



Federal Aviation
Administration

Airspace Technology Demonstration 2 (ATD-2)

ANG-C52

FAA/NASA Coordinated Activities

Compilation

FY2016-FY2018

NextGEN

The logo for NextGEN, with "Next" in a light blue font and "GEN" in a dark blue font. A gold swoosh underline is positioned beneath the "Next" portion of the text.

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Project Lead (ANG): Ben Marple/Susan Passmore

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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.

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

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FAA Status

FY16

October 2015

For the period of 10/15/2015 to 10/30/2015 ANG has continued progress on the planning for the IADS/ATD-2 Departure Metering Demonstration. ANG-C53 coordinated the delivery of the “S-CDM GUI Guide”, the first of five additional S-CDM artifacts requested by NASA. These additional artifacts were identified after the completion of the initial tech transfer from Metron. However, ANG-C53 determined there was funding available to complete the transfer of these additional items.

ANG-C53 continued working collaboratively with NASA on the Integrated Arrival Departure Surface Research Transition Team (RTT) Plan to document the research transition products to be delivered. Working meetings were held October 21st and 29th. The meeting on the 21st focused on the RTT plan exclusively. Topics for the meeting on the 29th covered the status of several ongoing activities including status of the Joint ATD-2 Agreement Memo, the Lead Carrier letter and coordination for the upcoming media event at CLT as well as a review of the latest draft of the Research Transition Team Plan.

November 2015

For the period of 11/15/2015 to 11/30/2015 ANG has continued progress on the planning for the IADS/ATD-2 Departure Metering Demonstration. During this reporting period the team has delivered the completed Research Transition Team Plan (RTT Plan) closing out a Project Level Agreement deliverable and Business Plan Goal. The FAA document was submitted to the Portfolio Management Organization on November 16, 2015.

Additionally, ANG-C53 facilitated the delivery of two Surface Collaborative Decision Making (S-CDM) research artifacts from Metron to NASA to support ATD-2. This completes 3 of the 5 additional S-CDM items NASA requested subsequent to the completion of the initial Technical Transfer.

December 2015

For the period of 11/30/2015 to 12/15/2015 ANG has continued progress on the planning for the IADS/ATD-2 Departure Metering Demonstration. During this reporting period the completed Research Transition Team Plan (RTT Plan) has been signed by the FAA and NASA project co-leads.

ANG-C53 facilitated a meeting with ATD-2 researchers and Washington Center (ZDC) where NASA briefed the ATD-2 work being done at Charlotte International Airport. The high level briefing focused on the Center aspects of the project. NASA team members had an opportunity to observe Washington Center traffic and discuss Washington Center challenges. A goal of the meeting was to evaluate the level of interaction possible between the ATD-2 effort at Charlotte and ZDC and to gauge ZDC interest in participation in later phases of ATD-2 research. The Facility expressed willingness to participate, so ANG-C53 and NASA will coordinate to define the research aspects ZDC participation will enable, and incorporate them into project planning.

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NASA hosted a second ATD-2 Technology Familiarization at NTX. This outreach event is intended to introduce the concepts that will be used for ATD-2. Attendees were from NASA Ames and ANG-C (including contract support personnel). The “University” covered the “What, Where, and How” of ATD-2. Additionally, the briefings described the 3 phases planned for the operational evaluations and where the activities will be conducted and how the field evaluations will be executed.

January 2016

For the period of 1/31/2016 to 2/15/2016 ANG has continued progress on the planning for the IADS/ATD-2 Departure Metering Demonstration. The IADS RTT team continues to meet via telcon weekly to coordinate ATD-2 activities and joint work sessions. The monthly FAA Internal Stakeholder meeting also fell in this reporting period. Several deliverables are in progress as an outcome of these meetings and working sessions. The ATD-2 Risk Control Board membership has been drafted and is undergoing internal reviews within NASA and the FAA. A draft ATD-2 stakeholder roles and responsibilities matrix has been drafted and is being vetted internally to formalize POC’s to represent each stakeholder organization in ATD-2 Stakeholder meetings. The matrix will be incorporated into the draft Joint Project Management Plan. ANG-C53 drafted an initial list of ATD-2 project risks and completed internal review which identified 3 joint risks to be managed by the ATD-2 Risk Control Board.

Additionally, key FAA stakeholders have been identified and scheduled to attend NASA’s ATD-2 “University” at NTX in March.

February 2016

For the period of 2/16/2016 to 2/29/2016 ANG has continued progress on the planning for the IADS/ATD-2 Departure Metering Demonstration. The IADS RTT team continues to meet via telcon weekly to coordinate ATD-2 activities and joint work sessions. The focus of the RTT conference calls this period has been on drafting the FAA sections of the Joint Project management plan, identifying a joint risk management board, the initial list of project risks and defining a management process to address identified risks. ANG-C53 shared the FAA risk matrix with NASA to help inform them on our methodology of determining risks and impacts. NASA is developing a process to leverage their existing risk management process as a management technique for ATD-2 joint risks.

Additionally, ANG-C53 staff reviewed the preliminary draft NASA Concept of Use document and delivered comments. When a draft is finalized for release by NASA, the document will be distributed for further comments.

March 2016

For the period of 3/1/2016 to 3/15/2016 ANG has continued progress on the planning for the IADS/ATD-2 Departure Metering Demonstration. The IADS RTT team continues to meet via telcon weekly to coordinate ATD-2 activities and joint work sessions.

On March 8th and 9th members of the IADS RTT/ATD-2 Working Group participated in ATD-2 University at NASA’s NTX Research Station along with participants from American Air Lines (AAL) and NASA

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researchers. Over this two day event, the group was briefed on the foundational technologies that ATD-2 is building upon as well as the 'what', 'how' and 'where' of ATD-2. The class also spent time with the current ATD-2 system interfaces that are running with live CLT/ZTL/ZDC data, and were briefed on the projected future user interfaces. Tim Niznik of American Airlines led the group in a tour of AAL's new IOC and explained the operations.

The updated draft Joint Project Management Plan was reviewed during the FAA ATD-2 Internal Stakeholder meeting on 3/14/2016. Comments and edits from the meeting will be incorporated into the document for a final review by the RTT working group. The Stakeholder group also reviewed the ATD-2 risk register to achieve FAA consensus on the risks identified to date. The ATD-2 Risk Board will review the matrix on 3/17/2016.

Over the past 3 IADS/ATD-2 RTT meetings, held 3/17/2016, 3/23/2016 and 3/30/2016, the RTT has focused on 3 major areas including the Joint Project Management Plan (JPMP), the ATD-2 Concept of Use (ConUse) and planning for FAA SME support to ATD-2. NASA has delivered their request for SME support and ANG-C53 is working plans to ensure the required resources are available when needed. NASA's draft ConUse was reviewed and comments delivered to NASA. NASA is now working to resolve the comments and expects a second draft in April. ANG-C53 submitted the Initial JPMP on 3/31/2016 meeting the Project Level Agreement goal and establishing a baseline plan to guide project work.

On 3/17/2016 the ATD-2 Joint Risk Management Board convened for their initial assessment of project risks. The purpose of the Board is to ensure coordination for project risks impacting both NASA and FAA. Each organization remains responsible for managing their internal project risks. Five risk items were identified as potential joint risks. The Board considered the risk issues submitted and accepted 2 of the 5 as joint risks for management by the Board. One of the risks rejected had been adequately addressed through the development of the JPMP and the other 2 were determined to reside entirely within the recommending agency, so therefore they were not candidates for management by the Board. The Board will meet periodically as needed going forward to evaluate additional risks and update mitigations on the accepted risks.

On 3/29/2016 ATD-2 Stakeholders had the opportunity to attend a briefing on the NASA Charlotte EDC Evaluation and Demonstration (CEED) out brief. This brief highlighted the environment and scenarios of the initial NASA HITL of Charlotte traffic for ATD-2.

April 2016

For the period of 4/1-29/2016 ANG continued progress on the planning for the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS RTT team continues weekly telcon meetings to coordinate ATD-2 activities and joint work sessions.

During this reporting period ANG-C53 completed two PLA items. The Technical Letter on Integration for Departure Scheduling is a PLA deliverable. This paper documents research into the functionality of the separate FAA scheduling systems and highlights required system interactions in an integrated environment. The Draft ATD-2 Operational Roles and Responsibilities document identifies the systems

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and participants required for the ATD-2 demonstrations and discusses the roles each entity and system are expected to perform. This draft will be reviewed by ATD-2 stakeholders for comments to be incorporated in the final document.

On 4/12/2016, ANG-C53 met with the Tower Data Link System (TDLS) Program Management Office regarding potential impacts to ATD-2 planning stemming from the deployment of TDLS at Charlotte Airport (CLT). The PMO is researching questions from NASA to inform efforts to mitigate any potential impacts.

On 4/25/2016, representatives from ANG-C53, AJM and AJR met for a briefing on NASA's proposal regarding the Time Based Flow Management (TBFM) tool to be used for ATD-2. Initial ATD-2 planning anticipated use of a NASA modified version of TBFM to support the ATD-2 Demo. This modified system would be required to run alongside the baseline FAA system and necessitate an additional effort for users. NASA is now proposing a change to the baseline system for CLT. This proposal would avoid the need to run parallel systems, but imposes additional resource requirements that must be evaluated. Additional meetings including more technical experts are planned in order to determine the scope and impacts of NASA's proposed solution.

IADS RTT telecons during this period were devoted to planning upcoming events in May including an ATD-2 Pre-Brief and User Work Group Meeting 5/3-4/2016 and the Advanced Electronic Flight Strips Kickoff Meeting 5/5/2016, both taking place at Charlotte. Also planned is an ATD-2 University session on 5/17-18/2016. IADS RTT/ATD-2 Stakeholders are scheduled to participate and will attend detailed briefs on all aspects of the ATD-2 effort.

May 2016

For the period of 5/1-31/2016 ANG continued progress on the planning for the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS RTT team continues weekly telcon meetings to coordinate ATD-2 activities and joint work sessions. Due to ATD-2 activities this month only two weekly meetings were held. The first on 5/11/2016 focused on TDLS information requested by NASA, discussing next steps for TBFM/IDAC discussions within FAA and briefing the plan for AEFS deployment at Charlotte.

ANG-C53 participated in the NASA lead ATD-2 Stakeholders Work Group on 5/4-5/2016. Participants were briefed on the status of ongoing work, including the Phase 1 Concept of Use, the notional Time-Based Flow Management (TBFM) deployment plan, the desired training model and the proposed ATD-2 process and quality checkpoints.

