

Airspace Regulatory Roadmaps 2014 v1

Communication
Navigation
Surveillance
Recorders and Emergency Transmitters
Airspace Modernization

***Rockwell
Collins***

- What's New
- Global Mandate Summaries
- Mandates and Services
 - Communication
 - Navigation
 - Surveillance
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 - Recorders and Emergency Transmitters
- Airspace Modernization
 - FAA NextGen
 - European SESAR
 - ICAO Aviation System Block Upgrade
- Reference Links
- Acronyms

The information provided herein indicates the expected mandates and air navigation services in global airspace. This information is intended to be accurate, however, the appropriate civil aviation authorities and air navigation service providers (ANSPs) should be consulted for current regulatory requirements and status.

This information is produced by the staff of the Advanced Concepts Group, Rockwell Collins Commercial Systems.

Questions and comments should be sent to Matthew Carrico, 319-295-8230, mjcarric@rockwellcollins.com

- Australia allows temporary exemptions from requirement to carry ADS-B Out equipment
 - Exemption period 12 Dec 2013 to 11 Dec 2015
 - Exempted airspace at or above FL290 in the SSR J-curve area
- FAA defines Phase 2 of the North Atlantic Data Link Mandate (NAT DLM)
 - Phase 2A: 5 Feb 2015: FL350 to FL390 (inclusive) all tracks in the OTS;
 - Phase 2B: 7 Dec 2017: FL350-FL390 (inclusive) throughout the NAT;
 - Phase 2C: 30 Jan 2020: FL290 and above throughout the NAT.
- Eurocontrol releases Regulatory Approach Document (RAD) for PBN
 - Final report for the Implementing Rule expected in June 2014
 - RAD defines a “modified Option 2” approach:
 - By 2020: Terminal Area: RNP1 + RF leg + RNAV Holding + Ability to meet altitude constraints
 - By 2023: En Route: Advanced RNP + FRT Above FL 195 & RNP 1 + RNAV Holding Below FL 195; Advanced RNP is defined as RNP 1, RF leg, RNAV Holding and TPO, with mandatory carriage of GNSS.

◇ = Draft Rule Published


◆ = Final Rule Published


📄 = Reference Document


▼ = Equipage Mandate In Effect

▽ = Published Equipage Mandate

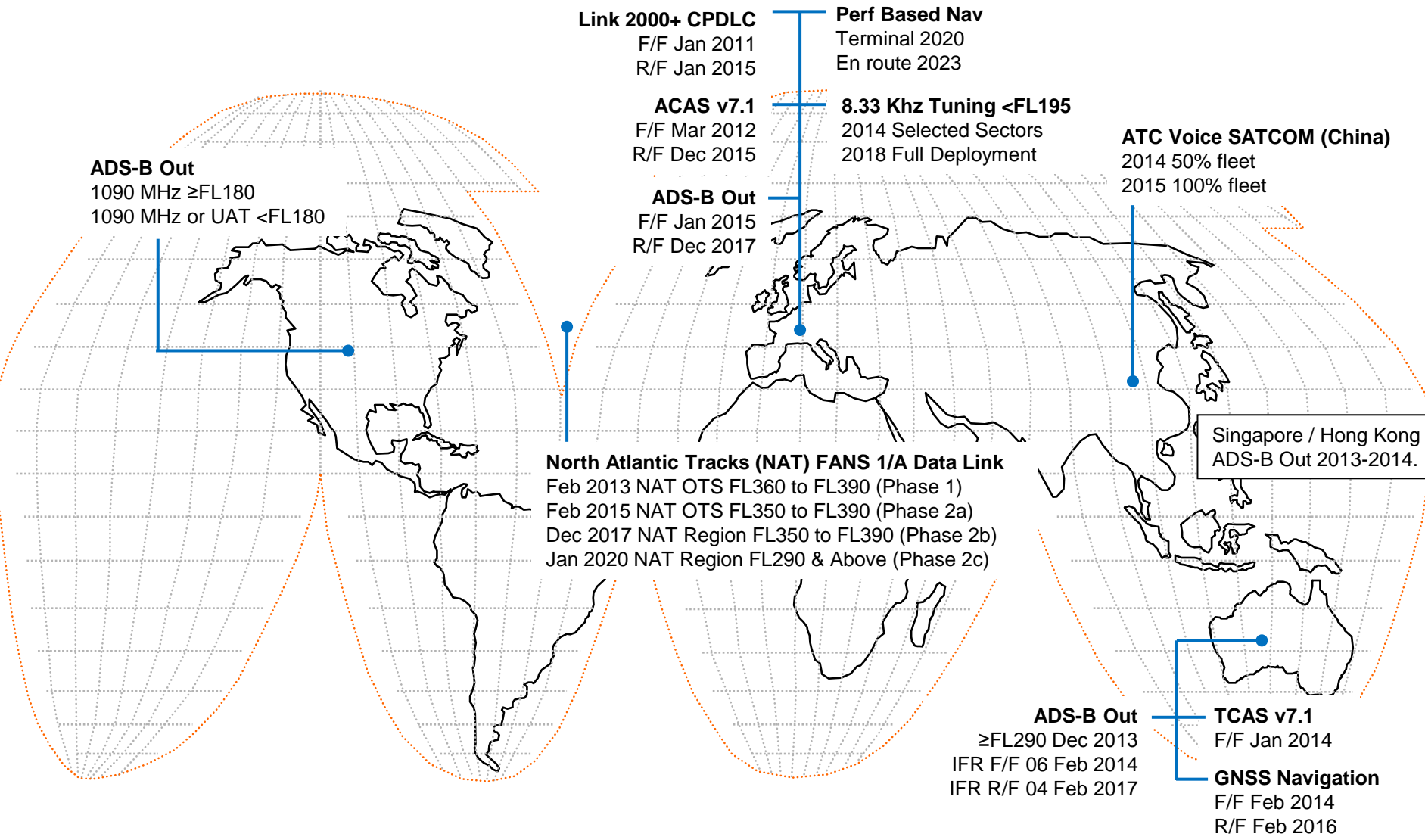
□ = Forecast Equipage Mandate

 = Activity or Service Declining Utilization

 = Activity or Service Increasing Utilization

 = Forecast Service

2014 v1



ADS-B Out
1090 MHz ≥FL180
1090 MHz or UAT <FL180

Link 2000+ CPDLC
F/F Jan 2011
R/F Jan 2015

Perf Based Nav
Terminal 2020
En route 2023

ACAS v7.1
F/F Mar 2012
R/F Dec 2015

8.33 Khz Tuning <FL195
2014 Selected Sectors
2018 Full Deployment

ATC Voice SATCOM (China)
2014 50% fleet
2015 100% fleet

ADS-B Out
F/F Jan 2015
R/F Dec 2017

North Atlantic Tracks (NAT) FANS 1/A Data Link
Feb 2013 NAT OTS FL360 to FL390 (Phase 1)
Feb 2015 NAT OTS FL350 to FL390 (Phase 2a)
Dec 2017 NAT Region FL350 to FL390 (Phase 2b)
Jan 2020 NAT Region FL290 & Above (Phase 2c)

Singapore / Hong Kong
ADS-B Out 2013-2014.

