

# *SWIM Interactive Developer Workshop 2016*

## *Technical Overview of STDDS Data*

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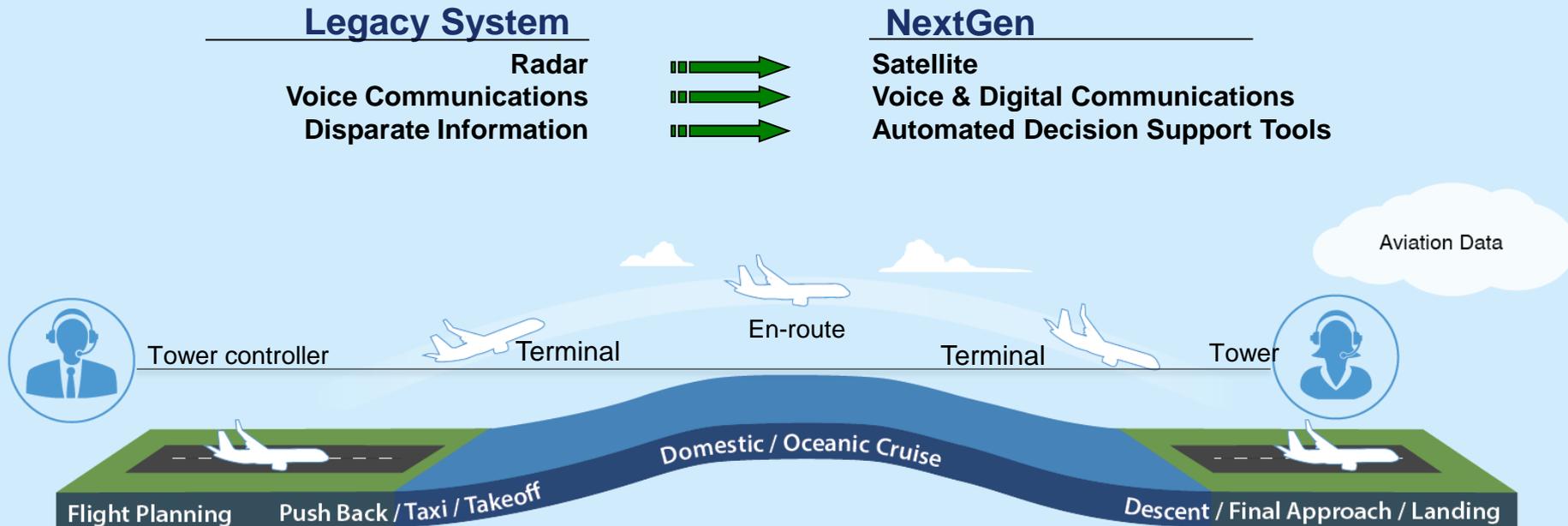


