

Performance-Based Navigation Update

Presentation to: EWG Ops SC

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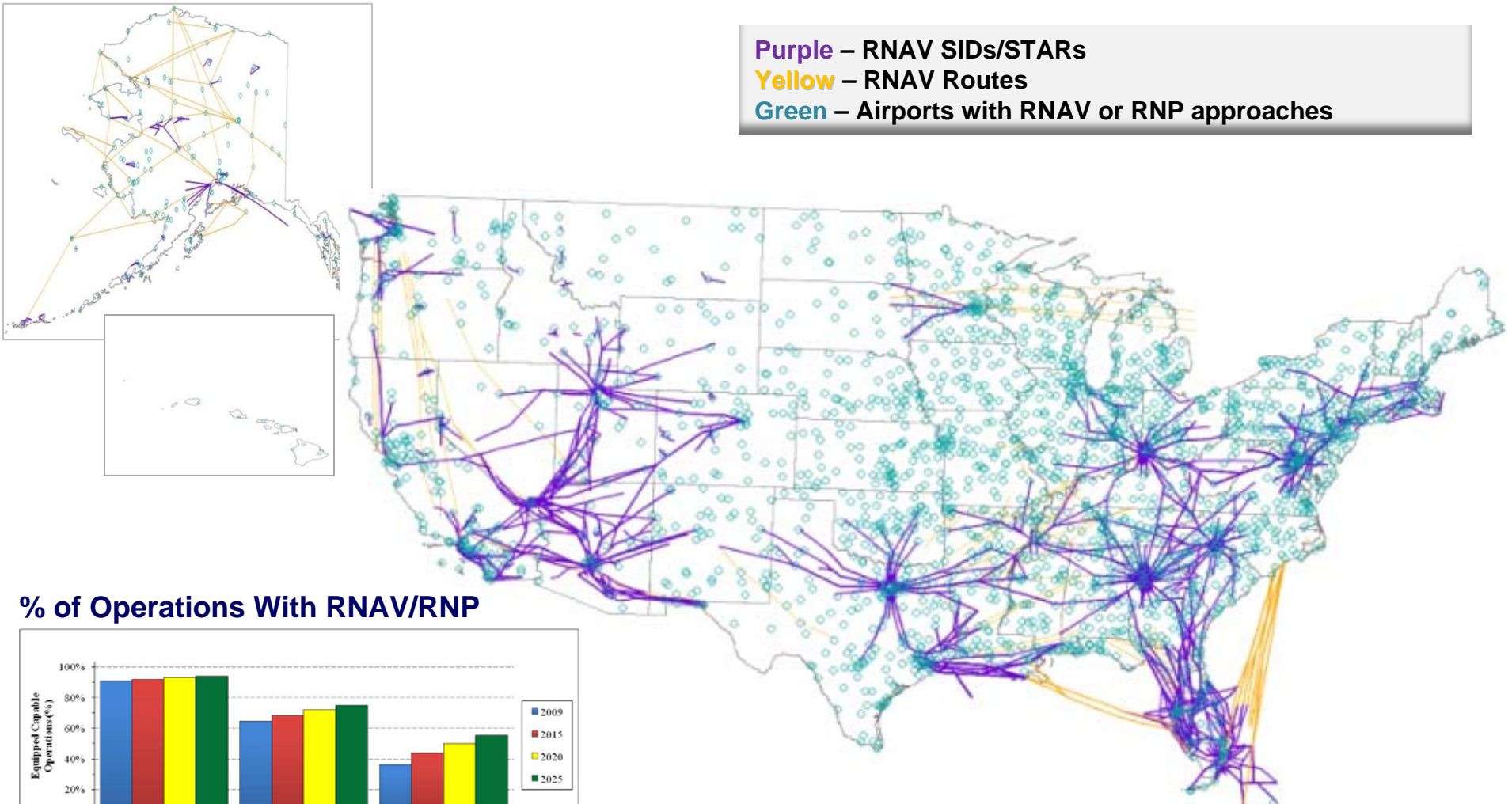
Federal Aviation
Administration



