



ATD-2 Integrated Arrival/ Departure/Surface (IADS) Phase 3 System Requirements

Tyler T. Ngo

*Universities Space Research Association (USRA) - NASA Academic Mission Services (NAMS)
NASA Ames Research Center, Moffett Field, CA*

Stuart Wilson

*Mosaic ATM Inc.
NASA Ames Research Center, Moffett Field, CA*

Andrew T. Ging

NASA Ames Research Center, Moffett Field, CA

Ehsan Talebi

*Millennium Engineering & Integration Company
NASA Ames Research Center, Moffett Field, CA*

Louise K. Morgan-Ruszkowski

*KBRWyle/Parallel Innovations
NASA Ames Research Center, Moffett Field, CA*

July 2020

Purpose









This document contains the system requirements for the IADS data elements and functional capabilities developed during ATD-2 Phase 3.

Table of Contents

1	Front-End Data Elements	3
2	Back-End Data Elements	10
3	Front-End Functional Capabilities	17
4	Back-End Functional Capabilities	20
5	Scheduler Capabilities	22
6	Data Definition.....	25

1 Front-End Data Elements

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-FE-1	The ATD-2 system shall display to ATC users and flight operators the TOS header menu containing the following: <ol style="list-style-type: none"> 1. TOS operation status - Active or Inactive 2. TOS operations menu 3. TOS notifications menu 	Stormy 19	ATDI-4560 - Add TOS indicator to GUI toolbars CLOSED ATDI-4550 - Integrate TOS table into STBO client CLOSED ATDI-4577 - Add TOS notifications to the notification table CLOSED	T, D
ATD2-P3-FE-2	The ATD-2 system shall display to ATC users and flight operators TOS notifications.	Stormy 19	ATDI-4577 - Add TOS notifications to the notification table CLOSED	T
ATD2-P3-FE-3	The ATD-2 system shall display to the ATC users a list of all flights with TOSs.	Stormy 19	ATDI-4562 - Create a TOS flight data table CLOSED ATDI-4679 - Client: Set up Flight Operator and Metroplex Planner roles CLOSED	D
ATD2-P3-FE-4	The ATD-2 system shall display to the flight operators a list of their own flights with TOSs.	Stormy 19	ATDI-4562 - Create a TOS flight data table CLOSED ATDI-4679 - Client: Set up Flight Operator and Metroplex Planner roles CLOSED ATDI-4714 - Flight Operators should only be allowed to see their own flights CLOSED	I, D
ATD2-P3-FE-5-1	The ATD-2 system shall allow the flight operators to see their own flights and no others with respect to TOS information.	Stormy 19	ATDI-4714 - Flight Operators should only be allowed to see their own flights CLOSED	I

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-FE-5-2	<p>The ATD-2 system shall allow the flight operators to see the following information for all flights, which include flights that are not their own:</p> <ol style="list-style-type: none"> 1. Departure demand and delay at the runway for the airport 2. Departure demand and delay at the departure fix and departure gate for the metroplex 	Stormy 19	<p> ATDI-4976 - Flight Operator limitation to see their own flights only applies to TOS CLOSED</p>	D
ATD2-P3-FE-6	The ATD-2 system shall display to the ATC users and flight operators a filtered list of flights with TOSs.	Stormy 19	<p> ATDI-4562 - Create a TOS flight data table CLOSED</p> <p> ATDI-4563 - TOS table filtering CLOSED</p>	T, D
ATD2-P3-FE-7	The ATD-2 system shall display to the ATC users and flight operators a list of all TOSs for a flight.	Stormy 19	<p> ATDI-4562 - Create a TOS flight data table CLOSED</p> <p> ATDI-4566 - Setup TOS table fields CLOSED</p> <p> ATDI-4712 - Update TOS table fields per latest requirements CLOSED</p>	D
ATD2-P3-FE-8	The ATD-2 system shall display to the ATC users and flight operators a customized list of data associated to a flight with TOS.	Stormy 19	<p> ATDI-4713 - Update TOS table filters and default fields per latest requirements CLOSED</p>	I, D
ATD2-P3-FE-9	<p>The ATD-2 system shall display to ATC users and flight operators of the flight when:</p> <ol style="list-style-type: none"> 1. A TOS route is submitted for that flight. 2. Their TOS route is ATC approved. 3. A TOS route is filed for that flight. 	Stormy 19	<p> ATDI-4578 - Add TOS alerting to flight and TOS tables CLOSED</p>	D

