ISPACG/30 FIT/23

PBCS Monitoring in US Oceanic Airspace

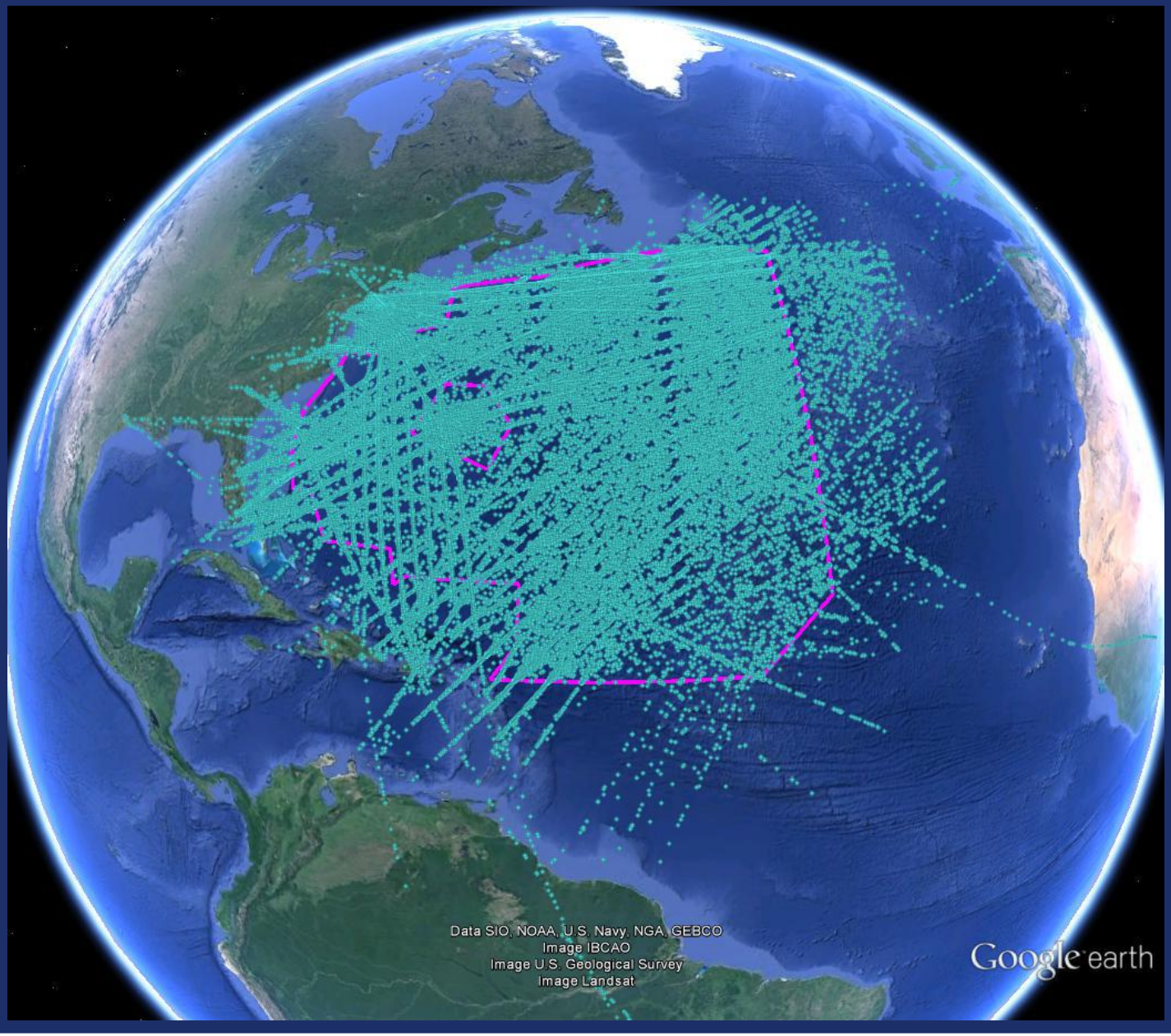
Prepared by:
Theresa Brewer-Dougherty
FAA Technical Center
Separation Standards Analysis Branch
theresa.brewer@faa.gov

Surfers Paradise, Australia
15 March 2016

Overview

- Overview of FANS Data Link Usage in US Oceanic FIRs
- Summary of Reported Outages and Measured Availability
- PBCS Performance Criteria
- How to Read PBCS Monitoring Charts
- Aggregate FANS Data Link Performance
- ASP for SATCOM Station Identifiers by FIR
- Aggregate FANS Data Link Performance by Operator
- Aggregate FANS Data Link Performance for Business Jet Aircraft Types

New York FIR
KZNY



KZNY – FANS Data Link Usage

July – December 2015

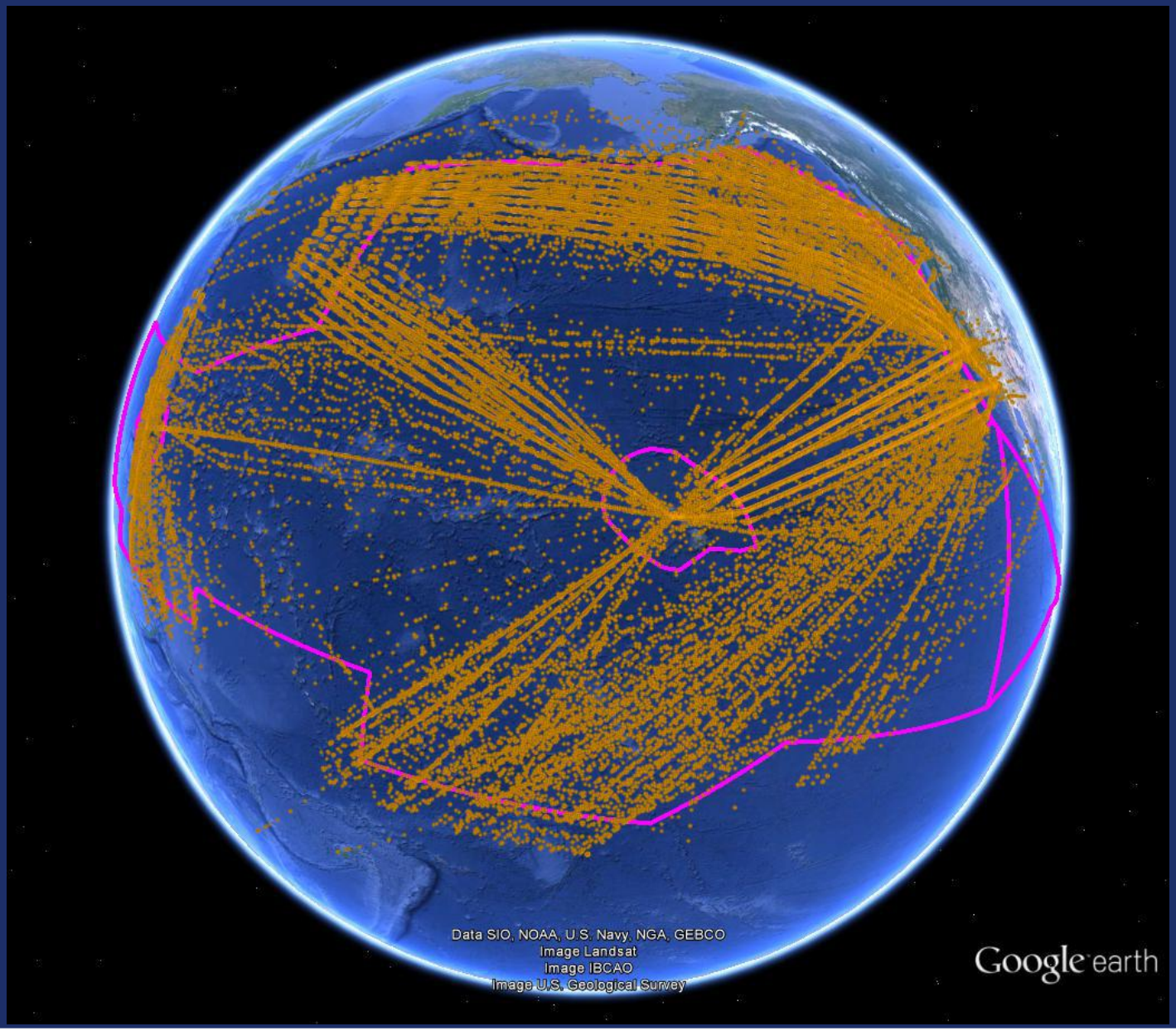
	All ZNY	NAT	WATRS
Total flights	109,374	56,624	92,387
% flights using FANS data link	53%	88%	49%
% RNP4	38%	54%	37%

Average FANS data link flights per day	314
% using Iridium	7%
% using Inmarsat I-4	28%

Total FANS data link airframes	2,966
% using Iridium	9%
% using Inmarsat I-4	33%

Oakland FIR

KZAK



KZAK – FANS Data Link Usage

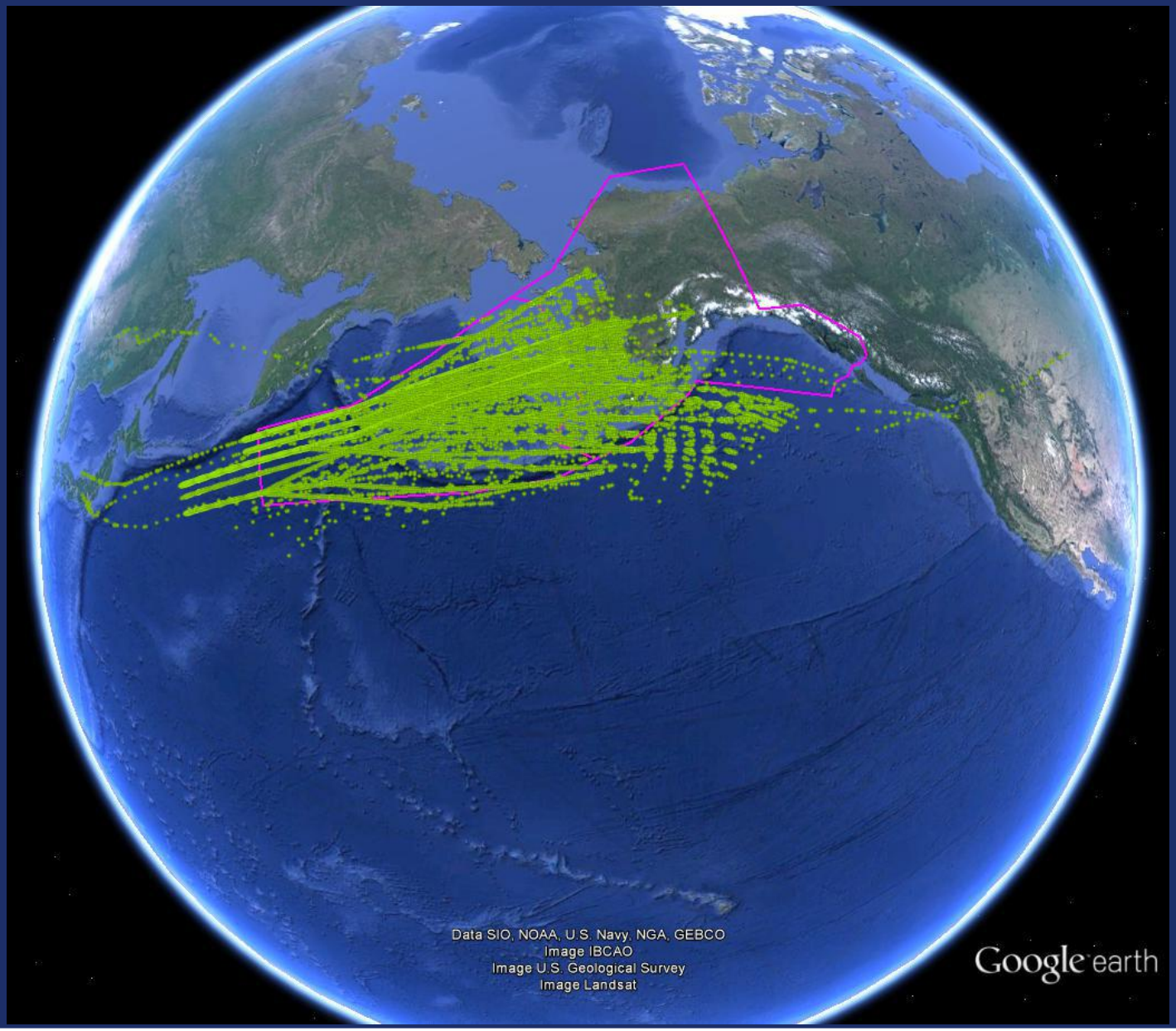
July – December 2015

Total flights	132,607
% flights using FANS data link	65%
% RNP4	71%

Average FANS data link flights per day	452
% using Iridium	6%
% using Inmarsat I-4	23%

Total FANS data link airframes	2,508
% using Iridium	10%
% using Inmarsat I-4	28%

