NextGen Advisory Committee (NAC)
March 18, 2021 Meeting Summary

The NextGen Advisory Committee (NAC) convened virtually March 18, 2021. The meeting discussions are summarized below. Reference the attachments for additional contextual information.

List of attachments:

- Attachment 1: NAC Presentation Deck
- Attachment 2: Attendance List
- Attachment 3: Public Statement
- Attachment 4: Approved *FAA Reauthorization Act of 2018, Section 547 Enhanced Air Traffic Services NAC Task 20-3 Report*
- Attachment 5: *NAC SC Data Comm Ad Hoc Team Free Text STAR Recommendation Supplemental Report*

Opening of Meeting

NAC Chairman Mr. Chip Childs (SkyWest, Inc.) opened the meeting and welcomed virtual attendees.

Public Statements

After administrative housekeeping notes, Mr. Greg Schwab (FAA) invited the following public speaker to make their pre-approved public statement. Please reference Attachment 3 for the full text of the statement.

- Ms. Darlene Yaplee, Concerned Residents of Palo Alto and the Aviation-Impacted Communities Alliance (AICA)

Chairman's Report

Mr. Childs then provided the Chairman's Report. To begin, he called for a motion to approve the November 17, 2020 NAC Meeting Summary Package, which the NAC approved.

Outcome: The NAC passed a motion to approve the November 17, 2020 NAC Meeting Summary Package

Mr. Childs said that the aviation industry has seen more than its share of professional transitions during the economic crisis caused by the pandemic. This has naturally led to changes that affects NAC membership. He publicly thanked those NAC members that have or are in the process of transitioning to other professional opportunities. He specifically acknowledged that today is Mr. Craig Drew's final meeting as a NAC member representing Southwest Airlines and as the Chairman of the NAC Subcommittee. He thanked Mr. Drew for his positive impact on the NAC, the NAC Subcommittee, and all the working groups. Mr. Childs also introduced the following new NAC Members appointed by Secretary Pete Buttigieg:

- Mr. Patrick Burns, Vice President, Flight Operations and System Chief Pilot, Delta Air Lines, Inc. replacing Mr. Jim Graham
- Mr. Denis Donohue, Vice President, Communications & Airspace Management Systems, Raytheon Intelligence and Space replacing Mr. John Harris
- Mr. Joseph Landon, Vice President, Advanced Programs Development, Lockheed Martin Corp. replacing Mr. Vivek Lall

Next, Mr. Childs handed off to FAA Administrator Mr. Steve Dickson who made some FAA leadership announcements. Mr. Dickson first introduced the new Deputy Administrator, Mr. Brad Mims. He said that Mr. Mims is a distinguished transportation professional and infrastructure expert with more than 40 years of experience working across the public, private, and nonprofit sectors. He added that Mr. Mims previously served as the FAA Assistant Administrator for Government and Industry Affairs. Mr. Dickson also announced that he appointed Mr. Mims as the Designated Federal Officer (DFO) for the NAC. He also introduced Mr. Laurence Wildgoose, who joined the FAA team as the Assistant Administrator for the Office of Policy, International Affairs and Environment. Lastly, he announced the selection of Ms. Pamela Whitley as the permanent Assistant Administrator for NextGen, who had previously served in an acting capacity.

Mr. Dickson then announced that he recommended Mr. John Ladner, Vice President of Flight Operations at Alaska Airlines, to the Secretary of Transportation as the FAA nominee for the NAC Subcommittee (NAC SC) Chair, replacing outgoing NAC SC Chairman Mr. Drew. He added that Mr. Ladner represents the Alaska Air Group, which is one of the industry mainline and regional airline leaders in avionics equipage.

Mr. Childs then concluded the Chairman's Report and turned the floor over to Mr. Mims for the FAA Report.

FAA Report

Mr. Mims began the FAA Report by saying he is truly honored to have been designated DFO for the NAC. He said that he is impressed with the NAC's current efforts and is confident the FAA is receiving the best possible advice for implementing NextGen. He continued that as part of the new Administration, he will be focused on the priorities of infrastructure, environment, and racial equity.

Mr. Mims said the FAA Report will be a team effort that will include initial responses to the Minimum Capabilities List (MCL) tasking, the Performance Based Navigation (PBN) Clarification tasking advice, and a NAC Member request for more information on aviation community engagement efforts. He then handed off to Mr. Dickson who provided FAA Administrator insights.

Mr. Dickson said that at the start of NAC meetings, he shares some insights into important issues that are typically outside of the NAC's normal scope of agenda items. He said the intent is to inform the NAC of pressing issues facing the aviation community. Additionally, it provides insights on extended NAS stakeholder sectors, such as commercial space transportation and Unmanned Aircraft Systems.

He continued by describing Everett Rogers' diffusion of innovations theory and indicating that these sectors have entered the early adopter stage. He said it is a time of tremendous innovation and change that is introducing challenges. He said the FAA's certification experts are already working with several Urban Air Mobility applicants such as flying taxis that have applied for type certification of full-scale

aircraft. He added that dozens more companies are discussing conceptual prototypes and components with the FAA.

Mr. Dickson said the FAA just ended its 60-day comment period on *The Operation of Unmanned Aircraft Systems Over People Final Rule.* This is the next incremental step towards further integration of unmanned aircraft in the NAS. The final rule allows routine operations over people and routine operations at night under certain circumstances. The rule will eliminate the need for those operations to receive individual Part 107 waivers from the FAA. Additionally, he said that on March 2, the FAA selected five host airports to evaluate technologies and systems that could detect and mitigate potential safety risks posed by unmanned aircraft. This effort is part of the agency's Airport UAS Detection and Mitigation Research Program. The five airports are Atlantic City International Airport, Syracuse Hancock International, Rickenbacker International Airport, Huntsville International Airport, and Seattle-Tacoma International Airport. He said the research will lead to the implementation of new technologies that will make airports safer for passengers and traditional aircraft. Researchers plan to test and evaluate at least 10 technologies or systems at these airports. Testing will begin later this year and continue through 2023.

On the topic of commercial space, Mr. Dickson said the final rule to streamline the FAA launch and reentry licensing requirements takes effect on March 21. This rule modernizes the way the FAA regulates and licenses commercial space operations and allows the burgeoning aerospace industry to continue to innovate and grow, while maintaining public safety. He said that in 2020, the FAA licensed 41 commercial space operations for both launches and reentries, the most in its history. Those operations included a record 39 FAA-licensed launches, including the first-ever NASA-crewed mission to be licensed by the FAA. For 2021, the FAA is forecasting the number of licensed operations could reach 50 or more. He continued that the FAA is updating its automation systems and enhancing capabilities available to air traffic controllers to enable the agency to move from accommodation to integration of commercial space transportation operations in the NAS. The goal is to maximize and make more dynamic use of the airspace to gain further efficiencies during space operations and minimize impacts to other users in the NAS.

He said that as an agency, the FAA is making sure the policy and regulatory landscape welcomes exciting new entrants, while keeping safety as its North Star and ensuring the NAS continues to operate efficiently as it becomes more diversified. He then concluded and handed off to Mr. Mims

Mr. Mims opened the floor for any NAC Member comments or questions.

Mr. Joe DePete (ALPA) voiced support for the commercial space efforts and his desire to stay engaged.

Mr. Dickson thanked Mr. DePete and said there are a lot of differences but also a lot of similarities in how the FAA oversees airspace and commercial space operations.

Mr. Mims then handed off to Ms. Whitley to discuss the MCL.

Ms. Whitley said that she thinks the MCL will be recorded as one of the most important recommendations the FAA has received from the NAC. Equipping to the MCL level ensures NAS operators derive the maximum benefit from the FAA NextGen investments by specifying the minimum avionics equipment necessary to derive these benefits. She said the MCL work is foundational to the joint FAA and NAC understanding of aircraft equipage in relation to operationalizing NextGen and future airspace modernization efforts. She added that it informs NextGen implementation, as well as

how the FAA operationalizes NextGen across the NAS. She said the MCL work is finding its way in to many very important discussions on Vertical Navigation and ADS-B In application forecasts. The FAA will also use it to inform strategic conversations on the viability of a PBN-centric NAS if operators cannot meet the MCL guidelines.

She said that after careful review of the NAC MCL report and thorough consideration on its advice, the FAA intends to use the MCL as a living document to inform conversations going forward. Consequently, she recommended to the NAC DFO to issue an FAA tasking to the NAC to periodically update the MCL with any new findings or any necessary changes over time to the document's underlying assumptions so that the document remains useful. She clarified that the tasking will request that the NAC review the MCL document once a year and report any findings and whether any changes need to be made to the original report. Ms. Whitley said that the FAA appreciates the work that went into developing the MCL. She added that it will be central to The FAA's ability to achieve the goal of a PBN-centric NAS and operationalizing NextGen.

Ms. Whitley then said she had a chance to meet with the House Transportation and Infrastructure minority staff last month. She said they discussed NextGen progress and the robust industry engagement with the NAC. She added that it was a good discussion and they remain very supportive of NextGen programs and engagement with the NAC. She concluded and handed off to Mr. Mims.

Mr. Mims said he has been in conversations with NAS operators and have heard the interest in a potential link between the Administration's infrastructure efforts and the MCL equipage effort. He said he looks forward to continuing the conversation on the MCL. He added that he has also heard from operators who believe that equipping to the MCL level will allow them to reduce their environmental impact through taking advantage of fuel efficient PBN routings and real time Data Comm clearances.

Next, Mr. Mims handed off to Ms. Teri Bristol, FAA Air Traffic Organization Chief Operating Officer.

Ms. Bristol said that in a year of responding to unimaginable challenges facing the aviation community and the Nation, the NAC remarkably leaned into the challenges of airspace modernization by deliberating and delivering advice on a series of groundbreaking issues to address long-standing barriers to fully operationalizing NextGen. She said that the FAA has heard them and it takes NAC advice from the PBN Clarification, MCL, Section 547, Industry Avionics, and the "Opportunities" efforts very seriously.

She said the ATO Strategy office, led by Ms. Angela McCullough, ATO Vice President of Mission Support Services, is working the next steps in the evolution of airspace modernization. She said the team is poring over the results of the PBN Clarification, MCL, and opportunities advice. She added that the her team is also looking forward to the results of the advice from the NAC's Section 547, VNAV, and ADS-B In Ad Hoc Teams. She said the FAA is using the NAC's advice to reexamine and revalidate the vision, strategies, plans, and policies to inform its strategic way forward. To further explain, she introduced Ms. Beth White, FAA Senior Strategist for Public and Industry Engagement, who Ms. Bristol explained will introduce the nexus between airspace modernization, NAC advice, and community engagement.

Ms. White said that although the NAC has not received an update on community engagement in a while, the efforts have continued. She reviewed the steady progress made since 2016, including creating the Public Workshop Format, publishing the Community Involvement Manual and Desk Guide, restructuring regional administration so they are clear to hire Community Engagement Officers (CEOs)

and activate Matrix Teams, starting the dialogue with Airports through the Western Noise Forum and participation and presentation at Airport Industry meetings (ACI, ACC, Noise Forums), and launching virtual meetings for South/Central Metroplex, Boston, and Raleigh Durham. She said there had also been a tremendous amount of virtual training in 2020. She thanked industry participants across the board for the invaluable dialogue during these meetings that add depth to the conversations with communities.

She continued by saying that the FAA has developed a new strategy and structure to engage in meaningful dialogue with Airports and Communities about the airspace changes that are needed to continually manage and modernize the NAS. The FAA moved the Regional Administration under the Policy side and hired Community Engagement Officers (CEOs) to represent all of the Regions. These CEOs may be physically located in the Air Traffic Organization or in a Regional Office, but they operate as a National team. They have connectivity across the agency to find the appropriate and sustainable channels for communication. She said that the strategy is designed to identify who is talking to the FAA and how does it standardize that communication to ensure the FAA is understanding the question and providing good answers. She said the strategic goal is to identify the groups and provide an appropriate and sustainable channel of communication.

Ms. White then reviewed the next steps for the Community Engagement efforts. She said that based on need, the FAA is creating the Structure and Strategy that is supported by a Headquarters delivering a National Strategy with Regional engagement. She said said that previously the agency has been following single efforts such as Metroplex, Single Site PBN, VOR Mon, etc. The next evolution is to to become more holistic and regional. She specifically mentioned productive conversations with Ms. Candace McGraw (Cincinnati/Northern Kentucky International Airport) about plans at Cincinnati as an example of the more proactive and strategic community engagement efforts.

She said that part of this engagement is the tools and said the FAA has developed a full kit of tools to help in communicating the complex issues to the communities. She specifically mentioned a website, infographics, and chat bot as examples. Next, Ms. White handed off to Mr. Shawn Kozica (FAA) who briefed on airspace modernization efforts connected to community engagement efforts.

Mr. Kozica said that the shared vision for the NAC is currently laid out in the PBN NAS Navigation Strategy, which is a vision document that lays-out a desired end state and high-level commitments through 2030. He said the focus now is putting the "how" down on paper as the Metroplex program closes. This will be a national roadmap to continuously evaluate and/or modernize the airspace infrastructure and processes. He described that FAA Headquarters will provide leadership and direction on strategic priorities, integration, resources, and messaging. The regions will focus on the regional prioritization, collaboration, and resource deployment based on local considerations, and aligned with the national strategy. He said this will empower regional leadership teams to take ownership of work and prioritization in the service areas and set the course of where they want to go with their region.

He then reviewed the roadmap's key themes:

- **Integrated**
    - o Future airspace modernization efforts integrated with existing projects and programs
    - o Holistic, long-term planning around major airports to reduce repeated visits, ensure resource availability, and efficiently transition to a satellite-based NAS

- o Mr. Kozica described that this is ensuring HQ connectivity with one clear strategy that is also making sure to consider what is coming down the pipe tomorrow
- **Sustainable**
  - o Improved/streamlined business processes to ensure continuous/sustainable review, refresh, and modernization
  - o An inclusive stakeholder collaboration/governance to enable consistent connectivity and integration
  - o Mr. Kozica mentioned that this includes using the good advice from activities like the MCL and PBN Clarification work to inform efforts moving forward
- **Agile**
  - o Processes, structures, and resources that allow for scalability based on evolving technologies, new entrants, shifting priorities, and changing environments
  - o Long-term strategic planning balanced with the ability to be agile without becoming tactical

Next, Mr. Kozica reviewed the need to shift from a tactical perspective to a more strategic perspective. He described moving from conducting modernization activities tactically by stakeholder request and individual programs to planning and integrating the activities in alignment with the national strategy and priorities. He explained that resources would move from being deployed according to individual request and programs to being planned and deployed according to the national strategy and priorities. He said that messaging to stakeholders and Congress would also be developed from the agency perspective to ensure consistent and credible communications. He then handed back to Ms. White.

She said the FAA is thinking about operations and communication as an integrated effort with the overarching goal to be proactive, strategic, and coordinated. She continued to review how to break through with the message to create additional support for modernization. She described the need for more tools to inform and educate, earlier holistic conversations within communities that reflects transparency and an explanation of the purpose and need, and more voices in the regional conversation. She said this needs to be a larger story told as an entire aviation industry with earlier and holistic conversations with communities as a cornerstone to success.

Ms. White reviewed several industry initiatives that can show a supportive and integrated commitment to the FAA's Community Engagement initiative, including:

- Support for the ongoing review, and if possible, improvement to the adherence of local Noise Abatement Procedures.
- Support for a campaign to increase adherence to flight procedures. Many new procedures have been developed with input from the Airport and/or the Community. Never limiting the controller or pilots need to adapt to for safety, weather, etc., all things being equal we want to stay on procedures.
- Potential opportunities to show that newer, quieter aircraft are being considered.
- Opportunities for Industry to work with local airports, and community leadership on Industry specific requests to better inform and garner support of the request.

She closed by saying that the COVID recovery around the corner hopefully might be an opportunity to identify items the FAA and Industry can address together.

Mr. Childs then asked NAC Member Mr. Brad Pierce (NOISE) whether he had thoughts on how to engage the NAC more.

Mr. Pierce thanked the FAA for the presentations. He said that NOISE is enthused and happy to partner with the FAA, Industry, and airports around the country to move this forward. He added that the NOISE organization is open to helping, assisting, or partnering to make progress.

Ms. McGraw thanked the FAA for focusing on this, adding that if airports are involved earlier in community engagement, Industry can benefit. She said she thinks they are on the right path.

Mr. DePete said that from the pilot perspective, they are huge supporters of PBN because it is safer, has better situational awareness, is more efficient, and is cleaner. He said he fully supports engaging on it.

Mr. Patrick Burns (Delta) said that he appreciates the efforts. He said sustainability is certainly an industry priority. He added that meaningful progress on some PBN initiatives contributes to lessening the environmental impact and sustainability. He said that refocus and priority is something that Delta supports moving forward.

Mr. Drew thanked everyone for the great discussion. He said that one of the big elephants in the room when it comes to NextGen and PBN is mixed equipage. Until Industry reaches a really high level of proper equipage, it is never going to reach the common goal of reduced track miles, reduced fuel emissions, environmental sustainability and noise goals. He continued by mentioning that A4A has a draft proposal for federal funding of $1.2 billion for equipage as part of the $1.9 trillion infrastructure bill. He said if that is a possibility, it would save 5-10 years of waiting for things to slowly improve as older aircraft are replaced.

Mr. Childs said he has had significant engagement on this given the current political climate, noting that there are several legislative opportunities related to equipage. He said that from a sustainability perspective, getting equipage in to some of this legislation through leveraging trade organizations is a great opportunity.

Mr. Dickson agreed that mixed equipage is one of the biggest challenges. He said avionics on the fleet that is out there is a form of infrastructure. To the extent that a proposal like this can be looked at as part of the strategy going forward, the FAA would be interested in working with the NAC on what that looks like. He added that the work that has been done on the Minimum Capabilities List is certainly a good template that gets to the baseline equipage needed.

Mr. Childs said establishing a standard that the trade organizations and lobbyists can go back to with an example of where we need to be to move forward is among the most important things the NAC has done. He added that moving that forward to Congress with FAA support of what the benefits are is key, while acknowledging it may be out of the NAC's specific purview.

Mr. Warren Christie (JetBlue) said that on the subject of community engagement, Industry stands ready to engage. He asked that the FAA call Industry out if it is not providing support. He then asked how Industry can continue to support the PBN Roadmap strategy and what role the NAC or NIWGs might play.

Mr. Kozica said that headquarters will provide national oversight with projects being managed locally at the regional level. He said the connectivity to industry is very important. He added that it helps to

understand Industry priorities. He said that the FAA is going to rely on continued conversations at the NAC and lower levels, referring to it as an ongoing conversation.

Mr. Don Dillman (FedEx) acknowledged the briefing and offered his encouragement and support. He also acknowledged the partnership with the FAA that contributed to having no significant ATC-0 events since late 2020.

