

# NZZO FANS1/A Performance 2016



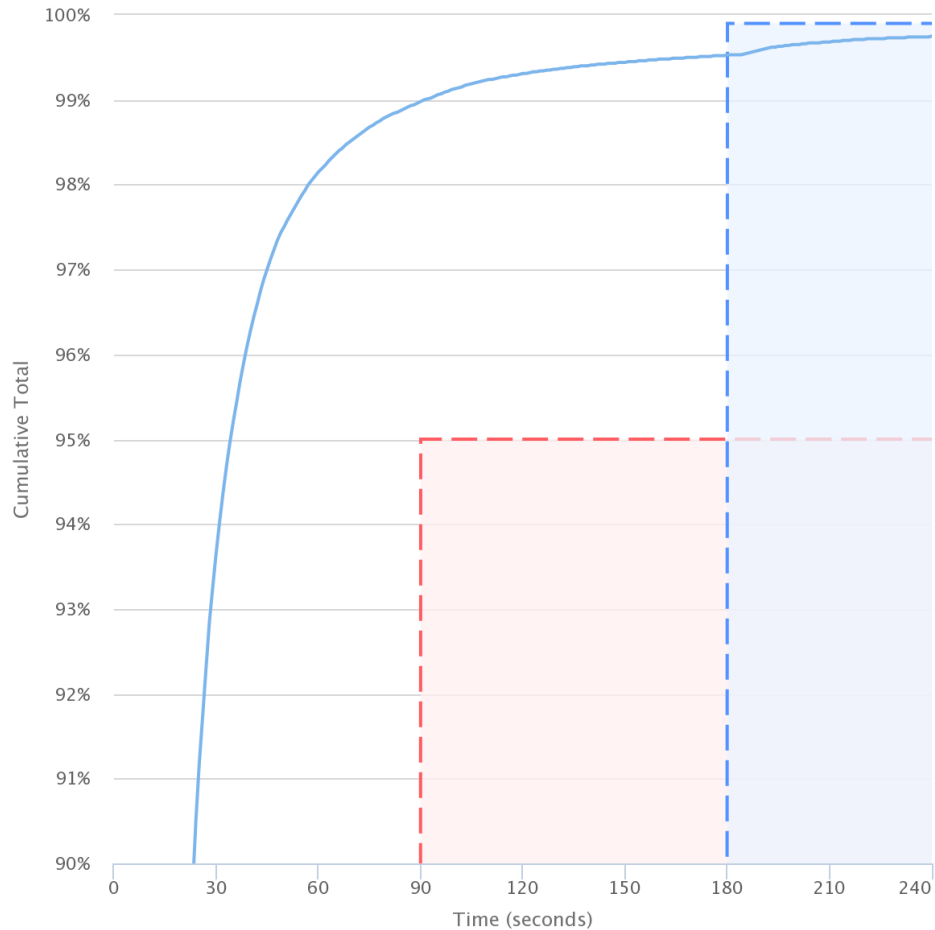
ISPACG FIT 24  
Honolulu, Hawaii  
6-7 March 2017



