Agenda Item #2
NZZO Feedback

ISPACG FIT 26
Queenstown, New Zealand
19-20 March 2019

ISPACG
Informal South Pacific Air Traffic Services Coordinating Group

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NZZO Feedback - Overview

- PBCS
  - Latency Monitor
- Performance:
  - Performance observed against both RSP180 and RCP240 specifications is acceptable.
  - Availability affected by the number of outages in 2018.
- HFDL
  - Concerns over poor performance when used as sole means may be mitigated by PBCS.
  - HFDL does not meet RCP240/RSP180 when sole means
- Iridium
  - Makes up < 2% of satellite traffic.
  - Significant performance improvement observed in 2018
- PBCS monitoring in 2018
  - On-line analysis tool simplifies the task.
  - Standardised ICAO reporting templates available for use when reporting to ISPACG FIT and for the consolidated ISPACG report to RASMAG.

PBCS

PBCS

- Implemented 29 March 2018.
- 75% of FANS1A traffic in NZZO is now indicating PBCS status in FPL. This is an increase of 23% in the last 10 months.

  (Note: These percentages are based on the number of ADS-C reports received).
- No operational issues have been reported with the PBCS implementation.
- One PBCS tail reported to NZ CAA and CRA with performance below 95% RSP180 standard.
- 965 PBCS Charter members
- 1227 Airlines signed to CRA/DLMA website
- Airlines filing PBCS status in their FPL during the week 10-17 January 2019 were:

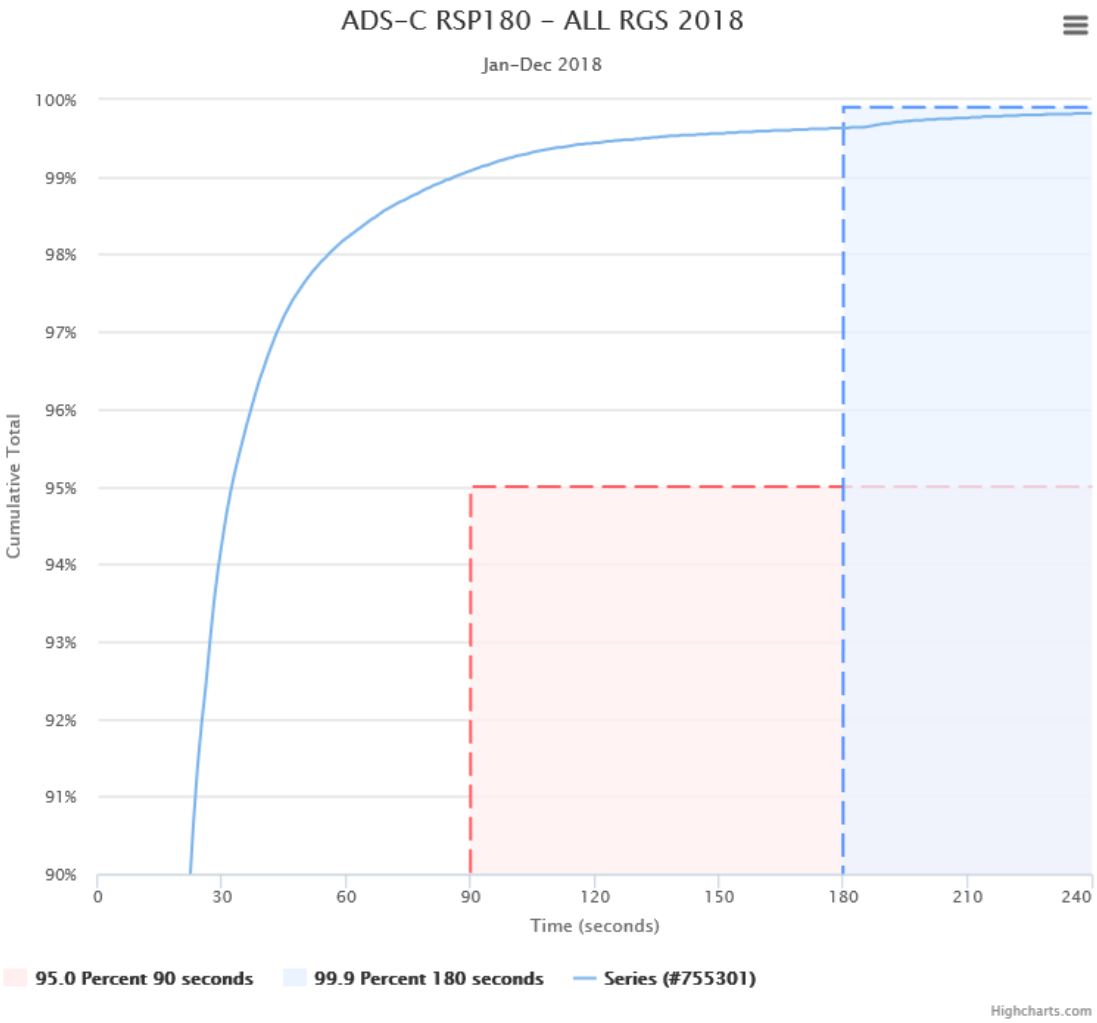
Company	Type
AAL	B789
ANZ	B772
ANZ	B77W
ANZ	B789
ANZ	A21N
CAL	B77W
CHH	A333
CPA	A359
CRK	A332
CSN	B789
DAL	B77L
FDX	MD11
GCR	A332
HAL	A332
KAL	B77W
PAL	A333
QFA	A388
QFA	B789
QTR	B77L
SIA	B772
SIA	B77W
SIA	A388
SIA	A359
THT	A343
THT	B789
UAE	A388
UAE	B77W
UAL	B77W
UAL	B789
XAX	A333

