



NAC Meeting

March 18, 2021



Opening of Meeting

Chip Childs, NAC Chairman
President & CEO, SkyWest, Inc.

PUBLIC MEETING ANNOUNCEMENT

NextGen Advisory Committee

March 18, 2021

This meeting is being held pursuant to a notice published in the Federal Register on March 4, 2021. The agenda for the meeting was announced in that notice, with details as set out in the agenda provided today. The FAA Deputy Administrator, Brad Mims, is the Designated Federal Officer responsible for compliance with the Federal Advisory Committee Act, under which this meeting is conducted.

The meeting is open to the public, and members of the public may address the NAC with the permission of the Chair. The public may submit written comments in advance of the meeting. In addition, the Chair may entertain public comment if, in his judgment, doing so will not disrupt the orderly progress of the meeting and will not be unfair to any other person.





Public Statements

Members of the Public



Chairman's Report

Chip Childs, NAC Chairman
President & CEO, SkyWest, Inc.

Motion for NAC Approval

- November 17, NAC Meeting Summary Package Draft



Newly Appointed NAC Members



Patrick Burns

Vice President, Flight Operations
& System Chief Pilot

Delta Air Lines



Denis J. Donohue

Vice President, Communications &
Airspace Management Systems (CAMS)

Raytheon Intelligence & Space



Joseph P. Landon

Vice President, Advanced Programs
Development

Lockheed Martin Corporation





FAA Report

Brad Mims, FAA Deputy Administrator
NAC Designated Federal Officer



Chairman's Roundtable

Chip Childs, NAC Chairman
President & CEO, SkyWest, Inc.

NextGen Advisory Committee Round Table

March 18, 2021

Regional Airlines Perspective

Regional Airline Perspective

Outline

- Current Regional Airline fleet types
- Regional Airline fleet numbers
- Regional aircraft avionics OEMs
- Regional aircraft manufacturers
- Potential regional fleet outlook – Next Steps
- Current regional fleet equipage – MCL

Regional Airline Fleet Types

- CRJ-200
- CRJ-700 (Variant CRJ-550)
- CRJ-900
- Cessna 402
- Tecnam Traveller
- Islander



Regional Airline Fleet Types

- ERJ-140
- ERJ-145
- ERJ-170/175
- ATR-42
- ATR-72
- Cessna 208
- DHC-8 1/2/300
- DHC-8 400



Regional Fleet numbers

- Current Regional fleet numbers are just over 1,600 – broken down as shown:

Aircraft Type	Numbers
CRJ-200	250
CRJ-700 includes -550 variant	183
CRJ-900	330
Cessna 402	77
Tecnam Traveller	18
Islander	8
ERJ-145	171
ERJ-170/175	414
ATR-42	15
ATR-72	10
Cessna 208	36
DHC-8 100	10
DHC-8 400	32

Regional Aircraft Avionics

- Current Regional fleet avionics equipment:

Aircraft Type	Numbers	Avionics
CRJ-200	250	Collins
CRJ-700 includes -550 variant	183	Collins
CRJ-900	330	Collins
ERJ-145	171	Universal/Honeywell
ERJ-170/175	414	Honeywell
DHC-8 400	32	Universal
ATR-42/72	25	Universal/Bendix/Garmin/Honeywell

Regional Aircraft Manufacturers

- Embraer
 - ERJ-175
 - ERJ-175 E2
- ATR-72
- Mitsubishi Spacejet
- De Havilland Canada Q-400



Next Steps

Four Questions:

- Who decides what the size and composition of the regional fleets will be in future years?
 - Perhaps the most difficult question to answer due to the organization of the various airlines.
 - Independent – own their aircraft.
 - Wholly owned by a major airline – major airline owns the aircraft.
 - Operating under contract – aircraft are predominantly owned by the associated major airline.
 - Decisions on fleet purchasing and equipage will in most cases be determined by the major airline.
- What aircraft will continue operating?
 - Again, difficult to answer, but older aircraft are likely to be less capable and the potential for avionics upgrades may be more difficult. Older aircraft are also likely to be retired sooner.
- What are the specific NextGen initiatives that are must haves for all aircraft operating in the NAS and when will these be implemented?
- What avionics do the regional fleets need to meet the above?

Minimum Capabilities List (MCL)

NextGen Enabling Category	Aircraft Enabling Capability	Key Missing Components
Performance Based Navigation	<ul style="list-style-type: none"> • RNP-2 (Enroute) • RNP-1 w/ RF (Terminal SID/STAR) • RNP APCH w/ RF (Approach) • A-RNP or RNP AR 0.3 w/ RF (Approach) • RNP Scalability • Autopilot-coupled VNAV 	<ul style="list-style-type: none"> • RF Leg Type • Autopilot-coupled VNAV • Auto-throttle • RNP AR capability • FMC database size
Data Comm	<ul style="list-style-type: none"> • FANS-1/A with "Push to Load" over VDL Mode 2 with multi-frequency 	<ul style="list-style-type: none"> • CMU/CMF/ATSU • VHF Digital Radios • FANS 1/A capable FMC/FMGC
Surveillance	<ul style="list-style-type: none"> • ADS-B Out: Mandate 	<ul style="list-style-type: none"> • None
Performance Based Navigation, Low Vis Ops, Surveillance	<ul style="list-style-type: none"> • Resilient NextGen Ops (DME-DME/IRU) 	<ul style="list-style-type: none"> • Airworthiness approval for DME-DME, IRU hardware

BUSINESS AND GENERAL AVIATION PERSPECTIVE ON MCL

NextGen Advisory Committee (NAC)

March 18, 2021

MINIMUM CAPABILITIES LIST

- Business & General Aviation Supported MCL Development
 - GAMA
 - NBAA
 - Embraer
 - NetJets
 - AOPA
 - Avionics Manufacturers

MCL: IN PRODUCTION BUSINESS JETS IN 2021

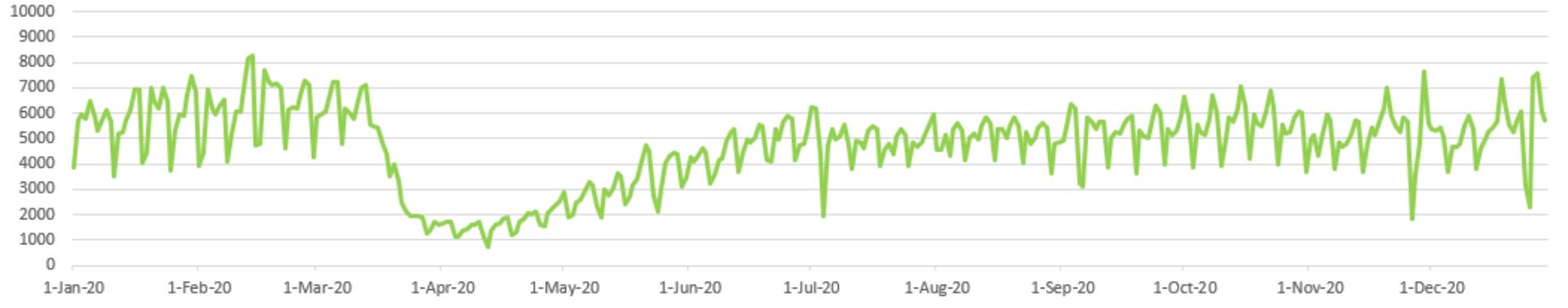
NextGen Enabling Category	Aircraft Enabling Capability	Example OEM: Light Jet	Example OEM: Mid-Size Jet	Example OEM: Large Jet
Performance Based Navigation (PBN)	RNP-2 (Enroute)	Standard	Standard	Standard
	RNP-1 w/ RF (Terminal SID/STAR)	Standard	Standard	Standard
	RNP APCH w/ RF (Approach)	Standard	Standard	Standard
	A-RNP or RNP AR 0.3 w/ RF Approach	Standard for A-RNP	Optional Item	Standard
	RNP Scalability	Standard	Standard	Standard
	Autopilot-coupled VNAV	Standard	Standard	Standard
Data Communications (CPDLC)	FANS-1/A with "Push to Load" over VDL Mode 2 with multi-frequency (DCL and enroute CPDLC services)	Options Item	Optional Item	Standard
Surveillance	ADS-B Out: Mandate	Standard	Standard	Standard
PBN, Low Vis Ops, Surveillance	Resilient NextGen Ops (DME-DME/IRU)	Not Available	Not Available	Standard

GENERAL FEEDBACK AND CHALLENGES

- MCL Success is Highly Dependent On Stable and Clear Equipment Requirements for Each CNS Capability
- Challenges:
 - International Harmonization, including Standards and Timelines
 - Operators Embracing Non-Required Equipment
 - Operators Obtaining Authorizations (*e.g.*, Public Law 115-254, Section 513)
- Continued Work on Non-Business Jet Aircraft and MCL

PANDEMIC LOOK BACK: BUSINESS JET TRAFFIC

2020 BUSINESS JET Operations: January 1 through December 31



Source: FlightAware

ENTRANTS INTO SERVICE - 2020



Bombardier



Daher



Epic Aircraft



Piper Aircraft



Pacific Aerospace



Pilatus



Textron Aviation

BUSINESS AIRPLANES IN CERTIFICATION



ACJ Two Twenty



Dassault G7X



Gulfstream G700



Textron CE-280 Denali



Textron CE-408 SkyCourier



Textron King Air 260

FUTURE ELECTRIC CERTIFIED AIRCRAFT



Alaka'i



Airbus



Bell



Beta Technologies



Bye Aerospace



Daher



Eviation Aircraft



Embraer



Hyundai
Genesis Air Mobility



Joby Aviation



Kitty Hawk



Lilium



magniX



Overair



Pipistrel



Volocopter



Wisk



XTI



NAC Task 19-2 / 20-3: Section 547

Warren Christie

Senior Vice President (Safety, Security & Fleet Operations), JetBlue Airways

FAA Reauthorization Act of 2018, Section 547

- a. IN GENERAL. — Not later than 180 days after the date of enactment of this Act, the Administrator shall **establish a pilot program to provide air traffic control services on a preferential basis to aircraft equipped with certain NextGen avionics** that —
 - 1. **lasts at least 2 years**; and
 - 2. operates in **at least 3 suitable airports**.
- b. DURATION OF DAILY SERVICE. — The air traffic control services provided under the pilot program established under subsection (a) shall occur for **at least 3 consecutive hours** between 0600 and 2200 local time during each day of the pilot program.
- c. AIRPORT SELECTION. — The Administrator shall designate airports for participation in the pilot program after **consultation with aircraft operators, manufacturers, and airport sponsors**.
- d. DEFINITIONS. —
 - 1. **CERTAIN NEXTGEN AVIONICS**. — The term “certain NextGen avionics” means those avionics and related software designated by the Administrator after consultations with aircraft operators and manufacturers.
 - 2. **PREFERENTIAL BASIS**. — The term “preferential basis” means —
 - A. prioritizing aircraft equipped with certain NextGen avionics during a Ground Delay Program by assigning them fewer minutes of delay relative to other aircraft based upon principles established after consultation with aircraft operators and manufacturers; or
 - B. sequencing aircraft equipped with certain NextGen avionics ahead of other aircraft in the Traffic Flow Management System to the maximum extent consistent with safety.
- e. SUNSET. — The pilot program established under subsection (a) shall terminate on **September 30, 2023**.
- f. REPORT. — Not later than 90 days after the date on which the pilot program terminates, the Administrator shall submit to the appropriate committees of Congress a report on the results of the pilot program.



