



Federal Aviation
Administration

Airspace Technology Demonstration 2 (ATD-2)

ANG-C52

FAA/NASA Coordinated Activities

Compilation

Sep 2019 - Jun 2020

NextGEN



ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

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

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

FAA Status

September 2019

The FAA ATD-2 management has begun the process of reconvening the full NASA/FAA Joint Risk Management Board (JRMB). An initial FAA-only internal meeting was held on September 30, 2019 to discuss risks and issues regarding the ATD-2 project. No new risks were identified and many of the previous risks were recommend for closing, edited, or left for further discussion. The next full NASA/FAA JRMB is tentatively scheduled for late October or early November. The purpose of the JRMB is to identify, track and mitigate issues determined and agreed to be joint risks for both NASA and FAA. The Risk Board meets as needed to review proposed risks for addition to the Joint Risk Register and to update currently identified risks.

NASA delivered the Phase 2 Technology Transfer Package on September 30, 2019. The documents and accompanying artifacts delivered satisfy the second of three research transition products (RTPs) defined in the Integrated Arrival/Departure/Surface (IADS) Research Transition Team (RTT) plan. The Field evaluation of Phase 2 IADS capabilities commenced in September 2018 and continued through the end of September 2019. The documentation delivered is primarily focused on the Terminal Flight Data Manager (TFDM) pre-cursor body of work and includes a substantial update (now more than 4,000 pages of content and dozens of hours of videos). The technology transfer is available to the public via the link:

<https://aviationsystemsdivision.arc.nasa.gov/publications/atd2/tech-transfers/>

October 2019

The Surface Tactical Flow (STF) General Aviation (GA) Strategic Planning Departure Demand and Data Sharing Mobile Application (Pacer)¹ was officially launched at the National Business Aviation Association (NBAA) Conference in Las Vegas, NV, on October 20-25, 2019. ANG C-52 presented FAA research on using mobile technologies to interface and exchange data with General Aviation pilots at the NBAA Conference. The presentation covered three primary mobile research areas under the STF Program:

- Mobile-Based Two-Way Data Exchange with GA flight operators for Collecting and Disseminating Departure Information in ATD-2 Phase 2
- Methods for broad adoption of Departure Readiness Data Exchange Capabilities by GA in ATD-2 Phase 3

¹ Hereafter referred to as Pacer App, or App

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

- Integrated Departure Scheduling – GA Strategic Planning Departure Demand and Data Sharing at LAS

The team also demonstrated the Pacer application to GA pilots at the two Fixed Base Operators (FBO) in LAS and at Henderson Executive Airport (HND). Pilots and conference attendees had the opportunity to see the Pacer App on display at kiosks in the FBO and observe STF team members demonstrating the use of the App on tablet displays. Staff assisted pilots interested in installing the App on their personal device for future use. NBAA organizers, airport authorities and local air traffic managers were generally pleased with the PACER App's launch. Over 100 new users have registered to use the App since the launch.

The FAA ATD-2 management team will host the next full NASA/FAA Joint Risk Management Board (JRMB) meeting on November 12, 2019 at JMA Headquarters in Washington, DC. The purpose of the JRMB is to identify, track and mitigate issues determined and agreed to be joint risks for both NASA and FAA. The Risk Board meets as needed to review proposed risks for addition to the Joint Risk Register and to update currently identified risks.

The Surface Collaborative Decision Making (CDM) Team (SCT) met on October 23, 2019 in Las Vegas, NV to discuss CDM Departure Metering and National Airspace System (NAS) Scheduling as well as TFDM industry engagement and collaborative site implementation team support. The Surface CDM Team was formed to leverage the findings of the previous Surface Management Working Group (SMWG). The success criteria for the SCT is to develop a written description of base requirements and processes that would support a prototype Surface CDM System (SCS).

November 2019

On November 12, 2019, the FAA ATD-2 management team hosted the NASA/FAA Joint Risk Management Board (JRMB) meeting in Washington, DC. The purpose of the JRMB is to identify, track and mitigate issues determined and agreed to be joint risks for both NASA and FAA in regards to the ATD-2 project. Key stakeholders and contributors from NASA, the Time Based Flow Management (TBFM) program, and the Terminal Flight Data Manager (TFDM) program also attended. Several prior risks were closed, one remained open, and one new risk was added to the risk register. The Risk Board meets as needed to review proposed risks for addition to the Joint Risk Register and to update currently identified risks.

