Federal Aviation Administration

Airspace Technology Demonstration 2 (ATD-2)
ANG-C52

FAA/NASA Coordinated Activities Compilation

Jul 2020 - Aug 2021

NextGEN

NOTE: This report was developed to report on Airspace Technology Demonstration 2 (ATD-2) activities during the Presidential Declared National Emergency, brought on by the rapid spread of the Coronavirus Disease 2019 - known as COVID-19 (declared as a world-wide pandemic).

Executive Summary

NASA's Airspace Technology Demonstration 2 (ATD-2) is a five-year research activity running from 2015-2020. NASA's ATD-1 Demonstration focused on improving the efficiency of arrivals using Terminal Sequencing and Spacing (TSAS) to facilitate increased use of efficient RNAV approaches during periods of high traffic demand. RNAV arrival efficiency decreased when vectoring became required to maintain separation resulting in less efficient flight paths for the vectored aircraft. TSAS provided visual references to controllers allowing them to sequence aircraft through speed adjustments rather than vectoring, allowing more flights to remain on the more efficient RNAV flight path. ATD-2 will focus on the scheduling of departures within a metroplex terminal environment to create similar efficiencies for departing aircraft. A primary challenge for ATD-2 is to develop a departure metering solution that accommodates surface and airspace flow constraints while allowing aircraft to execute efficient flight profiles.

In October 2014, the NextGen Integration Working Group (NIWG) recommended a range of potential enhancements to Surface Operations that are designed to increase predictability and provide actionable and measurable surface efficiency improvements. The NIWG's specific recommendations in the Surface Focus Area included the deployment of an initial airport surface departure management capability in the 2017 timeframe that reflects the capability described in the FAA's Surface Collaborative Decision Making (S-CDM) Concept of Operations.

Subsequent to the NIWG's recommendations, the FAA completed a feasibility assessment focusing on technical, operational, cost and schedule constraints. The option of working in conjunction with NASA to define joint milestones for the ATD-2 project was identified as the only feasible option to meet the NIWG Departure Management recommendation in the required timeframe.

Due to the COVID-19 pandemic, data collection for the ATD-2 Phase 3 operational evaluation during 2020 has been significantly impacted. The dramatic reduction in traffic volume has led to the decline in terminal demand/capacity imbalances that the ATD-2 system was designed to address. NASA leadership has considered these COVID-19 impacts on ATD-2 Phase 3 along with the significant investments made by airline field demo partners and the strong interest expressed by the broader airline community in seeing the Phase 3 field demo produce meaningful results. Consequently, NASA leadership has directed the ATD Project to extend ATD-2 work through FY21 with the goal of maximizing the impact of NASA and Field Demo Partner investments in ATD-2 Phase 3.

Project Communications

The project team has compiled a list of project stakeholders and will update the list as additional stakeholders are identified. Communications plans are in place to ensure the stakeholder groups are adequately informed of project activities. The following channels are being used to ensure key stakeholders receive timely updates on project status and activities.

- Monthly ATD-2 Status Reports submitted to ANG-1
- Weekly Significant Activities Reports submitted to ANG-C
- Weekly ATD-2 Stakeholder meetings
- Quarterly IADS RTT/ATD-2 meetings
- Monthly FAA/NASA Leadership Teleconferences

FAA Status

July 2020

On July 21, 2020, ANG-C52 distributed to the appropriate FAA stakeholders its sponsored analysis of NASA's ATD-2 technological transfer materials for Phase 1 through Phase 2 as well as cataloged artifacts published by NASA at the end of ATD-2 Phase 2. The technology transfer assessment provides information to FAA Integrated Arrival/Departure/Surface Research Transition Team (IADS RTT) stakeholders regarding the capabilities relevant to their programs. The document includes the findings of the demonstration so far and lessons learned to benefit future FAA work. ATD-2 capabilities were mapped to current FAA work programs (e.g., Terminal Flight Data Manager (TFDM), Traffic Flow Management System (TFMS), and Time Based Flow Management (TBFM)) to show the linkages for related stakeholders and capabilities not currently covered by existing FAA work programs were identified.