Anchorage FIR
PAZA



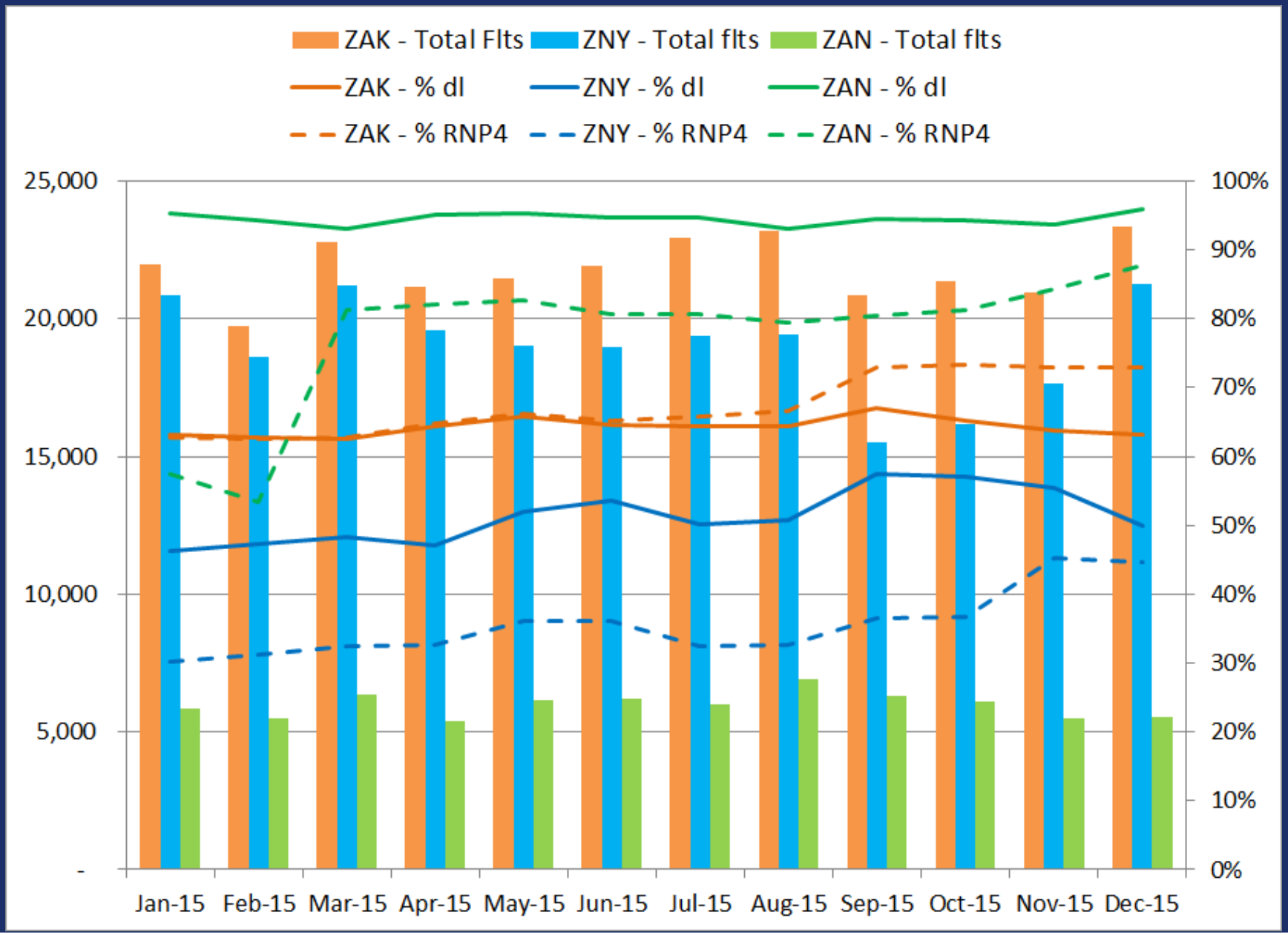
PAZA – FANS Data Link Usage

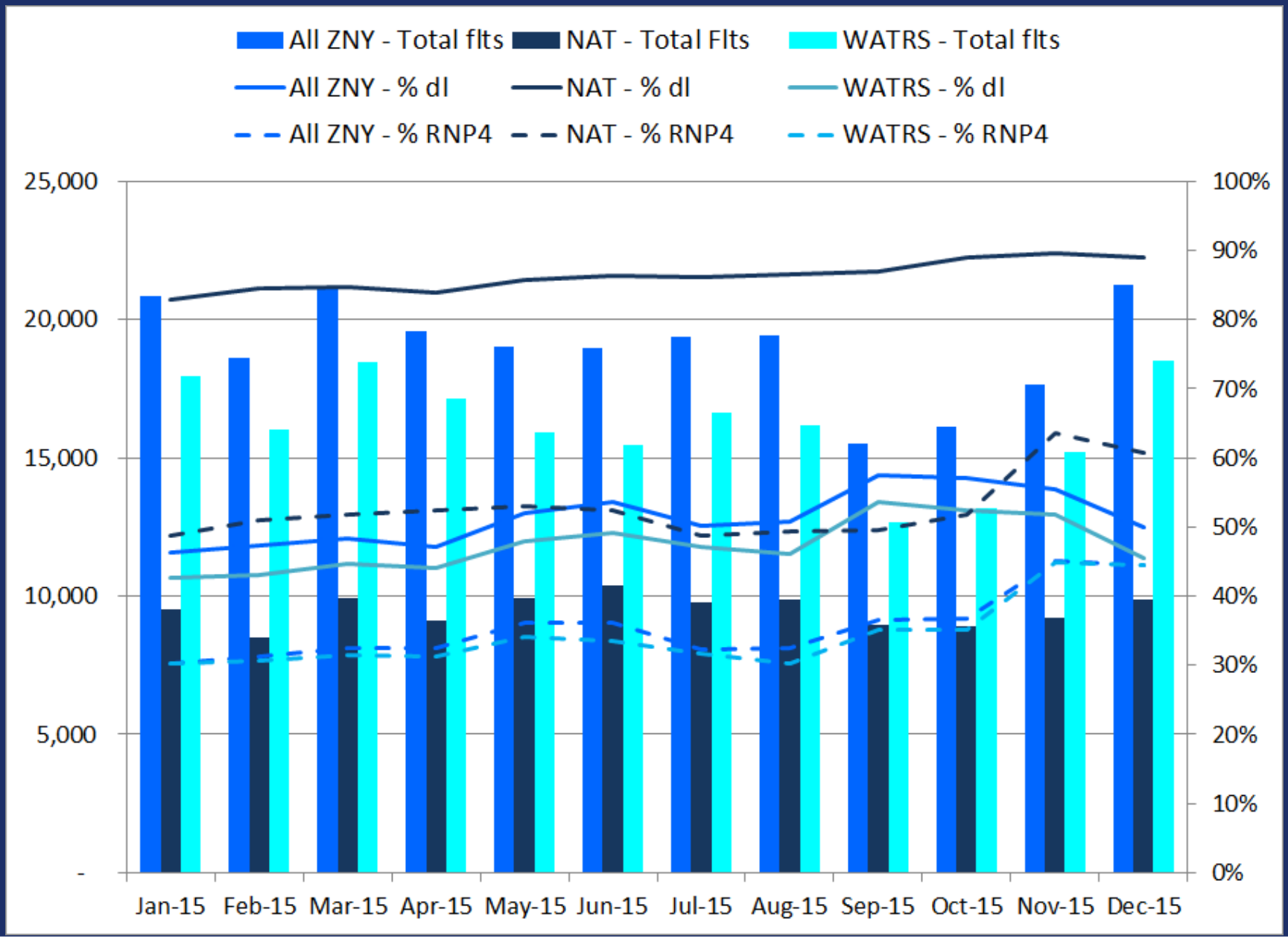
July – December 2015

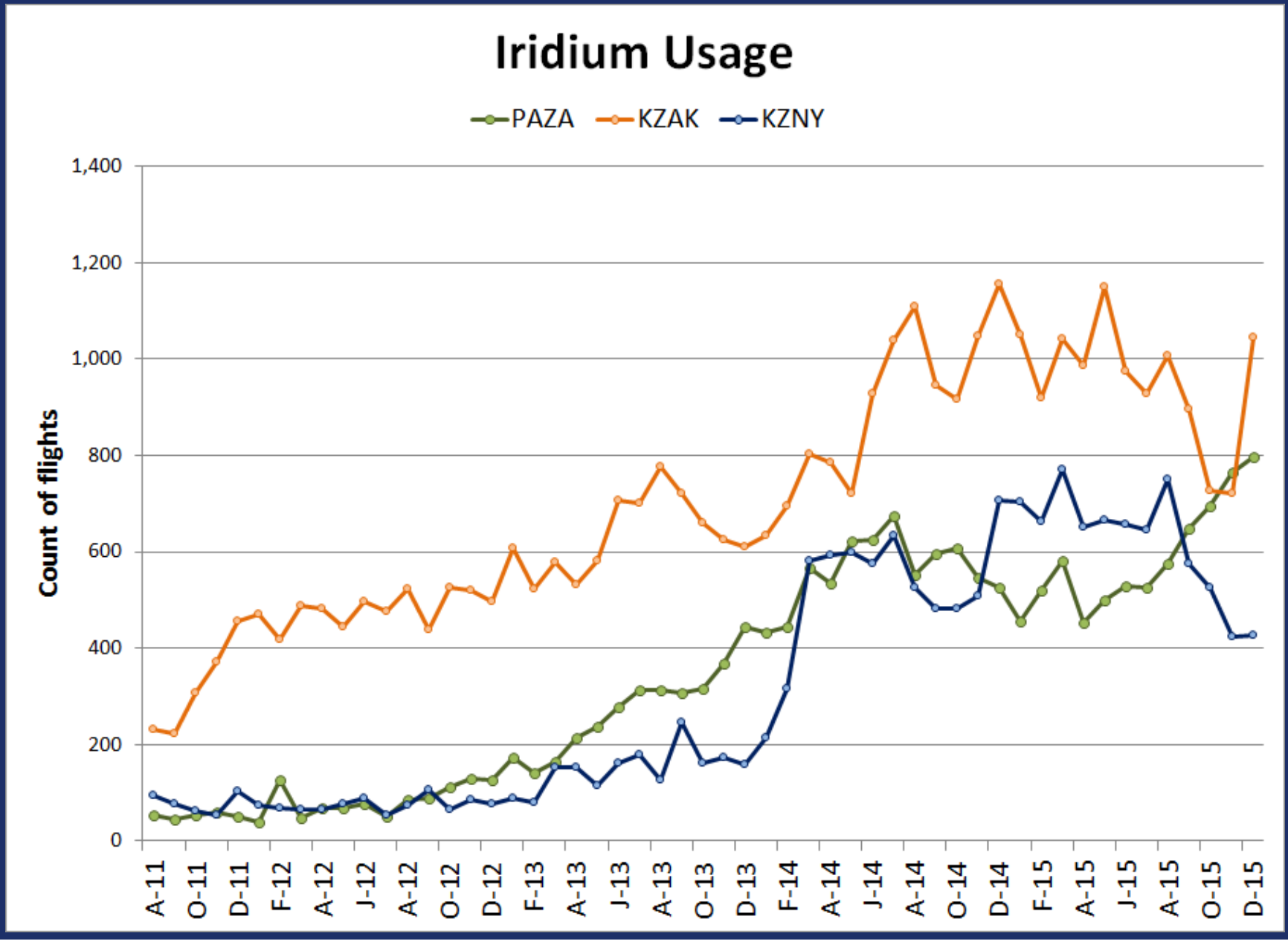
Total flights	36,371
% flights using FANS data link	94%
% RNP4	82%

Average FANS data link flights per day	187
% using Iridium	9%
% using Inmarsat I-4	31%

Total FANS data link airframes	1,650
% using Iridium	10%
% using Inmarsat I-4	27%


ZAK - Total Flts
ZNY - Total flts
ZAN - Total flts
ZAK - % dl
ZNY - % dl
ZAN - % dl
ZAK - % RNP4
ZNY - % RNP4
ZAN - % RNP4
25,000
20,000
15,000
10,000
5,000
-
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15


All ZNY - Total flts
NAT - Total Flts
WATRS - Total flts
All ZNY - % dl
NAT - % dl
WATRS - % dl
All ZNY - % RNP4
NAT - % RNP4
WATRS - % RNP4
25,000
20,000
15,000
10,000
5,000
-
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15


Iridium Usage
PAZA
KZAK
KZNY
Count of flights
1,400
1,200
1,000
800
600
400
200
0
A-11
O-11
D-11
F-12
A-12
J-12
A-12
O-12
D-12
F-13
A-13
J-13
A-13
O-13
D-13
F-14
A-14
J-14
A-14
O-14
D-14
F-15
A-15
J-15
A-15
O-15
D-15

Outages Reported since PARC CWG/34 (1 of 2)

Last outage reported – 1 July 2015

START DATE	START TIME (UTC)	DURATION (HH:MM:SS)	SERVICE IMPACTED	SATELLITE REGION IMPACTED	NOTIFICATION SOURCE	NOTES
5-Sep-15	01:53	02:00:00	ARINC I-3	POR, IOR	ARINC	Inmarsat Global Ltd has resolved I-3 Pacific Ocean Region for Classic Aero over 13 and the I-3 India Ocean Region for Classic Aero over 13 region
5-Sep-15	03:21	00:41:00	SITA Iridium	Global	SITA	Iridium customers may have experienced intermittent Short Burst Data service delay during the above timeframe
6-Sep-15	03:21	01:00:00	I-4	EMEA	ARINC	Degradation has been rectified - no cause was provided.
6-Sep-15	03:03	00:59:00	I-4	EMEA	SITA	There was a degradation over EUA1 Ocean region on I4 Ground Earth Station in Fucino due to Inmarsat network issue. Aircrafts switched to Atlantic and Indian Ocean region during this period.
20-Sep-15	12:52	04:12:00	I-3	POR	ARINC	Issue on the 3F3 satellite was resolved on the return direction
20-Sep-15	12:45	04:18:00	I-3	POR	SITA	Unscheduled loss of Classic Aero Services in Pacific Ocean Region (POR) has been resolved
25-Sep-15	16:31	02:03:00	ARINC Iridium	Global	ARINC	one of Iridium's terrestrial Internet Service Providers experienced an issue with routing traffic through their network backbone. As a result, users may have experienced failed data transmissions if their traffic utilized the failing route. Iridium was able to correct this issue by forcing all traffic to another ISP and have opened a ticket with the affected provider. Please note that as a result of the traffic rerouting, some users may have experienced additional delays lasting until at least 20:34 or longer as these changes fully propagated across the internet.
9-Jan-16	16:36	00:14:00	SITA	Global	SITA	A network interruption occured in our SIN Data center and the services were switched to our Montreal Center
21-Jan-16	21:37	00:55:00	Inmarsat I-4	EMEA	ARINC	Inmarsat network service degradation in I-4 EMEA for SwiftBroadband

Outages Reported since PARC CWG/34 (2 of 2)

Last outage reported – 1 July 2015

START DATE	START TIME (UTC)	DURATION (HH:MM:SS)	SERVICE IMPACTED	SATELLITE REGION IMPACTED	NOTIFICATION SOURCE	NOTES
25-Sep-15	16:31	02:45:00	SITA Iridium	Global	SITA	Customers may experience issues with Iridium Datalink ACARS service
30-Sep-15	19:19	00:54:00	ARINC I-3	IOR	ARINC	
30-Sep-15	18:45	00:20:00	SITA I-3	IOR	SITA	
23-Oct-15	11:24	00:12:00	SITA I-4	EMEA	SITA	Inmarsat I-4 Ground Earth Station in Fucino experienced an unplanned interruption of service
26-Oct-15	02:20	00:21:00	Inmarsat SBB	APAC	ARINC	Inmarsat reports they performed an AGGW server switch in Hawaii. Issue resolved. (XXU).
27-Oct-15	14:32	00:39:00	Inmarsat I-4	EMEA	SITA	Fucino GES Inmarsat Voice and Data Services
27-Oct-15	14:56	00:15:00	Inmarsat I-4	EMEA	ARINC	No update on cause
30-Oct-15	01:05	00:50:00	Inmarsat I-3	POR	SITA	
30-Oct-15	01:56	00:07:00	Inmarsat I-3	POR	ARINC	Inmarsat experienced a network service degradation
19-Nov-15	04:30	00:05:00	MTSAT	MTSAT	SITA	SATELLITE Voice and Data Services via MTSAT were affected due to a maintenance issue at MTSAT
5-Dec-15	18:25	00:26:00	Inmarsat I-4	EMEA	ARINC	Inmarsat experienced a network service degradation
17-Dec-15	12:46	00:30:00	Inmarsat I-4	EMEA	ARINC	Inmarsat experienced a network service degradation
7-Jan-16	17:27	01:44:00	Inmarsat I-3	IOR	ARINC	Inmarsat for Classic Aero over I3 outage
9-Jan-16	16:36	00:14:00	SITA	Global	SITA	A network interruption occured in our SIN Data center and the services were switched to our Montreal Center
21-Jan-16	21:37	00:55:00	Inmarsat I-4	EMEA	ARINC	Inmarsat network service degradation in I-4 EMEA for SwiftBroadband

Measured Availability

Using Reported Outages from Jan to Dec 2015

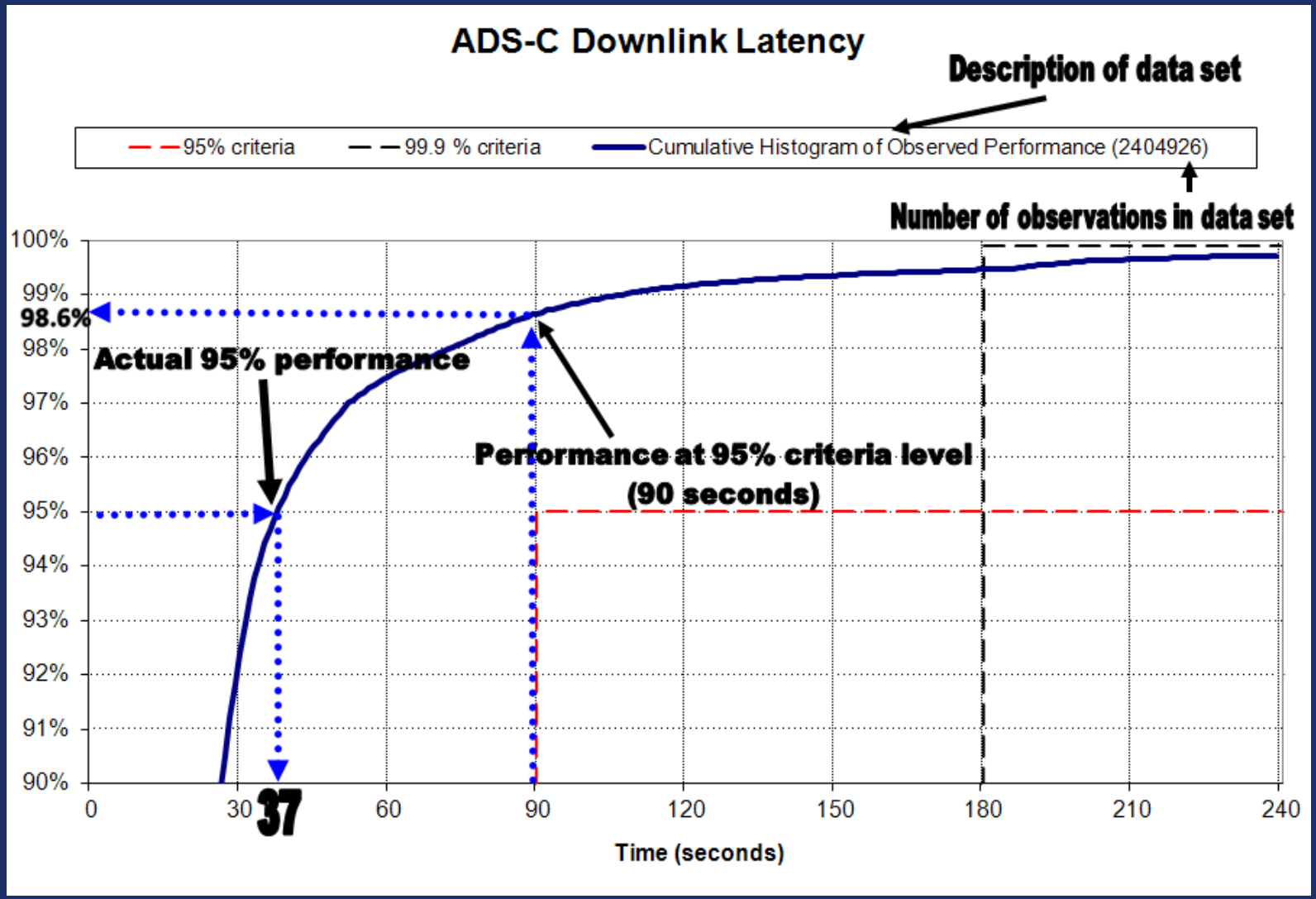
PBCS criteria - max values					
Safety - 99.9%				48	520	99.90%
Reliability - 99.99%				4	52	99.99%
Satellite	**Region**	**DSP**	**Station ID**	**# unplanned outages > 10 min**	**Sum of unplanned outages > 10 min (min)**	**Estimated availability**
Inmarsat I-3	AOR-E	SITA	AOE2	2	70	99.99%
		ARINC	XXN	2	35	99.99%
	AOR-W	SITA	AOW2	2	92	99.98%
		ARINC	XXW	2	35	99.99%
	IOR	SITA	IOR2	2	131	99.98%
		ARINC	XXI	4	568	99.89%
	POR	SITA	POR1	4	343	99.93%
		ARINC	XXP	3	35	99.99%
Inmarsat I-4	EMEA	SITA	EUA1	1	145	99.97%
		ARINC	XXF	7	210	99.96%
	Americas	SITA	AME1	1	35	99.99%
		ARINC	XXH	1	35	99.99%
	Asia-Pac	SITA	APK1	1	35	99.99%
		ARINC	XXA	1	35	99.99%
Iridium	Global	SITA	IGW1	12	1,068	99.80%
		ARINC	IG1	6	593	99.89%

