William J. Hughes
FAA Technical Center

Oceanic Integration and Interoperability Facility Support Services

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1 Executive Summary

The Oceanic Integration and Interoperability Facility (OIIF) lab at the William J. Hughes Technical Center (WJHTC) was tasked to evaluate the benefits that could be obtained with ground based ADS-B surveillance over the transatlantic routes in New York Oceanic airspace. The OIIF staff developed a baseline scenario from recorded ATOP flight data and examined the benefits that would be derived had that traffic been able to take advantage of the reduced separation standards available with ADS-B equipage.

Since ADS-B is not currently implemented in ZNY Oceanic airspace, several assumptions were made for the purposes of this study. These assumptions, which are detailed in the document, include equipage levels of aircraft, the separation standards simulated, weather conditions during flight, and aircraft type capabilities.

The original flight data used for the simulation was from recorded ZNY ATOP eastbound air traffic that passed through fixes DOVEY, SLATN and JOBOC in Oceanic airspace during a peak traffic period in November/December of 2010. These fixes were chosen since these are currently the entry and exit points into ZNY Oceanic airspace for transatlantic routes. The study then evaluated the number of conflicts created under normal separation vs. a simulated ADS-B reduced separation and also measured the altitude deviation of the flights caused by the conflicts. Conflict resolution was used as a measurement of benefit because altitude deviation can cause additional fuel burn and additional ATC workload. An altitude change requires a controller action as well as a pilot action to resolve the conflict. The data obtained from the simulation may further be used to calculate fuel savings and carbon emission (CO_2) reductions.

The final outcome of the study was that under ADS-B simulated surveillance, more flights had an opportunity to fly at the requested or optimal altitude than under the current separation standards. In fact, of the 59 flights in the study there was reduction from 51 conflicts to 16 conflicts with ADS-B separation and a reduction of flight level changes saving 125,000 feet of flight level altitude changes. Using ADS-B separation standards there was a 69% reduction of conflicts, a 67% reduction of altitude changes, and an 88% reduction in the total amount of altitude change necessary.

2 Introduction

As Oceanic air traffic levels increase, rather than be held or re-routed, aircraft will typically be assigned altitudes further away from the optimal altitude that they request, thus causing later arrival times and/or greater fuel burn. Currently, in ZNY Oceanic airspace, conflicting transatlantic flights cannot be separated laterally since all transatlantic flights must pass over one of the 3 coordination fixes (DOVEY, SLATN or JOBOC). These three fixes are close to exactly 60 nm apart, which is the Minimum Navigational Performance Specification (MNPS) separation that is used on North Atlantic Traffic. To study the effects and benefits of reduced ADS-B separation, actual flight data from busy periods of time with large numbers of flights over DOVEY, SLATN and JOBOC were used.

Since the customary Oceanic ATC procedure to resolve a conflict over an Oceanic entry point is to move a conflicting flight to an alternate altitude rather than a lateral re-route or a speed change, in high traffic periods, as traffic increases, fewer and fewer aircraft are able to achieve their optimal altitudes while in Oceanic airspace. This study evaluates the number of conflicts created under normal separation vs. ADS-B reduced separation and also measures the altitude deviation of the flights caused by the conflicts. Conflict resolution was used as a measurement of benefit because altitude deviation can cause additional fuel burn and additional ATC workload. An altitude change requires a controller action as well as a pilot action to resolve the conflict.

For the purpose of the demonstration, it was assumed that all aircraft were requesting the same altitude (FL350) as an optimal level for those flights during the given weather conditions. When a requested altitude is not available, the ATOP system has a function to determine the nearest conflict free altitude. The scenario was initially executed with an Oceanic non-radar based separation adaptation. Each time that FL350 was not available, the next available lower altitude was assigned. The next lower altitude was chosen because some types of aircraft have altitude limitations. Depending on the number of flights at any one time, some flights were assigned FL340, FL330, and possibly lower. The scenario was repeated, using ADS-B separation instead of Oceanic non-radar separation. Using ADS-B separation, it was expected that more aircraft would be able to maintain the requested altitude of FL350, and those that were not at FL350 would be much closer to the requested altitude. Using fuel burn statistics, a hypothetical fuel savings, and CO2 reduction may be calculated.

One possible benefit may be that with ADS-B separation, aircraft could fly routes with less lateral separation, and would not necessarily have to go over one of the three fixes (DOVEY, SLATN or JOBOC). It would be feasible to perform additional ADS-B testing using lateral separation. In this testing, rather than change the altitude of the aircraft in conflict, additional coordination fixes and lateral deviations could be used to resolve the conflicts. It would be difficult however to compare this data to the run with standard separation since we can only speculate as to what deviations the controller would choose. We also would only be speculating as to which coordination fixes would be used. It’s also important to note that the original routes of flight could have been filed differently if these new coordination fixes were available.

Figure 1 depicts a proposed ADS-B coverage area. Note that some Canadian airspace is also included. For the purpose of this study, ADS-B surveillance coverage was assumed to encompass the area as shown in this figure including both ZNY and Canadian airspace.

