ADVANCED SURFACE & NETWORK MANAGEMENT SOLUTIONS

NASA Airline Operations Workshop
August 2-4, 2016

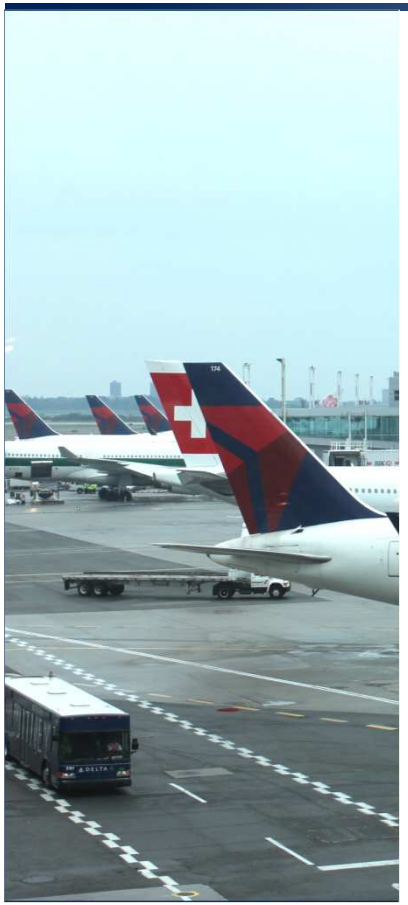
SAAB SENSIS, WHO WE ARE

- Saab Sensis is a U.S. subsidiary of Saab AB – a global aerospace and defense company founded in Sweden in 1937
- We are headquartered in Syracuse, NY
- We lead Saab's global ATM unit with solutions deployed at more than 250 locations worldwide

Mission Statement:

Enable a safe and efficient aviation system by providing surveillance and automated decision support solutions to all ATM stakeholders

OUR **AIRLINE FOCUS**

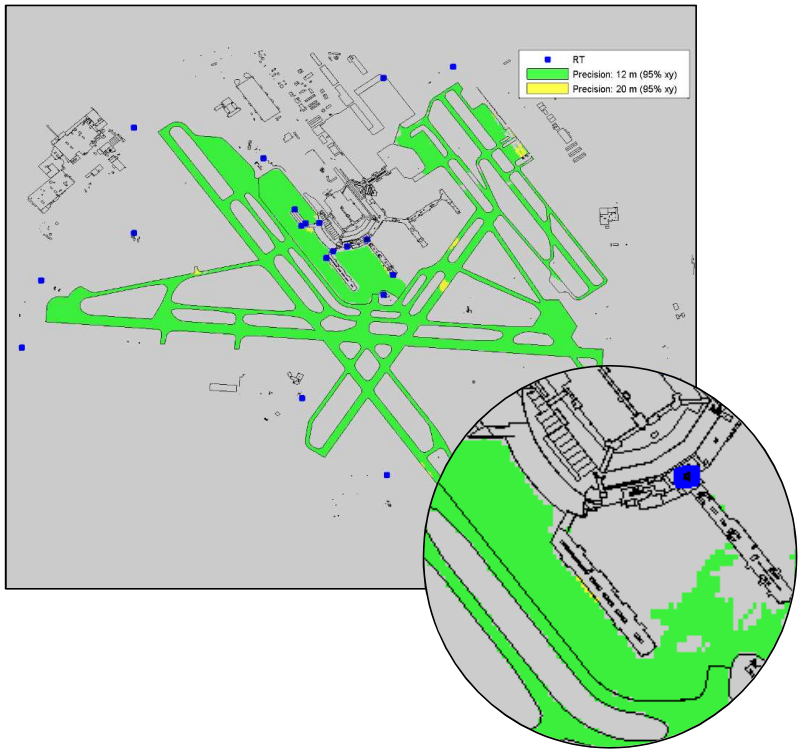


- Since 2003, we have made a concentrated effort to improve airline operations
- We pioneered commercial surface management at DTW with Northwest Airlines
- That first version evolved into the extensive surface and network management suite we offer today
- Our airline solutions primarily include:
  - Surface Surveillance Solutions
  - Aerobahn Suite
  - Digital Ramp Towers

New Offering

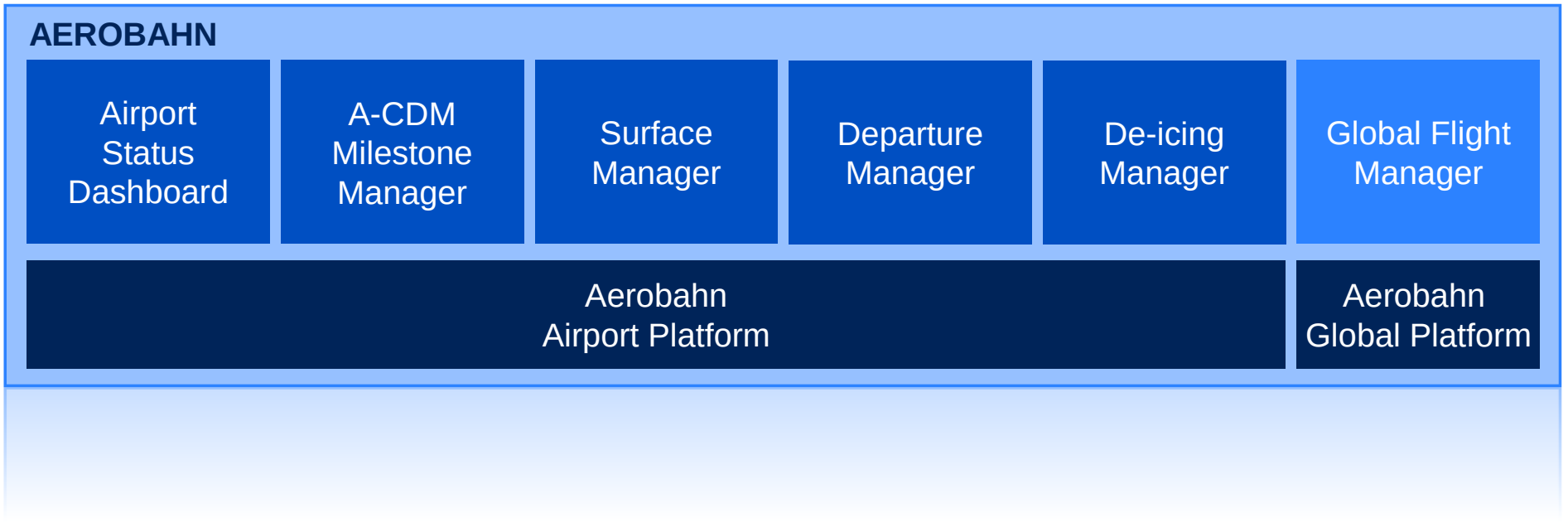
SURFACE SURVEILLANCE SOLUTIONS

- Managing starts with measuring
- We are the prime contractor on the FAA's ASDE-X and ASSC programs
  - Provide the ATCT with surface surveillance and safety alerts
  - Also help drive commercial solutions, but…
  - Designed to meet FAA needs, not the airlines'
- We offer augmented or independent coverage
  - Mature (7th gen) multilateration technology
  - Supports ADS-B
- We also offer cost effective vehicle tracking solutions
  - GPS and LTE for coverage on the entire surface with no upfront infrastructure

