
# Airspace Technology Demonstration 2 (ATD-2)

## Ramp Traffic Console (RTC) Capabilities, Best Practices

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October 12, 2017

# Remote Demo Series – Schedule

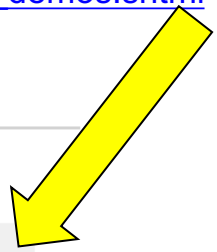
- ~~ATD-2 101 (General Briefing and Demo)~~ ~~May 5th 11AM–1PM EST~~
- ~~ATD-2 101 (General Briefing and Demo)~~ ~~June 9th 11AM–1PM EST~~
- ~~ATD-2 201 (Surface/TBFM Scheduling)~~ ~~July 20th 10–11:30 AM EST~~
- ~~ATD-2 101 (General Briefing and Demo)~~ ~~Aug 3rd 10 - Noon EST~~
- ~~ATD-2 201 (Surface ON time predictions, Runway assignments)~~ ~~Aug 24th 10:30–Noon EST~~
- ~~ATD-2 301 (Fuser, SWIM Processing & Mediation, Matching)~~ ~~Sept 7th 10:30–Noon EST~~
- ~~ATD-2 201 (Tactical Surface Metering)~~ ~~Sept 21st 10:30–Noon EST~~
- ATD-2 201 (Ramp Traffic Tools, Capabilities, Best Practices) Oct 12th 10:30–Noon EST
- ATD-2 101 (General Briefing, Field ”go-live” status update) Oct 26th 10:30–Noon EST
- ATD-2 201 (Real-time Dashboard and Post Ops) Nov 9th 10:30–Noon EST
- ATD-2 201 (Metrics-Baseline, Current Reports, Data Analysis) Nov 30th 10:30–Noon EST
- ATD-2 201 (Understand & Process ATC Restrictions in the NAS) Dec 13th 10:30-Noon EST

# ATD-2 Remote Demo Objectives

- Keep broad group of ATD-2 stakeholders informed of progress in an inexpensive and unobtrusive manner
- Demonstrate actual system capability and lessons learned (as opposed to documents/plans)
- Take input from stakeholders that can be used to improve the ATD-2 system, processes and/or outreach
- Identify areas where more detailed discussion is desired/warranted

# Upcoming Demos!

Go to https://www.aviationsystemsdivision.arc.nasa.gov/research/tactical/atd2_remote_demos.shtml to learn about upcoming ATD-2 remote demos!



**ATD-2 Remote Demos**

**To Join…**

1. Go to: **https://ac.arc.nasa.gov/atd2/**
   Enter as a guest and type your name. NASA Employees can log-in with their email and password (NDC Credentials).
2. Dial the Telecon Number: **1-844-467-6272, Passcode: 592382#**

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# Demo Recordings

- The audio and video from this demo are being recorded

**RECORDING IN PROGRESS**

# Agenda

- Need for an Airline tool
- Evolution of Ramp Traffic Console (RTC)
- Lesson Learned
- Demo
- What's in the Pipeline?

# ATD-2's Plans for a Ramp Tool

- Needed a ramp tool for the purposes of ATD-2 Field Demo that could be developed in an agile manner along with the rest of our IADS system
- ATD-2's tool RTC/RMTC is a government-furnished example of what an IADS-enabled Ramp Tool and is available to all
- ATD-2 plans include dual track IADS tech transfer
  - FAA and industry vendors for ATC tools
  - Flight operators, airport operators, and industry vendors for ramp tools

# Need For an Airline Tool

- Procedures, Roles and Responsibilities
- Surface Metering
- Surface Scheduling
- Surface Modeling
- Surface Surveillance
- Data Exchange and Integration

# Need For an Airline Tool

- Data exchange with other users in the NAS
  - Traffic management initiatives (TMIs) such as wheels- up time, Miles in trail (MIT), EDCTs
  - Runway Configurations and Runway changes
- Tool to foster collaboration for metering and depict metering advisories/ recommended gate hold times
- Tool that can capture Flight Intent information required for the carrier provided data elements on the TFDM SWIM
  - Pushback a flight
  - Hold a Flight
  - Intent to hold in the ramp/ hardstand
  - Proceed to taxi
  - Update spot, gate and runway