Mr. Ladner noted that although COVID-19 has slowed controller training and industry benefits, he is encouraged and looks forward to continue working with the FAA to make sure the investments pay off.

Ms. Bristol then continued her report. She said that nearly 12 months into the pandemic, the FAA and ATO continue to work collaboratively with Customers, Stakeholders and Labor to manage through the national health emergency. Navigating through a complex web of innumerable federal, state, regional, & local requirements, continues to be a challenge. She said the top priority will always be to ensure the delivery of safe and efficient air traffic services.

She said that the FAA has worked in close collaboration with NATCA and FAA flight surgeons, who helped to interpret CDC guidance to keep the operational workforce safe. She said even though her team is working differently, the ATO is working every bit as hard to keep the operation running smoothly and efficiently. She said they continue to execute on high priority safety and sustainment activities across the NAS, emphasizing engineering and repair work outside of facilities, on airfields and remotely populated sites, as well as having pilots out flight checking procedures and equipment each day.

Ms. Bristol said like Industry, she is anxious to continue the momentum in implementing the NextGen portfolio of programs. Over this last year the workforce has utilized creative ways to move NAS modernization forward. For example, they have employed remote technologies for many activities, including test, safety panels, site surveys and software development. She said they have also made great progress staging work for when facilities open. When trying to coordinate multi-month, multi-facility schedules with large teams of people against the backdrop of a situation where there is little predictability and it gets extremely complicated.

She said gaining access to FAA field facilities for NextGen program work, while still a very challenging proposition, is looking more promising if the current decline in COVID positive cases continues. She said the weeks ahead will be a delicate balance. The FAA is laser focused on working smartly and continuing to take advantage of whatever low-risk opportunities it can find to conduct activities in support of NAS modernization. She said she does not expect to pick up where we left off a year ago. Re-planning work will need to continue to occur as we work to better understand the impacts on our programs. She said the FAA will continue to provide updates to the public and aviation community through FAA website updates, press releases, and social media.

She closed by saying she is cautiously optimistic, adding that the FAA is very anxious to get back in facilities when the time is right. She then handed off to Mr. Mims.

Mr. Mims concluded the FAA Report and handed off to Mr. Childs.

Chairman's Roundtable

Mr. Childs thanked Mr. Mims and introduced the Chairman's Roundtable agenda item. He said it is intended to be a continuation of the discussion that started at the last NAC focused on aircraft

equipage. At that meeting, Mr. Mike Sinnett and the Boeing team provided a look at its recently updated market survey. This was followed by Mr. Mike Ingram (Honeywell) with an update from the avionics manufacturer market outlook. These briefings set up a good high-level conversation focused on the mainline and cargo operator equipage trends based on publically available fleet forecasts.

He said he asked Mr. Bill Whyte (RAA), Mr. Ed Bolen (NBAA), and Mr. Pete Bunce (GAMA) to provide the NAC with similar insight into the regional airline, business jet, and high-end general aviation fleet forecasts and avionics equipage outlooks. Mr. Childs said the continued focus on equipage is intended to provide a deeper understanding of operators' equipage status and forecasts. With this information, the NAC and its technical staff will be able to provide the FAA advice armed with a deeper understanding of the operator ecosystem.

Mr. Childs said that one of the reasons he was appointed as NAC Chairman is the recognition that, of all NAS operators, regional fleets were clearly lagging in meeting even the basic equipage to benefit from NextGen. This also led the NAC to identify a mixed equipage risk to NextGen. The NAC assessed that mixed equipage posed a high probability of inhibiting those better equipped from achieving returns on their avionics investments. Due to the regional airlines' unique and varying business relationships with the mainline operators, current equipage data and future fleet forecasting is especially difficult. He then handed off to Mr. Whyte.

Mr. Whyte said that his briefing is to to set the scene for the discussion alongside the NBAA and GAMA briefing. He began by reviewing the types of planes regional airlines fly, including the CRJ-200, CRJ-700 (Variant CRJ-550), CRJ-900, Cessna 402, Tecnam Traveller, Islander, ERJ-140, ERJ-145, ERJ-170/175, ATR-42, ATR-72, Cessna 208, DHC-8 1/2/300, and DHC-8 400.

He then reviewed regional fleet numbers (just over 1,600) detailed in the following table:

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

Next, Mr. Whyte reviewed Current Regional fleet avionics equipment detailed in the following table:

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

Mr. Whyte then reviewed some regional aircraft manufacturers including Embraer (ERJ-175 and ERJ-175 E2), ATR-72, Mitsubishi Spacejet, and De Havilland Canada Q-400.

Next, he reviewed some of the questions that will need consideration moving forward, including:

- Who decides what the size and composition of the regional fleets will be in future years?
- What aircraft will continue operating?
- 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?

He concluded by reviewing how the regional fleet currently fits with the MCL.

NextGen Enabling Category	Aircraft Enabling Capability	Key Missing Components
Performance Based Navigation	• 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	• RF Leg Type • Autopilot-coupled VNAV • Auto-throttle • RNP AR capability • FMC database size
Data Comm	• FANS-1/A with "Push to Load" over VDL Mode 2 with multi-frequency	• CMU/CMF/ATSU • VHF Digital Radios • FANS 1/A capable FMC/FMGC
Surveillance	• ADS-B Out: **Mandate**	• None
Performance Based Navigation, Low Vis Ops, Surveillance	• Resilient NextGen Ops (DME-DME/IRU)	• Airworthiness approval for DME-DME, IRU hardware

Mr. Whyte then handed off to Mr. Childs. He said that in looking at regional fleet numbers, the issue of equipage in the regional fleet is complicated. He said a year ago many in industry were looking for pathways to equipage. He added that the pandemic is creating demand for smaller communities and there is a strong resurgence in demand for smaller aircraft. He noted that although SkyWest owns most of its aircraft, many regional aircraft are owned by major carriers and the responsibility for equipage should be on major carriers in those situations.

Mr. Childs then requested a deeper dive with Mr. Dickson and his staff to further discuss the dynamics of this problem and potential solutions.

Mr. Bryan Quigley (United Airlines) said that one of the challenges is who pays for equipage, noting that some aircraft are owned by legacy carriers and regional carriers. He also mentioned that exclusivity can be an issue, with very few regional aircraft being flown for exclusively for one carrier. Who pays for the equipage is a huge challenge. He added that some equipage also requires pilot training. He said the complexity is tremendous, clarifying that he is trying to add a little more detail to the conversation.

Mr. Childs said he believes everything has to have a return on investment composition. He mentioned that regionals have had good conversations and engagement with major carriers but that the pandemic derailed the conversations. He said that as the pandemic winds down, he hopes for more conversation, noting that potential solutions get extremely technical and complex commercially.

Mr. DePete said this is great discussion, adding that solving this problem enables Industry to benefit from NextGen. He initiated discussion on the idea of including financial incentives to bridge the equipage gap in the Administration's upcoming infrastructure bill. He said that COVID has made it clear that aviation is critical and that Industry has a strong argument to talk about some type of financial incentives.

Mr. Quigley said that United has discussed this idea internally and held initial conversations with A4A. He said it is a brilliant thought that he absolutely believes has merit and encouraged the NAC to get on same page. He added that getting ALPA engagement and support is priceless. Mr. Childs mentioned looking in to the viability of developing a NAC consensus (e.g., letter) to help move these efforts forward. He specifically mentioned the Administration's infrastructure bill, tax bill, and environmental bills as potential opportunities. He said that he would work with the FAA and the lawyers to determine feasibility.

Mr. Christie said he clearly supports further equipage, adding that the closer Industry gets to full equipage, the sooner it benefits. He also pointed out that some carriers have already made investments that may deserve some consideration.

Mr. Bunce said identifying the best bang for the buck to retrofit the fleet with would make it easier for Industry collectively.

Mr. DePete mentioned the idea of retroactive tax credits for carriers who have already equipped.

Mr. Childs then handed off to Mr. Bolen and Mr. Bunce. Mr. Bunce reviewed the following "MCL: In Production Business Jets in 2021" table:

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 en route 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

He then reviewed some MCL general feedback and challenges, including:

- 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

Mr. Bunce said challenges come in shifting requirements. Technology is moving so fast that when you look at investments manufacturers have to do it becomes a huge gamble. These shifts hurts the ability to get to full equipage, also mentioning the need to leap frog requirements between the US and Europe and the need to build jets as a global entity. He said there is always the lag between order/delivery versus what is required. He then handed off to Mr. Bolen

Mr. Bolen said the MCL has done a great job of laying a pathway for manufacturers and operators. He said realities of mixed equipage are realities Industry needs to keep in mind. He then reviewed 2020 business jet operations. He said operations fell off dramatically as the reality of COVID became clear, then around the late May/early June timeframe they saw improvements. Operations are down 15-20% over the year, adding that the flights taking place were not going to more traditional business areas.

He then reviewed some of the entrants into service in 2020, including aircraft from Bombardier, Daher, Epic Aircraft, Piper Aircraft, Pacific Aerospace, Pilatus, and Textron Aviation. He then reviewed some of

the business airplanes in certification including: ACJ Two Twenty, Dassault 6X, Gulfstream G700, Textron CE-280 Denali, Textron CE-408 SkyCourier, and Textron King Air 260.

Mr. Bolen emphasized the need for harmonized regulation and to build an infrastructure for the future of aviation. He said 2020 was a challenging year, but also saw continued progress and new aircraft in the market.

Mr. Bunce and Bolen reviewed some future electric certified aircraft and associated certification efforts. They emphasized the need for increasing communication between the NAC and the Drone Advisory Committee (DAC) moving forward as these and other new entrants start sharing the airspace. They then handed off to Mr. Childs. He thanked Mr. Bunce and Mr. Bolen for the briefing and posed the question of how to integrate with the DAC.

On behalf of the FAA, Mr. Mims agreed to explore the potential for increasing communication on efforts to certify electric propulsion aircraft and explore the potential for increasing communication between the NAC and DAC on this issue.

Mr. Childs thanked the NAC for the engagement and encouraged continued conversations even after the NAC meeting. He also encouraged NAC Members to reach out to him with any feedback. He said he will continue to reach out to other NAC members and encourage them to help engage in discussions important to the NAC mission. He offered Ms. McGraw as an example. He said he saw a recent article in the New York Times on efforts to diversify the business portfolio at Cincinnati Northern Kentucky International Airport, which includes the Amazon Air build-up. He said she has accepted his invitation to brief the NAC this summer on the updates to CVG with the expanding cargo operations, push to add Data Comm clearance services, adoption of driverless ground equipment, and other areas she would like to highlight. He said he had also asked her, as a board member of Airports Council International-North America, to inform the NAC of other airport infrastructure projects from around the country, such as the improvements at Salt Lake City (SLC) or potentially even coordinating with Mr. Huntley Lawrence (PANYNJ) on a briefing about infrastructure updates at LGA or JFK.

Mr. Dickson said that he wants to go back to the points about a holistic approach. He said he is pushing his leadership team very hard to take an enterprise approach around these issues and to think about requirements across domains. He said how they proceed from here will look different. This does not necessarily mean delays. He said things that are going on in the real world are interacting with airspace modernization. He said there is a conversation here where they can look at opportunities to look at how to holistically move forward.

Action: The NAC Chairman and FAA Administrator committed to a follow-up conversation on the mixed equipage risk and holistic way forward.

Mr. Pete Dumont (ATCA) said this is what ATCA is looking at right now with the Blue Skies Initiative. He said that he would like some time in the future to present ATCA's view of what of modernization looks like.

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

Next, Mr. Childs introduced the Section 547 Ad Hoc Team Lead, Mr. Warren Christie. He said Mr. Christie has done a fantastic job leading the NAC-level ad hoc team tasked with helping the NAC provide advice to the FAA on its congressionally mandated pilot program, which was laid out in the FAA

Reauthorization Action of 2018, Section 547. He said the presentation is the culmination of two years of NAC work. He then handed off to Mr. Christie.

Mr. Christie began by thanking the members of the Section 547 Ad Hoc Team, as well as the SME team that supported the members. He then reviewed the FAA Reauthorization Act of 2018, Section 547 language and the three elements of the NAC tasking, including:

- 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

Next, Mr. Warren then provided a summary of the report including key definitions, tasking elements, and other recommendations detailed in the report (reference Attachment 4 for the complete report). The following table summarizes the 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

Mr. Christie reviewed the concept of "Staggered Start" that suggests the start of the pilot program should be staggered to allow for inclusion of meaningful candidates, starting with those candidates that are feasible in September 2021 and committing to actions needed to include other candidates that

could be feasible by mid 2022. He said the adjusted start would not impact the mandated pilot program end date. He added that NAC operator members will commit to go with the FAA to Congress to support the staggered start time. He noted that this concept was not part of the tasking, but said the team recommends this option be considered.

Mr. Bunce asked that as this capability is tested, if there was a sustainability package that speaks to how to sell this in messaging to communities.

Mr. Christie responded that there is a way to tie that back to sustainability, but the group did not discuss that much. However, he said he thinks it is fair to include that.

He then continued to review a series of other recommendations in the report including:

- 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

Mr. Childs said the team has done an outstanding job of getting this back on schedule and that the FAA is expected to respond at the June 2021 NAC Meeting. Mr. Christie commended the work of the SME team where he said the majority of the work was done.

Mr. Childs then called for a motion to approve the Section 547 Ad Hoc Team's report as advice to the FAA.

Outcome: The NAC passed a motion to approve the *FAA Reauthorization Act of 2018, Section 547 Enhanced Air Traffic Services NAC Task 20-3 Report* as advice to the FAA

NAC Subcommittee (SC) Chair's Report - NAC Taskings Status

Next, Mr. Childs handed off to NAC Subcommittee Chairman Mr. Drew who walked through the current NAC SC issues with the working group leads. Mr. Drew began by sharing what a tremendous honor it has been to serve on the NAC and as the NAC Subcommittee Chair. He said he is immensely proud of the many accomplishments in the NAC and that it has been a pleasure to engage with everyone on both the Industry and FAA sides. He said that at the NAC Subcommittee level, he is confident that the NAC SC is in good hands with Mr. Ladner taking the reins as NAC SC Chair and wished him nothing but the best.

Mr. Drew said the NAC SC has continued to persevere and remain engaged on the various NAC taskings it oversees. Since the November 2020 NAC, he said work on the ADS-B In and VNAV taskings has continued in earnest and that the NAC SC is excited about both teams' early findings.

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

Next, Mr. Drew handed off to ADS-B In Ad Hoc Team Co-Leads Mr. Don Kauffman (Honeywell) and Mr. Dave Surridge (American). Mr Kauffman began by reviewing the tasking language and ADS-B In Ad Hoc Team members. He then reviewed the timeline that was extended out to the June 2021 NAC, where the team will brief its final report. He then reviewed some of the teams activities including SME presentations on some ADS-B In applications under consideration, airline, pilot, and OEM

questionnaires on level of interest and priority of various applications, and the final report outline that will focus on a summary of these activities. He then reviewed the ADS-B In applications under consideration that airlines will be asked to rank on both interest and priority, including:

- 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)

Mr. Surridge then reviewed some of the specifics of the respective airline, pilot association, and OEM questionnaires.

NAC Task 20-2: Vertical Navigation (VNAV)

Next, Mr. Drew handed off to VNAV Ad Hoc Team Co-Leads Mr. Greg Young (Delta) and Mr. Michael McDowell (Collins Aerospace). Mr. Young began by reviewing the team's timeline that was extended out to the June 2021 NAC, where the team will brief its final report. He then reviewed some of the fleet data, including:

- 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
- The team targeted 1809 (85%) of these a/c as belonging to 17 "Impactful Operators," each operating 20 or more a/c

After reviewing the team's initial strategy, Mr. Young then reviewed the team's modified strategy to engage focused on approaching all 17 impactful operators in the same pass with a standardized data response template with MITRE as the primary collection venue. He said that 14 operators have acknowledged participation (three yet to acknowledge contact), with six data responses to date, representing 786 a/c (43% of the target group). He described the "second half" engagement strategy as focusing on one-on-one outreach (leveraging RAA), mailed briefing packages, and personal references. The team also provided an overview of its most recent working group meeting that featured upgrade briefings from Collins Aerospace and Honeywell.

Multiple Runway Operations (MRO)

Next, Mr. Drew introduced the MRO team, including Mr. Natee Wongsangpaiboon and Mr. Raul Zamora from the FAA and industry co-chairs Mr. Phil Santos (FedEx) and Mr. Scott Dehart (Southwest Airlines). The team reviewed the following accomplishments:

- 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 through put 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

Next, the team reviewed the following looking ahead information:

- 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 and Data Sharing

Next, Mr. Drew introduced the Surface and Data Sharing team including Mr. Doug Swol and Mr. Ayaz Kagzi from the FAA and industry co-chairs Rob Goldman (Delta) and Steve Vail (Mosaic). The industry co-chairs briefed the following:

- SWIFT meetings continue with tremendous participation and energy
  - 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

- o 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

The team then provided the following update on 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
  - o CLT Equipment maintained until TFDM implementation
  - o 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'
  - o TBO departure scheduling
  - o Need for fused data and a method for distribution (microservices)
- ATD-2 phase 3 – "Surface meets trajectory options"
  - o DFW/DAL from 2019 through 2021
    - Multi-airport geometry/balance and delay reduction
    - Improving departure throughput at TRACON/Center boundary

Mr. Swol then briefed the following TFDM program status:

- Build 1 Status (Key Site: PHX)
  - o Completed B1.2 Software Development and began remote Testing
    - B1.3 will be IOC software build in PHX
  - o Planning B1.2 operational risk reduction test at WJHTC in April-May 2021
- Build 2 Status (Key Site: CLT)
  - o 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
  - o 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)

Mr. Swol then reviewed the following milestone impacts:

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

Performance Based Navigation (PBN)

Next, Mr. Drew introduced the PBN team including Mr. Juan Narvid, Mr. Aaron Wilkins, and Ms. Wendy O'Connor from the FAA and industry co-chairs Mr. Brian Townsend (APA) and Mr. Bill Whyte (RAA). Mr. Whyte provided an update on the recent Las Vegas Metroplex Implementation, which he described as a great success. The following bullets provide an overview of the project that Mr. Whyte briefed (reference Attachment 1 for additional context in the briefing slides).

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

        o   Rwy 19 Departures

Data Communications (Data Comm)

Next, Mr. Drew introduced the Data Comm team with Mr. Jesse Wijntjes from the FAA and industry co-chairs Mr. Chris Collings (L3Harris) and Mr. Ed Evans (Southwest Airlines). The team reviewed the following 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
- 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

Next, the team provided background and an overview of the Data Comm Ad Hoc Team's 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

The Data Comm Avionics Ad Hoc has drafted the recommendation for the En Route STAR in Free Text mitigation in response to the FAA's action at the November 2020 NAC. The team developed also NAC SC Data Comm Ad Hoc Free Text STAR Recommendation paper to provide some background and rationale for the recommendation (reference Attachment 5). The team then provided an overview of avionics updates detailed in the following slide:

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 Critical Path Action	Operating; No Action Required	Delayed: Operating fix needed	Delayed/Not Operating

Data Comm Fleet Status

- Operating 44%
- Delayed: Operating fix needed 41%
- Not operating 15%

After the briefing, Mr. Drew encouraged anything that FAA and NATCA can do to get facilities back open because the situation the Data Comm team described creates a mixed equipage Data Comm environment.

