Federal Aviation Administration

NextGEN

NEXTGEN PRIORITIES JOINT IMPLEMENTATION PLAN

EXECUTIVE REPORT

ROLLING PLAN 2017-2019

This *NextGen Priorities Joint Implementation Rolling Plan 2017-2019 Executive Report* is prepared and signed by:

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EXECUTIVE SUMMARY

NextGen capabilities continue to bring positive effects to the aviation industry and the flying public all across the National Airspace System (NAS). The Federal Aviation Administration (FAA) and the aviation industry work together through the NextGen Advisory Committee (NAC) to identify high-benefit, high-readiness NextGen capabilities for implementation in the near term. This work began in 2014 by identifying four focus areas — Multiple Runway Operations (MRO), Performance Based Navigation (PBN), Surface Operations and Data Sharing, and Data Communications (Data Comm). The FAA and the aviation industry identified specific capabilities to implement at specific locations in the 2014–2017 timeframe and documented both FAA and industry commitments in the FAA's *NextGen Priorities Joint Implementation Plan*.

The FAA and industry monitor progress against these commitments through the NAC and jointly agree to adjust commitments to better suit the NAS's needs. The FAA and industry successfully met the vast majority of these commitments by implementing new PBN procedures, reducing separation standards, improving access to critical surface data and delivering enhanced Data Comm services on or ahead of schedule.

The FAA and industry are committed to jointly evaluating the effects of these commitments on the NAS through the work of a Joint Analysis Team (JAT). This helps the FAA and industry understand the value of implementations in this plan.

Given the success of this collaboration, the FAA and industry agree to keep collaborating through the NAC to update the commitments each year and roll the plan forward biannually. The commitments in this plan reflect the culmination of work through 2019. Both the FAA and industry have identified specific commitments within each of the four focus areas to implement capabilities at specific locations by specific dates to increase safety, reduce aviation's impact on the environment, enhance controller productivity, and increase predictability, airspace capacity and efficiency. The FAA and industry will continue to monitor joint progress and be agile and flexible to make necessary adjustments to commitments.

ACCOMPLISHMENTS

Accomplishments were realized in all four focus areas:

- The FAA made substantial progress on Wake Recategorization (Wake RECAT) implementation at locations with simultaneous approaches to parallel runways by reducing separation criteria for multiple runway operations. RECAT was refined with additional separation reductions that are currently implemented at all RECAT sites across the NAS. The FAA also successfully addressed separation standards for multiple dependent and independent parallel operations at numerous locations and completed safety analyses for a variety of other separation standards. To date, the Wake RECAT capabilities identified positive effects on the NAS with capabilities delivering benefits as anticipated. For

example, the JAT's operational performance findings on Charlotte's Wake RECAT implementation estimated $237,000 in total annual savings in airborne and taxi out time.

- In the critical area of PBN, the FAA increased its community outreach at Charlotte by holding two public workshops to discuss flight path changes for routes northeast and southeast of the city. The FAA implemented 11 procedures at Charlotte, with 10 more to be implemented in early 2017. The agency also completed a Metroplex implementation at Northern California, implemented Established on RNP (EoR) capabilities at Denver, published the EoR National Standard, and conducted a single site assessment for Las Vegas.
- As an early implementation activity, the Terminal Flight Data Manager (TFDM) Program funded the Traffic Flow Management System (TFMS) Release 13 to enable the addition of new surface data elements. This modification was implemented in April 2016 and included changes to the data use hierarchy so that near-term "early implementation" benefits in TFMS will be realized. The FAA is now able to ingest and use several data elements in TFMS that will yield TFM (traffic flow management) benefits with better traffic management initiatives and increased predictability for the customers and the system. The FAA made the investment in early implementation given industry's commitment to provide the data, and there is a concerted effort underway with industry to provide data. The FAA also deployed electronic flight strips at Newark, Las Vegas and San Francisco.
- The FAA has made significant progress in Data Comm and is on track to complete Departure Clearance Tower Services at 56 airports by the end of Calendar Year 2016. Our industry partners are well on their way toward the goal of 1,900 Data Comm-equipped aircraft operating in the NAS by the end of CY 2019. More than 900 Data Comm-equipped aircraft currently operating (as of August 2016) were equipped through the FAA's Data Comm equipage initiative.

BACKGROUND

The Federal Aviation Administration (FAA) and the aviation industry, through the NextGen Advisory Committee (NAC), produced the first *NextGen Priorities Joint Implementation Plan*[1] in October 2014. This plan codified months of work analyzing the components of NextGen, discussing the merits of each capability, and decided on concrete milestones to implement priority capabilities for specific locations and dates.

The FAA and the NAC have successfully met the vast majority of commitments in the initial Plan, and where challenges arose, agreed to revise and codify those joint decisions in the first annual update, the *NextGen Priorities October 2015 Joint Implementation Plan*.[2]

[1] http://www.faa.gov/nextgen/media/ng_priorities.pdf

[2] http://www.faa.gov/nextgen/media/NGPriorities-2015.pdf

During a lessons-learned review in 2015, the FAA and industry agreed that the joint effort to identify, track and implement NextGen priority capabilities was extremely valuable to moving NextGen forward and increasing industry confidence in NextGen. This work set a new standard for collaboration. The FAA and industry agreed that the plans must be agile and flexible to make necessary adjustments. FAA and industry leadership re-engaged the NextGen Integration Working Group (NIWG) teams in January 2016 to continue work in the four areas of MRO, PBN, Surface and Data Comm, with additional focus on time based flow management decision support tools to better enable PBN.

WHAT THIS PLAN CONTAINS

This plan summarizes the three categories of high-level commitments made by the FAA and the aviation community:

1. **FAA milestones for operational implementation at specific locations that will be available for immediate use that are funded with Operations dollars as well as Facilities and Equipment funding.**

2. **Major FAA pre-implementation activities**. These include safety analyses, engineering studies and investment analyses for capabilities that the agency and the aviation community are mutually interested in pursuing. The FAA will not presuppose the outcome of these analyses, which could also reveal reasons that these are not viable for implementation. The agency is committed to completing the activities, and, where possible, will seek to establish additional implementation milestones in the future.

   For the first time the plan includes a research and development activity—assessment of a time based wake separation concept for operational use within the multiple runway operations focus area. The FAA is leaning forward with industry, listening to stakeholders and adding future focus through this research and development activity. The agency is committed to doing strictly research in this area in the timeframe of this report.

3. **Commitments by industry to complete activities required for successful implementation.**

Each focus area section includes a graphical depiction of the capability milestones and locations along a timeline, accompanied by a brief description of the work. Cost statements are included in each focus area. Appendix A is a list of acronyms and airport codes, and Appendix B is the complete report from the NAC, which further details the methodology, criteria and considerations addressed by the working groups.

MANAGEMENT OF THIS PLAN

The activities in this report require funding from three FAA accounts: Facilities and Equipment, Research and Development, and Operations, and can be delivered within our current budget requests.

They are part of the larger FAA efforts to implement NextGen and are included in the FY 2017 President's Budget Request and the supporting Capital Investment Plan (CIP). The CIP is based on detailed program schedules with deliverable dates and includes the specific NAC priorities identified in the report. Cost estimates for these commitments are based on analysis of previously completed sites, as well as on the number of procedures to be implemented and the level of effort needed to complete the work. These commitments leverage operational analyses and engineering studies funded and conducted in prior years. In addition the FAA has committed research funding as well as staff resources to meeting NAC priorities. The FAA's current budget requests also cover the cost of the pre-implementation commitments, but pursuing any additional implementation commitments as a result of pre-implementation work may require more funding.

All parties must understand that the FAA's agreement to assess a capability does not imply agreement to implement the capability, because the FAA must always make a credible business case to justify its full lifecycle costs. Implementation of future capabilities will be determined by established FAA processes that transcend the overarching lifecycle and acquisition management processes. These include: strategic planning, enterprise risk management, management and budgeting, enterprise architecture, portfolio management and ultimately program management. For example, new operational capabilities must be planned and managed through the NAS Enterprise Architecture Service Roadmaps. Those capabilities that require procurement decisions are governed by the FAA Acquisition Management System. During implementation, changes within programs are then governed by internal program management processes. Finally, the FAA must comply with its NAS Configuration Control process to adjust the NAS baseline to reflect the equipment changes required to support any new capability. These existing FAA processes ensure that all NAS changes are operationally, technically and financially responsible and feasible, and that the required documentation is in place to adequately reflect the change to the NAS and the reasons.

The report, and the FAA's commitment to meet planned implementation schedules, assumes continued funding at the current CIP levels. Future budget constraints may cause schedule slippages but will not change the FAA's commitment to meet the planned NAS operational, procedural, and equipage improvements laid out in the plan.

MONITORING AND OVERSIGHT

The FAA established a formal process for monitoring and reporting on progress toward achieving the commitments in the Joint Implementation Plan in 2014. The document can be found at *NextGen Priorities Joint Implementation Plan Oversight Process*.[3] The management and oversight of the commitments in this plan will continue to follow internal monitoring and oversight activities, risk management, continued industry engagement and quarterly reporting of the NextGen integration working group teams to the NextGen Advisory Committee and NAC Subcommittee. The NIWG

[3] http://www.faa.gov/nextgen/library/media/NextGenPrioritiesOversightProcess-FINAL.pdf

teams will continue to identify and work to mitigate risks associated with these focus areas in accordance with the FAA's risk management processes at the program, portfolio, and enterprise level.

POST-IMPLEMENTATION JOINT OPERATIONAL PERFORMANCE ANALYSIS

The FAA has committed to transparency in monitoring progress metrics. A section of the NextGen Performance Snapshots[4] website provides regular updates on the plan's status. These capabilities' full benefits will be realized when operators begin routinely using them. The operational impact will be measured against existing FAA operational performance metrics, which are showcased on both the Snapshots page as well as the agency's Harmonized Metrics website.[5] Additionally, the NIWG teams are reviewing the findings of the Joint Analysis Team (JAT) chartered by the NAC and the FAA to analyze the performance effects of NIWG implementations and provide feedback to each of the workgroups for future work plans. Under the JAT, industry and the FAA have collaborated to analyze performance changes from Wake RECAT's implementation in Charlotte and Chicago (Midway and O'Hare) and Performance Based Navigation procedural changes in the North Texas metroplex. The JAT is examining these and other more-detailed metrics relevant to each unique project to measure the operational performance effects, validate the modeled performance, and inform future benefits projections. These metrics are envisioned to help identify areas of focus, process change and organizational change.

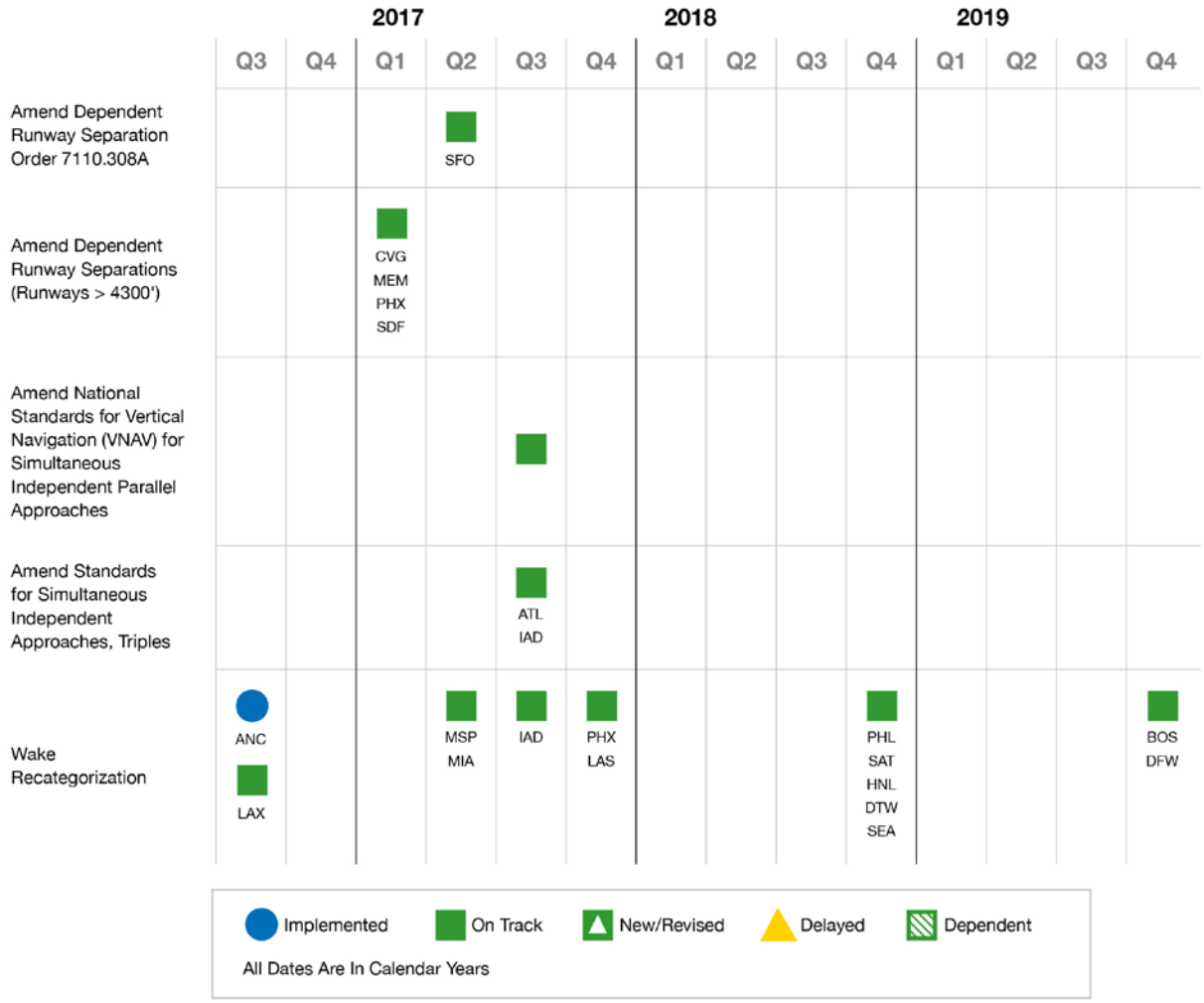
[4] The NextGen Performance Snapshots is the agency's vehicle for sharing metrics about how NextGen is improving NAS operations, and can be found at www.faa.gov/nextgen/snapshots

