NAS Infrastructure Roadmap Update

Presented to: NEXTOR Infrastructure Conf

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Ver 6.9.06

Relationship of Roadmap to Strategic Vision/Planning

Mission Roadmap Improvement Initiatives Influence SMP Objective/Initiative Development

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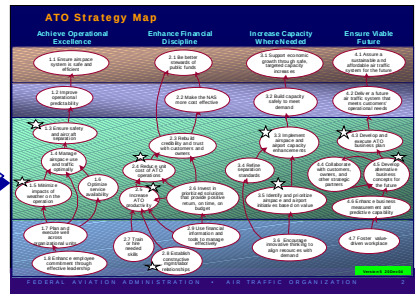

- Strategy Map provides Initiatives tied to specific Organization Objectives

- Mission Roadmap provides view of Service/Infrastructure Change (Improvement Initiatives)

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During the Budget Formulation Process for a Specific FY… Pathway Initiatives Prioritize and Refocus Roadmap Proposed Improvements – There must be 100% mapping from SMP to Roadmaps

MISSION

drives

Mission Roadmap

Services

FY07 | FY08 | FY09 | FY10

Service Roadmap

drive

Proposed Service/Infrastructure Improvement Initiatives

Infrastructure

FY07 | FY08 | FY09 | FY10

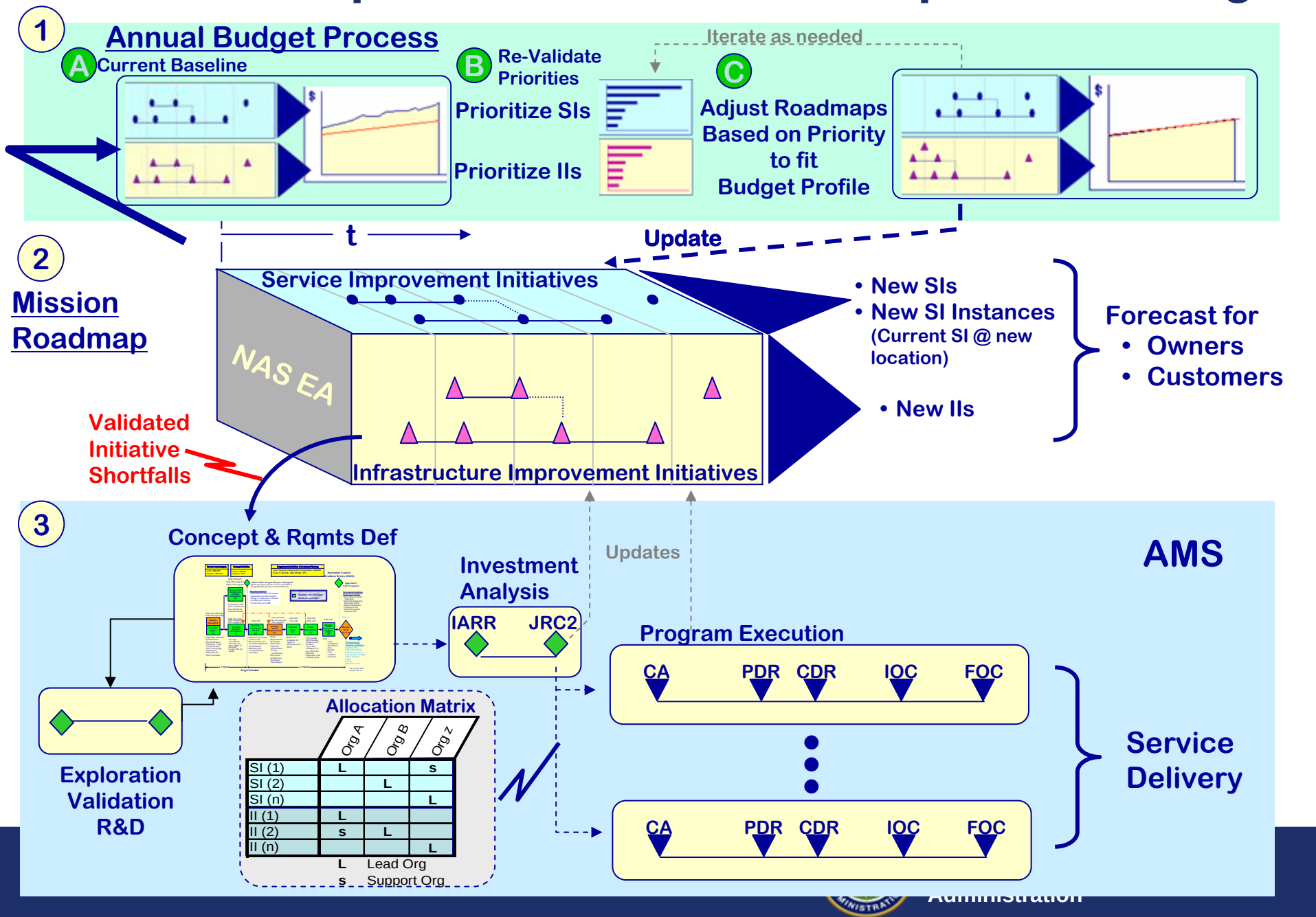
Infrastructure Roadmap

NGATS

satisfies

SMP Pathway Initiative Mapped to Infrastructure

Relationship of ATO NAS EA to Capital Planning



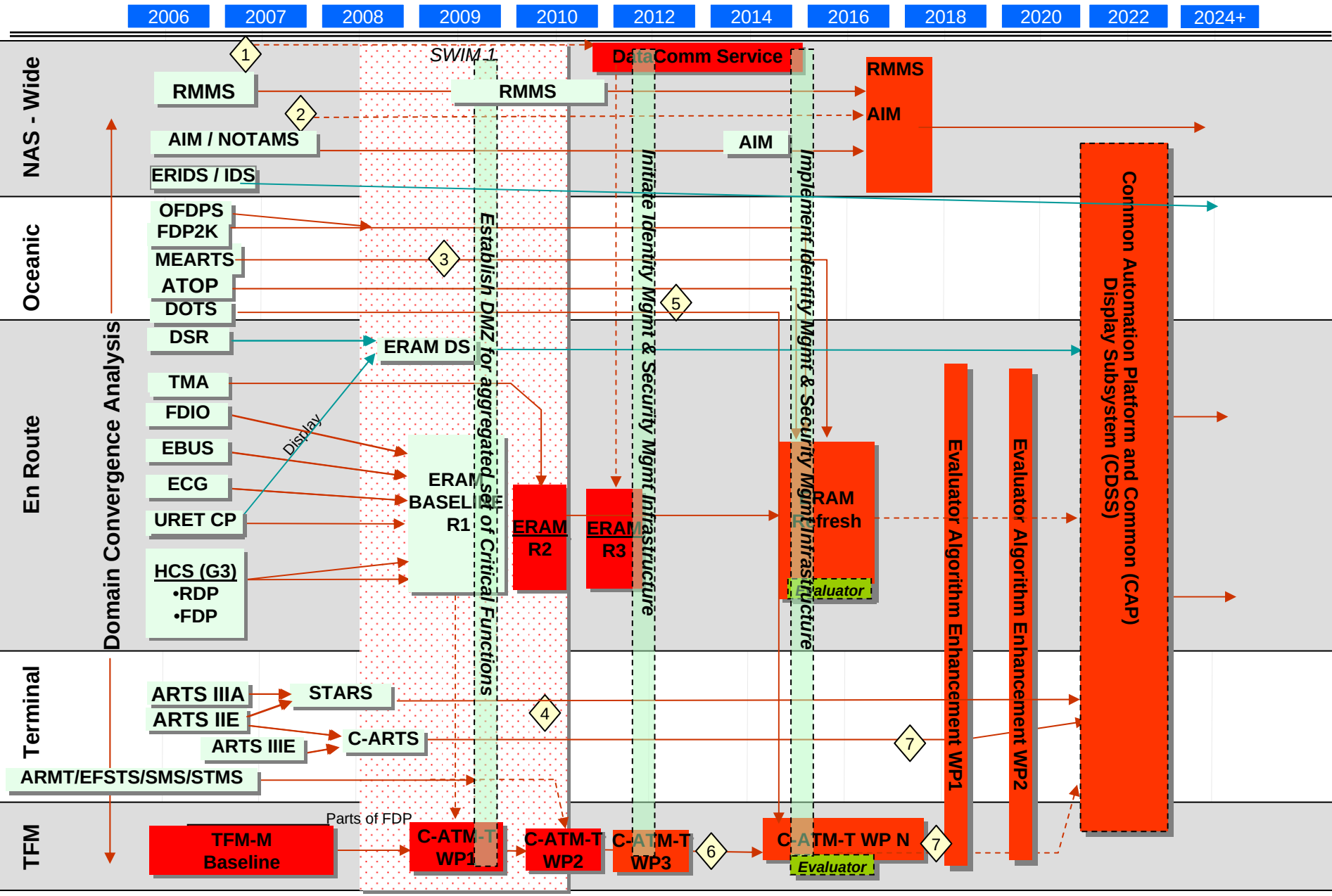
Infrastructure Roadmaps

- **Motivation**
  - Efficiently accommodate NGATS vision
- **Roadmaps**
  - Automation
  - Communications
  - Surveillance
  - Navigation
  - Weather

Automation Assumptions

- **Enhanced TFM, where assets adjust to flow, not flow constrained by infrastructure**
- **Net-centric operations via SWIM-based architecture link ATM, customers, DHS, and DoD into common information environment**
- **Automation and Data Convergence across domains with a Common Display Subsystem**
- **Converge with automation “Back-Rooms” and integrate security management**