Latency Monitor

- Implemented latency monitor uplink 21 June 2018.
  - Supports safety requirement #15 on aircraft - mitigating late message receipt.
  - Message is sent when NZZO is confirmed CDA requesting aircraft set 300".
  - Incorporates 2" delay in timestamp to mitigate timing issue in some Airbus fleets.
  - Currently sending round 4000/month.
  - Monitor Airbus for rejects – observe a low number usually associated with HFDL use for uplink (aircraft operating no SATCOM)
  - Airbus are currently arranging an interop test date to validate a fix for their timing issue.

Performance

ADS-C RSP180 – All RGS 2018



No significant change observed from 2018 year.

95% RSP180 Benchmark	99.9% RSP180 Benchmark
RSP <= 90 sec	RSP <= 180 sec
99.08	99.63

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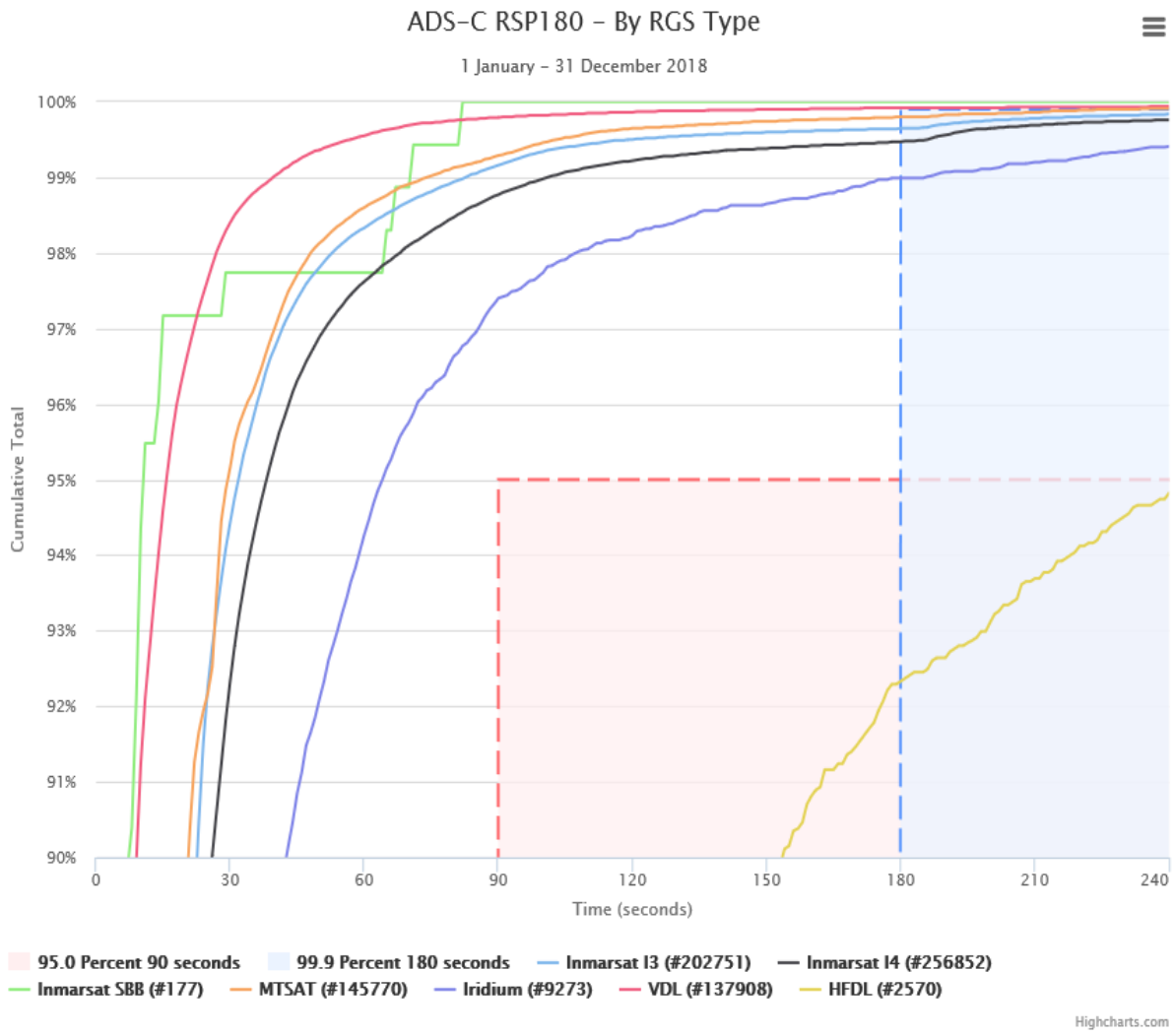
ADS-C RSP180 – By RGS Type



