Universal Product Update

• UNS Flight Management System
• EFI-890R and EFI 1040, Electronic Flight Display Systems
• Attitude & Heading Reference System (AHRS)
• UniLink Communications Management Unit
• Iridium for Datalink
• LPV
Flight Management Systems

SBAS FMS Family
LP/LPV Monitor

- Fly RNAV (GPS) LP and LPV Approach Types With a Single FMS Installation
- Internal SBAS Receiver Compatible with WAAS, EGNOS and MSAS
- Eliminates the Need for RAIM Prediction
- Embedded Precision Approach Subsystem (Level B)
- FAA TSO C-146b and C-115b Certified
Benefits of FMS for LPV

LPV/APV Approach

– Procedure development focused in areas not served by ILS
  • Greater access to airports and new markets
– Minimal Approach training
– Allows you to plan alternate airports served by LPV/APV
  • Closer alternate airports means less fuel on board
– LPV/APV Approach as back up to ILS
  • Ensures on time arrival even when ILS is down
– Stabilized LPV/APV approach eliminates intermediate step-down fixes
  • Added safety and fuel savings
– Minimal Approach training
LPV Monitor
LPV STC’s Completed

• ATR 42/72 – 1LW - single with LPV monitor.
• BAE 146 – 1LW - dual FMS / LPV.
• Dash 8 – 1LW - dual LPV.
• F50 – 1LW - single with LPV monitor.
Datalink - UniLink CMU

- 1 MCU Box
- Optional version with Internal VDR
- Media Interfaces
  - Digital VHF
  - SatCom
- FANS Compliant
- ATN / Link 2000+
- Air Traffic Services
  - D-ATIS
  - PDC
  - Oceanic Clearance
  - Taxi Clearance
  - Push Back Clearance
- Uplink Weight & Balance, Load sheets, Take off data, etc.
DataLink via Iridium

“The new affordable SATCOM”
• **Global SATCOM** – ICG Iridium.
• **Cost effective** – ACARS – Cockpit Security Services.
• **Cost effective** – Cabin Voice / Data in one 2 MCU unit.
• **Fans** over Iridium approved.
• **CPDLC** – **Link 2000 solution**.
• **Low**
  – Installation hardware cost.
  – Low voice cost.
  – Low data cost.
• **3000 aircraft installations** flying with models of the ICG Iridium.
Installation Kits
Antennas and Coax
External SIM Readers
Wiring and Extender Cables
Ease of installation
120-150 man hrs. 1st install
AHS-525 System

- Available February 2015
- Solid-State MEMS sensor
- Plenty of digital & analog I/O
Large Displays

- EFI 890R - LCD
- EFI 1040 – AM(active matrix)LCD
EFI-890R Display System – 8.9 in

- Certified on over 50 Aircraft Types and Counting
- Single Part Number for PFD & ND
- Configurable by Installer
- LED Backlighting – LCD Display
  - Significantly Higher MTBF than Fluorescent
  - Lower Power Requirement
  - Less Heat
- Full Integration to existing Autopilot
- RNP & LPV/APV LoS Annunciators Built-In
- Weight Savings
- Displays Universal Synthetic Vision System
- Display Universal ASU Class III EFB
- Input for external video
The Perfect Fit Cockpit Upgrade for the Saab 340
UASC Next Generation Components

- AM(active matrix) LCD – LED backlit Displays
- Each display is a “System”
  1. EFIS Control Display Unit
  2. Alpha-Numeric Keypad
  3. Reference Set Panel with SPD / HDG / ASEL
  4. Cursor Control switch on flight control stick for control of many EFIS functions / settings with Hands on the controls
System Components

Data Concentrator Unit (DCU)

EFI Display

Reference Set Panel (RSP)

EFIS Control Display Unit (ECDU) & Alpha-Numeric Keypad (ANK)
System Features

• **Embedded** Synthetic Vision
• **Embedded** Chart Function
• **Embedded** Radio / Frequency Management
• **Embedded** Terrain Awareness & Warning System (TAWS)
• **Enhanced** Moving Map Functions
• High Speed digital network architecture
CASE STUDY

ATR 72-500
Upgrade Items on the ATR Fleet

Aging & Obsolescence

- SPZ-6000 System
  - ED-800 Display
  - SG-811 Symbol Generator
  - AH-600 AHRS system
- AZ-810 Air Data System
- Radio Control Panel obsolescence
- RADAR performance
Operational requirements

