

Ramp Traffic Console (RTC) Ramp Manager Traffic Console (RMTC) Observer Mode User Manual

ATD-2 Team

Abstract

This document serves as a user manual for the Observer Mode Ramp Traffic Console (RTC) in Charlotte Douglas International Airport Ramp Control Tower. It describes the elements of the full RTC interface and provides explanations for how to interact with the RTC while managing ramp traffic using one of the four RTC sector displays. The RTC provides digitally updated data for all flights including Earliest Off Block Times (EOBT) and Traffic Management Initiatives. Use of the RTC in observer mode allows only for observer and reading of data provided on RTC. In Observer Mode, the RTC may not be used to make data entries. This includes pushback, holds, and proceed inputs as well as updates to a flights data using the flight menu. However, using the RTC in Observer Mode allows for real time observation of ramp operations including pushback and hold entries made by the ramp sector controllers. The pushback advisories and Traffic Management Initiative information is also provided in Observer Mode. The RTC also provides notifications, runway departure counts and lists and near arrival flight lists as additional sources of information for management of ramp traffic. There are also detailed instructions for how to manage traffic with Surface Time Based Metering (STBM) advisories provided on RTC if in STBM mode. This document also provides instructions for use of the Ramp Manager Traffic Console (RMTC) while performing ramp manager functions such as managing the priority flight list, setting ramp status, and setting the metering mode. The RTC and RMTC ramp tool are one component of a suite of ATD-2 Tools.

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1 Getting Started

The 1 pixel wide green bar (Figure 1.1) provides access to a number of different system views. To get started, first make sure that the correct desktop is displayed.

To access the correct display:

Step 1: Hover over the green bar.

Step 2: Select the option for the RTC.

Step 3: Wait for the RTC to load. This may take a few minutes.

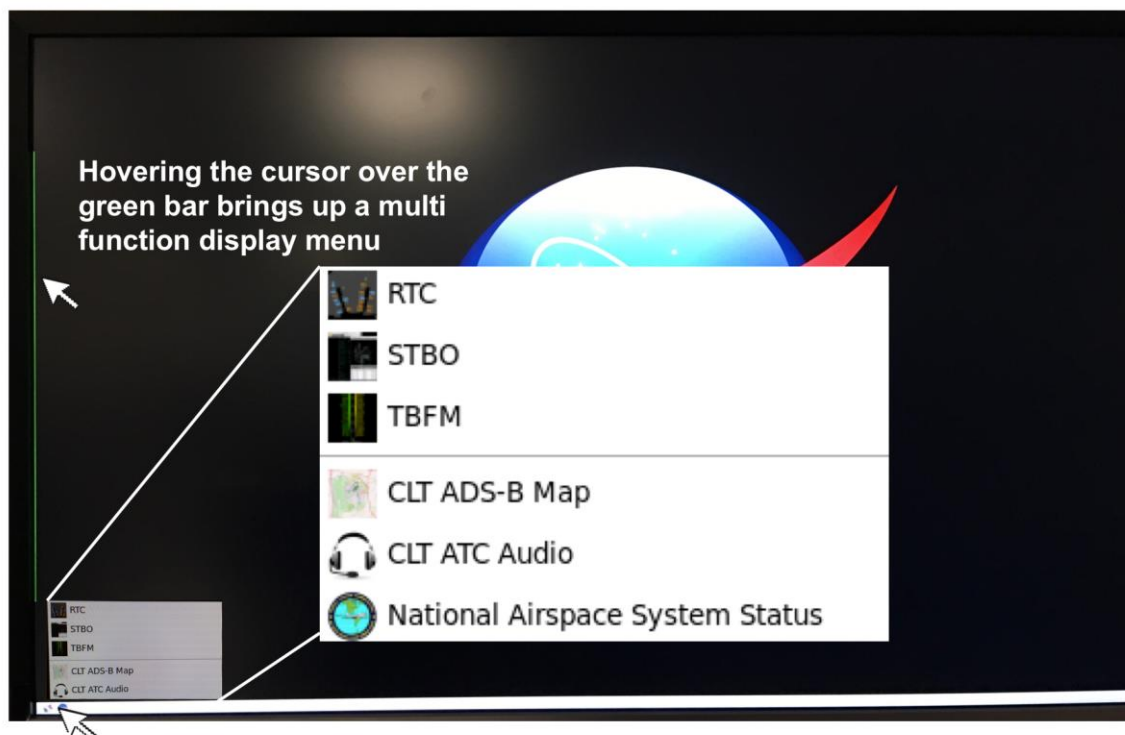


Figure 1.1 Select RTC from Menu

2 General Description of the RTC Interface

The Ramp Traffic Console (Figure 2.1), is comprised of an interactive map display and “electronic flight strip” and flight icons that reflect user inputs and flight state information.

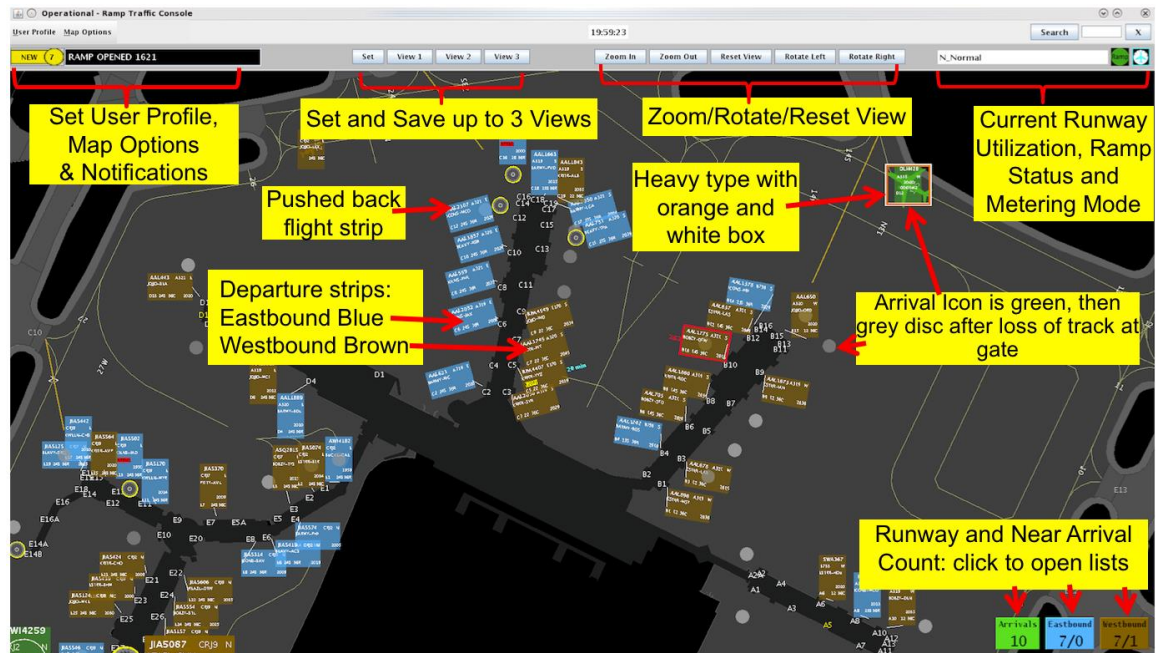


Figure 2.1. RTC Interactive Map Display.

It is possible to save and load display configurations, and search for flights. Also provided are notifications and, if applicable, Traffic Management Initiative (TMI) and gate conflict information for each flight.

The RTC map displays surveillance data and provides a visual representation of current aircraft state and position in the ramp, the Airport Movement Area (AMA), and near airspace. When a flight loses surveillance data, the flight becomes a hollow icon that may be repositioned on the map using drag and drop. There are many data exchange elements shared between Ramp (RTC/RMTC) and ATC (STBO Client) including TMI information, notifications, ramp status, runway utilization and closure information. The RTC is also able to support all three metering modes: No Metering, Departure Sequencing and Surface Time Based Metering (STBM). If in Departure Sequencing mode, there are departure lists and hold lists available to support Departure Sequencing. If STBM is in effect, then the RTC will provide metering advisories for certain flights in the form of recommended gate hold times.

3 RTC Display Overview and Sector Map Settings

The RTC map view is adjustable by using the mouse to click, drag and drop the map and by using the scroll wheel to adjust the zoom level.

3.1 Set and Save User Profile

There are four default RTC sector map displays available, preconfigured to display each of the four ramp sectors. These include North, East, South and West sectors. Once opened, the default sector view may be configured based on user preference.

To choose a RTC sector view select the User Profile tab located on top left status bar. Choose Load to select the desired profile from the list of already saved profiles, for example choose “RampSouth.xml” to open the South Sector RTC display.

To choose a RTC sector view:

Step 1: Click on User Profile as shown in **Figure 3.1** below.

Step 2: Choose Load to open menu of available profiles.

Step 3: Select a user profile from list of options.

Step 4: Click “Open”.

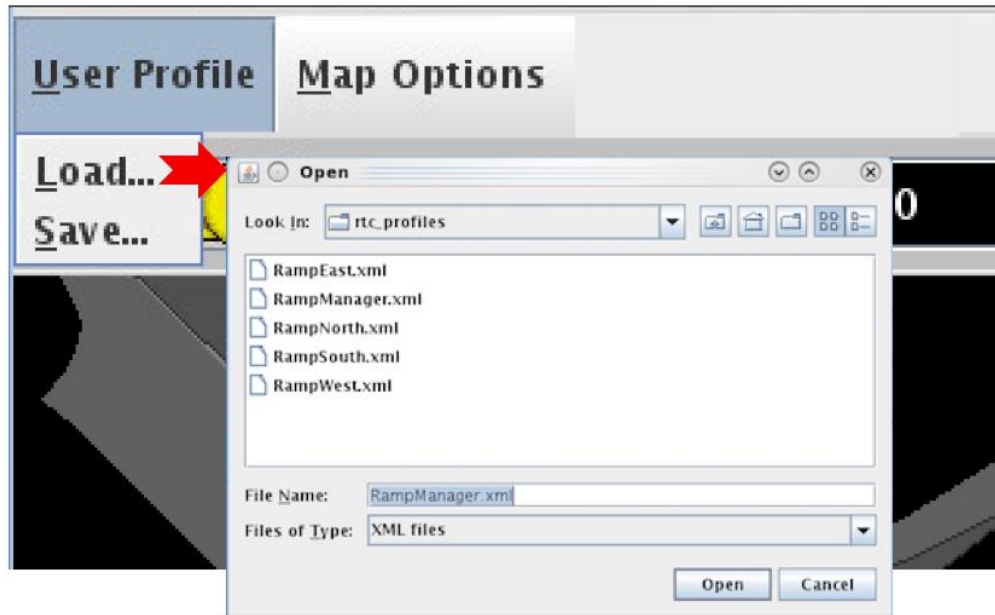


Figure 3.1. Load User Profile.

To save your settings as a unique profile name:

Step 1: Click on User Profile as shown in Figure 3.2 below.

Step 2: Choose Save to open the Save menu.

Step 3: Type in new profile name.

Step 4: Click “Save”.

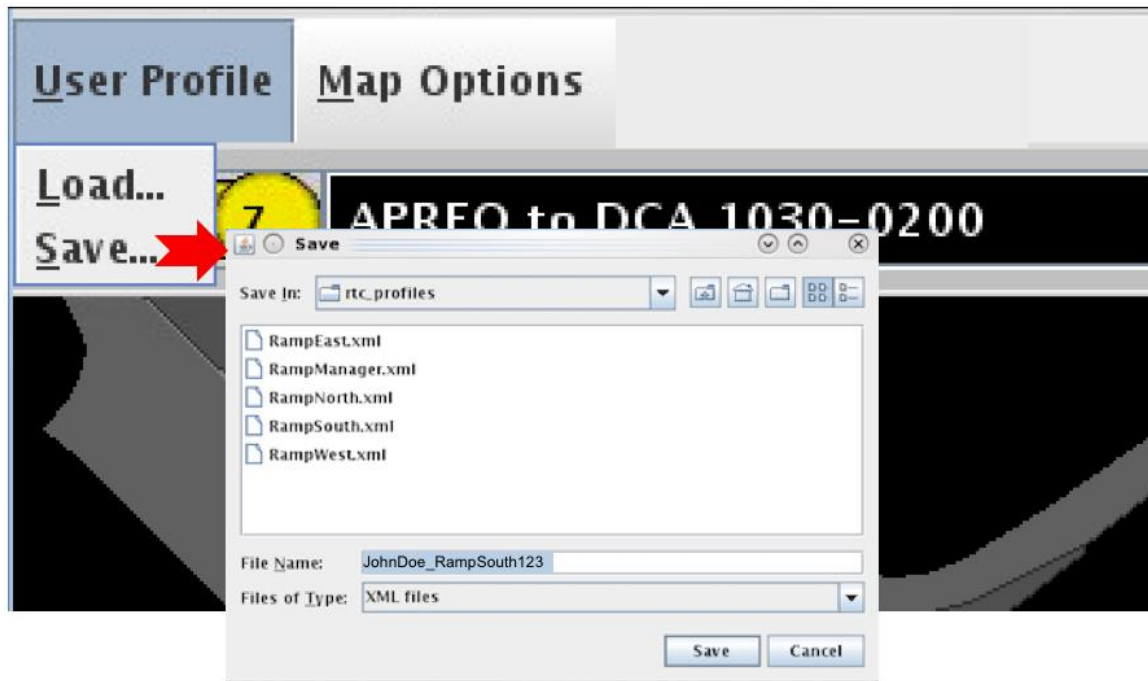


Figure 3.2. Save User Profile.

Choose the Save option to save your settings as a unique profile name, for example, “JohnDoe_RampSouth123”. The saved user profile will then be available to “Load” from the User Profile Options.

3.2 Notifications and Notifications Panel

The RTC provides notifications in the form of a Notification icon, Notification banner, and a Notification window (Figure 3.3). These notifications are generated when new information is populated in the system. This new information may originate from the STBO Client or from an outside source, such as SWIM, OIS, NTML, or other ATD-2 users. Notifications are always related to events that impact multiple flights or the airport (e.g., Ground Stops, runway closures, metering events), and are never issued for single flights. For events or restrictions related to a single flight, the flight’s datablock, properties, and/or entry in the Flights Table are modified in some way that’s more salient than the standard display of information (without events or restrictions).

When new notifications are received, the Notification icon is yellow and displays the number of new notifications (Figure 3.3). The Notification banner will display the subject of the notification and the time range of the event. New notifications are highlighted in yellow in the Notification window. When notifications are acknowledged, the

Notification icon changes to grey and displays “0” (zero) to represent no new notifications. Clicking on the Notification window will also acknowledge and remove all yellow highlighting (Figure 3.3). The Notification banner will begin cycling through the active notifications; expired events will no longer appear in the banner.

