (GPS/GLONASS/Beidou/Galileo)
GNSS Augmentations
SBAS
GBAS Cat I
GBAS Cat II/III
Multi-Freq GBAS/SBAS
Capability
PBN
(see PBN Roadmap)
PBN Operations
B0-65, B0-05, B0-10
B1-10, B1-40
B2-05
B3-05, B3-10
Precision Approach
CAT I/II/III Landing
ILS/MLS
GBAS Cat I
GBAS Cat II/III
Cat I/II/III
SBAS LPV 200
B0-65
B1-65


PBN
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
En-Route Oceanic and Remote Continental
RNAV 10 (RNP 10)
RNP 4
RNP 2
En-Route Continental
RNAV 5
RNAV 2
RNAV 1
RNP 2
Advanced RNP
RNP 0.3 (Helicopter only)
Terminal Airspace: Arrival and Departure
RNAV 1
Basic RNP 1
Advanced RNP
RNP 0.3 (Helicopter only)
Approach
RNP APCH (SBAS: LPV, BARO VNAV: LNAV/VNAV, Basic GNSS: LNAV)
RNP AR APCH (where beneficial)
Migration path based on Region/States requirements


Avionics
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Communications
FANS 1/A with Comm, Nav integration (through ACARS)
B0-86, B0-40, B0-10
B1-15
FANS 2/B with Comm integration (through ATN B1)
Enablers
FANS 3/C with CNS Integration (via ATN B2)
B1-15, B1-40
B2-75, B2-85, B2-05
B3-85, B3-05
Aircraft access to SWIM
B2-31
B3-25, B3-105,
Surveillance
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Enablers
B0-85, B0-86
B1-75, B1-85, B1-102
B2-75, B2-85, B2-101
Traffic Computer
ADS-B In/Out (ICAO Ver. 2)
ADS-B In/ Out (ICAO Ver. 3)
B1-85
B2-75, B2-85
B3-85
Surveillance Integration (via ATN B2)


Avionics
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Navigation
Enablers
INS
B0-10
B1-10
Multi-Sensor Navigation Management
B0-10,
B1-65, B1-10, B1-05
Multi-Constellation/Freq
& Multi-Sensor
B1-65
B3-10, B3-05
FMS-supporting PBN
B0-10, B0-05
B1-65, B1-10, B1-05
B2-05
FMS initial 4D
FMS Full 4D
B1-40
B3-10, B3-05
Airport Navigation integration (via ATN B2)
B1-40


Avionics
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Airborne Safety Nets
Enablers
ACAS 7.1
B0-101
Future ACAS
B2-101
TAWS
Weather Radar
B2-70
On-Board Systems
Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Displays
Airport Moving Map
B0-75
B1-75, B1-40
EVS
B1-75
B2-75
SVS
CDTI
B0-85, B0-86
B1-75, B1-85
B2-75, B2-85, B2-05
B3-105, B3-85
Information
Electronic Flight Bags


Block 0
2018
Block 1
2023
Block 2
2028
Block 3
Information Management
SWIM CONOPS
SWIM G-G
SWIM A-G
B1-25, 30, 31 SWIM (Ground-Ground): Flight Intents before departure, ATM information exchanges
B2-25 SWIM (Ground-Ground): Inter-Centre coordination
B2-31 SWIM (Air-Ground): Aircraft integration
ATM Information Reference & Service Model, Common governance, ISO, OGC, …
Flight and Flow
Capability
B1-30, B1-25
B2-25
B3-25, B3-05
Exchange of Flight Intents and Strategic Flight Information (initial FF-ICE)
Flight and Flow Coordination (initial FF-ICE)
4D Trajectories, Full FF-ICE
Enablers
FIXM
AIS/AIM
Capability
Enablers
B0-30
B1-30
AIS-AIM
Enhanced quality
Paper → Digital data availability
Digital Data exchange & services, shorter update cycles
Electronic Charts, Digital Briefing, In Flight updates
Digital NOTAM
eAIP, AIXM
Meteorology
Capability
Enablers
B1-30, B1-105
B3-105
Traditional alphanumerical codes replaced by digital data; enhanced quality
Digital MET Data exchange & MET information services. In Flight updates
WXXM

ATN/ AMHS relevant SARPs

ATN Ground-ground data applications

- Current
  - AFTN (Aeronautical Fixed Telecommunications Network) (between communication centres)
    - low/medium speed
    - 1800 character message limitation
    - store and forward
  - OLDI (On Line Data Interchange) (between ATS centres)
- New
  - AMHS (Aeronautical Message Handling System) an ATN application between communication centers
  - AIDC (ATS Interfaculty Data Communication) an ATN application between ATS centers

ATN/ AMHS relevant SARPs

ANNEX 10

Volume II:

4.4 Aeronautical fixed telecommunication network (AFTN)

4.6 ATS message handling services (ATSMHS).

Volume III:

CHAPTER 8. AFTN Network

Chapter 3: Aeronautical Telecommunication Network (ATN)

ATN/ AMHS relevant SARPs

Guidance Material

The ATN concept : 10th Air Navigation Conference in 1991.

First ATN Manual : Doc 9578 Manual of the ATN

The initial ATN related SARPS and Guidance Material in November 1996.