[5] http://www.faa.gov/about/plans_reports/operational_metrics/

FOCUS AREA: MULTIPLE RUNWAY OPERATIONS (MRO)

The efficiency of Multiple Runway Operations (MRO), particularly those that are closely spaced, has been limited by a variety of factors that influence safety risk, including collision avoidance and the interplay of wake vortices (also known as wake turbulence) with nearby aircraft. MRO capabilities improve access to these runways and can increase basic runway capacity and throughput by reducing aircraft separation based on improved wake categorization standards. Improved access will enable more arrivals and/or departures during instrument meteorological conditions, which will increase efficiency and reduce flight delays. These commitments are a subset of the FAA's overall programs and activities to address these issues.

IMPLEMENTATION COMMITMENTS



For an accessible version of the MRO Implementation Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=mro#impl-comm.

- **Amend Dependent Runway Separation Order 7110.308A:** FAA Order 7110.308A allows a reduction in the required wake separations for dependent operations for runways less than

2,500 feet apart when small or large category aircraft are leading in the dependent pair. The FAA commits to amending Order 7110.308A in Q2 CY 2017 to enable additional benefit at San Francisco (SFO).

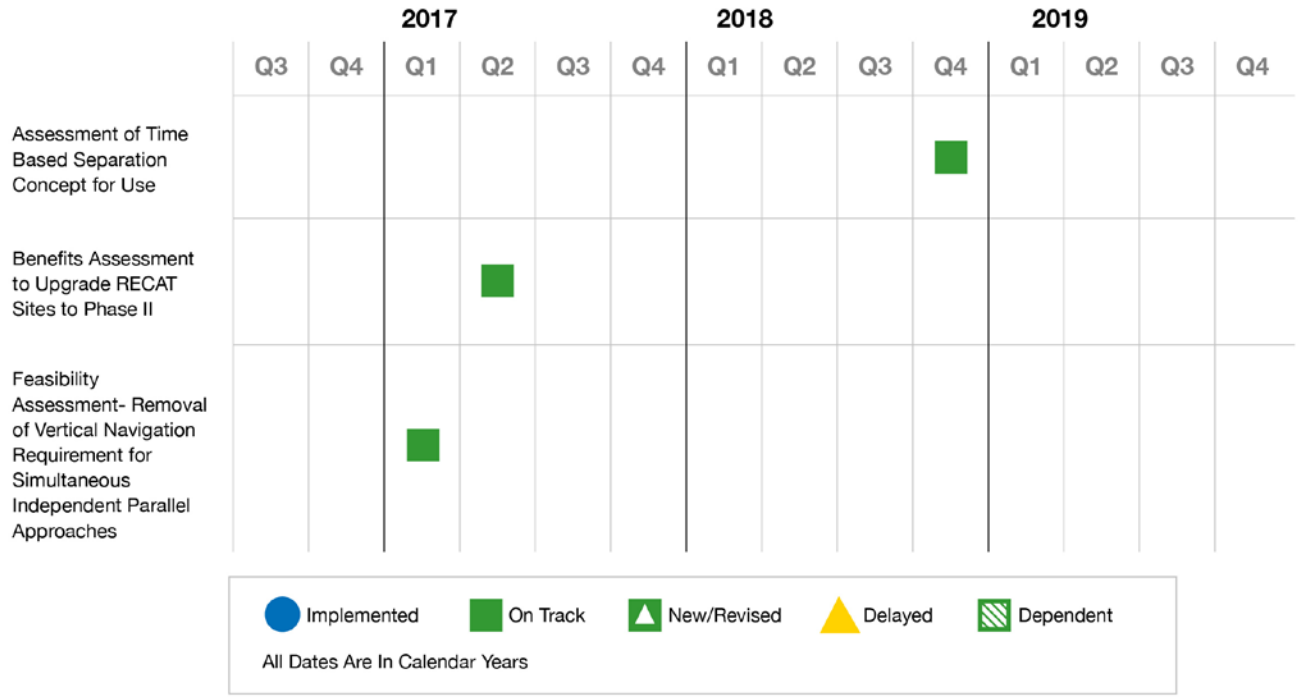
- **Amend Dependent Runway Separations for Runways Greater than 4,300 Feet:** This capability reduces the dependent stagger separation from 2 nautical miles (nm) to 1.5 nm for parallel runways with centerline spacing greater than 4,300 feet and less than 8,300 feet. Safety analysis has been completed, and implementation is pending completion of SMS and procedure authorization. The FAA commits to implementation in Q1 CY 2017 at Louisville (SDF), Phoenix (PHX), Cincinnati (CVG) and Memphis (MEM) airports.

- **Amend National Standards for Vertical Navigation (VNAV) for Simultaneous Independent Parallel Approaches:** The FAA will authorize revised standards for non-VNAV-equipped aircraft in closely spaced parallel approach operations both with VNAV-equipped aircraft and other non-VNAV traffic. Changes are dependent on the results of the pre-implementation safety assessment of the VNAV requirement for closely spaced parallel operations. Based on those results, the FAA will complete Safety Management System (SMS) and Document Change Proposal (DCP) activities as needed. The FAA commits to authorization of new VNAV National Standards in Q3 CY 2017.

- **Amend Standards for Simultaneous Independent Approaches, Triples:** This capability allows triple simultaneous operations for parallel runways with centerline spacing greater than 3,900 feet. Safety analysis, SMS efforts, and procedure authorization are all complete and the new standards are implemented at Chicago O'Hare (ORD). The FAA commits to additional implementation in Q3 CY 2017 at Atlanta (ATL) and Washington Dulles (IAD).

- **Wake Recategorization (Wake RECAT), Additional Sites:** In the past, the degree to which two aircraft were separated for wake turbulence concerns was primarily based on aircraft weight. The FAA has replaced that model at numerous airports in the past few years with newly approved wake turbulence categories that group aircraft more optimally based on their wake turbulence characteristics. Since these initial implementations, additional research has defined pair-wise wake separation standards for each aircraft leader-follower pair. Implementation of these standards can then uniquely address the needs of a given airport to increase site-specific benefits by developing unique wake categories based on the local fleet mix. Recent assessments confirm that Wake RECAT works where needed and that not all airports need this capability. Using joint analysis work, the FAA and industry collaborated to identify more locations for implementation. The FAA commits to implementation at 12 airports by the close of 2019: Minneapolis/St. Paul (MSP) and Miami (MIA) in Q2 CY 2017; IAD in Q3 CY 2017; Phoenix (PHX) and Las Vegas (LAS) by Q4 CY 2017; Philadelphia (PHL), San Antonio (SAT), Honolulu (HNL), Detroit (DTW), and Seattle (SEA) in CY 2018; and Boston (BOS) and Dallas/Ft. Worth (DFW) in CY 2019.

PRE-IMPLEMENTATION COMMITMENTS



For an accessible version of the MRO Pre-Implementation Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=mro#pre-impl-comm.

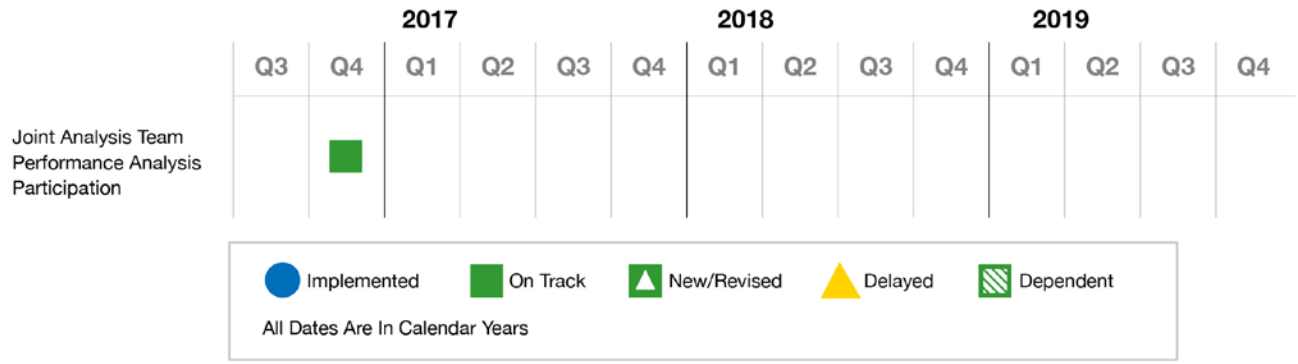
- **Time Based Separation:** RECAT Phase III concepts are currently being researched and will provide dynamic pair-wise wake separations based on weather, aircraft performance characteristics and trajectory based operations**.** One concept to achieve this dynamic wake separation is to use time based, rather than distance based, wake separations in headwind conditions. Under this concept, efficiency lost through longer flight time in a headwind over a given distance would be regained. This has been in use by NATS UK for more than a year with positive results and will be investigated as part of FAA dynamic wake separation concept development. The FAA commits to assessing the use of the time based separation concept in the NAS for dynamic wake turbulence separation standards by Q4 CY 2018. This research and development activity is included in response to industry's interest in time based separation for operational use.

- **Upgrading Wake RECAT Sites to Phase II:** RECAT Phase I defined wake categories based on a methodology that encompasses more than weight to include wingspan, rolling moment of inertia and other factors, resulting in a new six-category system for wake separation. This system was refined with additional separation reductions in RECAT Phase 1.5, which is currently implemented at all RECAT sites across the NAS. RECAT Phase II defined pair-wise wake turbulence separation standards among 123 aircraft types that make up 99 percent of global operations. These pair-wise separations allow for reduction in wake turbulence spacing between pairs of aircraft based on data collected as these aircraft operate in the NAS, such as

approach speed at specific distances from the threshold. While the implementation of the RECAT Phase II pair-wise separations would maximize the static capacity gains from RECAT, continued use of categorical implementations will be needed until controller tools can support these complex separations. RECAT Phase II categorical implementations can be optimized for the fleet mix in a given Terminal Radar Approach Control Facility (TRACON) and may provide a significant increase in benefits over RECAT Phase 1.5 for the primary airport in a TRACON, while generally maintaining or improving throughput at smaller airports and the TRACON airspace when compared to RECAT Phase 1.5. The FAA commits to completing by Q2 CY 2017 an analysis of sites where Wake RECAT has already been implemented to see if it is both beneficial and operationally feasible to upgrade to RECAT Phase II.

- **Vertical Navigation Requirement for Simultaneous Independent Parallel Instrument Approaches to Closely Spaced Parallel Runways:** The FAA is investigating the requirement for vertical navigation (VNAV) during simultaneous closely spaced parallel approach operations. Using the data from prior multiple runway operations studies, lateral and vertical track dispersions will be used in high-speed simulation studies to examine the risks associated with including non-VNAV-equipped aircraft in closely spaced parallel approach operations both with VNAV-equipped aircraft and other non-VNAV traffic. The FAA commits to completing a feasibility assessment of the requirement for vertical navigation for closely spaced parallel operations in Q1 CY 2017.

INDUSTRY COMMITMENTS



For an accessible version of the MRO Industry Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=mro#ind-comm.

- **Joint Analysis Team (JAT) Performance Analysis Participation:** Air carriers may have access to additional metrics that should be considered during the assessment of MRO and Wake RECAT procedures. These partners commit to working with the JAT to provide metrics data, which may include a comparison of pre-implementation to post-implementation data, and is not limited to taxi times, fuel burn and gate delays.

