



National Aeronautics and Space Administration

Flight Awareness Collaboration Tool Development

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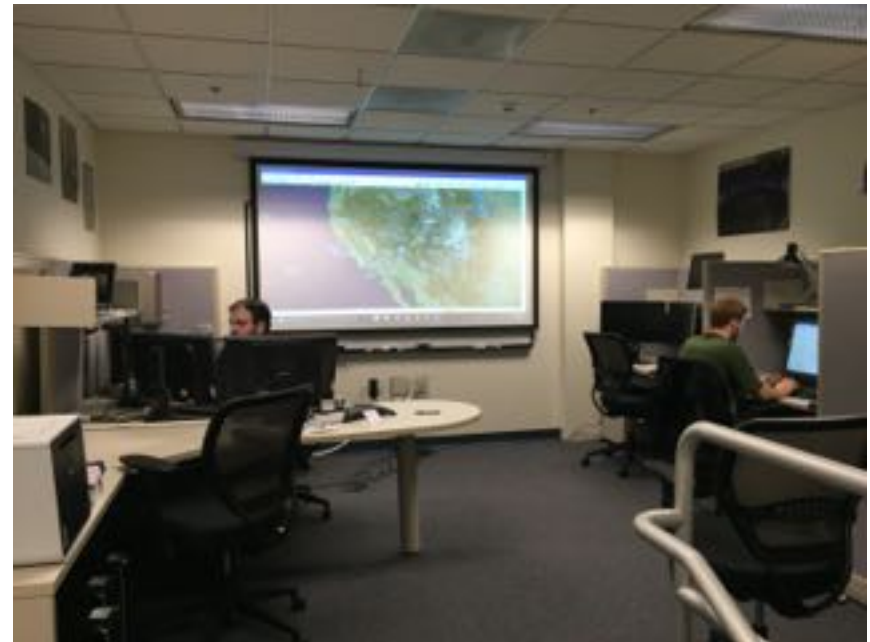
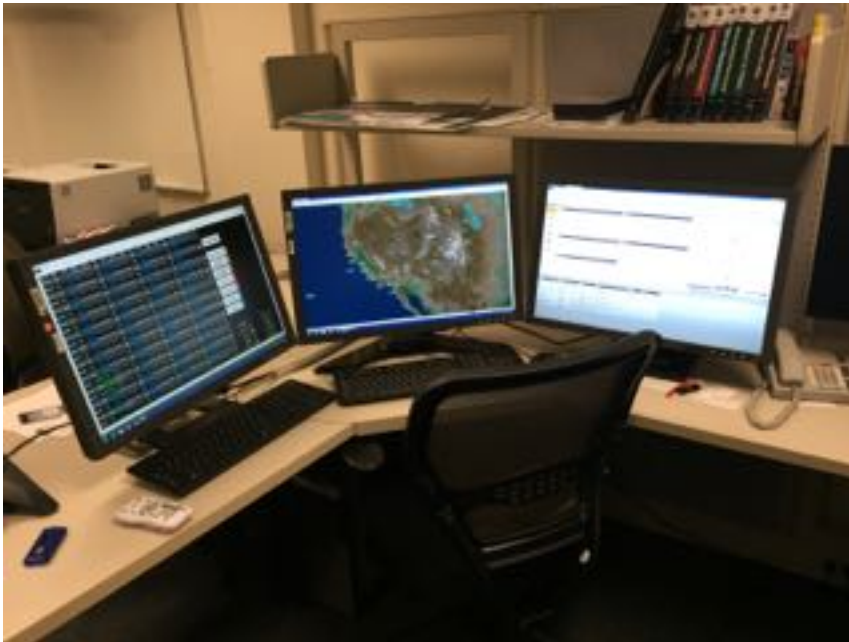


NASA AOC Research Areas



- AOC automation
 - Applied advanced “cognitive computing” systems to airline operations
 - Objective was to improve access to documents (e.g., FAA Regulations, airline procedures, etc.) and Internet resources
- Winter weather operations
 - Developing automation tool to improve airport operations during winter storms
 - Objective is to reduce cancelations and delays due to winter weather
- Creating AOC laboratory to support research
 - At NASA Ames in the Human Systems Integration Division

Airline Operations Research Group (AORG)



