INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWENTY SIXTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/26)

Bangkok, Thailand, 7 – 10 September 2015

Agenda Item 3: **Performance Framework for Regional Air Navigation Planning and Implementation**

3.2: **ATM**

OPTIMIZATION OF AIRSPACE AND PROCEDURES

(Presented by the United States of America)

SUMMARY

This paper presents the Federal Aviation Administration's (FAA) efforts at leveraging Performance Based Navigation (PBN) expertise and experience to expedite implementation of optimized airspace and procedure.

1. INTRODUCTION

1.1 In September 2009, the FAA received the Radio Technical Commission for Aeronautics' (RTCA)[1] Task Force (TF)[2] 5 final report on the mid-term Next Generation Air Transportation System (NextGen)[3] implementation containing recommendations concerning the top priorities for the implementation of NexGen initiatives. A key recommendation stated that Area Navigation (RNAV) Operations should be increased and optimized, with a structured and systematic approach to PBN implementation.

1.2 The convergence of RTCA's TF 5 recommendations issued in the fall of 2009, coupled with (a) lack of a way to prioritize new projects; (b) the length of time it was taking to complete large scale airspace & procedures projects (New York airspace redesign effort); and (c) the requirements to meet annual PBN production goals led to the creation of the Metroplex optimization of airspace and procedures program.

[1] The Radio Technical Commission for Aeronautics is chartered by the FAA to operate Federal advisory committees; RTCA employs a consensus-driven process to generate minimum performance standards for CNS/ATM systems and equipment; to forge recommendations on key aviation policies, and identifying and developing mitigation on issues affecting air traffic management operations. These performance standards form the basis for FAA regulatory requirements; policy advice informs the FAA's prioritization and investment decisions; and tactical advice helps resolve real-world impediments to air transportation today.

[2] From time to time, when the FAA has a unique and immediate need for input from the aviation community on a specific issue, they will ask RTCA to establish a Task Force. Since the inception of RTCA in 1935, five such Task Forces have been established and produced reports with actionable recommendations.

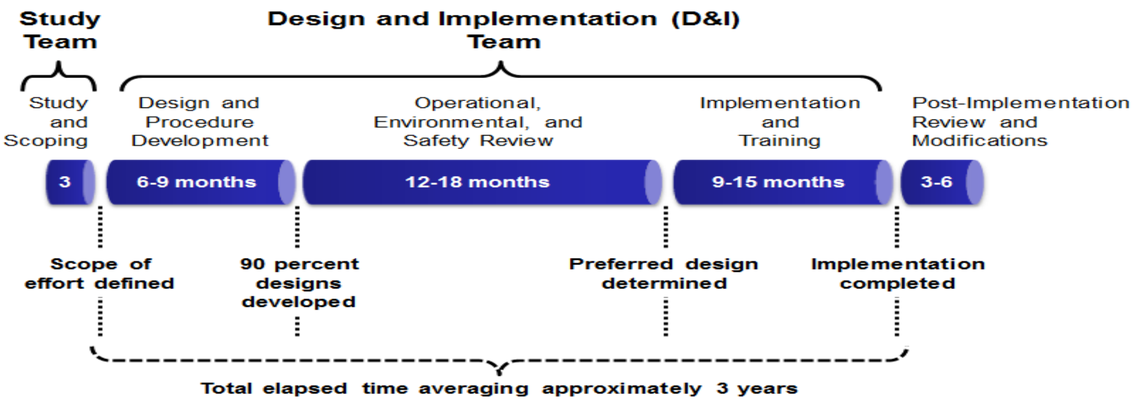
[3] NextGen is the advanced national airspace system due for implementation across the United States in stages between 2012 and 2025.

1.3 Hence Metroplex projects focus on a geographic area, rather than a single airport. This approach considers multiple airports and the airspace surrounding a metropolitan area, including all types of operations, as well as connectivity with other Metroplexes. One of the key elements of the Metroplex projects is an expedited life-cycle (approximately three years from planning to implementation) for the integrated airspace and procedure efforts.

