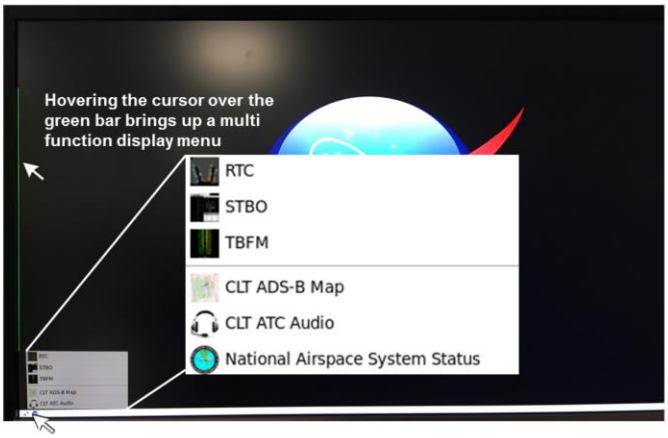
National Aeronautics and Space Administration
NASA
Air Traffic Management Demonstration II (ATD-2)
Washington Center Training
NEXTGEN
ZDC
September 19-20, 2017

Agenda

Time	Event	Presenter
0000	**NASA Menu and Multi-function Display**	Eric
0010	Overview of STBO Client	Eric
0040	APREQ Procedures	Bob
0110	TBFM IDAC Disconnecting Procedure	Bob
0115	DASH	Eric
0120	What-If	Eric
0130	Hands-on Training	

CLT Multi Functional Display (MFD)

Kiosk Type Display with "My Desktop" view



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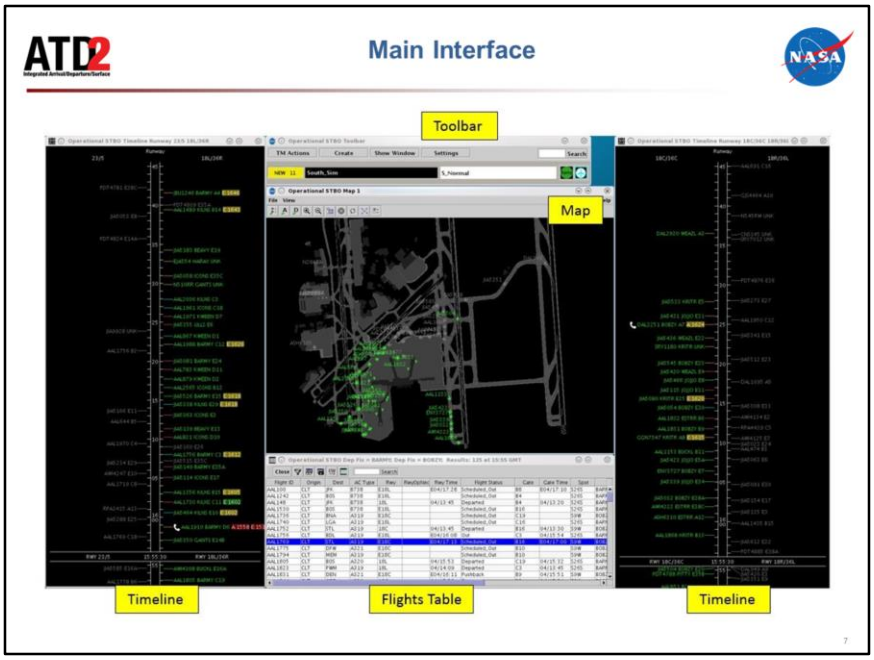


The full interface of the STBO Client is composed of multiple display windows that all serve different purposes and can be configured and arranged however the user wants.

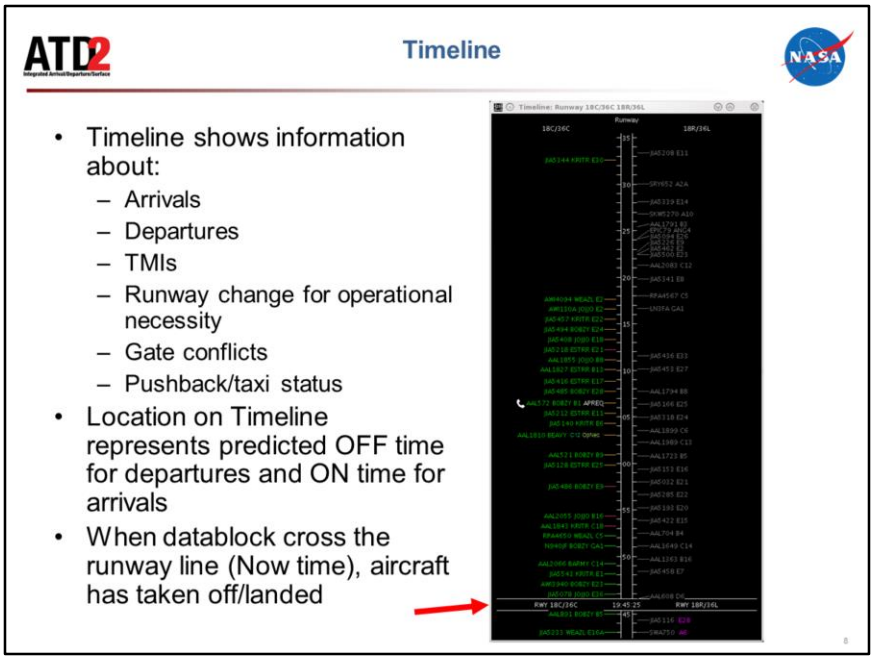
The Toolbar allows the user to interact with the system by adding new display windows, managing current display windows, saving and loading display configurations, searching for flights, scheduling TMIs and airport events, and displaying new notifications to the user.

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.



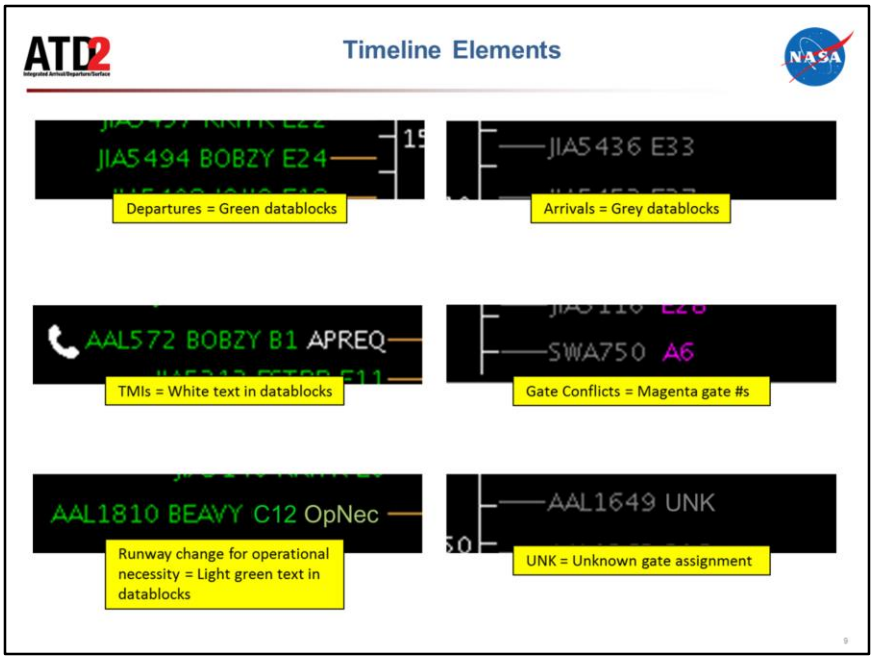
The Timeline is set up to display flight positions, resource labels (e.g., “18C/36C”) at the top and bottom of the display, the type of resource (e.g., “Runway” at the top of the timeline or “RWY” at the bottom), and the now time. The timeline also provides information about arrivals, departures, TMIs, 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.



