CENTER FOR ADVANCED AVIATION SYSTEM DEVELOPMENT (CAASD)

Communications and Automation Transformation Challenges for the Future Air Transportation System

Presented at NEXTOR's
NAS Infrastructure Management Conference

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September 9, 2005

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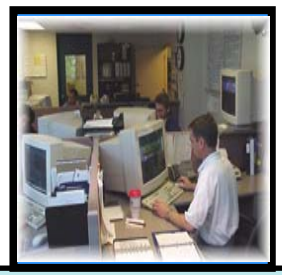
CNS/ATM Infrastructure Modernization Areas

Operational Elements

Air Traffic Control

Air Crews

ffic Flow Management



Planning and Dispatch

Infrastructure Modernization

Communications

Navigation & Surveillance
Covered by Dave Hamrick

Automation

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Motivation for Modernization

- **Extensive FAA facilities**
  - ~ 500 FAA-managed Airport Traffic Control Towers
  - ~ 180 Terminal Radar Approach Control Facilities
  - 21 En route Centers
  - ~ 76 Flight Service Stations (A-76)
  - > 40,000 Radios, Radars, NAVAIDs
- **Although current system has worked well since introduced in 1950s, it is showing signs of strain**
  - Replacement cost of assets > $30 billion
  - Significant infrastructure operations and maintenance
    - ~ 25% of ATO costs (~ $2 billion)

- ~ 75% of Ops budget is FAA staff costs
- Traffic back to pre 9/11 and will continue to grow – Perhaps by 2 to 3 times by 2025
- The rest of the world is moving ahead fast
  - Leader will set standards for the world

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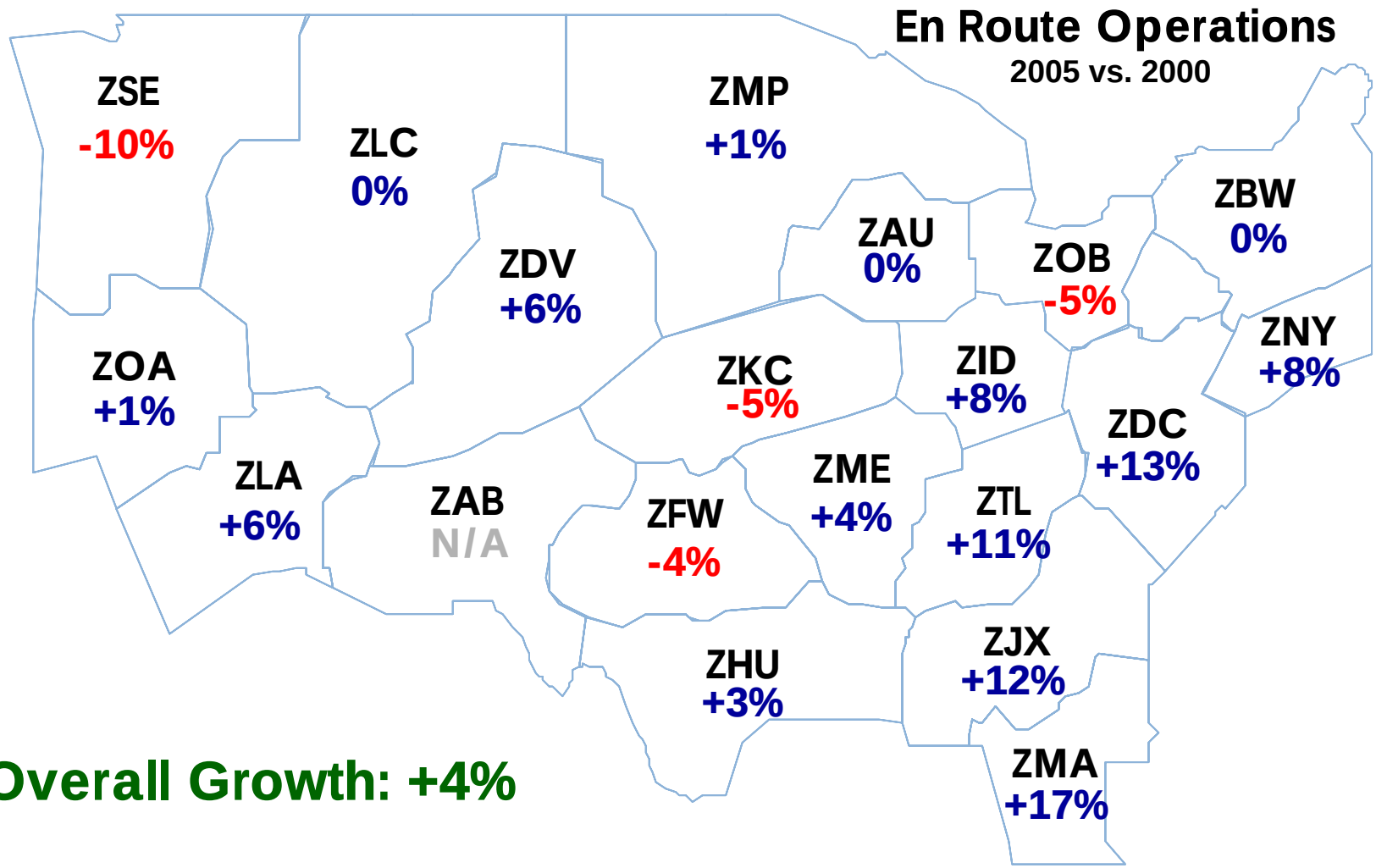
En route Traffic is Increasing

2005 *En route traffic has surpassed 2000 levels*



Overall Growth: +4%

Source: OPSNET

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Traffic will Continue to Grow Perhaps Faster than Before