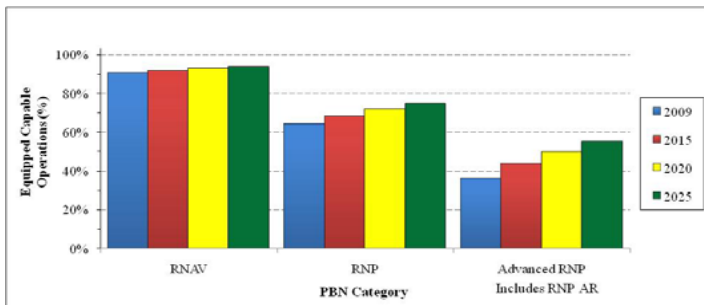


RNAV and RNP Implementation in the National Airspace System

Purple – RNAV SIDs/STARs
Yellow – RNAV Routes
Green – Airports with RNAV or RNP approaches



% of Operations With RNAV/RNP



Current FAA Approved RNP SAAAR Operators



Honeywell



American Airlines

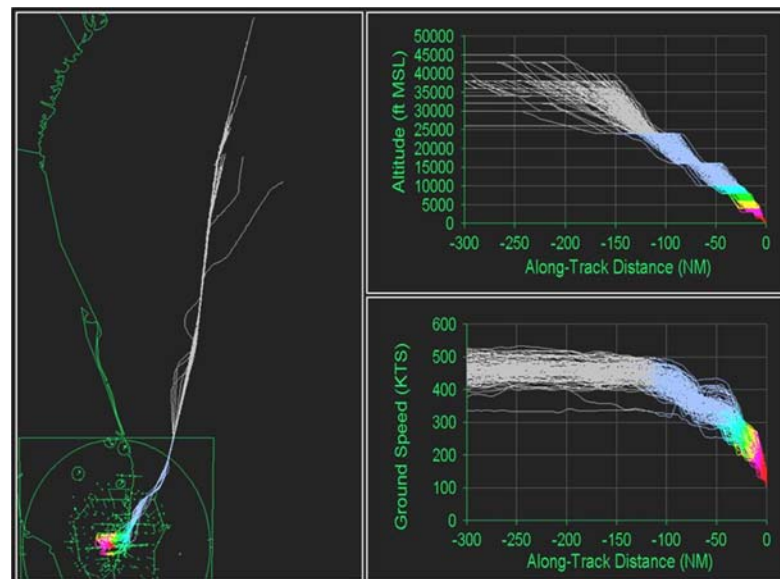


NETJETS



RNAV Implementation of OPD

- Three OPD (conventional) procedures implemented at Los Angeles (LAX)
- Other Procedures published:
 - Atlanta (ATL) - One full OPD Published 8/2009
 - Phoenix (PHX) - Two OPDs published
 - Las Vegas (LAS) - Four published with vertical profiles
 - San Diego (SAN) - Two OPD published
- OPD demonstrations:
 - Louisville (SDF) 2004-2005
 - Atlanta (ATL) 2007-2009
 - Miami (MIA) 2008
 - Anchorage (ANC) 2009
- Other OPD developments are:
 - Denver (DEN) - OPD RNAV STARs under development
 - Louisville (SDF) - Joint effort with UPS. Five RNAV STARs under development. Publication date TBD
 - Charleston (CHS) - FAA/Air Mobility Command/DAL effort; Four procedures developed. C-17 flight sim work 8/2009. January 2010 demo. FY11 publication
 - Hawaii (HNL) - Five Honolulu/Hilo STARs developed. Pub date 6/10, 11/10 and 3/11
 - Reno (RNO) - Three OPD RNAV STARs developed. Pub date 6/10, 7/10 and 1/11
 - Anchorage (ANC) - Five OPD RNAV STARs. Pub dates 7/10. Demo ongoing.
 - Las Vegas optimization of RNAV STARs. Pub date TBD
 - Atlanta (ATL) - Additional OPDs planned.
 - Charlotte (CLT) - OPD Demo WG meeting 04/10
 - Chicago (ORD) - En Route vertical profile developed for 5 RNAV STARs; Pub date TBD