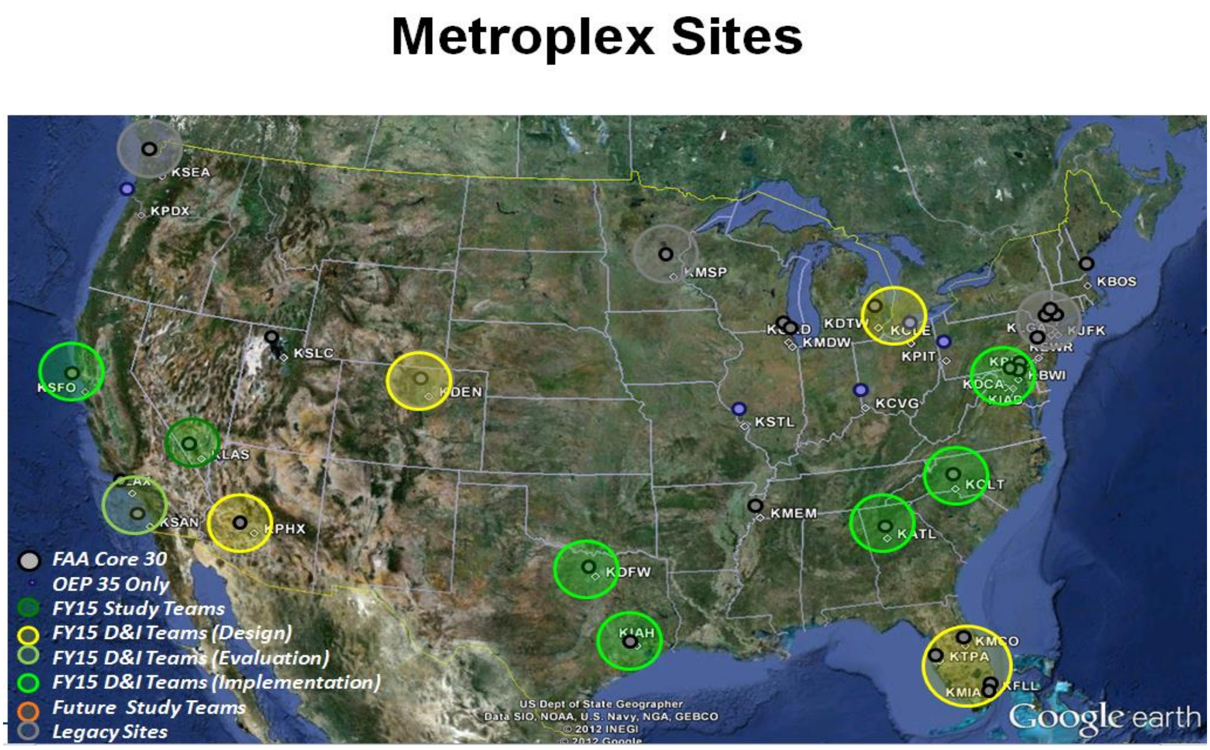
1.4 The expedited timeline for the Metroplex projects centers on two (2) types of collaborative teams. First, study teams provide a comprehensive, up- strategic look at the operational issues and problems that the Metroplex faces. Second, design teams use the results of the study teams for ongoing work in terms of design and specific solution approaches of PBN optimized airspace and procedures.

