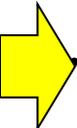




# Airspace Technology Demonstration 2 (ATD-2)

Ramp Traffic Console (RTC) Capabilities, Best Practices  
Al Capps and Savvy Verma

October 12, 2017

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



- 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

Go to [https://www.aviationsystemsdivision.arc.nasa.gov/research/tactical/atd2\\_remote\\_demos.shtml](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#**

### 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)
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- Identify areas where more detailed discussion is desired/warranted

### Schedule

ATD-2 201 (Tactical Surface Metering)	Sept. 21st 10:30–Noon ET
ATD-2 201 (Ramp Traffic Tools, Capabilities, Best Practices)	Oct. 12th 10:30–Noon ET
ATD-2 101 (General Briefing, Field “go-live” status update)	Oct. 26th 10:30–Noon ET
ATD-2 201 (Real-time Dashboard and Post Ops)	Nov. 9th 10:30–Noon ET
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- The audio and video from this demo are being recorded



**RECORDING  
IN PROGRESS**



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



- 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



**Procedures, Roles and Responsibilities**

**Surface Metering**

**Surface Scheduling**

**Surface Modeling**

**Surface Surveillance**

**Data Exchange and Integration**



- 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



- 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

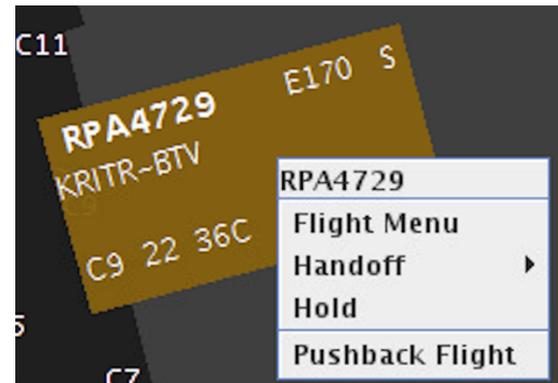
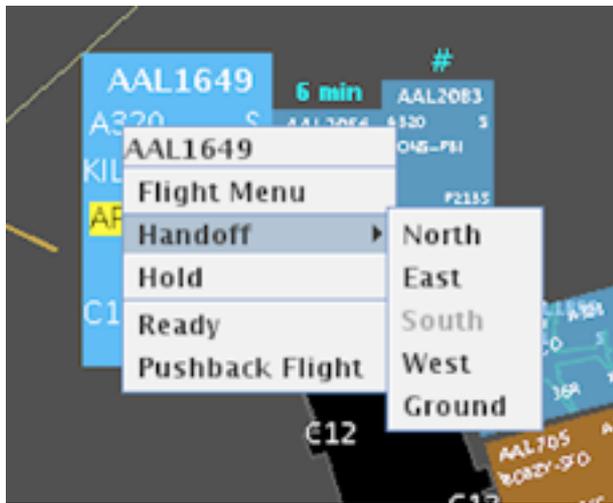


Evolution of RTC has been based on feedback received from

- 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

- 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



## 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

```

AAL1864 A319 E
KILNS-DCA
APREQ
D12 27 18L . 1916
    
```

```

AAL1864 A319 E
KILNS-DCA
A2100
D12 27 18L 1916
    
```

**APREQ**

```

AAL1864 A319 E
KILNS-DCA
M20
D12 27 18L 1916
    
```

**MIT**

**EDCT**

```

AAL1864 A319 E
KILNS-DCA
E2230
D12 27 18L 1916
    
```

```

AAL1864 A319 E
KILNS-DCA
D12 27 18L 1916
    
```

```

AAL1864 A319 E
LILLS-DCA
D12 27 18L 1916
    
```