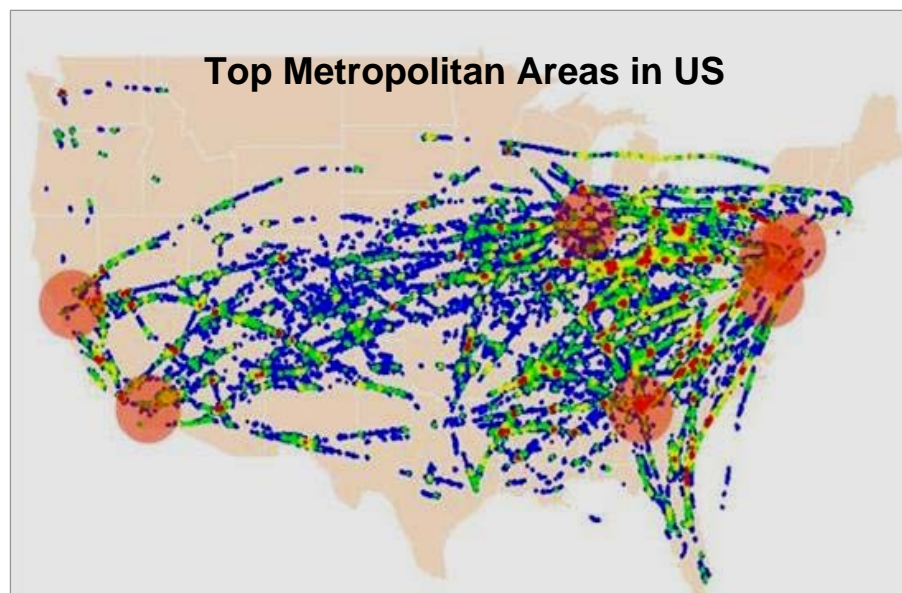
Several RNAV STAR Workgroups Ongoing

- Tailored Arrival Demonstrations:
 - Los Angeles (LAX)
 - Miami (MIA)
 - San Francisco (SFO)

Additional coastal sites pending for FY11

Airspace Design and Analyses

- **Chronic delays** in several terminal areas continue to increase
- **New runways** increase capacity for some areas but are not an option for others

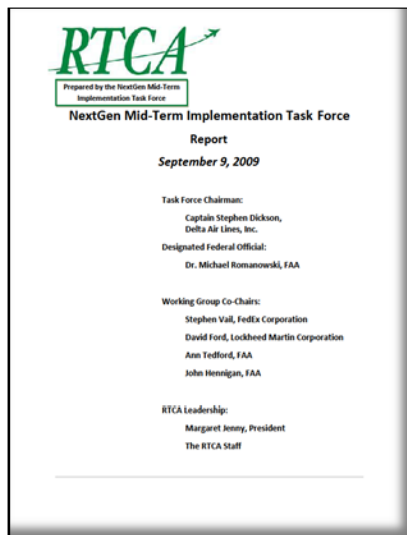


- Congestion and **complexity** impact capacity and efficiency
- Special activity airspace and other restrictions may **limit access**

Ongoing Airspace Activities

NY/NJ/PHL Metro Area Redesign
Chicago Airspace Project
Houston Area Air Traffic System Airspace
Las Vegas Airspace Optimization/SNSA Airspace
Southern California Airspace
Denver Airspace
North Texas Airspace Review

Where are we going and How will **WE** get there ?