# ADS-C RSP180 – All RGS 2016

## NZZO RSP180 All RGS

Jan - Dec 2016



95.0 Percent 90 seconds    99.9 Percent 180 seconds    All RGS (#560969)

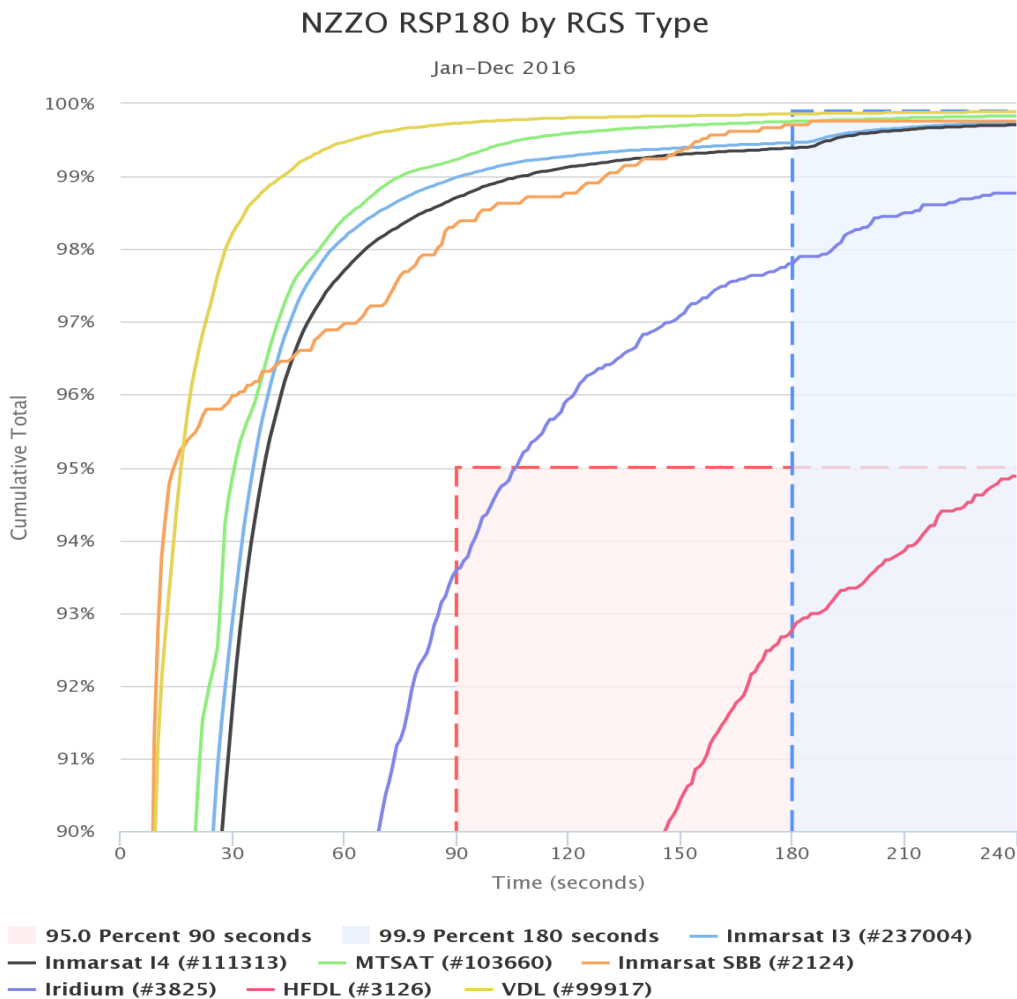
Highcharts.com

- No significant change observed from 2015 year.

<b>95% RSP180 Benchmark</b>	<b>99.9% RSP180 Benchmark</b>
<b>RSP &lt;= 90 sec</b>	<b>RSP &lt;= 180 sec</b>
98.98	99.53



# ADS-C RSP180 – By RGS Type



- No significant change observed from 2015 year.

Highcharts.com

# ADS-C RSP180 – By Operating Company and Aircraft Type (1)

- No significant change observed from 2015 year.

ADS-C Performance									
Colour Key		Period 1 Jul 2016 - 31 Dec 2016					95% RSP180 Benchmark	99.9% RSP180 Benchmark	
Meets Criteria		Aircraft Type		Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
99.0%-99.84%		Media Type	RGS						
Under Criteria									
<b>NZZO RSP180 (Greater than 100 data points)</b>									
All	All	B77W	AAL	All	NZZO	7681	99.53	99.76	
All	All	B788	AAL	All	NZZO	10038	99.64	99.77	
All	All	B77L	ACA	All	NZZO	103	98.05	100	
All	All	A320	ACI	All	NZZO	1658	93.72	97.58	
All	All	A332	ACI	All	NZZO	1632	99.57	99.87	
All	All	B772	ANZ	All	NZZO	36326	99.62	99.85	
All	All	B77W	ANZ	All	NZZO	37813	99.51	99.76	
All	All	B789	ANZ	All	NZZO	29957	98.75	99.62	
All	All	A332	CAL	All	NZZO	3016	99.33	99.43	
All	All	A333	CAL	All	NZZO	2660	99.24	99.43	
All	All	A332	CCA	All	NZZO	1784	99.38	99.83	
All	All	B789	CCA	All	NZZO	1334	99.62	99.7	
All	All	A332	CES	All	NZZO	3840	99.47	99.73	
All	All	A359	CPA	All	NZZO	1168	99.65	100	
All	All	B77W	CPA	All	NZZO	516	97.48	99.41	
All	All	A332	CRK	All	NZZO	1394	99.13	99.71	