Automation Roadmap



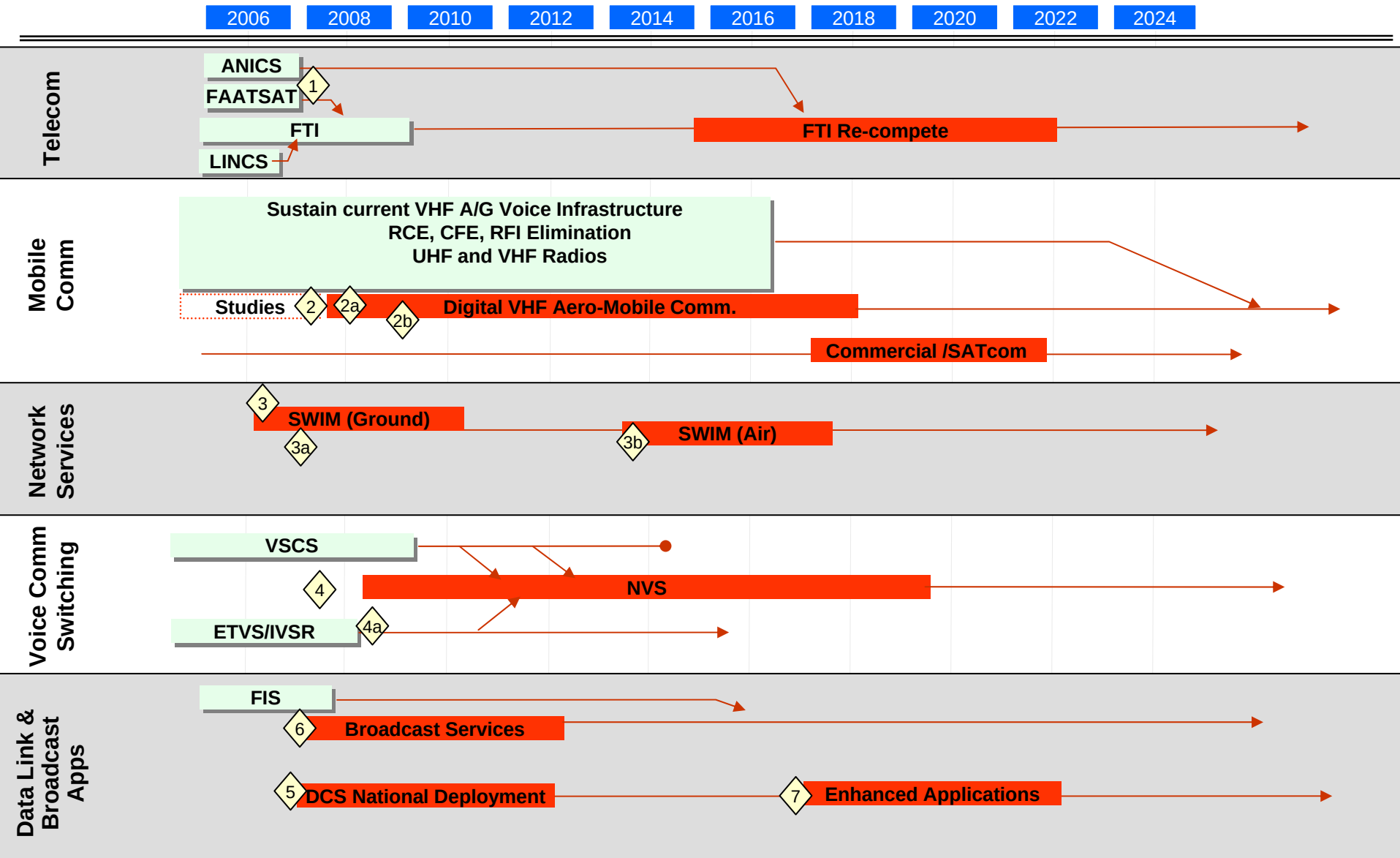
Automation Roadmap Decisions

1. 2007 - Investment decision for Data Communications Service (DCS) and Integration of DCS with CAP
2. 2007 - Decision on Security and SWIM Policy/ Implementation
3. 2009 - Decision about OCONUS facilities
4. 2010 - Decision for proceeding with CAP or NGATS automation platform to support NGATS vision and align facilities, equipment and staff for General Service Delivery Facility (GSDF)
5. 2012 - Decision for DOTS Integration into TFM
6. 2012 - “Move-in” Decision on the GSDF
7. 2016 - Decision for Implementation into CAP

Communications Assumptions

- **NAS characterized by Net Centricity**
- **All flight safety critical communications VHF**
- **FTI becomes primary Voice/Data transport system**
- **Next Generation Voice Switch (NVS) is required**
- **Broadcast Services available over multiple links**