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-FE-10	<p>The ATD-2 system shall display to the flight operators of the flight when:</p> <ol style="list-style-type: none"> 1. A TOS route becomes a candidate TOS for that flight. 2. A TOS route becomes a potential TOS for that flight. 	Stormy 19	<p>↑ ATDI-4578 - Add TOS alerting to flight and TOS tables CLOSED</p>	D
ATD2-P3-FE-11-0	<p>The ATD-2 system shall display to the ATC users and flight operators the following</p> <ol style="list-style-type: none"> 1. TOS departure data elements: <ol style="list-style-type: none"> a. Top/Optimal CDR, CDR Rte, RTC, RMNT, Add nm, RWY, Dep Gate, Dep Fix b. Top/Optimal Dep Fix Time <ol style="list-style-type: none"> i. TCFT or EDFT ii. TDFT iii. UDFT c. Top/Optimal Takeoff Time <ol style="list-style-type: none"> i. TCOT or ETOT ii. TTOT iii. UTOT d. Top/Optimal delay at OFF: <ol style="list-style-type: none"> i. Surface delay = TTOT - UTOT ii. Terminal delay = ETOT - TTOT iii. Total delay = ETOT - UTOT e. Top/Optimal delay at Fix: 	Stormy 19	<p>ATDI-4562 - Create a TOS flight data table CLOSED</p> <p>ATDI-4566 - Setup TOS table fields CLOSED</p> <p>ATDI-4712 - Update TOS table fields per latest requirements CLOSED</p> <p>ATDI-4559 - Timelines should show TOS status CLOSED</p> <p>ATDI-4561 - Add delay to TOS timeline CLOSED</p> <p>ATDI-4575 - Update timeline datablock to show TOS CDR CLOSED</p> <p>↑ ATDI-4805 - Display Terminal Controlled Off Time (TCOT) on STBO timelines CLOSED</p> <p>ATDI-5062 - Modify the timeline settings for the Metroplex Planner CLOSED</p>	T, D

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	<ul style="list-style-type: none"> i. Terminal delay = EDFT - TDFT ii. Total delay = EDFT - UDFT f. Top/Optimal Delay savings at OFF: <ul style="list-style-type: none"> i. Terminal delay saving at OFF ii. Total delay saving at OFF g. Top/Optimal Delay savings at Fix: <ul style="list-style-type: none"> a. Terminal delay saving at Fix b. Total delay saving at Fix 2. Currently filed CDR, CDR Rte, RWY, Dep Gate, Dep Fix 3. Currently filed Dep Fix Time: <ul style="list-style-type: none"> a. TCFT or EDFT b. TDFT c. UDFT 4. Currently filed Takeoff Time: <ul style="list-style-type: none"> a. TCOT or ETOT b. TTOT c. UTOT 5. Currently filed Surface delay, Terminal delay, Total delay at OFF 6. Currently filed Terminal delay, Total delay at Fix 7. Eligibility State 			







Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	<ul style="list-style-type: none"> 8. Coord State 9. Number of TOS Candidates 10. Number of TOS Submitted 11. Scratch Pad 12. Flight TOS data elements: <ul style="list-style-type: none"> a. CDR b. Route c. RTC d. RMNT e. Add nm f. RWY g. Eligibility State h. Coord State i. UDFT, TDFT, EDFT/TCFT j. UTOT, TTOT, ETOT/TCOT k. Surface delay, Terminal delay, Total delay at OFF l. Terminal delay, Total delay at Fix m. Surface, Terminal, and Total Delay savings at OFF n. Terminal and Total delay saving at Fix 			

