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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FAA

Federal Aviation Administration

Introduction

- The presentation provides and 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.

AC 90-117 Format

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

Statement of Compliance - example

"The FAA has approved the aircraft data link system to the criteria in AC 20-140C for the following data link capabilities:

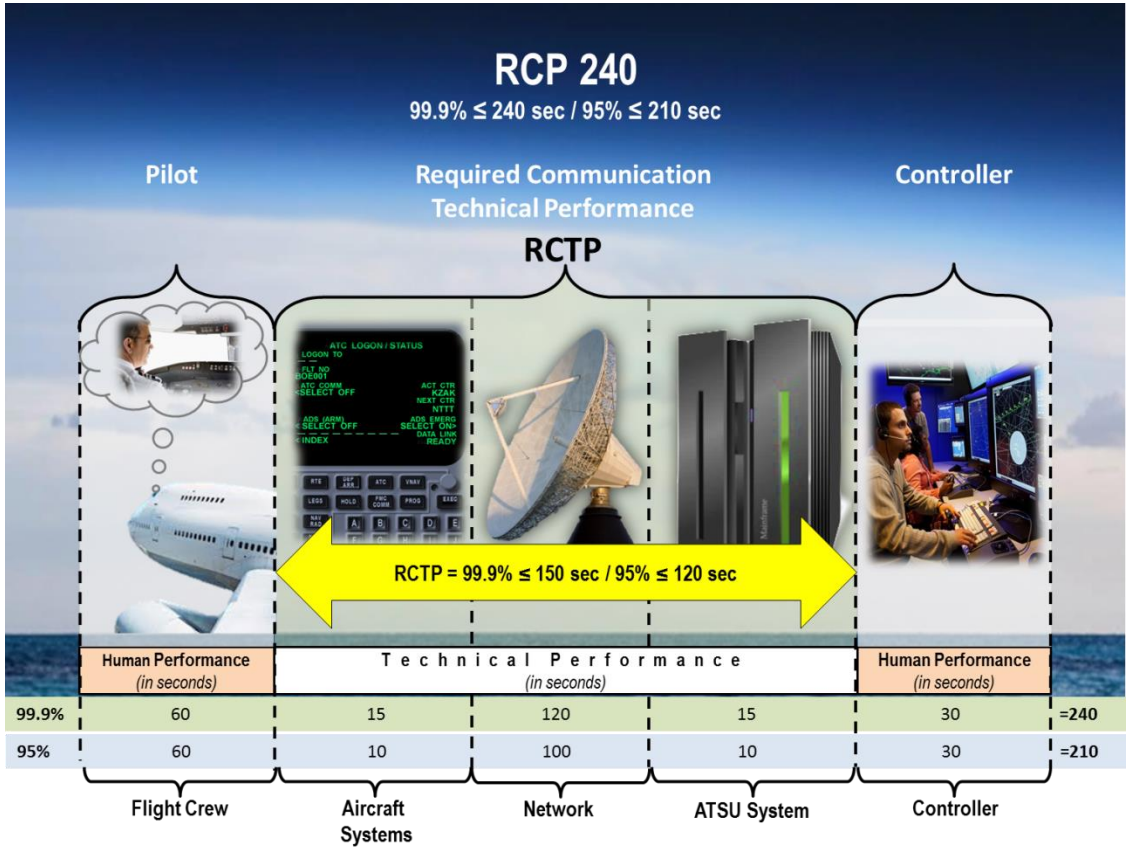
Interop Designators:	FANS 1/A+ (with automation) ATN B1 B2 ACARS ATS
Subnetworks:	VDL M0/A/2 SATCOM (Classic Aero, SBD, SBB) HFDL ACARS ATS
Aircraft-Allocated Performance	CPDLC: RCP 130, RCP 240, RCP 400 ADS-C: RSP 160, RSP 180, RSP 400