# ADS-C RSP180 – By Operating Company and Aircraft Type (2)

ADS-C Performance										
Colour Key		Period 1 Jul 2016 - 31 Dec 2016					95% RSP180 Benchmark	99.9% RSP180 Benchmark		
Meets Criteria 99.0%-99.84% Under Criteria		Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
NZZO RSP180 (Greater than 100 data points)										
All	All	A332	CSN	All	NZZO	3064	99.67	99.86		
All	All	B77W	CSN	All	NZZO	906	98.23	99.11		
All	All	B788	CSN	All	NZZO	5922	98.26	99.49		
All	All	B77L	DAL	All	NZZO	3851	98.62	99.5		
All	All	MD11	FDX	All	NZZO	1143	98.95	99.82		
All	All	A332	FJI	All	NZZO	3220	96.11	98.29		
All	All	A333	FJI	All	NZZO	1373	96.94	98.54		
All	All	A332	GCR	All	NZZO	109	99.08	100		
All	All	B744	GTI	All	NZZO	1004	96.61	98.6		
All	All	A332	HAL	All	NZZO	4551	99.6	99.91		
All	All	B763	HAL	All	NZZO	1511	98.41	99.73		
All	All	B772	KAL	All	NZZO	2222	98.78	99.72		
All	All	B77W	KAL	All	NZZO	295	99.66	100		

## ADS-C RSP180 – By Operating Company and Aircraft Type (3)

ADS-C Performance								
Colour Key		Period 1 Jul 2016 - 31 Dec 2016					95% RSP180 Benchmark	99.9% RSP180 Benchmark
Meets Criteria								
99.0%-99.84%								
Under Criteria								
Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
NZZO RSP180 (Greater than 100 data points)								
All	All	B752	KIW	All	NZZO	526	99.04	99.42
All	All	B789	LAN	All	NZZO	14405	98.35	99.17
All	All	A333	MAS	All	NZZO	3432	99.53	99.73
All	All	B752	PVT	All	NZZO	403	96.52	99
All	All	DC87	PVT	All	NZZO	122	92.62	95.9
All	All	FA7X	PVT	All	NZZO	237	97.04	99.15
All	All	GL5T	PVT	All	NZZO	177	98.3	100
All	All	GLEK	PVT	All	NZZO	1045	98.18	99.9
All	All	GLF4	PVT	All	NZZO	131	93.12	96.18
All	All	GLF5	PVT	All	NZZO	666	97.29	98.49
All	All	GLF6	PVT	All	NZZO	957	98.11	99.05
All	All	B737	RAAF	All	NZZO	176	98.86	98.86
All	All	C130	RNZAF	All	NZZO	790	97.84	99.11
All	All	A388	SIA	All	NZZO	1182	99.74	99.91
All	All	B772	SIA	All	NZZO	4341	98.98	99.86
All	All	B77W	SIA	All	NZZO	2227	97.66	99.05
All	All	B744	SQC	All	NZZO	2099	99.71	99.95
All	All	B772	THA	All	NZZO	2734	98.97	99.59