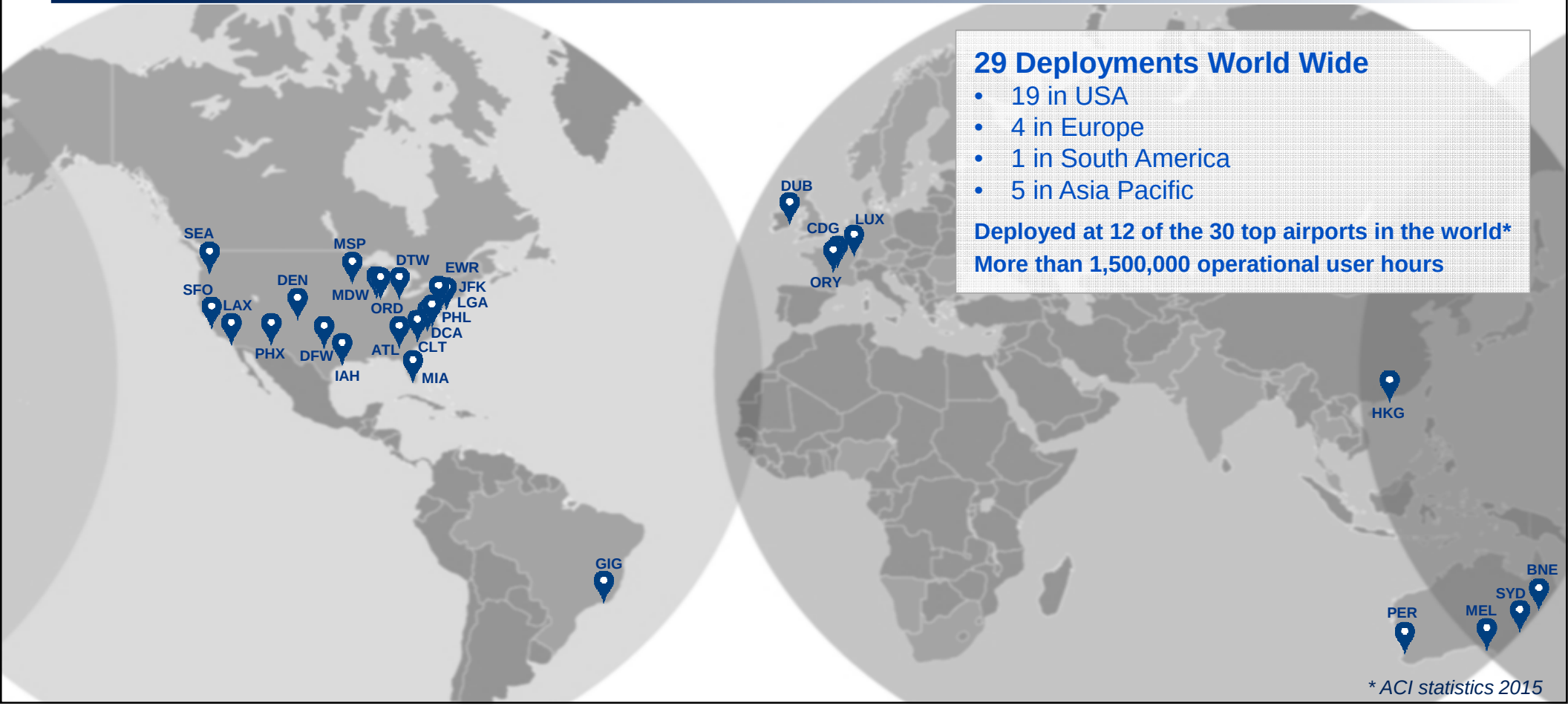


AEROBAHN SUITE

MULTIPLE TOOLS
FOR MULTIPLE CHALLENGES



AEROBAHN **DEPLOYMENTS**



29 Deployments World Wide

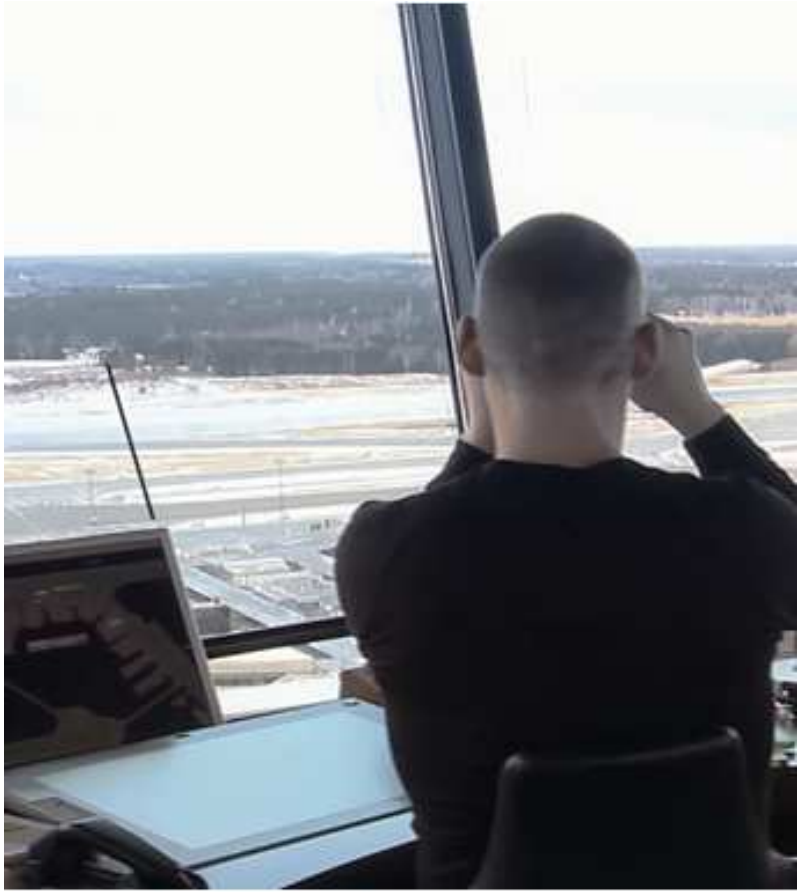
- 19 in USA
- 4 in Europe
- 1 in South America
- 5 in Asia Pacific