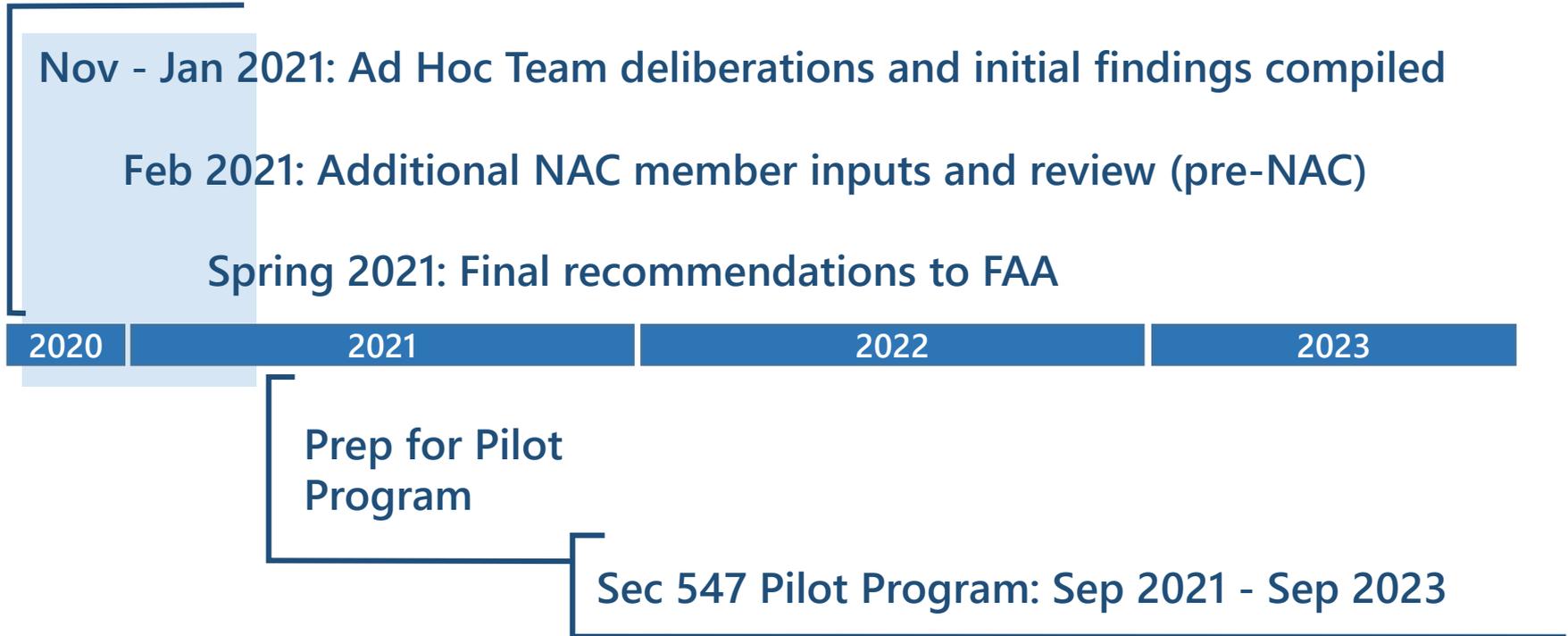
Task 20-3: FAA Reauthorization Act of 2018, Section 547

Three elements in FAA's request:

- A **short list of recommended candidate airports and applications** (airport, aircraft capability, and concept) for the pilot program
- For airports, while the legislation points to **providing preferential basis** at airports with Ground Delay Programs, the FAA seeks a recommendation from industry if this is appropriate or if other airports are preferred and why
- Describe potential and **targeted benefits of most value** to industry.



High-Level Schedule



Summary of Report

- Key Definitions
- Tasking Element 1: Short list of candidate
- Tasking Element 2: Airport selection and preferential basis
- Tasking Element 3: Targeted, high-value benefits
- Other Recommendations

Key Definitions

- **NextGen Avionics:**
 - > Defined as navigation, communication, and surveillance baseline capabilities in the NAC Minimum Capabilities List
- **Preferential Basis:**
 - > Air traffic operations, ground delays and other traffic management initiatives are significantly reduced from pre-COVID traffic levels
 - > Like TSA Pre Check program – no operator will be denied service, but those that have chosen to equip will experience more efficient service, shorter queuing or priority clearances



Tasking Element 1: Short List of Candidates

- Sources for candidates:
 - > FAA inputs on what is already ongoing that could meet the intent of Section 547 (must be feasible by September 2021)
 - > PBN Clarification Report priorities
 - > NextGen Opportunities
 - > Other NIWG and NAC work
- Down-select process based on input from SMEs
 - > Considered readiness, return and relevance



Tasking Element 1: Short List of Candidates (cont.)

- Simultaneous independent Established on RNP (EoR) at LAX
- Simultaneous dependent EoR at PDX
- Simultaneous dependent EoR at DAL
- Simultaneous dependent EoR at BNA
- Simultaneous dependent approaches to closely spaced parallel runways (7110.308) for BOS
- Advanced-RNP approach procedures for Ski airports, MSO, BZN, EGE
- ADS-B Out application enabling 3 nautical mile (nm) separation in en route airspace for SEA/ZSE
- Controller Pilot Data Link Communications (CPDLC) Departure Clearance (DCL) capabilities at MCO



Tasking Element 2: Preferential Basis

- Recommend airport selection for the pilot program not be limited to airports with GDPs or other traffic management initiatives (TMIs)
- Airports identified in the short list were selected for following reasons:
 - > Expectation that the application could showcase a capability enabled by NextGen avionics
 - > Potential to benefit equipped operators, without denying service to the non-equipped
 - > Ability to enhance operational efficiency or throughput



Tasking Element 3: Targeted Benefits

- Showcase key NextGen capabilities
 - > Providing an advantage to those that have invested in NextGen avionics
 - > Translating that advantage into real benefits - minimize operational constraints, while increasing capacity, access, and efficiency
- Incentivize operators to equip with emerging capabilities and avionics that can provide increased throughput and access



Staggered Start

- Start of the pilot program should be staggered to allow for inclusion of meaningful candidates
 - > Start with those candidates that are feasible in September 2021
 - > Commit to actions needed to include other candidates that could be feasible by mid 2022
- Adjusted start would not impact the mandated pilot program end date
- NAC operator members will commit to go with the FAA to Congress to support the staggered start time



Summary of Tasking Element Recommendations

Recommended Candidate Application	MCL* Equipage	Preferential Basis	Feasible by 09/2021	Expected Benefit
Independent EoR at LAX	RNP w RF	✓	✓	More efficient (time and distance) approaches Keeping aircraft on higher approach profile
DCL capabilities at MCO	CPDLC	✓	✓	Reduced departure delays
7110.308 at BOS	VNAV	✓		Increased arrival throughput in less than visual approach weather
3nm en route separation at SEA/ZSE	ADS-B Out		✓	Increased airspace throughput
A-RNP for Ski Country airports	A-RNP			Increased access to airports
Simultaneous dependent EoR at PDX	RNP w RF			More efficient (time and distance) approaches Keeping aircraft on higher approach profile
Simultaneous dependent EoR at DAL	RNP w RF			More efficient (time and distance) approaches
Simultaneous dependent EoR at BNA	RNP w RF			More efficient (time and distance) approaches

* "Minimum Capabilities List (MCL) Ad Hoc Team NAC Task 19-1 Report," November 2020.



Other Recommendations

- All candidates have been identified as priorities through other NAC efforts; need to proceed outside Section 547
- Design and development efforts for any procedure changes or additions should be cooperative with aircraft and airport operators
- Continue cooperative engagement:
 - > Coordination with FAA, airport operators and aircraft operators
 - > Use appropriate forums for technical and operational activities to support candidates
 - > Provide status updates to the NAC
 - > Operators should be involved in monitoring pilot program, operational and safety impacts
 - > Operators should contribute to the Section 547 final report to Congress



Motion for NAC Approval as Advice to the FAA

- FAA Reauthorization Act of 2018, Section 547 Ad Hoc Team – NAC Task 20-3 (Task 19-2 Extension) Report





Break



NAC Subcommittee (SC) Chairman's Report

Craig Drew, NAC Subcommittee Chair, Southwest Airlines



20-1: ADS-B In Commercial Application Technologies

Don Kauffman, Honeywell Aerospace

David Surridge, American Airlines

Task 20-1: ADS-B In Commercial Application Technologies

- The NAC is tasked to provide the FAA with insight from the industry on their potential application acquisitions and deployment plans, including a timeline of ADS-B In commercial application technologies pursued by the aviation community
- **The NAC advice should include the following:**
 - > A comprehensive list of ADS-B In commercial applications that NAC members either have or intend to invest in (within the next 5-10 years)
 - > A comprehensive list of ADS-B In commercial applications that are promising and a list of the NAC members tracking this list for future acquisitions