# ADS-C RSP180 – By Operating Company and Aircraft Type (4)

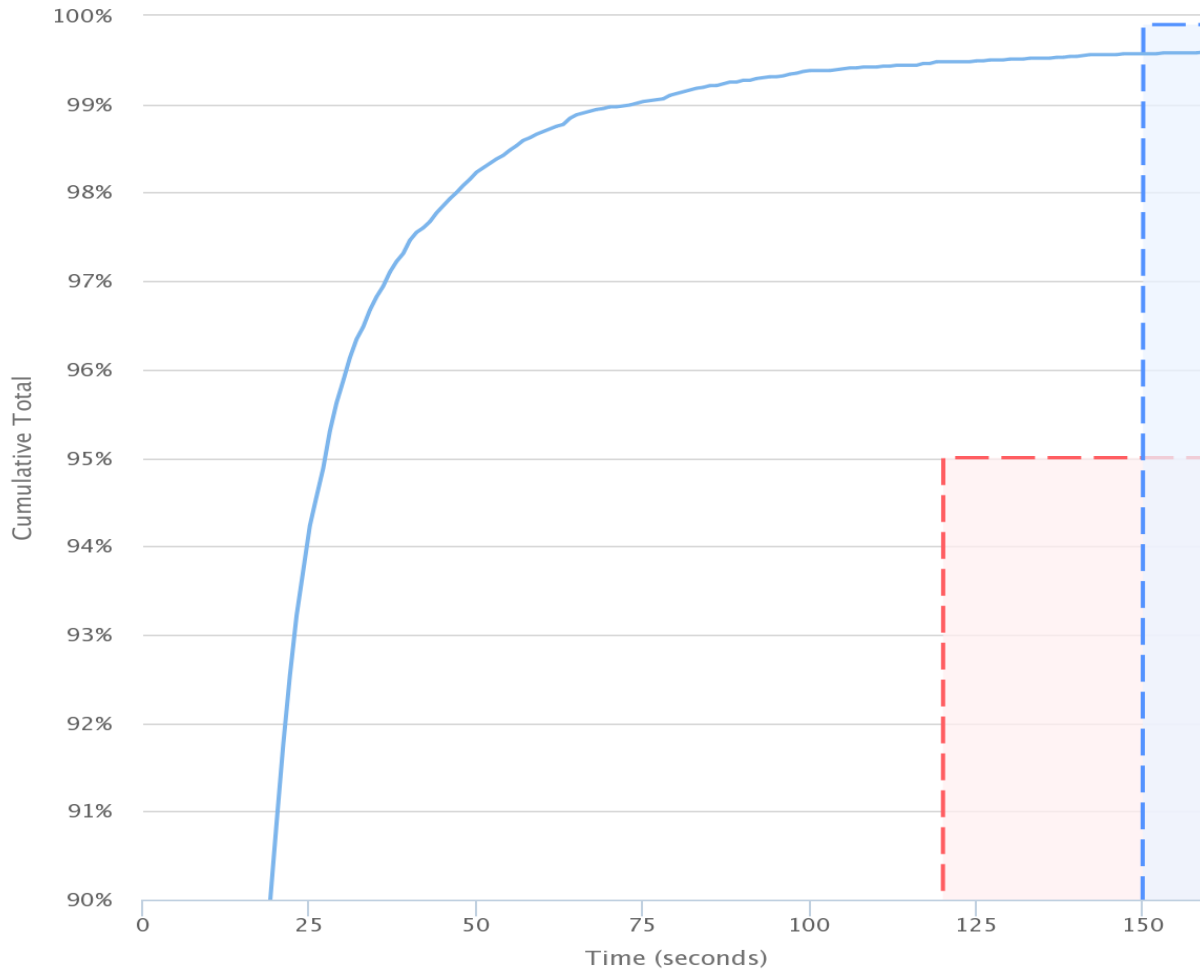
ADS-C Performance										
Colour Key		Period 1 Jul 2016 - 31 Dec 2016					95% RSP180 Benchmark	99.9% RSP180 Benchmark		
<span style="color: green;">■</span> Meets Criteria <span style="color: yellow;">■</span> 99.0%-99.84% <span style="color: red;">■</span> Under Criteria		Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
<b>NZZO RSP180 (Greater than 100 data points)</b>										
All	All	A343	THT	All	NZZO	5535	99.76	99.83		
All	All	A388	UAE	All	NZZO	11683	99.64	99.91		
All	All	B77L	UAE	All	NZZO	2454	99.26	99.67		
All	All	B77W	UAE	All	NZZO	1789	98.88	99.88		
All	All	B772	UAL	All	NZZO	3854	99.4	99.66		
All	All	B788	UAL	All	NZZO	2639	99.16	99.35		
All	All	B789	UAL	All	NZZO	18003	98.77	99.11		
All	All	B752	USAF	All	NZZO	262	99.23	100		
All	All	C17	USAF	All	NZZO	1410	99.36	99.5		
All	All	B737	USN	All	NZZO	188	100	100		
All	All	B77W	VAU	All	NZZO	5705	98.84	99.33		
All	All	A332	VOZ	All	NZZO	205	98.04	99.02		
All	All	A333	XAX	All	NZZO	4299	98.92	99.46		



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

## NZZO RCP240 ACTP

Jan – Dec 2016



95.0 Percent 120 seconds    99.9 Percent 150 seconds    All RGS (#19342)

Highcharts.com

- No significant change observed from 2015 year.

