ATD-2 Integrated Arrival/ Departure/Surface (IADS) System Software Version 5.x Releases and Notes Version 2

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September 2021

Table of Contents

1   Purpose

Below are change reports for the 5.x series of releases to Charlotte-Douglas International Airport (CLT) and/or Dallas-Fort Worth International Airport (DFW). These list all the changes since the previous release. The Release Notes for Distribution are meant to be more readable by stakeholders.

Information on software releases V5.0.0 to V5.11.0 was included in the ATD-2 Tech Transfer V2.5, August 2020. This document updates that information to add releases V5.11.1 to V5.11.3.

Release	Release Date	CLT Deployment Date	DFW Deployment Date	Notes
V5.0.0	06 Jun 2019	n/a	10 Jun 2019	Stormy 19, NTML parsing
V5.1.0	15 Jul 2019	n/a	17 Jul 2019	Scheduler performance improvements
V5.1.1	19 Jul 2019	n/a	20 Jul 2019	
V5.2.0	08 Aug 2019	n/a	12 Aug 2019	Scheduler, Client, TOS, and TTP bug fixes
V5.2.1	15 Aug 2019	n/a	19 Aug 2019	
V5.2.2	29 Aug 2019	n/a	09 Sep 2019	TOS route parsing bug fixes
V5.3.0	12 Sep 2019	Not deployed	Not deployed	Small airports, arrivals in terminal scheduler. Internal departure bug fixes.
V5.3.1	16 Sep 2019	n/a	18 Sep 2019	
V5.3.2	11 Oct 2019	n/a	12 Oct 2019	TOS adaptation updates due to CCU
V5.4.0	28 Oct 2019	03 Nov 2019	04 Nov 2019	New Metroplex Planner features; CLT & DFW on same code branch
V5.4.1	13 Nov 2019	n/a	14 Nov 2019	Bug fix addressing some of the large delays in the TOS options candidates
V5.5.0	10 Dec 2019	19 Dec 2019	17 Dec 2019	Gate conflict detection updates, add parsing of reroute advisories
V5.6.0	22 Jan 2020	30 Jan 2020	n/a	Correct connection with AEFS; add CDR management
V5.7.0		Not deployed	Not deployed	For Phase 3 freeze event Friday Feb 14th.
V5.7.1	05 Feb 2020	n/a	14 Feb 2020	Small airport model calling the tactical scheduler.
V5.8.0	24 Mar 2020	Not deployed; pending WJHTC AEFS testing	n/a	CLT only; TBD features. Suspending deployment to CLT due to WJHTC inability to test with shelter-in-place caused by corona virus.
V5.9.0	30 Mar 2020	n/a	01 Apr 2020	Final features and bug fixes for Stormy 20 field evaluation
V5.9.1	07 Apr 2020	n/a	09 Apr 2020	Bug fixes to 5.9.0 for Stormy 20

Release	Release Date	CLT Deployment Date	DFW Deployment Date	Notes
V5.10.0	01 May 2020	Not deployed; pending WJHTC AEFS testing	07 May 2020	Minor scheduling and Client TOS enhancements
V5.11.0	31 Jul 2020	10 Aug 2020	12 Aug 2020	Final 5.x release before CLT support transitions from NASA Ames to Mosaic ATM. Minor TOS features, backend improvements, and bug fixes
V5.11.1	21 Aug 2020	n/a	25 Aug 2020	DFW only release to address some bugs found in the 5.11 release
V5.11.2	18 Sep 2020	n/a	21 Sep 2020	DFW only release for TOS and STBO Client fixes/improvements
V5.11.3	02 Feb 2021	n/a	04 Feb 2021	DFW only release to add new data elements to TOS Table and allow a route to jump from Submitted to Reroute Filed

2 Release 5.0.0

2.1 Overview

This document describes the changes to the ATD-2 software baseline for version 5.0.0. Version 5.0.0 was deployed on 10 June 2019 to DFW only.

2.2 Adaptation

- (**DFW**) Updated the node-link model to better match the latest guidance lines in the apron area, to better line up spot locations, and to adjust gate locations according to imagery from Google Earth. Updated gate labels to reflect adjusted gate locations and to minimize overlap of labels. Added new gates.
- (**DFW**) Added runway detection polygons to DFW's bridge routes to improve runway assignment detection.
- (**DFW**) Added the missing departure procedures KUSSO and SWABR to the departure fix decision tree.
- (**DAL**) Created a default gate decision tree for DAL airport and updated it with data collected from FlightStats.
- (**DAL**) Removed the 18/36 runways from the adaptation, as they are no longer in use.
- (**DAL**) Created a set of arrival and departure taxi time decision trees to estimate taxi predictions at DAL. DAL will use taxi times, instead of taxi speeds, for predicting the OFF time, due to the lack of surface surveillance at DAL.
- (**DAL**) Created pushback decision tree files for DAL, but the default time is set to 0.
- (**DAL**) Created a simple background map for DAL.
- (**DAL**) Updated the departure runway decision tree assignments, based on information provided by DAL Tower.
- (**DAL**) Updated the DAL adaptation to support the MITRE Mobile App.
- (**DFW, DAL**) Updated the separations decision tree to support RECAT wake turbulence values, now that DFW is operating under Wake Turbulence Recategorization - Phase III (RECAT).

- (**DFW, DAL**) Created a file in the NFDC format with the runways for the runway-specific SIDs, since certain SIDs are dependent on the assigned departure runway (e.g., DFW's AKUNA7).
- (**DFW, DAL**) Updated the D10/DFW TRACON video maps to include seven modified maps. The changes are modest and will be hard to notice in most cases.
- (**SFO**) Created an adaptation for the SFO airport.

2.3   APREQ Management Service

- Updated the TBFM mappings in the AMS component to contain DAL mappings for runways, airport configurations, and to map DAL to the D10 TRACON group.

2.4   Data Feeds

- Set up a project to parse EOBT data provided by Southwest Airlines into a format expected by the Fuser.
- Set up MITRE messages for DAL/DFW to be passed into the Fuser.
- Verified the integration of ramp surveillance data from AAL.
- Set up arrival runway actual times from TFM to be used for DAL flights.

2.5   Flight Management

- Split flight fields that used to be a single generic value, like "runway", into arrival- and departure-specific fields to support the Metroplex environment.
- Added a new "Major Carrier" data element.

2.6   Fuser

- Set up a single Fuser instance which is capable for providing data to both DFW and DAL.
- Set up arrival runway actual times from TFM to be used for DAL flights.

2.7   IDAC

- Modified the IADS and IDAC components to allow TBFM receiving departure fix ETA requests through WSRT/TMWS.

2.8   Model

- Developed a Small Airport Model to support scheduling at lesser-equipped airports, such as DAL.
- Modified the Model so that, when the Tactical Scheduler assigns the targeted departure runway time for a flight, it will be used to set the departure fix targeted time for flights before they depart.
- Added a new component which can be embedded into the Model and the Terminal Scheduler in order to serve and process modeling requests.

2.9   STBO Client

- Updated the Client to be able to display flights from multiple airports on the timelines, maps, and data tables. Filters can be set up on the timelines and data tables so that only flights from a single airport are displayed, if desired. The maps currently do not provide filtering by airport.
- (**TOS**) Added an option to the map's View menu which will hide the display of arrival icons on a map.
- Moved the "Show Flights At Gates", "Show Suspended Flights" and "Show Legend" map options from the Map Datablock dialog to the map's "View" menu.
- Updated the background map to display the departure fixes in an IDS5-like display. Each of the departure fixes is shown as a circle labeled by the departure gate or procedure name. Features:
   o Draws departure fixes on the map according to their gate color scheme

- o Draws MIT restrictions on the inside of the fix
  - o Draws closed fixes in gray
  - o Draws the name of a closed fix with a CDR next to its alternate fix
  - o Draws fix closure caused by a departure gate "out the gate" closure with "OTG" next to the fix name
  - o Updates the map in response to TMI events
  - o Opens the TM action panel when a fix marker/circle is clicked
- Enhanced the functionality of the TM Actions panel for the Metroplex environment.
  - o The D10 and airport-specific ATC Clients will allow entering, editing, and display of the restrictions for MITs, Departure Fix Closures, APREQ Schedules, and Ground Stops. Restrictions are applied to all airports and are distributed to all Clients by default. An "Airport" constraints tab to the Constraints Settings dialog to limit which airport(s) a TMI is to affect; in this case, the restriction is distributed only to the affected airport.
  - o The airport-specific ATC Client has the additional ability to allow entering, editing, and display of the restrictions for Runway Utilization and Runway Closures for that specific airport. Restrictions are distributed to only Clients configured for the same airport.
  - o In the Departure Fix Closures tab, when the Departure Gate option is selected, "OTG" was added to the list of alternate gates to signify an "Out The Gate" procedure is in effect.
    - Any fix that is considered to be Out The Gate will show "OTG" instead of the true CDR value that will be assigned to the restriction by the TMI Service.
    - OTG TMIs are entered for a gate but are displayed on the STBO Client as a separate restriction for each fix. Any time a fix that is part of an OTG restriction is then updated or removed, the entire set of fixes within that same departure gate will be updated/removed instead of only applying the changes to the single fix.
- Added a departure demand bar graph to show the active and scheduled flight counts by either departure fix or departure gate. Hovering the mouse over a bar will display a tool tip of "<resource>: <count>", where <resource> is a fix or a gate. A legend may optionally be displayed. The graph is configurable by:
  - o Data type: Undelayed vs Terminal Constrained vs Both (Undelayed and Terminal Constrained bars are side-by-side)
  - o Data aggregation: summed vs side-by-side (side-by-side is not allowed for data type = Both)
  - o How to count flights with operator-submitted TOS: include in fix/gate counts or count separately in which case they will be gray (not available when data type = Undelayed)
  - o Reference point of departure fix vs runway
  - o Filter of runway: the list of runways in the filter can be all or a user-selected subset
  - o Filter of departure fix vs departure gate: the list of fixes or gates in the filter can be all or a user-selected subset
- Added a departure delay line graph to show the calculated delay across all departure fixes/gates over user-selectable intervals. The delay can be calculated using either the terminal delay (fix reference point), or surface delay (runway reference point). . Hovering the mouse over a bar will display a tool tip of "<resource>: <count>", where <resource> is an airport, fix, or gate. A legend may optionally be displayed. The graph is configurable by:
  - o Reference point of departure fix vs runway
  - o Filter of runway: the list of runways in the filter can be all or a user-selected subset
  - o Filter of departure fix vs departure gate: the list of fixes or gates in the filter can be all or a user-selected subset
- (**TOS**) Added the TOS active/inactive status:
  - o ATC can set the TOS status as active or inactive using the TM Actions -> TOS Operation tab.
  - o The main STBO Tool Bar will display an icon to indicate active (orange) or inactive (gray) TOS operation for all users (Metroplex Planner, Flight Operators, Ramp, and ATC).
  - o When the TOS status is changed, a notification will appear in the Notification Banner and Notification Panel.

- (**TOS**) Added the TOS Departure Table for the Metroplex Planner and Flight Operator users. This table is opened by clicking the "TOS" button from the main toolbar. This table is actually a set of individual data panels. Features:
  o The TOS Departure Table will show flights with either Potential or Candidate trajectory options which have not yet departed. For ATC, this table will show all flights. For Flight Operators, this table will show only the flights whose major carrier is that of the Flight Operator.
  o The user can add a new data panel to the window by clicking the "Add Table" button.
  o An individual data panel can be removed by clicking the X in the top right corner of the panel.
  o Each data panel can be individually filtered by clicking the funnel icon in a specific data panel's toolbar.
  o Each data panel is labelled with a description of the filter currently in effect for that panel.
  o Data elements displayed in each data panel can be individually customized by clicking the binocular icon in the data panel's toolbar. The available data elements consist of all departure data elements currently available in the Flights Table plus all TOS data elements.
  o The data panels are created with default color coding for the TOS Coordination State and TOS Eligibility State.
  o Odd/even row colors can be set up and color alerts can be added to each individual data panel by clicking the color icon in a data panel's toolbar.
  o Records in each data panel can be sorted by clicking on a column header.
  o Entering a search criteria in any Search box on the Client will highlight matched flights across all displays including the TOS Departure Table.
  o A "Scratch Pad" right mouse menu option will open a separate dialog to allow the user to enter text to display in the Scratch Pad data element of the data panels. The Scratch Pad dialog can only be opened for one flight at a time.
  o Only one flight may be selected on the TOS Departure Table at a time.
- (**TOS**) Added the TOS Flight Menu for the Metroplex Planner and Flight Operator users. Features:
  o The TOS Flight Menu will show the filed route and all TOS route options for a single flight.
  o The TOS Flight Menu is opened by clicking the Flight Menu option of a flight's right mouse menu.
  o Flight Menus can be filtered by clicking the funnel icon in any Flight Menu's toolbar. The filtering options selected on one Flight Menu will be immediately applied to all currently-opened Flight Menus and will be used the next time a Flight Menu is opened.
  o Each Flight Menu is labelled with a description of the filter currently in effect.
  o Data elements displayed in the Flight Menus can be customized by clicking the binocular icon in the Flight Menu's toolbar. The available data elements consist of all TOS route data elements. The data elements selected on one Flight Menu will be immediately applied to all currently-opened Flight Menus and will be used the next time a Flight Menu is opened.
  o The Flight Menus are created with default color coding for the TOS Coordination State and TOS Eligibility State.
  o Odd/even row colors can be set up and color alerts can be added to Flight Menus by clicking the color icon in a Flight Menu's toolbar. The colors selected on one Flight Menu will be immediately applied to all currently-opened Flight Menus and will be used the next time a Flight Menu is opened.
  o Records in each Flight Menu can be sorted by clicking on a column header. However, the filed route will always be the first route.
  o A "Scratch Pad" right mouse menu option will open a separate dialog to allow the user to enter text to display in the Scratch Pad data element. This scratch pad text will be displayed for all routes and will be displayed in the Scratch Pad data element of the TOS Departure Table. The Scratch Pad dialog can only be opened for one flight at a time.
  o Only one route may be selected on the Flight Menu at a time.
  o The records are cleared from a Flight Menu when the flight has departed.