Change Sectors

Modify the shape of existing sectors or add new sectors

Change Routes

Modify or add routes for normal use or for flexibility during weather

Change Restrictions

Modify altitude or spacing restrictions to protect congested sectors

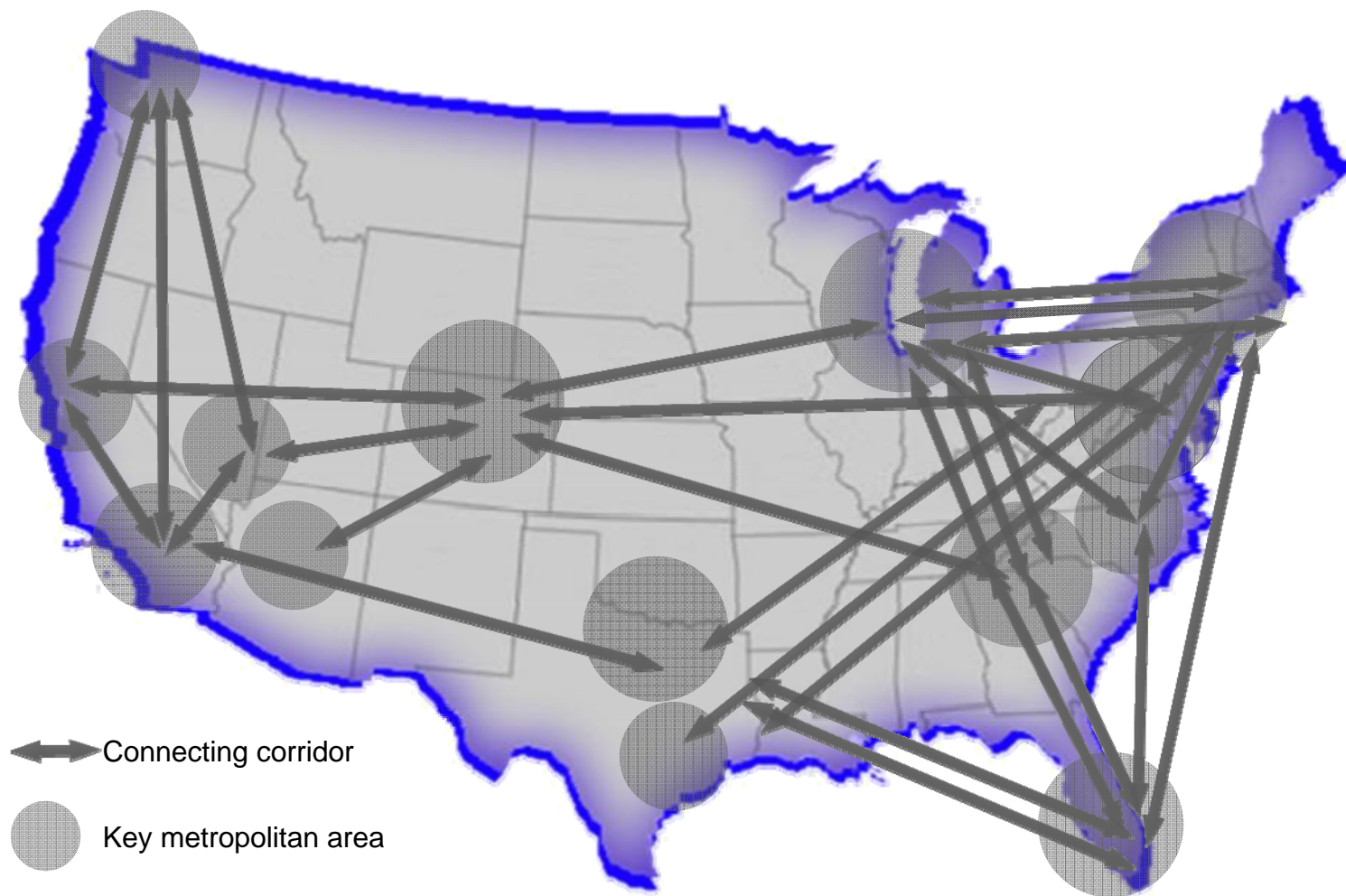
Integration of procedures

RNAV and RNP
SID/STAR, OPDs, Decouple Adjacent Airport Flows, City-Pair
Overlays and Non-overlays

