



Air Traffic Management Demonstration II (ATD-2)

ATC Tower and TRACON Training

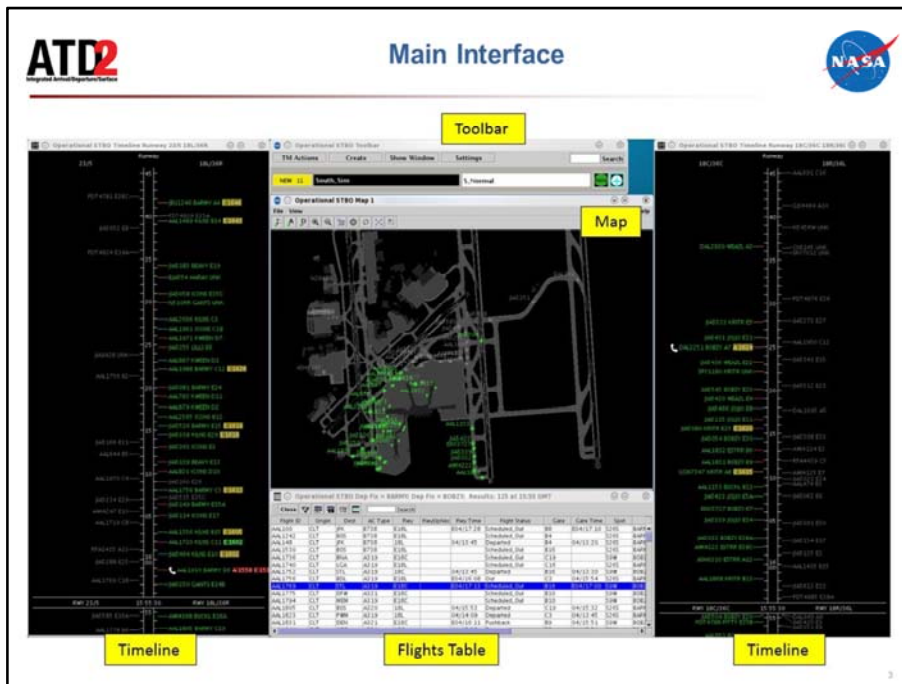
NEXTGEN

CLT

September 25-29, 2017



Time	Event	Presenter
0730	Overview of STBO Client	Lindsay
0800	Data Exchange and Integration	Lindsay
0835	APREQ Procedures	Bob
0920	Break	
0930	DASH	Shivanjli
0950	What-If	Shivanjli
1010	Hands-on Training	




The full interface of the STBO Client is composed of multiple display windows that all serve different purposes and can be configured and arranged however the user wants.

The Toolbar allows the user to interact with the system by adding new display windows, managing current display windows, saving and loading display configurations, searching for flights, scheduling TMIs and airport events, and displaying new notifications to the user.


The Timelines provide information about the predicted OFF times for departures, predicted ON times for arrivals, gate conflicts, and TMIs that aircraft are subject to. They can be displayed to show flight-specific information in the Timeline datablocks.

The Map displays surface surveillance data and provides a visual representation of aircraft current positions. The map also displays runway closures and can be set up to display flight-specific information in the map datablocks.

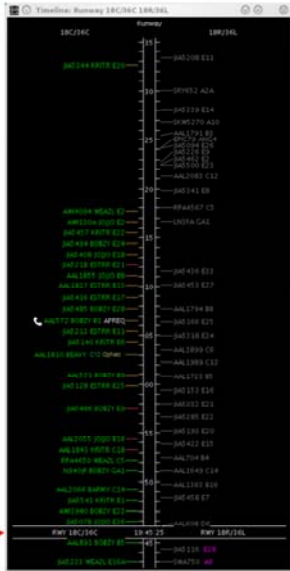
The Flights Table is a list of all known arrivals and departures for the airport. The list can be sorted and filtered according to the user's preference, and information columns can be moved, sorted, added, and removed.



Timeline



- Timeline shows information about:
 - Arrivals
 - Departures
 - TMIs
 - Runway change for operational necessity
 - Gate conflicts
 - Pushback/taxi status
- Location on Timeline represents predicted OFF time for departures and ON time for arrivals
- When datablock cross the runway line (Now time), aircraft has taken off/landed



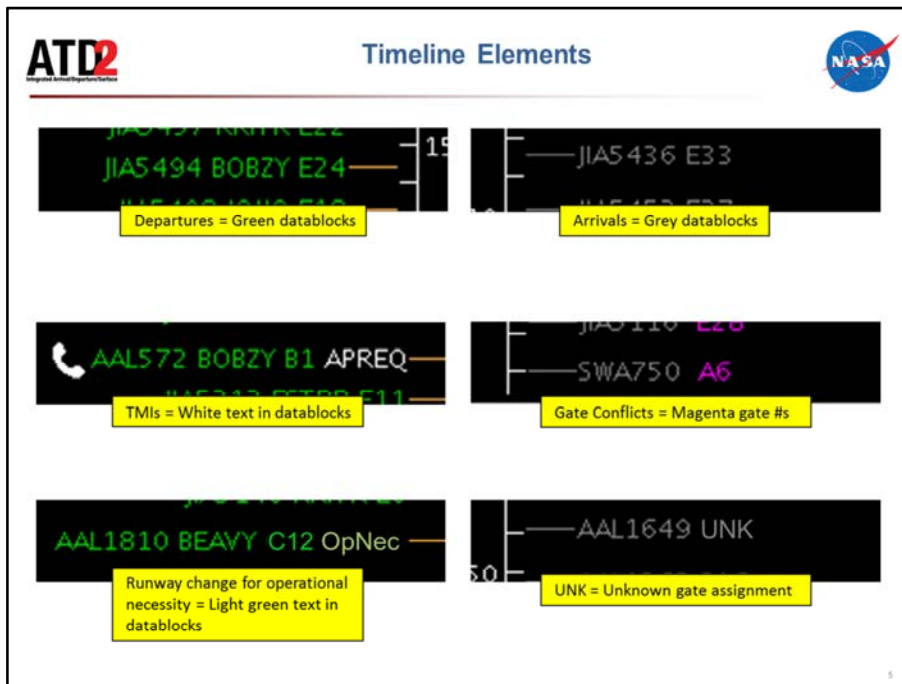
The Timeline is set up to display flight positions, resource labels (e.g., “18C/36C”) at the top and bottom of the display, the type of resource (e.g., “Runway” at the top of the timeline or “RWY” at the bottom), and the now time. The timeline also provides information about arrivals, departures, TMIs, runway assignments and changes for operational necessity, gate conflicts, and pushback and taxi status.

The position on the timeline is the prediction the tactical scheduler generates of OFF time for departures and ON time for arrivals. For departures, this is either the TTOT, CTOT or EFTT.

- EFTT is only provided for APREQs that have yet to be negotiated with Center.

- TTOT is a prediction of OFF. It can be equal to CTOT (the controlled departure time from ATC) for APREQ and EDCT flights.

When flight datablocks cross the resource line with the Now time, arrivals have landed and departures have taken off.



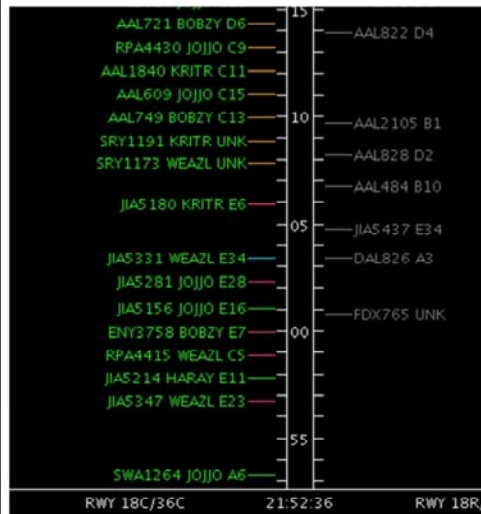
When the timeline is configured by arrivals and departures, arrival flights are displayed in grey and departure flights are displayed in green.

APREQ flights have additional symbology (e.g., the telephone icon displayed here), but all TMI information is displayed in white text. APREQ and EDCT times are also displayed on the Timeline in white text once the system has the times.

When parking gates are selected to be displayed on the Timeline, unknown parking gate assignments are displayed as "UNK". When gate conflicts are selected to be displayed on the Timeline, the parking gate number is colored magenta for flights with gate conflicts.

When ramp inputs a requested change of runway assignment for operational necessity, the flight datablock moves to the new runway assignment and "OpNec" is written in light green text on the datablock.

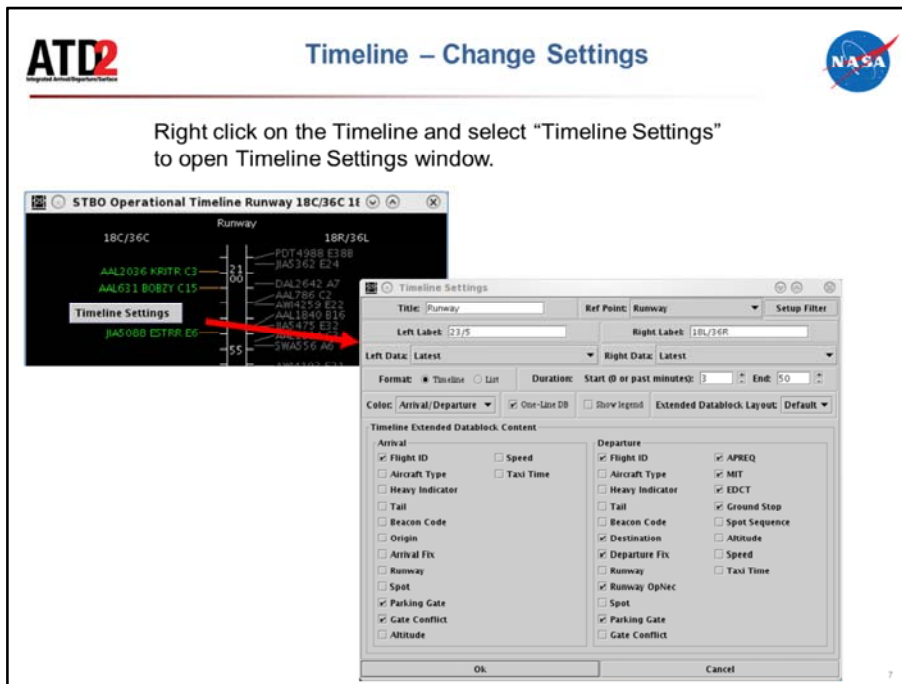
Additional flight information can be configured to display on the timeline flight datablocks (see slide 7).