Note: Significant improvement in Iridium performance observed from April 2018 – this media is now meeting RSP180 performance requirements

95% RSP180 Benchmark	99.9% RSP180 Benchmark
RSP <= 90 sec	RSP <= 180 sec
NZZO Iridium: 1 Apr – 31 Dec	
98.33	99.66

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ADS-C RSP180 – By Media Type

FIR	NZZO					
Criteria	RSP180					
Period	Jan-June 2018			July-December 2018		
Colour Key Meets Criteria 99.0%-99.84% Under Criteria	Message Counts	95% % < = 90sec	99.90% % <= 180sec	Message Counts	95% % < = 90sec	99.90% % <= 180sec
By Media Type						
SATCOM	298495	99.05	99.61	316328	98.96	99.59
VHF	67576	99.81	99.82	70332	99.78	99.91
HF	1177	81.73	92.69	1393	78.24	92.03
ALL	367248	99.13	99.65	388053	99.03	99.62

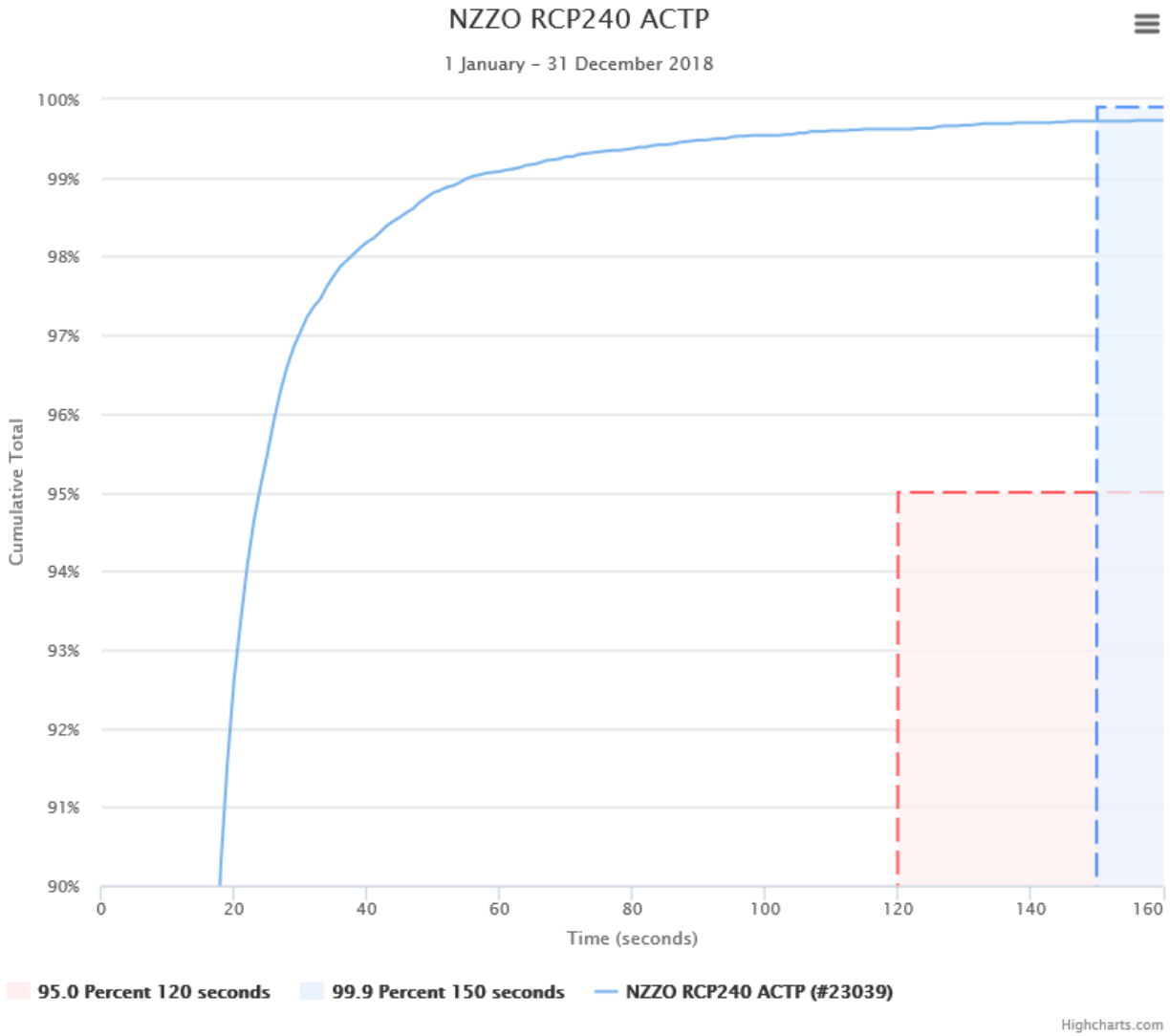
ADS-C RSP180 – By RGS/GES Satcom

FIR	NZZO					
Criteria	RSP180					
Period	Jan-June 2018			July-December 2018		
Colour Key: Meets Criteria; 99.0%-99.84%; Under Criteria	Message Counts	95% % < = 90sec	99.90% % <= 180sec	Message Counts	95% % < = 90sec	99.90% % <= 180sec
By Remote Ground Station (RGS) Ground Earth Station (GES)						
Designator	**Type**	(only RGS/GES with message counts >100 recorded)				
AME1	SAT	31036	98.90	99.32	29984	98.93	99.32
AME2	SAT	471	100.00	100.00	6187	99.01	99.49
APK1	SAT	33695	98.56	99.50	53061	98.29	99.26
APK2	SAT				34703	99.05	99.65
IG1	SAT	1141	98.07	99.12	1208	98.75	99.75
IGW1	SAT	2408	94.64	97.38	4516	98.33	99.62
MTS1	SAT	66775	99.26	99.78	78995	99.31	99.81
POR1	SAT	72272	99.07	99.56	22261	99.13	99.57
XXA	SAT	31780	99.27	99.78	35930	98.70	99.58
XXH	SAT	2046	99.85	100.00	1997	99.89	100.00