- o A Flight Menu can only be opened when TOS model is active.
- (**TOS**) Added a right mouse menu option for Flight Operators which will allow them to Submit a route request for all Potential and Candidate route options. Route options are displayed in the menu with the format "<route> <eligibility> <etot> <delay savings>". Once a route has been submitted but not yet approved by ATC, an Undo Submit right mouse menu option will allow the Flight Operator to cancel a submission request. The Submit and Undo Submit options are available in the TOS Departure Table, Flight Menu, and on a flight's timeline data tag, but only when TOS mode is active and only if ATC has not already approved a route.
- (**TOS**) Added a right mouse menu option for ATC which will allow them to Approve a route request for route options submitted by a Flight Operator. Routes are displayed in the menu with the format "<route> <eligibility> <etot> <delay savings>". Once a route has been approved, an Undo Approve right mouse menu option will allow ATC to cancel an approval. The Approve and Undo Approve options are available in the TOS Departure Table, Flight Menu, and on a flight's timeline data tag, but only when TOS mode is active and only if a Flight Operator has submitted a route request.
- (**TOS**) Enhanced the display to draw a flight's coded departure route (CDR) on the map when a flight is selected from the TOS table or a route is selected from the TOS Flight Menu. The display of routes can be toggled via the map's View-> TOS Routes option.
- (**TOS**) Added a "Scratch Pad" option to a flight's right mouse menu on the TOS Departure Table, the Flight Menu, or the timeline data tag. This option is only available when TOS mode is active. Selecting this option will open a separate dialog to allow either ATC or the Flight Operator to enter text to display in the Scratch Pad data element of the data panels.
  - o The text entered will be displayed in all TOS Departure Table and all Flight Menu route records for that flight.
  - o Only the most recent entry will be displayed.
  - o The text entry is shared between ATC and Flight Operator displays.
  - o The Scratch Pad dialog can only be opened for one flight at a time.
- (**TOS**) Added a "Flight Menu" option to a flight's right mouse menu on the TOS Departure Table and the timeline data tag. This option is only available when TOS mode is active. Selecting this option will open a separate dialog to allow either ATC or the Flight Operator to enter text to display in the Scratch Pad data element of the data panels.
  - o The text entered will be displayed in all TOS Departure Table and all Flight Menu route records for that flight.
  - o Only the most recent entry will be displayed.
  - o The text entry is shared between ATC and Flight Operator displays.
  - o The Scratch Pad dialog can only be opened for one flight at a time.
- Added the following elements to the timeline data tags:
  - o (**TOS**) A highlighted "T" will display at the end of the data tag when a TOS route request has been submitted by a Flight Operator. The display of this element can be enabled/disabled with the "TOS" checkbox in the timeline settings panel.
  - o Current Delay = timeline data type time – undelayed time is displayed in orange in mm format
  - o Estimated Delay = terminal scheduler OFF time – target OFF time is displayed in cyan as "ED: <mm>" format; valid only for timelines with a runway reference point.
  - o Total Delay = terminal scheduler time – undelayed time is displayed in cyan as "TD: <mm>" format; valid only for timelines with a runway or a fix reference point.
- Updated the data type selections in the Timeline Settings dialog.
  - o "Latest" was renamed to "Surface Constrained". This displays the target time from the Tactical Scheduler.
  - o "Terminal Constrained" was added for the Metroplex environment. This displays the target time from the Terminal Scheduler.

2.10 TBFM

- Added the ability for STBO to request departure fix ETAs from TBFM.

2.11 Terminal Scheduler

- Created a Trajectory Projection Library which:
  - o Provides a transit time from the runway to the departure fix.

- o Is able to compute transit times for flights from DFW or DAL.
        - o Provides the ability to use different implementations of a transit time service (TBFM or decision tree).
        - o Has an implementation that leverages the new TBFM departure fix time request service.
        - o Has an alternate implementation that will work without TBFM.
        - o Calls the TBFM service only as necessary to avoid performance issues.
- Created a Terminal Scheduler that will run in the Metroplex environment. The Terminal Scheduler is based heavily on the TDST Live project that was used for TDS-T Scheduling, but was trimmed and reworked for what is needed for the Phase III terminal scheduler.
        - o The Terminal Scheduler will compute the surface delay associated with the flight as determined by the Tactical Scheduler for the filed route and each trajectory route option.
        - o The Terminal Scheduler will compute the terminal delay associated with the flight. The delay on TOS routes which are using the same resources (fix, runway) as the Filed route and the same undelayed times will have the same scheduler results.
        - o The Terminal Scheduler will send updated Terminal Constrained OFF times, Expected Departure Fix Times, etc., to the TOS Service for each alternate TOS route.
- Excluded flights from scheduling by the Terminal Scheduler that: 1) have crossed the departure fix more than 15 minutes in the past, 2) have an activation time outside of the scheduling window (480 minutes), 3) have an unknown flight state, or 4) switched from departure to arrival (returning to the same airport).
- Enhanced the processing for flight separations.
        - o Default separation values can be set per fix via a configuration file. It currently defaults to 5 MIT for all fixes in the EAST gate. There currently are no default separation for the other gates.
        - o Flights over the same fix are separated using the fix-specific default MIT value. If there is an active MIT in the system, that separation will overrule the default separation value.
        - o The end time of a current MIT restriction is taken into consideration when separating flights. After the MIT end time, the separation will return to the default value.

2.12   TMI Service

- (**TOS**) Added a new TMI type to indicate whether TOS management is active or inactive. The TOS mode will reset to the default (INACTIVE) state after the nightly TMI reset.
- Updated the metering mode to be reset to the default values specified in the configuration files after each nightly TMI reset.
- Updated to handle TMIs in a multi-airport environment.
        - o At startup, default TMIs (airport configuration, metering mode, TOS mode) will be created individually for each active airport instead of system wide. The parameters for the default TMIs are configurable per airport.
        - o Airport Configurations have been updated to keep track of current configurations for each airport separately so that a new configuration for one airport doesn't wipe out a 'previous' configuration for a separate airport.
        - o TMIs are only applied to flights whose departure airport matches the entity key for the TMI. Also, routing has been updated so that if a TRACON wide TMI is entered (i.e. with an entity key of D10) it can be split into individual TMIs for each active airport. The airports can then update or remove TMIs individually, while updates/cancellations of those TMIs from the TRACON will still be processed at all active airports. The distribution facilities/recipients are configurable. Also, the Notification Window in the Client will include 'TRACON' in the details to give users an indication that the TMI was sent as a TRACON-wide TMI.
- Enhanced parsing of TFM restrictions to be able to return a list of restrictions when a single TFM message can result in more than one restriction.
- (**DFW**) Defined a mapping of inner/outer fixes needed for some restrictions.
- (**DFW**) Added handling for Out the Gate (OTG) closures, where an entire departure gate is partially closed due to weather. In this condition, the flights are all scheduled to a single fix

though technically the flight may use any of the fixes as it vectors around the weather. The initial mappings set up for DFW are:
  o NORTH - BLECO
  o EAST - TRYTN
  o SOUTH - JASPA
  o WEST – HRPR

- Added parsing of Miles In Trail Restrictions and Fix Closures from TFM Flow data.
  o If a restriction has a recognized qualifier (OTG, ON INNERS, ON OUTERS, ON (FIX)), it will be parsed as a fix closure according to specific rules for each qualifier type.
  o If the qualifier is NONE and there is a MilesInTrail value, the restriction will be parsed as an MIT.
  o If the MilesInTrail value is set in conjunction with another qualifier, the MIT will be applied to the rerouted fixes specified in the fix closures.

Departure gate OTG and INNERS/OUTERS restrictions will be processed as well. Using the OTG and INNERS/OUTERS lookups, the appropriate fix closures will be processed by the TMI Service and distributed to reroute to the appropriate open fix.

2.13 TOS Service

- Created a server to manage TOS data:
  o Handles all the flight TOS statuses (Potential, Candidate, Submitted, Approved, etc.)
  o Updates TOS data in response to
    - ATC actions
    - Flight Operator actions
    - Scheduler predictions, such as Target OFF time or Expected Departure Fix Time
- Created a library to generate a static TOS. It leverages a CDR DataStore that loads an NFDC CDR file and uses a RouteParser to calculate route distance. The algorithm to generate a TOS for participating airlines and departure airports is:
  o Add the Filed route as the first element of the TOS. RTC=0.
  o Find all CDR routes that match the flight's origin and destination.
  o Calculate the distance of each route
  o Look up the departure fix and departure fix gate of each route
  o RTC = max (minimum RTC, en route cost multipier * (TOS route distance - Filed route distance) / filed speed)
  o Apply RTC upper and lower thresholds
- Created a static TOS generator.
  o A TOS is generated for all flights whose major carrier is AAL or SWA with filed flight plans containing a departure airport of DFW or DAL.
  o Airline-specific values (for AAL and SWA) are used when computing the RTC. The values include:
    - Minimum RTC
    - RTC Cost Factor
  o Since these values are proprietary, a flag was added to disable the use of those values during demonstrations.
  o A new TOS is generated when a flight plan is filed or if the flight diverts.
  o A CDR is not included in the TOS if it already matches the Filed route or if it is a duplicate.
  o A CDR is not included if its name pattern matches 8N or 9S. Excluded name patterns are set in a configuration file.
  o A TOS is no longer created for flights that have departed
- Updated to allow only one ATC Approved route per TOS. When a TOS route is ATC Approved, the TOS "Filed" route will switch to the "approved" route and all RTC values will be re-computed.
- Updated to reject ATC or Flight Operator actions if flight has departed or is cancelled.

2.14 TTP

- Changed MetricsService and TfdmSwimEngine to allow TTP data to be published for multiple airports from the same system.
- Corrected Flight Data flight identification information to be entered into the TfdmFlightType's FlightIdentification instead of FlightIdentificationPrevious field.

3   Release 5.1.0

3.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.1.0. Version 5.1.0 was deployed on 17 July 2019 to DFW only.

3.2   Adaptation

- (**DFW**) Updated the runway decision tree based on the latest analysis looking at destinations and aircraft type/weight class.
- (**DFW**) Decreased the size of the 17C, 35C, 18R, 36L runway detection boxes and runway queue boxes so that they're not touching the boxes of neighboring runways to reduce runway detection errors.
- (**DAL**) Added wake vortex separation dependencies for different runways. Flights at DAL share a common first fix, so regardless of departure runway, they will be separated as if they depart the same runway.

