

**THE THIRTY-SEVENTH MEETING OF THE
INFORMAL SOUTH PACIFIC ATS CO-ORDINATING
GROUP (IPACG/48)**

**FANS Interoperability Team Meeting
(FIT/35)**

Des Moines, Washington
26 September 2023

FAA PBCS Monitoring Updates

Presented to: **FIT/35**

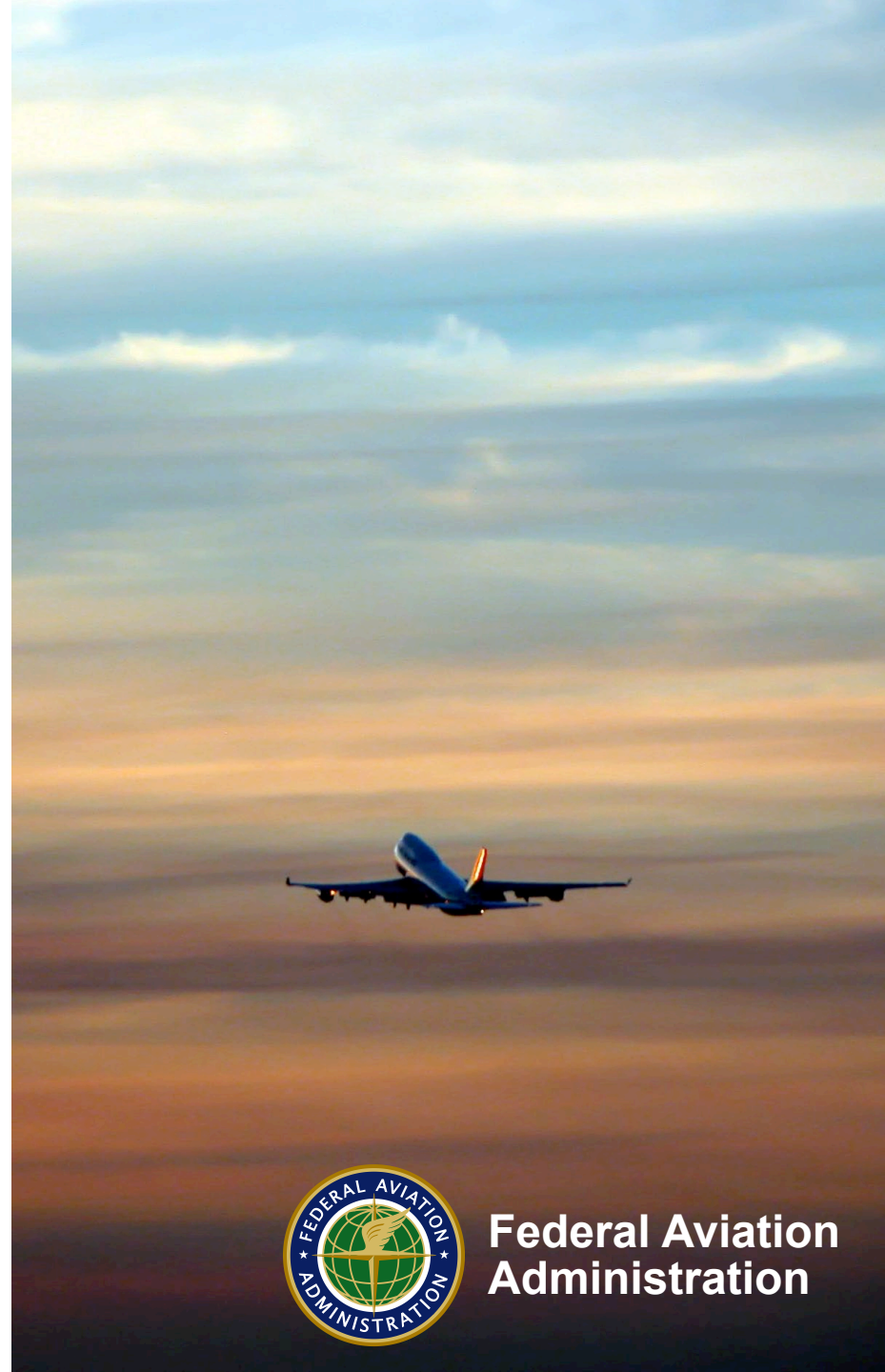
By: **Julia Fuller**

Date: **26 September 2023**

FAAPBCSmonitoring@faa.gov



**Federal Aviation
Administration**



Overview

ICAO PBCS monitoring requirements

Anchorage PBCS monitoring results

- Airspace report
- Airframe report
- Message delivery path issues

Oakland PBCS monitoring results

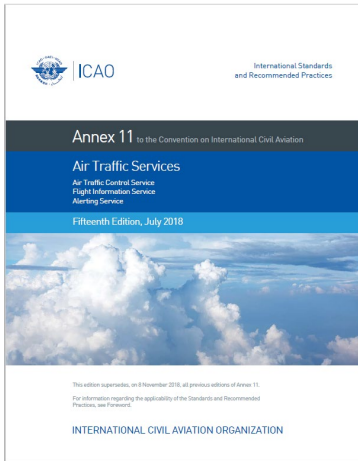
- Airspace report
- Airframe report
- Message delivery path issues

Summary

Additional information



ICAO PBCS monitoring requirements



Annex 11, Air Traffic Services, 3.3.5.2

- Where RCP/RSP specifications are applied, programs shall be instituted for monitoring the performance of the infrastructure and the participating aircraft against the appropriate RCP and/or RSP specifications
- The purpose is to ensure that operations in the applicable airspace continue to meet safety objectives



Annex 6, Operation of Aircraft, Part I, 7.1.5, 7.3.4; Part II, 2.5.1.9, 2.5.3.5

- The appropriate authority shall ensure that adequate provisions exist for:
 - receiving reports of observed communication performance issued by monitoring programs established in accordance with Annex 11, Chapter 3, 3.3.5.2
 - taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports

RCP: Required Communication Performance

RSP: Required Surveillance Performance



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What is the purpose of the monitoring?

- **Safety assurance - ensure continued compliance over a period of time**
 - airspace
 - aircraft
 - CSP and subnetwork