Communications Roadmap



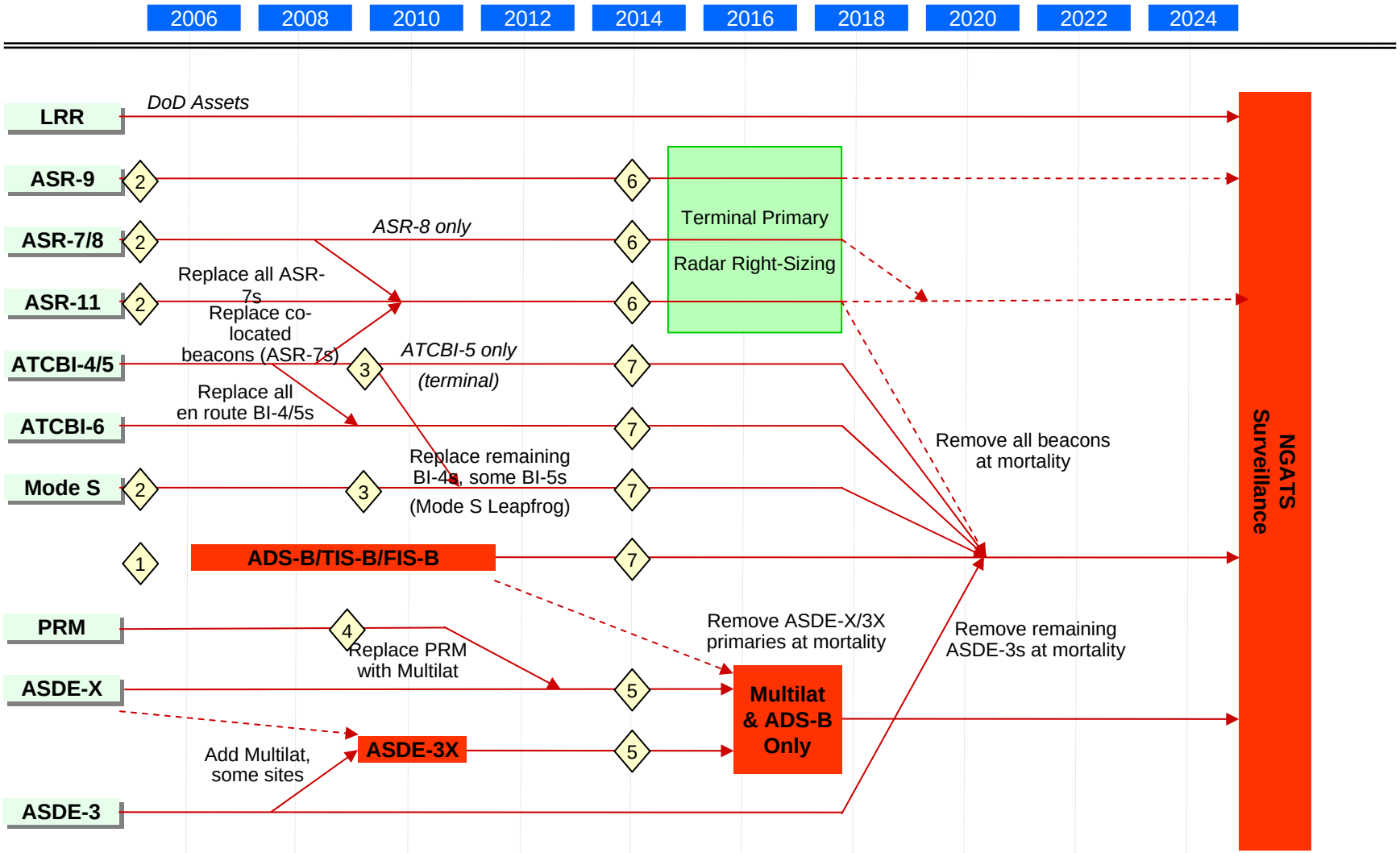
Communication Roadmap Decisions

1. **2007 - Decision on FAATSAT integration**
2. **2007 - Decision on Future Air/Ground Comm. System Europe/U.S. Harmonization**
   - a – 2008 - Investment decision for modernized new Air/Ground Communications system infrastructure
   - b – 2010 - Decision for Rulemaking for new air/ground comm. system
3. **2007 - SWIM Investment decision**
   - a – 2008 - SWIM Standards
   - b – 2014 - Airborne SWIM Investment decision
4. **2008 - Investment decision for new voice switch**
   - a – 2009 - Decision to extend VSCS/ETVS or commit to NVS cut-over
5. **2007 - Investment decision for Data Communications System (DCS)**
6. **2007 - Investment decision to implement additional Broadcast Services (ADS-B)**
7. **2018 - Investment decision to implement enhanced data link applications**

Surveillance Assumptions

- **Migrate Long Range Radars to e-Gov concept (single agency/multi-user)**
- **Move to ADS-B with Multi-Lateration as backup**
- **Surveillance “right-sizing” will result in low activity sustain of existing systems until Next Generation Surveillance system**