Northeast Corridor (NEC)

Next, Mr. Drew introduced the Northeast Corridor team with Mr. Wilkins, Mr. Narvid, and Ms. O'Connor from the FAA and industry co-chairs Mr. Ralph Tamburro (Port Authority of New York and New Jersey) and Ms. Lee Brown (JetBlue). Ms. Brown reviewed the status of the following key issues for NEC:

- 2020/2021 Commitments
  - o Facility access, travel, training and fiscal limitations are delaying some commitments beyond the dates in the August 2020 NJIP update
  - o Virtual resources support progress
- Advancing NAC-recommended "NextGen Opportunities"
  - o LGA Runway 31 approach procedure
  - o High-performance escape routes for TEB/HPN
- Looking ahead
  - o Focus for continuing work on LGA Runway 31 procedures and TEB/HPN High-Performance Escape Routes
  - o Monitor existing milestone status

She then provided an outlook overview of CY2020/2021 commitments. With specific regard to the ACR milestone, Mr. Tamburro reported incremental progress amid COVID-related schedule delays, including:

- 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

Mr. Christie thanked Ms. Bristol and her team for moving opportunities forward. She thanked Mr. Christie and said it has absolutely been a team effort.

Mr. Drew thanked the NEC and the rest of focus areas and ad hoc teams for the outstanding work and handed back to Mr. Childs

Mr. Childs thanked Mr. Drew and everyone involved with the working groups, ad hoc teams, and NAC Subcommittee. He then handed off to Mr. Dickson who had some remarks about Mr. Drew.

Mr. Dickson said that it is an honor to recognize Mr. Drew's many successes in all aspects of the NAC. From his long-term perspective, Mr. Dickson said Mr. Drew can be proud of the impact he has made as a NAC member during his more than five-year tenure. In addition to his NAC member responsibilities, the FAA asked him to provide leadership to the NAC Subcommittee as its Chair. Mr. Dickson said he has volunteered countless hours to ensure the technical analysis is thorough and that it comes from the best technical experts from the aviation community. This work underpins all NAC deliberations and ultimately manifests itself as official advice to the FAA. Over the past four years as Chair, Mr. Drew ensured the FAA and the NAC were able to jointly agree on more than 185 FAA and industry NextGen milestones of priority to the entire aviation community. His leadership ensured successful completion of all joint milestones prior to the onset of the pandemic in the focus areas of Multiple Runway Operations, Data Communications, Surface and Data, Performance Based Navigation, and a focus on the Northeast Corridor. When faced with long-standing barriers to successful NextGen implementation, Mr. Drew formed ad hoc teams to focus exclusively on these vexing barriers to address them. His leadership has ensured that issues with industry avionics, PBN clarification, Vertical Navigation, and ADS-B In are investigated by experts and critical information is brought to light that may one day resolve all of these barriers. Mr. Dickson said his leadership has been historic. Over the past year, Mr. Drew led through the most consequential pandemic in our lifetime. In March 2020 when COVID-19 was designated a national emergency, he immediately worked with Mr. Childs and the NAC Subcommittee to determine a way forward for the NAC SC work during the pandemic. The result was an enthusiastic recommendation to the FAA to continue on with the NAC SC work in a virtual environment. Additionally, he started a conversation with the FAA to assess if during the pandemic, with so few flights operating in the NAS, where there any opportunities to leverage in this environment to propel NextGen related work forward during this unique period. Mr. Dickson said thanks to Mr. Drew's leadership, the NAC SC has completed one of the most productive years since it was established. His impact on the entire aviation community has been immense. He said thanked Mr. Drew for all he has accomplished and the course he set for continued FAA-NAC success. He then handed off to Mr. Childs.

Mr. Childs said it has been a true pleasure to work with Mr. Drew as a NAC colleague and as the NAC Subcommittee Chair. He provided leadership on some of the most contentious issues seen in the NAC, ensured all had a voice at the working group and subcommittee level, coordinated with FAA leaders, and dedicated an enormous amount of hours collaborating with everyone involved to help make sure they always made progress. He congratulated and thanked Mr. Drew.

DFO Announcements

Next, Mr. Childs handed off to Mr. Mims for announcements. Mr. Mims said the FAA agrees with the request for extension of the VNAV tasking to Summer 2021. Additionally, as Ms. Whitley stated earlier in the meeting, the FAA will request periodic updates to the MCL. He said he will send the NAC an FAA tasking letter to cover both the VNAV extension and the MCL periodic update tasks after this meeting. Mr. Mims then handed off to Mr. Childs.

Closing Comments and Adjourn

Mr. Childs said that he and Mr. Mims would like to thank NAC Members for their time and participation. Mr. Childs then adjourned the meeting.

Attachment 1

NAC Meeting

March 18, 2021

Opening of Meeting

Chip Childs, NAC Chairman

President & CEO, SkyWest, Inc.

March 18 NAC Administrative Announcements

- Reminder: Please keep your phones and/or computer mics on mute.

- For **NAC members with comments or questions, presenters, and pre-approved speakers only,** when called upon to speak by the Chairman:

  > Please announce your name and organization

  > If using Zoom computer audio, click the Mute/Unmute button in the bottom left corner

  > If using the phone line audio without a participant ID, dial *6 to unmute, as well as your phone's mute button if enabled

  > If using a phone line and entered a participant ID, click the Zoom Mute/Unmute button, dial *6 to unmute your phone line, as well as your phone's mute button if enabled

- Rather than do a roll call, please feel free to scroll through the Zoom Participants list by clicking the Participants button at the bottom of the Zoom window. All meeting participants will be captured in the meeting summary.

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, 2020 – NAC Meeting Summary Package Draft

Newly Appointed NAC Members

Patrick Burns

Vice President, Flight Operations
& System Chief Pilot

Delta Air Lines, Inc.

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

Update on Community Engagement

March 18, 2021

Federal Aviation Administration

Steady Progress

- **2016/2017**
  - Create the Public Workshop Format. Open house format, educational stations, one on one dialogue with the community.

- **2017/2018**
  - Community Involvement Manual and Desk Guide published.
  - PBN Blueprint informed Engagement Strategy

- **2018**
  - Restructure RA's, clear to hire Community Engagement Officers (CEOs) and activate Matrix Teams
  - Start the dialogue with Airports through the Western Noise Forum and participation and presentation at Airport Industry meetings (ACI, ACC, Noise Forums)

- **2019- 2020**
  - All CEOs on board and training completed
  - Launched Virtual Meetings for South/Central Metroplex, Boston, and Raleigh Durham

FAA Community Structure and Strategy

New structure and new positions

The FAA has developed a new strategy and structure to engage in meaningful dialogue with Airports and Communities about the airspace changes that are needed to continually manage and modernize the National Airspace System (NAS).

✈ Regional Administration moved under the Policy side of the Agency.

✈ Community Engagement Officers were hired to represent all of the Regions. They may be physically located in the Air Traffic Organization or in a Regional Office but they operate as a National team.

✈ Identify WHO is talking to us and HOW do we standardize that communication to ensure we are understanding the question and providing good answers.

✈ Our strategic goal is to identify the groups and provide an appropriate and sustainable channel of communication.
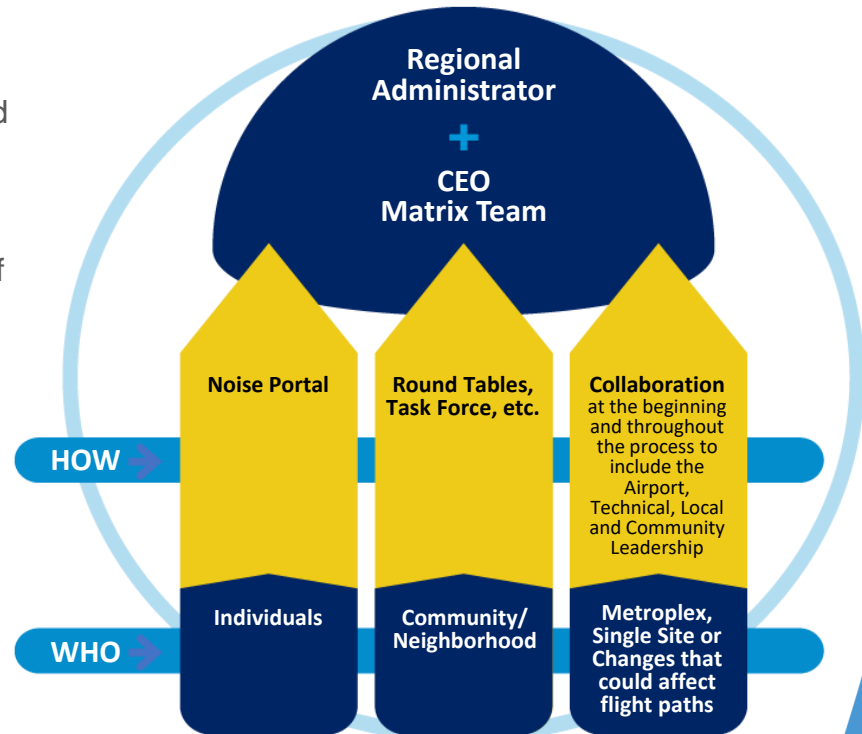
What's next for our CE effort?

- **Based on the need we creating the Structure and Strategy that is supported by a Headquarters delivering a National Strategy – Regional engagement**

- **We have been following single efforts – Metroplex, Single Site PBN, VOR Mon, etc.**

- **Our next evolution is holistic and regional. We will not just have CE follow a specific change, but rather ask:**

  - What is the 5 year plan for Cincinnati?

  - What is the growth with Amazon and DHL?

  - What are the Community Concerns around that new growth?

  - What are the Airport projects?

  - Our effort will need to blend all of that work and all of those voices.

Community Engagement Support

Presentation Materials – Poster Board

PowerPoint Presentations

eBook

Virtual Workshops

Graphics

AI Chat Bot

Website Content

Infographics

Video Production

14

Airspace Modernization Roadmap

Presented to: NextGen Advisory Committee

Presented by: FAA Air Traffic Organization

March 18, 2021

Federal Aviation Administration

Overview

Where are we today?	Where do we need to go?	What do we need to get there?

PBN NAS Navigation Strategy

Airspace Modernization Roadmap

National Strategic Oversight — FAA Headquarters leadership and direction on strategic priorities, integration, resources, and messaging

A vision document which lays-out a desired end state and high-level commitments through 2030

A national roadmap to continuously evaluate and/or modernize our airspace infrastructure and processes

Regional Execution — Regional prioritization, collaboration, and resource deployment based on local considerations, and aligned with the national strategy

Key Themes

Integrated

- Future airspace modernization efforts integrated with existing projects and programs

- Holistic, long-term planning around major airports to reduce repeated visits, ensure resource availability, and efficiently transition to a satellite-based NAS

Sustainable

- Improved/streamlined business processes to ensure continuous/sustainable review, refresh, and modernization

- An inclusive stakeholder collaboration/governance to enable consistent connectivity and integration

Agile

- Processes, structures, and resources which allow for scalability based on evolving technologies, new entrants, shifting priorities, and changing environments

- Long-term strategic planning balanced with the ability to be agile without becoming tactical
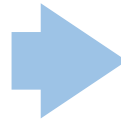
Where do we need to go?

From

To

Modernization activities conducted tactically by stakeholder request, and individual programs (separate uncoordinated requests at a single location)

Modernization activities are planned and integrated to align with national strategy and priorities (enabling multiple capabilities in a holistic and coordinated manner)

Resources are deployed according to individual requests and programs (resources are assigned tactically)

Resources are planned and deployed according to national strategy and priorities (long-term planning enables agile, sustainable execution)

Responsive/reactive messaging is developed by FAA organizations to address inquiring stakeholders/Congress

Messaging is developed from an agency perspective to ensure consistent/credible communications and responses to stakeholders/Congress

Where are we headed?

GOAL:

- Proactive,

- Strategic,

- Coordinated

19

Telling the Whole Story

- **How do we break through with our message to create additional support for essential modernization?**

- **We know that Satellite Navigation is:**
  - A safety enhancement
  - Can be used to avoid noise sensitive areas and reduce the number of homes overflown
  - Optimized arrival procedures show significant reduction in CO_2 emissions and is a more sustainable way to operate.

- **We need more tools to inform and educate.**

- **We need earlier holistic conversations within communities that reflects transparency and an explanation of the purpose and need.**

- **We need to add more voices to the regional conversation.**

How can Industry support the FAA CE Structure?

- **Set of industry initiatives that can show a supportive and integrated commitment to the FAA's Community Engagement initiative.**

  - Support for the on-going review, and if possible, improvement to the adherence of local Noise Abatement Procedures.

  - Support for a campaign to increase adherence to flight procedures. Many new procedures have been developed with input from the Airport and/or the Community. Never limiting the controller or pilots need to adapt to for safety, weather, etc., all things being equal we want to stay on procedures.

  - Is there an opportunity to show that newer, quieter aircraft are being considered?

  - Identify the opportunity for Industry to work with local airports, and community leadership on Industry specific requests to better inform and garner support of the request.

Chairman's Roundtable

Chip Childs, NAC Chairman

President & CEO, SkyWest, Inc.

NextGen Advisory Committee Round Table

March 18, 2021

Regional Airlines Perspective

RAA
Regional Airline Association

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

RAA
Regional Airline Association

Regional Airline Fleet Types

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

Regional Airline Fleet Types

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

Regional Airline Association

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

RAA
Regional Airline Association

Regional Aircraft Manufacturers

- o Embraer
  - o ERJ-175
  - o ERJ-175 E2
- o ATR-72
- o Mitsubishi Spacejet
- o 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?

RAA
Regional Airline Association

Minimum Capabilities List (MCL)

NextGen Enabling Category	Aircraft Enabling Capability	Key Missing Components
Performance Based Navigation	• 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	• RF Leg Type • Autopilot-coupled VNAV • Auto-throttle • RNP AR capability • FMC database size
Data Comm	• FANS-1/A with "Push to Load" over VDL Mode 2 with multi-frequency	• CMU/CMF/ATSU • VHF Digital Radios • FANS 1/A capable FMC/FMGC
Surveillance	• ADS-B Out: **Mandate**	• None
Performance Based Navigation, Low Vis Ops, Surveillance	• Resilient NextGen Ops (DME-DME/IRU)	• Airworthiness approval for DME-DME, IRU hardware

RAA
Regional Airline Association

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
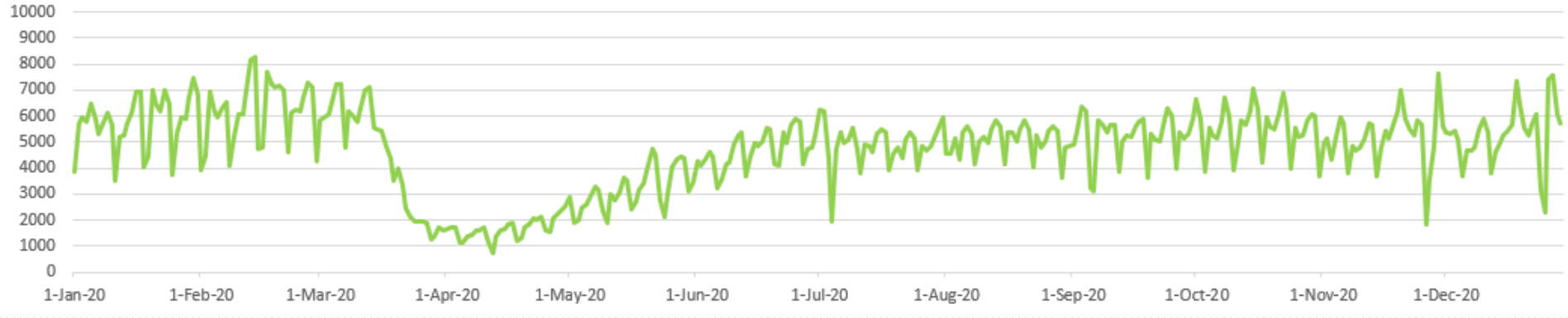
Source: FlightAware

ENTRANTS INTO SERVICE - 2020

Bombardier

Daher

Epic Aircraft

Piper Aircraft

Pacific Aerospace

Pilatus

Textron Aviation

BUSINESS AIRPLANES IN CERTIFICATION

ACJ Two Twenty

Dassault 6X

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

Nov - Jan 2021: Ad Hoc Team deliberations and initial findings compiled

Feb 2021: Additional NAC member inputs and review (pre-NAC)