To open, view, and acknowledge notifications:

Step 1: Click in notification display field shown in Figure 3.3 to open the notification panel.

Step 2: Click anywhere in the panel or on the yellow notification alert to acknowledge all new (yellow) notifications.

The Notification window displays all notifications for the past 24 hours, and the list is cleared each day at 0400. The notifications received in this window pertain to information exchange that will happen between the ATC-T and AA ramp.



- Notification Panel opened here shows entire list of notifications with the new notifications highlighted in yellow
- Click anywhere in the list to clear yellow alerting

Figure 3.3. Notifications.

3.3 Map Options

Use the Map Options tab (Figure 3.4) to configure aspects of the RTC map display. The Map Options include:

- Pushback Time
- Gate Conflict Setting
- Highlight All Gates
- Bloom Icon Upon Hover
- Show Near Arrival Count
- Reset Strip Font
- Increase Font
- Decrease Font

3.3.1 Pushback Time

Select the ‘Pushback Time’ map option shown below in Figure 3.4 to choose what time is to be displayed on the departure flight strips. P-TIME, the airline scheduled departure time or the Scheduled Off-block Time is the default time displayed on the departure flights. It is also possible to display the Earliest Off Block Time (EOBT) or the Target Off Block Time (TOBT) on the flight strip instead of the airline scheduled pushback time. EOBT is an updated departure time provided by the airline, and TOBT is calculated by STBM.

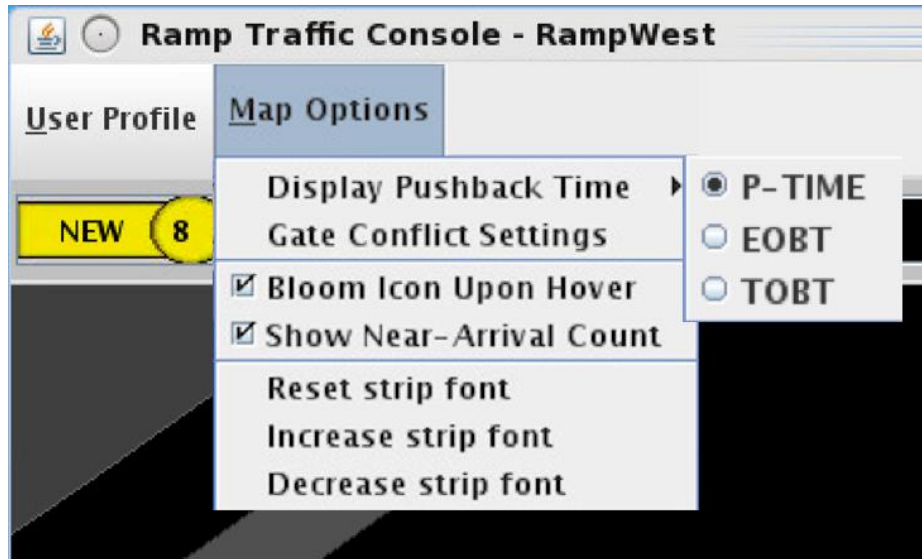


Figure 3.4. Set Time to Display on Strip.

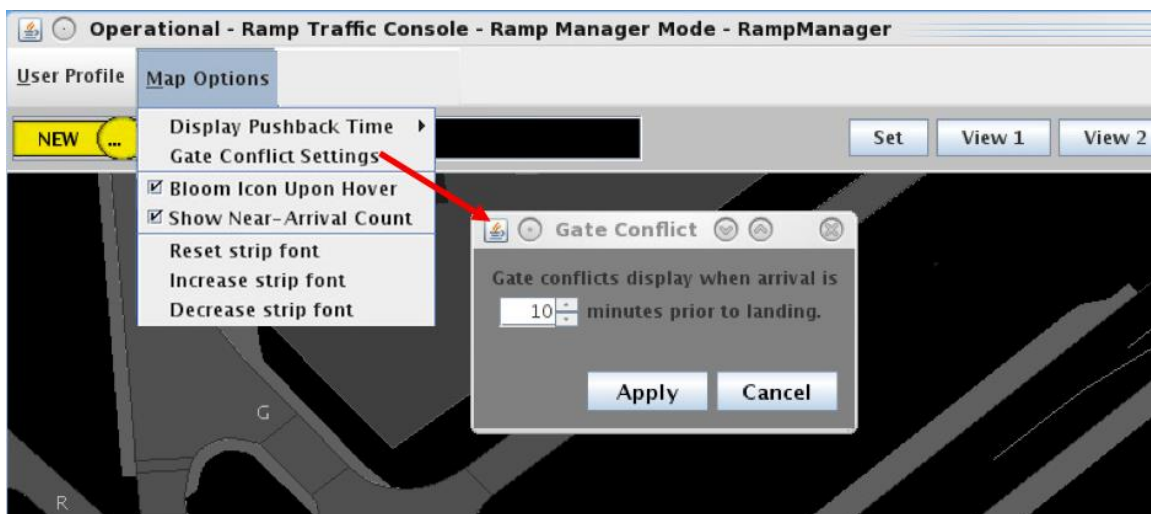


Figure 3.5. Gate Conflict Settings.

3.3.2 Gate Conflict Settings

Select the Gate Conflict Settings map option shown in Figure 3.5 to set the time for when to display gate conflicts in the RTC display. The default is set to display the gate conflict at 10 minutes prior to arrival landing, when the departure at the gate has not yet been released. The setting can be configured to display the gate conflict at some other number of minutes prior to the arrival landing, or it may be set to 0 so that there is no gate conflict alerting until the inbound flight has landed.

To edit the gate conflict alerting settings:

Step 1: Click on Map Options

Step 2: Select Gate Conflict Settings to open the Gate Conflict Settings Menu

Step 3: Enter the number of minutes prior to arrival landing to display conflict

Step 4: Select Apply

The gate number of the gate in a conflict and the associated arrival aircraft icon are highlighted in magenta as shown in Figure 3.6 alerting the controller to the gate conflict. Click on either the magenta arrival icon or the magenta gate number to draw a tether line connecting the two.

Gate conflicts are also shown for gates blocked by a heavy aircraft, such as A330. When there is a heavy aircraft blocking an adjacent gate, and there is an inbound arrival for that gate, the arrival icon and the gate will be displayed in magenta to alert to this conflict. Clicking on the arrival icon will draw a tether to its gate plus an additional tether from its own gate to the heavy blocking the arrival at the neighboring gate.

- Gate conflict Alerting:
The arrival icon as well as gate number are displayed in magenta
- Click on icon or gate number to draw “tether” line between them
- Gate conflict alerting logic: gates blocked by a heavy type aircraft are also shown as gate conflict

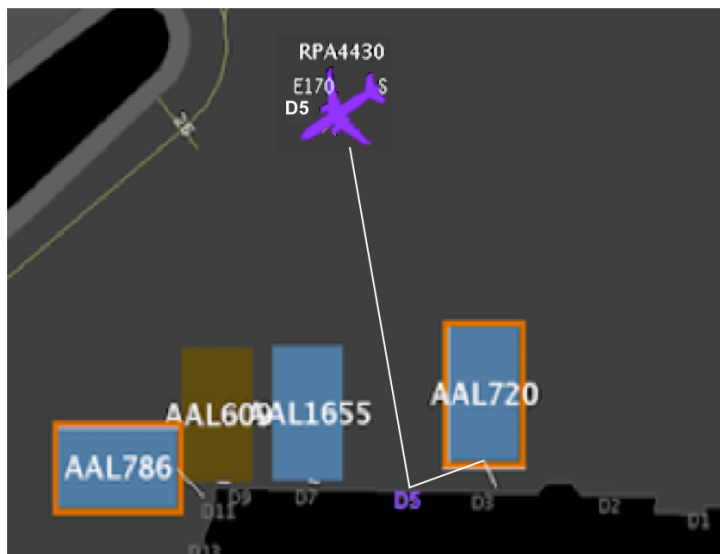


Figure 3.6. Gate Conflict Alerting.

If there is more than one flight assigned to a gate, clicking on the gate number repeatedly will successively draw a tether to each flight assigned to that gate. Gate numbers for arrivals that have landed are always displayed in yellow and gate numbers that have a conflict are always displayed in magenta. Click on the yellow or magenta gate

numbers to draw a tether line from that gate to the arrival icon on the map or in the near airspace. Select any arrival flight to draw a tether line between the flight and the assigned gate.

3.3.3 Bloom Icon Upon Hover-Map Option

Select the Bloom Icon Upon Hover map option to enable “bloom” of strip/icon when hovering (Figure 3.7). Using the mouse to “hover” over a flight strip or icon on the display will result in that icon or strip “blooming” to enlarge the strip and font to facilitate reading and to focus attention. However, this “bloom” may be distracting or cause interference in some instances. Deselect this option to disable the “bloom” of icon upon hover. Even if this option is deselected, when any flight strip or icon is selected, it is enlarged or “bloomed” until it is deselected by clicking anywhere else on the map.

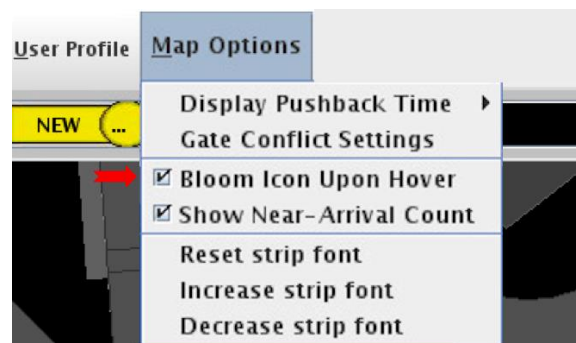
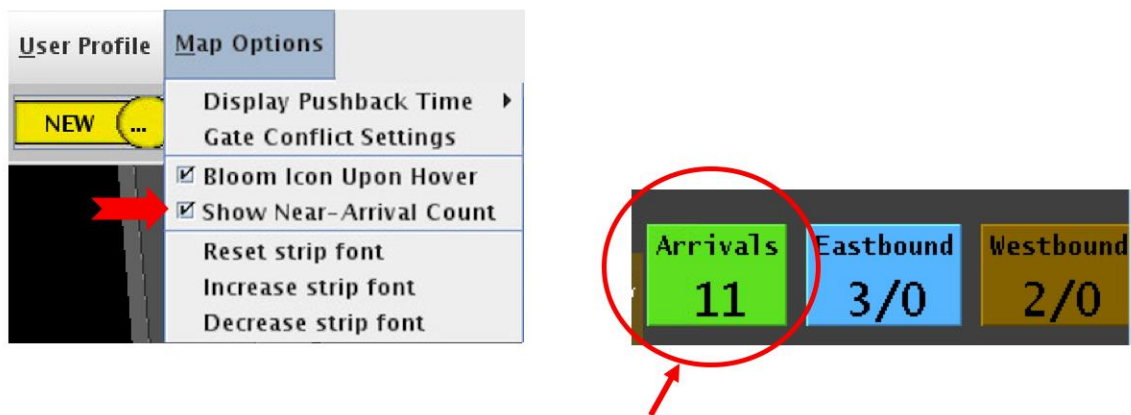


Figure 3.7. Bloom Icon Upon Hover.

3.3.4 Show Near Arrival Count-Map Option

The Near Arrival Count provides the users with the count of and the list of arrivals that are due in the next 10 minutes. To see the Near Arrival Count displayed on the bottom right corner of the RTC display, select the Show Near Arrival Count map option shown in Figure 3.8 to display the green near arrival count box on the bottom right of the display next to the brown (westbound) and blue (eastbound) departure count boxes. Click on this green near arrival count box to open the near arrival list. Refer to Section 3.6 below for complete discussion of Departure Count boxes and Lists.



Select Show Near Arrival Count to display the Near Arrival Count Box next to the departure count boxes on bottom right side of the RTC display.

Figure 3.8. Show Near Arrival Count.

3.3.5 Reset Strip Font

Select the Reset Strip Font map option shown (Figure 3.9) to reset the size of the font to the default font size. Select either **Decrease or Increase** strip font size to decrease or increase the font size on the flight strips. The default value is set at an optimal size for the display, however under certain conditions one may opt to increase or decrease the size of the text.

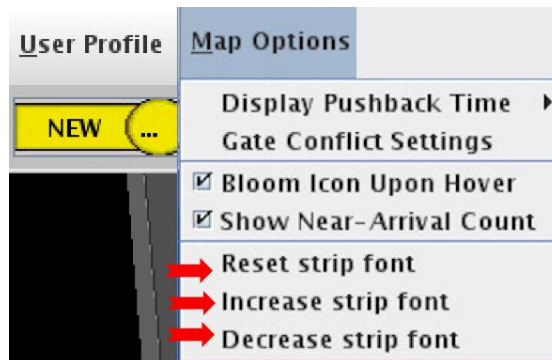


Figure 3.9. Reset, Increase, Decrease Strip Font.

3.3.6 Set Views, Zoom and Rotate Map

The Set Views feature (Figure 3.10) may be used to save up to three different RTC display views. The Zoom and Rotate buttons allow for incremental adjustment to the zoom and the orientation of the map display. The Set View feature allows display customization by setting and saving up to three different preset views. First, set the zoom, pan and angle to the desired view, then click on Set, then click on View 1, View 2 or

View 3 to save the RTC display view. After the views are set, simply select View 1, View 2 or View 3 to quickly toggle between these saved views.

To save a display View to:

Step 1: Set the display to a desired view.

Step 2: Click on Set.

Step 3: Click on either View 1, View2, or View 3 to save this view.

Step 4: Change the display to another desired view and repeat above steps until all three views are saved.

Step 5: Click on View 1, View 2, or View 3 to quickly toggle between saved views.



Figure 3.10. Set Views, Zoom, Rotate Map.

Use the **Zoom In** and **Zoom Out** buttons (Figure 3.10) to incrementally increase or decrease the zoom level. The zoom level may also be adjusted using the scroll wheel on the mouse. Use the **Rotate Left** and **Rotate Right** buttons to incrementally rotate the angle of the map display. Select the **Reset View** button in between the Zoom and Rotate buttons to reset the map view to the default view for that RTC sector display.

3.4 Search

Search for a flight on the RTC map using the alphanumeric search feature (Figure 3.11). Type in the call sign or flight number for a flight, a five-letter name for a departure fix, or a 3 letter ID for a destination airport.