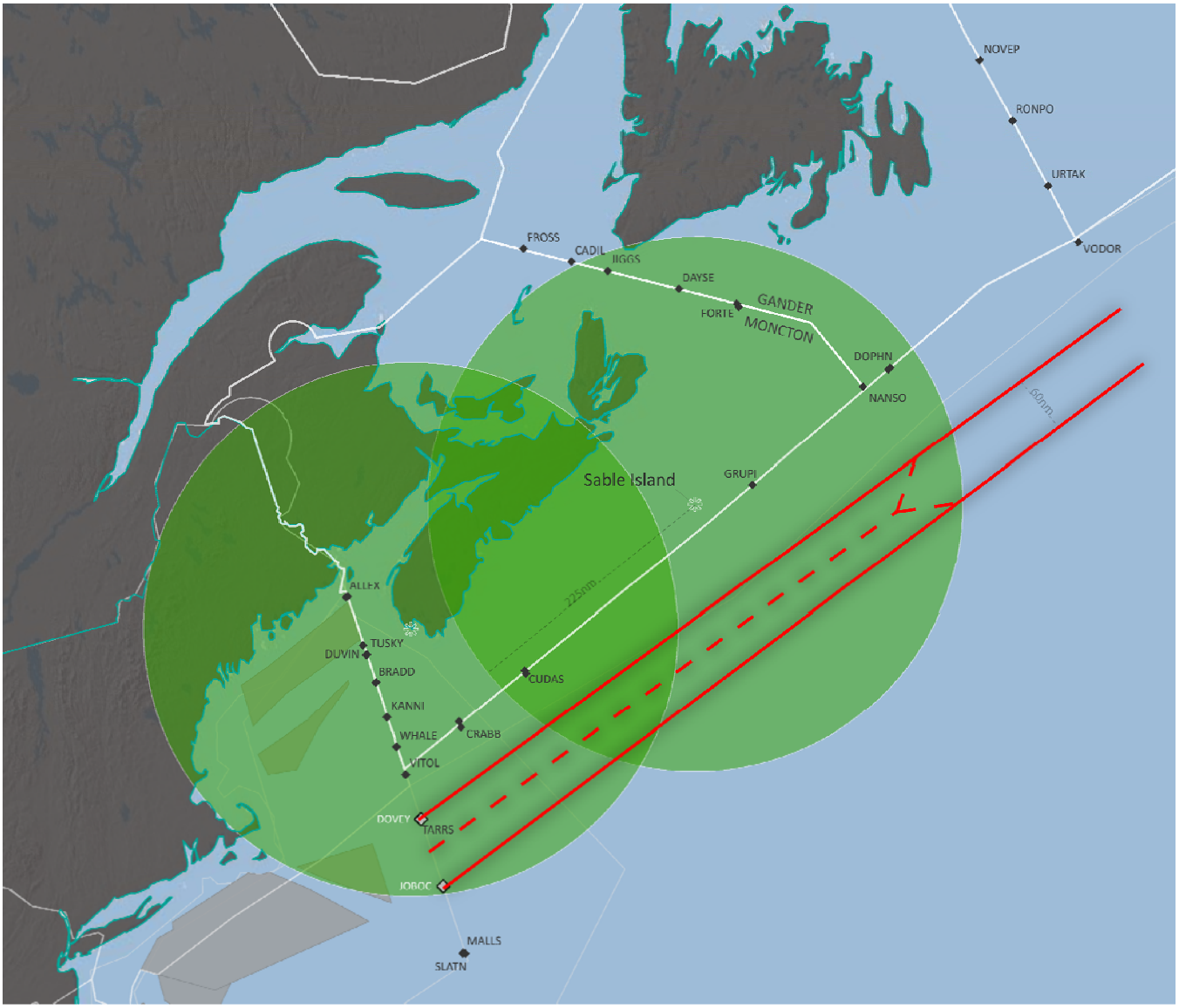

Figure 1: Proposed North Atlantic ADS-B Surveillance Coverage

3 Scope and Assumptions

Based on recorded flight data that was provided from ZNY, three data sets were identified for the study:

1. A high volume of air traffic crossing DOVEY on 11/24/2010.
2. A high volume of air traffic crossing JOBOC on 12/02/2010 and 12/03/2010.
3. A high volume of air traffic crossing SLATN on 12/02/2010 and 12/03/2010.