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-FE-11-1	The ATD-2 system shall display to the ATC users data for flights departing from multiple airports that are ATD-2 participants within the metroplex.	Stormy 19	↑ ATDI-4902 - rungui.MetroplexPlanner for DAL CLOSED 🔍 ATDI-4552 - Multi airport timeline support CLOSED	D
ATD2-P3-FE-12-0	The ATD-2 system shall display applicable terminal restrictions for the D10 TMU.	Stormy 19	🔍 ATDI-4681 - Client: Add MIT and DepFix closure information to map CLOSED 🔍 ATDI-4538 - IDS5 Metroplex TMI client Departure Fix Display CLOSED 🔍 ATDI-4541 - IDS5 Metroplex TMI client fix closures CLOSED 🔍 ATDI-4542 - IDS5 Metroplex TMI client Miles in Trail restrictions CLOSED 🔍 ATDI-4544 - IDS5 Metroplex TMI client should react to TMI changes CLOSED	D
ATD2-P3-FE-12-1	The ATD-2 system shall display coded departure route (CDR) information for flight routes.	Stormy 19	🔍 ATDI-4543 - IDS5 Display flight route data as layer on Metroplex TMI client CLOSED ↑ ATDI-4494 - Improve RouteParser Capability CLOSED	I
ATD2-P3-FE-13-0	The ATD-2 system shall display demand by the following categories: <ol style="list-style-type: none"> 1. Demand type: Terminal Controlled and undelayed 2. Runways, departure gates 3. Demand aggregation by departure fixes 4. User-defined OR predefined bin sizes, scale 	Stormy 19	🔍 ATDI-4548 - Create departure demand graph CLOSED	D




Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-FE-13-1	The ATD-2 system shall display flights with TOS available for offloading to another departure fix.	Stormy 19	ATDI-4548 - Create departure demand graph CLOSED	D
ATD2-P3-FE-13-2	The ATD-2 system shall display delay by the following categories: <ol style="list-style-type: none"> 1. Runways, departure gates 2. User-defined OR predefined bin sizes, scale 	Stormy 19	ATDI-4549 - Create departure delay graph on IDS5 CLOSED	D

2 Back-End Data Elements






Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-BE-1	The ATD-2 system shall provide a list of all flights with a Trajectory Option Set (TOS).	Stormy 19	ATDI-4499 - TOS Service Part 3 (TOS Generator) CLOSED ATDI-4498 - TOS API CLOSED ATDI-4500 - TOS Service Part 1 (new ATD2 component) CLOSED ATDI-4501 - TOS Database CLOSED ATDI-4495 - TOS Data Model and TOS Datastore CLOSED	D, I, T
ATD2-P3-BE-2	The ATD-2 system shall provide a static list of all TOS routes for a given flight.	Stormy 19	ATDI-4499 - TOS Service Part 3 (TOS Generator) CLOSED	D, T
ATD2-P3-BE-3-1	The ATD-2 system shall provide a populated static database, available to be queried for valid routes.	Stormy 19	ATDI-4691 - STBO departureFix and departureFixGate lookup from CDR departureFixes CLOSED ATDI-4692 - Support runway-specific departure route (SIDs) parsing for DFW and DAL CLOSED	
ATD2-P3-BE-3-2	The ATD-2 system shall provide a populated TOS database, available to be queried for TOS routes and TOS status.	Stormy 19	ATDI-4499 - TOS Service Part 3 (TOS Generator) CLOSED ATDI-4501 - TOS Database CLOSED ATDI-4790 - Add TOS computed values to DB CLOSED	D, T
ATD2-P3-BE-4	The ATD-2 system shall provide the following TOS eligibility states: 1. Not applicable	Stormy 19	ATDI-4500 - TOS Service Part 1 (new ATD2 component) CLOSED ATDI-4645 - TOS Service Part 5 (Metroplex) CLOSED	D, I

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	<ol style="list-style-type: none"> 2. Potential 3. Candidate 4. Expired 			
ATD2-P3-BE-5	<p>The ATD-2 system shall provide the following TOS coordination states between the flight operators and the ATC users:</p> <ol style="list-style-type: none"> 1. Not submitted 2. Operator submitted 3. ATC approved 4. Reroute filed 	Stormy 19	<p> ATDI-4500 - TOS Service Part 1 (new ATD2 component) CLOSED</p> <p> ATDI-4645 - TOS Service Part 5 (Metroplex) CLOSED</p>	D, I
ATD2-P3-BE-6	<p>The ATD-2 system shall provide scratchpad entries for each departure flight that has TOS:</p> <ol style="list-style-type: none"> 1. Message text (stormy 19) 2. Timestamp (stormy 20) 3. User Type (ATC ARTCC / ATC TRACON / ATC Tower / FOC / Ramp) 4. User 	Stormy 19	<p> ATDI-4643 - Add scratch pad to Fuser and FMC flights CLOSED</p>	T
ATD2-P3-BE-7	<p>The ATD-2 system shall provide the following information for each flight that has TOSs:</p> <ol style="list-style-type: none"> 1. Candidate TOSs 2. Potential TOSs 3. Expired TOSs 	Stormy 19	<p> ATDI-4498 - TOS API CLOSED</p> <p> ATDI-4500 - TOS Service Part 1 (new ATD2 component) CLOSED</p> <p> ATDI-4645 - TOS Service Part 5 (Metroplex) CLOSED</p>	D, T, I