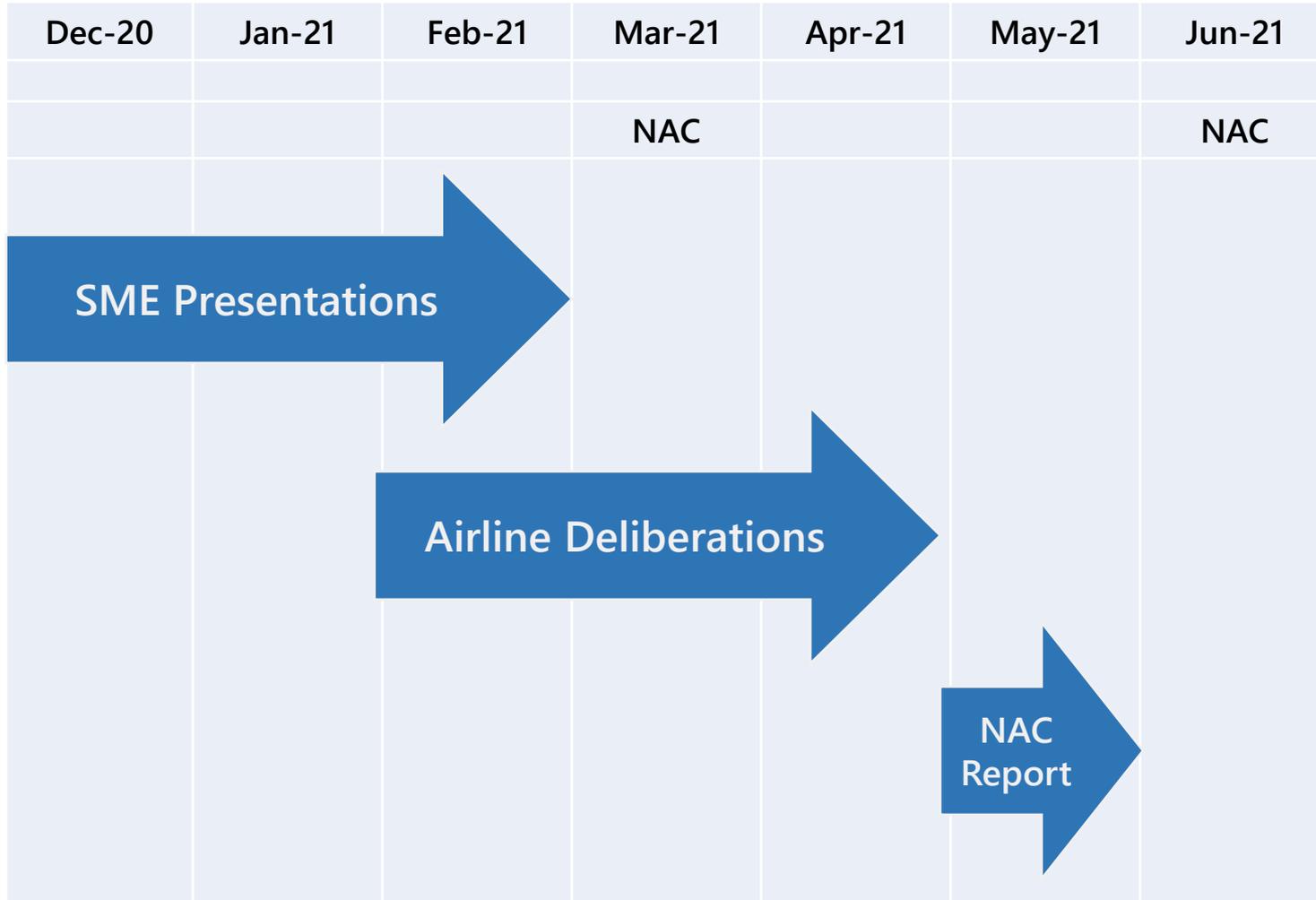


Task 20-1 Members

ORGANIZATION	LAST NAME	FIRST NAME	TITLE/POSITION
UPS Airlines	Bonds	Jonathan	Chief Pilot
JetBlue Airways	Brown	Lee	Manager, Strategic Airspace Programs
A4A	Cebula	Andy	Vice President, NextGen & New Entrants
ALPA	Hahn	Edward	Senior Engineer, Air Traffic Management & Technology
Alaska Airlines	Harrison	Paul	Technical Pilot for Surveillance
GAMA	Hennig	Jens	Vice President, Operations
Airbus Americas	Joly	Pascal	Senior Director, Flight Safety & Technical Affairs
Honeywell Aerospace	Kauffman	Don	Senior Research & Development Manager, CNS/ATM Systems
Collins Aerospace	McDowell	Michael	Technical Marketing Manager, Commercial Avionics
L3 Harris	Morast	Cam	Senior Program Manager, ACSS
United Airlines	Renk	Ron	Chief Technical Pilot
American Airlines	Surridge	David	Senior Manager, Airspace & Aircraft Modernization
APA/American Airlines	Townsend	Brian	Manager & Technical Pilot, Airspace Optimization
FedEx Express	Tree	Jon	Technical Pilot, Flight Technical & Regulatory Compliance
RAA	Whyte	Bill	Vice President, Aviation Operations & Technical Services
ALPA	Willey	Douglas	Chairman, Air Transport Services Group
NATCA	Woods	Jeff	Representative, National PMO
Delta Air Lines	Young	Gregory	Chief Technical Pilot, Airspace & Industry Affairs
NATCA	Zarick	Thomas	Representative, ADS-B In
Boeing	Turner	Jessie	Technical Fellow



Schedule



Activities

- **SME Presentations - ADS-B In Applications Under Consideration**
 - > Airspace Benefits
 - > Airline Direct Operating Cost Benefits
 - > Equipage
 - > Pilot and Controller Interactions
- **Airlines, Pilot Associations, and OEMs Deliberations – Task Group Questionnaires**
 - > Mitre will collect and deidentify all questionnaire responses
 - > Provide Level of Interest and Priority for each ADS-B In Application
 - > Provide additional qualitative feedback – details on following slides
- **Final Report**
 - > Summarize Level of Interest and Priority Responses
 - > Summarize the qualitative responses



ADS-B In Applications Under Consideration

CDTI-Assisted Visual Separation (CAVS)
CDTI-Assisted Separation (CAS) – Approach
CDTI-Assisted Separation (CAS) – Departure
Oceanic In-Trail Procedures (ITP)
Surface (SURF)
Surface Alerting (SURF-A)
Surface Indicating and Alerting (SURF-IA)
Flight-deck-based Interval Management (FIM) – Same Merge Point (Corner Post) Arrivals
IM.308 Approach
Flight-deck-based Interval Management (FIM) – Multiple Corner Posts Arrivals
Converging/Crossing Runways (DCCR) Arrivals
Dependent Staggered Approaches (DSA)
Paired Approach (PA)

- **Airlines will be asked to rank each ADS-B In Application on two scales**
 - > Level of Interest – High, Medium, Low
 - > Priority from Highest (1) to Lowest (13)

Airline Questionnaire

Overall Questions:

- Airline perspective on value of ADS-B In Applications
- Airline interest, commitment, and timeline to investments in ADS B In Applications
- Importance of two-rate Ground Delay Program to airline investment decisions

ADS-B In Application-specific Questions:

- Level of Interest and Priority for each ADS-B In Application
- Airline perspective on the value of each ADS-B In Application
- Issues impacting airline investment decisions for each ADS-B In Application
- Additional feedback regarding each ADS-B Application



Pilot Association Questionnaire

Overall Questions:

- Pilot Association perspective on value of ADS-B In Applications
- What ADS-B In Application are you interested in?

ADS-B In Application-specific Questions:

- Level of Interest and Priority for each ADS-B In Application
- Pilot Association perspective on the value of each ADS-B In Application
- Pilot / controller workload concerns related to each ADS-B In Application
- Additional feedback regarding each ADS-B Application

- **Note:** ➤ indicates difference from airline questionnaire

Aircraft and Avionics OEM Questionnaire

Overall Questions:

- Plans to offer ADS B In Applications avionics
- Which ADS-B In Applications are you interested in providing and what is your timeline?

ADS-B In Application-specific Questions:

- Level of Interest and Priority for each ADS-B In Application
 - OEM perspective on the value of each ADS-B In Application
 - Issues impacting OEM investment decisions for each ADS-B In Application
 - Additional feedback regarding each ADS-B Application
-
- **Note:** ➤ indicates difference from airline questionnaire



Vertical Navigation (VNAV)

Greg Young, Delta Air Lines

Michael McDowell, Collins Aerospace

Timeline Review



◆ FAA Request to NAC

◆ Develop Working Group Roster

◆ NAC Briefing, 11/17

◆ NACSC Briefing, 12/3

◆ 20-2: VNAV WG Kickoff, 12/4

◆ Collect/Analyze Fleet Equipage Data

Obtain Fleet Plan and Solution Data 

Analyze Data and Formulate Information 

Summarize and Culminate Tasking Response 

Final Report to NAC SC, 6/2 

Final Report to NAC, 6/21 



Fleet Data: Review

- 7351 U.S. Commercial Fleet TOTAL aircraft
 - observed in ICAO flight plans in 12 month pre-COVID period
- 2131 (29% of TOTAL) are LNAV Only (Affected) aircraft
- We targeted 1809 (85%) of these a/c as belonging to 17 “Impactful Operators,” each operating 20 or more a/c



Initial Strategy

- Focus on “Top Eight” impactful operators (>100 affected aircraft each)
- Realize lessons learned, Regroup
- Re-attack next nine impactful operators (>20 affected aircraft each)
- Data collected by Mitre for de-identification and analysis



Modified Strategy

- Approached all 17 impactful operators in same pass
 - 11 RAA members engaged by “Ambassador” Bill Whyte
 - 6 remaining members engaged by Greg
- Data
 - Devised a standardized data response template
 - Mitre still primary collection venue
 - Some operators have chosen to fwd data through POC for convenience



Fleet Data: Results to Date

- 14 operators have acknowledged participation (3 yet to acknowledge contact)
- 6 data responses to date, representing 786 a/c (43% of our target group)



Fleet Data: Results to Date (cont.)

- Data Response has been “less than robust”
- “2nd Half Strategy”
 - 1v1 Outreach (RAA)
 - Mailed briefing pkg
 - Personal references



WG Mtg #3 23Feb21

- Upgrade briefings by Collins and Honeywell
- Seeking to include Universal FMS rep (EMB-145's)
 - Representative identified; engagement imminent
- First look at Final Report outline
- Next mtg ~ end of March pending receipt of more fleet data



FIN

- Questions





NAC Tasks 18-4 & 18-5: Focus Area Risks/Mitigations

FAA NIWG Subject Matter Experts (SMEs)

Multiple Runway Operations (MRO)

Surface & Data Sharing

Performance Based Navigation (PBN)

Data Communications (Data Comm)

Northeast Corridor (NEC)



Multiple Runway Operations (MRO)

Natee Wongsangpaiboon (FAA) & Raul Zamora, Jr. (FAA)

Phil Santos (FedEx) & Scott Dehart (Southwest Airlines)

Accomplishments (since Dec 2020 NAC)

- **Industry completed the Consolidated Wake Turbulence (CWT) benefits assessment**
 - > Q4 2020 milestone was met
 - > 2 operators provided analysis at IAD, and DFW
 - > Outcome revealed beneficial results that can be translated into increase of throughput at the airport
 - Up to 1 an hour at peak (DFW)
 - Up to 2 an hour at peak (IAD)
- **FAA completed CWT standards conversion at 4 sites**
 - > Cincinnati (CVG/LUK), Anchorage (A11/ANG), Louisville (SDF/LOU), and Charlotte (CLT)
 - > Remote/virtual implementation
 - > Started with smaller Towers and TRACON operations with less complex airspace and with flexibility in schedule and training



Looking Ahead

- **Additional CWT Implementation/Conversion**
 - > MEM/M03 – April 2021
 - > IND – May 2021
 - > ORD/C90 – June 2021

- **Separation Standards for Closely Spaced Parallel Operations (CSPO) with High Update Rate Surveillance (HUR) - Q2CY2021**
 - > Increase opportunities to conduct simultaneous independent approaches to parallel runways
 - > Safety Risk Management (SMS) process is undergoing to approve the new standards by June, 2021



Surface & Data Sharing

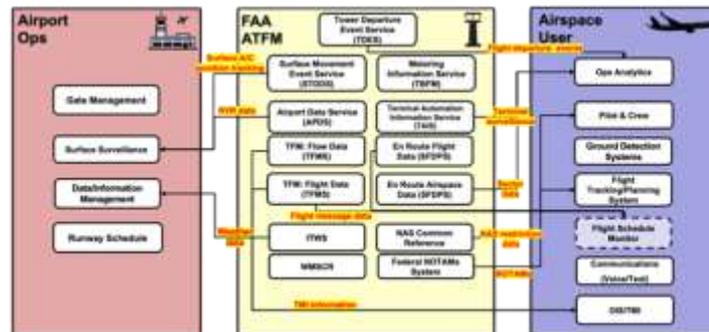
Doug Swol (FAA) & Ayaz Kagzi (FAA)

Rob Goldman (Delta Air Lines) & Steve Vail (Mosaic ATM)

Surface & Data Sharing

SWIFT meetings continue with tremendous participation and energy

- NGIP industry milestone
- Addresses an industry NAC recommendation and need
 - > A community forum that acts as a clearinghouse for collaborative engagement around NAS information and data sharing to provide insight through information
 - > Community includes Operations, Technologist, Data analyst
 - > Traditional aviation, new entrants, expanded community
- Initial focus on connecting to SWIM and providing clarity on operational context of current data available on SWIM
- Intermediate attention to business rules and duplication of data
 - > ETA is found in six SWIM services
- Current and future effort
 - > Collaborating with programs to address data NOT currently available in SWIM feeds
 - > TBFM data request that supports TBO
 - > Fusing data to provide meaningful insight and making available via microservices
 - > Focus on post-op analytics, including machine learning to drive better decisions and performance
- Partner with NASA to leverage SWIFT to communicate with the broader aviation community and get feedback for DIP and other programs
- SWIFT continues to grow and evolve



Surface & Data Sharing (cont.)