~4.8% annual growth in carrier services

~8.5% annual growth in regional service

5.2% annual growth in argo services

~12% annual growth in corporate jet traffic

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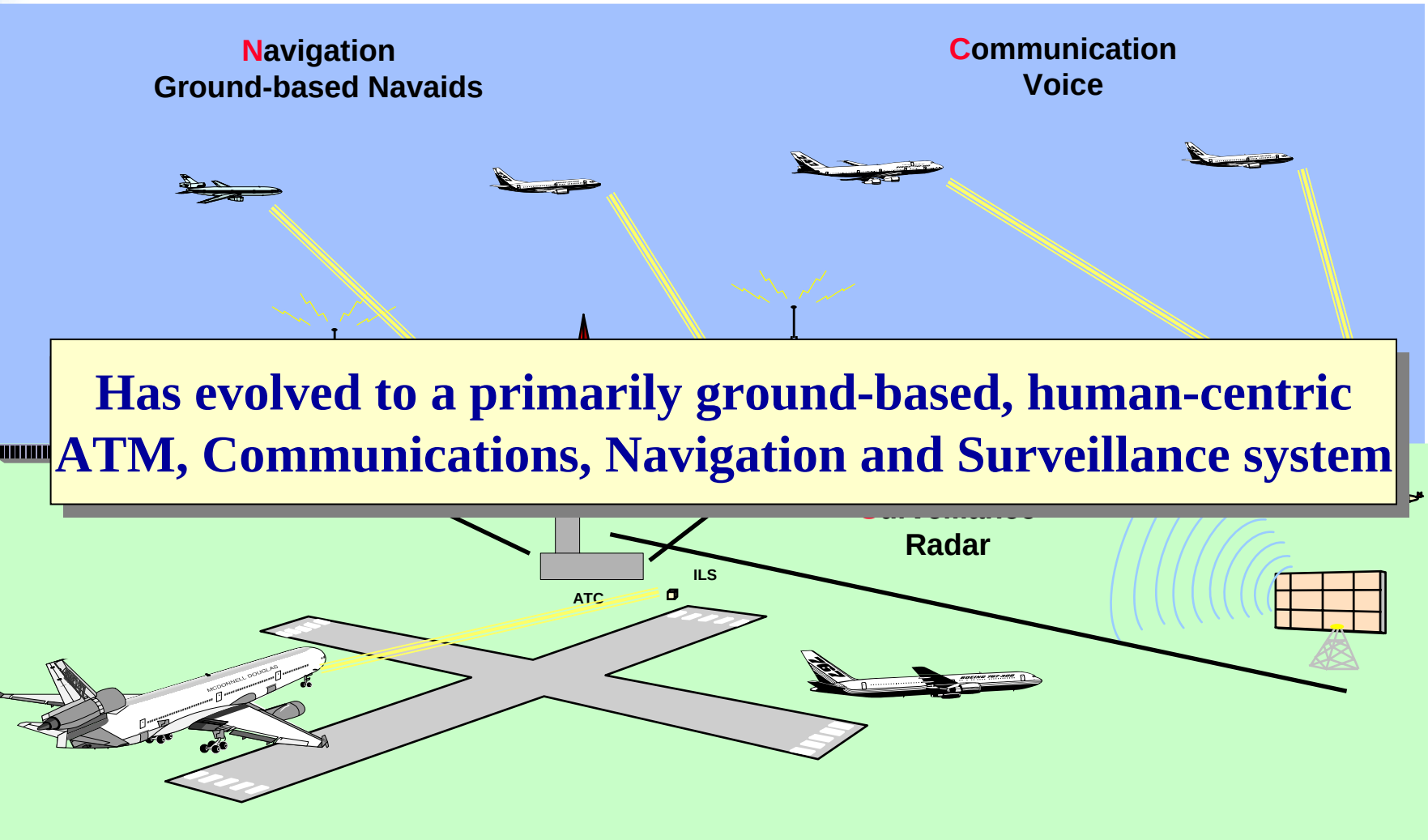
Today's Air Transportation System