**Dep Fix -  
New Route**

**Dep Fix  
Closure**

```

AAL1864 A319 E
KILNS-DCA
E2340Q
D12 27 18L 1916
    
```

**EDCT &  
APREQ**

```

AAL1864 A319 E
KILNS-DCA
D12 27 18L 1916
    
```

**Ground  
Stop**

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

**Before runway change**

**After runway change**

**Flight Menu**

AAL848 A319 NAS

SURFACE

Hardstand: Clear

Bypass: Clear

Gate: B14

Spot: 235

Runway: 36R

DEPARTURE DETAILS

P-Time: 1715

METERING STATUS

Exempt from metering

SCRATCH PAD

**Select Runway**

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

Operational Necessity

18C	18L
18R	23
36C	36L
<b>36R</b>	5

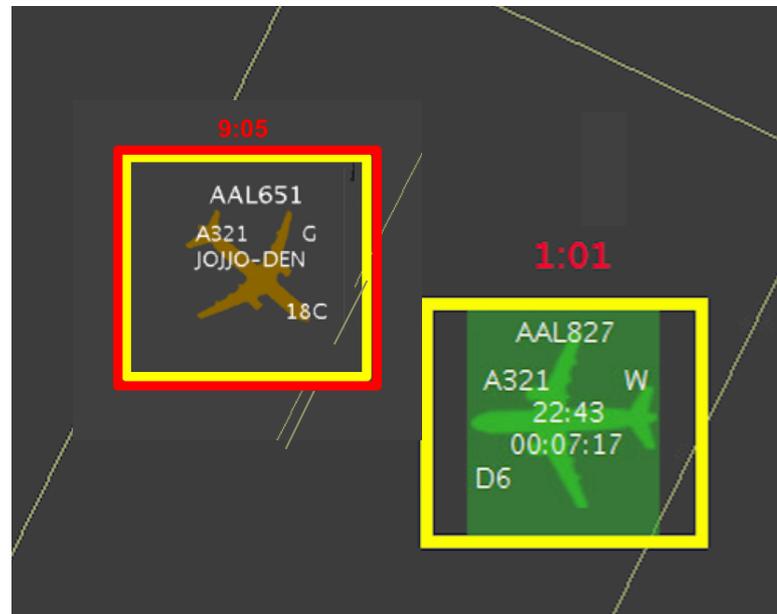
Apply Cancel

- 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

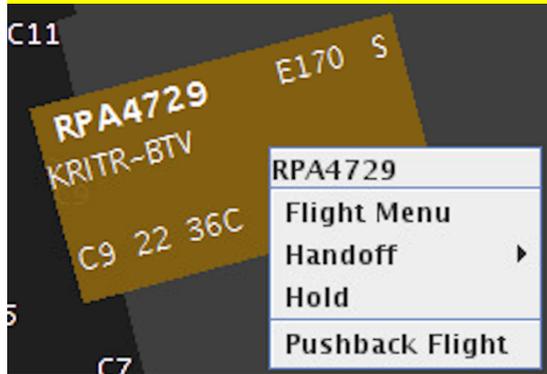
The screenshot shows the ATD2 software interface. At the top, there is a menu bar with 'User Profile', 'Map Options', 'Tools', and 'Dev Tools'. The current time is 16:51:16. A search bar is on the right. Below the menu bar, there are buttons for 'NEW', 'VMC', 'Set', 'View 1', 'View 2', 'View 3', 'Zoom In', 'Zoom Out', 'Reset View', 'Rotate Left', and 'Rotate Right'. The main area is a map showing flight paths and aircraft positions. A notification window is open, displaying a table of events.

Reported	Event Type	Description	Event Start	Event End	Details
8/16/17 1345	TMI	APREQ to DFW	8/16/17 1145	8/16/17 1345	Expired
8/16/17 1300	TMI	APREQ to ORD	8/16/17 1015	8/16/17 1300	Expired
8/16/17 1107	TMI	APREQ to DCA	8/16/17 1100	8/17/17 0130	INCL JET...
8/16/17 1052	TMI	APREQ to EWR	8/16/17 1045	8/17/17 0130	INCL KIL...
8/16/17 1037	TMI	APREQ to LGA	8/16/17 1030	8/17/17 0130	INCL JET...
8/16/17 0949	Airport	North	8/16/17 0949		
8/16/17 0949	Airport	N_Normal	8/16/17 0949		
8/16/17 0949	Airport	VMC	8/16/17 0949		
8/16/17 0818	Ramp	RAMP OPENED	8/16/17 0818		
8/16/17 0818	Metering Mode	TIME BASED METERING	8/16/17 0800		
8/16/17 0818	Airport	VMC	8/16/17 0800	8/16/17 0949	
8/16/17 0818	Airport	S_Normal	8/16/17 0800	8/16/17 0949	
8/16/17 0818	Airport	South_Sim	8/16/17 0800	8/16/17 0949	