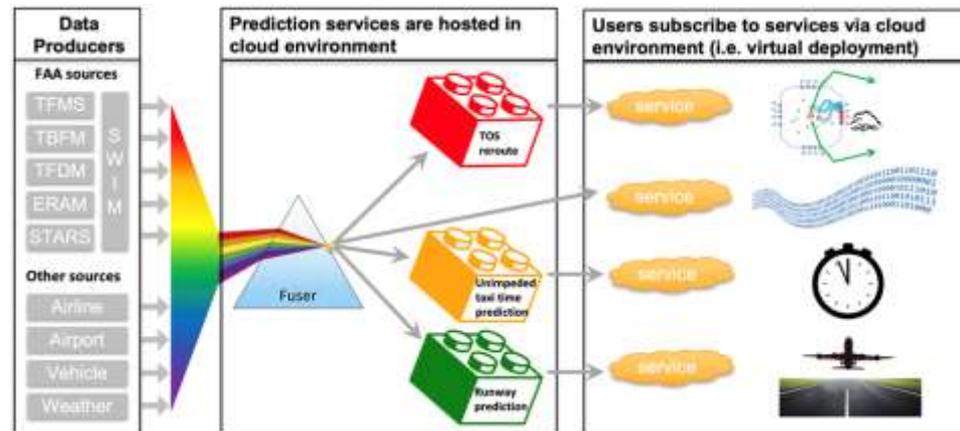
NASA Airspace Technology Demonstration 2 (ATD-2)

- Response to original NIWG Report Recommendation “departure metering in NAS”
- Phases 1 & 2 in Charlotte from 2017 through 2019
 - > CLT Equipment maintained until TFDM implementation
 - > Demonstration brought to life the Surface-CDM CONOPS and has supported TFDM program development for FAA and industry alike
- In addition to operational insight, ATD-2 has provided new ‘data awareness’
 - > TBO departure scheduling
 - > Need for fused data and a method for distribution (microservices)

ATD-2 phase 3 – “Surface meets trajectory options”

- DFW/DAL from 2019 through 2021
 - > Multi-airport geometry/balance and delay reduction
 - > Improving departure throughput at TRACON/Center boundary

ATD2
Integrated Arrival/Departure/Surface



Surface & Data Sharing (cont.)

ATD-2 handing off to Digital Information Platform (DIP) under NASA's new ATM eXploration (ATM-X) Project:

Accelerate transformation of the NAS through the development of a **foundation** for advanced, **data-driven, digital services** from **traditional operations and new entrants** to promote **cohesive decision making**

- **Formulation Input:**

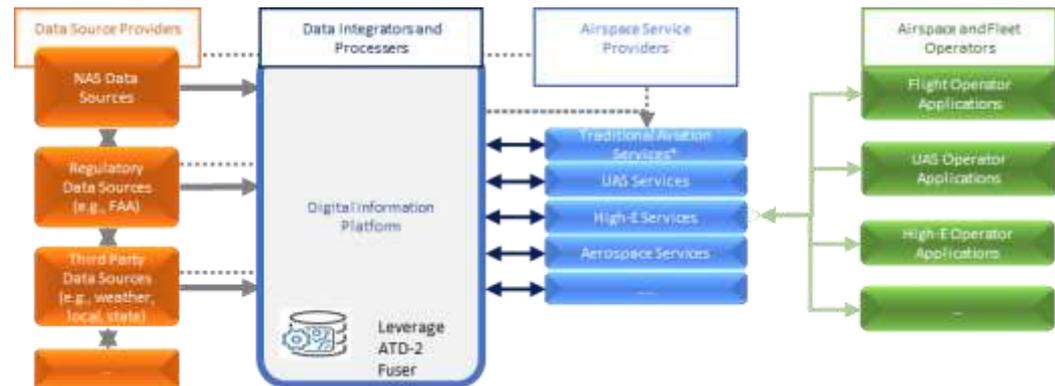
- > Create an **architecture** that allows high reuse of solutions (building blocks) for advanced capabilities
- > Leverage the explosion in data science technologies for services to be more scalable
- > Test with smaller footprint cloud-based demonstrations

- **Leverage ATD-2 Technologies, ex:**

- > Fuser
- > TOS and Surface Model Services

- **Project seeking community input on:**

- > Challenges and Pain Points
- > Operational Concept
- > Data Assets and Services Needs
- > Concept Adoption Feedback



Next Step: Gather a DIP Community to collaboratively demonstrate a reference implementation of DIP connecting fused, mediated data to advanced services



Participation =
Risk Mitigation



TFDM Program Status

Build 1 Status (Key Site: PHX)

Accomplishments:

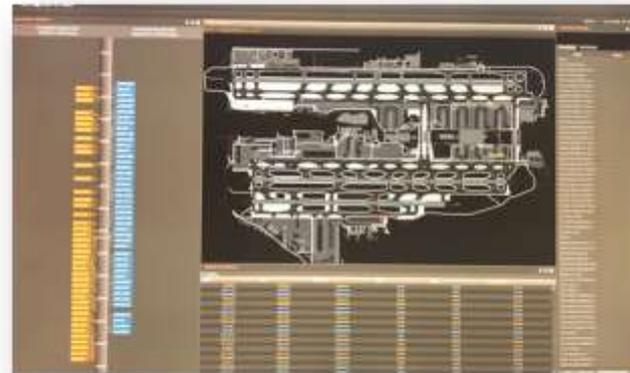
- Completed B1.2 Software Development and began remote Testing
 - > B1.3 will be IOC software build in PHX
- Planning B1.2 operational risk reduction test at WJHTC in April-May 2021



TFDM Build 1 Electronic Flight Strips Display

Build 2 Status (Key Site: CLT)

- Completed B2.0 software development
 - > Informal testing/checkouts of B2.0 will begin in March
 - > B2.1 will be the TFDM IOC build at CLT
- Completed development of TFDM testbed
 - > Allows industry to connect to version to TFDM to test data connections
 - > One industry partner already planning to on-ramp
 - > Initiating work to connect TFDM testbed to SWIM Cloud Distribution Service (provide near real time data for TFDM testbed)



TFDM Build 2 Surface Management Display



NAC Milestone Impact

SURFACE AND DATA SHARING

PRE-IMPLEMENTATION COMMITMENTS	Old Date	New Date
TFDM program will complete the operational testing for Build 1	Q2 CY2020	Late CY2021*
NASA ATD-2 interim technology transfer from Phase 2: Fused IADS at CLT	Q4 CY2019	Complete
NASA ATD-2 final technology transfer from Phase 3: Terminal departure IADS at DFW/DAL	Q3 CY2020	Q4 CY2021
IMPLEMENTATION COMMITMENTS	Old Date	New Date
TFDM program will achieve key site IOC for Build 1 at PHX	Q2 CY2020	Late CY2021 - Early CY2022*
TFDM program will achieve the in-service decision (ISD) for Build 1 to allow additional TFDM system deployments into the NAS	Q4 CY2020	TBD
TFDM program will achieve IOC at 3 additional sites	Q1 CY2021	TBD
TFDM program will achieve the key site IOC for Build 2 at CLT	Q4 CY2021	TBD
TFDM program will achieve ISD for Build 2 to allow additional deployments of the full TFDM capabilities into the NAS	Q1 CY2022	TBD
TFDM program will achieve IOC at 5 additional sites	Q1 CY2022	TBD

* New Dates dependent on ability of program to travel, access FAA facilities, conduct training, conduct testing and other FAA program dependencies. If dependencies are not met, the program will not meet these dates.





Performance Based Navigation (PBN)

Juan Narvid (FAA), Aaron Wilkins (FAA), & Wendy O'Connor (FAA)
Brian Townsend (APA) & Bill Whyte (RAA)