Spring 2021: Final recommendations to FAA

2020	2021	2022	2023

Prep for Pilot Program

Sec 547 Pilot Program: Sep 2021 - Sep 2023

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

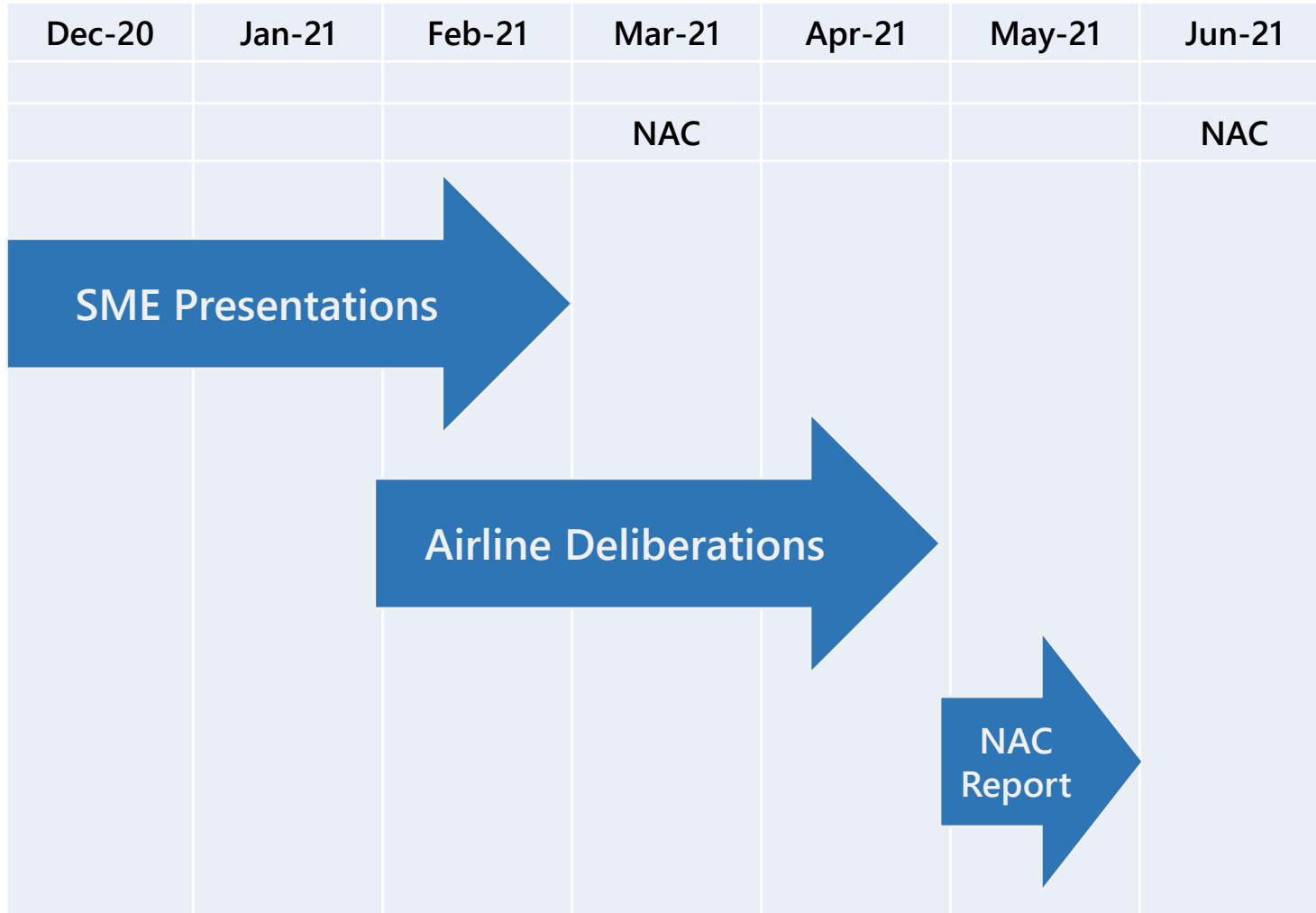**David Surridge,** American Airlines

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

Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21
			NAC			NAC

SME Presentations

Airline Deliberations

NAC Report

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

Sep, 2020	Oct, 2020	Nov, 2020	Dec, 2020	Jan, 2021	Feb, 2021	Mar, 2021	Apr, 2021	May, 2021	Jun, 2021

◇ 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

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 through put 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
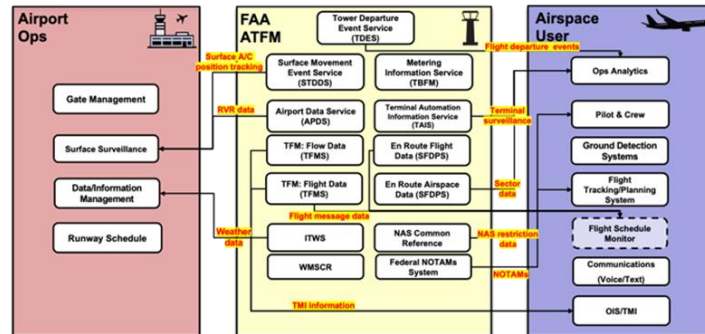
Surface & Data Sharing

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
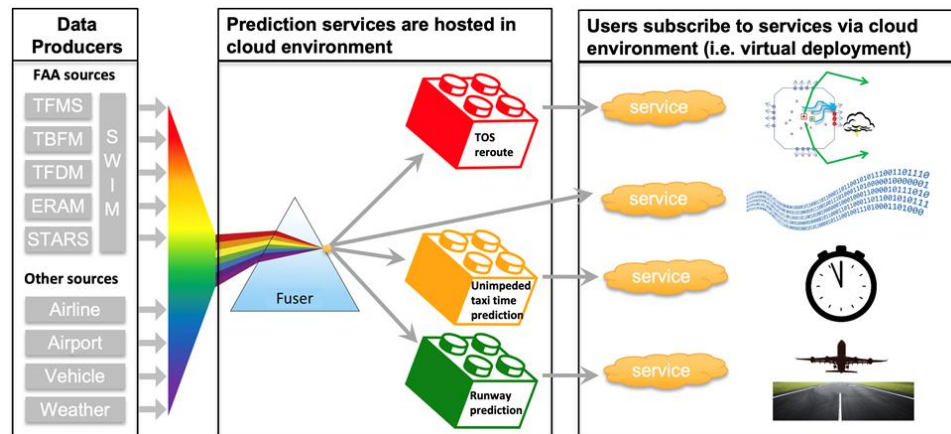
Surface & Data Sharing (cont.)

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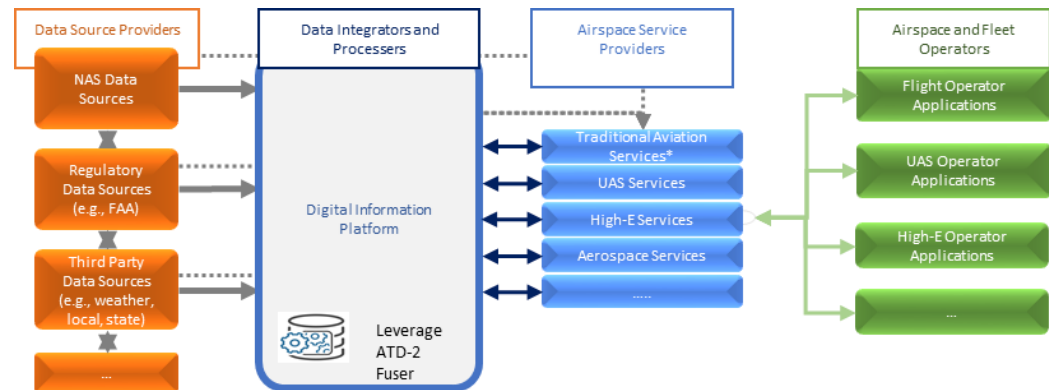
Next Step: Gather a DIP Community to collaboratively demonstrate a reference implementation of DIP connecting fused, mediated data to advanced services

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)
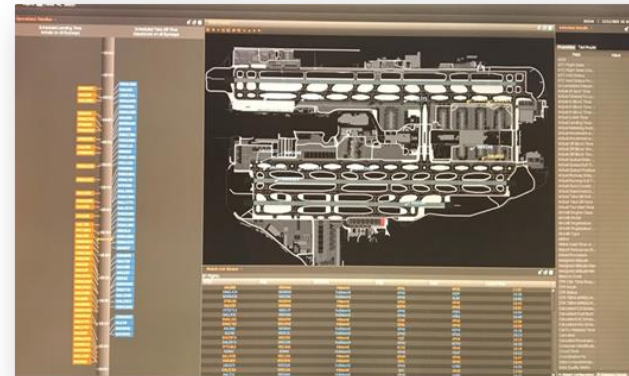
TFDM Build 2 Surface Management Display

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
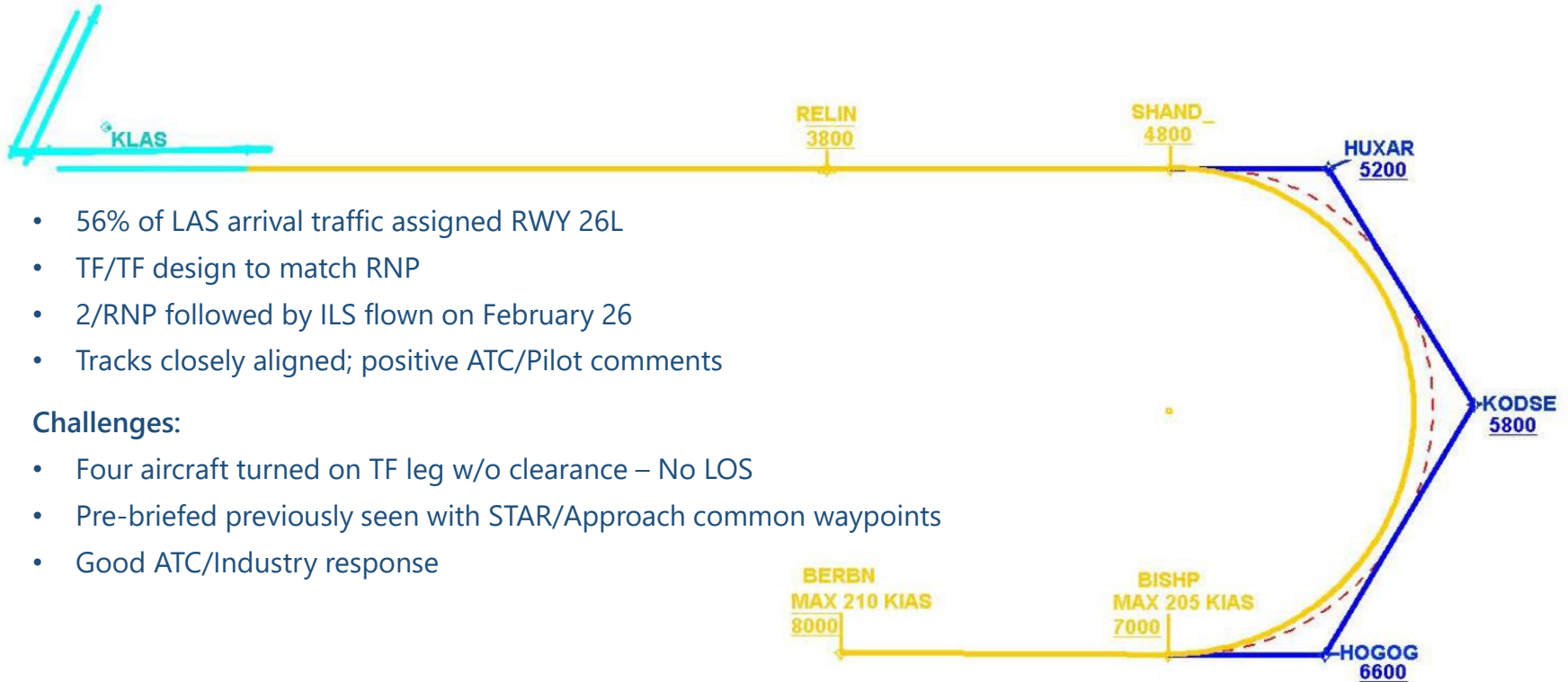 - Flight Plans
  - Charting
  - Rwy 19 Departures

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
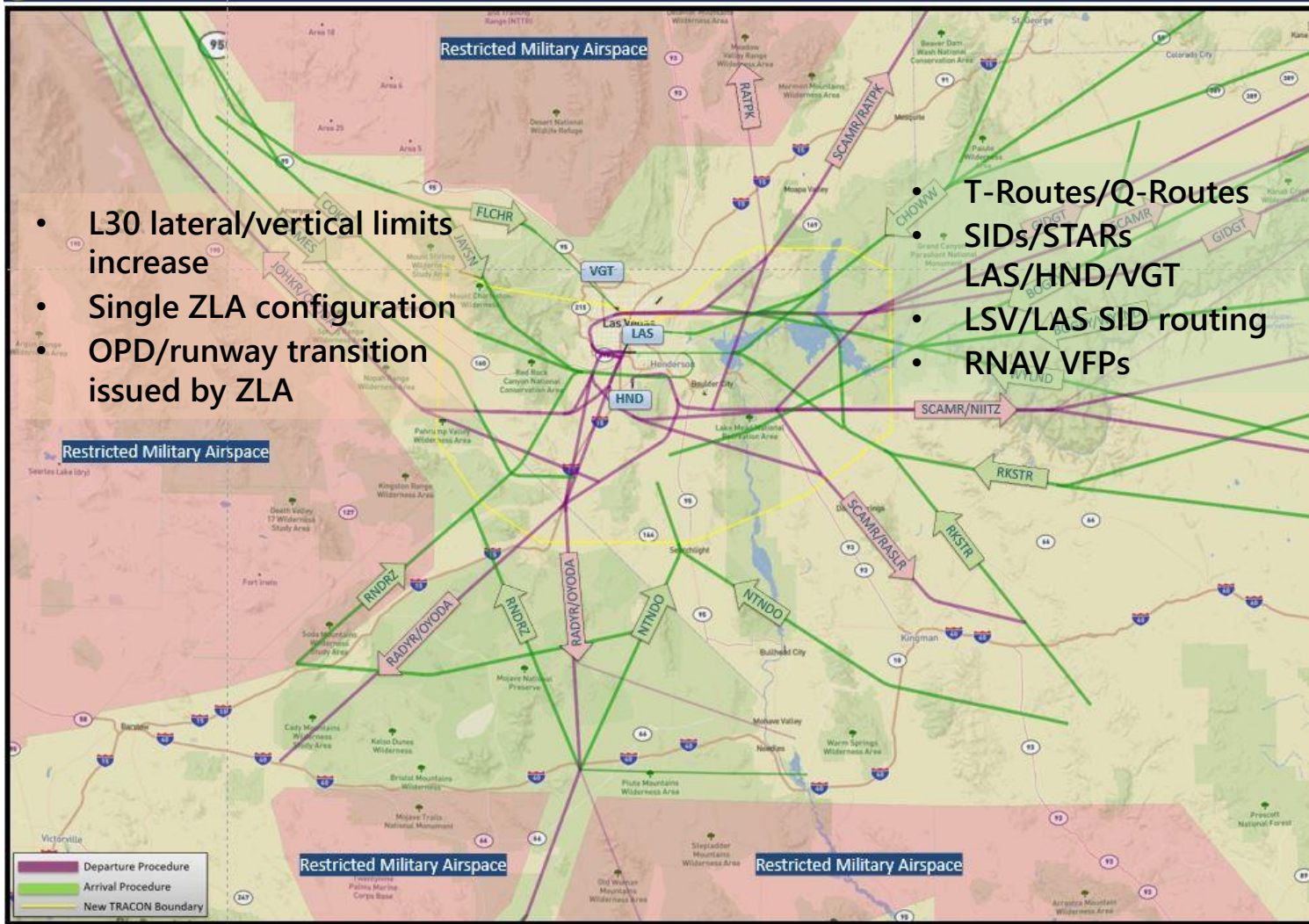
RNAV (RNP) & ILS or LOC RWY 26L

- 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
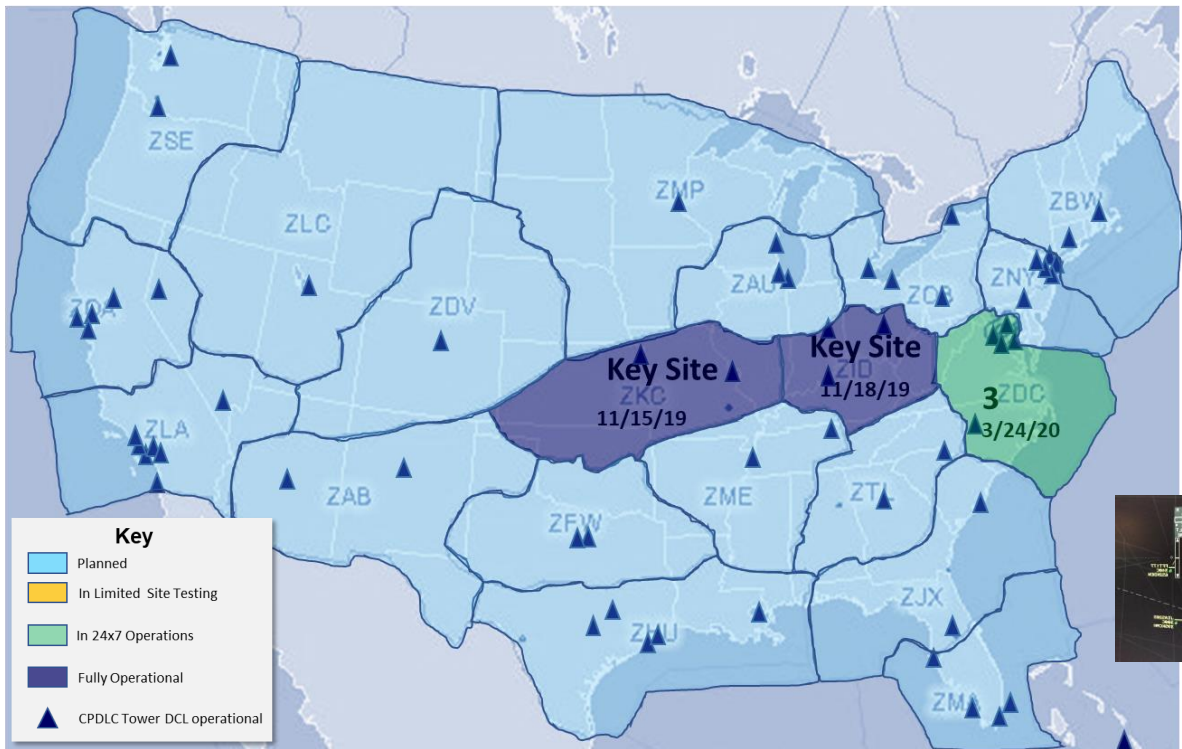
Questions?