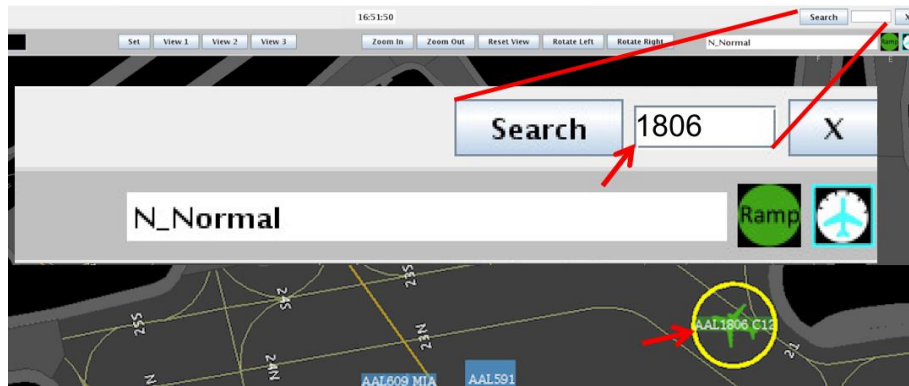


Figure 3.11. Search.

The search results will be displayed on the map with a yellow circle around each resulting flight on the map display. The search results are narrowed in scope as a more complete call sign is entered into the search field. Search results will be marked by a yellow circle around the flight(s) matching the search. It may be necessary to pan the map display and scan the map to locate the search result, as the map view will not change to include the location of the search result if it is not in the current view. The search feature applies to departures and arrival flights in the ramp, AMA, or near airspace.

3.5 Runway Utilization, Ramp Status, and Metering Mode

There are a set of icons displayed below the search feature on the right side of the upper status bar (Figure 3.12), and these include the current Runway Utilization, Ramp Status and Metering Mode.

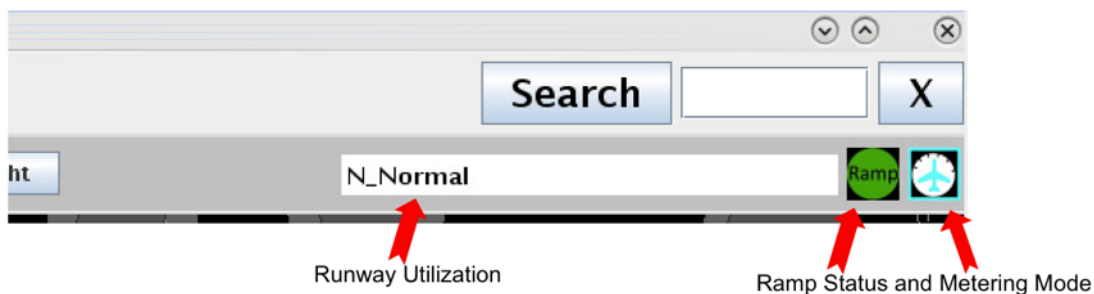


Figure 3.12. Runway Utilization, Ramp Status, and Metering Mode.

These icons are displayed on STBO Client as well as on RTC, and are meant to display to changing conditions in the ramp as well as in the AMA.

3.5.1 Runway Utilization

Runway utilization information is displayed. It is updated by ATC-T via the STBO client. A change in runway utilization will also be accompanied by a notification in the notification window.

3.5.2 Ramp Status

When the Ramp Manager updates the ramp status to either Open, Pending Closure or Closed, the icon will be updated to reflect the current status as shown in Figure 3.13

below. An update to the ramp status will also be accompanied by a notification in the notification window to both the ATC-T on the STBO Client and to RTC for the ramp tower.

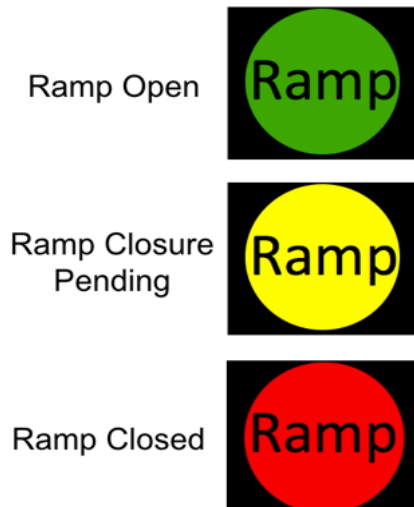


Figure 3.13. Ramp Status Icons.

3.5.3 Metering Mode

The ramp manger can set metering modes for the ramp using RMTC, and the current metering mode is shown on the upper status bar as shown in Figure 1.1. The three metering modes available are: No Metering, Departure Sequencing, and Surface Time Based Metering Mode (refer to Section 6.1). When the ramp manager updates the metering mode, one of three metering mode icons will be displayed, as shown in Figure 3.14 below.

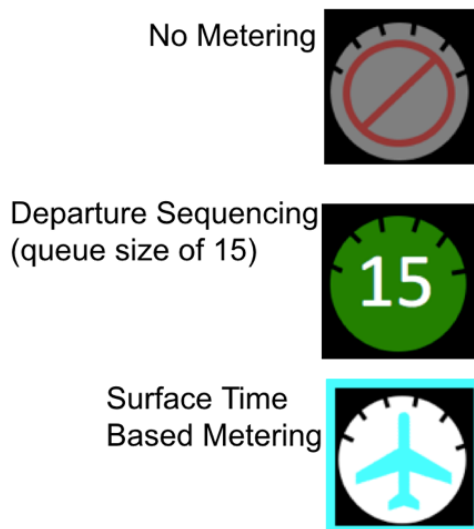


Figure 3.14. Metering Mode Icons.

A notification of the change in metering mode will also be provided to the notification window for both RTC and STBO. If Departure Sequencing is selected on RMTC, the target queue length as set by the ramp manager will be displayed inside the green departure sequencing icon, and included in the notification as well. A notification is also sent to all the users if Surface Time Based Metering mode is selected on RMTC (refer to Section 7.1: RMTC Tools Menu: Metering Modes).

3.6 Departure and Arrival Count Boxes and Lists

The Departure Count boxes are located on the bottom right side of the display. The numerator in the runway count box displays the number of flights that have been released to either the eastbound (blue) or westbound (brown) runway, 18L/36R and 18C/36C, respectively. The denominator reflects the number of flights that have been placed on hold to the eastbound and westbound runways.

The Near Arrival Count box may also be displayed by selecting that option in the Map Options menu. The Near Arrival Count reflects all arrivals expected in the next 10 minutes.

All three departure and arrival lists may also be opened by clicking on any of the departure or arrival count boxes on the bottom right of the display (Figure 3.15) below.

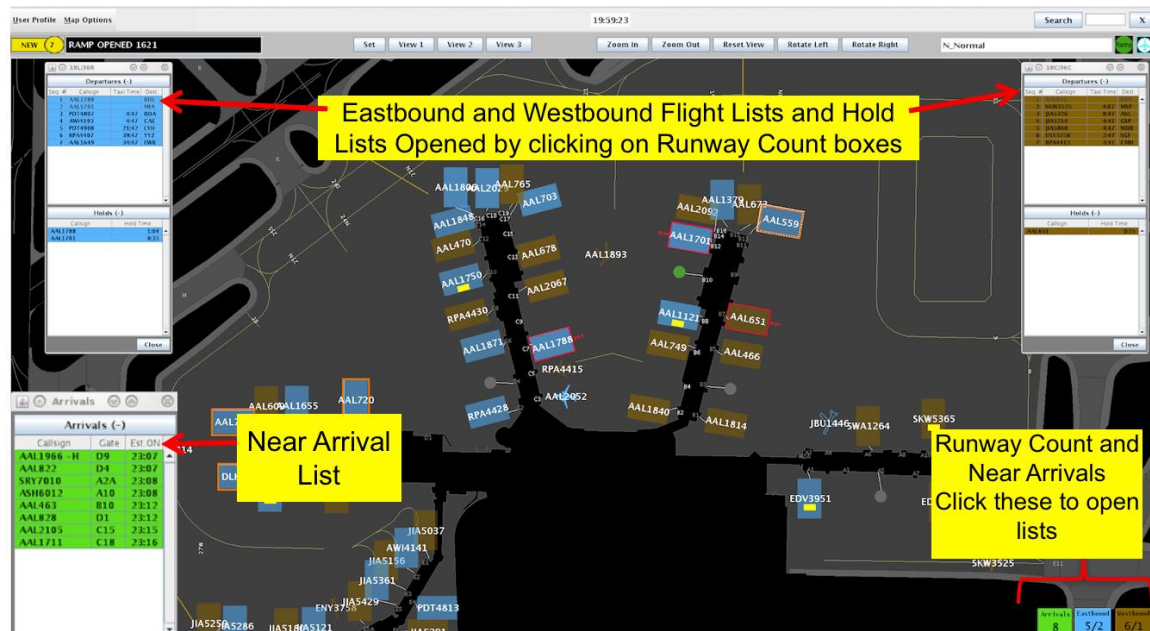


Figure 3.15. Departure and Arrival Count and Lists.

3.7 Long On Board (Lengthy Taxi Delay)

The RTC Map also displays Long On Board (LOB) or Lengthy Taxi Delay (LTD) information for flights. LOB (LTD) is displayed on the Map using a colored disc that surrounds the aircraft icon (Figure 3.16). LOB (LTD) timer starts from the flight's pushback from the gate (Actual Off-Block Time; AOBT) for departure flights or from the moment wheels touch down (Actual Landing Time; ALDT) for arrival flights. The following table describes the parameters for when each LOB (LTD) disc color is displayed.

Disc Color	LOB (LTD) Timer
Yellow	60-89 minutes
Orange	90-119 minutes
Red	120+ minutes

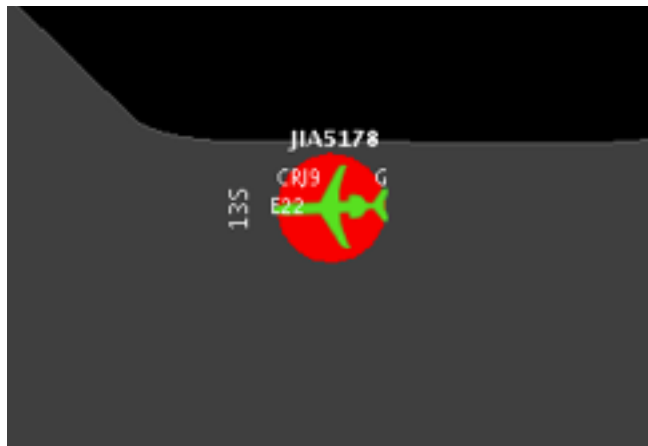


Figure 3.16. Long On Board (red).

4 Flight Strips and Icons

Flights are displayed as flight strips while at the gate through pushback (Figure 4.1). After pushback, flight strips are displayed with an aircraft engine symbol attached to indicate the spool up state of the flight. After pushback, flights that have track data are displayed as solid icons, while flights that have no track data are shown as hollow icons.

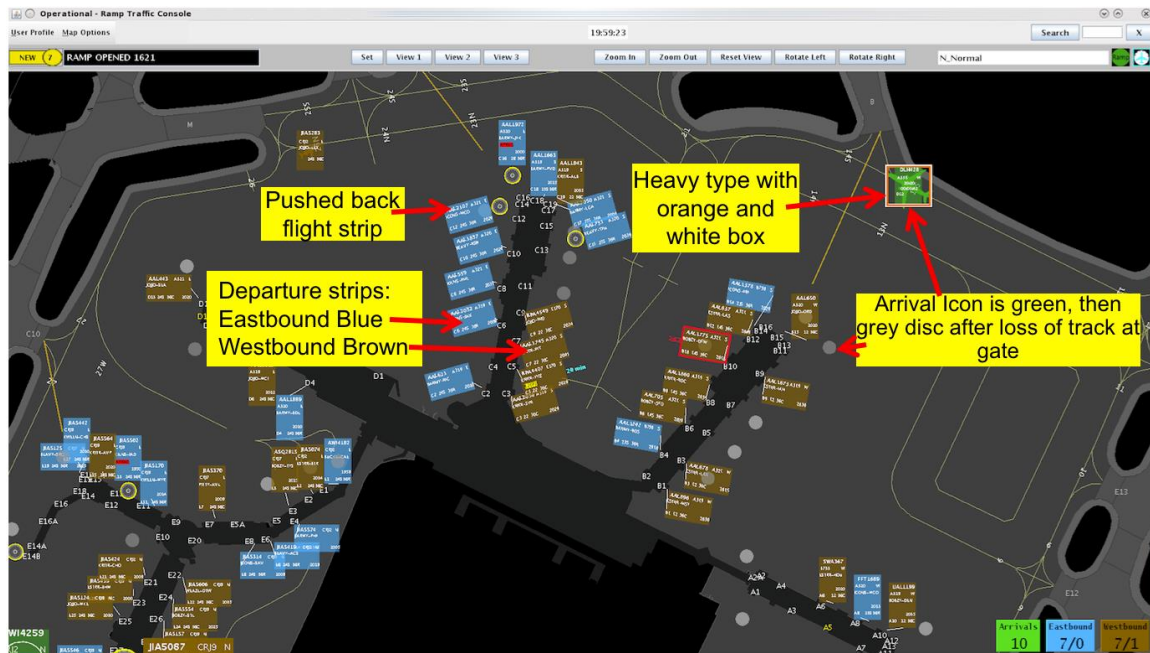


Figure 4.1. Flight Strips and Icons.

4.1 Flight Entries and Right Click Menu: Updating flight state

Flight state updates based on ramp controller entries are reflected on the RTC as well as throughout the entire ATD-2 system and are important for situational awareness of current flight state for the entire system including STBO. When a flight requests pushback approval and the ramp controller enters pushback approval, then the system updates with this data for each state change; the flight has called ready and it has been given pushback approval. The entire ATD-2 system reflects the updated state of each flight accordingly and the algorithms use this updated information to provide correct predictions.

4.1.1 Departures and Arrivals, Colors, Flight States, Solid and Hollow icons

- The different colors, symbols, and flight state definitions are shown in Figure 4.2.
- Arrival flights are green. Click on any arrival icon to draw a tether line to the assigned gate.
- Departure flights are blue if eastbound, brown if westbound.
- After pushback, flight strips are displayed with an aircraft engine symbol
- Flights that have track data are displayed as a solid icon. Hollow icons indicate flights that do not have track data (have not yet received it or have lost it).
- Heavy flights are marked with an orange and white border on the flight strip and an orange and white box around the icon.
- A flight given a priority flight status will have a green border around the flight strip and a green box around the icon. Flights are designated as priority flights using the ramp manager's list feature (refer to Section 6) or by the sector controller by using the Flight Menu (refer to Section 7).

- Flights may be assigned to the hardstand if the ramp controller uses the Flight Menu and the flights will then be displayed with a yellow box around them (refer to section 4.1.1). However, if a hardstand assignment is not applied by the ramp controller but a flight is detected in the hardstand, it will automatically have the yellow box displayed.