Las Vegas Metroplex Implementation Update

Jim Arrighi, FAA

Project Overview

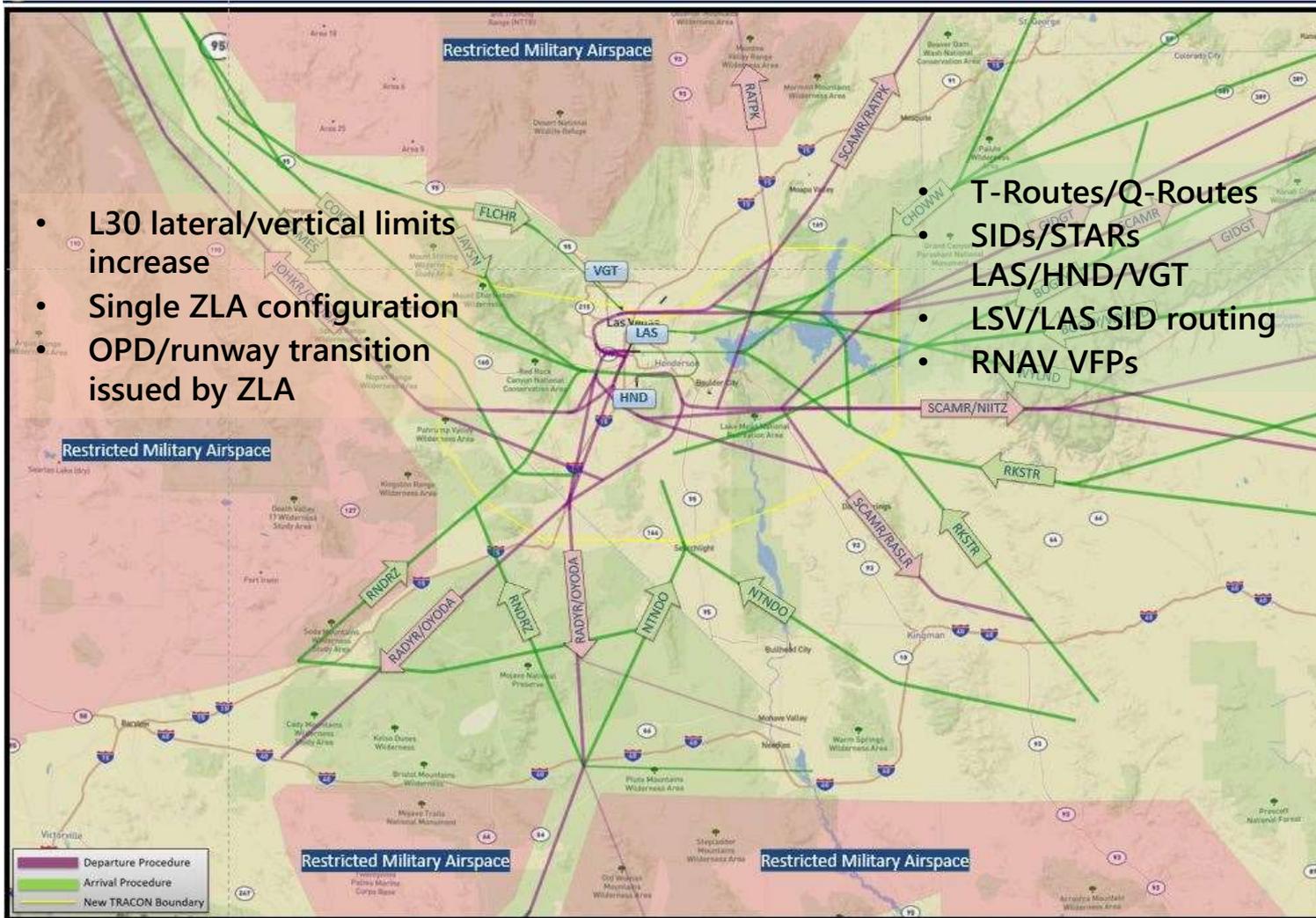
- **February 25, 2021 Implementation**
- **45 Procedures:**
 - > 11 SIDs – 7 LAS RNAV, 2 HND RNAV, 2 LAS Conventional
 - > 14 STARs – 5 LAS RNAV, 3 HND RNAV, 2 VGT RNAV, 4 LAS Conventional
 - > 12 SIAPS – 5 LAS RNP, 3 LAS GPS, 1 VGT GPS, 3 LAS ILS/LOC
 - > 5 T-Routes – 5 New
 - > 3 Q-Routes – 1 New, 2 Amended
- **36 Airspace Changes:**
 - > 4 ZLA Sector boundary changes due to L30 airspace expansion
 - Currently 2 configurations based on L30 configuration
 - Design is for only a single configuration
 - > 32 L30 Sector boundary and vertical limit changes
 - 4 airport configurations x 8 L30 sectors
- **Minor Implementation Issues:**
 - > ATC Automation
 - > Database Update
 - > Flight Plans
 - > Charting
 - > Rwy 19 Departures



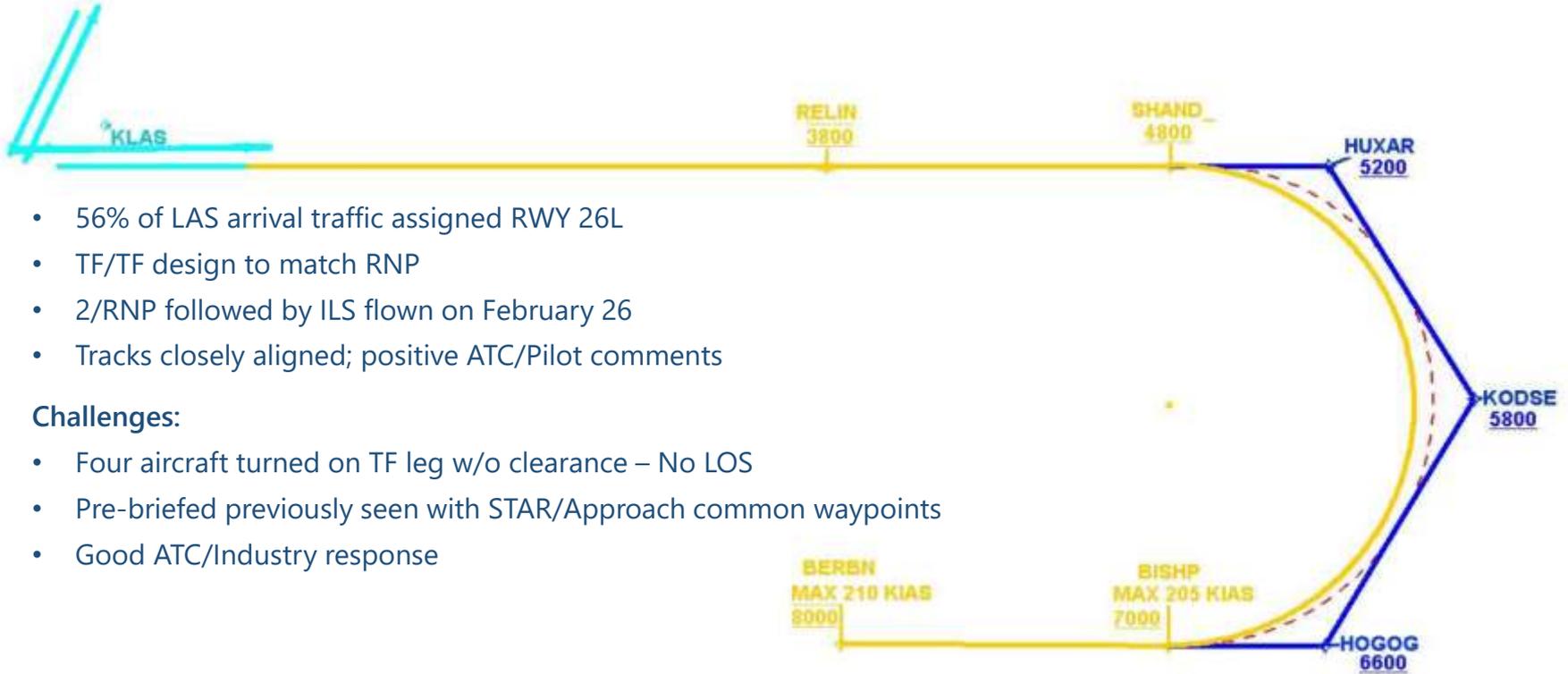
Airspace

- L30 lateral/vertical limits increase
- Single ZLA configuration
- OPD/runway transition issued by ZLA

- T-Routes/Q-Routes
- SIDs/STARs
- LAS/HND/VGT
- LSV/LAS SID routing
- RNAV VFPs



RNAV (RNP) & ILS or LOC RWY 26L



- 56% of LAS arrival traffic assigned RWY 26L
- TF/TF design to match RNP
- 2/RNP followed by ILS flown on February 26
- Tracks closely aligned; positive ATC/Pilot comments

Challenges:

- Four aircraft turned on TF leg w/o clearance – No LOS
- Pre-briefed previously seen with STAR/Approach common waypoints
- Good ATC/Industry response

Highlights

- **May 2020 Implementation Rescheduled due to Covid-19**
 - > Shift to a virtual world for all implementation phase work
 - > Nov 2020 pivot to COVID protocols for facility training
 - > Automation updates/TBFM adaptation testing virtual support
 - > Virtual implementation Go-team: Facilities/HQ/Support/Industry
 - > Teamwork! AJV/AJT/AJR/AOC/AGC/AJM/Western Pacific RA/Industry/NBAA/CCDOA/LSV...
- **Community Engagement**
 - > Regional Administrator led
 - > Community Engagement Officers, AOC messaging
 - > Community Engagement Workshops
 - > Outreach to 22 tribal nations, State/Congressional Delegations, CCDOA, LUC, NPS



Questions?





Data Comm

Jesse Wijntjes (FAA)

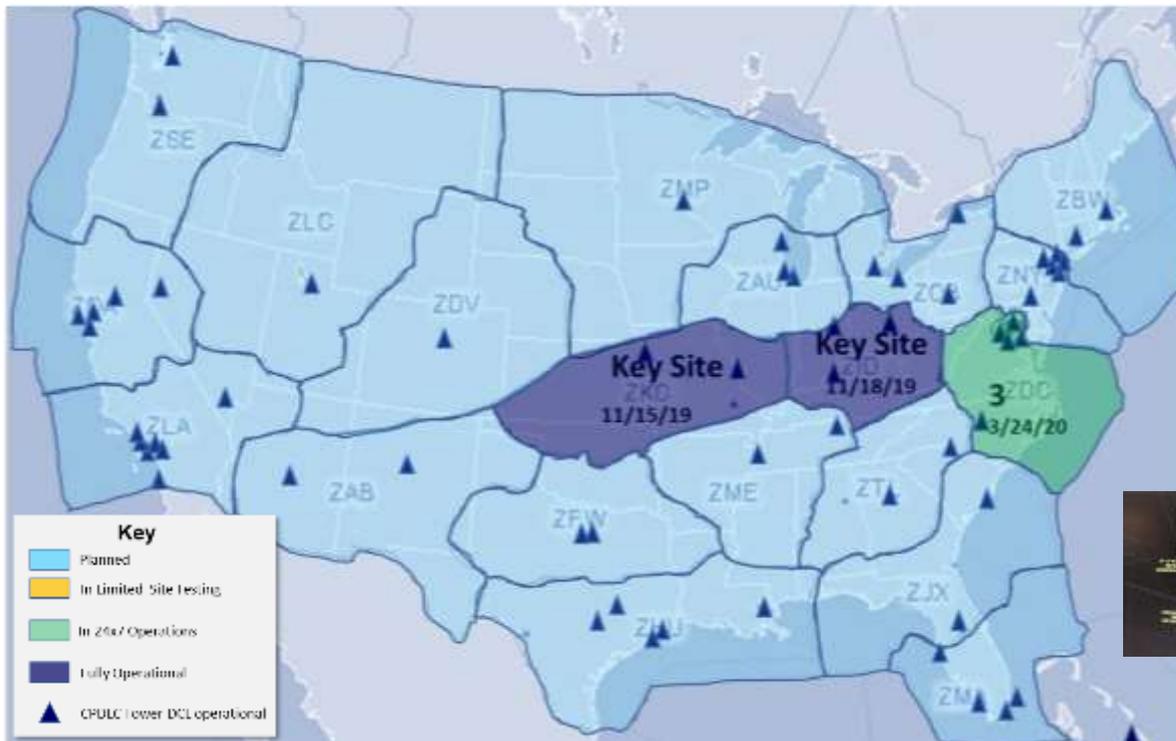
Chris Collings (L3Harris) & Ed Evans (Southwest Airlines)

Data Comm Accomplishments

- Data Comm services are operational at 62 airports and the first 3 En Route Centers
 - > CPDLC services exceeding operational performance targets (>99% success)
- Business/General aviation & DOD communities addressing avionics issues and resuming En Route participation
- Localized air-to-ground interop issues are being fault isolated & addressed
 - > Localized air-to-ground interop issues are being fault isolated & addressed