Federal Aviation  
Administration

SWIM  
Interactive Developer  
Workshop 2016



# Delivering NextGen Major Investments



## NextGen

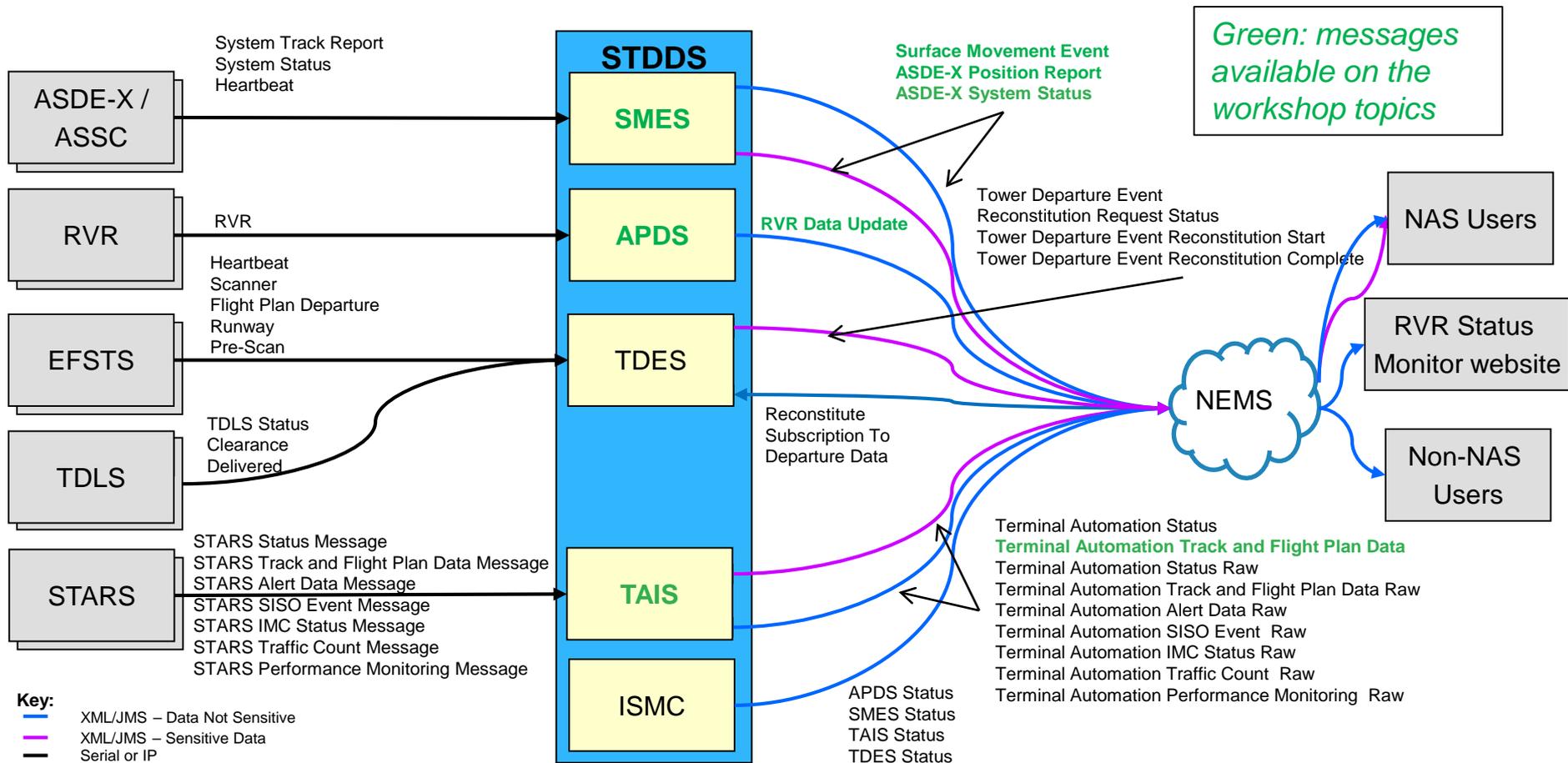
Automatic Dependent Surveillance-Broadcast (ADS-B),  
DataComm, National Airspace System (NAS) Voice System

## Foundational

En Route Automation Modernization (ERAM)

Terminal Automation Modernization/Replacement (TAMR)

# STDDS R3.2 Data Flow



# STDDS Data Overview

## Surface Movement Event Service (SMES)

- ASDEXMessage.positionReport (msgType=AT)
  - Delivers Cat11 messages from ASDE-X and ASSC systems
  - Fused from 4 data sources: ASR, SMR, MLAT, ADS-B
  - Messages output once per second per flight track
  - Contains aircraft identification, position, and limited flight plan information
- SurfaceMovementEventMessage (msgType=SE)
  - Derived from Cat11 messages and airport ramp boundary information
  - Identifies the following flight transitions, and the time they occurred:
    - SPOTOUT: aircraft transitioned from ramp area to movement area
    - OFF: aircraft has taken off
    - ON: aircraft has touched down
    - SPOTIN: aircraft entered a ramp area
  - Particularly useful for managing airport traffic and congestion