- **Identify, report, investigate, resolve problems**
 - Correction of inefficient/incorrect settings (aircraft, CSP, ANSP)
 - Development of aircraft software fixes
 - Development of ground and network automation fixes/improvements
 - Development of improvements to technical and interoperability standards
 - Development of improved procedures and training



PBCS monitoring – airspace report

January to June 2023

Av data link flights/day: 247
Filing RCP240/RSP180: 90%

Anchorage

Media Type	ADS-C Actual Surveillance Performance (ASP)			CPDLC Actual Communication Performance (ACP)		
	Count of ADS-C Downlink Messages	% ASP ≤ 90 sec	% ASP ≤ 180 sec	Count of CPDLC Transactions	% ACP ≤ 180 sec	% ACP ≤ 210 sec
Performance Criteria		RSP180 95%	RSP180 99.9%		RCP240 95%	RCP240 99.9%
Aggregate	1510971	98.85%	99.65%	96168	99.24%	99.51%
SAT	1039645	98.60%	99.66%	75760	99.28%	99.54%
VHF	468359	99.70%	99.84%	19222	99.68%	99.79%
HF	2967	51.13%	65.52%	89	42.70%	53.93%
SAT-VHF				323	92.26%	95.36%
VHF-SAT				657	96.35%	97.41%
SAT-HF				6	50.00%	83.33%
HF-SAT				103	81.55%	87.38%
VHF-HF				5	100.00%	100.00%
HF-VHF				3	33.33%	33.33%

Meeting requirement

Below requirement but acceptable

Below requirement



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PBCS monitoring – aircraft report

Anchorage

Airspace: **Anchorage**

Monitoring period:	Nov-Jan 2023	Dec-Feb 2023	Jan-Mar 2023	Feb-Apr 2023	Mar-May 2023	Apr-Jun 2023
Total aircraft observed using data link	1839	1804	1846	1958	2082	2043
Have 100 or more ADS-C downlink reports and/or CPDLC transactions	1117	1090	1082	1135	1204	1217
Observed below 95% for RSP180 and/or RCP240	23	25	23	37	32	46
Filed P2/RSP180	14	13	12	22	19	37
# Aircraft reported to applicable regional monitoring agency (RMA) - PARMO	6	3	7	12	6	4