Winter Weather



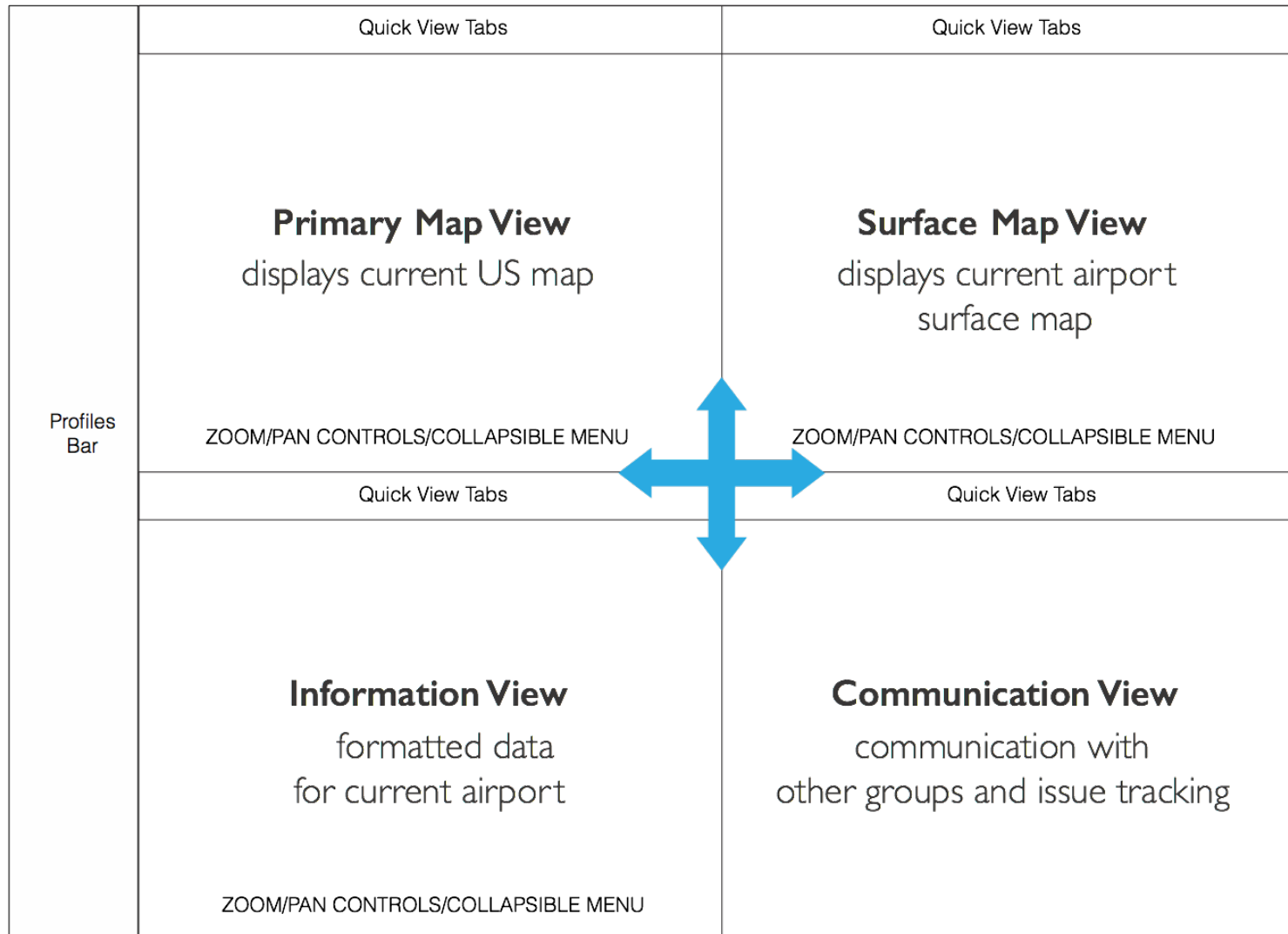
- Developing the “Flight Awareness Collaboration Tool” (FACT)
- Concentrates information about winter weather events on one display
- Includes predictive tools
- Supports collaboration between AOC, air traffic control, airport authority, and de-icing operators
- User interface designed completed and web-based prototype under development
- User group at Detroit airport
- Space Act Agreement with Virgin America to support FACT evaluation
 - Virgin America backup AOC located at NASA Ames

FACT Information



- Weather status and forecasts
- Reporting of runway closures for snow/ice treatment
- Runway braking action
- Visual display of surface traffic movement at airport
- Hourly arrival and departure rates
- Airport runway configuration
- De-icing areas
- Notices to Airmen
- Field conditions
- FAA Operational Information System
- Aviation Digital Data Service icing information
- Runway visual range
- Tracking of arrival flights in en route airspace

FACT User Interface Design



FACT User Interface Design



The screenshot displays the FACT User Interface, which is divided into several sections. On the left, there is a sidebar with a user profile icon, a plus sign, and labels for 'DENVER RUNWAY LEFT', 'WESTERN SIGMETS', and 'SAN JOSE FLOW'. The main area is split into two panels: 'PRIMARY MAP' and 'SURFACE'. The 'PRIMARY MAP' panel shows a map of the United States with various airport codes labeled. The 'SURFACE' panel shows a detailed view of an airport's surface, with a yellow arrow pointing from a specific location on the map to this view. Below the maps, there is a 'PLANNING' section with tabs for 'CHARTS' and 'QUICK INFO'. This section contains two tables of 'ATCSCC ADVISORIES FOR WEDNESDAY, 06-10-2015'. A yellow arrow points from the 'Send' button in the first table to the 'QUEUE' section on the right. The 'QUEUE' section has tabs for 'QUEUE' and 'FACT CHAT'. It displays a list of advisories, including 'LGA: Too many aircraft in de-icing area.' and 'JFK: UAL 3740 stall in de-icing area. Expect a 20 min delay.'. Each advisory has a timestamp, author, and actions like 'RESOLVE', 'SHARE', and 'DELETE'. There is also a 'Comments' section for each advisory.

ATCSCC ADVISORIES FOR WEDNESDAY, 06-10-2015

#	Control Element	Date	Brief Title	Send
004	FCAA16	06/10/2015	CDM Airspace Flow Program CNX	06/10/15 00:18
003	ATL/ZTL	06/10/2015	CDM Ground Delay Program	06/10/15 00:14
002	LGA/ZNY	06/10/2015	CDM Ground Delay Program CNX	06/10/15 00:13
001	DCC	06/10/2015	Reroute Cancellation	06/10/15 00:05

ATCSCC ADVISORIES FOR WEDNESDAY, 06-10-2015

#	Control Element	Date	Brief Title
161	DCC	06/09/2015	Reroute Cancellation
160	DCC	06/09/2015	Reroute Cancellation

QUEUE

LGA: Too many aircraft in de-icing area. 15:30:02 AUTHOR: mmogford MORE

JFK: UAL 3740 stall in de-icing area. Expect a 20 min delay. 11:18:16 AUTHOR: dpeknik LESS