The following assumptions were made for the purposes of this study:

- ADS-B surveillance coverage will encompass the areas of ZNY and Canada airspace as shown in Figure 1: Proposed North Atlantic ADS-B Surveillance Coverage.
- All aircraft in the scenario are equipped to take full advantage of ADS-B separation.
- For the purpose of this analysis, all aircraft are requesting the same optimal flight level (FL350). The flight level 350 was arbitrarily chosen for the simulation, but could have been any single flight level that day.
- Conflicts were resolved by always giving the aircraft the next available lower altitude. This was necessary since all aircraft types may not be capable of accepting a higher altitude. For comparison purposes, both simulations were conducted with the same "lower altitude" procedure..
- Flight plans used from ZNY were captured "as filed" and do not reflect any route or altitude amendments that may have been made during flight. Route amendments were not executed by the testers.
- The ADS-B separation standard used for the simulation is 10 nautical miles (nmi). Actual ADS-B standard would likely be 5 nmi, however controllers may not be able to direct traffic at bare minimum separation. 10 nmi is a projection as to how close controllers would actually allow aircraft to be spaced using ADS-B in consideration of the large distance scale that would be used, and the number of aircraft that a controller would have to monitor.
- Canada would use the same or similar separation standard (i.e. ZNY will not have to increase the separation prior to handoff to Canada).
- Scenarios simulating future traffic increases were not developed since the days and hours that were specifically chosen exemplified extremely high traffic

4 Flight Data Sets

There were three data sets used for the studies which are further identified below. Each of the data sets was derived from recorded live ATOP air traffic. The data sets all included air traffic that passed through one of the three north Atlantic transition fixes DOVEY, SLATN or JOBOC.

4.1 Data set one DOVEY 11/24/2010

The data used for the simulation was recorded on 11/24/2010 from 22:20:15 to 23:54:45 which contained 19 total flights with flight plans passing through the DOVEY fix.. Appendix B lists the actual flight plans used in the simulation.

4.2 Data set two JOBOC 12/02/2010 – 12/03/2010

The data used for the simulation was recorded on 12/02/2010 and 12/03/2010 from 23:12:27 to 00:58:21 which contained 29 total flights with flight plans passing through the JOBOC fix.. Appendix B lists the actual flight plans used in the simulation.

4.3 Data set three SLATN 12/02/2010 – 12/03/2010

The data used for the simulation was recorded on 12/02/2010 and 12/03/2010 from 23:29:51 to 00:37:20 which contained 10 total flights plans with flights passing through the SLATN fix. Appendix B lists the actual flight plans used in the simulation.

5 Approach

A scenario was created utilizing the flight plans contained in the three data sets. The times were changed to accommodate the scenario; however, the amount of time between aircraft remained the same such that the relative positions of the aircraft were preserved. All three data sets were combined. Every flight in each data set then enters the scenario from ZNY domestic airspace and is coordinated into Oceanic through one of the 3 fixes, DOVEY, JOBOC, or SLATN. Data set one (DOVEY) actually occurred on a different day than the other two sets. Data sets two and three actually occurred at the same date and time. As such there were 13 conflicts (phase 1) between DOVEY flights and flights from either JOBOC or SLATN that may not have been in conflict on the day in question. However, since we are only using a sample of the data from each day, it's reasonable to expect that there would have been some conflicts. This data represented a sample of a high traffic period in ZNY Oceanic airspace. Also, as stated in the assumptions, the flight plans were modified to be flying at 35,000 feet as the optimal level for fuel burn on that particular day and time.

When running the scenario, the tester manually resolved all conflicts as an Oceanic Air Traffic Controller (ATC) would likely have done. Figure 2 below shows the traffic over DOVEY, JOBOC & SLATN during the simulation. Figure 3 below shows a sample Conflict Alert Summary which was used to identify and manually resolve the conflicts.