# STDDS Data Overview (cont'd)

## Airport Data Service (APDS)

- RVRDataUpdateMessage (msgType=RR)

Delivers runway visual range information for airports equipped with RVR systems

Used to detect reduced lateral visibility at the runway surface

Measurement is in hundreds of feet, at three different points on the runway

Trend information for each point is provided

On/Off status and intensity of runway edge and centerline lights is also provided

Messages are delivered every 2s for each airport, with each message containing all RVR runways at that airport

Exceptions are ORD, DFW, DEN and SEA which have dual RVR systems. These sites deliver 2 messages every 2s, each containing different sets of runways for those airports.

# STDDS Data Overview (cont'd)

## Terminal Automation Information System (TAIS)

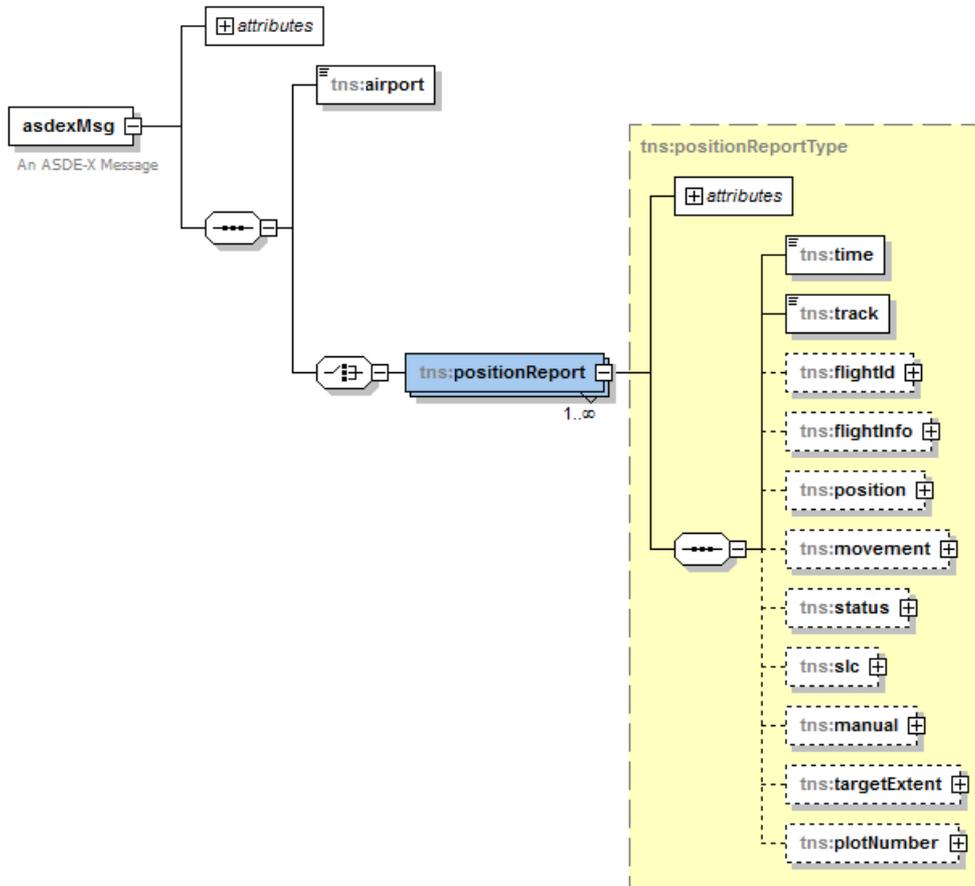
- TerminalAutomationStatus message (msgType=ST)
  - Derived from STARS AIG100
  - STARS system status
- TerminalAutomationTrackAndFlightPlanData message (msgType=FP)
  - Derived from STARS AIG200
  - Includes one or more Flight Plans and Track point data records
  - Reports track points using X/Y coordinates which can be converted to lat/lon
  - Supports strategic and tactical decision making, as well as monitoring and statistical analysis
- TerminalAutomationIMCStatusRaw message (msgType=IR)
  - Derived from STARS AIG502
  - TRACON IMC Status (visual or instrument)