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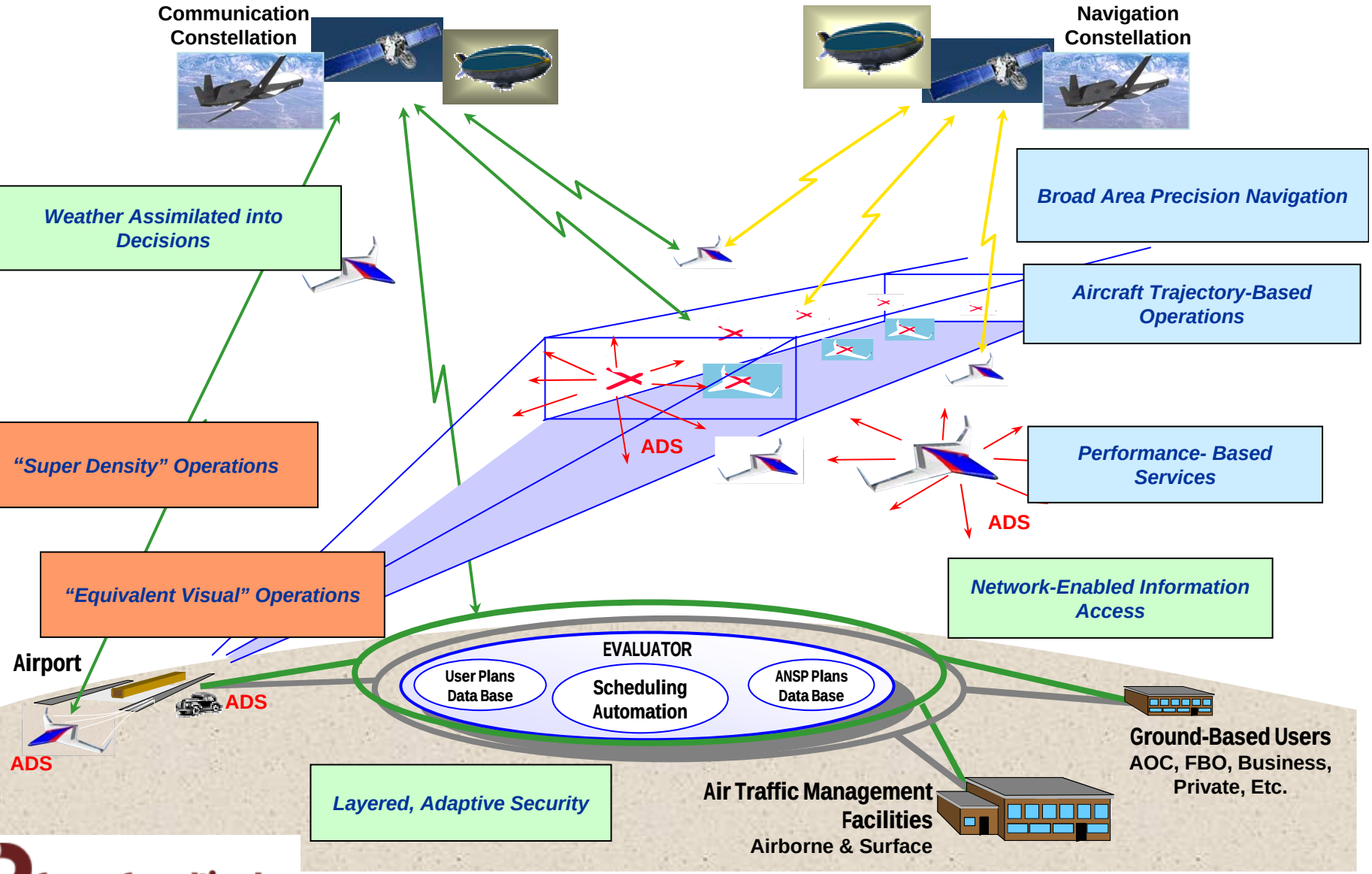
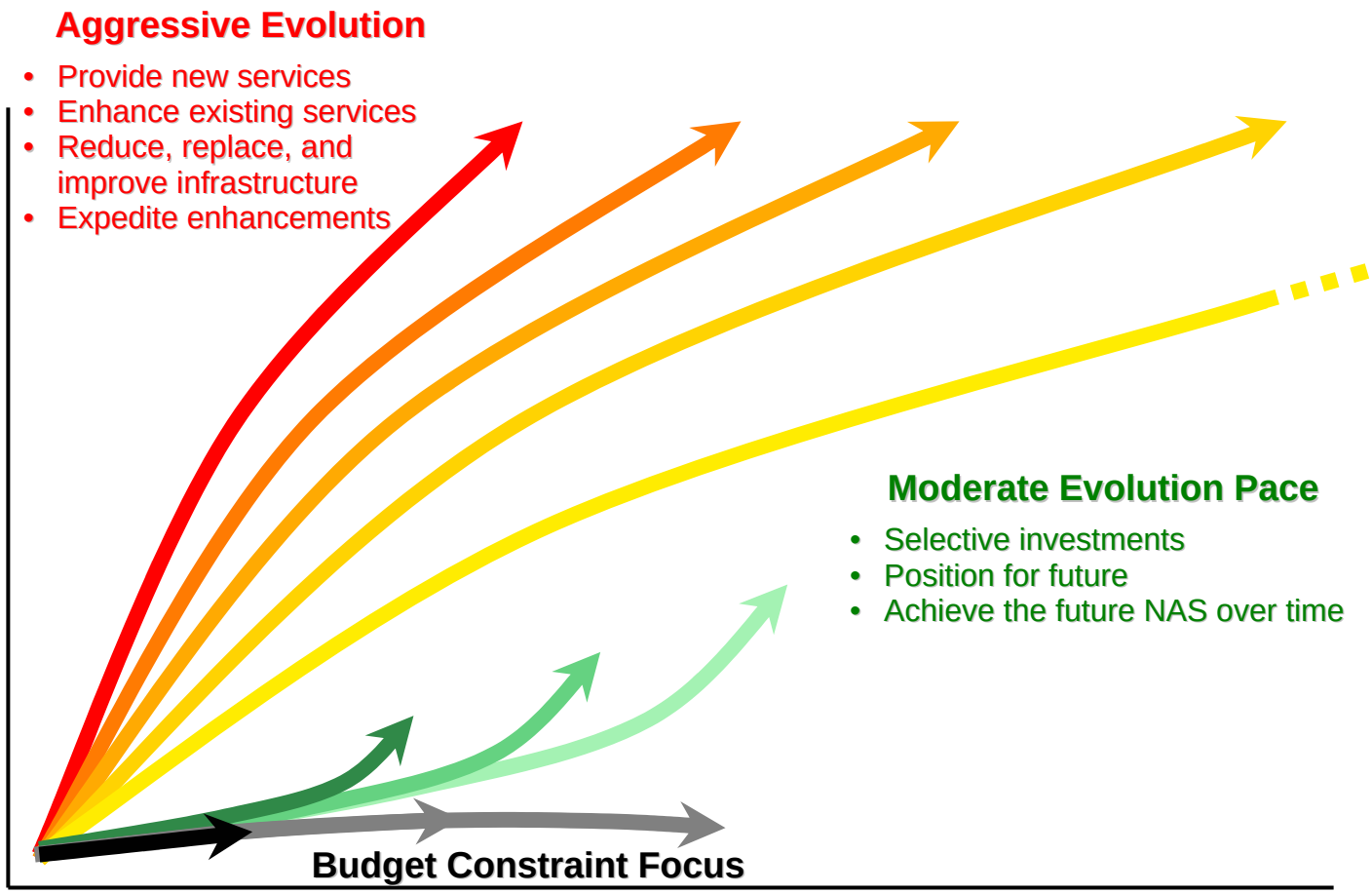
NGATS Vision - 2025



Crown Consulting, Inc.

Notional NAS Transformation Options



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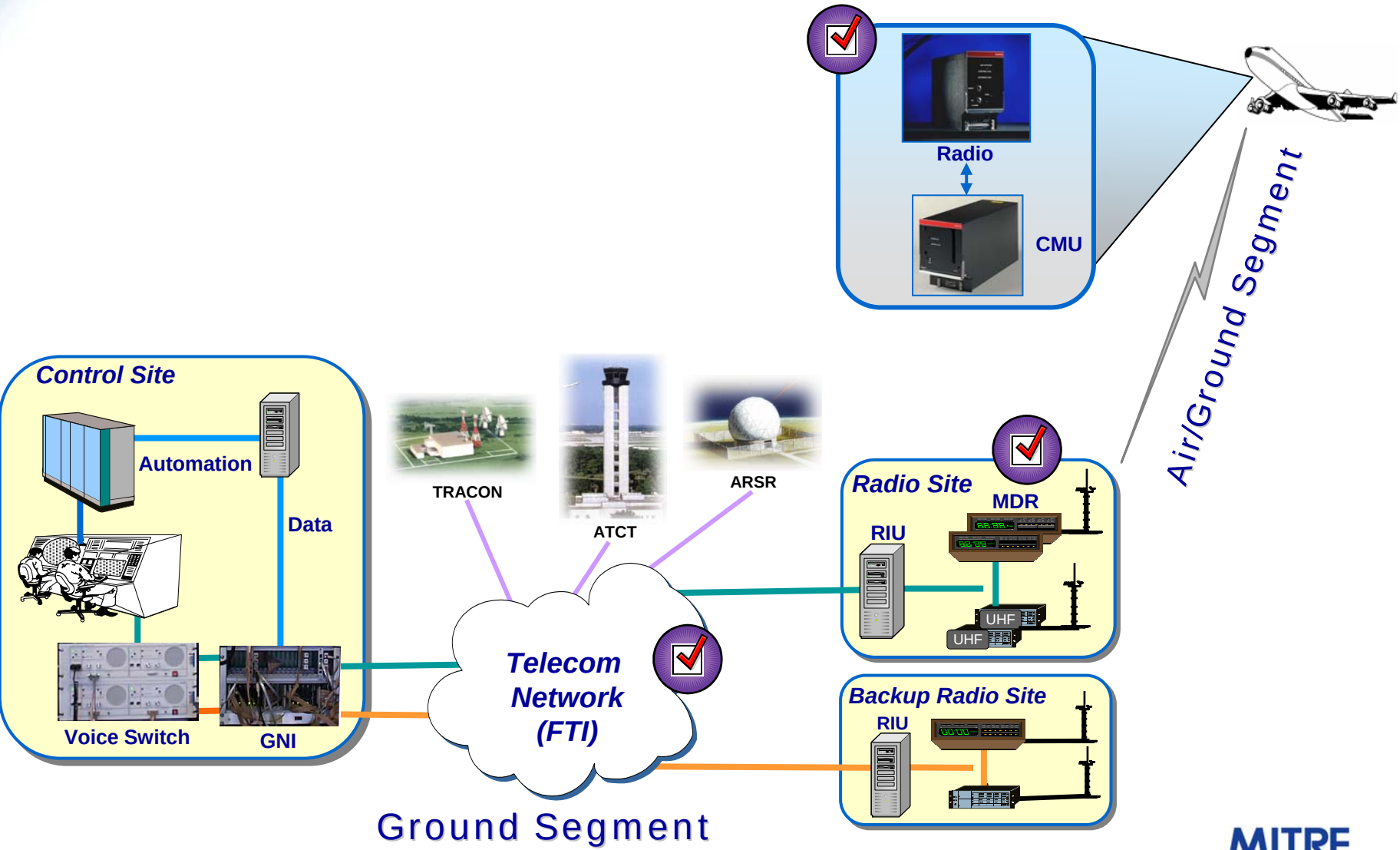
NAS Communications System Segments