- Leader lines
 - Orange = Untracked
 - Dark Pink = Untracked with OUT time
 - Blue = Tracked in the Ramp
 - Green = Tracked in the AMA
 - Grey = Arrival flights

Leader lines are useful for determining the status/position of the flight on the surface.

- Orange leader lines show untracked departure flights that are scheduled but have not yet pushed off the gate (no OUT time)
- Dark pink leader lines show untracked departure flights that have pushed back from the gate (have an OUT time)
- Blue leader lines are for tracked departure flights that are still in the ramp area
- Green leader lines are for tracked departure flights that are in the AMA
- Grey leader lines are for arrival flights

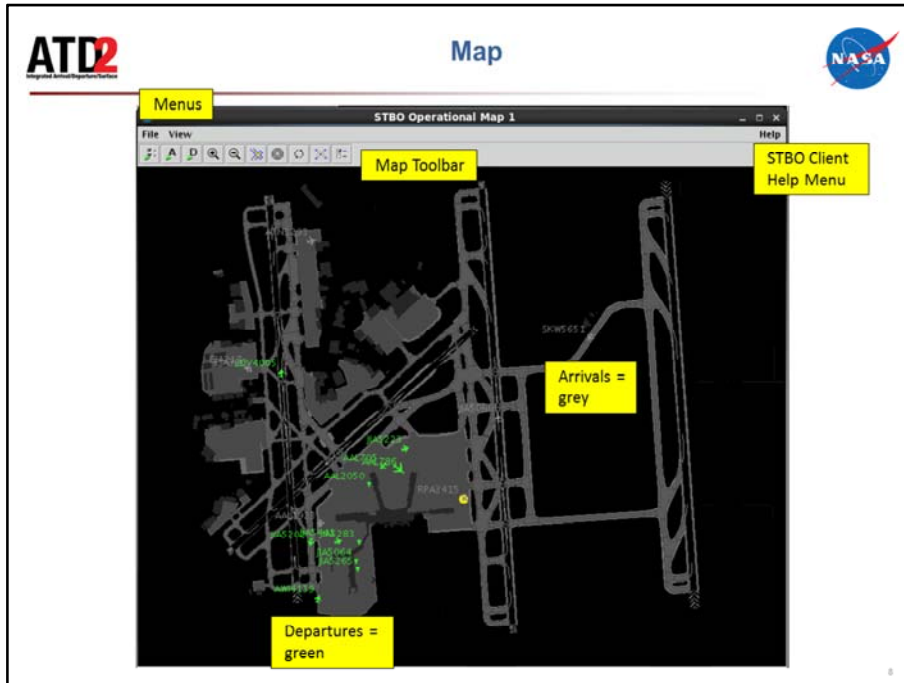


Timeline display windows are not limited to showing information about arrivals and departures to the runway. Timelines can be configured for other resources (or reference points), to input different data, to have color coding beyond that of arrivals and departures, be filtered to display select information, and can be shown in list format rather than as a timeline. Timelines can also be configured to show a variety of information in the datablocks about arrival and departure flights.

To open the Timelines Settings window, right click anywhere on the timeline background (anywhere not on a flight datablock) and select "Timeline Settings."

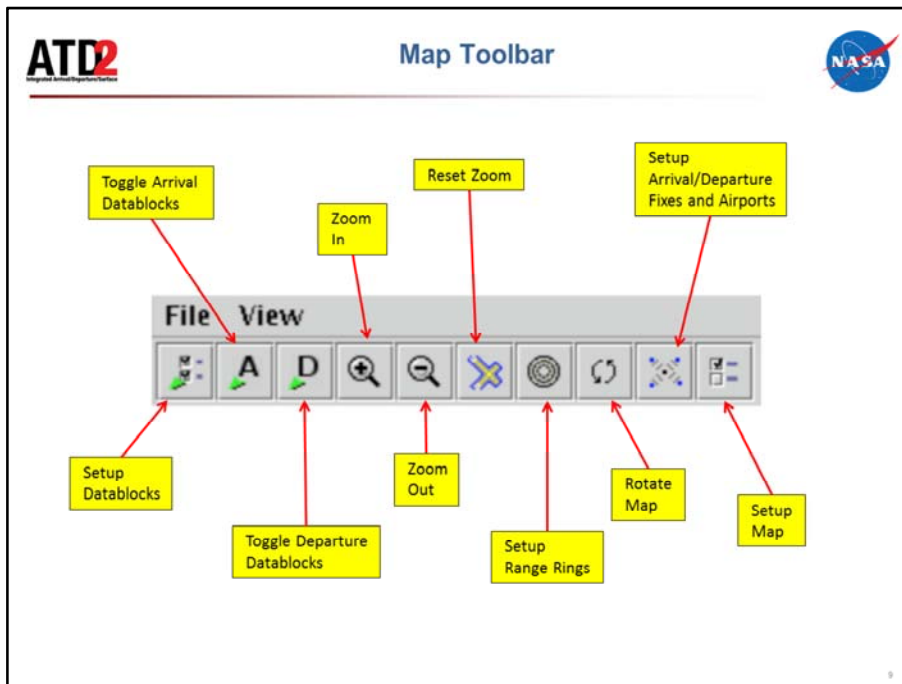
The duration of the Timeline display can be configured to any interval of the user's choice. The user also has the ability to left or right click on the center column of the Timeline and drag the Timeline up or down and look further into the timeline's past or future. When dragging the Timeline, the interval remains the same, but the start and end times will differ. For example, lets say the Timeline is displaying a 53-minute interval of time that starts 3 minutes in the past and ends 50 minutes into the future. If you click and drag the timeline down 10 minutes, the Timeline will keep displaying a 53-minute interval, but the start and end time for the timeline

display will now be from 7 minutes into the future to 60 minutes into the future.



STBO Client Map consists of dropdown menus (which will not be covered in these slides since most of the functions are found elsewhere on the GUI), a Map toolbar, STBO Client Help menu, and flight positions on the surface. Flight positions are collected from surface surveillance.

Like on the Timeline, departure flights are displayed in green and arrival flights are displayed in grey. Gate conflicts appear as magenta parking gates.

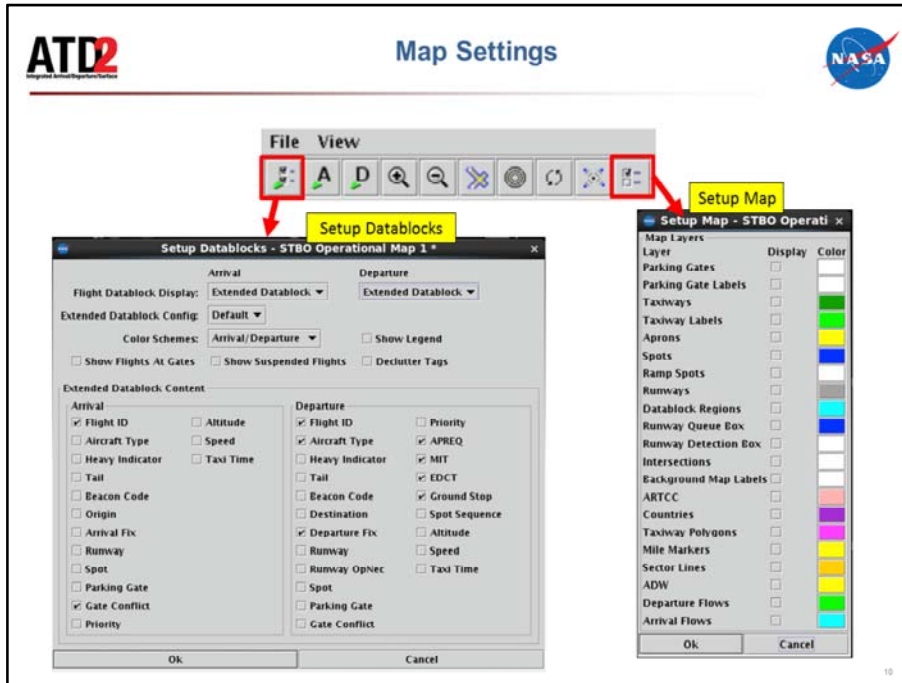


There are several functions available to the user on the Map toolbar. The labels above are what appear on the hover tooltips feature for each button. From left to right:

- Setup Datablocks: opens a settings window for making adjustments to how all Map datablocks are displayed (see slide 10)
- Toggle Arrival Datablocks: toggle between no DB, ACID only DB, and Extended DB
- Toggle Departure Datablocks: toggle between no DB, ACID only DB, and Extended DB
- Zoom In: zoom in on the map
- Zoom Out: zoom out on the map
- Reset Zoom: return to the default map zoom level
- Setup Range Rings: opens settings window to set interval for range ring spacing, show range rings, show distance labels for each range ring, and set the max distance to show range rings
- Rotate Map: select one of four orientations for the map (0°, 90°, 180°, 270°) – note: choosing the orientation the map is currently on will result in no rotation
- Setup Arrival/Departure Fixes and Airports: add specific fixes and