	Meets safety and reliability criteria
	Meets safety criteria only
	Does not meet safety or reliability criteria

PBCS Performance Criteria
Time/Continuity

Performance Measure	Percentage of Messages Required to Meet Criteria	ADS-C		CPDLC	
		RSP180 Criteria (sec)	RSP400 Criteria (sec)	RCP240 Criteria (sec)	RCP400 Criteria (sec)
ASP Actual Surveillance Performance	95%	**90**	**300**		
	99.9%	**180**	**400**		
ACTP Actual Communication Technical Performance	95%			**120**	**260**
	99.9%			**150**	**310**
ACP Actual Communication Performance	95%			**180**	**320**
	99.9%			**210**	**370**
PORT Pilot Operational Response Time	95%			**60**	**60**

How to Read PBCS Monitoring Charts



July – December 2015

DATA LINK PERFORMANCE BY MEDIA TYPE

Performance by Media Type

July – December 2015

New York

57,697 flights

Media Type	ADS-C			CPDLC					
	Count of ADS-C Downlink Messages	ASP 95%	ASP 99.9%	Count of CPDLC Transactions	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
Performance Criteria		**RSP 180**			**RCP 240**				
Aggregate	1,530,259	98.3%	99.4%	51,273	99.6%	99.7%	99.1%	99.4%	96.9%
SAT	1,182,082	98.1%	99.4%	46,965	99.6%	99.7%	99.1%	99.4%	96.9%
VHF	344,060	99.2%	99.6%	3,612	99.9%	99.9%	99.6%	99.7%	97.3%
HF	4,101	65.9%	81.7%	1	--	--	--	--	--
SAT-VHF				346	97.7%	98.8%	96.8%	97.7%	89.9%
VHF-SAT				308	95.5%	97.1%	94.5%	96.1%	94.2%
SAT-HF				33	--	--	--	--	--
HF-SAT				8	--	--	--	--	--

Performance by Media Type

July – December 2015

Oakland

84,272 flights

Media Type	ADS-C			CPDLC					
	Count of ADS-C Downlink Messages	ADS-C 95%	ADS-C 99.9%	Count of CPDLC Transactions	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
Performance Criteria		**RSP 180**			**RCP 240**				
Aggregate	2,631,360	98.6%	99.4%	109,709	99.7%	99.7%	99.5%	99.7%	98.5%
SAT	2,330,955	98.7%	99.5%	106,944	99.7%	99.8%	99.5%	99.7%	98.5%
VHF	288,100	98.7%	99.2%	2,022	99.7%	99.7%	99.5%	99.8%	98.4%
HF	12,290	69.2%	82.4%	31	--	--	--	--	--
VHF-SAT				229	91.7%	94.8%	94.3%	96.5%	96.1%
SAT-VHF				192	100.0%	100.0%	99.0%	99.5%	96.4%
SAT-HF				165	90.3%	93.3%	95.2%	95.8%	97.6%
HF - SAT				121	99.2%	99.2%	94.2%	97.5%	86.8%
HF-VHF				4	--	--	--	--	--
VHF-HF				1	--	--	--	--	--

Performance by Media Type

July – December 2015

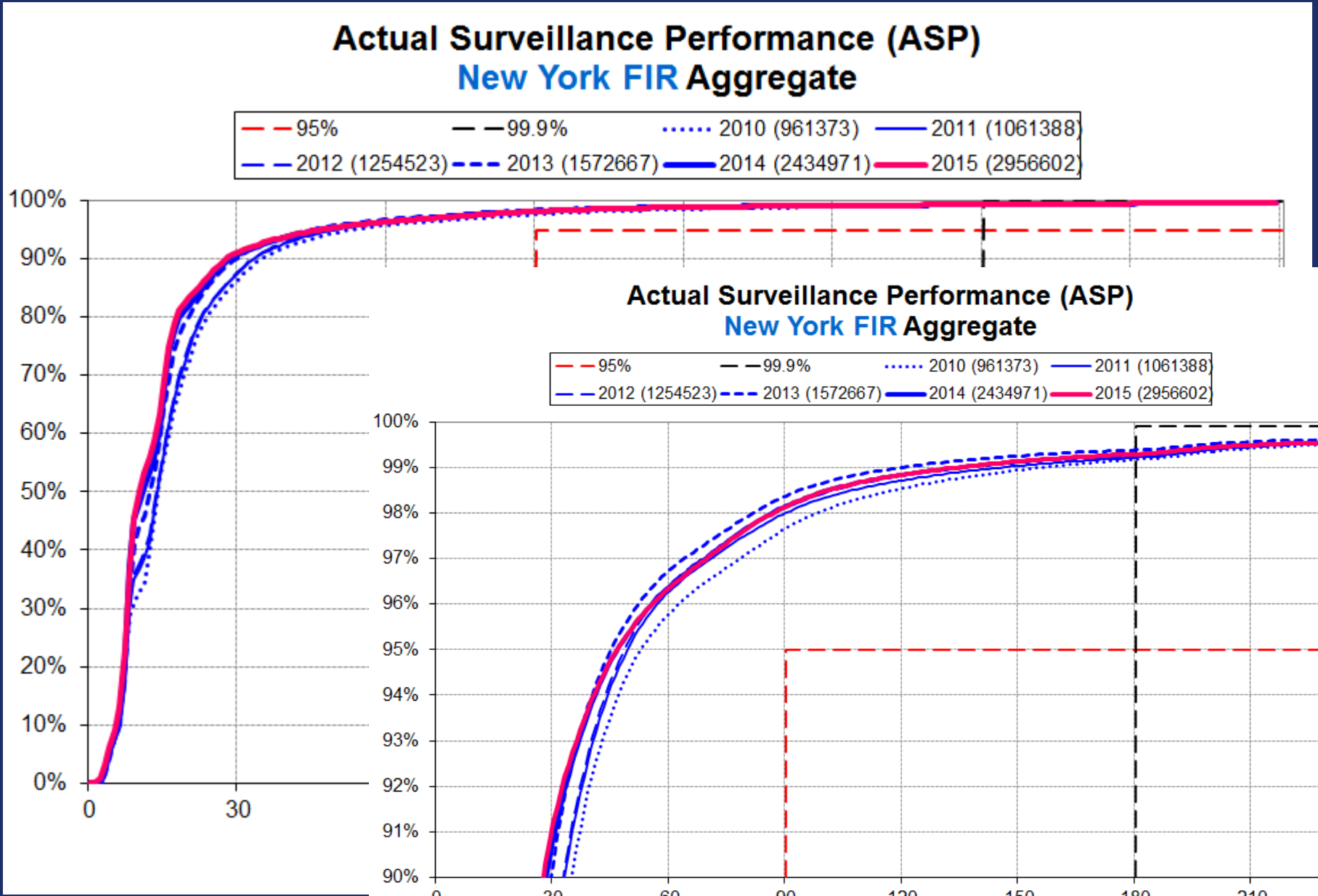
Anchorage

34,497 flights

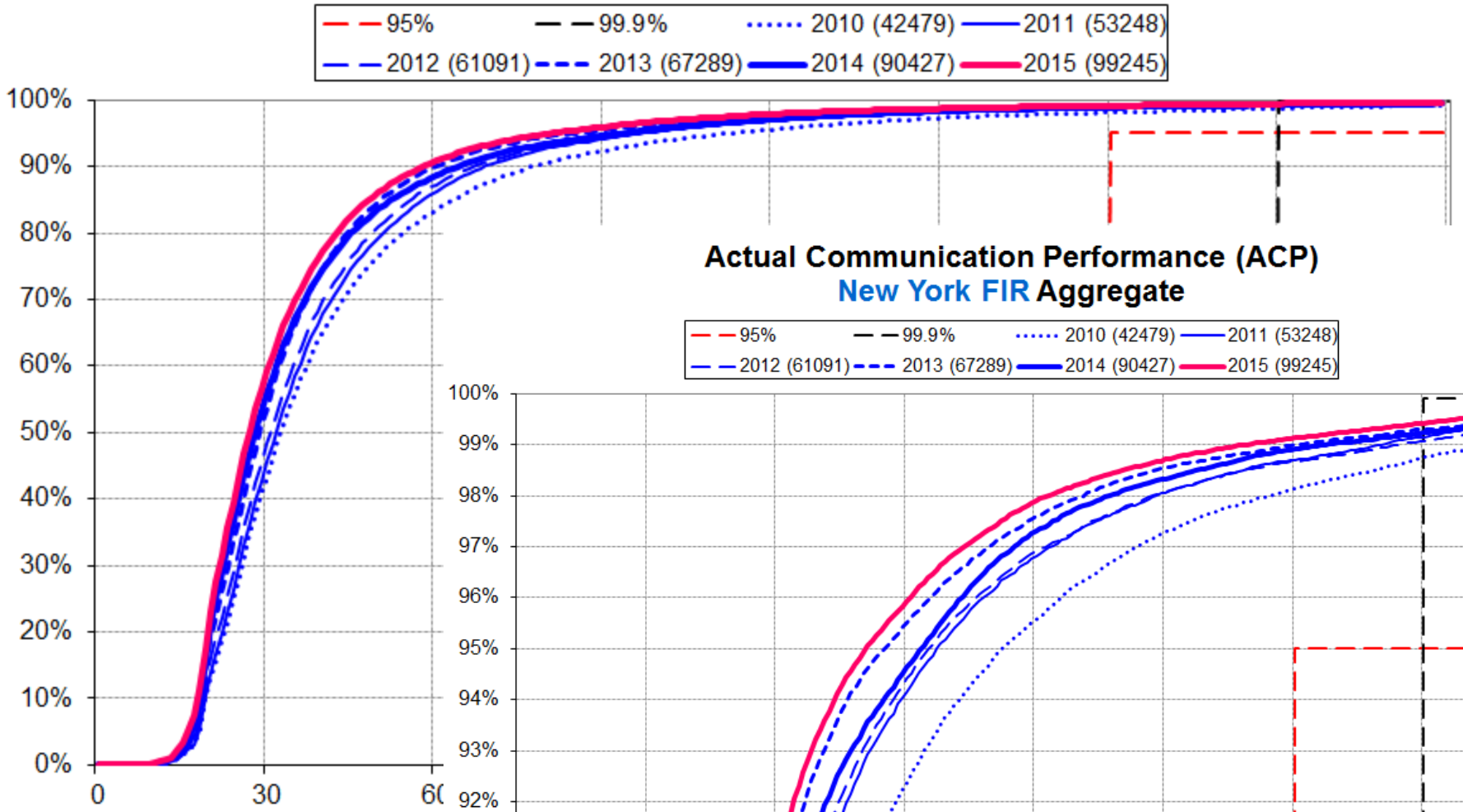
Media Type	ADS-C			CPDLC					
	Count of ADS-C Downlink Messages	ADS-C 95%	ADS-C 99.9%	Count of CPDLC Transactions	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
Performance Criteria		**RSP 180**			**RCP 240**				
Aggregate	1,226,721	97.9%	99.1%	23,817	99.5%	99.6%	99.3%	99.5%	97.9%
SAT	828,453	97.7%	99.2%	16,045	99.5%	99.6%	99.3%	99.6%	97.7%
VHF	390,810	99.0%	99.3%	7,268	99.7%	99.7%	99.6%	99.7%	98.6%
HF	7,418	63.4%	77.5%	8	--	--	--	--	--
SAT-VHF				261	99.6%	100.0%	98.1%	99.2%	90.4%
VHF-SAT				159	92.5%	96.9%	93.1%	94.3%	95.0%
SAT-HF				39	--	--	--	--	--
HF-SAT				27	--	--	--	--	--
VHF-HF				7	--	--	--	--	--
HF-VHF				3	--	--	--	--	--