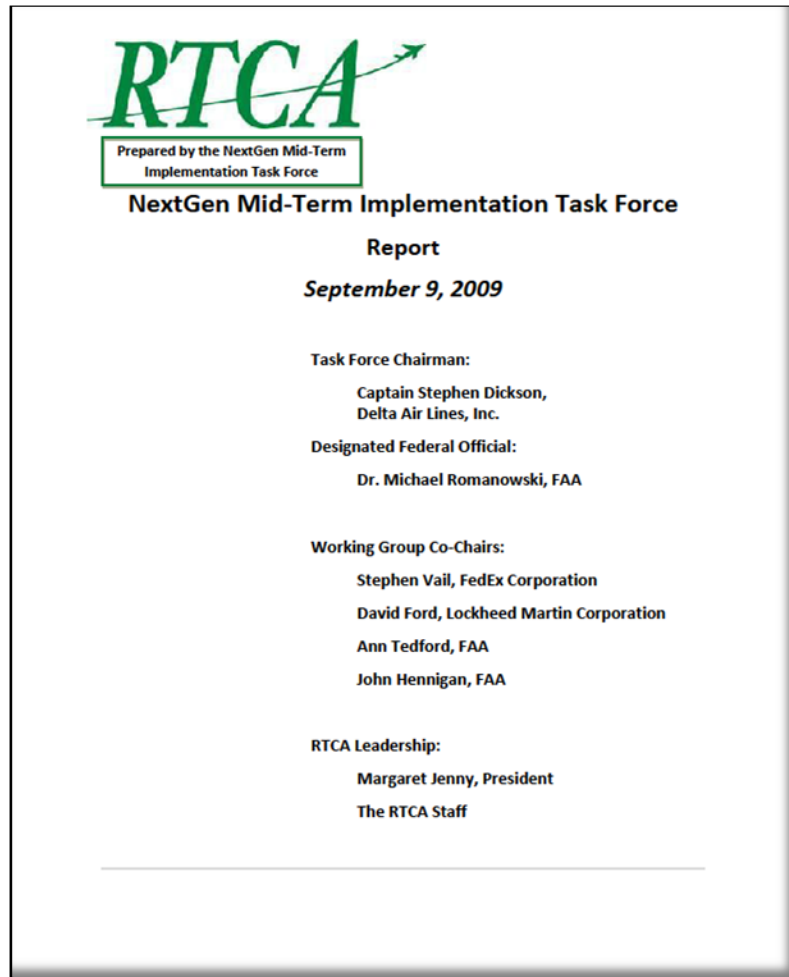
Add Technology

Examples: Broadcast Services, Data Link, Conflict Probe, RPI, Metering Tools

Integrated Airspace and Procedures: PBN Focus Areas 2010-2018



FAA is Assessing, Funding, and Planning



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- Integrated Procedures
 - Benefits Focus

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RTCA Task Force Recommendations



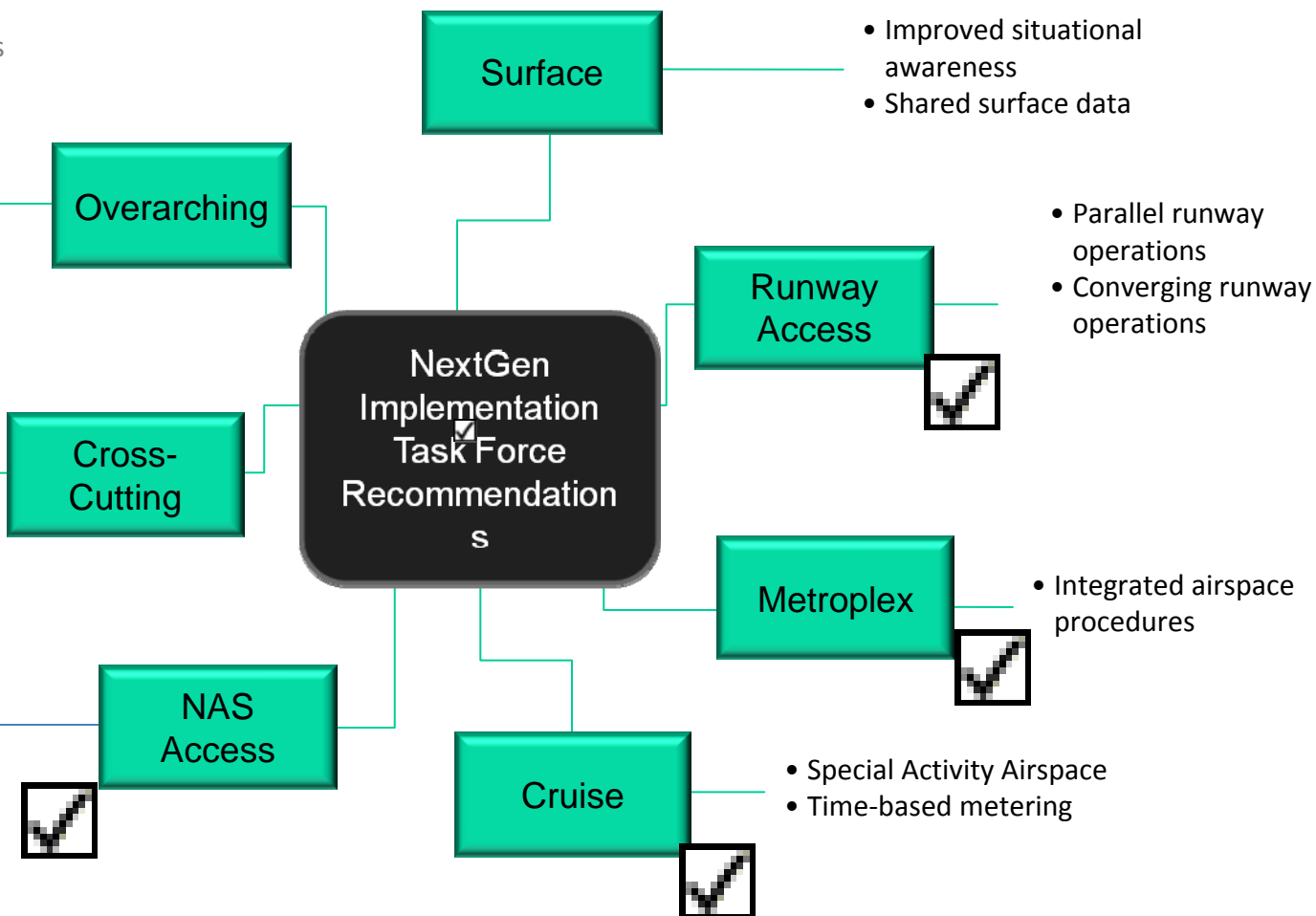
FAA RNAV and RNP Group and Airspace Division Programs and Priorities