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	<ol style="list-style-type: none"> 4. Submitted TOSs 5. Approved TOS 6. Filed TOS 		↑ ATDI-4662 - TOS Service Part 2 (FMC integration) CLOSED	
ATD2-P3-BE-8	<p>The ATD-2 system shall provide the following information for a TOS route:</p> <ol style="list-style-type: none"> 1. CDR 2. Route 3. RTC 4. RMNT 5. Add nm 6. RWY 7. Eligibility State 8. Coord State 9. UDFT, TDFT, EDFT/TCFT 10. UTOT, TTOT, ETOT/TCOT 11. Surface delay, Terminal delay, Total delay at OFF 12. Terminal delay, Total delay at Fix 13. Surface, Terminal, and Total Delay savings at OFF 14. Terminal and Total delay saving at Fix 	Stormy 19	↑ ATDI-4586 - TBFM RA calculate runway to departure fix time for a given aircraft and departure fix CLOSED ↑ ATDI-4498 - TOS API CLOSED ↑ ATDI-4500 - TOS Service Part 1 (new ATD2 component) CLOSED ↑ ATDI-4645 - TOS Service Part 5 (Metroplex) CLOSED ↑ ATDI-4494 - Improve RouteParser Capability CLOSED ↑ ATDI-4722 - TOS Service Part 4 (additional data elements) CLOSED	D, T, I

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-BE-9	<p>ATD-2 system shall receive and process the following data elements for each message received for flights departing from the Dallas Love Field airport:</p> <ol style="list-style-type: none"> 1. Time at which message was received 2. Time at which message was processed 3. Message source 4. Updated values 	Stormy 19	 ATDI-3905 - Single Fuser for DFW and DAL CLOSED	D
ATD2-P3-BE-10	<p>The ATD-2 system shall receive and process the following flight identification information for flights departing from the Dallas Love Field airport:</p> <ol style="list-style-type: none"> 1. Aircraft equipment qualifier 2. Aircraft type 3. Aircraft Registration (tail marking) 4. Beacon code 5. Flight ID (acid) 6. GUF1 7. Carrier 8. Major carrier 9. IATA departure and arrival airports 10. ICAO departure and arrival airports 	Stormy 19	 ATDI-3905 - Single Fuser for DFW and DAL CLOSED	D
ATD2-P3-BE-11	<p>The ATD-2 system shall provide the following flight status for flights departing from the Dallas Love Field airport:</p>	Stormy 19	 ATDI-3905 - Single Fuser for DFW and DAL CLOSED	D

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	<ol style="list-style-type: none"> 1. Scheduled 2. Out 3. Departed 4. Canceled 			
ATD2-P3-BE-12	<p>The ATD-2 system shall receive and process the following flight plan information for flights departing from the Dallas Love Field airport:</p> <ol style="list-style-type: none"> 1. Assigned altitude 2. Requested altitude 3. Filed altitude 4. Filed speed 5. Route text 6. Center list values 7. Sector list values 	Stormy 19	ATDI-3905 - Single Fuser for DFW and DAL CLOSED	D
ATD2-P3-BE-13	<p>The ATD-2 system shall receive and process the following departure stand (i.e. departure parking gate) information for flights departing from the Dallas Love Field airport:</p> <ol style="list-style-type: none"> 1. Departure stand 2. Departure stand initial time (from official airline guide/OAG) 3. Departure stand proposed time (p-time) 4. Departure stand earliest time (EOBT) 	Stormy 19	ATDI-4910 - SWA data parsing of EOBT's CLOSED ATDI-3905 - Single Fuser for DFW and DAL CLOSED ATDI-4731 - update default_gate_decision_tree for DAL CLOSED	I