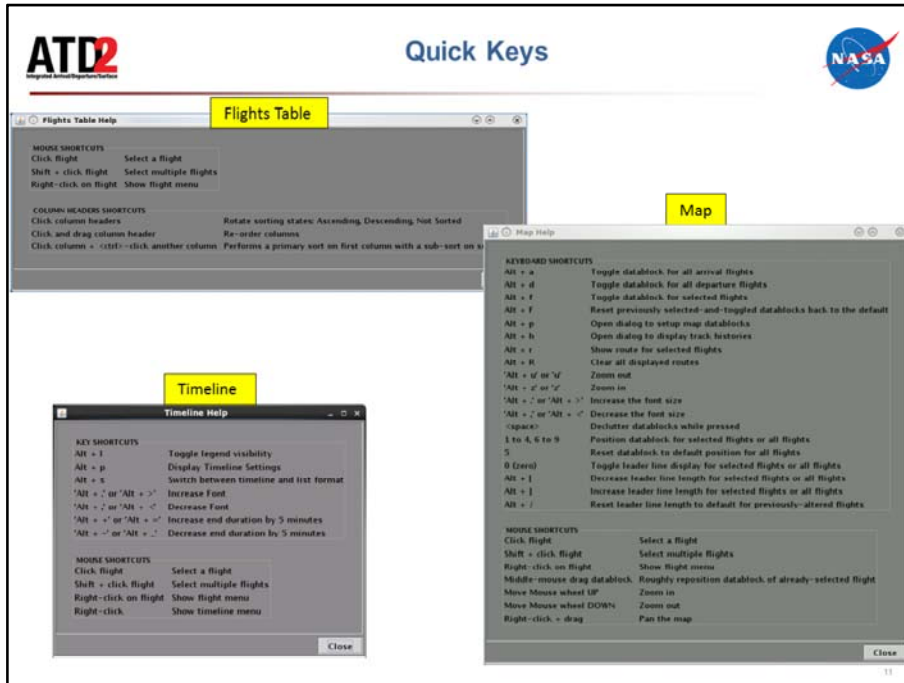
airports to the display, overlay TRACON map onto airport map

- Setup Map: opens a window to change settings for showing or hiding labels, shapes, and other items on the map (see slide 10)



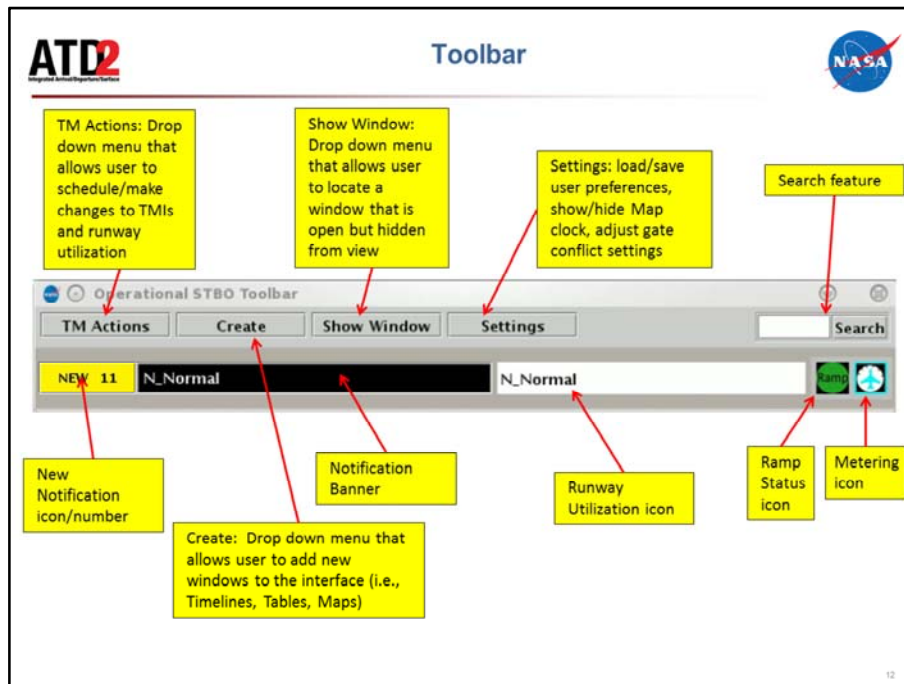
The Setup Datablocks button on the Map toolbar opens a window that enables changing the settings for what items are displayed on arrival and departure datablocks, as well as setting up how aircraft icons are color coded, showing (untracked) flights at the gate, and other display filters.

The Setup Map button on the Map toolbar opens a window that enables changing the labels, shapes, and other items on the map (e.g., selecting the “ADW” checkbox displays the physical boundary for the ADW on the map).



Some users prefer to use quick key functions to navigate through the interface and interact with it. Some quick key functions exist in the system today.

The Map toolbar currently uses hover tooltips to display the button labels. Menu tooltips will be added to the system to describe some of the quick keys.



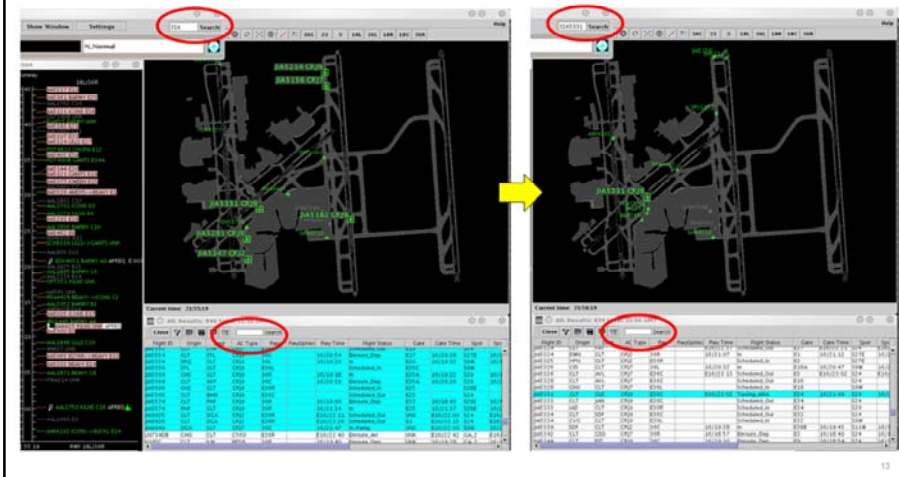
There are several functions available to the user on the Toolbar. From left to right:

- TM Actions: dropdown menu that allows user to schedule/make changes to TMIs and runway utilization
 - New Notification Icon/Number: displays in yellow with the number of new notifications when new notifications are populated in the notification window. When there are no new notifications, this icon is grey with the number "0" displayed.
 - Notification Banner: this banner cycles through the new notifications in the notification table. Once notifications are cleared/acknowledged, the banner is blank. Only new notifications are displayed. Clicking on the banner populates the notification window.
 - Create: drop down menu that allows user to add new windows to the interface (i.e., timelines, tables, maps, load graphs)
 - Show Window: drop down menu that allows user to locate a window that is open but hidden from view beneath other windows
 - Settings: button that opens a window to allow users to save the current display configuration for the whole STBO Client or to load a previously saved configurations
 - Search Feature: search for a flight either by entering the full callsign or numbers only
 - Ramp Status Icon: shows when the Ramp is open, pending closure, or

closed.

- Flow Icon: provides situational awareness for the airport runway configurations and runway utilization.

Use the search feature on the toolbar or in the Flights Table search for flight numbers, callsigns, destination airports, or departure fixes. All flights that match the search criteria are highlighted.



The search function is located on the STBO Client Toolbar and Flights Table. It can be used to locate groups of flights from the same carrier or to locate individual flights. To search, type the flight number, callsign, destination airport, or departure fix in to the search textbox. When typing begins, the search feature will highlight all flights that match the first character (the first image). As more characters are entered, the number of flights that match the search will narrow (the second image).

The screenshot displays the ATD2 'Flights Table' interface. At the top left is the ATD2 logo, and at the top right is the NASA logo. The main window title is 'Operational Control' and it shows a search for 'ix = BOBZY' with 125 results at 15:55 GMT. Below the title bar is a table of flight data with columns: Flight ID, Origin, Dest, AC Type, Rwy, RwyOptic, Rwy Time, Flight Status, Gate, Gate Time, and Spot. The table contains several rows of flight information, with the row for flight AAL1752 highlighted in blue. Below the table are two dialog boxes: 'Edit Filters - All' and 'Column Settings'. The 'Edit Filters' dialog has fields for 'Field', 'Operator', and 'Values' with 'AND' operators. The 'Column Settings' dialog has two lists: 'Available' and 'Shown', with arrows to move columns between them. The 'Shown' list includes Flight ID, Origin, Dest, AC Type, Rwy, Rwy Optic, Rwy Time, Flight Status, Gate, and Gate Time.

Flight ID	Origin	Dest	AC Type	Rwy	RwyOptic	Rwy Time	Flight Status	Gate	Gate Time	Spot
AAL100	CLT	FK	B738	E1BL		E04/17:28	Scheduled_Out	B8	E04/17:10	5265 BAP9
AAL1242	CLT	ROS	B738	E1BL			Scheduled_Out	B4		5265 BAP9
AAL148	CLT	FK	B738	1BL		04/13:45	Departed	B4	04/13:20	5265 BAP9
AAL1530	CLT	ROS	B738	E1BL			Scheduled_Out	B16		5265 BAP9
AAL1736	CLT	BNA	A319	E18C			Scheduled_Out	C19		59W BOB2
AAL1740	CLT	LGA	A319	E1BL			Scheduled_Out	C16		5265 BAP9
AAL1752	CLT	STL	A319	18C		04/13:45	Departed	B16	04/13:30	59W BOB2
AAL1756	CLT	BDL	A319	E1BL		E04/16:08	Out	C3	04/15:54	5265 BAP9
AAL1757	CLT	STL	A319	E18C		E04/17:11	Scheduled_Out	C16	E04/17:09	59W BOB2
AAL1775	CLT	DFW	A321	E18C			Scheduled_Out	B10		59W BOB2
AAL1794	CLT	MEM	A319	E18C			Scheduled_Out	B10		59W BOB2
AAL1805	CLT	ROS	A320	1BL		04/15:53	Departed	C19	04/15:32	5265 BAP9
AAL1823	CLT	FWM	A319	1BL		04/14:09	Departed	C3	04/13:45	5265 BAP9
AAL1831	CLT	DEN	A321	E18C		E04/16:11	Pushback	B9	04/15:51	59W BOB2

The Flights Table provides a list of scheduled flights for the airport. The column headings on the list can be traded out and moved around in the “Column Settings” window. The list of flights displayed can be adjusted by using the “Edit Filters” window and adding filter parameters.

ATD2 Changing a Runway for a Single Flight

Flights Table			
Flight ID	Origin	Dest	AC Type
AAL100	CLT	JFK	873B
AAL1757	CLT	EBR	A319
AAL2068	CLT	LGA	A321
AAL591	AAL2068		19
UAL183			18
AAL843			19
DAL109			88
AAL66R			21
AAL195			19
AAL206			21
N557G			50
PPA240			70
AAL173			19
EDV338			7
ASQ530			7
JAS545			9
DAL225			88
AAL148			18

Right click on Timeline datablock, Map datablock, or the flight ID on the Flights Table and select the new runway.