# Evolution of Ramp Traffic Console (RTC)

- Developed as part of Spot and Runway Departure Advisor (SARDA) project
- RTC emulated the paper strips and the way users manipulated the strips
- RTC was developed on a touch screen allowed users to manipulate them like paper strips (2012-2016)
  - Drag strip away from gate to push the flight
  - Drag strip towards gate to hold the flight
- Mouse driven RTC displays (2017)
  - Ergonomics of using touch screen on large displays
  - Constant calibration of displays for maintenance
  - Ease of development and adding features
  - Hygiene factor

# Evolution of RTC

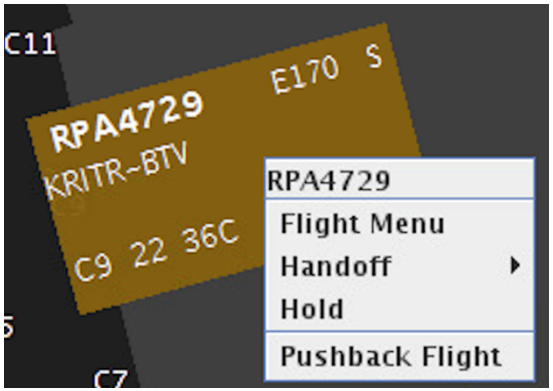
Evolution of RTC has been based on feedback received from

- Current Airline tools (Aerobahn and Passur)
- Human In the Loop simulations (2012, 2014, 2017)
- Shadow sessions (14 sessions in CLT)
- Feedback from users in the operational field

# Lessons Learned

# Less is More when Mouse-Clicking

- Reduce physical workload: Fewer mouse clicks
  - Automated handoffs
  - Detect pushback from surveillance
  - Flight owners/ Sector controller receives and acknowledge the blinking alert instead of everyone

# Data Exchange and Integration

## ATC-T to Ramp

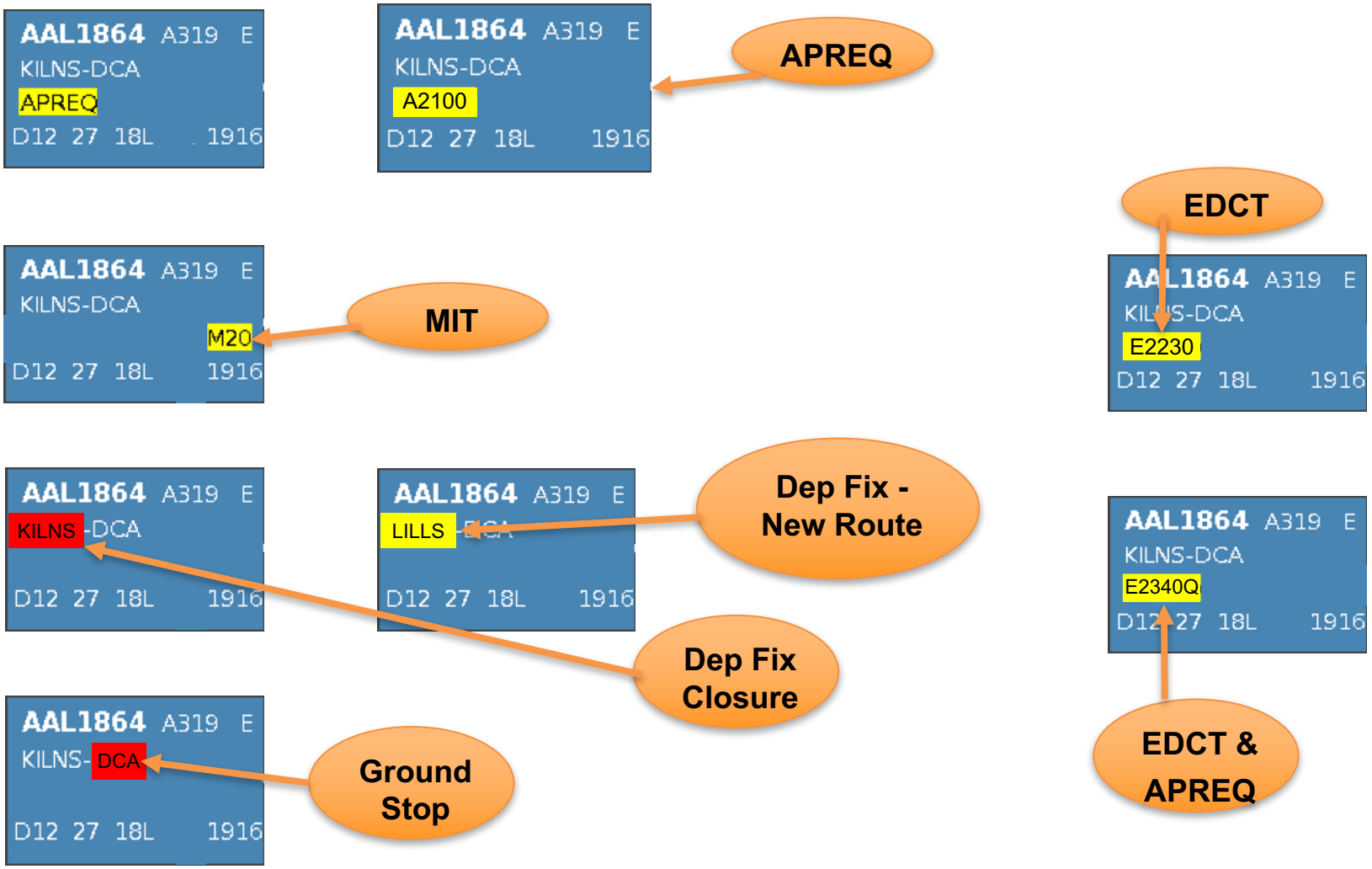
- Airport Config & Runway Utilization
- MIT
- EDCTs
- APREQ/Call For Release (CFR)
- Departure Fix Closures
- Ground Stop
- Runway Closures