SARPS first published in Annex 10 in 1998: Doc 9705 Manual of Technical Provision for the ATN

SARPS for Directory Services, Security and System Management completed in 2000

Directory Services, Security and System Management SARPS published in 2001: Doc 9739 Comprehensive ATN Manual

SARPS for ATN deployment using ATN/OSI and Internet protocol suite (IPS) standards in the provision of aeronautical internetworking for ground-ground and air-ground applications

Doc 9880 Manual on Detailed Technical Specifications for ATN using ISO/OSI and Doc 9896 Manual for the ATN using IPS - First Editions 2010

ATN/ AMHS relevant SARPs

Guidance Material

Aeronautical Communication Panel (ACP) of ICAO has agreed to the use of TCP/IP or the Internet protocol suite (IPS) in the provision of aeronautical internetworking for ground-ground and air-ground to replace the ATN/OSI Internet for the following reasons:

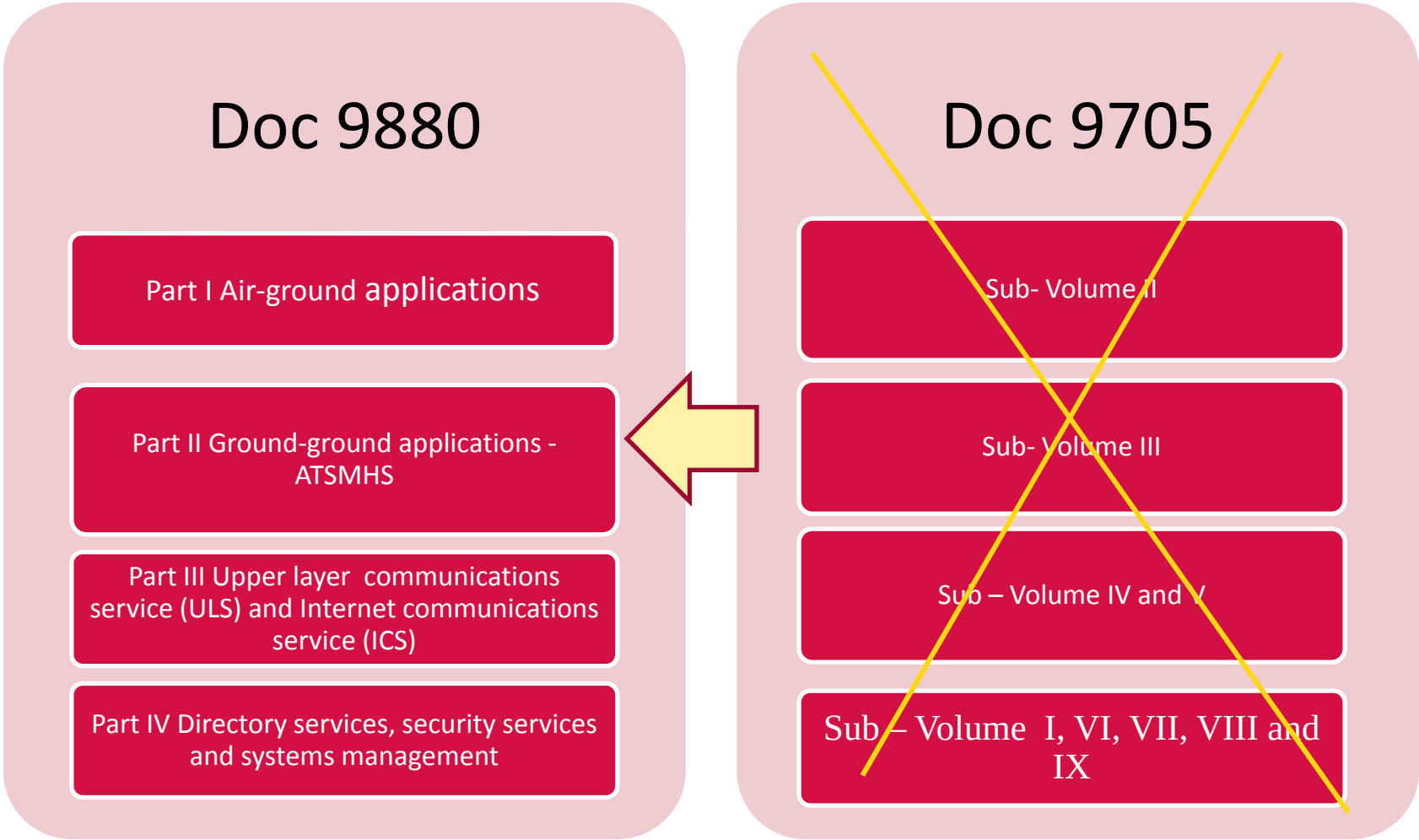
- X-25 technology is obsolete;
- IPS infrastructure is available and flexible; and
- ATN/OSI Internet protocols are not maintained

The feasibility of using IPS for air–ground data applications has been demonstrated. Future air/ground data link system will be based on already existing IPS SARPs.