- Overarching recommendations include:

- Consideration of government financial equipage incentives
- Streamlined procedures/equipment deployment & approvals

- Data Comm
- Integrated ATM

- LPV approaches
- Low altitude services



Focus on Streamlining

- RNAV/RNP Group, Airspace, AJW-3, AFS
 - Improve procedure planning design and implementation
 - NAV Lean Process
- Realigning to meet TF5 and NextGen Goals
- National Airspace Counsel
 - Streamlining to meet commitment
 - Improve procedure planning and prioritization
 - Resources
- Changes in motion
- Articulate changes
 - Transparency of plan
 - Processes
 - Responsibilities
 - Resources



FAA PBN Implementation Planning

Collaborative planning, priorities, sites, resources, especially for 2011 and beyond



FAA NAPT list - RNAV SID/STAR, Q-Routes, RNP SAAR planned through 2011 charting

ASRPORT	ST	RP	Doc Date for Review	Doc Date for Review	Chart Date	Current Status / Location	Comments
Flight Plan Goal 50, Scheduled for FY10, 110							
TRAVIS AFB (TXAS)	CA	ANCH 1 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009	ATC	Support T22 VOR DOWNS, per Tech OPS
		LIND 1 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
		TENCO 1 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
		PATCO 2 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
Logan INTL (MASS)	MA	WETA 2 (RNAV SID)	8/11/2009	10/5/2009	11/18/2009	ATC	
		WETA 2 (RNAV SID)	8/11/2009	10/5/2009	11/18/2009		
		DELTA 2 (RNAV SID)	8/11/2009	10/5/2009	11/18/2009		
		HYLND 2 (RNAV SID)	8/11/2009	10/5/2009	11/18/2009		
Atlanta INTL (GA)	GA	SSOKS 2 (RNAV SID)	8/11/2009	10/5/2009	11/18/2009	ATC	
		CANAK 8 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
		BRUN 6 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
		FLCON 4 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
Memphis (MEM)	TN	HERND 3 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009	ATC	
		HORNE 6 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
		PECHY 4 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
		LVRUE 3 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
Orlando INTL (FL)	FL	STOWN 3 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009	ATC	
		TANNY 3 (RNAV STAR)	8/11/2009	10/5/2009	11/18/2009		
		COSTA 3 (RNAV STAR)	10/6/2009	11/16/2009	1/13/2011		
		SSD RUVV 31 (RNAV SID)	10/6/2009	11/16/2009	1/13/2011		
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		TRAMP 5 (RNAV STAR)	10/6/2009	11/16/2009	1/13/2011		
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		ORND 3 (RNAV SID)	10/6/2009	11/16/2009	1/13/2011		
		ENDES 3 (RNAV SID)	10/6/2009	11/16/2009	1/13/2011		
Tampa INTL (FL)	FL	GANDY 3 (RNAV SID)	10/6/2009	11/16/2009	1/13/2011	ATC	
		SPNES 3 (RNAV SID)	10/6/2009	11/16/2009	1/13/2011		
		BLOND 3 (RNAV STAR)	10/6/2009	11/16/2009	1/13/2011		
		DADES 3 (RNAV STAR)	10/6/2009	11/16/2009	1/13/2011		
		DEAK 3 (RNAV STAR)	10/6/2009	11/16/2009	1/13/2011	ATC	
		FOODK 3 (RNAV STAR)	10/6/2009	11/16/2009	1/13/2011		