XXP	SAT	56640	99.18	99.69	46123	99.22	99.73
XXW	SAT	133	100.00	100.00	1359	99.26	99.63

ADS-C RSP180 – By RGS/GES VDL HFDL

FIR		NZZO					
Criteria		RSP180					
Period		Jan-June 2018			July-December 2018		
Colour Key Meets Criteria 99.0%-99.84% Under Criteria		Message Counts	95% % < = 90sec	99.90% % <= 180sec	Message Counts	95% % < = 90sec	99.90% % <= 180sec
By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	**Type**	(only RGS/GES with message counts >100 recorded)					
AKL	VHF	12203	99.77	99.87	14163	99.80	99.95
AKL1	VHF	4766	99.79	100.00	5749	99.73	99.89
AKL2	VHF	9585	99.79	99.93	11843	99.67	99.85
AKL7	VHF	10459	99.97	100.00	5821	99.98	100.00
AKL9	VHF	912	100.00	100.00	3117	99.93	100.00
AKLB	VHF	796	99.24	99.74			
AKLV	VHF	434	100.00	100.00			
APW1	VHF	7647	99.90	99.94	7563	99.90	99.94
CHC	VHF	891	99.77	99.77	1213	100.00	100.00
CHC1	VHF	1935	99.94	100.00	1331	99.77	100.00
CHC2	VHF	169	100.00	100.00	115	100.00	100.00
DUD1	VHF				103	99.02	100.00
HLZ	VHF	1425	99.92	100.00	3513	99.97	99.97
HLZ1	VHF	181	99.44	100.00	826	99.15	100.00
IVC1	VHF	414	97.58	98.79	374	99.19	99.46
NAN1	VHF	230	100.00	100.00	298	98.99	98.99
NLK1	VHF	10069	99.86	99.91	8279	99.73	99.83
NOU1	VHF	1112	99.91	99.91	938	100.00	100.00
PMR1	VHF	153	98.03	100.00	286	96.85	99.65
RAR1	VHF	2383	99.87	99.95	2885	99.96	100.00
ROT1	VHF				192	100.00	100.00
WLG	VHF	254	100.00	100.00	188	100.00	100.00
WLG1	VHF	314	100.00	100.00	243	100.00	100.00
H02	HF	259	71.04	89.18	340	73.82	89.70
H05	HF	846	85.93	94.68	959	81.23	93.63

CPDLC RCP240 – Actual Communications Technical Performance (ACTP) – All RGS



- No significant change observed from 2017 year.