## Ramp to ATC-T

- Runway Change for Operational Necessity
- Flight Cancellations
- Ramp Closure
- Metering Information
- Pushback & Surveillance

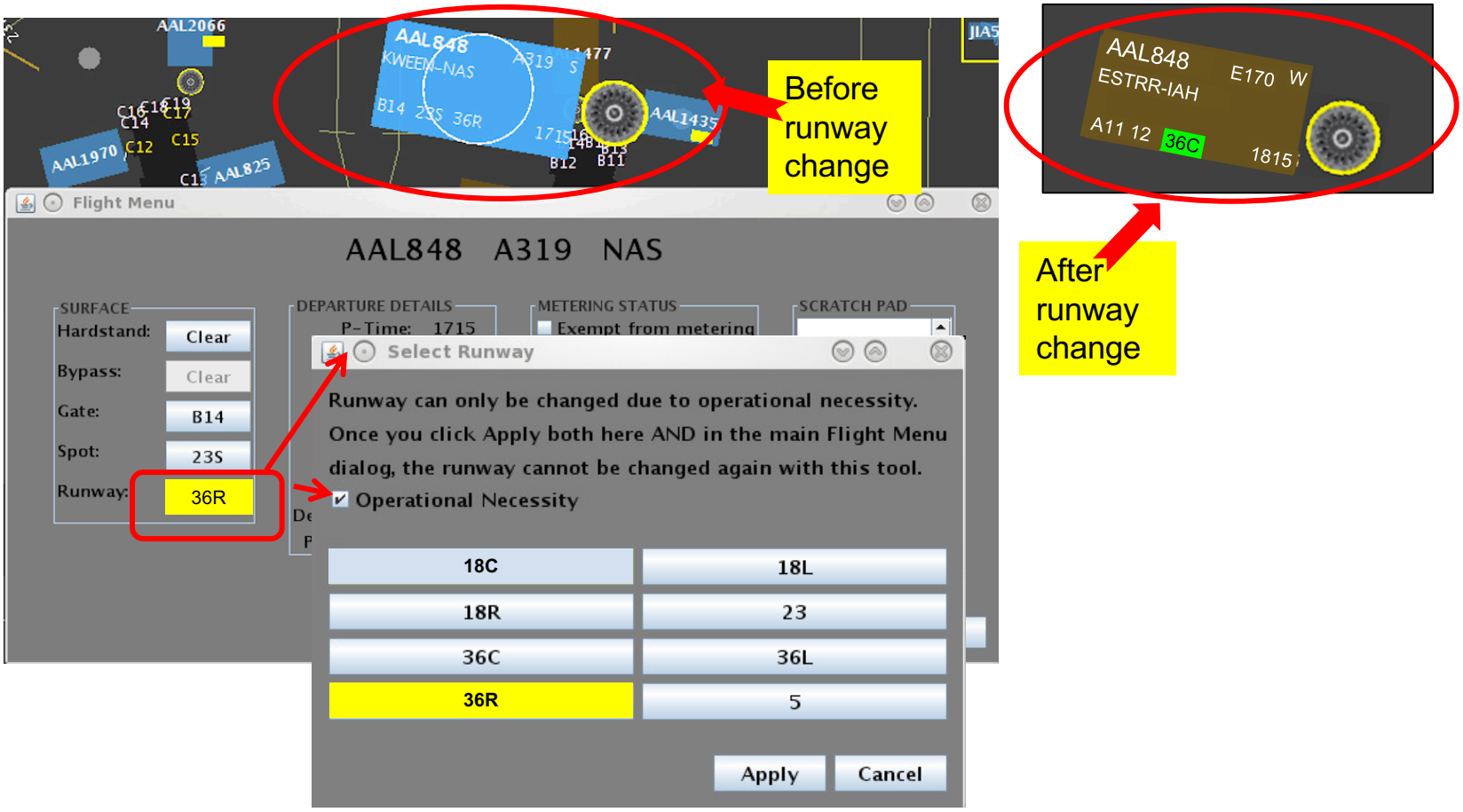
Gate Conflicts &  Lengthy Taxi Delay