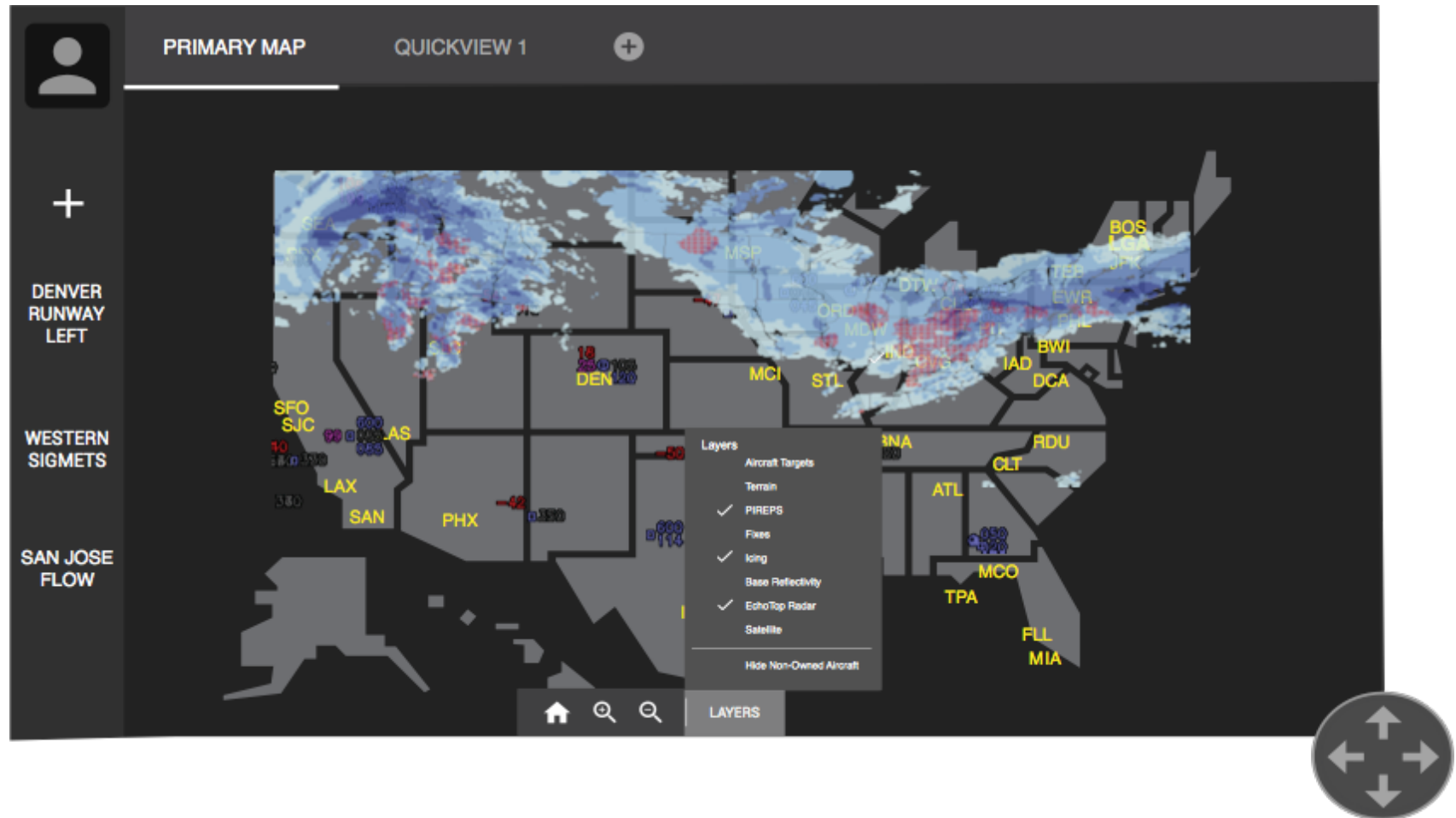
Comments:

13:30:45 **dpeknik:** There seems to be a stall in the de-icing area. Can we set a delay? "I'll do the calls if needed. [attachment](#) [@](#) [REPLY](#)

13:42:34 **eleong:** I say go for it. [REPLY](#)

13:42:34 **mmogford:** Let me check and see what our next crew roster says. [REPLY](#)

Primary Map View



Surface Map View



Information View



PLANNING CHARTS QUICKVIEW 1 +

Search

ATCSCC ADVISORIES FOR WEDNESDAY, 06-10-2015

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ATCSCC ADVISORIES FOR WEDNESDAY, 06-10-2015