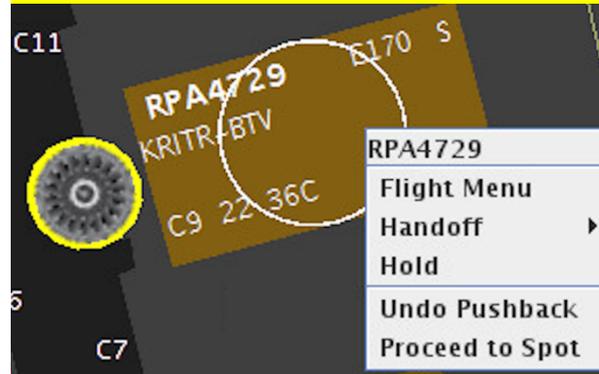
- Hardstand assignment places yellow box around the flight
- Arrivals now get automatic delay counter and are automatically detected in hardstand



## Flight Strip at Gate



## Pushback State Engine icon indicates spool up



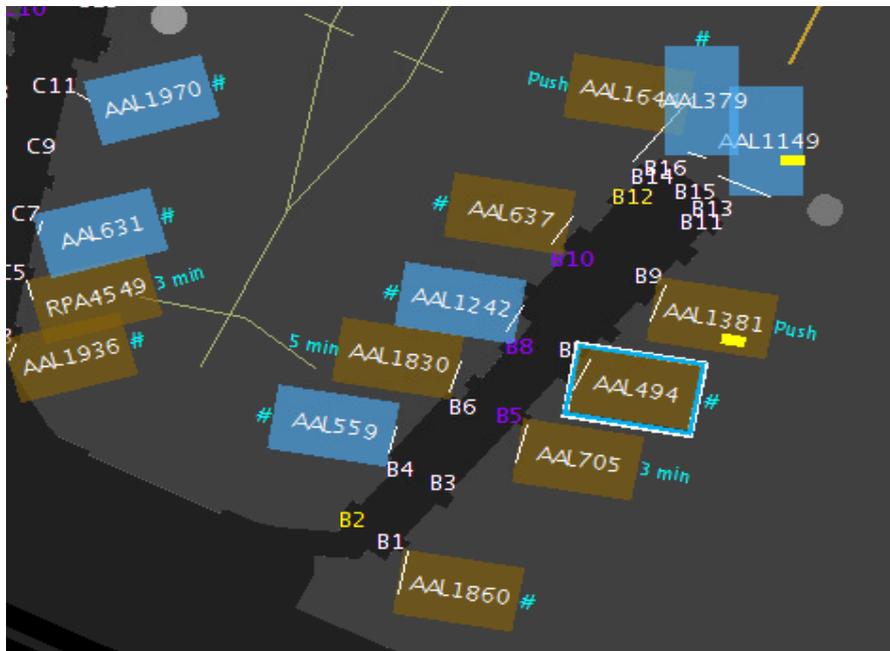
## Hollow icon if no track solid if track



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

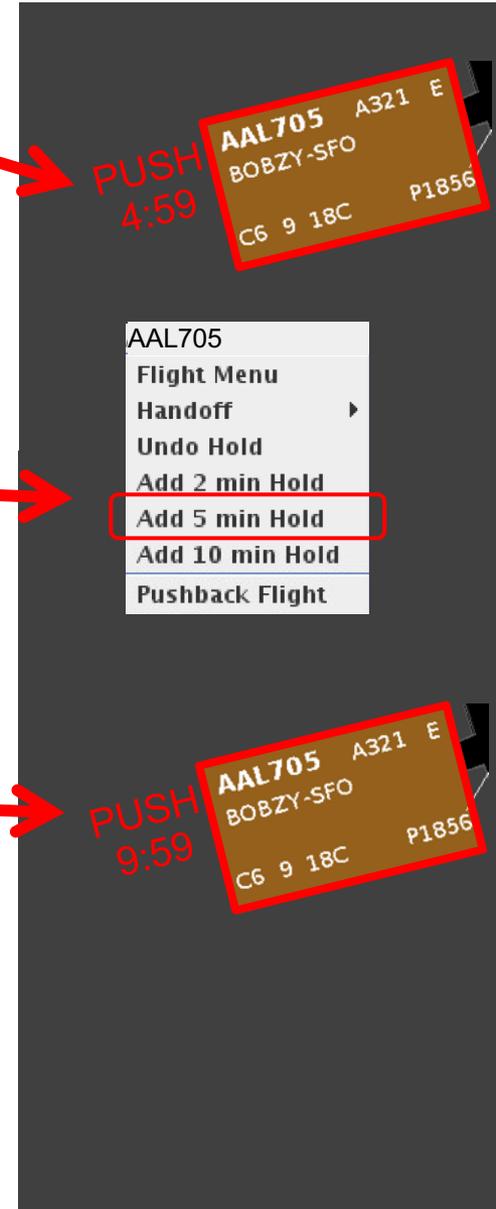
- Hold
- Pushback
  - Undo pushback
  - Undo Proceed to Spot
    - Proceed to Spot
    - Return to gate