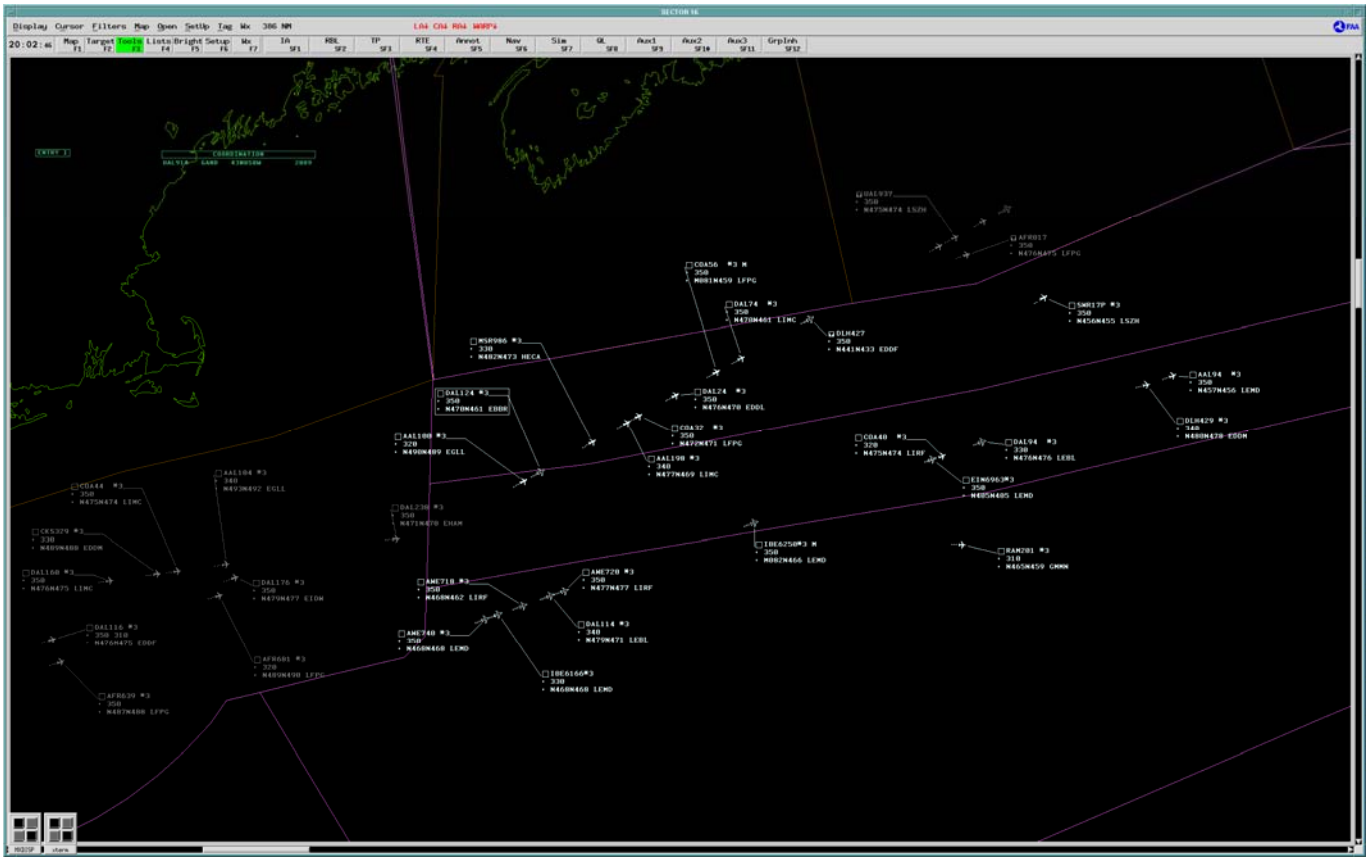

Figure 2: Traffic over DOVEY, JOBOC & SLATN.

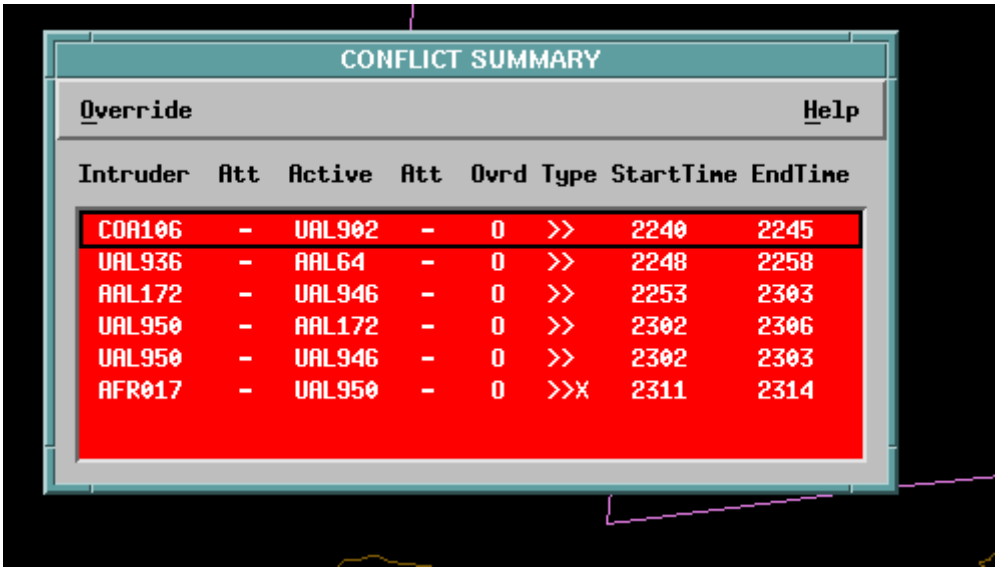

Figure 3 : Conflict Summary Window

The study was accomplished in 2 phases:

1. The scenario was executed with today's standard separation standards (15min/50nmi) and the conflicts were resolved on inbound coordination manually by providing the next lower available altitude. The number of conflicts and the modified flight levels required were recorded.

2. The scenario was executed with the assumed ADS-B separation standards (10 nmi) and the conflicts were resolved manually on inbound coordination by providing the next lower available altitude. The number of conflicts and the modified flight levels required were recorded.

This data was tabulated and then compared in the spreadsheet in table 1.

ADS-B separation standards are not currently adapted into ZNY airspace. Full adaption would require a change to the ATOP ATC software. However, the ADS-B separation standard was simulated using Required Navigational Performance (RNP) standards. RNP standards support a distance based separation of 30nmi. The adaptation was changed for the purposes of this testing to support a 10nmi separation which would be consistent with ADS-B. Appendix A contains a description of RNP distance-based longitudinal separation.

6 Results - Metrics and Reporting

Table 1 below shows the comparison between phase one and phase two. This is a comparison between ADS-B and standard separation. A description of each column follows. The column header is followed by a description of the contents therein:

1. **Fix** - designates which coordination fix the identified aircraft passed over (D=DOVEY, J=JOBOC, S=SLATN).