# Data Exchange on RTC



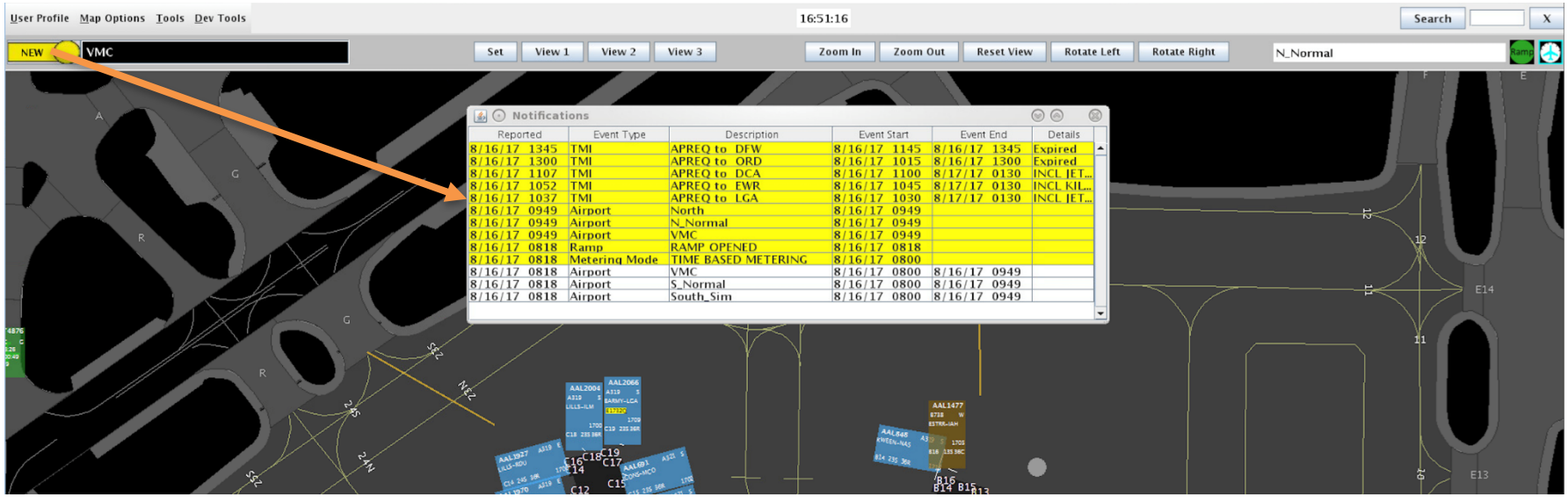
# Runway Change for Operational Necessity

- Data Exchange item where the ATC-T and Ramp agreed to allow Ramp to make a runway change for operational necessity