The Surface Collaborative Decision Making (CDM) Team (SCT) and the Flow Evaluation Team (FET) held a virtual meeting on July 23, 2020. The meeting primarily focused on briefings from NASA presenting updated Airspace Technology Demonstration 2 (ATD-2) FY21 operational plans, highlighting modifications made to the newly extended Phase 3 of the ATD-2. The modifications will increase Trajectory Option Set (TOS) submissions giving the evaluation of Phase 3 greater significance. SCT/FET tasking requirements and a timeline of future SCT/FET events were also discussed at the meeting.

August 2020

The Surface Collaborative Decision Making (CDM) team (SCT) and Flow Evaluation Team (FET) held a joint virtual meeting on August 24, 2020. The meeting predominantly focused on a presentation of updates to ANG-C52's Mobile application tool – Pacer and metering for non-CDM flight operators (General Aviation and International). The presentation titled "Pacer: Enabling General Aviation Departure Readiness Information Exchange" detailed the evolution of mobile aviation technology and

future plans for the application. A demonstration of the Pacer app was also given followed by a brief Q&A. Information about the Pacer app can be found on the Pacer research website:

https://sites.mitre.org/mobileaviationresearch/

NASA hosted a virtual planning meeting for ATD-2's Phase 3, "Stormy 2021" evaluation on August 26, 2020. Phase 3 capabilities are mainly used during periods with weather impacts on departure routes; therefore, the demonstration periods usually coincide with periods of severe weather in the North Texas region, hence referred to as "Stormy 2021". The meeting briefed Phase 3 plans and detailed coordination activities with ATD-2 partners and stakeholders. The "Stormy 2021" evaluation is scheduled to begin in April 2021 and end in July 2021. Additional details are included in the NASA Status section of this document.

ANG-C52's project management team hosted an ATD-2 follow up meeting with NASA and Terminal Flight Data Manager (TFDM) on August 26, 2020. The meeting provided an opportunity to better update and inform the three PM teams on project activities, issues, and relevant information in preparation for the upcoming fiscal year. The topics discussed at the meeting included: Status update of the ATD-2 to TFDM transition operations at Charlotte Douglas International Airport (CLT), ATD-2 Phase 3 Extension Plan, Review of the Integrated Arrival/Departure/Surface (IADS) Research Transition Team (RTT) Weekly Meetings in preparation for FY21, and Status update of ATD-2 Technology Transfer (TT) 2.5.

The National Air Traffic Controllers Association (NATCA) informed the ATD-2 team on August 26, 2020, that Kristen Wilson out of Dallas Fort Worth International Airport (DFW) was selected as the new Article 114 ATD-2 Rep in substitution of John Short.

NASA delivered to the FAA the next installment of research transition products developed within the ATD-2 Project on August 31, 2020. With the ATD-2 Phase 3 field demonstration extended through September 2021, TT 2.5 constitutes an interim delivery of artifacts from the Phase 3 effort. The Phase 3 Metroplex IADS system provides additional capabilities for a multi-airport IADS demonstration in the North Texas terminal environment including DFW and Dallas Love Field (DAL) airports. These additional capabilities include: Trajectory Option Set (TOS) service, scheduling to the Terminal boundary, and Traffic Management Initiative (TMI) propagation. TT 2.5 contains ATD-2 concept and technology documents, technical publications, and informal knowledge transfer artifacts relevant to the ATD-2 Phase 3 Field Demonstration. The technical reports include evaluation results, simulation results, performance metrics, and benefits analyses, with over 6,000 pages (2,500 new with TT 2.5) of information. ANG-C52 notified the appropriate FAA stakeholders of the interim TT. The ATD-2 artifacts can be downloaded from this NASA website:
https://aviationsystems.arc.nasa.gov/publications/atd2/tech-transfers/

September 2020

On September 4, 2020, Kristen Wilson, the new National Air Traffic Controllers Association (NATCA) Article 114 ATD-2 representative was formally introduced to the FAA ATD-2 Project Management Team.

The meeting, organized by ANG-C52 provided and opportunity for team members to brief their roles and responsibilities on the ATD-2 project and answer any questions or concerns from the new NATCA ATD-2 representative.

The Surface Collaborative Decision Making (CDM) Team (SCT) and Flow Evaluation Team (FET) hosted a Virtual Meeting on September 14, 2020. Representatives from the NASA ATD-2 team briefed plans for Stormy 2021 (April – July 2021) evaluation and field users training.