2010 - 2015

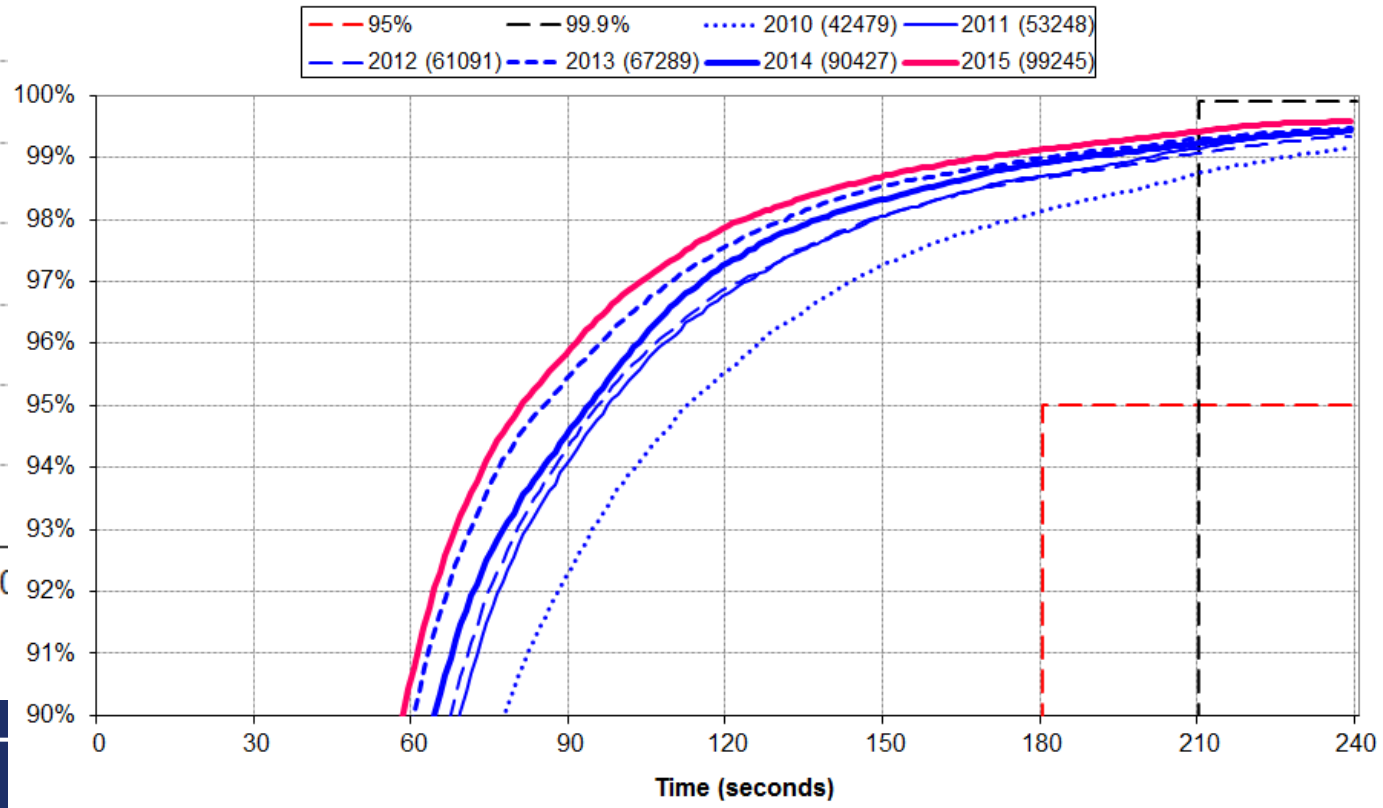
ANNUAL AGGREGATE FIR PERFORMANCE

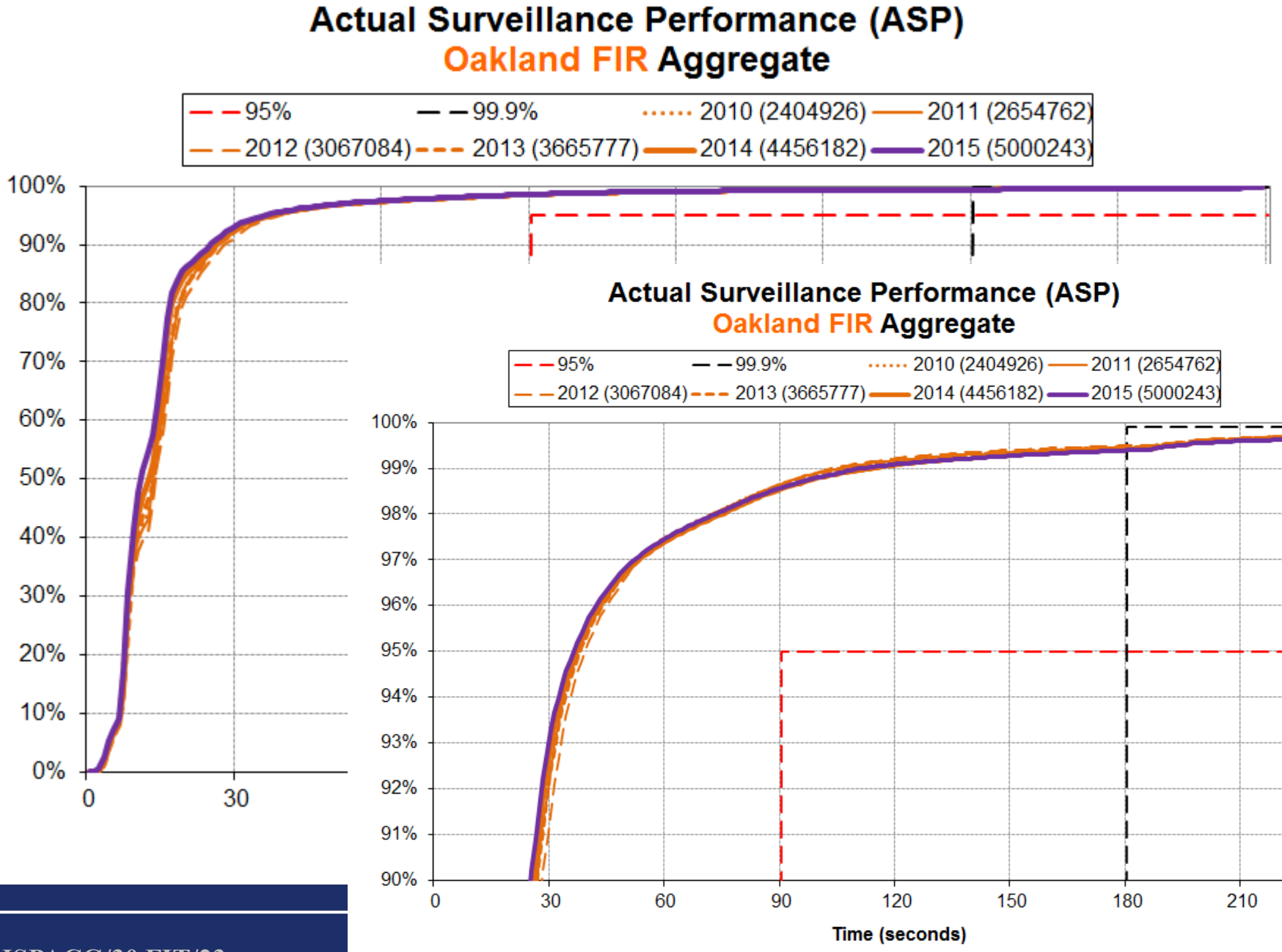

Actual Surveillance Performance (ASP)
New York FIR Aggregate
95%
99.9%
2010 (961373)
2011 (1061388)
2012 (1254523)
2013 (1572667)
2014 (2434971)
2015 (2956602)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
30
Actual Surveillance Performance (ASP)
New York FIR Aggregate
95%
99.9%
2010 (961373)
2011 (1061388)
2012 (1254523)
2013 (1572667)
2014 (2434971)
2015 (2956602)
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
0
30
60
90
120
150
180
210
240
Time (seconds)

Actual Communication Performance (ACP)
New York FIR Aggregate

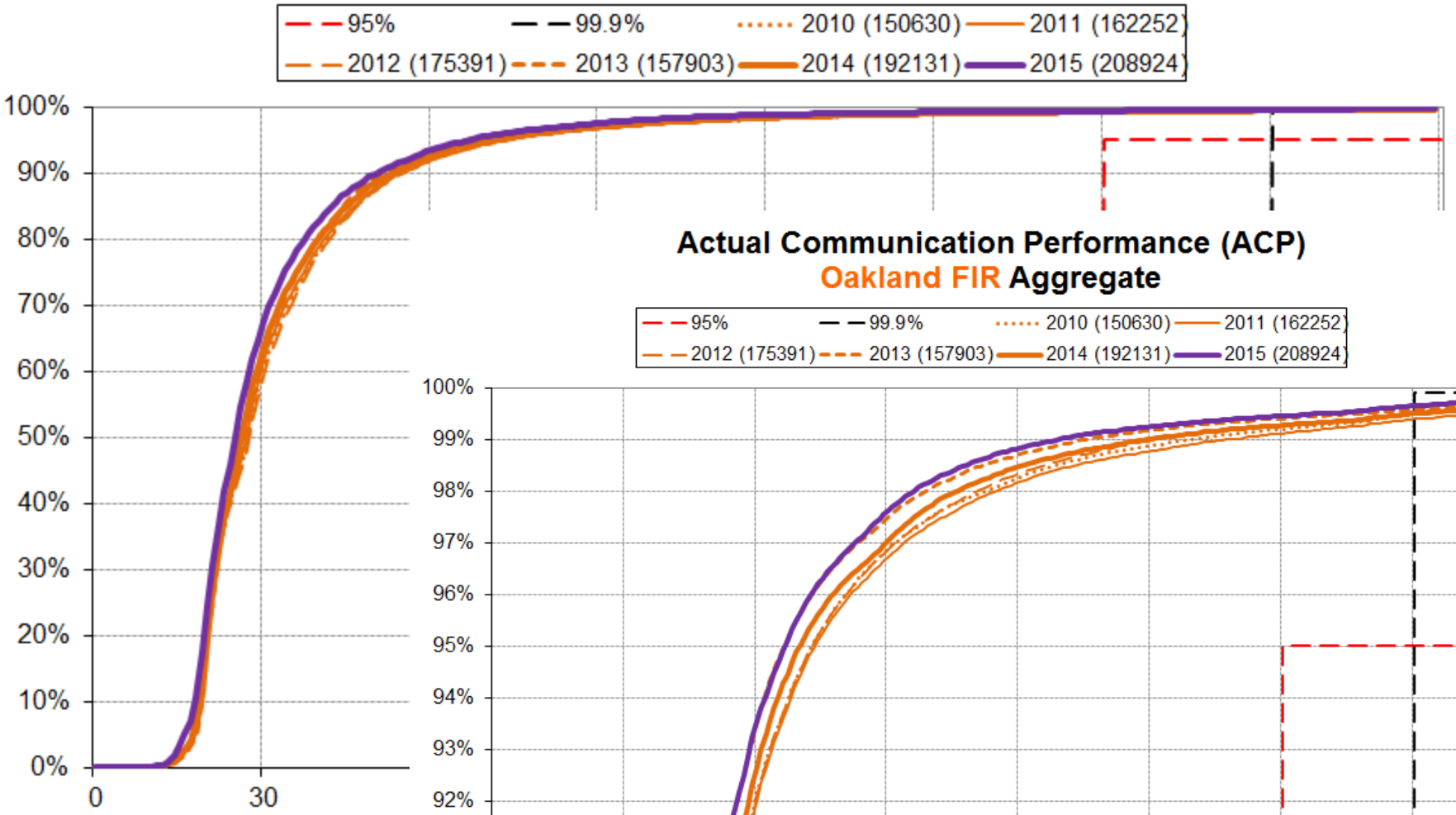


Actual Communication Performance (ACP)
New York FIR Aggregate



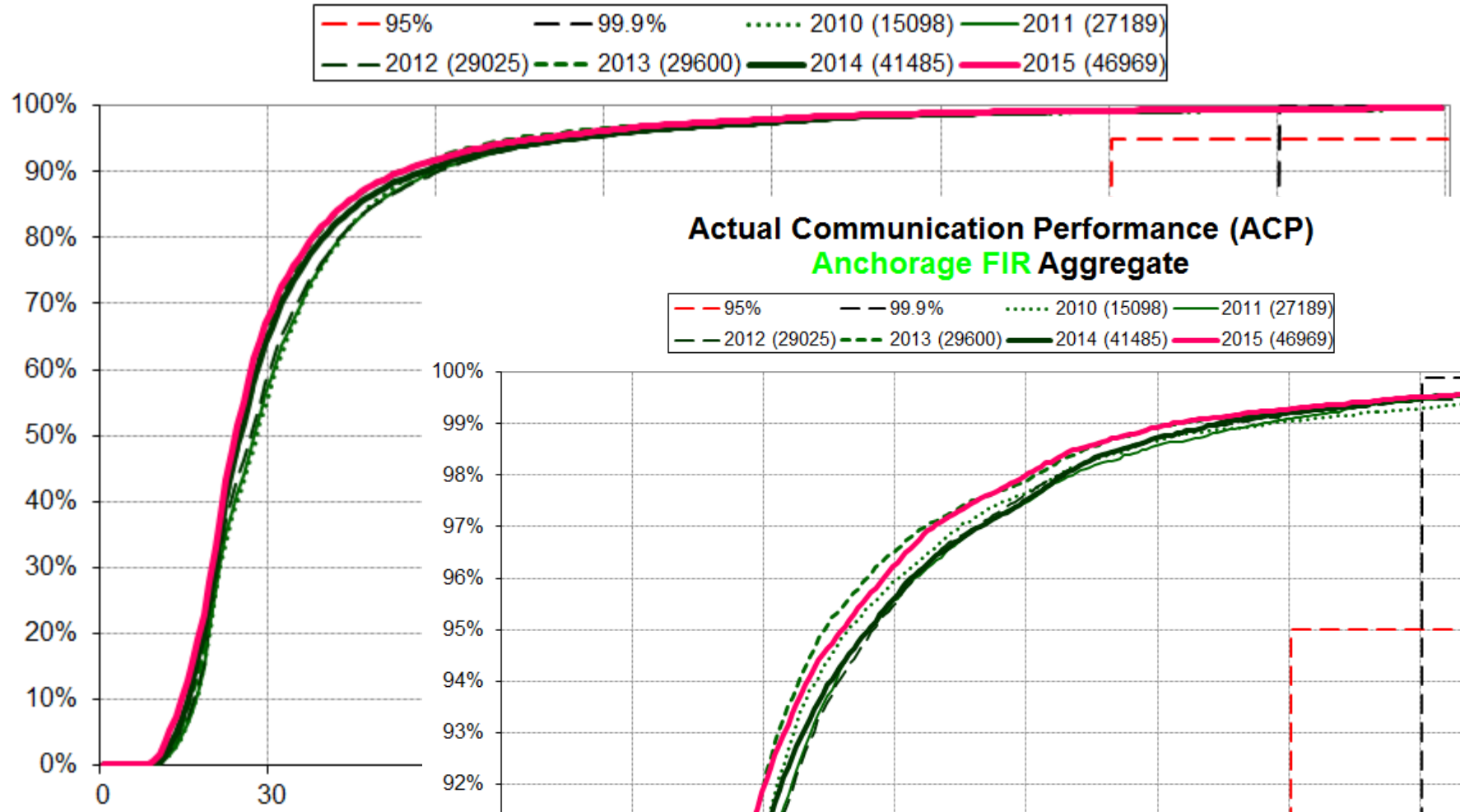

Actual Surveillance Performance (ASP)
Oakland FIR Aggregate
95%
99.9%
2010 (2404926)
2011 (2654762)
2012 (3067084)
2013 (3665777)
2014 (4456182)
2015 (5000243)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
30
Actual Surveillance Performance (ASP)
Oakland FIR Aggregate
95%
99.9%
2010 (2404926)
2011 (2654762)
2012 (3067084)
2013 (3665777)
2014 (4456182)
2015 (5000243)
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
0
30
60
90
120
150
180
210
240
Time (seconds)