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
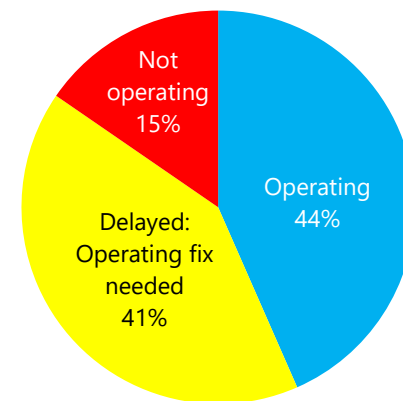
Data Comm Avionics Updates Fleet Status

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

Pie chart:
- Operating 44%
- Delayed: Operating fix needed 41%
- Not operating 15%

Data Comm Critical Path Action	Operating; No Action Required	Delayed: Operating fix needed	Delayed/Not Operating

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
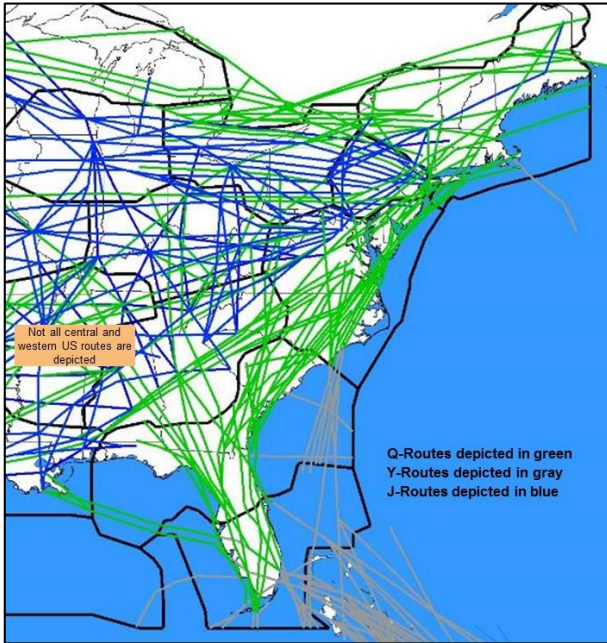 - > Monitor existing milestone status

Outlook for CY2020/2021 Commitments

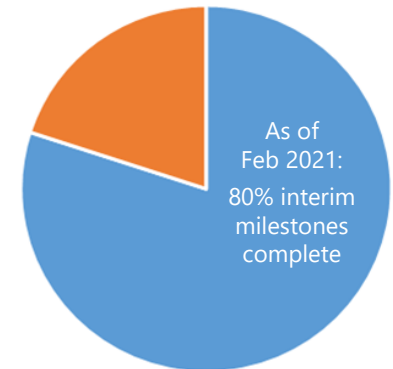| Type	Commitment/Milestone	Jun 2019 NJIP	Aug 2020 NJIP**	Mar NAC Update
Implementation*	Improved departure management for flights destined for LGA	Q3 CY2020	Q4 CY2020	TBD
Implementation*	DSP enhancements	Q4 CY2020	Q2 CY2021	TBD
Implementation*	Atlantic Coast Routes	Q4 CY2020	Q4 CY2021	Q4 CY2021
Implementation*	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 TFDM at BOS	Q4 CY2021	TBD	TBD

ACR: Incremental Implementation

Q-Routes depicted in green
Y-Routes depicted in gray
J-Routes depicted in blue

Not all central and western US routes are depicted

- ✓ 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)

As of Feb 2021: 80% interim milestones complete

- • **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

LGA Runway 31 Approach Procedure

TEB/HPN High-Performance Escape Routes

Park Visual Approach

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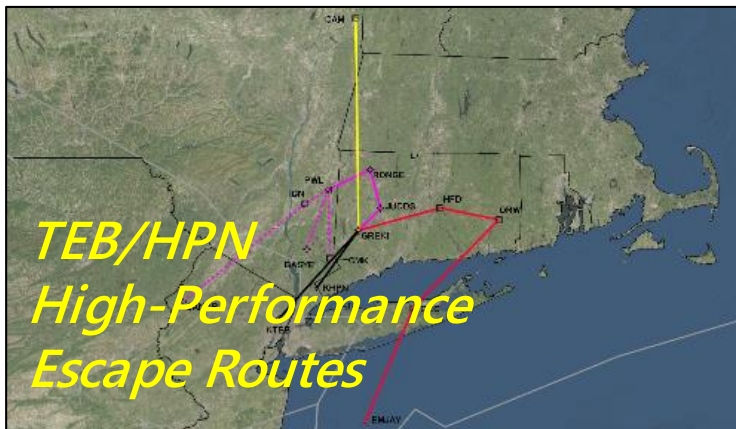
High-performance Escape Routes

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

Chairman Announcements

Chip Childs, NAC Chairman

President & CEO, SkyWest, Inc.

DFO Announcements

Brad Mims, FAA Deputy Administrator

NAC Designated Federal Officer

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.

Back-Up Slides

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

112

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 CO_2 Emissions

Prevented 133,280+ readback errors

Data Comm En Route by the Numbers

January 2021: En Route Data Comm Since 2019
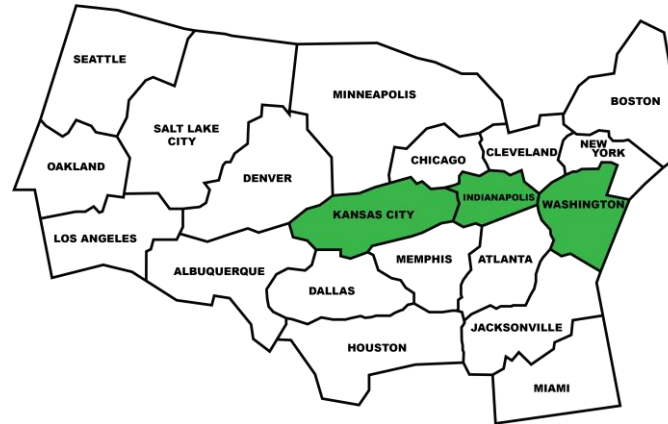
4,526,186 transactions

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	
2021 Priority Items	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	🟨

Action	Status	
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	🟨

Complete & Operating	Available for Install	Planned	Delayed

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

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
Alaska AIRLINES	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	
American Airlines	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

118

Operator	Fleet	Avionics Action	Action Complete by	Action Status	Action Risk	Active En Route
DELTA AIR LINES	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	
FedEx Express	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		
	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

NAC
NEXTGEN ADVISORY COMMITTEE

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

Operator	Fleet	Avionics Action	Action Complete by	Action Status	Action Risk	Active En Route
UNITED	**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 I 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

Avionics Return to Service

EMBRAER — 25

Legacy 450/500/550 (Collins Core 12 Equivalent)	9
Praetor 500/600 (Collins Core 12 Equivalent)	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

FALCON — 34

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

GULFSTREAM — 321

G280 (Collins Core 12 Equivalent)	216
G500 (HW EPIC CMF BP3.1 -522 Equivalent)	54
G600 (HW EPIC CMF BP3.1 -522 Equivalent)	43
G700 (HW EPIC CMF BP3.4 -523 Equivalent)	7
G650 (522 Equivalent) • HW NG Block 3.1 – Q2 2020	1
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
Challenger 605/650 (Collins Core 12 Equivalent)	32
Challenger CRJ (Collins Core 12 Equivalent)	🟢
Global 5000 GVFD (Collins Core 12 Equivalent) 822-1863-175 and Above	26
Global 6000 (Collins Core 12 Equivalent) 822-1863-175 and Above	40
Global 7500 GVFD (Collins Core 12 Equivalent) Only 822-1863-671 and above	8

OTHER-AVIONICS — 58

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

Total Eligible

676

Legend:
- 🔵 Ready
- 🟢 Test pending
- 🟡 Need data
- 🟣 Test Approved
- 🔴 Update req

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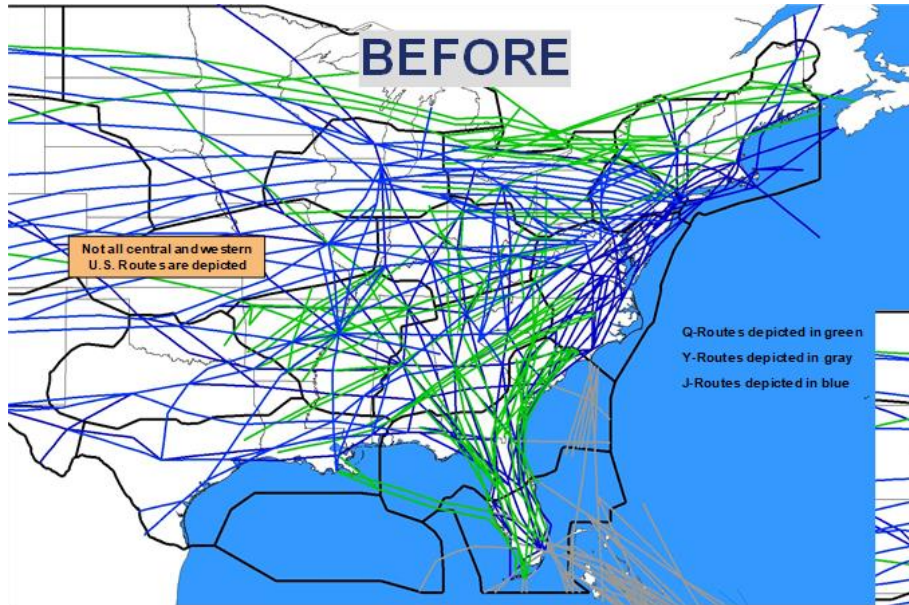
ACR is one of the biggest routes changes in the NAS
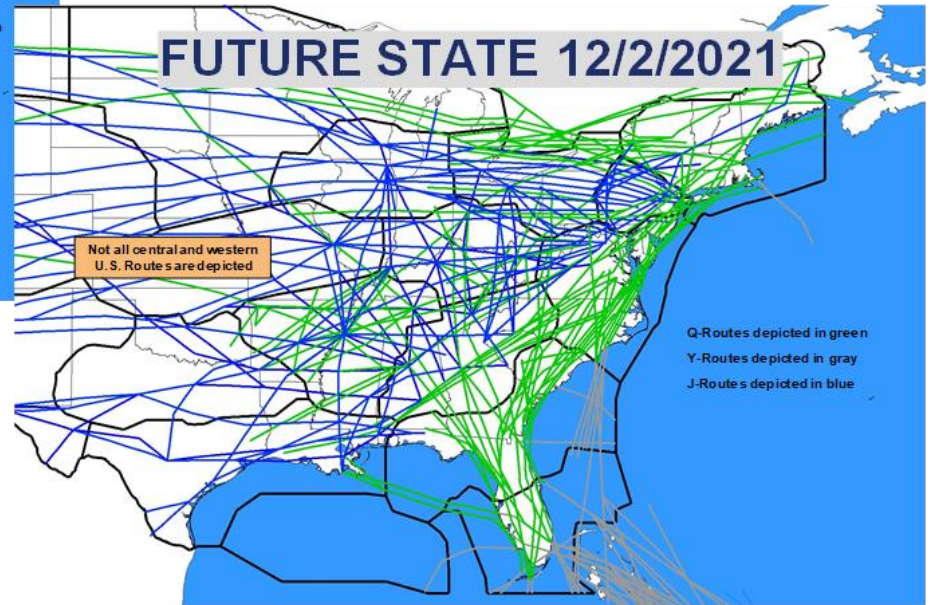
- **What**: 39 new/amended Q Routes and Y Routes will replace the north-south high-altitude route structure along the east coast of the United States
- **Why**: Transition to a PBN-Centric NAS thus decreasing reliance on ground-based NAVAIDs
- **When**: Changes being implemented on 13 separate chart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

NEC ACR Implementation Milestones

- ✓ 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)

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

LGA Runway 31 Approach Procedure

TEB/HPN High-performance Escape Routes
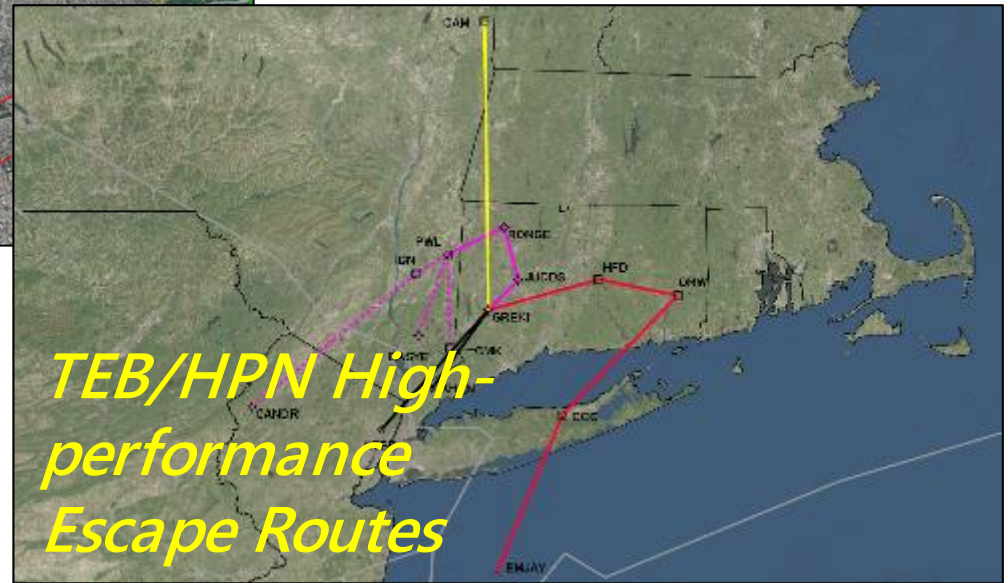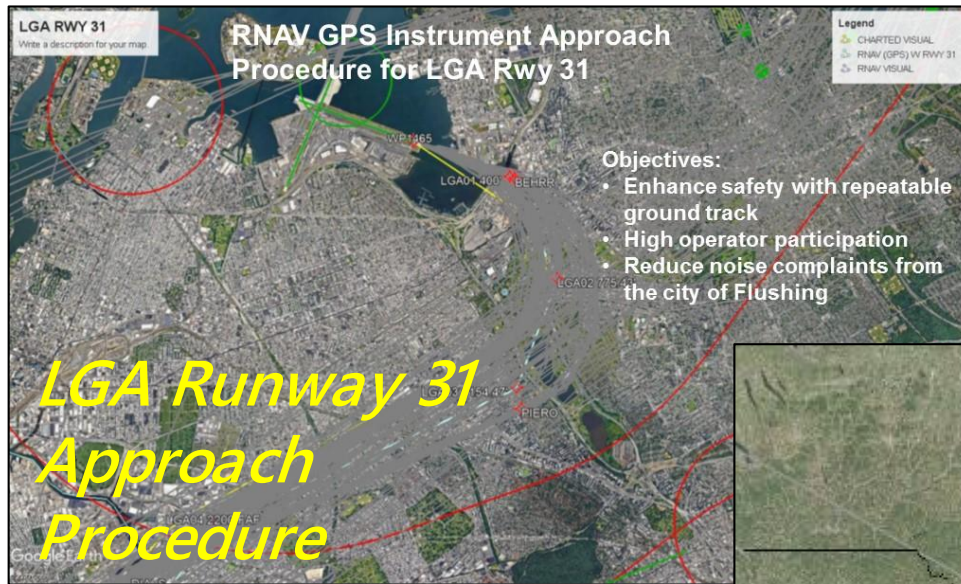
Status of "Opportunities" Recommendations

- 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

Attachment 2

NextGen Advisory Committee (NAC)
March 18, 2021 Attendance List

Last Name	First Name	Affiliation
Adcock	Tom	National Air Traffic Controllers Association
Allen	Daniel	FedEx Express
Arbuckle	Doug	Federal Aviation Administration
Arrighi	Jim	Federal Aviation Administration
Baker	Jodi	Federal Aviation Administration
Baker	Mark	Aircraft Owners and Pilots Association
Batchelor	David	SESAR Joint Undertaking
Beasley	Stephanie	POLITICO Pro
Berlucchi	Robert	American Airlines
Bertapelle	Joe	JetBlue Airways
Blum	Danny	Federal Aviation Administration
Bolen	Ed	National Business Aviation Association
Boyle	Virginia	Federal Aviation Administration
Bristol	Teri	Federal Aviation Administration
Brown	Lee	JetBlue Airways
Brown	Steve	National Business Aviation Association
Bunce	Peter	General Aviation Manufacturers Association
Burke	Gregory	Federal Aviation Administration
Burns	Patrick	Delta Air Lines, Inc.
Butler	Steven	Federal Aviation Administration
Buttie	Steve	Department of Defense
Capezzuto	Vincent	Aireon

Last Name	First Name	Affiliation
Carey	Bill	Aviation Week
Carroll	Ray	FedEx Express
Cebula	Andy	Airlines for America
Challan	Peter	L3Harris Technologies
Childs	Russell "Chip"	SkyWest Airlines
Christiansen	Cindy	Public
Christie	Warren	JetBlue Airways
Clarke	Steven	National Aeronautics and Space Administration
Cochran	Walt	Leidos
Cointin	Rebecca	Federal Aviation Administration
Collings	Chris	L3Harris Technologies
Cook	Chuck	JetBlue Airways
Cuddy	Thomas	Federal Aviation Administration
Cunha	Jason	Concept Solutions
Dalton	Rick	Southwest Airlines
Dehart	Scott	Southwest Airlines
DeNicuolo	Mark	Federal Aviation Administration
DePete	Joseph	Air Line Pilots Association
DeVito	Joseph	JetBlue Airways
Dillman	Don	FedEx Express
Dowd	Jody	Federal Aviation Administration
Drew	Craig	Southwest Airlines
Duffy	Kent	Federal Aviation Administration
Dumont	Peter	Air Traffic Control Association
Eck	Jim	L3Harris Technologies
Egentowich	John	Federal Aviation Administration
Evans	Ed	Southwest Airlines

Last Name	First Name	Affiliation
Fanning	Eric	Aerospace Industries Association
Fremont	Marie-Jo	Public
Goldman	Robert	Delta Air Lines, Inc.
Gorlich	Greg	Southwest Airlines
Graham	Jim	Delta Air Lines, Inc.
Guillermet	Florian	SESAR Joint Undertaking
Gupta	Vipul	Honeywell International
Guthrie	Roddy	American Airlines
Guy	Rebecca	Federal Aviation Administration
Hamel	Christophe	Hamel Studio Aerospace
Hayman	Gene	Collins Aerospace
Hill	Fran	Leidos
Hollander	Anne	Montgomery County Quiet Skies Coalition
Hope	Chris	Federal Aviation Administration
Hoskins	Craig	Airbus
Hyland	Lauren	Cargo Airline Association
Ivers	Benjamin	The Boeing Company
Jackson	Catherine	Airline Dispatchers Federation
Jackson	Rachel	Raytheon Technologies
Jennings	Michael	Federal Aviation Administration
Johnson	Antionette	Federal Aviation Administration
Joly	Pascal	Airbus
Kagzi	Ayaz	Federal Aviation Administration
Kamyab	Ahmad	Federal Aviation Administration
Kauffman	Don	Honeywell International
Kenagy	Randy	Air Line Pilots Association
Knorr	Dave	Federal Aviation Administration

Last Name	First Name	Affiliation
Kozica	Shawn	Federal Aviation Administration
Ladner	John	Alaska Airlines
Lamparello	Sandy	Federal Aviation Administration
Landon	Joe	Lockheed Martin Corporation
Landsmann	Jennifer	Public
Lawrence	Huntley	Port Authority of New York and New Jersey
Lenfert	Winsome	Federal Aviation Administration
Leone	Gregg	MITRE
Madera	Norbert	Federal Aviation Administration
Maffei	John	Federal Aviation Administration
Marks	Julie	Federal Aviation Administration
McCoy	Tiffany	Federal Aviation Administration
McCullough	Angela	Airlines for America
McDowell	Mike	Collins Aerospace
McGraw	Candace	Cincinnati/Northern Kentucky International Airport
McLean	Donna	Donna McLean Associates, LLC
Menchion	Christopher	JetBlue Airways
Mercer	Roosevelt	Federal Aviation Administration
Merkle	Michele	Federal Aviation Administration
Mitchell	Tiffany	Federal Aviation Administration
Mims	Bradley	Federal Aviation Administration
Mitra	Trin	Mitra Aviation Consulting
Moloney	John	The Boeing Company
Morrow	Clint	BridgeNet International
Mulligan	Jessica	SkyWest Airlines
Nadarski	Nick	U.S. Government Accountability Office
Narvid	Juan	Federal Aviation Administration

Last Name	First Name	Affiliation
Ngai	Eva	Federal Aviation Administration
O'Connor	Wendy	Federal Aviation Administration
Olson	Lee	National Aeronautics and Space Administration
Olson	Loren	National Association to Insure a Sound-Controlled Environment (NOISE)
Oswald	Chris	Airports Council International-North America
Patel	Azmal	JetBlue Airways
Pearce	Robert	National Aeronautics and Space Administration
Pecoraro	Ryan	The Boeing Company & eVTOL Flight Test Council
Pennington	Darrell	Air Line Pilots Association
Perez	Karina	Aerospace Industries Association
Perrone	Mike	Professional Aviation Safety Specialists
Peyton	Bret	Alaska Airlines
Pfingstler	Susan	United Airlines, Inc.
Pierce	Bradley	National Association to Insure a Sound-Controlled Environment (NOISE)
Quigley	Bryan	United Airlines, Inc.
Ramadani	Almira	Federal Aviation Administration
Renk	Ron	United Airlines, Inc.
Rice	Colin	Metropolitan Washington Airports Authority
Richardson	Jesse	Oakland International Airport
Rinaldi	Paul	National Air Traffic Controllers Association
Rose	Yvette	Cargo Airline Association
Russell	Sally	JetBlue Airways
Schatz	Wayne	Department of Defense
Schwab	Greg	Federal Aviation Administration
Sequeira	Christopher	Environmental Science Associates, Inc.