Data Comm Operational Status



Data Comm operational at 62 Towers
 CVG, PBI, & JAX approved for Tower CPDLC DCL services

Data Comm operational at 3 En Route Centers
 Remaining 17 En Route Centers on hold due to COVID-19



Air-to-Ground Network



En Route



Tower



2021 Data Comm NIWG/Avionics Ad Hoc Focus Items

- **Resume en route center Data Comm deployment**
 - > FAA & aircraft operators ready to resume as soon as facilities are ready
- **Complete installation of Data Comm avionics updates for retrofit and newly delivered aircraft**
 - > Focus on Airbus ATSU CSB7.5, Collins CMU 900 Core 16, and Boeing 757/767 Pegasus 1 Latent Message Fix
- **Re-visit plan for En Route STAR in Free Text mitigation (NAC response item)**
 - > Developed recommendation in Data Comm Avionics Ad Hoc for NAC consideration
- **Continue to track progress against NextGen Joint Implementation Plan (NJIP) milestones**
 - > Progress against FAA and industry Data Comm milestones



En Route STAR in Free Text Recommendation

- **Milestone:** Resolution of avionics/Pegasus 1 interoperability issue by end of 2021
- **December 2019:** NAC recommendation to extend milestone
- **November 2020 NAC Action:** NAC SC Data Comm Avionics Ad Hoc to explore options
- **Data Comm NAC SC Ad Hoc Recommendation:**
 - > Boeing fleets with NextGen avionics implement Nav Data base change
 - > GA aircraft to receive a software update
 - > Boeing 757/767 with Pegasus 1 will require mitigation for the remainder of their service life



Data Comm Avionics Updates Fleet Status

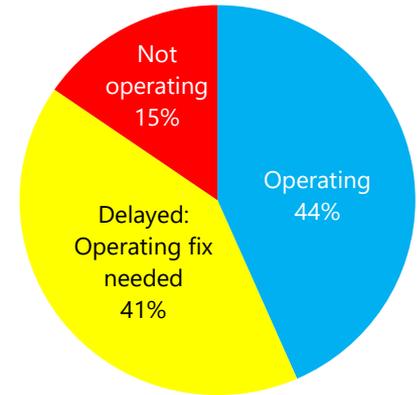
Completed Actions

Operator & Fleet Actions Complete	Status
American Airlines: B777, B787	Operating en route, no action required
FedEx: B777, MD11	Operating en route, no action required
Southwest Airlines: B737	Operating en route, no action required
UPS: B744, B757, B767, MD11	Operating en route, no action required

Pending Avionics Actions

Avionics Action	Operator/Fleet	Status
Collins CMU 900 Core 16	Alaska, American, Delta, United	Install Delayed (COVID); Aircraft operating
Airbus A320/30 ATSU CSB 7.5	Alaska, American, Delta, JetBlue	Fix Released Dec 2020, Aircraft operating; installs planned
Boeing 757/767 Pegasus 1 Procedure Mitigation	FedEx	Delayed – Pending approval; Aircraft removed
Boeing 757/767 Pegasus 1 Fix	FedEx, UPS, United	Delayed – Q3 2022 (some aircraft operating under procedure mitigation)
Collins VDR Update	Alaska, United	Install Delayed (COVID), Aircraft removed
Boeing 777 AIMS 2 BP17B	United	Install Delayed (COVID); Aircraft operating
Boeing 787 CMF BP6	United	Install Delayed (COVID); partial fleet operating
Airbus A350	Delta	Aircraft removed from en route; need fix plan
Boeing 747-8 ATN-203	UPS	Planned – Q2 2021; aircraft operating

Data Comm Fleet Status



Data Comm Critical Path Action

Operating; No Action Required

Delayed: Operating fix needed

Delayed/Not Operating



Data Comm

NAC Read-Ahead



Data Comm Metrics



Data Comm Tower by the Numbers



17 US Air
Carriers
(Part 121)



65 Non-US
Air Carriers
(Part 129)



1,900+
Business Aviation
Operators
(Parts 91, 91K, 135)



62
Airports



67
Aircraft
Types



Over 5,900
Equipped
Aircraft

Data Comm Tower Benefits

January 2021: Departure Clearance Benefits Realized Since 2016



Saved 2.44M minutes of radio time



Saved 1,723,260+ minutes of airspace user time



Served 1.27B+ passengers



Cleared 9,367,580+ flights



Prevented 20.06M Kgs of CO₂ Emissions



Prevented 133,280+ readback errors

Data Comm En Route by the Numbers

January 2021: En Route Data Comm Since 2019



4,526,186 transactions



743,796 sessions



22 aircraft types



17 operators



86,616 readback errors mitigated



326,944 minutes of comm time saved

Data Comm Avionics Status



Data Comm Avionics Retrofit Availability

Action	Status	
Collins Core 16	Collins: Delivered Core 16, demonstrating strong performance	
	Operators: UPS & FDX complete; 4 delayed due to COVID-19	
Pegasus I Mitigation	Interim Procedure Mitigation; 2 operators using	
	Stale message point fix to Peg 1 – delayed to Q3 2022	
	Address gap between procedure mitigation & Peg 1 fix: 6 mo from SB release	
Airbus ATSU CSB 7.5	Airbus: Delivered CSB 7.5 December 2020	
	Operators: JBU installs starting Mar, ASA Mar, AAL April, DAL TBD	
Airbus A220	Need plan from Airbus on FMC issue correction & VDLm2 “core 16” update	
Airbus A350 & A380	Need corrective action plan from Airbus on VDLm2 issues	
Boeing B748 ATN-203	Service Bulletin planned from Boeing Q4 2021	
Honeywell Mark II+ v523	Delivered, installed and, demonstrating strong performance	
Boeing 787 BP6	Service Bulletin released December 2019; AAL complete, UAL in progress	
Boeing 777 BP17B	Service Bulletin released December 2019; AAL & FDX complete, UAL in progress	
Business Aviation	Initial fleets re-started en route ops on trial basis	
	FAA planning to publish Notice in Q1 2021	

2021 Priority Items

Complete & Operating	Available for Install	Planned	Delayed
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Data Comm Avionics Forward Fit Availability

Issue: Several new aircraft models are being produced and delivered to customers without Data Comm avionics fixes – forcing customers to retrofit after delivery.

Action	Status on New Delivered Aircraft	
Collins CMU 900 Core 16	B737 MAX – Only CMU 900 Core 12 available in TC; Retrofit STC ~Q2 2021	Red
	B767 – Only CMU 900 Core 12 available in TC; Retrofit STC available	Red
Honeywell Mark II+ v523	B737 MAX – Included in TC	Blue
Pegasus I Fixes	B767 – Pegasus 2 available line fit Q3 2022	Yellow
Airbus ATSU CSB 7.5	A320/A330/A340: CSB/CLR 7.5 and CSB/CLR 9 available	Blue
Airbus A220	Collins Core 16 equivalent not available until ~2023?	Yellow
Boeing 787 BP6	All new deliveries include BP6	Blue
Boeing 777 BP17B	All new deliveries include BP17B	Blue
Airbus A350	Need corrective action plan from Airbus on VDLm2 issues	Red
Boeing B748 ATN-203	Service Bulletin planned from Boeing Q4 2021	Yellow

Delivered Compliant

Planned

No New Delivery Option



Data Comm Operator Status (1 of 4)

Operator	Fleet	Avionics Action	Action Complete by	Action Status	Action Risk	Active En Route
	A320	ATSU CSB 7.5	April 2021	Start installs March 2021	Planned	Operating
	B737	Collins CMU 900 Core 16	TBD	Delayed due to COVID-19	Delayed	Operating
		Collins VDR SB	TBD	12% installed	Delayed	

	A320	ATSU CSB 7.5	End of 2021	Start installs April 2021	Planned	Operating
	B737	Collins CMU 900 Core 16	TBD	Delayed due to COVID-19	Delayed	Operating
		Collins VDR SB	Complete	Complete	Complete	
	B777	AIMS 2 BP17B	Remaining AC parked	Complete installs at RTS	All operating AC complete	Operating
	B787	CMF BP6	Complete	Complete	Complete	Operating

Data Comm Critical Path Action	Operating, no action required	Operating, pending action	At Risk/Planned	Delayed/ Not operating
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Data Comm Operator Status (2 of 4)

Operator	Fleet	Avionics Action	Action Complete by	Action Status	Action Risk	Active En Route
	A220	FMC fix and VDL2 "core 16"	OEM needs plan	TBD	New Jan '21	Fixes Req
	A320	ATSU CSB 7.5	TBD	Pending install plan	Planned	Operating
	A350	VDL handoff issues	OEM needs plan	TBD	New Nov '20	Fixes Req
	B737	Collins CMU 900 Core 16	TBD	Delayed due to COVID-19	Delayed	Operating
		Collins VDR SB	Complete	Complete	Complete	

	B757/67	Collins CMU 900 Core 16	Complete	Complete	Complete	Planning Re-Start
		Collins VDR SB	Complete	Complete	Complete	
		Peg I Mitigation (FDX)	April/May 2021	Procedures approved	Planned	
	B777	AIMS 2 BP17B	Complete	Complete	Complete	Operating
		Collins VDR SB	Complete	Complete	Complete	
	MD11	Collins CMU 900 Core 16	Complete	Complete	Complete	Operating
		Collins VDR SB	Complete	Complete	Complete	

Data Comm Critical Path Action	Operating, no action required	Operating, pending action	At Risk/Planned	Delayed/ Not operating
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Data Comm Operator Status (3 of 4)

Operator	Fleet	Avionics Action	Action Complete by	Action Status	Action Risk	Active En Route
jetBlue	A320	ATSU CSB 7.5	6 months from release	Installs to start Mar 2021	Planned	Operating
	A220	FMC fix and VDL2 "core 16"	OEM needs plan	TBD	New Jan '21	Fixes Req
Southwest	B737	Honeywell Mark II+ CMU v523	Remaining AC parked	Complete installs at RTS	All operating AC complete	Operating
ups	B744 B757 B767 MD11	Collins CMU 900 Core 16	Complete	Complete	Complete	Operating
	B748	Collins CMU 900 ATN-203	70% 3 months from release, full fleet 6 months from release	Awaiting release from Boeing (Q4 2021)	Pending release	Operating

Data Comm Critical Path Action	Operating, no action required	Operating, pending action	At Risk/Planned	Delayed/ Not operating
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Data Comm Operator Status (4 of 4)

Operator	Fleet	Avionics Action	Action Complete by	Action Status	Action Risk	Active En Route
	B737	Collins CMU 900 Core 16	TBD	Delayed due to COVID-19	Delayed	Operating
		Collins CMU 900 VM update	Complete	Complete	All operating AC complete	
		Collins VDR SB	Remaining AC parked	84% installed, complete at RTS	All operating AC complete	
	B757/67	Peg 1 Mitigation	TBD	Evaluate at RTS	Delayed	Awaiting Peg 1 software fix
		Collins CMU 900 Core 16	TBD	Delayed due to COVID-19	Delayed	
		Collins CMU 900 VM update	Remaining AC parked	24% installed, complete at RTS	Installs in progress	
		Collins VDR SB	Remaining AC parked	88% installed, complete at RTS	Installs in progress	
	B777	AIMS 2 BP17B	TBD	50% installed	Delayed	Operating
	B787	CMF BP6	TBD	10.3 pre-req 100% 10.4/BP6 20%	Delayed	Operating