Timeline:
RWY 18L/36R

Step 1

Timeline:
RWY 18C/36C

Step 2

To change the runway for a single flight:

- Step 1: right click on the flight ID on either the Timeline or Flights Table
- Step 2: choose “Change Runway”
- Step 3: choose a runway from the drop down menu. The flight’s timeline datablock will automatically move to the Timeline for the new runway assignment. Ramp is automatically notified of the change.

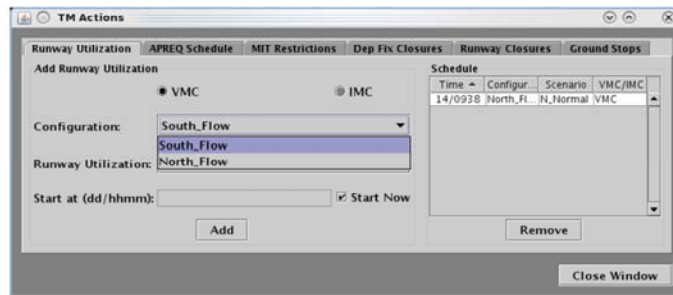
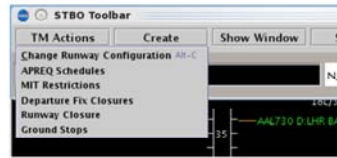
Runway changes for multiple flights can be completed at once. To do this, select multiple flights, then follow the above steps 1-3. Multi-flight runway change can only be completed for groups of flights whose runway assignment is being changed to the same runway.

The same procedures can be used to change the departure fix for a single flight:

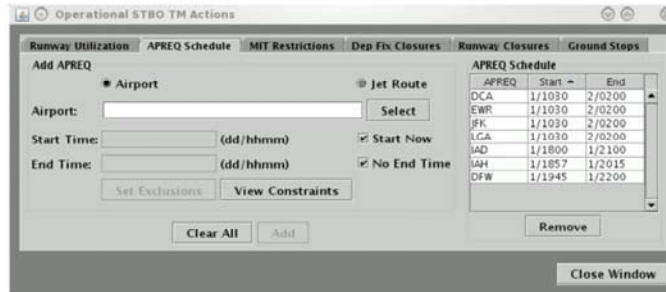
- Step 1: right click on the flight ID on either the Timeline or Flights Table
- Step 2: choose “Change DepFix”
- Step 3: choose a departure fix from the drop down menu. The flight’s timeline datablock and Flights Table will automatically update with the new departure fix assignment. Ramp is automatically notified of the change.

TM Actions

- Click on TM Actions menu
 - select “Change Runway Configuration”
- “Runway Utilization” tab is pre-selected
- Fill in information and “Add” to the schedule



- Select "APREQ Schedules" tab
- Fill in information and "Add" to the schedule
- You can set and preview exclusions too



- Select "MIT Restrictions" tab
- Fill in information and "Add" to the schedule
- You can set and preview exclusions too



Operational STBO TM Actions

Runway Utilization | APREQ Schedule | MIT Restrictions | Dep Fix Closures | Runway Closures | Ground Stops

Add MIT

DepFix: BOBZY BOBZY

MIT Restriction: 15

Start Time: (dd/hhmm) Start Now

End Time: (dd/hhmm) No End Time

Set Exclusions View Constraints

Clear All Add

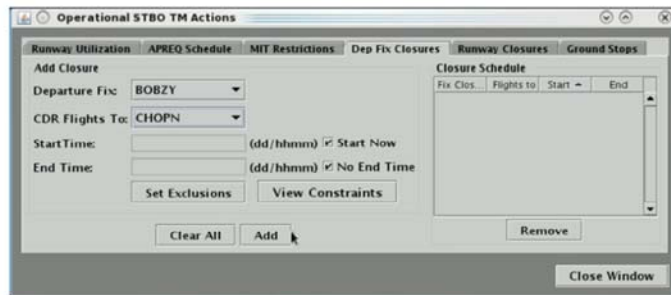
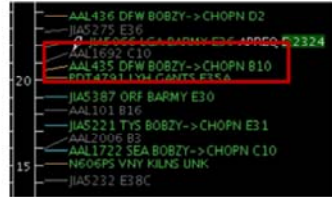
MIT Schedule

Resource	MIT	Start	End
BAPMY	20	21/2305	No End
BEAVY	20	21/2305	No End

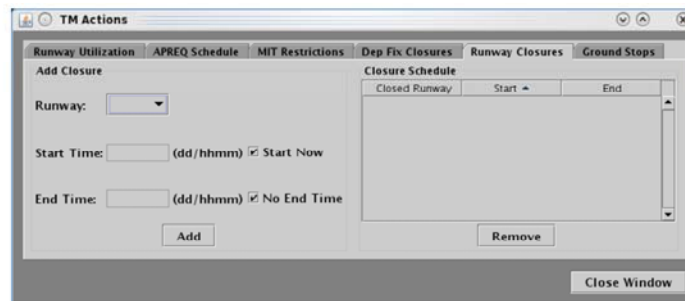
Remove

Close Window

- Select "Dep Fix Closures" tab
- Fill in information and "Add" to the schedule
- You can set and preview exclusions too



- Select "Runway Closures" tab
- Fill in information and "Add" to the schedule



The screenshot shows the "TM Actions" dialog box with the "Runway Closures" tab selected. The dialog is divided into two main sections: "Add Closure" on the left and "Closure Schedule" on the right.

Add Closure Section:

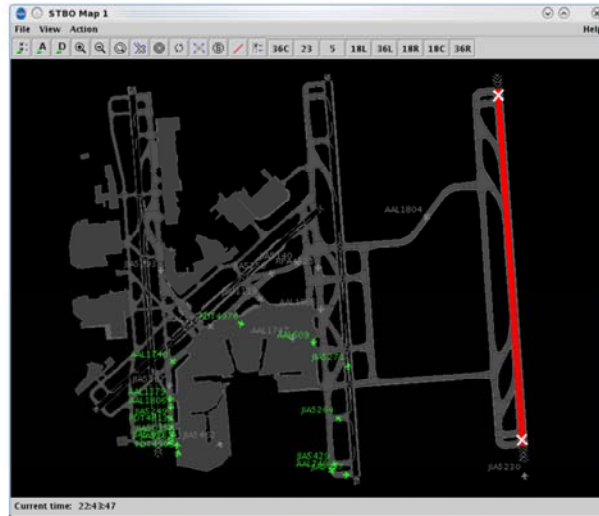
- Runway:** A dropdown menu.
- Start Time:** A text input field with a format "(dd/hhmm)" and a checked checkbox labeled "Start Now".
- End Time:** A text input field with a format "(dd/hhmm)" and a checked checkbox labeled "No End Time".
- Add:** A button at the bottom of the "Add Closure" section.

Closure Schedule Section:

- Closure Schedule:** A table with columns "Closed Runway", "Start", and "End". The table is currently empty.
- Remove:** A button at the bottom of the "Closure Schedule" section.

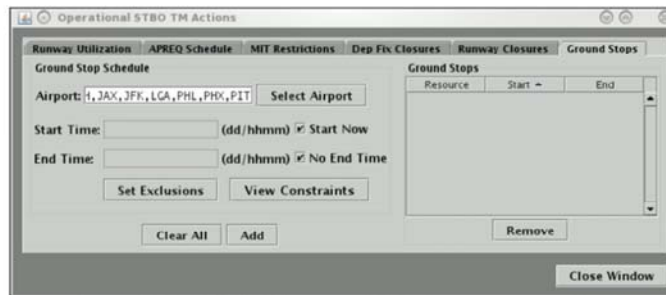
Close Window: A button at the bottom right of the dialog box.

- Closed runway is marked red with white "X"s

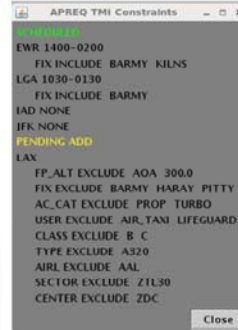
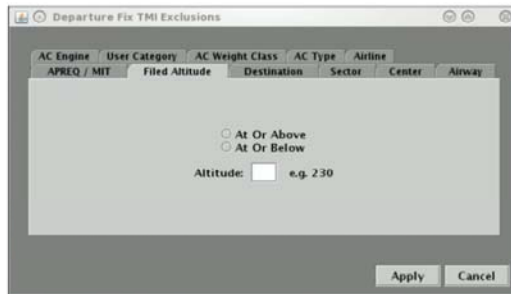


The closed runway is marked red with white "X"s at either end.

- Select "Ground Stops" tab
- Fill in information and "Add" to the schedule
- You can set and preview exclusions too



- Fill in any necessary information
- “Apply” to the restriction
- Preview exclusions



Time	Event	Presenter
0730	Overview of STBO Client	Lindsay
0800	Data Exchange and Integration	Lindsay
0835	APREQ Procedures	Bob
0920	Break	
0930	DASH	Shivanjli
0950	What-If	Shivanjli
1010	Hands-on Training	



- Data Exchange and sharing between CLT Tower and AA Ramp is foundational to Scheduling and Metering
- Improves Situational Awareness among decision makers
- Allows automated exchange of information and less reliance on phone calls
- Allows for collaboration between different kind of users
- Seven ATD2 Shadow sessions at CLT lab have captured more than a dozen data exchange items between Tower and Ramp
- Data exchange generates a notification for the users in their respective system

Data exchange is the key to information sharing between the Ramp and Tower and is likely to improve situational awareness. Many of these exchanges will remove the over reliance on phone calls and hopefully make the process a lot more efficient and streamlined. It also puts the onus on one party to make inputs into the system so that it is effectively disseminated among others. Even though pilots are not getting any new ATD-2 technologies, many of the changes in their procedures are included here



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Ground Stop
- Cancellations
- Departure fix close
- Long On Board
- Runway Closure
- Ramp Closure