Deployed at 12 of the 30 top airports in the world*

More than 1,500,000 operational user hours

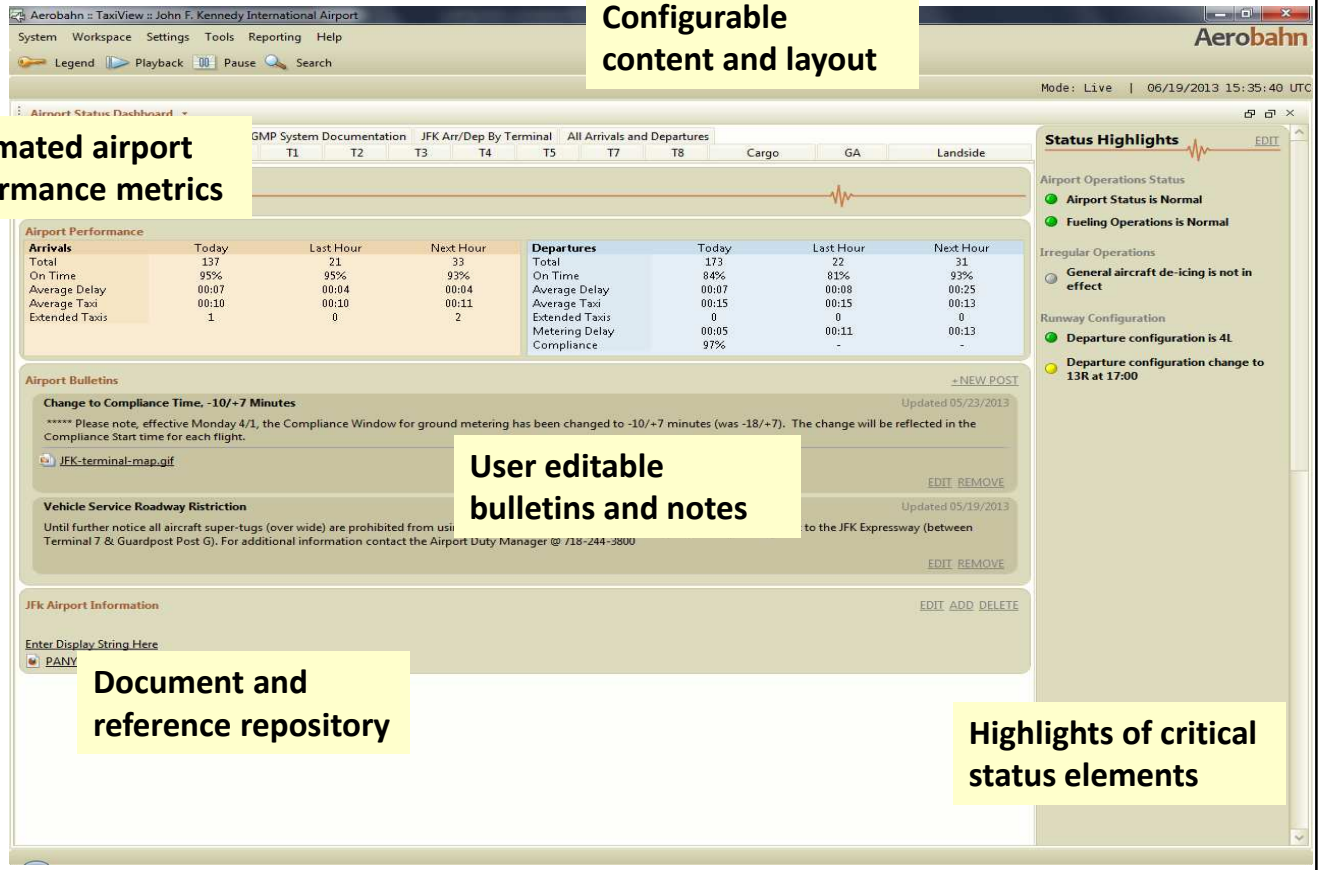
** ACI statistics 2015*

AEROBAHN **AIRPORT DASHBOARD**



- Shared portal for collecting and distributing performance information
- Centralized location for stakeholders to view key performance indicators (KPIs) and communicate details
- Combines automated metric tracking with user entered bulletins and documents
- Includes information like runway status, construction details, passenger delays, and mass transit status
- Assists in handling irregular operations