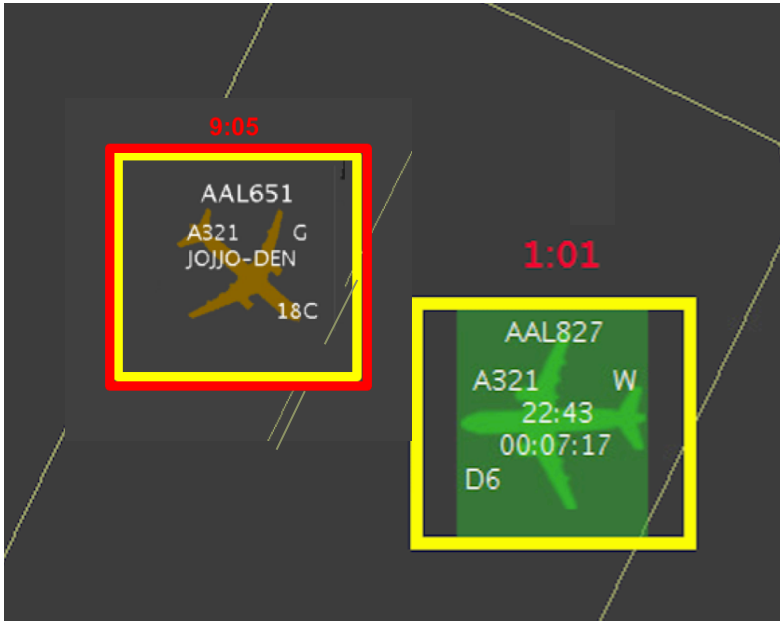
# Notifications

- Airport level notifications that affect multiple aircraft is the same across users
- Flight strips get notification to keep information in field of view
- Blinking alerts so that the peripheral vision can catch it



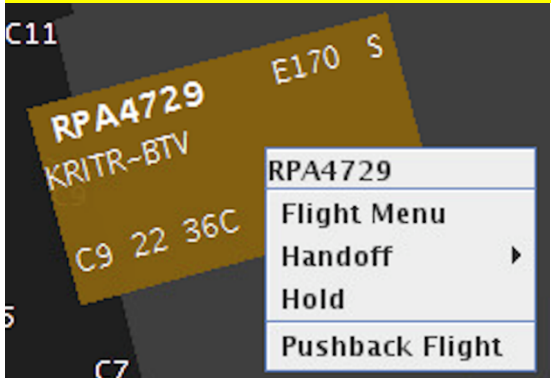
# Delay Counters

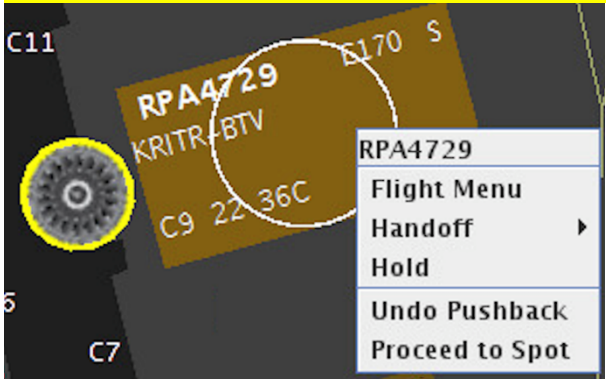
- Hardstand assignment places yellow box around the flight
- Arrivals now get automatic delay counter and are automatically detected in hardstand

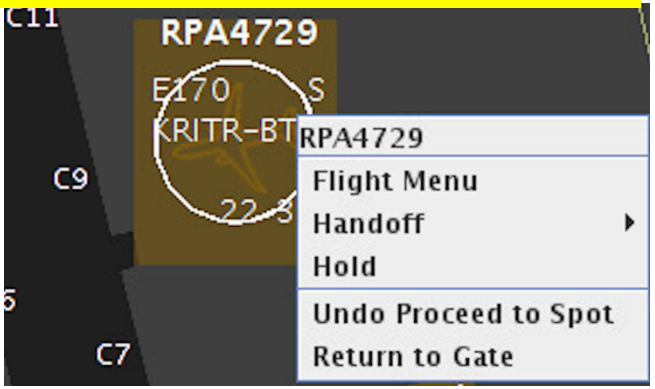


# Logical Menus

| Flight Strip at Gate | Pushback State<br>Engine icon indicates spool up | Hollow icon if no track<br>solid if track |
|---|---|---|