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Quicklinks

- FAA OIS
- ✓ Aviation Weather Center
- FAA NOTAMs
- WWACM

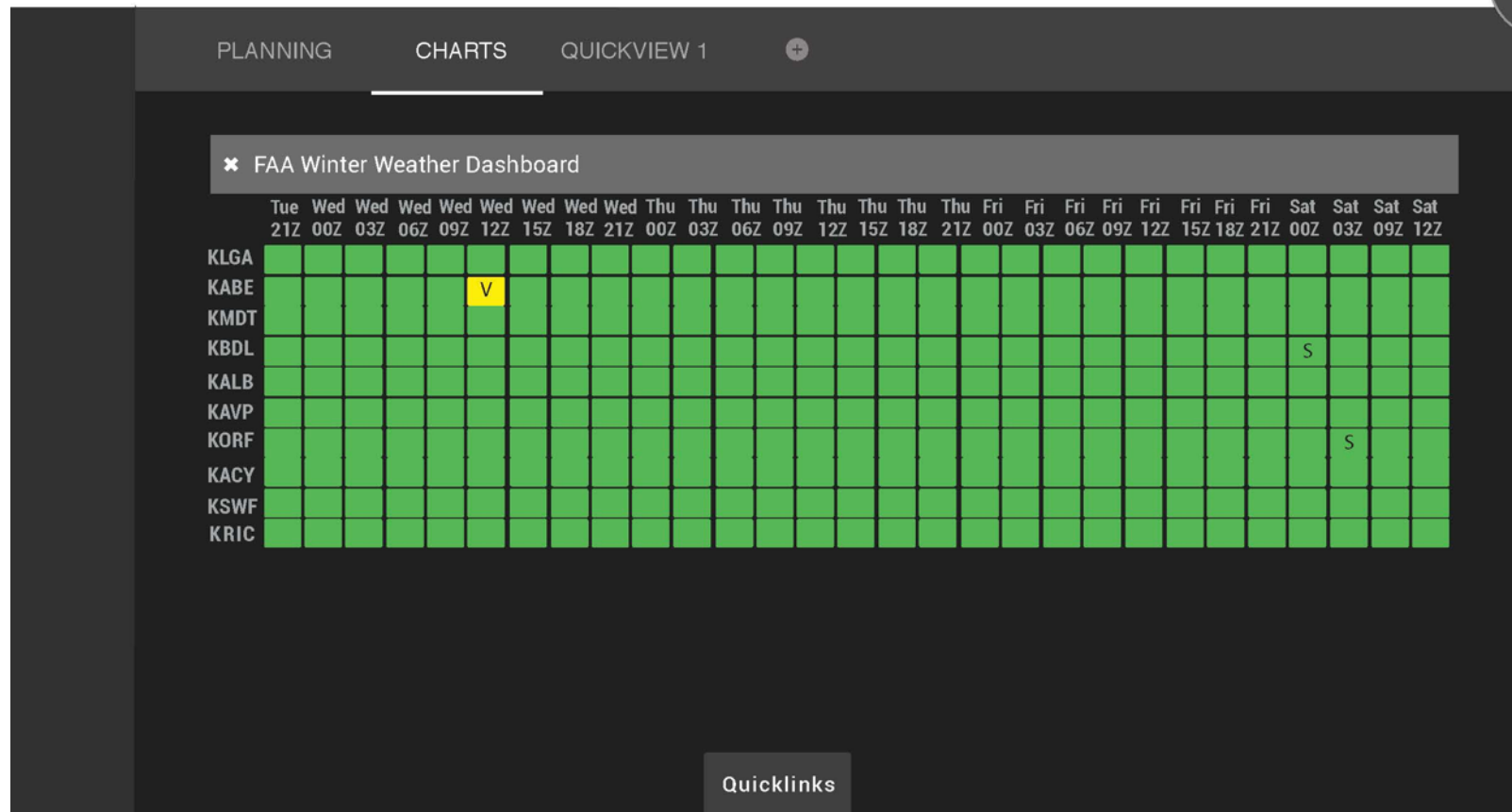
Quicklinks

Name: FLA_TO_NYMETROS
Constrained area: ZJX/ZMA


DCC 06/09/15 Route RQD /FL

Gathers and “tailors” data from external web sites

Information View





Communication View


A circular icon with four arrows pointing up, down, left, and right, indicating navigation options.

MY QUEUE **FACT CHAT** **+**

ADD QUEUE ITEM **PRINT REPORT**




LGA: Too many aircraft in de-icing area. 


MORE 


15:30:02

AUTHOR: **rmogford**

RESOLVE **SHARE** **DELETE**



JFK: UAL 3740 stall in de-icing area. Expect a 20 min delay. 


LESS 

11:18:16

SHARED WITH:

RESOLVE **SHARE** **DELETE**

Comments:

13:30:45 **dpeknik:** Not sure how to deal with this one, any suggestions?
Here's the procedure. **attachment** 

REPLY

13:42:34 **eleong:** That's an old document I believe,.

13:42:34 **rmogford:** I'll update and send a new document to the team.