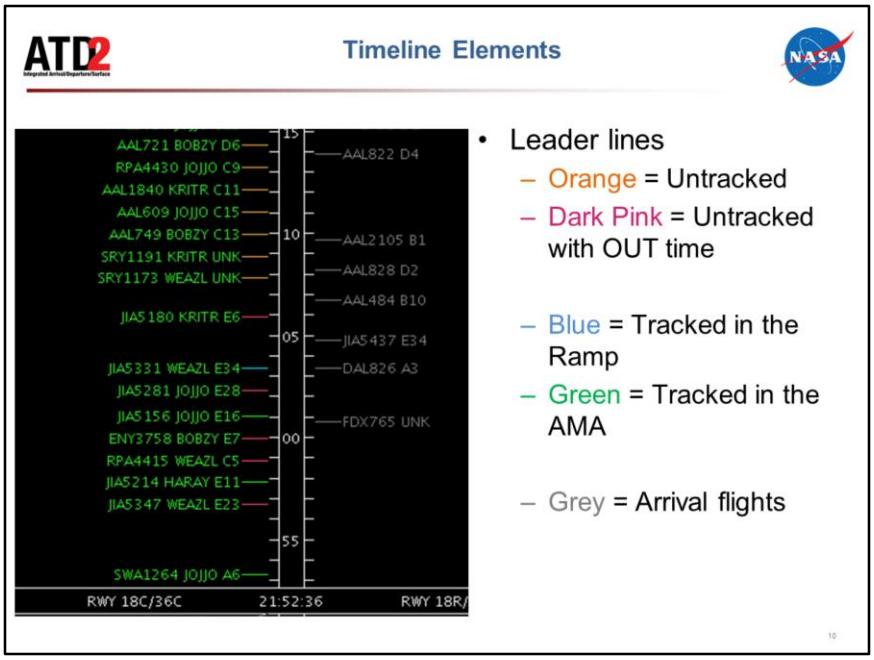
When the timeline is configured by arrivals and departures, arrival flights are displayed in grey and departure flights are displayed in green.

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.

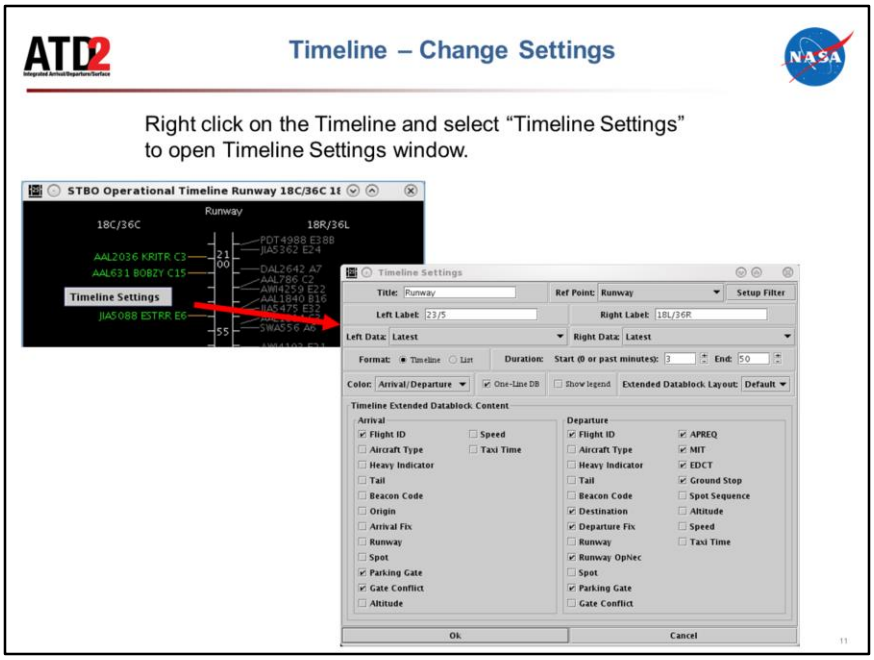
When ramp inputs a requested change of runway assignment for operational necessity, the flight datablock moves to the new runway assignment and “OpNec” is written in light green text on the datablock.

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



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

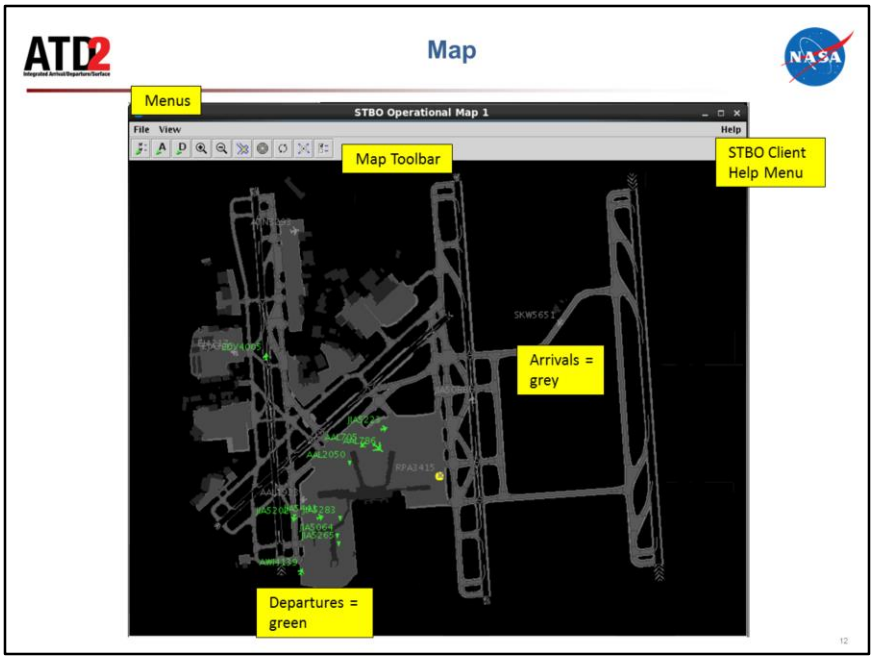
- Orange leader lines show untracked departure flights that are scheduled but have not yet pushed off the gate (no OUT time)
- Dark pink leader lines show untracked departure flights that have pushed back from the gate (have an OUT time)
- Blue leader lines are for tracked departure flights that are 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.

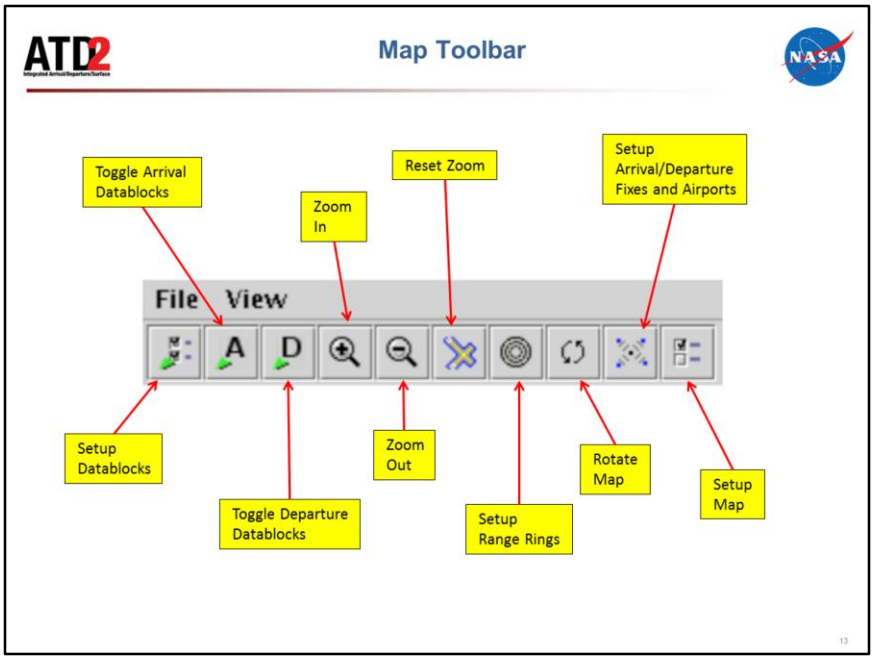
To open the Timelines Settings window, right click anywhere on the timeline background (anywhere not on a flight datablock) and select "Timeline Settings."

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.

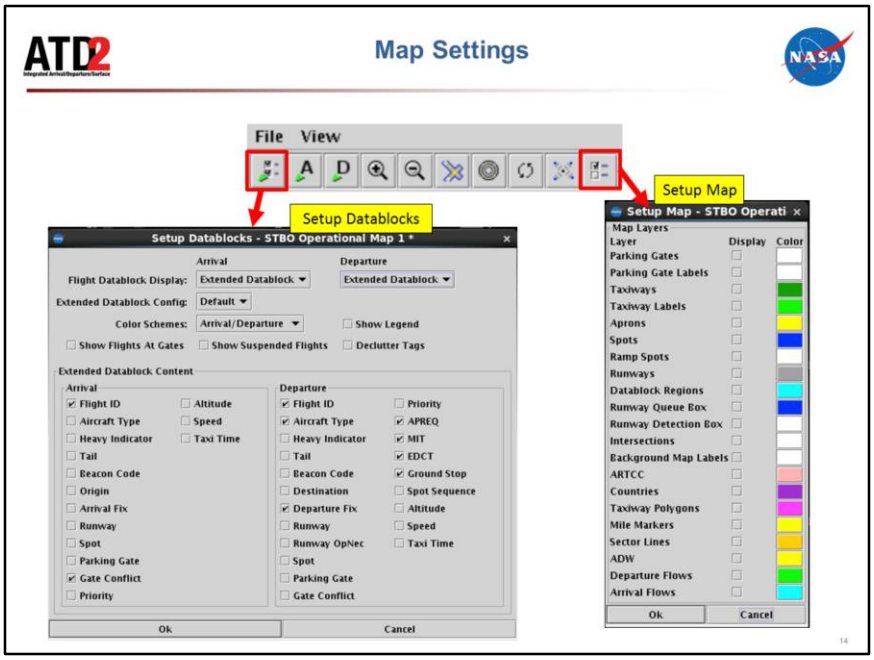


There are several functions available to the user on the Map toolbar. The labels above are what appear on the hover tooltips feature for each button. From left to right:

- 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

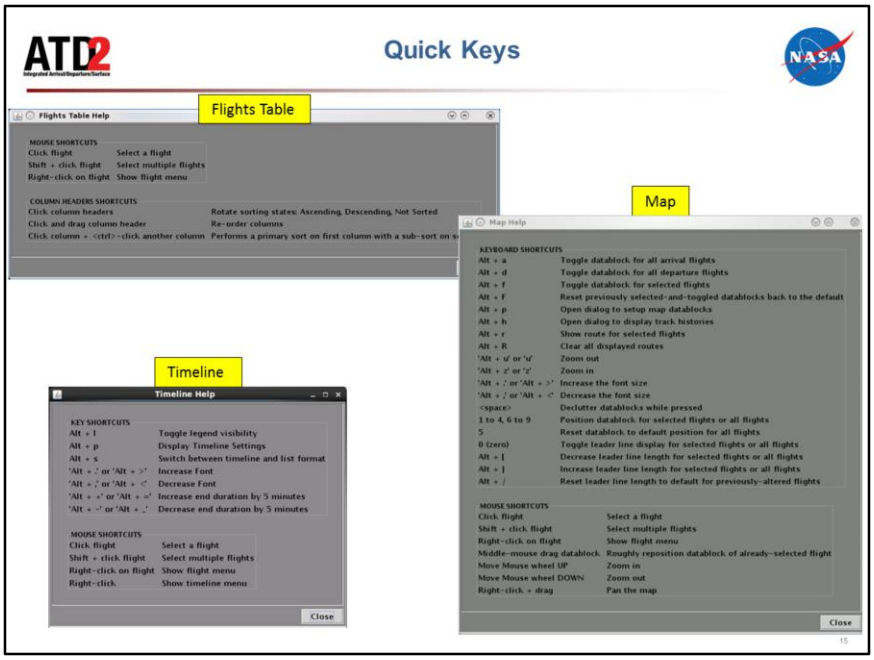
airports to the display, overlay TRACON map onto airport map

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



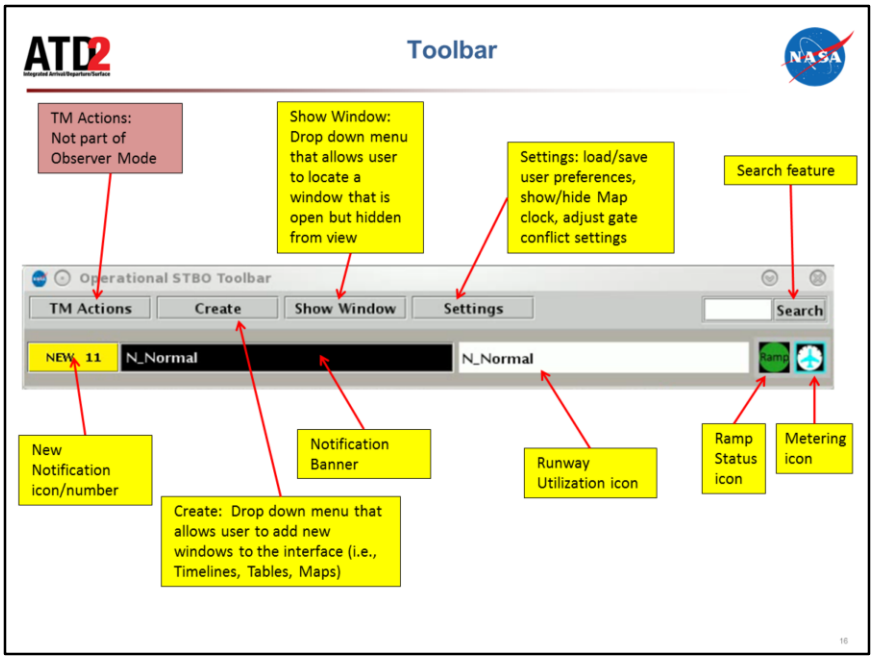
The Setup Datablocks button on the Map toolbar opens a window that enables changing the settings for what items are displayed on arrival and departure datablocks, as well as setting up how aircraft icons are color coded, showing (untracked) flights at the gate, and other display filters.

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

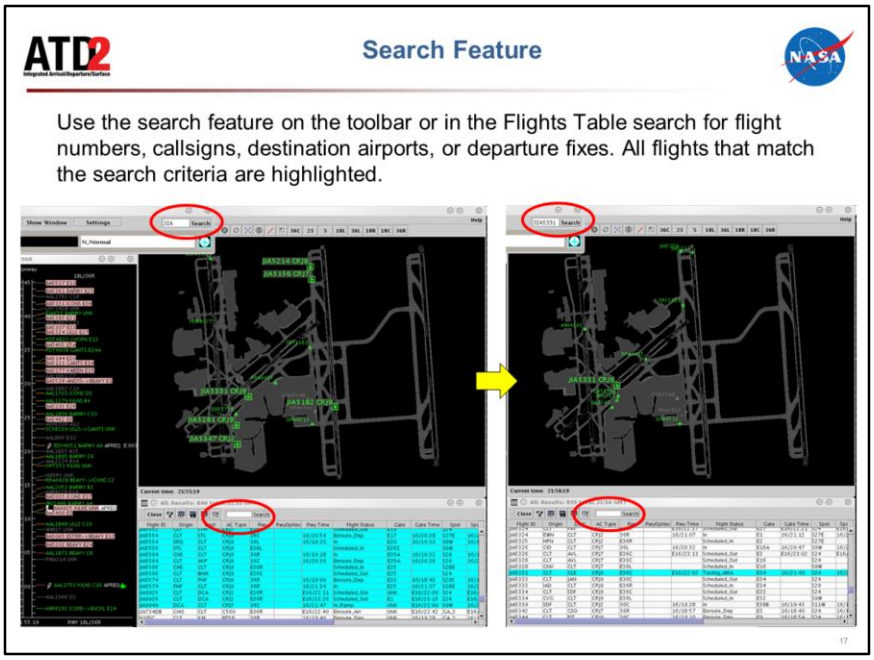
- Settings: button that opens a window to allow users to save the current display configuration for the whole STBO Client or to load a previously saved configurations

- Search Feature: search for a flight either by entering the full callsign

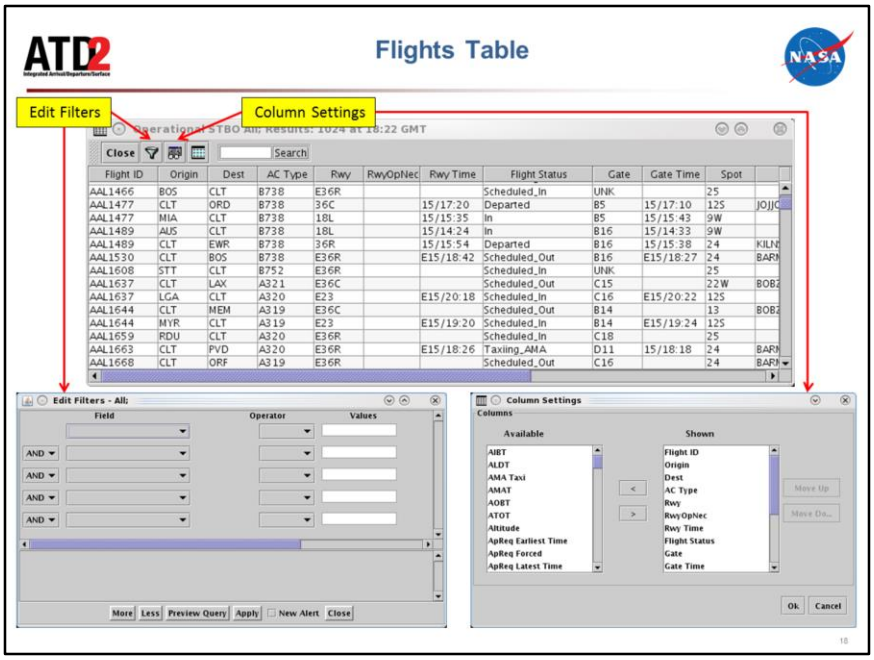
or numbers only

- Ramp Status Icon: shows when the Ramp is open, pending closure, or closed.