Current sector is indicated (N, E, S, W, or G for Ground) on the flight strip or icon. Sector “ownership” is updated automatically. No handoff is required (Figure 4.2).



Arrivals are green



After pushback, engine symbol indicates spool up state



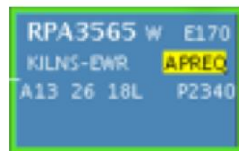
Westbound departures are brown, eastbound are blue



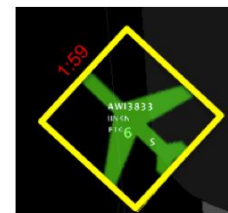
Hollow icon if no track



Heavy aircraft has orange and white border



Priority flight has a green border



A flight assigned to the hardstand has yellow border. Apply a hold to also display red count up timer

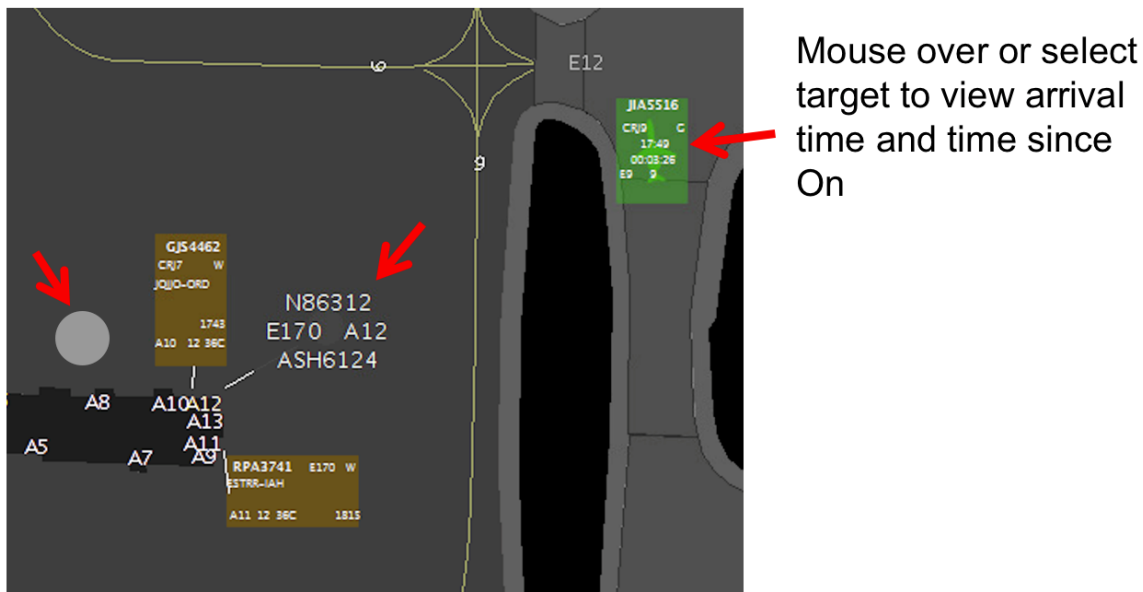


Sector ownership is automatically transferred.

Figure 4.2. Flight States.

There may be instances when a flight has no track data (displayed as a hollow icon), then after it does acquire track data, the flight will “snap” to the updated location (now a solid icon).

Arrivals are displayed as grey discs at the gate after loss of track data (Figure 4.3). To view the arrival flight number (and tail number if available), hover on or select the grey arrival disc. For turnaround flights, the next departure flight strip is displayed up to an hour prior to the airline scheduled departure time, or when the system has acquired data regarding the flight. Arrival flights, if selected, will display the “On” time for the flight as well as the predicted duration of taxi.



- Arrivals are green
- Arrivals become grey discs after they become inactive at the gate, click on the grey disc to view flight data.
- Once there is an In time, the arrival may be relocated on the map

Figure 4.3. Arrivals.

4.1.2 Display of TMIs and Airspace Constraint Information on Flights

If applicable, TMI Information and other constraints are displayed on the flight strip for each flight (Figure 4.4.). Alerting is provided on the sector controller’s display for new and/or updated APREQs, EDCTs, and MITs with blinking yellow highlighted TMI information on the flight. Alerts are also provided on the sector controller’s display for departure fix closures, ground stops and destination airport closures by a blinking red highlight of the departure fix, ground stop, or destination airport on the flight. The ramp controller may acknowledge the blinking alerts by clicking on the flight to stop the blinking; however the information will remain on the flight in yellow or red highlighted text box.

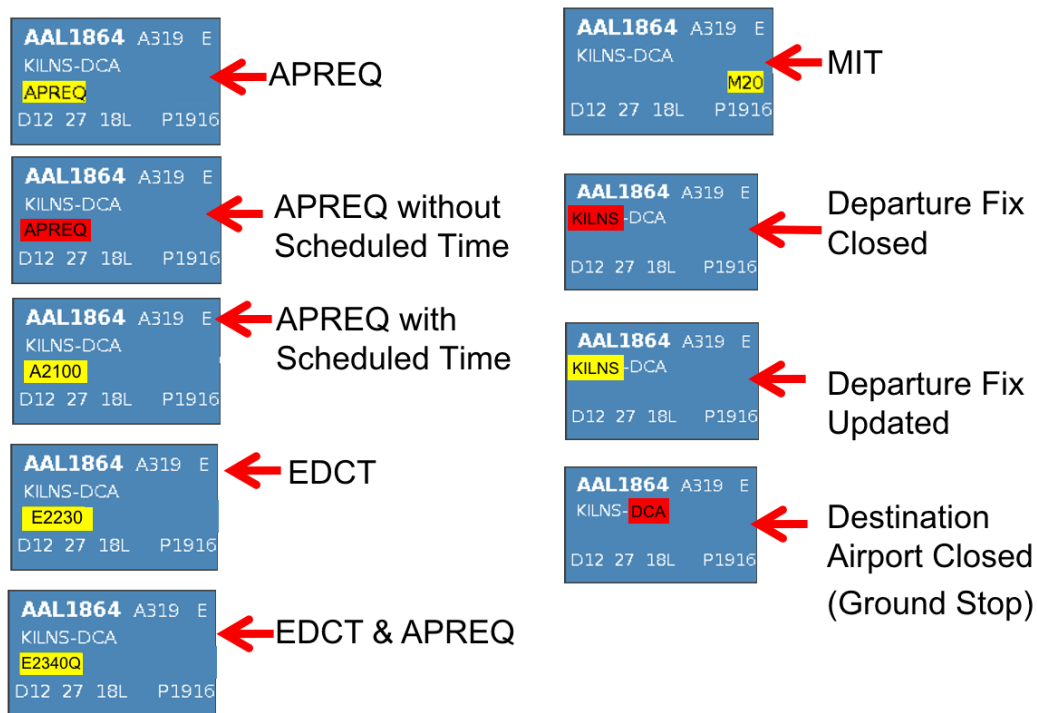


Figure 4.4. Flight Alerts

- Flights under APREQs are indicated by showing **APREQ** in a yellow text box on the flight strip. This is for flights that need an APREQ/Call-For-Release (CFR) time, also known as wheels up time or flow time, but have not yet been scheduled by the ATC Tower. If a flight is pushed back prior to getting a CFR time, then APREQ will be shown in a red text box and blink as an alert on the sector controller's display indicating that this flight still needs to be scheduled. The ramp controller may click on the blinking alert to acknowledge the red APREQ alert and stop the blinking. After the APREQ is scheduled it will be displayed on the strip with the scheduled time after A, e.g., as **Ahhmm**. It is expected that pilots will obtain the CFR prior to pushback.
- MIT restriction is displayed on the flight as **Mnm** highlighted in a yellow text box on the flight, where *nm* specifies the distance in nautical mile.
- Flights that are subject to metering will have TMAT displayed after pushback, without the yellow highlighting (see the top of Figure 4.5). EDCT flights display the EDCT time on the flight in a yellow text box "**Ehhmm**".
- Flights with both EDCT and APREQ show "**EhhmmQ**" while wheels-up time is not scheduled. On receipt of wheels-up time by the system, the EDCT is replaced and only "**Ahhmm**" is shown. After pushback, flights with an EDCT or a scheduled APREQ will be shown with TMAT highlighted in yellow in the format "**Thhmm**". This will be shown until the flight has reached the designated spot; beyond that "**Ahhmm**" is shown (see the bottom of Figure 4.5).

- Departure fix Closures are indicated by highlighting the fix in a red text box.
- Fix changes or Coded Departure Routes (CDRs) are indicated by the highlighting the display of the fix in a yellow text box.
Note: If there is an update to the route, then the yellow background will blink for an alert to the change. The ramp controller may click on the flight to stop the blinking alert. It is expected that the pilot shall obtain the new route prior to pushback.
- Ground Stop (GS) programs are indicated on the flight by displaying the destination airport in a red text box.

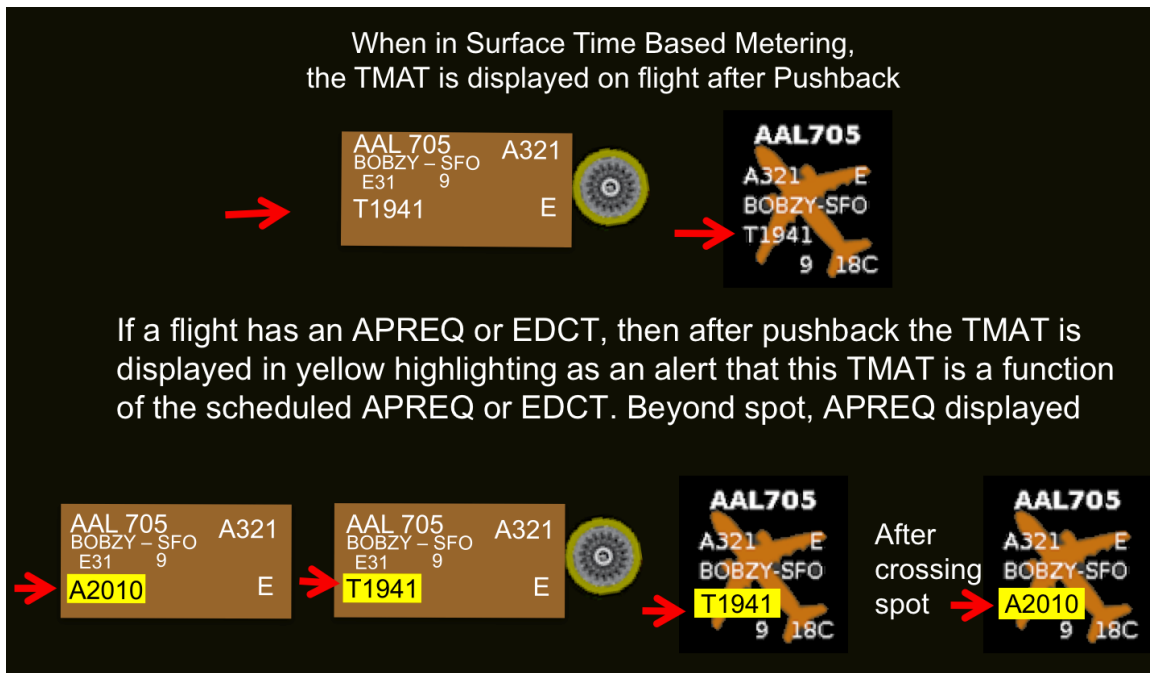


Figure 4.5. TMAT After Pushback (Yellow if TMI).

APREQ and EDCT flights will always have a recommended hold time as shown in Figure 4.5, based on the release time (i.e., APREQ/CFR release time or EDCT time). Recommended hold times and how they are displayed is discussed in greater detail in the Metering Modes section, Section 6.

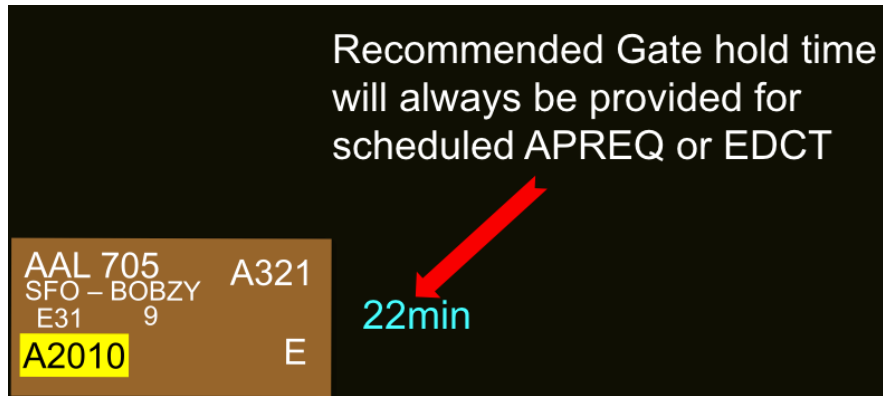


Figure 4.6. APREQ and EDCT Flights: Always Display Hold advisory.

4.1.2.1 TMI flights will have a Release Advisory from the Hardstand

If sent to the Hardstand, any flight that has an EDCT or a scheduled APREQ/CFR time will also have a Release Advisory to guide this flight's release from the Hardstand in time to meet the TMAI time, which, in turn is based on the flight's being able to comply with the TMI. The Release Advisory, displayed in cyan blue, will count down to the time the flight should be released to be able to meet the TMAI time (Figure 4.7). If the flight has not been released from the Hardstand prior to the countdown reaching zero, a Red "Release" alert (Figure 4.8) will be displayed for that flight.



Figure 4.7. TMI Flight: Release Advisory.



Figure 4.8. Alert to Release From Hardstand.

5 Flight Menu

Double click a flight strip or icon to open the Flight Menu for any departure (Figure 5.1) or arrival (Figure 5.2) flight. The flight menu may also be opened for a flight using the right mouse click menu. Select Flight Menu from right click mouse menu to open the Flight Menu for any arrival or departure flight. The Flight Menu is available for each flight to view various flight details for that flight.



Figure 5.1. Departure Flight Menu.

The flight Menu for an arrival flight is slightly different than the flight menu for a departure. The departure flight details do not apply to arrival flights and are therefore greyed out in the arrival Flight Menu (Figure 5.2).