ADS-B Out
≥FL290 Dec 2013
IFR F/F 06 Feb 2014
IFR R/F 04 Feb 2017

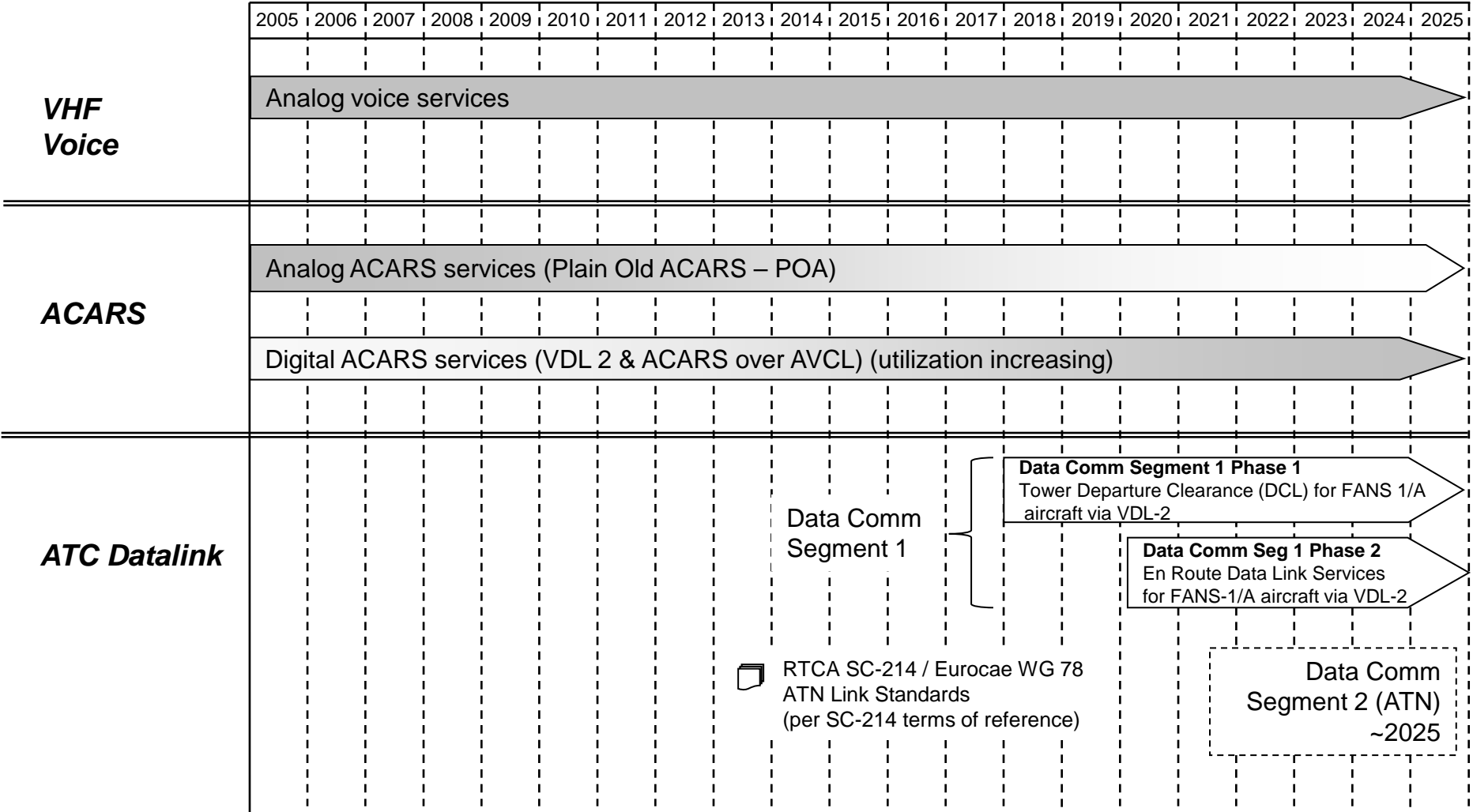
TCAS v7.1
F/F Jan 2014

GNSS Navigation
F/F Feb 2014
R/F Feb 2016

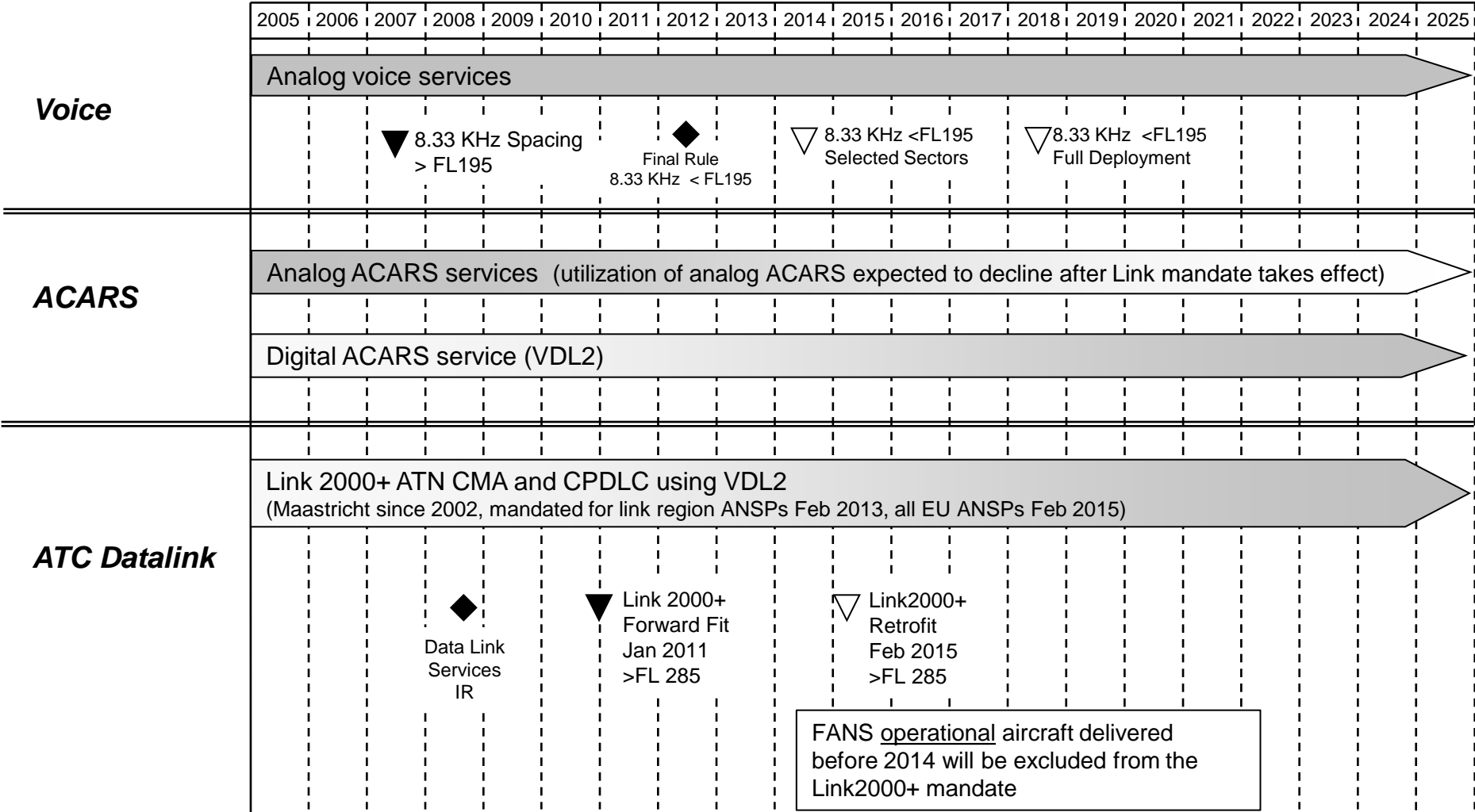
Communication Mandates and Services

- VHF – USA
- VHF – Europe
- VHF – Asia / Pacific
- HF
- SATCOM

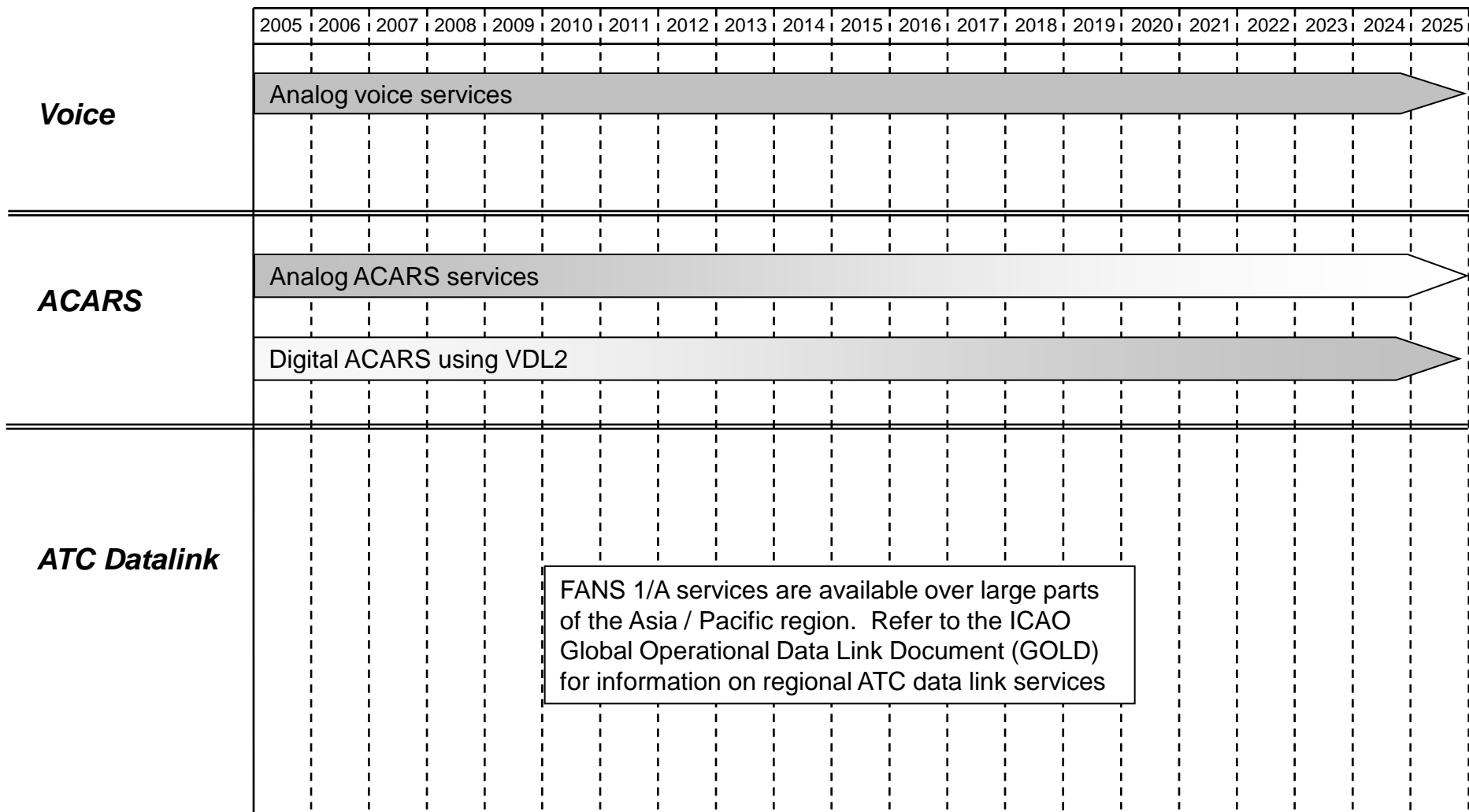