AEROBAHN **AIRPORT STATUS DASHBOARD**



Configurable content and layout

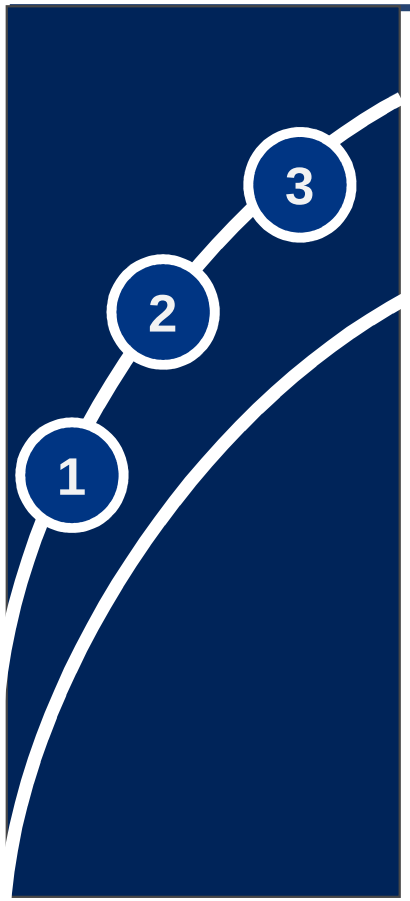
Automated airport performance metrics

User editable bulletins and notes

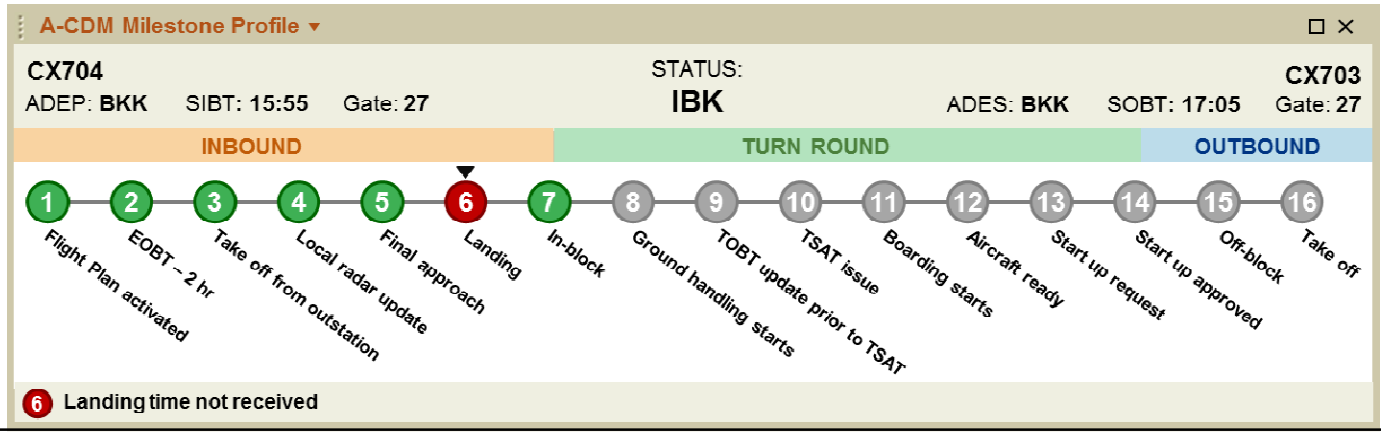
Document and reference repository

Highlights of critical status elements

AEROBAHN **A-CDM MILESTONE MANAGER**

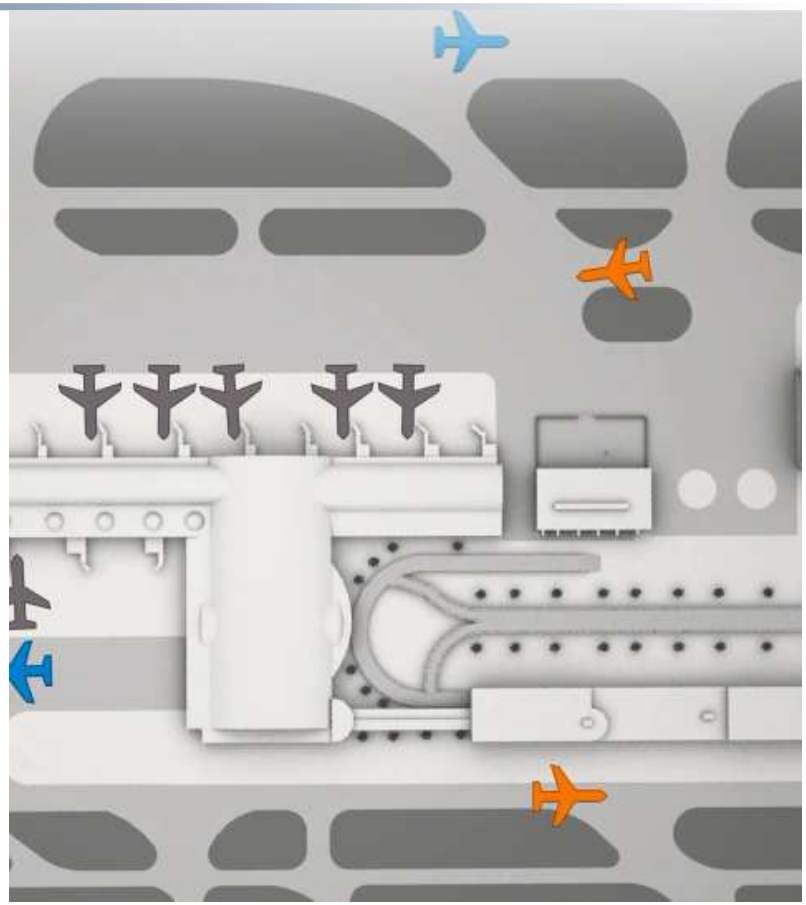


- Foundational component for implementing Eurocontrol-style Airport CDM (A-CDM), which is being adopted at most major non-U.S. airports
- Provides information sharing and milestone tracking capabilities, two of the core conceptual features of A-CDM.
- Links arrival and departure flight information together and incorporates real-time progress updates in accordance with the 16 A-CDM milestones.



AEROBAHN **SURFACE MANAGER**

- Wide array of customizable situational awareness tools, both graphical and tabular
- Powerful dynamic rule engine processes fused flight information to expose important operational details
- Condenses huge amounts of data into actionable information and alerts, enabling **management by exception**
- Detailed historical reporting and analytics



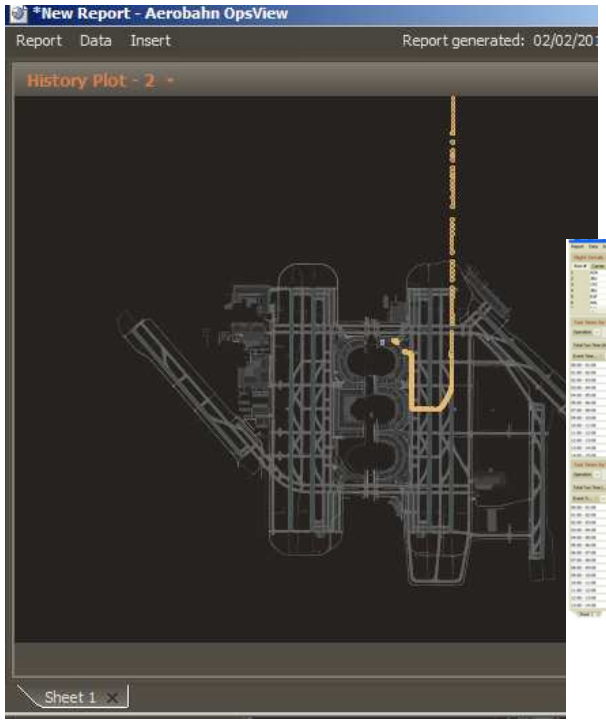
AEROBAHN **SURFACE MANAGER**

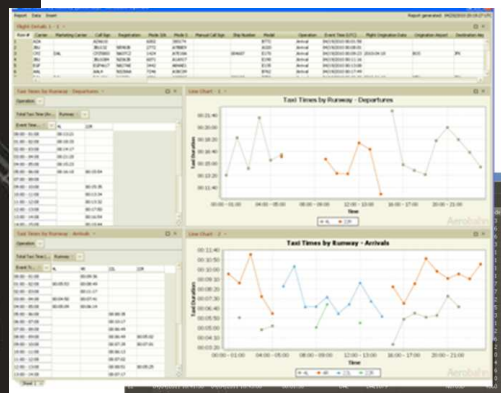
Map display and counters display important flight events and metrics

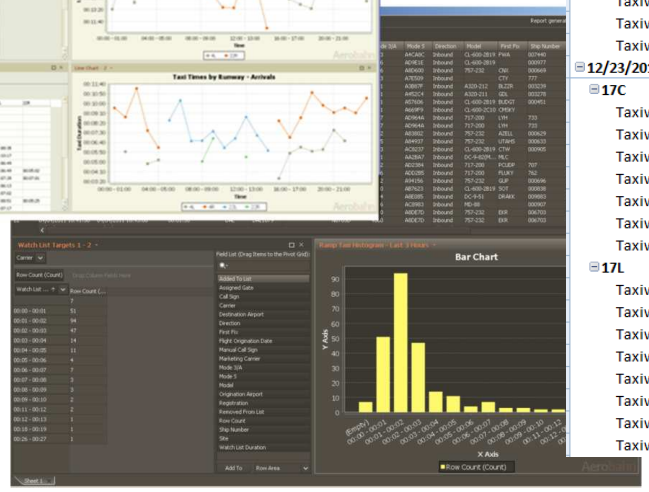
Business rules provide fully configurable alerts and highlights