Amendment No. 83 to Annex 10: introduces ATN/IPS applicable since July 2008

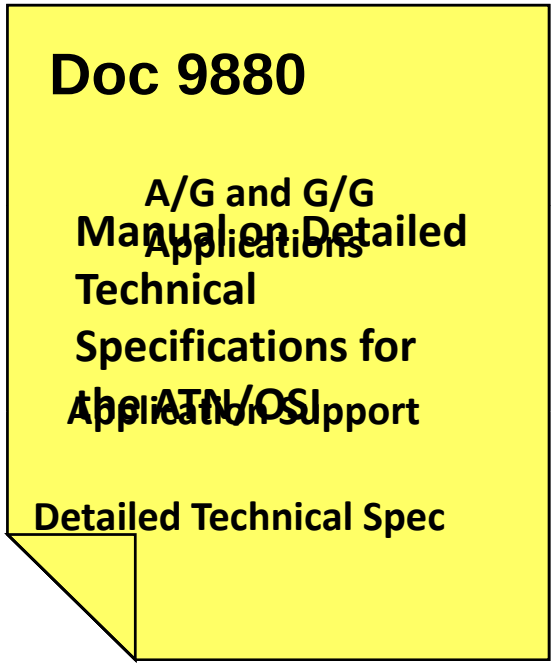
ATN/ AMHS relevant SARPs

Guidance Material

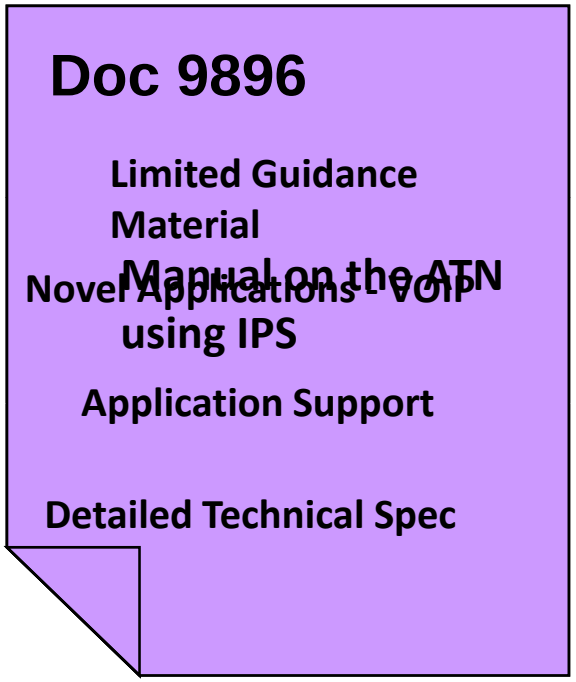


ATN/ AMHS relevant SARPs

Guidance Material



OSI



IPS

ATN/ AMHS relevant SARPs

Guidance Material

For OSI Implementations

Doc 9880

A/G and G/G Applications

Application Support

Detailed Technical Spec

For IPS Implementations

Doc 9896

Limited Guidance Material

Novel Applications - VOIP

Application Support

Detailed Technical Spec

Doc 9880

A/G and G/G Applications

ATN/ AMHS relevant SARPs

Guidance Material
DOC 9880

ATSMHS: ATS Message Service , exchange of ATS messages between service users

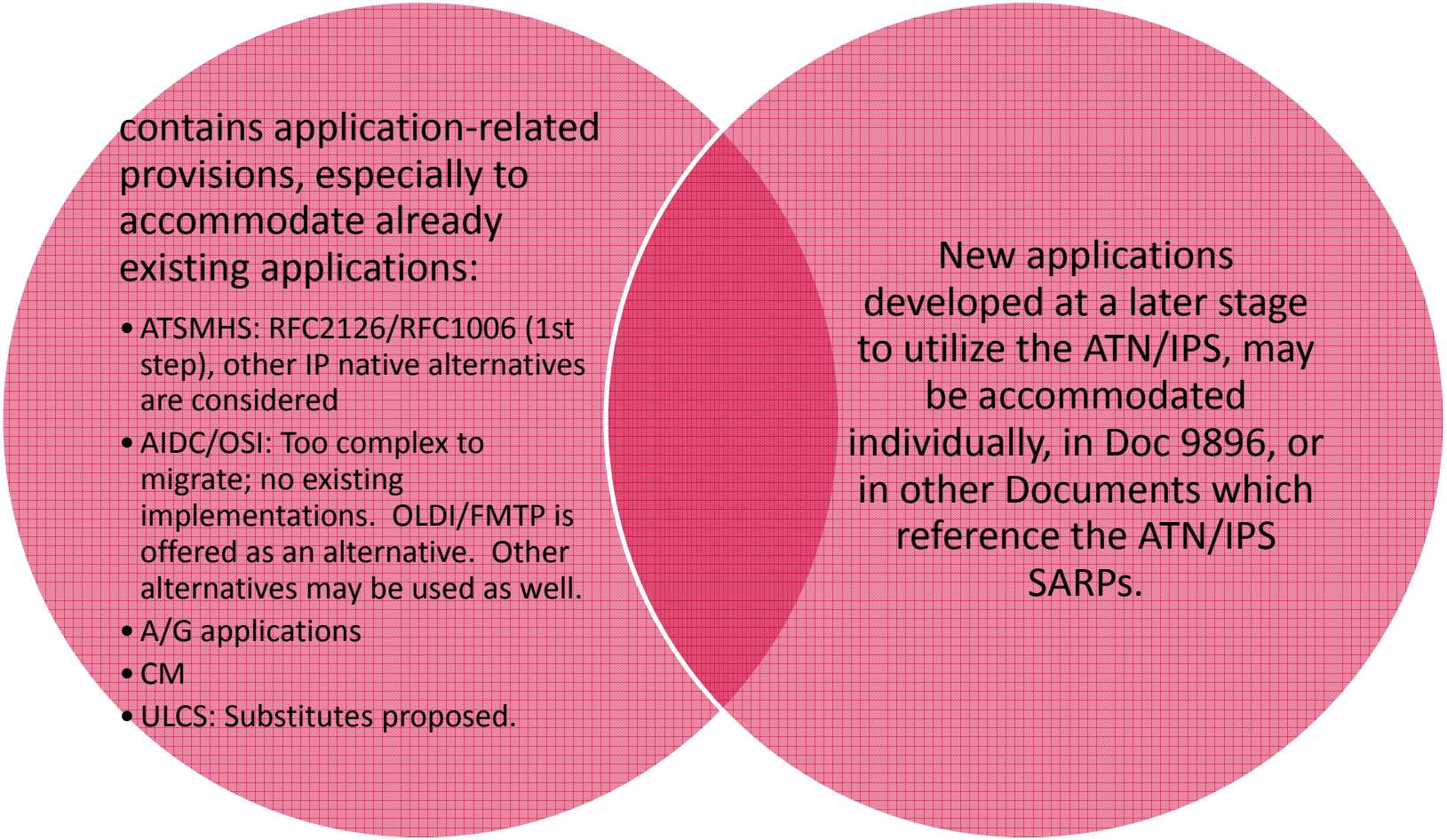
Two ATSMHS levels of service: a) the basic ATSMHS and b) extended ATSMHS

AMHS: Set of end systems providing the ATSMHS

ATN End Users: a) ATS message server, b) ATS message user agent and c) AFTN/ AMHS gateway

ATN/ AMHS relevant SARPs

Guidance Material
Doc 9896



ATN/ AMHS relevant SARPs

Guidance Material
DOC 9896

- Ground networking elements are relatively stable, based on IPv6 and BGP routing
- Compatible with on-going IP implementations
- Networking protocols
- Provisions for mobility management
- Provisions for security (IPSec, SSL/TLS, ATN Security)
- VoIP material (references)

ATN/ AMHS relevant SARPs

Guidance Material
Doc 9896

- Connection oriented and connectionless transmission
- Transport layer addressing
- Multicast services for surveillance
- AS numbering and addressing schemes
- IPv4/IPv6 migrations and translation
- Inter-domain routing
- Quality of Service (QoS) management

ATN/ AMHS relevant SARPs

Guidance Material
Doc 9896

- ICAO IPv6 Address Allocation
- IPv6 Network Architecture Design Guidance
- PKI and IPSec Implementation Guidance
- Aircraft Naming/Identity for PKI Use
- Aircraft IPS Naming (DNS) Structure
- IPS DNS Implementation Guidance
- uses external Reference Documents

- Mature Standards referenced rather than developing our own
- RFCs developed by the Internet Society (ISOC) Internet Engineering Task Force (IETF) are referenced in the new Annex 10 amendment and Doc 9896 as appropriate.
- EUROCAE and RTCA documents may also be referenced.

