



PBCS Charter Concept

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

Prepared by:
FAA WJH Technical Center
Separation Standards Analysis Branch
Presented by: John Warburton ANG-E61



FAA



Federal Aviation
Administration

Overview

- Communication services provider (CSP) requirement
 - Detailed Requirements from Appendices
- CSP/SSP Compliance Topics
- Final Considerations

CSP/SSP Definition

- Communication services provider (CSP). Any public or private entity providing communication services for general air traffic. The services would include those provided by a satellite service provider (SSP) through a contract or agreement
- Satellite service provider (SSP). An entity or group of entities that provide, via satellite, aeronautical fixed services and/or aeronautical mobile services at least from the signal in space to/from aircraft, to the attachment point of the ground earth station (GES) to the ground communication services network.

ANSP Contracted Services

PBCS Manual 4.3.1.5

- The ANSP should ensure that contracted services, such as with CSPs and aeronautical stations, are bound by **contractual arrangements** stipulating the RCP/RSP allocations, including any monitoring or recording requirements, and the guidelines of section 4.3.2.

Communication services provision

PBCS Manual Paragraph 4.3.2

- The CSP should provide services that meet the RCP/RSP allocations provided in the specifications. These allocations are used to establish **contractual arrangements**, which support safety oversight and approval of both ANSP and the aircraft operator for provision and use of the services, respectively.
- The CSP should ensure that the services it provides adhere to the **contractual arrangements**, which include:
 - a) RCP/RSP allocations, as contained in the appropriate RCP/RSP specification(s); and
 - b) notification to ATS units, aircraft operators and others, as appropriate, of any failure condition that may impact PBCS operations.
- When a CSP holds a contract with an aircraft operator, but not with ATS units for airspace in which the aircraft operator operates, that CSP should also notify the appropriate the ATS units of any failure condition that may impact the aircraft operator's PBCS operations.
- The CSP should record and retain all communication and surveillance data, thereafter providing this data to ANSP and regional PBCS monitoring programmes upon request, when authorized by appropriate parties, in accordance with the contractual arrangements with the ANSP or aircraft operator.

Aircraft Operator CSP Requirements

PBCS Manual Paragraph 4.3.43-4

- The aircraft operator should ensure that contracted services, such as those with CSPs, are bound by contractual arrangements stipulating the RCP/RSP allocations, including any monitoring or recording requirements, and the guidelines of section 4.3.2.
- The aircraft operator should ensure that contractual arrangements include a provision for the CSP to notify the appropriate ATS units for the route system of the aircraft operator in case failure conditions impact PBCS operations.
 - Note.— This provision ensures appropriate ATS units are notified in cases when the ANSP does not have a contractual arrangement with a particular CSP, and services are provided through internetworking among CSPs/SSPs.

ANSP Detailed Requirements

PBCS Appendix B & C 3.1.2 Availability

RCP availability criteria			
Specification: RCP 400/D	Application: CPDLC		Component: ANSP
Availability parameter	Efficiency	Safety	Compliance means
Availability – service ($A_{SERVICE}$)	N/A	0.999	<p>Contract/service agreement terms, <i>Note 1.</i>— For guidelines to aid in the development of the contract/service agreement with the CSP/SSP, see paragraph B.3.1.3, RCP 400/D allocations to CSP/SSP for RCP availability criteria.</p> <p><i>Note 2.</i> — The availability criteria are allocated entirely to $A_{CSP/SSP}$ and assume that the ATS unit's system is always available.</p>

RSP availability criteria			
Specification: RSP 180/D	Application: ADS-C		Component: ANSP
Availability parameter	Efficiency	Safety	Compliance means
Availability – service ($A_{SERVICE}$)	0.9999	0.999	<p>Contract/service agreement terms, <i>Note 1.</i>— For guidelines to aid in the development of the contract/service agreement with the CSP/SSP, see paragraph C.2.1.3, RSP 180/D allocations to CSP/SSP for surveillance availability criteria.</p> <p><i>Note 2.</i>— The availability criteria are allocated entirely to $A_{CSP/SSP}$ and assume that the ATS unit's system is always available.</p>

CSP/SSP Detailed Requirements

PBCS Appendix B & C 3.1.3 Transaction Time

RCP transaction time and continuity criteria			
Specification: RCP 240/D	Application: CPDLC		Component: CSP/SSP
Transaction time parameter	ET (sec) C = 99.9%	TT (sec) C = 95%	Compliance means
RCTP time allocations			
RCTP _{CSP/SSP} (D1 to D2) + (D5 to D6)	120	100	Contract/service agreement terms. Pre-implementation demonstration.

RSP data delivery time and continuity criteria			
Specification: RSP 180/D	Application: ADS-C		Component: CSP/SSP
Data delivery time parameter	OT (sec) C = 99.9%	DT (sec) C = 95%	Compliance means
RSTP time allocations			
RSTP _{CSP/SSP} (D1 to D2)	170	84	Contract/service agreement terms. Pre-implementation demonstration.

CSP/SSP Detailed Requirements

PBCS Appendix B & C 3.1.3 Availability

RCP availability criteria			
Specification: RCP 240/D	Application: CPDLC		Component: CSP/SSP
Availability parameter	Efficiency	Safety	Compliance means
Availability – CSP/SSP ($A_{CSP/SSP}$)	0.9999	0.999	Contract/service agreement terms
Unplanned outage duration limit (minutes)	10	10	Contract/service agreement terms
Maximum number of unplanned outages	4	48	Contract/service agreement terms
Maximum accumulated unplanned outage time (minutes/year)	52	520	Contract/service agreement terms
Unplanned outage notification delay (minutes)	5	5	Contract/service agreement terms

Note.— RTCA DO-306/EUROCAE ED-122 specifies a requirement to indicate loss of the service. Unplanned outage notification delay is an additional time value associated with the requirement to indicate the loss to the ANSP per the RCP related safety requirement SR-4 for the ANSP.