Performance by message delivery path – observed below 95%

FAA-Anchorage Reporting on ADS-C Actual Surveillance Performance (ASP)				
Period: January to June 2023				
Color key: <div>Meets criteria</div> <div>99.0%-99.9%</div> <div>Under criteria</div>		Message Counts	95% RSP 180 Benchmark	99.9% RSP 180 Benchmark
			ASP ≤90 sec	ASP ≤180 sec
Message Delivery Path ID	Media Type			
KUHV	VHF	303	93.40%	94.39%
KUH1	VHF	137	65.69%	70.80%
H02	HF	2197	53.16%	67.55%
H01	HF	419	59.67%	70.41%
H16	HF	139	22.30%	42.45%
H05	HF	105	41.90%	64.76%



PBCS monitoring – airspace report

January to June 2023

Oakland

Media Type	ADS-C Actual Surveillance Performance (ASP)			CPDLC Actual Communication Performance (ACP)		
	Count of ADS-C Downlink Messages	% ASP ≤ 90 sec	% ASP ≤ 180 sec	Count of CPDLC Transactions	% ACP ≤ 180 sec	% ACP ≤ 210 sec
Performance Criteria		RSP180 95%	RSP180 99.9%		RCP240 95%	RCP240 99.9%
Aggregate	5103764	98.82%	99.67%	319665	99.32%	99.57%
SAT	4454057	98.85%	99.73%	293615	99.38%	99.63%
VHF	642731	99.17%	99.72%	22410	99.59%	99.70%
HF	6976	45.26%	60.41%	115	32.17%	40.87%
SAT-VHF				2051	94.78%	96.49%
VHF-SAT				1230	96.83%	97.64%
SAT-HF				15	80.00%	80.00%
HF-SAT				228	81.14%	85.53%
VHF-HF				0		
HF-VHF				1	0.00%	0.00%

Meeting requirement

Below requirement but acceptable

Below requirement



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PBCS monitoring – aircraft report

Oakland

Airspace: Oakland

Monitoring period:	Nov-Jan 2023	Dec-Feb 2023	Jan-Mar 2023	Feb-Apr 2023	Mar-May 2023	Apr-Jun 2023
Total aircraft observed using data link	3590	3550	3479	3468	3457	3384
Have 100 or more ADS-C downlink reports and/or CPDLC transactions	2564	2488	2428	2471	2477	2438
Observed below 95% for RSP180 and/or RCP240	56	65	75	89	88	74
Filed P2/RSP180	37	46	52	60	60	55
# Aircraft reported to applicable regional monitoring agency (RMA) - PARMO	12	14	32	30	20	19