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	5. Departure stand actual time			
ATD2-P3-BE-14	<p>The ATD-2 system shall receive and process the following departure runway status information for flights departing from the Dallas Love Field airport:</p> <ol style="list-style-type: none"> 1. Departure runway user 2. Departure runway source data 3. Departure runway actual 4. Departure runway actual time 	Stormy 19	<p> ATDI-3905 - Single Fuser for DFW and DAL CLOSED</p> <p> ATDI-4692 - Support runway-specific departure route (SIDs) parsing for DFW and DAL CLOSED</p>	D
ATD2-P3-BE-15	<p>The ATD-2 system shall receive and process the following departure fix status information for flights departing from the Dallas Love Field airport:</p> <ol style="list-style-type: none"> 1. Departure fix user 2. Departure fix source data 3. Departure fix actual 4. Departure fix actual time 	Stormy 19	<p> ATDI-3905 - Single Fuser for DFW and DAL CLOSED</p> <p> ATDI-4691 - STBO departureFix and departureFixGate lookup from CDR departureFixes CLOSED</p>	D
ATD2-P3-BE-16	<p>The ATD-2 system shall receive and process the following TMI information for flights departing from the Dallas Love Field airport:</p> <ol style="list-style-type: none"> 1. APREQ 2. EDCT 3. Fix closure 4. Ground stop 	Stormy 19	<p> ATDI-3905 - Single Fuser for DFW and DAL CLOSED</p>	D

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	5. MIT			
ATD2-P3-BE-17	The ATD-2 system shall receive and process the following location information for flights departing from the Dallas Love Field airport: <ol style="list-style-type: none"> 1. Position latitude 2. Position longitude 3. Position heading 4. Position altitude 5. Position speed 6. Position timestamp 	Stormy 19	📄 ATDI-3905 - Single Fuser for DFW and DAL CLOSED	D

3 Front-End Functional Capabilities

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-FF-1	The ATD-2 system shall allow the ATC users to switch the TOS operation from active to inactive and vice-versa.	Stormy 19	ATDI-4715 - Add ability to turn TOS active/inactive in TM Actions CLOSED	T
ATD2-P3-FF-2	The ATD-2 system shall notify ATC users and flight operators when TOS operation status changes from to active to inactive and vice-versa.	Stormy 19	ATDI-4560 - Add TOS indicator to GUI toolbars CLOSED ATDI-4577 - Add TOS notifications to the notification table CLOSED	T, D
ATD2-P3-FF-3	The ATD-2 system shall allow flight operators to submit TOS routes for their own flights and no others.	Stormy 19	ATDI-4714 - Flight Operators should only be allowed to see their own flights CLOSED ATDI-4716 - TOS per-flight right mouse menu CLOSED	I
ATD2-P3-FF-4	The ATD-2 system shall allow the ATCT TRACON ARTCC TMC to approve submitted TOS routes.	Stormy 19	ATDI-4716 - TOS per-flight right mouse menu CLOSED	D
ATD2-P3-FF-5	The ATD-2 system shall allow users to undo their actions: 1. Undo submission if the TOS route is not already ATC approved 2. Undo ATC approved	Stormy 19	ATDI-4716 - TOS per-flight right mouse menu CLOSED	D
ATD2-P3-FF-6	The ATD-2 system shall provide a flight scratch pad entry capability for each flight with the following permissions: 1. ATC can see flight operators' scratchpad entries 2. Flight operators can see their own scratchpad entries and no others	Stormy 19	ATDI-4567 - Allow scratch pad entries from the flight specific TOS table CLOSED	D

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-FF-7	The ATD-2 system shall enable all users to sort data fields associated to a flight with TOS.	Stormy 19	ATDI-4717 - TOS table sorting CLOSED	D
ATD2-P3-FF-8	The ATD-2 system shall allow all users to search by the following criteria: <ol style="list-style-type: none"> 1. callsign 2. destination 3. terminal gate 4. departure fix 	Stormy 19	ATDI-4564 - TOS table searching CLOSED	D
ATD2-P3-FF-9-1	The ATD-2 system shall allow all users to filter TOS data by the following criteria: <ol style="list-style-type: none"> 1. Major Carrier 2. Coord State 3. Eligibility State 4. Flight Status 5. Dep Gate 6. Top Dep Gate 7. RWY 8. TMI Info 9. Top Add nm 10. EOBT 11. DepFix Time 	Stormy 19	ATDI-4563 - TOS table filtering CLOSED	T