On 5/5/2016 the TFDM Program Office hosted an Automated Electronic Flight Strip (AEFS) kickoff at Charlotte Douglas International Airport. AEFS deployment is an element of the Terminal Flight Data Manager (TFDM) early implementation of Electronic Flight Data (EFD), which is a key component of the overall Integrated/Arrival/Departure/Surface (IADS) solution. The FAA is deploying AEFS to CLT earlier than originally planned to support the ATD-2 field demonstration. During the meeting, the groups

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established general dates by which the installation, adaptation, training and operational use of the system would transpire, and enabled productive dialog between the relevant parties.

On 5/12/2016 ANG-C53 met with MITRE to review progress to date and future Stakeholder engagement required to document ATD-2 Success Criteria and the current assessment of concept maturity.

On 5/17-18/2016 FAA Stakeholders attended the ATD-2 Stakeholder event at Charlotte Douglas International Airport. Attendees participated in NASA briefings on the technologies expected to be used as part of ATD-2 to the scope of the project beyond Surface Collaborative Departure Management capabilities.

The second weekly telcon held this period was on 5/18/2016 and included a brief on the ATD-2 Booth at WJHTC "Tech Tuesday" during the 2016 ATCA Technical Symposium, follow up from the initial TBFM/IDAC strategy meeting and plans for the CLT install and Update on planning for the AEFS site survey.

June 2016

For the period of 6/1-30/2016 ANG continued progress on the planning for the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS RTT team continues weekly telcon meetings to coordinate ATD-2 activities and joint work sessions.

ANG-C53 worked with the Terminal Flight Data Manager Program Office to develop a draft task for the Collaborative Decision Making Stakeholders Group (CSG) Surface Collaborative Decision Making Team (SCT) Sub-team to validate the suitability of the ATD-2 surface metering capability for use within the NAS at TFDM equipped airports. The Memo was delivered to the CSG and is now under consideration.

ANG-C53 coordinated with the TFDM Program Office, The Surface Office and NASA to complete the Advance Electronic Flight Strips (AEFS) site survey at Charlotte. The site survey was completed on 6/16/2016 and provided the information required for planning the installation. Suitable spaces for the AEFS equipment have been documented and power verified as available and adequate.

On 6/16/2016 ANG-C53 hosted a meeting with representatives from TBFM, TFDM, AJR, AJM, Lockheed Martin and NASA to discuss technical details on a NASA proposed change to TBFM/IDAC to support ATD-2 demonstrations. Briefings detailed the reasons for the request and detailed a suggested solution. Lockheed Martin is now working to determine the impacts of the change request. A follow up meeting to discuss the least impact option is scheduled for July 11th.

On 6/21/2016 the ATD-2 Project team delivered the ATD-2 ConOps for outside review and comments. The draft had been through 2 rounds of internal review prior to being made available to the wider stakeholder audience.

On 6/24/2016 representatives from ANG participated in the NASA ATD-2 Lab Ribbon Cutting ceremony along with Secretary Anthony Foxx and NASA Administrator Charles Bolden, National Air Traffic

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Controllers Association (NATCA), American Airlines, and the Charlotte Douglas International Airport (CLT).

July 2016

For the period of 7/1-31/2016 ANG continued progress on the planning for the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS RTT team continues weekly telcon meetings to coordinate ATD-2 activities and joint work sessions.

A key focus area this reporting period was the NASA proposed change to TBFM/IDAC to support ATD-2 demonstrations. ANG-C53 coordinated follow up Technical Exchange meetings on 7/11/2016 and 7/20/2016 which continued the collaboration effort among TBFM, TFDM, AJR, AJM, Lockheed Martin and NASA to seek a minimally disruptive solution to modify IDAC to support the ATD-2 Demonstration. A proposed solution utilizing changes to the adaptation only has been identified and is being evaluated to fully describe the impact on the TBFM development cycle.

ANG-C53 also hosted the FAA ATD-2 Stakeholders Meeting on 7/14/2016. MITRE briefed a presentation on Integrated Departure Scheduling (IDS) leveraging their work on FAA TBFM and their work on integrating TBFM, TFMS and TFDM (3T Integration). The brief is a step towards developing an FAA consensus on future (Post TFDM) Departure Scheduling. MITRE will continue to coordinate with the program offices, ANG, AJR and other stakeholders to vet the IDS capability.

On 7/20/2016 ANG-C53 convened the ATD-2 Joint Risk Board to review the ATD-2 Project Plan to identify any new risks and update existing risk status. The two previously identified risks were updated with current information and impact adjustments were suggested based the current status. Two new risks were proposed and forwarded to proceed through the approval process.

On 7/28/2016 ANG-C53 delivered the ATD-2 Stakeholder Roles and Responsibilities document in completion of an STF PLA goal. The ATD-2 Stakeholder Roles and Responsibilities document provides an analytical framework for the safety study in the form of a function-based mapping of ATD-2 operations. It describes the various actors involved in ATD-2 departure metering operation (both human and automated), their roles, functional linkages, and the information flows that connect them.

August 2016

For the period of 8/1-31/2016 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS RTT team continues weekly telcon meetings to coordinate ATD-2 activities and joint work sessions.

At the 8/10/2016 weekly teleconference, Jane Thipphavong was announced as the NASA Co-Lead for IADS/ATD-2 RTT replacing Tom Davis. The need for a new data sharing IAA to cover data required to support ATD-2 was shared with the group. The current status of changes to TBFM required to support ATD-2 were presented and planning begun to address current FAA ISS requirements. FAA SME travel planning to meet NASA requests for SME support of ATD-2 HITLS continues to be a priority given constrained FAA Travel funding. ANG-C53 will attend S-CDM in September.

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At the 8/17/2016 weekly teleconference, the team was advised of the Staff Change at CLT with a new Acting Air Traffic Control Manager. Planning for FAA SME support for upcoming CLT HITLS continued. The status of the TBFM Whitepaper was discussed. Additional information to support the development of the NASA IAA for data connectivity was requested to complete the future data connection architecture.

On 8/17/2016 ANG-C53 met with FAA ISS to discuss the current, expired data sharing agreement with NASA and current NASA connection architecture. Plans to address the need to renew an agreement to cover the existing connections and a plan to move to meet current security requirements are in progress.

On 8/23/2016 John Greene, acting CLT ATCT/TRACON Manager and several of his staff, (Chris Del Negro, Chris Rickenbaker, and Bill Rutland) spent the morning observing the ATD-2 shadow session with NASA. John's comments to NASA reflected a very successful shadow session with CLT personnel. CLT personnel appreciated the level of detail and capability that ATD-2 will provide to the facility. They also provided valuable feedback.

The 8/31/2016 weekly teleconference covered updates on the NASA ATD-2 System Requirements Review, update on progress of August Shadow HITL, planning for the TBFM Testing plan meeting with NASA at WJH Technical Center, shared planning info for Quarterly Management update on ATD-2 for Jaiwon Shinn.

September 2016

For the period of 9/1-30/2016 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS RTT team continues weekly telcon meetings to coordinate ATD-2 activities and joint work sessions.

The 9/7/2016 Weekly coordination meeting focused on preparations for a kickoff meeting at WJHTC to coordinate testing of the NASA modified TBFM system to support ATD-2 field evaluations. Additionally, the required data feeds, communications architecture and system security issues were discussed as critical items to ATD-2 success.

On 9/13/2016 ANG-C53 coordinated an onsite meeting at WJHTC for NASA resources and TBFM Testers to discuss the role of the NASA modified version of TBFM to support ATD-2, the standard TBFM release testing process and understand potential additional testing requirements for the NASA modified product. The data exchange was well received and additional coordination is underway. A process to insure any issues surfaced during testing are routed to the correct organization is under development.

Beginning 9/20/2016 and running through 9/22/2016, the ATD-2 project conducted shadow evaluations at Charlotte, NC. This session of shadow evaluations focused on discussions for data sharing among the Air Traffic Control Tower (ATCT) and the American Airlines (AAL) ramp.

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On 9/21/2016 the Surface Collaborative Decision Making (S-CDM) Team met in Charlotte NC. During this visit S-CDM members also toured the Airspace Technology Demonstration 2 (ATD-2) lab at the airport.

On 9/27/2016 ANG-C53 facilitated a discussion of data exchange support for ATD-2 via System Wide Information Management (SWIM). Topics included near and far term support, SWIM data from Airlines, and the exchange of ideas between various types of users. Attendees included representatives from NASA, ANG, ATO, and Volpe.

ANG-C53 completed two Project Level Agreement deliverables in September. One deliverable also fulfilled a Business Plan Goal. The ATD-2 Safety Case document was submitted on 9/30/2016 completing ANG-C53's last Business Plan Goal for 2016. Additionally, the ATD-2 Success Criteria report was completed and turned in as planned in the FY14 STF PLA.

FY17

October 2016

For the period of 10/1-31/2016 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS RTT team continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

During the weekly IADS RTT conference calls the team discussed the following:

- TBFM Liedos White Paper status
- Information Security requirements related to NASA connection with TBFM
- Installation of NASA hardware in the FAA's William J. Hughes Technical Center's (WJHTC's) STBO Lab and preparations for testing the NASA TBFM modifications in TBFM release 4.7
- Planning for Integrated Departure and Arrival Control (IDAC) training for ATD-2 participants
- Outcomes from the Charlotte shadow session
- Interagency Agreement (IAA) progress
- Progress on the Advanced Electronic Flight Strips (AEFS) Installation for Charlotte was briefed including plans to extend existing fiber cabling to the ATCT
- Planning for FAA SME's to support the ATD-2 HITL event in March
- ATD-2 Safety Case analysis

Coordinating NASA access to the FAA data required to support ATD-2 was a focus throughout October. Meetings to discuss the data required, determine acceptable architectures and document required data sharing agreements took place on 10/6, 10/11, 10/13 and 10/27. ANG-C5 is continuing to research the requirements for network connections and system security monitoring.

On October 19th and 20th FAA Traffic Management Subject Matter Experts from Washington Center (ZDC) met with participants from Charlotte ATCT, FAA HQ and NASA personnel in the Charlotte ATD-2 lab for the 4th ATD-2 shadow session. Oct 19th was dedicated for ZDC participants to ramp up on the latest ATD-2 tools and shadow evaluation process. On Oct 20th the team agreed on the TBFM/ATD-2

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integration plan as well as the airspace scenarios that the electronic coordination technology would likely be used. Strong collaboration and fast progress in this meeting resulted in ample time for system shadow scheduling. ATD-2 shadow testing was the focus of the afternoon session.

On 10/26/2016 the NASA provided hardware required for the STBO installation at WJHTC was delivered. ANG-C32 staff at WJHTC has installed and setup equipment in the rack in the SDSS Lab. NASA will install software/scripts remotely in the coming weeks.