Detailed statistical information and forecasts

AEROBAHN **SURFACE MANAGER**



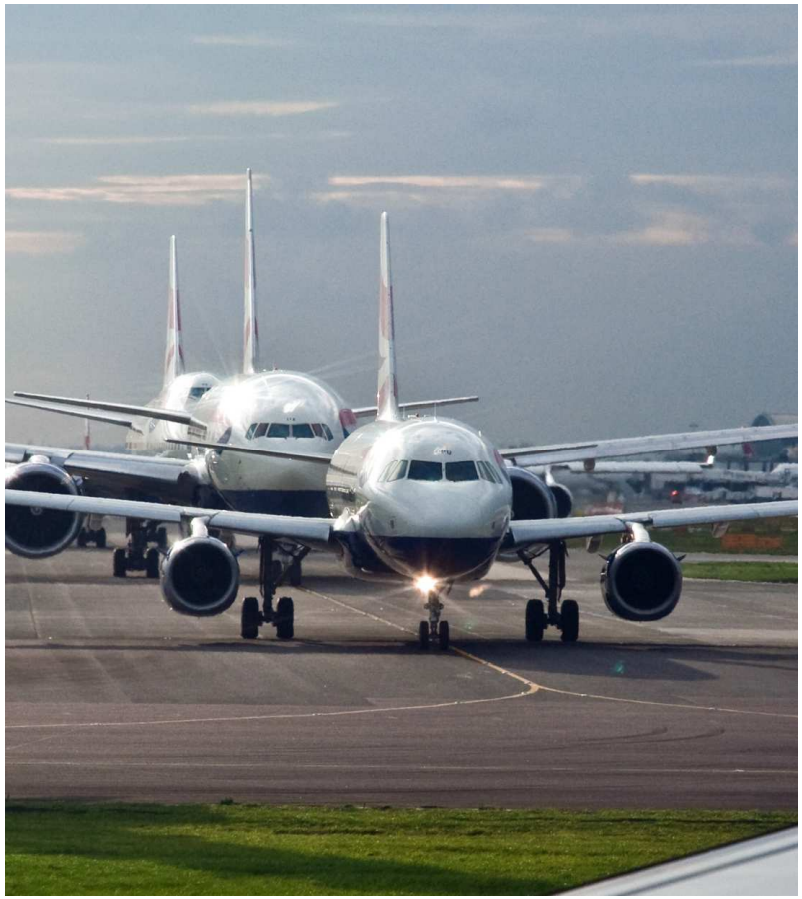




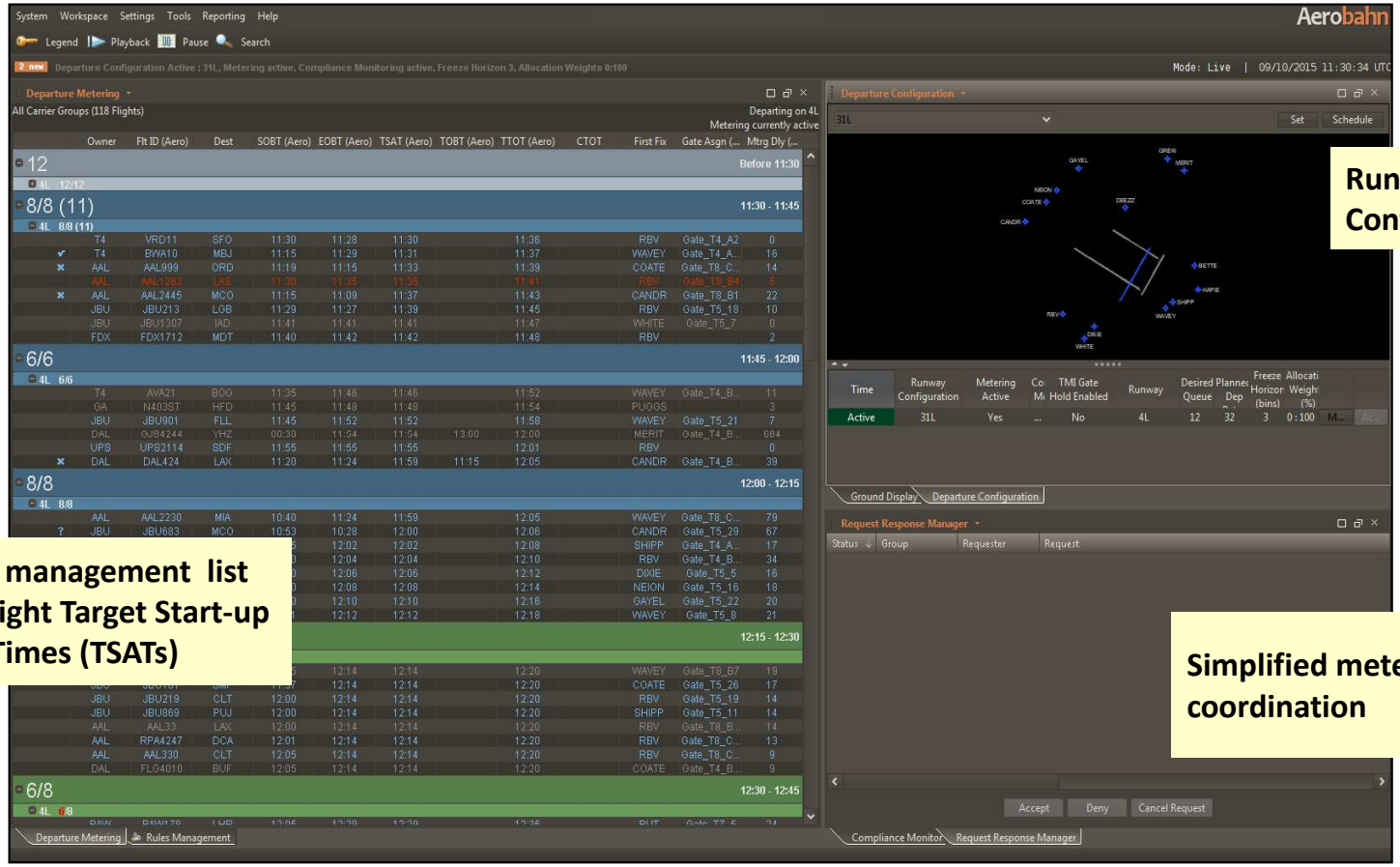
	Values		
Row Labels	Count of Call Sign	Average of Occupancy Time	Sum of Occupancy Time
12/22/2015	**1353**	**0:00:27**	**10:00:37**
17C	**287**	**0:00:27**	**2:07:36**
TaxiwaySegment_ES_3	41	0:00:08	0:05:36
TaxiwaySegment_ES_4	41	0:00:23	0:15:33
TaxiwaySegment_ES_5	41	0:00:15	0:10:18
TaxiwaySegment_JS_5	41	0:00:36	0:24:26
TaxiwaySegment_JS_6	41	0:00:32	0:22:02
TaxiwaySegment_M_30	41	0:00:30	0:20:21
TaxiwaySegment_M_31	41	0:00:43	0:29:20
17L	**1066**	**0:00:27**	**7:53:01**
TaxiwaySegment_ES_1	133	0:00:15	0:32:51
TaxiwaySegment_ES_2	133	0:00:25	0:56:09
TaxiwaySegment_ES_3	133	0:00:10	0:22:19
TaxiwaySegment_ES_4	134	0:00:20	0:44:51
TaxiwaySegment_ES_5	136	0:00:15	0:33:12
TaxiwaySegment_JS_5	132	0:00:34	1:14:17
TaxiwaySegment_JS_6	132	0:00:32	1:10:24
TaxiwaySegment_P_23	133	0:01:03	2:18:58
12/23/2015	**377**	**0:00:26**	**2:46:01**
17C	**176**	**0:00:28**	**1:20:41**
TaxiwaySegment_ES_3	25	0:00:09	0:03:52
TaxiwaySegment_ES_4	25	0:00:24	0:10:10
TaxiwaySegment_ES_5	26	0:00:15	0:06:40
TaxiwaySegment_JS_5	25	0:00:36	0:15:09
TaxiwaySegment_JS_6	25	0:00:33	0:13:56
TaxiwaySegment_M_30	25	0:00:29	0:12:17
TaxiwaySegment_M_31	25	0:00:45	0:18:37
17L	**201**	**0:00:25**	**1:25:20**
TaxiwaySegment_ES_1	25	0:00:15	0:06:10
TaxiwaySegment_ES_2	25	0:00:25	0:10:18
TaxiwaySegment_ES_3	25	0:00:09	0:03:53
TaxiwaySegment_ES_4	25	0:00:19	0:07:55
TaxiwaySegment_ES_5	25	0:00:15	0:06:10
TaxiwaySegment_JS_5	25	0:00:32	0:13:21
TaxiwaySegment_JS_6	25	0:00:30	0:12:22
TaxiwaySegment_P_23	26	0:00:58	0:25:11