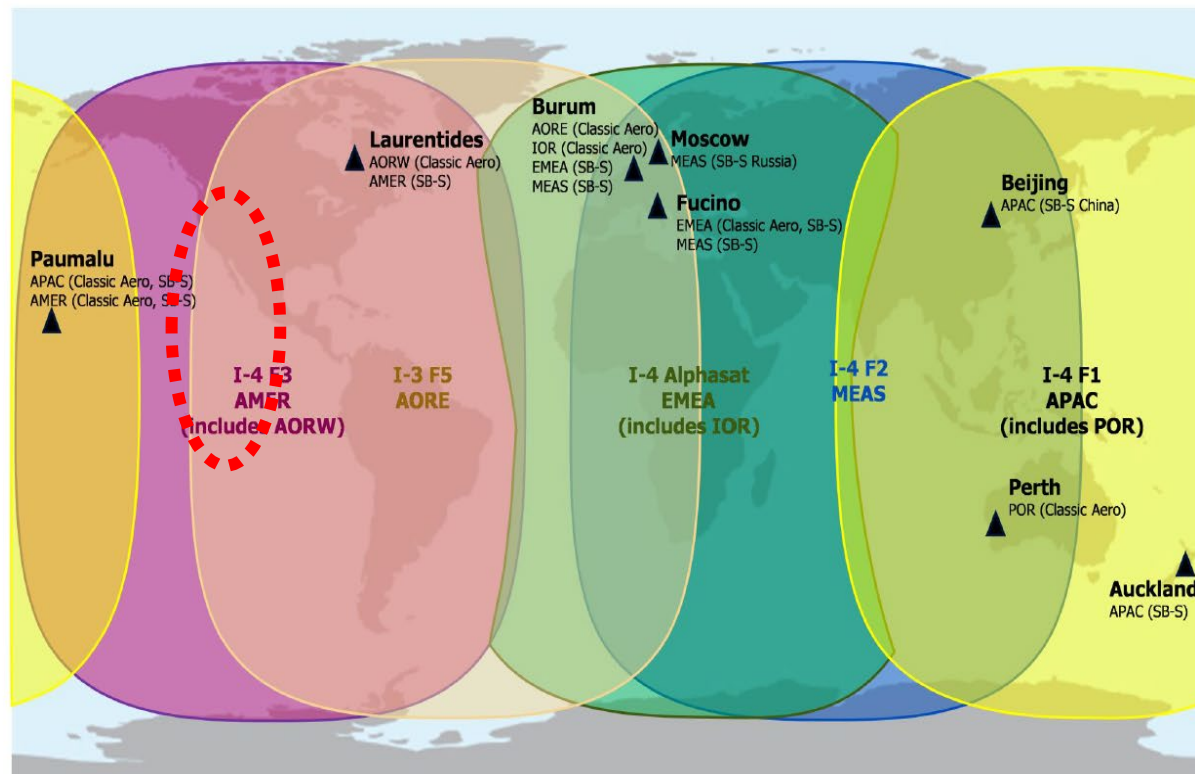


Performance by message delivery path – observed below 95%

FAA-Oakland Reporting on ADS-C Actual Surveillance Performance (ASP)				
Period: January to June 2023				
Color key: <div>Meets criteria</div> <div>99.0%-99.9%</div> <div>Under criteria</div>		Message Counts	95% RSP 180 Benchmark	99.9% RSP 180 Benchmark
			ASP ≤90 sec	ASP ≤180 sec
Message Delivery Path ID	Media Type			
XXN	SAT	1641	91.16%	95.92%
AOE6	SAT	382	92.41%	95.55%
OTHV	VHF	5821	93.63%	98.57%
STS7	VHF	4797	93.77%	96.96%
OTH	VHF	4231	93.57%	97.71%
STS8	VHF	2151	92.47%	95.68%
SAN9	VHF	1338	93.20%	97.53%
UIL8	VHF	839	94.28%	98.93%
SDJV	VHF	158	91.14%	91.77%
HAC1	VHF	139	86.33%	87.05%
H02	HF	4319	47.35%	63.14%
H01	HF	1341	45.34%	60.85%
H16	HF	663	39.97%	52.79%
H05	HF	392	44.64%	53.32%
H04	HF	101	25.74%	44.55%

Satellite Service Provider (SSP)	Satellite	Service	Ground Station Location	ARINC ACARS Identifiers	SITA ACARS Identifiers
Inmarsat	AORE (3F5 at 54°W)	Classic Aero	Burum, Netherlands	XXN	AOE6

Inmarsat Operational Coverage Map (Classic Aero and SB-Safety)



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inmarsat
AVIATION



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NAT OPS Bulletin 2019_003 Rev 1

Data Link Performance Improvement Options

Maximizing access to the Classic Aero Ground Earth Station (GES) services:

- In the Inmarsat SATCOM system, there are a multitude of transmission paths available via the different ground stations and satellites. If one path fails, the aircraft may be able to switch to an alternate path provided the Operator Requirement Table (ORT) in the SATCOM terminal is correctly configured.
- Proper configuration of the ORT table is therefore vital for maximizing availability of SATCOM services.
- Below are some links to the SATCOM manufacturers' information portals:
 - Cobham: <https://sync.cobham.com/satcom/>
 - Honeywell: <https://myaerospace.com/>
 - Thales: <https://www.thalesgroup.com/en/customer-online>
 - Rockwell Collins: <https://www.shopcollins.com>



Summary

ASP measured against RSP180 95% requirement (90 sec)

- ZAN – met for aggregate, SAT, VHF; not met for HF
- ZOA – met for aggregate, SAT, VHF; not met for HF

ASP measured against RSP180 99.9% requirement (180 sec)