REPLY

Communication View



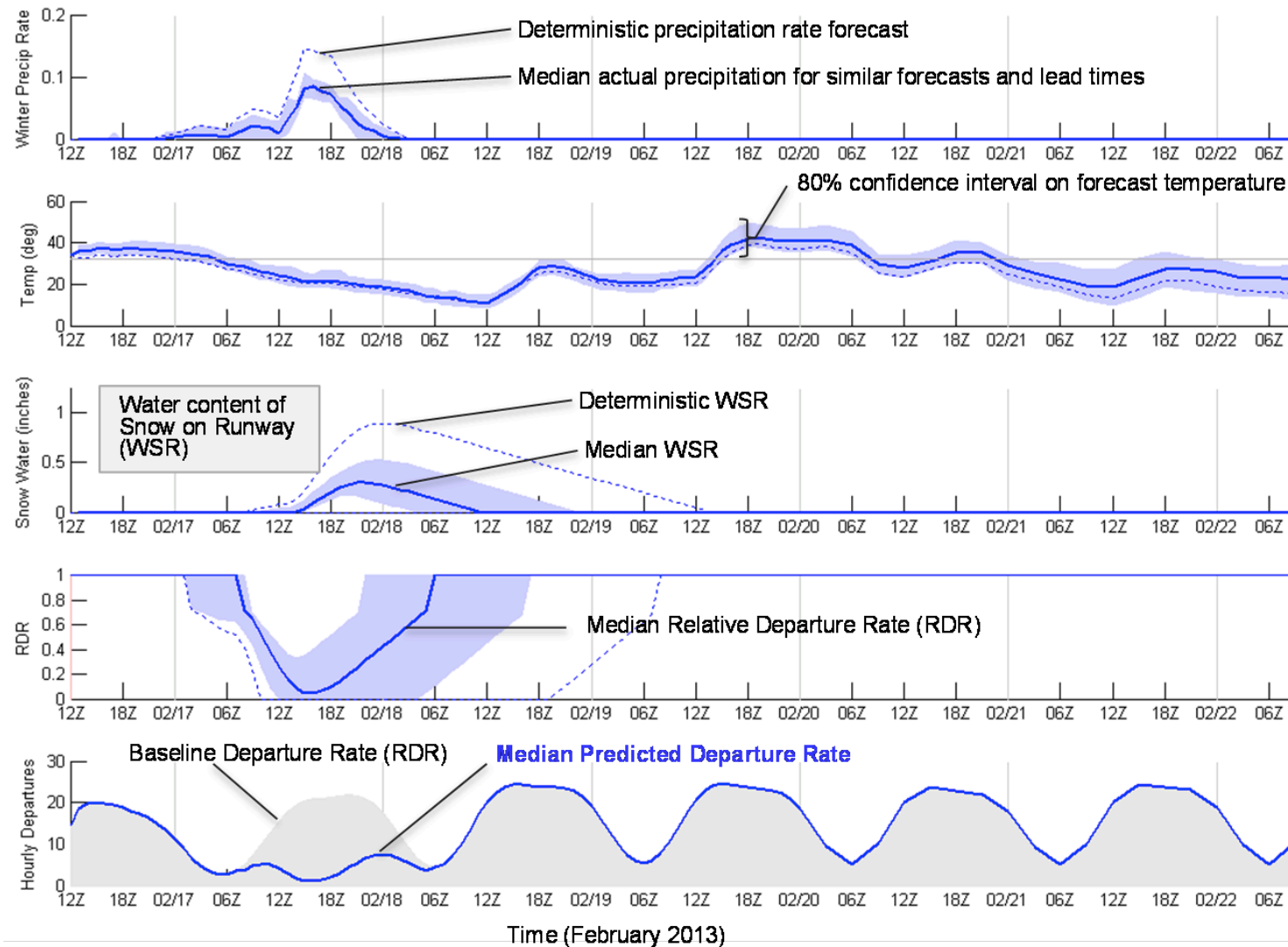
A screenshot of a web-based communication interface. At the top left is a circular icon with four arrows pointing outwards. Below it, the interface is divided into two main sections. The left section, titled "MY QUEUE", lists "41 users online" and a group of roles: "TMC Group", "2 LGA Dispatchers" (with a green circle containing the number 2), "GMTO", "AFP Position Managers", "4 Information Team" (with a green circle containing the number 4), "LGA Controllers", and "JFK Controllers". The right section, titled "FACT CHAT" with a green circle containing the number 6, displays a chat log. The chat log contains five messages: "Hello there..." (green bubble), "Hello there..." (blue bubble), "It seems like we're getting a lot of warnings about ice and heavy freezing rain." (green bubble), "The group is tracking and shows an hour or more..." (blue bubble), and "Thanks for the update, have a good one. Before I forget, there's another front coming in, so stay tuned for additional info." (green bubble). Each message is followed by the name "Richard Mogford" and the time "8:56:14 AM". At the bottom is a text input field with the placeholder "Type your message here & press Enter or the send icon to submit..." and a right-pointing arrow icon.

FACT Implementation



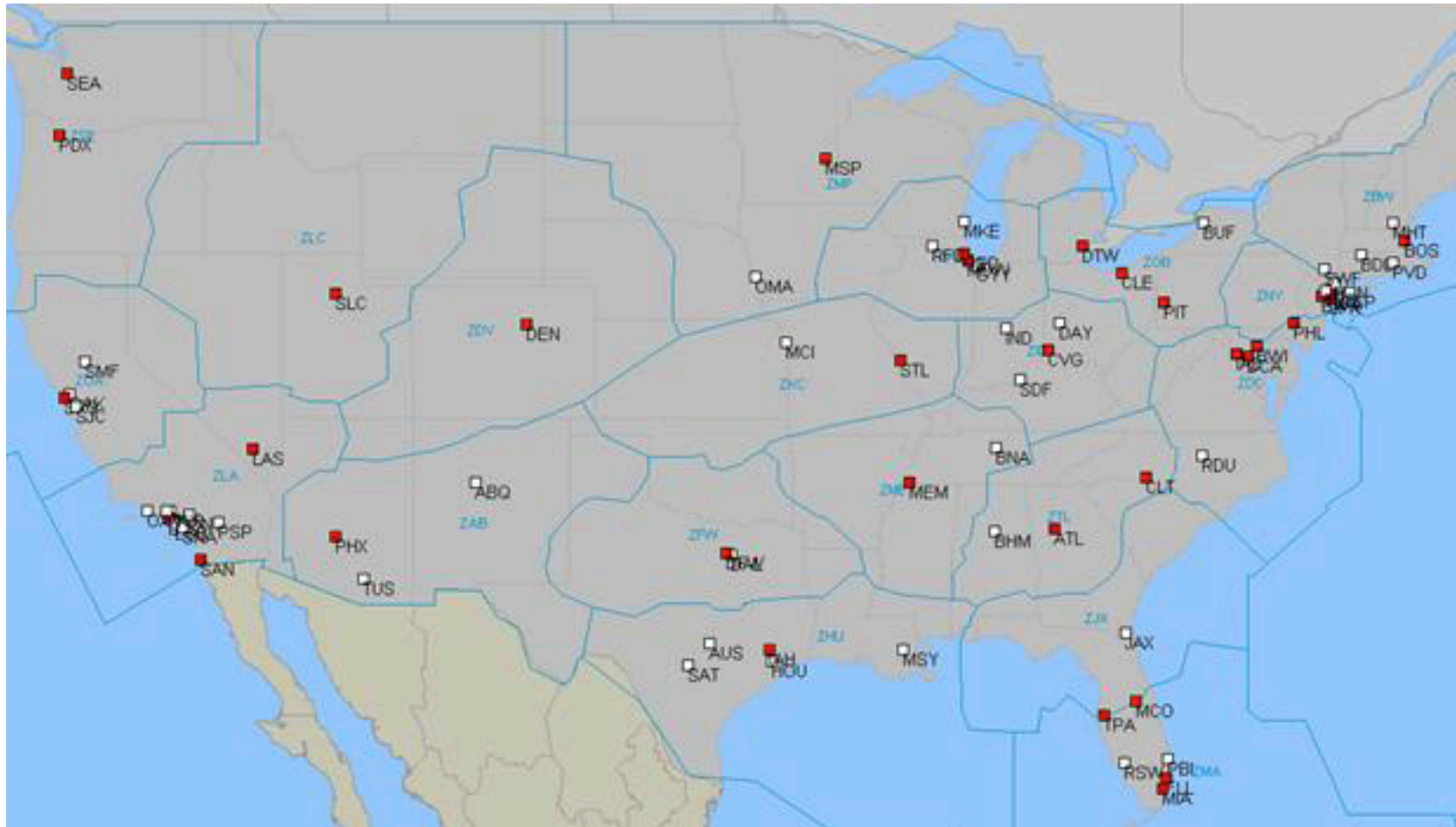
- FACT is a web-based application
- Receives JAVA messages from the FAA System Wide Information Management (SWIM) data repository
- Surface movement data are from ASDE-X
- Data are acquired from web pages and tailored for the Information View
- Predictive tools will be built into FACT
- First one competed is Metron's Winter Weather Airport Capacity Model (WWACM)
 - Predicts changes in airport departure rates from weather reports

