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**

<table>
<thead>
<tr>
<th>Profiles Bar</th>
<th>Quick View Tabs</th>
<th>Quick View Tabs</th>
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<tbody>
<tr>
<td></td>
<td><strong>Primary Map View</strong></td>
<td><strong>Surface Map View</strong></td>
</tr>
<tr>
<td></td>
<td>displays current US map</td>
<td>displays current airport surface map</td>
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<tr>
<td></td>
<td>ZOOM/PAN CONTROLS/COLLAPSIBLE MENU</td>
<td>ZOOM/PAN CONTROLS/COLLAPSIBLE MENU</td>
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<tr>
<td>Information View</td>
<td>Communication View</td>
<td></td>
</tr>
<tr>
<td></td>
<td>formatted data for current airport</td>
<td>communication with other groups and issue tracking</td>
</tr>
<tr>
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<td>ZOOM/PAN CONTROLS/COLLAPSIBLE MENU</td>
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</table>
FACT User Interface Design
Primary Map View
Surface Map View
Information View

Gathers and “tailors” data from external web sites
Information View
Communication View

MY QUEUE

LGA: Too many aircraft in de-icing area.
15:30:02
Author: rmogford

JFK: UAL 3740 stall in de-icing area. Expect a 20 min delay.
11:18:16
Author: dpekni

Comments:
13:30:45 dpekni: Not sure how to deal with this one, any suggestions?
Here's the procedure attachment
13:42:34 rmogford: I'll update and send a new document to the team.
Communication View

Hello there...
Richard Mogford 8:56:14 AM

It seems like we're getting a lot of warnings about ice and heavy freezing rain.
Richard Mogford 8:56:14 AM

The group is tracking and shows an hour or more...
Richard Mogford 8:56:14 AM

Thanks for the update, have a good one.
Before I forget, there's another front coming in, so stay tuned for additional info.
Richard Mogford 8:56:14 AM

Type your message here & press Enter or the send icon to submit...
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
The 77 airports included in WWACM
WWACM in FACT
FACT Prototype
Primary Map
Surface Map
### ADVISORIES FOR MONDAY, 08-01-2016

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| 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                  |
Communication

TWO MANY AIRCRAFT IN THE DE-ICING AREA

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

00:40:34Z  admin (Me)  test

21:32:56Z  admin (Me)  asdfdasdfasdfs

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
Questions?

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