On September 17, 2020, NASA and the FAA signed the ATD-2 Phase 3 Field Demo Operating Plan in the North Texas Region (NTX) for FY21 Extension. The plan is substantially the same as the 2019 Phase 3 Project Plan but reorganizes research material and includes updates to cover the ATD-2 extension into FY21 due to the COVID-19 pandemic. NASA briefed FY21 plans to ATD-2 Phase 3 Field Demo Partners (i.e., local FAA facilities, American Airlines, Southwest Airlines, and Envoy Air) on August 26, 2020, emphasizing that this was a one-time, one-year extension.

Annex 6 of the Non-Reimbursable Interagency Umbrella Agreement (NRIUA) between NASA and the FAA was signed on September 24, 2020. Annex 6 documents roles and responsibilities to continue the operational use of NASA's ATD-2 research system at Charlotte Douglas International Airport (CLT) until the FAA Terminal Flight Data Manager (TFDM) Build 2 achieves an Operational Readiness Decision.

On September 25, the FAA Fort Worth District (TCFW) in coordination with NASA determined that the original 2019 ATD-2 Phase 3 Safety Risk Management (SRM) document is sufficient to cover continued Stormy 2021 field evaluation at NTX based on no significant operational changes to the ATD-2 Phase 3 system.

On September 30, 2020, NASA concluded ATD-2 Phases 1 and 2 field demonstrations at CLT. Phase 1 evaluation begun on October 2017 and researched two-way data sharing with industry, surface metering, and electronic release negotiation between Charlotte Air Traffic Control Tower (ATCT) and Washington Air Route Traffic Control Center (ZDC). Phase 2 begun on October 2018 and added new capabilities including two-way data exchange between the ATD-2 system and the Advanced Electronic Flight Strips (AEFS) system and expanded electronic release negotiation to include Atlanta Air Route Traffic Control Center (ZTL). Phase 3 research evaluation is still ongoing at NTX and will conclude on September 30, 2021.

October 2020

Beginning October 7, 2020, the Integrated Arrival, Departure, Surface (IADS) Research Transition Team (RTT) meetings will be conducted bi-weekly instead of weekly. The new meeting format adapts to the current ATD-2 project and stakeholders needs mainly focusing on Phase 3 as Phases 1 and 2 concluded on September 30, 2020. NASA and the FAA Terminal Flight Data Manager (TFDM) also provide updates about the ongoing operational use of the NASA IADS prototype system by the FAA at Charlotte Douglas International Airport (CLT).

On October 27, 2020, ANG hosted a virtual meeting with NASA and TFDM to discuss the status, legal agreements, and overall plan review to continue the operational use of the NASA IADS prototype system by the FAA at CLT beyond FY21. The virtual meeting also provided the opportunity for NASA and the FAA to discuss joint ATD-2 project risks through the ATD-2 Joint Risk Management Board (JRMB). A follow-on meeting is planned for early December 2020.

On October 28, 2020, the Collaborative Decision Making (CDM) Surface Evaluation Team (SCT) and Flow Evaluation Team (FET) met virtually to discuss the newly assigned joint task #100/Real-time Coordination, Collaboration, and Information Exchange to expand upon the FET's previous work. The CDM Stakeholder Group (CSG) agreed that such work, including expanding on the search for tools to assist in real-time coordination, should include the surface team's input. Task #100 directs the CDM SCT/FET to jointly identify opportunities for improved coordination, collaboration and information exchange between the flight operators and the Traffic Flow Management System (TFMS) and determine the benefit from initial field evaluations using prototyping software such as the MITRE National Airspace System Operations (NOD). The upcoming discussions could uncover possibilities for the near or long-term use of tools that already exist or can be incorporated later.

November 2020

ANG-C51 and MITRE met virtually on November 16, 2020, to continue the discussions about the analysis of the interim ATD-2 Phase 3 Technology Transfer (a.k.a. ATD-2 technology transfer 2.5) and plan for the final NASA ATD-2 Phase 3 Technology Transfer scheduled by the end of September 2021. As NASA is providing lessons-learned and research findings to the FAA as they complete each phase of ATD-2, ANG-C51 and MITRE are assessing this information to determine FAA programmatic implications, and to recommend the transfer of information to appropriate FAA internal organizations.