ATN/ AMHS relevant SARPs

Maintenance of Guidance Material

ICAO ACP WG Maintenance (ACP WG-M)

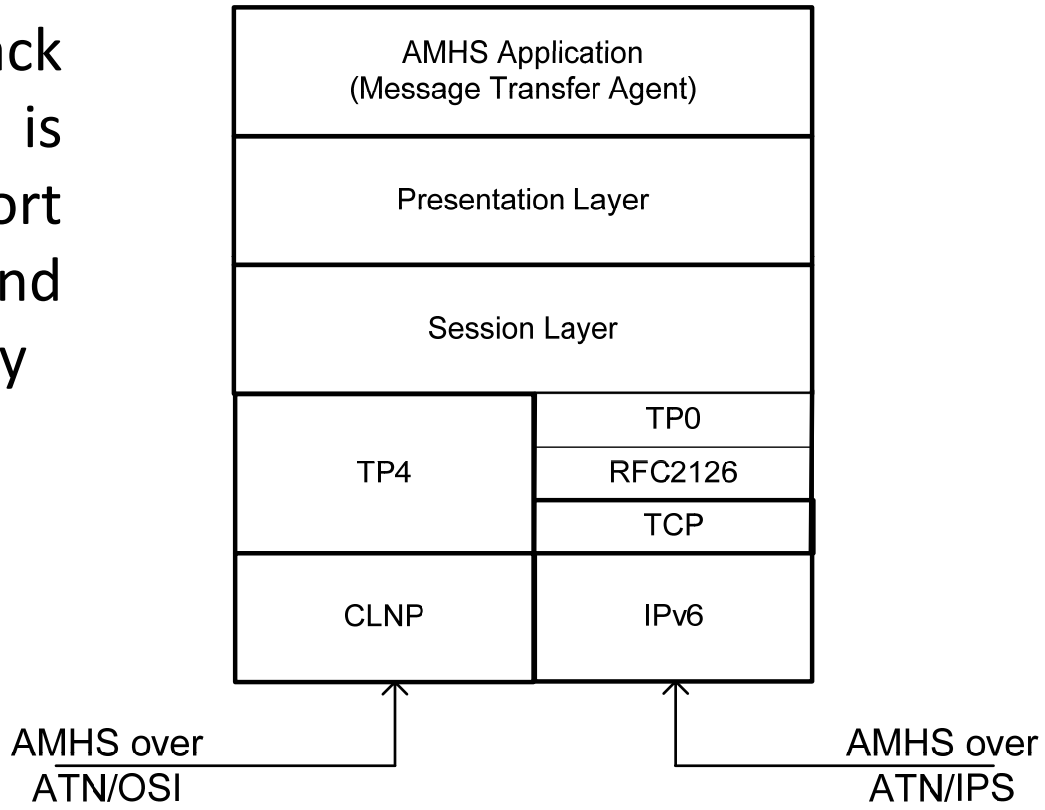
- ACP WG-M is responsible for maintenance including the ATN.
- Former ATNP maintenance procedures are no longer applicable since the ACP re-organisation
- Any Proposed Defect Reports (PDRs) are to be forwarded to WG-M chairman and ACP Secretary

ICAO Working Group Internet (WG-I)

- Developed Doc 9896 “Manual for the ATN using IPS standards and protocols”
- The ATN IPS is principally driven by de-facto IP industry standards