WWACM



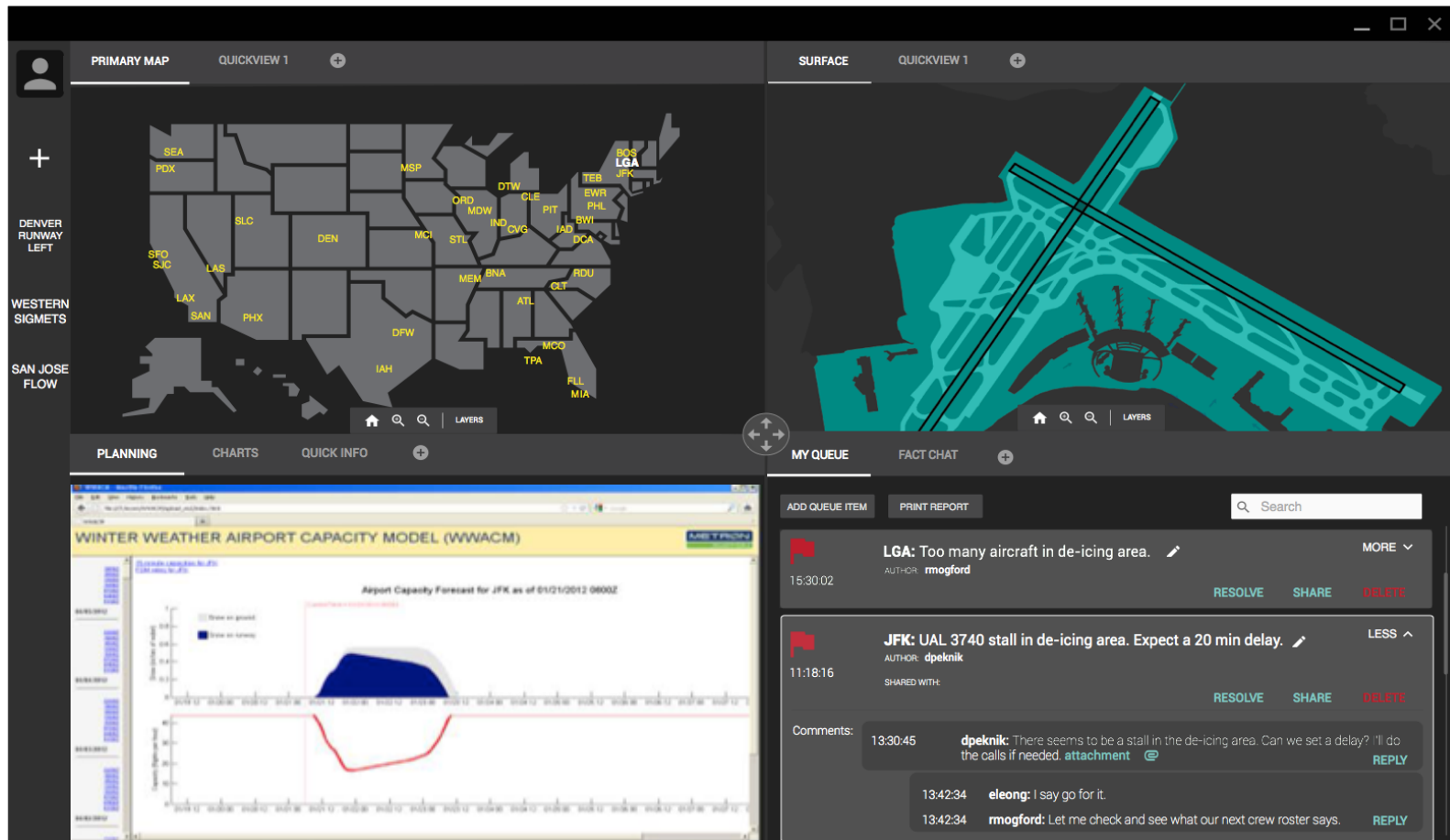
WWACM for BOS for February 16, 2013

WWACM



The 77 airports included in WWACM

WWACM in FACT



FACT Prototype



+

Default

Full Map View

Layers

Map data ©2016 Google, INEGI | Terms of Use

Surface

Layers

Map data ©2016 Google | Terms of Use | Report a map error

Planning

Charts

Search

ADVISORIES FOR MONDAY, 08-01-2016

#	CTRL ELEMENT	BRIEF TITLE
101	ZDC	DCINTERNATIONALDEPARTURES
100	DCC/ZDC	ZDCSWAPSTATEMENTFYI
099	FCAOB1	CDM
098	FCAA08	CDM
097	DCC	OPERATIONS
096	FCAA08	CDM
095	FCAOB1	CDM