3.3   Metroplex Planner and STBO Clients

- Added features to Metroplex Planner D10:
    - o TM Actions:
        - ▪ Added the ability to change or schedule runway utilization for any airport in the STBO Metroplex system
        - ▪ Added the ability to add or schedule runway closures for any airport in the STBO Metroplex system
- Added features to Metroplex Planner DFW and DAL:
    - o Taxi List
    - o Map toolbar:
        - ▪ Added Open/Close Links
- Added features to Metroplex Planner D10, DFW, and DAL:
    - o Create Map:
        - ▪ Changed to be a menu of DFW or DAL - the airport background and airport-specific features will referenced to this airport
    - o Map File menu:
        - ▪ Added Recycle Flights
    - o Map View menu:
        - ▪ Moved "Show" toggles to Airport Settings dialog which can be configured on a per-airport basis
        - ▪ Added options to show/hide departure/arrival flights which can be configured on a per-airport basis
    - o Map toolbar:
        - ▪ Added Toggle Arrival / Departure DB
        - ▪ Added Setup Range Rings
        - ▪ Added Rotate Map
        - ▪ Added Setup Arr/Dep Fixes and Airports
        - ▪ Added Setup Target Trails

- o Map display:
    - Updated to display the airport layout for both DFW and DAL
    - Updated to display runway closures regardless of the airport for which the map was created (e.g., the map created for DFW will still show DAL's runway closures)
    - Updated to display features toggled via the Setup Map dialog for all airports
    - Updated display to include the name of the airport for which the map was created in the window frame, since it can be different than the primary airport (e.g., a Metroplex Planner DFW creates a DAL map: the window title will be "Metroplex Planner – DFW Map <n> : DAL"
    - *Potential source of ambiguity: if there is a MIT restriction constrained to DFW only (e.g., there will be no indication on the map restriction display that there is an airport inclusion (or exclusion) constraint)*
  - o Per-flight right mouse menu
    - Added Exclude from APREQ / Fix Closure / Ground Stop / MIT
    - Added Undo Exclude from APREQ / Fix Closure / Ground Stop / MIT
    - Added Suspend
    - Added Return to Ramp
  - o Departure Fix table
    - Updated table to identify MIT or fix closure restrictions which are specific to an individual airport (e.g., an MIT constrained to include DFW only will be flagged with "DFW")
- Removed features from STBO Client DFW and DAL:
  - o TM Actions:
    - Removed TOS Operations
- Added features to STBO Client DFW and DAL:
  - o Map File menu:
    - Added Recycle Flights
  - o Map View menu:
    - Moved "Show" toggles to Airport Settings dialog which can be configured on a per-airport basis
    - *Note STBO Clients do not have the option to toggle arrival and departure icons like the Metroplex Planners do. This is because the arrival/departure toggles are meant to help distinguish flows from different airports. Since the STBO Clients only show data from a single airport, these toggles were not included.*
  - o Per-flight right mouse menu
    - Added Change Parking Gate
  - o Map background
    - Updated to display only restrictions that pertain to that airport
    - *Note that the STBO Clients display the airport layout and traffic for only that airport (e.g., STBO DAL will not display DFW's airport layout or DFW traffic).*
- Added features common to all Metroplex Planner and STBO Clients:
  - o Changed the color scheme specification from one per timeline/map to dual arrival and departure color schemes. The dual color schemes are also reflected on the timeline/map legend.
- Improved features common to all Metroplex Planner and STBO Clients:
  - o Updated to display range rings, mile markers, and arrival fix markers relative to the airport for which the map was created
  - o Moved the "Schedule Config Change" option from the flight-specific timeline right mouse menu to the timeline right mouse menu, below the Timeline Settings option. This option is available when the user activates the right mouse menu button within

the timeline time column. *(Note: This option does not appear for the D10 user since this user does not have an airport defined.)*

- Updated the TOS Departure Table:
  - Added the save-for-quick-create functionality to individual TOS tables.
  - Changed the "Top" data fields. Previously, the TOS departure table only displayed the best route in the top data fields. When the Flight Operator submitted a route that didn't match the best route, then that route was not displayed in the top data fields. This has been changed so that when the Flight Operator submits a route, the TOS Departure Table shows the submitted route in the top data fields. When there are more than 2 routes that have been submitted, the TOS Departure Table shows the best of the submitted routes in the top data fields. The new logic for the "Top" route is:
    - Approved route, if one exists
    - Best route of all submitted routes, even if no route is a "Candidate"
    - If no route is submitted, the best "Candidate", non-submitted route, if one exists
    - Otherwise, top route = filed route
- (**DAL**) Corrected the runway utilization label on the main toolbar to show DAL's utilization instead of DFW's on DAL Clients.

3.4 Tactical Scheduler

- Removed preferential treatment of AMA flights over RAMP taxiing flights, such that AMA flights with a later pushback time than RAMP flights always have a later target takeoff time than RAMP flights.
- Modified to allow a TCOT flight to be eligible for a slot prior to the defined TCOT, to correct the problem that TCOT flights were unable to compete for a slot, even if considered early.

3.5 Terminal Scheduler

- Changed to apply a default 5 MIT separation for the duration of the fix closure when fixes are combined.
- Improved handling of flights at the end of a MIT restriction.
- Removed enforcement of separation at the fix for aircraft with piston or turboprop engine classes. They will still be separated at the runway.
- Improved the sort algorithm.

3.6 TMI Service

- Changed to update a MIT from TFM Flow using the matching departure fix when the MIT is sent with a departure procedure as the restricted element.
- Fixed a bug where TRACON wide restrictions were only being partially recovered after a restart.
- Modified to parse the TFM Flow MIT and fix closure cancellation messages as removal messages and automatically cancel the restrictions in STBO.
- Modified to process TFM Flow messages with 'SWAP' in the qualifier as fix closures. The restriction elements will be one or more departure fix/procedure names with the keyword SWAP in the qualifier field followed by a departure gate (e.g. LOWGN SWAP WEST).
- Removed linking of DAL's airport configuration with DFW's so that DAL's airport configuration will no longer be automatically updated when DFW's airport configuration changes.
- (**DAL**) Added 13L/31R runway closure to default TMIs, which will be loaded at startup and after TMI reset.

3.7   TOS Service

- Removed international flights from TOS processing due to international flights having bad routes caused by the lack of data on international airports and NAVAID elements.
- Added the ability to use the departure runway and fix times which can be saved at the time of pushback for use in delay computations, instead of the current, constantly-updating times.
- Retained the original filed route even when a new route is approved. Previously, once an alternative route was approved, the eligibility and comparison to the other routes defaulted on the new route, which means that all flights with the approved route showed Potential in the eligibility state. The logic assumed that the flight was on its new route and thus was looking for other opportunities. However, this logic was counter-intuitive and prevented tracking the delay savings at the TOS Departure Table level. To address this, the original filed route is retained even when a new route is approved, and is used when showing delays savings, eligibility state, and other TOS data. The filed route will always be the real NAS-filed route.

3.8   TTP

- Updated the MetricsService's REST service to use the aerodrome's passed in parameters to filter the data returned to be specific for the provided airport. This will ensure that the metrics and flight delay information produced by TTP is specific per airport. The TfdmSwimEngine passes the aerodrome to the MetricsService when pulling metrics and delay information for TTP.
- Corrected the TfdmSwimEngine to include the airline in the NasMessage/flight/operator field instead of in the AdditionalFlightInformation when publishing Flight Data.

4   Release 5.1.1

4.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.1.1. Version 5.1.1 was deployed on 20 July 2019 to DFW only.

4.2   APREQ Management System

- Updated TBFM configuration mappings to support long running runway closure.

4.3   Terminal Scheduler

- Improved scheduler performance to speed up iterations, by clearing out scheduler constraints between iterations and removing unnecessary cloning of flights.

4.4   Tactical Scheduler

- Disabled MIT constrains.

5   Release 5.2.0

5.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.2.0. Version 5.2.0 was deployed on 12 August 2019 to DFW only.

5.2   Data Feeds

- Connected system to SWA EOBT data.
- Incorporated SFDPS data to capture CPDLC-DCL equipage status, Field 10A (filed route), and Field 10B (local intended route).

5.3   Small Airport Model

- (**DAL**) Modified system to transition DAL flights directly to TAXI_OUT status on receiving an AOBT.

5.4   Metroplex and STBO Clients

- Enhanced the column headers of the Flights Table and TOS Departure Tables to be multi-line. The column headers can be dragged to set new widths, which can in turn be saved in the user's personal settings file. *(Note: Sometime TOS departure panels in particular still open with the single-line headers. They will update to multi-line if the user just slightly drags one of the column headers.)*
- Added filters to the TOS departure table:
    - Top Total Delay – RTC
    - Destination has APREQ
    - Has EDCT
    - Has Ground Stop
- Added filters to the Timeline Settings:
    - Coord State
    - Eligibility State
- Enhanced the "T" on the timeline data tag when a TOS route has been submitted for approval to continue to display the "T" highlighted in green when the OS route is approved.
- Added a global timeline settings option so users can choose to show either:
    - Closed Fix (new option) or
    - Closed Fix-> Alt Fix (current functionality)

  Since this is a global option that applies to all timelines, it is accessed from the main ToolBar. Click the Settings button, then select the Global Flight Settings tab.
- Added a global settings option so users can choose to show either:
    - Departure Fix Name (current functionality) or
    - Departure Procedure Name (new option)

  This is a global option that affects all timeline data tags, map data tags, the map fix display, and the departure fix status table.   Since this is a global option that applies to all timelines, it is accessed from the main ToolBar. Click the Settings button, then select the Global Flight Settings tab.
- Added the ability to display a flight's airport of origin to the timeline departure data tag. The origin can be displayed by selecting "Origin" in the Departure section of the Timeline Settings.
- Added a "CPDLC" column to the TOS departure table. The field will show "Y" if aircraft have this capability.

5.5   TMI Service

- Updated the parsing such that, when a TFM Flow MIT restriction contains a combination of fix closures/MITs (e.g., qualifier of ON OUTERS with 10 miles on the open fixes), if the miles value is updated to '0', a removal for the corresponding MIT restriction will be triggered in the TMI Service.
- Updated the parsing such that, when a TFM Flow restriction is cancelled through TFM and then re-added with the same/similar start time (within 15 minutes of the original), the TMI

Service will now allow that restriction to be re-added. If the user has removed the restriction, it will still not be allowed to be automatically re-added.

- Disabled processing of refresh messages from TFM Flow. This will only affect the system if there is down time for the TMI Services and a restriction is added/updated during that time period.

5.6   TOS Service

- Enhanced processing to use the filed route from SFDPS to match the CDR route for a TOS re-route. This causes more flights to transition from the TOS route "Approved" status to the TOS "Reroute Filed" status.
- Switched the TOS delay calculations back to using UTOT (instead of UTOT at pushback).
- Corrected problems that caused Candidate routes to display an ETOT for the reroute earlier than the EOBT.

6   Release 5.2.1

6.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.2.1. Version 5.2.1 was deployed on 19 August 2019 to DFW only.

6.2   STBO Client

- Enhanced the green highlighted "T" on the timeline data tag previously displayed when the Coordination State was Approved; it will now also display when the Coordination State is Reroute Filed.
- Updated the shade of blue used on the map for the arrivals landing on DFW 17C/35C.
- Corrected an error which prevented the user from being able to save personal settings.

6.3   Tactical Scheduler

- Updated taxiing flights with an EDCT to be scheduled at the front of the EDCT window. A recent change allowed an EDCT flight to be scheduled at the front of time window when possible, but that change was only applied to flights not yet taxiing.
- Corrected a problem in which priority flights were not sorted properly and thus received higher delay than they should.

6.4   TOS Service

- Removed flights in the UNCERTAIN tactical group from being considered for reroute. The option to mark UNCERTAIN flights as not applicable for reroute is a configurable feature.
- Updated CDRs and route parser data to the August 15 chart date.
- Added support to the NfdcParser to use the CIFP file format that includes the runway-specific routings for SIDs and STARs; previously the NFDC STARDP.txt file was used which did not include the runway-specific SIDs and STARs.
- Corrected a few bugs in route parser distances.

6.5   TTP

- Added filtering of CDM Data Elements in TTP Flight Data messages when sent to non-CDM participants. The original message with all data will be published with the CDM privacy level header. A copy of the message with the CDM elements removed will be published with the

CDM-omit privacy level header. Messages originally containing no CDM elements will continue to be published with the NoSFD_NoCDM header. CDM elements published by ATD-2:
- o   ActualTakeOffTime
- o   ActualLandingTime
- o   ActualOffBlockTime
- o   ActualInBlockTime
- o   EarliestOffBlockTime
- o   DepartureStandDesignator
- o   ArrivalStandDesignator
- o   AircraftRegistrationMark

7   Release 5.2.2

7.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.2.2. Version 5.2.2 was deployed on 09 September 2019 to DFW only.

7.2   Adaptation

- (**D10**) Updated six D10 TRACON map files.

7.3   STBO Client

- (**DFW**) Corrected the abbreviation of fix ARDIA from ARD to RDA.
- Updated the map keyboard shortcuts to change font sizes to be as follows:
  - o   Alt + . Increases font size for flight data tags
  - o   Alt + , Decreases font size for flight data tags
  - o   Alt + > Increases font size for all map labels
  - o   Alt + < Decreases font size for all map labels
- Added a "Block at Industry" permission which will display (ATC) or hide (Flight Operators) flights marked as "block at industry".

7.4   TMI Service

- Corrected an inconsistency between how the Model, TmiService, and Scheduler logic handled a fix closure for an already-rerouted fix. For example, in the case of two fix closures ZACHH -> FORCK and FORCK -> MRRSH, flights that were originally using ZACHH were just rerouted to FORCK in the Model (and on the STBO Client), but the TmiService included the flight in both closures, causing the Scheduler to push those flights back to the end time of the FORCK -> MRRSH. This has been corrected so that flights will only be considered included in a fix closure only if the closed fix matches the flight's original fix. If the closed fix matches the flight's rerouted fix (due to an already existing closure), the flight will not be included in the new closure.
- Corrected a problem in which priority flights were not sorted properly and thus received higher delay than they should.

7.5   TOS Service

- Changed RTC calculations to calculate route distances using the departure runway procedure, instead of skipping the initial points on the SID. When a departure runway assignment changes, the route distances and RTCs are re-calculated.