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(FAA and Eurocontrol)

Future Communications Study Steering Group

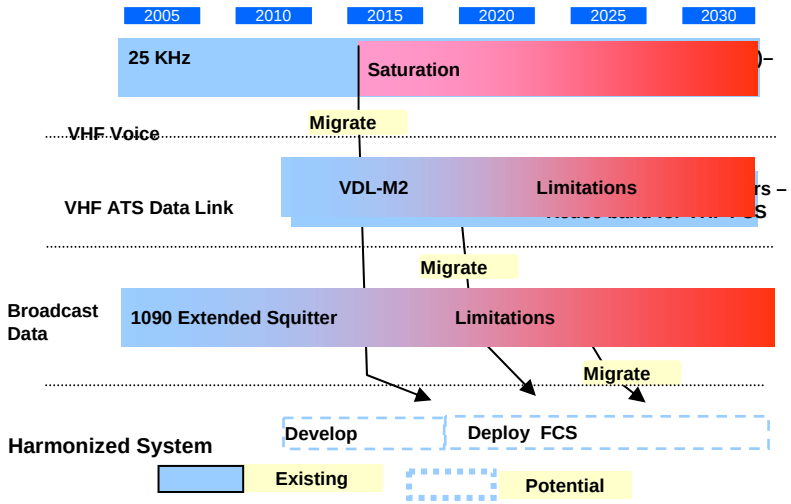
- **Operational Concepts & Requirements**
- **Technology Assessment**
- **Communications Evolution & Transition Planning**

ommunications, perating Concept and equirements

- uture operations in 2015-2030
- perational environment
- oncepts and services
- echnical information to assess mm traffic demand

Joint Technology Downselect

- Aviation Specific Technologies (VDL Derivatives, B-VHF)
- Public Safety Standards (P34)
- Wireless MAN Technology (IEEE 802.16)
- Cellular Telephony Technology (WCDMA)
- Satellite Communications (Aero BGAN)



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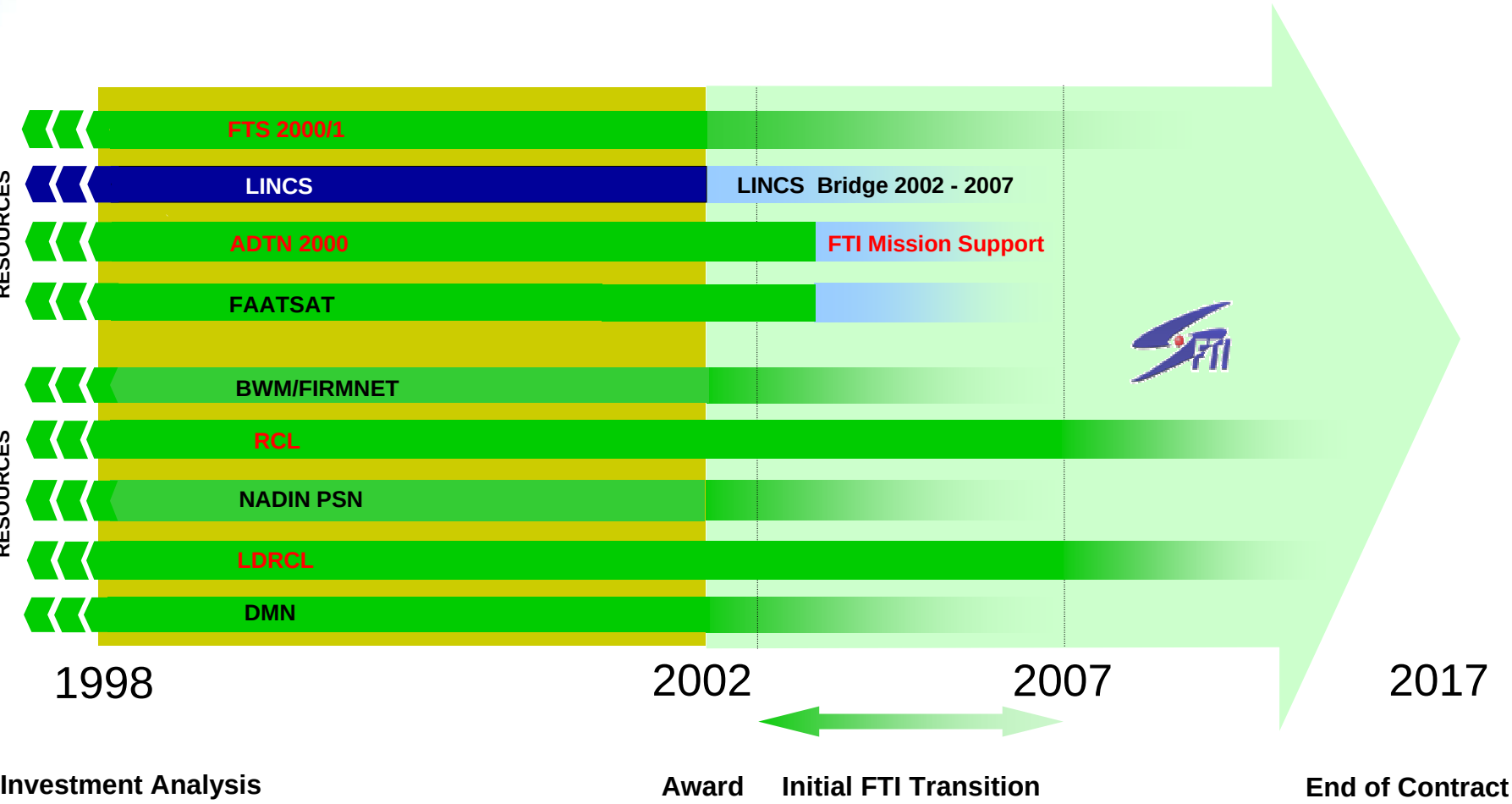
Telecommunications Infrastructure (FTI)