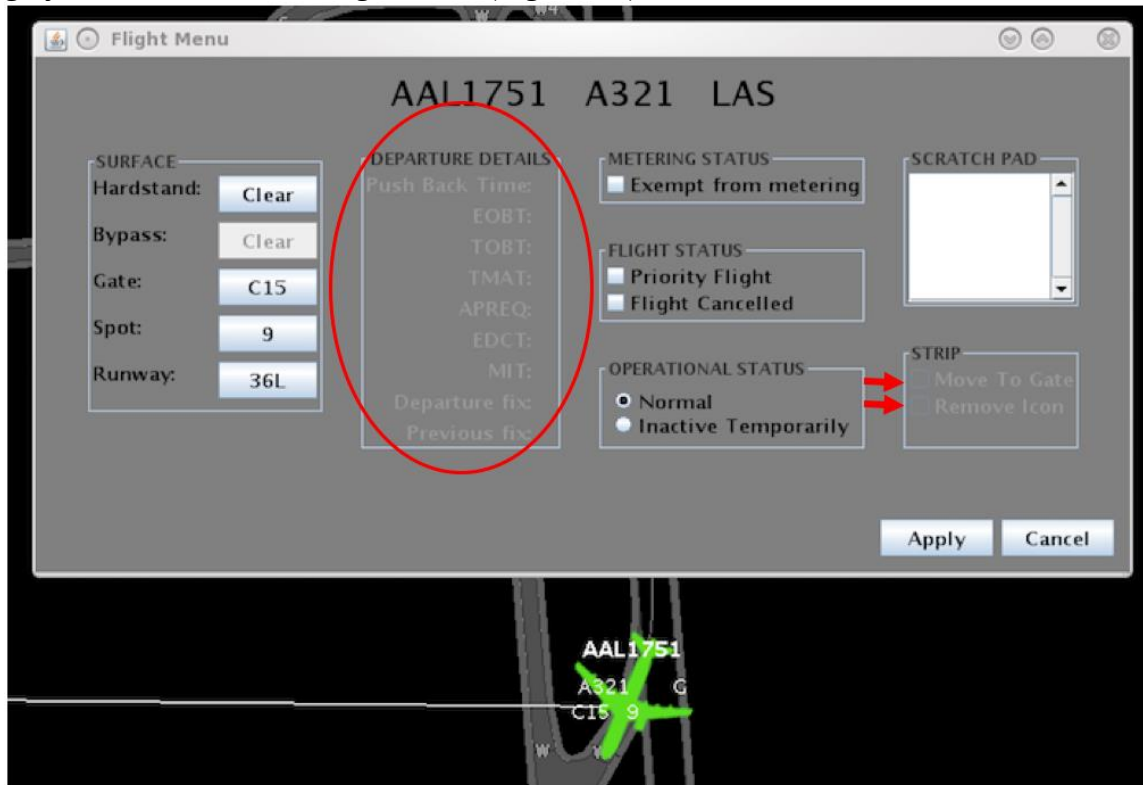


Figure 5.2. Arrival Flight Menu.

5.1 How to Update Surface Status using the Flight Menu

Figure 5.3 shows the options for a ramp controller to update a flight's hardstand, gate, spot and runway assignment.



Figure 5.3. Update Surface Flight Data.

Figure 5.4 shows the options for a ramp controller to assign flights to the hardstand.

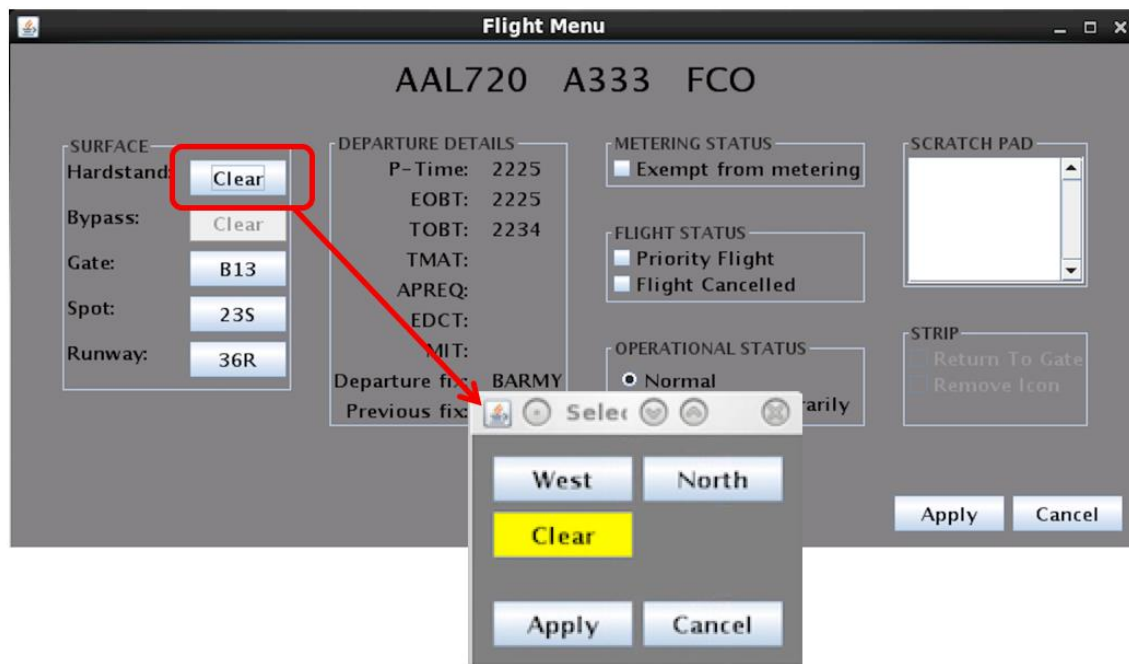


Figure 5.4. Hardstand Assignment.

Figure 5.5 shows the options for a ramp controller to update the gate assignment.

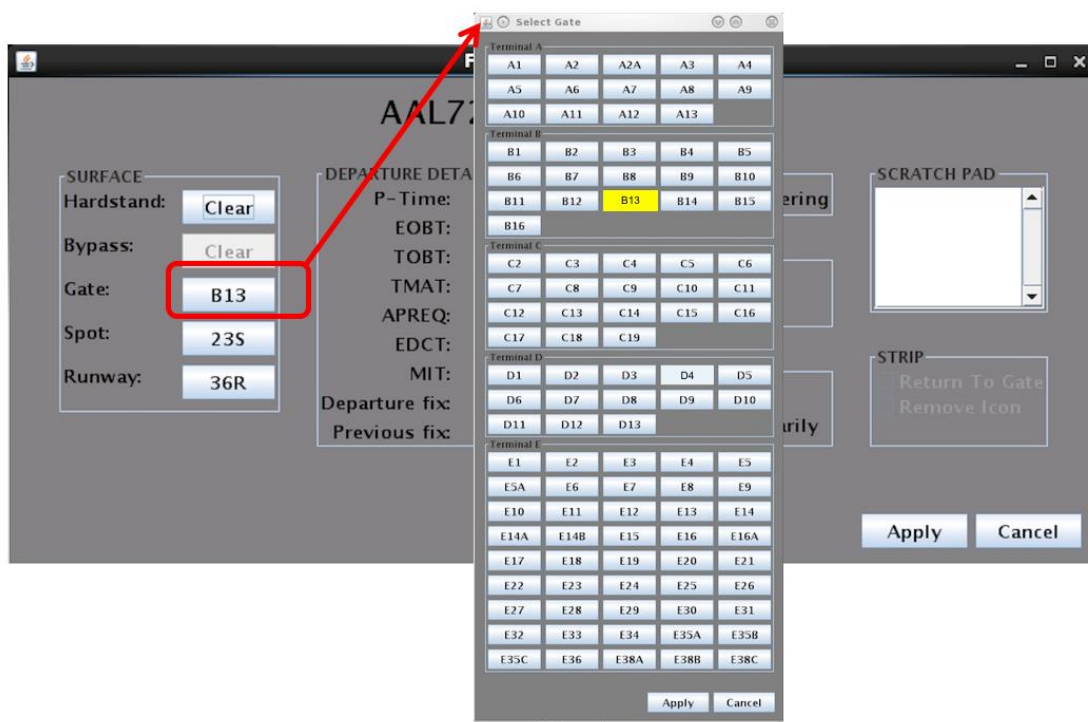


Figure 5.5. Gate Assignment.

Figure 5.6 shows the method for a ramp controller to update the spot assignment.

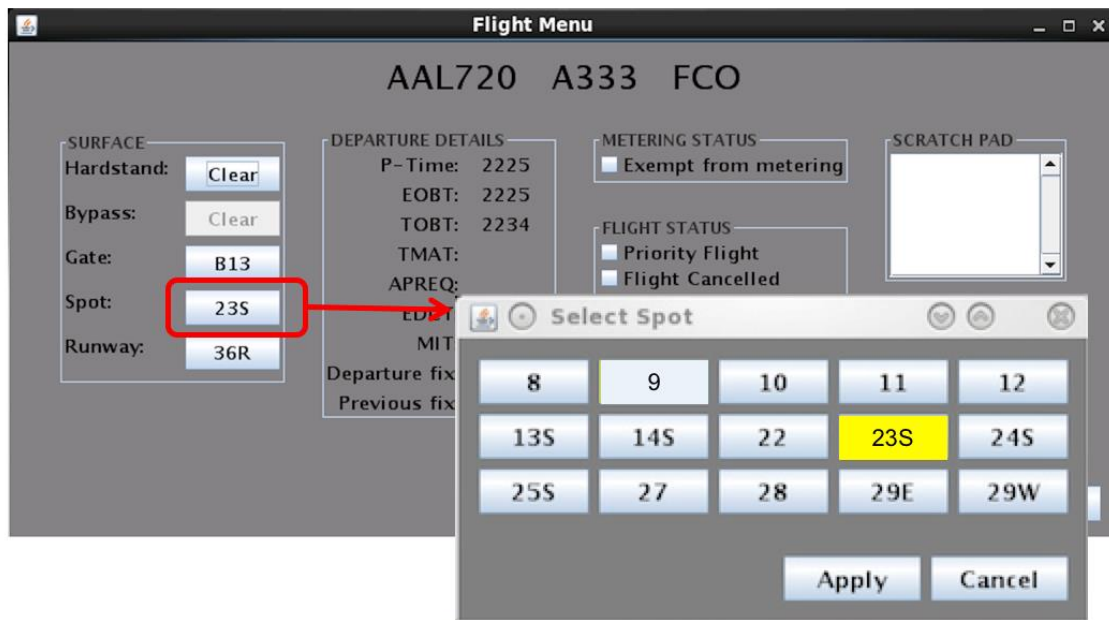


Figure 5.6. Spot Assignment.

Figure 5.7 shows the method for a ramp controller to make a runway change for operational necessity.

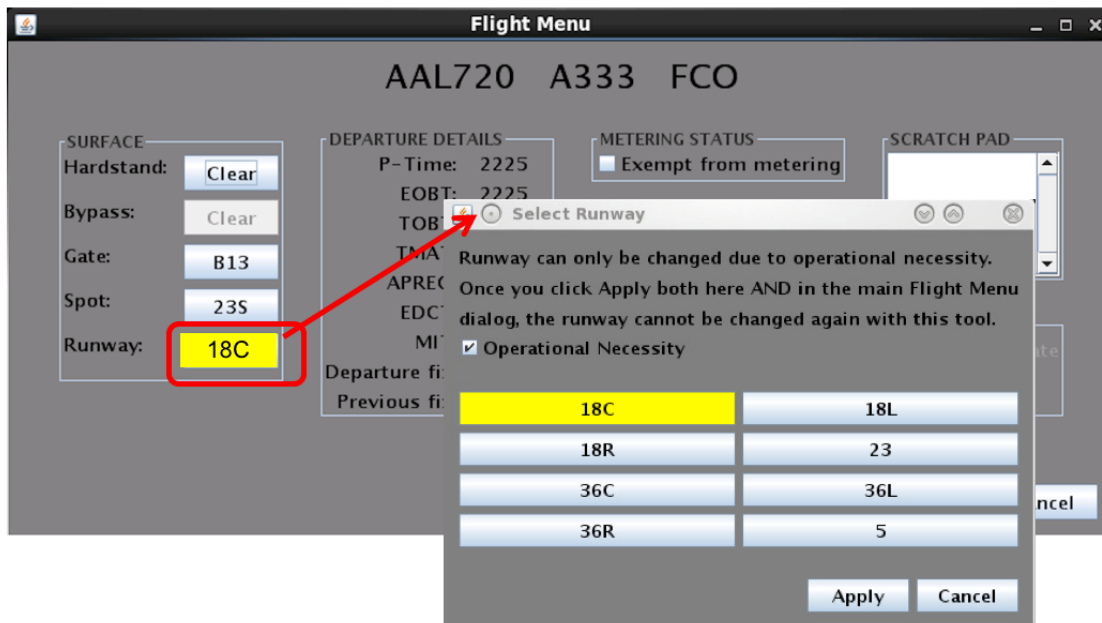


Figure 5.7. Runway Change (For Operational Necessity).

This procedure results in a change in the direction of the flight so it may change from blue to brown or vice versa to reflect the updated runway. The runway will also be highlighted in green on the flight strip (Figure 5.8). This change will also be reflected on the ATC-T's STBO Client timeline, as the flight will be moved to the new runway timeline. Runway change cannot be made on Arrivals.



Figure 5.8. Updated Runway in Green Highlight.

5.1.1 Departure Details

Under the Departure Details section of the Flight Menu (Figure 5.9), all times pertaining to the flight are listed, including times for any TMIs. The Departure Fix and any updated departure fix information are also shown here.

The screenshot shows a software interface titled "Flight Menu" for flight "AAL720 A333 FCO". The interface is divided into several sections:

- SURFACE:** Includes fields for Hardstand (Clear), Bypass (Clear), Gate (B13), Spot (235), and Runway (36R).
- DEPARTURE DETAILS:** This section is highlighted with a red box and contains the following information:
 - P-Time: 2225
 - EOBT: 2225
 - TOBT: 2234
 - TMAT:
 - APREQ:
 - EDCT:
 - MIT:
 - Departure fix: BARMY
 - Previous fix:
- METERING STATUS:** Includes a checkbox for "Exempt from metering".
- FLIGHT STATUS:** Includes checkboxes for "Priority Flight" and "Flight Cancelled".
- OPERATIONAL STATUS:** Includes radio buttons for "Normal" (selected) and "Inactive Temporarily".
- SCRATCH PAD:** A text area for notes.
- STRIP:** Includes buttons for "Return To Gate" and "Remove Icon".

At the bottom right, there are "Apply" and "Cancel" buttons.

Figure 5.9. Departure Details.