8 Release 5.3.0 / 5.3.1

8.1 Overview

This document describes the changes to the ATD-2 software baseline for versions 5.3.0 and 5.3.1. Version 5.3.1 was deployed on 18 September 2019 to DFW only. Version 5.3.0 was not deployed.

8.2 System-wide

- Enhanced the configuration of all processes to enable the remaining small airports: ADS, AFW, DTO, FTW, FWS, GKY, GPM, FWH, RBD, and TKI.

8.3 Adaptation

- (**DFW**) Added runway utilization scenarios for the user to utilize different taxi plan strategies. Each scenario is unique in its fix-to-runway mapping.
- (**DFW**) Updated the background map to add:
  - Taxiway S between runway 17C and FedEx ramp.
  - Paved areas extending north on S and M.
  - Paved area around M1, EJ, and runway 17C, mirroring M1 on the east side.

8.4 Model/Small Airport Model

- Improved detection and modeling for diverted flights.

8.5 STBO Client

- Changed the flight timeline data tags to be mirrored around the center of the timeline. Whether on the left or right side of the timeline, the flight ID will always be closest to the timeline column; TMI markers, delay values, etc., will be on the outer edges.
- Updated the handling of user preference files to allow Flight Table and TOS Table sort criteria to be saved and loaded.
- Improved sizing of TOS Flight Menu windows.
- Added the small airports to the "Create Map" options, Map -> View Airport Settings options, TMI inclusion/exclusion criteria, etc.

8.6 Terminal Scheduler

- Added arrivals in airport scheduling.
- Added scheduling of internal departures at both their arrival and departure airports.

8.7 TMI Service

- Added handling for a withdrawal action (value of 39) as a cancellation in the TFM Flow raw XML for MIT messages.

8.8 TOS Service

- Corrected a problem for the case of a closed fix without an alternate fix, which resulted in the TOS Table showing candidate routes via the closed routes.

8.9   TTP

- Added Surface Metering Program messages. When the METERING_MODE_UPDATE and DMP_TYPE event types are received, they are transformed and published in SurfaceMeteringProgram messages via JMS to TTP consumers.
- Added a property to enable/disable the router to split TTP flight data to separate JMS topics per airline. This is disabled by default so that the TTP flight data will be broadcast to a single JMS topic (swim.flightdata.publish).
- Changed publication of data from CLT and DFW/D10 systems to have CDM and CDM-omit messages routed appropriately to TTP consumers (i.e., CDM-omit header to non-CDM consumer topic, CDM header to CDM consumer topic).
- Updated the Metrics Service and Tfdm Swim Engine to track and publish more accurate timestamps in the Operational Metrics TTP messages; previously they were showing truncated timestamps (typically midnight of the publication date, but also reported as sometimes being the previous day). Affected elements:
    - Initial Gate Time Of Departure
    - TMAT (if published, generally not published; note Prior TMAT Times and New TMAT Times lists seem to have accurate times)
    - Actual Metering Control Arrival Time
    - Initial Off Block Time (both from the metering ready time compliance and metering time compliance sections of the message)
    - Actual Movement Area Entry Cleared Time
    - Actual Takeoff Time

9   Release 5.3.2

9.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.3.2. Version 5.3.2 was deployed on 12 October 2019 to DFW only.

9.2   TOS Service

- Updated the TOS Adaptation Data to reflect the 10/10/19 AIRAC that included multiple SID definition changes impacting Dallas.

10 Release 5.4.0

10.1 Overview

This document describes the changes to the ATD-2 software baseline for version 5.4.0. Version 5.4.0 was deployed on 4 November 2019 to CLT and DFW.

10.2 Adaptation

- (**DAL**) Updated the default gate decision trees to assign GA flights a default runway of 13L/31R.
- (**DAL**) Updated the TRACON video maps file.
- (**DFW**) Updated the default taxi speed decision trees for arrivals in the AMA, which will result in more accurate predictions.

10.3   AEFS

- Changed an arrival's gate conflict flag to be turned off when the departure pushes back. (This impacts AEFS only; STBO Client and RTC are unaffected.) This functionality is very complicated and may still show a conflict for some flights, for which work is still ongoing.

10.4   APREQ Management Service

- Enabled APREQ pre-scheduling for EWR and LGA, with a pre-scheduling time window of 10 minutes.

10.5   Fuser

- Updated the preferred sources in two Fuser mediation rules to have the following order:
    - AirlineParkingGateRule: TFDM, FlightHub, FlightStats
    - DepartureStandEarliestTimeRule: TFDM, Airline (obsolete FlightHub_EOBT was removed)

10.6   RTC

- Corrected flashing in the Priority Flight List window.

10.7   Small Airport Model

- Enabled the automatic airport configuration monitor for DAL airport to only detect an airport configuration change based on an actual, position derived, or user-specified runway assignment.
- Corrected scheduling for DAL arrivals which were not being scheduled into the arrival runway with the NASA-TBFM STA nor the TFMS ETA.
- Corrected scheduling for DAL departures which were hovering on the timeline at "current time + taxi time".

10.8   STBO Client

- Added the ability to select multiple flights to exclude or undo-exclude from an APREQ in the flight right mouse menu. This makes the APREQ functionality consistent with other TMIs, such as MIT and Fix Closure, which already had the ability to exclude or undo-exclude multiple selected flights.
- Corrected the "Exclude from <TMI>" flight right mouse menu options so that they work for TFM-added TMIs. They formerly only worked for user-added TMIs.
- (**CLT**) Added the "Setup Target Trails" feature to the map toolbar.
- Corrected the timeline Engine Type filter so that it no longer removes all flights from the timeline.
- Corrected the initialization of the TM Actions -> Runway Utilization panel when the user opens the panel using the timeline's right mouse menu option "Schedule Config Change."
- (**DFW, DAL**) Updated the Departure Fix and Departure Gate color schemes to display internal departures in white.
- (**DFW, DAL**) Updated the Departure Fix and Departure Gate color schemes to display DAL 13L/31R arrivals in gray.
- (**DFW, DAL**) Updated the Arrival Runway color scheme for satellite airports.
    - West arrivals for DTO, AFW, FTW, FWH, FWS, GKY and GPM will be displayed in a dark mustard.

- o   East arrivals to TKI, ADS, HQZ, and RBD will be displayed in teal.
- **(DFW, DAL)** Updated the list of selectable airports in the "Select Airport" Window in the TM Panel as follows:
  - o   Removed ADS, TKI, HQZ, RBD, GPM, GKY, FWS, FTW, AFW, DTO, FWH, ASE, EGE and MEX
  - o   Added EWR, JFK, FLL, BWI, IAD, TEB and MDW
- Added "Destination" to the field options for arrival data tags in the Timeline Settings.
- Updated the Departure Fix and Departure Gate color schemes to display a flight with a CDR to a different gate to display the swapped fix in the new fix/gate's color scheme.
- Enhanced the Flight Plan Demand timeline feature to provide the option to display the count based on a rolling time window. In addition, the chosen flight plan demand type (rolling window or fixed time range) can now be saved in the user preference file.
- Updated the TM Actions panel to allow the user to select multiple rows of restrictions to modify the end time.   The TMIs that can be modified as a group are the APREQ Schedules, Departure Fix Closures, MIT Restrictions, and Ground Stops.
- (TOS) Trimmed the width of each TOS panel within the TOS Departures Table so that the scroll bar and close button are at the end of the data instead of at the right edge of the window.
- (TOS) Added an option to the toolbar of each TOS panel within the TOS Departures Table toolbar which will allow the user to limit the number of rows shown; the default is 10.
- (TOS) Renamed the Coordination State of "Operator Submitted" to "FO Submitted".
- (TOS-ATC) Expanded the TOS Operation panel in the TM Actions to become the TOS Route Availability Monitor (RAM).
  - o   The RAM provides the ability to:
    - ▪   Turn TOS on and off (prior functionality)
    - ▪   Exclude destinations globally from all routes
    - ▪   Restrict each CDR individually with an option to set exclusion/inclusion constraints
  - o   The CDRs are grouped by direction and then by departure fix/procedure. The user can choose whether to display the fix name or the procedure name by using the main Toolbar -> Settings -> Global Flight Settings -> Departure Fix Display option.
  - o   Each CDR is displayed with its 2-character code on a colored background.
    - ▪   If a CDR is unrestricted, its label will be displayed in green.
    - ▪   If a CDR is restricted with no constraints, it is considered to be "fully restricted" and its label will be displayed in red.
    - ▪   If a CDR is restricted with any inclusion/exclusion constraints, it is considered to be "partially restricted" and its label will be displayed in yellow.
- (TOS) Enhanced the background map to display CDR labels to show a route's restriction status.
  - o   A label is drawn for each CDR in the green/yellow/red color of its restriction status.
  - o   The labels can be toggled on or off using a button on the map's tool bar.
  - o   Clicking on a partially-restricted (yellow) label will display the exclusion/inclusion constraints for that route.
- (TOS) Added notifications to the Notification Window when TOS CDR restrictions or the global destination exclusions are changed.
- (TOS-FO) Added a view-only version of the TOS Route Availability Monitor for Flight Operators. To access it, a TM Actions button was added to the main toolbar with the option "TOS View Route Availability Monitor".
- (TOS-FO) Enhanced the Flight Operator functionality to exclude and undo-exclude a flight from TOS operations. This option is available in a flight's right-click menu on the TOS Departure Table. When the user selects the Exclude option, a popup dialog will be presented to allow the user to enter a scratch pad entry which will only be visible to that Flight Operator,

but not to ATC. (Note: if the ATC previously entered scratch pad text for a flight, the Flight Operator's text will erase the ATC's entry. This is because the scratch pad only displays the latest entry.) When excluded, the flight's Coordination State will be set to "FO Excluded" and the Eligibility State will be set to "Excluded". These states can be used in filters and can be color-coded in the TOS tables.

10.9   Tactical Scheduler

- (**CLT**) Added a compression algorithm and detection for whether it should be executed for a runway. This is not enabled for DFW.
- Corrected exempt flights with an APREQ or EDCT time to be scheduled to the flight's APREQ or EDCT time, instead of scheduling the flight as an exempt flight with no controlled time.
- Updated processing for flights that have a long taxi time so that they are no longer at a disadvantage competing for runway slots against flights with a short taxi time.
- Updated processing for flights that have an APREQ time to be eligible for slots that are up to 2 minutes earlier than its APREQ time.
- Changed the use of the SMP start time freeze to be the default.

10.10 TMI Service

- Updated the TOS mode TMI handling to support filtering flights by destination and also CDR-specific inclusion/exclusion filters.
- Added functionality to mark CDRs in the system as available/not available based on the restrictions set up for the CDR on the TOS RAM panel in the STBO Client.
- Added processing for the case when a fix is closed without an alternate fix or is closed with alternative fix/route that matches a SWAP (alt fix is located at an adjacent gate). In this case, any CDRs using that fix will be marked as not available. For example:
  - A CDR should be marked as unavailable when:
    - AKUNA is closed with no other alternative fix.
    - AKUNA is closed with ZERLU/ZACHH as the alternative fix.
  - A CDR should be marked as available when:
    - AKUNA is closed with GRABE as the alternative fix. (The reason is that controllers will deviate the trajectory slightly, locally. This type of closure within the terminal gate typically does not require a change of flight plan. For this reason, the CDR will remain usable.)

10.11 TOS Service

- Enhanced TOS Service to support single-flight and global exclusions instigated from the STBO Client.
- Removed all the non-corner CDR routes from consideration by the TOS Service. Going forward, the TOS Service will only utilize CDRs that use the corner departure fixes, relative to DFW/DAL.
- Updated CDR and NFDC adaptation to the latest AIRAC.
- Set the SWA minimum RTC to 30 seconds.
- Enhanced to automatically exclude flights with an APREQ, EDCT, or Ground Stop TMI from TOS operations.

11 Release 5.4.1

11.1 Overview

This document describes the changes to the ATD-2 software baseline for version 5.4.1. Version 5.4.1 was deployed on 14 November 2019 to DFW only.

11.2 Adaptation

- (**DAL**) The taxi speeds for KDAL airport were updated from 12 knots to 6 knots. This is because the previous iteration of taxi speed updates for KDAL airport included the pushback buffer in the system, causing excessive undelayed ramp taxi times.

11.3 RTC

- In the last release, a bug was introduced which caused the flights in the departure list to be displayed in green. This has been corrected to display the flights in brown and blue as expected.

11.4 Small Airport Model

- Previously, logic was introduced to hover a KDAL departure (or any small airport departure) at the current time once the current time > UTOT at OUT. This logic worked, but it did not update the departure fix undelayed time which was still calculated using the UTOT at OUT, which resulted in the UTOT possibly surpassing the undelayed departure fix time as time elapsed. This logic has been updated to use the same UTOT as the undelayed flight scheduler, and a check was added so that if the flight didn't have position data and had not yet pushed, the starting time for calculating the undelayed fix time would be the max of the current time or the undelayed time of the last point in the taxi trajectory.