VHF Communications - USA



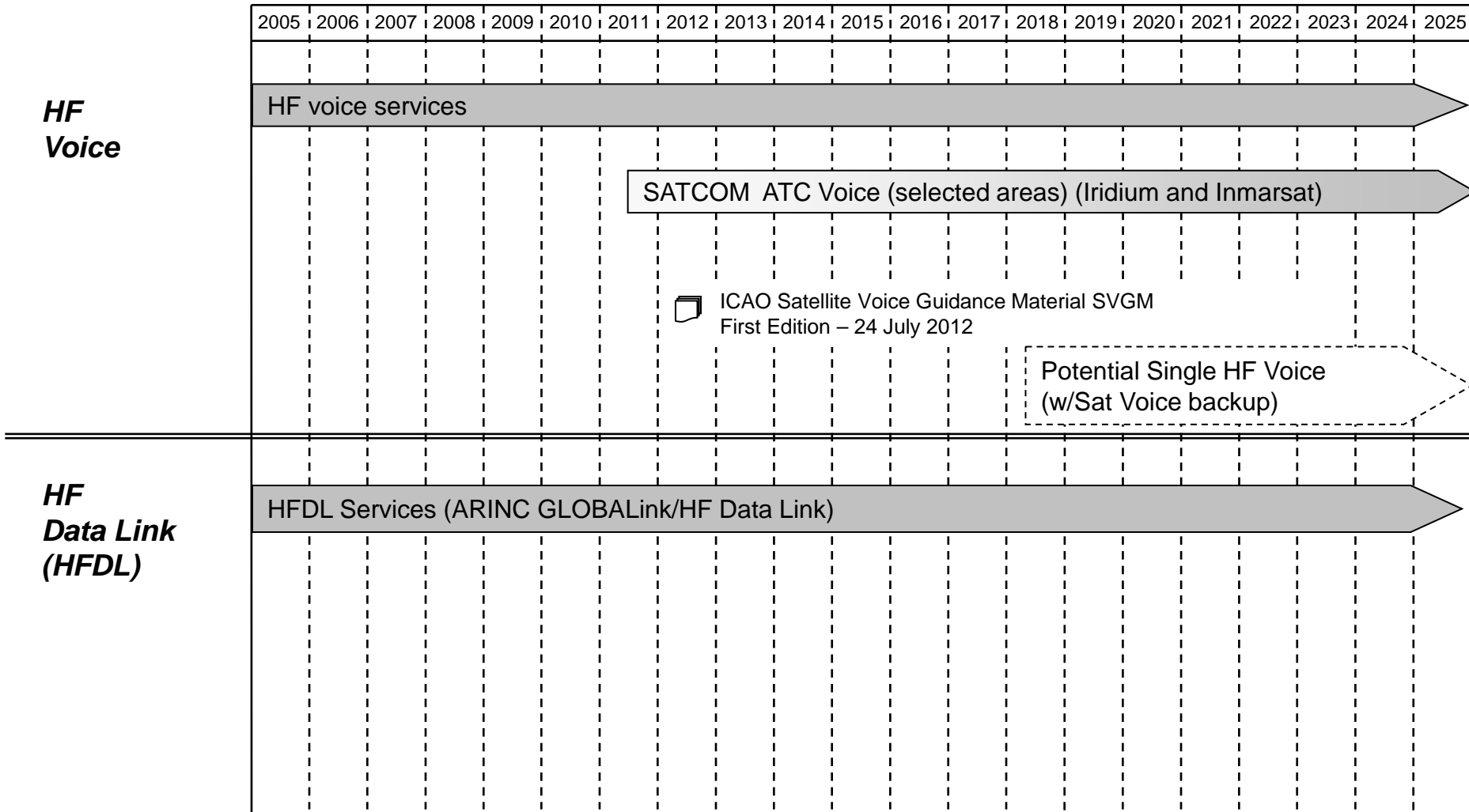
VHF Communications - Europe



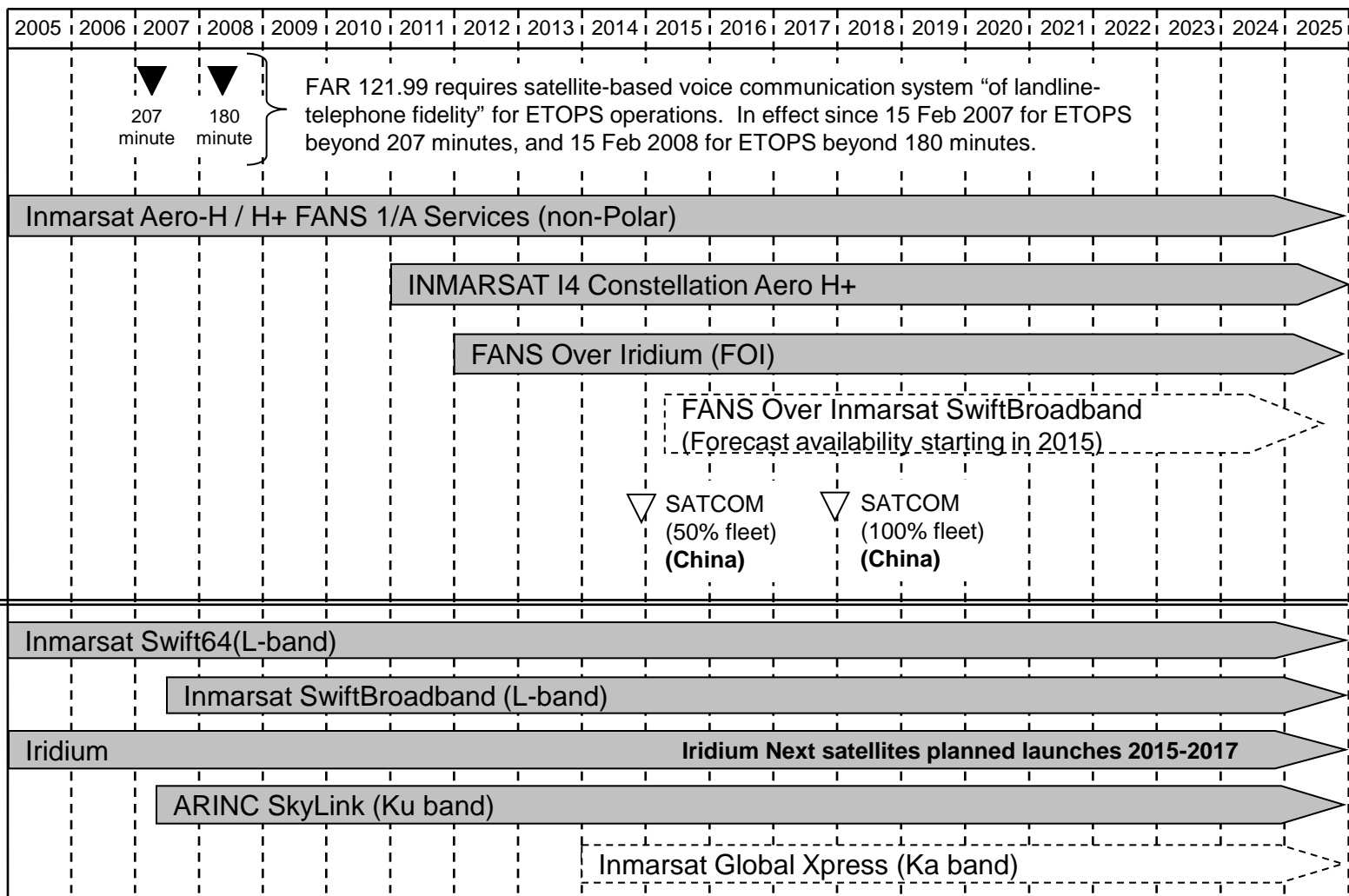
VHF Communications – Asia / Pacific



HF Communications (Global)

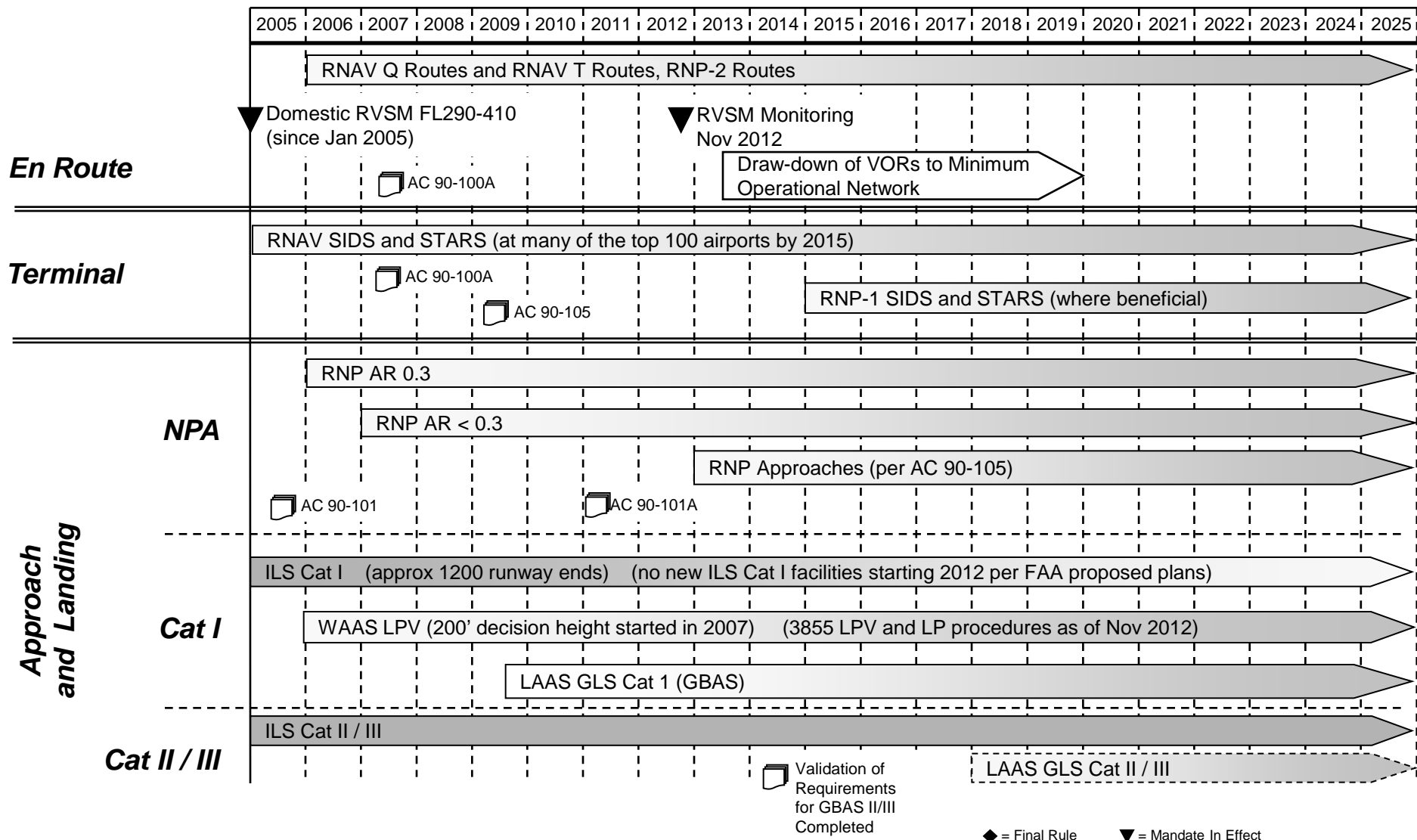


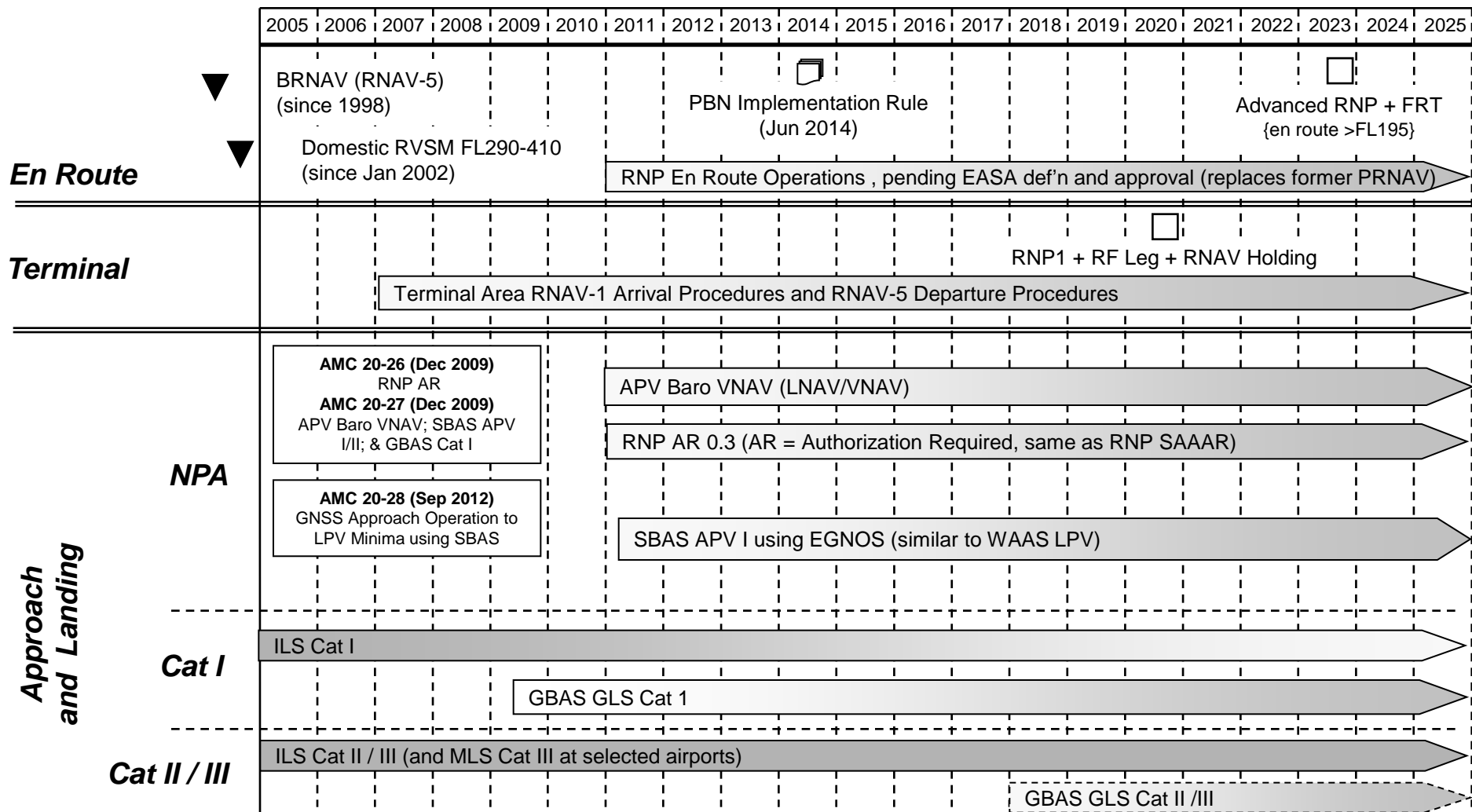
Satellite Communications (Global)