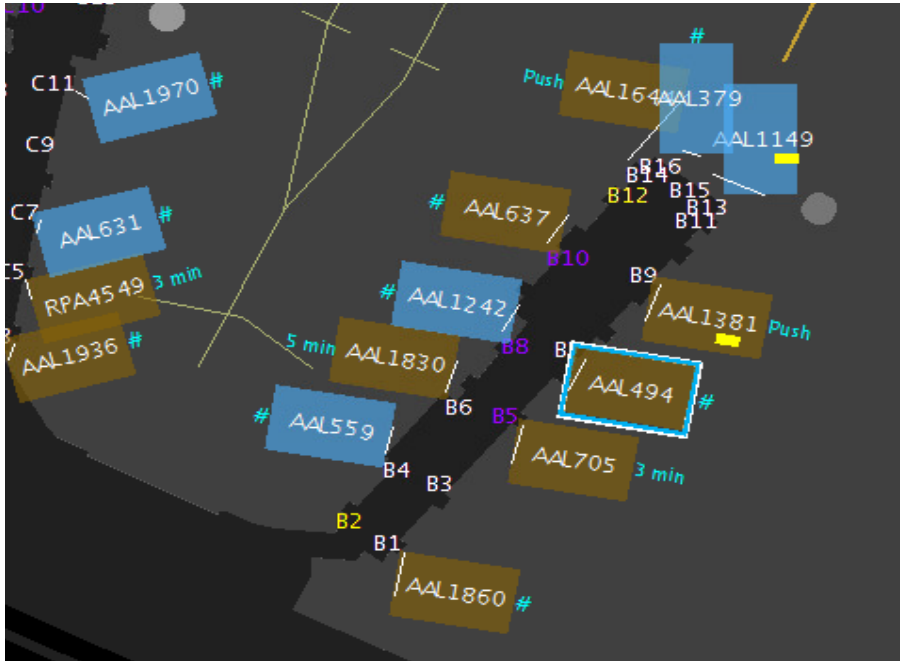




Use right click mouse menu to Open Flight Menu, Handoff, or Hold.
Also use right click menu to select “next logical action”:

- Hold
- Pushback
    - Undo pushback
    - Undo Proceed to Spot
        - Proceed to Spot
        - Return to gate

# Lessons Learned : Metering

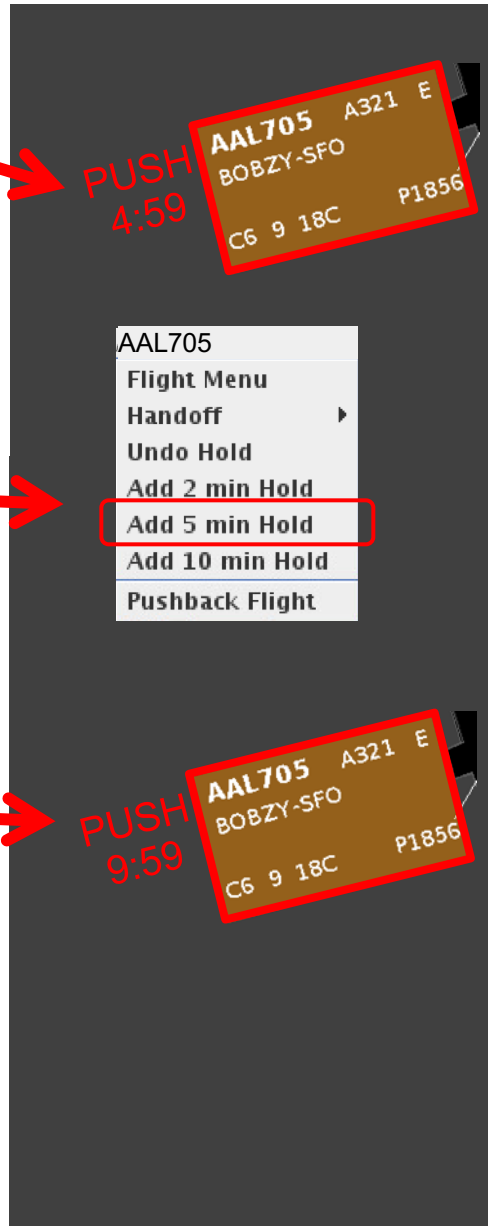
- Automatic detection of pushback trumped metering advisories, so user input became a requirement for pushback
- The user should be able to provide additional intent information when required
- Show a symbol for flights that have higher uncertainty and may have fluctuating gate holds



# Additional Intent Information

- During metering, after recommended gate hold counts down to zero, an extra 5 minutes are provided to push
- If the flight does not push within the extra 5 minutes provided, the flight is treated as in the uncertain group
- To prevent flight from being placed into the uncertain group (hashtag), additional time may be added to the hold