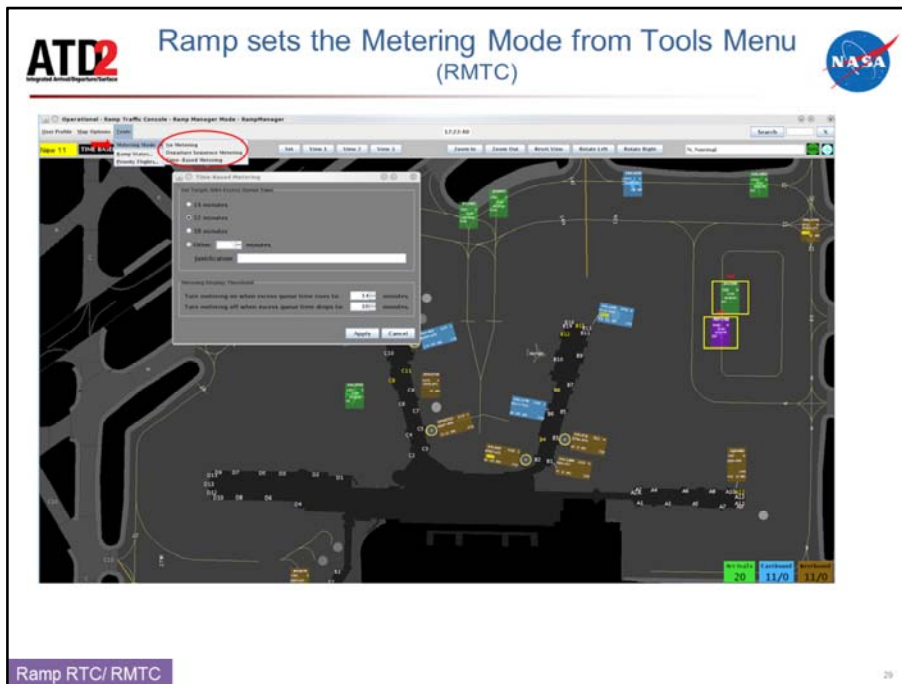
As a theme most TMIs are never shared directly with Ramp. They know about this after the TMI has been given to the pilot. NASA team discussed these topics for data exchange and integration between the Ramp and the Tower over 7 shadow evaluations that were held at CLT lab. This list shows all the topics that were discussed and planned to become part of the phase-1. Our main system is Surface Trajectory Based Operations (STBO), which is analogous to a big house that has several windows – one for the amp and one for the ATC-T (STBO Client). These data exchange items will be displayed in a similar way in the two windows- RTC and STBO Client.



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Ground Stop
- Cancellations
- Departure fix closure
- Long On Board
- Runway Closure
- Ramp Closure



The Ramp Manager will have the option to set the metering mode from the tools menu. The option to set it as “no metering” or “departure sequence metering” is meant to collect data, it does not change any algorithms. Ramp Manager is expected to make this input into the system and it will be sent to the users as a new notification. The notification icon shown in the top right hand side will be also get updated for both STBO Client and RTC. A close up of the notification icons can be seen in the next few slides



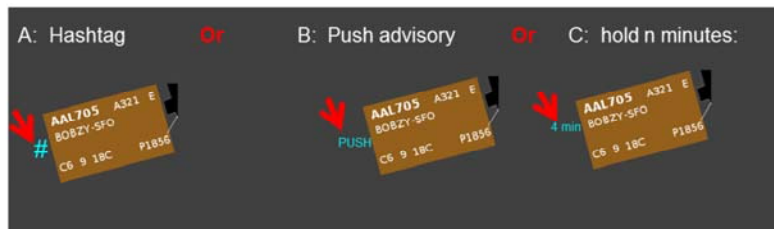
- **No Metering :**
 - No time-based advisories are displayed
 - Hold lists are available on RTC/RMTC

- **Sequence-based metering:**
 - This is provided primarily for legacy backward compatibility
 - This is how ATD-2 allows the count-based metering that CLT has previously called "departure sequencing"
 - Requires selection of a queue size on RMTC
 - Hold lists are available on RTC/RMTC

- **Time-based metering:**
 - This is the new tactical surface metering ATD-2 is adding which leverages time-based-metering & ration-by-schedule principles
 - The time-based pushback advisory is for individual aircraft using trajectory based predictions & scheduling algorithms
 - Both pushback and recommended hold times advisories are available on RTC/RMTC

The metering modes are described above. These will be updated depending on Mode set by the Ramp Manager, STBO Client will also display the Metering Mode Icon on the right hand corner of the Toolbar.

- Advisories are present only if Metering is on and there is sufficient demand
- **After** the pilot calls for pushback, the Advisory (in cyan) will recommend: A, B or C
- If a hashtag is displayed, click on hashtag to generate the advisory
- If a "PUSH" advisory is displayed, then pushback recommended by the scheduler, make pushback entry using right click menu
- If a recommended hold time, then use right click menu to hold for n minutes



When Time Based Metering is enabled, there may not be advisories generated right away. The metering may be enabled sooner than the tool turns on these advisories. The tool turns on the advisories when it sees a demand capacity imbalance that propagates delays to some flights. The advisories should be used when the pilot calls in.

Tactical Scheduler advisories provide a recommended hold time for the controller to advise a flight to either pushback or hold at the moment they call for pushback approval.

These advisories are updated every 10 seconds based on real time movements on the surface including queue length, number of pushbacks at the gate.

Gate conflicts are not resolved by scheduler, RC may decide to push a flight at a gate with a conflict, or to hold the arrival in HS.

When Tactical Scheduler Advisories are in use, we ask the ramp controllers to follow these recommendations while controlling traffic



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- **APREQ Scheduling**
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Ground Stop
- Cancellations
- Departure fix closure
- Long On Board
- Runway Closure
- Ramp Closure

- Notification on RTC for the APREQ

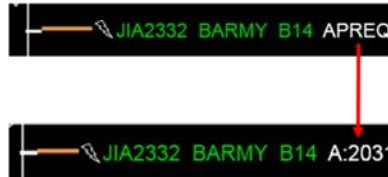
Reported	Event Type	Description	Event Start	Event End
2/8/17 1808	AIRPORT	JFK APREQ	2/8/17 1800	2/9/17 --
2/8/17 1701	FIX	LGA 15 MIT	2/8/17 1650	2/9/17 --
2/8/17 1630	FIX	DCA OPEN	2/8/17 1515	2/8/17 --
2/8/17 1624	AIRPORT	EWR APREQ	2/8/17 1615	2/9/17 --
2/8/17 1600	FIX	ORD OPEN	2/8/17 1515	2/8/17 --
2/8/17 1100	FIX	LGA APREQ	2/8/17 1115	2/8/17 --

- APREQ showing on the strip



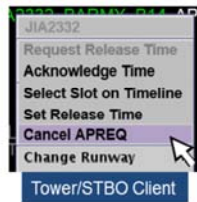
Adding an APREQ restriction will generate a notification on RTC and add the word “APREQ” to the Flight Strips of the affected flights.

- APREQ Time shown on STBO Client Timeline after scheduled



Initially the word “APREQ” is shown on Timeline data block when it’s known that the flight needs to request Wheels-up time. After the negotiated time is received from the Center, the word “APREQ” changes to the scheduled time shown as “A:hmm” on the Timeline datablock.

- To cancel or reschedule an APREQ release time
 - Right click on Timeline datablock
 - Click "Cancel APREQ"
 - Begin the APREQ process again
- RTC will show APREQ on the flight strip when the time has been cancelled



If the APREQ release time needs to be rescheduled then it has to be cancelled using the right click menu. After it has been cancelled, the APREQ process has to start all over again with the Center.



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- **MIT handling**
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Ground Stop
- Cancellations
- Departure fix closure
- Long On Board
- Runway Closure
- Ramp Closure

NEW 8 15 MIT ICONS 2015-0712



JIA5043 CRJ9 N
 ICONS-SAV
M15
 E28 29E 18L P2109

Ramp RTC/ RMTC

Added restrictions show up as "M15" on Timeline.

- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- **EDCT flights**
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Ground Stop
- Cancellations
- Departure fix closure
- Long On Board
- Runway Closure
- Ramp Closure

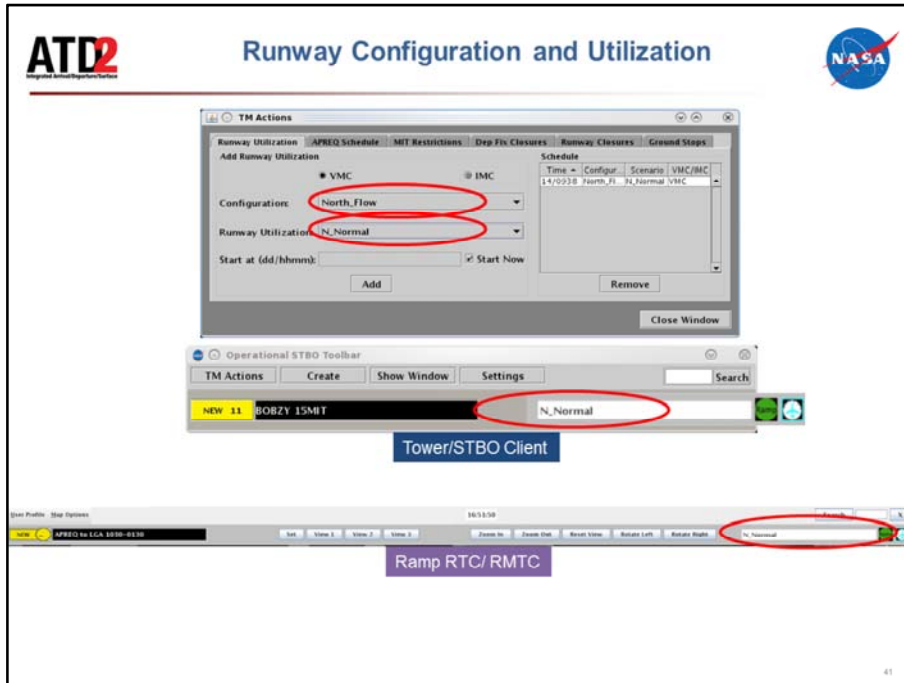


EDCT aircraft that is currently within time window of ±5 min

Expected Departure Clearance Times (EDCT) are “Wheels Up” times that are assigned to aircraft due to Traffic Management Initiatives (TMIs) that require holding aircraft on the ground at the departure airport. They have a - 5 minute / + 5 minute conformance window.