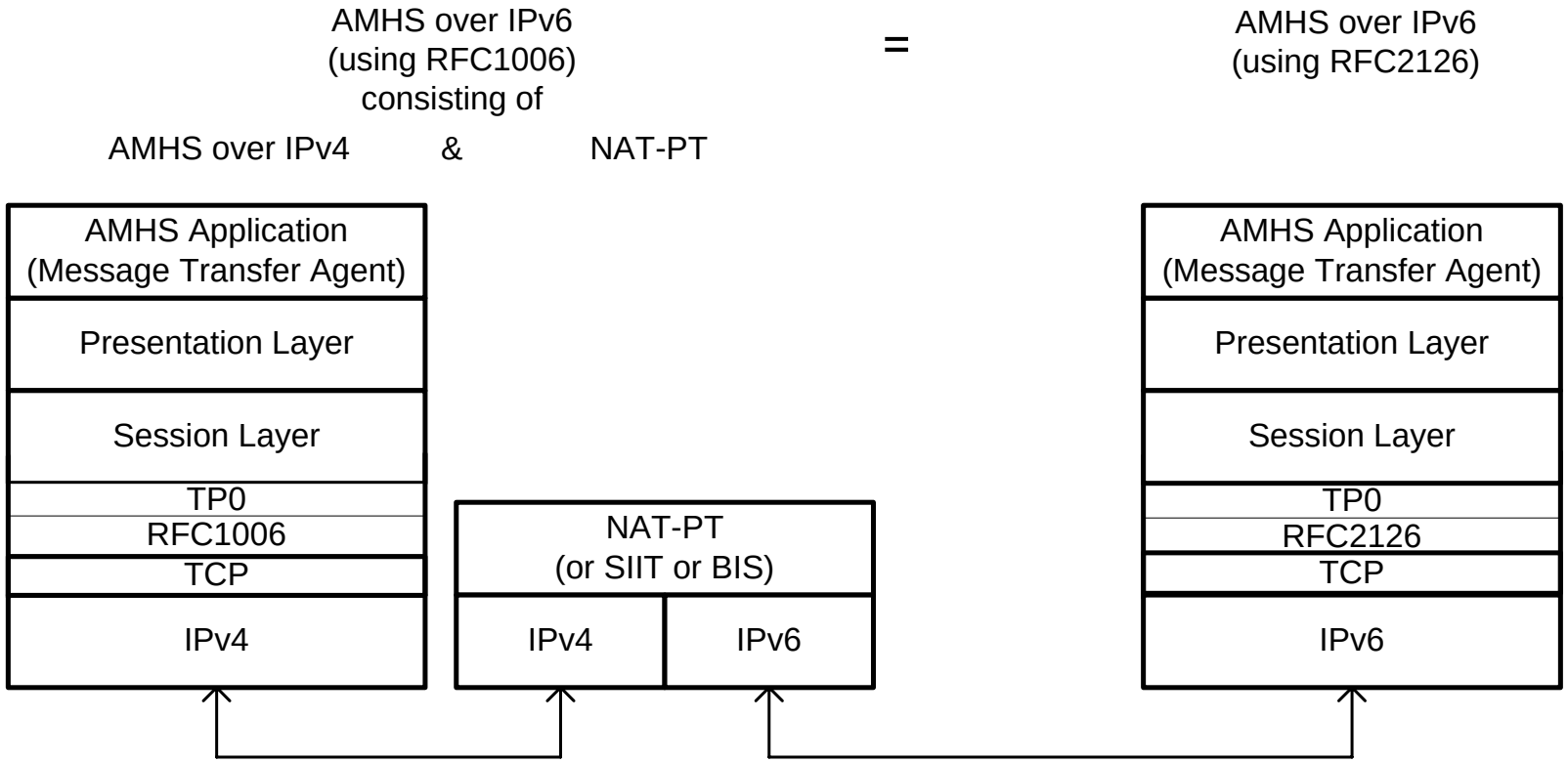
ATN/AMHS Regional IMPLEMENTATION Issues

AMHS dual stack implementation is envisaged to support both ATN/OSI and ATN/IPS when necessary



ATN/AMHS Regional IMPLEMENTATION Issues

AMHS implementations over IPv4 and IPv6 interoperable



ATN/AMHS Regional IMPLEMENTATION Issues

CAR/SAM Regional References

AFTN PLAN CNS TABLE 1Ba

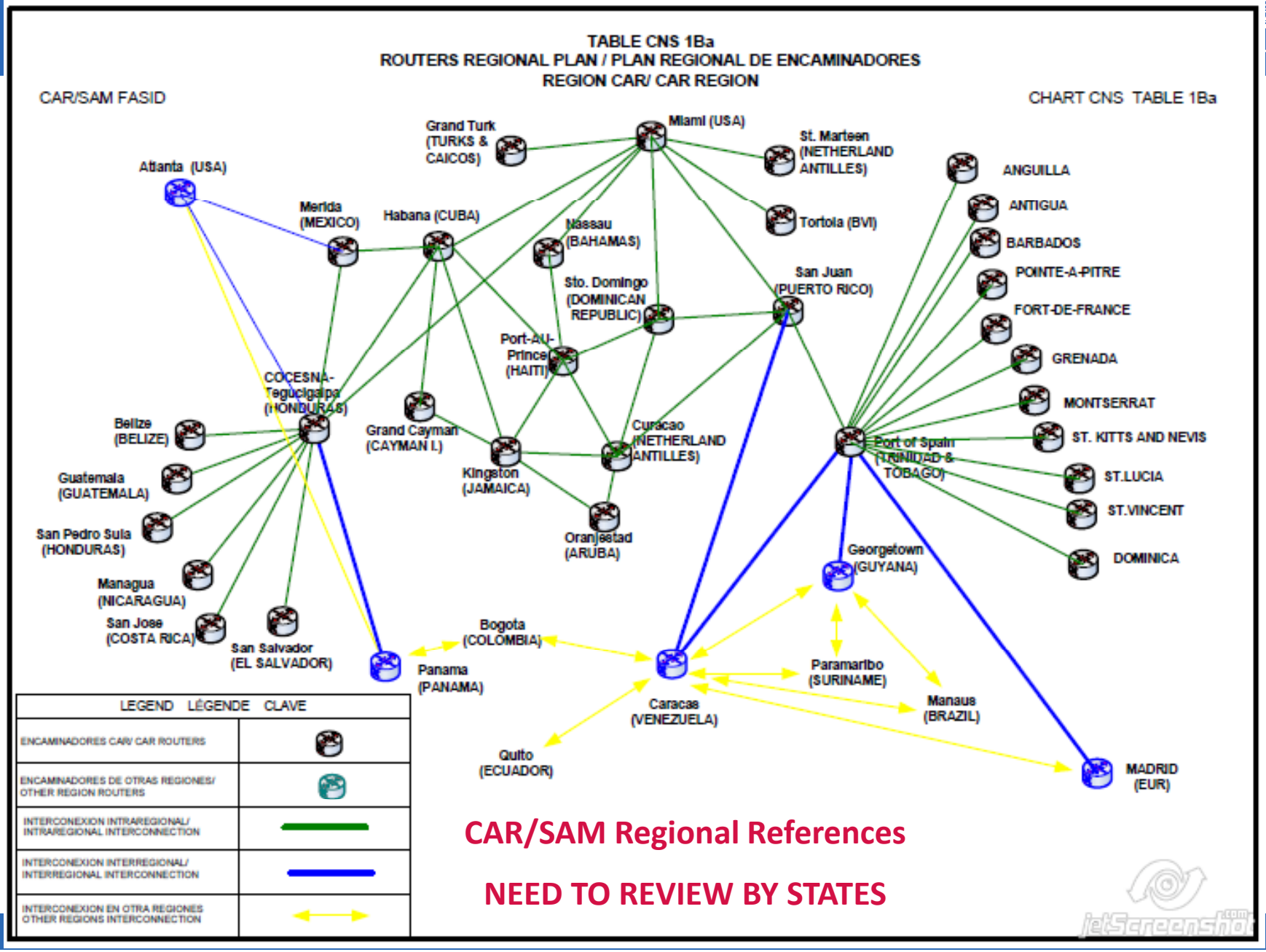
Chart CNS 1A – Rationalized AFTN Plan for CAR/SAM Regions