2. **Conflict Information Assuming all Flights Requesting FL350** – These two columns show the Flight IDs of the aircraft that were in conflict during phase one testing which was conducted using today's separation standards (15min/50mi). It was assumed that all flights were requesting FL350.

3. **Conflicts Under Standard Separation** – designates the actual amount of time the two aircraft are separated by. In some cases there is also a distance separation which is shown in parentheses. The required separation is 15min/50mi, so in each case where there is a conflict these numbers will be less than that in both of these dimensions. The longitudinal separation standard is time based (15min). This is the distance that one aircraft is trailing another. The lateral separation standard is expressed in nautical miles (nmi). The lateral separation standard is 50 nmi. Vertical separation must be 1000 feet. For a conflict to be detected the vertical separation must be violated and either the lateral or the longitudinal dimension must be violated. Dashes in these fields indicate where there is no conflict. The rows are still included, however, since there is a conflict when ADS-B standards are used as depicted in the right-most columns. It seems counter-intuitive that there could be a conflict under ADS-B where there was none under normal separation standards. However, when simulated ADS-B separation standards were adapted, there were fewer altitude changes made early in the run, therefore some new conflicts occurred downstream where they otherwise wouldn't have. Overall, there were fewer conflicts using ADS-B.

4. **Resulting Altitude Change Assuming Coordination at Next Available Lower Altitude** – These two columns designate the new altitude which was assigned by ATC to resolve the conflict and the amount of change necessary in thousands of feet during the standard separation run.

5. **Conflicts Under ADS-B Separation** – designates the actual amount of distance the two aircraft are separated by. The required separation is 10nmi/10nmi. The longitudinal separation (trailing distance) and the lateral separation are both 10 nautical miles. Vertical separation must be 1000 feet. For a conflict to be detected the vertical separation must be violated and either the lateral or the longitudinal dimension must be violated. Dashes in these fields indicate where there is no conflict. It was assumed that all flights were requesting FL350.

6. **Resulting Altitude Change Assuming Coordination at next Available Altitude (ADS-B)**– These two columns designate the new altitude which was assigned by ATC to resolve the conflict and the amount of change necessary in thousands of feet during the ADS-B run.

Notes:

Table 1 is sorted by scenario time.

The RNP separation standards that were adapted to simulate ADS-B separation will not permit the 10 nmi separation for crossing route conflicts. All crossing route conflicts were analyzed to determine the actual distance of separation. Any conflicts which were not inside the 10 nmi were overridden manually and were not included in the results as conflicts. This was done to simulate how we expect the ADS-B system would be adapted.