November 2016

For the period of 11/1-30/2016 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS RTT team continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

On 11/1-2/2016, the ATD-2 Article 48 Representative attended training for TBFM/IDAC. The training presented covered the use of the tool from the TRACON perspective on the first day, and the Center perspective the second day.

The ATD-2 Core project team met on 11/2, 11/9, 11/16 and 11/30. Coordinating NASA access to the FAA data required to support ATD-2 was a continuing focus throughout November as ATD-2 data needs and architecture were socialized among the FAA systems owners, engineers and security organizations. ANG-C5 is continuing to research the requirements for network connections and system security monitoring and developing drafts of the required agreements.

On November 16th and 17th participants from Charlotte ATCT, FAA HQ, Charlotte Douglas International Airport, American Airlines and NASA met in the Charlotte ATD-2 lab for the 5th ATD-2 shadow session. The event was largely focused on Operational considerations for the ATD-2 evaluation. The morning of the first day participants were presented mockups of a reporting dashboard that is being developed. The intent of the dashboard is to provide both real time and longer term analytical capability. The Dashboard is intended to provide an easy view for end users to provide a quick high level view of the systems status and assess the traffic levels and delay. There was quite a bit of discussion around the word "delay" and how it should be presented in the dashboard. The dashboard draws data from STBO, but is a separate application that can be run on its own. The current GUI is envisioned as a tool bar with icons for each data element. The four focus areas are:

- Situational Awareness information - Airport Configuration, Flow information, NAS Status, Ramp Status, TMI's Departure metering status, Arrival metering status, pending TMI's, etc.
- Monitoring Metrics - Airport throughput, capacity, delay, queue length (defining "queue" is another topic for discussion as it is not settled)
- Benefits Metrics - fuel savings, CO2 savings, monetized savings
- Data quality - Fidelity of data (Quality of EOBTs was mentioned), CLT airport is interested in Deicing throughput

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December 2016

For the period of 12/1-31/2016 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS Research Transition Team (RTT) continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

On 12/6/2016, The Assistant Administrator for NextGen (ANG-1), FAA Chief Operating Officer (COO) and NASA Associate Administrator for Aeronautics Research Mission Directorate (ARMD) met to discuss Air Traffic Demonstration 2 (ATD-2). Topics covered included the objectives, approach, deliverables and schedule for the demonstration. The ATD-2 communications and outreach plans were also discussed. Looking further to the future, the leadership team discussed the Joint Long-term vision for the NAS and status of the Trajectory Based Operations (TBO) Planning Effort.

The ATD-2 Core project team met on 12/7, 12/14 and 12/21/2016. Coordinating NASA access to the FAA data required to support ATD-2 was again a continuing focus throughout December as ATD-2 data needs and architecture were socialized among the FAA systems owners, engineers and security organizations. ANG-C5 is continuing to research the requirements for network connections and system security monitoring and developing drafts of the required agreements.

On 12/6/2016, the ATD-2 Project team hosted an FAA ATD-2 Internal Stakeholder meeting. Susan Passmore briefed recent ATD-2 accomplishments and upcoming activities. Mike Huffman briefed status of TFDM and AEFS. AEFS cab modifications and cabling at CLT are in progress, the latest build of AEFS is in testing at WJHTC. If it passes testing there, it will be deployed to an existing field site for further test/evaluation. The Software must pass both test cycles before deployment to CLT. The schedule is at risk if the software encounters additional development issues, but is currently on track. Outcomes from this meeting include actions to develop an engagement plan to align ATD-2 Technical Transfers with TFDM Deployment schedule, draft a memo for AJR approving use of Airline CDM Data to support ATD-2, coordinate with NASA to develop a data protection plan to ensure data security for ATD-2, explore an enterprise solution for SWIM data publishing to support ATD-2 and multiple other FAA programs, document TBFM risks to present at the 1/11/2017 ATD-2 Joint Risk Board meeting and to reengage on the ATD-2 Joint Project Management Plan (JPMP).

On 12/22/2016 ANG-C53 coordinated a meeting with MITRE and NASA researchers to discuss the potential to leverage ongoing MITRE research using smart phone/tablet based apps for clearance delivery and read back which could be expanded to deliver EOBT's (Estimated Off Block Time) from lesser equipped airports. NASA is receptive to exploring the capability as part of ATD-2 and additional coordination will be planned to assess schedule compatibility.

January 2017

For the period of 1/1-31/2017 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS Research

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Transition Team (RTT) continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

The ATD-2 Core project team met on 1/4, 1/11, and 1/18. The 1/4/2017 meeting included updates on NASA access to Sensitive Unclassified Information, progress from FAA on approval for a Traffic Situation Display in the NASA Charlotte Lab and progress on the Advanced Electronic Flight Strip (AEFS) testing for deployment at Charlotte. The team also finalized preparations for the ATD-2 Joint Risk Board the following week. The 1/11 ATD-2 Team meeting focused on status updates for AEFS and prep for the Risk Board.

The ATD-2 Core project team met on 1/11 for weekly status updates on TBFM, TFD, TFMS and SWIM work to support ATD-2. Additionally, the team finalized coordination for the January Shadow Evaluation session and preparation for the Joint Risk Board Meeting.

On 1/11/2017 ANG-C53 coordinated a kickoff meeting to prepare for the Architecture Review Board (ARB) required to document and approve the network architecture to support ATD-2. The participants identified the 7 data sources and network connections NASA must have access to for a successful ATD-2 demonstration. Actions from the meeting included developing an improved graphic depiction of the network requirements and scheduling a follow up. The follow up meeting was held 1/26/2017 to review the NASA submission. The team determined the depiction captured the information the ARB would want to see. AJM-31 took the action to reformat the document into the format the ARB is accustomed to in order to facilitate the briefing.

On 1/11/2017 the Joint ATD-2 Risk Board met to update the status of 2 previously accepted risks and review 2 newly submitted risks. Two new risks were accepted as Joint ATD-2 Risks. The new risks are related to TBFM pre-deployment activities and network security approvals required to support ATD-2. The newly approved risks will now be managed and tracked by the ATD-2 Risk Board to mitigate the impacts.

The ATD-2 Core project team met on 1/18 for weekly status updates on TBFM, TFD, TFMS and SWIM. AEFS Testing was successfully completed at Cleveland and progressing at Phoenix. NASA and ANG continue to coordinate FAA SME travel for upcoming NASA events.

On 1/23/2017 AJM-22 briefed ANG-C53 on the schedule and cost estimate for the work to successfully complete the ATD-2 demonstration. ANG-C53 has the action to brief ANG Management on the estimate.

On 1/26/2017 ANG facilitated a follow up to the ARB kickoff meeting. NASA presented the revised network diagrams including the data requested at the 1/11/2017 meeting. The team determined the required information had been captured, but recommended using a format more familiar to the Architecture Review Board. AJM-22 took the action to revise the network diagrams and agreed to review them via telcon the following day. The properly formatted diagrams have been completed and the team is preparing a complete briefing package for the Review Board targeting 2/8/2017 with a fall back of 2/22/2017.

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Project Lead (ANG): Ben Marple/Susan Passmore

February 2017

For the period of 2/1-28/2017 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS Research Transition Team (RTT) continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

On 2/2/2017, The Federal Aviation Administration (FAA) National Time-Based Flow Management (TBFM) Operations Team Co-Leads and FAA Headquarters representatives from the Future Standards and Procedures Group (AJV-85), Mission Support to the Air Traffic Organization visited NASA's North Texas Research Facility. Participants included the AJV-85 Group and Team Manager and NATCA National Representative for TBFM. The group was briefed on the ATD-2 system displays with live data from NASA's lab at the Charlotte-Douglas International Airport. The ATD-2 system overview included a description of the goals, benefits, and tools developed for use across the various user groups from Air Traffic Control Tower (ATCT) personnel to ramp managers and controllers. ATD-2 Subject Matter Experts (SMEs) from Human Solutions Inc. also supported the visit, providing key insights on how the ATD-2 system will be used operationally.

On 2/16/2017 AJV-723 Terminal Requirements and Validation determined, based on the completed two phased Operational Testing and Evaluation (OT&E) of Advanced Electronic Flight Strips (AEFS) software build 5.3.0.3, conducted at the William J. Hughes Technical Center and The Phoenix Air Traffic Control Tower, that the software build is suitable for baseline deployment. The AEFS Operational Suitability decision allows for AEFS deployment at Charlotte on schedule to support the ATD-2 project schedule.

On 2/21-23/2017 FAA ATD-2 Stakeholders including ATC SME's, ANG-C53 representatives and NATCA representatives observed the 7th ATD-2 Shadow Session. The February shadow session focused on the Flight Crew interaction with ATD-2 to capture the pilot perspective. Flight Crew members from American Airlines, UPS, Alaska Airlines (also the ALPA rep), PSA and Piedmont were briefed on ATD-2 capabilities to be evaluated at CLT. CLT Air Traffic Control Tower (ATCT) and Ramp controllers participated with the pilot participants and NASA researchers. The group was also briefed on the MITRE mobile application planned for incorporation into ATD-2. The mobile app will allow delivery of Expected Off Block Times from less equipped stakeholders in order to allow more accurate scheduling.

On 2/28/2017 Pete Slattery NATCA Article 48 Representative for ATD-2 visited the Phoenix ATCT for an operational familiarization with AEFS. Bill Rutland and Marco Smith from CLT ATCT also participated in the familiarization for the latest version of AEFS and operational observation at Phoenix.

On 2/28/2017 MITRE briefed representatives of NBAA at the Command Center on the MITRE Mobile Application work. NBAA has agreed to coordinate to identify CLT based flight departments, including but not limited to, Bank of America, Duke Energy and Family Dollar as potential ATD-2 participants using the mobile application. The next step is to set up a briefing/ discussion time with those flight departments to determine if they are interested in participating in the mobile technology research in CLT. Dean Snell is the Surface CDM representative from NBAA. Ernie Stellings, Senior Manager, Air Traffic Services from NBAA was also briefed.

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Project Lead (ANG): Ben Marple/Susan Passmore

March 2017

For the period of 3/1-31/2017 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS Research Transition Team (RTT) continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

During the week of 3/6/2017, ANG-C53 observed the ATD-2 Integrated Surface and Airspace Simulation (ISAS) held at NASA AMES. The goals of the simulation runs were to evaluate the operational procedures of the ATD-2 Tactical Surface Metering Tool by evaluating the effect of gates holds on the runway queues and the impact of EOBT accuracy on the gate hold advisories. Additional goals included evaluation of the APREQ procedures between the Charlotte ATCT and Washington Center and evaluation of the data exchanged between the ATCT and the American Airlines ramp tower. The simulations integrated the Charlotte airport surface environment with the surrounding airspace and involved over 40 participants including the American Ramp Tower controllers, Charlotte ATCT/TRACON Traffic Management Coordinators, Washington Center and Atlanta Center Traffic Management Controllers, confederate controllers for ATCT local, ground and clearance delivery, TRACON arrivals and departures and numerous pseudo pilots. Results from the 8 simulation runs will inform the preparation for ATD-2 Freeze Event scheduled for March 29 and procedures for the field demonstration that starts later in FY17. The outcomes of the HITL runs were documented and provided as inputs to the ATD-2 Phase 1 Freeze Event held on 3/29/2017.