# Message header properties for STDDS messages

- timestamp=2014-01-13T10:55:52.878Z  
UTC date and time of message generation
- msgType=AT, SE, RR, ST, FP, IR  
Flavor of STDDS message (see previous slides)
- airport=KBOS  
ICAO code of airport originating the message (for APDS and SMES messages)
- srcTracon=PCT  
FAA location id of the STARS site (for TAIS messages only)
- tracon=A90  
FAA location id of STDDS site that produced the message
- sendTo=filtered  
Indicates if sensitive data has been masked, otherwise “all”
- version=2.0  
New header property in R3.2, to help identify schema version

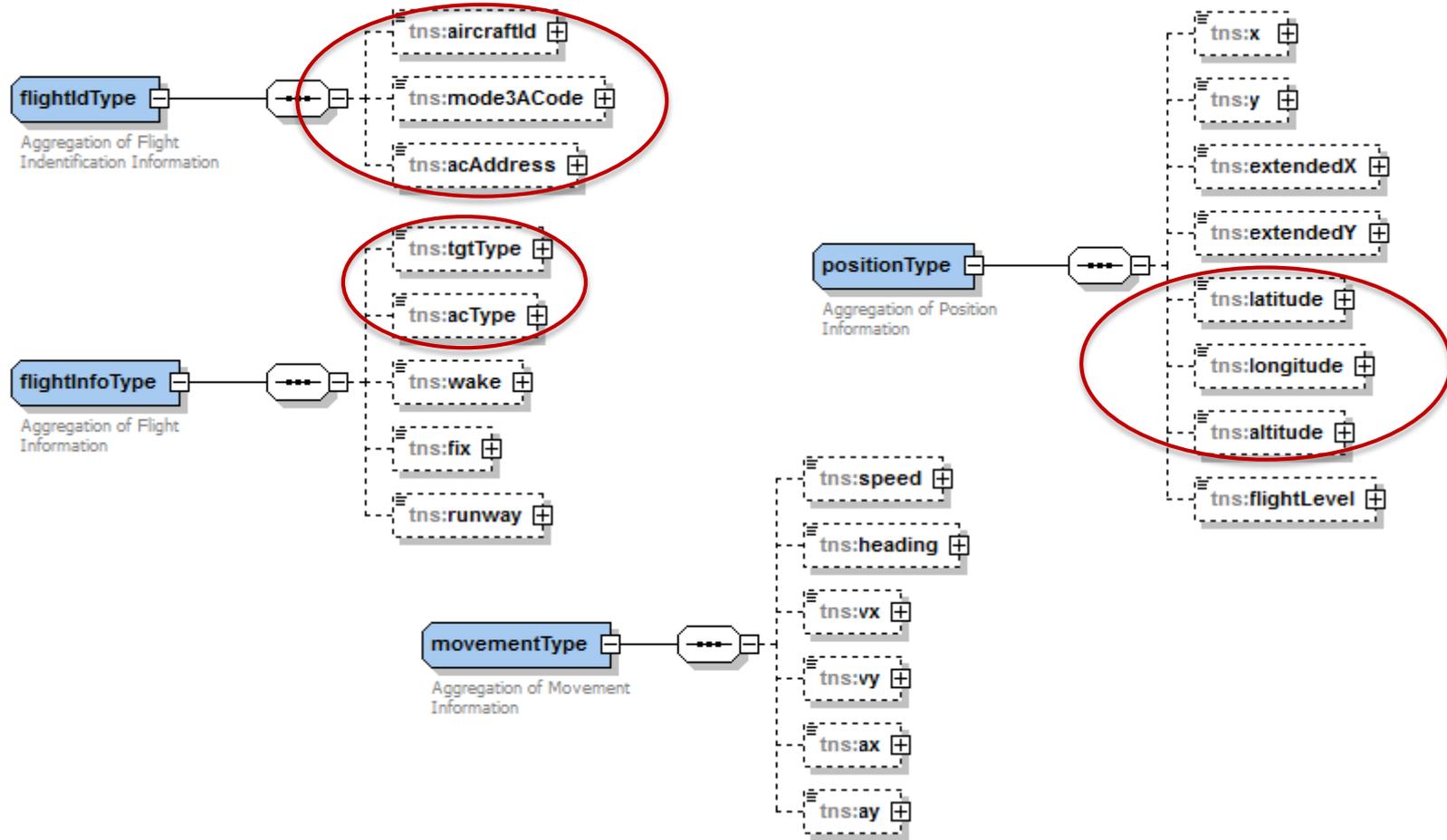
# Overview of ASDEXMessage.positionReport