On November 20, 2019, stakeholders from ANG C-52 and MITRE toured the Collins Aerospace ARINC Direct/Network Operations Center in Annapolis, MD and were briefed on the capabilities of the Network Operations Center and the services provided to ARINC Direct subscribers. MITRE and ANG briefed stakeholders from Collins on the GA data sharing work to support strategic

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

planning currently underway at McCarran International Airport in Las Vegas and Love Field in Dallas, TX. The goal of the meeting was to discuss opportunities to collaborate with additional flight plan service providers to provide flight intent data for a large number of flight operators.

December 2019

On December 4, 2019, MITRE briefed NextGen stakeholders on the General Aviation (GA) data sharing work to support Strategic Planning currently underway at Charlotte Douglas International Airport, McCarran International Airport in Las Vegas and at Love Field in Dallas Texas. The goal of the meeting was to update participants on the work completed to date and to outline the planned work for FY2020 and beyond.

On December 10, 2019, MITRE and ANG-C3 briefed management from Signature Flight Support on the GA data sharing work to support Strategic Planning currently underway at McCarran International Airport in Las Vegas and Love Field in Dallas Texas. The goal of the meeting was to investigate methods of collecting intent data via current company automation rather than by individual pilot inputs.

January 2020

The Nonreimbursable Interagency Umbrella Agreement (NRUA) between the FAA and NASA concerning data sharing for NextGen research and development, which has been effective since 01/30/15, has been renewed and will now expire on 09/30/21. The purpose of this agreement between the FAA and NASA is to establish a framework for mutual data exchange to support continued collaboration on NextGen research and development (R&D). This is a broad, nonreimbursable, umbrella Agreement as the interagency data exchange covered is crosscutting and supports the full spectrum of FAA/NASA NextGen collaboration. A key objective of the agreement is to avoid unduly limiting interagency data exchange by the terms of narrowly focused agreements developed for specific R&D activities.

As of 01/31/20, NASA's ATD-2 team reported the benefits of the ATD-2's Integrated Departure Arrival Capability (IDAC) field demonstration at Charlotte Douglas International Airport alone (by holding departures at gates through surface metering) is estimated to have achieved:

- 652,613 gallons of fuel savings,
- A reduction of 13,487,415 pounds of CO2 emission,*
- A reduction of 3,317 hours of engine run time,
- Delay reduction of 557 hours,
- Passengers saved an estimated \$2,673,697 in value of time, and Operators estimated saving \$757,627 in flight crew costs.

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

*NOTE: These CO2 reductions are equivalent to planting 100,292 urban trees, according to the formula developed by the US Environmental Protection Agency (EPA).

February 2020

From 02/19/20-02/20/20, the Surface Collaborative Decision Making (CDM) Team (SCT) met in Fort Worth, TX at an American Airlines facility and at the NASA North Texas Research Station (NTX) lab to discuss CDM Departure Metering, National Airspace System (NAS) Scheduling, Collaborative Site Implementation Team sites for Terminal Flight Data Manager (TFDM), Flow Evaluation Team (FET) support, and the ATD-2 project. The next SCT meeting will be held in Denver, CO. More detail on day 2 of the meeting is discussed in the NASA status section of this report.

The ANG-C52 management team hosted the “ATD-2 to TFDM Transition / Gap Meeting” on 02/19/20. The purpose of the meeting was to resume the ATD-2 to TFDM transition/gap conversation, clarify any questions or concerns stakeholders had, and identify gaps in the transition/gap plans. Potential options and recommendations to maintain the Surface Management Capabilities of ATD-2 in the interim period between the end of the demonstrations in September 2020, and the deployment of TFDM at Charlotte Douglas International Airport (CLT) were discussed. Being that the new air traffic control tower and radar approach control at CLT are scheduled to be commissioned in June 2020, the old to new tower transition plan at CLT was also discussed.

On 02/11/20-02/13/20 members of the ANG-C52 STF Project team traveled to Augusta, GA to meet with Fixed Based Operators (FBO) at Augusta Regional, Daniel Field, and Aiken Airports to discuss the Pacer Demo that is planned to be conducted during the Masters Golf Tournament. The team also met with the Augusta Air Traffic Control Tower staff to discuss how the demo will be conducted and other logistical concerns. The FBO’s at each airport were very receptive to the demo briefing and look forward to participating during the event. A major outcome of the site visit was permission to import data from the Augusta FBO reservation system, FlightBridge, into Pacer. This should result in a much higher participation rate during the demonstration than relying on each individual pilot.