Table CNS 1Ba –Routers Regional Plan

Table CNS 1Ba –Routers Regional Plan (Chart)

All FASID References available at:
http://www.mexico.icao.int/CNS.html#FASID

ATN/AMHS Regional IMPLEMENTATION Issues



CAR/SAM Regional References

NEED TO REVIEW BY STATES

ATN/AMHS Regional IMPLEMENTATION Issues

CAR/SAM Regional References

Table CNS 1Bb – ATN Ground- Ground Applications Plan

- Due to the implementation of the New Flight plan format, several States have speed up the implementation of their AMHS Systems
- With the recognition of the operation benefits achieved through the implementation of CPL-LAM functionalities, several States plan to implement AIDC shortly
- The modernization of regional telecommunication networks are facilitating the implementation of ATN applications

Revision of CNS 1Bb Table by States

ATN/AMHS Regional IMPLEMENTATION Issues

CAR/SAM Regional References

CARSAM Regional Strategy for the deployment of the ATN and its applications

Short term (1/2)

Actions	Implementation Status
Complete the updating of the aeronautical digital communication networks by providing intra and inter-regional interconnection and interoperability.	Completed
implementation of the AMHS to replace the AFTN.	On going with delays
Carry out the strategic deployment of a limited number of ATN routers of the ATN backbone to support other ground-ground and air-ground applications.	On going with Network improvements
The referred ATN routers must provide AFTN/AMHS gateway during the transition phase.	completed
Beginning of implementation of the AIDC within control centres	On goiong with delays

ATN/AMHS Regional IMPLEMENTATION Issues

CAR/SAM Regional References

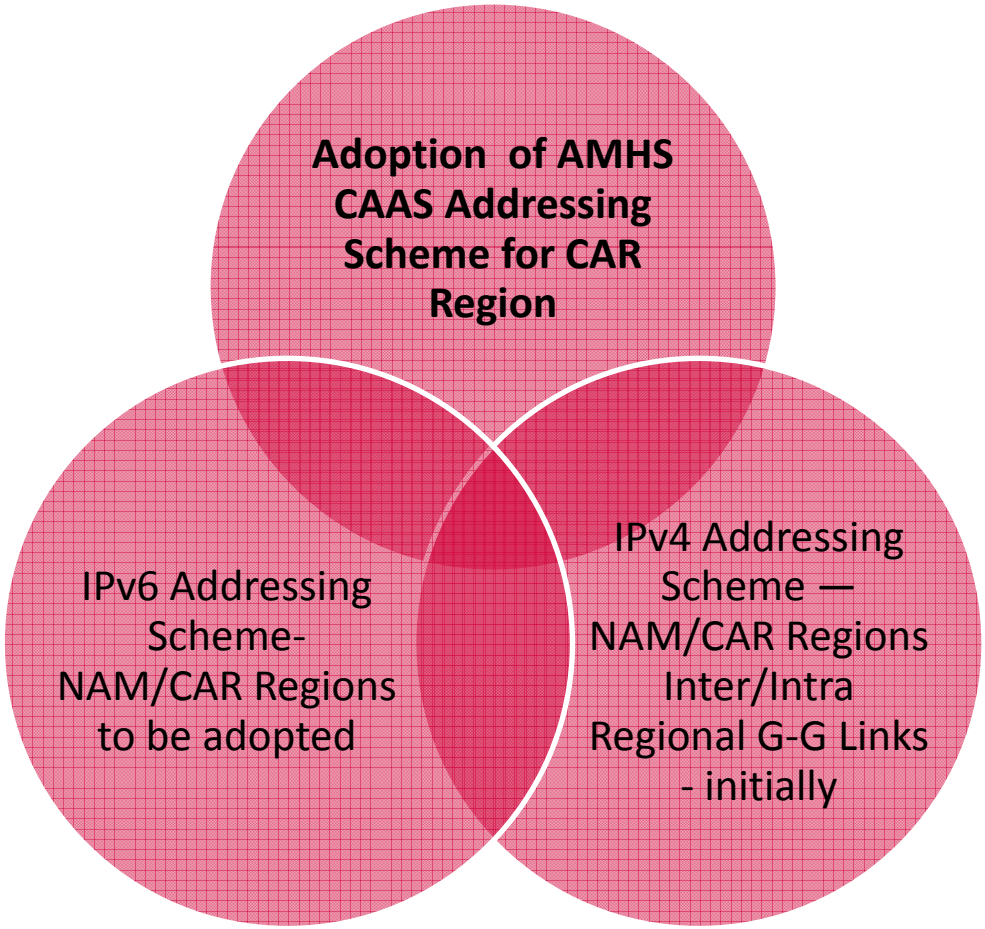
CARSAM Regional Strategy for the deployment of the ATN and its applications

Short term (2/2)

Actions	Implementation Status
undertake the training of operational and technical personnel in order to provide the necessary knowledge to introduce the ATN and its ground-ground applications (AMHS and AIDC).	On going with delays
Based on the relevant deployment of the ATN ground-to-ground infrastructures and ground applications, gradual introduction of ATN air-ground applications is suggested	delayed
Implementation will be in full agreement with SARPs, ICAO PANS and GREPECAS guide.	understood

ATN/AMHS Regional IMPLEMENTATION Issues

CAR/SAM Regional References



ATN/AMHS Regional IMPLEMENTATION Issues

ATS Messaging Management Centre (AMC)

implemented in coordination with Eurocontrol and ICAO:

- ICAO State Letter 09-34 dated 14th April 2009, in the short- to medium-term, ICAO will utilize the European ATS Messaging Management Centre (AMC), provided by EUROCONTROL, to coordinate the allocation and management of AMHS addresses.
- All States are therefore invited to designate representatives to register as AMC users as well as all States and/or ANSPs, operating international COM Centres, with the intention of implementing the foreseeable future, should engage themselves into the AMHS address coordination process without delay.