- P-time: This is the airline scheduled pushback time
- EOBT (Earliest Off Block Time): This is the expected pushback time or when the flight will be ready based on airline updates
- TOBT (Target Off Block Time): This is the time the tactical scheduler plans for the flight to pushback
- TMAT (Target Movement Area entry Time): This is the time the tactical scheduler plans for the flight to be at the spot
- APREQ: If the flight is under APREQ/CFR restriction, the release time will be displayed here after the APREQ/CFR is scheduled
- EDCT: If the flight is under a Ground Delay Program (GDP), the EDCT will be displayed here
- MIT: If there is an MIT restriction for this flight, it will be displayed here
- Departure Fix: The assigned departure fix for the flight is shown here
- Previous Fix: If there was an update to the assigned fix, then the previously assigned fix is listed here

5.1.2 Metering Status, Flight Status and Operational Status

The status of a flight may be viewed in detail with the Flight Menu Metering, Flight, or Operational Status options (Figure 5.10).

Figure 5.10. Metering, Flight, Operational Status.

A flight is exempted from Surface Time Based Metering (STBM) when the checkbox for “Exempt from metering” is selected; refer to Section 6 for an explanation of Metering Modes. Certain flights may be automatically exempt from metering, such as military flights or General Aviation flights. International flights are not automatically exempt from metering; if they are, they will be marked for exemption as shown in Figure 5.10.

A flight is designated as a priority flight if the “Priority flight” checkbox is checked. The flight will be on the ramp manager’s Priority Flight List (refer to Section 7.5) and will have a green border around the flight strip (Figure 5.11).

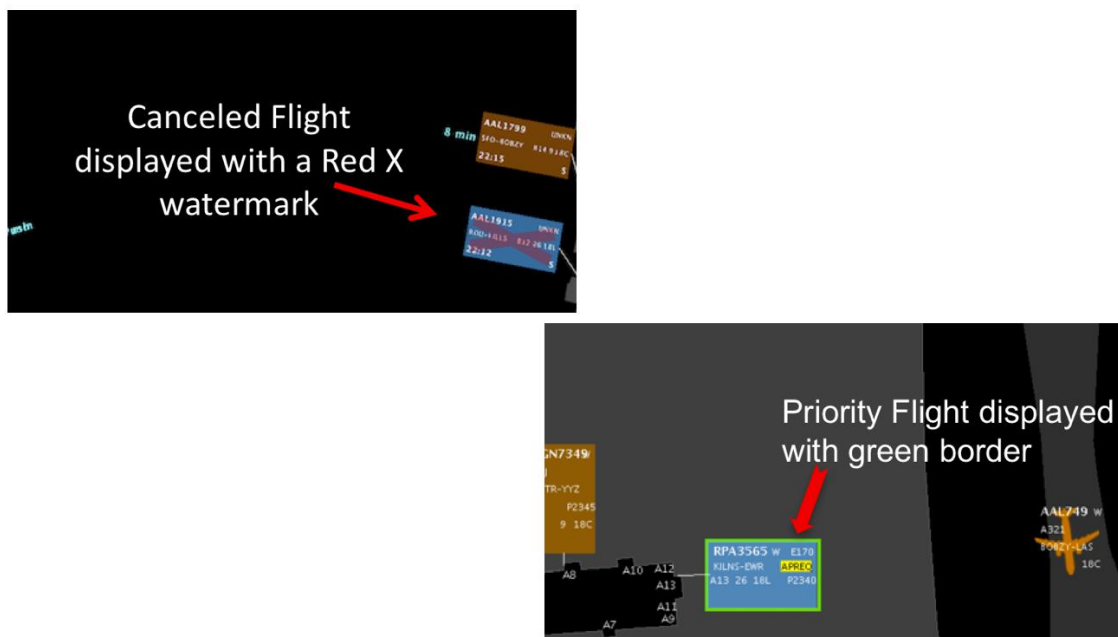


Figure 5.11. Canceled and Priority Flights.

In case cancellation status is not received via the data feeds, the sector controller may need to cancel the flight. When a flight is cancelled, a red X watermark is on the flight (Figure 5.11). The flight will then time out within a minute and the flight strip will turn into a grey icon on the display. If the flight is scheduled for departure again and that data is received from the data feeds, a flight strip will appear at the gate. It will be deleted automatically when the underlying flight is deleted by the system 4 hours after it is cancelled.

The Operational status for a flight can be seen on the Flight Menu (Figure 5.10). Operational status refers specifically to how the STBM tool considers the flight (refer to Section 6). Normal status means the flight is expected to proceed as a normal/ regular flight and is treated accordingly by the STBM. “Inactive Temporarily” means that the flight has been temporarily removed by the controller from normal consideration in the STBM system, for example when there is a quickly remedied maintenance issue.

5.1.3 Scratch Pad entry, Return to Gate, and Remove Icon

The Flight Menu for any flight has a scratchpad feature (Figure 5.12).

Figure 5.12. Scratch Pad, Return to Gate, Remove Icon.

The “Remove Icon” checkbox shown in Figure 5.12 may be checked by the ramp controller to permanently remove the flight from the RTC display.

If the departure flight has been mistakenly cleared to proceed, the “Return to Gate” checkbox may be checked by the ramp controller.

6 Metering Modes

There are three metering modes possible in RTC and RMTC: No Metering, Departure Sequencing, and Surface Time Based Metering (STBM). Departure Sequencing mode refers to the legacy metering historically used in the AAL ramp. STBM mode provides tactical gate hold recommendations generated by the scheduler based on multiple inputs, including scheduled departure times, EOBTs, nominal taxi times, and demand at the runway. STBM is described in greater detail in the next section.

6.1 Surface Time Based Metering (STBM)

STBM is ATD-2's surface metering tool to alleviate surface congestion in the near-term tactical time frame. The tool provides gate hold recommendations that are expected to be treated as advisories by the ramp controller. STBM meters departures at the gate and provides gate hold advisories based on a selected target excess queue time (or excess taxi time) to the runway. The excess queue time is the acceptable amount of additional taxi time the departures may spend while they are taxiing on the surface and waiting in the runway queue before taking off. Simply put, when the demand from the ramp is predicted to exceed the set value, the STBM starts recommending hold times at the gate.

The STBM uses Earliest Off Block Times (EOBTs) and un-delayed taxi time estimations to predict when aircraft will arrive at the runways. Based on these predictions and operational constraints, STBM generates a schedule that calculates Target Takeoff Times (TTOTs) at the runways, Target Movement Area entry Times (TMAT) at the spots, and Target Off Block Times (TOBT) at the gates. The TOBT is used to provide gate hold recommendations.

The metering tool considers the demand and capacity imbalance for every departure runway before recommending gate holds. It may be observed, at times, that there are no gate holds recommended for flights departing from one runway, while at the same time there are gate holds recommended for flights departing from another runway. STBM takes into consideration the following: APREQs, EDCTs, taxi time estimates both in ramp and on the AMA, gate pushback duration estimates, flight spacing requirements based on the type of runway operations (such as converging runway or dual use operations), and runway crossings. Finally, STBM takes into consideration EOBT quality to determine the level of certainty when generating runway schedules for departures and their corresponding gate hold recommendations (see Section 6.1.4).

The tactical surface scheduler is expected to run all the time in the background. However, the Ramp Manager can turn metering on and off to manage any demand/capacity imbalances according to strategy.

When the Ramp Manager decides to turn on time-based metering, he or she will choose a target level of excess queue time in the AMA. There are three values to choose from: 14, 12 and 10 minutes. However, a custom value may be entered (Figure 7.7). The higher the excess queue time in the AMA is set, the lower the gate hold times are recommended by the metering tool. The selection of these target excess queue times is described in Section 7.3.

In addition to the target excess queue time value, there are lower and upper thresholds to this value. The lower and upper thresholds determine when to show recommended gate hold times on the RTC display. The STBM will start showing recommended gate hold times when the predicted maximum excess queue time exceeds the upper threshold, and will stop showing these hold times when the predicted minimum excess queue time reaches the lower threshold.

The upper threshold establishes a target of maximum of excess queue times. Hold times will then be assigned to prevent departures from being delayed beyond the upper threshold. The lower threshold establishes the minimum of excess taxi times that

qualifies for metering. Flights with the minimum excess taxi time below that threshold will not get assigned a hold time.

The target values already come with pre-set values for both the lower and upper threshold of excess queue time. These pre-set threshold values are intended to provide a reasonable duration and amount of gate holds. However, both threshold values can be custom set by the ramp manager at any time. Once the lower and upper thresholds are set, the STBM scheduler algorithm will generate recommended hold times based on these values and will display gate hold advisories on the RTC display.

RTC displays STBM recommended Gate hold times or PUSH advisories in cyan blue color adjacent to the flight strip. See Figure 6.1 for examples of PUSH and recommended hold time advisories.

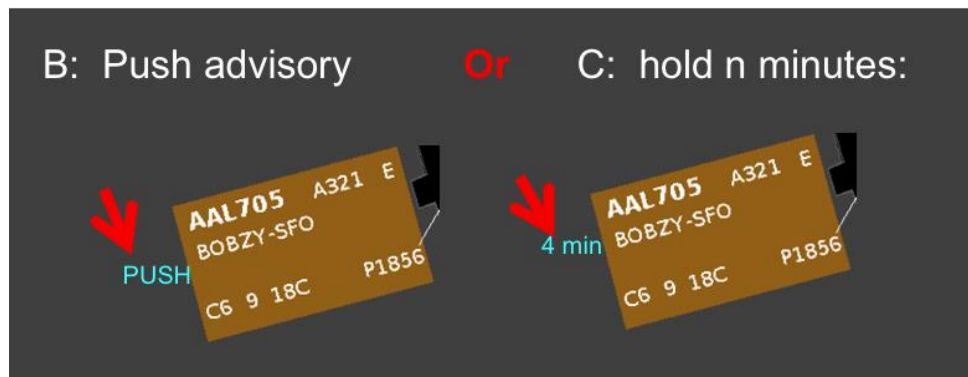


Figure 6.1. STBM Advisories.

6.1.1 Exempt flights

Exempt flights are flights that will not be subject to recommended gate holds. For example, both international and GA flights may be included in this flight category. Ramp Control can designate a specific flight as an exempt flight on the RTC or the RMTC by using the Flight Menu described in Section 5.1. An exempt flight will not display any guidance or gate holds from the surface metering tool, allowing the ramp controller to push or hold the flight as they deem fit when the pilot calls in ready for departure.

6.1.2 Priority Flights

The Ramp Manager can create a list of priority flights on the RMTC (see Section 5.1.2). Alternatively, Ramp Controllers can designate a flight as a priority flight using the Flight Menu on the RTC (Section 5.1.2). In the Phase 1 demonstration, priority flights are scheduled ahead of other flights within the same airline during surface metering. Ramp controllers may not see the change in the recommended hold time of a priority flight until the pilot calls and the flight is in hold.

6.1.3 TMI Flights

TMI flights (e.g., EDCT, APREQ/CFR flights) are *not* subject to surface metering in order to avoid a potential double delay due to both metering and the TMI restriction. However, recommended gate hold or push advisories for TMI flights will *always* be displayed on the RTC (once wheels-up time has been negotiated), regardless of whether

surface metering is turned on or off, in order to assist the ramp controller in releasing these flights to meet their TMI wheels-up time. Once the flight pushes back, instead of the APREQ or EDCT times, a TMAT will be shown with a yellow background on the flight strip. Note that a large number of TMI flights in the system will impact demand and may increase gate hold times for flights that are subject to metering.

6.1.4 EOBTs and Gate Hold Time Advisories

STBM takes Earliest Off Block Times (EOBT) that can also be described as flights' estimated ready times and uses those to generate gate hold advisories. EOBT is being calculated by the airline based on various factors such as percentage of passengers boarded and baggage loaded. The STBM scheduler allocates runway departure slots at the gates in order of consideration based on the quality of the flight's EOBT. The order of consideration increases as a flight's predictability of its runway takeoff time increases. For example, a taxiing flight has a higher order of consideration than that of a flight at the gate. In current scheduler implementation, an aircraft moves from the Uncertain group to the Planning group, to the Ready group, and then on to an Out group, a Taxi group, and finally to the Queue (see Figure 6.2), and therefore, as the level of certainty about actual pushback times increases, flights are moved from the 'Uncertain' to the 'Planning' group.

6.1.5 'Planning' Group

The flights that have reliable EOBTs are placed in the Planning group. This takes place when flights' EOBTs fall within a specified scheduling accuracy window, e.g., 10 minutes. Once flights are in the Planning group, STBM displays gate holds or pushback advisories on the RTC. Pushback advisories are updated at every scheduling cycle (i.e., 10 seconds). See Figure 6.2 for a depiction of the scheduling groups as well as the advisories shown on RTC for flights in the Planning group. Ramp controllers are expected to act on pushback advisories only after the pilot calls ready for pushback. The expectation is that pilots will call in by at least 5 minutes past their EOBTs. If they do not, their flights will be put in the Uncertain group. This prevents flights that are late to push from adding unnecessary delay to other flights. Flights that are past the window of their EOBTs, and therefore have been put in the Uncertain group, will receive a gate hold or pushback advisory as soon as pilots call for pushback (see Section 5.1.1).

Group	Definition	RTC display
Uncertain	Flights with poor quality EOBT or (EOBT – current time) > 10 min	
 Planning	Flights with good quality EOBT (and within 10 minutes of EOBT)	 Or  
Ready	Flights that have called in ready for pushback	
Out	Flights that are in pushback state	
Taxi	Flights that are cleared for taxi	
Queue	Flights waiting in the runway queue	

Figure 6.2. Planning Group.

6.1.6 “Ready” Group

Flights are considered to be in the ‘Ready group’ when pilots call in for pushback clearance. The Ramp Controllers either put flights on hold or push them based on the advisories provided by the scheduler for these flights. The flights will remain in the Ready group if the flights are on hold. Otherwise, the flights will be placed in the Out group, once they begin pushback (Figure 6.3).

Group	Definition	RTC display
Uncertain	Flights with poor quality EOBT or (EOBT – current time) > 10 min	
Planning	Flights with good quality EOBT (and within 10 minutes of EOBT)	 Or 
Ready	Flights that have called in ready for pushback	
Out	Flights that are in pushback state	
Taxi	Flights that are cleared for taxi	
Queue	Flights waiting in the runway queue	

Figure 6.3. Ready Group.

If there is a recommended gate hold time provided by the STBM advisory, the Ramp Controller is expected to hold the flight, providing the hold time to the Pilot. The Ramp Controller places a hold on the flight by sliding the flight strip toward the gate (Figure 6.4). In the examples shown in the figures above and below, placing a flight on hold places a red border around the flight strip, and the 4-minute cyan blue hold timer begins counting down the recommended hold time.