EDCTs are read through our system and show up on the STBO Client timeline as “E:hhmm.” If the flight is subject to EDCT agreeen compliance indicator show if the flight is inside the +/- 5 window, it’s red when it is outside the window and late, and it’s yellow when it’s outside the window and early.

- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- **Airport configurations and runway utilization**
- Runway assignments – operational necessity only
- Gate Conflicts
- Ground Stop
- Cancellations
- Departure fix closure
- Long On Board
- Runway Closure
- Ramp Closure



This feature will certainly eliminate the need for phone calls between the Ramp and ATC-T. The ATC-T has agreed to input the airport configuration and any changes to runway utilization. This will be displayed to the Ramp as well as the ATC-T as a notification.

- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- **Runway assignments – operational necessity only**
- Gate Conflicts
- Ground Stop
- Cancellations
- Departure fix closure
- Long On Board
- Runway Closure
- Ramp Closure

Before runway change

After runway change

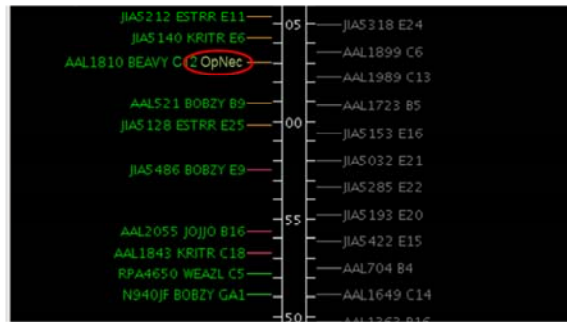
Select Runway

Runway can only be changed due to operational necessity. Once you click Apply both here AND in the main Flight Menu dialog, the runway cannot be changed again with this tool.

Operational Necessity

18C	18L
18R	23
36C	36L
36R	5

Apply Cancel



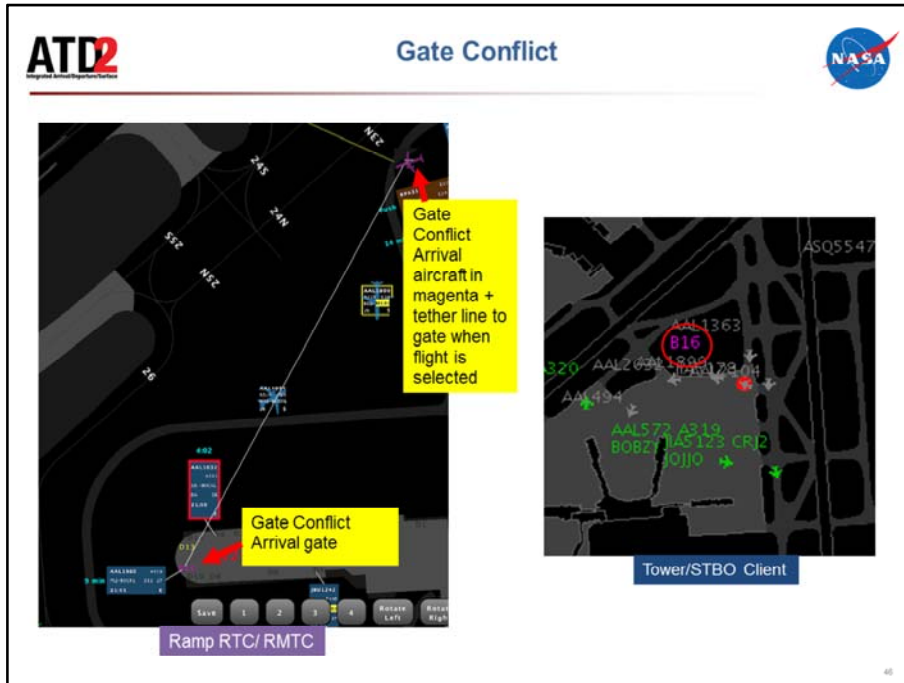
ATC-T knows that a flight has changed runway due to Operational Necessity. The word "OpNec" will show on the STBO Timeline datablock.



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- **Gate Conflicts**
 - Ground Stop
 - Cancellations
 - Departure fix closure
 - Long On Board
 - Runway Closure
 - Ramp Closure



In RTC, the gate conflicts are shown as magenta for the arrival icon and the affected gate also shows as magenta. In future the users will be able to configure gate conflicts and see gate conflicts/ gate occupied in the next “n” minutes and “n” min could be specified by the users as per their needs. Also gates blocked due to heavies parked next to the gate will be marked as magenta.



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- **Ground Stop**
- Cancellations
- Departure fix closure
- Long On Board
- Runway Closure
- Ramp Closure



Reported	Event Type	Description	Event Start	Event End
3/14/17 1736	TMI	GROUND STOP at BWI	3/14/17 1736	
3/14/17 1730	TMI	GROUND STOP REMOVED BWI	3/14/17 1723	
3/14/17 1700	TMI	OPEN LGA	3/14/17 1659	
3/14/17 1700	TMI	OPEN BWI	3/14/17 1659	
3/14/17 1700	TMI	OPEN BOS	3/14/17 1659	
3/14/17 1601	TMI	GROUND STOP REMOVED SNA	3/14/17 1456	3/14/17...

On RTC, Notification window shows the “Ground Stop at BWI,” and the flight strip highlights the individual flights with destination to BWI in blinking red for that sector until it is acknowledged.



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Manual updates/corrections to flights
- Ground Stop
- **Cancellations**
 - Departure fix closure
 - Long On Board
 - Runway Closure
 - Ramp Closure

Flight Menu

RPA3474 E170 EWR

Handstand: Clear
Bypass: Clear
Gate: 36R
Spot: 36R
Runway: 36R

DEPARTURE DETAILS
Push Back Time: 1602
CPR:
EDCT:

FLIGHT STATUS
 Priority Flight
 Flight Cancelled

OPERATIONAL STATUS
 Normal
 Inactive Temporarily
 Removed from Service

Apply Cancel



Ramp RTC/RMTC

All Results: 841 total. 17:58 GMT

Flight ID	Dest	Origin	AC Type	Rwy	RwyOptic	Rwy Time	Flight Status	Gate	Gate Time	Spot	Spk
PDT4955	AVL	CLT	DH3	E16C		E14/18:55	Scheduled_Out	E308	E14/18:40	S24	E14/18:55
PDT4968	HTS	CLT	DH3	36C		14/17:35	Enroute_Dep	E34	14/17:15	S24	14/17:35
PDT4968	CLT	HTS	DH3C	E36L			Scheduled_In	E12		S9W	
PDT4972	CLT	ProA	DH3	36R		14/14:23	In	E308	14/14:27	S29	14/14:23
PDT4974	TRI	CLT	DH3	36C		14/17:20	Enroute_Dep	E3BA	14/16:59	S24	14/17:20
PDT4974	CLT	TRI	DH3C	E36L		E14/19:26	Scheduled_In	E12	E14/19:36	S9W	E14/19:26
PDT4976	HTS	CLT	DH3C	E36C			Scheduled_Out	E3BA		S24	
PDT4982	AVL	CLT	DH3C	E36C			Scheduled_Out	E308		S24	
PDT4983	CLT	AVL	DH3C	E36L			Scheduled_In	E4		S9W	
RPA3454	IAH	CLT	E170	E36C		E14/18:40	Scheduled_Out	A12	E14/18:25	S125	E14/18:40
RPA3474	EWR	CLT	E170	E36L			Cancelled	A11		S9W	
RPA4402	CLT	ProA	E170	36L		14/18:15	In	CP	14/16:23	S9W	14/18:15

Tower/STBO Client

Cancellations come into the system quite late, sometimes the ramp is aware of these and will be able to enter them into RTC. But cancellation provided by the AA data will also be read into the system.

To cancel a flight from RTC, open the flight menu for the flight, select "Flight Cancelled."



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Manual updates/corrections to flights
- Ground Stop
- Cancellations
- **Departure fix closure**
- Long On Board
- Runway Closure
- Ramp Closure

ATD2 NASA

Departure Fix Closures

NEW 11 Closure KILNS 1755-0712

Closed Dep Fix with CDR Fix selected

20	AAL436 DFW BOBZY->CHOPN D2
	JIAS275 E36
	JIAS066 LGA BARMY E36 APREQ E2324
	AAL1692 C10
	AAL435 DFW BOBZY->CHOPN B10
	PDT4791 LYH GANTS E35A
	JIAS387 ORF BARMY E30
	AAL101 B16
	JIAS221 TYS BOBZY->CHOPN E31
	AAL2006 B3
15	AAL1722 SEA BOBZY->CHOPN C10
	N606PS VMM KILNS LNK
	JIAS232 E38C

Tower/STBO Client

JIA5098

CRJ9 E

KILNS-MKE

P1830

E11 2436C

Ramp RTC/ RMTC

52

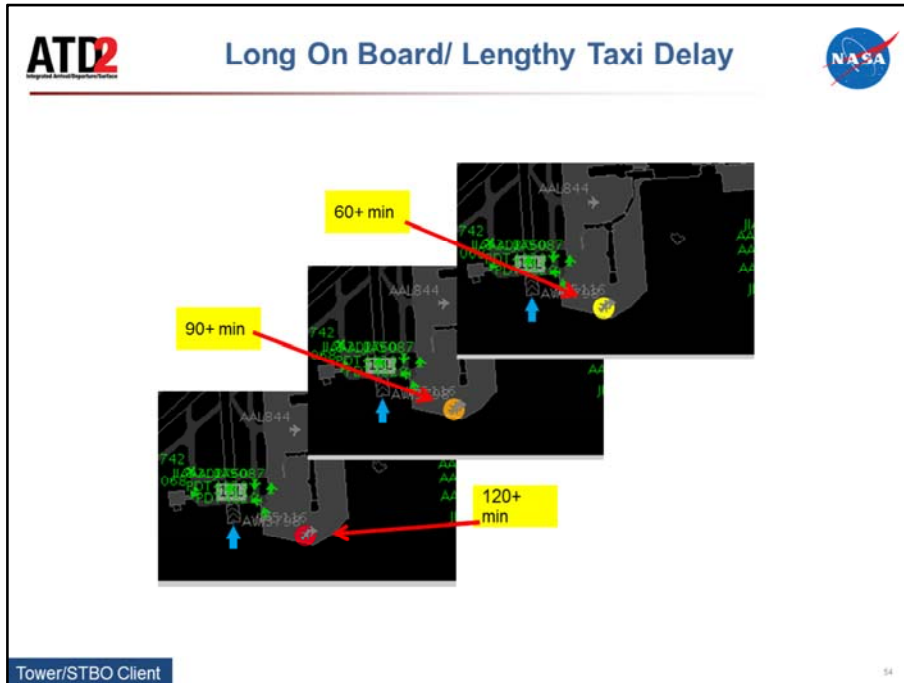
If no “CDR Flights To” fix was selected in STBO Client, the fix will turn red and the datablock will move to the end of the closure after a few seconds (or 2 hours into the future if “No End Time” was selected). If a CDR fix was selected, the red will update to show the CDR as “[original fix]→[CDR fix]”. On the RTC/RMTC, regardless of whether a CDR fix was selected or not, the original fix will be displayed in red.