Namespace: us:gov:dot:faa:atm:terminal:entities:smes:v2-0



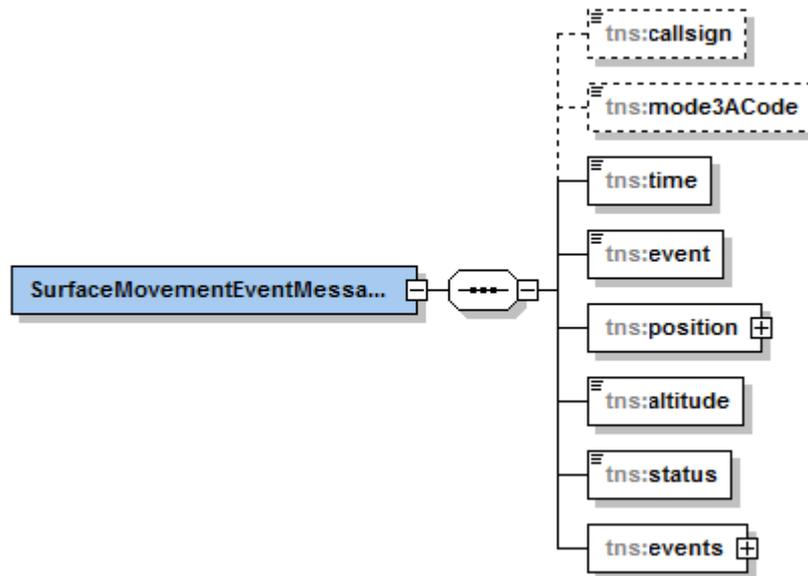
- positionReports are batched up in an asdexMsg message (100ms or 50 messages)
- In each batch, all positionReports are from same airport
- “full” attribute for positionReport indicates “delta encoding”, per track:
  - Every 60<sup>th</sup> msg has full=“true” attribute; ALL known elements are included
  - Other 59 msgs / minute have full=“false” attribute; only changed or removed elements (r=“1”) are included

# Overview of ASDEXMessage.positionReport (cont'd)



# Overview of SurfaceMovementEventMessage

Namespace: us:gov:dot:faa:atm:terminal:entities:smes:v2-0



All elements have same values from positionReport, except new elements:

- `<event>`  
Event transition for flight, values are:
  - spotin
  - spotout
  - off
  - on
- `<status>`  
Surface status of flight, values are:
  - undefined
  - airborne
  - onramp
  - onsurface
- `<events>`  
List of past events

# Artifacts used to help ingest STDDS data

**XML Schema** (R3.2-stdds-schemas-20150929.zip)

**SMES JMSDD** (NAS-JMSDD-4307-003.pdf): Java Messaging Service Description Document for the SMES, describes features and elements in the schema, such as data types, values, etc.