Actual Communication Performance (ACP)
Oakland FIR Aggregate

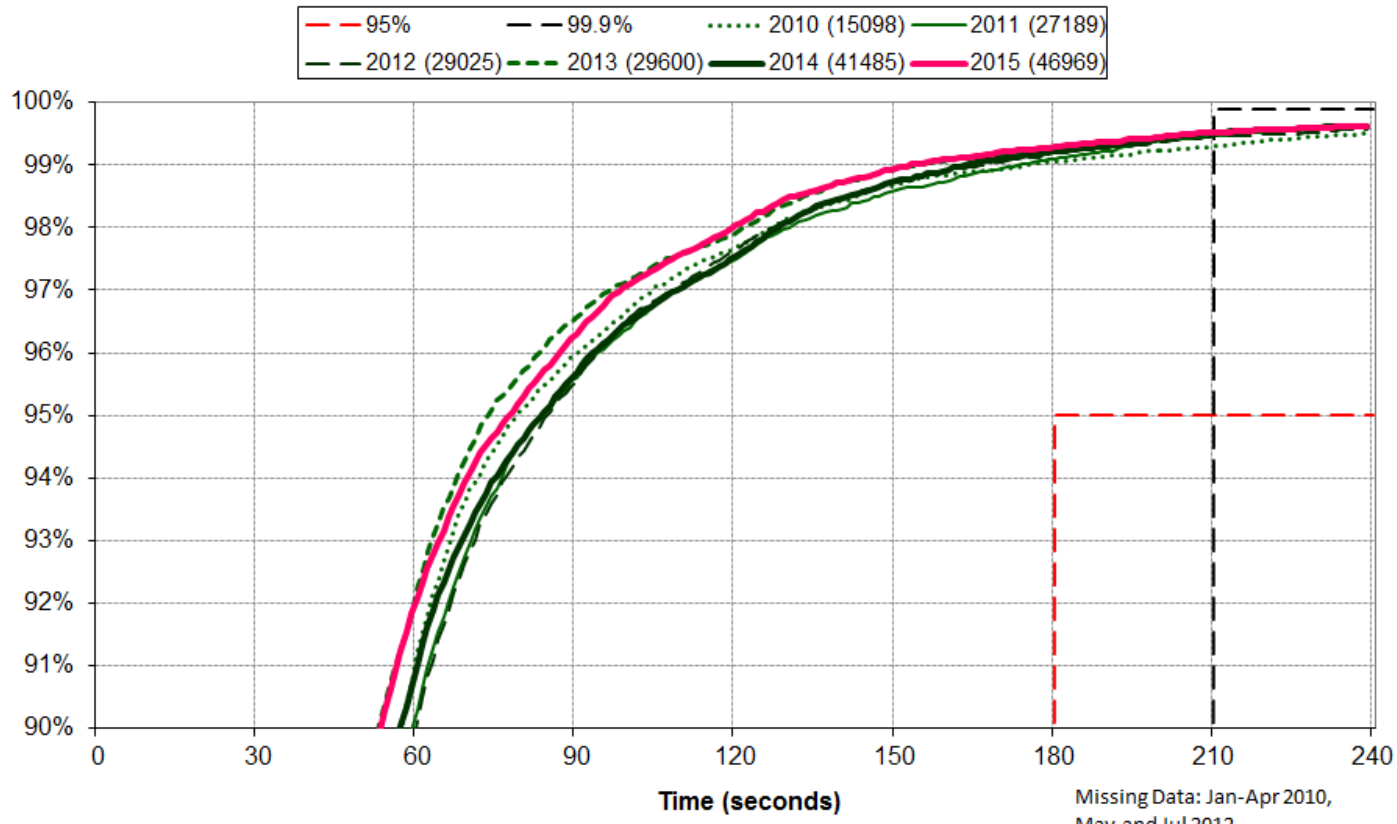


Actual Communication Performance (ACP)
Oakland FIR Aggregate

Actual Communication Performance (ACP)
Anchorage FIR Aggregate

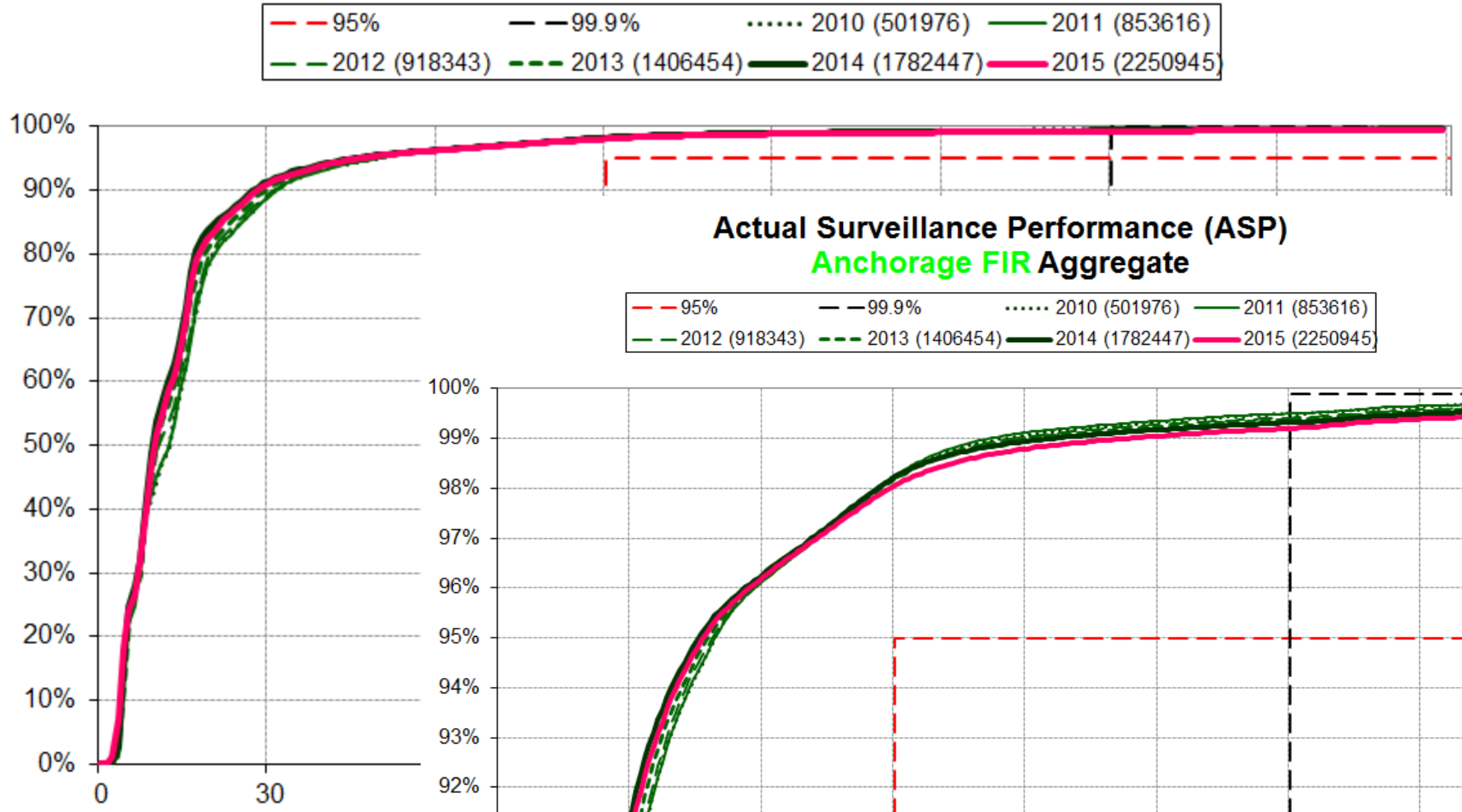


Actual Communication Performance (ACP)
Anchorage FIR Aggregate

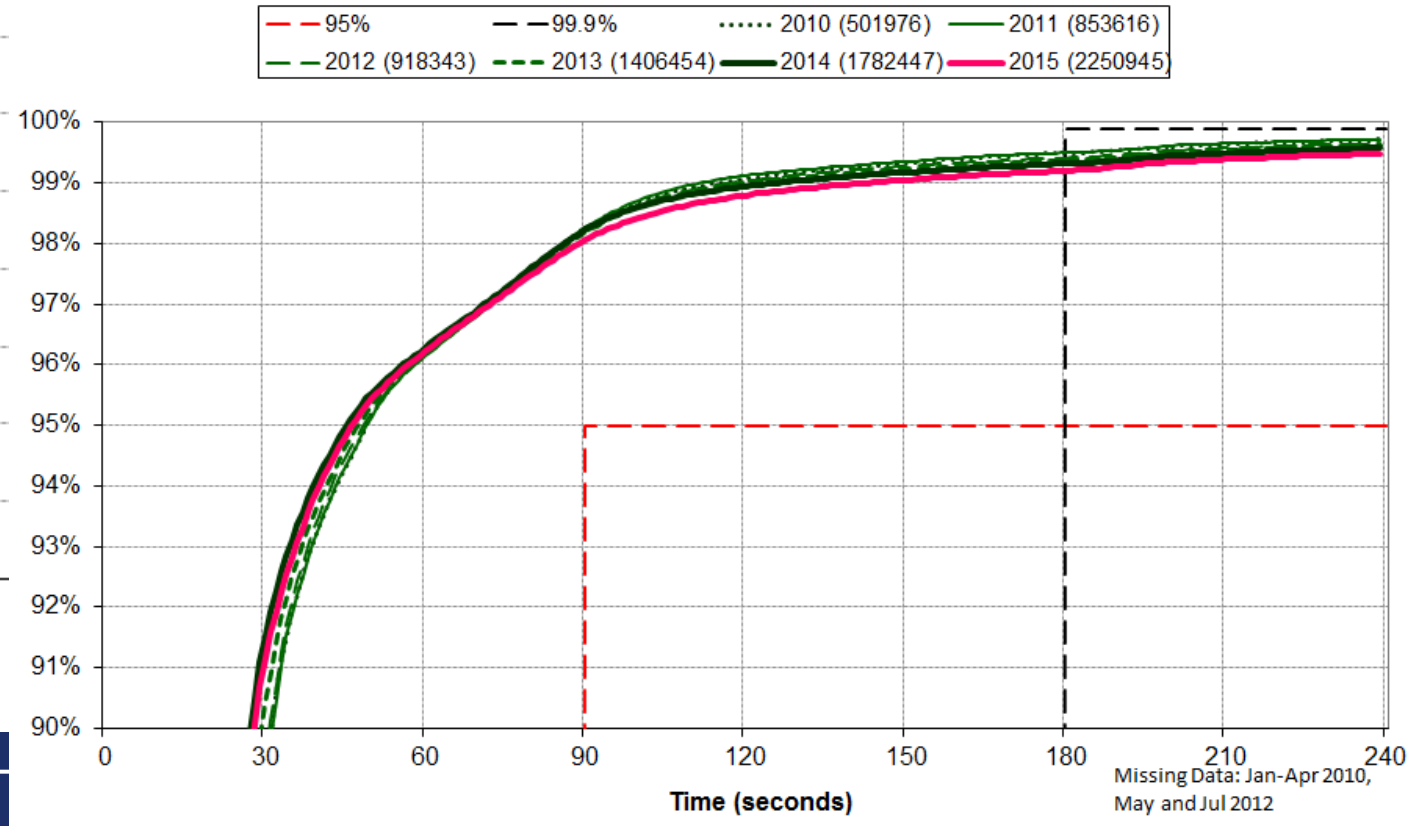


Missing Data: Jan-Apr 2010, May and Jul 2012

Actual Surveillance Performance (ASP)
Anchorage FIR Aggregate



Actual Surveillance Performance (ASP)
Anchorage FIR Aggregate



Overview

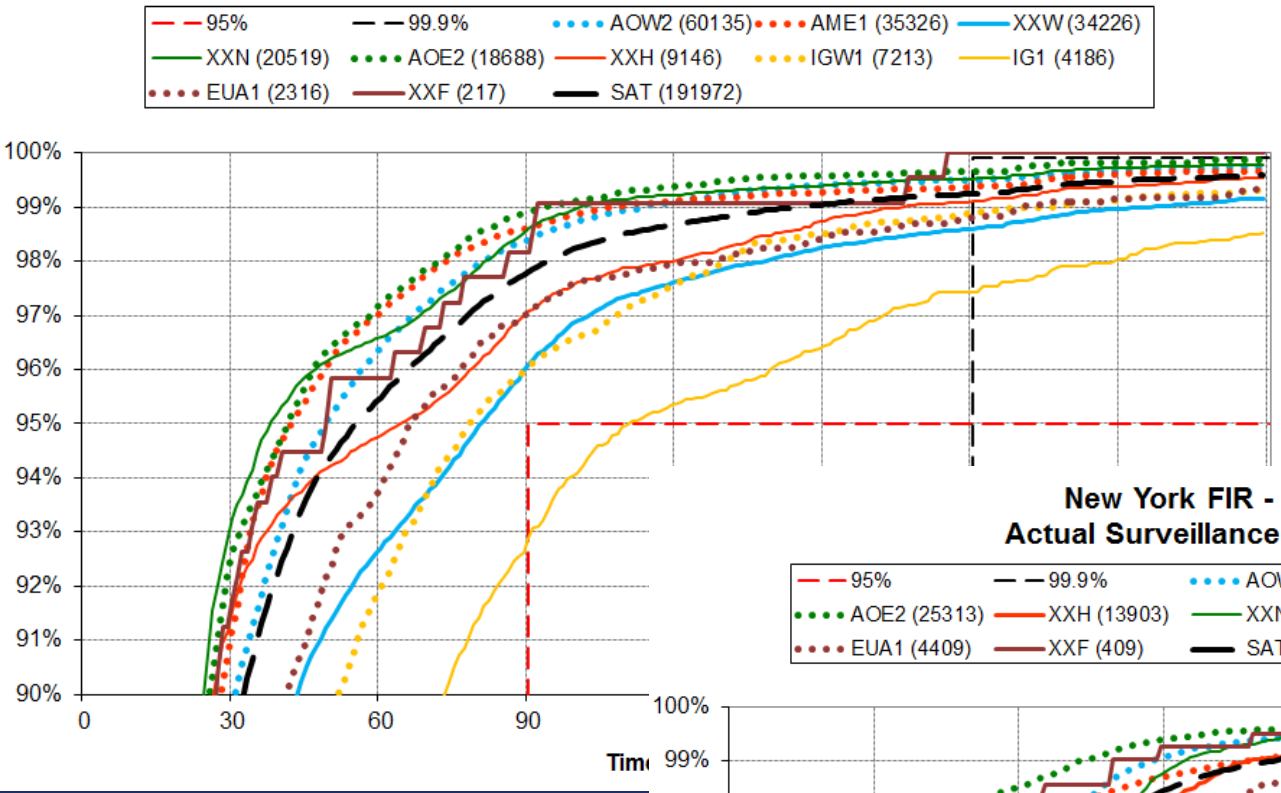
- Analysis period: June and December 2015
- Analysis by FIR: Oakland, Anchorage, New York
- ASP → RSP180 criteria
- Station identifiers designate "path" taken by data link messages between aircraft and ATC
- "Paths" vary between the four constellations of satellites and between the two data link service providers