The 3/15/2017 Weekly IADS/ATD-2 RTT meeting focused on coordination and planning for the Joint TBFM/ATD-2 Safety Panel scheduled for 4/9-11/2017 at Charlotte Douglas International Airport. TBFM stakeholders are being engaged and prepared to support the Safety Panel. The TFDM program reported progress on the AEFS install for Charlotte to support ATD-2 is on track. ANG-C53 has begun initial coordination to obtain a Test NCP for ATD-2.

On 3/21/2017 ANG-C53 coordinated an internal ATD-2 Stakeholder brief for TFDM and the Surface Office on MITRE's Mobile Application for CDM Data and how we may leverage that work to support ATD-2.

On 3/23/2017 NASA hosted TBFM NATCA representatives along with Paul Fontaine Director, ANG-C, Chris Del Negro acting Chief CLT ATCT/TRACON, Pete Slattery ATD-2 Article 48 Representative, and several representatives from the national TBFM Ops Team at the CLT ATD-2 Lab for a briefing on the ATD-2 capabilities and status. Additionally, participants were able to view the initial activation of the ATD-2 displays in the CLT TRACON backroom. These displays are intended to support familiarization and training for ATD-2 stakeholders at CLT.

On 3/29/2017 the ATD-2 Phase 1 Freeze Event was held at Charlotte Douglas International Airport. The ATD-2 Freeze event supported developing consensus from all ATD-2 participants on the capabilities to be demonstrated in Phase 1 of ATD-2. NASA provided Freeze materials (9-10 documents) to document the freeze of Phase 1 capabilities.

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Project Lead (ANG): Ben Marple/Susan Passmore

April 2017

For the period of 4/1-30/2017 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS Research Transition Team (RTT) continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

On 4/4/2017 ANG-C53 coordinated and meeting with TBFM technical POC's, ANG-C32 in a follow-on meeting for Integration Testing Utilizing ATD-2 and TBFM labs. The participants continue to coordinate the receipt of the software for testing, testing process and clarifying roles and responsibilities during the testing phase.

On 4/6/2017 ANG-C53 met with stakeholders from TBFM and TBFM technical support contractors to initiate the process to collect and submit the required NCP documentation.

On 4/11-12/2017 ANG-C53 attended the SCDM Spring Meeting where the ATD-2 project status was briefed, including details on expectations for Surface Metering at Charlotte. The Collaborative Decision Making Automation Team (CAT) also briefed on their tasking from CSG for TFM and TFDm.

On 4/18/2017, ANG-C53 met to discuss ATD-2 data requirements and to clarify the security classification of the required data. ATD-2 will require access to some Sensitive Unclassified Information (SUI) to support NASA research needs.

May 2017

For the period of 5/1-31/2017 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS Research Transition Team (RTT) continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

On 5/ 9-11/2017, ANG-C53 facilitated a Safety Risk Management (SRM) review of the ATD-2 Phase 1 Field Demonstration. The panel was held at the Carolinas Aviation Museum in Charlotte, NC to facilitate Subject Matter Expert support from the local facilities. The SRM panel was comprised of FAA, National Air Traffic Controllers Association (NATCA), and American Airlines representatives responsible for implementing operational changes, accepting the risks, validating identified controls, and implementing safety mitigations. During the review, the teams focused on assessing the safety impacts related to the integration of the ATD-2 system with the FAA's Time Based Flow Management (TBFM) system and risks associated with the ATD-2 system, Phase 1 Concept of Use, and field demo site operations.

The SRM panel's report is expected to conclude that the ATD-2 project did not increase any safety risks on operations and its users. The results will be included in an SRM Document, which will complete a key step before operational use of the ATD-2 system.

On 5/17/2017 the ATD-2 project team reviewed stakeholder status during the weekly Integrated Arrival/Departure/Surface (IADS)/ATD-2 RTT Teleconference. Two follow up meetings were

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Project Lead (ANG): Ben Marple/Susan Passmore

coordinated, the first to coordinate testing the ATD-2 TBFM patch and the second to begin planning for TFDM/AEFS modifications required to support ATD-2 Phase 2.

On 5/22/2017 ANG-C53 facilitated a meeting with technical representatives from NASA, FAA, NATCA and the Advanced Electronic Flight Strips (AEFS) support vendor to initiate planning for the ATD-2 Phase 2 requirements. In Phase 2, the NASA ATD-2 system will deliver data to the AEFS system for inclusion on the flight strip. AEFS will require modifications to accept and display this data. The team identified strategies and a planning horizon to address the project needs.

On 5/22/2017 ATD-2 stakeholders from FAA HQ, WJHTC, NASA and TBFM support vendors met to discuss technical details and scheduling for the testing of the TBFM patch being developed to support ATD-2 at Charlotte. The participants discussed roles and responsibilities regarding issues surfaced during the testing phase.

On 5/24/2017 the ATD-2 project team reviewed stakeholder status during the weekly IADS/ATD-2 RTT teleconference. The issue of connectivity for TBFM lab connectivity was a primary topic as the configuration of the proxy server is a critical path task. A POC was designated to support the extension of the TFMS TSD to the Charlotte lab. The Safety Risk Management Document (SRMD) is in progress and expected to be completed 6/30/2017.

On 5/31/2017, leadership from FAA, NASA and Industry visited the ATD-2 CLT Lab, FAA Tower/TRACON, and American Airlines Ramp Tower. The visit included an orientation at the ATD-2 CLT Lab and overview of the concept and technologies at the CLT Tower/TRACON and American Airlines Ramp Tower.

June 2017

For the period of 6/1-30/2017 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS Research Transition Team (RTT) continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

NASA and ANG-C52 continues close coordination with ATD-2 internal stakeholders through weekly meetings. June meetings were held on 6/7 and 6/21. The remaining dates were cancelled due to other ATD-2 activities.

On 6/14/2017, ANG-C52 coordinated an ATD-2 briefing at the National Customer Forum. Al Capps of NASA presented the briefing and addressed questions from forum members.

On 6/20/2017 members of the ATD-2 project team from ANG and NASA traveled to the Atlanta Air Route Traffic Control Center (ARTCC) to conduct a site survey. The team briefed the facility representatives on the ATD-2 project, equipment and communications requirements. The team then identified the demarcation point for data connectivity, investigated potential locations for rack equipment, identified suitable cabling routes and discussed options for displays at the TMU positions.

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On 6/22/2017 ATD-2 Stakeholders from SWIM, NASA, TBFM and ANG met to discuss data requirement for Phase 1 and Phase 2 of ATD-2. Participants reviewed available option and elected to move forward with: Use TFMS Request/Reply (work with Flight Operator Systems (FOS) to send in more data), On-ramp TFDM Flight Substitutions and Operational Metrics Service (FSOMS) in R&D with NASA as the producer and On-ramp TFDM Terminal Publication (TTP) service in R&D with NASA as the producer.

On 6/27/2017 ANG-C52 met with MITRE for an update on the Mobile Application work to expand participation in departure scheduling. MITRE has developed a version of the application to accommodate sharing EOBT's and is now collecting data.

On 6/27/2017 ANG and TBFM met to update planning for the ATD-2/TBFM operational testing schedule.

July 2017

For the period of 7/1-31/2017 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. The IADS Research Transition Team (RTT) continues weekly telcon meetings to coordinate ATD-2 activities and joint working sessions.

NASA and ANG-C52 continues close coordination with ATD-2 internal stakeholders through weekly meetings. Several recurring weekly coordination meetings were cancelled during July as key stakeholders were away on leave during the month. Meetings were held on 7/19 and 7/26.

Several key Milestones and Project Level Agreements (PLA) deliverables related to ATD-2 were completed in July. On 7/10/2017 the project achieved a key milestone when Operational Shadow Evaluations were initiated. Operational Shadowing is scheduled to continue through 9/28/2017 when the project moves into the evaluation phase. Field Demonstrations are scheduled to begin 9/29/2107.

Another critical path task was completed when the ATD-2 Test NCP was briefed to NAS Change Control Board (CCB), on 7/17/2017. The NCP will be approved when the remaining comments are resolved. However, no further review by the board is required. Approval will clear the way for ATD-2 Demonstrations to begin as scheduled.

PLA deliverables supporting ATD-2 that were completed this month include the Draft ATD-2 Phase 1 Safety Assessment (7/17/, 2017) and the Final ATD-2 Phase 1 Safety Assessment (7/19/2017), the Draft Lab Services and Testing report (7/17/2017) and the Final Lab Services and Testing report (7/24/2017). Lastly, the Updated STF Multi-Year Program Plan was completed on 7/25/2017.

August 2017

For the period of 8/1-31/2017 ANG continued progress on the planning and executing of the Integrated Arrival/Departure/Surface (IADS)/ATD-2 Departure Metering Demonstration. NASA and ANG-C52 continue close coordination with ATD-2 internal stakeholders through weekly meetings with meetings on 8/2, 8/16 and 8/30. The 8/9 meeting was cancelled due to several key stakeholders on leave and the 8/23 meeting was cancelled due to the conflict with the TBFM testing at the WJHTC.

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Project Lead (ANG): Ben Marple/Susan Passmore

On 8/7-11/2017, the NASA Airspace Technology Demonstration-2 (ATD-2) Team conducted operational training for users in the Phase 1 Field Demonstration. ANG-C53 coordinated attendance for seventeen FAA Traffic Managers and Supervisors who were trained to use the Surface Trajectory-Based Operations (STBO) Client that will be used to automate the Call For Release (CFR) process between CLT ATCT and Washington Center.

On 8/17 and 8/24 ATD-2 Stakeholders held teleconferences to discuss issues with the TBFM system failover process. Options for automated and manual failover processes were discussed. An issue with automatic failover was identified in that the proxy server would receive duplicate messages from the secondary server which would increase the communications bandwidth requirements. NASA determined the STBO system would not be inversely impacted by the duplicate messages, however the data connections in place may not be capable of handling the increased amount of traffic. Therefore, the team agreed to develop and document manual failover processes. Procedures are currently being developed.