AMHS MD Register For CAR/NAM Regions in AMHS Management Domain Identifier

- ICAO List: institutional purposes (TO REVIEW) AMHS Register

AMHS COM Centre Training Guidelines available

ATN/AMHS Regional IMPLEMENTATION Issues

GREPECAS Projects

- **PROGRAM:** GROUND-GROUND AND AIR-GROUND TELECOMMUNICATIONS INFRASTRUCTURE
- **PROJECT:** D CAR ATN INFRASTRUCTURE AND ITS GROUND-GROUND AND AIR-GROUND APPLICATIONS

Deliverables:

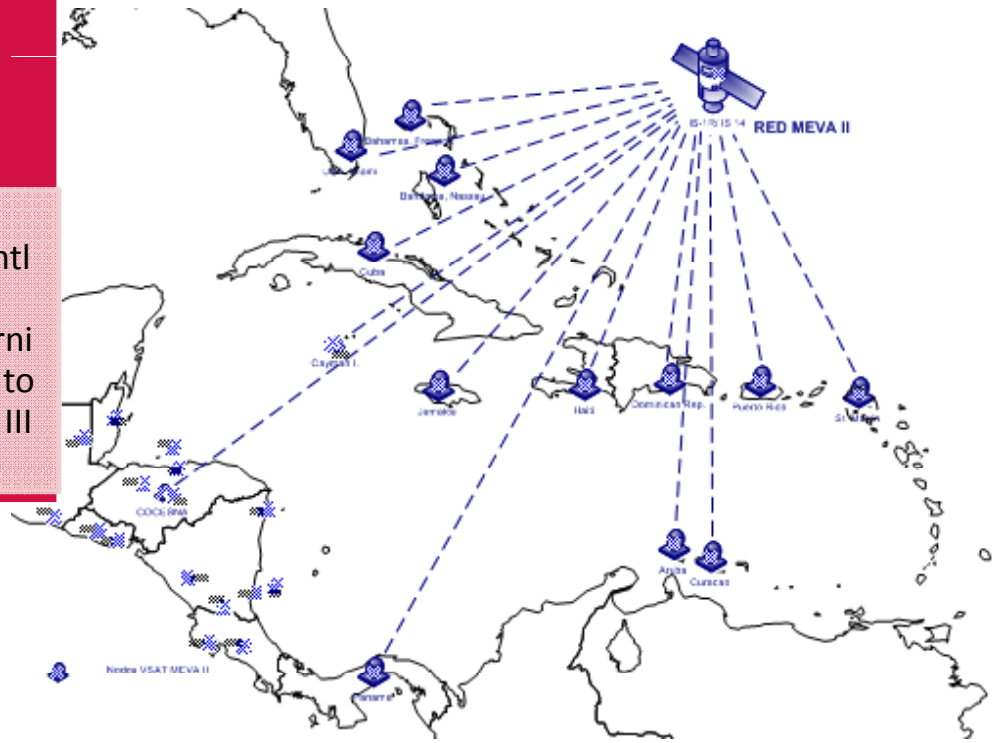
- Evaluation of the preliminary trials results on the definition of the CAR/SAM ATN bandwidth requirement
- Study for the configuration of an IP backbone network
- Study of communication requirements to support ATFM implantation
- Transition Plan for the ATN and its applications in the CAR region
- Implementation plan for ground-ground ATN applications (AMHS)
- Update proposal for CNS Table 1Bb
- Implementation Plan for Ground-ground ATN Applications (AIDC)
- Evaluation and recommendations on the AMHS coordination and trials conducted
- Transition plan for ground air ATN applications

ATN/AMHS Regional IMPLEMENTATION Issues

NAM/CAR Implementation Activities

MEVA II Network:

VSAT Network / Frame Relay	Provides services to all Central Caribbean, Mexico and Central America	Main Network for AMHS impleme ntation	Has intercon nection with REDDIG Network	Currentl y in moderni zation to MEVA III