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Manual updates/corrections to flights
- Ground Stop
- Cancellations
- Departure fix closure
- **Long On Board**
- Runway Closure
- Ramp Closure



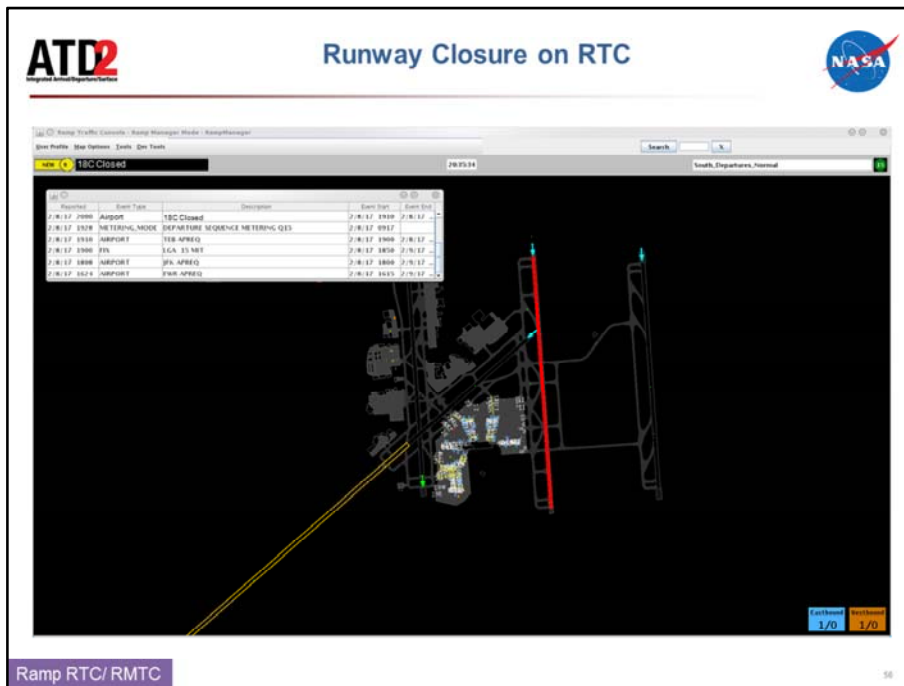
Long On Board is especially important to the Airlines to avoid heavy penalties. ATC-T also expressed a desire to see the LOB information so that they could assist the Ramp with getting the flights to their gates as soon as possible. The timer for LOB starts as soon as the arrival touches ground and gets its ON, and for departures it starts when it gets its OUT or pushes back. The LOB indicator is a colored disc drawn on the flight icon. On STBO Client Map and RTC/RMTC it is a yellow disc when the flight has been on the tarmac for 60 min, it's orange when it has been there for 90 min and its red when the flight has been on tarmac for over 120 minutes or 2 hours.



Data Exchange Planned for Phase-1



- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Manual updates/corrections to flights
- Ground Stop
- Cancellations
- Departure fix closure
- Long On Board
- **Runway Closure**
- Ramp Closure



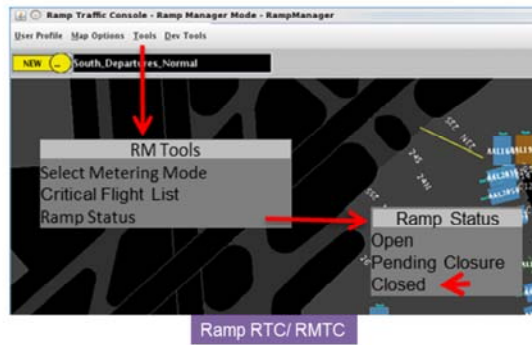
The closed runway is marked red with white "X"s at either end on STBO Client and RTC/RMTC.



Data Exchange Planned for Phase-1

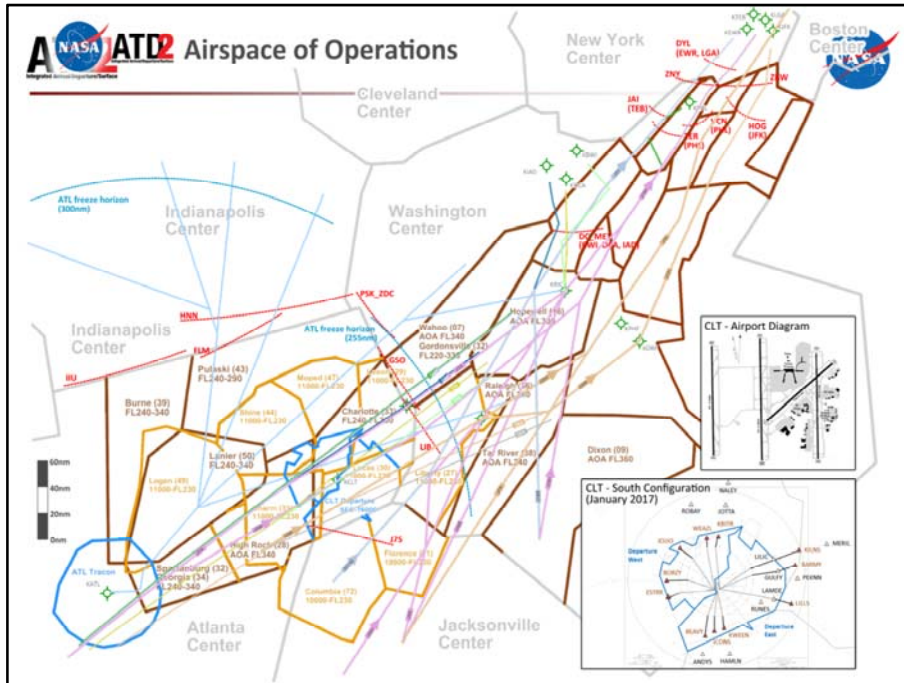


- Metering – Time based metering
- Pushback and Surveillance information
- APREQ Scheduling
- MIT handling
- EDCT flights
- Airport configurations and runway utilization
- Runway assignments – operational necessity only
- Gate Conflicts
- Manual updates/corrections to flights
- Ground Stop
- Cancellations
- Departure fix closure
- Long On Board
- Runway Closure
- **Ramp Closure**



Ramp Closures often occur due to inclement weather especially lightning. This information will be entered by the Ramp and shared with the ATC-T.

Time	Event	Presenter
0730	Overview of STBO Client	Lindsay
0800	Data Exchange and Integration	Lindsay
0835	APREQ Procedures	Bob
0920	Break	
0930	DASH	Shivanjli
0950	What-If	Shivanjli
1010	Hands-on Training	



Tower/STBO Client

- You can request time electronically: indicated by the **lightning bolt symbol** on Timeline datablock



- To begin the APREQ process:
 - Right click on Timeline datablock
 - Click on "Request Release Time"
 - This action automatically picks earliest time aircraft is projected to meet
 - Yellow arrow appears to right of Timeline datablock—you sent it to Center

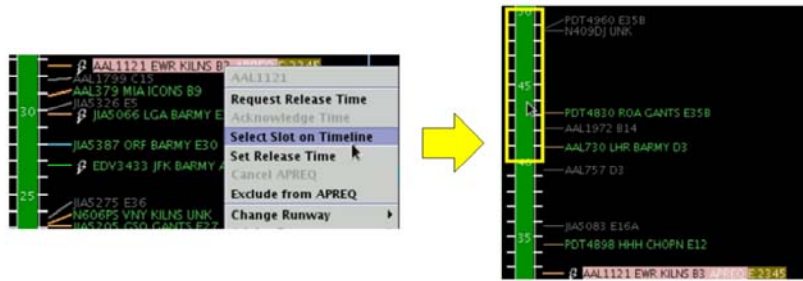


If a lightning bold symbol is present on the flight’s timeline datablock, the APREQ release time can be negotiated electronically.

To begin the APREQ process, right click on the flight’s timeline datablock and select “Request Release Time.” This option automatically picks the earliest feasible takeoff time as the time to request to Center. When the time is sent, a yellow arrow will appear next to the Timeline datablock.

Tower/STBO Client

- Alternately, you can request time electronically by:
 - Right click on Timeline datablock
 - Click on “Select Slot on Timeline”
 - Click on the desired slot on the timeline
 - Yellow arrow appears to right of Timeline datablock



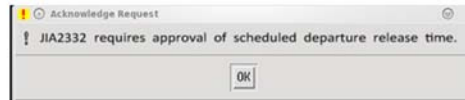
Alternately, the Tower user can send an electronic request for a specific time by choosing the “Select Slot on Timeline” option from the flight’s right click menu. This will populate red and green bars in the middle of the Timeline to show available slots that the flight can be scheduled to in the overhead stream. Green slots are available, red slots are unavailable. Available slots are drawn from 15 minutes before the current predicted OFF time to 30 minutes after the current predicted OFF time. Click on a time on the Timeline and the STBO Client will send a request for that time to Center. Again, a yellow arrow will appear next to the Timeline datablock to show that the time was sent.

Center/TBFM TGUI

- On TBFM Meter Fix timeline an exclamation point in yellow appears



- If you forget, this reminder will appear in 2 minutes, accompanied by an audio alert (if audio is turned on)



Note that the images are for demonstrative purposes and do not match the flight callsigns between ATCT and Center.