On 8/24/2017, ANG-C53 coordinated TBFM operational testing at WJHTC. TBFM and ATD-2 NATCA representatives conducted operational testing for the TBFM version 4.6.1 Patch 2 at the WJHTC. This is the patch with the modifications required to enable the ATD-2 Demonstrations. As a result of this testing, the team identified three issues and suggested 3 improvements to the ATD-2 system. NASA is currently researching the issues and the improvements are scheduled for the next ATD-2 STBO release in late January 2018.

On 8/29/2017 ANG-C53 coordinated a meeting to continue discussing departure metering data elements to share with AEFs and ATD-2 to support Phase 2. Participants discussed what data elements are required and potential options to display the data on the electronic flight strip. This effort will identify and prioritize the data elements, determine an estimated level of effort and produce a plan to achieve the needed modifications to AEFs for ATD-2 Phase 2.

September 2017

Despite impacts of Hurricane Irma which forced some key events to be rescheduled as local ATC resources were not available, the ATD-2 project continued to progress towards the major milestone of an Operational Readiness Evaluation 1 decision point scheduled for the end of September.

The team held two regularly scheduled coordination meetings on 9/6 and 9/13. The meeting scheduled for 9/20 was cancelled due to stakeholders participating in the training at Washington Center (ZDC) and the 9/27 meeting was cancelled due to stakeholders participating in the CDM meeting at the ATC Command Center (ATCCC).

On 9/7, the NASA/FAA Data Protection Plan was signed, clearing the way for NASA to receive unfiltered data via SWIM.

The ATD-2 equipment at ZDC was connected to the data network on 9/12/2017 and ready for the evaluation.

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On 9/14/2017 ANG-C52 was informed NASA was receiving the unfiltered SWIM feed required for ATD-2 as approved in the Data Protection Plan.

NASA and ANG-C52 coordinated to provide training for the ZDC Traffic Managers that would participate in the ATD-2 evaluations. Training was conducted at ZDC on 9/19 and 9/20/2017. ZDC and CLT ATCT/TRACON have established a Letter of Agreement (LOA) Appendix to support the ATD-2 evaluation beginning 9/30/2017. The LOA establishes an agreement to support the evaluation for a period of 90 Days. Participating facilities will evaluate results and make a determination on further participation at that point.

On 9/26/2017, ANG-C52 coordinated a meeting with NASA and MITRE to harmonize activities related to expanded participation in the ATD-2 evaluations through a mobile application with direct pilot input to update earliest off block times (EOBT).

On 9/27/2017, ANG-C52 attended the Surface CDM team meeting at the ATCCC. NASA updated the S-CDM team members with the status of ATD-2 Phase 1. NASA also shared the plans for development of the Phase 2 capabilities, including Strategic/ Tactical Fusion, TFDN terminal Publication, ATD-2 and AEFIS integration and the mobile application integration. NASA also discussed their plans to date for industry technical transfer and requested feedback from S-CDM team members concerning industry technical transfer. Discussion areas included the TMC Role, the importance of good OUT times and Swap/ Substitution industry investment.

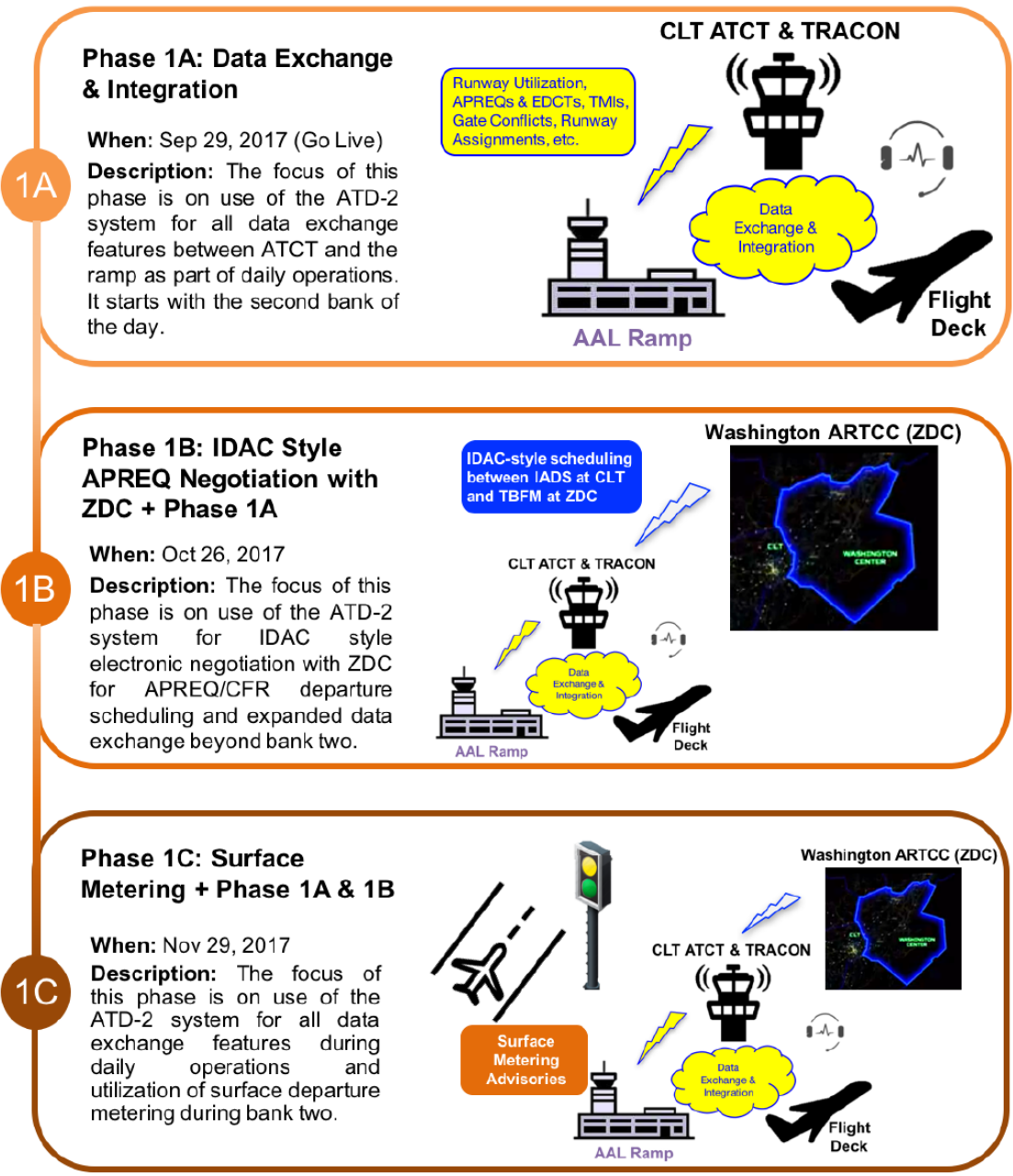
The ATD-2 project achieved a major milestone when, on 9/28/2017, the ATD-2 field demo partners met to review the state of the IADS system for an Operational Readiness Evaluation 1 decision point. NASA reviewed the ATD-2 installations and infrastructure in the field, software features of the system, and discussed the training and procedures the stakeholders had received. The field demo partners gave their concurrence for "Go Live" for 9/29/2017. To reduce risks of adverse operational impacts, stakeholders chose to introduce capabilities through a micro-phased approach targeting on bank of traffic during bank two. Remaining capabilities will be implemented when users are ready and final testing is completed. The graphic below details the Phase 1 Micro-Phase strategy ATD-2 Stakeholders have agreed to.



Phase I Description



The ATD-2 Integrated Arrival, Departure, and Surface (IADS) traffic management system extends integrated traffic sequencing all the way from the gate to the overhead stream and back again for multi-airport, metroplex environments. NASA and the FAA are developing IADS in close coordination with Industry Partners. Phase I of the ATD-2 demonstration begins on September 29, 2017 and will proceed as a series of micro-phases or stages, each of which introduces additional capabilities.



For more information, please visit www aviation-systems.nasa.gov/ang/ang/atd2/

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Project Lead (ANG): Ben Marple/Susan Passmore

FY18

October 2017

Having adopted a strategy to execute the ATD-2 Phase 1 demonstrations in 3 distinct steps (Micro-phases) and successfully initiating stage 1A in September, the project team continued to focus on a series of tasks required to be completed in order to initiate Micro-phase 1B. In addition, the team continued progress on the data and display requirements for electronic flight data, and the integration of a mobile application based interface for expected off block times (EOBT) to support later Phases of ATD-2.

In preparation for Micro-phase 1B the following meetings and actions were completed:

On 10/2/2017, an Independent Risk Assessment Team (IRAT) completed an onsite inspection at Washington Center (ZDC) to ensure NASA ATD-2 equipment isolated from FAA equipment.

On 10/5/2017 TBFM released the router configuration to support ATD-2, the following day on 10/6, TBFM released the ATD-2 software patch.

On 10/6/2017, FTI completed a degraded network operations test and delivered the report indicating sufficient network robustness.

On 10/11/2017 another IRAT encompassing all of TBFM, including the ATD-2 capabilities, was completed at the WJHTC, with no critical deficiencies for the TBFM proxy server.

On 10/19/2017 TBFM released the adaptations/ customization files to be installed to support ATD-2

On 10/19/2017 ANG coordinated a briefing to ZDC stakeholders responsible for TBFM systems support for TBFM release with ATD-2 capabilities. The brief clarified roles and responsibilities and contacts in the event of issues with the system.

On 10/23/2017 2017 ANG coordinated a briefing to ZTL stakeholders responsible for TBFM systems support for TBFM release with ATD-2 capabilities. The brief clarified roles and responsibilities and contacts in the event of issues with the system.

On 10/25/2017 The participating Stakeholders met at CLT for to review readiness for Phase 1B. The stakeholders determined they were ready to initiate Micro-phase 1B upon the completion of the cut over to the operational network scheduled to be performed after hours on 10/31/2017.

On 10/30/2017 NASA confirmed receiving the TBFM TRACON feed via the NESG. They are reviewing and comparing the SWIM feed to the legacy feed and will let SLE know when we can disconnect the legacy feed. This is the TRACON Live Feed Manager (TLFM).

On 10/31/-11/1 2017 TBFM successfully performed the cutover to the Operational Network. Micro-phase 1B is scheduled to begin 11/3-2017.

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In addition to the Micro-phase 1B activity, coordination and planning for ATD-2 Phase 2 continued, with the following meetings and actions being completed:

On 10/10/2017, The ANG-C53 project team hosted a meeting to coordinate with NASA to provide a current version of the ATD-2 software to be installed in the FAA Florida Test Bed to support the Limited Trajectory Based Operations effort. NASA and ANG will coordinate the delivery of the software to avoid potential resource constraints with the vendor delivering the software.

