FAA AC for PBCS Approval AC 90-117

Global Operational Data Link (GOLD)
Familiarization with Performance Based Communications and Surveillance (PBCS) Workshop
Dakar, Senegal 11-15 September 2017

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Introduction

- The presentation provides an overview of the FAA AC for PBCS approval – AC 90-117
- The AC is scheduled to be released this month
- The AC was released for public comment this spring, and the release version will be provided
- A notification of the final version will be provided to the attendees of this workshop
Status of State Operator Policy Development

➤ Transport Canada
  • Advisory Circular (AC) 700-041: effective 1 Jan 2017

➤ United Kingdom
  • Aeronautical Information Circular Y 062/2017: effective 8 June 2017

➤ United States
  • Advisory Circular (AC) 90-117
    • Posted for 30-day public comment (ended 15 May)
    • Anticipated publish date in September 2017
  • FAA inspector guidance, authorization templates (A056) and a compliance matrix published anticipated by Sep 2017
The following slides were prepared and presented by Mark Patterson, FAA AFS-470 as identified with the stipulations

- These are DRAFT documents
- This discussion covers the documents as of today

A public comment period will be completed prior to publication.
Objectives

- Timelines
- AC Overview
- New Content
  - CPDLC-DCL vs. PDC
  - CPDLC
  - CVR/FDR Recording
  - Aircraft Eligibility
  - NAS En route
  - Oceanic and Remote
  - Communication Service Provider (CSP)
  - Performance Monitoring
  - Flight Planning
- Supplemental Materials
- Questions and Answers
AC 90-117 Format

8 Chapters:

- Ch 1: General
- Ch 2: Data Link Communications Overview
- Ch 3: Aircraft Eligibility
- Ch 4: Communication Service Providers (CSP)
- Ch 5: Operational Use of Data Link Communications
- Ch 6: Performance Monitoring
- Ch 7: Training
- Ch 8: Reports

Chapters 3 thru 8 provides complete data communication guidance.
7 Appendices:

- A - Foreign Operators
- B - MEL and MMEL Provisions
- C - Summary of Airspace Requirements
- D - Flight Planning
- E - Voice Phraseology
- F - CPDLC uplink and downlink tables
- G - Terminology and Acronyms
New Content

- CPDLC-DCL vs. PDC
- CPDLC-DCL & “KUSA” NSDA
- CVR/ FDR
- Aircraft Eligibility
- NAS En Route
- Oceanic and Remote Continental
- Communication Service Providers (CSP)
- Performance Monitoring
- Flight Planning
- Numerous Diagrams and Tables
Aircraft Eligibility: Performance

• Initial Aircraft Eligibility is based on:
  – A Statement of Compliance (SOC)
  – Demonstrated performance:
    https://www.faa.gov/air_traffic/separation_standards/PBCS_Monitoring/
    • SOC not available - demo performance data only may be used
    • Performance not avail – may use identically-equipped aircraft data

• SOCs are accomplished by:
  – Entity that owns the design approval for the aircraft data link installation
"The FAA has approved the aircraft data link system to the criteria in AC 20-140C for the following data link capabilities:

| Interop Designators:          | FANS 1/A+ (with automation) |
|                              | ATN B1                      |
|                              | B2                          |
|                              | ACARS ATS                   |

| Subnetworks:                 | VDL M0/A/2                  |
|                             | SATCOM (Classic Aero, SBD, SBB) |
|                             | HFDL                         |
|                             | ACARS ATS                    |

| Aircraft-Allocated Performance | CPDLC: RCP 130, RCP 240, RCP 400 |
|                                | ADS-C: RSP 160, RSP 180, RSP 400 |

• This design approval does not constitute operational authorization."

Note: Should be provided in the normal section of the airplane flight manual or flight manual supplement
Oceanic and Remote Continental: RCP

- **RCP 240/400**
  - Requires A056
  - Minimum acceptable performance 95%
Oceanic and Remote Continental: RSP

- **RSP 180/400**
  - Requires A056
  - Minimum acceptable performance 95%
CSP

- Operators must ensure the services they have arranged with their CSP(s) include:
  - Failure Notifications (to operator and ANSPs affected along route of flight)
  - CSP ability to meet their performance allocations associated with RCP and RSP in Table 1 of the OpSpec/MSpec/LOA
  - Recording data link messages
  - CSP Integrity
  - Adequate subnetwork coverage for the route of flight
Performance Monitoring - oceanic