11.5 STBO Client

- The 'Destination' field was added to the map data tag options for arrival flights.
- The behavior of the TM Actions window was changed for the case of the user clicking the 'X' button in the corner of the TM Actions window to close the window instead of using the Apply or Cancel buttons. Previously, the window was left in an inconsistent state. Now, the window will be closed as if the user has pressed the Cancel button. This same handling was added to all other dialog windows of the Client.
- (**DFW**) "ATC Excluded" was added to the Coordination State filters, and it was given a default color alert of the exclude brown.
- (**CLT**) When the STBO timelines display the yellow diamond indicating that an APREQ event requires acknowledgement, the location where the user clicks should have been relative to the position of the yellow diamond in the datablock. However, when the timeline data tags were changed so that the left side was a mirror of the right, the detection for the mouse click was not updated such that the user had to click to the right of the data block even if the APREQ acknowledgement diamond was on the left. This has been corrected.
- For any right mouse menu command that can be used on multiple flights, the requirement that all selected flights must be subject to the same airport configuration was removed, with the exception of "Change Runway". Also, if a flight cannot be processed in a multi-flight command, a dialog will pop up telling the user why the flight cannot be included and the flight will be de-selected.

11.6   Tactical Scheduler

- (**CLT**) The compression algorithm was changed to use the standardized delay distribution algorithm prior to freezing. As a result, the gate delay should be at most the currently defined target queue for that runway.

11.7   Terminal Scheduler

- (**DFW**) A terminal scheduler property was changed to allow converging runway separation criteria (e.g., ADW) to be used in the terminal what-if airport scheduler. This solves the problem where the airport scheduler did not include the separation between departures and arrivals on the converging runway which resulted in the what-if scheduler seeing gaps on the timeline that it thought a what-if flight could fill when in fact an arrival was on the converging runway.
- (**DFW**) A problem was corrected that had resulted in all flights already scheduled being assumed to be included in the MIT for the current flight. When finding an available time in the scheduler, the previous version passed in a full list of flights already scheduled to find an available time. When enforcing a MIT for a flight, the entire list passed in was assumed to be involved in the restriction, so the flight was being scheduled against all flights as if they had MIT, even arrivals. This was creating excessive delay in the system. The change made now passes only the list of flights involved in the same restriction so the MIT could be properly enforced against only the flights it needed to.
- (**DFW**) When there is a MIT, this change allows unrestricted flights to drop down the timeline to fill in gaps that were spaced out due to MIT-restricted flights. Prior to this change, the unrestricted flights would be delayed and not allowed to drop down into the gaps.

11.8   TOS Service

- (**DFW**) Previously, APREQ, EDCT, and GS flights were assigned a NOT_APPLICABLE TOS coordination state by default; this in turn caused flights to be filtered out of the STBO Client's TOS Departure Table. In order to allow these TMI flights to still be visible in the Client, the TOS Service was changed to marks these flights' coordination state as ATC_EXCLUDED instead of NOT_APPLICABLE and the eligibility state to always be marked as EXCLUDED.
- (**DFW**) The TM Action's TOS Operation panel will continue to retain the last set of restrictions even when the TOS state is changed to 'inactive' during the course of the day, but the panel fields and all restrictions will be cleared out after the nightly TMI reset.

12   Release 5.5.0

12.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.5.0. Version 5.5.0 was deployed on 17 December 2019 to DFW and 19 December 2019 to CLT.

12.2   Adaptation

- (**SFO**) Updated the default gate decision tree.
- (**SFO**) Updated all adaptation to match the new gate numbering.
- (**CLT**) Updated the default gate decision tree for the following airlines:
  - DAL was updated to A13.
  - CPZ and EDV were updated to A5.
  - SCX was updated to A12.
- (**CLT**) Updated gates blocked by heavies to show:
  - A12 blocked by A10.

- o   A8 blocked by A6 and A10.
- o   A4 blocked by A2 and A6.
- Updated the default spot decision tree for cargo flights.

12.3   AEFS

- Refined the conflict indicator logic to improve accuracy.

12.4   Fuser

- Improved handling for internal departures.

12.5   Model

- (**DFW**) Changed the default runway assignment for departures with a closed fix to assign the default runway based on the fix from the original route, not the alternate fix.
- (**DFW**) Added modeling of divergent departure operations by deriving if a departure flight will fly over an inner or outer waypoint, using a decision tree based on runway and departure fix.
- Updated the gate conflict detection occupancy windows:
    - o   The occupancy window for departures without a previous arrival was changed to always start based on UOBT.
    - o   The departure occupancy ending time was changed to always check for actual OUT time first.

12.6   RTC

- Added a watermark to RTC/RMTC when Compression occurs for a runway. The feature it is enabled by default, but can be disabled by de-selecting Map Options -> Show Compression Alert. The value of this setting can be saved in the user profile.
- Added the ability to sort the Metered List by any column by clicking on the appropriate column title.
- Changed a non-surface metered flight at the gate to revert from the READY state to the state it was in before (PLANNING or UNCERTAIN) if a Hold was put on it and then undone. Previously, the flight remained in the READY state.

12.7   STBO Client

- (**CLT**) Updated color schemes:
    - o   The Arrival color scheme was updated to be a brighter grayish white to improve visibility.
    - o   The Arrival Runway and Departure Runway color schemes were updated to show flights on 18R/36L as yellow.
- (**DFW, DAL - Metroplex Planner and STBO**) Added "OPSNET" to the timeline datatag for the DFW and DAL towers. It is set using the flight's right mouse menu. When selected, "OPS" displayed in black on a gray background on the timeline datatag. It can only be set and viewed on the timeline data tag if the Client's airport matches the flight's airport (i.e., a DFW Client cannot set/view a DAL flight's flag). However, OPSNET was also added to the Flights Table which can be viewed by any user, but an airport filter can be used to restrict the list of flights to only one airport.
- (**DFW, DAL - Flight Operators**) Removed the runway filter for all panels in the TOS Departure Table.
- (**DFW, DAL - Flight Operators**) Renamed the "TOS View Route Availability Monitor" tab to "TOS Operations".
- Added an option to display the datatag information on the left side of the timeline to be in the same order as the right side (left to right) to the Global Settings tab of the Settings window. This option can be saved in the user preference file.

12.8   Tactical Scheduler

- (**CLT**) Corrected a persistent error in the SMP prediction accuracy results when looking at flight count. Flights in the ramp were not being included.
- (**CLT**) Corrected the order of consideration sequence to RBS. This had been RBS starting in the 4.4 release, but was set to FCFS in the 5.3 and 5.4 releases.

12.9   Tactical and Terminal Schedulers

- (**DFW**) Changed the network to use the new Multi-Network slot algorithm.

12.10 TMI Service

- Added automatic exclusion of prop and turbo flights from MIT restrictions. This will apply to all MITs regardless of entry point (e.g., user, TFM, OIS).
- (**DFW**) Added parsing of reroute advisories from TFM Flow data. Any valid advisories are used to mark coded departure routes as not available. Reroutes are matched to coded departure routes based on the origin and destination of the routes.

13   Release 5.6.0

13.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.6.0. Version 5.6.0 was deployed on 30 January 2020 to CLT only.

13.2   Adaptation

- (**CLT**) Updated the gate adaptation:
  - Wide-body or B757 on A4 blocks A2 only; blockage of A6 was removed.
  - Wide-body on A8, blocks A6 only; blockage of A10 was removed.
  - Gate A2A was removed.

13.3   AEFS

- Corrected a problem in which flights from AEFS weren't being distributed to the Fuser and, because the Fuser didn't have knowledge of the AEFS flights, then TMI and other flight data was not being published back to AEFS.

13.4   Data Feeds

- (**CLT**) Changed the highest source for gate data back to the AAL FlightHub data feed. In a previous release, TFM Terminal Flight data was made the highest priority of gate data as this will be the only source available to TFDM. However, due to the resulting lag in gate updates at CLT, the highest source for gate data was changed back.

13.5   Model

- (**DFW**) Identified individual departure queues within a runway queue box and assigned the appropriate queue to the trajectory of a flight when a flight is in that queue in order to enable better prediction of divergent departures at DFW. A flight's predicted departure queue is used by the tactical scheduler.
- (**DFW**) Corrected a bug in the trajectory determination code that resulted in flights in the departure queue calculating UTOT based on the next defined node rather than current flight position; this bug resulted in flights getting the same UTOT and showing up swapped in the timeline.

- (**DFW**) Corrected the surface flight states for internal departures so that they no longer toggle between RAMP_TAXI_IN/TAXI_IN or RAMP_TAXI_OUT/TAXI_OUT.

13.6   RTC

- Disabled the "Freeze Advisory" in the RMTC's Flight Menu for flights which do not have a time available to freeze, in particular:
    o   TMI APREQ flights, where the APREQ has not yet been negotiated,
    o   TMI EDCT+APREQ flights, where the APREQ has not yet been negotiated, and
    o   Non-TMI flights with no Gate Hold Advisory or are unmetered.

13.7   STBO Client

- (**DFW**) Changed delay savings to be negative on the Client (TOS Tables, TOS Flight Menu, and right click info when submitting and approving). Negative value means less delay and earlier departure time. Positive value means accumulation of delay and later departure time.
- Changed taxiway closures to now be treated as persistent until reopened by the user instead of tracking the start/end times of the individual taxiway closures.
- Corrected a problem in the TM Action panel applying Filed Altitude constraints.
- Updated the handling of the APREQ time so that if an APREQ release is cancelled, the APREQ time will be cleared, which results in the recalculation of the dependent flight times. Previously, if an APREQ release time for a flight was assigned and then cleared, the STBO Flight Table still showed values for TOBT, TMAT, TTOT, APREQ, and APREQ Roll and the placement of the flight on the timeline was at the TTOT derived from the release time.

13.8   TBFM / IDAC Proxy

- Modified TBFM's WSRT to handle a MIT Constraint Message. The message is created in IdacProxy and forwarded to TMWS.
- Applied regular Chart Change Updates (CCU) to the ZFW, ZTL, and ZDC adaptation sets.

13.9   Terminal Scheduler

- Added a basic "Slot" algorithm for the Terminal Scheduler. There will be only 4 different flights types to consider:
    o   flights with actual takeoff time,
    o   flights with APREQ time,
    o   flights with EDCT, and
    o   normal flights.

    For the algorithm, actual flights will have a rigid STA similar to arrival flights in the large airport scheduler; control flights will have higher priority than normal flights for a given slot, but can be pushed back slightly to ensure separation with the earlier flights; and normal flights will be scheduled if no control flights are eligible for a given slot. This change should reduce overall delays by allowing some flexibility to APREQ/EDCT flights' STA while ensuring they have higher priority than normal flights. In addition, introducing the slot algorithm will pave the way for a more complicated algorithm in future work.

- Reduced the scheduling window from 480 to 120 minutes.

13.10 TTP

- Updated the ArrivalStandAvailability field for TTP flight data to mark this field as not available if the arrival has a gate conflict.
- (**CLT**) Corrected a missing property in the CLT configuration files that prevented all flights from having TTP metrics published. (Previously, TTP was only publishing for flights departing to/arriving from DAL or DFW.)

14 Release 5.7.0 / 5.7.1

14.1 Overview

This document describes the changes to the ATD-2 software baseline for versions 5.7.0 and 5.7.1. Version 5.7.1 was deployed on 14 February 2020 to DFW only. Version 5.7.0 was not deployed.

14.2 RTC

- Updated the "Exempt from Metering" checkbox in the Flight Menu to be disabled if the flight is not on the ramp or at the gate (i.e., when in AMA/queue/runway), or if it has a TMI. It is still available when the flight is in the ramp, even if metering is off.

14.3 Small Airport Model

- Enhanced the Small Airport Model to call the Tactical Scheduler for DAL flights. This will result in more accurate TTOT times, which will in turn improve the accuracy of scheduling at the departure fix for all flights in the DFW Metroplex.

14.4 STBO Client

- (**DFW**) Updated the timeline data tag to display "filed fix -> approved fix" when a Flight Operator's submitted TOS route has been approved by ATC until the reroute is filed. Each fix is displayed in the color appropriate for that fix based on the timeline color scheme.
- (**DFW**) Added a table to show the availability of all TOS CDRs. The table can be opened by clicking the "List" button in the "CDR Info" box on the TOS Operation tab of the TM Actions panel.
  - o The table displays the CDR name, origin, destination, departure fix, departure gate, procedure, and the route availability as "Y" in a green field, if it is unrestricted, or as "N" in a red field, if it is restricted.
  - o A "Search" field allows the user to search for procedures by procedure name or departure fix. Matching procedures are highlighted only one-at-a-time, but up/down arrows are provided to navigate to the next and previous matching procedure.
  - o If TOS mode is active, the currently highlighted route will be drawn on the map in green, if the route is unrestricted, or in red, if the route is restricted (this is why only one procedure at a time is highlighted in the route table).
  - o The table also has a toolbar to allow the user to change the table columns, set color alerts, and filter the procedures; these settings can be saved in the user's preference file.
- Enhanced the Search functionality to accept "GA D" and "GA A" to show only departure or arrival general aviation flights, respectively. The existing ability to show all general aviation flights when only typing "GA" has not been affected.
- Enhanced the Map background color to change to a tan/beige color if the user clicks the "Open/Close Links" button to alert the user that the Open/Close Link mode has been activated.
- Added the "AMA Only Datablocks" option to the Map settings. When selected, flights in the AMA will display both their icon and their data tag, while flights in the ramp will display their icon only (no data tag). When de-selected, both the icon and data tag will be displayed for all flights in both the ramp and the AMA. This option is available from a map's View -> Airport Settings dialog. Note this option affects only those flights displayed based on the other view options, such as Flights At Gates, Departures, etc.
- Updated timelines to display a flight's APREQ or EDCT times in the data tag even after the flight has taken off; previously the APREQ or EDCT time was removed from the data tag display at OFF.