On 10/11/2017 the ATD-2 Project team met to continue to elaborate the data and display requirements to adapt AEFS to support Phase 2 of ATD-2. The team is continuing to research ideas to display information that are consistent with planned TFDM capabilities.

On 10/17/2017 ANG coordinated a meeting with NASA and MITRE to continue harmonizing efforts to incorporate the MITRE Mobile App to support ATD-2.

November 2017

Having adopted a strategy to execute the ATD-2 Phase 1 demonstrations in 3 distinct steps (Micro-phases) and successfully initiating stage 1A in September and 1B on 1 November, the team continued a focused effort to complete micro-phase 1C completing the Phase 1 Capabilities. In addition, the team continued progress on the data and display requirements for electronic flight data, and the integration of a mobile application based interface for expected off block times (EOBT) to support later Phases of ATD-2.

On 11/1 the ATD-2 Project team initiated micro-phase 1B of ATD-2 Phase 1. This phase initiated a capability for CLT Traffic Managers to electronically negotiate release times with Washington Center. This process replaced an existing voice process previously used. At the outset Traffic Managers were continuing to use telephonic communication to verify the system was accurately providing correct release times.

On 11/9/2017 NASA's Remote Demo Online session was dedicated to a review of the electronic release negotiation capability initiated in micro-phase 1B. The electronic release process proved reliable and users were soon satisfied a confirmation call was no longer a required part of the process and releases are now communicated entirely within the system reducing the need for a call thereby reducing workload. Users found the new capability accurate and stated the system was quickly becoming a reliable tool for Traffic Managers.

On 11/28/2017 ATD-2 Stakeholders, including all participants with an active role in Surface Metering, met at the ATD-2 Lab at Charlotte Douglas International Airport for a briefing on current ATD-2 Status and review of the new capabilities for micro-phase 1C. The goal of the meeting was to verify the active participants were ready to move forward. The team agreed the systems and participants were ready to initiate Phase 1C during Bank 2 on 11/29 as scheduled.

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On 11/29/2017 The ATD-2 Project team initiated the first evaluation of a Surface Metering capability consistent with the Surface CDM Concept of Operations. The capability was tested during Bank 2 as scheduled. This accomplishment marks the fulfilment of the FAA NIWG commitment for surface. Surface metering will continue being evaluated at Charlotte through the duration of ATD-2.

ATD-2 Ramp Manager Workstation during 1st Surface Metering Evaluation



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ATD-2 Ramp Display during 1st Surface Metering Evaluation



In addition to the Micro-phase 1B and 1C activity, coordination and planning for ATD-2 Phase 2 and beyond have continued.

On 11/2/2017 MITRE hosted a meeting to brief work under the “3T” effort and technical leads were able to exchange expert knowledge of FAA and NASA systems and continue efforts to harmonize research activity for future Phases of ATD-2.

On 11/3 ATD-2 Technical resources met with Tech Ops staff and the Data Communications vendor to detail the required data connections for ATD-2 at Atlanta Center(ZTL). Topics included the path of fiber optic connection to street to the demark. Scheduling work to meet project requirements and avoid Holiday moratoriums and logistical support requirements.

On 11/7/2017 MITRE briefed their Mobile App research including the EOBT capability to the General Aviation Manufacturers Association (GAMA).

On 11/8/2017 ANG-C52 coordinated a continuation of the AEFs/ATD-2 Phase 2 working group. The Working Group continues to explore options to efficiently and effectively transmit and display the additional data required for future ATD-2 Phases.

On 11/14/2017 ANG facilitated a brief for AJV (Rob Hunt) to discuss Time Based Metering for Terminal Departures in Phase 3 ATD-2. Stakeholders from AJV, ANG, NASA and MITRE attended.

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Project Lead (ANG): Ben Marple/Susan Passmore

December 2017/January 2018

With the successful initiation of ATD-2 Phase 1 in November of 2017, the joint project team has shifted the focus to Phase 1 data collection and Phase 2 planning. Data collection is underway. However, the team is continuing to calibrate system parameters to optimize results. Project stakeholders continue to coordinate to harmonize activities enabled by the ATD-2 capabilities. As users develop a common understanding of the system capabilities researchers anticipate further improvements in the metrics. NASA is carefully analyzing the early data to understand potential impacts as users gain experience with the new capabilities.

NASA is examining the data as the project team continues to calibrate the system and harmonize processes across the user community. As operations using the new capabilities become more routine, the data will become more reliable and less effort will be required to normalize data elements to account for changes as users optimize their use of the system.

A critical step for ATD-2 Phase 2 development is the integration of the Advanced Electronic Flight Strip (AEFS) System with the NASA ATD-2 platform. AEFS is a local system with no existing networking capability outside the facility, so a local connection would be the most efficient means for the systems to share data. However, NAS Data security policies would prohibit a local connection to ATD-2. Therefore, the project team is pursuing a dual path to achieve the required connectivity. First the team is seeking an exemption to allow the local connection for the duration of ATD-2, while at the same time formulating a plan to comply with data security policy, if an exemption is not granted. Project Cost and Schedule are at risk if AEFS and ATD-2 are required to connect via the NAS Enterprise Security Gateway (NESG).

February 2018

With the successful initiation of ATD-2 Phase 1 in November of 2017, the joint project team has shifted the focus to Phase 1 data collection and Phase 2 and Phase 3 planning. Data collection for Phase 1 is underway. The team is continuing to calibrate system parameters to optimize results. Project stakeholders continue to coordinate to harmonize activities enabled by the ATD-2 capabilities.

On 2/13, 2018 NASA hosted shadow session 15 at the Charlotte ATD-2 lab. Stakeholders participated in a review of surface metering since the start of Phase 1C, a discussion on features in release 3.1, and a look ahead to future releases and Phase 2. Stakeholders agreed to extend metering from the current single morning departure bank (Bank 2) to encompass the following bank (Bank 3). Additionally, the stakeholders agreed to a schedule to add an afternoon bank after 2-3 weeks successful operations during Banks 1 and 2.

On 2/15, 2018 Al Capps from NASA presented a briefing to the NACSC with examples of lessons learned and metrics from Phase 1 ATD-2 since implementation.

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On 2/16, 2018 Paul Rinaldi and NATCA leadership visited the CLT ATD-2 Lab and CLT ATCT/TRACON at Charlotte Douglas International Airport. Pete Slattery, NATCA Article 48 Representative for ATD-2, facilitated a NATCA Leadership visit to observe ATD-2 activities at Charlotte.

On 2/21, 2018 ANG-C532 facilitated a Joint ATD-2 Risk Board. The participants reviewed previously identified risks and agreed to close three risks, which were successfully mitigated. The previously identified risk related to the NASA ATD-2 schedule and the TFDm deployment schedule remains open. Additionally, the team identified and documented five new risks to be managed under the ATD-2 Risk Board.

On 2/22, 2018 ANG-C52 met with the ATD-2 Point of Contact designated by the TBFM Program Office to discuss ATD-2 needs related to TBFM and the associated programmatic impacts to TBFM. The group identified the need to extend the existing Test NCP for the ATD-2 connections at ZDC and the challenges to extending the ATD-2 capability to ZTL. Further, the potential for the deployment of TBFM to ZTL to affect the current ATD-2 network was discussed. The team is continuing to research the potential conflicts and to identify mitigation strategies. The team is also identifying and planning the testing that needs to be accomplished at the WJHTC lab with NASA so that Washington Center and Atlanta Center TBFM can upgrade to version 4.7.1 by the end of March.

On 2/27, 2018 ANG-C52 attended the NASA ATD-2 Phase 3 kickoff meeting held at the North Texas D10 TRACON facility on Dallas Fort Worth Airport. The purpose of the meeting is to gain stakeholder consensus on Phase 3 research activities. NASA is proposing deploying the phase 3 capabilities at DFW prior to May 2019, when the area experiences the start of the storm season. On 2/26 and prior to the kickoff meeting, ANG-C53 attended the optional event for Phase 3 stakeholders to see an early version of the NASA ATD-2 capabilities in the North Texas Research Station.

March 2018

With the successful initiation of ATD-2 Phase 1 in November of 2017, the joint project team has shifted the focus to Phase 1 data collection and Phase 2 and Phase 3 planning. Data collection for Phase 1 is underway. The team is continuing to calibrate system parameters to optimize results. Project stakeholders continue to coordinate to harmonize activities enabled by the ATD-2 capabilities.

On 3/7/2018 the IADS RTT stakeholders met and reviewed project area status. Topics included WJHTC AEFS and ATD-2 systems set up for testing, Phase 2 TFMS connectivity issues, SWIM TTP update and the NASA Remote Demo schedule for March.

On 3/14/2018 the IADS RTT stakeholders met and reviewed project area status. Topics included Phase 2 TFMS connectivity issues, NCP requirements, AEFS/TFDM data display discussion and Phase 2 safety panel planning discussion.

On 3/20/2018, ANG and MITRE met via conference call to brief NetJet's on Mobile Application work for increasing General Aviation participation in ATD-2. NetJet's operational procedures may create challenges for sharing updated departure data however, they are interested in participating at some

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level. They mentioned the possibility of having one fleet participate to limit the scope of the demonstration.

On 3/27/2018 MITRE and ANG hosted a conference call with Mobile Application Beta Testers based at Charlotte to review the text data sharing capability, This capability is needed for the Beta Testers to allow greater participation. Some Charlotte based flight operators are willing to participate but do not have the required mobile platform or are barred from installing 3rd Party applications on their mobile device. The text feature allows pilots or dispatchers to text ready to taxi times without installing and application.

On 3/28/2018 the IADS RTT stakeholders met and reviewed project area status. Topics included completion of the AEFS simulator connection to ATD-2 to allow capability testing, status of NASA proposals to address Multi-IDST issues, SWIM on-ramping for ATD-2 and Safety Board planning for AEFS, TBFM and ATD-2.

On 3/28/2018, Atlanta Air Route Traffic Control Center (ZTL) successfully completed the cutover to TBFM 4.7.1, along with the new WSDL running on the XML gateway/forum and ATD-2/STBO client software upgrades.

April 2018

With the successful initiation of ATD-2 Phase 1 in November of 2017, the joint project team has shifted the focus to Phase 1 data collection and Phase 2 and Phase 3 planning. Data collection for Phase 1 is underway. The team is continuing to calibrate system parameters to optimize results. Project stakeholders continue to coordinate to harmonize activities enabled by the ATD-2 capabilities.

On 4/3-4/2018, the joint Surface Collaborative Decision Making Team (SCT)/Collaborative Decision Making Automation Team (CAT) met and determined that flight operators, including NBAA, did not want airport operators submitting operational data such as an EOBT on their behalf. The final decision was that airports should be CDM participants, but the information they have, might be better shared by dialog rather than automation. Collaborative Site Implementation Team (CSIT) will identify how airports can participate.