» Five minutes added to hold countdown timer

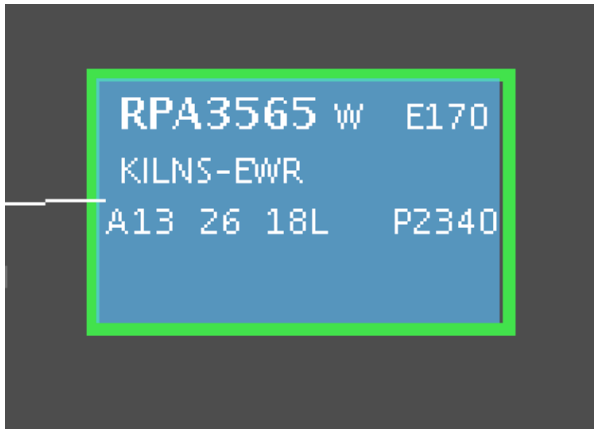


# Show TMATs for Flights under TMI

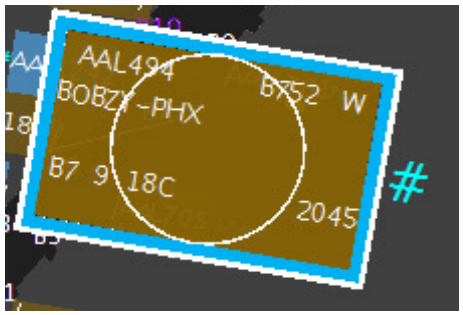
If a flight has an APREQ or EDCT, then after pushback the TMAT or Spot Time is displayed in yellow highlighting as an alert that this TMAT is a function of the scheduled APREQ or EDCT. Beyond spot, APREQ displayed

# Priority and Heavy Aircraft

Priority Flight




B757 Aircraft




Heavy Aircraft

# Readability on RTC

- Adjusted zoom levels to show right level of information
- Adjusted font type and sizes
- Added the ability to drag a flight strip away from the gate to avoid overlap
- Remove ability to drag towards gate and away from gate as way of putting a flight on hold or pushback

# Demo

# Challenges

- Flight Matching and conflicting data
- Should all aircraft visible outside the window (OTW) be shown on RTC?
- Should RTC show flight strips on departures sooner than one hour?
- Gate Conflicts

# What's in the pipeline?

- Ability create flight strips for missing flights
- Manage repositioned flights on RTC
- Mark a flight for medical emergency
- Add configurability of the map and strips to provide users more flexibility
- Alert on flights that may miss their A14

# Questions?

# Back up

# Human Factor Principles

- Consistency
- Affordances and salience
- Keeping information in focus
- Alerts that need to be acknowledged use peripheral vision
  - Blinking alerts in flights strips
  - Only sector controllers
- Proximity Compatibility principles keeping alerts close to where action needs to happen