Table 1 Conflict Comparison

Conflict Altitude Comparison for flights over DOVEY, JOBOC, and SLATIN											
	Conflict Information assuming all flights requesting FL350			Conflicts under standard separation of 15min (50mi)	Resulting altitude change assuming coordination at next available altitude		Conflicts under ADS-B Separation 10mi/10mi	Resulting altitude change assuming coordination at next available altitude			
Fix	ORIG FL ACID1	Fix	Confl FL ACID2	Actual (time(dist)	New Alt	Level Change	Actual Distance	New Alt	Level Change		
D	AFR023	D	AAL44	1:53(0)	34000	**1000**	-	-	-		
D	UAL916	D	DAL106	2:42(0)	34000	**1000**	-	-	-		
D	UAL914	D	DAL106	5:37(14)	33000	**2000**	-	-	-		
D	AAL70	D	DAL106	5:23(0)	32000	**3000**	-	34000	**1000**		
		D	UAL914	-			0/0				
D	DLH411	D	DAL106	7:24(0)	31000	**4000**	-	-	-		
J	DAL130	J	UAL915	0:57 (0)	34000	**1000**	7/0	34000	**1000**		
D	COA106	J	UAL915	1:14(49)	33000	**2000**	-	-	-		
		D	UAL902	7:32(0)			-				
J	COA80	J	UAL915	6:23(0)	33000	**2000**	-	-	-		
D	AAL64	J	UAL915	5:43(49)	32000	**3000**	-	-	-		
J	UAL974	J	UAL915	10:58(0)	32000	**3000**	-	-	-		
D	ACA084	D	AAL64	-	31000	**4000**	8/0	34000	**1000**		
		J	UAL915	4:52(49)			-				
J	DAL66	J	UAL915	12:53(0)	31000	**4000**	-	-	-		
D	UAL936	J	UAL915	9:28(49)	30000	**5000**	-	-	-		
D	UAL946	J	UAL915	10:40(49)	29000	**6000**	-	-	-		
D	AAL172	J	UAL915	13:40(49)	28000	**7000**	-	-	-		
J	DLH429	J	AUA94	0:53(2)	34000	**1000**	7/2	34000	**1000**		
		S	AAL94	4:07(49)			9/8				
D	UAL950	J	AUA94	1:19(49)	34000	**1000**	-	-	-		
J	AWE710	D	AAL172	8:27(0)	33000	**2000**	-	-	-		
		D	UAL946	10:58(0)			-				
		J	AUA94	4:43(0)			-				
D	SWR17P	J	AUA94	2:41(49)	32000	**3000**	-	-	-		
J	UAL937	J	AUA94	9:03(0)	31000	**4000**	-	-	-		
S	DAL94	S	EIN6963	2:35(0)	33000	**2000**	9/0	34000	**1000**		
		S	AAL94	14:59(0)			-				
J	UAL982	S	AUA94	10:40(0)	30000	**5000**	-	-	-		
S	COA40	S	EIN6963	5:09(0)	32000	**3000**	9/0	34000	**1000**		
J	RAM201	S	AUA94	14:00(crossing)	29000	**6000**	-	33000	**2000**		
		S	EIN6963	5:09(crossing)			9/5				
D	VIR4	S	AUA94	3:53(49)	31000	**4000**	-	-	-		
D	AFR017	S	AUA94	8:22(49)	29000	**6000**	-	-	-		
J	DAL74	J	DLH427	7:30(0)	34000	**1000**	-	-	-		
S	IBE6250	S	EIN6963	14:59(0)	34000	**1000**	-	-	-		
J	COA56	J	DLH427	9:26(0)	33000	**2000**	-	-	-		
J	DAL24	J	DLH427	12:58(0)	32000	**3000**	-	-	-		
J	COA32	J	DLH427	14:59(0)	31000	**4000**	-	-	-		
J	AAL198	J	COA32	-	-	-	7/0	34000	**1000**		
J	MSR986	J	AAL198	3:00(crossing)	30000	**5000**	-	-	-		
S	DAL114	S	AWE720	0:59(1)	34000	**1000**	7/1	34000	**1000**		
J	DAL124	J	AAL198	7:06(0)	34000	**1000**	-	-	-		
S	AWE718	S	AWE720	3:00(crossing)	33000	**2000**	-	-	-		
J	AAL100	J	DAL124	-	33000	**2000**	9/0	34000	**1000**		
		J	AAL198	8:45(0)			-				
S	IBE6166	S	AWE720	5:00(crossing)	32000	**3000**	-	-	-		
S	AWE740	S	AWE720	6:00(crossing)	31000	**4000**	-	34000	**1000**		
		S	IBE6166	-			8/0				
J	DAL176	J	DAL238	11:47(0)	34000	**1000**	-	-	-		
J	AAL104	J	DAL238	11:28(0)	33000	**2000**	-	34000	**1000**		
		J	DAL176	-			0/0				
J	AFR681	J	DAL176	-	30000	**5000**	7/1	33000	**2000**		
		J	DAL238	11:36(20)			-				
J	COA44	J	DAL238	14:36(42)	32000	**3000**	-				
J	CKS329	J	DAL238	14:59(47)	31000	**4000**	7/0	34000	**1000**		
J	AFR639	J	DAL160	3:37(6)	29000	**6000**	-	-	-		
J	DAL116	J	AFR639	-	28000	**7000**	8/1	34000	**1000**		
		J	DAL160	5:00(0)			-				

7 Conclusions

Table below summarizes the conflicts which were resolved in phases one and two. After phase one, standard separation simulation run, it was identified that there were 18 total conflicts for aircraft passing over DOVEY within the time span used. There were 26 conflicts over JOBOC and 7 over SLATN for a total of 51 conflicts (Refer to Table 1 for individual conflicts). These conflicts necessitated 45 altitude changes by ATC. In some cases, the altitude had to change as much as 7000 feet. There was a total of 142,000 feet of altitude changes necessary under today's separation standards.

After phase two, ADS-B separation simulation run, it was identified that there were 2 conflicts over DOVEY, 10 over JOBOC and 4 over SLATN for a total of 16 conflicts. These conflicts necessitated only 15 altitude changes. Altitude changes necessary were never more than 2000 feet. There was a total of only 17,000 feet of altitude changes necessary. Using ADS-B simulated separation standards there was a 69% reduction of conflicts, a 67% reduction of altitude changes (ATC actions), and a 88% reduction of the total amount of altitude change necessary.

The results indicated that more flights would get their optimal flight paths, there could be considerable fuel savings and reduced CO_2 emissions with optimal altitudes, and possible reduced controller workload with fewer traffic conflicts and fewer delays.

An additional observation was that with ADS-B lateral separation at 10nmi, there could be an airspace redesign with more entry points from ZNY domestic into Oceanic airspace. The benefit may be that optimal routes and altitudes could be granted with even fewer conflicts and level changes.