**TAIS JMSDD** (NAS-JMSDD-4307-004.pdf)

**APDS JMSDD** (NAS-JMSDD-4307-001.pdf)

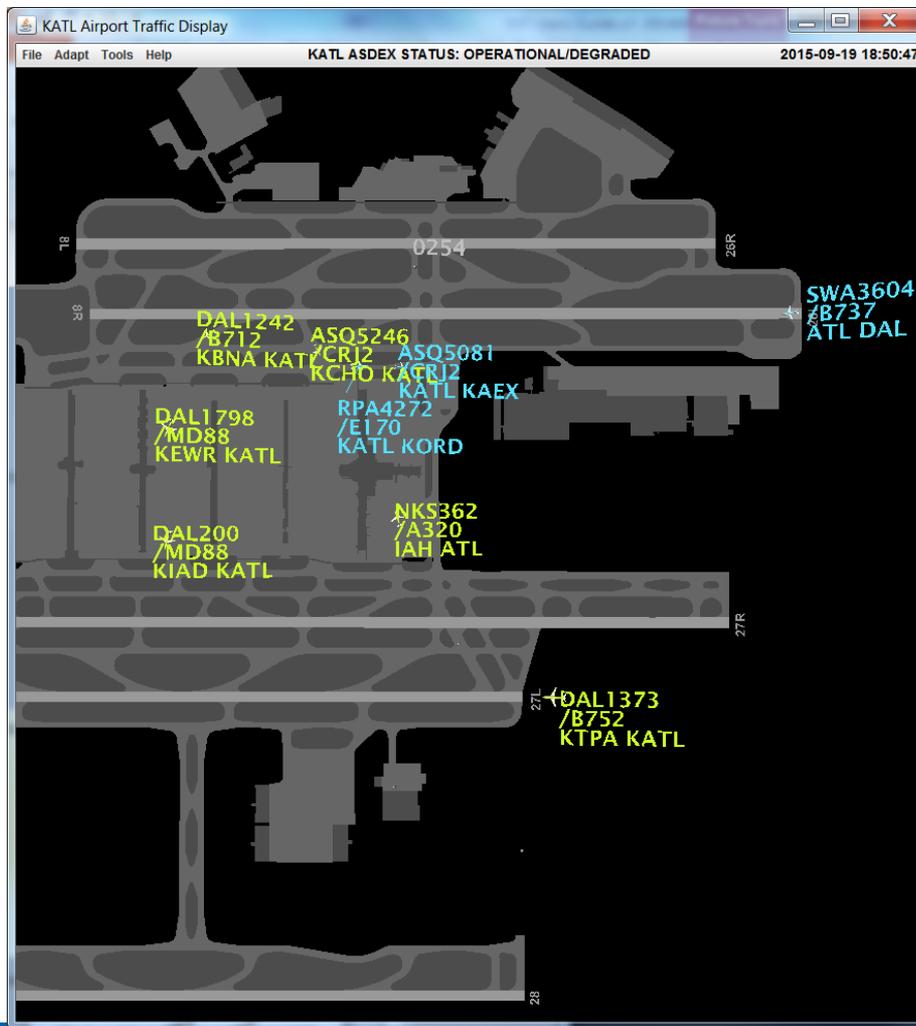
**STDDS Site Data Availability** (STDDS Site Data Availability 2016\_05\_31.xls): Identifies which airports or TRACONS publish which STDDS data products to which FAA network: Ops, FNTB, R&D

**Sample client (including Solace):** NEMSTopicClient\_v01.03.tar\_.gz

**Sample data**

All of the files above are available in the NSRR

# Other tools/resources useful with STDDS data



## SWIM Visualization Tool (SVT)

Used by TRACONs and the ATCSCC for airport situational awareness

Planned use by FAA Search & Rescue (SAR) and the Emergency Operations Network (EON)