- 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



- 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

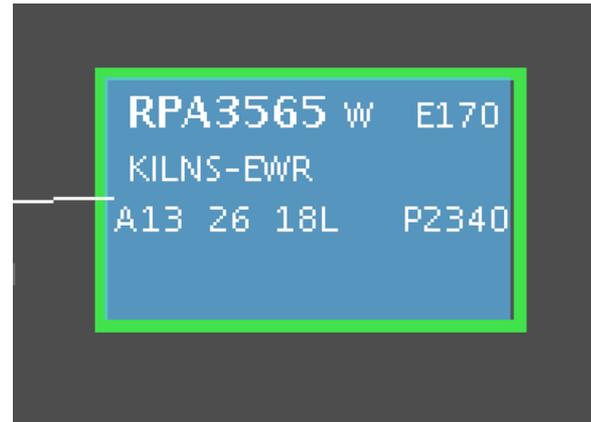
» Five minutes added to hold countdown timer



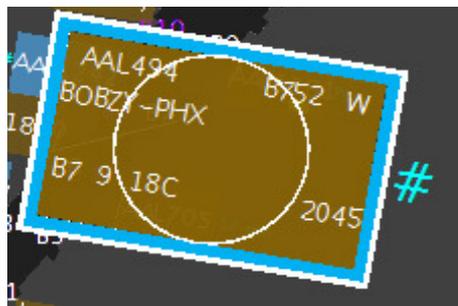
If a flight has an APREQ or EDCT, then after pushback the TMA T or Spot Time is displayed in yellow highlighting as an alert that this TMA T is a function of the scheduled APREQ or EDCT. Beyond spot, APREQ displayed



## Priority Flight



## B757 Aircraft



## Heavy Aircraft





- 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





- 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



- 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?