ANG-C51 attended the Collaborative Decision Making (CDM) General Session Virtual Edition, which was held on November 17, 2020. The virtual session recognized CDM Sub-team activities, reviewed recommendations, and celebrated the success of CDM. During this virtual edition, each CDM Sub-team reported on their tasks for the year and discussed upcoming opportunities to promote traffic flow management in the National Airspace System. The Surface CDM team also had the opportunity to report about the ATD-2 Phase 3 extension at the North Texas Region. Additional details are included in the NASA Status section of this document.

The System-Wide Information Management (SWIM) Industry-FAA Team (SWIFT) met virtually on November 19, 2020. The meeting included focus group updates, various widget demos, and a Terminal Flight Data Manager (TFDM) update. TFDM used this meeting also as an opportunity to brief the audience about the ongoing FAA operational use of ATD-2 Integrated Arrival, Departure, and Surface (IADS) research system at Charlotte Douglas International Airport (CLT). The next Swift Meeting is planned for February 18, 2021.

December 2020

The ATD-2 Joint Risk Management Board (JRMB) convened on December 1, 2020, to update project risks shared between NASA and the FAA. The purpose of the ATD-2 JRMB is to identify, track and mitigate issues determined and agreed to be joint project risks for both NASA and FAA. NASA, ANG, and the Terminal Flight Data Manager (TFDM) Program Management (PM) teams updated currently identified risks and reviewed proposed risks for addition to the Joint Risk Register.

On December 7, 2020, ANG-C51, NASA and MITRE met virtually to continue discussions about the interim ATD-2 Phase 3 Technology Transfer (aka TT #2.5) delivered by NASA in September 2020 and current developments of the final ATD-2 Phase 3 Technology Transfer scheduled to be delivered in September 2021. As NASA is providing lessons-learned and research findings to the FAA as they complete each phase of ATD-2, ANG-C51 and MITRE are assessing this information to determine FAA programmatic implications, and to recommend the transfer of information to appropriate FAA internal organizations. The group discussion served as a means for MITRE/FAA ATD-2 PM team to question NASA about the TT #2.5 artifacts and continue planning for the final Technology Transfer.

January 2021

On January 15, 2021, the Collaborative Decision Making (CDM)/ Flow Evaluation (FET) and Surface CDM (SCT) teams convened for the Task #92 Surface CDM Departure Metering and NAS Scheduling January update. NASA briefed the group on recent ATD-2 developments, which included updates of Phase 3 at the North Texas field demo for the upcoming Stormy 2021 season (April-July). The next Task #92 meeting date is yet to be determined.

February 2021

ANG-C51 attended the System Wide Information Management (SWIM) Industry-FAA Team (SWIFT) Meeting #13 on February 18, were NASA briefed on ATD-2 Phase 3. The presentation provided an update of the North Texas field demo in preparation for the upcoming Stormy 2021 season (April – July). More details of the SWIFT meeting can be found at https://www.faa.gov/air_traffic/technology/swim/swift/

On February 24, ANG-51 and ATD-2 Phase 3 field users attended the Bi-weekly Stormy 21 update presentation provided by NASA. Pre-stormy season trials are underway by participation from the Flight Operators and Air Traffic Controllers even though the stormy season has not begun. In use at 3 airline operation centers: Envoy air, Southwest, and American Airlines and 4 FAA facilities: Dallas Love Field Airport (DAL), Dallas-Fort Worth International Airport (DFW), Ft Worth Center (ZFW), and Dallas - Ft Worth Terminal Radar Approach Control (TRACON) (D10). The presentation contained a field user training schedule update, an operational discussion focused on the scratch pad functionality of the

metroplex planner software as well as analysis of current Trajectory Option Set (TOS) benefits. The next Stormy 21 update is scheduled for March 10, 2021.

March 2021

ANG-C51 received the ATD-2 Phase 3 Interim Technology Transfer (TT) 2.5 Analysis Assessment from MITRE on March 31, 2020. This knowledge management effort provides information to FAA regarding the capabilities/results developed throughout ATD-2 Phase 3 demonstrations so far, and lessons learned to benefit future FAA initiatives. This work provides an assessment report and catalog of the NASA artifacts and a mapping to current FAA programs (e.g., Terminal Flight Data Manager (TFDM), Traffic Flow Management System (TFMS), and Time Based Flow Management (TBFM)) to show the linkages for related stakeholders. Capabilities not currently covered by existing FAA programs were identified as candidates for future FAA research. ANG-C51 plans to distribute this interim assessment to FAA internal stakeholders in April 2021 as referenced in the memorandum that ANG-1 provided to AJO-0, AJM-0, and AJV-0 on November 6, 2020.