June and December 2015

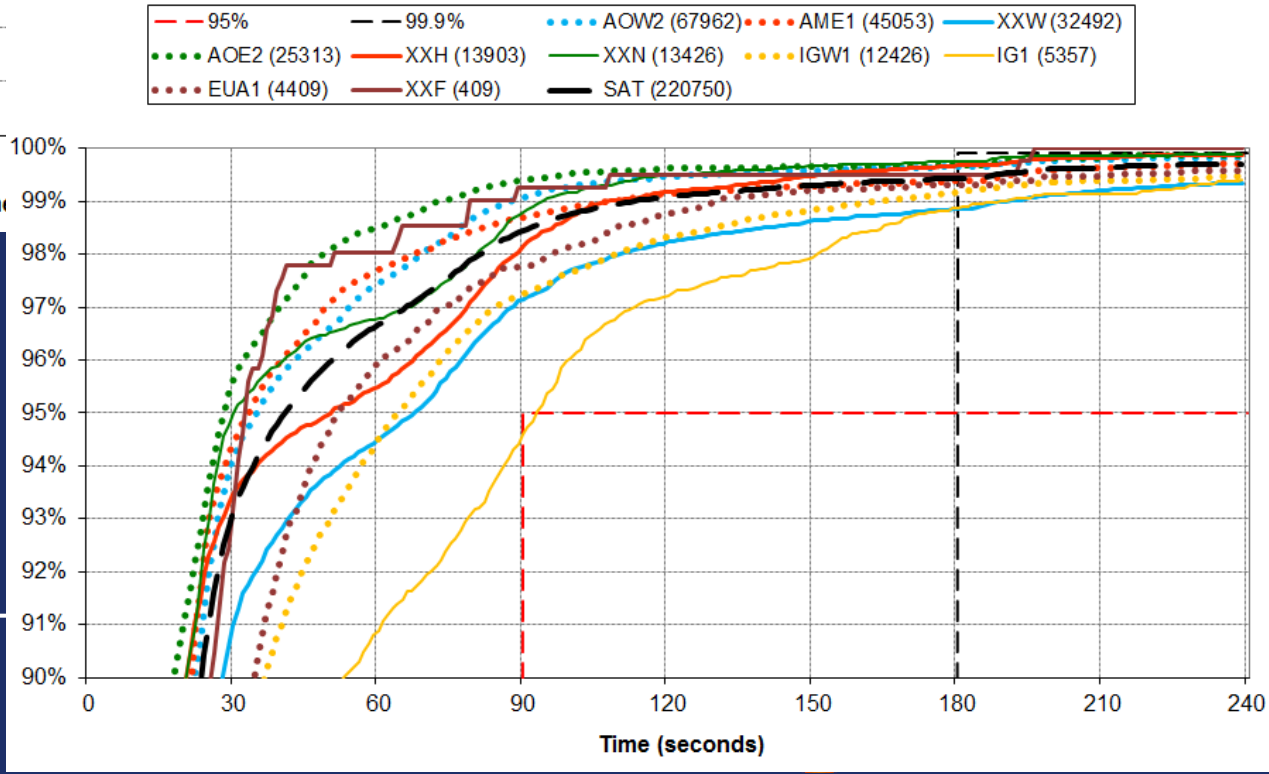
ASP BY STATION IDENTIFIER

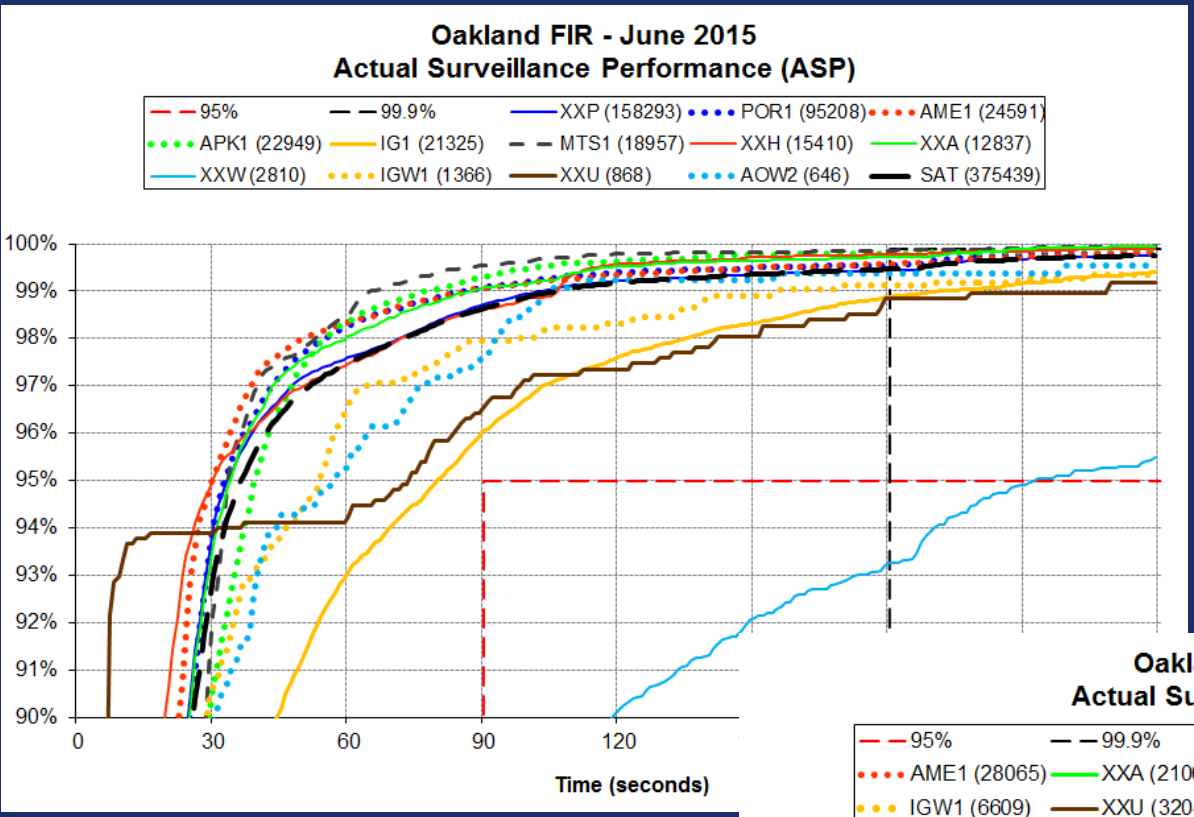
GES LOCATION(S)	SATELLITE/ REGION	SITA	ARINC
Burum, Netherlands	Inmarsat I-3 AOR-E	AOE2	XXN
	Inmarsat I-3 AOR-W	AOW2	XXW
Perth, Australia	Inmarsat I-3 IOR	IOR2	XXI
	Inmarsat I-3 POR	POR1	XXP
Fucino, Italy	Inmarsat I-4 EMEA	EUA1	XXF
	Inmarsat I-4 EMEA SBB	EME9	XXB
Paumalu, Hawaii, US	Inmarsat I-4 Americas	AME1	XXH
	Inmarsat I-4 Asia-Pacific	APK1	XXA
	Inmarsat I-4 Americas SBB	AMR9	XXU
	Inmarsat I-4 Asia-Pacific SBB	PAC9	XXS
Kobe and Hitachiota, Japan	MTSAT Japan	MTS1	--
Phoenix, Arizona, US	Iridium Global	IGW1	IG1

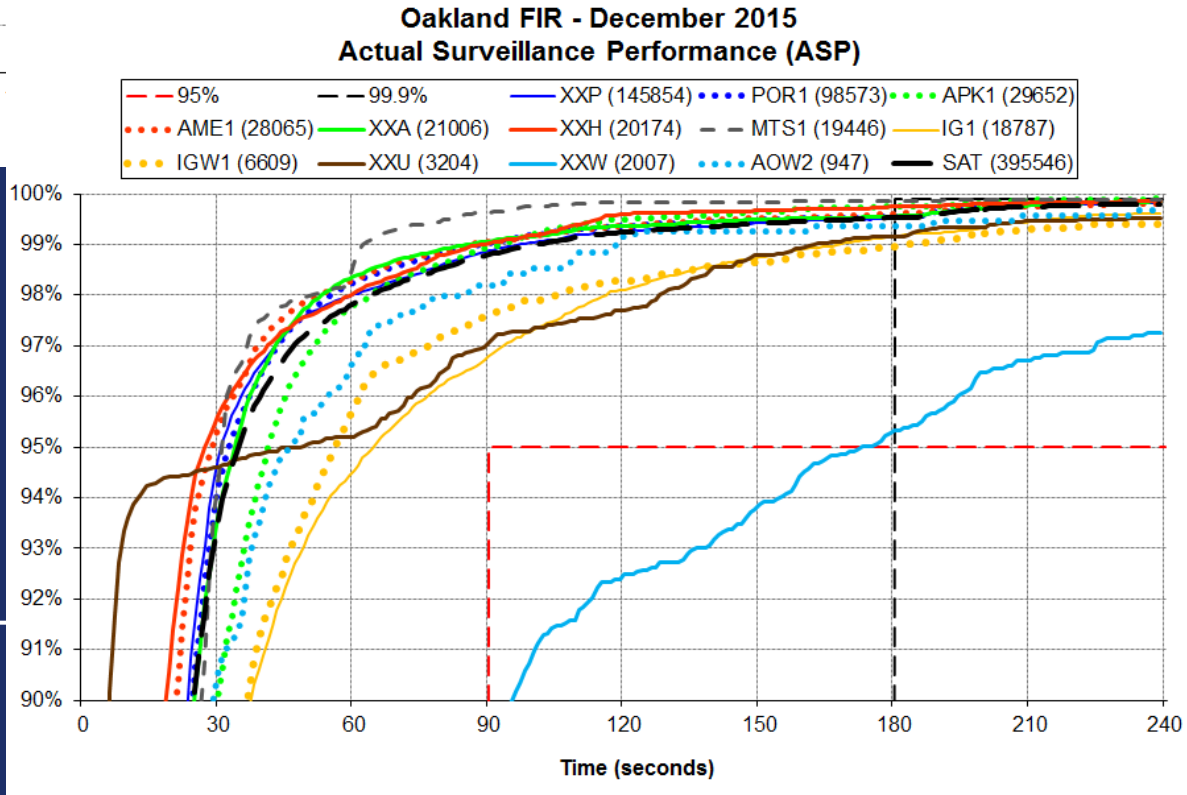
New York FIR - June 2015
Actual Surveillance Performance (ASP)



New York FIR - December 2015
Actual Surveillance Performance (ASP)




Oakland FIR - June 2015
Actual Surveillance Performance (ASP)
95%
99.9%
XXP (158293)
POR1 (95208)
AME1 (24591)
APK1 (22949)
IG1 (21325)
MTS1 (18957)
XXH (15410)
XXA (12837)
XXW (2810)
IGW1 (1366)
XXU (868)
AOW2 (646)
SAT (375439)
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
0
30
60
90
120
Time (seconds)


Oakland FIR - December 2015
Actual Surveillance Performance (ASP)
95%
99.9%
XXP (145854)
POR1 (98573)
APK1 (29652)
AME1 (28065)
XXA (21006)
XXH (20174)
MTS1 (19446)
IG1 (18787)
IGW1 (6609)
XXU (3204)
XXW (2007)
AOW2 (947)
SAT (395546)
100%
99%
98%
97%
96%
95%
94%
93%
92%
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90%
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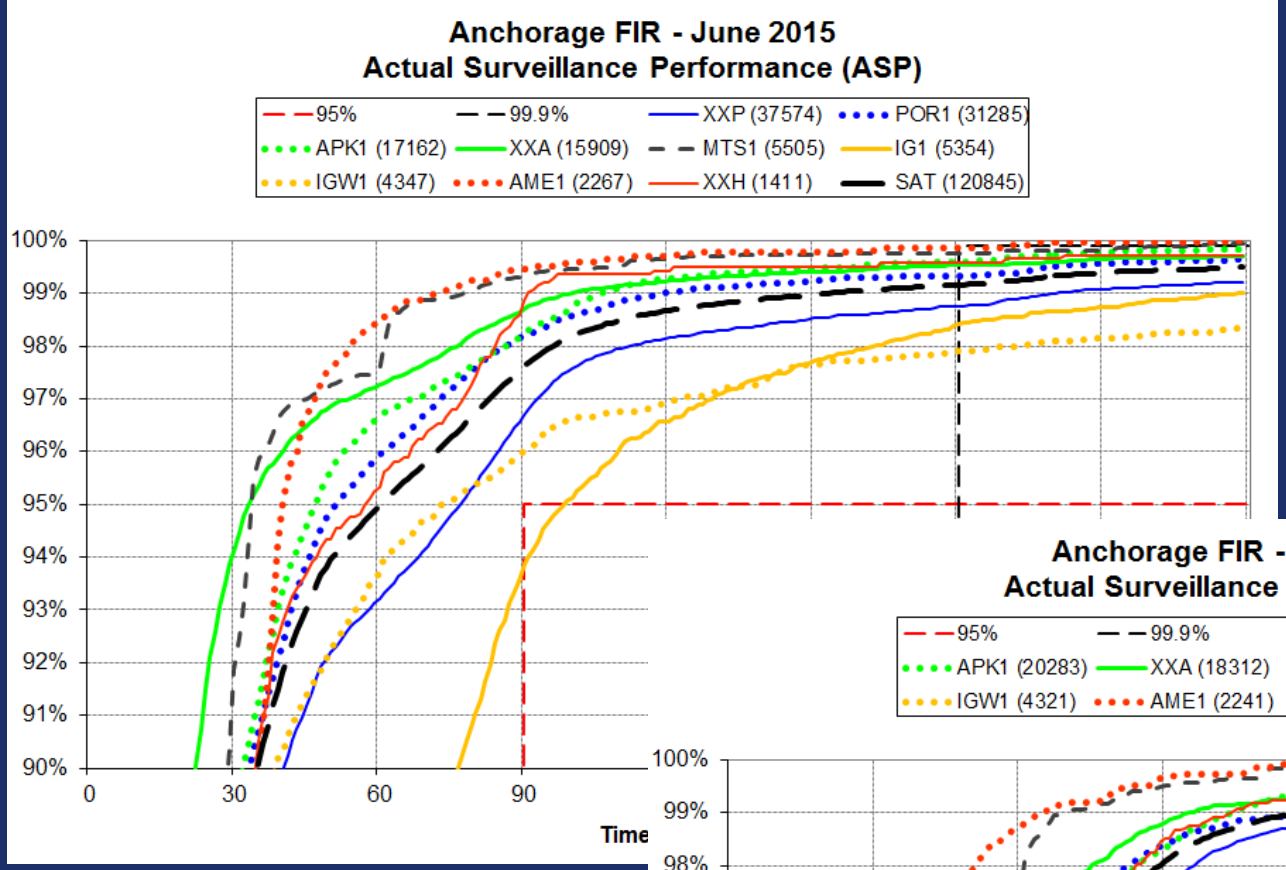
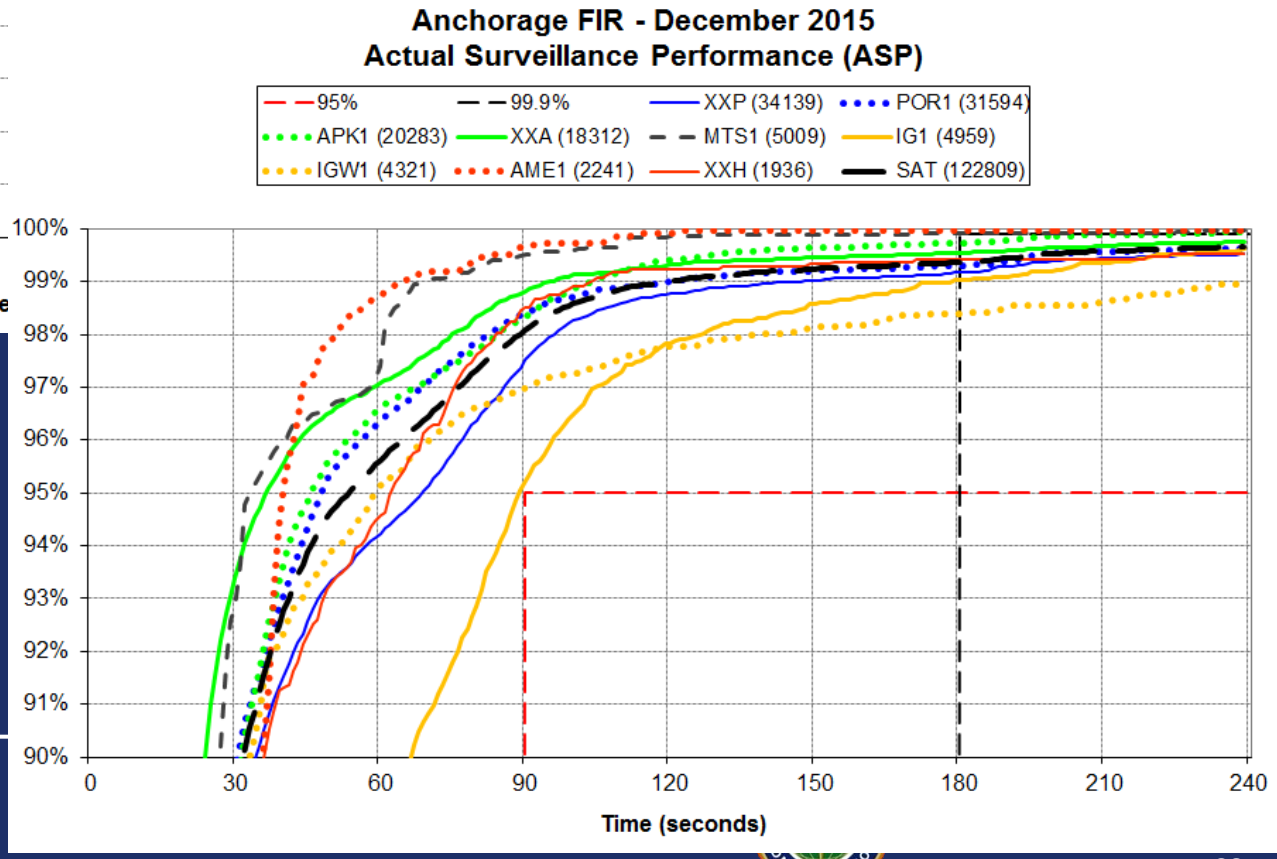
180
210
240
Time (seconds)


Anchorage FIR - June 2015
Actual Surveillance Performance (ASP)
95%
99.9%
XXP (37574)
POR1 (31285)
APK1 (17162)
XXA (15909)
MTS1 (5505)
IG1 (5354)
IGW1 (4347)
AME1 (2267)
XXH (1411)
SAT (120845)
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
0
30
60
90
Time


Anchorage FIR - December 2015
Actual Surveillance Performance (ASP)
95%
99.9%
XXP (34139)
POR1 (31594)
APK1 (20283)
XXA (18312)
MTS1 (5009)
IG1 (4959)
IGW1 (4321)
AME1 (2241)
XXH (1936)
SAT (122809)
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
0
30
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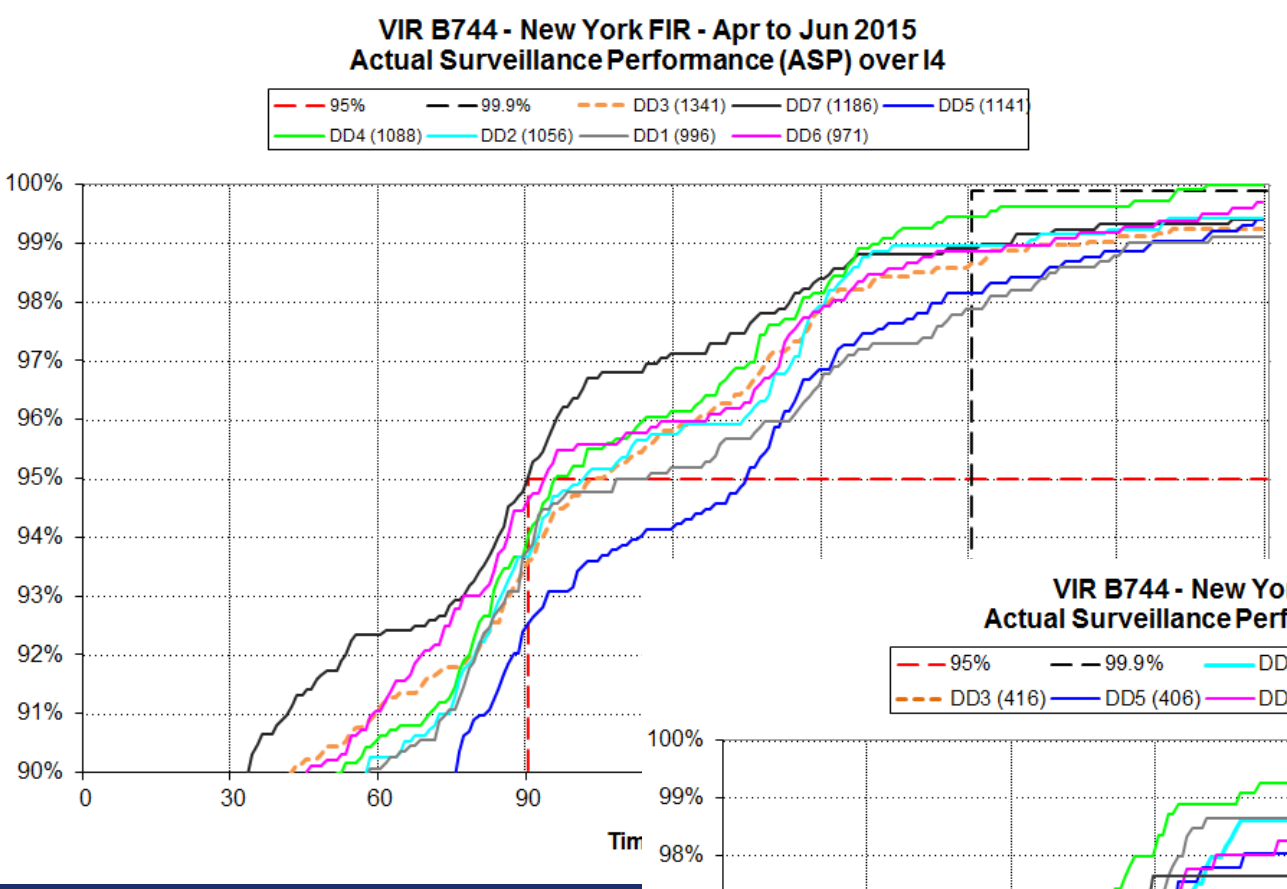
90
120
150
180
210
240
Time (seconds)