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	12. Top Term Delay Savings at OFF 13. Top Total Delay Savings at OFF 14. Top Term Delay Savings at Dep Fix 15. EDFT 16. ETOT			
ATD2-P3-FF-9-2	The ATD-2 system shall alert all users to the following additional criteria for TOS data: <ol style="list-style-type: none"> TOS Coordination State TOS Eligibility State (Except "Expired") RMNT Threshold 	Stormy 19	ATDI-4565 - TOS table color code eligibility and coordination state CLOSED ATDI-4578 - Add TOS alerting to flight and TOS tables CLOSED	D
ATD2-P3-FF-10	The ATD-2 system shall allow flight operators and ATC users to hide display of arrival flights information for metroplex planning purpose.	Stormy 19	ATDI-4680 - Client: Add map toolbar option to hide arrival icons CLOSED	D
ATD2-P3-FF-11	The ATD-2 system shall allow metroplex planners and flight operators access to metroplex planning capabilities, but not any other ATC capabilities.	Stormy 19	ATDI-4682 - Client: TOS flight right mouse menu CLOSED ATDI-4679 - Client: Set up Flight Operator and Metroplex Planner roles CLOSED ATDI-5133 - Consolidate Metroplex TMI's in TM Actions panel CLOSED	D
ATD2-P3-FF-12	The ATD-2 system shall allow the ATC users to apply TMIs to a specific airport with ATD-2 capability within the metroplex.	Stormy 19	ATDI-4824 - Front-end capability to apply TMIs to a specific airport within metroplex CLOSED	D

4 Back-End Functional Capabilities

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-BF-0	The ATD-2 system shall provide the TOS TMI to indicate whether TOS operation is active or inactive.	Stormy 19	ATDI-4718 - Create TOS TMI CLOSED	D
ATD2-P3-BF-1	The ATD-2 system shall provide TOS routes using the following criteria: <ol style="list-style-type: none"> 1. Flight belongs to a specific flight operator that signed up with ATD-2 as a TOS participant. 2. Flight is departing from an origin airport where ATD-2 is operating. 3. Flight is not cancelled. 4. Flight is not departed. 5. Flight plan is filed and TOS does not already exist 6. Flight plan is filed and TOS exists, but the new flight plan is to a different destination. 	Stormy 19	ATDI-4500 - TOS Service Part 1 (new ATD2 component) CLOSED ATDI-4499 - TOS Service Part 3 (TOS Generator) CLOSED	D, I, T
ATD2-P3-BF-2	The ATD-2 system shall automatically detect filed reroutes and update flight information and TOS information to reflect reroute.	Stormy 19	ATDI-4500 - TOS Service Part 1 (new ATD2 component) CLOSED ATDI-4795 - Integrate TOS results into Model CLOSED ATDI-4784 - TOS Service Handling for Approve Route CLOSED	D, I, T
ATD2-P3-BF-3	The ATD-2 system shall receive and process data for flights departing from multiple airports that are ATD-2 participants within the metroplex.	Stormy 19	ATDI-4580 - FMC multi airport support for flights CLOSED	T

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
			ATDI-4579 - Update client to support multiple airports CLOSED ATDI-4554 - Multi airport data filtering CLOSED ATDI-3905 - Single Fuser for DFW and DAL CLOSED ATDI-4184 - Metroplex commander configuration for DFW and DAL CLOSED	
ATD2-P3-BF-4	The ATD-2 system shall provide the capability to apply TMIs to specific airports that are ATD-2 participants within the metroplex.	Stormy 19	ATDI-4711 - Update TmiService to work in single Fuser environment CLOSED ATDI-5095 - Problems with multi-airport TMIs CLOSED	D
ATD2-P3-BF-5	The ATD-2 system shall modify TOS status based on the set of rules and coordination specified in the TOS Sequence Diagram within the <u>ATD-2 Phase 3 TOS Sequences (Requirements)</u> .	Stormy 19	ATDI-4500 - TOS Service Part 1 (new ATD2 component) CLOSED ATDI-4645 - TOS Service Part 5 (Metroplex) CLOSED	D, I
ATD2-P3-BF-6	The ATD-2 system shall compute Relative Trajectory Cost/RTC values utilizing the following criteria: <ol style="list-style-type: none"> Airline-based cost factors Route distance and filed speed for each TOS route 	Stormy 19	ATDI-4499 - TOS Service Part 3 (TOS Generator) CLOSED ATDI-4862 - Airline-specific TOS RTC computations CLOSED	D, T