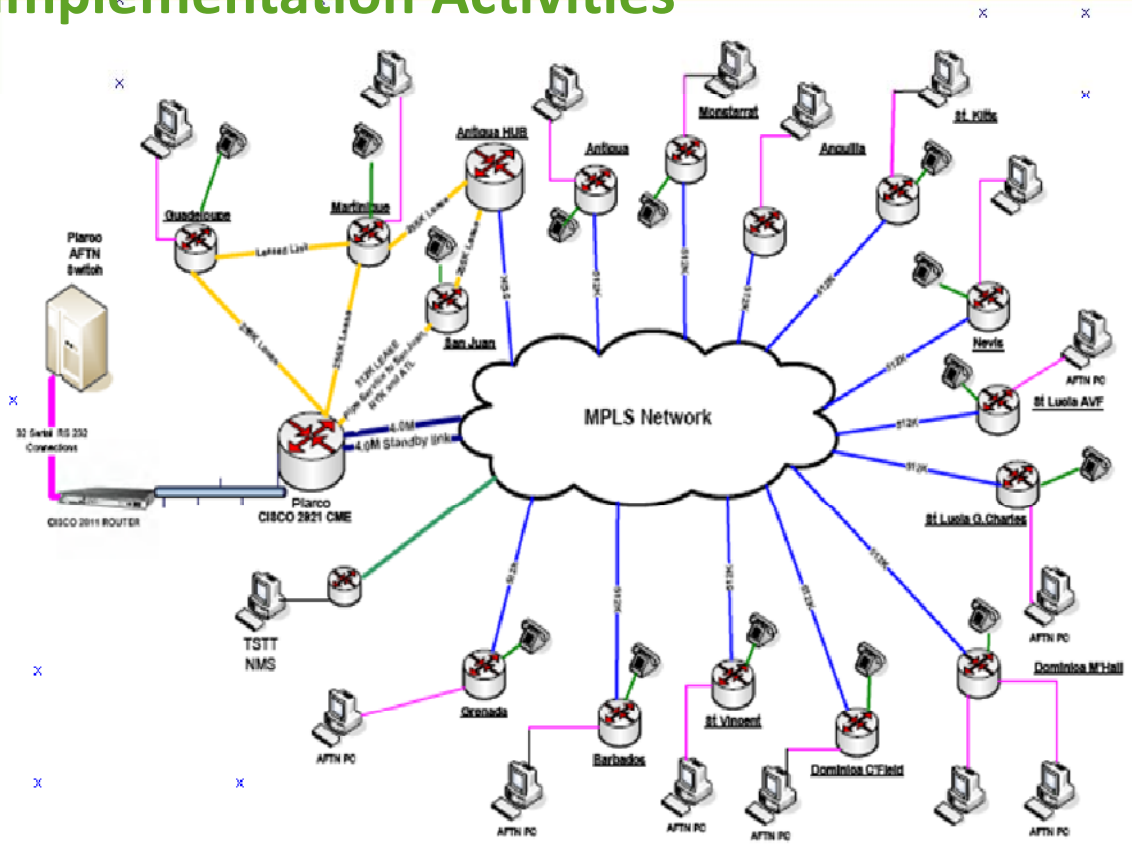


ATN/AMHS Regional IMPLEMENTATION Issues

NAM/CAR Implementation Activities

E/CAR Network:

MPLS Network / IP	Provides services to all Eastern Caribbean States	Main Network for AMHS implementation	Currently in plans with MEVA III for a single CAR telecom Network

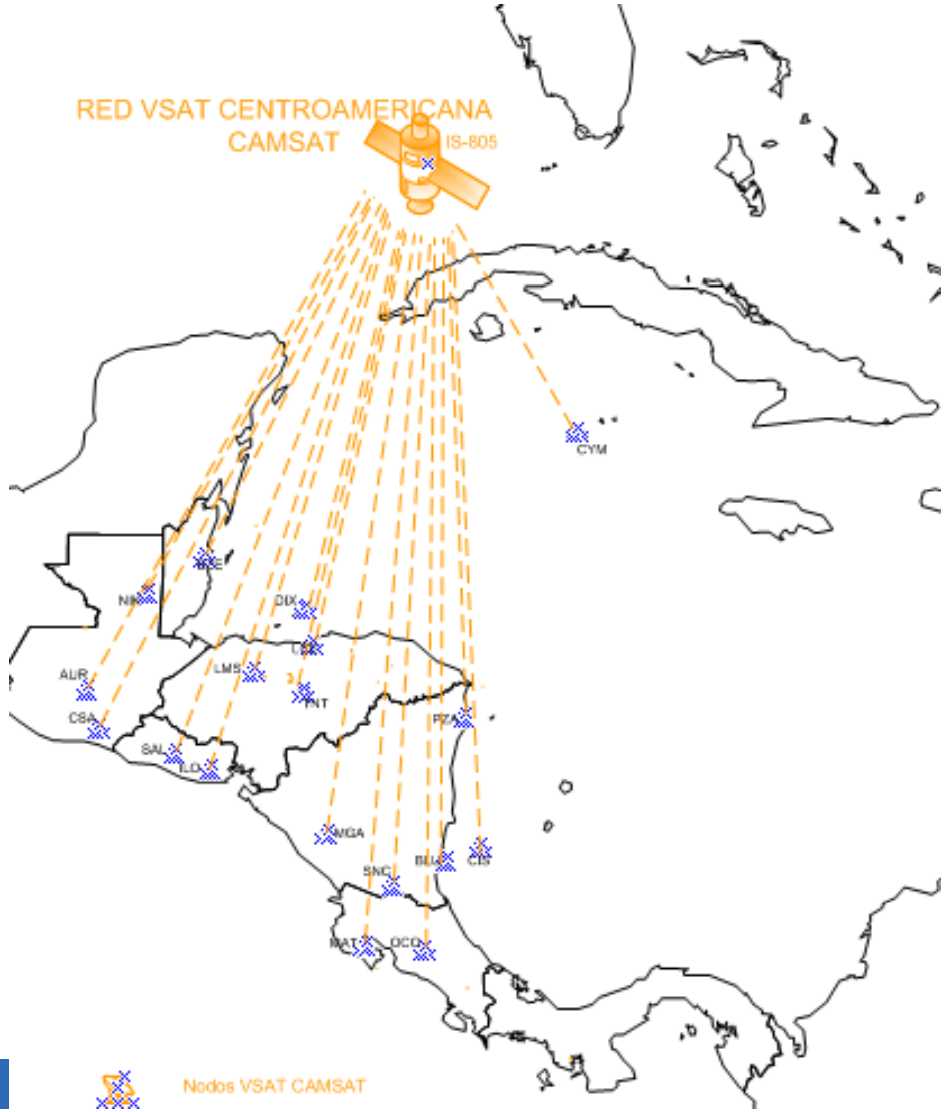


ATN/AMHS Regional IMPLEMENTATION Issues

NAM/CAR Implementation Activities

CAMSAT Network:

VSAT Network / Frame Relay	Being modernized with ground microwave infrastructure	Provides services to all Central America	Main Network for AMHS implem entation	New node in Panama



ATN/AMHS Regional IMPLEMENTATION Issues

NAM/CAR Implementation Activities

NAM/CAR REGIONAL PERFORMANCE-BASED AIR NAVIGATION IMPLEMENTATION PLAN (NAM/CAR RPBANIP)

Harmonized implementation of Air Navigation Services and Systems under PBA.

Every sub-region (C/CAR, E/CAR and Central America) follows-up this Plan, and formulate detailed Action Plans under each Working Group

Among the 12 Regional Performance Objetives (RPO), the implementation of the ATN is considered under RPO No. 9 Optimization and Modernization of Communication Infrastructure.

ATN/AMHS Regional IMPLEMENTATION Issues

NAM/CAR Implementation Activities

Review of conclusions and discussions from FAA Workshop on the Implementation of the ATS Message Handling System (AMHS) in the NAM/CAR Regions
(Miami, Florida, United States, 19 to 21 October 2010)

- ICAO references and guidance material
- Procedure/activities to follow-up for AMHS trials
- System Configuration and Procurement
- Test considerations with the FAA
- Training aspects
- Monitoring edge device services
- Exchange of experience and lessons learned: AMC/ FAA Websites
- Recommendation for a follow-up AMHS implementation meeting
- A website for AMHS and technical exchange of information
- Matrix: Trial sequence and technical information to follow-up

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