RSP availability criteria			
Specification: RSP 180/D	Application: ADS-C		Component: CSP/SSP
Availability parameter	Efficiency	Safety	Compliance means
Availability – CSP/SSP ($A_{CSP/SSP}$)	0.9999	0.999	Contract/service agreement terms
Unplanned outage duration limit (minutes)	10	10	Contract/service agreement terms
Maximum number of unplanned outages	4	48	Contract/service agreement terms
Maximum accumulated unplanned outage time (minutes/year)	52	520	Contract/service agreement terms
Unplanned outage notification delay (minutes)	5	5	Contract/service agreement terms

Note.— The RSP availability criteria for RSP 180/D are the same as those provided for RCP 240/D. See Appendix B, paragraph B.2.1.3.

CSP/SSP Detailed Requirements

PBCS Appendix B & C 3.1.3 Integrity Criteria

RCP integrity criteria				
Specification: RCP 240/D	Application: CPDLC	Component: CSP/SSP		
Integrity parameter	Integrity value	Compliance means		
Integrity (I)	Not specified	RSP integrity criteria		
		Specification: RSP 180/D	Application: ADS-C	Component: CSP/SSP
		Integrity parameter	Integrity value	Compliance means
		Integrity (I)	Not specified	<p>Contract/service agreement terms. Per surveillance related safety requirements SR-26 for the ANSP and SR-26 for the aircraft system, the end system is required include provisions, consistent with the overall data integrity criteria, to mitigate the effects of errors introduced by the network. These provisions require the network to pass protected information (or data) to the end system without manipulating the protected information (or data) it passes.</p> <p><i>Note.— In formulating contract terms with the CSP/SSP, the ANSP and/or operator may specify an integrity value and other related criteria, as appropriate, for the network, including subnetworks, that will ensure acceptable data integrity, consistent with the assumptions used to define the end system provisions (e.g. CRC or Fletcher’s checksum).</i></p>

Aircraft Operator

PBCS Appendix B & C 2.1.5

RCP transaction time and continuity criteria			
Specification: RCP 240/D	Application: CPDLC		Component: Aircraft operator
Transaction time parameter	ET (sec) C = 99.9%	TT (sec) C = 95%	Compliance means
RCTP time allocations			
RCTP _{CSP/SSP} (D1 to D2) + (D5 to D6)	120	100	CSP/SSP contract/service agreement. See also paragraph B.2.1.3. Pre-implementation demonstration.

RSP data delivery time and continuity criteria			
Specification: RSP 180/D	Application: ADS-C		Component: Aircraft operator
Data delivery time parameter	OT (sec) C = 99.9%	DT (sec) C = 95%	Compliance means
RSTP time allocations			
RSTP _{CSP/SSP} (D1 to D2)	170	84	CSP/SSP contract/service agreement. See also paragraph C.2.1.3. Pre-implementation demonstration.

CSP Compliance

CSP Perspective

- CSPs stated that they would be unable to enter into binding contracts/agreements
 - The nature of the communication system is such that it is impossible for them to guarantee a certain performance to individual ANSPs and Aircraft Operators with their being many contributors affecting performance outside of the CSP domain
 - It would take significant cost/effort to re-negotiate individual contracts currently in place between CSP and each operator as well as with each ANSP

CSP Compliance

PBCS Perspective

- Ensuring the compliance of CSP allocations through the ANSP and operator is particularly important because no direct State safety oversight requirements under existing Annex provisions
 - ATS provision and aircraft operation are subject to the certification and/or SMS requirements under Annexes 6, 11 and 19
- Difficult to justify absolving the CSPs from PBCS requirements while other stakeholders are expected to adhere to the stated “terms” of the PBCS concept
- Some States prefer an enforceable “contract/agreement” to specify performance and safety requirements for the CSPs
 - Difficult to address identified deficiencies without an incentive (or penalty) to ensure that performance improvements be made within a reasonable timeframe

CSP Compliance

PBCS Charter

- PBCS charter concept proposed as an alternative means to ensure that each data link stakeholder meets its allocated responsibilities according to the RCP/RSP specifications
 - PBCS Charter being developed by ICAO PBCS project team
 - Will be available an “alternate means of compliance” for CSP “contract/agreement” needed for operator approval if State of Operator/State of Registry accepts as means of compliance
 - Hosted on the DLMA/CRA website where stakeholders will go to sign and obtain proof of respective CSP signature, as required by approval process
- Provide best efforts to comply with the PBCS Manual’s RCP 240/D and RSP 180/D allocations.
 - Investigate issues where PBCS requirements are not being met, investigate and take feasible corrective action
 - Regional mitigations would be used to mitigate problems that are not considered feasible to correct

Expected Stakeholders

- PBCS Charter stakeholder could include:
 - ANSPs using PBCS to support ATM operations in their airspace.
 - Aircraft operators participating in PBCS operations
 - Aircraft equipment suppliers.
 - Aircraft manufacturers.
 - Communication service providers/Satellite service providers (CSPs/SSPs)
- Co-operation among all PBCS stakeholders in achieving all elements of the PBCS manual would be the primary objective

Considerations

- Operators and ANSPs should consider whether they want a more “enforceable” approach in the event their aircraft data link performance is negatively impacted by CSP/SSP infrastructure
- The charter will not replace CSP/SSP contracts, and terms of those contracts could include the specified PBCS requirements allocated to CSP/SSPs in renewal efforts