On 4/5/2018, ATD-2 stakeholders from ANG attended the Phase 2 ATD-2 Freeze event. The team was briefed on the capabilities to be evaluated in the next phase of the project. The presentation began with an overview of the work leading to the successful launch of Phase 1 and the metrics collected during the first 6 months operations including 4 months of surface metering. The major topics included the expanded capabilities to be rolled out in Phase 2 including electronic negotiation of overhead stream slots with both Washington and Atlanta Centers, expanding metering timeframes into the strategic realm and integration with AEFS. An overview of the MITRE Mobile Application work to support GA participation in ATD-2 was briefed.

On 4/11/2018, The ATD-2/IADS RTT met to review status updates from project stakeholders. The status of the 5.4 and 5.5 AEFS build and the status of the AEFS NCP process was briefed to the team. Planning for separate Safety Risk Management boards for AEFS, TBFM and ATD-2 is in progress with the ATD-2

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board scheduled for 6/6-7/2018. NASA is coordinating with MITRE to conduct outreach to pilots using the mobile application.

On 4/18/2018, ANG briefed Jill Sparrow (AJR) and the Command center TFMS experts on the mobile app and EOBT sharing plans for NBAA users and GA/military. AJR shared TFMS capabilities and designs to keep in mind in the research.

On 4/23 and 4/24 ANG and TBFM PMO POC discussed possible strategies for ATD-2 to TBFM integration to add Atlanta Center. TFDN also participated, so that everyone understood the planned interconnection when TFDN is deployed. This discussion is continuing.

On 4/25/2018 ANG coordinated with ATD-2 Stakeholders from ANG-C7 and ATO PMO to participate in the NASA remote briefing on Traffic Management Initiatives. This format allowed ANG to focus on key issues with the ATD-2 Project and better inform the participating stakeholder on the scope and value of the ATD-2 research effort.

On 4/25/2018, The ATD-2/IADS RTT met to review status updates from project stakeholders. Plans for AEFS Testing at WJHTC and at Charlotte Douglas International Airport were discussed and NASA will coordinate to support testing as needed. The AEFS NCP casefile has been opened in the WebCM tool. The SWIM team reported NASA is consuming the prototype TPP data. SWIM is awaiting details on additional Airline consumers. MITRE is now planning to begin receiving TFDN Terminal Publication (TTP) Service via SWIM to replace the non-SWIM data currently received through NASA.

May 2018

With the successful initiation of ATD-2 Phase 1 in November of 2017, the joint project team has shifted the focus to Phase 1 data collection and Phase 2 and Phase 3 planning. Data collection for Phase 1 is underway. The team is continuing to calibrate system parameters to optimize results. Project stakeholders continue to coordinate to harmonize activities enabled by the ATD-2 capabilities.

On 5/8/2018 the ATD-2 PM's met with stakeholders from TBFM and TFDN PMO to review current programmatic constraints on TBFM and to discuss options to best meet NASA's support requirements for ATD-2 Phase 2. The group discussed alternative dates and options for deployment of TBFM at Atlanta Center and Charlotte and how these options would align with the ATD-2 schedule.

On 5/9/2018 the IADS RTT met and reviewed current status from stakeholders. AEFS briefed the 3 proposed options for the connection to ATD-2 at Charlotte scheduled to be briefed to the ARB on 5/16. SWIM requested confirmation that ANG continued to be the sponsor for SWIM TTP data consumers for ATD-2. Meeting logistics and expected participants for the Phase 2 Safety Panel discussed by the team. MITRE reviewed their meeting with Mobile App Beta testers to brief on the text capability to expand the use to platforms. The prototype App was limited to iPhones only while text data exchange is not dependent on a specific platform. Beta testers indicated a high level of interest in the text capability to deliver ready to taxi times.

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On 5/16/2018 TFD/ AEFS briefed 3 network configurations to allow AEFS and ATD-2 to exchange Data to support Phase 2 ATD-2 to the Architecture Review Board. The project team preferred solution would be a direct connection of AEFS and ATD-2 at the Charlotte ATCT. The project team believes a direct serial connection within a FAA facility constitutes a minimal risk and would exist for the limited duration of the ATD-2 field activity. However, current security protocols would require the connection be routed through the NAS Enterprise Security Gateway (NESG). AEFS presented the approved configuration through the NESG and two alternatives for a direct connection. Several board members strongly opposed any non-NESG solution without further vetting by security.

On 5/23/2018 the IADS RTT met and reviewed current status from stakeholders. TFD/ AEFS is scheduled to perform integration testing of the AEFS/ATD-2 connection in the test environment at WJHTC on June 12th. FAA subject matter experts have been coordinated and NASA confirmed they will have appropriate support available. TBFM briefed on the progress in evaluating options to meet the required deployment timeline to support ATD-2. SWIM reported the potential for short interruptions in SWIM Terminal Data Distribution System (STDDS) data due to equipment moves related to new tower construction at CLT.

On 5/24/2018 ANG-C52 met with the TBFM PMO to continue the discussion on options to support NASA's requested for a modified IDAC deployment wherein the FAA deploys only the ZTL ARTCC portion of IDAC in September 2018 to allow commencement of ATD-2 Phase 2 in ZTL. The deployment is required to enable Integrated Departure Arrival Capability (IDAC)-style electronic negotiation between ATD-2 at CLT and the TBFM system at ZTL. The purpose of the meeting was to identify technical operational, resource requirements and benefits associated with the proposed activity. AJM-22 will present the groups findings to management NLT June 4, 2018.

On 5/29/2018 ANG-C52 coordinated a meeting with AEFS and NAS Authorizing Official Designated Representative (AODR) where AEFS presented an additional alternative to the 3 options briefed at the ARB. The fourth option was to route AEFS data through the Airport Resource Management Tool (ARMT) system to ATD-2. ARMT is already routed through the NESG and therefore the network infrastructure requirements are greatly reduced in comparison to establishing a new connection. ARMT and AEFS are both under the same system owner and both will be subsumed by TFD when deployed, and therefore will be decommissioned at the same time. The participants agreed this option would require less resources than a new NESG connection and would meet FAA security protocols. The team is now working to scope the level of effort to complete the connection and determine what additional hardware would be required to support this option.

June 2018

With the successful initiation of ATD-2 Phase 1 in November of 2017, the joint project team has shifted the focus to Phase 1 data collection and Phase 2 and Phase 3 planning. Data collection for Phase 1 is underway. The team is continuing to calibrate system parameters to optimize results. Project stakeholders continue to coordinate to harmonize activities enabled by the ATD-2 capabilities.

ANG-C52 hosted the ATD-2 Phase 2 Safety Panel at Charlotte on 6/6 and 6/7/2018. The panel assessed the safety of five changes to the baseline (Phase 1) ATD-2 system. The Phase 1 baseline system has

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been in operation at CLT and ZDC since the fall of 2017. The Phase 2 changes are to be implemented at CLT, ZDC, and ZTL beginning in the fall of 2018. These changes to ATD-2 were considered primarily from an operational perspective. The panel worked through the Safety Risk Management hazard identification process to identify potential safety hazards associated with each of the proposed changes, and identified a risk that users were unaware of – the loss of ATD-2 data or ARMT data. To mitigate the risk, the panel suggested the addition of status indicators to AEFS to alert users when ATD-2 or ARMT data was not available. The indicators would alert users to revert to non-ATD-2 procedures. AEFS agreed to incorporate these indicators into the ATD-2 build. The five operational/systemic changes to be introduced during Phase 2 include the following:

- Display of ATD-2 relevant information on AEFS to be implemented in the CLT tower.
- ARTCC participation in ATD-2 assisted overhead insertion to be expanded from ZDC in Phase 1 to ZDC plus ZTL in Phase 2.
- In addition to the tactical (10 minute look-ahead) surface metering capability employed in Phase 1 of ATD-2, Phase 2 will include a strategic (20-30 minute look-ahead) surface metering capability.
- In addition to receiving information (such as EOBT estimates) via SWIM from participating airline stakeholders as in Phase 1, the Phase 2 ATD-2 system will also publish data via SWIM to stakeholders using a prototype version of the TFDM Terminal Publication (TTP) Service protocol.
- Pilots not under the control of a participating airline operations center will be able to receive ATD-2 relevant flight information directly using an in-cockpit mobile application (Mobile App).

On 6/12/2018, NATCA representative for ATD-2, Pete Slattery, provided a demonstration for all the AEFS developers of the ATD-2 capabilities with AEFS at the WJ Hughes Technical Center.

On 6/12/2018, ATD-2 began publishing the prototype TFDM Terminal Publication (TTP) data on the SWIM R&D network. TFDM worked closely with ATD-2 developers to explore this early feature to help the aviation community prepare for TFDM. The MITRE mobile app is ingesting this TTP data and preparing to send two-way data to general aviation pilots at CLT.

On 6/13/2018, the IADS RTT team met to review stakeholder status. TFDM/AEFS reported that integration testing of ATD-2 and AEFS was in progress on the test systems at WJHTC. NASA resources were available to support the testing and the testers verified data was passing between the systems. AEFS worked to incorporate the status indicators as recommended by the safety panel. Additionally, AEFS was in shakedown testing for the AEFS 5.5 build for ATD-2. In addition, AEFS has proposed a network configuration leveraging ARMT's existing NESG connection to pass data to ATD-2. Work is progressing to achieve ARB approval of this FAA security-compliant option. TBFM is developing a proposed schedule to support ATD-2.

On 6/15/2018, ANG-C52 met with TBFM stakeholders to discuss the ATD-2 Test NCP status. The NCP for Phase 1 expires 9/2018 and will need to be expanded. The team discussed the possibility of including the Phase 2 work in a renewal of the existing NCP or creating a separate NCP to cover Phase 2. After discussing the existing and future requirements for ATD-2, the team agreed to a plan to renew the

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existing NCP as is, and a new NCP to cover the Phase 2 activity. The team is moving forward to request the renewal and submit a casefile for Phase 2.

On 6/19/2018, the AEFS Program office held the safety panel for AEFS version 5.5, which is the version that has the interconnection between ARMT and NASA ATD-2. A CLT GC/LC participated in the panel. No additional security hazards were identified.

The week of 6/25/2018 ANG-C52 stakeholders observed the NASA Assessment of Ramp Times (ART) HITL simulation. The objective of the ART/ HITL simulation was to evaluate different aspects of the integration of the tactical and strategic scheduling components, specifically exploring the ideal TMAT compliance window, and whether instructing ramp personnel to focus on compliance of Target Off Block Times (TOBT) with and without Target Movement Area Times (TMAT) would result in more optimal surface operations.