- ZAN – better than 99.0% for aggregate, SAT, VHF; not met for HF
- ZOA – better than 99.0% for aggregate, SAT, VHF; not met for HF

ACP measured against RCP240 95% requirement (180 sec)

- ZAN – met for aggregate, SAT, VHF; not met for HF
- ZOA – met for aggregate, SAT, VHF; not met for HF

ACP measured against RCP240 99.9% requirement (210 sec)

- ZAN – better than 99.0% for aggregate, SAT, VHF; not met for HF
- ZOA – better than 99.0% for aggregate, SAT, VHF; not met for HF



Summary

Performance by message delivery path

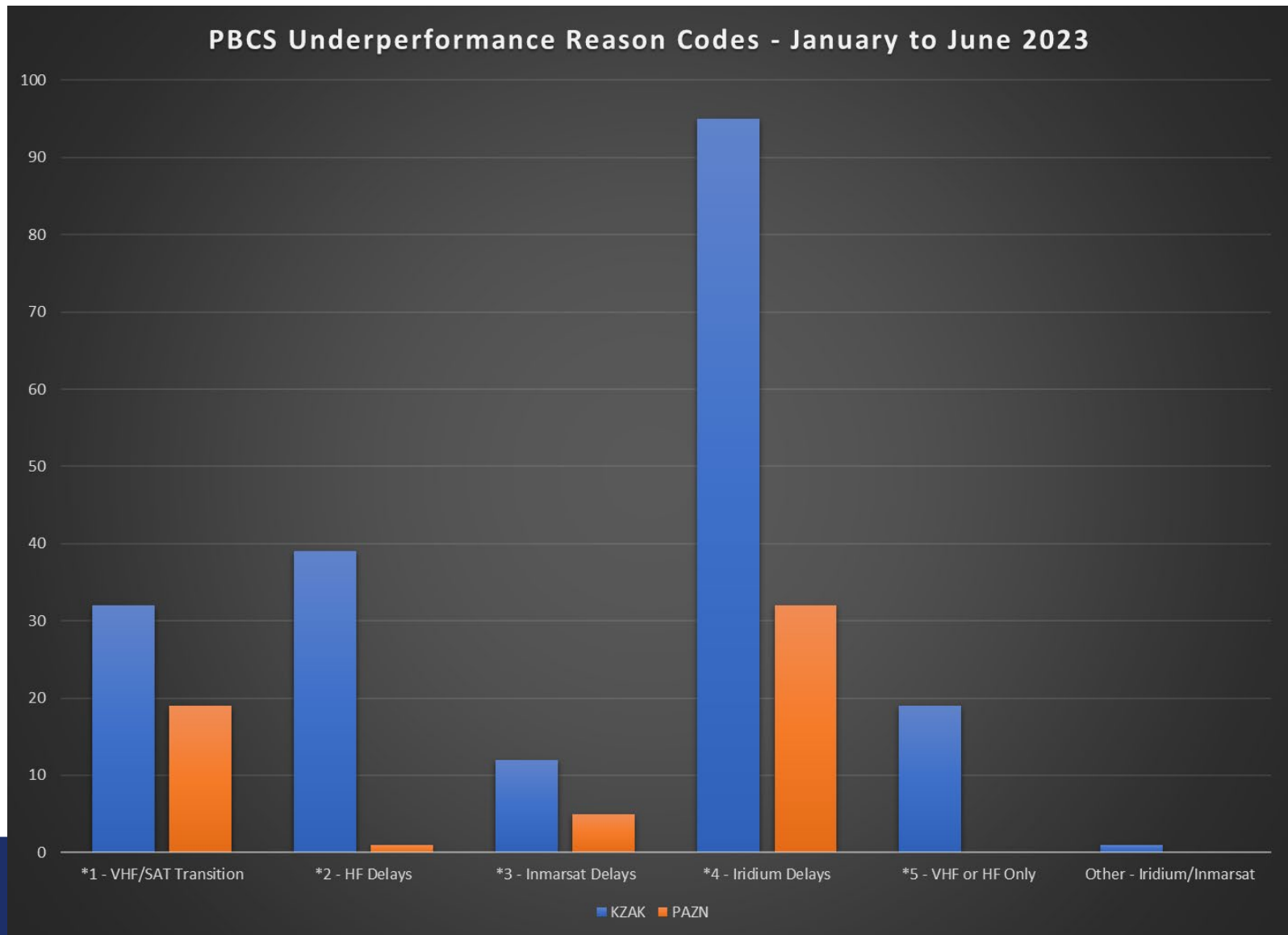
- ZAN – no new issues observed
- ZOA – no new issues observed