AEROBAHN **DEPARTURE MANAGER**

- Combines pre-departure sequencing and runway sequence optimization
- Enables flight operators to prioritize their own flights
- Incorporates dynamic variable taxi time calculations and trajectory predictions
- Accounts for constraints like wake vortex separation and departure procedure/fix balancing
- Integrated compliance tracking



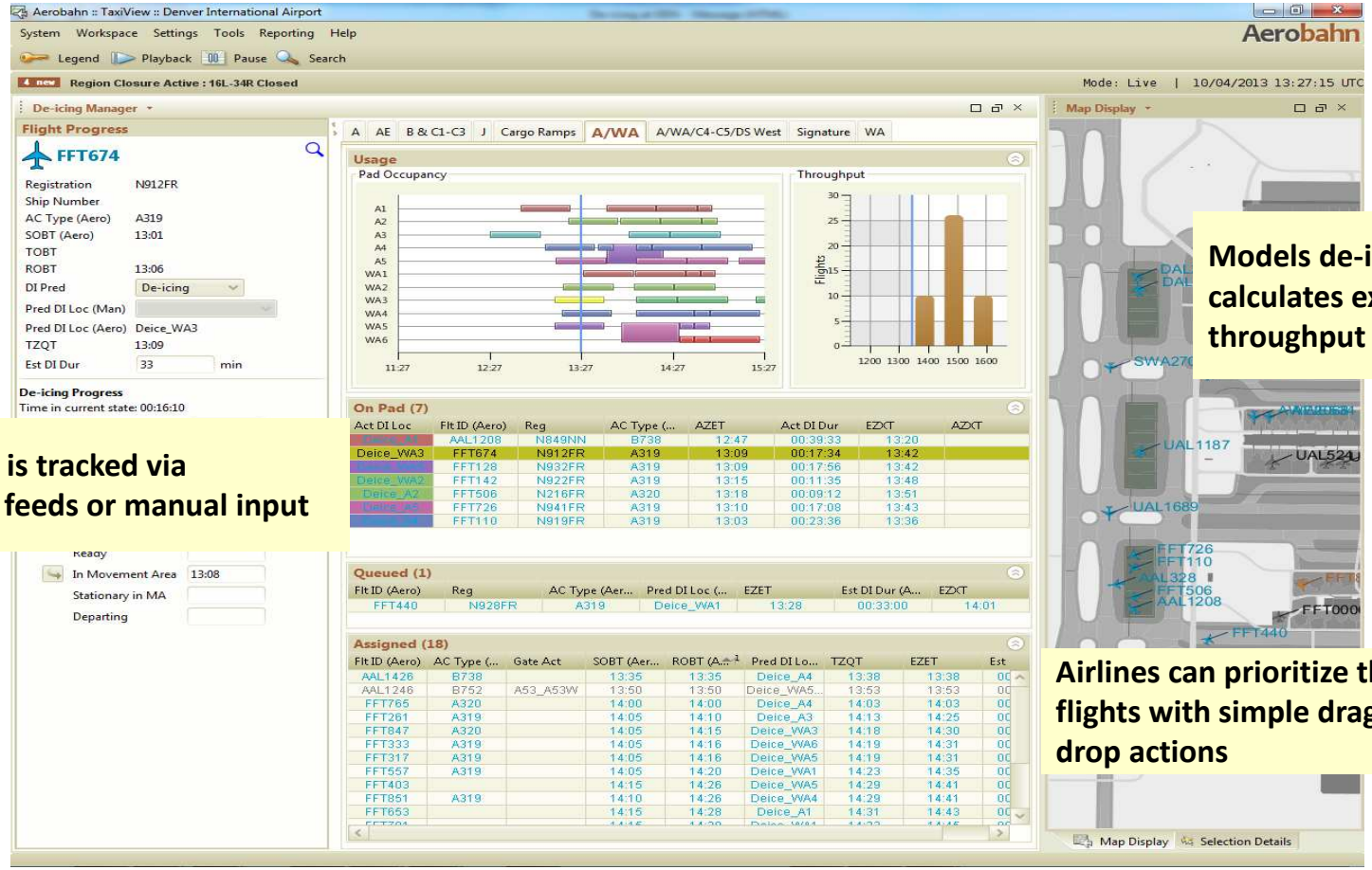
AEROBAHN **DEPARTURE MANAGER**



AEROBAHN **DE-ICING MANAGER**

- Enables scheduling and sequencing of aircraft into centralized de-icing pads to control queues and maximize throughput
- Automatically tracks actual de-icing milestones and durations (queuing, pad occupancy, etc.)
- Facilitates recording of de-icing milestones
- Calculates estimated de-icing queue entry, pad entry, pad occupancy, and pad exit times
- Provides recommended push back and queue entry times to maintain de-icing plan and improve predictability