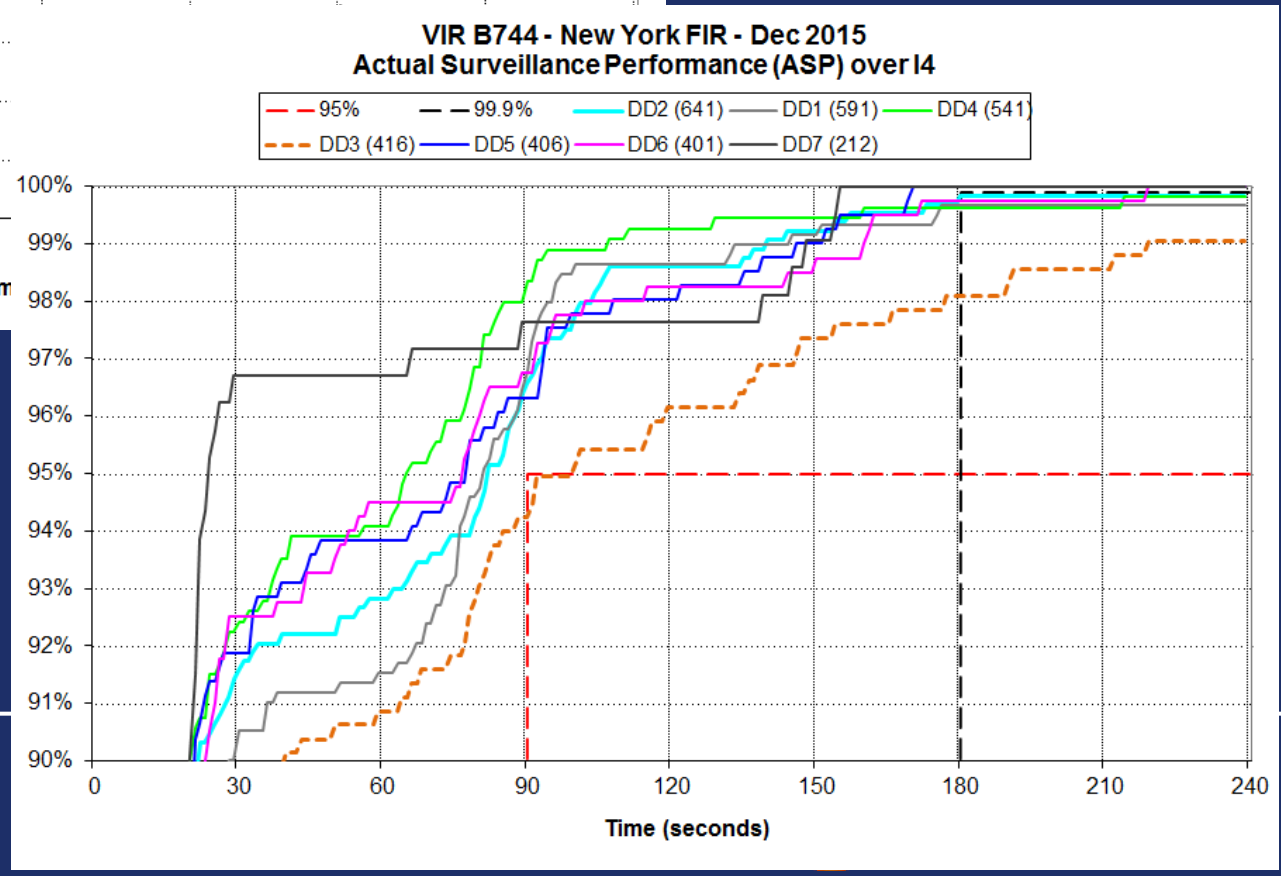
PR 1411: Poor performance for AOR-W over I-3

- Submitted PR to DLMA for performance over XXW – 11/8/2013
- Inmarsat investigation revealed it is not an Inmarsat issue
- Investigated as an issue with certain operator/aircraft
- CLOSED – operator/aircraft type performance issues will be dealt with individually through full PBCS implementation

PR 1508: Poor performance for AOR-E over I-4

- Submitted PR to DLMA for performance over XXH – 2/5/2014
- Variation in performance by operator/aircraft type
- VIR B744 performance has continued to degrade
- Data from Shanwick FIR showed notably better performance
- ASP for New York FIR split between east of 57W and west of 57W
  - 57W chosen as point beyond which SAT/VHF transitions would occur
- SAT/VHF transitions identified as having significant effect on data link performance
- CLOSED – VIR B744 will continue to be monitored
- Improvement noted for December 2015


VIR B744 - New York FIR - Apr to Jun 2015
Actual Surveillance Performance (ASP) over I4
95%
99.9%
DD3 (1341)
DD7 (1186)
DD5 (1141)
DD4 (1088)
DD2 (1056)
DD1 (996)
DD6 (971)
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
0
30
60
90


VIR B744 - New York FIR - Dec 2015
Actual Surveillance Performance (ASP) over I4
95%
99.9%
DD2 (641)
DD1 (591)
DD4 (541)
DD3 (416)
DD5 (406)
DD6 (401)
DD7 (212)
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
0
30
60
90
120
150
180
210
240
Time (seconds)

July – December 2015

DATA LINK PERFORMANCE BY OPERATOR/AIRCRAFT TYPE

Summary of Performance by Operator/Aircraft Type

New York FIR

- 224 operator/aircraft type pairs with at least 100 ADS-C messages
- 88 operator/aircraft type pairs with at least 100 RCP transactions during this 6-month period

Criteria	RSP180 ASP	RCP240 ACTP	RCP240 ACP	RCP240 PORT
Meets 95%	212	88	88	73
Meets 99.9%	70	43	29	
Below 99.9% but above 99.0%	127	45	50	
Below 99.0%	27	0	9	
Total pairs	***224***	***88***		

Operator/Aircraft Types Not Meeting RSP180/RCP240

New York FIR

July – December 2015

Operator/ Aircraft Type	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
A/B752	11,367	0.7%	93.4%	97.2%	274	0.5%	98.9%	99.3%	98.5%	98.5%	94.5%
DL/A332	5,313	<0.1%	94.5%	97.7%	177	0.3%	99.4%	99.4%	98.9%	99.4%	96.1%
P/B77L	3,169	<0.1%	94.1%	98.9%	53	0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
BW/B763	2,345	<0.1%	93.1%	98.5%	39	0.1%	100.0%	100.0%	100.0%	100.0%	97.4%
BC/A332	2,013	<0.1%	94.0%	99.8%	116	0.2%	100.0%	100.0%	99.1%	99.1%	98.3%
CG/B748	1,139	<0.1%	93.1%	97.1%	22	<0.1%	100.0%	100.0%	95.5%	95.5%	86.4%
IGA/CL35	429	<0.1%	94.4%	98.4%							
CZ/G280	218	<0.1%	92.7%	95.9%	8	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
P/A333	197	<0.1%	92.4%	99.5%							
IGA/FA50	181	<0.1%	94.5%	98.3%							
A/B744	127	<0.1%	90.6%	93.7%							
AQ/B752	115	<0.1%	93.0%	100.0%							

PR 1502: Poor performance Operator DL

- Submitted PR to DLMA for performance of DL (ARA) - 1/29/14
- Assigned to Airbus
- Airbus suggested change in particular part
- 1 aircraft stored, the other not observed as of December 2015
- Left open pending observation of improvement

Summary of Performance by Operator/Aircraft Type

Oakland FIR

- 161 operator/aircraft type pairs with at least 100 ADS-C messages
- 99 operator/aircraft type pairs with at least 100 RCP transactions during this 6-month period

Criteria	RSP180 ASP	RCP240 ACTP	RCP240 ACP	RCP240 PORT
Meets 95%	155	99	99	90
Meets 99.9%	29	43	38	
Below 99.9% but above 99.0%	114	53	52	
Below 99.0%	18	3	9	
Total pairs	***161***	***99***		

Operator/Aircraft Types Not Meeting RSP180/RCP240

Oakland FIR

July – December 2015

Operator/ Aircraft Type	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
P/B788	11,794	<0.1%	94.1%	94.7%	363	0.3%	99.5%	99.5%	99.5%	99.5%	99.5%
A/B752	7,701	<0.1%	94.0%	97.6%	235	0.2%	97.5%	97.9%	96.6%	97.5%	94.0%
MIL/DC10	3,321	<0.1%	91.4%	95.2%	86	0.1%	98.8%	100.0%	95.4%	96.5%	88.4%
IGA/CL35	1,256	<0.1%	93.6%	96.7%	17	<0.1%	100.0%	100.0%	100.0%	100.0%	88.2%
A/B753	260	<0.1%	92.3%	92.7%							
AQ/B752	116	<0.1%	93.1%	100.0%	6	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%

Summary of Performance by Operator/Aircraft Type

Anchorage FIR

- 114 operator/aircraft type pairs with at least 100 ADS-C messages
- 51 operator/aircraft type pairs with at least 100 RCP transactions during this 6-month period

Criteria	RSP180 ASP	RCP240 ACTP	RCP240 ACP	RCP240 PORT
Meets 95%	107	51	50	46
Meets 99.9%	26	26	19	
Below 99.9% but above 99.0%	65	19	26	
Below 99.0%	23	6	6	
Total pairs	***114***	***51***		

Operator/Aircraft Types Not Meeting RSP180/RCP240

Anchorage FIR

July – December 2015

Operator/ Aircraft Type	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
P/B788	27,287	1.7%	94.4%	95.8%	431	1.8%	96.3%	96.5%	96.3%	97.0%	97.7%
Y/B763	21,440	1.3%	94.5%	97.1%	137	0.6%	97.8%	98.5%	95.6%	97.1%	94.2%
R/B788	11,269	0.7%	94.1%	95.5%	142	0.6%	95.8%	95.8%	93.7%	95.1%	95.8%
CY/B788	4,163	0.3%	92.2%	94.0%	63	0.3%	96.8%	96.8%	96.8%	96.8%	100.0%
DW/K35R	359	<0.1%	80.5%	81.6%	4	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
MIL/C135	227	<0.1%	71.4%	74.9%	1	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
S/B763	102	<0.1%	77.5%	79.4%							

July – December 2015

AGGREGATED DATA LINK PERFORMANCE FOR BUSINESS JET AIRCRAFT TYPES

Performance for IGA Aircraft Types

New York FIR

July – December 2015

Operator/ Aircraft Type	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
CL30	58	<0.1%	98.3%	100.0%							
CL60	31	<0.1%	100.0%	100.0%							
GL5T	3,409	<0.1%	97.4%	99.6%	86	0.2%	98.8%	98.8%	97.7%	98.8%	88.4%
GLEX	9,420	0.5%	97.7%	99.6%	248	0.5%	99.6%	100.0%	97.6%	98.4%	93.2%
F2TH	1,806	<0.1%	96.0%	98.1%	38	0.1%	100.0%	100.0%	97.4%	97.4%	89.5%
F900	1,615	<0.1%	97.3%	98.8%	39	0.1%	97.4%	97.4%	89.7%	89.7%	74.4%
FA7X	7,009	0.4%	98.1%	99.3%	189	0.4%	99.5%	99.5%	96.8%	96.8%	92.1%
G280	218	<0.1%	92.7%	95.9%	8	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
GLF4	2,915	<0.1%	96.8%	98.5%	63	0.1%	98.4%	98.4%	92.1%	95.2%	76.2%
GLF5	11,434	0.7%	96.4%	98.7%	281	0.5%	99.3%	99.6%	96.4%	96.4%	86.8%
GLF6	3,181	<0.1%	97.4%	99.3%	86	0.2%	98.8%	98.8%	95.4%	95.4%	91.9%

Performance for IGA Aircraft Types

Oakland FIR

July – December 2015

Operator/ Aircraft Type	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
CL30	46	<0.1%	100.0%	100.0%	4	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
CL60	143	<0.1%	98.6%	100.0%	4	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
GL5T	3,039	<0.1%	97.5%	99.4%	41	<0.1%	100.0%	100.0%	100.0%	100.0%	97.6%
GLEX	10,310	<0.1%	98.3%	99.6%	296	0.3%	100.0%	100.0%	97.3%	97.6%	94.9%
F2TH	343	<0.1%	96.8%	98.3%	8	<0.1%	100.0%	100.0%	100.0%	100.0%	75.0%
F900	634	<0.1%	99.4%	99.5%	31	<0.1%	100.0%	100.0%	100.0%	100.0%	87.1%
FA7X	2,945	<0.1%	97.7%	99.1%	70	0.1%	100.0%	100.0%	94.3%	95.7%	85.7%
G280	301	<0.1%	98.3%	99.7%	6	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
GLF4	4,724	<0.1%	97.6%	99.1%	85	0.1%	100.0%	100.0%	98.8%	100.0%	83.5%
GLF5	11,562	<0.1%	97.6%	98.9%	319	0.3%	99.4%	99.4%	97.8%	98.4%	89.3%
GLF6	6,499	<0.1%	98.2%	99.4%	228	0.2%	98.3%	98.3%	97.8%	98.3%	93.0%