Last Name	First Name	Affiliation
Sinnett	Mike	The Boeing Company
Snow	Marissa	SkyWest Airlines
Sotelo	Guillermo	Federal Aviation Administration
Spurio	Kip	Raytheon Technologies
Steinbicker	Mark	Federal Aviation Administration
Stevenson	Dawn	Federal Aviation Administration
Sullivan	James	JetBlue Airways
Sunny	De Paul	JetBlue Airways
Surridge	David	American Airlines
Swol	Doug	Federal Aviation Administration
Tamburro	Ralph	Port Authority of New York and New Jersey
Thoma	Don	Aireon
Torpe	Sean	Federal Aviation Administration
Tranter	Emily	National Association to Insure a Sound-Controlled Environment (NOISE)
Vail	Steve	Mosaic ATM
Valcich	Jeremy	Public
Vincent	Jeffrey	Federal Aviation Administration
Wendling	Kelle	L3Harris Technologies
White	Beth	Federal Aviation Administration
Whitley	Pamela	Federal Aviation Administration
Whyte	Bill	Regional Airline Association
Wijntjes	Jesse	Federal Aviation Administration
Wijntjes	Jesse	Federal Aviation Administration
Wilkins	Aaron	Federal Aviation Administration
Willey	Doug	Air Line Pilots Association
Wongsangpaiboon	Natee	Federal Aviation Administration

Last Name	First Name	Affiliation
Wright	Janelle	Montgomery County Quiet Skies Coalition & DCA Community Working Group
Yaplee	Darlene	Public
Young	Greg	Delta Air Lines, Inc.
Zamora	Raul	Federal Aviation Administration

Attachment 3

Darlene Yaplee
Organization Affiliation: Concerned Residents of Palo Alto and the Aviation-Impacted Communities Alliance (AICA)

REQUEST FOR WRITTEN COMMENTS

I recently presented at the ANE conference and shared community perspectives. My comments are informed by 53 responses from residents, advocacy groups, Roundtable and City Council members.
In a nutshell, ...the current systems used by the FAA to **assess, report, and address noise and health impacts do not reflect the 21st Century.**

There are 6 key, inter-related areas that are problematic.

- o FAA's Narrow Mission Provides Limited Protection for People on the Ground
- o Significant Impact Definition is Inadequate
- o One Size Does Not Fit All - Near versus away from the airport are very different
- o Environmental Review Process is Flawed
- o Strategies to Reduce Noise are Underused
- o and...Aviation Emissions Need Attention

- The FAA's **interpretation of significant impact** is problematic:
  - o it's **over 40 years old** and uses **a single metric (DNL) with a fixed threshold.**
  - o A single-metric is **not** what Congress instructed the FAA to do: **Congress asked for a single SYSTEM to measure noise, not a single metric.**
  - o The FAA's recently published NES study casts doubt on the Schultz Curve and establishes that the number of highly annoyed people is an order of magnitude higher than previously thought

- Here is an example of why the 65 dB DNL definition is flawed.
  - o - Noise was monitored in Palo Alto, CA which is 16 miles from the airport.
  - o - 244 noise events per day were reported.
  - o - The Aircraft CNEL* is 52 dBA
  - o - Why is this important? To reach a 65 CNEL, Palo Alto would need almost 5,000 airplane noise events PER DAY versus the roughly 250 it currently has.
  - o - This would be an airplane every 17.7 seconds in a 24 hour period
  - o - This example shows that the current definition of Significant Impact is flawed, especially for communities away from the airport.

- The FAA has the authority to change regulations such as the metric and threshold for "significant impact" to reflect the true experience of people on the ground.

Please take action now.

Attachment 4

FAA Reauthorization Act of 2018, Section 547
Enhanced Air Traffic Services

NAC Task 20-3 Report

To be Presented to the NextGen Advisory Committee

March 2021

Table of Contents

Executive Summary

In October 2019, the Federal Aviation Administration (FAA) tasked the NextGen Advisory Committee (NAC) with providing advice on Section 547 of the FAA Reauthorization Act of 2018. This report documents the efforts of a NAC-level Ad Hoc Team and presents recommendations for the Enhanced Air Traffic Services pilot program.

The Ad Hoc Team has identified a short list of eight Section 547 pilot program candidates and recommends that preferential basis for the pilot program should not be based on Ground Delay Programs (GDPs), but on ability to provide advantage to equipped operators. Of the eight candidates, the three that provide a definitive gain for equipped operators and best meet the Ad Hoc Team's definition for preferential basis are:

- Simultaneous independent Established on Required Navigation Performance (EoR) at Los Angeles International Airport (LAX),
- Simultaneous dependent approaches to closely spaced parallel runways (FAA Order 7110.308) for General Edward Lawrence Logan International (BOS),
- Controller Pilot Data Link Communications (CPDLC) Departure Clearance (DCL) capabilities at Orlando International (MCO).

The FAA has stated that the procedures for BOS may not be feasible until mid-2022 due to ongoing environmental review and training considerations. A staggered start for the pilot program would support inclusion of this application at BOS.

The staggered start could also promote consideration for the remaining four candidates, particularly because they provide targeted benefits and showcase emerging technologies. A commitment to enabling activities could allow for the inclusion of these valuable candidates sometime in 2022:

- Advanced Required Navigation Performance (A-RNP) approach procedures for Ski Country airports, Missoula International Airport (MSO), Bozeman Yellowstone International Airport (BZN) or Eagle County Regional Airport (EGE),
- Simultaneous dependent EoR at Portland International Airport (PDX),
- Simultaneous dependent EoR at Dallas Love Field (DAL), and
- Simultaneous dependent EoR at Nashville International Airport (BNA).

While not directly meeting the preferential basis description, the Automatic Dependent Surveillance Broadcast (ADS-B) Out application enabling 3 nautical mile (nm) separation in en route airspace for Seattle Tacoma International Airport (SEA)/Seattle Air Route Traffic Control Center (ZSE) is expected to provide access and throughput benefits, via equipping with ADS-B Out, and may be feasible by September 2021.

Background

The Federal Aviation Administration (FAA) Reauthorization Act of 2018 was passed by Congress and signed into law in October 2018. Section 547, entitled Enhanced Air Traffic Services, establishes a pilot program to provide air traffic control services on a preferential basis to aircraft equipped with certain NextGen avionics (See Appendix A for full Congressional language).

In October 2019, then FAA Deputy Administrator Daniel Elwell tasked the NextGen Advisory Committee (NAC) with providing advice to the FAA on Section 547. This tasking included an interim product, including a list of candidate Section 547 applications, and a final down-selected list of applications by spring 2020. To address the tasking, the NAC Chairperson created and led an Ad Hoc Team consisting of a subset of NAC members. Membership was focused on airlines and other operators, with the primary responsibility within their organizations for coordinating equipage investment and resource placement. This group held initial meetings in late 2019 and early 2020. However, the effort was put on hiatus in March 2020 as the Coronavirus (COVID) 19 global pandemic took shape.

In August 2020, the NAC was asked to continue its efforts to provide advice to the FAA on Section 547 (see Appendix B). With an extension into spring 2021, the revised tasking requested the same key elements of the original assignment:

- 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; and
- Describe potential and targeted benefits of most value to industry.

This report documents the efforts of the Section 547 Ad Hoc Team under the August 2020 revised tasking and presents the Team's recommendations for the Enhanced Air Traffic Services pilot program.

Methodology Overview

To address the tasking elements, the Ad Hoc Team conducted a series of meetings between October 2020 and March 2021. These meetings are summarized below:

- October 2020: Reorientation meeting, reviewing tasking and previous materials developed in early 2020 under Tasking 19-2.
- November 2020: Received an update from the FAA on current initiatives that might be considered in fulfillment of Section 547 requirements; and defined NextGen avionics and preferential basis, for the purposes of this tasking.
- December 2020: Developed candidate list using input from FAA and other NAC recommendations (e.g. Performance Based Navigation (PBN) Clarification Report).
- January 2021: Reviewed proposed candidates, then down-selected to "short" list by assessing readiness, return, and relevance.
- February-March 2021: Completed coordination and documentation.

The Ad Hoc Team members were supported by Air Traffic Management and Flight Operations subject matter experts (SMEs) from within their organization. These operator SMEs worked in tandem with the Ad Hoc Team. The FAA provided SMEs as well. Appendix C contains a list of Ad Hoc Team members and other supporting participants.

Throughout the Ad Hoc Team's efforts, data was provided and used to inform the team's deliberations. This data included:

- From the FAA, pre-COVID data on aircraft equipage (communication, navigation, and surveillance) and airport information (including construction schedules, Severe Weather Avoidance Plan (SWAP) frequency, Ground Delay Program (GDP)/Ground Stop (GS) history);
- An update on current levels and near-term forecasts of National Airspace System (NAS) operations from the FAA;
- From the PBN Clarification Ad Hoc and NextGen Opportunities Workgroup, debrief on the recommendations and findings of their respective activities;
- From the FAA's PBN Dashboard and the PBN Clarification Report, updated post-COVID PBN equipage data;
- From the FAA Data Communications Program Office, recent Controller Pilot Data Link Communication (CPDLC) Departure Clearances (DCL) equipage and utilization information by airport.

The operator SME team also obtained background information from meetings with the NextGen Opportunities team and the Data Communications NextGen Integration Working Group (NIWG).

Key Definitions

The Congressional language references two key phrases: "certain NextGen avionics" and "preferential basis." For purposes of the Ad Hoc Team's deliberations, the two phrases were interpreted as follows.

Certain NextGen Avionics

For the deliberations of the Ad Hoc Team, "certain NextGen Avionics" are identified as the navigation, communication, and surveillance baseline capabilities in the NAC Minimum Capabilities List (MCL)[1]. For the Section 547 task, the team chose to highlight the following baseline capabilities:

- Navigation: Required Navigation Performance (RNP) with Radius to Fix (RF), Advanced RNP (A-RNP), Autopilot coupled Vertical Navigation (VNAV);
- Communication: CPDLC DCL;
- Surveillance: Automatic Dependent Surveillance Broadcast (ADS-B) Out.

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

Preferential Basis

The Congressional language was developed during some of the highest levels of aviation activity and well before the COVID-19 pandemic would cause a devastating impact to NAS operations. Air traffic operations, ground delays and other traffic management initiatives have since been significantly reduced from pre-COVID traffic levels. Between March 2020 and September 2020, the quantity of GDPs has decreased by over 90% compared to the same months in 2019. Given these circumstances, the Ad Hoc Team felt that the concept of preferential basis needed to be reinterpreted.

The Ad Hoc Team identified several key tenets around the concept of preferential basis:

- The intent of the Section 547 pilot program is to prove the benefits of the NextGen investment by highlighting the advantage of NextGen equipage (verses punitive action for the non-equipped).
- Proving the benefit of NextGen equipage should still permit accommodation of non-equipped operators, though not with the same benefit gains as equipped operators.
- Preferential basis to equipped operators should not hinder overall capacity or reduce throughput.

Basically the Ad Hoc Team defines preferential basis for enhanced air traffic services in a manner very similar to the Transportation Security Administration (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 Candidate Airports and Applications

The short list of candidates was developed in the following manner:

Candidate Generation: An initial set of candidates was developed from multiple sources, all associated with previous or ongoing NAC activities. Resources included the PBN Clarification Ad Hoc Team Report[2] and the NextGen Opportunities presentation[3]. Using these sources helps ensure that candidate applications mirror existing priorities. The FAA also provided input on current modernization initiatives that could meet the intent of Section 547 and be implemented in the specified timeframes[4]. Given the limited lead time before the planned start of the pilot program, the FAA input emphasized concepts that are already in development or operational. Appendix D contains the list of the initial candidate applications.

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[2] "Performance Based Navigation Clarification NAC Task 19-4 Report," November 2020.

[3] "NextGen Opportunities," briefing to NAC SC Opportunities Meeting, June 2020.

[4] "FAA Reauthorization - Section 547," briefing by Rebecca Guy to NAC Section 547 Ad Hoc Team, November 2020; and "FAA Mixed Options," briefing by Kim Stover to NAC Section 547 Ad Hoc Team, February 2020.

Candidate Down-Select: The Ad Hoc Team reduced the initial set by a little more than half using a simple priority query. A subjective scoring process was used to assess the remaining candidates. The three categories for scoring included:

- Readiness = how likely is it that the candidate will be operational by September 2021.
- Return = how well does the candidate provide benefit to equipped operators.
- Relevance = how well does the candidate meet the intent of the Congressional language.

Each operator (representative or entity) provided one set of scores, which were then averaged to produce an aggregate score. As a result of the scoring assessment and associated discussion, two candidates were removed from consideration: one for lowest readiness score and the other for the lowest return score. Appendix E contains a more detailed description of the down-select process.

Additional Considerations: The Ad Hoc Team discussed the results of the down-select process with the FAA SMEs. Concern was raised that the candidates did not cover the communications element of the MCL, a key consideration for the FAA. The Ad Hoc Team agreed that inclusion of a CPDLC DCL candidate would be most beneficial for airport that has weather impacts causing reroutes and at a location with a mix of carriers and equipage. Using the data that was provided by the FAA Data Communications Program Office, a candidate using the FAA's concept for CPDLC DCL capabilities was added into consideration.

Finalization of the Short List: The short list of candidate applications consists of the following eight initiatives:

- Simultaneous independent Established on RNP (EoR) at Los Angeles International Airport (LAX),
- Simultaneous dependent EoR at Portland International Airport (PDX),
- Simultaneous dependent EoR at Dallas Love Field (DAL),
- Simultaneous dependent EoR at Nashville International Airport (BNA),
- Simultaneous dependent approaches to closely spaced parallel runways (FAA Order 7110.308) for General Edward Lawrence Logan International (BOS),
- A-RNP approach procedures for Ski Country airports, Missoula International Airport (MSO), Bozeman Yellowstone International Airport (BZN) or Eagle County Regional Airport (EGE),
- ADS-B Out application enabling 3 nautical mile (nm) separation in en route airspace for Seattle Tacoma International Airport (SEA)/Seattle Air Route Traffic Control Center (ZSE), and
- CPDLC DCL capabilities at Orlando International Airport (MCO).

These eight candidates are based on established concepts[5] and showcase three primary MCL equipage categories. Most of the candidates highlight PBN capabilities with EoR, A-RNP

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[5] All concepts have been referenced or worked as part of previous NAC Ad Hoc or NIWG activities.

and 7110.308 approaches. Appendix F contains additional details describing the concepts for each of the short list candidates. These details include information on expected benefits and potential risks, provided primarily by SMEs supporting the Ad Hoc Team. Airport operators from the candidate airports were not involved in the development of this supporting data or in the recommended candidates. Coordination among the FAA, airport operators and aircraft operators will be needed as part of the implementation of the pilot program[6].

The Congressional language identifies the "duration of daily service" for the pilot program to be at least three consecutive hours, between 0600 and 2200 local time. The Ad Hoc Team recommends that the hours of operation be selected such that maximum benefit can be achieved when there is a predominance of equipped operators and overall airport operations can be enhanced. Presently air traffic continues to recover, and schedules are evolving, so it is difficult to pinpoint times for these applications. Currently no time-of-day limitations were noted, primarily because each of these candidates could provide benefit during any time of use. The Ad Hoc Team recommends continued operator engagement in defining operating times for the pilot program.

It is important to note that while the FAA stated all eight candidates were viable, only three of eight candidate applications in the short list were likely to be operationally feasible by September 2021:

- Simultaneous independent EoR at LAX,
- ADS-B Out enabled 3 nm separation in en route airspace for SEA/ZSE, and
- CPDLC DCL capabilities at MCO.

The other five candidates require activities with longer lead times (e.g. establishing or changing criteria, developing new procedures, conducting safety studies or environmental review). Given limited access to operational facilities, training challenges and other risks associated with the COVID-19 recovery, the FAA suggested that it could take anywhere from a few months or to over a year to complete these actions. Given the benefit potential of these five candidates, the Ad Hoc Team has recommendations to address these concerns under Tasking Element 3.

Tasking Element 2: Rational for Preferential Basis

As stated earlier in this report, the Ad Hoc Team recommends selection for the pilot program not be limited to airports with GDPs or other traffic management initiatives (TMIs). The airports identified in the short list candidate applications 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; and
- Ability to enhance operational efficiency or throughput.

---

[6] See Appendix A for Congressional Language on Airport Selection (paragraph 1c).

Using the TSA Pre Check analogy, the following short list of candidates best meet the updated definition of preferential basis that the Ad Hoc Team used during its deliberations:

- Simultaneous independent EoR at LAX – equipped operators receive shorted downwind segments.
- Simultaneous dependent approaches to closely spaced parallel runways (FAA Order 7110.308) for BOS – equipped operators enable use of an additional arrival runway.
- CPDLC DCL capabilities at MCO – equipped operators have priority for departure as a result of receipt of the reroute update through CPDLC.

Tasking Element 3: Targeted Benefits of Most Value

The objective of the Section 547 pilot program should be to showcase key capabilities, by providing an advantage to those that have invested in NextGen avionics and translating that advantage into real benefits. The benefits of the most value to the operators are delivered by capabilities that minimize operational constraints, while increasing throughput, access, and efficiency. The 7110.308 closely spaced parallel procedures are good example of incentivizing autopilot coupled VNAV while benefiting overall airport throughput.