Surveillance Roadmap



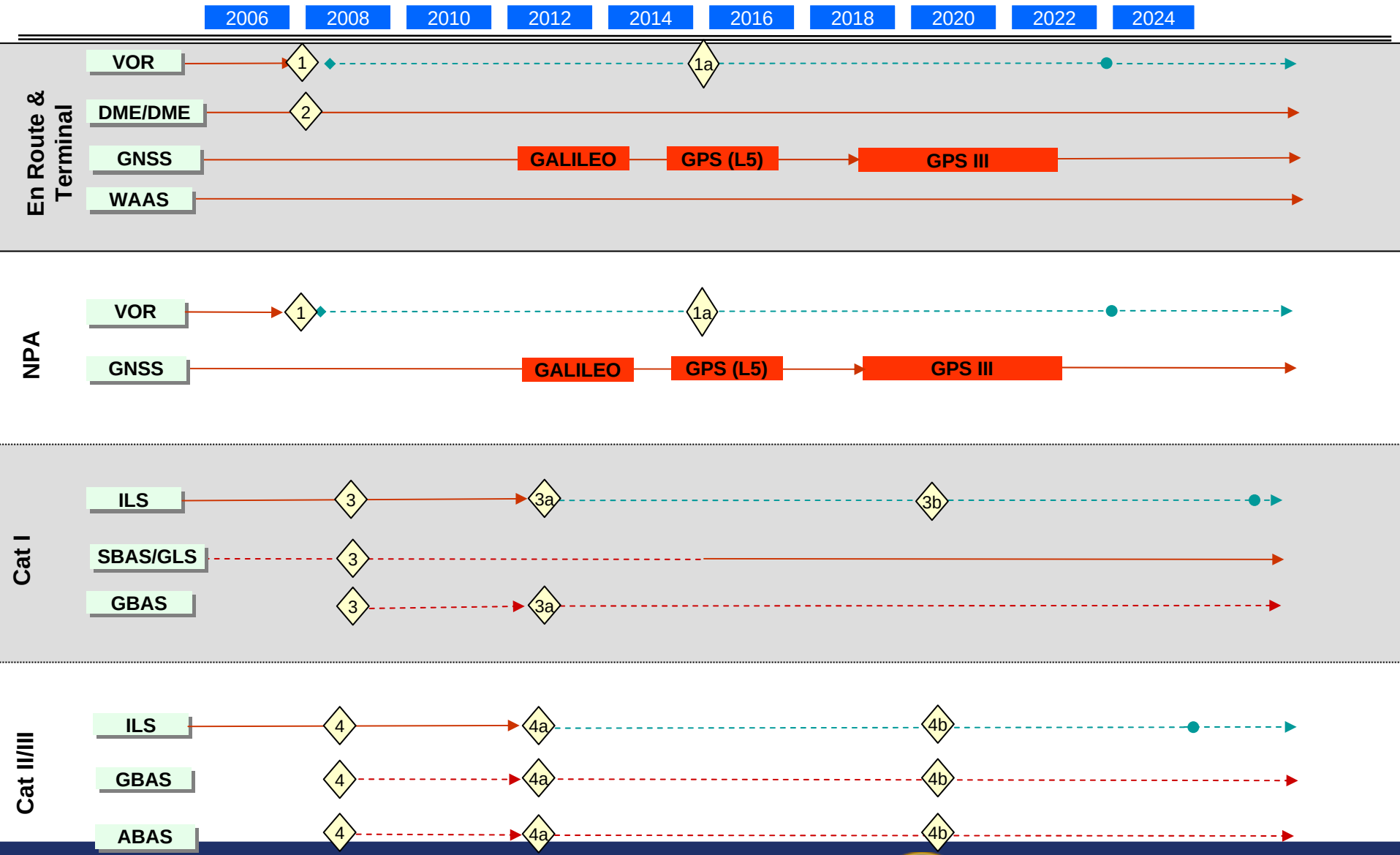
Surveillance Roadmap Decisions

1. **2006 - Investment decision for Automatic Dependent Surveillance / Traffic/ Flight Information Services - Broadcast (ADS-B/TIS-B/FIS-B) NAS-Wide Implementation**
2. **2006 - Investment decision for Terminal Radar (ASR-9/Mode S) low-activity refresh; restructuring ASR-11 program to address critical needs (ASR-7 replacement); digitizing and extending remaining ASR-8 radars**
3. **2009 - Investment decision for leapfrogging Mode S beacons, replacing remaining ATCBI-4 beacons and selected ATCBI-5s**
4. **2009 - Decision for continuation of PRM, or removal from service, based on RNP and Multilateration**
5. **2014 - Decision for continuation of ASDE-X/3X primary radars, or removal from service, based on Multilateration/ADS-B**
6. **2014 - Decision on Terminal Primary Radar right-sizing (continuation, reduction, or removal from service)**
7. **2014 - Decision for continuation of beacon radars, or removal from service, based on ADS-B and capacity backup**