# Features- Industry Example and RTC

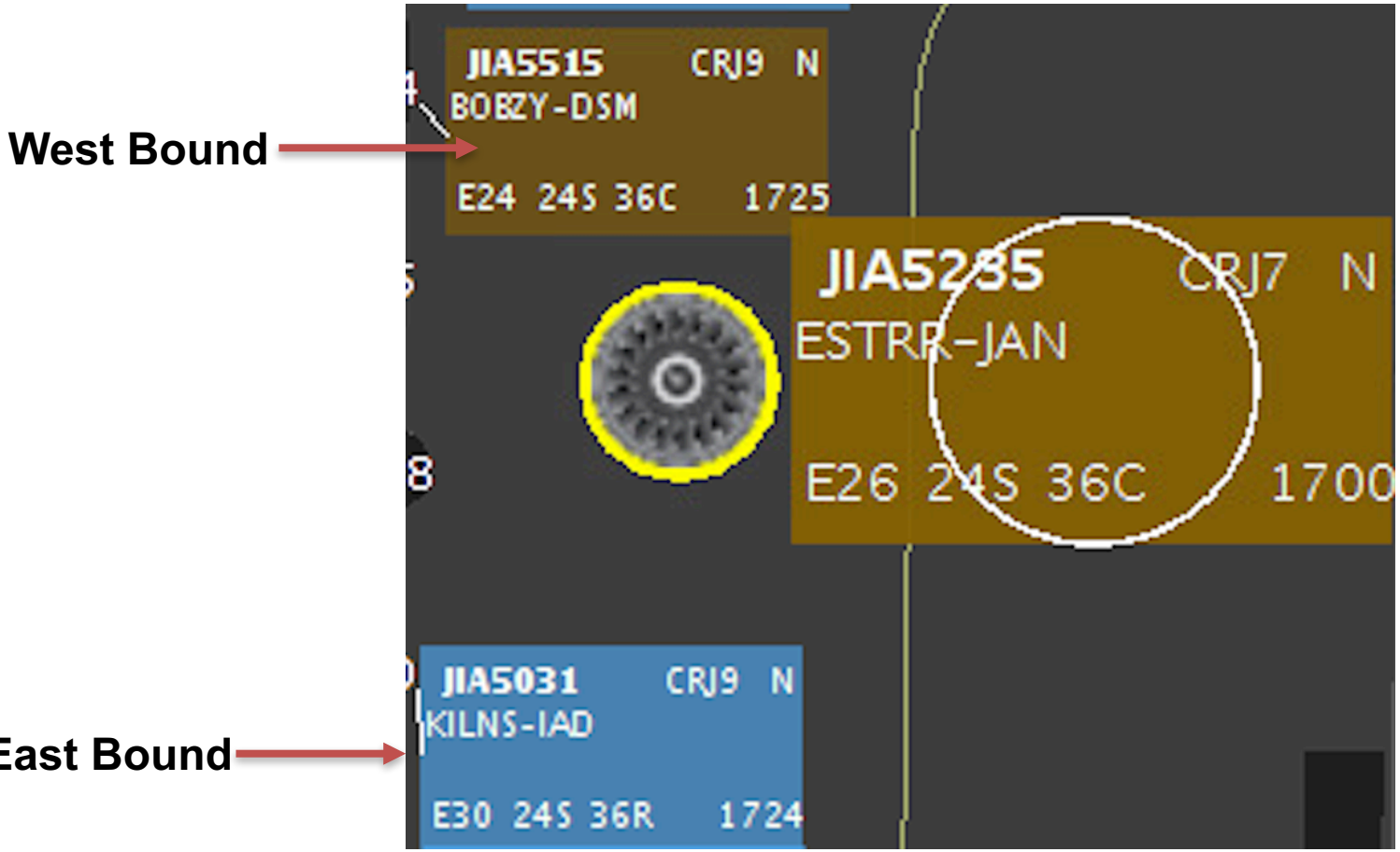
- Display Flight strips on the map

# Features- Industry Example and RTC

- Hold Lists

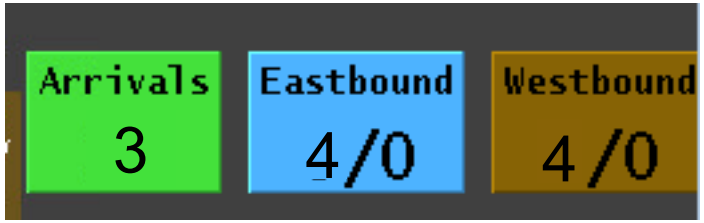
# Features- Industry Example and RTC

- Direction of Flight ( show blue and brown data tag )



# Features- Industry Example and RTC

- Departure and Near arrival Counts



# Features- Industry Example and RTC

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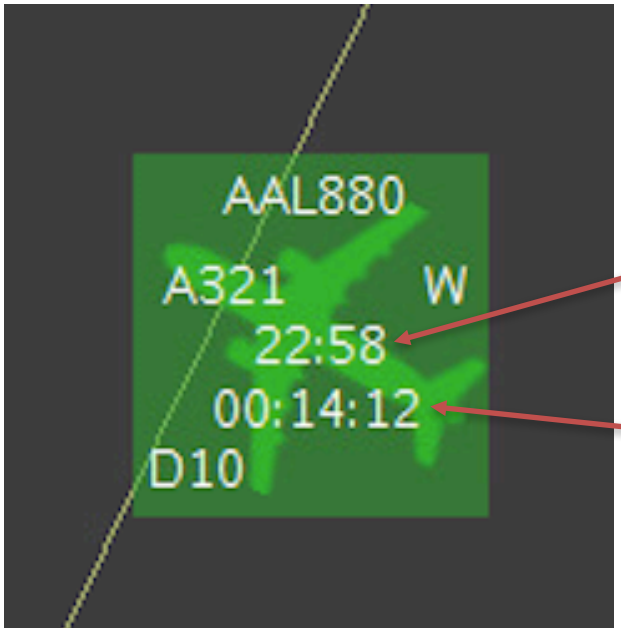
- Arrival Data Tag / Flight Strip




**Scheduled Arrival Time**

**Taxi Time**

# Example of Industry Tool- Aerobahn