COST

The specific commitments in this report are part of the larger MRO program and are funded in the FY 2017 President's Budget Request and the supporting Capital Investment Plan (CIP). These efforts are also supported each year by the FAA's annual operating budget. Funding for these commitments is included as part of the F&E plan that totals $5.3 million for FY 2017. In addition, the FAA plans to fund the NextGen Wake Turbulence research program for $8.6 million in FY 2017. Cost estimates are developed based on engineering analysis and known historical costs for wake and closely spaced parallel operations procedure conceptual design, data collection, analysis and training. The Time Based Separation (TBS) assessment will be funded beginning in early FY 2017 from the Wake Turbulence research program. Post 2017, if development progresses, the TBS research is planned to transition to the RECAT F&E CIP for the acquisition process and implementation efforts.

These commitments leverage operational analyses and engineering studies funded and conducted in prior years. Through FY 2016, the FAA spent $79 million in the F&E account on the MRO program. Using this funding, the FAA performed analyses that led to the authorization of Wake RECAT Phase 1.5, which has been implemented at 23 sites. The agency revised blunder assumptions and performed analyses to reduce required separation standards for simultaneous independent and dependent approaches, which have been implemented at 10 sites. The FAA also performed analyses and authorized procedural and system solutions to reduce wake separation requirements on arrival and departure for closely spaced parallel runway operations; and implemented 7110.308 and Wake Turbulence Mitigation for Departures (WTMD) solutions at five sites to date.

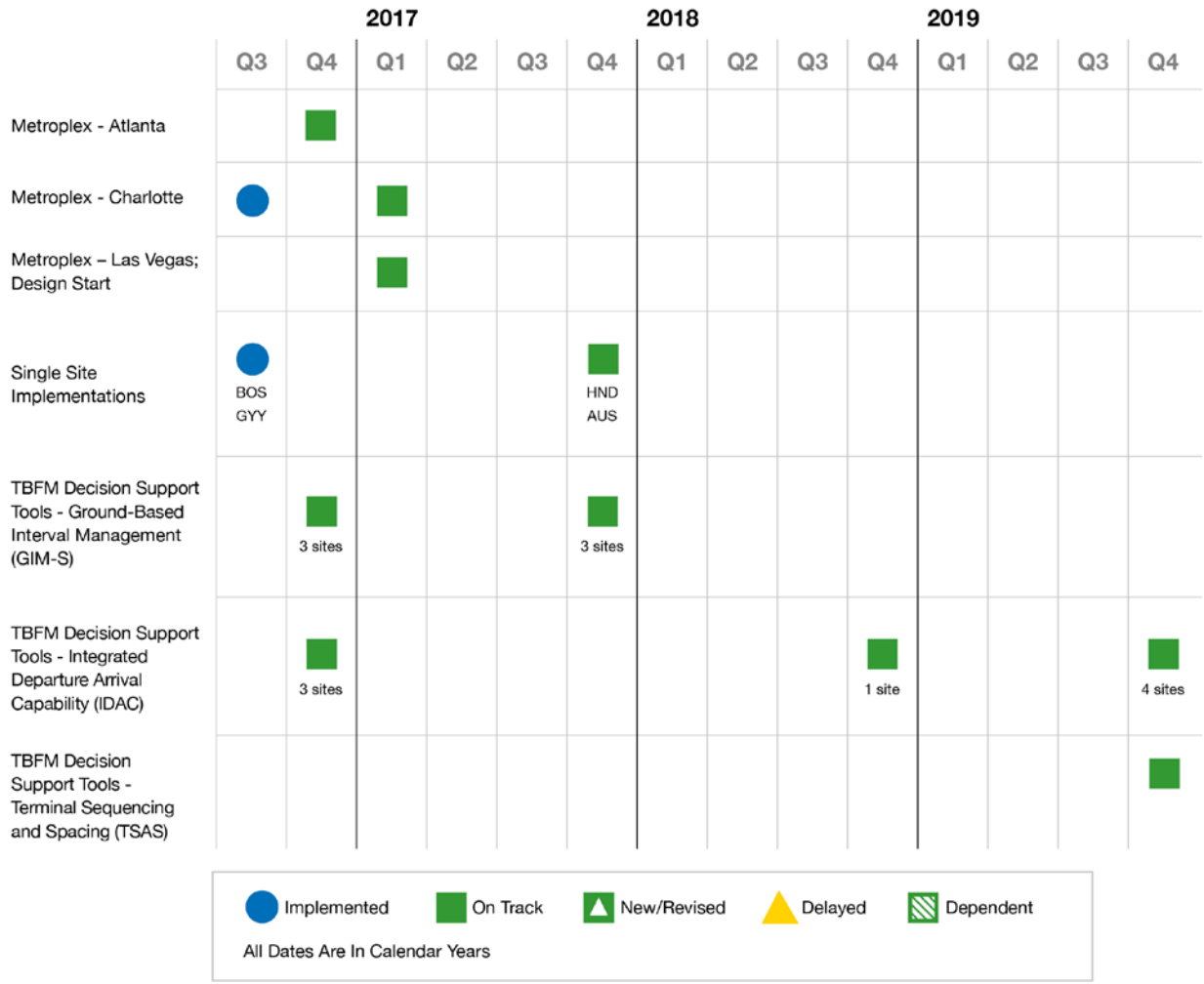
RISKS

As with any program, these commitments are subject to cost, schedule and performance risks. The FAA is committed to providing executive oversight to mitigate risks and adhere to these commitment timelines. This focus area has significant interdependencies with other FAA projects that senior leadership will closely monitor. All changes to separation requirements require completion of safety analyses to ensure the proposed procedures meet the target level of safety; therefore, plans are subject to change based on the results of these analyses. Changes to MRO plans can also occur due to unplanned runway closures and changes in deployment of other programs. Such changes can also affect the benefits case for planned implementations, leading to removal of a site from the plan in favor of another site which will net greater benefits. In some cases, there is dependence on the development of new PBN procedures and there may be environmental risks if the effects of new procedures exceed FAA threshold criteria for significance, which could delay implementation.

FOCUS AREA: PERFORMANCE BASED NAVIGATION (PBN)

The FAA is moving to a PBN NAS and has published the *PBN NAS Navigation Strategy 2016*, which has been coordinated and endorsed by the NAC. With PBN, the FAA delivers new routes and procedures that primarily use satellite-based navigation and onboard aircraft equipment to navigate with greater precision and accuracy. PBN provides a basis for designing and implementing repeatable flight paths and airspace redesign which provides increased access to airspace near obstacles and terrain. Benefits include shorter and more direct flight paths, improved airport arrival rates, enhanced controller productivity, increased safety due to repeatable and predictable flight paths, more stabilized approaches, fuel savings and a reduction in aviation's environmental impact. These commitments are a subset of the overall series of PBN activities the FAA is planning to implement.

IMPLEMENTATION COMMITMENTS



For an accessible version of the PBN Implementation Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=pbn#impl-comm.

- **Metroplex Projects:** The FAA has been introducing integrated NextGen capabilities to improve air traffic flow at metroplexes across the United States. Airspace congestion and other

limiting factors, such as environmental constraints, combine to reduce efficiency in these areas. Using a consistent, repeatable approach, study teams of FAA and aviation community experts analyze the operational challenges of a given metroplex area and explore the available tools for improvement. Collaborative design and implementation teams then put in place the solutions the study teams recommend, including PBN procedures and airspace redesign. The FAA commits to implementing Metroplex projects at two locations highlighted by industry by the end of CY 2017 and to continue work toward implementation in another metroplex (Las Vegas).

- **Atlanta Metroplex:** This project has completed the study and design phases of the Metroplex process. There are 57 procedures planned for ATL. There are several procedures proposed for nearby airports, including Raleigh-Durham (RDU), Greensboro (GSO), Greenville-Spartanburg (GSP), and Charleston Air Force Base International (CHS). Given the proximity and interconnectivity of these airports, this Metroplex area is currently being coordinated closely with the Charlotte Metroplex site. The FAA commits to final procedure publication in Q4 CY 2016.

- **Charlotte Metroplex:** This project has completed the study and design phases of the Metroplex process. There are 46 procedures proposed for Charlotte (CLT), as well as the previously identified 10 procedures planned for the nearby airports shared with the Atlanta Metroplex site. The FAA has completed the first set of new procedures in Q2 CY 2016; a second set of procedures is on target for Q3 CY 2016 and final procedure publication in Q1 CY 2017.

- **Las Vegas Metroplex:** This project has completed the study phase and will begin the design phase of the Metroplex process in Q1 CY 2017. Timelines for subsequent phases will be determined during the design phase. The study team's scope included McCarran International Airport (LAS), Henderson Executive Airport (HND), North Las Vegas Airport (VGT), and Nellis Air Force Base (LSV).

- **Single Site Implementations:** While Metroplex brings benefits to large complex geographic areas, Standard Terminal Arrivals (STARs) with Optimized Profile Descents (OPDs) and Standard Instrument Departures (SIDs) also provide benefits to locations beyond those areas. The FAA commits to the following implementations:

  - OPD/Area Navigation (RNAV) Standard Terminal Arrival (STAR) at Gary International Airport (GYY) – LUCIT1 in Q3 CY 2016

  - OPD/RNAV STAR at Boston Logan International Airport (BOS) – JFUND1 in Q3 CY 2016

  - OPD/RNAV STAR at Austin International Airport (AUS) – PINCH1 in Q4 CY 2017

  - RNAV Standard Instrument Departure (SID) at Henderson Executive Airport (HND) in Q4 CY 2017

- **Time Based Flow Management (TBFM) Ground-Based Interval Management–Spacing (GIM-S):** GIM-S provides improved time based metering operations, through software and technology enhancements, to the ERAM and TBFM system platforms. Software and technology enhancements enabling the GIM-S capability have been fully implemented at all 20 Air Route Traffic Control Centers (ARTCC). Benefits from GIM-S include expanded metering design options, reduced vectoring for sequencing needs, increased and consistent application of OPDs, and improved Estimated Time of Arrival (ETA)/Scheduled Time of Arrival (STA) performance.

  GIM-S achieved initial operating capability in September 2014 and has continued operational implementation to two additional sites. The FAA commits to implementing GIM-S at three additional sites in CY 2016 and CY 2017 for arrival flows and at ARTCC sites where an operational benefit exists. The priorities for GIM-S implementation include improving GIM-S operations where GIM-S has been introduced and providing a foundation for Terminal Sequencing and Spacing (TSAS) for those sites that will support TSAS implementation. CY 2018 and CY 2019 implementations will be defined based on lessons learned regarding operational integration and training requirements in CY 2016 and CY 2017.

  Benefits from GIM-S include expanded metering design options, reduced vectoring for sequencing needs, increased and consistent application of OPDs, and improved ETA/STA performance. The physics behind GIM-S limit its application to those arrival flows where it is unhampered by factors such as distance, winds and operational constraints.

- **TBFM Integrated Departure Arrival Capability (IDAC):** IDAC automates the process of monitoring departure demand and identifying departure slots. IDAC coordinates the departure times between airports and provides situational awareness to air traffic control towers (ATCT) such that controllers can select from available departure times and plan their operations around those times. Specific enhancements to the TBFM system include electronic scheduling of departure approval requests, as opposed to current telephonic coordination, and enhanced operational awareness through ATCT depiction of available departure slots.

  IDAC achieved IOC status at ZLA in 2015 and has been implemented at one additional site (ZID). Three additional sites are scheduled for IDAC implementation in FY 2016, and include ZOB, ZBW and ZDC. The FAA commits to implementing IDAC at one more site in CY 2018 and four more sites in CY 2019.