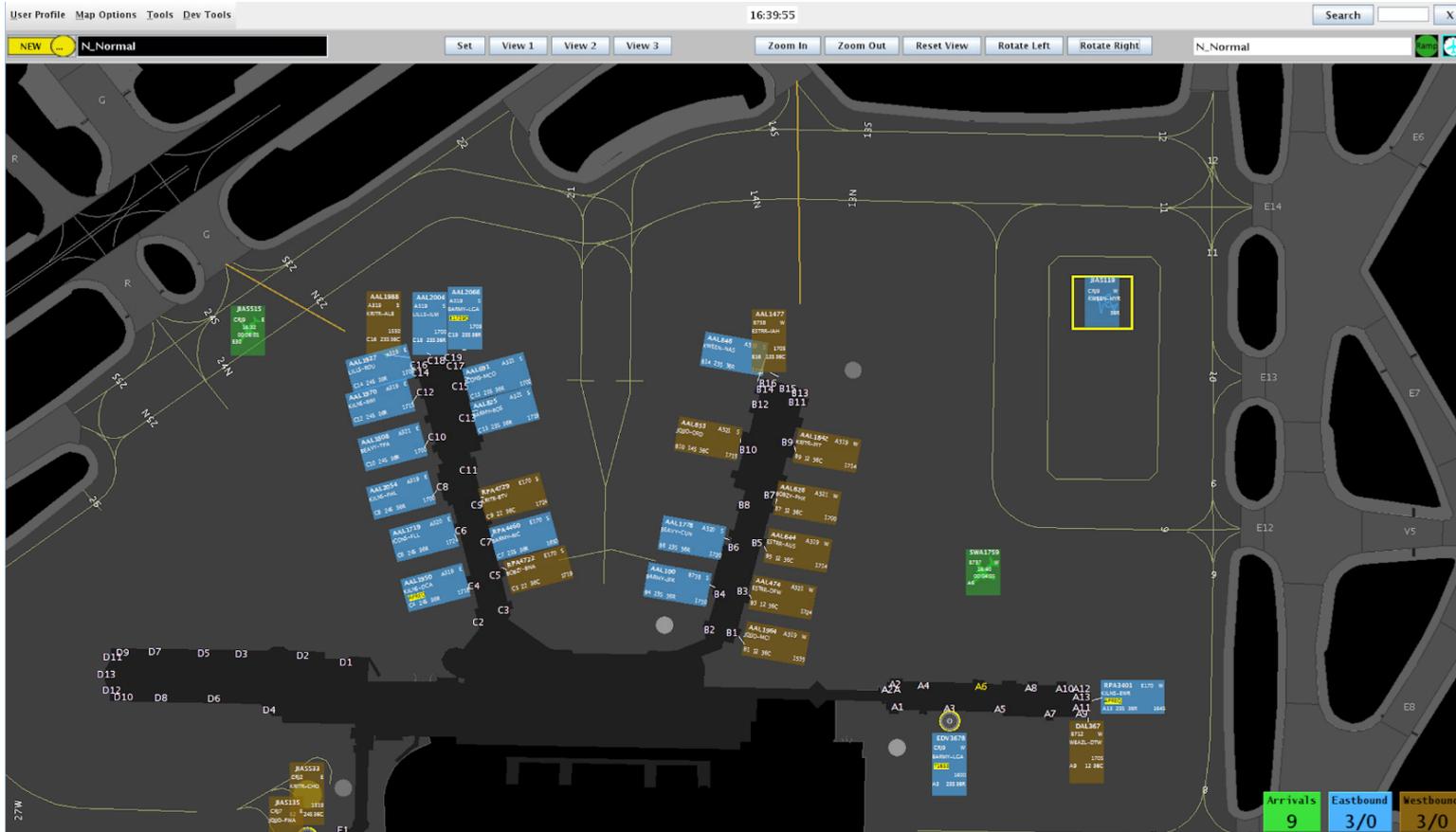






- Consistency
- Affordances and salience
- Keeping information in focus
- Alerts that need to be acknowledged use peripheral vision
  - Blinking alerts in flights strips
  - Only sector controllers
- Proximity Compatibility principles keeping alerts close to where action needs to happen

- Display Flight strips on the map



- Hold Lists

The screenshot displays the ATD2 software interface for a terminal. The main map shows a terminal layout with various gates (A1-A13, B1-B15, C1-C15, D1-D13, D19-D21) and flight data overlays. The interface includes a top menu bar with 'User Profile', 'Map Options', 'Tools', and 'Dev Tools'. A search bar is located in the top right corner. The main map area shows flight data overlays for various airlines and destinations, including AAL, JAS, EDV, and PDT. The interface also features several panels for flight data:

- Departures (-) Panel (Left):**

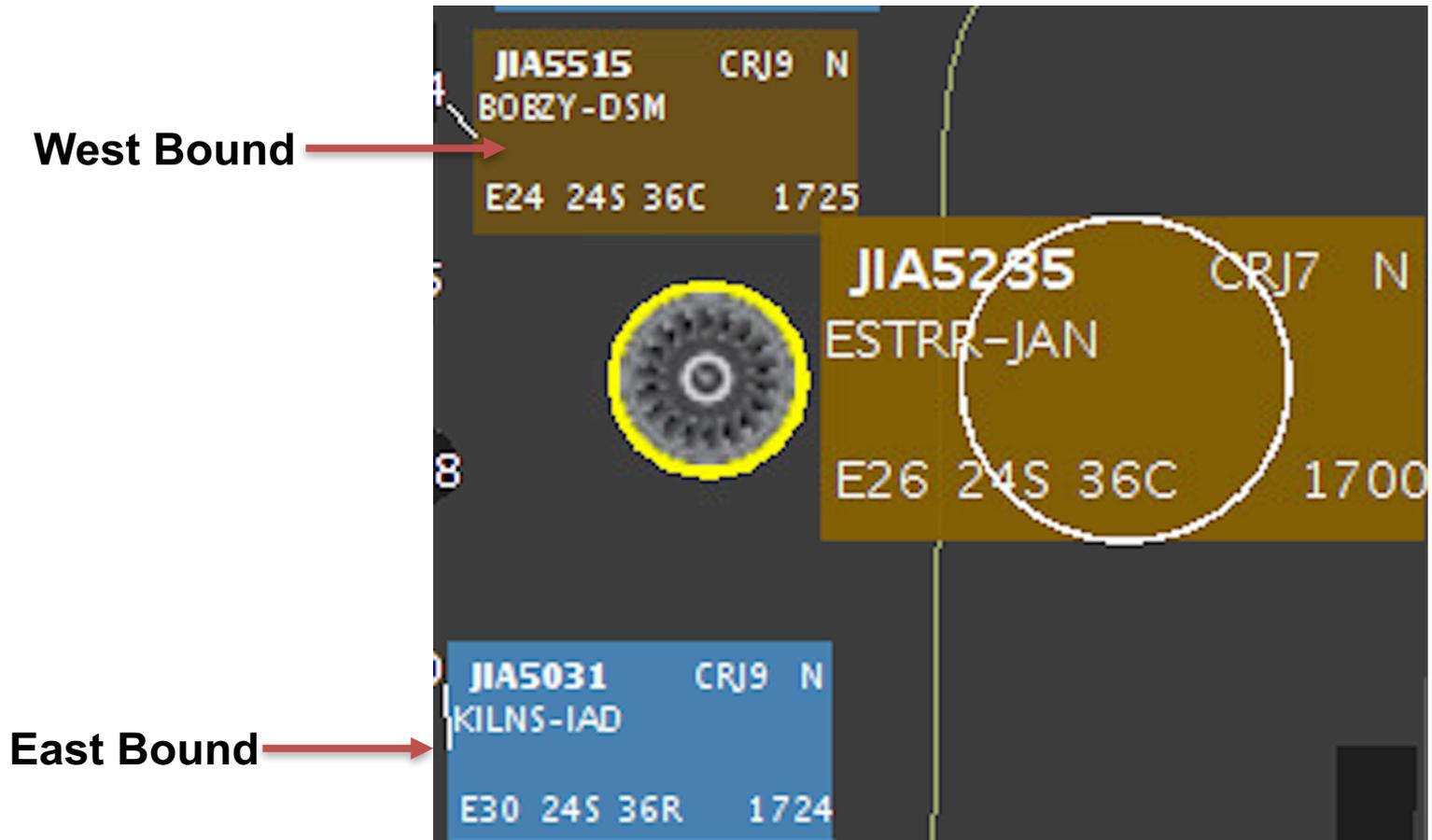
Seq #	Callsign	Taxi Time	Dest
1	RPA4160	7:00	RIC
2	JJA5119	0:17	MYR
3	EDV3678	15:00	LGA
4	PDT4935	15:30	LYH
- Departures (-) Panel (Right):**

Seq #	Callsign	Taxi Time	Dest
1	JJA5123	28:19	DAY
2	AAL1988	6:00	ALB
3	JJA5533	01:17:00	CHO
4	JJA5615	2:00	AVL
- Arrivals (-) Panel (Bottom Left):**

Callsign	Gate	Est ON
JJA5457	E16	16:10
JJA5063	E6	16:12
PDT4876	E35A	16:49
- Holds (-) Panels:** Two empty panels for tracking hold times, one on the left and one on the right.

The main map area shows flight data overlays for various airlines and destinations, including AAL, JAS, EDV, and PDT. The interface also features a 'TIME BASED METERING 0800' panel and a 'Search' bar. The bottom right corner displays a summary of arrivals and departures: Arrivals 3, Eastbound 4/0, and Westbound 4/0.