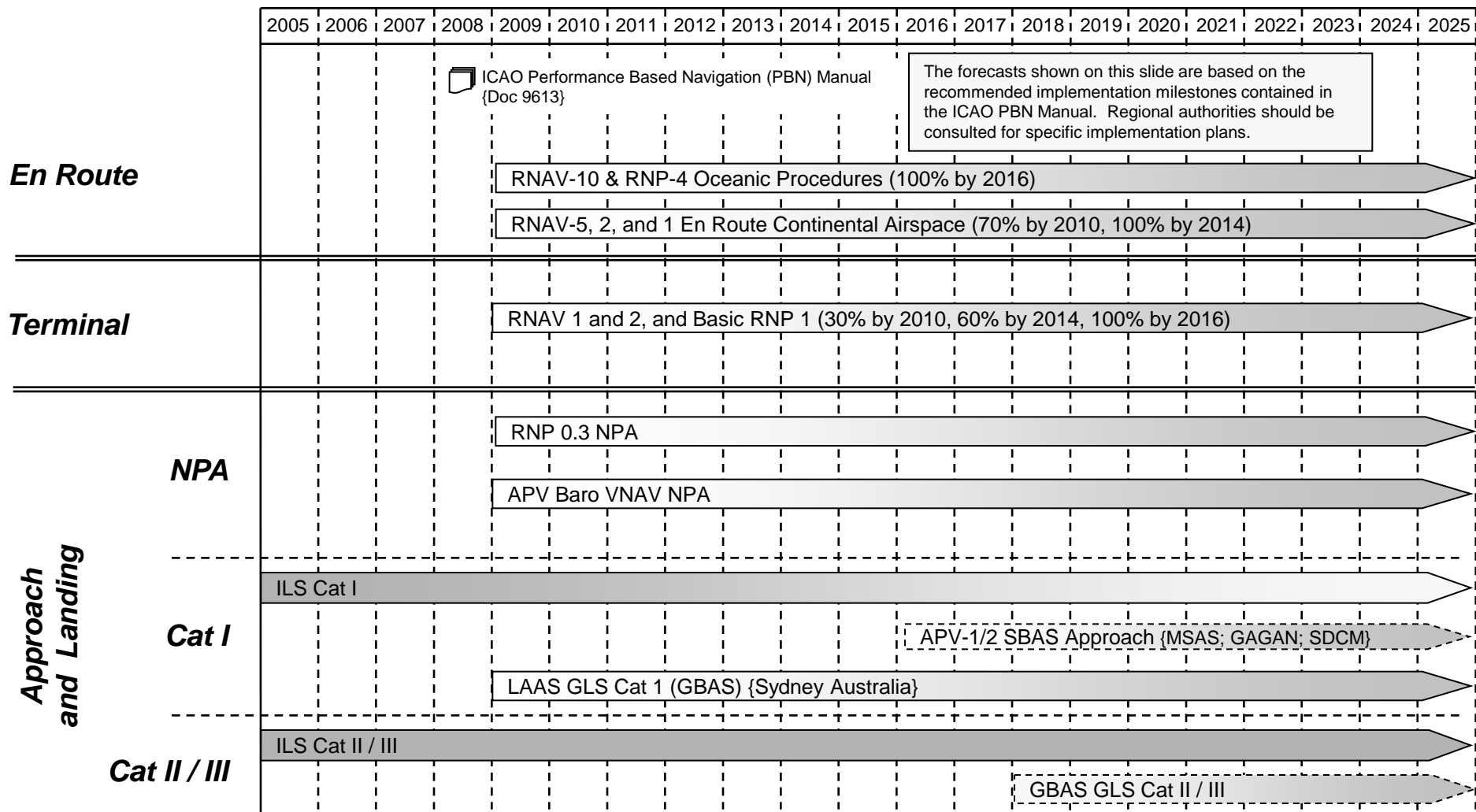
Navigation Mandates and Services

- USA
- Europe
- Asia / Pacific
- Global Navigation Satellite Systems
- Space Based Augmentation Systems





2014 v1

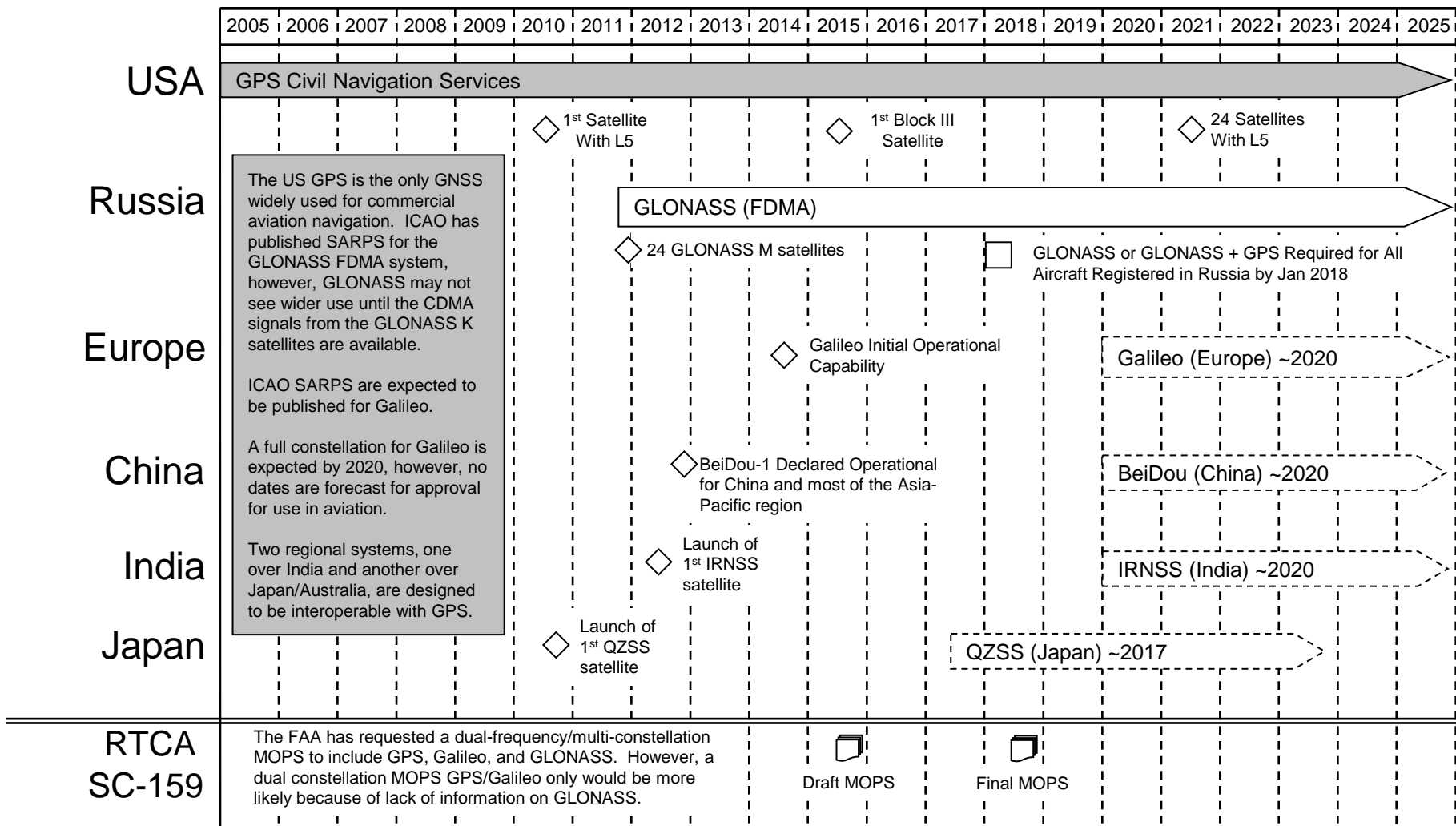


ICAO Performance Based Navigation (PBN) Manual {Doc 9613}

The forecasts shown on this slide are based on the recommended implementation milestones contained in the ICAO PBN Manual. Regional authorities should be consulted for specific implementation plans.