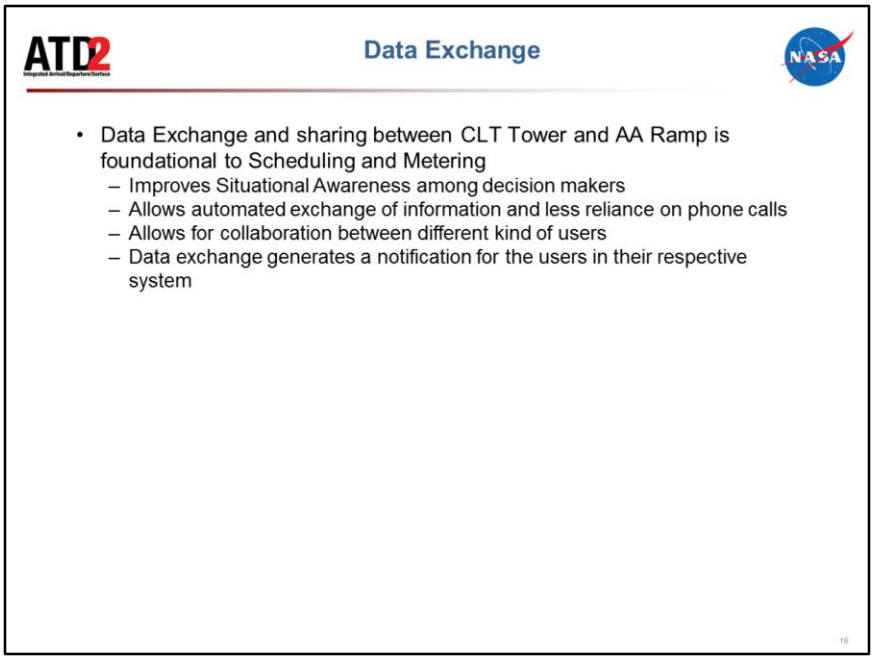
- Flow Icon: provides situational awareness for the airport runway configurations and runway utilization.



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).



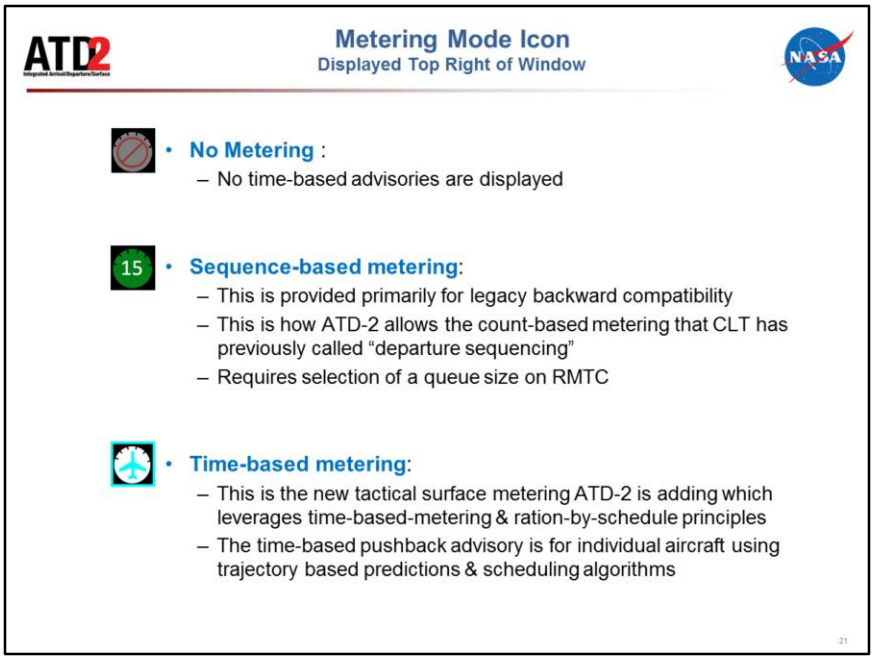
The Flights Table provides a list of scheduled flights for the airport. The column headings on the list can be traded out and moved around in the “Column Settings” window. The list of flights displayed can be adjusted by using the “Edit Filters” window and adding filter parameters.



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

Data Exchange During 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 close
- Long On Board
- Runway Closure
- Ramp Closure



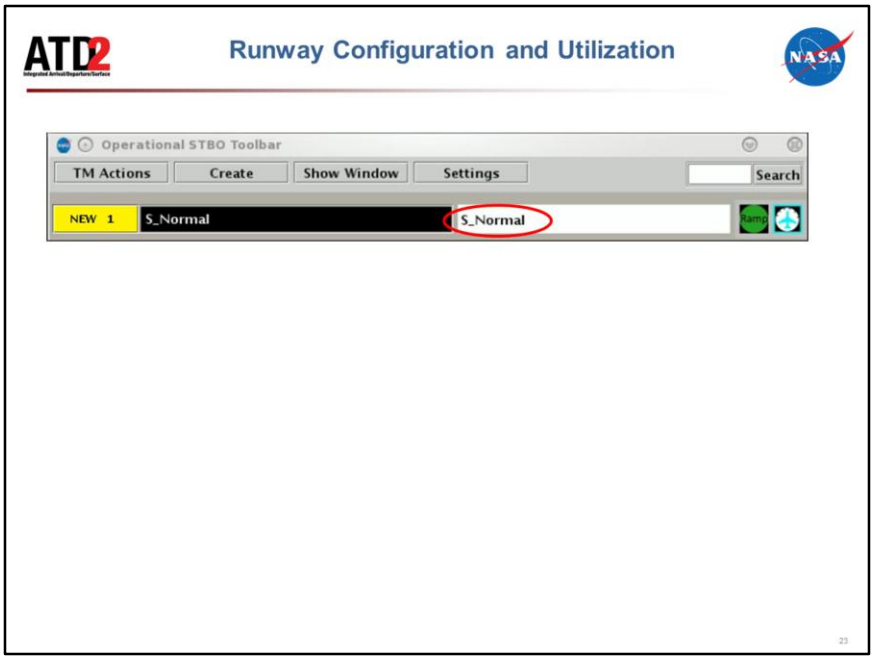
The metering modes are described above. These will be updated depending on Mode set by the Ramp Manager, STBO Client will also display the Metering Mode Icon on the right hand corner of the Toolbar.

Notifications on STBO Client

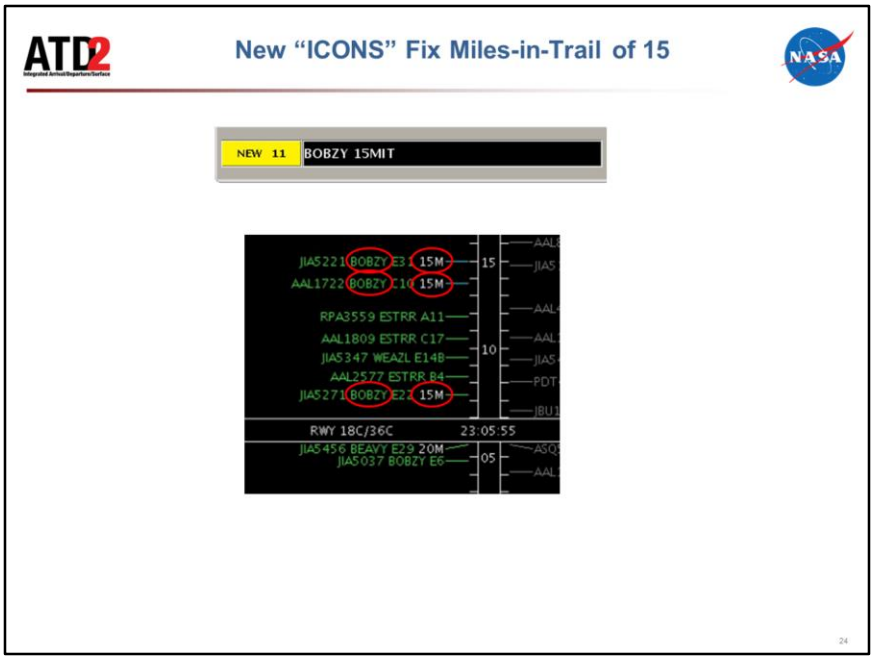
- Notification of APREQ restrictions

Reported	Event Type	Description	Event Start	Event End	Details
7/21/17 2207	Fix	BOBZY OPENED	7/21/17 1934		
7/21/17 2147	Airport	North	7/21/17 2147		
7/21/17 2147	Airport	N_Normal	7/21/17 2147		
7/21/17 2147	Airport	VMC	7/21/17 2147		
7/21/17 2146	Airport	South_Sim	7/21/17 2146	7/21/17 2147	
7/21/17 2146	Airport	S_Normal	7/21/17 2146	7/21/17 2147	
7/21/17 2146	Airport	VMC	7/21/17 2146	7/21/17 2147	
7/21/17 2032	Airport	North	7/21/17 2032	7/21/17 2146	
7/21/17 2032	Airport	N_Normal	7/21/17 2032	7/21/17 2146	
7/21/17 2032	Airport	VMC	7/21/17 2032	7/21/17 2146	
7/21/17 1957	TMI	APREQ to ORD	7/21/17 1950	7/22/17 0000	
7/21/17 1938	TMI	ROA STOP	7/21/17 1938	7/21/17 1938	
7/21/17 1938	TMI	PHX STOP	7/21/17 1938	7/21/17 1938	
7/21/17 1938	TMI	PHL STOP	7/21/17 1938	7/21/17 1938	