- **TBFM TSAS:** TSAS provides metering tools in the terminal environment for time-based merging, sequencing and spacing. TSAS provides speed advisories, slot markers and metering information through software and technical enhancements to the TBFM and STARS system

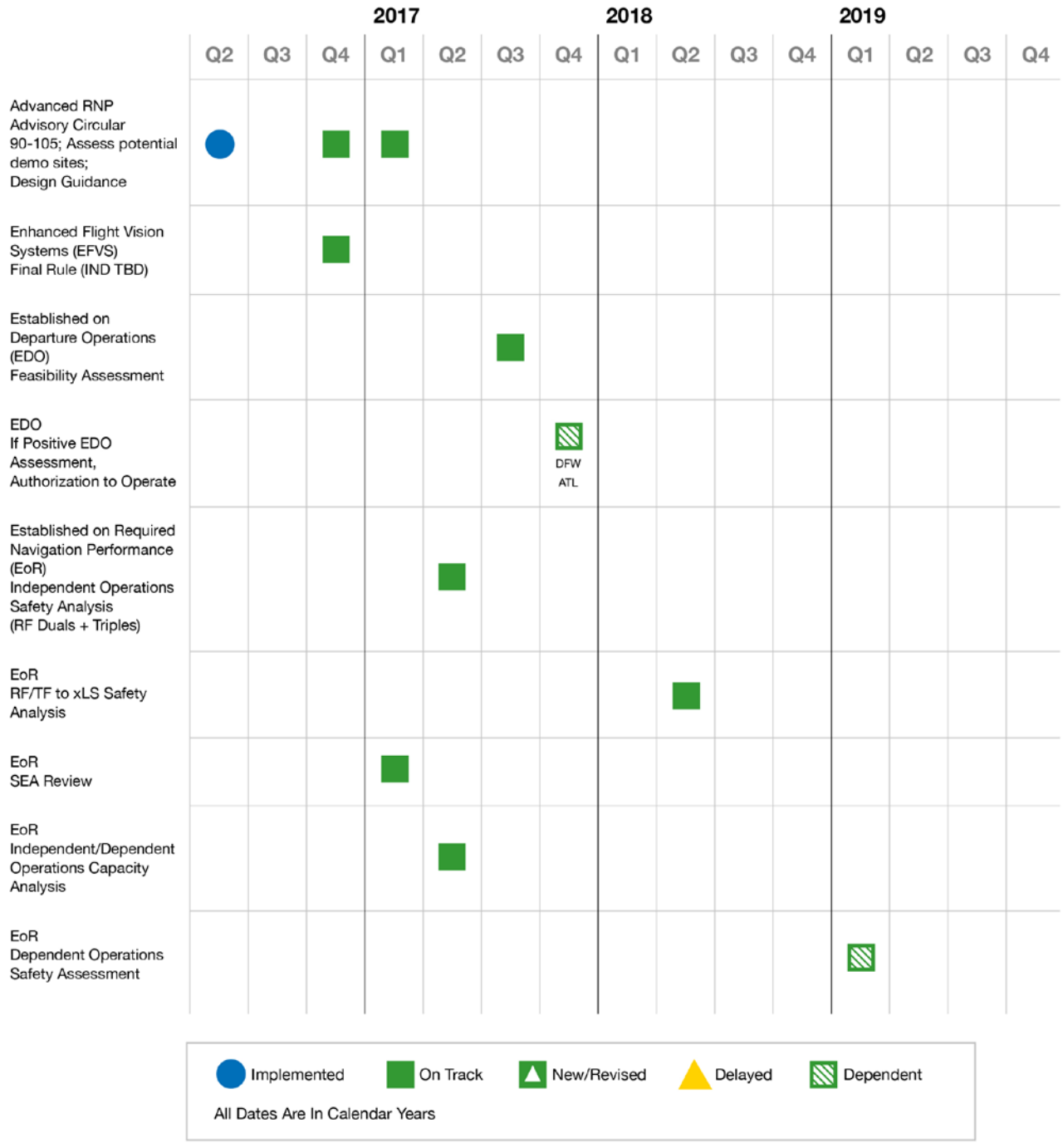
platforms. TSAS benefits include improved runway delivery, sequencing accuracy, and sequencing consistency necessary to increase PBN usage. TSAS allows for the design of terminal metering operations that carries the en route sequencing achievement into the terminal operations. Like GIM-S, the TSAS capability alters the fundamental design and inputs into sequencing operations.

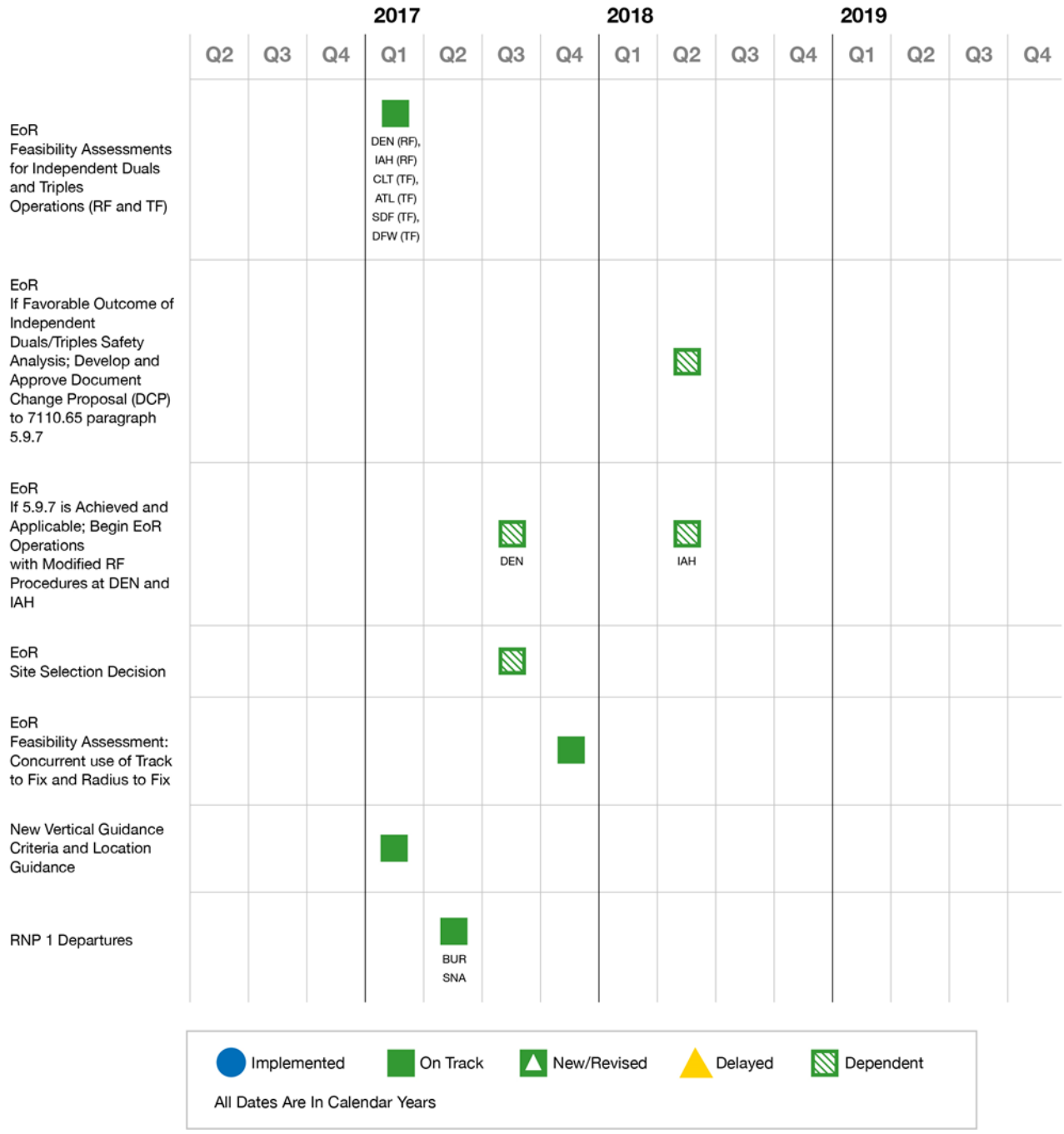
Following the work of Greener Skies at Seattle (SEA), the deployment of TSAS would help to optimize the traffic flow into SEA.

The FAA commits to implementing the key site for TSAS in CY 2019. Sites under consideration as a key site are SEA, DEN or PHX. Additional sites for planned future deployment include LAS, IAH, SFO, LAX, ATL and CLT.

The TBFM implementation schedules are for use on an initial arrival flow within the ARTCC or supporting an adjacent ARTCC, not completion of all flows to all airports managed by a center.

PRE-IMPLEMENTATION COMMITMENTS





For an accessible version of the PBN Pre-Implementation Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=pbn#pre-impl-comm.

- **Advanced RNP (A-RNP):** The FAA published operational and airworthiness guidance in support of A-RNP operations in Q2 CY 2016. FAA commits to publish procedure design criteria in Q1 CY 2017. The FAA will also work with industry and other stakeholders to assess potential A-RNP procedure demonstration sites in Q4 CY 2016.

- **Established on Required Navigation Performance (RNP) (EoR):** EoR enables controllers to clear aircraft on an RNP approach while on the downwind to an airport without the need to use the standard 1,000 feet of vertical separation when the aircraft turns to align with the runway centerline. This change to separation standards allows aircraft to turn to align to the runway much closer to the field, reducing track miles, fuel burn and noise. Unlike EoR for Widely Spaced Operations, which require an aircraft and its crew to be RNP Authorization Required (RNP AR)-capable, the Track-to-Fix (TF) procedures are envisioned to require only Area Navigation (RNAV) capability. More than 85 percent of the current commercial fleet would be able to use these procedures, which would greatly increase their potential usage and benefits. The FAA will work a focused effort to develop and implement an EoR TF leg approach to the North Runway at Atlanta to inform future TF plans. The following studies' results will inform which runway configurations are best suited to RNP approaches using RNP TF and/or Radius to Fix (RF). EoR provides safety, reliability and efficiency benefits in the NAS while improving customer service and minimizing delays en route and on the ground. Design guidance and tools to develop TF approach procedures are in development. RF/TF transition to xLS[6] procedures requires a safety analysis that will be conducted after completing the independent runway operations analysis. The FAA commits to conducting the analysis and assessments below:

  - Safety Analyses for EoR dual/triple independent RF operations in Q2 CY 2017.
  - Safety Analyses for RF/TF to xLS in Q2 CY 2018.
  - Safety Analyses for EoR dual dependent operations in Q1 CY 2019.
  - Seattle review for RF in Q1 CY 2017.
  - Feasibility assessments for EoR dual/triple independent operations: DEN (RF), CLT (TF), ATL (TF), SDF (TF), DFW (TF) and IAH (RF) in Q1 CY 2017.
  - Capacity analyses for independent and dependent operations in Q2 CY 2017.
  - Site Selection Decision in Q3 CY 2017.
  - If favorable outcome of collision risk assessment for EoR dual/triple independent RF operations (above), develop and approve document change proposal (DCP) to 7110.65 5.9.7 in Q2 CY 2018.
  - If DCP to 7110.65 5.9.7 is achieved and applicable, begin EoR operations with existing RF procedures at DEN in Q3 CY 2017 and IAH in Q2 CY 2018.
  - Feasibility assessment of the concurrent use of TF and RF procedures in Q4 CY 2017.

[6] Types of landing systems such as ILS, GLS, MLS

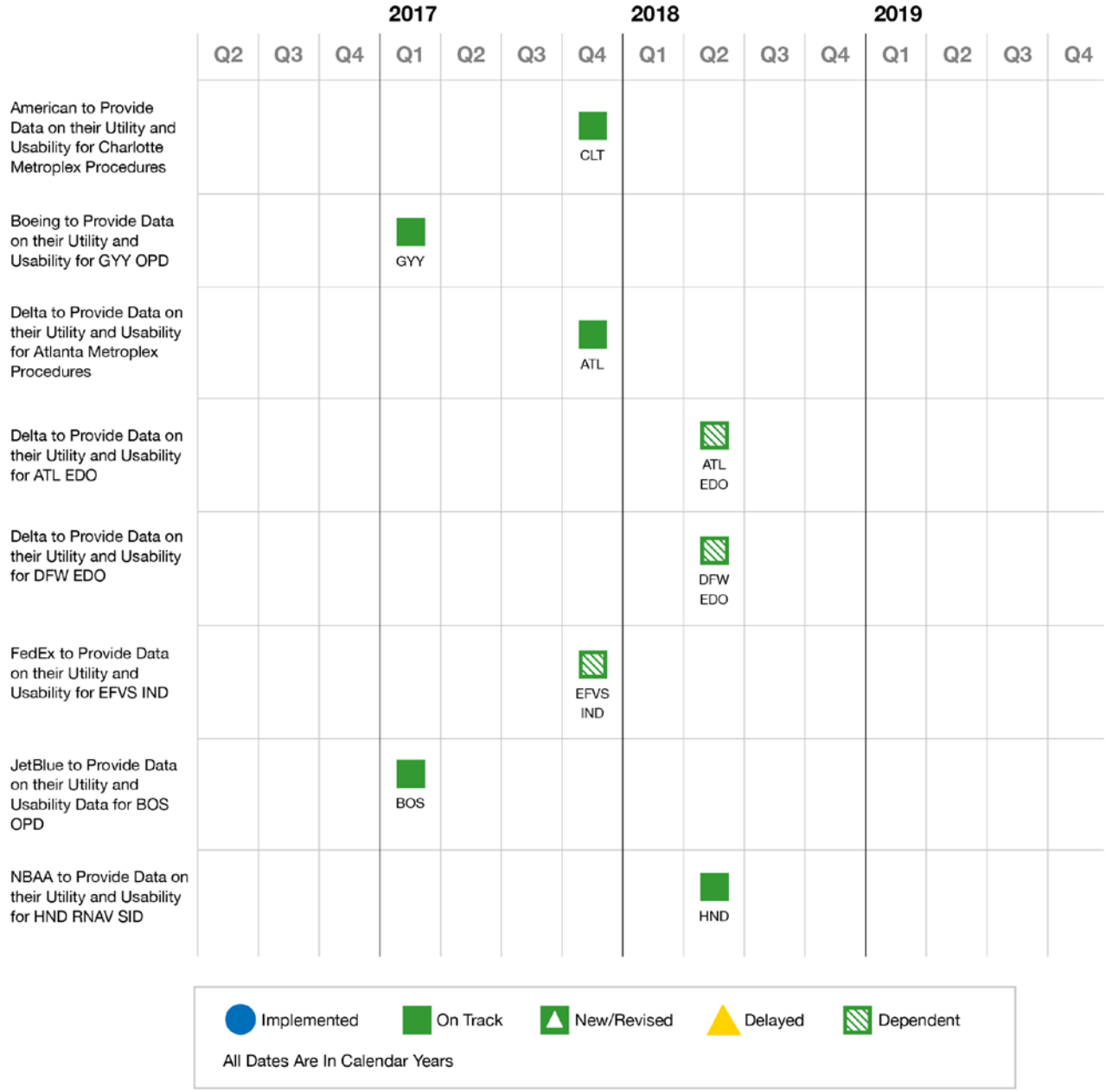
- **Established on Departure Operations (EDO):** The Established-on-Departure Operation (EDO) standard is based on the Equivalent Lateral Spacing Operation (ELSO) concept and incorporates current diverging procedures permitted in the terminal area to improve efficiencies of departure operations transitioning into the en route environment. The FAA commits to conducting an assessment on the feasibility of use, which will include human-in-the-loop (HITL) and fast-time simulation in Q3 CY 2017. If found feasible, target locations for letters of authorization to conduct the operation are ATL and DFW in Q4 CY 2017.