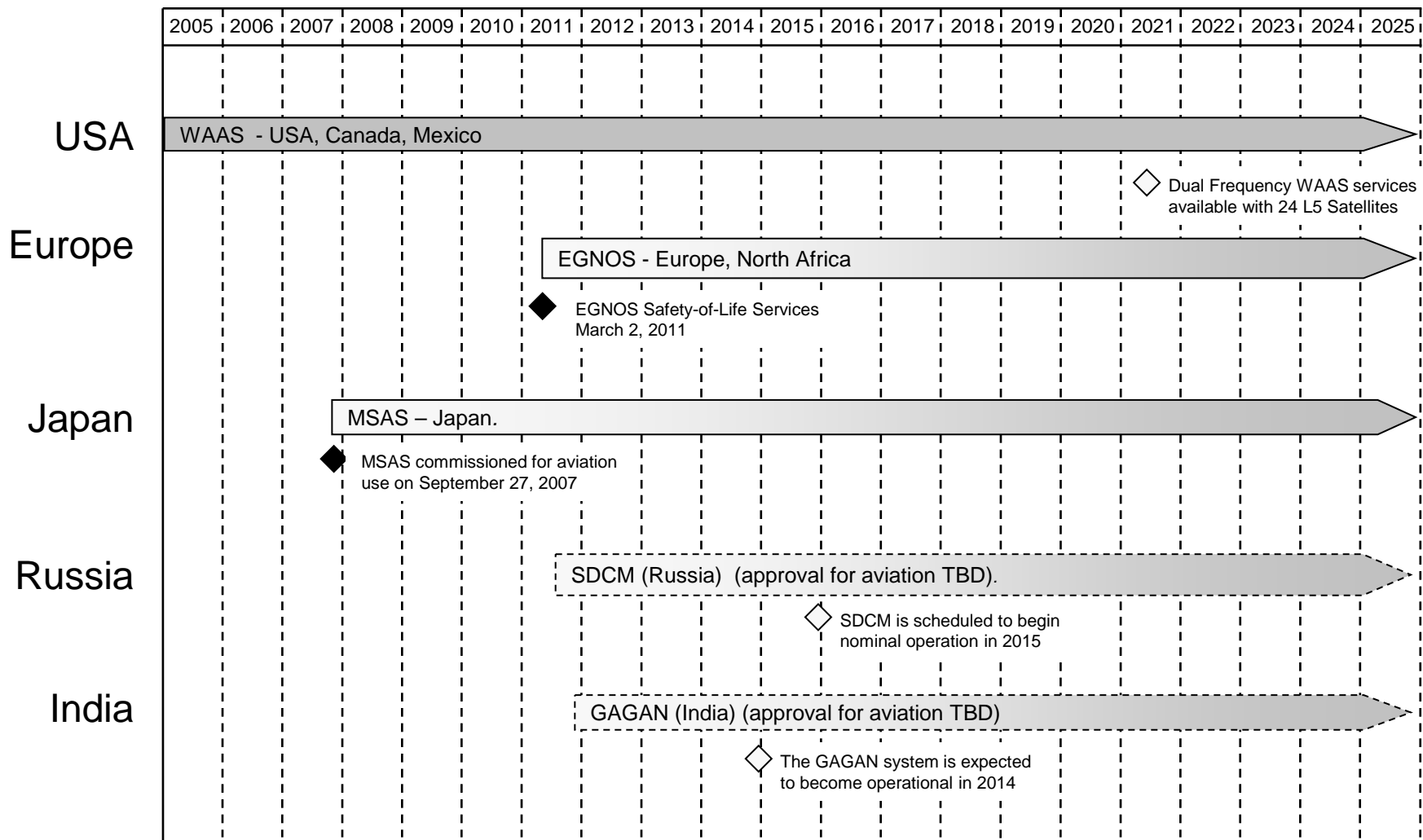
- ◆ = Final Rule
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- ▼ = Mandate In Effect
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- = Forecast Mandate

Global Navigation Satellite Systems



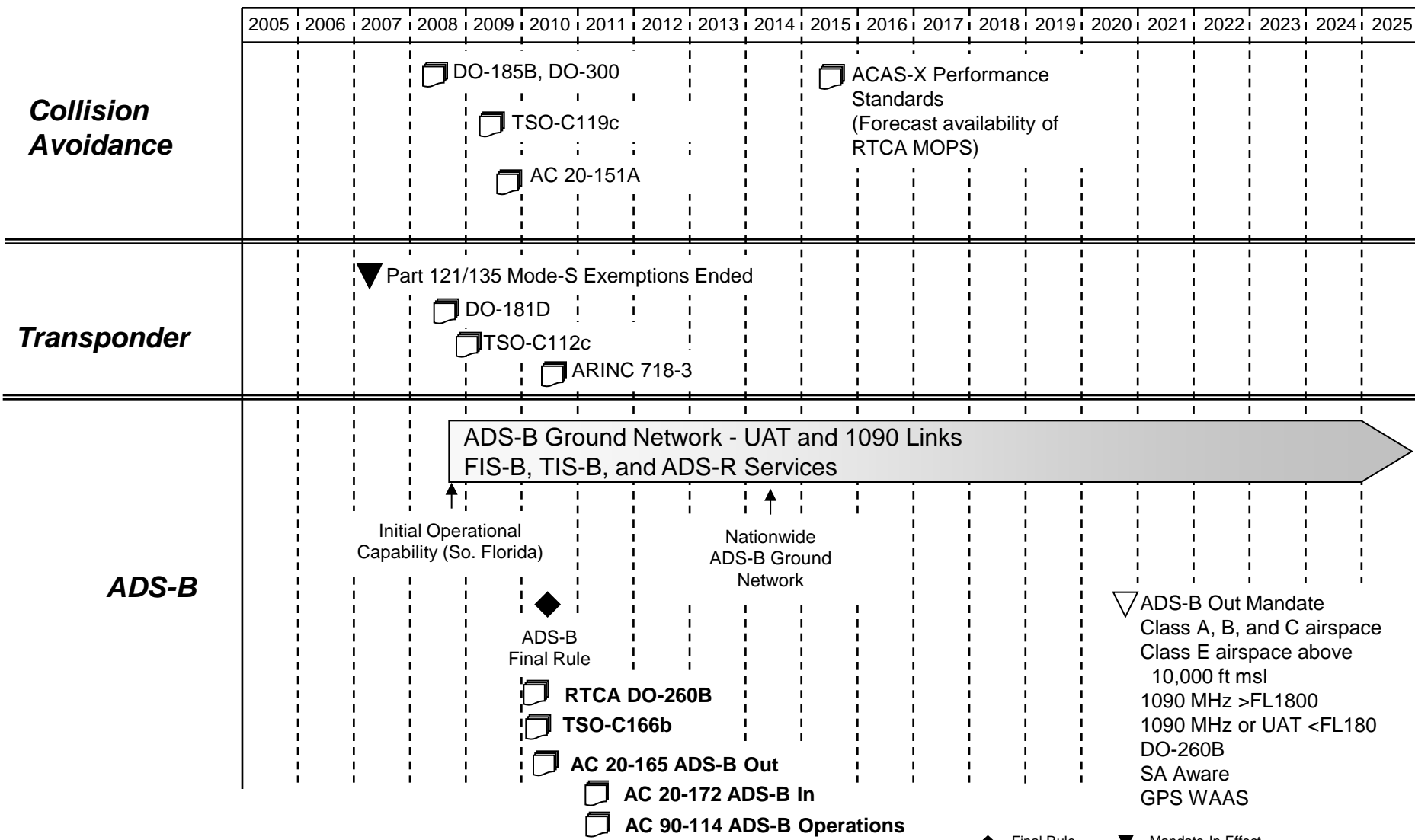
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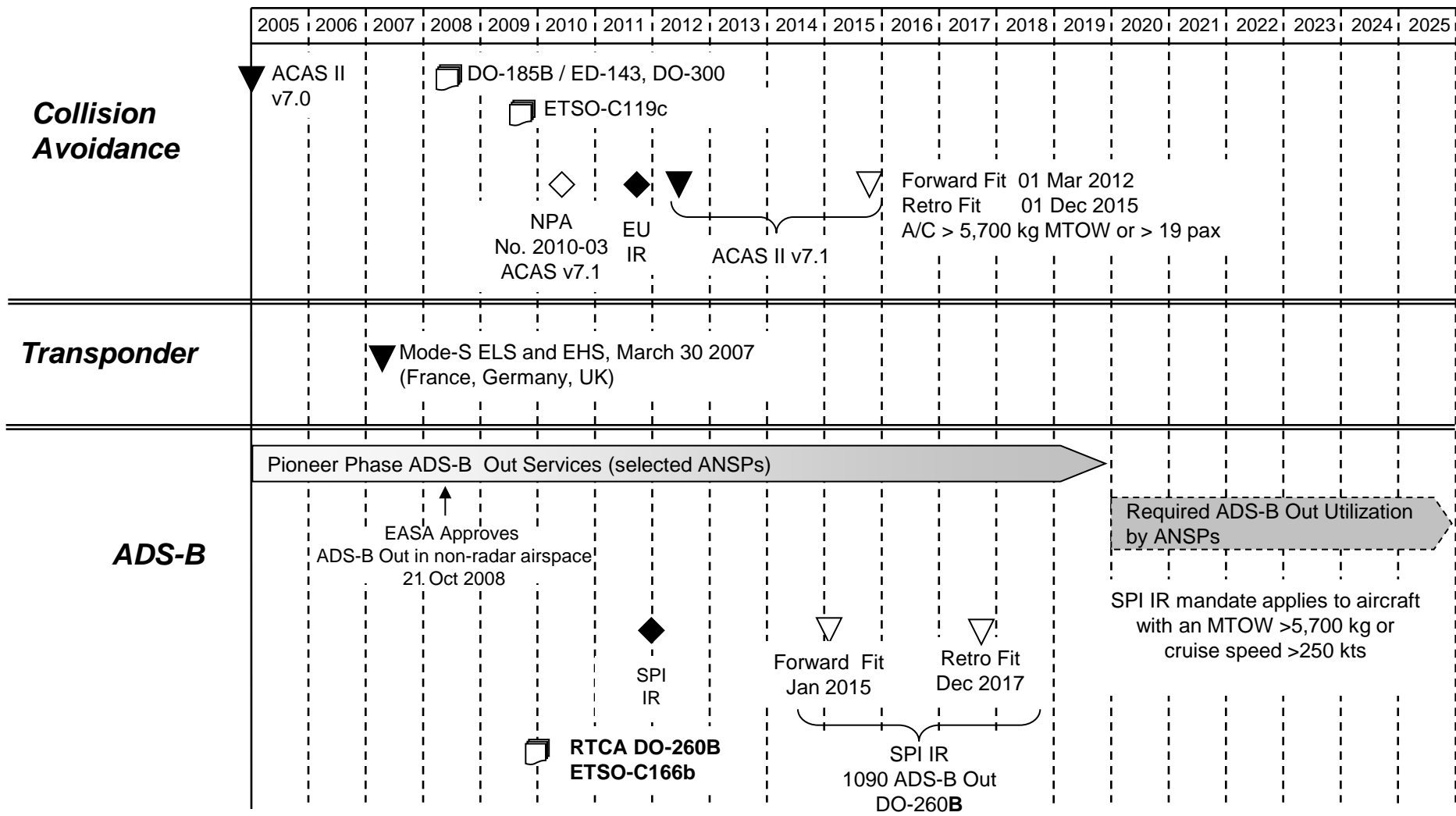
Space Based Augmentation Systems