We need to optimize in 2010-11 and prioritize for public use, benefits, and integration for 2011 and beyond

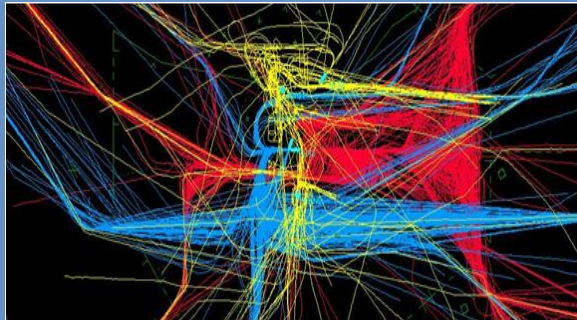


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Develop 2011 and beyond Implementation plan

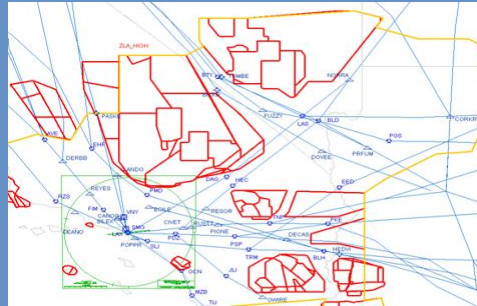


RNAV and RNP Implementation and Challenges



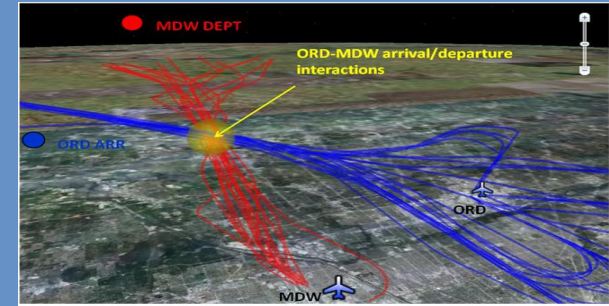
Takeoff and Departure Challenges

- Complex flows include satellite airport traffic
- Terrain avoidance
- Environmental and noise restrictions
- Operator readiness and approvals
- Training
- Avionics equipage variations



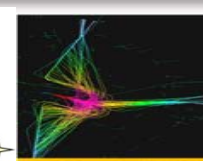
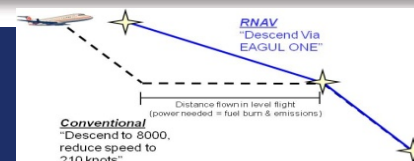
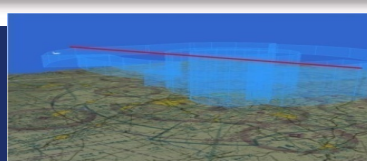
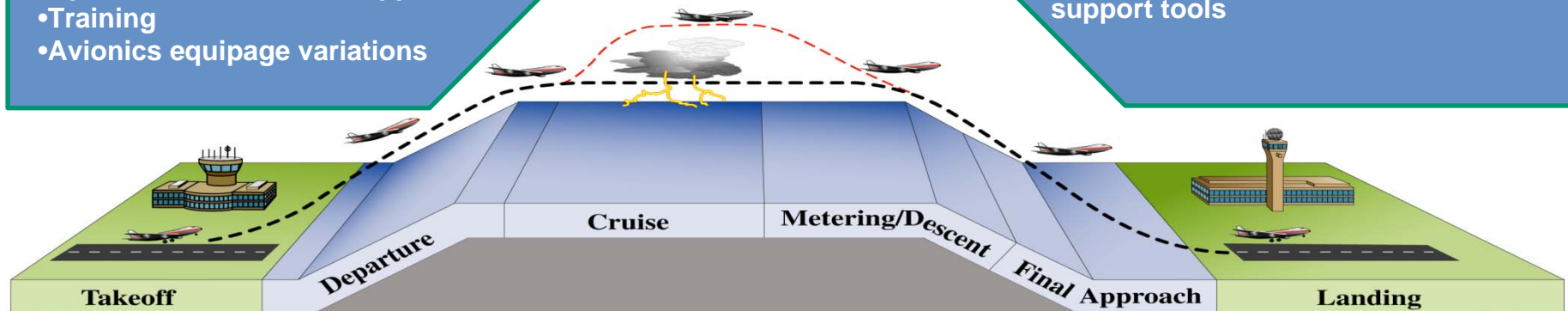
En Route Challenges