March 2020

NASA hosted the ATD-2 Phase 3 Stormy 2020 kickoff meeting via WebEx on March 19, 2020. The kickoff meeting formally presented to all team members and stakeholders the Stormy 20 vision goals and key dates. The objectives of Stormy 2020 are to:

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

- Create ATD-2 capabilities in the operational environment that are conducive to Trajectory Option Sets (TOS) submissions that generate benefit to all demonstration partners
- Collect data in an on-going manner to measure potential benefits
- Share lessons learned with all partners

Stormy 2020 will officially begin on April 6, 2020, after agreement from all stakeholders. Phase 3 capabilities provide maximum benefits during spring/summer stormy seasons due to the occurrence of convective weather activity in the North Texas Region. The spring/summer stormy 2020 season will be the last season before the end of ATD-2 in September 2020.

April 2020

The ANG-C52 management team hosted a virtual “Internal ATD-2 to TFDM Transition/Gap Telecon Meeting” on April 23, 2020. Only FAA stakeholders were invited. The invitees comprised of representatives from Terminal Flight Data Manager (TFDM), Time Based Flow Management (TBFM), NextGen (ANG), the National Air Traffic Controllers Association (NATCA), Professional Aviation Safety Specialists (PASS), and William J. Hughes Technical Center (WJHTC). The purpose of the meeting was to assemble internally and discuss issues, action items and commitments to the ATD-2 Integrated Arrival/Departure/Surface (IADS) to TFDM Transition effort before reconvening with NASA at a later date. The meeting concluded in a common understanding of the general direction and next steps the FAA will be taking in sustaining IADS and supporting the transition.

May 2020

ANG-C52 coordinated the ATD-2 to Terminal Flight Data Manager (TFDM) Transition/Gap vehicle document discussion on May 7, 2020 via teleconference. Attendees included NextGen, NASA, TFDM, and Advanced Electronic Flight Strips (AEFS). The purpose of the meeting was for the FAA and NASA to convene, review, and discuss the initial draft of Annex 06 of the Non-reimbursable Interagency Umbrella Agreement between NASA and the FAA. As established between NASA and the FAA, the interagency agreement Annex 06 will document roles and responsibilities to continue the operational use of NASA’s ATD-2 research system at Charlotte Douglas International Airport (CLT) until the FAA TFDM Build 2 achieves an Operational Readiness Decision.

The group in attendance was able to discuss and collaborate in creating an annex that contained major transition milestones and the appropriate level of detail needed to satisfy interagency requirements. Concerns and risks associated with the ATD-2 research system handover to the FAA were also addressed.

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

On May 13, 2020, ANG-C52 coordinated an internal FAA ATD-2 stakeholder meeting to continue the discussion of the ATD-2 Arrival/Departure/Surface (IADS) system handover from NASA to FAA at CLT by the end of the ATD-2 project (September 30, 2020). Representatives from NextGen, TFDM, Time Based Flow Management (TBFM), Initial Trajectory Based Operations (iTBO), Surface Trajectory Based Operations (STBO) lab and AEFS lab at the William J. Hughes Technical Center (WJHTC) attended. The STBO and AEFS labs provided an overview of how they currently support the ATD-2 IADS system and how they plan to support it once transferred from NASA to the FAA. TBFM and AEFS's expiring annual test NAS Change Proposals (NCP) were also discussed and it was determined that TFDM in collaboration with TBFM will lead the effort needed on the TBFM test NCP extension while the AEFS team will manage their own test NCP renewal. The stakeholders in attendance then discussed NASA's equipment use at FAA facilities after NASA hands over the equipment to the FAA. Preliminary internal discussion was that all IADS equipment would remain in place except for the supplemental displays deployed at ZDC and ZTL.

The Surface CDM Team (SCT) held its monthly meeting on May 21, 2020 via teleconference. The meeting primarily discussed TFDM and CDM Surface Implementation Team (CSIT) updates. TFDM provided an update of program status for Phoenix Sky Harbor International Airport (PHX) and CLT and proposed a TFDM Terminal Publication (TTP)/ TFDM Flight Operator System (FOS) Collaboration Service (TFCP) testbed with the industry prior to TFDM Initial Operational Capability (IOC) at CLT. At CLT, TFDM will be in Shadow Mode while ATD-2 remains the operational system prior to TFDM IOC. CSIT provided an overall program update, presented scheduled site visits and introduced Keith Henry as the new CSIT Lead after Eric Cole. The next virtual SCT/ Flow Evaluation Team (FET) meeting is scheduled for June 8, 2020.