AEROBAHN **DE-ICING MANAGER**



Models de-icing queues and calculates expected throughput and usage

De-icing process is tracked via automated data feeds or manual input

Airlines can prioritize their flights with simple drag-and-drop actions

AEROBAHN **GLOBAL FLIGHT MANAGER**

- Easy-to-use decision support tool for the real-time management of a flight network
- Enables monitoring of flights in the en-route, terminal and surface environment
- Tracks flight progress and helps identify, avoid, and manage disruptions like diversions and holds
  - Utilizes our advanced diversion and hold detection algorithms
- Monitor multiple airports and click to zoom on surface situation

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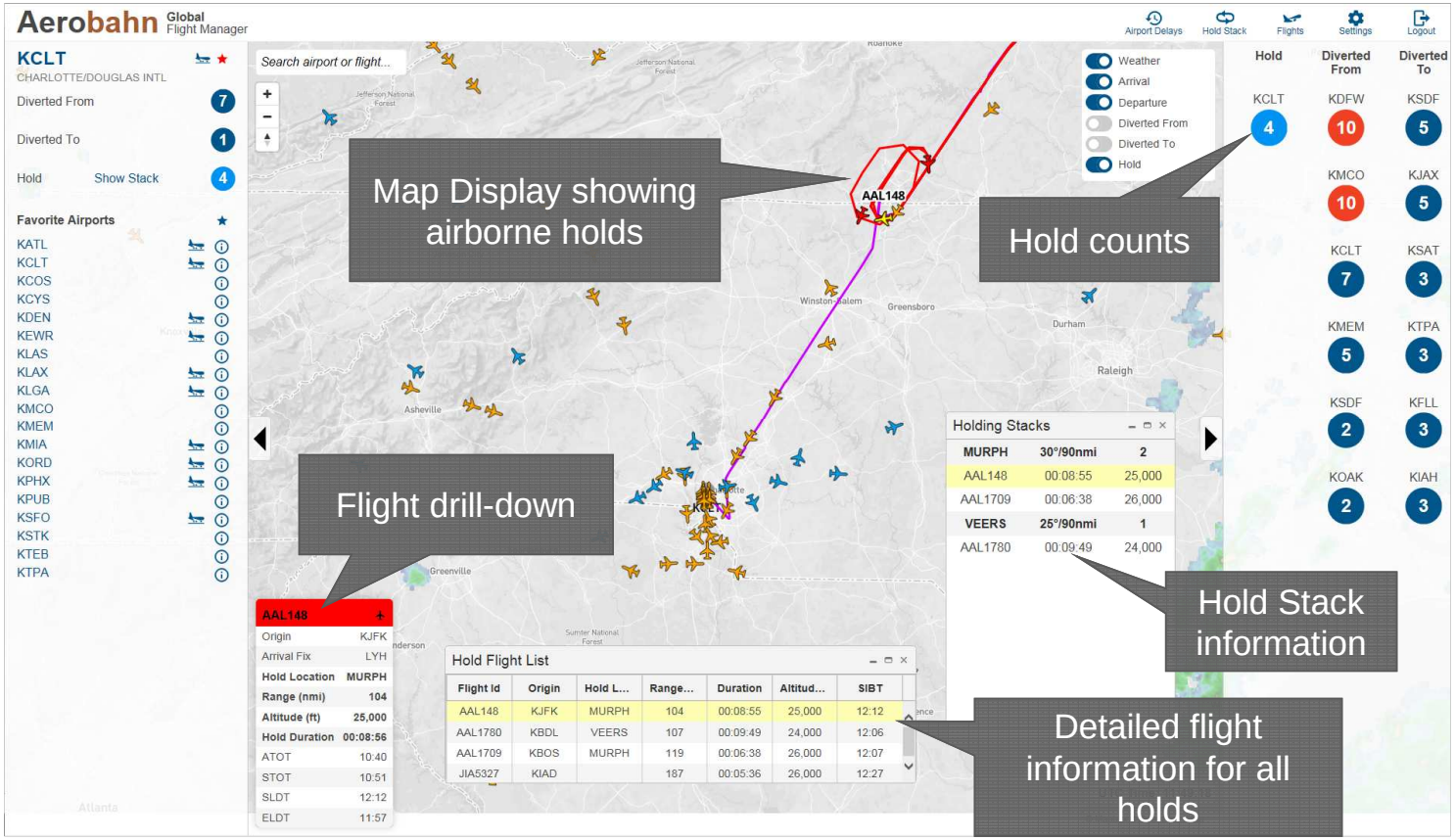

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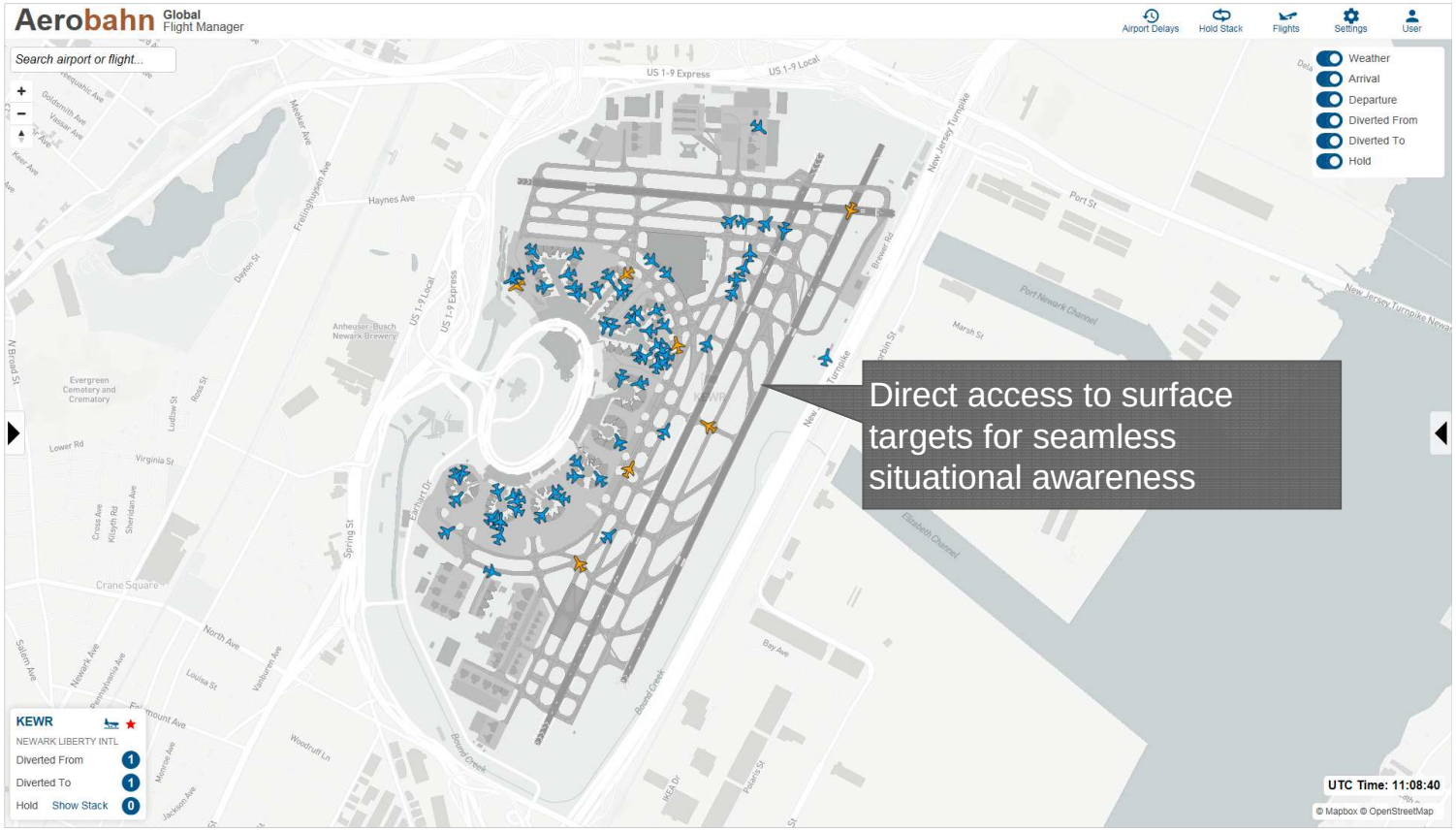
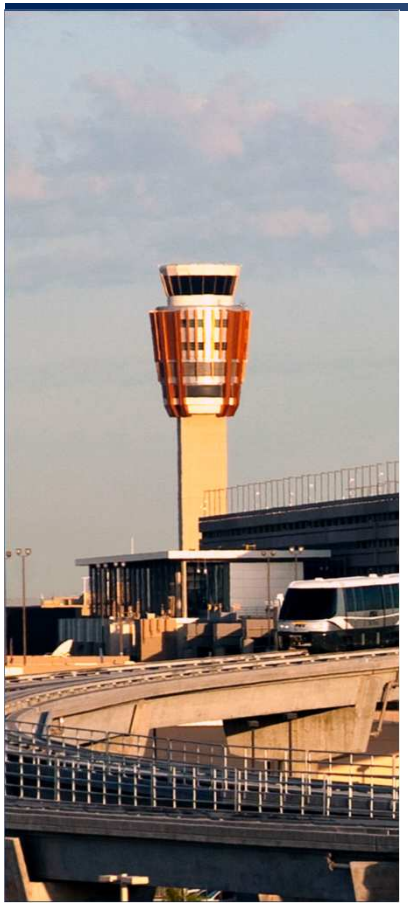