- Modified the entry of Runway Closures on the TM Actions panel to persist the runway closure indefinitely if no end time was set.
- Modified the entry of start and end times on all TM Action panels from a format of "dd/hhmm" to simply "hhmm". All times entered are assumed to be future times.
- (**DFW**) Corrected file permissions on the user preference files so that the user should be able to update and save existing SCF files.

14.5   Tactical Scheduler

- Applied a minor correction to flights with a pending APREQ.

14.6   Terminal Scheduler

- (**DFW**) Enhanced scheduling to use the embedded tactical scheduler for DAL scheduling. The TCOT for DAL flights with an EDCT will now be scheduled to their EDCT earliest window.

14.7   TMI Service

- Added processing of TFM Reroutes with the reason listed as 'WEATHER'. The first implementation of reroute parsing excluded these routes.

14.8   TTP

- Added Fix Closures in TrafficManagementRestriction messages.

15   Release 5.8.0

15.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.8.0. Version 5.8.0 was NOT deployed to CLT due to ramifications of COVID-19.

15.2   Adaptation

- (**DFW**) Updated twenty D10 TRACON video maps, six of which affect the STBO D10/DFW and D11/DAL video map files (both are identical). The most obvious changes are the dates in the maps' legends.
- (**CLT**) Updated the location of gates E31-E38C. The orientation of some gates were also updated for the map display.
- (**CLT**) Updated the arrival spot decision tree to reflect arrivals, previously going through spot 11W when arriving on RWYs 18C or 18R, now going through spot 22 after completion of construction.

15.3   APREQ Management System

- (**CLT**) Updated the prescheduling flag for ORD to only trigger when a flight is within 10 minutes of the EOBT.

15.4   RTC

- (**CLT**) Changed the metered flight list to only update after each scheduler run (i.e., once every 10 seconds).
- (**CLT**) Corrected the problem noticed by users in which the EDCT showed as "0000" for flights after the EDCT was removed.

15.5   STBO Client

- (**DFW**) Removed HANUH_1P and ROOOO_GC from the TOS CDR groups.
- (**DFW**) Updated the option on the map toolbar to show TOS routes so that the user can now display the TOS routes whether the TOS mode is active or inactive.
- (**DFW**) Added a new tab to the TM Actions Panel to display DCC Route Advisories. This tab will display advisories for ZFW, ZHU, ZME, ZAB, and ZKC. As with other data tables, the user will have the ability to configure odd/even row colors, to color fields based on origin or destination, to change displayed columns, and to save the table configuration in the user preference file.
- (**DFW**) Enhanced the TOS Operation tab of the TM Actions panel to distinguish parsed vs user restrictions and to utilize the CDR settings window to allow user modifications to restrictions.
- (**DFW**) Added TOS predicted delay savings metrics to the data tables. Certain fields can be used in table filters and color alerts.
- (**DFW**) Updated the display of the departure fix/gate in the TOS Departure Table and TOS Flight Menu to display the associated departure fix/gate for alternate routes, but display the departure fix/gate according to what a restriction is requiring for the filed routes. For example, if a filed route is through the EAST gate, but the EAST gate is closed with a CDR to the NORTH gate, then the NORTH gate will display for the filed route.
- (**DFW**) Added the following airports to the "Select Airport" window and the "Destination" tab of the constraints window: AMA, CRP, GGG, IND, JAX, LBB, MAF, MLU, SHV, SJC, SJT.
- Added the "Airline" field to the list of available columns in the Flights Table.
  - o   (**DFW**) Added the field to the TOS Departure Table also, and added it as a criteria in the TOS Departure Table filter options.
- (**CLT**) Added a new "APREQ Pre-Scheduling" tab to the STBO Client Settings window. The tab can be used to toggle whether prescheduling is enabled or not. The toggling will trigger a request be sent to the APREQ Management System to disable/enable prescheduling.
- Added a new menu item "Change Font Size" to the STBO map "View" menu. The new dialog will allow the user to increase, decrease, or reset the font size for map flights and map elements (e.g., departure fix labels).
- Enhanced the layout of the main ToolBar:
  - o   Increased the size of the configuration label to accommodate the longest runway utilization names at an airport; previously, the longest names were being truncated at **CLT.**
  - o   Enhanced the toolbar to be resizable if the user drags the ToolBar window frame. The extra space will be given to the notification banner. This is of primary benefit at **DFW** for TOS notifications with multiple inclusion/exclusions which previously were not able to be fully visible.

15.6   Tactical Scheduler

- (**DFW**) Added a new algorithm to schedule flights based on a diverging route scheduling algorithm.
  - o   The diverging route algorithm will only execute when there is enough demand for a particular slot. An adaptation was created to define by runway how many flights must be competing for a particular slot to determine whether there is enough demand (currently 2).
  - o   A valid divergent flight needs to meet the requirement of:
    - ▪   has a divergent route
    - ▪   and flight ETA <= last scheduled flight STA + adaptation defined buffer (currently 65 seconds).
  - o   The diverging route scheduling algorithm will pick the diverging flight when the differences between the two flights' ETAs are within the differential tolerance value (currently 2.5 minutes). If it is not within the tolerance, then the flight with the earliest ETA is chosen.

- o For flights that are competing for a slot that are in the runway queue, the flight with the earliest queue entry time will take the slot.

15.7   Terminal Scheduler

- (**DFW**) Enhanced to calculate aggregate runway delay change for flight TOS options.

15.8   TMI Service

- (**DFW**) Added parsing of TFM Reroutes for adjacent centers (ZME, ZHU, ZAB, ZKC) and using them to determine availability for corresponding Coded Departure Routes. The reroute must include a segment for ZFW, DFW, or DAL to be considered valid for parsing.
  - o The CDR group restriction logic will check the protected segment of a reroute against the CDRs in the group before constraining it. CDR groups will only be constrained by reroute advisories if the corresponding CDRs do not match the protected segment provided in the reroute.
  - o When a fix closure is added to the system, the CDR groups affected by the fix closure will be restricted. CDR group restrictions triggered by related TMIs (fix closures or reroute advisories) will not take effect until after the related TMI's start time.
  - o CDR group constraint updates triggered by fix closures and reroute advisories take effect even when the TOS Mode is inactive, so that users can be aware of the restrictions that will take effect when the TOS Mode is activated.
  - o A CDR group will only be restricted if both the inner and outer pair for that CDR is closed (i.e., both AKUNA and GRABE must be closed to restrict AKUNA_1N and AKUNA_J3). If only one is closed, the CDR group and associated CDRs will be left as available. This is also true for Preferred CDRs (0P).
  - o The system tracks whether the source of a CDR constraint is from the user or parsed from TFM. User entries always take precedence.
    - ▪ If a TFM entered reroute advisory duplicates a current user constraint for a CDR group, the TFM constraint will be entered for situational awareness, but will not be active so that it doesn't override the user's settings.
    - ▪ If a user or TFM reroute has entered constraints for a CDR group, but then the fix is closed (i.e., overriding the constraints), once the fix closure is removed or expires, the CDR group constraints will return to their previous user-set states.

15.9   TOS Service

- (**DFW**) Enhanced to compute delay savings for all applicable flight TOS options whenever scheduling completes. The TOS delay savings mean, 5th percentile, 95th percentile, and savings over RTC probability are made available to the STBO Client's TOS Departure Table.
- (**DFW**) Modified the "Top" route criteria to be the least-worst alternate route. Previously the Top route needed to be a CANDIDATE. New logic for the "Top" route is:
  - o ATC_APPROVED coordination status route
  - o SUBMITTED coordination status route with most delay savings over RTC
  - o CANDIDATE eligibility status route with most delay savings over RTC
  - o POTENTIAL eligibility status with most delay savings over RTC (least negative).

16   Release 5.9.0

16.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.9.0. Version 5.9.0 was deployed on 01 April 2020 to DFW only.

16.2   Adaptation

- Updated TOS Adaptation Data to March 26, 2020.

16.3   Fuser

- Added the TBFM super stream class to the TBFM SWIM parsing and then into the Fuser flight data.

16.4   STBO Client

- Added a launch script and default configuration for ENY.
- Added a TOS alert dialog.
    - The TOS Alert dialog will alert:
        - ATC when a Flight Operator submits a route
        - Flight Operator when ATC approves a route
    - Alerts only go to certain users
        - SWA only gets alerts for SWA flights
        - ENY only gets alerts for ENY flights
        - AAL gets alerts for AAL and all sub-carriers except ENY
        - DAL only gets alerts for SWA flights
        - DFW only gets alerts for AAL flights and its subcarriers
        - D10 gets alerts for all flights
    - Alert dialog features:
        - All current alerts clear when the window is closed.
        - If the window is not closed by the user when an alert comes in, the window will expand with new alerts as they come in.
        - If the alerts 'expire' either due to the user undoing the operation or due to the flight departing, the alert will be automatically removed from the window.
        - If all alerts are automatically removed, the window will be closed automatically.
    - The display of the alert dialog can be disabled/enabled in the ToolBar -> Settings -> TOS Alerts tab.
- Updated the handling of the TOS Operation panel such that, if CDR Settings is left open when trying to cancel or close the TOS Operation panel, a popup dialog will warn the user of the pending modifications.
- Added Tool Tips to the column headers of the Real-Time Metrics columns of the TOS Departure Table and TOS Flight Menu. The tool tips display for a longer duration than other tools tips and are line-wrapped for readability.
- Added the percent symbol "%" next to numbers in the "Prob Delay Sav > RTC".
- Updated the display of the CDR expansion box on the map so that the text will now match the text displayed in the TOS Operation tab. Text will not display at all for inactive restrictions.
- Updated handling for CDRs when the user is making entries when a new restriction is parsed. Previously, if a user has made entries on the TOS Operations table and an update came in from the system, such as new parsed DCC restriction, the update would silently clear out the user updates. This was corrected to pop up a warning dialog if a system update comes in that wipes out an assumed outdated user entry that has not been submitted.
- Updated handling for CDRs with duplicate destinations.
- Updated handling for multiple reroutes affecting the same CDR(s). The TMI Service will allow destination constraints to be created for the affected CDRs for both reroutes. The second constraint will be marked as inactive until the original reroute is removed. At that time, the constraint will be activated.
- Updated excluded CDRs in the adaptation data. Additional CDRs will be allowed to be shown in the CDR List and TOS Flight Menu, but will not show as a group on the TOS Operation panel. Previously only one CDR was able to be considered 'preferred' and not linked to a CDR group in the TOS Mode.

16.5   Tactical Scheduler

- Turned off the divergent route flight selector for the 5.9 release.
- Removed departure fix separation constraint processing for DFW and DAL.

16.6   Terminal Scheduler

- Removed departure fix separation constraint processing for DFW and DAL.
- Split the scheduling window for arrivals and departures in the WhatIf scheduler. Previously in the WhatIf scheduler, the arrival flight scheduling window was set to be the same as departure flights at 1 hour. The primary scheduler had a scheduling window of 3 hours. This created an inconsistency between the two schedulers because arrival flights whose ETA were between 1 hour and 3 hours from current time could still affect scheduling for departure flights whose UTOT is less than 1 hour from current time. This was because departure flights whose UTOT is less than 1 hour from current time can have an ETOT more than an hour after current time. Since arrival flights whose ETA between 1 hour and 3 hours from current time were present in the primary scheduler, but not in WhatIf scheduler, the same set of flights whose UTOT is earlier than 1 hour had more delay in the primary scheduler than the WhatIf scheduler, resulting in erroneous delay savings, especially in shared runways like 18L. To correct this, the scheduling window was split for arrival and departure flights. The primary scheduler time window will remain 3 hours for both, but the WhatIf scheduler now has an arrival flight scheduling time window of 3 hours, but a departure flight scheduling time window of 1 hour. This should eliminate the inconsistency between the two schedulers due to arrival flights.
- Split the time window for computing the aggregated delay metrics from the arrival and departure scheduling windows. Previously in the aggregated delay calculation, all flights scheduled in the WhatIf embedded Primary Scheduler were used for calculation. However, the scheduling flight window should be larger than aggregate delay metric calculation window because flights with UTOT later than scheduling time window can still affect flights with UTOT earlier than scheduling time window, resulting in aggregated delay inaccuracy at regions near scheduling time window. Therefore, the scheduling windows were updated to be:
  - arrivalScheduingWindowMinutes = 180
  - departureSchedulingWindowMinutes = 75
  - metricCalculationWindowMinutes = 60

16.7   TBFM

- Updated to allow the user to enter a start and end time which will specify when to enable the constraint in the future and when it should revert to the default separation distance of 0. Previously, a MIT constraint update could only be made so that the update takes effect immediately and with no expiration time.