Data Comm Critical Path Action	Operating, no action required	Operating, pending action	At Risk/Planned	Delayed/ Not operating
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Avionics Return to Service

EMBRAER		25
Legacy 450/500/550 (Collins Core 12 Equivalent)	9	9
Prætor 500/600 (Collins Core 12 Equivalent)	15	15
Phenom 300 (Collins Core 12 Equivalent)		●
ERJ 70/75/90 E2 (HW EPIC CMF BP3.3 VDL 37-52 Equivalent)		●
ERJ 170/175/190/195 (HW EPIC CMF BP3.0 VDL 22 -521+ Equivalent)	1	1

FALCON		34
F900B/C/EX (depends on STC)	11	11
F900EXEASy/DX/LX (HW-521 equivalent)		●
F2000EXEASy/DX/LX/LXS/S (HW-521 Equivalent)		●
FA7X (HW-521 Equivalent)		●
FA8X (HW -522 Equivalent)	23	23

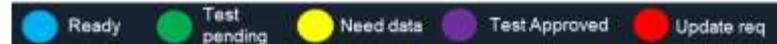
GULFSTREAM		321
G280 (Collins Core 12 Equivalent)	216	216
G500 (HW EPIC CMF BP3.1 -522 Equivalent)	54	54
G600 (HW EPIC CMF BP3.1 -522 Equivalent)	43	43
G700 (HW EPIC CMF BP3.4 -523 Equivalent)	7	7
G650 (522 Equivalent)	1	1
• HW NG Block 3.1 – Q2 2020		●
G450 (522 Equivalent)		●
• HW NG Block 3.4 – Q1 2021		●
G550 (522 Equivalent)		●
• HW NG Block 3.4 – Q2 2021		●

BOMBARDIER		238
Challenger 300/500 (Collins Core 12 Equivalent)	132	132
Challenger 605/650 (Collins Core 12 Equivalent)	32	32
Challenger CRJ (Collins Core 12 Equivalent)		●
Global 5000 GVFD (Collins Core 12 Equivalent) 822-1863-175 and Above	26	26
Global 6000 (Collins Core 12 Equivalent) 822-1863-175 and Above	40	40
Global 7500 GVFD (Collins Core 12 Equivalent) Only 822-1863-671 and above	8	8

OTHER-AVIONICS		58
Various		
• Garmin 3000/5000	49	49
• Honda, LJ75,C700,C68A,C25B,C25M,E55P, BE40		6
Various		1
• Universal Avionics		1
• G100,G200,CL60,C55B		2
Various		2
• ProLine Fusion v2.0		
Various		
• HW -524 Test Aircraft		

Total Eligible

676



Data Comm

NJIP Milestones CY19-21



Data Comm – NJIP CY19-21 Milestones (1 of 2)

Milestone	FAA or Industry	Milestone Date Q/CY	Status
Airlines to Equip 1,900+ Aircraft	Industry	4Q2019	Complete
Deploy Tower Services to an additional seven towers	FAA	3Q2019	Complete
Baseline additional Data Comm capabilities for En Route utilizing the existing FANS message set	FAA Industry	3Q2021 3Q2024	Agreement reached with ANG to defer to 2024 to align with deployment of initial and full en route services and funding constraints. Need to close with NIWG on the decision
IOC for Initial En Route Services at all CONUS ARTCCs	FAA	4Q2019 4Q2021 4Q2022	Milestone impacted by COVID-19; Remainder of waterfall to be replanned.
Resolution of avionics/Pegasus 1 interoperability issue	Industry	4Q2021	Data Comm NIWG working plan, Nov '20 NAC action



With the impacts from COVID-19, these milestones will likely need to be further adjusted based on when the program can restart/complete the initial services waterfall



Data Comm – NJIP CY19-21 Milestones (2 of 2)

Milestone	FAA or Industry	Milestone Date Q/CY	Status
Recommendation for target equipage rates for follow-on capabilities	FAA Industry	1Q2019 2Q2019	Complete
Recommendation for the equipage strategy for Regional Jet equipage	Industry	1Q2019 2Q2019	Complete
Loadability Solution for Runway SID/STAR	FAA	3Q2019	Complete – Plan developed for future TFDM implementation
Solution for Full Automation for the Confirm Assigned Route Capability	FAA	3Q2019	Removed



Northeast Corridor (NEC)

Aaron Wilkins (FAA), Juan Narvid (FAA), & Wendy O'Connor (FAA)
Ralph Tamburro (PANYNJ) & Lee Brown (JetBlue)

Northeast Corridor – Key Issues & Status

- **2020/2021 Commitments**

- > Facility access, travel, training and fiscal limitations are delaying some commitments beyond the dates in the August 2020 NJIP update
- > Virtual resources support progress

- **Advancing NAC-recommended “NextGen Opportunities”**

- > LGA Runway 31 approach procedure
- > High-performance escape routes for TEB/HPN

- **Looking ahead**

- > Focus for continuing work on LGA Runway 31 procedures and TEB/HPN High-Performance Escape Routes
- > Monitor existing milestone status



Outlook for CY2020/2021 Commitments

Type	Commitment/Milestone	Jun 2019 NJIP	Aug 2020 NJIP**	Mar NAC Update
Implementation*	Improved departure management for flights destined for LGA	Q3 CY2020	Q4 CY2020	TBD
Implementation*	DSP enhancements	Q4 CY2020	Q2 CY2021	TBD
Implementation*	Atlantic Coast Routes	Q4 CY2020	Q4 CY2021	Q4 CY2021
Implementation*	PDRR/ABRR Enhancements	Q4 CY2020	Q2 CY2021	TBD
Implementation*	Arrival time-based metering (TBFM) for PHL and EWR	Q4 CY2021	Q4 CY2021	Q4 CY2023

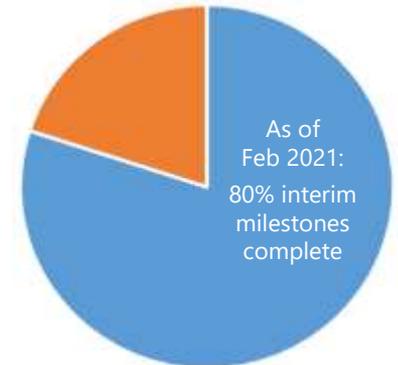
Outlook for CY2020/2021 Commitments

Type	Commitment/Milestone	Jun 2019 NJIP	Aug 2020 NJIP	Mar NAC Update
Industry	GBAS evaluation at BOS	Q2 CY2020	Q4 CY2021	TBD
Industry	GBAS at LGA	Q4 CY2020	TBD	TBD
Industry	GBAS at JFK	Q3 CY2021	TBD	TBD
Industry	Evaluate multi-route TOS	Q4 CY2021	Q4 CY2021	Q4 CY2021
Industry	Additional tower space for TFDN at BOS	Q4 CY2021	TBD	TBD

ACR: Incremental Implementation



- ✓ 10/10/2019 Publish/Implement 1 New Y-Route and 8 Waypoints
- ✓ 11/7/2019 Implement ZDC Low Altitude Sector Changes
- ✓ 12/5/2019 NOTAM NA 33 J-Routes/Q-Routes (FL Metroplex) for 56 days
- ✓ 1/30/2020 Delete/Amend 33 J-Routes/Q-Route (FL Metroplex), Cancel N/A NOTAM
- ✓ 1/30/2020 Delete 5 CHS STARs
- ✓ 3/26/2020 Delete/Amend 6 SIDs (BWI/IAD/DCA/HEF/ADW)
- ✓ 5/21/2020 Amend 2 Q-Routes: Q75, Q475
- ✓ 5/21/2020 Amend 1 SID (DOV)
- ✓ 7/16/2020 Delete/Amend 18 J-Routes
- ✓ 9/10/2020 Publish/Amend 8 Q-Routes, N/A NOTAM for 56 days
- ✓ 11/5/2020 Implement 8 Q-Routes, Cancel N/A NOTAM
- ✓ 11/5/2020 Publish/Delete/Amend 18 STARs (TEB/LGA/CHS)
- ✓ 11/5/2020 Delete/Amend 11 J-Routes/Q-Routes
- ✓ 2/25/2021 Publish/Delete/Amend 20 RDU SIDs/STARs
- 4/22/2021 Establish ZDC Ultra-High Sector 30
- 10/7/2021 Publish/Amend 24 Q-Routes, N/A NOTAM for 56 days
- 10/7/2021 Amend 1 ATL SID, Amend 4 Y-Routes
- 12/2/2021 Publish/Amend 5 STARs (PHL/EWR/TEB/LGA), Cancel N/A NOTAM
- 12/2/2021 Amend/Delete 24 J-Routes
- 1/27/2022 Delete 2 STARs (LGA/EWR)



• Incremental progress amid COVID-related schedule delays

- > Completed approximately 80% of the interim project milestones (even though full project completion was delayed by one year)
- > Recent progress – publication of RDU SIDs/STARs
- > Next key deliverable – Washington Center ultra-high sector



Opportunities Recommended at August 6 NAC Meeting



Park Visual Approach

- Operator simulations – Sep-Nov 2020
- Environmental review Jan 2021
- Flight check – Feb 2021
- Planned implementation – April 2021



High-performance Escape Routes

- Resumed planning and reviewed operational parameters – fall 2020
- Revised trials – Mar 2021

Northeast Corridor (NEC)

NAC Read-Ahead & Back-Up Slides



Task 18-4. Northeast Corridor: Implementation Risks and Mitigations of the NextGen Priorities Joint Implementation Plan

“The FAA requests that the NAC identify Northeast Corridor risks and mitigations to the successful operational implementation of industry commitments with respect to the NextGen Priorities Joint Implementation Plan through calendar year 2021. This should also include any needed industry mitigations to support successful operational integration of the joint commitments.”