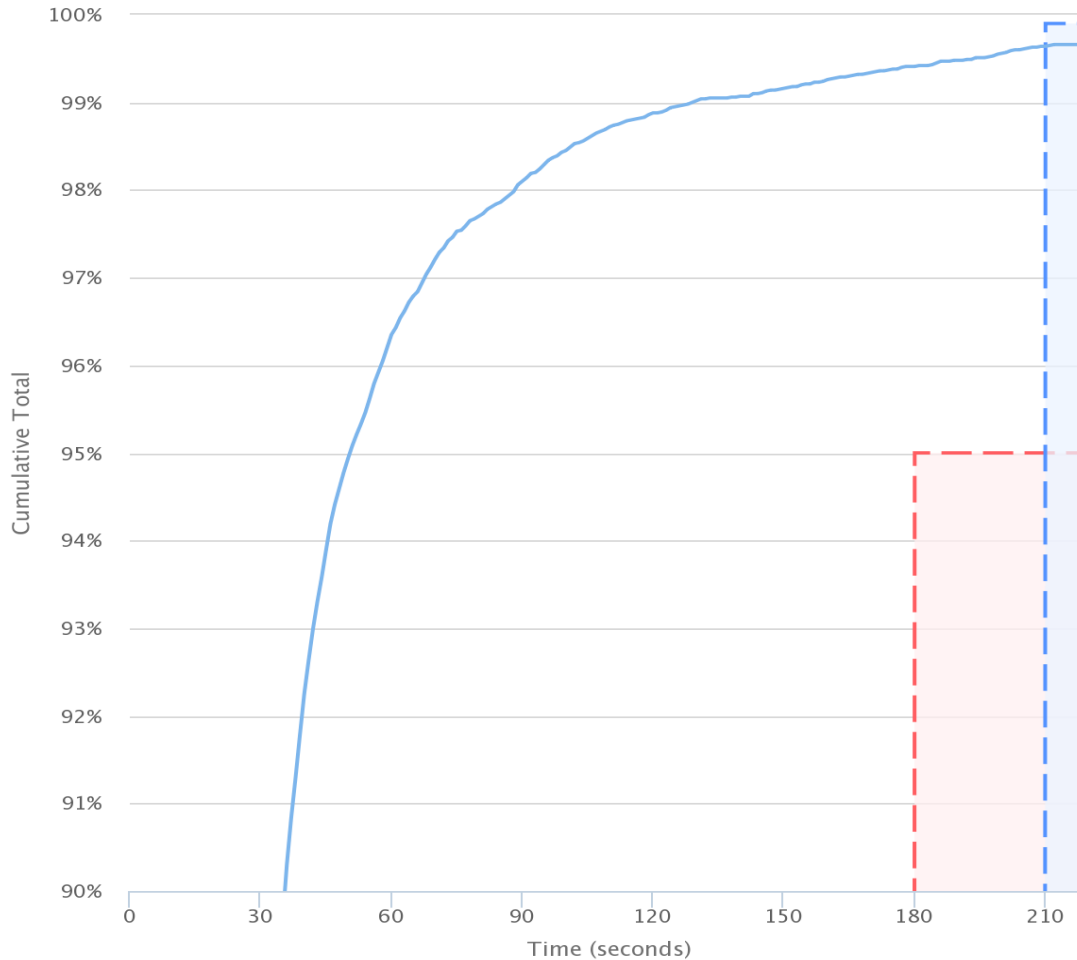
95% RCP240 Benchmark	99.9% RCP240 Benchmark
RCP <= 120 sec	RCP <= 150 sec
99.48	99.57



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

## NZZO RCP240 ACP

Jan - Dec 2016



95.0 Percent 180 seconds    99.9 Percent 210 seconds    All RGS (#19342)

Highcharts.com

- No significant change observed from 2015 year.

<b>95% RCP240 Benchmark</b>	<b>99.9% RCP240 Benchmark</b>
<b>RCP &lt;= 180 sec</b>	<b>RCP &lt;= 210 sec</b>
99.41	99.64

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

By airline operating company and aircraft type (>100 data points) (1)

CPDLC Performance								
Colour Key		Period 1 Jan 2016 - 31 Dec 2016					95% RCP240 Benchmark	99.9% RCP240 Benchmark
Meets Criteria								
99.0%-99.84%								
Under Criteria								
Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RCP <= 180 sec	RCP <= 210 sec
<b>NZZO ACP RCP240</b>								
All	All	B77W	AAL	All	NZZO	630	99.04	99.2
All	All	B788	AAL	All	NZZO	376	100	100
All	All	A332	ACI	All	NZZO	117	99.14	99.14
All	All	B772	ANZ	All	NZZO	3607	99.83	99.91
All	All	B77W	ANZ	All	NZZO	3496	99.25	99.62
All	All	B789	ANZ	All	NZZO	1312	99.31	99.61
All	All	A332	CES	All	NZZO	110	100	100
All	All	A332	CSN	All	NZZO	105	98.09	98.09
All	All	B788	CSN	All	NZZO	164	100	100