5 Scheduler Capabilities

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-TS-0	The ATD-2 system shall compute a transit time from the departure stand to the runway for the current flight route and all possible trajectory option sets (TOS) : <ol style="list-style-type: none"> Departure taxi undelayed duration value Departure taxi estimated duration value 	Stormy 19	↑ ATDI-4733 - create decision tree files for taxi times at DAL airport CLOSED	I
ATD2-P3-TS-1	The ATD-2 system shall compute a transit time from the runway to the departure fix for the current flight route and all possible trajectory option sets (TOS).	Stormy 19	↑ ATDI-4917 - Integrate transit time service into terminal scheduler CLOSED ↑ ATDI-4759 - Terminal Scheduler - TOS and WhatIf Integration CLOSED ↑ ATDI-4694 - Create transit time service to be used by the Terminal Scheduler CLOSED ↑ ATDI-4586 - TBFM RA calculate runway to departure fix time for a given aircraft and departure fix CLOSED	I
ATD2-P3-TS-2	The ATD-2 system shall produce the modeled runway determined for each trajectory option.	Stormy 19	↑ ATDI-4763 - Distribute TOS scheduling results from Terminal Scheduler CLOSED	I
ATD2-P3-TS-3	The ATD-2 system shall determine the order in which flights shall depart and at what times flights shall depart at the runway/airport and the departure fix while ensuring the following constraints are satisfied for both: <ol style="list-style-type: none"> MIT APREQ 	Stormy 19	↑ ATDI-4756 - Implement terminal scheduler core algorithm CLOSED	I

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
	<ul style="list-style-type: none"> 3. EDCT 4. Departure fix closures 5. Runway closures 6. Airport configurations 			
ATD2-P3-TS-4	The ATD-2 system shall what-if model a flight with all possible trajectory option sets (TOS) during each run.	Stormy 19	<ul style="list-style-type: none"> ↑ ATDI-4759 - Terminal Scheduler - TOS and WhatIf Integration CLOSED ↑ ATDI-4753 - IADS What-if Model as a service CLOSED ↑ ATDI-4752 - Integrate TMI Service into WhatIf CLOSED 	I
ATD2-P3-TS-5	The ATD-2 system shall produce a targeted controlled off time (TCOT) that is the result of scheduling, for the current flight and each trajectory option.	Stormy 19	<ul style="list-style-type: none"> ↑ ATDI-4759 - Terminal Scheduler - TOS and WhatIf Integration CLOSED ↑ ATDI-4756 - Implement terminal scheduler core algorithm CLOSED 	I
ATD2-P3-TS-6	The ATD-2 system shall produce a targeted controlled departure fix time that is the result of scheduling, for the current flight and each trajectory option.	Stormy 19	<ul style="list-style-type: none"> ↑ ATDI-4759 - Terminal Scheduler - TOS and WhatIf Integration CLOSED ↑ ATDI-4756 - Implement terminal scheduler core algorithm CLOSED 	I
ATD2-P3-TS-7	The ATD-2 system shall produce the surface delay associated with the flight as determined by the terminal scheduler, for the current flight and each trajectory option.	Stormy 19	<ul style="list-style-type: none"> ↑ ATDI-4763 - Distribute TOS scheduling results from Terminal Scheduler CLOSED 	I

Number	Requirement Text	Release	Trace (JIRA)	Verification Methods
ATD2-P3-TS-8	The ATD-2 system shall produce the terminal delay associated with the flight as determined by the terminal scheduler.	Stormy 19	↑ ATDI-4763 - Distribute TOS scheduling results from Terminal Scheduler CLOSED	I
ATD2-P3-TS-9	The ATD-2 system shall integrate multiple schedulers within the ATD-2 infrastructure to provide surface information at an individual airport.	Stormy 19	↑ ATDI-4756 - Implement terminal scheduler core algorithm CLOSED ↑ ATDI-4802 - Adapter to bridge between Terminal Scheduler and Tactical Scheduler CLOSED ↑ ATDI-4798 - TerminalSlotNetwork - Process terminal scheduler controlled off time in SurfaceSlotNetwork CLOSED	I
ATD2-P3-TS-10	The ATD-2 system shall schedule flights subject to an APREQ or EDCT at the APREQ or EDCT time.	Stormy 19	↑ ATDI-4756 - Implement terminal scheduler core algorithm CLOSED	I
ATD2-P3-TS-11	The ATD-2 system shall make values calculated by the terminal scheduler available to other components of the ATD-2 infrastructure.	Stormy 19	↑ ATDI-4756 - Implement terminal scheduler core algorithm CLOSED ↑ ATDI-4693 - Create Terminal Scheduler project CLOSED ↑ ATDI-4798 - TerminalSlotNetwork - Process terminal scheduler controlled off time in SurfaceSlotNetwork CLOSED	I
ATD2-P3-TS-12	The ATD-2 system shall store values calculated by the schedulers, available to be queried.	Stormy 19	↑ ATDI-4754 - Terminal Scheduler database writer CLOSED ↑ ATDI-4814 - Add isTcot to database CLOSED ↑ ATDI-4813 - Add isApreq and isEdct to database CLOSED ↑ ATDI-4922 - Add transit time source to flight and database CLOSED	I