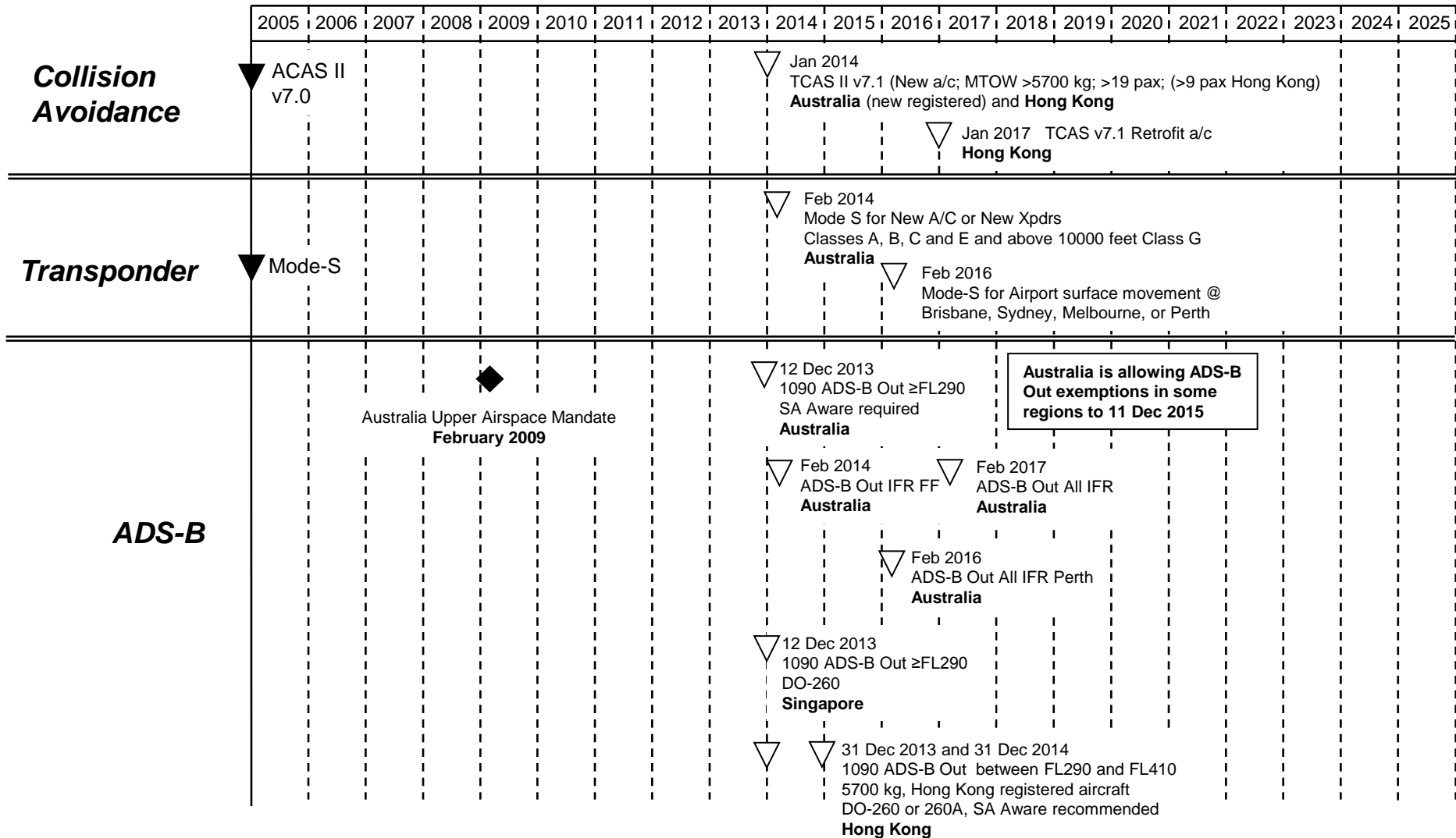


Surveillance Mandates and Services

- Traffic – USA
- Traffic – Europe
- Traffic – Asia / Pacific
- Traffic – Hudson Bay (Canada)
- Terrain



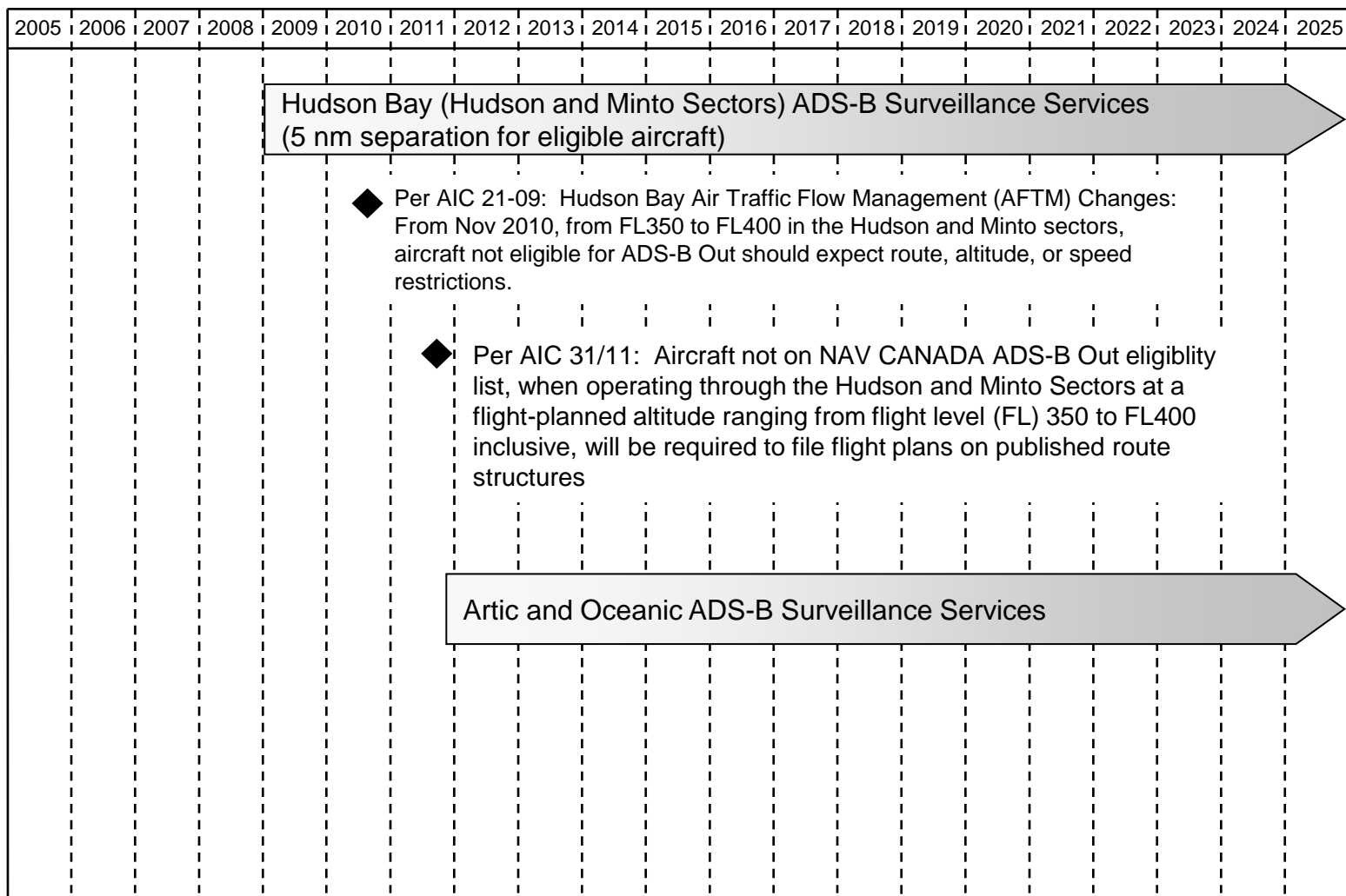


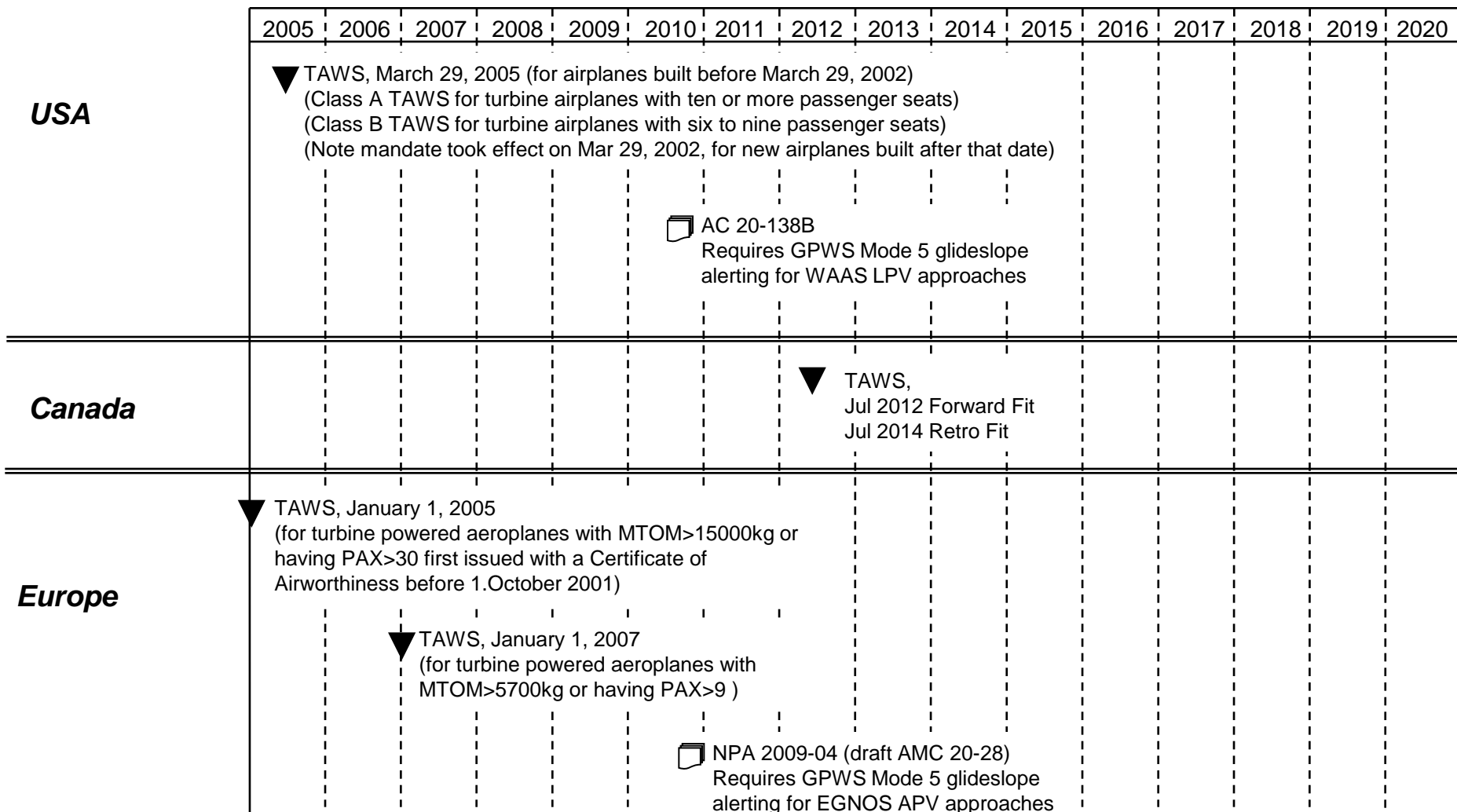


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ADS-B – Hudson Bay, Eastern Canada, Greenland