Used by other FAA organizations for STDDS/SMES troubleshooting

# Other tools/resources useful with STDDS data (cont'd)

## RVR Status Monitor

02:16:50 UTC 04-20-2015

RVR Airports						
<b>ANC</b> 6500	<b>ATL</b> 4500	<b>BFI</b> 6500	<b>BNA</b> 6000	<b>BOI</b> 6500	<b>BOS</b> 6500	<b>BUF</b> 6500
<b>BUR</b> 6500	<b>BWI</b> 5500	<b>CJL</b> (na)	<b>CLE</b> 6500	<b>CLI</b> 6500	<b>CVG</b> 5500	<b>DAL</b> 6500
<b>DCA</b> 4000	<b>DEA</b> 6500	<b>DFB</b> 6500	<b>DFA</b> 6500	<b>DFB</b> 6500	<b>DPA</b> 6500	<b>DTW</b> 5000
<b>EUG</b> 6500	<b>EWR</b> 6000	<b>GEG</b> 6500	<b>GJT</b> 6500	<b>HOU</b> 6500	<b>HPN</b> 6500	<b>IAD</b> 6500
<b>IAH</b> 6500	<b>ILG</b> 6500	<b>IND</b> 6500	<b>ISP</b> 6500	<b>JFK</b> 6500	<b>LAX</b> 6500	<b>LGA</b> 6000
<b>LGB</b> 6500	<b>LMI</b> 6500	<b>MCI</b> 6500	<b>MCO</b> 6500	<b>MDW</b> 6500	<b>MEM</b> 6500	<b>MFR</b> 6500
<b>MIA</b> 6500	<b>MKE</b> 3500	<b>MRY</b> 6500	<b>MSP</b> 6500	<b>MWH</b> 6500	<b>OAK</b> 6500	<b>ONT</b> 6500
<b>ORN</b> 6500	<b>ORS</b> 6500	<b>PAE</b> 6500	<b>PDX</b> 6500	<b>PHL</b> 6000	<b>PHX</b> 6500	<b>PII</b> 6500
<b>PSC</b> 6500	<b>RDU</b> 6500	<b>SAN</b> 6500	<b>SDF</b> 6500	<b>SEA</b> 6500	<b>SFO</b> 6500	<b>SJC</b> 6500
<b>SLC</b> 6500	<b>SMF</b> 6500	<b>SNA</b> 6500	<b>STL</b> 6500	<b>TPA</b> 6500	<b>VNY</b> 6500	

### KEY:

Values = lowest visibility (in feet) over last 10 minutes.

6100+	2500-6000	1300-2400	800-1200	0-700	No Data
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<http://rvr.fly.faa.gov>

Used by TFMS users (TMUs) for predicting congestion

Used by Airline Operations Centers (AOCs) for situational awareness

Available for public use as well

# Other tools/resources useful with STDDS data (cont'd)



## TrackKMLConverter

Single Java file, no dependencies

Converts a specified track from SMES log data to a KML file

Useful for troubleshooting ASDE-X/ASSC and SMES data

# Other tools/resources useful with STDDS data (cont'd)

Airport feature information (runways, taxiways, ramps, terminals)

Airport ramp boundary information

Other FAA resources:

- Digital Airport/Facility Directory, or D-AFD ([http://www.faa.gov/air\\_traffic/flight\\_info/aeronav/digital\\_products/dafd/](http://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dafd/))
- Operational Information System, or OIS (<http://www.fly.faa.gov/ois/>)
- PilotWeb (<https://pilotweb.nas.faa.gov/PilotWeb/>)
- NFDC (<https://nfdc.faa.gov/xwiki/bin/view/NFDC/WebHome>)
- Airports GIS, or AGIS (<https://airports-gis.faa.gov>, need credentials)

# Questions