2. DISCUSSION

2.1 <u>Metroplex Process Timelines:</u>



2.2 <u>Metroplex Key Sites:</u>

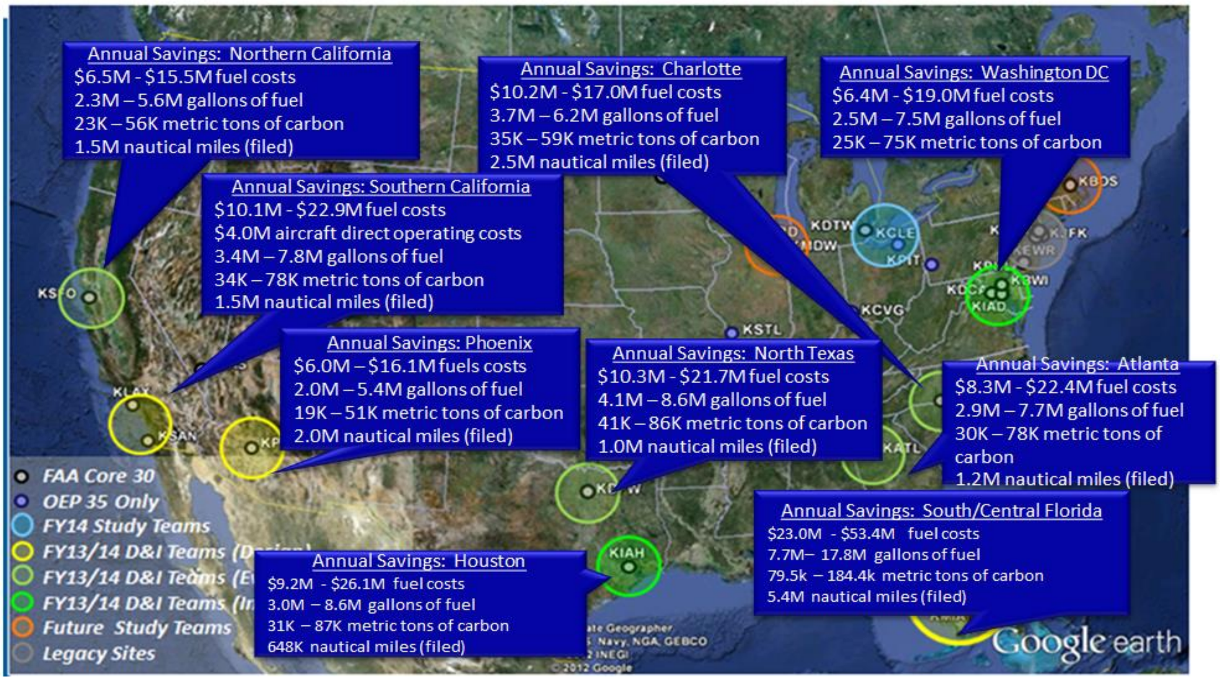


2.3 Metroplex Site Partners:

Metroplex Site Partners

2.4 Metroplex Study Teams:

Metroplex Study Teams



2.5 Metroplex Schedule:

Metroplex Schedule

	FY14				FY15				FY16				FY17				FY18			
Site	**1Q**	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**	**1Q**	**2Q**	**3Q**	**4Q**
Houston	I	I	I P	P	P															
North Tex	E	E I	I	I	P	P														
North Cal	E	E	E	E I	I	I	I P	P	P											
Washington	E #	#	#	# I	I	I	I	P	P											
Atlanta	E	E #	#	#	#	#	I	I	I	I	I	I	I P P	P	P					
Charlotte	E	E	E	E	E	E	I	I	I	I	I	I	I	P	P	P				
South Cal	D	D	E	E	E	E	E	E	E	I	I	I	I	P	P					
Phoenix	$	$	++	++	++ D	D	D	D E	E	E	E	E	I	I	I	P	P			
CLE/DTW		S	S	S ++ D	D	D	D	E	E	E	E	E I	I	I	I	P	P			
Denver				S	S	++	D	D	D	E	E	E	E I	I	I	I	I P	P	P	
Florida	$	$ #	#	# S	D	D	D	D	D	E	E	E	E	E	I	I	I	I	P	P

Milestone Leads Organizational Symbol	Functional Description
AJV-1	Airspace Services
AJV-121	Airspace Optimization Group
AJV-E	Mission Support, Eastern Service Center
AJV-C	Mission Support, Central Service Center
AJV-W	Mission Support, Western Service Center
AJV-114	Environmental Analysis
AJW-3	Aviation Systems Standards – Flight Checks

S	Study
D	Design
E	Eval
I	Implementation
P	Post Implementation
$	Budget Impact
F	Furlough Impact
#	ERAM Resource Impact
++	Facility Resource Issue

2.6 Washington DC Example:

Washington, DC

24 RNAV STARs, 25 RNAV SIDs, 3 Conv. STARs, 2 Conv. SIDs

Study and Scoping	Design and Procedure Development	Eval Phase Operational, Environmental, and SMS Review	Implementation and Training	Post-Implementation Review and Modifications
11/2010	3/2012	12/2013	12 Months	7