Section 547 is an opportunity to incentivize operators to equip with emerging capabilities and avionics that can provide increased throughput and access. The pilot program should not include applications simply because they are feasible by September 2021. The A-RNP applications are primary examples of emerging capabilities that can provide profound benefits but may not be operationally feasible by September 2021[7].

Staggering the start of the pilot program is an option for inclusion of high-value candidate applications. Under this proposal, the pilot program could start with the candidates that are feasible in September 2021 (e.g. EoR at LAX or 3 nm separation for SEA/ZSE). Other candidates that might be feasible by mid 2022 (e.g. 7110.308 at BOS or A-RNP at MSO) could be added when enabling activities (i.e. procedure development) are complete. This option does not advocate for extension of the pilot program, rather applications with the later start would still conclude by September 2023 (per Congressional language). The Ad Hoc Team believes that the high-value benefits offset the reduced duration and would still meet the intent of the language. The Ad Hoc Team recommends asking Congress to consider the staggered start concept and is committed to accompany the FAA in that discussion.

Summary of Findings and Recommendations

Since the original tasking in October 2019, the aviation system has experienced a significant level of change due to the impacts of the COVID 19 pandemic. Reduced timelines and other limitations necessitated a broader interpretation of the Congressional language. The Ad Hoc Team's findings and recommendations reflect this construct while striving to retain the spirit of the language.

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[7] The FAA has identified that A-RNP approaches will require new criteria, procedure development/amendment, and flight check, thus making it unlikely that these procedures would be available by September 2021.

The Ad Hoc Team has identified a short list of eight Section 547 pilot program candidates:

- Simultaneous independent 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 (FAA Order 7110.308) for BOS,
- A-RNP approach procedures for Ski Country airports, MSO, BZN or EGE,
- ADS-B Out enabled 3 nm separation in en route airspace for SEA/ZSE, and
- CPDLC DCL capabilities at MCO.

The Ad Hoc Team recommends that the hours of operation be selected such that maximum benefit can be achieved when there is a predominance of equipped operators and overall airport operations can be enhanced. While the report does not include specific time of day recommendations due to flight schedule evolution, the Ad Hoc Team does recommend continued operator engagement in defining operating times for the pilot program.

Given the impacts of COVID-19 on traffic levels, the Ad Hoc Team recommends preferential basis for the pilot program be based on ability to provide advantage to equipped operators, not on GDP history or occurrences. Of the eight candidates, the three that provide a definitive gain for equipped operators and best meet the Ad Hoc Team's definition for preferential basis are:

- Simultaneous independent EoR at LAX,
- Simultaneous dependent approaches to closely spaced parallel runways (FAA Order 7110.308) for BOS, and
- CPDLC DCL capabilities at MCO.

The FAA has stated that the procedures for BOS may not be feasible until mid-2022 due to ongoing environmental review and training considerations. A staggered start for the pilot program would support inclusion of this application at BOS, as well as consideration for the remaining four candidates. A commitment to enabling activities could allow for the addition of these valuable candidates sometime in 2022:

- A-RNP approach procedures for Ski Country airports, MSO, BZN or EGE,
- Simultaneous dependent EoR at PDX,
- Simultaneous dependent EoR at DAL, and
- Simultaneous dependent EoR at BNA.

While not directly meeting the preferential basis description, the ADS-B Out application enabling 3 nm separation in en route airspace for SEA/ZSE is expected to provide access and throughput benefits, via equipping with ADS-B Out, and may be feasible by September 2021.

All the proposed candidates are priorities and important opportunities to showcase NextGen avionics and technologies. Those that are not included under the Section 547 pilot program should be pursued through programs and activities outside Section 547. Throughout this effort,

the FAA SMEs have stated that the priority of these initiatives is understood and have pledged to pursue them outside the Section 547 pilot program, in particular the short list candidates. Given the repeated importance of these proposals, the Ad Hoc Team recommends that the FAA provide information on next steps as soon as practical, including details on the interim actions (e.g. criteria development, environmental review, flight check), for the initiatives not pursued under Section 547.

In addition to responding to the three elements of the FAA's tasking letter, the Ad Hoc Team has additional recommendations that will help ensure that the Section 547 pilot program meets its objectives.

Some of the candidates include amendments or new procedures. Amendments to existing procedures and/or new procedure development must be done in collaboration with aircraft and airport operators, in accordance with FAA orders and guidelines. The Ad Hoc Team recommends collaborative design and development efforts for any procedure changes or additions.

The overall success of Section 547 pilot program is dependent on continued engagement with aircraft and airport operators, to monitor progress and review operational consequences throughout the duration of the pilot program. The Ad Hoc Team recommends the following cooperative engagement efforts:

- Existing collaborative forums should be considered for coordination of technical and operational activities supporting the pilot program, including review of safety studies and training requirements, as needed;
- Status of planning efforts should be provided at the next NAC meeting, and overall pilot program status shared with the NAC as the program moves forward;
- Aircraft and airport operators, or their representative organizations, should be engaged in monitoring the safety and operational impacts of the pilot program, in particular ensuring airport throughput is not reduced due to Section 547 applications;
- Assessment should include the impacts to the equipped and non-equipped aircraft;
- Finally, aircraft and airport operators should contribute to the final report to be delivered to Congress at the end of the effort.

Appendix A: Congressional Language

SEC. 547. ENHANCED AIR TRAFFIC SERVICES.

(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.

Appendix B: FAA Tasking Letter

Below is an excerpt from the tasking letter from then Deputy FAA Administrator, Daniel Elwell, to NAC Chair, Russell Childs, dated August 10, 2020:

> **Task 20-3 (Task 19-2 Extension): FAA Reauthorization Act of 2018, Section 547**
>
> The NAC is asked to continue its efforts with providing advice to the FAA in accordance with FAA Reauthorization Act of 2018, Section 547. This tasking was originally issued prior to the emergence of the COVID-19 pandemic and its resulting economic impact on the aviation community. The FAA is cognizant of the need for the NAC members to remain focused on restarting industry operations as an essential part of the national recovery. This tasking is **extended through Spring 2021** to ensure the FAA is able to fulfill the congressional request contained in Section 547.
>
> The NAC advice should include the following:
>
> - 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.
>
> Scope:
>
> - FAA will provide the NAC team an update on current and near-term forecast of NAS operations.
> - FAA will provide the NAC team an update of current FAA/NAC initiatives that might be considered in fulfillment of any part of Section 547 requirements.

Other portions of the letter covering other NAC taskings – on autopilot coupled VNAV and ADS-B In Applications – have been omitted from this Appendix. The full letter can be found on the FAA website at:

https://www.faa.gov/about/office_org/headquarters_offices/ang/nac/media/20200810_NAC_Tasks_20-1_20-2_20-3.pdf.

Appendix C: Section 547 Ad Hoc Team and Other Supporting Participants

Ad Hoc Team Members	Organization
Ed Bolen	National Business Aviation Association
Patrick Burns	Delta Air Lines
Russell "Chip" Childs	SkyWest
Warren Christie (Lead)	JetBlue Airways
Don Dillman	FedEx Express
Craig Drew	Southwest Airlines
John Ladner	Alaska Airlines
Bryan Quigley	United Airlines
Kimball Stone	American Airlines

FAA SMEs	Organization
Rebecca Guy	Air Traffic Mission Support
Shawn Kozica	Air Traffic Mission Support

Operator SMEs	Organization
Lee Brown	JetBlue Airways
Steve Brown	National Business Aviation Association
Charles Cook	JetBlue Airlines
Lynae Craig	Alaska Airlines
Rick Dalton	Southwest Airlines
Robert Flynn	United Airlines
Robert Goldman	Delta Air Lines
Gary McMullin	Southwest Airlines
Brett Peyton	Alaska Airlines
Ron Renk	United Airlines
Phil Santos	FedEx Express
Eric Silverman	American Airlines
Dave Surridge	American Airlines
Jon Tree	FedEx Express
Heidi Williams	National Business Aviation Association
Greg Young	Delta Air Lines

Appendix D: Initial List of Candidates

Application	Airport	NextGen Avionics	Source	Notes
EoR with equipped on more efficient downwind	LAX	RNP w RF/ A-RNP	FAA input PBN Clarification Report	Included in short list
EoR with equipped on more efficient downwind	DEN	RNP w RF/ A-RNP	PBN Clarification Report	Lower priority for Sec 547
EoR with equipped on more efficient downwind	IAH	RNP w RF/ A-RNP	PBN Clarification Report	Lower priority for Sec 547
EoR with equipped on more efficient downwind	BNA	RNP w RF/ A-RNP	PBN Clarification Report	Included in short list
EoR with equipped on more efficient downwind	PDX	RNP w RF/ A-RNP	PBN Clarification Report	Included in short list
EoR with equipped on more efficient downwind	DAL	RNP w RF/ A-RNP	PBN Clarification Report	Included in short list
A-RNP approaches for access	MSO	A-RNP	PBN NIWG NextGen Opportunities	Combined for short list
A-RNP approaches for access	BZN	A-RNP	PBN NIWG NextGen Opportunities	Combined for short list
A-RNP approaches for access	EGE	A-RNP	PBN NIWG NextGen Opportunities	Combined for short list
A-RNP approaches for access	GUC	A-RNP	PBN NIWG NextGen Opportunities	Lower priority for Sec 547
A-RNP approaches for access	HDN	A-RNP	PBN NIWG NextGen Opportunities	Lower priority for Sec 547
PBN to deconflict airports	DAL/ DFW	RNP w RF	PBN Clarification Report NextGen Opportunities	Lower priority for Sec 547
PBN to deconflict airports	LGA/ JFK	RNAV	PBN Clarification Report NextGen Opportunities	Dropped from short list due to lower feasibility by 9/21
PBN arrivals & extended metering reducing vectors	DEN	RNAV	FAA input	Dropped from short list due to lower expected benefit
PBN arrivals to reduce TMIs/GDPs	JFK	RNP	NEC NIWG	Lower priority for Sec 547
PBN approaches with SCIA to increase throughput	PHL	RNAV	NEC NIWG	Lower priority for Sec 547
PBN approaches with .308 to increase throughput	SFO	RNAV	MRO NIWG	Lower priority for Sec 547
PBN approaches with .308 to increase throughput	EWR	RNAV	MRO NIWG	Lower priority for Sec 547
PBN approaches with .308 to increase throughput	BOS	VNAV	MRO NIWG	Included in short list
MRS to increase throughput	MEM	ADS-B Out	MRO NIWG NextGen Opportunities	Lower priority for Sec 547
3nm in en route airspace to increase throughput	SEA/ZSE	ADS-B Out	Industry input	Included in short list
Dedicated routes to increase throughput	ZMA/ ZNY	ADS-B Out/ SBS	SBS Interchange Meeting	Lower priority for Sec 547

Note: A CPDLC DCL candidate was included in the FAA input briefing provided in November 2020. The Ad Hoc Team initially did not include a DCL candidate in its initial list of candidates. Inclusion of a DCL candidate in the recommended short list is addressed in the main body of the report.

# Appendix E: Scoring Assessment to Support Candidate Down-Select

A two step-process was used to develop the short-list of candidates for the pilot program.

First, each Ad Hoc Team member was asked to identify the top six candidates, reflecting the priorities and considerations for each of their organizations. The nine candidates that received at least two priority votes were taken to the second step.

Second, the remaining nine candidates were assessed using a scoring process similar to one used for PBN Clarification prioritization. The Ad Hoc Team and supporting operator SMEs subjectively estimated the readiness, return and relevance of the remaining candidate. The factors were defined as follows:

- Readiness[8] = how likely is it that the candidate will be operational by September 2021
- Return = how well does the candidate provide benefit to equipped operators
- Relevance = how well does the candidate meet the intent of Sec 547 language

Each operator (representative or entity) provided one set of scores. The inputs were averaged to produce an aggregate score. The chart below presents the summary of the scoring.
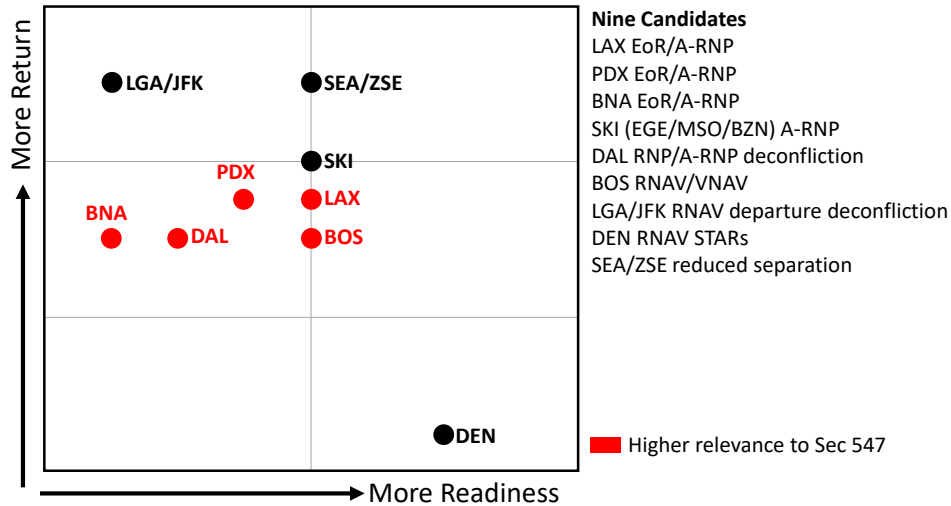
As a result of the scoring assessment and associated discussion, two candidates were removed from consideration for the recommended candidate short list:

- The DEN RNAV STARs candidate was dropped due to its low potential for benefit.
- The LGA/JFK PBN airport deconfliction candidate was dropped due to concerns over the potential impact of pending airspace changes in the New York area.

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[8] The readiness included in this scoring represents an operator-based assessment. The FAA SMEs provided separate input on readiness which is described in the body of the report.

Appendix F: Short List Candidate Details

Candidate: Established on RNP (EoR) at LAX	**Concept:**
Configuration Specifics: Arrival runways 24R, 25L	• Independent simultaneous EoR operation using existing RNP procedures
Equipage: RNP w RF; A-RNP (not required for EoR)	• Aircraft that are EoR-capable receive shorter (time and distance) approaches
Time of Day Considerations: None	• Non-equipped would remain on longer downwinds
	• A-RNP not required for EoR, but could increase utilization rates
Benefits: • More efficient (time and distance) approaches • Keeping aircraft on higher approach profile, supporting community interests	**Key Readiness Concerns:** • Timeframe for procedure amendment • Timeframe for A-RNP criteria approval • Community engagement
Other Notes: • Based on existing RNP approaches; transitions may need to be modified; procedure workgroup meeting may be required • A-RNP will increase utilization of the approaches • LAX would be independent simultaneous EoR operation; all required monitor positions exist • Review arrival/departure throughput while in use; no throughput decrease due to EoR	

Candidate: Established on RNP (EoR) at PDX	**Concept:**
Configuration Specifics: East flow - 10L, 10R; West flow - 28L, 28R	• Dependent simultaneous EoR operation with existing procedures
Equipage: RNP w RF; A-RNP (not required for EoR)	• Aircraft that are EoR-capable receive shorter (time and distance) approaches
Time of Day Considerations: None	• Non-equipped would remain on longer downwinds
	• A-RNP not required for EoR, but could increase utilization rates
Benefits: • More efficient (time and distance) approaches • Keeping aircraft on higher approach profile, supporting community interests	**Key Readiness Concerns:** • Timeframe for A-RNP criteria approval • Safety study and waiver required for dependent simultaneous EoR operation
Other Notes: • A-RNP will increase utilization of the approaches • New monitor positions would be required • Review arrival/departure throughput while in use; no throughput decrease due to EoR	

Candidate: Established on RNP (EoR) at BNA	**Concept:**
Configuration Specifics: South flow - 20L, 20R; North – 02L, 02R	• Dependent simultaneous EoR operation with existing procedures
Equipage: RNP w RF; A-RNP (not required for EoR)	• Aircraft that are EoR-capable receive shorter (time and distance) approaches
Time of Day Considerations: None	• Non-equipped would remain on longer downwinds
	• A-RNP not required for EoR, but could increase utilization rates
Benefits: • More efficient (time and distance) approaches	**Key Readiness Concerns:** • Timeframe for A-RNP criteria approval • Safety study and waiver required for dependent simultaneous EoR operation
Other Notes: • A-RNP will increase utilization of the approaches • New monitor positions would be required • Review arrival/departure throughput while in use; no throughput decrease due to EoR	

Candidate: Established on RNP (EoR) at DAL	**Concept:**
Configuration Specifics: South flow - 13L, 13R; North flow – 31L, 31R	• Dependent simultaneous EoR operation with existing procedures
Equipage: RNP w RF; A-RNP (not required for EoR)	• Aircraft that are EoR-capable receive shorter (time and distance) approaches
Time of Day Considerations: None	• Non-equipped would remain on longer downwinds
	• A-RNP not required for EoR, but could increase utilization rates
Benefits: • More efficient (time and distance) approaches	**Key Readiness Concerns:** • Timeframe for new DAL procedures; potential missed approach modifications needed at DFW • Timeframe for A-RNP criteria approval • Safety study and waiver required for dependent simultaneous EoR operation
Other Notes: • A-RNP will increase utilization of the approaches • New monitor positions would be required • Review arrival/departure throughput while in use; no throughput decrease due to EoR	

Candidate: Advanced RNP arrival procedures at Ski Country airports (MSO, BZN, EGE)	**Concept:**
Configuration Specifics: MSO: Rwy 30; BZN: Rwy 30; EGE: Rwy 25	• Add or replace existing RNP AR approaches with A-RNP approaches
Equipage: A-RNP	• A-RNP capable aircraft receive access to ski-country airports
Time of Day Considerations: None	• Non-equipped receive delayed access, based on operating conditions
Benefits: • Increased access to airport	**Key Readiness Concerns:** • Timeframe for new procedure development, including A-RNP criteria approval • Timeframe for flight checks
Other Notes: • Procedures have been drafted, but no production timeframe	

Candidate: 7110.308 procedures at BOS	Concept:
Configuration Specifics: 04L and 04R	• Dual arrival runway capability: 1 nm diagonal spaced approaches to closely spaced parallel runways
Equipage: Autopilot Coupled VNAV	• 04R for leading aircraft (ILS); 4L for trailing aircraft (RNAV-LNAV/VNAV capability required) – lead aircraft must be large or small (equivalent CWT categories)
Time of Day Considerations: For maximum benefit should avoid periods with high international arrivals or hours with high percentage of heavy aircraft	
Benefits: • Increased arrival throughput in less than visual approach weather (dependent on qualified aircraft pairs)	**Key Readiness Concerns:** • Completion of EA for new RNAV approach for 04L • Sorting of arrivals to keep LNAV only aircraft on 04R ILS
Other Notes: • Utilization would be limited to instrument flight conditions and consistent with 7110.308 usage descriptions in the "Draft Environmental Assessment for Boston Logan RNAV (GPS) Runway 04L" published in September 2020 • Sorting process may reduce qualified pairs and impact AAR • Segregating aircraft by type (e.g. regional on 04R) could aid sorting	

Candidate: 3nm in-trail separation in en route airspace at ZSE targeting SEA arrivals/departures	Concept:
Configuration Specifics: Below FL230	• Using current 7110.65 conditions, allow 3 nm separation using ERAM automation with ADS-B providing reliable targets
Equipage: ADS-B Out	
Time of Day Considerations: No time of day restrictions; should be managed as part of facility implementation plan	
Benefits: • Increased airspace throughput	**Key Readiness Concerns:** • ERAM adaptation
Other Notes: • Uses existing separation standards in 7110.65 • This capability is intended for any applicable airspace within ZSE. Tasking requires identification of an airport, therefore SEA is highlighted in the candidate description.	