- I. IF Flight has a Recommended Hold (**4 min**)
"AAL705, hold 4 minutes for metering"
 (Use right click menu, select Pushback))
- II. Red border appears and timer begins to count down to zero **note: the time may jump from the rounded advisory time to a specific count-down time when locked in*

Timer color will change to yellow when two minutes remaining
- III. When timer counts down to zero, if able, contact flight to give pushback approval
"AAL705, pushback and proceed to spot 9"
 (Use right click menu to enter pushback)
- IV. If count down goes past zero, then an extra 5 minutes count down will be provided with blinking **PUSH** to allow extra time to pushback



Figure 6.4. STBM Advisories, PUSH or Hold.

After the hold timer counts minutes is provided for the approval to the flight, with a timer (Figure 6.5). This count from 5 minutes to zero, opportunity to push the flight "push" advisory. Past this unknown or 'Uncertain' and taken at the gate is lost. The flight being penalized for not adding 2, 5, or 10 minutes



down to zero, an additional 5 controller to give pushback red PUSH and red countdown timer will count down giving the ramp controller the within 5 minutes of the point, the flight is treated as all the delay the flight has ramp controller can avoid this pushing within 5 minutes by time to the hold.

Figure 6.5. Add Time to Hold.

If a flight pushes back before the red push advisory expires, then the TMAT is displayed on the pushed back flight strip; see example 'T1941' in Figure 6.6.

If a flight is metered and there is a PUSH advisory then, provided that operational and safety concerns are met, the Ramp Controller is expected to give pushback approval to the flight, proceeding as usual.

- When in Surface Time Based Metering, the TMAT is displayed on flight after Pushback, also on the taxiing aircraft icon

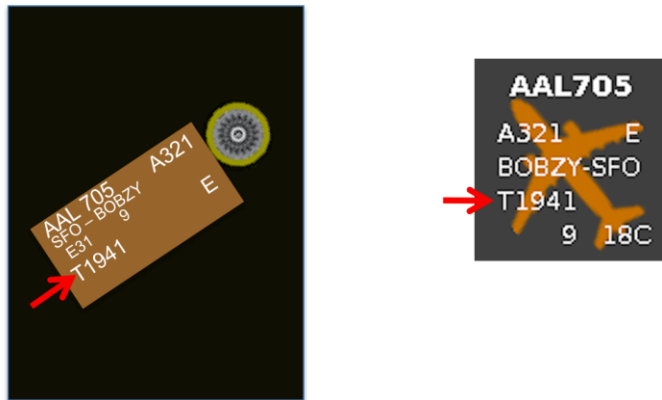


Figure 6.6. For Metered flights: TMAT displayed after pushback.

6.1.7 'Uncertain' group

The flights with unreliable EOBTs or outside the scheduling horizon of the 'Planning' group are placed in the 'Uncertain' group (Figure 6.7). The RTC does not display gate holds or push advisories for flights in the 'Uncertain' group. Instead it shows a hashtag symbol. When a pilot calls in ready for pushback, the Ramp Controller should click on the hashtag to generate a hold time or push advisory. When the Ramp Controller clicks on the hashtag, the scheduler generates target times (TTOT, TMAT, TOBT) and the gate-hold/pushback advisory is displayed on the RTC (Figure 6.8).

Group	Definition	RTC display
Uncertain	Flights with poor quality EOBT or (EOBT – current time) > 10 min	Click on hashtag to put flight in ready group and reveal advisory 
Planning	Flights within 10 min of EOBT (i.e., EOBT – current time <= 10 min)	
Ready	Flights that have called in ready for pushback	
Out	Flights that are in pushback state	
Taxi	Flights that are cleared for taxi	
Queue	Flights waiting in the runway queue	

Note: Flights with hashtag can not be put on hold. Must click hashtag to get advisory

Figure 6.7. Uncertain Group.

If the flight is in the uncertain Group, it will have a hashtag in place of the advisory

*The ramp controller may use the right click mouse menu to put the flight back into the "Unready group" if the hashtag is clicked on inadvertently

- The ramp controller may click on the hashtag to get the "instant advisory"
- (either PUSH or a recommended hold time)
- If a hold is recommended, the ramp controller may use right click mouse menu to place a hold on the flight, then a red border and countdown timer is displayed

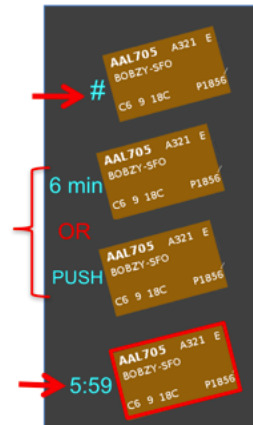


Figure 6.8. Uncertain Group, Hashtag Flights.

A flight in the 'Uncertain' group with a good quality EOBT will automatically progress to the 'Planning' group (Figure 6.2).

6.1.8 'Out', 'Taxi' and 'Queue' Groups

Flights are considered in the 'Out' group when flights have actually started pushing back and have an engine symbol next to them. Flights are the 'Taxi' group once they have started taxiing or surveillance has picked the flights up and they are displayed as solid aircraft icons on the RTC (see Figure 6.9).

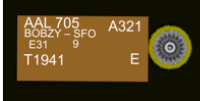
Group	Definition	RTC display
Uncertain	Flights with poor quality EOBT or (EOBT – current time) > 10 min	
Planning	Flights within 10 min of EOBT (i.e., EOBT – current time <= 10 min)	
Ready	Flights that have called in ready for pushback	
Out	Flights that are in pushback state	
Taxi	Flights that are cleared for taxi	
Queue	Flights waiting in the runway queue	

Figure 6.9. Out, Taxi and Queue Groups.

7 RMTC

The Ramp Management Traffic Console (RMTC) is designed to support the ramp manager's role. It provides the same RTC functions as described in the previous sections, plus additional functions that pertain to the ramp manager. The additional functions are accessed in the RMTC Tools Menu and are described below.

The functions available to the Ramp Manager are listed under the “Tools Menu” in the upper left side of the RMTC (see Figure 7.1). This menu gives access to the metering modes, the operational status of the ramp, and the list of priority flights.

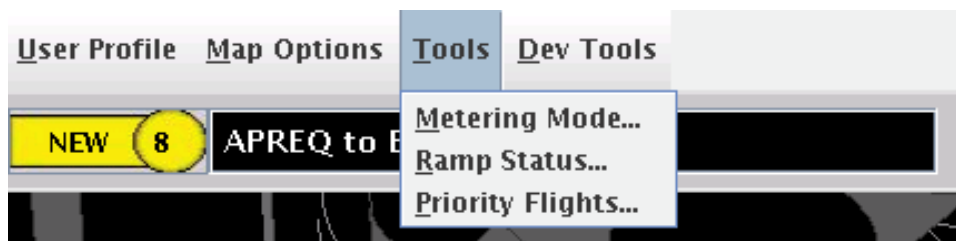


Figure 7.1. Functions under the RMTC “Tools” menu.

7.1 RMTC Tools Menu: Metering Modes

7.1.1 No Metering

When the “No Metering” mode is selected in the sub menu (See Figure 7.2), the metering symbol is updated on the upper right side of the RMTC and RTC, as well as on the STBO Client display in the ATC Tower (See Figure 7.3). The grey and red “No Metering” symbol communicates to the RTC and STBO users that no metering is taking place.

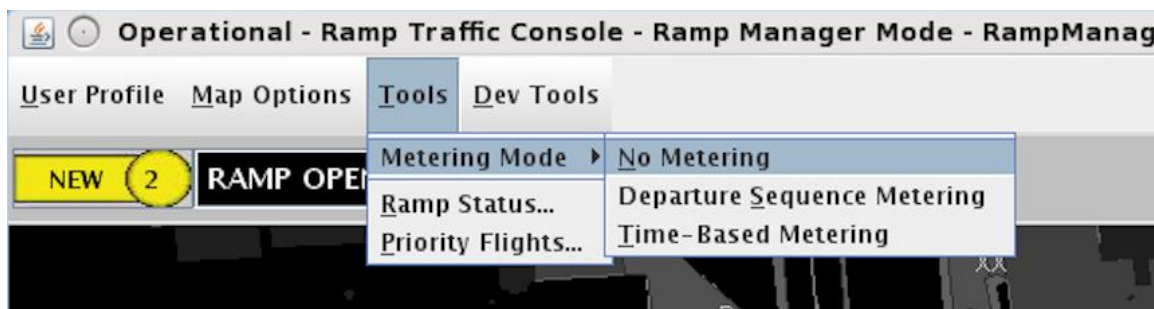


Figure 7.2. “No Metering” selected on the “Set Metering Mode” window.



Figure 7.3. No Metering symbol.

In the “No Metering” mode, no recommended gate hold times are displayed on the RTC or RMTC displays, except for the EDCT flights and APREQ flights after they have been scheduled.

Flights with an APREQ/CFR or an EDCT are always provided with recommended hold times irrespective of the status of metering as shown in Figure 7.4. These hold times

advise the ramp controllers when these flights should push to comply to their release time at the runway.

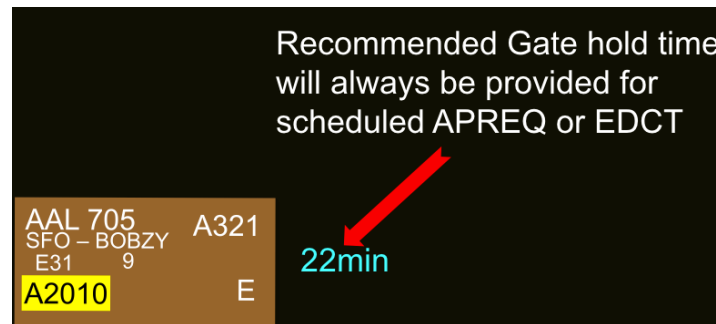


Figure 7.4. Scheduled APREQ and EDCT always have a recommended hold time

Note that the STBM scheduler is always running in the background and continuously assesses the need for gate hold times. The hold times are simply not displayed on the RTC and RMTC when the No Metering Mode is selected.

7.2 Departure Sequence Metering

When the “Departure Sequence Metering” mode is selected in the “Set Metering Mode” window (see Figure 7.5), the metering symbol is updated on the upper right side of the RMTC and RTC, as well as on the STBO Client display in the Tower (See Figure 7.6). The green symbol displays the target queue length as entered by the Ramp Manager. In Departure Sequencing, the queue includes all flights that have been released from the gate to the runway.

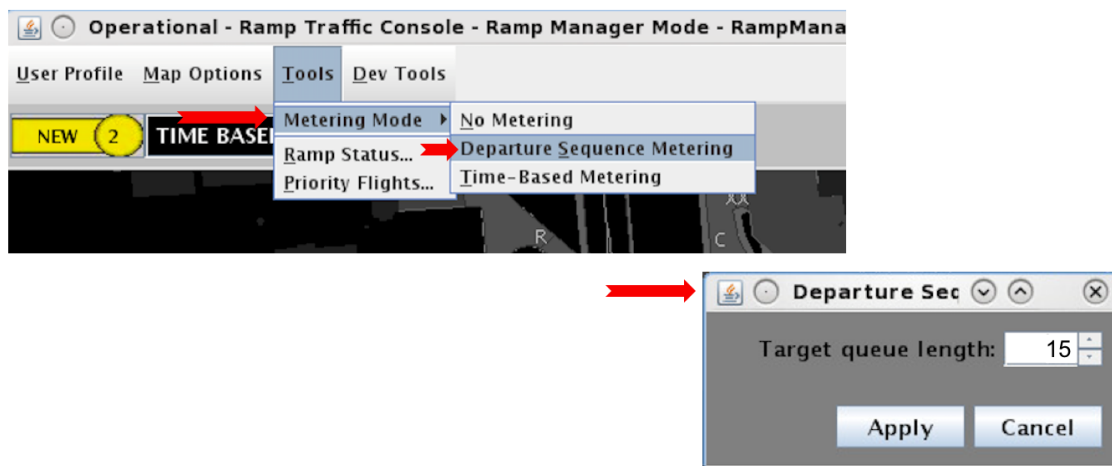


Figure 7.5 “Departure Sequence Metering” is selected on the “Set Metering Mode” window.



Figure 7.6 Departure Sequence Metering symbol with the target queue size value.

In Departure Sequencing Mode, the STBM scheduler will not recommend specific gate holds to meet a target queue size at the runway. The Ramp Controllers are expected to manage the aircraft pushbacks manually based on the runway flight lists (refer to Section 3.6).

7.3 Surface Time Based Metering (STBM)

When the “Surface Time Based Metering” mode is selected in the “Set Metering Mode” window (see Figure 7.7), the metering symbol is updated on the upper right side of the RMTTC and RTC, as well as on the STBO Client display in the ATC Tower (see Figure 7.8). This symbol communicates to the RTC and STBO users that the current Metering Mode is STBM.

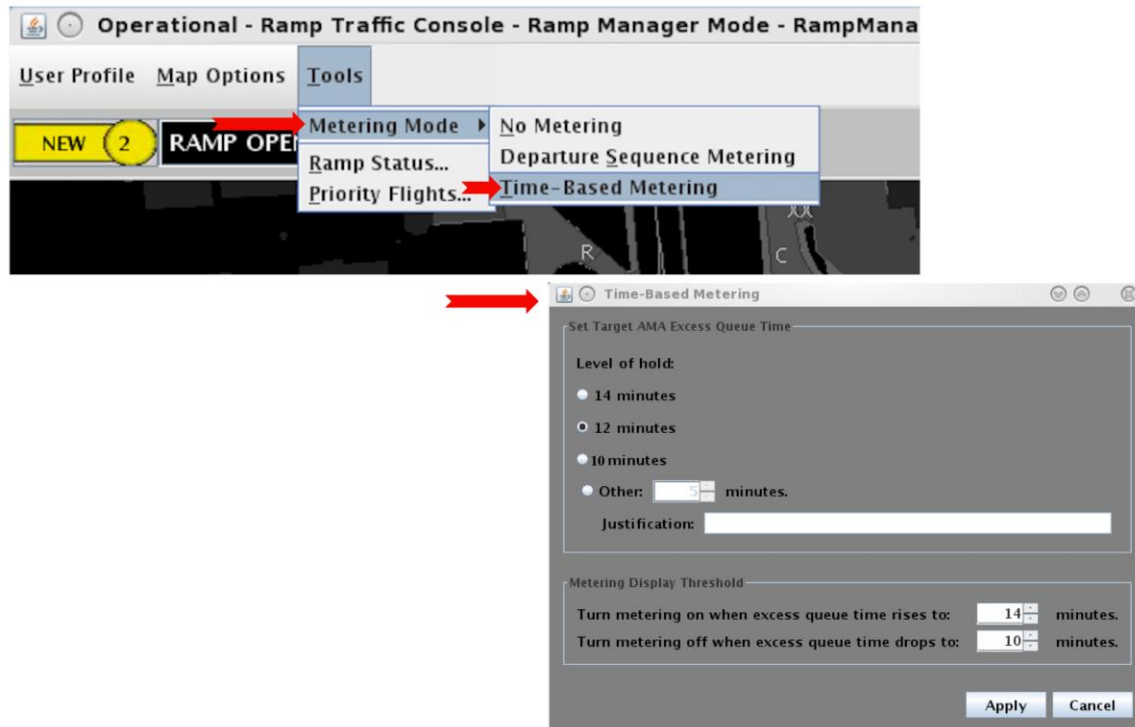


Figure 7.7 Surface Time Based Metering setting window.