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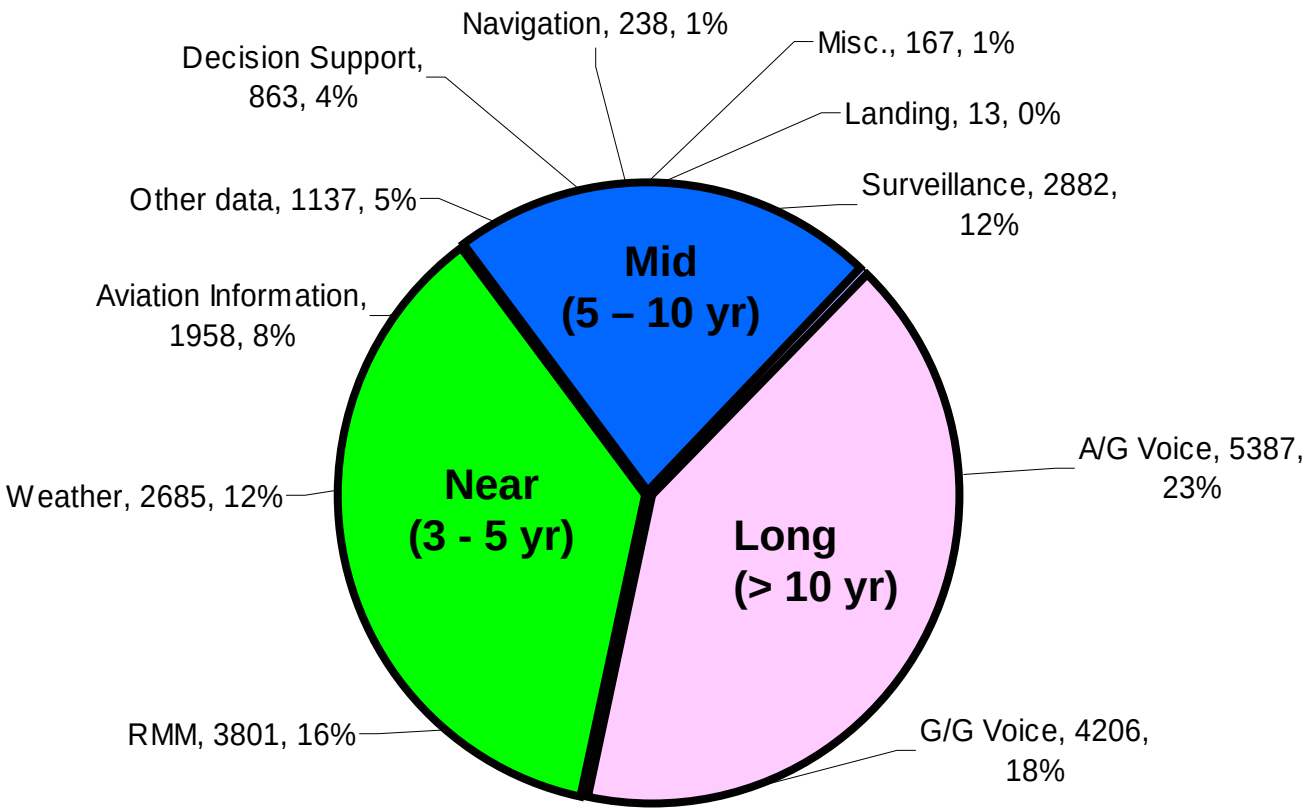
FAA Leased Wide Area Voice & Data Services Potential for Conversion to IP



Source: FTI Requirements Database

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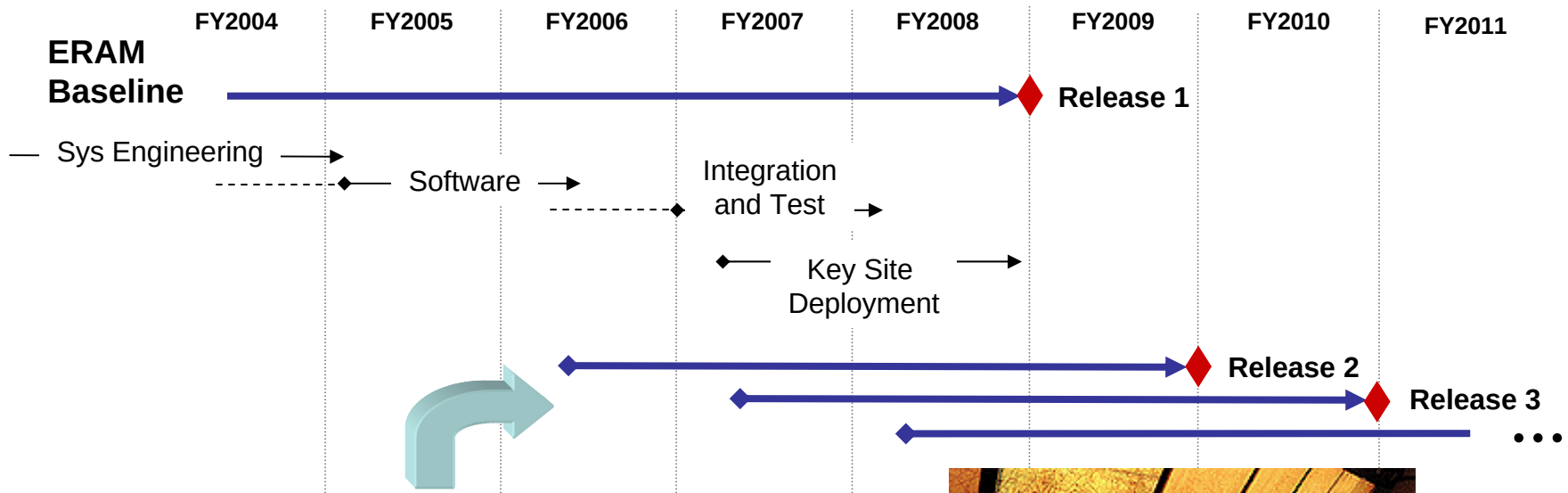
En route Automation Modernization - ERAM



