Collins Aerospace Pro Line 21 Program Updates

CJP 2019 CONVENTION - SEPTEMBER 6th, 2019

CJ/CJ1/CJ2 and 500 Series Legacy Session
Objectives

- Share latest Collins Aerospace program offerings and status
  - Temperature Compensation issue
  - ADS-B compliance
  - LPV upgrade
    - CJ1, CJ2
- Pro Line 21 Airspace Modernization Package
  - CJ1, CJ2
- Datalink / CPDLC roadmap
- Answer questions and receive feedback
Temperature Compensation (Update from 2018)

Pro Line 21 aircrafts with FMS 3.3.x and 4.x

- **Issue**
  - When a “climb to” altitude is manually edited or compensated for temperature, FMS may turn aircraft in wrong direction

- **Impact**
  - Collins OPS bulletin in 2018 recommended operators to turn off the temperature compensation feature

- **Corrective action**
  - An Airworthiness Directive from the FAA is expected to mandate the removal of the temperature compensation feature
  - Removal procedure at approved service centers or dealership
  - Approach procedures are not being removed from the FMS
  - FAQs: [https://www.rockwellcollins.com/Landing/FMS/FAQ-OPSB016617R1.aspx](https://www.rockwellcollins.com/Landing/FMS/FAQ-OPSB016617R1.aspx)
ADS-B out

Only 4 months left!

- Still time to equip before December 31th, 2019 FAA deadline
  - June 7th, 2020 EASA deadline

- Available options with Collins equipment (TDR-94 and GPS-4000S)

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<th>Aircraft model</th>
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<td>Citation I / 500</td>
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WAAS/LPV upgrade

Available at Textron Service Centers

- **Eligible Aircrafts**
  - Citation Jets 1 / 2

- **Benefits**
  - Access to non-ILS runways with reduced minimums (200ft DA, half-mile visibility)
    - About 4,000 LPV approaches now available in US, serving airports (1,200 of which without ILS)
  - Based on SBAS technology (WAAS in the US)
    - Same GPS can be used for ADS-B out compliance
    - Independent from temperature for vertical navigation

- **Upgrade**
  - Pre-requisites: DBU-50x0 + GPS-4000S
  - New hardware
    - OCM-3100
    - IOC-3100
  - Upgrades through Service Bulletins
    - IOC-3100
    - AFD-3010
Citation Jets 1/2 - Pro Line 21 Airspace Modernization

Upcoming retrofit package

• Value-add bundle to help single pilots navigating a more complex airspace
  • ADS-B compliance
  • LPV / RNP / Coupled VNAV
  • Charts on MFD (new FSU)
  • New dual FMS / CDU
  • New Radio stack
  • SW update to PFD/MFD
  • Optional SVS
  • Optional graphical weather
  • Optional VHF datalink

• SW update under development
  • SW certification Q4 2019
  • STC development and certification pending aircraft availability (incentive available), Q1 2020 target
Datalink / CPDLC 1-pager
Definitions, Benefits and Requirements

• **What is CPDLC by the way?**
  • “Controller-Pilot Data Link Communications”
  • Aka text messages replacing ATC voice communication
  • Using VHF DataLink (VDL) mode 2 over:
    • ACARS network in USA / North Atlantic (“FANS 1/A”)
    • ATN (B1) network in Europe (“Link 2k”)

• **Benefits**
  • Less errors / Safer communication with ATC
  • Faster airport clearance in congested area
    • Departure Clearance or DCL, deployed in 62 US airports
  • Dynamic en-route updates sent via text
    • US deployment starting Q3 2019, until 2022/2023
    • Unequipped aircraft will not have preferential routes to busy airspace (“Best-Equipped / Best-Served”)
  • More efficient North Atlantic Tracks (FANS 1/A required FL 290 to FL390)

• **Aircraft requirements**
  • VHF DataLink Mode 2 radio (+ Satcom for oceanic FANS)
  • Communication Management Unit (CMU or RIU)
  • Avionics displaying/acknowledging CPDLC messages
  • Datalink subscription service (eg ArincDirect)
  • “Push-to-load” FMS for en-route updates, once fully deployed in 2023 (“push” of new flight plan in FMS)

**Is it mandatory?**
• Domestic US: No (BEBS)
• North Atlantic Tracks: Yes (FANS 1/A)
• Domestic Europe: No for used aircraft below 100,000lbs MTOW and 19 seats (BEBS)
## Paths / Roadmap

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<td><strong>Late 2020 target, to be confirmed</strong> Potential additional option to on-going Airspace Modernization STC project (Domestic CPDLC US / Europe)</td>
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Q&As

• What is Collins’ plan to support Pro Line 21 fleet going forward?
  • We are continually investing in STC programs to bring new capabilities to Pro Line 21 aircraft (upcoming CJ1/CJ2 Airspace and CPDLC bundle is an example) not on a Pro Line Fusion path
  • We recognize we have a large Pro Line 21 fleet which needs to stay current with airspace requirements and upcoming obsolescence, which manifest themselves essentially through our FMS computer and software
  • We are currently developing an FMS roadmap for Pro Line 21 and will communicate once ready for market introduction