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



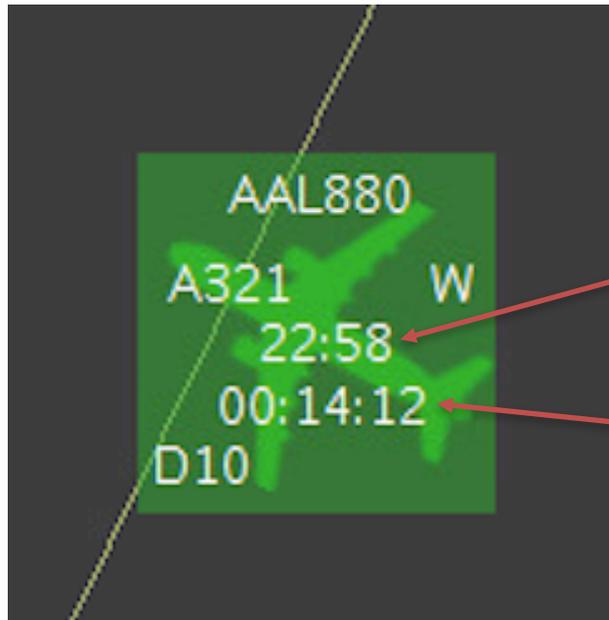


- Departure and Near arrival Counts

Arrivals	Eastbound	Westbound
3	4/0	4/0



- Arrival Data Tag / Flight Strip



**Scheduled Arrival  
Time**

**Taxi Time**

Aerobahn :: TaxiView :: Charlotte Douglas International Airport

System Workspace Settings Tools Reporting Help

Legend Playback Search

Region Closure Canceled: B5 OOS

Mode: Live | 10/04/2017 17:59:36 EDT

**En Route to East Departures**

(12 Flights) En Route to East Departure, En Route to East Departure - Gate, En Route to East Departure - MVMT Area, En Route to East Departure - Ramp

Flt ID (Aero)	Dest	First Fix	Taxi Time	State
PDT1483	LKH	GA0TB		
JIA5286	JAD	AUJ0I		
AAL2050	LOA	RDU		
AAL1740	LOA	RDU		
AAL1750	DCA	AUDII		
JBU1446	BOS	RDU		
EDU3973	LOA	RDU		
JIA5158	RIC	RDU		
AAL2018	BWI	AUJ0I		
AAL1788	BDL	RDU		
AAL1608	JFK	MERIL		

**Watch List Count**

East Count

**10**

East Departure - Gate Hold

(0 Flights) East Departure - Gate Hold

Flt ID (Aero)	Dest	Gate A...	Gate Hold

**Near Departure List**

(0 Flights) Aircraft Near Departure Time, Delayed Aircraft Near Departure, Delayed Aircraft Near Dep EXP

Flt ID (Aero)	Dest	Gate As...	First Fix

**Terminal Area layout**

**East Departures**

**West Departures**

**En Route to West Departures**

(8 Flights) En Route to West Departure, En Route to West Departure - Gate, En Route to West Departure - MVMT Area, En Route to West Departure - Ramp

Flt ID (Aero)	Dest	First Fix	Taxi Time	State
JIA5381	ICW	DOUBM		
BWA9999	MDW	DOO0E		
JIA5182	BHM	PITAY		
AAL1722	SEA	DOO0E		
JIA5074	BTR	PITAY		
AAL1940	ALB	FILDS		
JIA5094	PHS	PITAY		
AAL1932	FHM	PITAY		

**Watch List Count**

West Count

**4**

West Departure - Gate Hold

(2 Flights) West Departure - Gate Hold

Flt ID (Aero)	Dest	Gate A...	Gate Hold: D...
AAL1694	BNA	B2	00:01:47
RPA4820	BTV	C9	00:01:04

**Near Arrivals 10 Mins**

(28 Flights) Aircraft Near Arrival EXP, Aircraft Near Arrival

Flt ID (Aero)	Orig	Gate Asg...	Range
PDT4822	AGS	E38B	0
AAL1153	JFK	D2	0
AAL1941	ILM	B2	0
JIA5225	BHM	E3	0
JIA5192	OME	E98C	0
RPA4119	YUL	D9	0
JIA5484	CRW	E7	0
JIA5458	CID	E16A	0
JIA5383	GSO	E28	0
AAL1149	MIA	E15	0
JIA5304	MIR	E35B	0
JIA5948	FAY	E14B	0
AAL438	DFW	D5	0
JIA5299	SAV	E22	0

Ramp CLT Airport RADAR Display Taxi Time Departure Configuration Current Runway Usage Selection Details Rules Management Operations Timeline NOTAM Viewer Region Closures

35 12.54 N 80 56.46 W [x = -549.8 ft y = -2990.5 ft d = 3040.6 ft ang = 190.4 deg]

Type here to search

2:59 PM 10/4/2017