95% RCP240 Benchmark	99.9% RCP240 Benchmark
RCP <= 120 sec	RCP <= 150 sec
99.62	99.72

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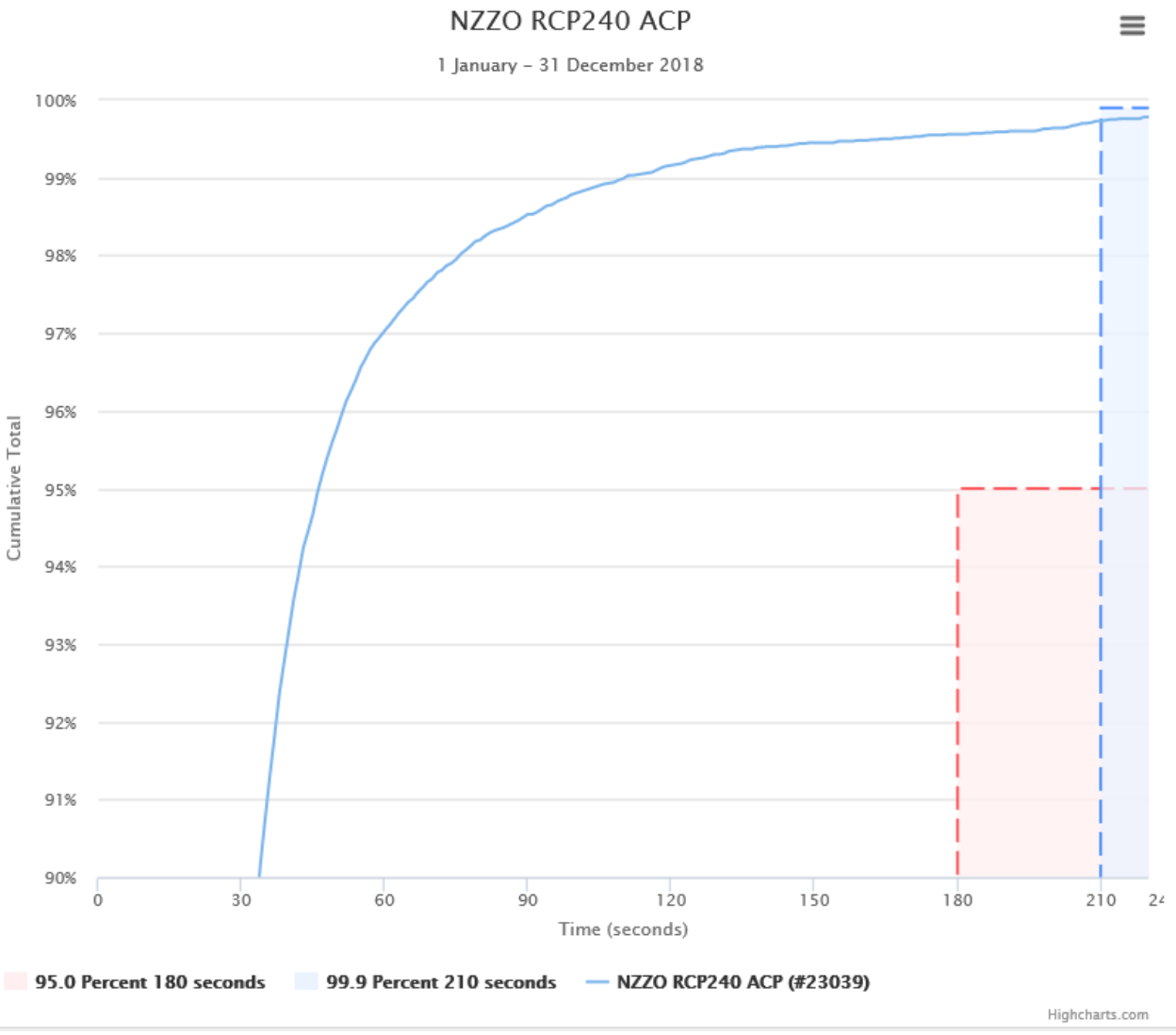
CPDLC RCP240 – Actual Communications Performance (ACP) – All RGS



No significant change observed from 2017 year.