Navigation Assumptions

- **The FAA requires an aggressive transition to space-based service.**
  - Decisions needing to be made *with the aviation community.*
    - share burden with operators through equipage mandates
    - transfer costs to airports through statutory changes
- **FAA will provide NAS-wide space-based service:**
  - RNAV/RNP (GNSS – including augmentation systems)
  - Baseline approach service is Cat I or equivalent
- **Policy determination on what is adequate backup**
  - FAA will provide NAS-wide backup for RNAV/RNP
  - FAA will provide Cat I ILS as backup at OEP airports (~55 airports)
  - End State - Most Cat I ILS & all Cat II/III ILS will be divested (transferred or decommissioned)
- **Fleet Equipage**
  - Today = Mixed Fleet – GNSS, D/D and D/D/I
  - Future = Fleet equipped with GNSS
    - Decision/specification of “Backup/Redundant” systems
- **GPS dual-frequency (L5) service crucial**

Navigation Roadmap



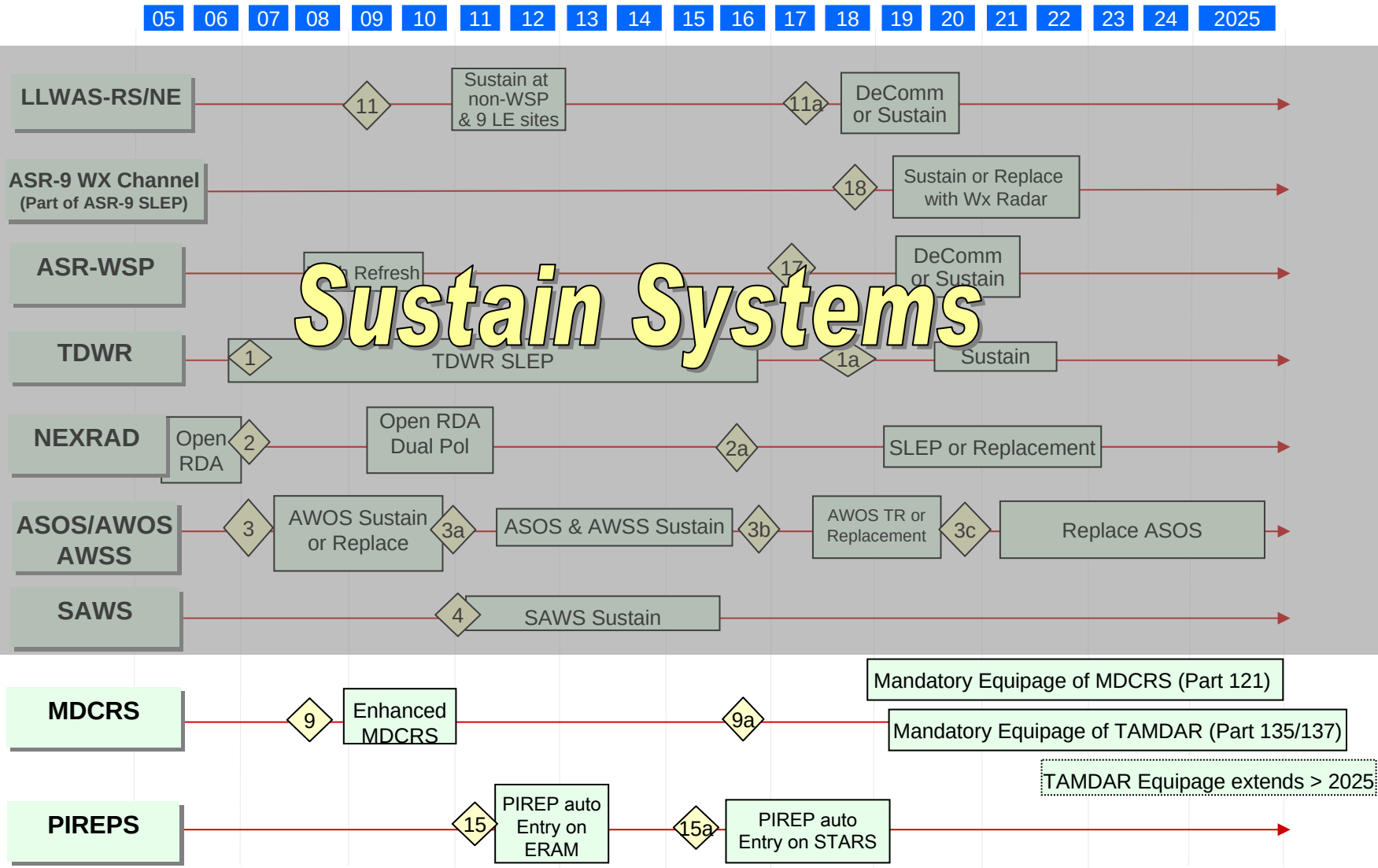
Navigation Roadmap Decisions

1. **2007 - VOR decision for drawdown based on GNSS**
   - a - 2015 - VOR decision on complete drawdown
2. **2007 - Rightsizing DME Requirements, e.g., Service Volume, DME Architecture**