April 2021

ATD-2's Phase 3 Stormy 21 season officially began on April 1, 2021, although pre-stormy season trials have been underway during 2021 by participation from the flight operators and ATC. In use at 3 airline operation centers (American, Envoy Air and Southwest Airlines) and 4 FAA facilities (Dallas-Fort Worth Air Traffic Control (ATC) Tower, Dallas Love ATC Tower, Dallas-Fort Worth Terminal Radar Approach Control and Fort Worth Center). More details of this project milestone can be found in the section "NASA Status" below.

On April 16, 2021, ANG-C51 distributed its analysis of NASA's Phase 3 Interim Technology Transfer (TT) 2.5 to FAA internal stakeholders, which was referenced in the memorandum that ANG-1 provided to AJO-0, AJM-0, and AJV-0 on November 6, 2020. This work provides an assessment report and catalog of the NASA artifacts and a mapping to current FAA programs (e.g., Terminal Flight Data Manager (TFDM), Traffic Flow Management System (TFMS), and Time Based Flow Management (TBFM)) to show the linkages for related stakeholders. Capabilities not currently covered by existing FAA programs were identified as candidates for future FAA research. This analysis was distributed to TFDM, TBFM and TFMS (PMOs), AJT-32, AJV-S23, Initial Trajectory Based Operations (iTBO), Advanced Electronic Flight Strip (AEFS) and Surface Trajectory Based Operations (STBO) labs at William J. Hughes Technical Center (WJHTC). NASA continues with its plan to deliver TT 3.0 final materials to the FAA and Industry towards the end of September 2021.

May 2021

Nothing to report for this period.

June 2021

Nothing reported for this period.

July 2021

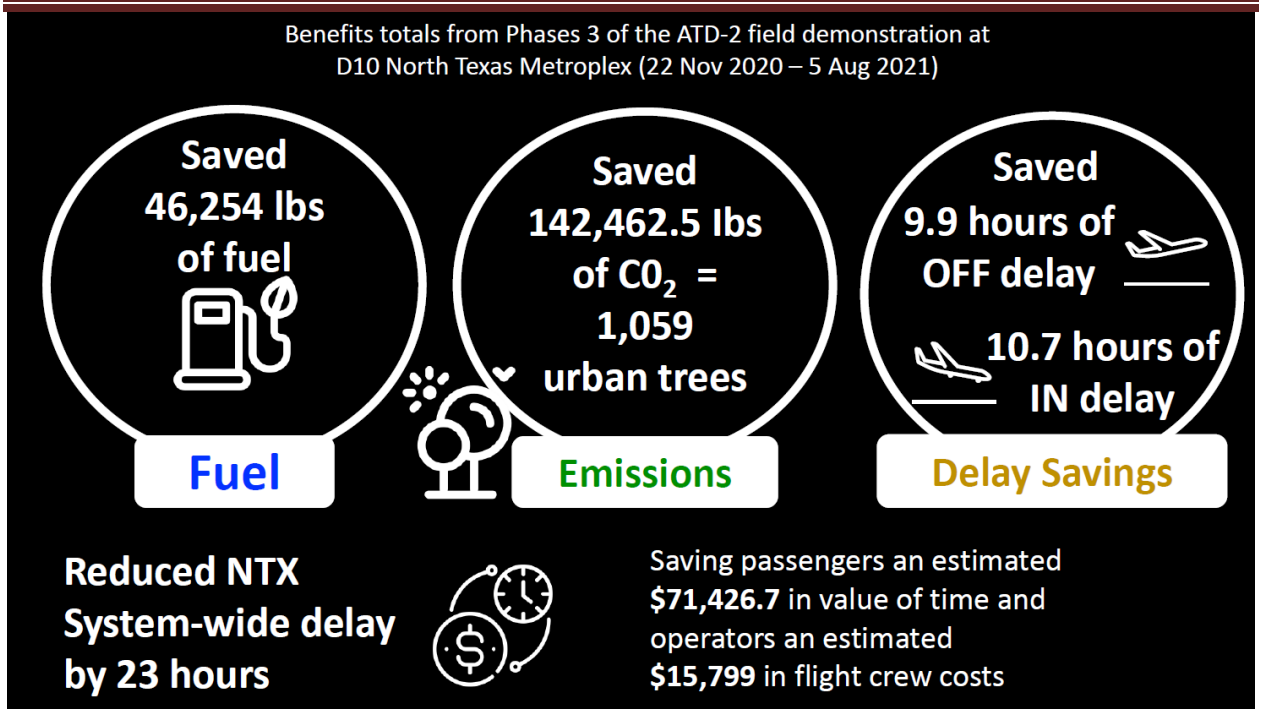
ANG-C51 coordinated two (2) virtual meetings with MITRE and the National Air Traffic Controllers Association (NATCA) ATD-2 Article 114 Rep on 07/07/21 and 07/20/21. The purpose of the meetings was to share and assess current air traffic controller experience with the ATD-2 system and brief the MITRE team on ATD-2 capabilities being developed by NASA in the North Texas Region (NTX). The discussion will aid the MITRE team in the development of the ATD-2 Phase 3 Technology Transfer Analysis report due to the FAA internal stakeholders during spring 2022.