Candidate: CPDLC DCL capabilities at MCO	Concept:
Configuration Specifics: none	• Equipped operators have priority for departure as a result of receipt of the reroute through Data Comm.
Equipage: FANS-1/A over VHF to support CPDLC DCL	• During a disruption at an airport (e.g., weather or runway turnaround) prioritize departures for DCL equipped aircraft.
Time of Day Considerations: None	
Benefits: • Reduced departure delays	**Key Readiness Concerns:** • Training and segregating equipped aircraft
Other Notes: • May aid development of a national policy	

Appendix G: Acronyms and Airport/Facility Identifiers

Acronyms

ADS-B	Automatic Dependent Surveillance Broadcast
A-RNP	Advanced Required Navigation Performance
COVID	Coronavirus
CPDLC	Controller Pilot Data Link Communications
DCL	Departure Clearances
EA	Environmental Assessment
EoR	Established on Required Navigation Performance
ERAM	En Route Automation Modernization
FANS	Future Air Navigation System
GDP	Ground Delay Program
GPS	Global Positioning System
GS	Ground Stop
ILS	Instrument Landing System
LNAV	Lateral Navigation
MCL	Minimum Capabilities List
NAS	National Airspace System
NM	Nautical Mile
PBN	Performance Based Navigation
RF	Radius to Fix
RNP	Required Navigation Performance
SMEs	Subject Matter Experts
SWAP	Severe Weather Avoidance Plan
TSA	Transportation Security Administration
VHF	Very High Frequency
VNAV	Vertical Navigation

Airport/Facility Identifiers

BNA	Nashville International Airport
BOS	General Edward Lawrence Logan International
BZN	Bozeman Yellowstone International Airport
EGE	Eagle County Regional Airport
DAL	Dallas Love Field
LAX	Los Angeles International Airport
MCO	Orlando International Airport
MSO	Missoula International Airport
PDX	Portland International Airport
SEA	Seattle Tacoma International Airport
ZSE	Seattle Air Route Traffic Control Center

Attachment 5

DATA COMM EN ROUTE STAR IN FREE TEXT RECOMMENDATION

NextGen Advisory Committee Subcommittee (NAC SC)
Data Comm Avionics Ad Hoc

Contents

En Route STAR in Free Text Issue Overview and Background

En Route STAR in free text to mitigate avionics issues

The FAA Data Comm program is responsible for the implementation of U.S. Domestic Controller Pilot Data Link Communications (CPDLC) in the tower and en route domains. During the development and test phase of the Data Comm en route system, several latent avionics issues were discovered. The loading of route clearance messages is an important feature of the FAA's en route system, providing key benefits to air traffic control and airspace users. Several of the identified avionics issues were related to loading of route clearances with a common issue related to the loading of the arrival or STAR route elements. The FAA en route ground system mitigates these issues by sending the STAR portion of a route clearance in a separate free text message to impacted aircraft identified by the flight plan.

The specific issues mitigated by STAR in free text are:

   A. Boeing 757 and 767 with the Pegasus 1 FMS, STAR loading issues

   B. Next Generation Boeing FMS implementations inhibiting partial route loads (B787, B748, B757/767 Peg II, and 777-9)

   C. Avionics route loading bugs on various Collins Aerospace and Honeywell FMS products

Data Comm NIWG and NJIP Recommendation

The NAC NextGen Priorities Joint Implementation Plan CY2019–2021 includes a milestone to resolve the B757 and B767 Pegasus 1 avionics interoperability issue by Q4 2021. The recommendation states that a temporary ground mitigation was put in place to allow the affected aircraft to participate in en route Data Comm but without a fix in the field will not be able to participate in Data Comm starting in January 2022. Industry had agreed to address the issues by the end of CY2021.

At the time of the rolling plan publication, B757 and B767 Data Comm operators were led to believe that the STAR loading issue on these Pegasus 1 aircraft would have a software fix available. Subsequently Boeing and their supplier Honeywell identified that the required software changes were not supported by the Pegasus 1 hardware solution. The manufacturer's solution was a hardware and software upgrade path branded Pegasus 2. Aircraft operators have noted Pegasus 2 is a significant investment and requires changes to the aircraft's wiring to support a modernized update media interface.

In December 2019, the Data Comm NextGen Integrated Working Group (NIWG) presented a recommendation to the NAC to extend the Pegasus 1 milestone beyond 2021 due to the challenges related to the Pegasus 2 solution. The FAA responded to this request in November 2020 with an action given to the NAC SC Data Comm Avionics Ad Hoc to review all options and develop a recommendation.

Issue A: Boeing Pegasus 1 STAR Loading Issue

Issue A is the original STAR loading avionics issue identified in the 2019-2021 NJIP with a milestone to correct the issue by the end of 2021.

   Impacted Aircraft: B757 and B767 with Pegasus 1 FMC avionics

   Issue: When a UM80 or UM83 message is sent to a Pegasus 1 FMC, the STAR is not loaded and error is not displayed to the flight crew.

Avionics Fix: Pegasus 1 cannot be fixed due to hardware limitations. Pegasus 2 hardware/software required.

> Note: Nav Database work around for Issue B does not solve on Pegasus 1.

Ground System Mitigation: ERAM implemented a fix that removed the STAR from the loadable portion of the route clearance and appends the STAR as a free text message for all flights that file "FANSER" in their flight plan field 18.

Issue B: Boeing Avionics Implementations

Impacted Aircraft: B787, B748, B757 and B767 with Pegasus 2 FMC, and 777-9

Issue: Avionics implementation inhibiting uplinked route from being loaded when a CPDLC route clearance with a runway dependent STAR is sent to these aircraft without runway.

Nav Database Workaround: A workaround using a modified Nav Database is currently being lab tested.

Ground System Mitigation: ERAM implemented a fix that removed the STAR from the loadable portion of the route clearance and appends the STAR as a free text message for all flights that file "FANSER" in their flight plan field 18.

Issue C: Avionics route loading issues

Impacted Aircraft: Multiple General and Business Aviation aircraft types with the Honeywell Epic and Collins ProLine FMC products.

Issue Summary:

> **Collins FMS:** When the FMS processes the route uplink, it doesn't expect the route uplink of the STAR/STAR Transition connection point (initial fix) to be included separately as a fix in the [routeinformation]. When provided as a fix, as well as being within the defined/named procedure retrieved from the onboard Nav Database, the FMS will see these as duplicates and reject the route as invalid.

> **Honeywell Epic NGFMS:** The Honeywell Epic NGFMS product has a runway dependent STAR issue similar to the Boeing NextGen avionics (Issue B).

Ground System Mitigation: ERAM implemented a fix that removed the STAR from the loadable portion of the route clearance and appends the STAR as a free text message for all flights that file "FANSER" in their flight plan field 18.

Avionics Fix:

> **Collins FMS:** Partial fixes to this issue are fielded on some platforms (addressing STAR transitions, for example, but not necessarily the common point), and all known software issues are fixed and available in the Collins facility. Collins is working with the various Business Aviation OEMs to find opportunities for updates, and will need their help with aircraft updates/field deployment.

Honeywell FMS: Software updates are scheduled for certification across various Business Aviation OEMs see table in next section. Note: Nav Database work around for Issue B does not solve on Honeywell Epic.

Alternative Mitigation Options

Boeing Aircraft Resolutions

Boeing developed a path forward for their fleet types that require the en route STAR in free text as described in the figure below.

Boeing 757 and 767 with Pegasus 1: Require a hardware and software upgrade to Pegasus 2. No other aircraft based technical solution has been identified for these aircraft.

Boeing 757 and 767 with Pegasus 2, Boeing 787, Boeing 747-8, Boeing 747-400 with NextGen FMC, and Boeing 777-9: A workaround using a modified Nav Database is currently being lab tested. If this workaround is successful, these aircraft can stop using the STAR in free text mitigation.
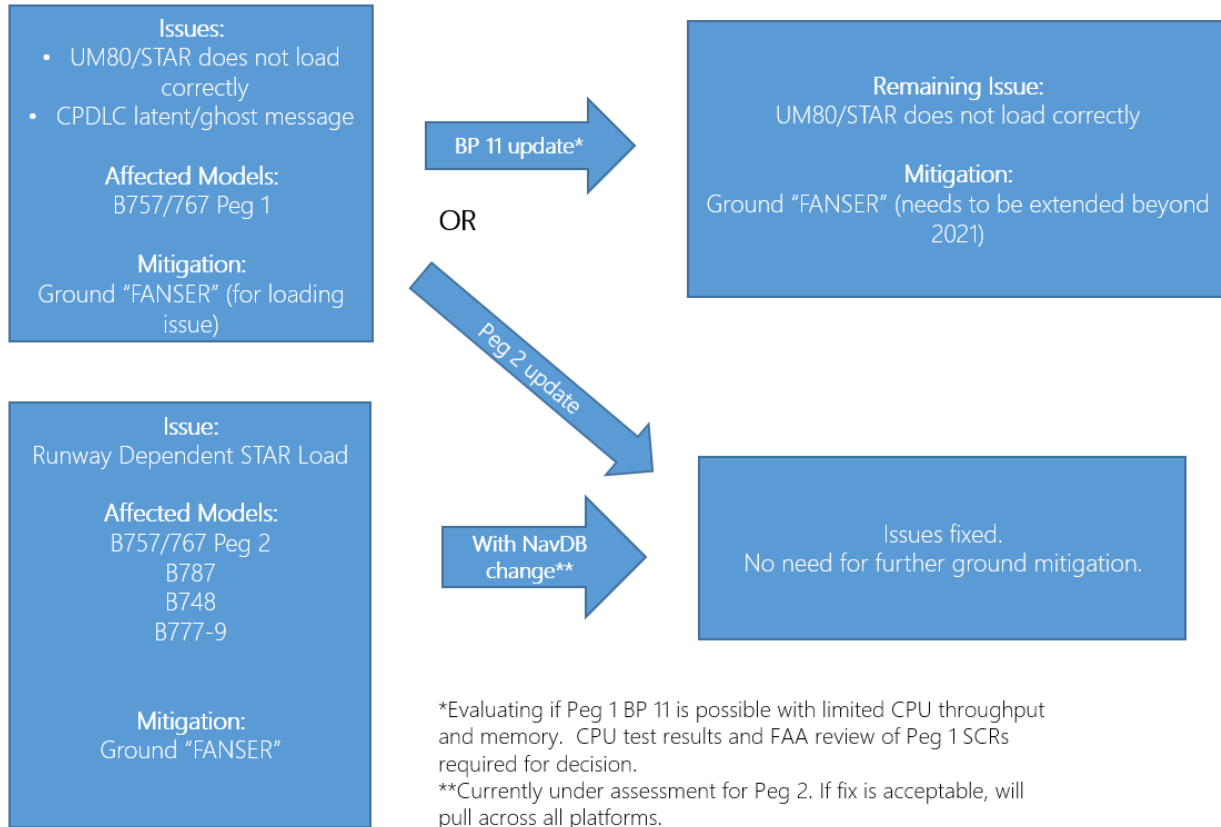
General Aviation Resolutions

Collins ProLine Fusion – Partial fixes to this issue are fielded on some platforms (addressing STAR transitions, for example, but not necessarily the common point), and all known issues fixed with our software available in our Collins facility. Collins is working with the various Business Aviation OEMs to find opportunities for updates, and will need their help with aircraft updates/field deployment.

Honeywell Epic – The software update plan is provided below.

Aircraft	Honeywell Epic Next Certification Load Name and Date		Next cert will contain runway dependent STAR update	STAR in Free Text Mitigation required after next cert?
Airbus A300	UPS Cert	Mid 2021	X	No
Dassault F900/F2000	EASy IV	2024	X	No
Dassault F5X/F6X	EASy IV	Late 2022	X	No
Dassault F7X/F8X	EASy IV	Late 2021	X	No
Embraer E1 (E170/175/190/195)	Load 27.4	Mid 2021		Yes
Embraer E2 (E175/190/195)	Load 9	Mid 2022	X	No
Gulfstream G500/600	Block 2	Late 2023	X	No
Gulfstream G650	Block 3	Mid 2021		Yes
Gulfstream G700	Type Cert	2022	X	No

Ground System Options

The FAA en route ground system mitigation by sending the STAR portion of a route clearance in a separate free text message to impacted aircraft identified by the flight plan is currently in place and there are no plans to remove the functionality.

During discussion of aircraft mitigation options for Issue B (aircraft not loading routes with a runway dependent STAR), a potential ground system mitigation to this specific problem would be to send the route with the STAR and assigned runway. The existing FAA en route automation platform does not have any knowledge of the flight's assigned runway to be able to send this information. A preliminary investigation was done in support of a Data Comm NIWG milestone. During this investigation it was determined that significant integration between the tower, TRACON, and en route automation systems would be required. There are no current plans to implement the integration required to send the assigned runway in a CPDLC clearance.

Impacted US Registered Data Comm Capable Aircraft

L3Harris and the FAA Data Comm program performed an analysis of the aircraft types capable of participating in en route Data Comm that require the en route STAR in free text.

The table and graphic below illustrate the air transport aircraft types and the corrective action required to stop using the ground mitigation. As seen in the table below, 849 US registered air transport aircraft must file FANSER to participate in en route CPDLC using the free text STAR mitigation. It is anticipated that 148 or 18% of the impacted aircraft will be eligible for the nav database work around.

The 757 and 767 fleets make up the remaining 701 aircraft or 82% of the impacted air transport fleet. These aircraft were separated into 2 groups based on aircraft age <= 10 years or > 10 years of age. Since Pegasus 2 is a significant upgrade, it is anticipated that older aircraft are less likely to be upgraded.
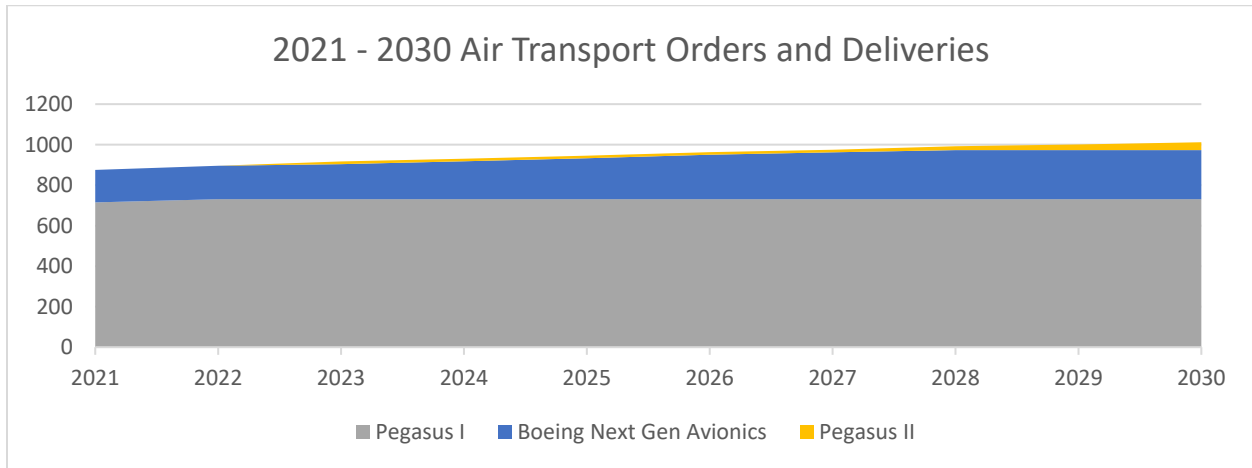
Air Transport Aircraft				
Aircraft Type	Count	Navigation Database Alternative	Needs Pegasus 2	
			Age <= 10 yrs	Age > 10 yrs
B747	38	38		
B757	399			399
B767	302		129	173
B787	110	110		
Grand Total	849	148	129	572
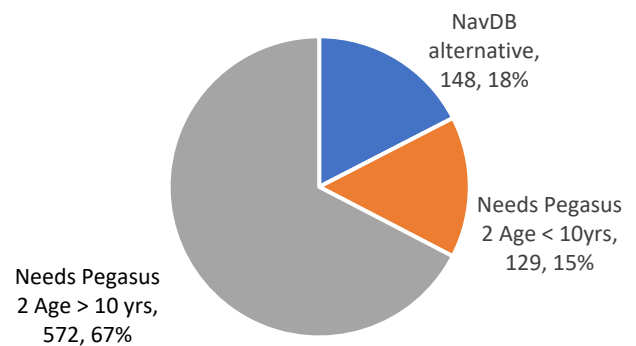
The business and general aviation aircraft impacted, and the corrective action required to stop using the ground mitigation are noted in the table below.

Biz/GA Aircraft			
Aircraft	Count	Honeywell Epic Fix	Collins ProLine Fix
GA	1148	568	580

Examining published order and delivery forecast data indicates that there is limited growth of the Pegasus 1 fleet from 2021 to 2030. None of the operators in this data set have announced plans to retire their Pegasus 1 B757 or B767 fleets.

In summary the newer model air transport aircraft have a forward path, however they represent < 20% of the fleet. The remaining air transport aircraft are unlikely to have avionics fix in the near term with almost a very small forecasted fleet growth.

Recommendation

After reviewing the issues, aircraft mitigation options, and the impacted Data Comm fleet the Data Comm Avionics Ad Hoc makes the following recommendation.

Boeing 757/767 Pegasus 1 Aircraft

Continue ground based STAR in free text mitigation for the remainder of their service life

Some subset of these aircraft may be upgraded to Pegasus 2, however none of the operators participating have indicated firm plans to do so.

Boeing fleet with NextGen avionics

B787, B777X, B748, B744 with NG FMC, B757/767 with Pegasus 2

Pending positive results from testing Pegasus 2, implement Navigation Database change for Pegasus 2 aircraft

Test and evaluate Navigation Database change for other affected models

Boeing will consider accommodating runway dependent STARs in future avionics releases

Honeywell Epic and Collins ProLine

Future avionics releases will correct issues requiring STAR in free text

FAA will look at future roadmap options to include assigned runway in route clearance.