The Next Generation Air Transportation System – NextGen or Destination 2025 - For Airports

Presented to:  WTS CT Valley

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NextGen Branch Manager

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Flight Standards Role at the Certificate Management Office (CMO) or Flight Standards Field Office (FSDO) Level

• Approve avionics equipment installation in the aircraft (ADS-B, Datalink, GPS including RNP AR, Electronic Flight Bags or EFB, EFVS, etc.)
• Approve Maintenance Program for equipment
• Approve Pilot Training Program for use of the equipment
• Approve Manuals for use of the equipment
• Approvals are mostly done through Operations Specifications (OPS Specs) which is a “contract” between the operator and the FAA
Elements of NextGen

• Performance Based Navigation (PBN)
  – RNAV
  – RNP – Required Navigation Performance
  – RNP SAAAR (RNP/AR)

• Surveillance (2020)
  – ADS-B In / ADS-B Out
    - TIS-B / FIS B

• Aircraft Centric Technology
  – HUD – Head-Up Display
  – EFVS – Enhanced Flight Vision System
  – SVS – Synthetic Vision System
  – EFB – Electronic Flight Bag

Photo courtesy of Chaim Van Pryoon
NextGen in CT

- The NextGen Branch is working with the Windsor Locks FSDO and 4 part 135 Operators for Electronic Flight Bag (EFB) Authorization.

- A part 135 operator is seeking Enhanced Flight Vision System (EFVS) Authorization. This will permit the use of Infrared to aid in low visibility operations and landings below Decision Height.
NextGen in CT

• There are 3 RNP AR approaches at Bradley and one Special Authorization CAT II Approach
• New Haven, Oxford, and Groton have Localizer Performance with Vertical guidance (LPV) precision approaches which rely upon GPS versus ground based NAVAIDS
• We will continue to work with you and your airports to find opportunities where NextGen may benefit your state.
Electronic Flight Bag

- Pilot Brain Book
  - Departures/Arrivals
  - Approach Charts
  - Airport Position & Conflicting Traffic
  - ADS-B/Self Separation
Hardware Example:
Class 2 EFB Aircraft Display
Electronic Flight Bag
Moving Map Display

Map View

Pilot View
Super Density Ground Ops & Electronic Taxi Charts

- Integrity of data for E-Taxi Charts
- Stringent control of data by airport operator
- Vehicle control concepts
- Timely integration of E-Taxi Chart “route” changes in data base
- EFVS/SVS credit opportunities
Head-Up Display

• Provides primary flight, navigation, and guidance information to the pilot in a forward field-of-view on a head-up transparent screen.

• Reduces flight technical error.

• Provides for a more stabilized approach.

• Eliminates head-down to head-up transition time.

• Eliminates out-the-window accommodation time.
Performance-Based Cockpit Technology in Low Visibility Operations

- Enhances low visibility flight and ground operations.
- Increases access, efficiency and throughput at many airports when low visibility is a factor.
- Reduces infrastructure necessary to support low visibility operations.
- Provides flight guidance on a HUD
- Provides a real time display of the outside world in low visibility conditions through the use of imaging sensors (forward looking infrared, millimeter wave, low-light level intensifying, etc.)
- HUD and EFVS are key enablers for Equivalent Visual Operations.

**HUD + Sensor Imagery = EFVS**
EFVS/SVS Technology Evolution

Yesterday

Today

Combined EFVS/SVS

SVS Research Efforts Underway

Emerging EFVS Capabilities
91.175

- EFVS Operations below DH
- Pilot continues with EFVS and real world visual cues
- LED lights are not visible in EFVS
GPS Problems

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<th>PERFORMANCE</th>
<th>CATEGORY I ILS Requirements</th>
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<td>H. 13 m</td>
<td>H 16.0 m V 4.0 m</td>
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<td>V. 23 m</td>
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ACCURACY (95%) | AVAILABILITY | INTEGRITY | CONTINUITY OF SERVICE
**User Segment**

- Consists of the GPS & WAAS-enabled receiver
- Receives WAAS corrections from the communications satellite to improve its position & time accuracy
- Accuracy of 7.6 m (25’) both laterally & vertically at least 95% of the time
WAAS Master Station
RNAV 1 and RNP AR Authorization Status

RNAV 1
• 838 U.S. operators and 90 foreign air carriers with RNAV 1 authorization

RNP AR
• 11 airlines (including 2 foreign air carriers) have been approved for RNP AR operations in the U.S.
• 22 corporate, charter, and fractional operators
• Approximately 2,300 aircraft associated with RNP AR approvals
  – Airbus A-320
  – Boeing B-737NG, 757, 767, and 777
  – Bombardier Q-400
  – Embraer E-170/190
  – Gulfstream G-350/450/500/550
  – B-737NG and B-777
  – Cessna Sovereign
WAAS Avionics Status

Garmin:
- 68,000+ WAAS LPV receivers sold
- New 650/750 WAAS capable units brought to market at the end of March 2011 to replace 430/530W units

AVIDYNE & Bendix-King:
- Avidyne release 9 and IFD 540 (panel mount) introduced at Oshkosh 2012
- SmartDeck glass panel and KSN-770 certification still pending

Universal Avionics:
- Full line of UNS-1Fw, UNS-1Ew and UNS-Lw Flight Management Systems (FMS) with WAAS LPV certifications
- 1900+ units sold

Rockwell Collins:
- Approximately 2,000 WAAS/SBAS with LPV integrated units sold to date

CMC Electronics:
- Achieved Technical Standards Orders Authorization (TSOA) certification on their 5024 and 3024 WAAS Sensors
- Convair aircraft will have WAAS LPV capable units installed December 2011
- Canadian North B-737-300 obtained STC for SBAS(WAAS) LPV using dual GLSSU-5024 receivers.

Honeywell:
- Primus Epic and Primus 2000 w/NZ 2000 & CMC 3024 TSO Approval, 12 aircraft have SBAS(WAAS) LPV STC certification.
- Primus 2000 FMS w/CMC 5024 TSO pending
WAAS Navigation Display of an LPV Approach
RNAV Equipage

- Aircraft don’t need to be FMS equipped to fly RNAV SIDs and STARs
Do you have LPV at your Airport?

- Clear approach surfaces required
- Infrastructure including Runway Markings required
- Who are your users?
Questions?

Thank you