	Standard Separation – Phase 1	ADS-B Separation – Phase 2
DOVEY Total Conflicts	18	2
DOVEY Total Alt. Changes	15 (52,000 Total Feet)	2 (2,000 Total Feet)
JOBOC Total Conflicts	26	10
JOBOC Total Alt. Changes	23 (74,000 Total Feet)	9 (11,000 Total Feet)
SLATN Total Conflicts	7	4
SLATN Total Alt. Changes	7 (16,000 Total Feet)	4 (4,000 Total Feet)
TOTAL Conflicts	51	16
Total Alt. Changes	45 (142,000 Total Feet)	15 (17,000 Total Feet)

Table 2 Conflict Summary

Appendix A CPFS Vol. 13 - FDP 3.12.2.3.7 Distance-based Longitudinal Separation

Note:
This information is included to describe the RNP separation that was used for the purposes of this testing since ADS-B is not supported by the software at this time. RNP is software supported, however is currently adapted at 30mi/30mi separation. The adaptation was changed for the purposes of this testing to reflect the 10mi/10mi used by ADS-B.

Distance-based Longitudinal Separation

This function assigns the distance-based longitudinal separation standards.
In Build 1, for the application of RNP distance-based longitudinal separation, the aircraft must meet the following RNP qualification:

- Both aircraft are turbojets
- Both have their distance based separation flag set
- Both aircraft meet the navigation requirement
- Both are datalink equipped (R, J, and D flag set)
- Both have ADS-A reporting frequency at 27 minutes
- Both aircraft are in the Area Navigation (RNAV) area or on RNAV airway legs and
- The angle between the intruder and active leg is for same or reciprocal track.

The system provides the capability to apply the distance-based longitudinal separation standard for RNP-10 aircraft with the D-50 flag set, operating in RNP-10 adapted areas, and on the same track or on reciprocal tracks after the aircraft are estimated to have passed: 50 NM.
In Build 2, the system provides the capability to apply the distance-based longitudinal separation standard for RNP-4 aircraft with the 30/30 flag set, operating in RNP-4 adapted areas or on RNP-4 tracks or ATS routes, and on the same track or on reciprocal track after the aircraft are estimated to have passed: 30 NM.

In Build 2, The system provides the adaptable capability to automatically set the D-50 and 30/30 flags on a per-site basis. If the automatic setting capability is enabled, the flags will be set for aircraft meeting the following criteria:

• **D-50 flag** - The aircraft is a turbojet with an RNP qualifier (R) in the equipage field of the ICAO flight plan, an active CPDLC connection, and an active ADS contract with a periodic reporting interval less or equal to an adapted interval.

• **30/30 flag** - The aircraft is a turbojet with an RNP qualifier (R) in the equipage field of the ICAO flight plan, an active CPDLC connection, an active ADS contract with a periodic reporting interval less or equal to an adapted interval, and a reported ADS Figure of Merit (FOM) that meets or exceeds the adapted RNP-4 navigation criteria.

If the D-50 and/or 30/30 flag is set for an aircraft and an ADS report has **not** been received for that aircraft within the VSP time interval specified for the appropriate flag, the system automatically clears the flag(s) and provides a notification to the controller. The flag(s) will automatically be set again once the applicable criteria described above are met. Automatic flag management for a given flag is discontinued if the controller manually disables that flag.