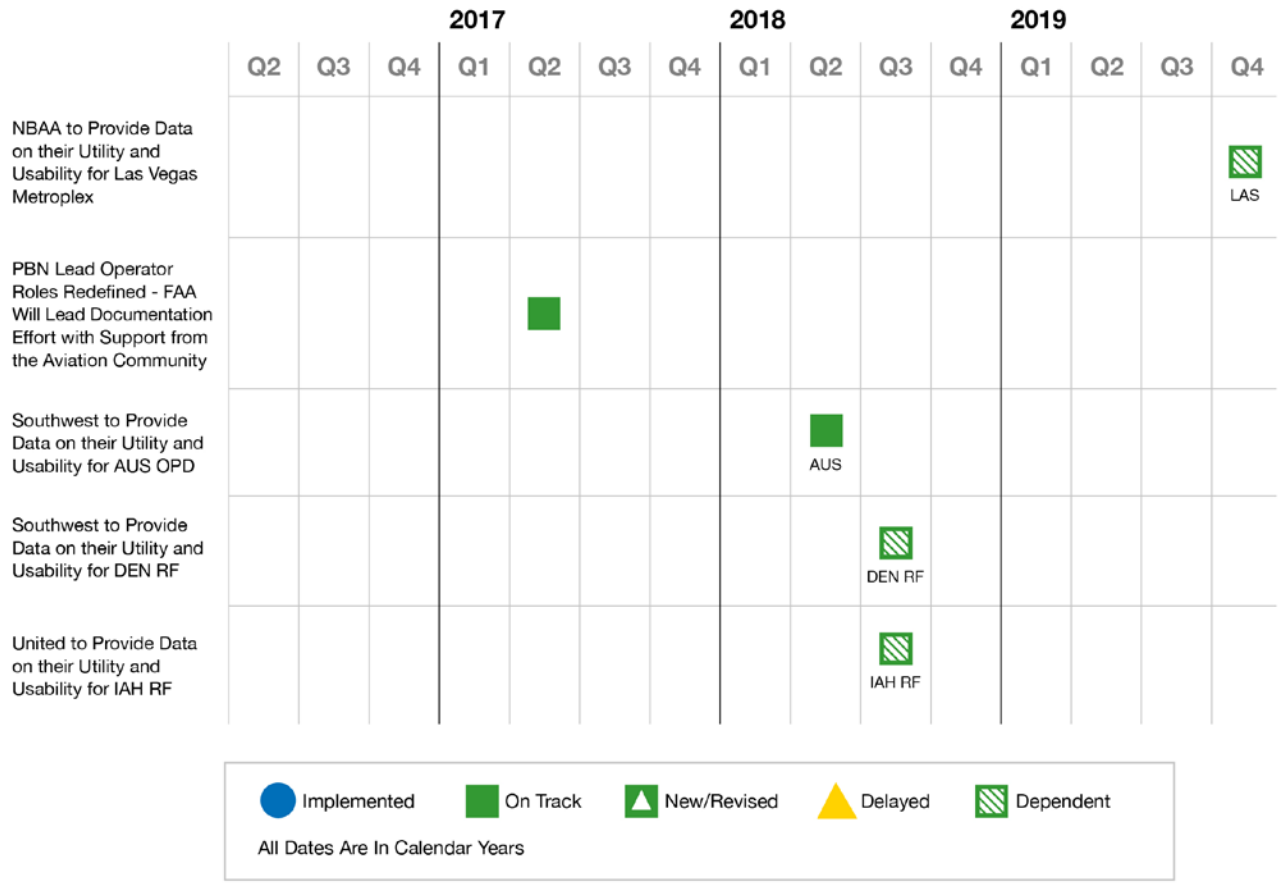
- **Enhanced Flight Vision Systems (EFVS):** The FAA commits to publishing a final rule, along with related operational and airworthiness guidance, in Q4 CY 2016 that will expand the safety, access, and efficiency benefits provided to operators equipped with EFVS. The FAA commits to working with capable operators including FedEx as the lead operator with planned operations at IND.

- **New Vertical Guidance:** The FAA published procedure design criteria in Q2 CY 2016 allowing for publication of PBN approach procedures with vertical guidance to a greater number of runways. The FAA commits to work with industry and other stakeholders to identify newly qualified runways and prioritize initial procedure development in Q1 CY 2017.

- **RNP 1 Departures:** The FAA has published operational and airworthiness guidance, along with procedure design criteria, in support of RNP 1 departure procedures. The FAA commits to work with industry and other stakeholders to identify and assess feasibility for Burbank (BUR) and John Wayne Orange County (SNA) in Q1 CY 2017. (Industry recommends SNA.)

INDUSTRY COMMITMENTS





For an accessible version of the PBN Industry Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=pbn#ind-comm.

The FAA collaborates with industry through Metroplex study and design teams and other forums to ensure that proposed procedures meet airport and flight operator needs and address concerns of underlying communities. Industry commits to provide training for pilots to prepare them to take advantage of new procedures and to remain flexible as adjustments may be necessary. As new procedures are used, industry commits to provide feedback on their utility and to provide usability data. The following lead operators have committed to doing their part to represent industry should an implementation decision be made for these locations:

Implementation Commitments:

- American for CLT Metroplex
- Delta for ATL Metroplex
- Boeing for GYY Single Site OPD
- Jet Blue for BOS Single Site OPD

- Southwest for AUS Single Site OPD
- NBAA for HND Single Site RNAV SID
- Several operators will work with the FAA to complete lead operator redefinition

Pre-implementation commitments that depend on corresponding FAA milestones:

- United for IAH RF
- Southwest for DEN RF
- Delta for ATL and DFW EDO
- NBAA for Las Vegas Metroplex
- FedEx for IND EFVS

COST

The specific commitments in this section are part of the larger PBN program and are funded in the FY 2017 President's Budget Request and the supporting Capital Investment Plan. These efforts are also supported each year by FAA's annual operating budget. Through FY 2016, FAA spent $216 million in the F&E account on the PBN program, which includes study, design, evaluation and implementation teamwork for Metroplex sites and research on EoR concepts. Funding for these commitments is included as part of the F&E plan, which totals $64 million for FY 2017. Cost estimates are based on analysis of completed sites as well as on the number of procedures to be implemented and the level of effort needed to complete the work.

PBN commitments leverage operational analyses and engineering studies funded and conducted in prior years.

RISKS

The Metroplex program, by design, is a highly collaborative process that requires subject matter experts from air traffic control facilities and industry to collaboratively develop solutions. Schedule deconfliction for timely access to these high-value resources is a persistent challenge.

Environmental concerns from a variety of non-aviation stakeholders are requiring increasing levels of community outreach. The time required to resolve these concerns may affect planned schedules. The need to proactively address varying perceptions from community stakeholders/activists was a key finding in the recent NAC PBN Blueprint workgroup activity.

Facility resources at Metroplex locations are in high demand for several NAS initiatives. In general, facilities can only support one large initiative at a time. Schedule deconfliction must be constantly monitored and adjusted to accommodate shifts in major programs (e.g., TAMR, Data Comm, Surface). Access to air traffic control experts is vital to the successful implementation of these

procedures and must always be balanced against operational needs. Staffing issues during high leave periods (i.e., summer months in many places) and facility operational staffing needs can affect the ability to devote resources to implementation of new procedures.

Infusing time based metering into the culture is required for successful implementation and utilization of TBFM decision support tools. GIM-S represents a significant cultural change for air traffic operations, even at sites that already utilize time based metering. Without a focus on culture, change management and operational integration, GIM-S implementation may not be implemented on time nor embraced.

The EoR program is working to determine which airports are viable sites to implement Independent Duals and Triples EoR for TF and RF. However, there are several issues that are on the critical path that must be resolved prior to beginning activities at these sites, or any sites that might follow.

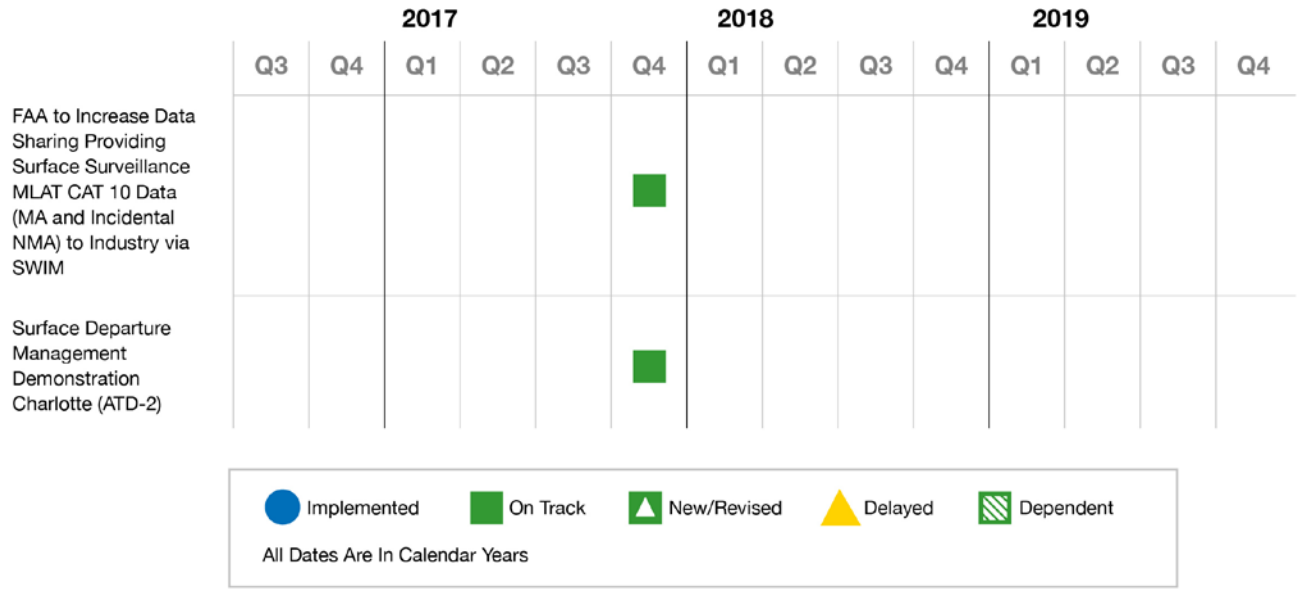
The majority of criteria for TF turns has evolved and is included in current development tool plans. However, there are several items that need to be updated before operationally feasible TF procedures can be prototyped or fully developed. Independent approach procedure prototypes must prove that a TF EoR operation is feasible and compliant at a given site in order to qualify for site selection.

The TF Independent Duals and Triples Safety Analysis that was completed in December 2015 established requirements to mitigate the risk that a pilot selects an incorrect flight procedure. DEN and IAH, two candidates to be RF sites, currently have RF independent approach procedures in place that may not comply with this requirement for Independent Duals and Triples. The PBN NIWG Team determined that an adequate understanding was achieved to continue moving forward with the schedule as planned. The PBN NIWG Team will reconvene findings from the incorrect runway entry safety analysis and relevant stakeholders are available. If the analysis indicates there is unacceptable risk associated with EoR using existing PBN approach procedure designs such as at Denver, the FAA, NATCA and industry will work to identify mitigations and agree upon a path forward to enable operations. In addition, the PBN NIWG Team agreed that data will inform the concurrent safety case and related operational benefits discussions, taking into account national interests along with local perspectives.