3. **2008 - Decision on next generation Cat I landing system/GLS & mandate.**
   Potential need for Local Airport Repeater (LAR) (leverage WAAS investment to provide low-cost GBAS).
   - a – 2012 - Begin ILS Cat I drawdown - limited backup at OEP airports
   - b – 2020 - Mandate execution
4. **2008 - Decision on next generation CAT II/III service mandate, pending feasibility & schedule of potential ABAS/GBAS solutions and risk mitigation strategies**
   - a – 2012 - Begin drawdown of ILS Cat II/III services
     - CAT II/III service provision transitions to airport & operator
     - Airports responsible for all lighting costs
   - b – 2020 - Mandate execution

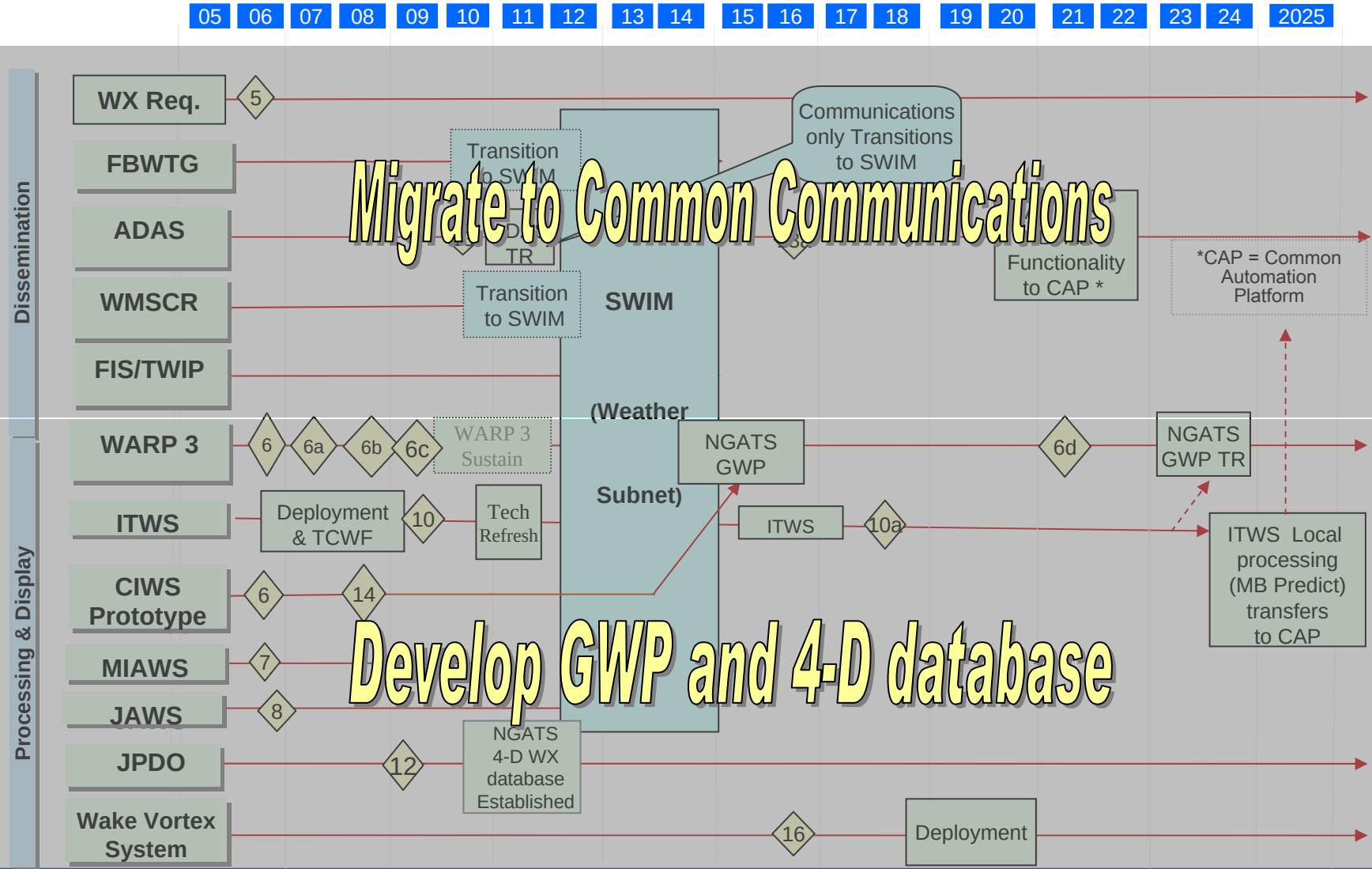
Weather Assumptions – High Level

- Ongoing Weather Sensor Sustainment
  - Issues
    - Sustainment of ASR-9/11 when surveillance no longer ground based
    - Need for ground based WS/MB functionality (SE study)
- Rulemaking to support in situ aircraft observations (MDCRS and TAMDAR-like systems)
- Migrate to Common NEO Communications
- Develop General Weather Processor
  - Issues
    - WARP End of Service
    - CIWS S/W brought up to standards (GFE)
    - ITWS integration
- Fund 4-D database