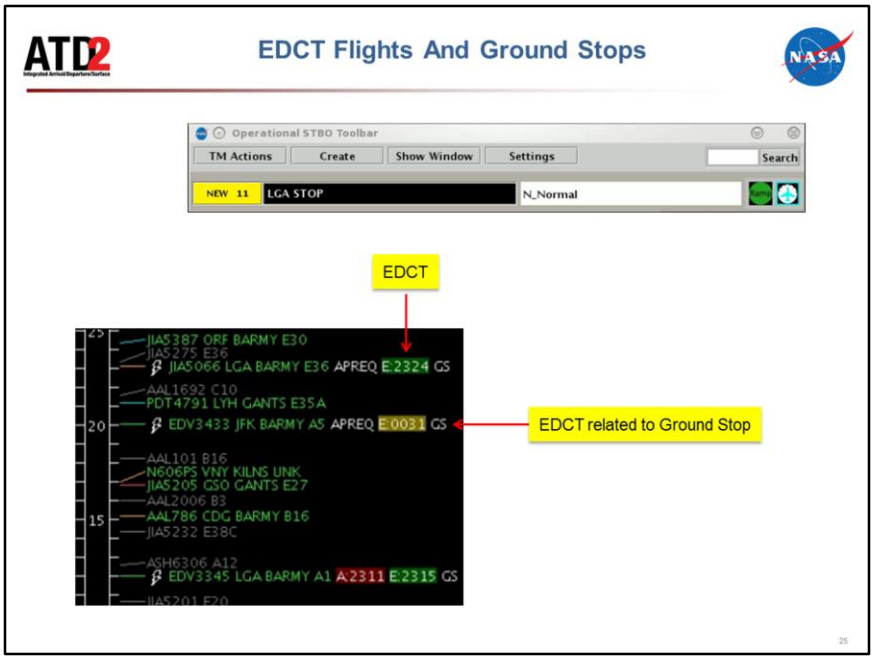
Adding an APREQ restriction will generate a notification on RTC and add the word "APREQ" to the Flight Strips of the affected flights.



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.

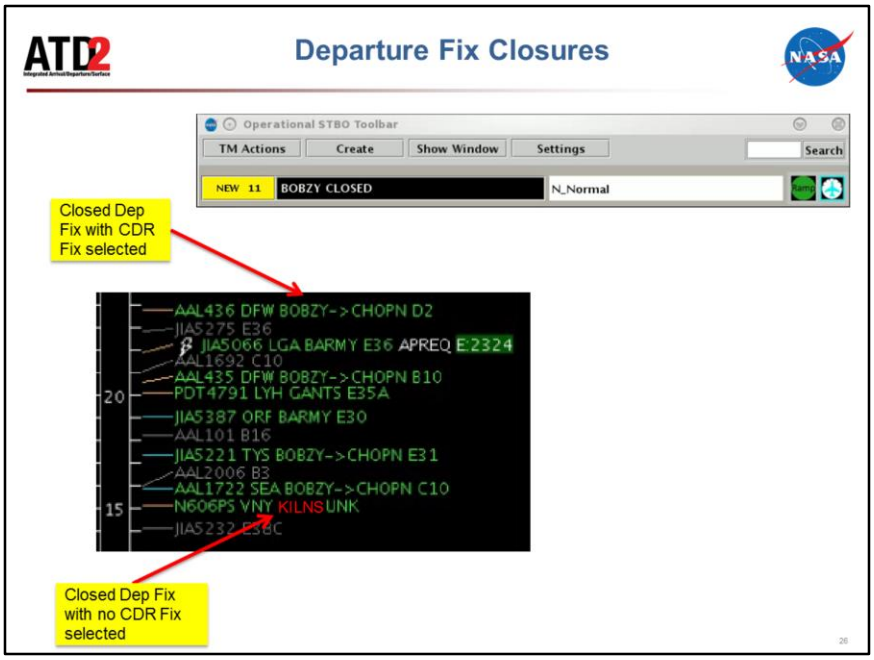


Added restrictions show up as "M15" on Timeline.

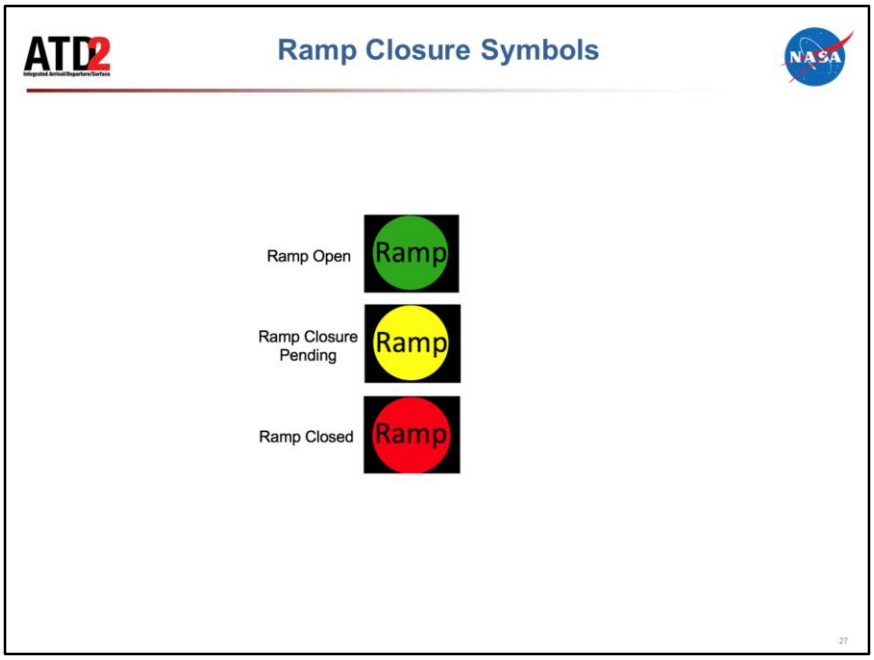


Expected Departure Clearance Times (EDCT) are “Wheels Up” times that are assigned to aircraft due to Traffic Management Initiatives (TMIs) that require holding aircraft on the ground at the departure airport. They have a - 5 minute / + 5 minute conformance window.

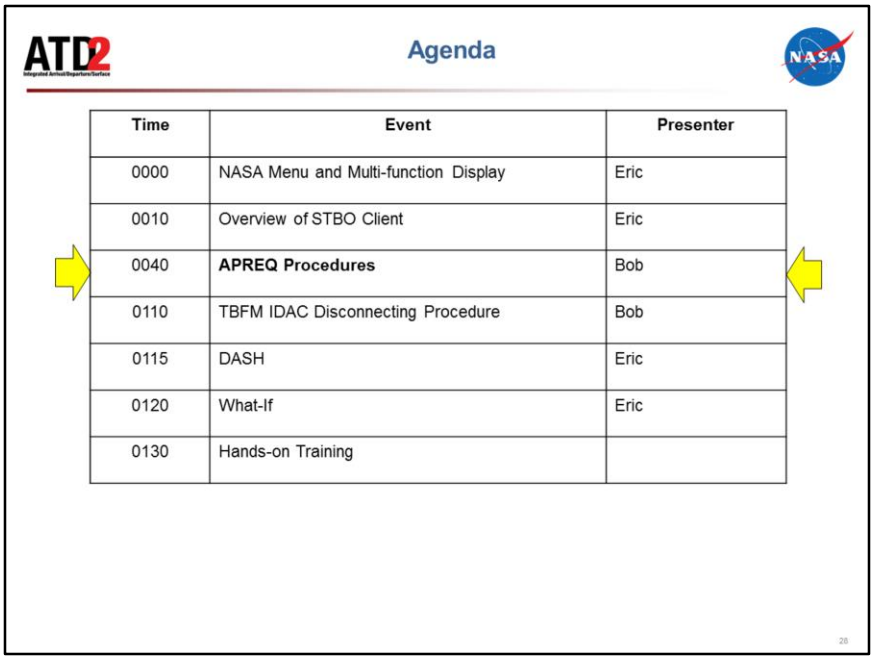
EDCTs are read through our system and show up on the STBO Client timeline as “E:hhmm.” If the flight is subject to EDCT agreen compliance indicator show if the flight is inside the +/- 5 window, it’s red when it is outside the window and late, and it’s yellow when it’s outside the window and early.