- Multi-facility coordination
- Terminal transitions to/from en-route
- Reducing separation while maintaining safety
- Avoiding restricted airspace
- Integrating with automation

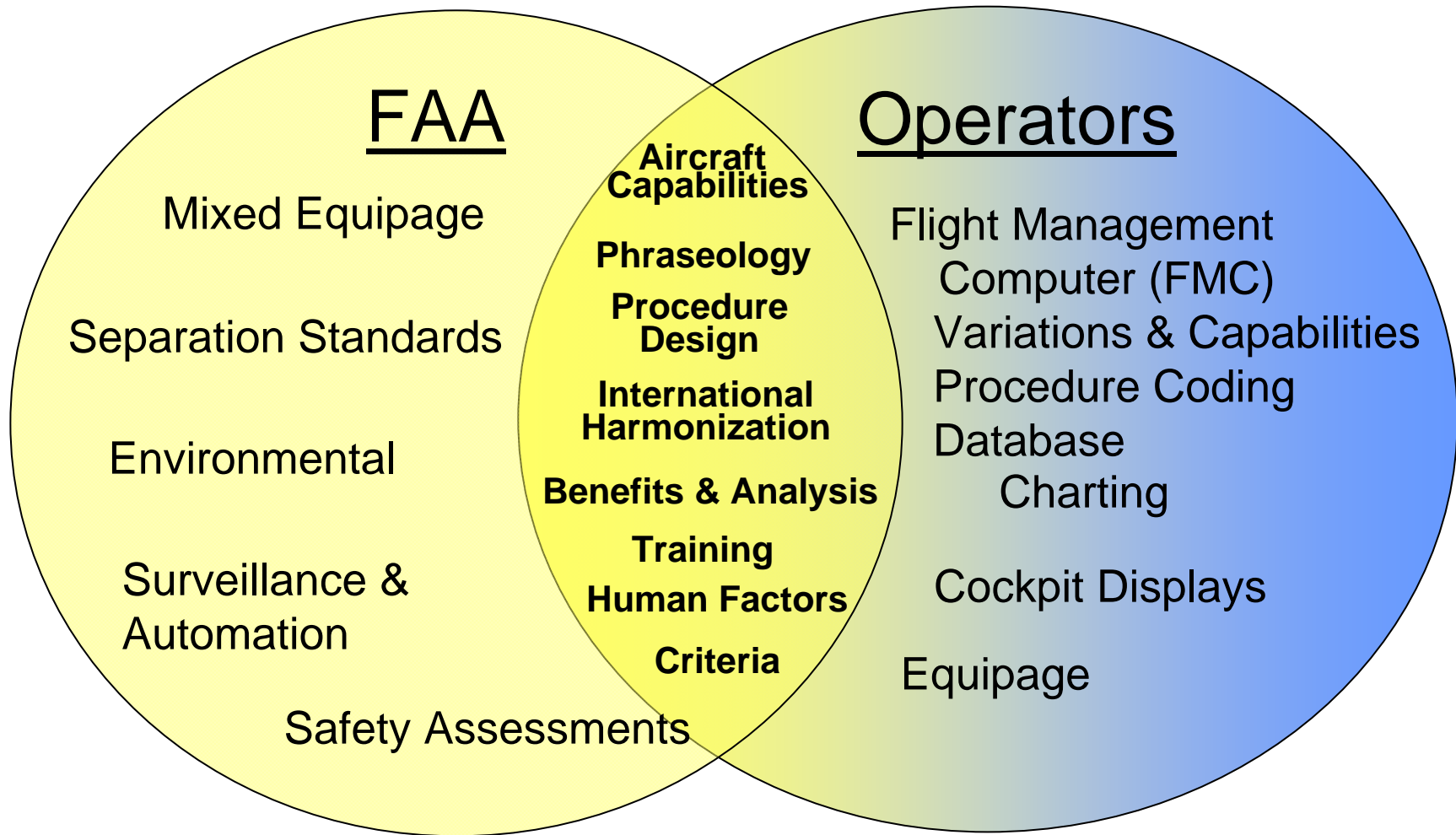


Arrival and Approach Challenges

- Adjacent airport flow interactions
- Environmental and noise restrictions
- Controlling and managing a mixed equipage environment
- Availability of controller decision support tools



Challenges



Thank You!

Questions and Comments