6 Data Definition

Operators	Descriptions
Metroplex Planner	FAA personnel; performs metroplex functions including: set up terminal restrictions, activate TOS operations, approve TOS submission, file reroutes; Normally uses the metroplex client to perform his duties; locations include: D10, DFW, DAL.
ATC	FAA personnel; includes TMC, ATC; performs STBO functions which concern single airport functionalities; Normally uses the STBO client to perform his duties; locations include: DFW, DAL
ATC users	FAA personnel
Flight Operators	Airline personnel; airport authorities; performs metroplex functions including: submit TOS routes; Normally uses the metroplex client configured for flight operators to perform his duties; locations include: DFW, DAL.

TOS States	Definitions
Not Applicable	No TOS trajectories. 1. Could mean no CDRs for the flight. 2. Or, no CDRs meeting reroute restrictions.
ATC Excluded	ATC excluded this flight or all TOS elements for this flight.
Potential	All TOS elements have delay below RTC.
Candidate	A TOS element has delay above RTC.
Operator submitted	The operator has submitted a/the TOS route
Operator Submitted Potential	One or more TOS elements are submitted by operator, but no submitted route is also a candidate.

TOS States	Definitions
Operator Submitted Candidate	One or more submitted TOS elements is a candidate.
ATC Assigned	Action taken by ATC to assign a reroute.
ATC Assignment Rejected	Action taken by ATC to reject a reroute, and no other route option is assigned.
ATC Approved	The ATC has approved a/the TOS route / Action taken by ATC to approve a reroute.
Reroute Filed	The ATC has amended the flight plan, and the data has come through SWIM; Filed flight plan matches approved (or assigned?) TOS trajectory.
Expired	<ul style="list-style-type: none"> Route minimum notification time exceeded, as compared to the UOBT. Or, other possible causes of expiration (e.g. aircraft in movement area?)
Not submitted	The operator has not submitted a/the TOS route

Flight States	Definitions
Scheduled_out	A departure aircraft has not pushed back out yet
Departed	A departure aircraft is airborne
Canceled	The flight has been cancelled by the operator
Suspended	The flight has been suspended by the operator. A suspended flight is expected to proceed at problem resolution.
Out	A departure has pushed back and/or released brakes and is taxiing in the Ramp
In_queue	A departure aircraft is inside the queue detection box of the assigned runway
Pushback	A departure aircraft is pushing back
Return_to_gate	A departure is returning to the gate

Flight States	Definitions
Taxiing_AMA	A departure aircraft is taxiing on the airport movement area

TOS Route Information	Definitions
TOS Status	relative to single TOS route
Route Name	CDR Code, if CDR
Original Filed Route	Route is the originally filed route, used to generate the static TOS
Route Availability	Reroute restriction may make the route unavailable
Route Expired?	<ol style="list-style-type: none"> 1. Is Route Minimum Notification Time (RMNT) exceeded? 2. Or, using flight status (e.g., movement area or in queue)
RTC satisfied?	RTC conditions are satisfied
Route Minimum Notification Time (RMNT)	<ul style="list-style-type: none"> • Time before pushback; lead time criteria. Note: RMNT is relative to undelayed off block time (EOBT / LOBT / P-Time/ etc) (This is related to design solution, not a requirement) • Setting to zero means route is acceptable after leaving the gate. (design solution)
Relative Trajectory Cost (RTC)	Delay threshold