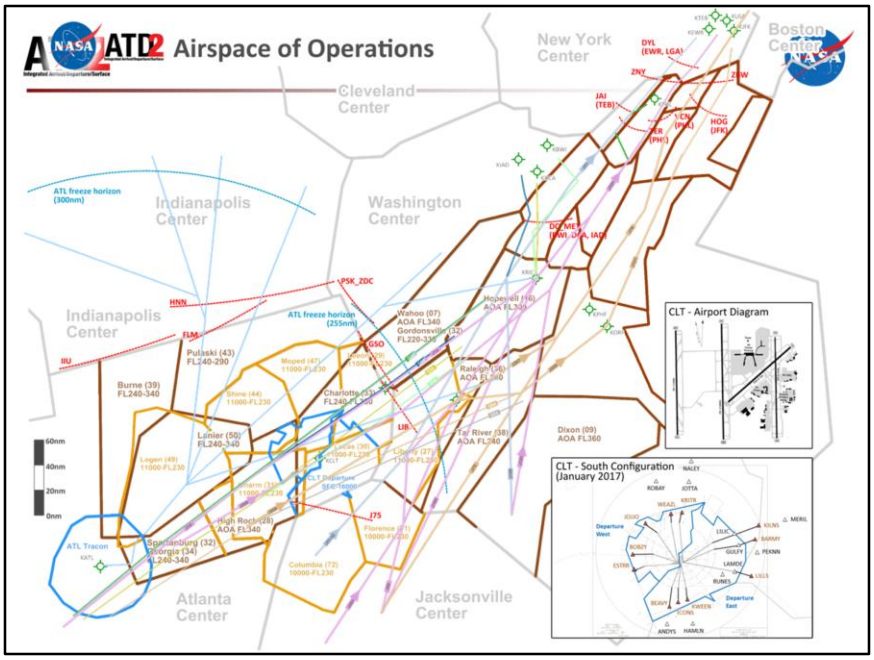


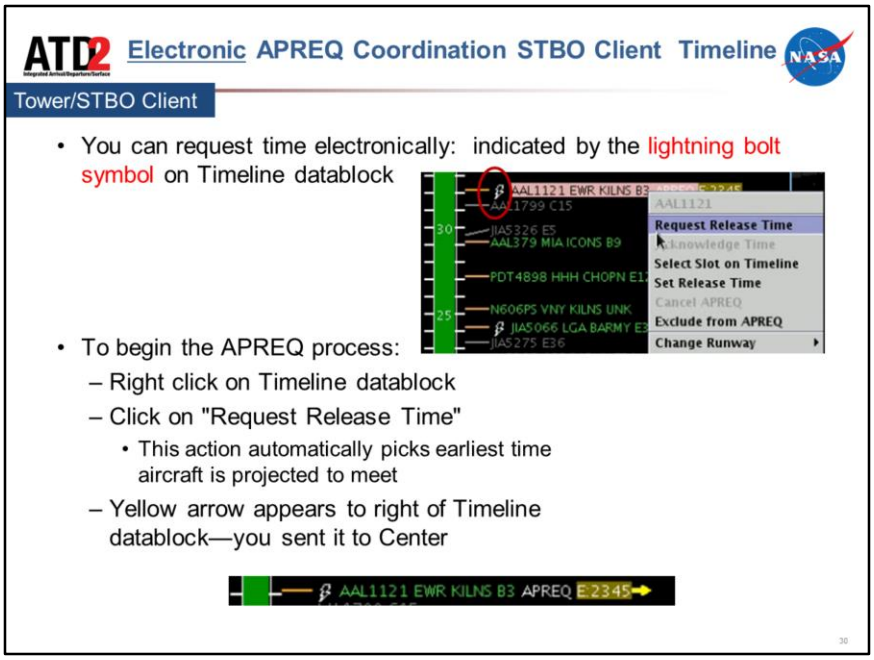
If no “CDR Flights To” fix was selected in STBO Client, the fix will turn red and the datablock will move to the end of the closure after a few seconds (or 2 hours into the future if “No End Time” was selected). If a CDR fix was selected, the red will update to show the CDR as “[original fix]→[CDR fix]”.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



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

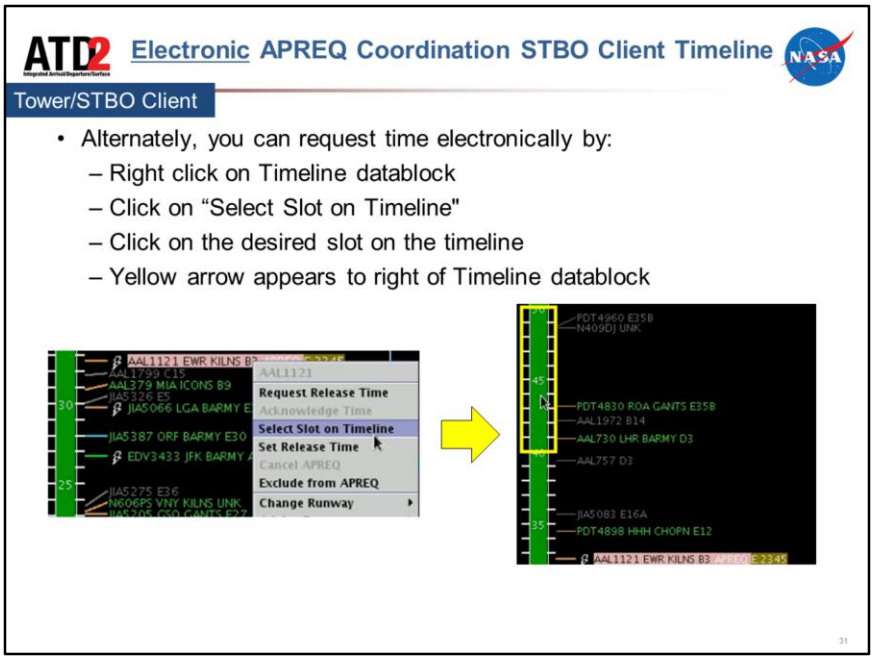

ATD2
Integrated Arrival/Departure/Surface
Agenda
NASA
Time
Event
Presenter
0000
NASA Menu and Multi-function Display
Eric
0010
Overview of STBO Client
Eric
0040
APREQ Procedures
Bob
0110
TBFM IDAC Disconnecting Procedure
Bob
0115
DASH
Eric
0120
What-If
Eric
0130
Hands-on Training
28


ATD-2
Airspace of Operations
Cleveland Center
New York Center
Boston Center
Indianapolis Center
Washington Center
Atlanta Center
Jacksonville Center
ATL freeze horizon (300nm)
ATL freeze horizon (255nm)
DYL (EWR, LGA)
ZNY
JAI (TEB)
HOG (JFK)
DQO MEM (BWI, DCA, IAD)
PSK_ZDC
HNN
FLM
IIU
GSO
LIB
Pulaski (43) FL240-290
Burne (39) FL240-340
Lanier (50) FL240-340
Wahoo (07) AOA FL340
Gordonsville (32) FL220-330
Ropewell (16) AOA FL350
Raleigh (36) AOA FL360
Charlotte (31) FL240-FL300
Te River (38) AOA FL340
Dixon (09) AOA FL360
High Rock (28) AOA FL340
Spartanburg (32)
Georgia (34) FL240-340
ATL Tracon
I75
CLT - Airport Diagram
CLT - South Configuration (January 2017)
60nm
40nm
20nm
0nm



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.

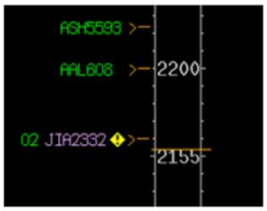


Alternately, the Tower user can send an electronic request for a specific time by choosing the "Select Slot on Timeline" option from the flight's right click menu. This will populate red and green bars in the middle of the Timeline to show available slots that the flight can be scheduled to in the overhead 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.

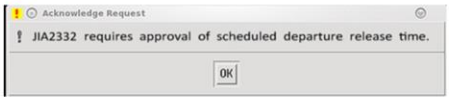
What Does the Center TMC See?