•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

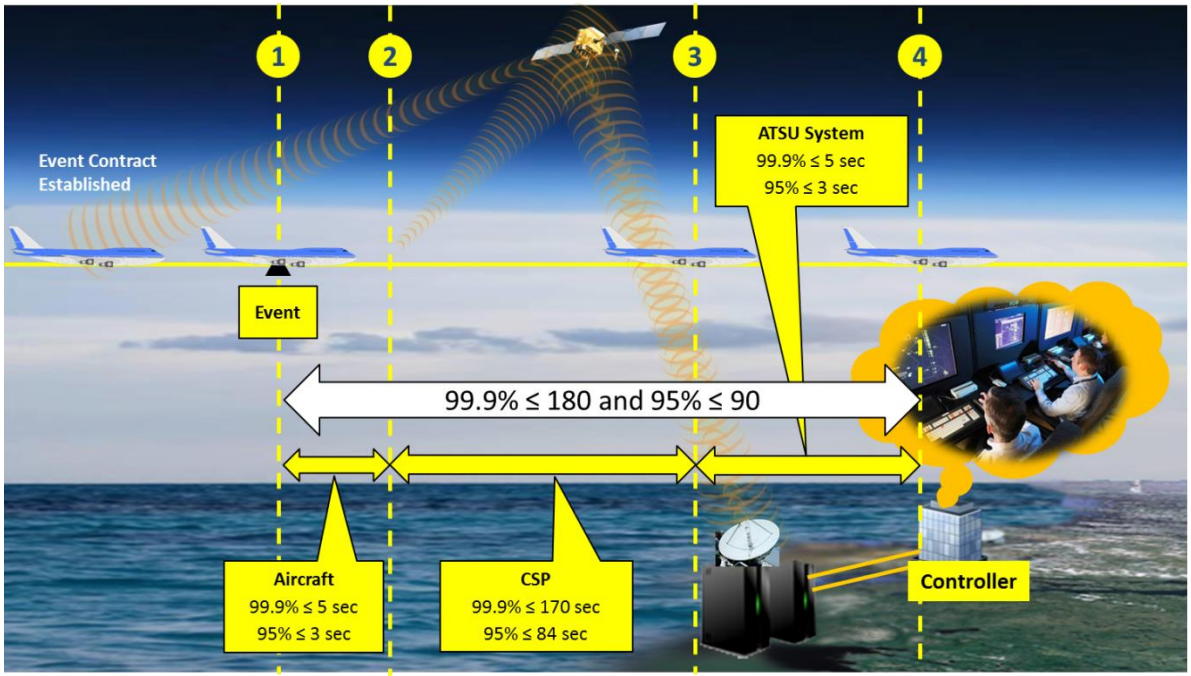
Oceanic and Remote Continental: RCP

- **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)

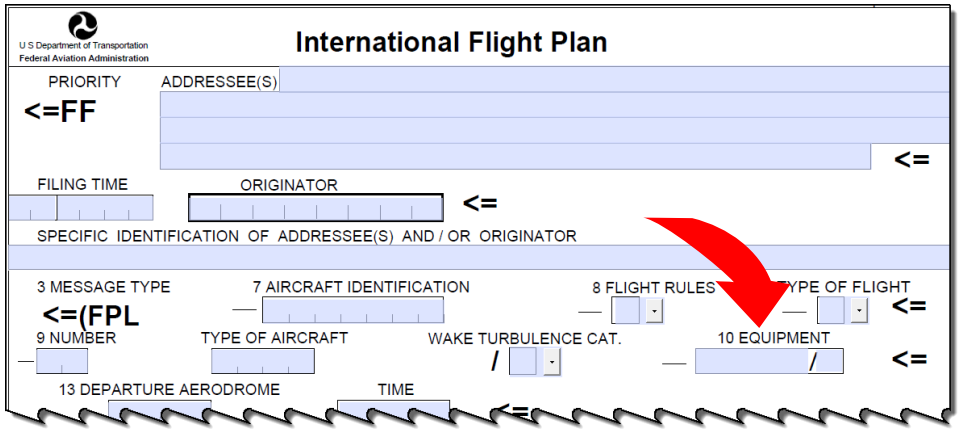
P-codes

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.

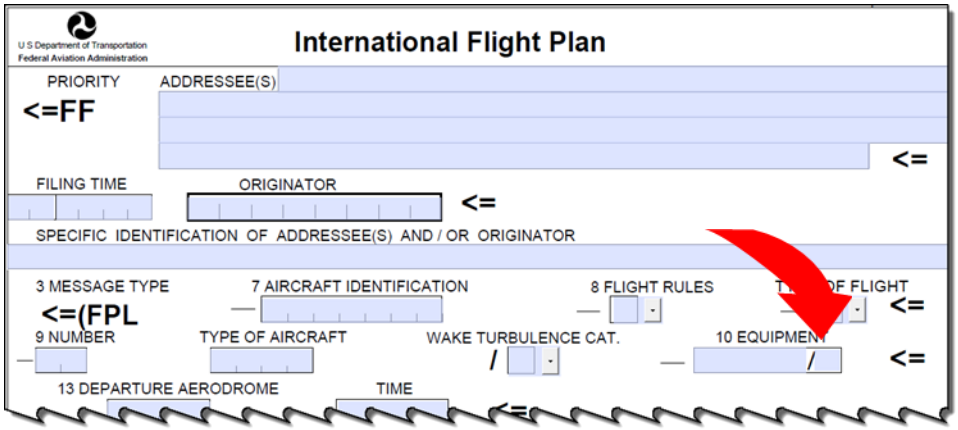
Item 10b: Equipment and Capabilities

Surveillance equipment and capabilities

ADS-C

D1 - ADS-C with FANS 1/A capabilities

G1 - ADS-C with ATN capabilities



Statement of Compliance
Challenge for “Legacy” Aircraft

- 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

Statement of Compliance
Bottom Line

- 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

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NextGEN

Questions??