Hudson Bay ADS-B





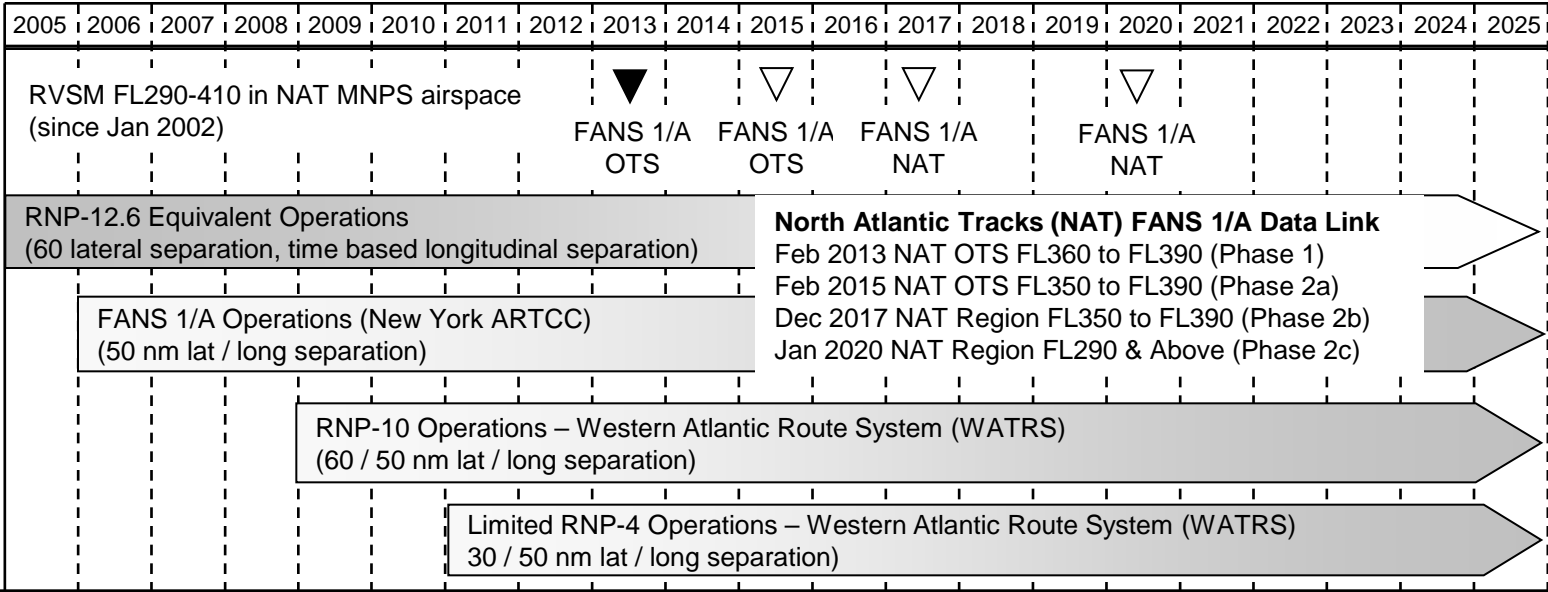
2014 v1

FANS 1/A

Atlantic

Minimum Navigation Performance Specification (MNPS)

North Atlantic (NAT)

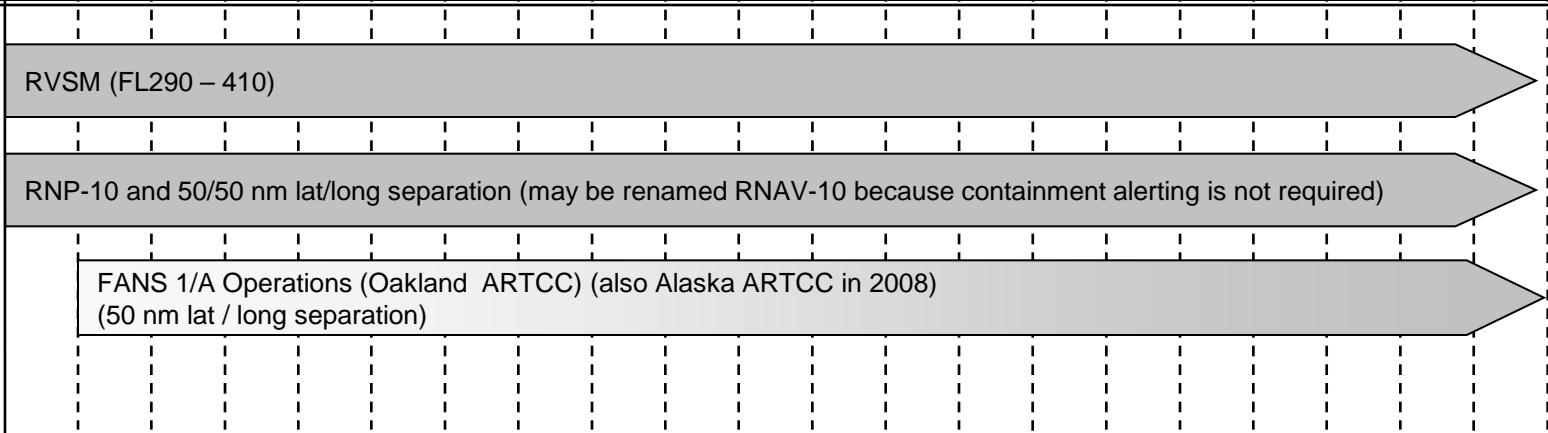


Pacific

North Pacific (NOPAC)

Central Pacific (CENPAC)

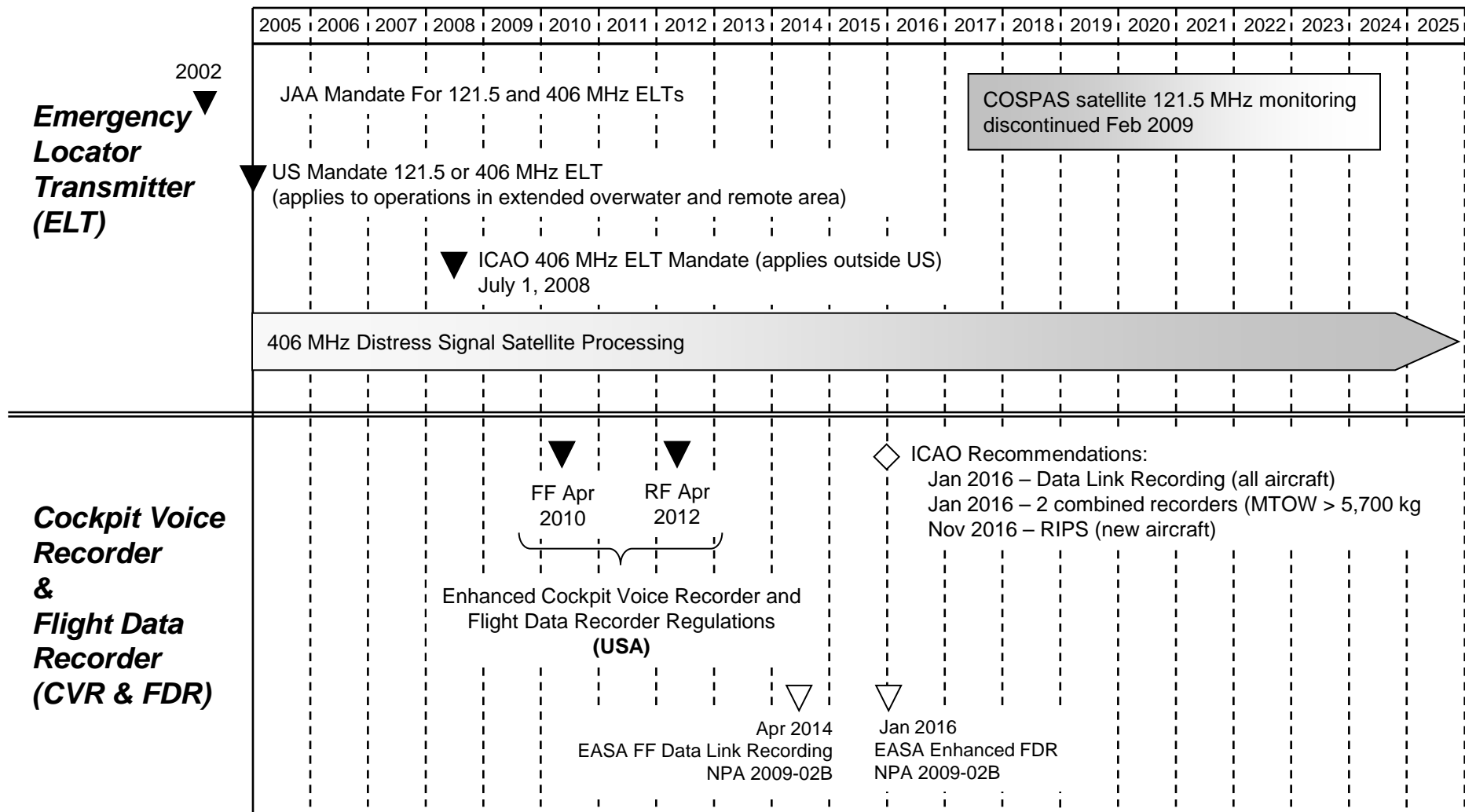
South Pacific (SOPAC)