On 07/29/21 the NASA ATD-2 team at NTX briefed the Collaborative Decision Making (CDM) Flow Evaluation Team (FET) and Surface Evaluation Team (SCT) on the current status of Phase 3 of the ATD-2 project and some of the realized benefits. ATD-2 Phase 3 is currently on track to be concluded by 09/30/21.

August 2021

NASA has announced that the agenda for the ATD Technical Interchange Meeting (TIM) slated for September 22 & 23, 2021 is now available at https://nari.arc.nasa.gov/atd2021tim. NASA has assembled a lineup of topics, speakers, and panelists to highlight how the ATD-1, ATD-2, and ATD-3 demonstration activities have contributed to NextGen. The TIM will focus on how the FAA and Industry are utilizing the knowledge and technology developed and delivered under ATD.

NASA has reported benefits totals from ATD-2 final Phase 3 field demonstration at the North Texas (NTX) Metroplex (November 2020 through August 2021). During this period, the ATD-2 system has reduced NTX system-wide delay by 23 hours saving passengers an estimated $71,427 in value of time and operators an estimated $15,799 in-flight crew costs. In addition, NASA estimates Phase 3 environmental savings of 46,254 lbs. of fuel, and 142,462 lbs. of C02 which is equivalent to 1,059 urban trees. ATD-2 and its final Phase 3 are on track to conclude by 09/30/21.



NASA's picture shown above

Key Stakeholders

Leadership Team

Name	Organization	Title
Pam Whitley	ANG-1	Assistant Administrator for NextGen (Acting)
Steve Bradford	ANG-3	Chief Scientist – NextGen
Paul Fontaine	ANG-C	Director Portfolio Management and Technology Development Office
Wes Wright	ANG-C5	Division Manager Technology Development and Prototyping
Bob Pearce	NASA	Associate Administrator for Aeronautics Research Mission Directorate
Akbar Sultan	NASA	Director Airspace Operations and Safety Program

RTT Working Group			
Name	**Organization**	**Title**	**Tier**
Jane Thipphavong	NASA	IADS RTT Co-lead	Tier 0
Shawn Engelland	NASA	Manager, ATD Project	Tier 0
Al Capps	NASA	Manager, ATD-2 Sub Project	Tier 0
Jeremy Coupe	NASA	ATD-2 Deputy Chief Engineer	Tier 0
Yoon Jung	NASA	ATD-2 Chief Scientist	Tier 0
Oriol Oliva	ANG-C52	STF Project Lead (Current)	Tier 0
Andras Kovacs	ANG-C52	Manager, Surveillance Branch IADS RTT Co-Lead (Former)	Tier 0
Jillian Cheng	ANG-C52	Mobile Technologies Project Lead	Tier 0
Ben Marple	ANG-C51	Manager, Technology Development & Prototyping Division Co-lead NASA-FAA IADS RTT (Current)	Tier 0
Kristen Wilson	ATO	NATCA ATD-2 Article 114 Rep (Current)	Tier 0
Adam Rhodes	ATO	NATCA ATD-2 Article 114 Rep (Former)	Tier 0
Mike Hoprich	ATO	CLT ATD-2 NATCA POC	Tier 1
Kurt Donnelly	AJW	PASS NextGen Rep	Tier 1
Mark Novak	PMO	Decision Support Programs Manager (A)	Tier 1
Doug Swol	PMO	TFDM Program Manager	Tier 1
Bob Tyo	PMO	TBFM Program Manager	Tier 1
Omar Baradi	PMO	TFMS Program Manager	Tier 1
Paul Losee	PMO	TFMS POC	Tier 1
Paula Seeley (A)	AJR-E	Airport Surface Efficiency	Tier 1
Jeff Woods	ATO	NATCA PMO	Tier 1
Kevin McLaughlin	ATO	NATCA NextGen	Tier 1
Howard Sapp	AJV-73	Terminal Validation and Requirements (Former)	Tier 1
Jeffery T. Cox	AJV-85	Terminal Standards and Procedures (Former)	Tier 1