Performance by airframe

- P2/RSP180 aircraft being investigated further for performance observed below 95% RSP180 and/or 95% RCP240



Summary



Investigation considerations

- ✓ **Check if performance issue occurred one time or persisted throughout monitoring period**
- ✓ **Check media types and position locations for ADS-C reports > 90 seconds (and reports before and after)**
 - Helps identify HF data link problems, media transition problems, specific media/path problem, FIR boundary problems
- ✓ **Check performance in previous monitoring periods**
 - Helps identify ongoing vs. new problems, scope of problem
- ✓ **Check estimated PORT if ACP < 95%**
 - May help identify abnormal pilot response behavior



Report form adopted in NAT and PAC

PBCS ATSP Non-compliance Report							
Report Date:			1/29/2022				
Period of observed non-compliance:			Oct-Dec 2021 (3 months)				
Reporting Air Traffic Service Provider (ATSP):			FAA - Anchorage				
Contact email address(es) at Reporting ATSP:			FAAPBCSMonitoring@faa.gov				
Reporting to Regional Monitoring Agency (RMA):			PARMO				
ICAO CODE:			XXX				
Airline Operator:			XXX Airlines				
State of Operator/Registry:			Country XYZ				
PBCS Data							
FIR	4-letter ICAO Aircraft Type	Registration	ADS-C downlink Message Counts	95% RSP 180 Benchmark	CPDLC Transaction Counts	95% RCP 240 benchmark	Issue code
				ASP		ACP	
				<=90 sec		<=180 sec	
PAZA	B748	Reg1	1573	93.32%	85	98.82%	(*4)(*2)
PAZA	B77W	Reg2	479	94.78%	49	100.00%	(*4)(*2)
PAZA	B77W	Reg3	360	94.17%	31	96.77%	(*4)(*2)
PAZA	B77W	Reg4	355	94.93%	40	97.50%	(*4)(*2)
PAZA	B77W	Reg5	335	91.94%	31	93.55%	(*4)(*2)
PAZA	B77W	Reg6	195	94.36%	21	95.24%	(*4)(*2)
ATSP analysis:		Notes: Ongoing large delays over Iridium and HF data link through October and November. Please contact us at the email address above if more data or information is needed.					

(*4) Delayed reports due to Iridium avionics (aircraft) or satellite problems (network).

(*2) Delayed reports via HF media.



Most commonly observed problems

Notes by numbers	Explanation	Recommendation(s)
(*1) Delayed reports around VHF/SAT transitions.	This note is used when ADS-C or CPDLC reports are observed with delays when there is mixed media usage in the sequence of reports before, at or after the delayed reports (ex.: VHF/VHF/SAT/VHF/SAT).	- Review "NAT OPS Bulletin 2019_003: Data Link Performance Improvement Options" and recommended solutions/actions (Problem/Issue #2).
(*2) Delayed reports via HF media.	This note is used when delayed ADS-C or CPDLC reports are observed to be delivered via HF data link (HFDL) or near reports delivered via HFDL. Check whether this appears to be a SATCOM failure with one flight or a period during the flight, or more continuous, intermittent use of HFDL. Potential issue with aircraft media priority settings.	- Review "NAT OPS Bulletin 2019_003: Data Link Performance Improvement Options" and recommended solutions/actions (Problem/Issue #1, #4, #9). - Review all Service Information Letters (SILs) and Software Bulletins (SBs) released from Satcom avionics manufacturers, particularly advice on Operator Requirement Table (ORT) set-up. - Operator should be aware that HFDL DOES NOT meet the RCP/RSP criterias for PBCS operations.
(*3) Delayed reports due to Inmarsat satellite to satellite transition (aircraft) or satellite problems (network).	This note is used when ADS-C or CPDLC reports are observed with delays and its noticed that there is a switch sequence between different or same Inmarsat satellite paths (Ex.: XXF/XXH/XXF/XXH). One known area where this occurs in the NAT is at 30W longitude. If multiple aircraft observed with same issue around same time, may be a network-related issue and ATSP may want to report to FANS-CRA/DLMA.	- Review all Service Information Letters (SILs) and Software Bulletins (SBs) released from Satcom avionics manufacturers, particularly advice on Operator Requirement Table (ORT) set-up. - Check with contracted Data Link Service Provider and Satellite Service Provider for possible coverage problems.
(*4) Delayed reports due to Iridium avionics (aircraft) or satellite problems (network).	This note is used when ADS-C or CPDLC reports are observed with delays via Iridium satellite paths (IG1, IGW1). If multiple aircraft observed with same issue around same time, may be a network-related issue and ATSP may want to report to FANS-CRA/DLMA.	- Check for SATCOM radio/unit problems.