Recorders and Emergency Transmitters

- ELT
- CVR
- FDR

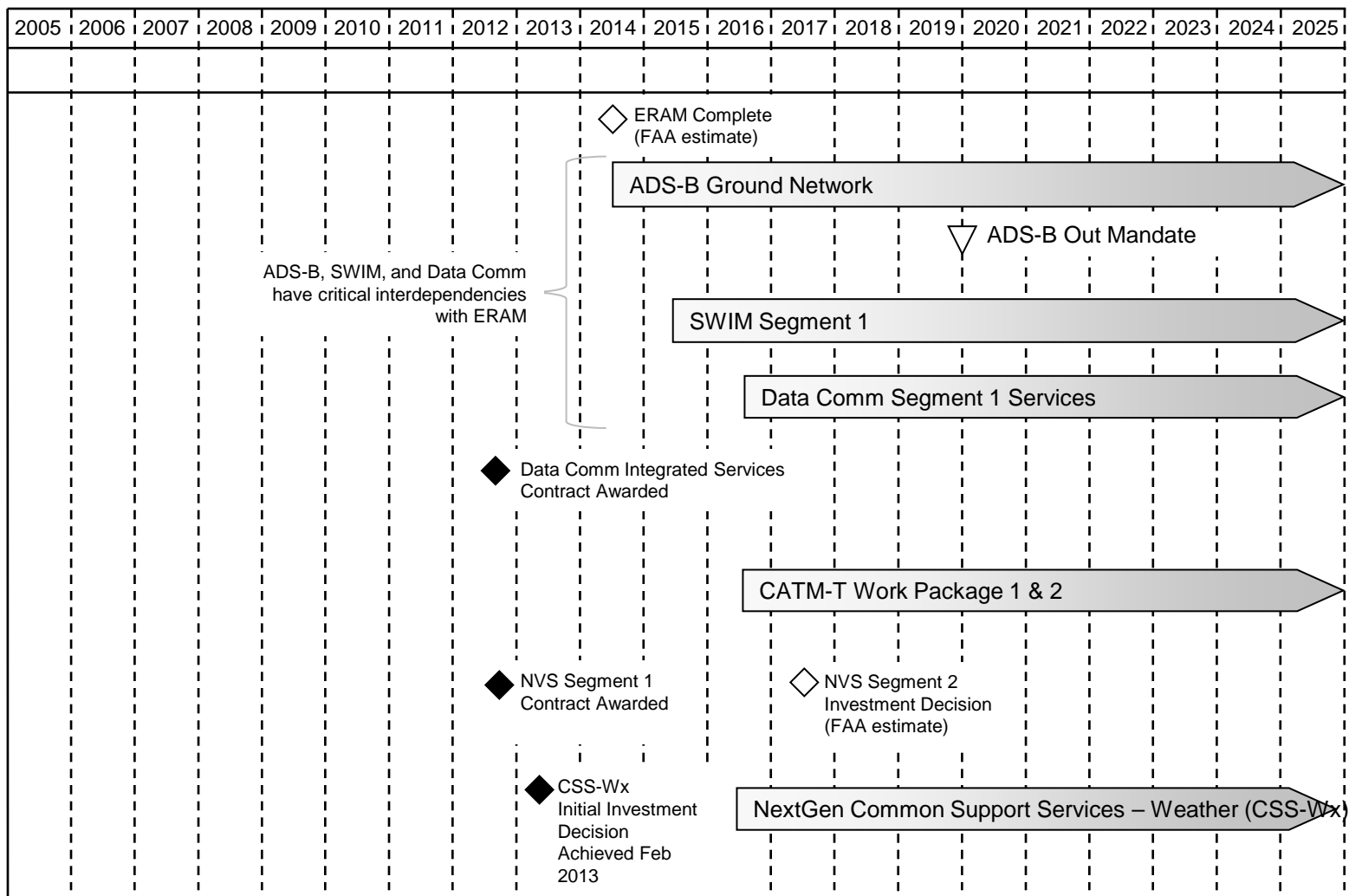
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Airspace Modernization

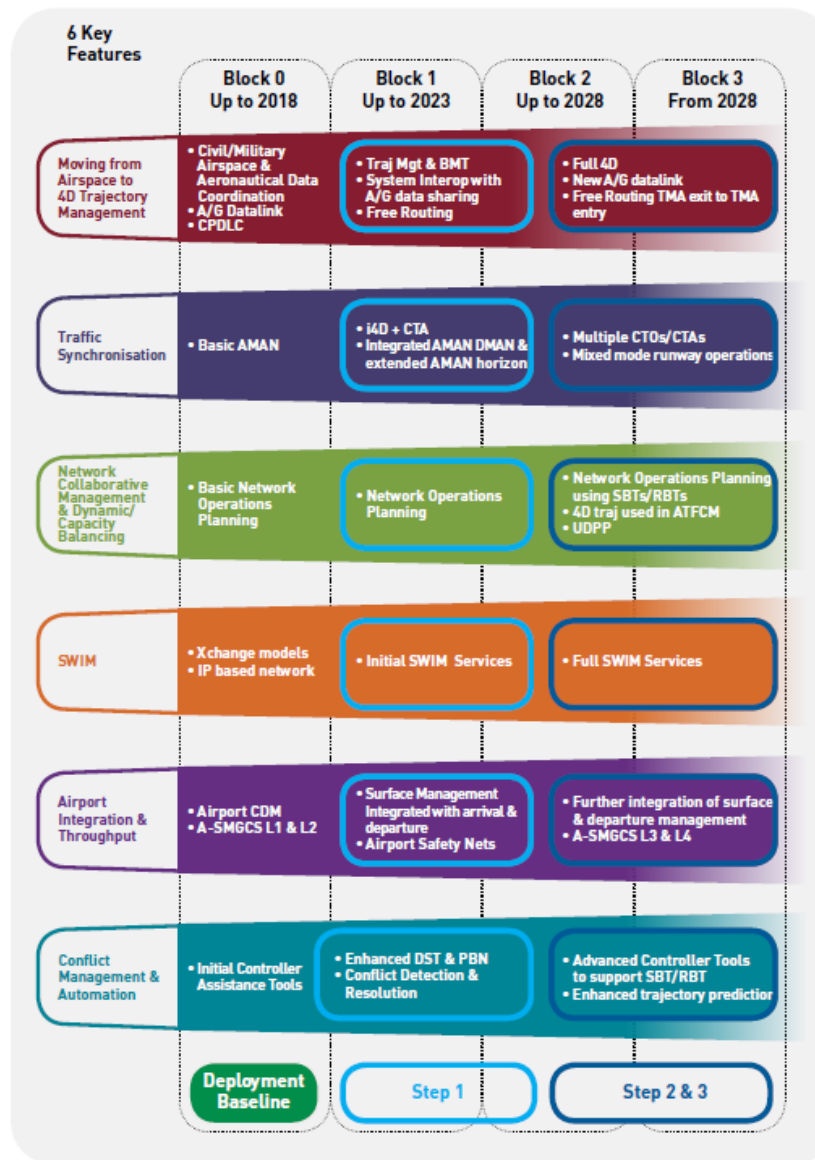
- FAA NextGen
- Europe Single European Sky ATM Research (SESAR)

FAA NextGen Transformational Programs



**FAA NextGen
Transformational
Programs**

SESAR Essential Operational Changes and ICAO's ASBU



FAA NextGen Homepage

<http://www.faa.gov/nextgen/>

JPDO Homepage

<http://www.jpdo.gov/>

SESAR JU Homepage

<http://www.sesarju.eu/>

ICAO Block Upgrade

<http://www.icao.int/Meetings/anconf12/Documents/ASBU.en.july%202012.pdf>

CASA Summary of Australian Mandates

http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_101179

AC	Advisory Circular
ACARS	Aircraft Communication and Reporting System
ACAS	Airborne Collision Avoidance System
ADS-B	Automatic Dependent Surveillance - Broadcast
ADS-C	Automatic Dependent Surveillance - Contract
AMC	Acceptable Means of Compliance
ANSP	Air Navigation Service Provider
APV	Approach with Precision Vertical
AR	Authorization Required
ARTCC	Air Route Traffic Control Center
ASAS	Airborne Separation Assistance System
ASEP C&P	ASAS Separation Crossing & Passing
ASPA S&M	Airborne Spacing
ATC	Air Traffic Control
ATLAS	Australian Transition to Satellite Technology Program
ATM	Air Traffic Management
ATN	Aeronautical Telecommunications Network
ATSA	Airborne Traffic Separation Assurance
ATSAW	Airborne Traffic Situational Awareness

BRNAV	Basic Area Navigation
Cat	Category
CASCADE	Cooperative Air Traffic Services through Surveillance and Communication Applications
CDA	Continuous Descent Approach
CDM	Collaborative Decision Making
CMA	Context Management Application
CONUS	Continental United States
CMU	Communication Management Unit
CPDLC	Controller Pilot Data Link Communications
CVR	Cockpit Voice Recorder
DLS	Data Link Services
EC	European Commission
EGNOS	European GNSS Navigation Overlay System
EHS	Enhanced Surveillance
ELS	Elementary Surveillance
ELT	Emergency Locator Transmitter
EU	European Union
Eurocae	European Organization for Civil Aviation Equipment

FAA	Federal Aviation Administration
FANS	Future Air Navigation System
FCS	Future Communications Study
FDR	Flight Data Recorder
FIS	Flight Information Services
FMS	Flight Management System
GAGAN	GEO Augmented Navigation
GBAS	Ground Based Augmentation System
GLS	GPS Landing System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
IR	Implementing Rule
ITP	In Trail Procedure
JPDO	Joint Planning and Development Office

LAAS	Local Area Augmentation System
LPV	Localizer Performance with Vertical Guidance
MLS	Microwave Landing System
MNPS	Minimum Navigation Performance Specification
MSAS	MTSAT Satellite Augmentation System
MTSAT	Multi-Functional Transport Satellite (MTSAT)
NAT	North Atlantic
NGATS	Next Generation Air Transportation System
NOP	Network Operations Plan
NPA	Non Precision Approach
NPA	Notice of Proposed Amendment (European term)
NPRM	Notice of Proposed Rule Making (FAA term)
NRA	Non Radar Airspace
OEP	Operational Evolution Program
OTS	Organized Track System

PARC	Performance-Based Operations Aviation Rulemaking Committee
PBN	Performance Based Navigation
PTC	Precision Trajectory Clearances
RAD	Radar
RNAV	Area Navigation (or Random Navigation)
RNP	Required Navigation Performance
RNP AR	RNP Authorization Required
RNP SAAAR	RNP Special Aircraft and Aircrew Authorization Required
RVSM	Reduced Vertical Separation Minima
SBAS	Space Based Augmentation System
SESAR	Single European Sky Air Traffic Management Research
SID	Standard Instrument Departure
S&M	Sequencing & Merging
SNAS	Sino Navigation Augmentation System
SPI IR	Surveillance Performance and Interoperability Implementing Rule
STAR	Standard Terminal Arrival
SVS	Synthetic Vision System
SWIM	System Wide Information Management

TAWS	Terrain Awareness and Warning System
TCAS	Traffic Collision Avoidance System
TMA	Terminal maneuver Area
UAT	Universal Asynchronous Transceiver
VDL	VHF Data Link
VHF	Very High Frequency
VSA	Enhanced Visual Separation on Approach
WAAS	Wide Area Augmentation System