June 2020

On June 4, 2020, at the request of the Professional Aviation Safety Specialists (PASS), FAA's Technology Development & Prototyping Division-Surveillance Branch (ANG-C52) alongside the Terminal Flight Data Manager (TFDM) team briefed the ATD-2 PASS representative on the ATD-2 equipment located at Charlotte Douglas International Airport (CLT). The meeting discussed the anticipated maintenance requirements post September 2020, the basis of the infrastructure that keeps ATD-2 operating at CLT, equipment locations, as well as schedule of events concerning the handover of ATD-2 from NASA to TFDM. The briefing helped answer questions PASS representatives had about the transition and helped illustrate PASS's anticipated involvement in ATD-2 equipment maintenance once the ATD-2 system is transferred to TFDM. It is expected that there will be minimal involvement by Technical Operations and most

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

equipment related issues will be handled by TFDM's contractors, however PASS will continue to be updated as deemed necessary.

The Surface Collaborative Decision Making (CDM) Team (SCT) and Flow Evaluation Team (FET) held a joint meeting on June 8, 2020 via teleconference. NASA was invited to brief and update attendees on ATD-2 Phase 3 work in the North Texas Region. NASA presented identified operational benefits from Trajectory Option Sets (TOS), identified metrics under ATD-2 as well as long term integration of ATD-2 (Phase 3) initial prototype capabilities into workflow. The feedback and questions raised from the discussion were valuable in assisting in the continued development of work concepts and technology that will enhance future uses of TOS.

ANG-C52 and MITRE completed a technology transfer assessment of NASA ATD-2 materials (Phase 1 through Phase 2) on June 30, 2020. The technology transfer assessment will provide information to stakeholders regarding the capabilities developed throughout ATD-2 Phase 1 and Phase 2, the results of the demonstration so far, and lessons learned to benefit future FAA work. ATD-2 capabilities were mapped to current FAA work programs to show the linkages for related stakeholders and capabilities not currently covered by existing FAA work programs were identified. ANG-C52 is in the process of coordinating the appropriate channels of distributing the technology transfer assessment.

Due to the COVID-19 pandemic, data collection for the 2020 stormy season and ATD-2 Phase 3 operational evaluation has been significantly impacted. The dramatic reduction in traffic volume has led to the decline in terminal demand/capacity imbalances that the ATD-2 system was designed to address. NASA leadership has considered these COVID-19 impacts on ATD-2 Phase 3 along with the significant investments made by airline field demo partners and the strong interest expressed by the broader airline community in seeing the Phase 3 field demo produce meaningful results. Consequently, NASA leadership has directed the ATD Project to extend ATD-2 work through FY21 with the goal of maximizing the impact of NASA and Field Demo Partner investments in ATD-2 Phase 3. ANG-C52 is closely monitoring the new developments and assessing the impacts of the decision to extend the ATD-2 project until September 2021. ANG-C52 will continue to keep all ATD-2 stakeholders informed as more information becomes available.

Annex 06 of the Non-reimbursable Interagency Umbrella Agreement between NASA and the FAA that documents roles and responsibilities for the continued operational use of NASA's ATD-2 research system at CLT post September 2020 is still being coordinated.

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

Key Stakeholders

Leadership Team

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

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

RTT Working Group			
Name	Organization	Title	Tier
Jane Thipphavong	NASA	IADS RTT Co-lead	Tier 0
Shawn Engelland	NASA	Manager, ATD Project	Tier 0
Kevin Witzberger	NASA	Manager, ATD Deputy Project (A)	Tier 0
Al Capps	NASA	Manager, ATD-2 Sub Project	Tier 0
Yoon Jung	NASA	ATD-2 Chief Scientist	Tier 0
Andras Kovacs	ANG-C52	Manager Surveillance Branch/IADS RTT Co-Lead	Tier 0
Oriol Oliva	ANG-C52	STBO Project Co-Lead (Former) / STBO Project Lead	Tier 0
Ben Marple	ANG-C52	Mobile Application Project Lead	Tier 0
Adam Rhodes	ATO	NATCA ATD-2 Article 114 Rep (Current)	Tier 0
John Short	ATO	NATCA ATD-2 Article 114 Rep (Former)	Tier 0
Mike Hoprich	ATO	CLT ATD-2 NATCA POC	Tier 1
Kurt Donnelly	AJW	PASS NextGen Rep	Tier 1
Mark Novak	PMO	Decision Support Programs Manager (A)	Tier 1
Mike Huffman	PMO	TFDM Program Manager (Former)	Tier 1
Doug Swol	PMO	TFDM Program Manager (Current)	Tier 1
Bob Tyo	PMO	TBFM Program Manager	Tier 1
Aaron Wilkins	PMO	TBFM POC (Former)	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

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

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

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

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
OSE	Operational Shadow Evaluation

ANG-Compilation FY2020

Project Lead (ANG): Oriol Oliva/Todd Lewis

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