Center/TBFM TGUI

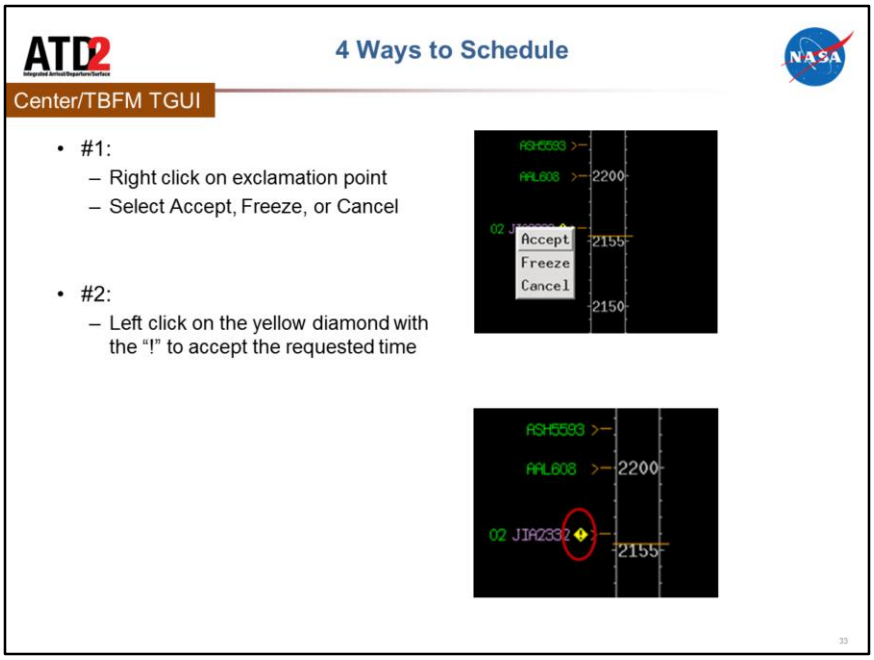
- On TBFM Meter Fix timeline an exclamation point in yellow appears



- 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.

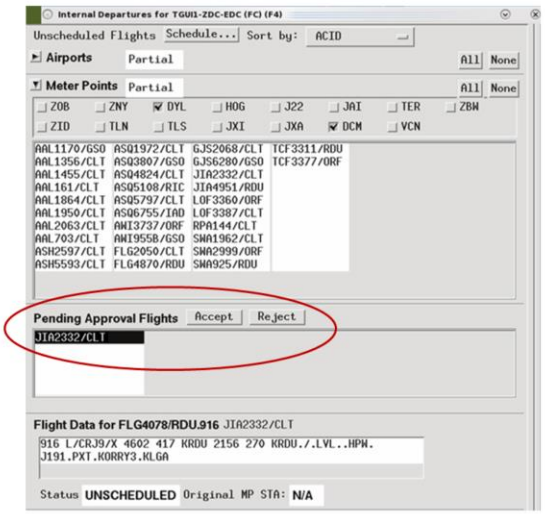


See slide for full description

4 Ways to Schedule

Center/TBFM TGUI

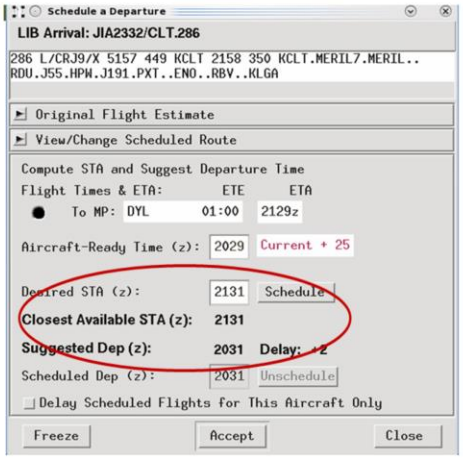
- #3:
  - Go to F4 window in TBFM
  - Accept or Reject



4 Ways to Schedule

Center/TBFM TGUI

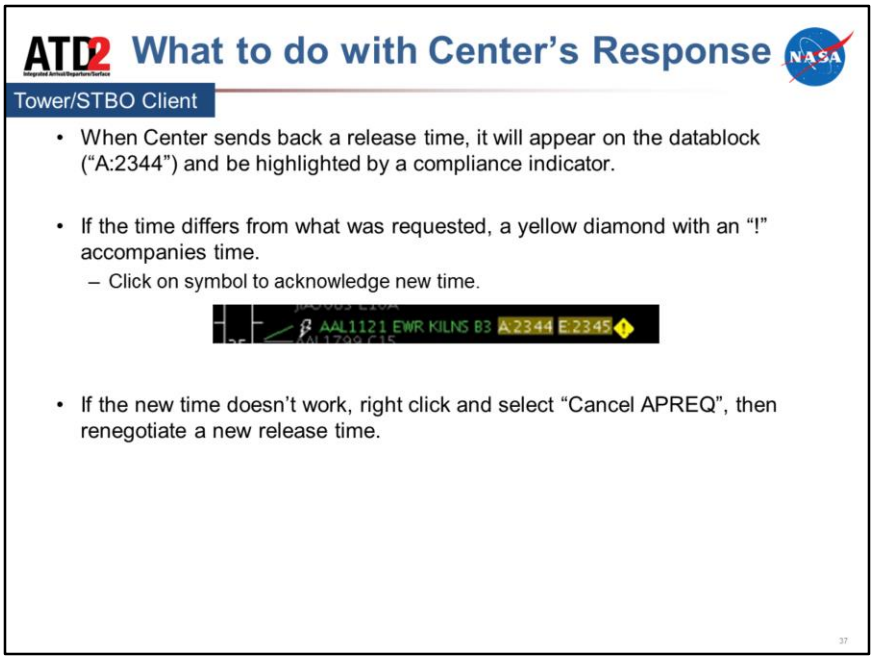
- #4:
  - Go to "Schedule a Departure Window" in TBFM
  - Press "Schedule"



After Center Schedules Release Time

Center/TBFM TGUI

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



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.

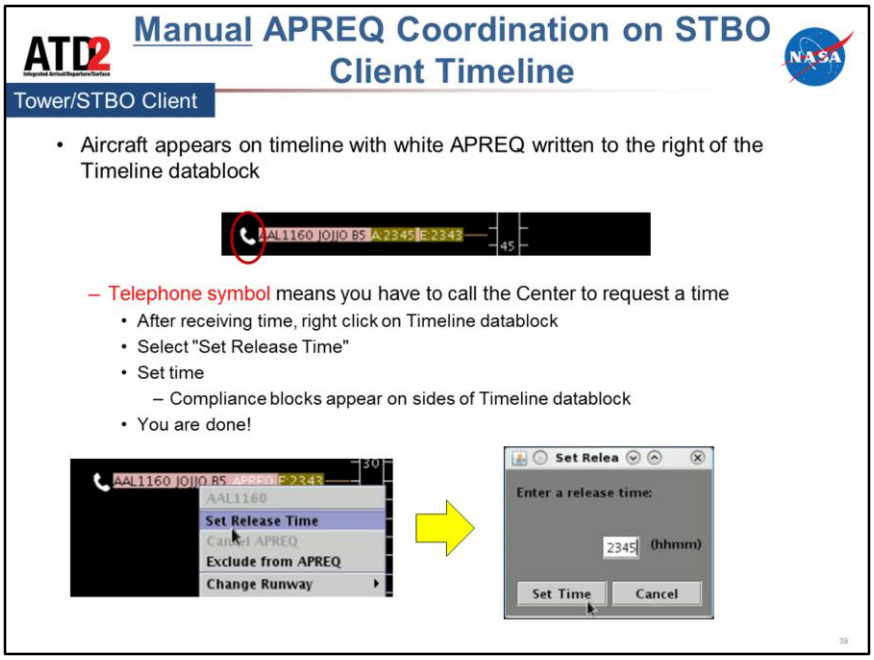
Status of APREQ Compliance

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.



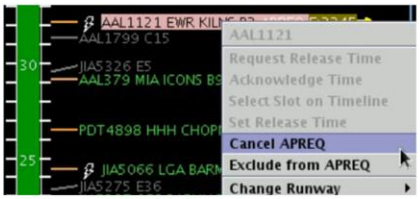
Flights that require manual coordination of APREQ release times will have a telephone symbol next to the flight's datablock. For these flights, you will need to verbally call the Center. Once Tower and Center agree on a time, right click on the flight's timeline datablock on the STBO Client Timeline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

Ramp is automatically notified of the release time.

Cancel APREQ or Reschedule

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.