- FAA conducts performance monitoring:
  - New York, Oakland, Anchorage
  - Analysis of Actual Communication Performance (ACP) and Actual Surveillance Performance (ASP)
  - Semi-annual basis with an emphasis on nominal continuity (95%)

- Operators must address substandard performance:
  - Operator’s monitoring process, CSP, FAA, or foreign authority

- FAA PBCS monitoring website shows FAA airspace aggregate performance (pass/fail/insufficient data). Respond to a “Fail” by:
  - Following the website guidance to request additional info and a corrective action plan. May result in:
    - Operating at a lower performance until corrected
    - Changing filed flight plan designators for lower performance
Performance Monitoring - oceanic

Eligibility for RCP240 and RSP180 based on 95% criteria

- **Initial**
  - Use most recent FAA monitoring report
  - “Pass” → supports SOC in determining aircraft eligibility
  - “Fail” → operator provided additional information showing deficient allocations, etc. While correcting deficiency, operator may be approved for lower performance if meeting those allocations
  - “Insufficient data” → use SOC only and data from identically-equipped aircraft type

- **Recurring**
  - Operator/CSP monitor own performance → pro-active engagement
  - FAA runs semi-annual report
  - “Pass” → no issues
  - “Fail” → website directions for additional data/corrective action plan--may result in authorization downgrade to lower performance
Item 10a: Equipment and Capabilities

Radio communication equipment and capabilities

**J-codes**
- J1 - CPDLC ATN VDL Mode 2
- J2 - CPDLC FANS 1/A HFDL
- J3 - CPDLC FANS 1/A VDL Mode A
- J4 - CPDLC FANS 1/A VDL Mode 2
- J5 - CPDLC FANS 1/A SATCOM (INMARSAT)
- J6 - CPDLC FANS 1/A SATCOM (MTSAT)
- J7 - CPDLC FANS 1/A SATCOM (Iridium)

**P-codes**
- P1 - CPDLC RCP 400
- P2 - CPDLC RCP 240
- P3 - SATVOICE RCP 400
- P4-P9 – reserved for future
Flight Plans - examples

RCP 240 and RSP 180
- Field 10 → “P2” and “P1” and appropriate “J” code
- Field 18 → “SUR/RSP180 RSP400”

RCP 400 and RSP 400
- Field 10 → “P1” and appropriate “J” code
- Field 18 → “SUR/RSP400”

No RCP/RSP
The operator may still use CPDLC/ADS-C but not for any services predicated on RCP/RSP
- Field 10 → no “P” code
- Field 18 → no “SUR/” indicated
Item 18: Other Information

DAT/ Indicate data communication equipment and applications or capabilities not specified in 10a

SUR/ Indicate surveillance equipment and capabilities not specified in Item 10b
  – Indicate as many RSP specification(s) as apply to the flight, using designator(s) with no spaces
    • RSP180
  – Multiple RSP specifications are separated by a space
    • RSP180 RSP400.
Item 10b: Equipment and Capabilities

Surveillance equipment and capabilities

**ADS-C**

D1 - ADS-C with FANS 1/A capabilities
G1 - ADS-C with ATN capabilities
As part of PBCS authorization, aircraft operators are required to demonstrate their aircraft eligibility for applicable RCP/RSP specifications, in accordance with ICAO Annex 6.

In most cases, this can be done through a Statement of Compliance (SoC) within Aircraft Flight Manual (AFM).

Some legacy airframes and older datalink systems were excluded from these AFM statements by major aircraft manufacturers because they had been certified before the RCP/RSP specifications were available.

- OEMs certain these legacy airframes do not meet the safety requirements prescribed in the applicable RCP/RSP specifications.

Re-certification has been identified by some OEM as difficult and costly due to considerable amount of engineering and validation resources required for the effort.
There are 5 aspects to the allocations for aircraft systems and aircraft operators defined for RCP240 and RSP180.

The end-to-end performance monitoring data separately addresses the system time/continuity requirements and give an idea of how well the aircraft are performing when the system works as expected.

The safety requirements and monitoring/alert requirements, as well as integrity and availability, provide design constraints to mitigate hazards encountered when the aircraft or some part of the end-to-end system are not performing as expected.

The SoC is an essential piece of the operator approval process and ensuring aircraft can meet all of the requirements identified as having significant impact of safe use of the reduced horizontal separation standards.
Questions??