Some Candidate Functional Enhancements

- ICAO Flight Plan Enhancements
- RNP Procedures and Automation
- TFM Integration & Convergence
- Advanced Simulation for Controller Training
- Decision Support / Integrated Sector Ops
- Datalink Services
- ADS-B Applications
- Dynamic Airspace

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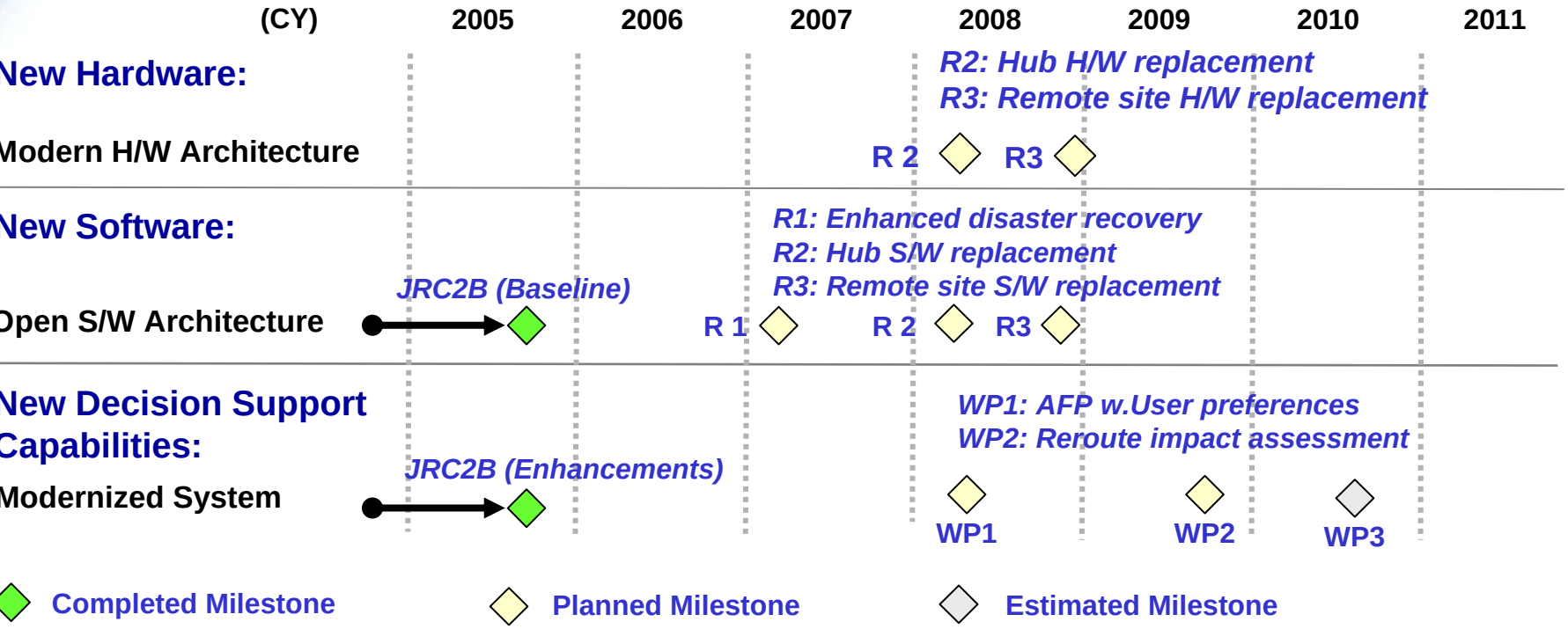
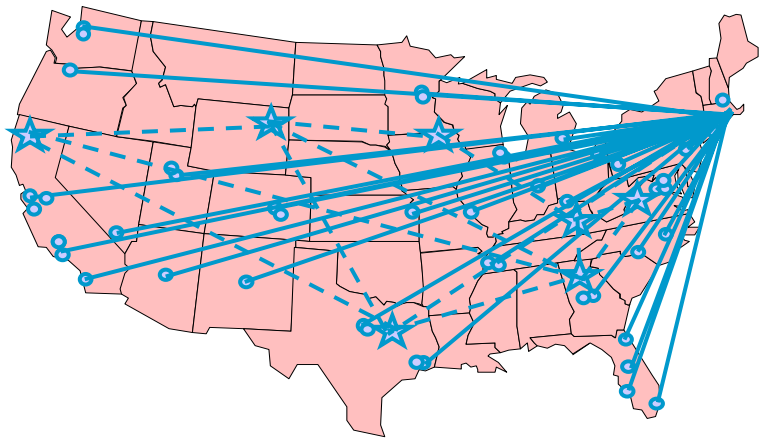
TFM Modernization: *New Hardware, New Software, New Decision Support Capabilities*