Center/TBFM TGUI

- #1:
 - Right click on exclamation point
 - Select Accept, Freeze, or Cancel

- #2:
 - Left click on the yellow diamond with the "!" to accept the requested time



See slide for full description

Center/TBFM TGUI

- #3:
 - Go to F4 window in TBFM
 - Accept or Reject

Internal Departures for TGU1-ZDC-EDC (FC F4)

Unscheduled Flights Schedule... Sort by: ACID

Airports Partial All None

Meter Points Partial All None

ZOB ZNY DYL HOG J22 JAI TER ZBM
 ZID TLN TLS JXI JXA DCM YCN

AA1170/GSO	ASQ1972/CLT	GJS2068/CLT	ICF3311/RDU
AA11256/CLT	ASQ3807/GSO	GJS6280/GSO	ICF3377/ORF
AA11455/CLT	ASQ4824/CLT	JIA2332/CLT	
AA1161/CLT	ASQ5108/RIC	JIA4951/RDU	
AA11864/CLT	ASQ5797/CLT	LOF3360/ORF	
AA11950/CLT	ASQ6755/IAD	LOF3387/CLT	
AA12063/CLT	AAI3737/ORF	RP1144/CLT	
AA1293/CLT	AAI9558/GSO	SHA1962/CLT	
ASH2597/CLT	FLG2050/CLT	SHA2999/ORF	
ASH5593/CLT	FLG4870/RDU	SHA925/RDU	

Pending Approval Flights Accept Reject

JIA2332/CLT

Flight Data for FLG4078/RDU.916 JIA2332/CLT

916 L/CRJ9/X 4602 417 KRDU 2156 270 KRDU./,LVL.,HPW.
J191.PXT.KORRY3.KLGA

Status: UNSCHEDULED Original MP STA: N/A

Center/TBFM TGUI

- #4:
 - Go to "Schedule a Departure Window" in TBFM
 - Press "Schedule"

Schedule a Departure

LIB Arrival: JIA2332/CLT.286

286 L/CRJ9/X 5157 449 KCLT 2158 350 KCLT.MERIL7.MERIL..
 RDU.J55.HPW.J191.PXT..END..RBV..KLGA

Original Flight Estimate

View/Change Scheduled Route

Compute STA and Suggest Departure Time

Flight Times & ETA: ETE ETA

● To MP: DYL 01:00 2129z

Aircraft-Ready Time (z): 2029 Current + 25

Desired STA (z): 2131 Schedule

Closest Available STA (z): 2131

Suggested Dep (z): 2031 Delay: +2

Scheduled Dep (z): 2031 Unschedule

Delay Scheduled Flights for This Aircraft Only

Freeze Accept Close



Center/TBFM TGUI

- STA will look turn green and will display the delay in minutes after ACID (02)



ATD2 What to do with Center's Response

Tower/STBO Client

- When Center sends back a release time, it will appear on the datablock ("A:2344") and be highlighted by a compliance indicator.
- If the time differs from what was requested, a yellow diamond with an "!" accompanies time.
 - Click on symbol to acknowledge new time.



- If the new time doesn't work, right click and select "Cancel APREQ", then renegotiate a new release time.

If Center returns a time that differs from the requested release time, a yellow diamond with an exclamation mark appears next to the flight's timeline datablock. If you accept this time, right click on the timeline datablock and choose "Acknowledge Time." In future versions of STBO Client, you will be able to click on the diamond to accept the time without having to right click on the timeline datablock first.

If you don't want to accept this time, right click on the timeline datablock, cancel the APREQ, and begin the APREQ process again.

Tower/STBO Client

Once flight has a release time, compliance indicators highlight the APREQ release time.

- If indicator is green = on time

- If indicator is red = aircraft late
 - Right click on Timeline datablock
 - Cancel the APREQ first.
 - Restart process for requesting a release time.

- If indicator is yellow = aircraft early
 - Option 1: Delay the aircraft until it can meet it's release time.
 - Option 2: Right click on Timeline datablock
 - Cancel the APREQ first.
 - Restart process for requesting a release time.



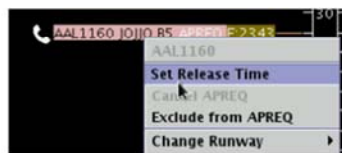
Ramp is automatically notified of the new time.

Tower/STBO Client

- Aircraft appears on timeline with white APREQ written to the right of the Timeline datablock



- Telephone symbol means you have to call the Center to request a time
 - After receiving time, right click on Timeline datablock
 - Select "Set Release Time"
 - Set time
 - Compliance blocks appear on sides of Timeline datablock
 - You are done!

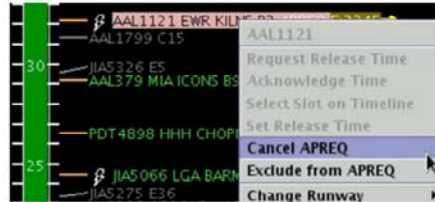


Flights that require manual coordination of APREQ release times will have a telephone symbol next to the flight's datablock. For these flights, you will need to verbally call the Center. Once Tower and Center agree on a time, right click on the flight's timeline datablock on the STBO Client Timeline and click "Set Release Time," then type in the time and click "Set."

Ramp is automatically notified of the release time.

Tower/STBO Client

- To cancel or reschedule an APREQ release time
 - Right click on Timeline datablock
 - Click "Cancel APREQ"
 - Begin the APREQ process again



- When the APREQ is cancelled, datablock will return to the original configuration with no time or compliance indicator.



Ramp is automatically notified of the cancellation.

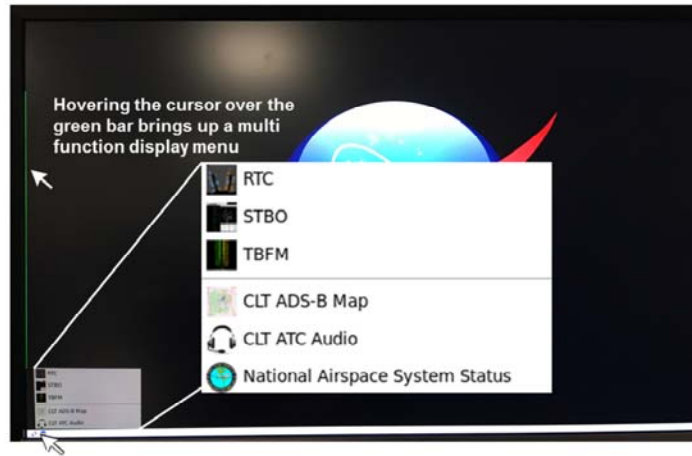
Time	Event	Presenter
0730	Overview of STBO Client	Lindsay
0800	Data Exchange and Integration	Lindsay
0835	APREQ Procedures	Bob
0920	Break	
0930	DASH	Shivanjli
0950	What-If	Shivanjli
1010	Hands-on Training	



Time	Event	Presenter
0730	Overview of STBO Client	Lindsay
0800	Data Exchange and Integration	Lindsay
0835	APREQ Procedures	Bob
0920	Break	
0930	DASH	Shivanjli
0950	What-If	Shivanjli
1010	Hands-on Training	



Kiosk Type Display with "My Desktop" view



Kiosk Type Display with "My Desktop" view





DASH Operational: localhost

Feedback Updated: 20:52 S_Normal Ramp Monitors

Operational user presses feedback button on real time dashboard

Resolve problem and report to originator



Bots

team emails

team texts

Software team

Retrieve operational user report and coordinate with team to determine if engineer on call can resolve and notify the software team concurrently





DASH Operational: localhost

Feedback Updated: 20:52 S_Normal Ramp Monitors

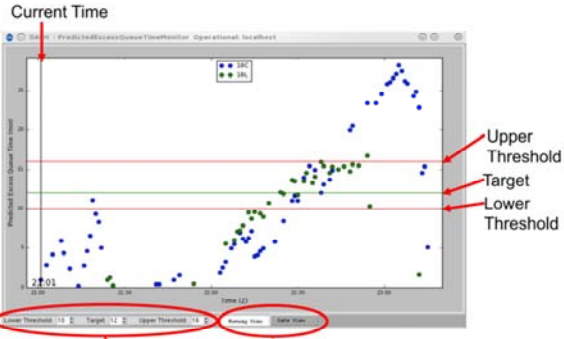
- Quick Look
- Dep & Arr Monitor
- Predicted Excess Queue Times Monitor
- Taxi Out Time Monitor
- Taxi In Time Monitor
- Throughput Monitor

APREQ			Predicted Excess Queue Time				Taxi Status		
Dest	Start Time	End Time	Predicted Excess Queue Times				Resource	Taxi In	Taxi Out
LGA	15/01:30		15 min	37	60 min	0	Full	20	9
JFK	15/02:00		30 min	0	90 min	0	Ramp	11	3
ENR	15/02:00						AMA	9	6
JFK	15/01:30								
JFK	15/00:00								

MIT			Gate Conflicts		Arrival/Departure Rate		
Fix	Start Time	nm			Rate	Actual	
NA					ARRIVAL	82/h	54
					DEPARTURE	78/h	48

Fix Closures			Throughput		
Fix	Start Time	Alternate	Resource	Arrival	Departure
NA			18L/36R	1	25
			18R/36L	25	0
			18C/36C	7	23
			23/5	21	0

**Predicted Excess Queue Time Graph
Runway View**



Enter proposed values for Lower Threshold, Target Queue Length, and Upper Threshold here

Choose Runway View or Gate View here

Predicted Excess Queue Time Graph
Gate View



Enter proposed values for Lower Threshold, Target Queue Length, and Upper Threshold here

Gate View selected

Time	Event	Presenter
0730	Overview of STBO Client	Lindsay
0800	Data Exchange and Integration	Lindsay
0835	APREQ Procedures	Bob
0920	Break	
0930	DASH	Shivanjli
0950	What-If	Shivanjli
1010	Hands-on Training	





- Select What If system from MFD (green bar)



Title bars of all windows labeled *What-If*



Desktop Background marked yellow *What-If*

Time	Event	Presenter
0730	Overview of STBO Client	Lindsay
0800	Data Exchange and Integration	Lindsay
0835	APREQ Procedures	Bob
0920	Break	
0930	DASH	Shivanjli
0950	What-If	Shivanjli
1010	Hands-on Training	