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

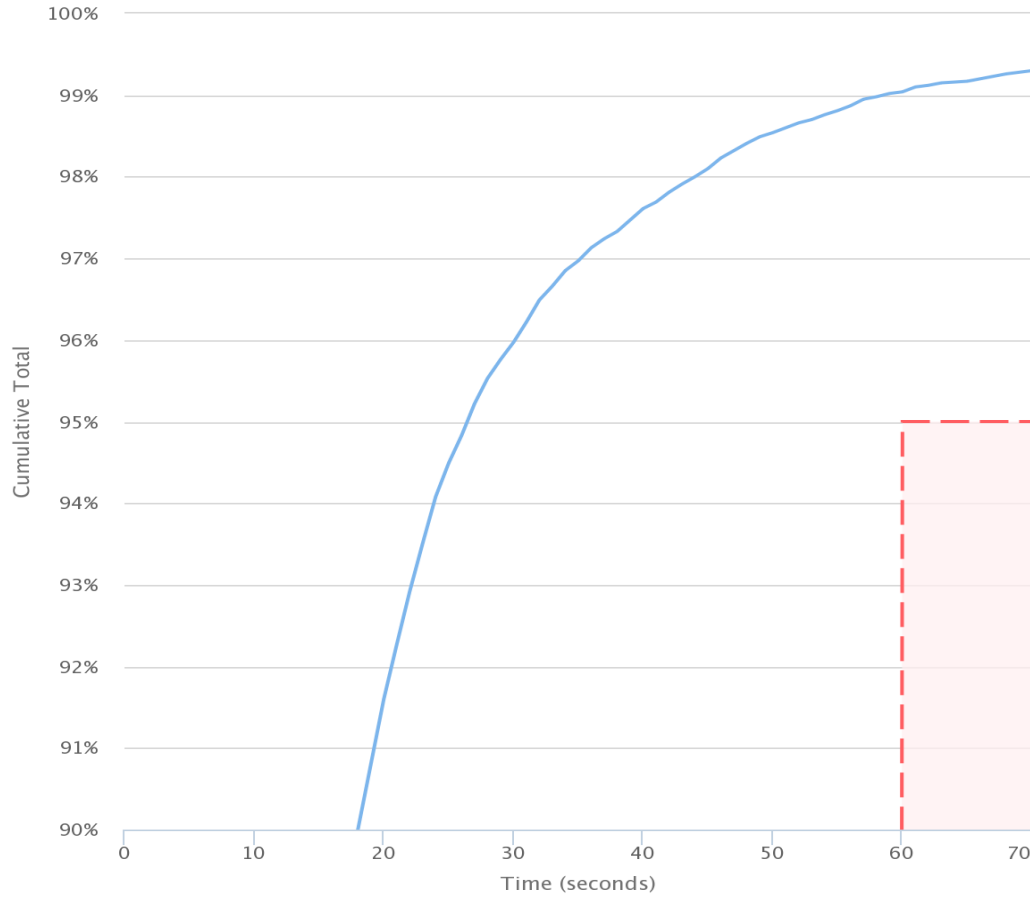
By airline operating company and aircraft type (>100 data points) (2)

CPDLC Performance								
Colour Key		Period 1 Jan 2016 - 31 Dec 2016					95% RCP240 Benchmark	99.9% RCP240 Benchmark
Meets Criteria	99.0%-99.84%							
Under Criteria								
Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RCP <= 180 sec	RCP <= 210 sec
<b>NZZO ACP RCP240</b>								
All	All	B77L	DAL	All	NZZO	341	99.7	100
All	All	A332	FJI	All	NZZO	121	98.34	98.34
All	All	A332	HAL	All	NZZO	448	99.33	99.33
All	All	B763	HAL	All	NZZO	271	98.89	100
All	All	B789	LAN	All	NZZO	1173	99.48	99.74
All	All	A388	QFA	All	NZZO	1131	99.38	99.46
All	All	B744	QFA	All	NZZO	1084	99.26	99.53
All	All	A343	THT	All	NZZO	356	100	100
All	All	A388	UAE	All	NZZO	275	99.27	99.27
All	All	B772	UAL	All	NZZO	377	100	100
All	All	B788	UAL	All	NZZO	120	98.33	98.33
All	All	B789	UAL	All	NZZO	1462	98.97	99.45
All	All	B77W	VAU	All	NZZO	458	99.78	99.78

# CPDLC RCP240 – Pilot Operational Response Time (PORT) – All RGS

## NZZO RCP240 PORT

Jan - Dec 2016



- No significant change observed from 2015 year.