Performance for IGA Aircraft Types

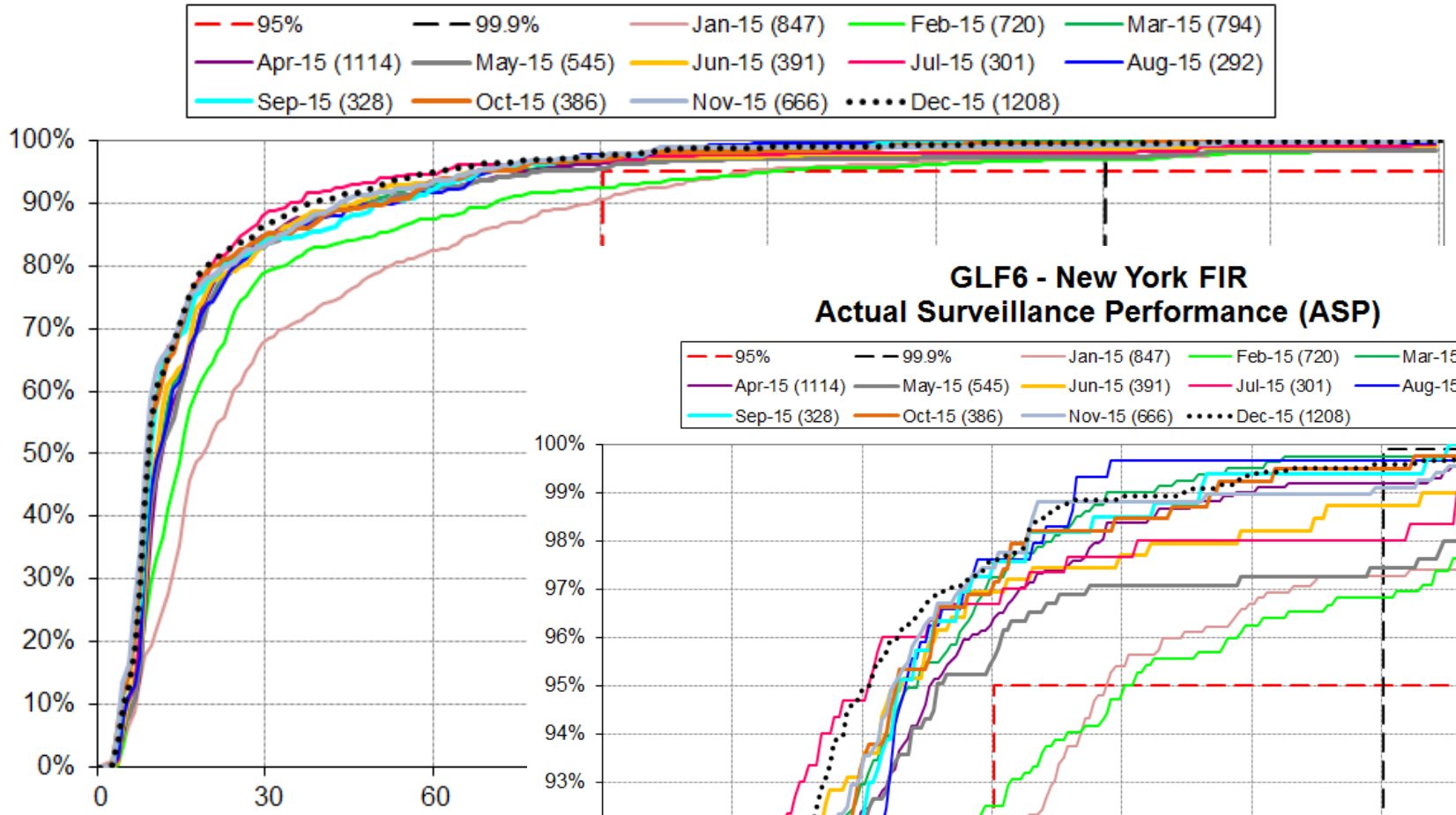
Anchorage FIR

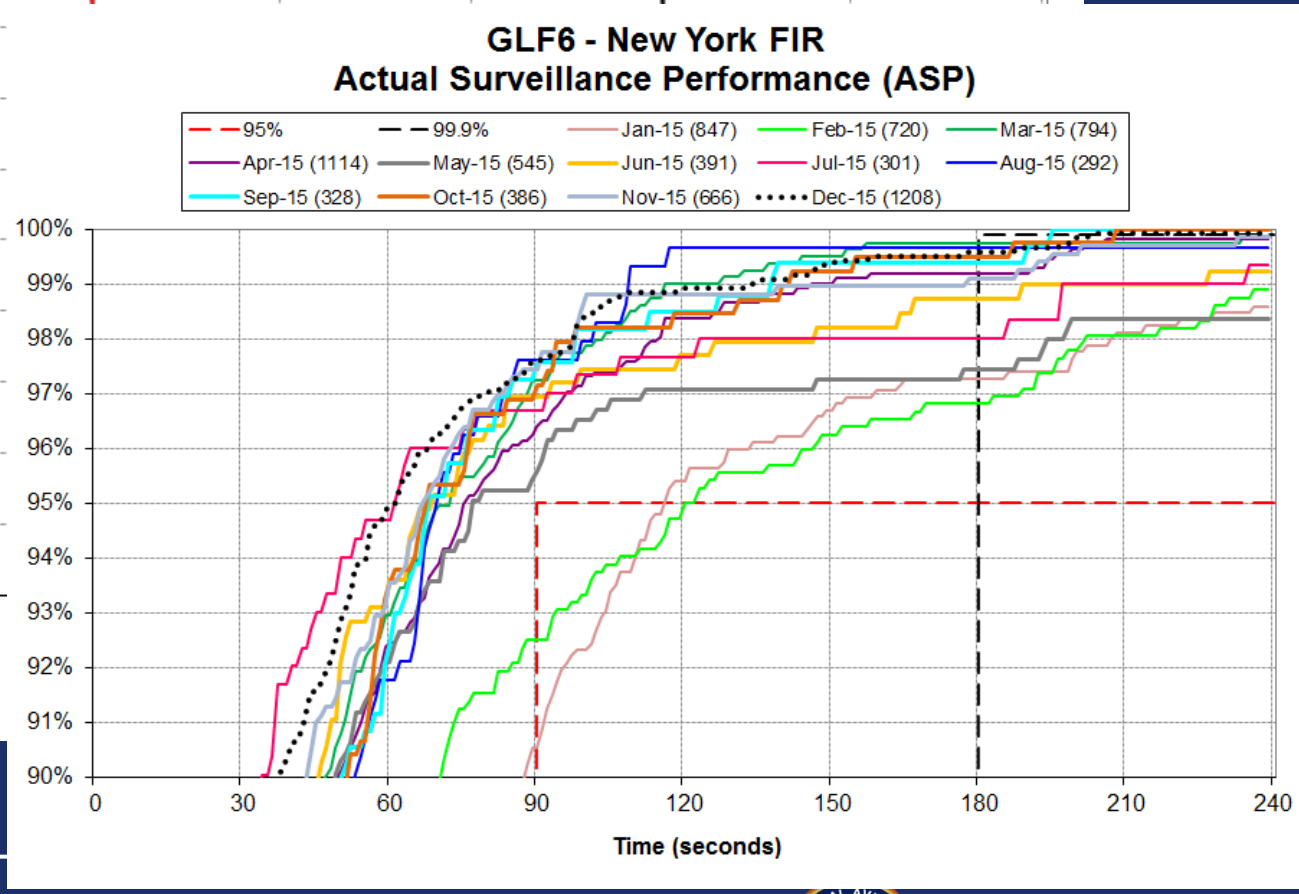
July – December 2015

Operator/ Aircraft Type	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
GL5T	751	<0.1%	98.1%	99.5%	5	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
GLEX	2,704	<0.1%	98.2%	99.9%	30	0.1%	100.0%	100.0%	100.0%	100.0%	96.7%
F2TH	81	<0.1%	100.0%	100.0%	1	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
F900	402	<0.1%	99.5%	100.0%	7	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
FA7X	1,063	<0.1%	97.0%	98.6%	12	0.1%	100.0%	100.0%	91.7%	91.7%	83.3%
G280	114	<0.1%	100.0%	100.0%	1	<0.1%	100.0%	100.0%	100.0%	100.0%	100.0%
GLF4	998	<0.1%	98.4%	98.9%	10	<0.1%	100.0%	100.0%	100.0%	100.0%	90.0%
GLF5	5,227	0.3%	97.7%	98.7%	55	0.2%	100.0%	100.0%	96.4%	96.4%	96.4%
GLF6	2,909	<0.1%	97.8%	99.1%	32	0.1%	93.8%	93.8%	90.6%	93.8%	96.9%

PR 1867: Poor performance for GLF6

- Submitted PR to ISPACG CRA/NAT DLMA for performance of GLF6 not meeting 95% criteria for RSP180 ASP – 11/3/2014
- Issue assigned to be worked by Gulfstream
- Notable improvement in March 2015
- GLF6 aggregate performance met in 3 US oceanic FIRs since March 2015
- FAA analysis showing performance improvement supports closing PR at this time


GLF6 - New York FIR
Actual Surveillance Performance (ASP)
95%
99.9%
Jan-15 (847)
Feb-15 (720)
Mar-15 (794)
Apr-15 (1114)
May-15 (545)
Jun-15 (391)
Jul-15 (301)
Aug-15 (292)
Sep-15 (328)
Oct-15 (386)
Nov-15 (666)
Dec-15 (1208)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
30
60


GLF6 - New York FIR
Actual Surveillance Performance (ASP)
95%
99.9%
Jan-15 (847)
Feb-15 (720)
Mar-15 (794)
Apr-15 (1114)
May-15 (545)
Jun-15 (391)
Jul-15 (301)
Aug-15 (292)
Sep-15 (328)
Oct-15 (386)
Nov-15 (666)
Dec-15 (1208)
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
0
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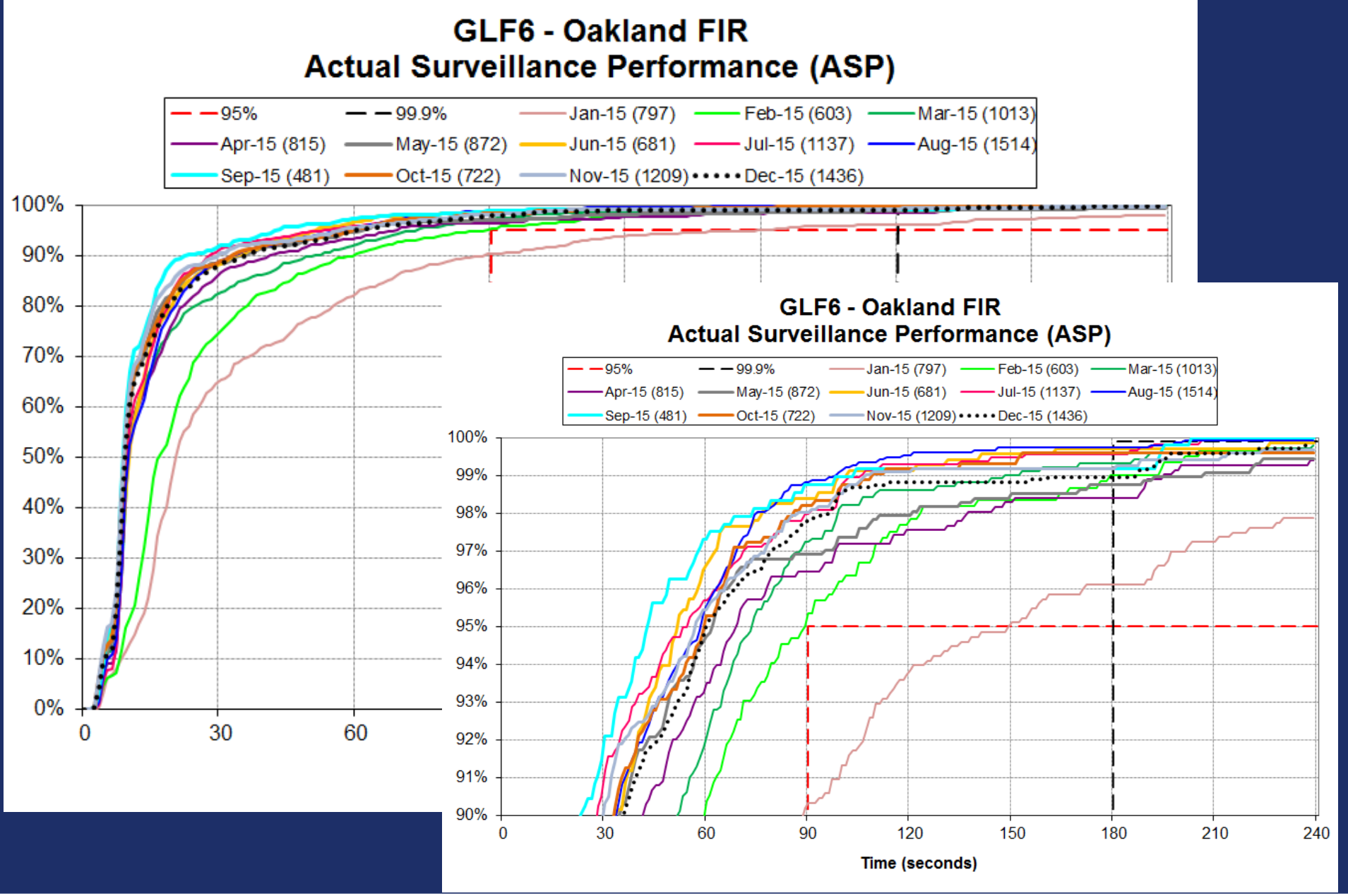
120
150
180
210
240
Time (seconds)


GLF6 - Oakland FIR
Actual Surveillance Performance (ASP)
95%
99.9%
Jan-15 (797)
Feb-15 (603)
Mar-15 (1013)
Apr-15 (815)
May-15 (872)
Jun-15 (681)
Jul-15 (1137)
Aug-15 (1514)
Sep-15 (481)
Oct-15 (722)
Nov-15 (1209)
Dec-15 (1436)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
30
60
GLF6 - Oakland FIR
Actual Surveillance Performance (ASP)
95%
99.9%
Jan-15 (797)
Feb-15 (603)
Mar-15 (1013)
Apr-15 (815)
May-15 (872)
Jun-15 (681)
Jul-15 (1137)
Aug-15 (1514)
Sep-15 (481)
Oct-15 (722)
Nov-15 (1209)
Dec-15 (1436)
100%
99%
98%
97%
96%
95%
94%
93%
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180
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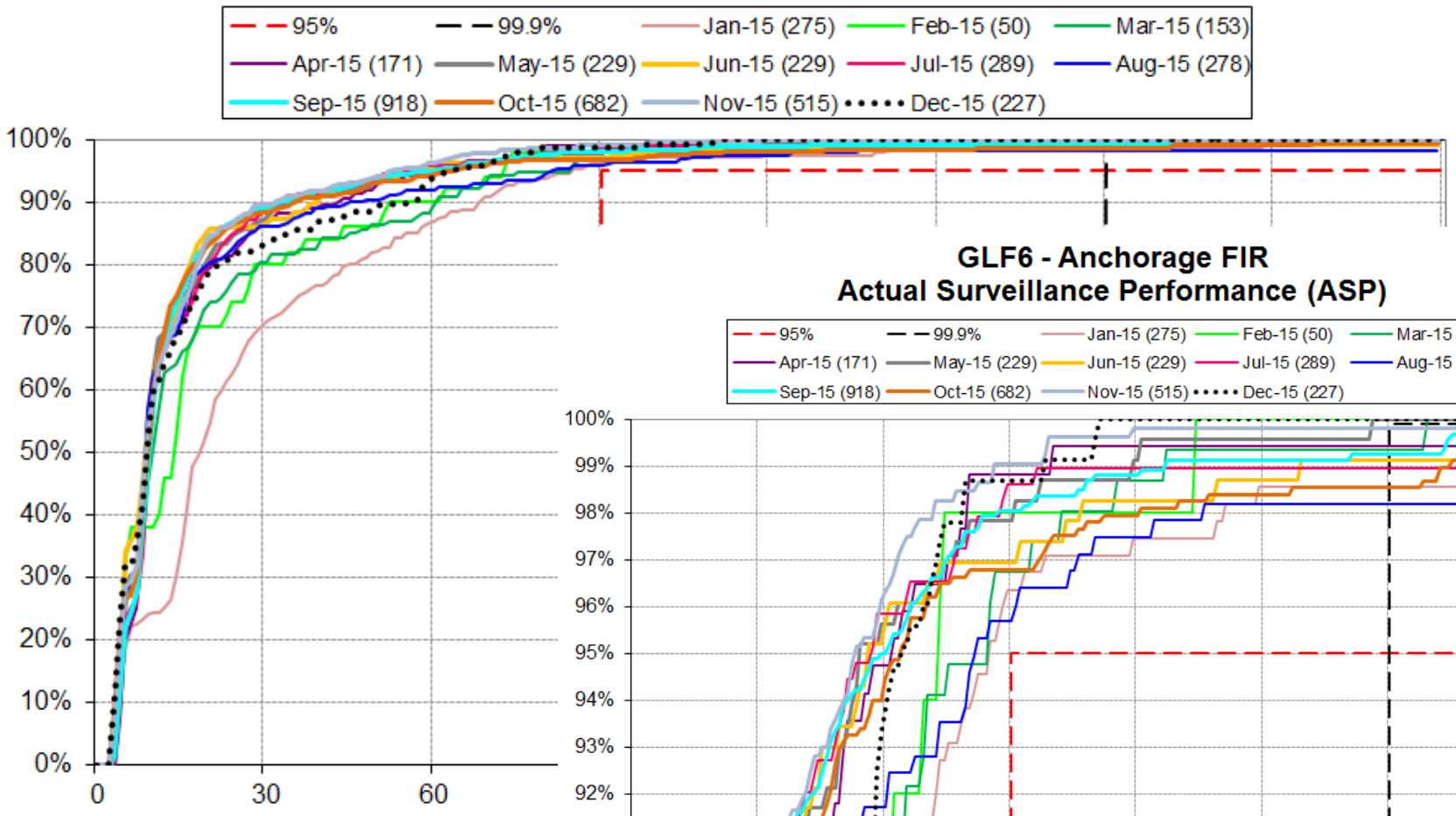
240
Time (seconds)

GLF6 - Anchorage FIR
Actual Surveillance Performance (ASP)



GLF6 - Anchorage FIR
Actual Surveillance Performance (ASP)