SAAB REMOTE TOWER

37th Annual Pennsylvania Aviation Conference

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AGENDA

• Concept

• U.S. launch project

• Updates on the international front
CONCEPT: PROVIDE ATC TOWER SERVICES FROM ANYWHERE

Remotely (or Locally) Controlled Airport

Remote Tower Center
REMOTE TOWER CENTER

Weather Overlay

Radar

Flight Data

“Out the Window” View

Airfield Lighting Control

PTZ Camera Control

Voice Switch

Electronic Flight Strips

Optional Features
REMOTE TOWER “CROWS NEST”

• 14 high-definition (HD) cameras
• Pan/tilt/zoom (PTZ) cameras (30x)
  – Electro-optical
  – Infrared (IR)
• Signal light gun
• Microphones
• Camera housing with “AirBlade” mitigates:
  – Rain, snow, hail, moisture and dust
  – Temperature extremes
  – Sunlight
  – Insects
  – Birds
• Size: ~ 5’ diameter x 8’ height
“AIRBLADE” AT WORK
BEYOND COST SAVINGS

- Enhanced situational awareness – even in low-visibility conditions
- Radar/ADS-B surveillance overlays
- Object tracking and alerting
- Infrared vision
- Weather and informational overlays
- Automatic runway incursion alerts
- Integrated automation systems
U.S. LAUNCH PROJECT AT LEESBURG

• Goals for Leesburg Executive Airport (JYO)
  – Reduce arrival and departure delays for IFR traffic
  – Provide greater safety margins for VFR traffic
  – Aid Special Flight Rules Area (SFRA) operations

• Strategy
  – Establish rTWR demonstration system at JYO
  – Obtain FAA operational approval for basic VFR tower services at Leesburg
  – Demonstrate potential NAS benefits

• Partnership established 2014
  – Virginia SATSLab, Inc. (VSATS)
  – Leesburg Executive Airport
  – Saab Sensis
  – Advisory partners… FAA, DOAV and NATCA
OPERATIONS AT LEESBURG

• ~ 35 miles west of Washington, DC
• Designated general aviation reliever for Washington-Dulles International Airport (IAD), ~ 9 miles southeast
• Non-towered operations in Class E/G airspace

<table>
<thead>
<tr>
<th>Aircraft based on the field: 254</th>
<th>Aircraft operations: avg 316/day *</th>
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<tbody>
<tr>
<td>Single engine airplanes: 209</td>
<td>85% local general aviation</td>
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<tr>
<td>Multi engine airplanes: 31</td>
<td>11% transient general aviation</td>
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<tr>
<td>Jet airplanes: 6</td>
<td>2% air taxi</td>
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<tr>
<td>Helicopters: 8</td>
<td>1% military</td>
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* for 12-month period ending 31 December 2014
LEESBURG PROJECT UPDATE

- Installed Saab rTWR v2.0 upgrade (Ireland)
- Installed Mobile ATC Tower (RVA, Inc.)
- Executed FAA Phase 1 passive testing
  - Aug ‘16: initial Safety Risk Assessment
  - Oct-Nov ‘16: “Talk aloud” testing
  - Nov ‘16: Comparative testing
- Executing FAA Phase 2 active testing
  - Dec ‘16 – May ‘17: development of Evaluation Plan (EP)
  - Apr ‘17: Safety Risk Management (SRM) Panel meetings
  - Jun 1: FAA/AJT VP authorization to proceed
  - Jun 5: MATCT began 8-hr daily services
  - Jun 14 – Sep 8: Active testing from rTWR
  - Fall ‘17: FAA Safety Panel

DATES

| Daily June 5th through August 12th, 2017 | 0600-1400 |
| Daily August 13th through September 8th, 2017 | 1600-0000 |
PHASE 2  TEST OBJECTIVES

• Demonstrate controllers’ ability to provide ATC tower services using rTWR
• Address hazards identified by Safety Risk Management Panel
• MATCT Hours of Operation
  – 6:00 am to 2:00 pm, seven days/week, for first eight weeks of test
  – 4:00 pm to midnight, seven days/week, for last four weeks
• rTWR Hours of Operation
  – Per schedule in Evaluation Plan
SAAB REMOTE TOWER

International Updates
WHAT STARTED IT ALL?

• 2006… Saab ATM launched proof-of-concept project with LFV (Swedish ATC service provider)
  – LFV… operational concepts, validation and safety assessment
  – Saab… system development
  – Air Traffic Controllers and Safety Authorities… collaborated

• The LFV business case based on:
  – ATC services at smaller airports
  – Low-cost alternative to building or refurbishing ATC towers
  – Enhanced local operations
  – Contingency operations at larger airports
WORLD’S FIRST AIRPORT WITH REMOTE TOWER SERVICES

Örnsköldsvik Airport Commissioned by LFV on 21 April 2015
LFV REMOTE TOWER CENTER
IN SUNDSVALL, SWEDEN

2nd Remote Airport (Sundsvall) commissioned in November 2016

3rd Remote Airport (Linköping) to follow in 2017
IRISH AVIATION AUTHORITY (IAA) REMOTE TOWER TRIALS PROJECT

- SESAR Large Scale Demonstration “Call for Tender” – October 2014
- IAA Contract with Saab – May 2015
- System Installation Concluded – March 2016
- System Site Acceptance Testing – May 2016
- Demonstrations – June-September 2016
- Demonstration Report – October 2016

**IAA long-range plan:** Operational approval for dual-airport, remote tower operations at Cork and Shannon airports
NATS/LONDON CITY AIRPORT DIGITAL TOWER

- 4.5 million passenger enplanements in 2016
- To replace 30-year old control tower with digital ATC tower
- Live feed to new NATS control room in Swanwick, Hampshire
- 2018 – Construction of 150’ digital tower
- 2019 – Operational
OUR 10-YEAR JOURNEY…

- r-TWR proof of concept project start
- ART project start
- Shadow mode validations at Sturup
- ART validations at Sturup
- SESAR validation 2 single
- Delivery of SESAR r-TWR prototype Værøy-Bodo
- Delivery of r-TWR test system to Airservices
- SESAR validation Contingency Landvetter
- Approved for operational use
- IAA Contract
- r-TWR installed at Ängelholm airport
- Start of SESAR r-TWR projects
- Delivery of 1st operational r-TWR system
- SESAR validation AFIS Værøy-Bodo
- Start of operational certification in Sweden
- Delivery to Rest
- SESAR Multiple Simulation/Validation
- Full operations 21st of April
- Leesburg Virginia validations
...CONTINUES