FOCUS AREA: SURFACE OPERATIONS AND DATA SHARING

Some of the greatest efficiencies can be gained while an aircraft is still on the ground and at the gate and when connecting the surface to the enroute airspace. The FAA commits to implementing surface improvements through the deployment of Terminal Flight Data Manager (TFDM), by exchanging more data with more stakeholders, and by completing feasibility assessments of other capabilities of interest. The goal of these enhancements is to measurably increase predictability and provide actionable and measurable surface efficiency improvements. These commitments are a subset of the overall series of programs and activities the FAA is planning to improve operations in these domains.

IMPLEMENTATION COMMITMENTS



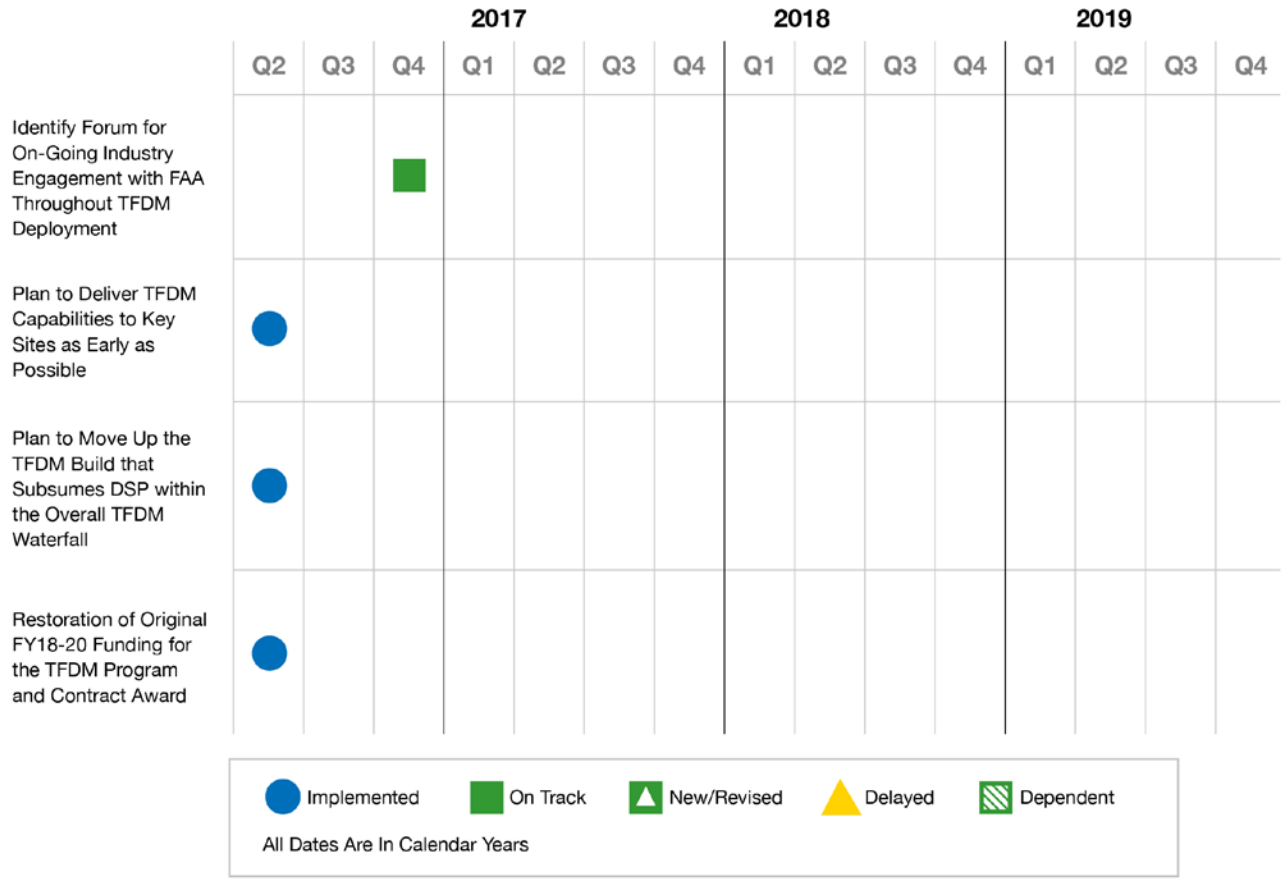
For an accessible version of the Surface Operations and Data Sharing Implementation Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=sops#impl-comm.

- **Increased Data Sharing among FAA, Flight and Airport Operators:** Collectively, the FAA and industry can improve both strategic planning and tactical execution of NAS operations if all stakeholders have access to relevant data. The FAA commits to providing surface surveillance multilateration (MLAT) Category (CAT) 10 data (movement area and incidental non-movement area) to industry via SWIM in Q4 CY 2017.

- **Surface Departure Management:** The FAA completed a feasibility assessment of the departure management capability in 2016 and determined that ATD-2 could be implemented at Charlotte. In Phase 1 of this demonstration, FAA and NASA will develop local air traffic procedures to support the new operation, evaluate the baseline capability, demonstrate improved compliance of tactical Traffic Management Initiatives (TMIs), develop training and reduce Air Traffic Control Tower (ATCT) workload by replacing paper strips with electronic flight data (EFD). Local procedures will inform the national procedures needed for national departure queue management implementation.

- FAA will commence Phase 1 of integration arrival and departure surface traffic management operational evaluation in Q4 CY 2017.
- FAA will complete Phase 1 tech transfer in Q3 CY 2018.
- Lead operator American Airlines will provide data for Charlotte demonstration via data exchange by Q2 CY 2017.[7]

PRE-IMPLEMENTATION COMMITMENTS



For an accessible version of the Surface Operations and Data Sharing Pre-Implementation Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=sops#pre-impl-comm.

TFDM Program: TFDM includes several capabilities that will be delivered primarily through the program or through integration with other critical traffic management systems such as TBFM and TFMS. The Surface Situational Awareness component of TFDM provides stakeholders with timely, accurate and actionable data for aircraft on the airport surface. The Electronic Flight Data (EFD) component of TFDM replaces paper flight strips with an electronic automation platform

[7] This milestone is in the industry milestones section.

that can display and transfer flight plan and other relevant information between Air Traffic Control positions in the tower cab in real time.

TFDM provides Departure Reservoir Management (DRM) capability based on the surface Collaborative Decision Making (CDM) concept to support surface metering. DRM includes Surface Demand Prediction capability for ATC that enables the FAA to more accurately estimate current and future demand for airport surface resources as derived from aircraft state data and continuously updated arrival and departure schedules. Such demand information will be displayed or available at ATCTs, TRACONs, Air Route Traffic Control Centers (ARTCCs) and the Air Traffic Control System Command Center (ATCSCC). TFDM data will also be available to approved airport operators, flight operators, flight service providers and other relevant stakeholders to further enable greater traffic management productivity while minimizing adverse effects on stakeholders, passengers and the environment.

With TFDM, multiple costly legacy systems will be replaced with a single, easily maintained state-of-the-art TFDM platform. Such systems include the Electronic Flight Strip Transfer System (EFSTS) in towers and TRACONs, the Advanced Electronic Flight Strip (AEFS) Prototype System in select towers and the Departure Spacing Program (DSP).

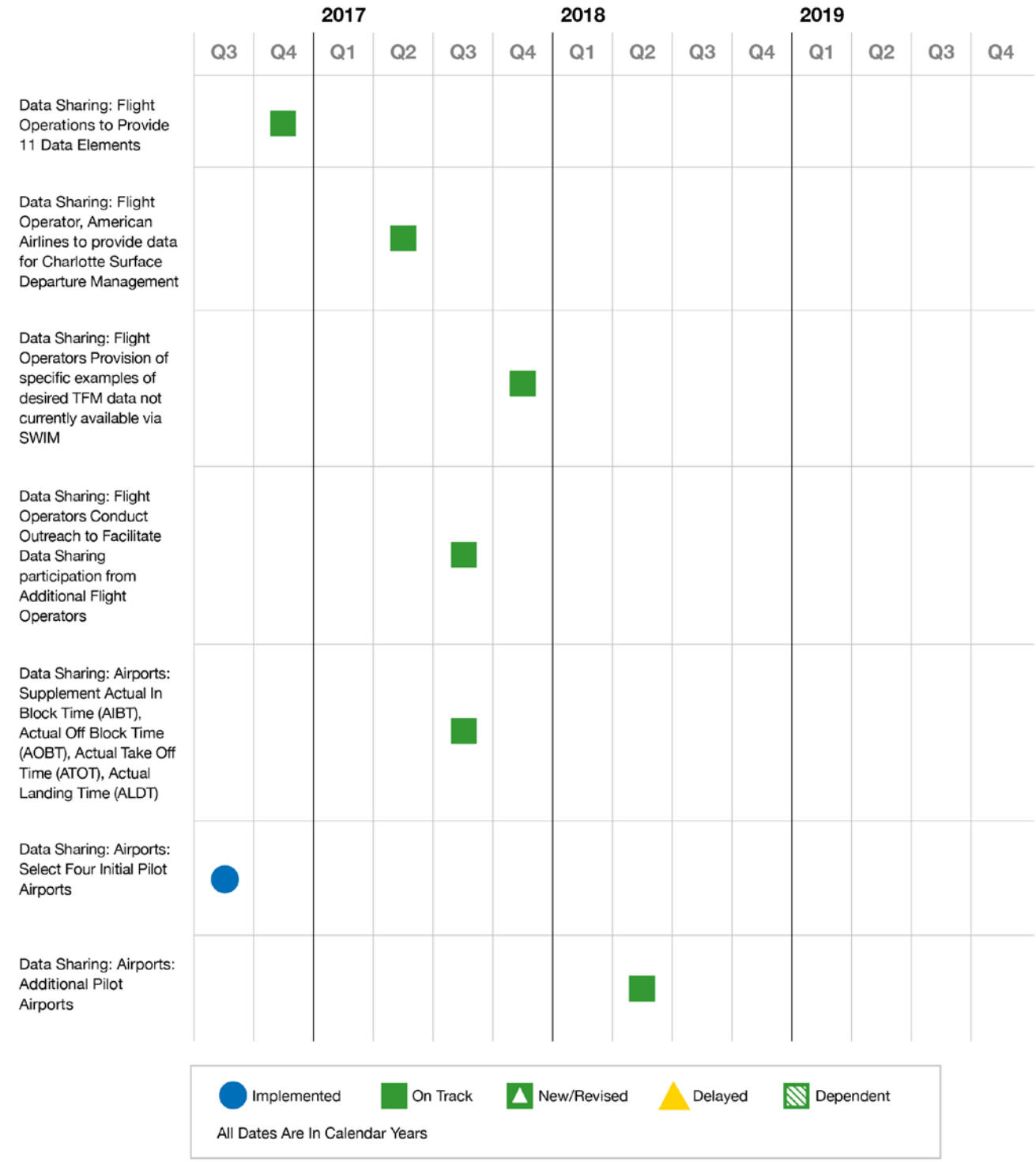
- **TFDM Meaningful Engagement:** In Q4 CY 2016, the FAA commits to identify a forum for ongoing industry engagement throughout the various stages of the TFDM deployment.

- **TFDM Plan to Deliver Capabilities as Early as Possible:** The restoration of funding for TFDM in the early years of the program, specifically FY 2018-2020, enables the FAA to commit to the implementation of a plan to deliver TFDM capabilities, including electronic flight strip capability, departure queue management capability and TFM system integration and consolidation to key sites as early as possible.

- **TFDM Plan to Subsume DSP:** In Q2 CY 2016, the FAA developed a plan to move the TFDM build that subsumes DSP to the left within the overall TFDM waterfall. The plan was complete and approved by the FAA in June 2016.

- **Restore TFDM Funding**: In Q2 CY 2016, the FAA restored the original FY 2018-2020 funding for this program to enable implementation as soon as practical.

INDUSTRY COMMITMENTS



For an accessible version of the Surface Operations and Data Sharing Industry Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=sops#ind-comm.