95.0 Percent 60 seconds    N/A for PORT    All RGS (#19342)

Highcharts.com



# Iridium Performance



## CPDLC RSP180 – Iridium Performance– All RGS

- No significant change observed from 2015 year.
- Still less than 1% of traffic using Iridium

ADS-C Performance										
Colour Key		Period 1 Jan 2016 - 31 Dec 2016					95% RSP180 Benchmark	99.9% RSP180 Benchmark		
<p>Meets Criteria</p> <p>99.0%-99.84%</p> <p>Under Criteria</p>		Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
<b>NZZO RSP180 Iridium by Aircraft Type</b>										
SATCOM Iridium	All	A320	All	All	NZZO	2041	92.11	97.35		
SATCOM Iridium	All	B744	All	All	NZZO	1343	96.79	98.73		
SATCOM Iridium	All	B752	All	All	NZZO	152	90.13	96.71		
SATCOM Iridium	All	B763	All	All	NZZO	129	92.24	100		
SATCOM Iridium	All	CL60	All	All	NZZO	38	81.57	92.1		
SATCOM Iridium	All	DC87	All	All	NZZO	122	92.62	95.9		

# HFDL Performance





- Increased HFDL usage observed in 2016.
- 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 (Refer WP10)
- Next slide depicts performance from all aircraft types using HFDL when used in “next on busy” mode.
- Still less than 1% of traffic using HFDL.

ADS-C Performance




Colour Key		Period 1 Jan 2016 - 31 Dec 2016					95% RSP180 Benchmark	99.9% RSP180 Benchmark		
<p>Meets Criteria</p> <p>99.0%-99.84%</p> <p>Under Criteria</p>		Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
<b>NZZO HFDL</b>										
HF All	All	A332	CCA	All	NZZO	227		87.22	93.83	
HF All	All	A332	CES	All	NZZO	337		93.17	97.62	
HF All	All	A332	CSN	All	NZZO	224		82.58	92.85	
HF All	All	A332	FJI	All	NZZO	807		80.17	93.3	
HF All	All	A333	FJI	All	NZZO	271		87.82	95.57	
HF All	All	A332	HAL	All	NZZO	3		100	100	
HF All	All	B763	HAL	All	NZZO	1		100	100	
HF All	All	B748	KAL	All	NZZO	9		77.77	100	
HF All	All	A388	QFA	All	NZZO	931		84.96	95.27	
HF All	All	A388	SIA	All	NZZO	110		81.81	90.9	
HF All	All	A388	UAE	All	NZZO	31		41.93	51.61	
HF All	All	B77W	CSN	All	NZZO	21		38.09	61.9	
HF All	All	B788	CSN	All	NZZO	13		23.07	46.15	
HF All	All	B772	KAL	All	NZZO	20		65	85	
HF All	All	B789	LAN	All	NZZO	13		38.46	76.92	
HF All	All	GLF5	NSJ	All	NZZO	2		100	100	
HF All	All	C130	RNZAF	All	NZZO	9		22.22	33.33	
HF All	All	B788	UAL	All	NZZO	6			16.66	
HF All	All	B789	UAL	All	NZZO	91		61.53	76.92	



# Swift Broad Band (SBB) Performance



# CPDLC RSP180 – SBB Performance– All RGS

ADS-C Performance								
Colour Key		Period 1 Jan 2016 - 31 Dec 2016					95% RSP180 Benchmark	99.9% RSP180 Benchmark
 Meets Criteria								
 99.0%-99.84%								
 Under Criteria								
Media Type	RGS	Aircraft Type	Operating Company	Tail Number	ATSP	Message Count	RSP <= 90 sec	RSP <= 180 sec
NZZO Inmarsat SBB								
SATCOM SBB	All	All	HAL	All	NZZO	2124	98.35	99.71

- VHF like performance below 90%
- Working on delays observed in the tail of the distribution

# Thank you