Regional reporting of aircraft performance

- **Semi-annual reports compiled and posted on www.FANS-CRA.com**
 - **North Atlantic** - Gander, New York, Santa Maria, Shanwick, Reykjavik
 - **Pacific** - Anchorage, Auckland, Fukuoka, Nadi, Oakland, Tahiti
 - ❖ Jan-Jun 2022 reports posted
 - ❖ Jul-Dec 2022 reports in progress
- **Annual reports for Asia-Pacific**
 - Data compiled through and reported to the FANS Interoperability Team – Asia (FIT-Asia) group
- When “red” performance is observed operators are directed to contact relevant monitoring programs for more details to confirm any need for corrective action



Regional PBCS monitoring reports – by aircraft

PAC PBCS Monitoring Report by Airframe												
Period: January to June 2021												
Color key:												
<div>Meets criteria</div> <div>99.0%-99.9%</div> <div>Under criteria</div>												
<div>* Operator code is approximated based on aircraft ID. State of registry is approximated based on operator code and registration number.</div> <div>* Select registration number of interest using filter. Multiple entries are seen for some registration numbers in the same FIR because of the use of different operator codes.</div> <div>* Results for airframes with low counts of messages/transactions may have skewed results. Request further information from monitoring data contacts.</div>												
State of Registry	Data Source (FIR)	3-letter ICAO Operator code (where applicable)	NAT PBCS Monitoring Report by Airframe									
Period: January to June 2021												
Color key:												
<div>Meets criteria</div> <div>99.0%-99.9%</div> <div>Under criteria</div>												
<div>* Operator code is approximated based on aircraft ID. State of registry is approximated based on operator code and registration number.</div> <div>* Select registration number of interest using filter. Multiple entries are seen for some registration numbers in the same FIR because of the use of different operator codes.</div> <div>* Results for airframes with low counts of messages/transactions may have skewed results. Request further information from monitoring data contacts.</div>												
State of Registry	Data Source (FIR)	3-letter ICAO Operator code (where applicable)	4-letter ICAO Aircraft Type	Registration Number	ADS-C downlink Message Counts	95% RSP 180 benchmark ASP <= 90 sec	99.9% RSP 180 benchmark ASP <= 180 sec	CPDLC Transaction Counts	95% RCP 240 benchmark ACP <= 180 sec	99.9% RCP 240 benchmark ACP <= 210 sec	Filed P2/RSP180 (Y/N)	
ARGENTINA	Fukuoka	ARGO										
ARGENTINA	Fukuoka	ARGO										
ARUBA	Auckland	PVT										
ARUBA	Nadi	PVT										
ARUBA	Oakland	PVT										
ARUBA	Anchorage											
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Oakland	ASY										
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Oakland	ASY										