AEROBAHN SUCCESS STORY: **JFK**

- At JFK, airlines and the Port Authority of NY and NJ are achieving significant taxi time reductions and cost savings with Aerobahn
- The Aerobahn Departure Manager is used daily to optimize the departure process
- During busy periods, all departures are assigned a metering time to limit runway queues
- Average of $15.6 million per year in fuel savings, combined with a reduction of 32,000 metric tons of CO2 emissions
- The airport is making better use of its resources and providing a better experience for passengers traveling through JFK
- And the FAA is provided a better sequence of aircraft in order to optimize runway usage and throughput

AEROBAHN SUCCESS STORY: **PHX**



- In Phoenix, Aerobahn is the foundation of a joint project between airlines, the FAA, and the City of Phoenix
- It is used to optimize the arrival traffic flow during peak periods
- The results:
  - During major banks, taxi times have been reduced by ~5 minutes per flight
  - Overall arrival taxi times are down about a ½ minute per flight
  - There's an ~50% reduction in the number of communications between pilot and ground
  - Transmission counts have decreased by over 252 transmissions/day (59%).
  - Ramp controller time has decreased by 9.25 minutes/day (17%).

PHX OPERATIONAL SOLUTION

FAA Ground

~~What Gate?~~
~~Gate Status?~~
Hold in Penalty Box!
Proceed to Spot!

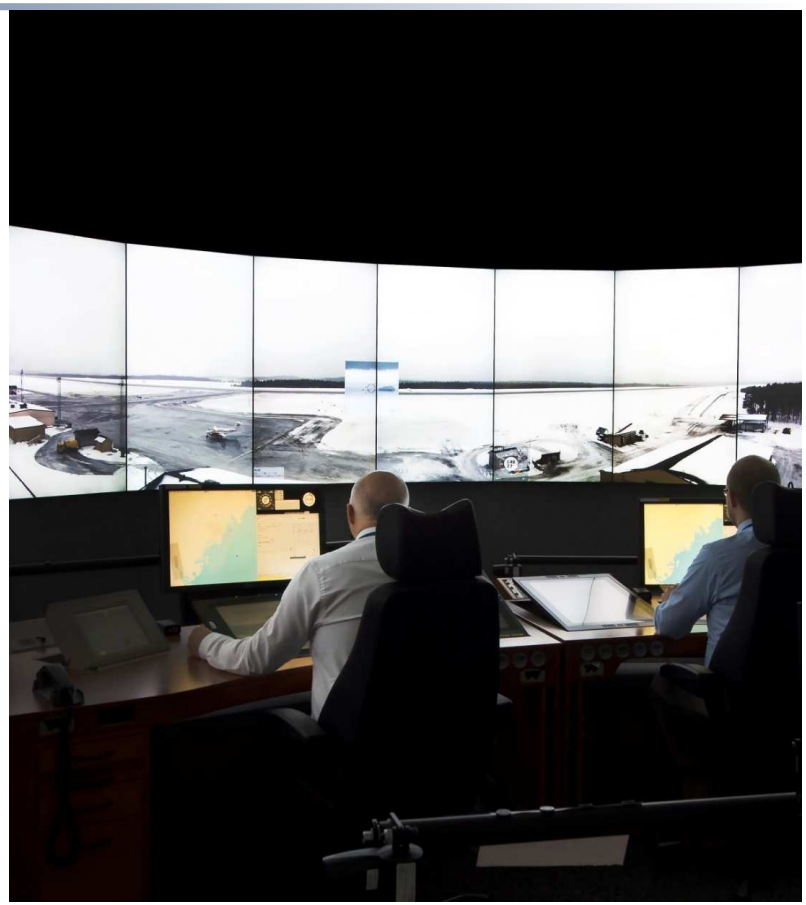
Pilot/Co-Pilot

~~What Gate?~~
~~Gate Status?~~
~~Ramp Ready?~~
Ramp ready to accept!

Ramp Control

DIGITAL TOWER SOLUTIONS

- Our Digital Tower Solutions enable ATC and ramp control services to be provided more efficiently **for any airport, from any location**
- Instead of a traditional tower, a lower-cost array of cameras is deployed
- An enhanced “out of the window” view is sent over a digital network
- Controllers are provided with an advanced working position and perform their duties as if they were in a physical tower



A NEW APPROACH
TO ATC AND RAMP CONTROL

ADVANCED SURFACE & NETWORK MANAGEMENT SOLUTIONS

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