New advisory received. ATCSCC ADVZY 001 NOC 08/01/2016 ANS FORECAST FOR SUN JUL 31

093 DCC FCA

My Queue

FACT Chat

ADD QUEUE ITEM

PRINT REPORT

TOO MANY AIRCRAFT IN THE DE-ICING AREA

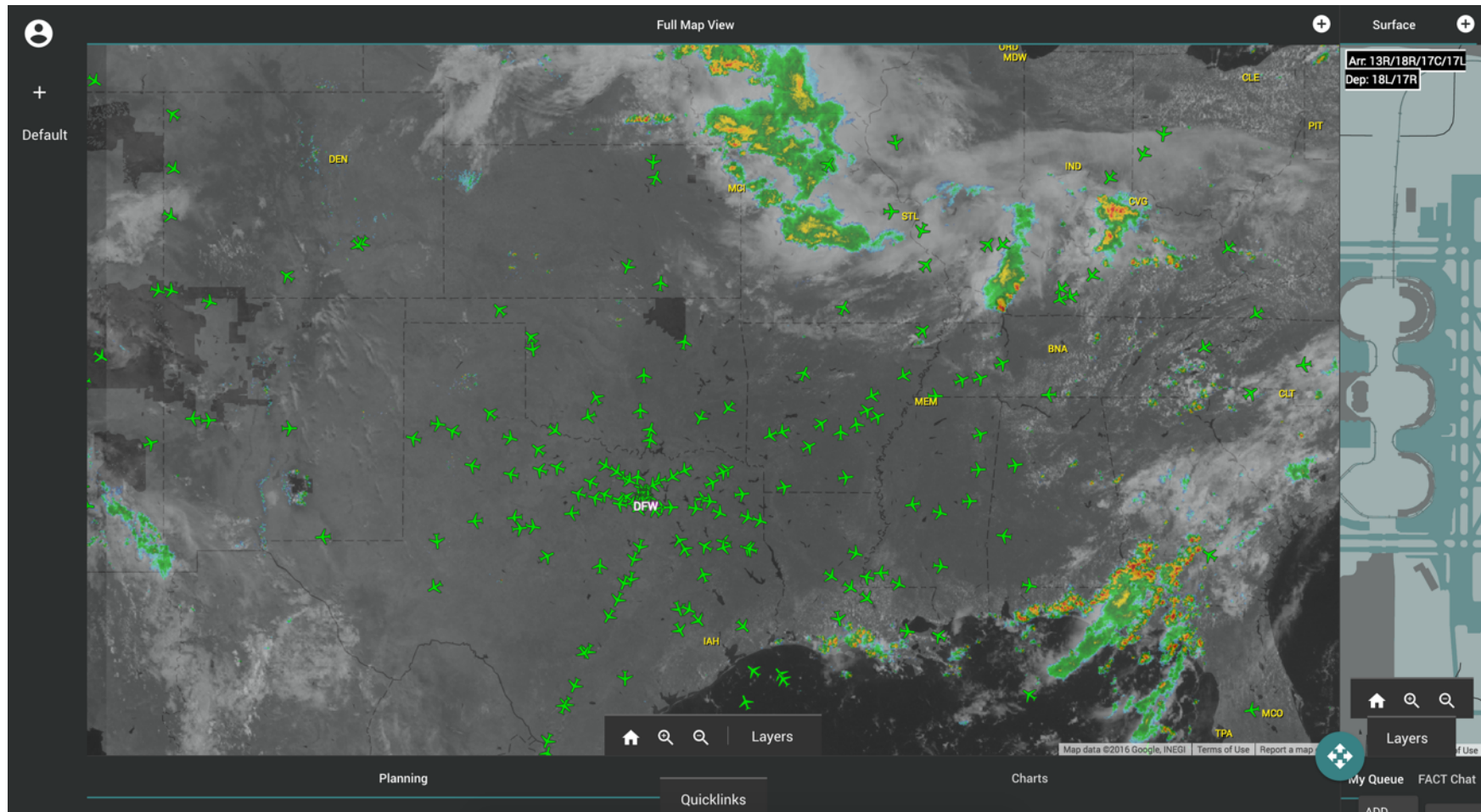
MORE ▾

RESOLVE

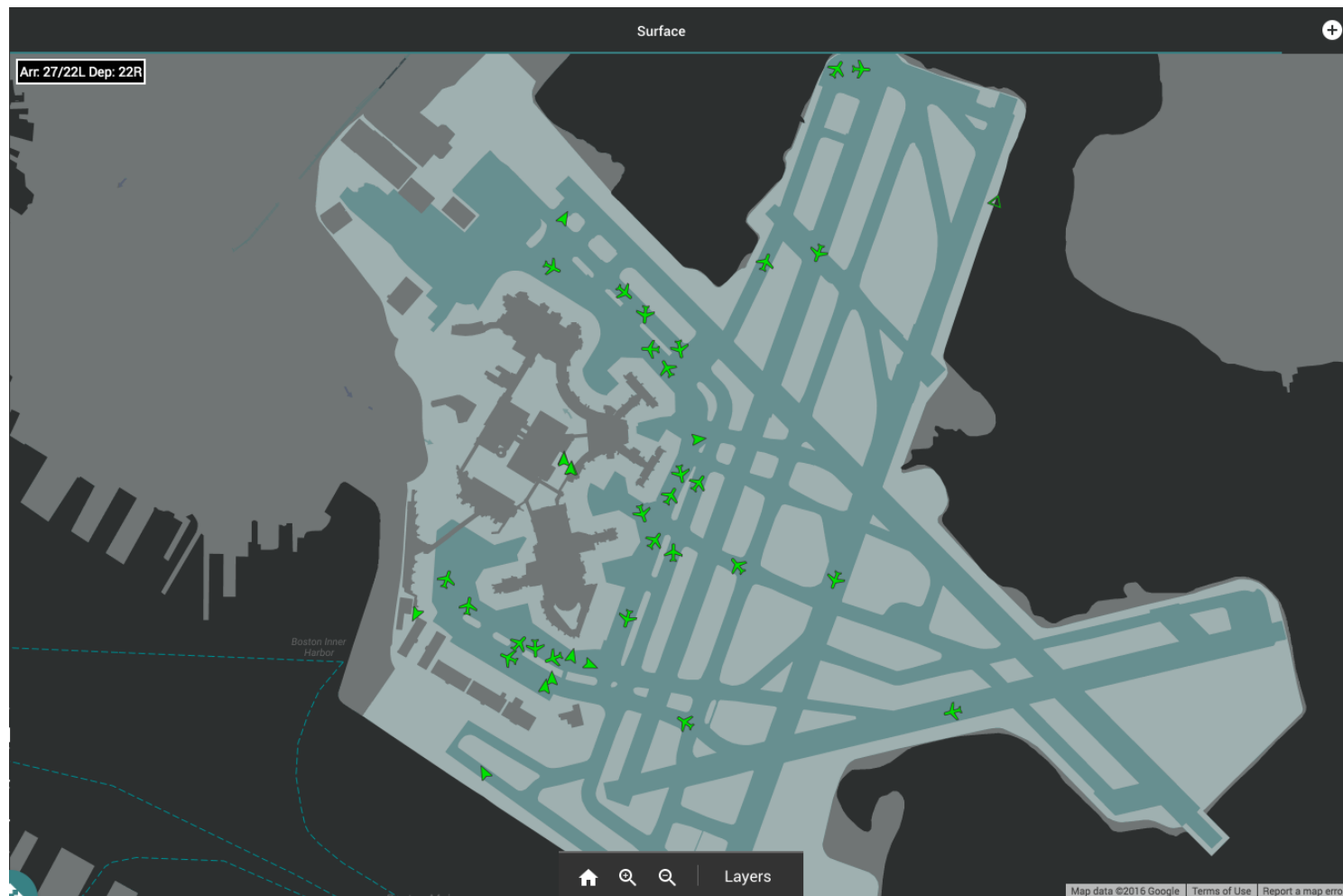
SHARE

DELETE

Primary Map



Surface Map



Information



Search

ADVISORIES FOR MONDAY, 08-01-2016

#	CTRL ELEMENT	BRIEF TITLE
101	ZDC	DCINTERNATIONALDEPARTURES

EVENT TIME 01/1900 020500
CONSTRAINED FACILITIES ZDC
DC METRO INTERNATIONAL DEPARTURES CAN ANTICIPATE PROBABLE USE OF
JERES J220 MICAH TRANSITION INTO ZBW FOR FLIGHTS TO NATOTS THIS IS
DUE TO WEATHER ANTICIPATED IN EASTERN ZNY AND ZDC FOR THE AFTERNOON
EFFECTIVE TIME 01/1637 02/0500
16/08/01 1637 DCCOPS1xstn20

100	DCC/ZDC	ZDCSWAPSTATEMENTFYI
099	FCAOB1	CDM
098	FCAA08	CDM
097	DCC	OPERATIONS
096	FCAA08	CDM
095	FCAOB1	CDM
094	DCC	FCA
093	DCC	FCA
092	BWI/ZDC	CDM

Quicklinks

Communication



TOO MANY AIRCRAFT IN THE DE-ICING AREA 

LESS ^

RESOLVE

SHARE

DELETE

CREATED DATE: 2016-06-14T00:40:02.000Z
MODIFIED DATE: 2016-08-01T16:44:15.297Z
AUTHOR: admin
SHARED WITH:

F.A.C.T

NOTES:

NOTES ARE EMPTY FOR THIS ITEM

COMMENTS:

00:40:27Z admin (Me) test

REPLY

00:40:34Z admin (Me) test

REPLY

21:32:56Z admin (Me) asdfasdfasdf

REPLY

ADD A COMMENT

FACT Progress



- Web-based prototype will be completed by the end of 2016
- Example of an approach for display integration
- Plan to demonstrate to airlines and airports to seek feedback
- FACT platform will be used to host additional automation tools (e.g., diversion management, planning snow removal)
- Creating AOC simulator at NASA Ames to evaluate FACT
- Will evaluate FACT in operational settings

NASA/Industry Collaboration



- Airline Operations Workshop in August 2016
 - Around 200 attendees
 - Focused on NASA, FAA, and private sector innovations to support the airlines (AOC and flight deck)
 - Identified gaps where research is needed
- Research themes
 - AOC simulation
 - Study dispatcher workload, situation awareness, errors
 - Display/system integration
 - Managing/accessing large information databases from multiple sources
 - Display/system integration
 - Preferred routes



National Aeronautics and Space Administration

Questions?

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