16.8   TMI Service

- Updated handling for multiple reroutes affecting the same CDR(s). The TMI Service will allow destination constraints to be created for the affected CDRs for both reroutes. The second constraint will be marked as inactive until the original reroute is removed. At that time, the constraint will be activated.
- Updated excluded CDRs in the adaptation data. Additional CDRs will be allowed to be shown in the CDR List and TOS Flight Menu, but will not show as a group on the TOS Operation panel. Previously only one CDR was able to be considered 'preferred' and not linked to a CDR group in the TOS Mode.
- Corrected parsing of the reroute action from TFM reroute advisories.
- Corrected handling of the advisory number for updates. When a reroute advisory is updated by TFM, the advisory number changes. The problem was corrected that an update to a TFM

reroute advisory number didn't update in the CDR group constraints which prevent constraint removal.

17 Release 5.9.1

17.1 Overview

This document describes the changes to the ATD-2 software baseline for version 5.9.1. Version 5.9.1 was deployed on 09 April 2020 to DFW only.

17.2 Adaptation

- (**DFW**) Added the following runway utilization scenarios to support "all East" or "all West" operations for both North and South configurations, due to reduced operations at DFW:
    - S_ALL_E
    - S_ALL_W
    - N_ALL_E
    - N_ALL_W

17.3 Fuser

- Corrected mediation rules for departure runway and parking stand actual times.

17.4 Terminal Scheduler

- Changed GA uncertain flights to have lower scheduling priority than all other flights.

18 Release 5.10.0

18.1 Overview

This document describes the changes to the ATD-2 software baseline for version 5.10.0. Version 5.10.0 was deployed on 7 May 2020 to DFW only.

18.2 Model

- (**DFW**) Enhanced scheduling for fix closures for the specific cases of an East gate route combination where one or both of the bottom two East gate fixes are combined to one of the top two East gate fixes OR an East gate route combination where one or both of the top two East gate fixes are combined to one of the bottom two East gate fixes, and similarly for the West gate.

18.3 STBO Client

- (**DFW**) Removed the "Estimated Delay" and "Total Delay" from the timeline datablock configuration dialog. Also, the "Current Delay" was renamed to "Predicted Delay" in the same dialog. The following MP D10 user preference (.scf) and timeline save-for-quick-create (.ttf) files formerly had the display of "Total Delay" turned on; they were change to display the "Predicted Delay" instead:
    - ADS_ARR_DEP.tff
    - AFW_ARR_DEP.tff
    - D10_SATELITE_DEP_ARR.scf
    - GKY_ARR_DEP.tff

- (**DFW**) Enhanced the map's "<alt>-r" quick-key to include the filed airborne route, in addition to the previously-shown surface trajectory, for all currently selected flights. <alt>-r will toggle the display for all selected flights, and <alt>-R will clear all routes. TOS routes for a flight will also now start at the end of the departure runway, rather than the center of the airport.
- (**DFW**) Added a TOS audio alert to alert the user of a submitted (ATC) or accepted (Flight Operator) TOS route change. The audio alert can be enabled/disabled from the main ToolBar -> Settings -> TOS Alerts tab. The audio alerts functions independently of the visual alert. The audio alert setting can be saved to the user's preference file.
- (**DFW**) Changed the display order of routes when a TOS flight's right-mouse-button menu is activated to submit or approve a TOS route. The display order of the routes was changed to be the Top Route first, followed by all Candidate routes (in any order), and finally all Potential routes (in any order).
- (**DFW**) Added ROOOO_GC to the CDR groups.
- (**DFW**) Corrected the DCC Route Advisories tab to only show Matching CDR values for Coded Departure Routes matching the reroute segment's destination.
- (**DFW**) Added the TOS Alert dialog to the main ToolBar -> Show Window options.

18.4   Terminal Scheduler

- (**DFW**) Added the computation of ETOT for flights with a UTOT greater than one hour for the filed route. Note: the TCOT will continue to NOT be populated for the various route options when the UTOT is greater than one hour.
- (**DFW**) Added a 30 minute buffer to limit the amount of disadvantage the GA uncertain flights have. If the GA uncertain flight has a larger than 30 minutes delay, then the flight will be scheduled like normal flights.

18.5   TMI Service

- (**DFW**) Changed handling when a pair of inner/outer fixes are closed such that all corresponding CDRs and CDR groups will be marked as restricted regardless of whether there is an alternate fix provided for the closed fix. Previously, individual CDRs were allowed to remain available if the corresponding fix closure included an alternate that was not a SWAP.
- (**DFW**) Changed handling for OTG closures to restrict all CDRs for the affected gate. Previously, CDRs for the open fix and its corresponding outer fix were allowed to remain available.

19   Release 5.11.0

19.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.11.0. Version 5.11.0 has a planned deployment date of 5 August 2020 to D10. Deployment to CLT is pending due to the ramifications of COVID-19.

19.2   Adaptation

- (**D10, D11**) Updated the following Radar Video Map (RVM) files for the D10/DFW and D11/DAL TRACONs in STBO Adaptation based on updated from the NFDC after the 03/26/20 CCU:
  - EMERGENCY
  - DEPARTURE_NORTH
  - DEPARTURE_SOUTH
  - FEEDER_NORTH
  - FEEDER_SOUTH

- o SATELLITE_NORTH
- o SATELLITE_SOUTH
- (**D10, D11**) Updated the following map files for the D10/DFW and D11/DAL TRACONs in STBO Adaptation based on data from the NFDC after the 05/21/20 CCU:
  - o DEPARTURE_NORTH
  - o DEPARTURE_SOUTH
  - o FEEDER_NORTH
  - o FEEDER_SOUTH
  - o SATELLITE_NORTH
  - o SATELLITE_SOUTH
- (**DAL, DTO**) Updated the STBO maps of two airports in D10:
  - o DAL: Taxiway M extended to end of runway. Taxiway D partially removed.
  - o DTO: Runway 17/35 was added, added taxiways C through Q
- Updated the STBO Adaptation to conform to the new "JO 7360.1E - Aircraft Type Designators" order from the FAA Air Traffic Procedures office. The changes are 25 new aircraft types, 6 deleted aircraft types, three new weight classes, and changes in weight class category for many aircraft.
- (**DFW, DAL**) Updated the STBO Adaptation with CDR changes planned for the 07/16/20 CCU for KDFW and KDAL. This set of changes includes more than the normal number of route changes: 230 for DAL and 141 for DFW, most of which are from upleveling SWTSR 4 to SWTSR5 for DAL and AKUNA7 to AKUNA8 for DFW. There are others, including up leveled STARs, added or changed waypoints, etc.

19.3 Bank Prediction Tool

- (**CLT**) Created a Bank Prediction Tool for use by FO users at CLT. Information is provided via a graphical interface accessed using a web browser on the STBO machine. The Bank Prediction Tool provides the following features:
  - o Prediction of arrival bank start/end times.
  - o Prediction of departure bank start/end times.
  - o Prediction of arrival and departure bank overlap time periods.
  - o Statistics provided for arrival banks:
    - ▪ Number of arrivals that have an undelayed stand arrival time occurring during an overlap with a departure bank.
    - ▪ Number of arrivals predicted to arrive 10 or more minutes early compared to scheduled arrival time.
    - ▪ Number of arrivals predicted to arrive 30 or more minutes early compared to scheduled arrival time.
    - ▪ Number of predicted gate conflicts during the bank overlap.
  - o Statistic provided for departure banks:
    - ▪ Count of departures with an EOBT occurring during a predicted overlap with an arrival bank.
    - ▪ Count of departures with an EOBT more than 15 minutes after SOBT.
  - o Identification of each bank (i.e. Bank 1, Bank 2, etc.)

19.4 Fuser

- Prepared the Fuser project for open sourcing the software.
- Added the "ctm" field that comes through the TBFM SWIM feed which is showing promise as the "ready time".
- Added the ATC sector from the SFDPS SWIM feed to the Fuser position messages.
- Updated to improve handling of SFDPS messages to only allow airport changes from filed flight plan and flight plan amendments. This was necessary because SFDPS frequently sends the wrong airports for other messages.
- Enabled ingestion of sector and boundary crossing messages from TFM which are needed for sector predictions. This is a configurable option.
- Added the TBFM Flight Plan Status, TBFM Aircraft Status, TBFM Departure Runway, and TBFM Manually Scheduled Entries.

19.5   STBO Client

- Updated the Flight Plan Demand Window - Rolling Window option was to be configurable to up to 2 hours in the past and 2 hours in the future. In addition, the display was adjusted to draw the window in white for the future time and in magenta for the past time.
- Updated the Flights Table was to display Filter Criteria in the Toolbar.
- (**DFW, DAL**) Changed the language used in Notifications when a previously restricted CDR becomes available. Before this change, identical language was used for when a CDR became both restricted and unrestricted "{CDR Name} RESTRICTED {TIME}". Now, when a CDR becomes unrestricted, the notification will read "{CDR Name} CLEARED {TIME}".
- (**DFW, DAL**) Removed the "TCOT" column from the TOS Flight Menu since it is not used. It was also removed as a default column in the Flights Table. Additionally in the Flight Table column selection tool, the TCOT column was moved to the "seldom used" section.
- Modified the Departure Fix Status Table "Count" label to read "Count (30 min)". This is to indicate to the user that the count provided is specifically for between current time and 30 minutes into the future.
- (**DFW, DAL**) Added a capability enabling Flight Operators users to hide Scratch Pad entries from ATC when excluding a flight from a TOS. The capability was also corrected to hide Scratch Pad entries from other Flight Operators when the entry was edited; previously, editing the entry caused it to be visible to other Flight Operators.
- (**DFW, DAL**) Removed multiple columns from multiple tables in an effort to make the presentation of Delay/Delay Savings as straightforward as possible and remove columns that aren't really used in TOS Operations, the following columns were removed:
    - Removed from the TOS Departure Table:
        - Term Delay OFF
        - Top TTOT
        - Top Term Delay OFF
        - Top Term Delay Savings Dep Fix
        - Top Term Delay Savings OFF
        - Altitude
        - APREQ
        - APREQ State
        - Arr/Dep
        - ATOT
        - RWYOpNec
        - TMAT
        - TOBT
        - TTOT
        - UOBT
        - Actual Time in Queue
        - DepFix Source
        - EstOBT
        - Flight Key
        - Gate Conflict
        - Gate Conflicting Key
        - Gate Source
        - Gate Time
        - Hidden
        - Latitude
        - Longitude
        - Metering Group
        - ModeS
        - Position Source
        - Ramp Area
        - Rwy Source
        - SDT:TBFM
        - Spot Source
        - TTOT-UTOT
        - Undlyd OFF at Queue Entry
    - Removed from the TOS Flight Menu:

- ▪ Term Delay OFF
- ▪ Term Delay Savings Dep Fix
- ▪ Term Delay Savings OFF
    - o Removed from the TOS Departure Table Filter:
        - ▪ Top Term Delay Savings Dep Fix
        - ▪ Top Term Delay Savings OFF
- Modified the help menu text to match the current functionality of two hot keys:
    - o Alt + comma decrease the font size.
    - o Alt + period increase the font size.
    - o Alt + minus decrease the timeline length.
    - o Alt + equals increase the timeline length.
- Fixed an issue where a fix closure and alternative fix is only displayed on the timeline for the own Flight Operators flights, instead of all flights. Now the Timeline displays all flights that are subject to the fix closure along with the alternative fix. This bug and subsequent fix only affected Flight Operator Timeline displays and did not affect ATC Timeline displays.
    - o Example of bug: On AAL timelines ENY flights show the "closed fix -> alternate fix" as expected since ENY is a subcarrier for AAL. However, on ENY's timelines, AAL flights only show the closed fix instead of the closed fix -> alternate fix because AAL is not an ENY carrier and thus the carrier filter does not allow the display of the alternate fix, which is confusing.
- (**CLT**) Imported user preference files from CLT into build 5.11 so they persist after deployment of the new build.