AUSTRALIA	Fukuoka	ASY										
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Oakland	ASY										
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Oakland	ASY										
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Oakland	ASY										
AUSTRALIA	Anchorage	ASY										
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Oakland	ASY										
AUSTRALIA	Nadi	ASY										
AUSTRALIA	Oakland	ASY										
AUSTRALIA	Fukuoka	ASY										
AUSTRALIA	Oakland	ASY										
AUSTRALIA	Auckland	ASY										
ALGERIA	Gander	DAH	A332	7TVJX	30	100.0%	100.0%	2	100.0%	100.0%	Y	
ALGERIA	Shanwick	DAH	A332	7TVJX	27	100.0%	100.0%	1	100.0%	100.0%	Y	
ALGERIA	Gander	DAH	A332	7TVJY	18	100.0%	100.0%	2	100.0%	100.0%	Y	
ALGERIA	Shanwick	DAH	A332	7TVJY	17	100.0%	100.0%	1	100.0%	100.0%	Y	
ALGERIA	Shanwick	PVT	GLF5	7TVPG	29	100.0%	100.0%	1	100.0%	100.0%	N	
ALGERIA	Gander	Q7T	GLF5	7TVPG	27	100.0%	100.0%	1	100.0%	100.0%	N	
ALGERIA	New York	PVT	GLF4	7TVPM	21	100.0%	100.0%	-			N	
ALGERIA	New York	PVT	GLF4	7TVPR	24	100.0%	100.0%	1	100.0%	100.0%	N	
ARGENTINA	Gander	PVT	CL60	LVCCW	30	100.0%	100.0%	2	100.0%	100.0%	N	
ARGENTINA	Shanwick	PVT	CL60	LVCCW	25	100.0%	100.0%	2	50.0%	50.0%	Y	
ARGENTINA	Gander	PVT	GL5T	LVGQE	11	90.9%	100.0%	1	100.0%	100.0%	N	
ARGENTINA	New York	PVT	GL5T	LVGQE	30	96.7%	100.0%	-			N	
ARGENTINA	Shanwick	PVT	GL5T	LVGQE	10	100.0%	100.0%	1			N	
ARGENTINA	New York	PVT	CL60	LVHQR	74	96.0%	100.0%	7	100.0%	100.0%	N	
ARGENTINA	Shanwick	PVT	CL60	LVHQR	10	90.0%	100.0%	1	100.0%	100.0%	N	
ARGENTINA	Gander	PVT	GLF5	LVIRQ	15	100.0%	100.0%	1	100.0%	100.0%	N	
ARGENTINA	New York	PVT	GLF5	LVIRQ	71	97.2%	100.0%	4	100.0%	100.0%	N	
ARGENTINA	Shanwick	PVT	GLF5	LVIRQ	26	96.2%	100.0%				N	
ARGENTINA	Gander	PVT	FA7X	LVJQF	22	95.5%	95.5%	2	100.0%	100.0%	N	
ARGENTINA	Shanwick	PVT	FA7X	LVJQF	21	90.5%	95.2%	2	100.0%	100.0%	N	
ARGENTINA	New York	PVT	LVJQF	LVJQF	67	100.0%	100.0%	4	100.0%	100.0%	N	
ARUBA	Reykjavik	P4zz	B788	P4787	24	100.0%	100.0%	3	100.0%	100.0%	N	
ARUBA	New York	PVT	P4787	P4787	71	100.0%	100.0%	2	100.0%	100.0%	N	
ARUBA	Shanwick	PVT	GL5T	P4AVA	6	100.0%	100.0%				N	
ARUBA	New York	PVT	P4AVA	P4AVA	43	97.7%	97.7%	1	100.0%	100.0%	N	
ARUBA	Gander	PVT	GLF5	P4BAR	30	100.0%	100.0%	-			N	
ARUBA	Shanwick	PVT	GLF5	P4BAR	23	100.0%	100.0%				N	
ARUBA	Gander	PVT	B737	P48BJ	13	100.0%	100.0%	1	100.0%	100.0%	N	
ARUBA	New York	PVT	B737	P48BJ	32	100.0%	100.0%	-			N	



PBCS Monitoring Contacts

Flight Information Region	Email Address
NAT	
Gander	PBCS@navcanada.ca
New York	FAAPBCSMonitoring@faa.gov
Reykjavik	PBCS@isavia.is
Santa Maria	Jose.Cabral@nav.pt
Shanwick	michael.price@nats.co.uk ; tom.brown@nats.co.uk
PAC	
Anchorage, Oakland	FAAPBCSMonitoring@faa.gov
Auckland	Paul.Radford@airways.co.nz
Fukuoka	hgt-cra-jasma@gxb.mlit.go.jp
Tahiti	seac-pf-sna-tiare-ld@aviation-civile.gouv.fr
Nadi	IvanW@fijiairports.com.fj



Questions