- PRNAV requirements / navigation equipment update

- ADS-B Out Mandates and future ADS-B in advantages
Phased Retrofit Advantages

• Start with a dual PFD installation only,
  – replacing existing ED-800 displays and SG-811 symbol generators

• Removes 25 LRUs per aircraft
  – Includes Radio Tuning capability – remove CTLs
  – Includes FMS system & ADS-B compliant GNSS

• Provides path for replacement of other components.
LRUs removed for Two PFD only Installation

- 4 ea. ED-800 CRT Displays
- 2 ea. SG-811 Symbol Generators
- 2 ea. DC-810 EFIS Ctrl Panels
- 2 ea. BA-141 Altimeters
- 2 ea. SI-285 Airspeed Indicators
- 2 ea. RA-VSI Indicators
- 2 ea. RMI Indicators
- 1 ea. DS-125 TAS Indicator
- 1 ea. ID-802 Advisory Display
- 1 ea. KLN-900 GPS
- 6 ea. Radio CTL units

Sept. 2014
Additional LRU Candidates for Replacement with Two PFDs

- 2 ea. AH-600 AHRS – replaced by UASC AHS-525 (ARINC 429) – ASCB to AFCS supplied by display system
- 2 ea. AZ-810 Air Data Computers – replaced by new ARINC 429 ADC – ASCB to AFCS supplied by display system.
- If a new All-in-One standby is installed
  - Standby Attitude instrument
  - Standby Airspeed
  - Standby Altimeter

Sept. 2014
Preparing for the Future

• ADS-B Mandate
  – High precision GNSS data needed – UASC FMS provides this
  – Transponder Update – multiple options

• ACARS / Future ATN capability
  – Universal UL-80X provides ACARS today plus two way messaging / tracking / graphical weather
  – Provides path to LINK-2000+ and US ATN requirements
Universal Two PFD Equipment

- 2 ea. EFI-1040P displays
- 2 ea. Electronic Control Display Units (ECDU)
- 1 ea. Alpha-Numeric Keypad
- 1 ea. Reference Set control Panel (RSP)
- 1 ea. Data Concentrator Unit (DCU)
- 1 ea. UNS-1Lw Nav Computer with embedded GNSS
- 1 LPV Monitor
ATR72-500+
updated cockpit display.

Possible cockpit configuration for an ATR72-500 upgrade using 4 EFI 1040 displays. The screen controllers would be mounted on the central pedestal.
LPV
The EGNOS system

- **EGNOS** is the European SBAS augmenting GPS L1 signal over the ECAC area

EGNOS is interoperable with other SBAS systems
What are LPV Approaches?

- A localizer performance with vertical guidance (LPV) approach based on SBAS GPS capabilities.
- A LPV approach is similar to an LNAV/VNAV approach.
- An LPV approach can get a pilot down to a 200 (250 feet decision altitude).
Performance Based Navigation
EGNOS BASED APPROACHES WITHIN PB CONCEPT

EGNOS for aviation

Performance Based Navigation

Chart: RNAV (GNSS)

RNP APCH

WITHOUT VERTICAL GUIDANCE

LNAV

LP

NPA SBAS supported Localiser Performance

GPS NPA Expected to be flown with CDFA

Chart: RNAV (RNP)

RNP AR APCH

WITH VERTICAL GUIDANCE

LNAV/VNAV

LPV

APV Baro (can also be supported by SBAS)

APV SBAS supported Localiser Performance with Vertical Guidance

Authorisation required, RF

30/09/2014, Barcelona
Short/mid-term expectations

As of 18th Sept 2014
128 LPV serving 86 airports
76 runways served by EGNOS enabled APV Baro

Plans by 2016
>320 LPV planned by 2016
LPV European Implementation

- 128 Approaches approved
- 80 runways
- LPV 200 - SBAS Cat 1
- 200 ft. minima (currently 250 ft.)
LPV FUNDING - only 30 days left!

- EGNOS has opened up funding for airline enablers.
- Funding for up to 60% of hardware and 7% of Operational costs
- **Only 30 Days remain** to apply for LPV funding
- Contact Victor and Carmen at ERA Barcelona
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