- **Flight Operators' Roles in Increased Data Sharing among FAA, Flight and Airport Operators:** Collectively, the FAA and industry can improve both strategic planning and tactical execution of NAS operations if all stakeholders can exchange and access relevant, timely and comprehensive data. As part of a two-way data-sharing agreement, flight operators committed to start providing the FAA with eleven surface data elements by Q4 CY 2016. The elements include Initial Off-Block Time (IOBT); Earliest Off-Block Time (EOBT); Flight Intent (intent to enter the movement area prior to the target movement area entry time); Aircraft Gate/Stand; Actual Out/Off/On/In Block Time; Flight Cancellation; and Aircraft Tail/Registration Number. These data were identified with a Collaborative Decision Making effort by the Surface CDM Team (SCT) for the purpose of being used to feed the Departure Reservoir Management (DRM) capability, a major component of the TFDM program. Since then, other uses of these data, specifically EOBT and Actual Out/Off/On/In, have been identified as data elements that could yield benefits in the near-term if provided prior to the deployment of TFDM. These are some of the first Traffic Flow Management (TFM) data to be exchanged two-ways via System Wide Information Management (SWIM) protocol versus via the legacy Aggregate Demand List. The FAA made available this new data exchange infrastructure in April 2016. Since then, CDM members have started the process of transitioning their individual data exchange capabilities to enable the provision of surface data elements.

- **Airport Operators' Role in Increased Data Sharing among FAA, Flight and Airport Operators:** The FAA and industry members involved in the NIWG Surface Sub-team have committed to continue outreach to current CDM data providers and others to expand participation and further foster improved data accuracy, timeliness and comprehensiveness of the data feeding the evolving Traffic Flow Management algorithms and systems in the NAS, specifically TFDM with airport operators. With respect to data sharing by airports, selection of "pilot" airports is underway to help determine what data elements airports will share, and to propose and execute a process for how to share the data. The Port Authority of New York and New Jersey (PANYNJ) has committed to be one of these "pilot" airports, as well as three other airports. Additional pilot airports are anticipated by Q2 CY 2018. The selected airports commit to participate in sharing data as soon as the CDM governance allows.

  Industry commits to providing for FAA consideration a list of TFMS data not currently available that may be useful. Members involved in the NIWG process also requested the ability to expand this data discussion by providing FAA with a list of TFMS data that is not currently available but may be useful. This list is to be provided by Q4 CY 2017.

COST

The specific commitments in this section are part of FAA's implementation of surface improvements. It is funded in the FY 2017 President's Budget Request and the supporting Capital Investment Plan. Through FY 2016, FAA spent $117 million in the F&E account for surface operation improvements. The TFDM baseline was approved in June 2016 for $356 million through FY 2019. Cost estimates are

based on analysis of previously completed sites, as well as on the number of procedures to be implemented and the level of effort needed to complete the work. These commitments leverage operational analyses and engineering studies funded and conducted in prior years.

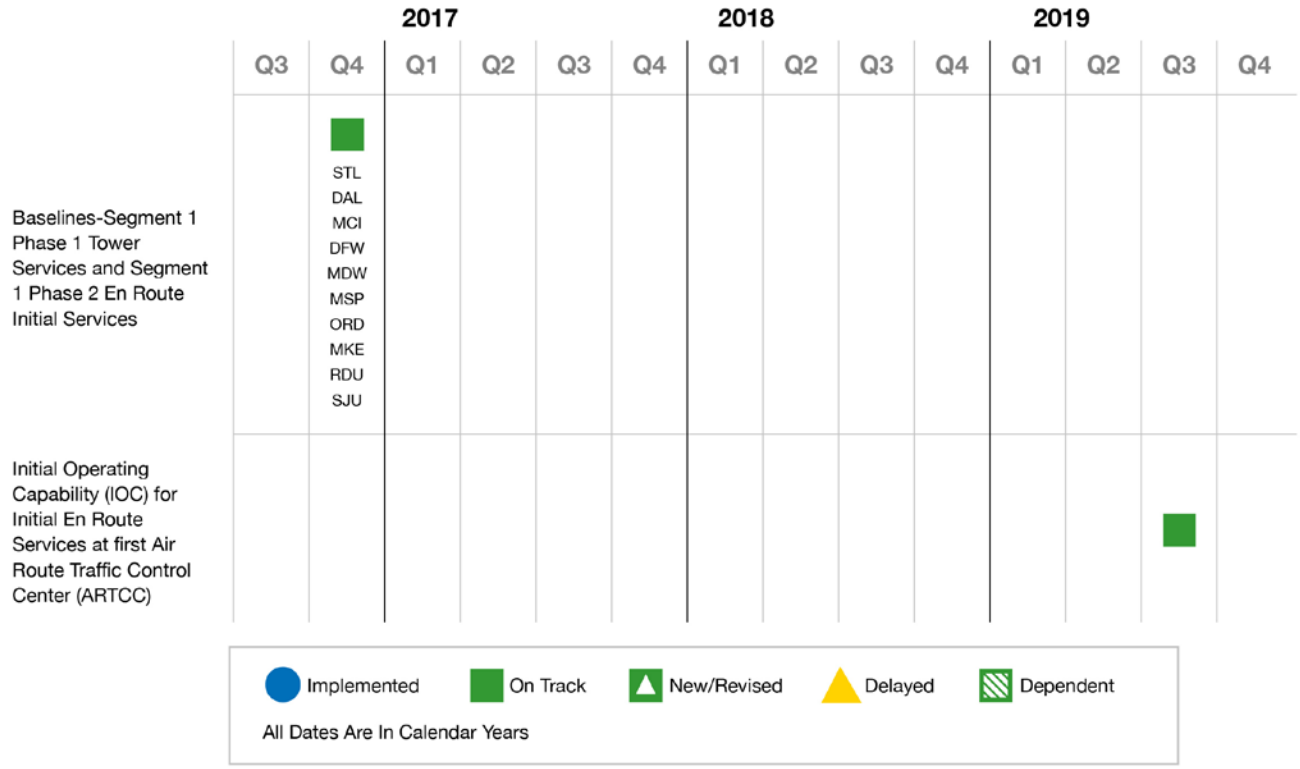
RISKS

Collaborative Decision Making is an operating philosophy whereby traffic flow management decisions are based on a foundation of real-time data sharing, a common view of constraints, and a decision making process that is focused on improving the predictability and efficiency of flight operations. CDM participants include representatives from government, airlines, general aviation, business aviation, private industry and academia all working together to develop new processes that often rely less on technology and more on stakeholder agreements that are intended to achieve mutually beneficial outcomes which support NAS efficiency and safety. The success of these types of initiatives depends on all parties sharing data and making a clear commitment to exchange data. If the majority of the operators do not provide the planned data elements, then improved traffic management initiatives and increased predictability for the customers and the system will not be realized. In order for pilot airports to be successful, the governance of data sharing for airports must be established in order to participate as CDM members. The TFDM contract has been awarded and will execute a robust risk, issue and opportunity (RIO) management process to mitigate programmatic risk. The early departure management capability at Charlotte is dependent on the success of EFD system IOC by April 2017.

FOCUS AREA: DATA COMMUNICATIONS (DATA COMM)

The Data Comm program will provide digital communications services between pilots and air traffic controllers as well as enhanced air traffic control information to airline operations centers. Data Comm will provide a data interface between ground automation and the flight deck for controller and pilot communications for safety-of-flight clearances, instructions, traffic flow management, flight crew requests and reports. Data Comm is critical to the success of NextGen, enabling efficiencies not possible with the current voice system. These services will enhance safety by reducing communication errors, increase controller productivity by reducing communication time between controllers and pilots, and increase airspace capacity and efficiency while reducing delays, fuel burn and carbon emissions.

IMPLEMENTATION COMMITMENTS



For an accessible version of the Data Comm Implementation Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=dcom#impl-comm.

- **Departure Clearance Tower Services Baseline Waterfall:** The FAA has made significant progress in delivering departure clearance services at 56 airports under the Data Comm program's Segment 1 Phase 1 plan. The deployment is more than 24 months ahead of schedule. Data Comm has deployed tower service to these sites:

Key Sites			
Site Name	Site ID	ARTCC ID	IOC
KS 1: Salt Lake City	SLC	ZLC	08/07/15
KS 2: Houston Intcl	IAH	ZHU	09/03/15
KS 3: Houston Hobby	HOU	ZHU	09/10/15

Group A			
Site Name	Site ID	ARTCC ID	IOC
New Orleans	MSY	ZHU	01/21/16
Austin	AUS	ZHU	02/04/16
San Antonio	SAT	ZHU	02/19/16
Los Angeles	LAX	ZLA	03/10/16
Las Vegas	LAS	ZLA	03/25/16
San Diego	SAN	ZLA	04/07/16
John Wayne	SNA	ZLA	04/25/16
Burbank	BUR	ZLA	05/06/16
Ontario	ONT	ZLA	05/18/16
San Francisco	SFO	ZOA	06/08/16
Oakland	OAK	ZOA	06/23/16
San Jose	SJC	ZOA	07/06/16
Sacramento	SMF	ZOA	07/20/16
Phoenix	PHX	ZAB	08/10/16
Seattle	SEA	ZSE	09/19/16
Portland	PDX	ZSE	09/19/16
Albuquerque	ABQ	ZAB	09/27/16
Dallas Love	DAL	ZFW	10/10/16
Dallas FTW	DFW	ZFW	10/24/16

Group B			
Site Name	Site ID	ARTCC ID	IOC
Louisville	SDF	ZID	02/10/16
Indianapolis	IND	ZID	03/07/16
Memphis	MEM	ZME	03/25/16
Nashville	BNA	ZME	04/13/16
Denver	DEN	ZDV	05/03/16
Atlanta	ATL	ZTL	05/19/16
Charlotte	CLT	ZTL	06/02/16
Orlando	MCO	ZJX	06/30/16
Miami	MIA	ZMA	07/29/16
Ft Lauderdale	FLL	ZMA	08/12/16
Tampa	TPA	ZMA	08/29/16
St Louis	STL	ZKC	10/03/16
Kansas City	MCI	ZKC	10/17/16
Minn-St Paul	MSP	ZMP	11/07/16
San Juan	SJU	ZMA	12/12/16

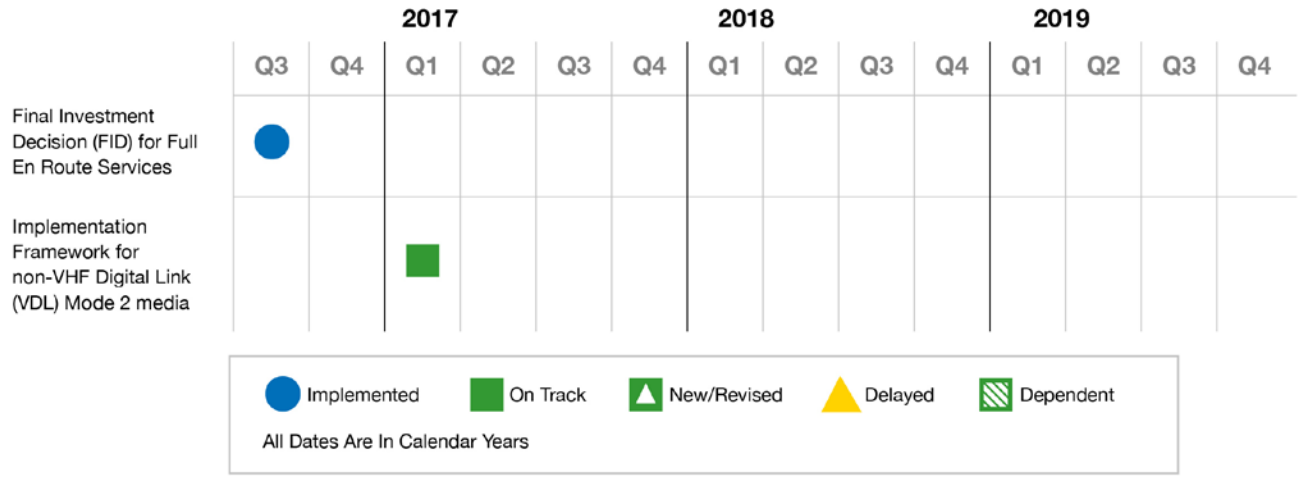
Group C			
Site Name	Site ID	ARTCC ID	IOC
Newark	EWR	ZNY	02/12/16
J F Kennedy	JFK	ZNY	02/25/16
La Guardia	LGA	ZNY	03/14/16
Teterboro	TEB	ZNY	03/24/16
Westchester	HPN	ZNY	04/12/16
Philadelphia	PHL	ZNY	04/22/16
Boston	BOS	ZBW	05/13/16
Bradley	BDL	ZBW	06/10/16
Detroit	DTW	ZOB	06/30/16
Cleveland	CLE	ZOB	07/13/16
Pittsburgh	PIT	ZOB	07/29/16
Balt/Wash	BWI	ZDC	08/16/16
Dulles	IAD	ZDC	08/30/16
Reagan	DCA	ZDC	09/19/16
Chicago Midway	MDW	ZAU	10/24/16
Chicago O'Hare	ORD	ZAU	11/07/16
Milwaukee	MKE	ZAU	11/07/16
Raleigh/Durham	RDU	ZDC	11/07/16

TDLS Sites Color Key	
CPDLC DCL Site	
Site Operational	

For an accessible version of the Data Comm Departure Clearance Tower Services Baseline Waterfall table, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=dcom#sched-stats.