95% RCP240 Benchmark	99.9% RCP240 Benchmark
RCP <= 180 sec	RCP <= 210 sec
99.56	99.73

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CPDLC RCP240 – Actual Communications Performance – by media type and RGS

FIR	NZZO									
Criteria	RCP240									
Period	Jan - Jun 2018					Jul - Dec 2018				
Colour Key: Meets Criteria; 99.0%-99.84%; Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		Message Counts	95% benchmark		99.9% Benchmark	
		ACP % < = 180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec		ACP % < =180sec	ACTP % <= 120sec	ACP % < = 210sec	ACTP % <= 150sec
By Media Type										
SATCOM	10663	99.57	99.71	99.79	99.76	10399	99.49	99.56	99.66	99.66
VHF	986	99.79	99.49	99.79	99.79	957	100.00	99.58	100.00	100.00
HF	23	100.00	100.00	100.00	100.00	11	81.81	81.81	90.90	90.90
ALL	11672	99.59	99.70	99.79	99.75	11367	99.52	99.55	99.68	99.68
By Remote Ground Station (RGS) Ground Earth Station (GES)										
Designator	**Type**	(RGS/GES with message counts >100)								
AKL	VHF	102	99.01	99.01	99.01	99.01	121	100.00	100.00	100.00	100.00
AME1	SAT	1626	99.20	99.13	99.63	99.13	1432	99.09	99.09	99.30	99.30
AME2	SAT						215	100.00	100.00	100.00	100.00
APK1	SAT	1016	99.70	99.70	99.90	99.80	1309	99.31	99.23	99.69	99.38
APK2	SAT						852	99.41	99.76	99.76	99.88
APW1	VHF	372	100.00	100.00	100.00	100.00	363	100.00	99.44	100.00	100.00
IGW1	SAT						113	99.11	100.00	99.11	100.00
MTS1	SAT	3077	99.70	99.67	99.87	99.67	3180	99.74	99.74	99.77	99.81
NLK1	VHF	327	100.00	100.00	100.00	100.00	268	100.00	99.62	100.00	100.00
POR1	SAT	1851	99.29	99.67	99.67	99.67	565	99.82	99.64	99.82	99.64
RAR1	VHF						108	100.00	100.00	100.00	100.00
XXA	SAT	939	100.00	100.00	100.00	100.00	962	99.37	99.58	99.58	99.68
XXH	SAT	108	100.00	100.00	100.00	100.00					
XXP	SAT	1921	99.73	99.79	99.79	99.89	1613	99.56	99.62	99.69	99.69

CPDLC RCP240 – Actual Communications Performance – By Operator and Type

FIR	NZZO										
Criteria	RCP240										
Period	Jan - Jun 2018						Jul - Dec 2018					
Colour Key: Meets Criteria / 99.0%-99.84% / Under Criteria	Message Counts	95% benchmark		99.9% Benchmark		95%	Message Counts	95% benchmark		99.9% Benchmark		95%
		ACP % <= 180sec	ACTP % <= 120sec	ACP % <= 210sec	ACTP % <= 150sec	PORT %<60secs		ACP % <=180sec	ACTP % <= 120sec	ACP % <= 210sec	ACTP % <= 150sec	PORT %<60secs
By Aircraft Operator / Type (only message counts >100 recorded)												
AAL/B789	601	100.00%	100.00%	100.00%	100.00%	99.33%	518	100.00%	99.61%	100.00%	99.80%	99.42%
ANZ/B772	1987	99.45%	99.69%	99.70%	99.74%	98.99%	2152	99.63%	99.53%	99.72%	99.67%	99.39%
ANZ/B77W	1999	99.50%	99.54%	99.80%	99.54%	99.24%	2001	99.55%	99.60%	99.65%	99.70%	99.30%
ANZ/B789	1118	99.82%	99.73%	99.91%	99.73%	99.73%	1000	99.70%	99.60%	99.70%	99.80%	99.60%
DAL/B77L	224	99.11%	100.00%	99.55%	100.00%	98.21%	188	99.47%	99.46%	99.47%	99.46%	98.93%
HAL/A332	320	100.00%	100.00%	100.00%	100.00%	97.81%	333	99.40%	99.69%	100.00%	99.69%	99.39%
LAN/B788	159	99.37%	99.37%	99.37%	99.37%	99.37%	219	100.00%	100.00%	100.00%	100.00%	99.54%
LAN/B789	470	100.00%	99.78%	100.00%	100.00%	99.78%	396	98.23%	98.48%	98.74%	98.48%	99.24%
QFA/A388	592	99.66%	99.83%	99.83%	99.83%	99.83%	617	99.84%	100.00%	100.00%	100.00%	99.83%
QFA/B744	500	98.80%	99.20%	99.60%	99.20%	98.40%	505	99.80%	99.80%	100.00%	100.00%	99.00%
QFA/B789	185	99.46%	100.00%	100.00%	100.00%	98.91%	179	100.00%	100.00%	100.00%	100.00%	100.00%
THT/A343	172	100.00%	100.00%	100.00%	100.00%	100.00%	124	100.00%	100.00%	100.00%	100.00%	100.00%
UAE/A388	129	100.00%	100.00%	100.00%	100.00%	98.44%						
UAL/B77W	294	100.00%	100.00%	100.00%	100.00%	100.00%	209	99.52%	99.53%	100.00%	99.52%	99.52%
UAL/B789	911	99.78%	99.67%	99.78%	99.78%	99.67%	930	99.78%	99.78%	99.89%	99.78%	99.67%
VAU/B77W	354	100.00%	100.00%	100.00%	100.00%	100.00%	339	99.71%	99.70%	99.71%	99.70%	99.41%