Eric Saldana	AJI-1	Safety and Technical Training (Former)	Tier 1
Mark Minik	AJT	Traffic Services	Tier 1
Dave Spencer	AJW	Technical Operations (Former)	Tier 1
Kent Duffy	ARP	Airports	Tier 1
Todd Lewis	ANG-C52	STBO Project Team Member (Former)	Tier 1

Acronyms and Abbreviations

A80	Atlanta TRACON
AAL	American Airlines
AEFS	Advanced Electronic Flight Strip System
AJV-7	Air Traffic Organization, Concepts, Validation & Requirements Directorate
AOL	Airspace Operations Laboratory
AMS	Acquisition Management System
ANG-C5	Office of Advanced Concepts & Technology Development
APREQ	Approved Request
ARB	Archetecture Review Board
ARMT	Airport Resource Management Tool
ART	Assessment of Ramp Times
ARTCC	Air Route Traffic Control Center
ATCT	Air Traffic Control Tower
ATD-2	Airspace Technology Demonstration 2
ATO	Air Traffic Organization
CCB	Change Control Board
CDM	Collaborative Decision Making
CLT	Charlotte Douglas International Airport
CSIT	Collaborative Site Implementation Team
eLMS	Electronic Learning Management System
EOBT	Earliest Off Block Time
FAA	Federal Aviation Administration
FET	Flow Evaluation Team
FFC	Future Flight Central (NASA)
FOS	Flight Operator Systems
FSOMS	Flight Substitutions and Operational Metrics
HITL	Human in the Loop Simulation
IADS RTT	Integrated Arrival/Departure/Surface Research Transition Team
IDAC	Integrated Departure Arrival Capability
IOC	Integrated Operations Center
IRAT	Independent Risk Assessment Team
NAC	NextGen Advisory Committee
NASA	National Aeronautics and Space Administration
NATCA	National Air Traffic Controllers Association
NCP	National Airspace System (NAS) Change Proposal
NESG	NAS Enterprise Security Gateway
NICS	NASA Integrated Communication Services
NIWG	NextGen Implementation Working Group
NOD	NAS Operational Dashboard
NTX	NASA North Texas Research Facility at Dallas/Ft. Worth Airport
OSE	Operational Shadow Evaluation

P3	Processes, Procedures, Policies
PLA	Project Level Agreement
PMO	Program Management Office
RMTC	Ramp Manager Tower Console
RNAV	Area Navigation
RTC	Ramp Tower Console
S-CDM	Surface Collaborative Decision Making
SMS	Safety Management System
SRM	Safety Risk Management
STDDS	SWIM Terminal Data Distribution System
STF	Surface Tactical Flow
SWIM	System Wide Information Management
SWIFT	SWIM Industry FAA Team
TBFM	Time Based Flow Management
TIM/TEM	Technical Interchange Meeting/Technical Exchange Meeting
TFDM	Terminal Flight Data Manager
TFMS	Traffic Flow Management System
TMAT	Target Movement Area Time
TOBT	Target Off-Block Time
TSAS	Terminal Sequencing and Spacing
TSD	Traffic Situation Display
TTP	TFDM Terminal Publication
ZDC	Washington Center
ZFW	Dallas/ Ft Worth Center
ZTL	Atlanta Center
3T	The 3 FAA Traffic Management Coordination Tools: TFMS, TBFM and TFDM