July 2018

With the successful initiation of ATD-2 Phase 1 in November of 2017, the joint project team has shifted the focus to Phase 1 data collection and Phase 2 and Phase 3 planning. Data collection for Phase 1 is underway. The team is continuing to calibrate system parameters to optimize results. Project stakeholders continue to coordinate to harmonize activities enabled by the ATD-2 capabilities.

On 7/11/2018 ANG-C52 hosted the weekly IADS RTT status update meeting. TBFM reported continued progress to deliver IDAC-like scheduling to support ATD-2 schedule. NASA discussed a "Pre-Scheduling" capability currently in use with Delta Airline and the requirement to accommodate this current capability during the ATD-2 Phase 2 demonstration. The team is discussing possible alternatives prior to discussing with Delta.

On 7/12/2018 The TBFM PMO coordinated a working session to continue update status and continue progress towards delivering IDAC-like scheduling for Atlanta Center to meet the ATD-2 schedule. Stakeholder provided updates on networking and integration at Atlanta and coordinated activities for the next steps. The team is meeting weekly.

On 7/13/2018 ANG-C52 coordinated a meeting with MITRE and NASA to continue to harmonize work towards incorporating Mobile Application technology to support ATD-2. The participants identified a need to conduct end-to-end 2-way communication testing to verify data flows as expected prior to including Mobile App data in the live operational system. MITRE and NASA are working their plan for validation testing by the end of July. The results of the testing will determine when mobile app data is ready to be included in the operational system.

On 7/16/2018, the TBFM PMO appeared before the NAS Change Control Board (CCB) to present the case for extending the current Phase 1 NAS Change Proposal (NCP). The board concurred that the visibility of ATD-2 warranted an extension for a second year and requested the changes for Phase 2 be rolled into the current NCP rather than a separate casefile.

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On 7/17/2018, ANG-C52 met to discuss requirements for the Independent Risk Assessment Team required to confirm the ATD-2 network is properly isolated from the FAA network. The IRAT cannot be completed until all network infrastructure is in place. ANG-C will continue to update the IRAT and visits will be scheduled after the Phase 2 network changes are completed.

On 7/24/2018 The TBFM PMO team hosted a call to discuss status updates on planning for TBFM IDAC-like scheduling at Atlanta Center. Adaptation development at testing is scheduled through the first weeks of August and training is scheduled for September.

On 7/25/2018, ANG-C52 hosted the weekly IADS RTT status update meeting. TFDM reported the NCP extension was on track for an out of cycle approval prior to the next Change Control Board meeting. TBFM reported continued progress towards meeting the schedule to deliver TBFM to support ATD-2 at Atlanta Center. The Team Co-leads are researching dates for a NextGen Executive visit to Charlotte.

On 7/31/2018 MITRE hosted an update Telecon to coordinate with NASA on Mobile Application Data exchange. The group discussed two-way data exchange, and the status of testing ongoing and planned. MITRE presented an overview of a document to be delivered to FAA entitled, "Evaluation Report on EFB Data Exchange in CLT". Finally, the group discussed ATD-2 Phase 3 planning for Dallas.

August 2018

With the successful initiation of ATD-2 Phase 1 in November of 2017, the joint project team has shifted the focus to Phase 1 data collection and Phase 2 and Phase 3 planning. Data collection for Phase 1 is underway. The team is continuing to calibrate system parameters to optimize results. Project stakeholders continue to coordinate to harmonize activities enabled by the ATD-2 capabilities.

On 8/1/2018 ANG-C52 hosted the weekly IADS RTT status update meeting. AEFS suitability test scheduled week of 8/6/2018, coordination for ATC participants to support the test underway. Draft ISA for AEFS in progress, Annex 4 to Security agreement sent to contracts. Phase 2 NCP's for TBFM submitted in WebCM, Tech Ops ATD-2 training requirements are being identified. SRMD in Final Review prior to signature process. NASA working to determine suitable KVM gear to interface with existing equipment at ZTL and work with ATD-2 systems.

On 8/6/2018 ANG-C52 met with MITRE to discuss NASA's interest in MITREs NAS Operational Dashboard (NOD) for ATD-2 and coordinate activities for the Mobile Application work to support ATD-2 Phase 2 at Charlotte, Phase 3 at Dallas Fort Worth and the Las Vegas GA Demand capability.

On 8/7/2018 ANG-C52 participated in the bi weekly TBFM Coordination meeting. Updates from Leidos on adaptation to support ATD-2 are on track. Differences in existing capabilities at Washington Center and Atlanta Center require modifications of Training for Atlanta TMU's.

On 8/8/2018 ANG-C52 hosted the weekly IADS RTT status update meeting. AEFS suitability test proceeding, coordination for ATC participants to support the test underway no issues to date but some future enhancements suggested. TFDM is installing hardware at Phoenix and planning a "Pre Site

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Survey” trip to CLT. TBFM targeting IRAT team on 8/27/2018. Final SRMD expected week of 8/13/2018. NASA is continuing to test equipment to support ZTL ATD-2 requirements. CLT ATCT migration coordination is beginning, stakeholder requirements need to be documented.

On 8/9/2018 ANG-C52 participated in the bi weekly TBFM Coordination meeting. TBFM PMO reviewing training provided for Charlotte as baseline for Atlanta ATD-2 TMU Training. NCP’s for Phase 1 extension and Phase 2 initiation are in progress. Speakers for ZTL scheduled for install on 8/17/2018, NASA will be onsite for the speaker install and installing some cabling. Tentative schedule for the IRAT is 8/27-8/28. Testing at WJHTC determined need to modify the adaptation to include an additional departure route to the south east. Liedos indicates the mod can be done without negative schedule impacts.

On 8/15/2018 ANG-C52 hosted the weekly IADS RTT status update meeting. TFDPM PMO presented a brief on the TFDPM Terminal Publication (TTP) at the SWIM Industry FAA Team (SWIFT) meeting. AEFS completed network degradation testing successfully. IRAT team confirmed ATD-2 system must be fully built out prior to testing. IRAT targeted for 8/27 must be rescheduled to occur after all hardware is installed and connected.

On 8/16/2018 ANG-C52 participated in the bi weekly TBFM Coordination meeting. Speaker install at ZTL TMU pushed from 8/17 to 8/21. ZTL TMU’s will require standard training for IDAC as it is a new capability. Specialized ATD-2 Training will be needed in addition to the standard FAA training. TBFM PMO is scheduling a separate meeting to document the standard training and ATD-2 training for ZTL TMU’s. Testing is in progress for the additional SE Gateway adaptation that was found in WJHTC testing. SLE is now testing the adaptation.

On 8/20/2018 ANG-C52 participated in the TBFM Bi weekly Coordination meeting. IDAC Introductory course available via the FAA Electronic Learning Management System (eLMS). In person classroom training conducted after the eLMS course is completed. TBFM Ops team responsible for in person training. Facility is developing a detailed class plan/timeline to train all TMU’s. Class size will be 2-4 persons per class.

On 8/21/2018 ANG-C52 participated in the follow up TBFM Coordination meeting to discuss requirement for IDST on the ZTL Support String to facilitate training for the Traffic Managers. Without the IDST on the support string participants will not be able to see both the ATCT and Center capabilities during training. Team agreed to update the adaptation for the Support String to include IDST. NASA briefed on current “Pre-scheduling” process in use at ZTL for several Airports including Charlotte and NASA’s proposal to move the process towards the capability to be deployed in TFDPM.

On 8/22/2018 ANG-C52 hosted the weekly IADS RTT status update meeting. AEFS NCP approved. Security determined an ISA for AEFS ATD-2 connection is not required due to connecting through ARMT. Modification to the ARMT IP supplemental form to reflect the AEFS connection is all that is required. Dyal and NASA are working to provide the information to complete the ARMT IP form. Approval of TBFM NCP’s for ATD-2 expected out of cycle prior to the next NAS CCB.

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On 8/29/2018 ANG-C52 met with MITRE to progress on MITREs the Mobile Application work to support ATD-2 Phase 2 at Charlotte, Phase 3 at Dallas Fort Worth and the Las Vegas GA Demand capability.

On 8/29/2018 ANG-C52 hosted the weekly IADS RTT status update meeting. AEFS on track for on site suitability and risk testing. Required NASA support has been coordinated and will participate. TBFM briefed a hardware failure at ZTL and determined the issue was unrelated to ATD-2. NASA did not experience any adverse conditions as a result of the hardware failure. Training plan and documentation is complete for FAA Training for ZTL TMU's. TBFM is on track for 10/1/2108 Phase 2 initiation. IRAT inspection has be rescheduled for 9/20/2018. Final Safety Risk document delivered for review. Availability of the TTP feed for stakeholders at CLT prior to TFDM implementation was discussed. Availability of the feed prior to implementation will allow stakeholders to prepare and integrate the data into stakeholder operations.

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Key Stakeholders

Leadership Team

Name	Organization	Title
Pam Whitley	ANG-1	Assistant Administrator for NextGen ANG-1
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
Jaiwon Shin	NASA	Associate Administrator for Aeronautics Research Mission Directorate
John Cavolowsky	NASA	Director Airspace Systems Program Office
Akbar Sultan	NASA	Deputy Director Airspace Systems Program Office

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RTT Working Group

Name	Organization	Title	Tier
Jane Thippavong	NASA	IADS RTT Co-lead	Tier 0
Shawn Engelland	NASA	Manager, ATD Project (A)	Tier 0
Kevin Witzberger	NASA	Manager, ATD Deputy Project (A)	Tier 0
Al Capps	NASA	Manager, ATD-2 Sub Project (A)	Tier 0
Yoon Jung	NASA	ATD-2 Chief Scientist	Tier 0
Andras Kovacs	ANG-C52	Manager(Acting) Communications Branch/IADS RTT Co-Lead	Tier 0
Ben Marple	ANG-C52	STBO Project Co-Lead	Tier 0
Susan Passmore	ANG-C52	STBO Project Co-Lead	Tier 0
Pete Slattery	ATO	NATCA Article 48 Rep	Tier 0
Mark Novak	PMO	Decision Support Programs Manager (A)	Tier 1
Mike Huffman	PMO	TFDM Program Manager	Tier 1
Bob Tyo	PMO	TBFM Program Manager	Tier 1
Aaron Wilkins	PMO	TBFM POC	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	Tier 1
Jeffery T. Cox	AJV-85	Terminal Standards and Procedures	Tier 1
Eric Saldana	AJI-1	Safety and Technical Training	Tier 1
Mark Minik	AJT	Traffic Services	Tier 1
Dave Spencer	AJW	Technical Operations	Tier 1
Kent Duffy	ARP	Airports	Tier 1

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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	Architecture 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

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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