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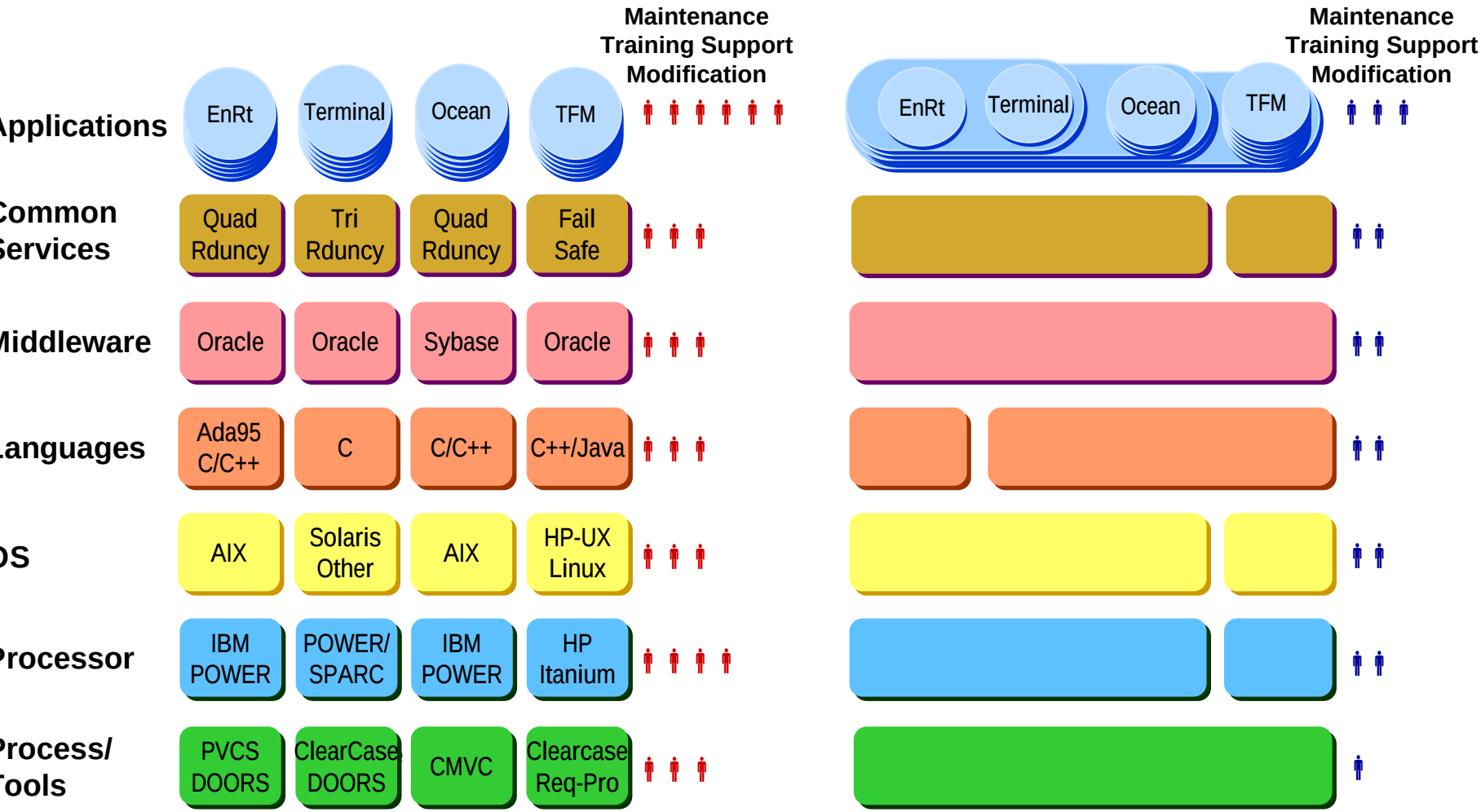
Automation Convergence



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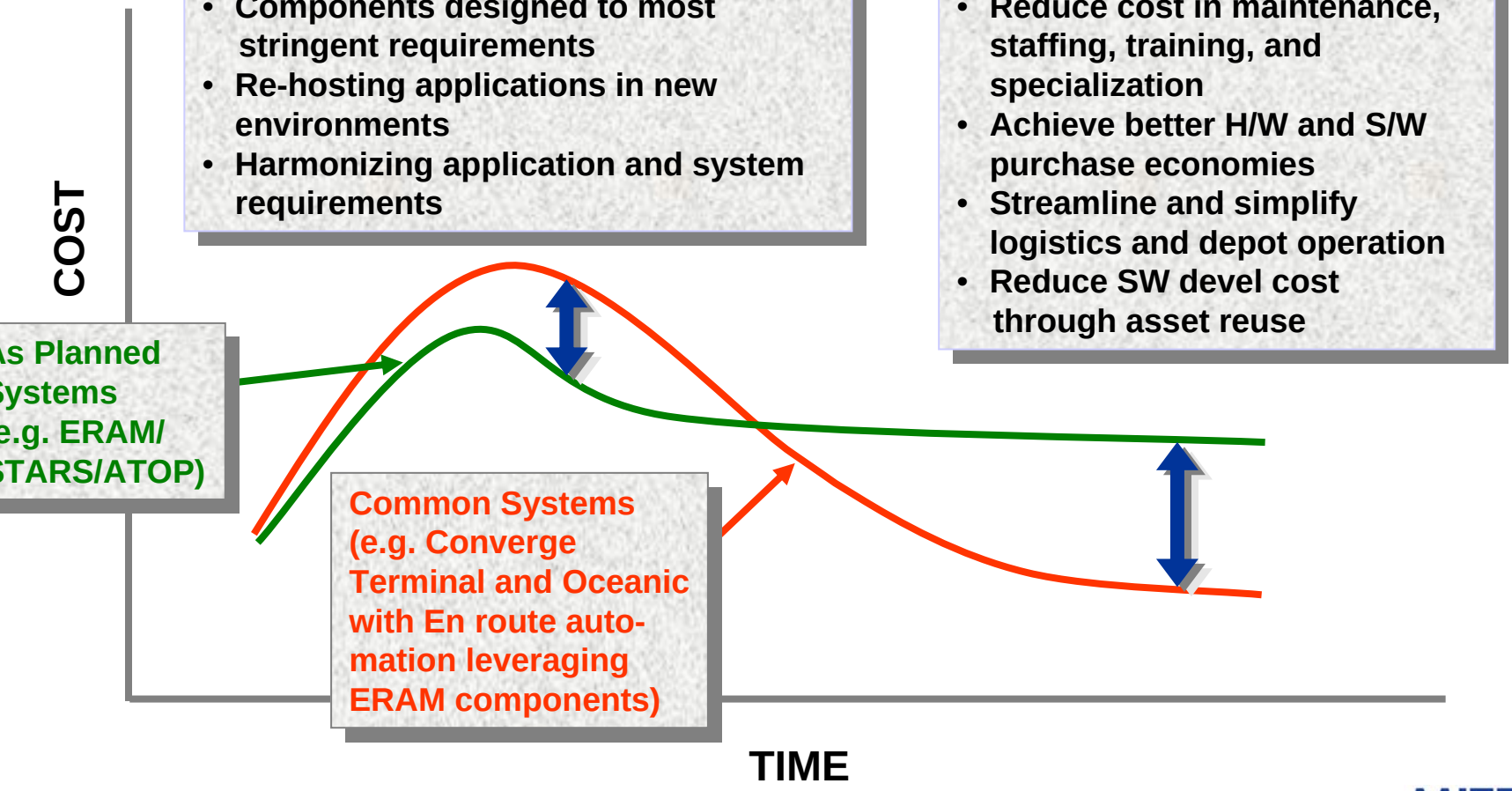
Benefits of Convergence

Extra Devel Cost for Convergence

- Components designed to most stringent requirements
- Re-hosting applications in new environments
- Harmonizing application and system requirements

Potential Life-cycle Savings

- Reduce cost in maintenance, staffing, training, and specialization
- Achieve better H/W and S/W purchase economies
- Streamline and simplify logistics and depot operation
- Reduce SW devel cost through asset reuse