Agenda

Time	Event	Presenter
0000	NASA Menu and Multi-function Display	Eric
0010	Overview of STBO Client	Eric
0040	APREQ Procedures	Bob
0110	**TBFM IDAC Disconnecting Procedure**	Bob
0115	DASH	Eric
0120	What-If	Eric
0130	Hands-on Training	

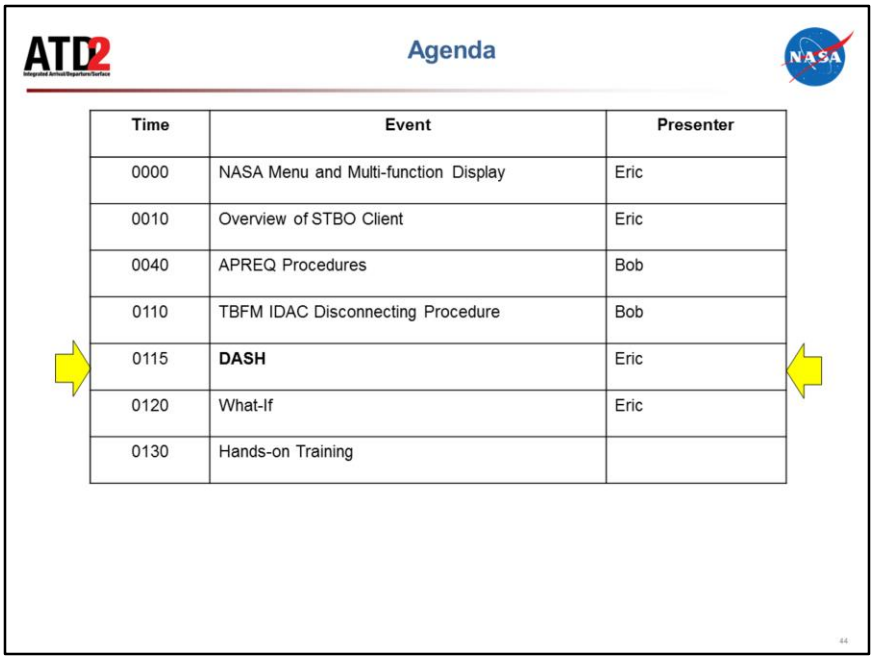
TBFM IDAC Disconnecting Procedure

- In case of need to disable, or stop, the TBFM IDAC connection with CLT ATCT STBO system arises, the following three actions need to be followed:
- ACTION 1
  - Washington Center configures the IDAC APREQ modes for CLT Tower to "Call for Release" in the TBFM IDAC set-up panel:
    - ***Step 1***: Open the F1 panel in the Timeline GUI.
    - ***Step 2***: Click on stream classes (or super stream class) button.
    - ***Step 3***: Click on "Dep" button to open the Airport Departure Scheduling Window
    - ***Step 4***: Select "Call For Release" under APREQ mode for CLT
  - The Airport Departure Scheduling window is available for each stream class and each super stream class for each gate.
    - CLT can be set in the following super stream classes: BOS, BWI, DCA, EWR, HPN, IAD, JFK, LGA, MMU, PHL, TEB
  - Eventually, APREQ mode "ON" should be set to "Call for Release" for CLT tower in all stream classes and super stream classes.
  - If Action 1 cannot be completed, follow Action 2

TBFM IDAC Disconnecting Procedure

- ACTION 2
  - Atlanta Center SOC disables the IDAC portion for CLT without affecting the use of TBFM for arrivals. (this instruction refers to prior official IDAC deployment at ATL since IDAC and T2T are only used to ATD-2.
  - Disable both the IDAC and ZDC-ZTL T2T icons to disable communication between TBFM and ATD-2.

- ACTION 3
  - Notify NASA's ATD-2 Technical Support by calling or texting # 704-802-2589 and report the reason, issues and the actions taken.


ATD2
Integrated Arrival/Departure/Surface
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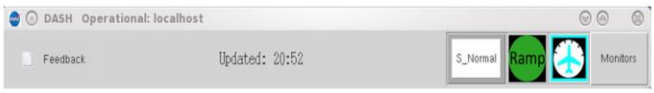
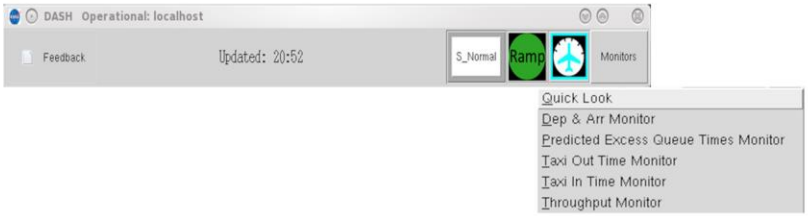
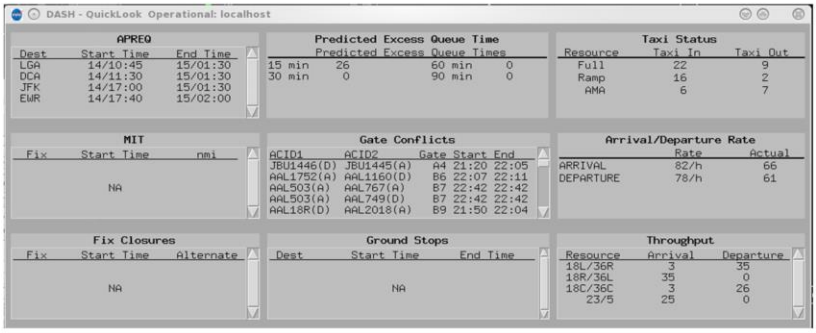
DASH


DASH Operational: localhost
Feedback
Updated: 20:52
S_Normal
Ramp
Monitors

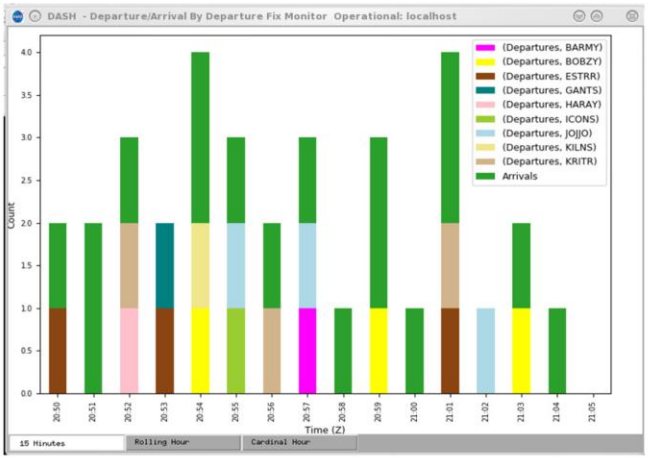
DASH Monitors

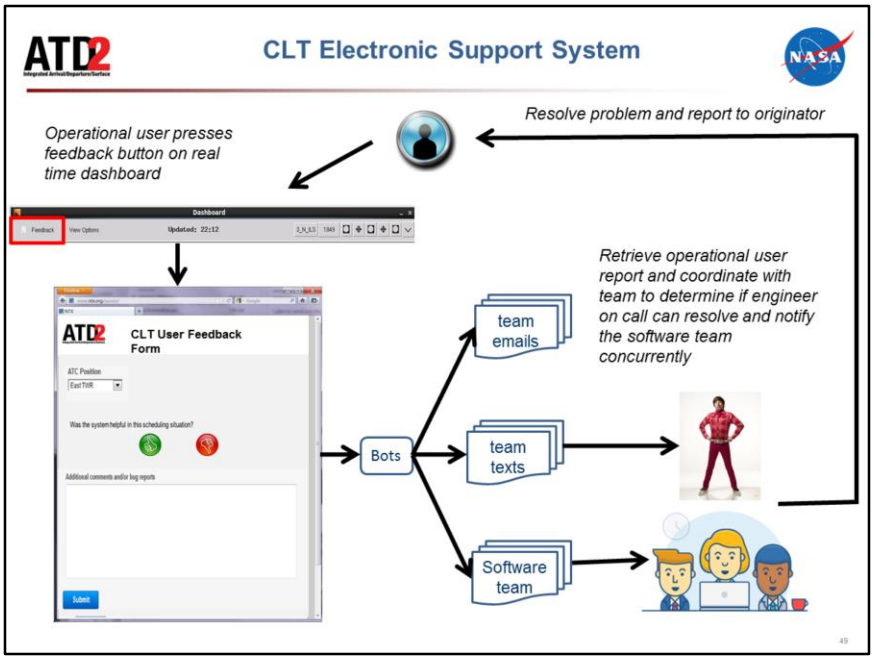


DASH Quick Look



DASH – Traffic Count Per Departure Fix




CLT Electronic Support System
Operational user presses feedback button on real time dashboard
Resolve problem and report to originator
Dashboard
Feedback
View Options
Updated: 22:12
CLT User Feedback Form
ATC Position
East TMR
Was the system helpful in this scheduling situation?
Additional comments and/or bug reports
Submit
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

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What-If Desktop Appearance

Title bars of all windows labeled *What-If*

Desktop Background marked yellow *What-If*

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