Phase Start	7/1/13	10/1/13	AJV-1
Impl Plan Complete	8/2/13	10/11/13	AJV-143
Training Plan Complete	9/14/13	10/11/13	AJV-143
Stage Implement	1/8/15		AJV-143
Stage Implement	3/5/15		AJV-143
Stage Implement	4/30/15		AJV-143
Flight Checks	1/17/14	5/4/15	AJW-3
Stakeholder Coordination	2/20/14	5/29/15	AJV-1
Training Complete	5/30/14	6/24/15	AJV-143
Stage 4 Implement	6/29/15		AJV-143
Implementation Complete	9/30/14	6/29/15	AJV-143

Phase Start	6/30/2015
Analysis Plan & Baseline Performance	7/27/2015
Initial Ops Implementation Monitoring Complete	8/28/2015
Data Collection Initiated	9/28/2015
Analysis Complete and Necessary Mods ID'd	1/8/2016
Post-Implementation Phase Complete	2/5/2016

RISKS/NOTES:

- *Automation system implementation slipped Metroplex schedule about 12 months from September 2014 to June 25, 2015.*
- *11 procedures implemented from October 2013 through September 2014.*
- *Remainder of Chart Dates:*
- *6/25/15—5 RNAV STARs, 10 RNAV SIDs, and 1 RNAV STAR to support ZTL. Operational Implementation on June 29th.*

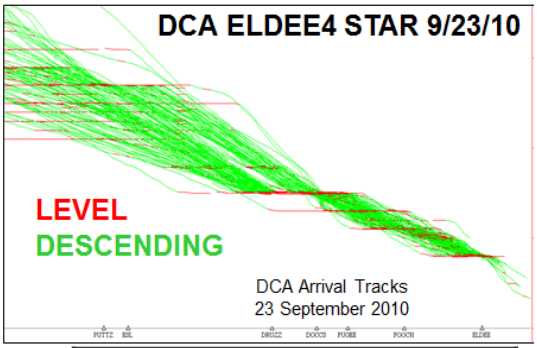
A4A Core 30

Complete
On Track
May Be Missed
Missed
FY16 or beyond

Washington D.C. Example
FRDMM and TRUPS *(Replace ELDEE - 2 of 2)*

Operational/Safety	
Benefits	**Impacts/Risks**
– Reduced ATC task complexity – Increased efficiency – Procedural (altitude) separation from southwest IAD/DCA arrivals	– Need for environmental assessment (leg between DRUZZ and AML below 10,000 feet) – Non-participating aircraft – Further optimization of altitude definition – Controller training

Airspace User	
Benefits	**Impacts/Risks**
– Predictable, repeatable flight path – Clarity on transitional altitudes – Reduces fuel burn and emissions – Accurate fuel planning	– Pilot training



Comparative Track Length on ELDEE STAR (nm)	Baseline	Proposed	Difference
ELDEE BUCKO	154.6	153.6	- 1.0
ELDEE BKW	231.1	231.1	0.0
ELDEE HVQ	255.0	253.5	-1.5

Estimated Fuel Savings (Dollars)*	Total	$745K - $2.2M
Estimated Fuel Savings (Gallons)*		295K - 883K
Estimated Carbon Savings (Metric Tons)*		2.9K - 8.8K

*Annual savings

This example is typical of all our sites, as we've identified considerable fuel burn benefits from Optimized Profile Descents or OPDs. In this case, the Study Team identified significant level-offs with arrivals into the DC Metro Area from the South. Aircraft heading to IAD, DCA and BWI are typically stacked on top of each other and laddered down, which is inefficient from a fuel burn perspective. This is a classic example for the need of an integrated airspace and procedure approach because once the OPDs are developed, there will need to be sectorization modifications in the area control center to manage the workload and gain expected efficiencies.

2.7 The following is a list of qualitative benefits we've identified from the first seven (7) sites:

a. More efficient lateral and vertical flight paths providing segregated flow where practicable.
b. Repeatable, predictable PBN procedures for more accurate fuel planning.
c. Reduced ATC task complexity and pilot/controller communications due to reduced radar vectoring.
d. Reduced need for traffic management initiatives.
e. Improved situational awareness, enhancing safety.
a. Increased departure throughput from additional departure gates and earlier divergence off the runway.
f. Foundations for Next Gen capabilities and tools (e.g., use of relative position indicator; required time of arrival).

3. CONCLUSION

3.1 The meeting is invited to note the information contained in this paper and discuss any relevant matters as appropriate.

— END —