19.6   TBFM

- Modified the AMS to TBFM airport configuration mappings to include a specific set of airport scenarios in support of a planned runway closure at KDAL that is spanning 8-9 months for runways 13R/31L. The following TBFM DAL configurations were added to AMS:
    - o SOUTH_2_VFR 13R 13L
    - o SOUTH_1_VFR 13R
    - o RESERVE13LVFR 13L
    - o NORTH_2_VFR 31L 31R
    - o NORTH_1_VFR 31L
    - o RESERVE31RVFR 31R

19.7   TMI Service

- Fixed an issue where Runway Closures entered into STBO by a user were removed during nightly resets. The fix ensures Runway Closures persist in STBO, through nightly resets, until removed by a user.
- Corrected handling for overlapping fix closures where removing one fix closure removed all CDR restrictions for the affected fixes.
- Updated reroute parsing to more reliably parse protected segments.
- (**DFW, DAL**) Fixed an issue where when applying the attached reroute advisory to TOS CDR group constraints, the destination on the TOS RAM panel for J3 showed both "TEB" and "BOS", when it should have only showed TEB due to there being a protected segment match in the DFWBOSJ3 CDR.
    - o The solution implemented a rule that when determining TOS CDR group constraints, only DFW CDRs will be used due to some slight differences in routes between DFW and DAL CDRs.

19.8   TOS Service

- (**DFW, DAL**) Updated TOS Service to default to ACTIVE TOS Mode after a reset for DFW and D10 Metroplex systems.
- (**DFW, DAL**) Updated TOS Service with most recent CDR adaptation.
- (**DFW, DAL**) Improved the TOS Service so that a CDR Closure overrides restrictions for individual destinations on the same CDR.

19.9   TOS Metrics Web Display

- (**DFW, DAL**) Added new TOS Metrics Web Display which provides the following real-time accuracy metrics of the ATD-2 Scheduler for DFW and DAL via a graphical interface accessed using a web browser on an STBO machine:
  - Estimated Takeoff Time (ETOT) prediction accuracy
  - Total Delay prediction accuracy
  - Both ETOT and Total Delay accuracy can be plotted against one of two references points:
    - Actual Off-Block Time (AOBT)
    - Actual Takeoff Time (ATOT)
  - Accuracy prediction data can be plotted using the following Statistics:
    - Median
    - Distribution (Middle 50% and Middle 90%)

19.10 TTP

- Prepared the TTP project for open sourcing the software.
- Removed diversion recovery flag in TTP, since STBO does not have that information.
- Updated the TTP Service to reflect the most recent TTP schema published by TFDM.
  - The new version of TTP Flight Data messages do not include the publication of InitialInBlockTime, ScheduledInBlockTime, and ScheduledOffBlockTime so these were removed from the ATD-2 TTP FlightData messages.
  - The new version of TTP SMP messages for the smpIdentifier were updated to use the new "SMPIdentificationKeyType" (previously "IdentificationKeyType").

20   Release 5.11.1

20.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.11.1. Version 5.11.1 was deployed on 25 August 2020 to DFW only.

20.2   Fuser

- Corrected to use IATA codes for origin/destination airports from ASDEX. The problem was originally noticed for international arrival flights to CLT.

20.3   Small Airport Model

- Corrected the feature to automatically set an airport's runway utilization when a runway is opened or closed so that it will work even if there had not been any flights in the last 15 minutes.
- (**DAL**) Added an actual delay calculator. The calculator captures the undelayed OFF time at pushback and stores that value for calculating the actual delay incurred by a departure flight. The actual delay is calculated as the current time minus the undelayed OFF time at pushback and can be displayed on a flight's timeline datatag as "AD: <min>" (e.g. "AD: 7") by selecting "Actual Delay" in the timeline's Extended Datablock configuration for Departures.

20.4   STBO Client

- Corrected problems when dragging the timeline column to adjust the time interval. The drag operation will now cease when the mouse leaves the time column, even if the mouse is dragged back into the time column.
- (**CLT**) Corrected the APREQ Set Release Time dialog to report an error if the user enters an invalid time.

- (**DFW, DAL**) Updated the Demand Graph and Delay Graph settings windows to report an error if the graph Max Height value is out of range.

20.5   TOS Real-time Metrics Web Display

- Corrected the zoom functionality so that the graphs scale based on zoom level.

21   Release 5.11.2

21.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.11.2. Version 5.11.2 was deployed on 21 September 2020 to DFW only.

21.2   STBO Client

- Turned on the TOS Visual Alert by default for all DFW Tower, DAL Tower, and Flight Operator users (D10's visual alert remains off).
- Corrected the usage of the 'Alt + r' functionality to display surface and airborne routes consistently, regardless of zoom level or map pan.
- Corrected the width of the "Shown" and "Available" lists in the column selection dialog to fully accommodate the column options. The height of the dialog was also doubled. This affects the:
    - TOS Table
    - TOS Flight Menu
    - Flights Table
    - Aircraft table

21.3   TOS Real-Time Metrics Display

- Corrected errors which caused the graph to show as having no data.

21.4   TOS Service

- Updated CDR and NFDC adaptation files to Sept 10, 2020.
- Changed the determination of the Top Route to select the route with the lowest nm if there are multiple routes with the same lowest RTC + delay savings value.

22   Release 5.11.3

22.1   Overview

This document describes the changes to the ATD-2 software baseline for version 5.11.3. Version 5.11.3 was deployed on 4 February 2021 to DFW only.

22.2   Adaptation

- Added four new scenarios to DFW North Flow Configuration to account for 31L departures. The new scenarios are:
    - 31L_Normal
    - 31L_N_ABW (west only on the west side)
    - 31L_N_E+2S (normal plus north on the west side)
    - 31L_N_E+2N (normal plus south on the west side)
- Added new features to the DFW surface map including:

- o the 17R end around taxi way
- o 17C/35C runway island shape change (the islands on the taxiway just before departures enter the runway)
- o changes to the taxiway just east of runway 17C/35C that crosses taxiway EJ
- Updated the background airport surface maps for FTW, FWS, and RBD.
- Applied minor updates from the 09/10/2020 and 11/05/2020 CCUs to the TRACON video map files d10027smvagp, d10120sgp, d10122sgp, and d10123sgp.
- Updated the TOS adaptation data with the 11/05/2020 and 12/31/2020 CCUs.
- Updated the departure fix decision trees as a result of CCUs:
  - o Departure Procedures
    - ▪ HUBB and WYLIE DPs were removed
  - o STARs
    - ▪ JEN and KNEAD STARs were removed
  - o Transitions
    - ▪ ELD, MEI, SQS, and UIM transitions were removed from DALL6
    - ▪ ELD, MEI, SQS, and UIM transitions were removed from BACH8 (DAL only)
    - ▪ UIM transition was removed from GARL8
    - ▪ UIM transitions were removed from CQY1 and YEAGR4

22.3 STBO Client

- (**TOS**) Renamed a few data elements in the TOS Departure Table and TOS Flight Menu for consistency:
  - o TOS Departure Table
    - ▪ Total Delay OFF -> OFF Delay
    - ▪ Top Total Delay OFF -> Top OFF Delay
    - ▪ Top Total Delay Savings OFF -> Top OFF Del Sav
  - o TOS Flight Menu
    - ▪ Total Delay OFF -> OFF Delay
    - ▪ Total Delay Savings OFF -> OFF Del Sav
- (**TOS**) Added field "Top Prob Del Sav > 0" to the TOS Departure Table and added "Prob Del Sav > 0" to the TOS Flight Menu.
- (**TOS**) Added field "Top IN Del Sav" to the TOS Departure Table and added "IN Del Sav" to the TOS Flight Menu. This element is the OFF delay savings plus the TOS route additional flight time (without wind miles); that is,
  `additionalFlightTime = (cdrRouteDistance - filedRouteDistance) / filedSpeed`.
  Example: If the flight's OFF delay savings is 10 minutes but the flight is flying an additional 5 minutes of flight time, the IN delay savings = 10 - 5 = 5
- (**TOS**) Added the predicted IN delay to the TOS Departure Table. This data element compares the predicted IN to the scheduled IN of the filed route. The predicted IN leverages the Flight Operator's en route prediction which includes wind miles.
  `predictedInDelay = ETOT + (LIBT - LTOT) - SIBT`
  A positive value means there is a delay while a negative value means the flight may arrive earlier than expected. This value is only displayed for the filed route.
- (**TOS**) Added Top IN Delay to the TOS Departure Table. This element is the sum of the predicted IN Delay for the filed route and the predicted IN delay savings for the Top CDR. Example: If the flight has 20 minutes of predicted IN delay on the filed route and can save 10 minutes on the TOS route, then the predicted IN delay on the TOS route is 20 - 10 = 10 minutes. Top IN Delay was also added to the list of search field options and color alert options.
- (**TOS**) Updated TOS Departure Table and TOS Flight Menu search and color alert options:
  - o Added search fields for TOS Departure Table:
    - ▪ OFF Delay
    - ▪ IN Delay
    - ▪ Top OFF Delay
    - ▪ Top IN Delay

- ▪ Top RTC
- ▪ Top RMNT
- o Added color alert fields for TOS Departure Table:
  - ▪ OFF Delay
  - ▪ Top OFF Delay
  - ▪ Top OFF Del Sav
  - ▪ Top IN Delay
  - ▪ Top Add nm
  - ▪ ETOT
  - ▪ Top RTC
  - ▪ Top OFF Del Sav Minus RTC
- o Removed search fields from TOS Departure Table:
  - ▪ Dep Fix Time
  - ▪ EDFT
  - ▪ Has Ground Stop
- o Added search fields for TOS Flight Menu:
  - ▪ OFF Delay
  - ▪ IN Delay
  - ▪ OFF Del Sav
  - ▪ IN Del Sav
  - ▪ RTC
- o Added color alert fields to TOS Flight Menu:
  - ▪ OFF Delay
  - ▪ OFF Del Sav
  - ▪ Add nm
  - ▪ RTC
- **(TOS)** Added three new groupings to the TOS Departure Table and TOS Flight Menu column selection dialog:
  - o TOS: Delay
  - o TOS: Delay Savings
  - o TOS: Aggregate Delay Savings
- **(TOS)** Updated all Delay Savings fields to display a "+" in front of positive values.
- **(TOS)** Updated the CDR Settings window to allow the selection of multiple rows (destinations) at once, either by shift-click to select a range of rows or by control-click to select specific entries.
- **(TOS)** Updated handling for the TOS Flight Menu windows such that, if the TOS Departure Table or TOS Flight Menus fall behind other windows, selecting the "TOS" button in the Toolbar will bring forward the TOS Departure Table and all TOS Flight Menus as well.
- **(TOS)** Enhanced the TOS Flight Menu to highlight the "top" route in a mint green.
- **(TOS)** Renamed the TM Actions DCC Route Advisories tab to DCC Advisories.
- Updated the OUT / OFF / ON / IN fields of Flight Properties dialog.
  - o The dialog displays the first-set value from a sequence of values. The sequences for these fields as follows:
    - ▪ OFF: ATOT - ETOT - TTOT - UTOT
    - ▪ OUT: AOBT - TOBT - UOBT
    - ▪ ON: ALDT - ELDT - TLDT - ULDT
    - ▪ IN: AIBT - TIBT – UIBT
  - o The OUT / OFF / ON / IN field labels dynamically update to show which data value is being displayed (e.g., ATOT for the OUT time)
- Updated the runway utilization drop-down list in the TM Actions -> Runway Utilization pane to always show all possible options, eliminating the need for the user to scroll.
- Changed the Setup Map dialog "Countries" label to "States" to more accurately reflect what is displayed.
- Enhanced the Taxi List to allow the user to specify the order of the runway display. To accomplish this, the Runway selection dialog was removed. Instead, the Taxi List toolbar

contains an Add Taxi List button; clicking the button will create a new taxi list pane. Each taxi list pane has its own drop-down runway selection. Any taxi list pane can be removed by clicking the X in the top right-hand corner. The runway order will be saved in the user preference file the next time the user saves their settings.

- Added a "Time in Queue" datatag element to both timelines and maps for departure flights for situational awareness. The Time in Queue element uses the runway queue detection box to measure the elapsed time a flight is in queue, i.e., the time the flight spends inside the detection box. The element is formatted as "TQ:<value in minutes>" and will remain displayed on the timeline after takeoff. This element can only be displayed for flights at airports which have surface surveillance to detect a flight's entry into the queue detection box.

- Updated the TOS Alert logic for Flight Operators to display the pop-up notification when the route transitions from "Submitted" directly to "Reroute Filed".

22.4 TOS Service

- Updated the TOS state changes to allow a route to transition from FO Submitted to Reroute Filed with or without the ATC Approval state. This is because ATC users sometimes amend the filed route to match the TOS route that was submitted before they Approve the route on the Client or sometimes without Approving the route request at all.

- Updated the handling for restricted routes such that, if a CDR route becomes restricted, it will no longer be flagged as a Top route UNLESS the Flight Operator has already Submitted a request for that route or ATC has already Approved a request for that route.

- Corrected the behavior for an Approved TOS route request so that, when a route request is Approved, the Route Of Flight field will display the route of the Approved route and the "Top" fields will display the data for the next-best route as the Top route (or nothing if there is no next-best Top route).

- Enabled RTC calculations for ENY; they are currently utilizing AAL's RTC values.