Iridium Performance

ADS-C RSP180 – Iridium Performance– All RGS

ADS-C Performance								
Colour Key Meets Criteria 99.0%-99.84% Under Criteria		Period 1 Jan 2018 - 31 Dec 2018					95% RSP180 Benchmark	99.9% RSP180 Benchmark
Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
Analysis by RSP180 Iridium >100 data points								
SATCOM Iridium	All	A21N	All	All	NZZO	2185	98.62	99.77
SATCOM Iridium	All	A320	All	All	NZZO	2543	95.39	97.64
SATCOM Iridium	All	B744	All	All	NZZO	1691	98.34	99.4
SATCOM Iridium	All	B74S	All	All	NZZO	1343	98.36	99.85
SATCOM Iridium	All	B752	All	All	NZZO	112	92.85	95.53
SATCOM Iridium	All	B763	All	All	NZZO	134	99.25	100
SATCOM Iridium	All	CL60	All	All	NZZO	309	97.73	100
SATCOM Iridium	All	F2TH	All	All	NZZO	263	95.43	98.09
SATCOM Iridium	All	FA7X	All	All	NZZO	231	96.96	98.26

- Significant improvement has been observed since April 2018.
- Now meeting requirements for most types.
- Less than 2% of Satcom traffic is using Iridium in NZZO.

HFDL Performance

ADS-C RSP180 – HFDL Performance – All RGS

- Performance when used in “next on busy” mode does not cause significant performance deterioration.
- Performance when used as primary media in event of SATCOM failure does NOT meet RSP180 performance requirements.
- Dispatching with no SATCOM will not meet PBCS in oceanic
- Less than 1% of reports are using HFDL.

ADS-C RSP180 – HFDL Performance – All RGS

ADS-C Performance								
Colour Key Meets Criteria 99.0%-99.84% Under Criteria		Period 1 Jan 2018 - 31 Dec 2018					95% RSP180 Benchmark	99.9% RSP180 Benchmark
Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
Analysis by RSP180 HFDL>100 data points								
HF All	All	A332	All	All	NZZO	1730	82.6	95.02
HF All	All	A333	All	All	NZZO	552	82.78	95.1
HF All	All	B789	All	All	NZZO	120	49.16	64.16

ADS-C RSP180 – HFDL Performance – Operating as primary mode

A333

20181028	H05	P	-26.859169	162.714905	23:12:56	23:24:32	696
20181028	H05	W	-27.131596	163.004669	23:15:32	23:27:21	709
20181028	H05	P	-28.413563	164.397186	23:27:52	23:30:16	144
20181028	H05	W	-29.148273	165.217209	23:34:55	23:51:31	996
20181028	H05	P	-29.980659	166.092682	23:42:49	23:53:32	643
20181028	H05	P	-30.866604	167.047638	23:51:27	23:56:27	300
20181029	H05	P	-32.383232	168.742966	00:06:23	00:07:26	63

A388

20180620	H09	P	-38.22281	169.5791	10:01:52	10:23:17	1285
20180620	H09	P	-38.38057	167.4344	10:14:06	10:35:01	1255
20180620	H09	P	-38.40975	166.9656	10:16:49	10:36:37	1188
20180620	H09	P	-38.52854	164.5857	10:30:18	10:57:25	1627
20180620	H09	P	-38.53884	164.3206	10:31:45	10:58:46	1621
20180620	H09	W	-38.58124	162.983	10:39:00	11:01:01	1321
20180620	H09	P	-38.60973	161.549	10:46:41	11:07:33	1252