- **En Route Initial Services:** The FAA continues moving forward with the development of En Route Initial Services. These capabilities will include airborne reroutes, altitude and limited speed assignments, altimeter settings, limited crossing restrictions, direct-to-fix instructions, transfer of communications and initial check-in, and limited controller initiated reroutes. Data Comm services in en route airspace will contribute to an additional reduction in flight delays, more efficient routes for aircraft resulting in increased operational efficiency, and enhanced safety, all while reducing operational costs for airspace users. The FAA commits to achieving Initial Operating Capability (IOC) for En Route Initial Services at the first Air Route Traffic Control Center (ARTCC) by Q3 CY 2019.

PRE-IMPLEMENTATION COMMITMENTS

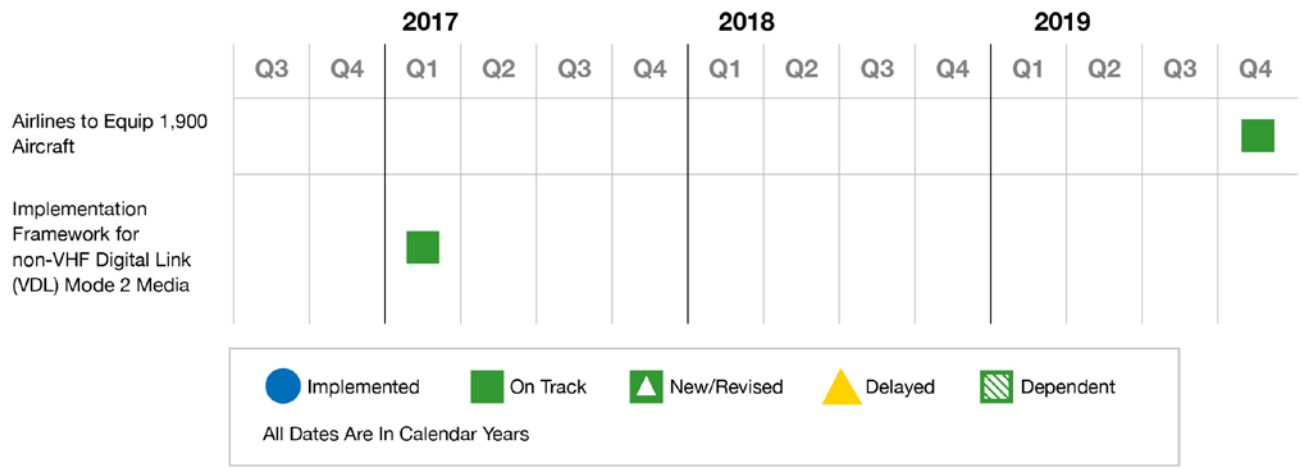


For an accessible version of the Data Comm Pre-Implementation Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=dcom#pre-impl-comm.

- **En Route Full Services:** The FAA met the commitment to conduct the Final Investment Decision (FID) for En Route Full Services in 2016 and is proceeding to develop En Route Full Services capabilities. En Route Full Services will include full controller-initiated routes, crossing restrictions, advisory messages and holding instructions. These Data Comm services in en route airspace will further contribute to an additional reduction in flight delays, more efficient routes for aircraft resulting in increased operational efficiency and enhanced safety, all while reducing operational costs for airspace users.

- **Implementation Framework for Non-VHF Digital Link (VDL) Mode 2 Media:** The Data Comm Program supports airline communications using VDL Mode 0 and VDL Mode 2 for Tower services. The focus for en route services has been VDL Mode 2. Certain operators have not fully adopted VDL Mode 2 capabilities in their older aircraft. The FAA worked with industry to investigate the effect on network performance of accommodating VDL Mode 0 and media other than VDL Mode 2 in en route airspace. Additionally, the Data Communications Implementation Team (DCIT) and Performance Based Operations Aviation Rulemaking Committee (PARC) examined the feasibility of aircraft operators being responsible for maintaining the specified Required Communications Performance (RCP) for the operation of FANS 1/A over the operator's chosen long range communications media, as is done in oceanic and remote airspace today, and delivered their recommendations to the FAA in 2016. The FAA commits to develop an implementation framework for non-VDL Mode 2 media by Q1 CY 2017.

INDUSTRY COMMITMENTS



For an accessible version of the Data Comm Industry Commitments chart, please visit http://www.faa.gov/nextgen/snapshots/priorities/?area=dcom#ind-comm.

- **Airlines to Equip 1,900 Aircraft:** The FAA established a Data Comm incentive program to encourage early equipage of 1,900 aircraft by 2019 to provide enough aircraft to realize operational benefits. Under the Data Comm equipage program, eight operators have signed agreements to deliver equipped aircraft into the NAS. For the Data Comm program to succeed,

industry stakeholders will work to honor the commitments and to support the FAA's implementation of Tower and En Route services in the NAS. In addition, industry and the FAA will collaborate to promote Data Comm services' usage across as many aircraft as feasible.

- **Implementation of Framework for Non-VHF Digital Link (VDL) Mode 2 Media:**[8] The FAA worked with industry to investigate the effect on network performance of accommodating VDL Mode 0 and media other than VDL Mode 2 in en route airspace. Additionally, the DCIT and PARC examined the feasibility of aircraft operators being responsible for maintaining the specified Required Communications Performance (RCP) for the operation of FANS 1/A over the operator's chosen long range communications media, as is done in oceanic and remote airspace today, and delivered their recommendations to the FAA in 2016. Industry commits to supporting this work and the FAA's development of an implementation framework for non-VDL Mode 2 media by Q1 CY 2017.

COST

The specific commitments in this report for Tower and En Route Services are funded as part of Data Comm Segment 1 Phase 1 (S1P1) and Segment 1 Phase 2 (S1P2) Initial En Route and Full En Route Services baselines, as reflected in the FY 2017 President's Budget Request and the current Capital Investment Plan. Through FY 2016, the FAA spent $898 million for S1P1 and S1P2. In FY 2017 the FAA plans to spend $238 million in the F&E account for S1P1 and S1P2.

RISKS

As with any program, these commitments are subject to cost, schedule and performance risks. The FAA is committed to providing executive oversight to mitigate risks and adhere to these commitment timelines. This focus area has significant interdependencies with other FAA projects that senior leadership will closely monitor. For the program to succeed both for Tower and En Route Services, all of the pieces of the program must work together to deliver the service into the NAS. Delay to the delivery and integration of any of the component subsystems could impact commitment dates. Additionally, close coordination with FAA field personnel and air carrier aircraft is required to operationally test and evaluate the system. Delay in providing these resources could impact the activation of services in the NAS. The development, acceptance, and delivery of training materials to support initial operations at a site, as well as training for operator flight crews, are also critical to success. For the en route environment, the FAA must understand and address the implications of accommodating VDL Mode 0 aircraft in the NAS.

[8] See corresponding FAA pre-implementation commitment above.

APPENDIX A

ACRONYM LIST

ARTCC	Air Route Traffic Control Center
ATCT	Air Traffic Control Tower
ATCSCC	Air Traffic Control System Command Center
AEFS	Advanced Electronic Flight Strips
AR	Authorization Required
ASDE-X	Airport Surface Detection Equipment-Model X
ASSC	Airport Surface Surveillance Capability
CAT	Category
CDM	Collaborative Decision-Making
CPDLC	Controller Pilot Data Link Communications
CSG	CDM Stakeholders Group
DCIT	Data Communications Implementation Team
DRM	Departure Reservoir Management
DSP	Departure Spacing Program
EFD	Electronic Flight Data
EFSTS	Electronic Flight Strip Transfer System
ELSO	Equivalent Lateral Spacing Operations
EOBT	Earliest Off Block Time
EOR	Established on RNP
ERAM	En Route Automation Modernization
FANS	Future Air Navigation System
FID	Final Investment Decision
GIM-S	Ground Based Interval Management - Spacing
GLS	Ground Based Augmentation System (GBAS) Landing System
IDAC	Integrated Departure Arrival Capability
ILS	Instrument Landing System
IOBT	Initial Off Block Time
IOC	Initial Operating Capability
JAT	Joint Analysis Team
JFUND1	OPD STAR name
JRC	Joint Resources Council
LNAV	Lateral Navigation
LUCIT1	OPD STAR name
MLAT	Multilateration
MLS	Microwave Landing System
MRO	Multiple Runway Operations
MOU	Memorandum of Understanding
NAC	NextGen Advisory Committee
NAS	National Airspace System
NATCA	National Air Traffic Controllers Association
NATS UK	National Air Traffic Services, United Kingdom
NIWG	NextGen Integration Working Group
NM	Nautical Miles
OPD	Optimized Profile Descents
PARC	Performance Based Operations Aviation Rulemaking Committee
PBN	Performance Based Navigation
PINCH1	OPD STAR name
RCP	Required Communications Performance
RIO	Risk, Issue and Opportunity

RNAV	Area Navigation
RNP	Required Navigation Performance
SID	Standard Instrument Departure
SMS	Safety Management System
STAR	Standard Terminal Arrival
SWAP	Severe Weather Avoidance Plan
SWIM	System Wide Information Management
TBFM	Time Based Flow Management
TDLS	Tower Data Link Services
TFDM	Terminal Flight Data Manager
TFMS	Traffic Flow Management System
TMI	Traffic Management Initiative
TRACON	Terminal Radar Approach Control Facility
TSAS	Terminal Sequencing and Spacing
VHF	Very High Frequency
VNAV	Vertical Navigation
WTMD	Wake Turbulence Mitigation for Departures
xLS	Landing Systems such as ILS, GLS, MLS

AIRPORTS

ADW	Joint Base Andrews
ANC	Ted Stevens Anchorage International
ATL	Hartsfield-Jackson Atlanta International
AUS	Austin Bergstrom International
ABQ	Albuquerque International Sunport
BOS	Boston Logan International
BUR	Bob Hope (Burbank, California)
CHS	Charleston Air Force Base International
CLE	Cleveland Hopkins International
CLT	Charlotte Douglas International
CVG	Cincinnati/Northern Kentucky International
DAL	Dallas Love Field
DEN	Denver International
DFW	Dallas/Fort Worth International
DTW	Detroit Metropolitan Wayne County
EWR	Newark Liberty International
FLL	Fort Lauderdale/Hollywood International
GSO	Piedmont Triad (Greensboro, North Carolina) International
GSP	Greenville-Spartanburg International
GYY	Gary/Chicago International
HOU	William P. Hobby (Houston)
HND	Henderson (Nevada) Executive Airport
HNL	Honolulu International
IAD	Washington Dulles International
IAH	George Bush Houston Intercontinental
IND	Indianapolis International
JFK	New York John F. Kennedy International
LAS	Las Vegas McCarran International
LAX	Los Angeles International
LGA	New York LaGuardia
LSV	Nellis Air Force Base
MCI	Kansas City International
MCO	Orlando International
MDW	Chicago Midway International
MEM	Memphis International
MIA	Miami International
MKE	General Mitchell Milwaukee International

MSP	Minneapolis/St. Paul International
MSY	New Orleans International
OAK	Oakland International
ONT	LA/Ontario International
ORD	Chicago O'Hare International
PDX	Portland (Oregon) International
PHL	Philadelphia International
PHX	Phoenix Sky Harbor International
PIT	Pittsburgh International
RDU	Raleigh Durham International
SAN	San Diego International
SAT	San Antonio International
SDF	Louisville International
SEA	Seattle International
SFO	San Francisco International
SJC	San Jose International
SJU	Luis Munoz Marín International (San Juan, Puerto Rico)
SLC	Salt Lake City International
SMF	Sacramento International
SNA	John Wayne (Santa Ana, Orange County)
STL	Lambert St. Louis International
VGT	North Las Vegas Airport

FAA AIR ROUTE TRAFFIC CONTROL CENTERS

ZAB	Albuquerque ARTCC
ZAU	Chicago ARTCC
ZBW	Boston ARTCC
ZDC	Washington ARTCC
ZDV	Denver ARTCC
ZFW	Fort Worth ARTCC
ZHU	Houston ARTCC
ZID	Indianapolis ARTCC
ZJX	Jacksonville ARTCC
ZKC	Kansas City ARTCC
ZLA	Los Angeles ARTCC
ZLC	Salt Lake ARTCC
ZMA	Miami ARTCC
ZME	Memphis ARTCC
ZMP	Minneapolis ARTCC
ZNY	New York ARTCC
ZOA	Oakland ARTCC
ZOB	Cleveland ARTCC
ZSE	Seattle ARTCC
ZTL	Atlanta ARTCC

APPENDIX B

NEXTGEN INTEGRATION WORKING GROUP FINAL REPORT

The *NextGen Integration Working Group Rolling Plan Final Report* contains the NextGen Advisory Committee's (NAC) final recommendations on commitments FAA and industry should take to deliver tangible benefits and increase community confidence in NextGen in the next three years. The recommendations were approved by the NAC on June 17, 2016.