NAS Weather Roadmap Sensors



NAS Weather Roadmap
Dissemination and Processing and Display



Weather Roadmap Decisions

1. 2006 – Investment Decision for TDWR Service Life Extension
   - a – 2018 – Investment Decision to Sustain TDWR/LLWAS-NE
2. 2006 – Decision re FY08 and beyond as funding insufficient for NEXRAD Dual Pol; RPD in the works
   - a – 2016 – Investment Decision for NEXRAD – SLEP or Replacement
3. 2006 – Investment Decision to replace AWOS (becoming insupportable)
   - a – 2010 - Investment Decision for (1) ASOS sensor (Snowfall Rate); potential to eliminate Contract Wx Observers at 36 Towers (~ $12M/year Ops cost avoidance), and (2) AWSS TR
   - b – 2016 – Investment Decision for AWOS follow-on TR
   - c – 2020 – Investment Decision to replace ASOS
4. 2006 – Status of remaining 150 SAWS TBD; may be used for spare parts and/or sites & regions receive system gratis but must pay Ops costs (SAWS related to Sfc Obs Service Standards)
5. 2006 - Initiate FAA Weather Requirements Analysis to converge Wx System functionality into NGATS netcentric Wx capability
6. 2006 – Investment Decision 2A for GWP (1st phase is WARP/CIWS functionality)
   - a – 2007 – Investment Decision 2B for GWP
   - b – 2008 - Investment Decision to Fund FAA portion of NGATS GWP
   - c – 2009 – WARP likely sustained w/existing O&M $$ till 2010/11 if funding not ‘perturbed’; otherwise possible Investment Decision needed to sustain it to 2014 (when subsumed into GWP w/CIWS)
   - d – 2021 – Investment Decision for NGATS GWP TR

Weather Roadmap Decisions

7 • 2006/7 – Service Unit decision to remove 3 MIAWS Prototypes upon ASR-11 commissioning

8 • 2006/7 - Investment Decision on operational requirement for JAWS (Alaska) (convert to O&M)

9 • 2008 - Investment Decision for S/W mods to WARP/ITWS to accept Enhanced MDCRS data (humidity & turbulence)

9a – 2016 – Decision to mandate weather sensor equipage on aircraft (Jetliners first, then Taxi/Commuter later)

10 • 2008 – Investment Decision for ITWS to

Tech Refresh initial ITWS 6-8 ITWS production systems

Field remaining 12 systems

Extend cost-effective coverage of NEXRAD/ASR to MIAWS sites

10a – 2017 – Determine if prudent to TR ITWS or move ITWS functionality into GWP and MB Predict capability goes to CAP**; then DeComm ITWS

11 • 2009 – Investment Decision to Sustain LLWAS-RS WS capability – TR 2011-2012

11a – 2017 – Decision to DeComm LLWAS-RS based on low WS accident rates, more widespread training, and possible coverage from NEXRAD (Eng study needed)

12 • 2009 – Investment Decision to fund FAA portion of NGATS 4-D Wx Data Base

13 • 2010 - Investment Decision for ADAS TR to continue ALDARS after Comms Functionality subsumed by SWIM

13a – 2016 - Investment Decision to move ADAS/ALDARS functionality to CAP

14 • 2010 - Maintain CIWS prototype until 2014; then consolidate functionality into NGATS GWP

Weather Roadmap Decisions

15 • 2011 – Investment Decision to modify ERAM for “auto PIREP” entry

15a – 2015 – Investment Decision to modify STARS For “auto PIREP” entry

16 • 2016 - Investment Decision to deploy Wake Vortex Sensor/Prediction capability

17 • 2017 – Decision to DeComm ASR-WSP based on low WS accident rates, more widespread training, aircraft equipage, and possible coverage from NEXRAD (Engineering study needed)

18 • 2018 – Investment Decision to Sustain ASR-9 (Wx Channel for Precip Intensity)

Facilities Assumptions

- **Consolidate 200+ radar and some tower facilities into 15 GSDFs**
- **Keep ATCTs running until virtual ATCTs are viable (require a timeframe to modify this assumption).**
- **No new TRACONs will be built after 2012.**
- **No new contract ATCTs will be built after 2012.**

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