B789

20180623	H05	P	-33.69198	170.2747	08:32:56	08:35:05	129
20180623	H05	P	-32.31714	168.6673	08:47:52	08:53:18	326
20180623	H05	P	-31.90996	168.205	08:52:15	09:01:18	543
20180623	H05	P	-30.91501	167.1003	09:02:48	09:11:14	506
20180623	H05	P	-30.06752	166.1852	09:11:55	09:17:08	313
20180623	H05	P	-29.54516	165.6323	09:17:44	09:18:50	66
20180623	H05	W	-29.14278	165.2114	09:22:25	09:49:23	1618
20180630	H05	P	-23.92925	167.2584	03:37:01	03:38:01	60

Availability

Availability

- RCP240/RSP180 specifications call for a safety availability of 0.999. This equates to a:
  - ❑ Maximum of *48* unplanned outages
  - ❑ Maximum accumulated outage of *520* minutes
  - ❑ Unplanned outage notification within *5* minutes

- In 2018 a global assessment based on reported outages to NZZO shows there were:
  - ❑ *29* unplanned outages
  - ❑ The accumulated outage was *6395* minutes
  - ❑ Notification delay average was *103* minutes (the best was 10 minutes)

- A review of the global outages and assessing if an operational impact was felt in NZZO shows:
  - ❑ *8* unplanned outages had operational impact
  - ❑ The accumulated outage time where there was operational impact was *2096* minutes (approximately 35 hours in the year)

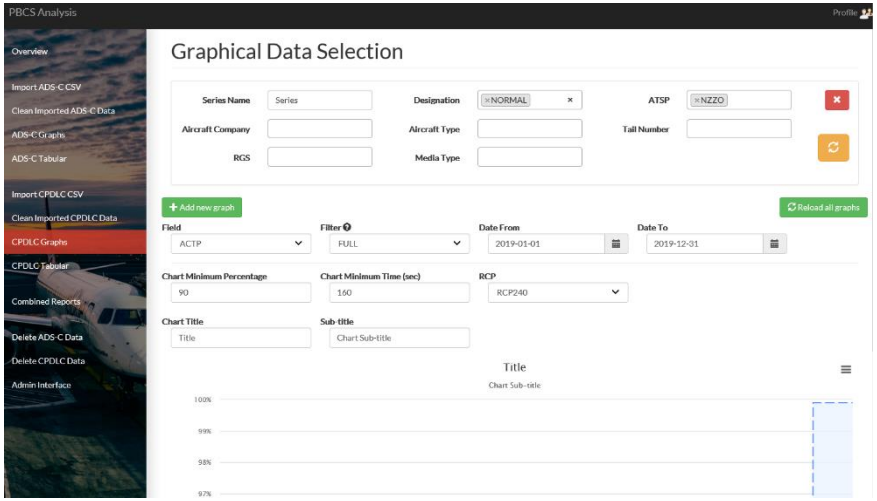
Availability

- In situations where the service availability are not met the PBCS manual allows for local assessment to determine appropriate mitigation and/or action taking into account local factors.
- Considering the traffic density within NZZO, the low frequency of application of the performance based separations, and reliable alternative means of communication (HF Voice) we are continuing with the application of the performance based separations.
- Availability in the 2019 year has already taken a hit with 7 outages totalling 466 minutes affecting NZZO operations between 1 January and 15 March:
  - Inmarsat I4 – 37 minutes
  - Network – 15 minutes
  - MTSAT – 19 minutes
  - Inmarsat I4 – 138 minutes
  - Network – 166 minutes
  - Iridium – 36 minutes
  - Inmarsat I4 – 55 minutes
- Work is needed to improve assessment of availability from an operational perspective. NAT TIG and ICAO OPDLWG PBCS Group are working on this question.

PBCS Monitoring

PBCS Monitoring

- Airways On-line analysis tool now in use by Fiji, Tahiti, and ourselves for FANS1/A performance analysis.



- ICAO standardised reporting formats now available when developing ANSP reports to FIT and for developing ISPACG consolidated reports to RASMAG.

FIR	NZZO					
Criteria	RSP180					
Period	Jan-June 2018			July-December 2018		
Colour Key: Meets Criteria / 99.0%-99.84% / Under Criteria	Message Counts	95% % <= 90sec	99.90% % <= 180sec	Message Counts	95% % <= 90sec	99.90% % <= 180sec
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HF	1177	81.73	92.69	1393	78.24	92.03
ALL	367248	99.13	99.65	388053	99.03	99.62

Thank you

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