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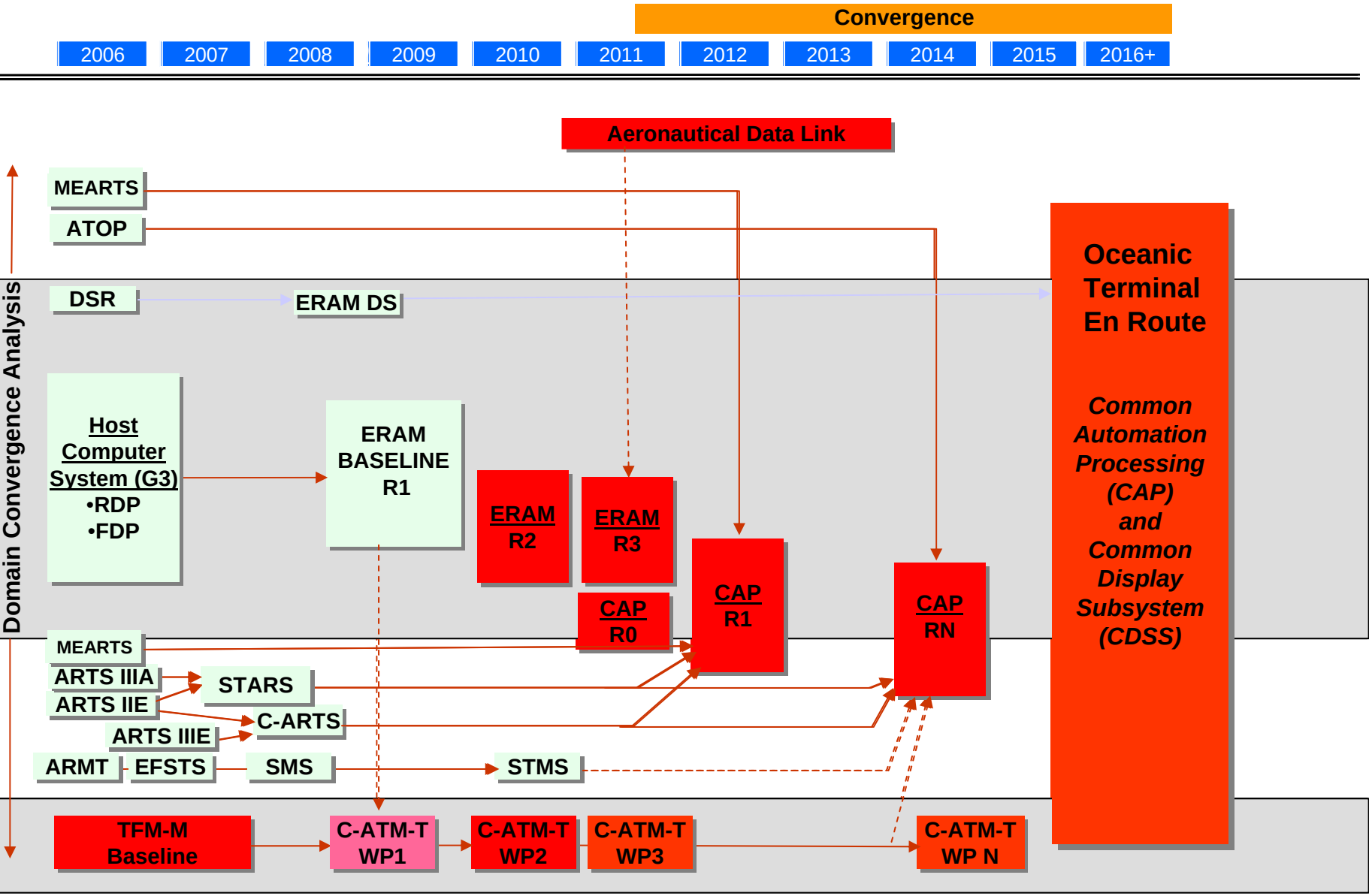
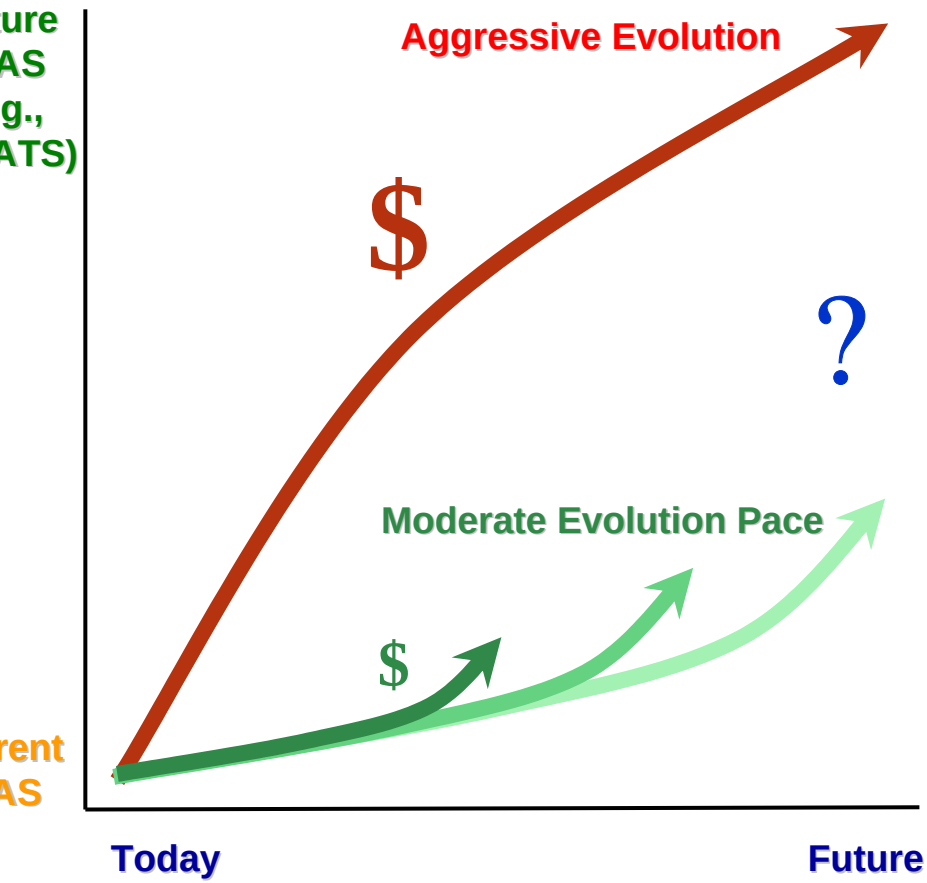
ATO's Automation Roadmap



Community Challenge: Which Options?



- **Traffic back to pre 9/11**
  - **2 to 3 times by 2025**
- **The increasing traffic needs to be safely and expeditiously managed**
- **Continued pressure on FAA budget will require innovative modernization approaches**
  - **Leveraging DoD and commercial infrastructures**
  - **Affordable long-term investment perspective**
    - **Robust foundation to enable a broad range of future evolution choices**
    - **Incentives for user equipage**

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