Summary of Activities (since Nov 2020 NAC)

- Updates on status and progress of remaining implementation milestones:
 - > Atlantic Coast Routes (Feb 2021 SID/STAR updates)
 - > TBFM in PHL
- Updates on “NextGen Opportunities” items
 - > LGA PARK Visual procedure
 - > High-performance routes for TEB/HPN
- Continued Operator discussions on TOS



COVID-19 Impacts on NEC NIWG

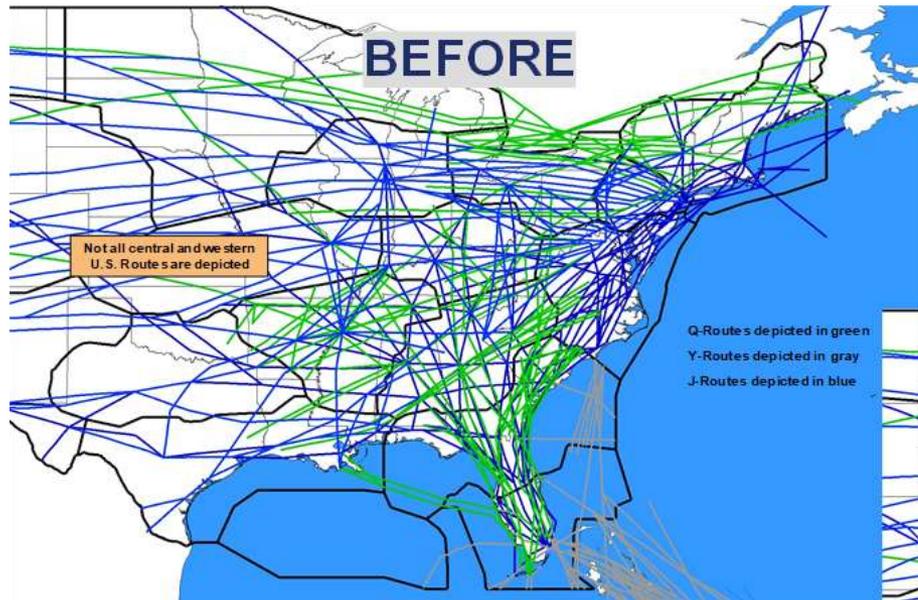
- Access to FAA and Industry facilities restricted
 - > Operational facilities are most impacted
 - > Simulators and laboratories also impacted
- FAA and Industry training impacted
 - > Access to training labs and availability of personnel
- Restoration of travel for FAA and Industry still unknown
- Fiscal austerity impacting investment
- Continued reduction in traffic levels across US but very pronounced in the Northeast

Impact on Remaining 2019-2021 NJIP Commitments

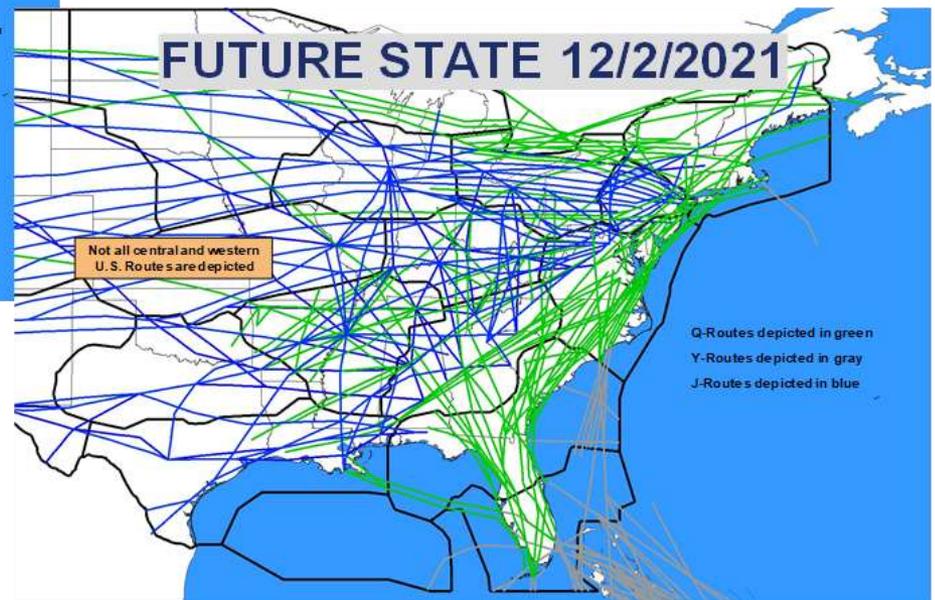
- Delays expected for all remaining CY2020 and CY2021 implementation commitments
 - > Improved departure management for flights destined to LGA
 - TBD - Waiting for traffic levels to increase
 - > DSP enhancements
 - TBD – software build schedule being worked
 - > Eastern seaboard high-altitude routes (Atlantic Coast Routes)
 - Overall route implementation still planned for end of 2021
 - Some internal ACR airspace milestones have slipped
 - > PDRR/ABRR
 - TBD – software build schedule being worked
 - > Arrival time-based metering (TBFM) for PHL
 - Impacted by ongoing PHL/EWR airspace changes
 - Combined with TBFM for EWR and shifted to end of 2023



Atlantic Coast Routes



ACR is one of the biggest routes changes in the NAS



- **What:** 39 new/amended Q Routes and Y Routes will replace the north-south high-altitude route structure along the east coast of the United States
- **Why:** Transition to a PBN-Centric NAS thus decreasing reliance on ground-based NAVAIDs
- **When:** Changes being implemented on 13 separate chart dates 10/10/2019 through 1/27/2022

NEC ACR Implementation Milestones

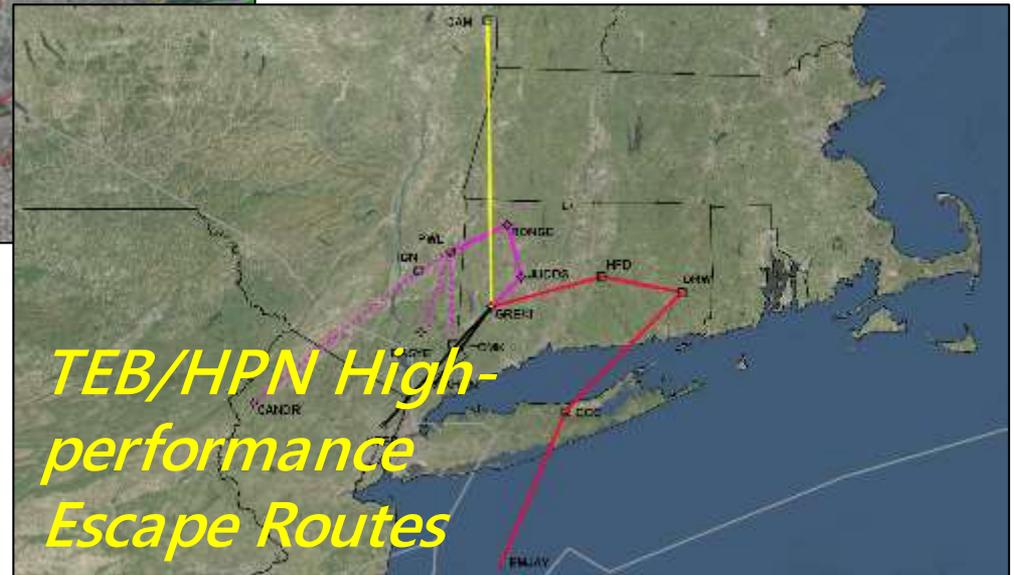
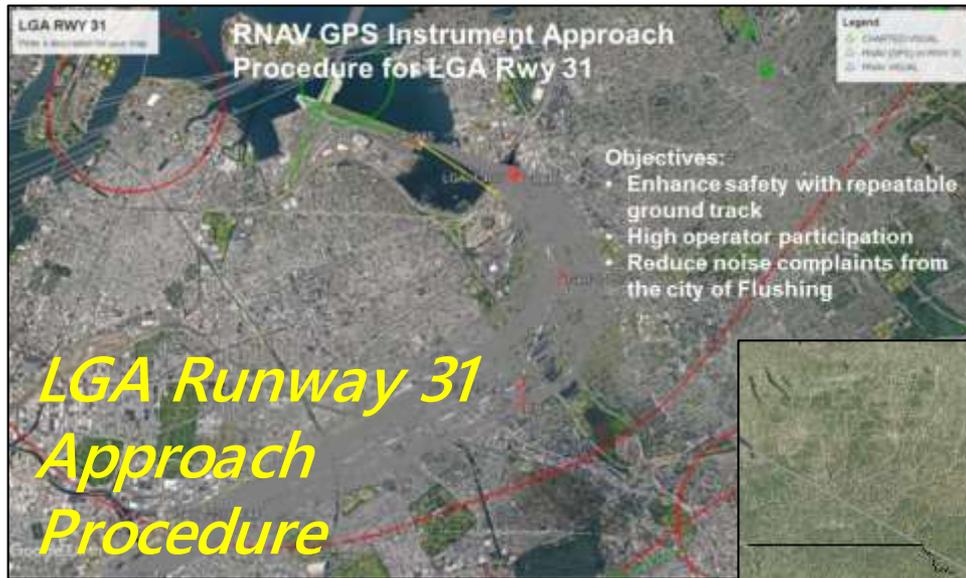
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- ✓ 9/10/2020 Publish/Amend 8 Q-Routes, N/A NOTAM for 56 days
- ✓ 11/5/2020 Implement 8 Q-Routes, Cancel N/A NOTAM
- ✓ 11/5/2020 Publish/Delete/Amend 18 STARs (TEB/LGA/CHS)
- ✓ 11/5/2020 Delete/Amend 11 J-Routes/Q-Routes
- ✓ 2/25/2021 Publish/Delete/Amend 20 RDU SIDs/STARs
- 4/22/2021 Establish ZDC Ultra-High Sector 30
- 10/7/2021 Publish/Amend 24 Q-Routes, N/A NOTAM for 56 days
- 10/7/2021 Amend 1 ATL SID, Amend 4 Y-Routes
- 12/2/2021 Publish/Amend 5 STARs (PHL/EWR/TEB/LGA), Cancel N/A NOTAM
- 12/2/2021 Amend/Delete 24 J-Routes
- 1/27/2022 Delete 2 STARs (LGA/EWR)



NEC Inputs to “Opportunities” Discussion

- ★ LGA RNAV GPS approach to Rwy31: public instrument approach procedure that can provide a stable and guided path to the threshold of Rwy31, enhancing the safety
- ★ TEB/HPN escape route: provides for an alternate route out of the airspace for capable business aviation aircraft
- LGA GLDMN and JFK 31L SKORR departures: use altitude separation to allow simultaneous departures; dispersal headings from LGA 13 provide departure efficiency; also improves efficiency by providing JFK with opportunities to utilize 31L for departures
- EWR 22L/29 operation: address the loss of a second landing runway at EWR during southwest to west winds, enabling a significant reduction in minutes of arrival delay
- LGA ILS 13 approach deconflicting TEB/EWR/LGA: deconflicts the three airports, to improve overall airspace operations and reduce the number of configuration changes

Opportunities Recommended at August 6 NAC Meeting



Status of “Opportunities” Recommendations

- LGA Runway 31 approach procedure - PARK Visual
 - > Collaborative Operator, Airport and FAA discussions
 - > Operator flight sims completed by late 2020
 - > FAA environmental review completed in Jan 2021
 - > FAA flight check completed
- High-performance escape routes for TEB/HPN
 - > Regrouped with FAA and NBAA
 - > Reviewed NBAA tabletop exercises from fall 2019; feedback on viability of proposed climb gradients
 - > Additional discussion planned for route design and climb parameters



Review of Action Items & Other Business

Greg Schwab, NAC Committee Manager, FAA

NextGen Advisory Committee (NAC) Upcoming Meetings

- **Summer 2021**

- > June 21, 2021 (1:00pm – 4:00pm ET)

- **Fall 2021**

- > October 19, 2021 (1:00pm – 4:00pm ET)





Closing Comments & Adjourn

Chip Childs, NAC Chairman
President & CEO, SkyWest, Inc.