Figure 7.8 STBM Metering symbol.

Target Excess Queue Time

When the “Surface Time Based Metering” mode is selected, the STBM scheduler will meter departures at the gate based on the selected target excess queue time to the runway. The excess queue time is the acceptable amount of additional time the departures spend taxiing before taking off. Simply put, when the demand for the runway is predicted to exceed the set value, the scheduler starts recommending hold times.

The target values displayed in Figure 7.7 are pre-set for both the lower and upper threshold of excess queue time (currently 10 to 14 minutes). These threshold values are intended to provide a reasonable duration and amount of gate holds. However, both threshold values can be custom set at any time.

To view data and graphics that can be used to determine the desired target excess taxi queue time and threshold levels, refer to the DASH User Manual for instructions on how to use the DASH tool.

7.4 RMTC Tools Menu: Ramp Status

As part of the data exchange between the Ramp and the Tower, the Ramp Manager can indicate any change of operational status of the ramp (i.e., whether it is open, pending closure, or closed) on the RMTC (see Figure 7.9). The change of status is then reflected on both the RTC and the STBO Client display in the ATC Tower. The symbol of the ramp status is updated and a notification is issued as well.

Note that the STBM scheduler will ***not*** know the impact of the ramp closure, and thus gate hold times may no longer make sense. It is up to the Ramp Manager’s discretion to turn STBM off or on during a ramp closure or a pending ramp closure.

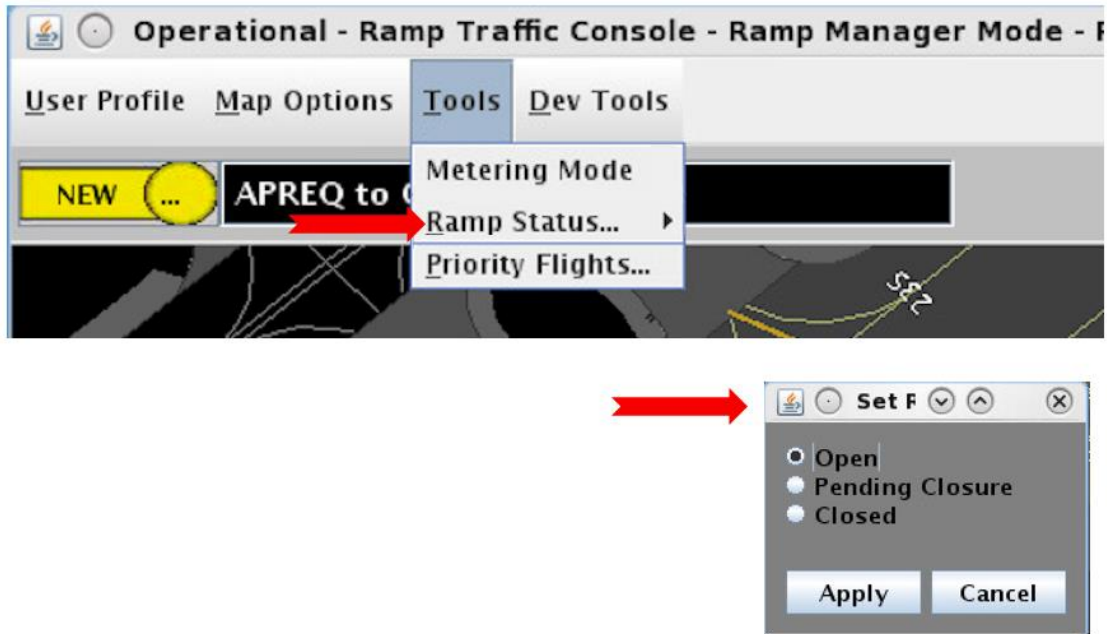


Figure 7.9. Set Ramp Status Window.

The status is indicated by a symbol on the upper right side of the RTC and RMTC. This symbol also appears on the ATC- T's STBO Client display. As can be seen in Figure 7.10, the green symbol indicates the ramp is open, the yellow symbol indicates the ramp is pending closure, and the red symbol indicates the ramp is closed.

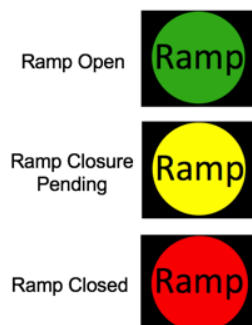


Figure 7.10 Symbols indicating the ramp status.

When changes are made to the Metering Mode or Ramp Status, in addition to the symbol for Metering Mode and Ramp Status being updated, a notification is generated. The new Metering Mode or Ramp Status will be displayed in the Notification Window on the upper left side of the RTC and RMTC, and STBO Client in the Tower, as shown in Figure 7.11.



Figure 7.11. Notification window.

The notification can also be seen by clicking on the black area (see Figure 7.12.).

Reported	Event Type	Description	Event Start	Event End
6/9/17 1935	Ramp	RAMP CLOSURE PENDING	6/9/17 1935	
6/9/17 1918	TMI	APREQ to IAH	6/9/17 1910	6/9/17 2015
6/9/17 1838	Airport	VMC	6/9/17 1838	
6/9/17 1838	Airport	S_Normal	6/9/17 1838	
6/9/17 1838	Airport	South_Conv	6/9/17 1838	
6/9/17 1806	Metering Mode	TIME BASED METERING	6/9/17 1010	

Figure 7.12. Notification Window

7.5 RMTC Tools Menu: Priority Flights List

The RMTC provides the ability to manage a list of priority flights. Departure flights added to the priority list are treated as such by the scheduler. For instance, when metering is turned on, the scheduler will give the priority flights the first available slots in the schedule and thus reduce the recommended gate hold times to their minimum value.

The panel accessed from the tools menu provides a drop-down list of all available flights in the system (first line), as well as a list of flights that have been added to the priority list (second line, see Figure 7.13).

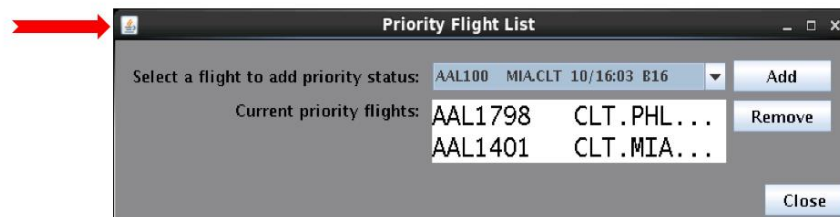
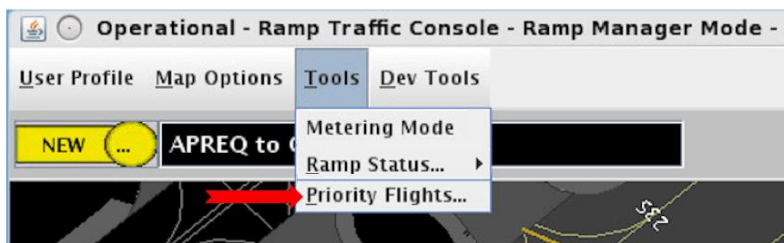


Figure 7.13. Priority Flight List window

Both departure and arrival flights are listed in alpha-numerical order (Figure 7.14).

Tip: To jump to another callsign (i.e. DAL), type the first letter of the callsign in the window (for instance “d”). This will bring the list to the Delta Air Lines flights.

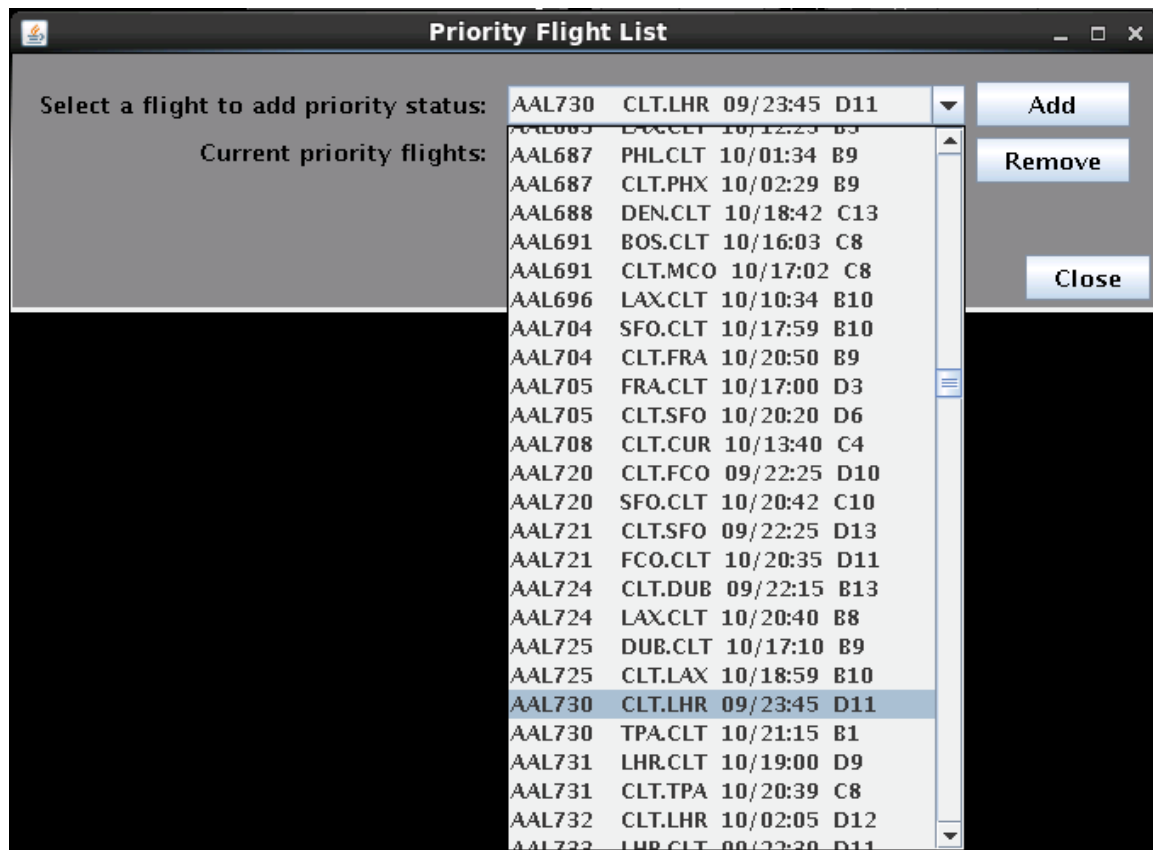


Figure 7.14. List of flights in the “Priority Flight List” window.

Note that even though arrivals are listed here, arrivals are not scheduled by the STBM scheduler.

Once flights are on the priority list, a green border appears around the flight strip (Figure 7.15).

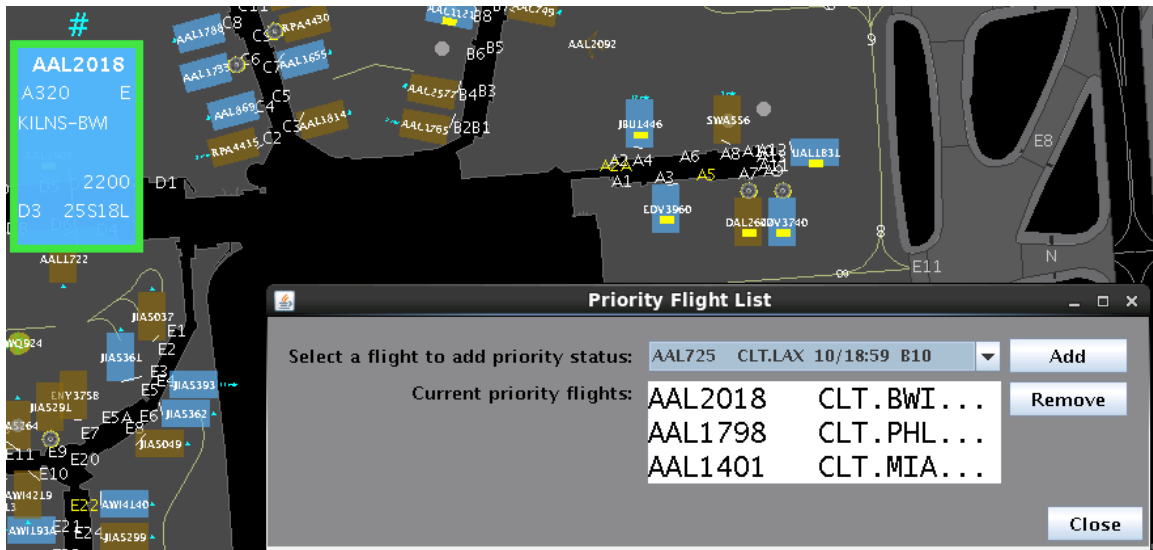


Figure 7.15. Priority Flight List and flight strip with green border on the map.

Appendix A: Acronyms

This appendix defines acronyms and terms that are used repeatedly throughout the ATD-2 RTC RMTC User Manual.

Acronym	Term
AAL	American Airlines
AMA	Airport Movement Area
APREQ / CFR	Approval Request / Call For Release
ATC	Air Traffic Control
ATD-2	Airspace Technology Demonstration-2
CDR	Coded Departure Route
CLT	Charlotte Douglas International Airport
DAL	Delta Air Lines
DASH	Data Analysis and System Health tool
EDCT	Expected Departure Clearance Time
EOBT	Earliest Off-Block Time
GA	General Aviation
GS	Ground Stop
IADS	Integrated Arrival, Departure, Surface
LOB	Long On Board
MIT	Miles-In-Trail
NASA	The National Aeronautics and Space Administration
P-time	Airline scheduled pushback time
RMTC	Ramp Manager Traffic Console
RTC	Ramp Traffic Console
STBM	Surface Time-Based Metering
STBO	Surface Trajectory Based Operations
STBO	Surface Trajectory Based Operations
SWIM	System-Wide Information Management
TBFM	Time-Based Flow Management System
TMAT	Target Movement Area entry Time
TMI	Traffic Management Initiative(s)
TOBT	Target Off-Block Times
TTOT	Target Take Off Time