Appendix B Data Sets

11/24/10	DATA SET ONE: DOVEY
22:20:15	N547 FP THY2 H/B773/Q 7114 0490 DOVEX E{{t+0,34}} 310 KJFK./.YAHOO..DOVEY.NATW.NERTU..TAKAS.UN491.LGL.UL851.MELKO.UM164.EPL.UL851.TRA.UP131.ADOSA.UL612.CHI.UL614.A DORU.UY883.ENESU..LTBA/0654 ùTCAS EQUIPPED* FLR I FLT S WAK H EQP SEHPRWXYJIGD SRV SD ALA ++LTFJ LTAC++ OTH ++D
22:35:44	N589 FP AAL44 H/B763/Q 7154 0461 DOVEX E{{t+0,35}} 330 KJFK./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..RATKA.UN502.JSY.UY111.INGOR.UM25.DVL..LFPG/0515 FLR I FLT S WAK H EQP SDXZWHIRPY SRV S ALA EGLL OTH ++EET/KZNY0041 060W0118 050W0211 CZQX0300 EGGX0349 020W0441 EISN0505 NERTU0510 EGTT0539 EGGX0544 LFFF0553 REG/N392AN SEL/LMPR NAV/RNVA1D1E2++
22:39:09	N596 FP AFR023 H/B772/Q 1501 0487 DOVEX E{{t+0,34}} 350 KJFK./.YAHOO..DOVEY.NATW.4700N/03000W.NATW.4900N/02000W.NATW.BEDRA.NATW.NERTU..RATKA.UN521.NERLA.UN491.BASI K.UZ57.LATGO..LFPG/0501 ùADSB
22:52:15	N639 FP DAL106 H/B763/Q 1606 0442 DOVEX E{{t+0,34}} 330 KJFK./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..TAKAS.UN491.LGL.UL851.TABOV.UN858.TSU.UN858.VALEK.UM163.LUTAX.U M163.DIK.UT856.ADUSU.T856.BENAK.T180.OSMAX..EDDF/0613 ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDHIPRWXYZ SRV S ALA EDDK OTH ++EET/KZBW0005 KZNY0032 LPPO0307 CZQX0307 EGGX0359 EGTT0550 EDUU0702 REG/N195DN SEL/AGCP NAV/RNVA1D1E2 RNP10++
2:55:15	N648 FP UAL916 H/B772/Q 5671 0488 DOVEX E{{t+0,34}} 350 KIAD./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..GAPLI.UN20.SAM.UM140.DVR.UL9.KONAN.UL607.SPI.UT180.DITEL.T180.OSM AX..EDDF/0551 ùTCAS AGCS 120 EROPS* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV SD ALA EDDL OTH ++EET/KZNY0024 KZBW0030 KZNY0053 CZQX0315 EGGX0404 EGTT0550 EBBU0636 EDGG0656 EDUU0657 REG/N769UA SEL/AQBL DAT/SV NAV/RNVA1D1E2 RNP4 RALT/CYJT LPLA EINN++
22:58:39	N658 FP UAL914 H/B772/Q 6571 0472 DOVEX E{{t+0,34}} 350 KIAD./.YAHOO..DOVEY..4200N/06000W..4300N/05000W..4500N/04000W..4700N/03000W..4900N/02000W..BEDRA..NERTU..RATKA.UN502. JSY.UY111.INGOR.U
22:59:09	N659 FP AAL70 H/B772/Q 2334 0492 DOVEX E{{t+0,34}} 350 KDFW./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..GAPLI.UN20.SAM.UM140.DVR.UL9.KONAN.UL607.SPI.UT180.DITEL.T180.OS MAX..EDDF/0555 FLR I FLT S WAK H EQP SXZJWHGRY SRV SD ALA LIMC OTH ++EET/KZNY0246 060W0321 050W0411 CZQX0458 EGGX0546 020W0634 EISN0657 NERTU0702 EGTT0731 EBUR0817 EDUU0839 REG/N756AM SEL/GKBC DAT/S NAV/RNVA1D1E2++
23:00:45	N667 FP DLH411 H/A346/Q 3463 0477 DOVEX E{{t+0,34}} 330 KJFK./.YAHOO..DOVEY.NATW.NERTU..GAPLI.UN20.SAM.UM140.DVR.UL9.KONAN.UL607.KOK.UM150.KRH.Z729.LBU.L173.RIXED.Y1 61.RIDAR.RIDAR1A.EDDM/0606 ùTCAS* FLR I FLT S WAK H EQP SGHIJPRXWYZ SRV S
23:11:15	N701 FP UAL902 H/B772/Q 3404 0481 DOVEX E{{t+0,34}} 370 KIAD./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..GAPLI.UN20.SAM.UM140.DVR.UL9.KONAN.UL607.AMASI.UM149.BOMBI.T104. XERUM.UM867.B
23:18:39	N728 FP COA106 H/B762/Q 3371 M079 DOVEX E{{t+0,34}} 370 KEWR./.LINND..DOVEY.NATW.BEDRA..NERTU..GAPLI.UN20.SAM.UM140.DVR.UL9.KONAN.UL607.AMASI.UM149.BOMBI.T104.BURA M..EDDM/0646 ùADS A
23:22:38	N740 FP AAL64 H/B763/Q 1625 0464 DOVEX E{{t+0,35}} 330 KJFK./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..GUNSO..EMPER..TAKAS.UN491.LGL.UL851.MELKO.UM606.BLM..LSZH/0630 FLR I FLT S WAK H EQP SDXZWHIRPY SRV S ALA LSGG OTH ++EET/KZNY0040 060W0117 050W0210 CZQX0259 EGGX0349 020W0441 EISN0505 NERTU0510 EGTT0539 LFFF0542 REG/N386AA SEL/JKQS NAV/RNVA1D1E2++

11/24/10	DATA SET ONE: DOVEY CONTINUED
23:25:09	N749 FP ACA084 H/B763/Q 2273 0461 DOVEX E{{t+0,32}} 310 CYYZ./.CAM..DOVEY..NATW..NERTU..TAKAS.UN490.TERPO.UM616.LERGA.UT183.OTROT.UM728.BEPER.UM728.KISTO.UQ160.MEDAL.UM729.PNZ.UM603.SOR.UM736.CRN.UM601.MIL.UN134.SOLIN.UH2.SIRON..LLBG ùTCAS EQPT AGCS EQPT* FLR I FLT S WAK H EQP SEGHIPRWXYZ SRV S OTH ++DO
23:26:15	N754 FP UAL936 H/B763/Q 3612 0438 DOVEX E{{t+0,34}} 330 KIAD./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..TAKAS.UN491.LGL.UL851.MELKO.UM606.BLM..LSZH/0634 ùTCAS AGCS 120 EROPS* FLR I FLT S WAK H EQP SDHIPRWXYZ SRV S OTH ++EET/KZNY0025 KZBW0032 KZNY0056 CZQX0323 EGGX0414 EGTT0605 LFFF0608 LFEE0710 EDGG0726 LSAS0727 REG/N660UA SEL/CFAR NAV/RNVA1D1E2 RNP10 RALT/CYJT LPLA EINN++
23:29:38	N765 FP UAL946 H/B772/Q 6514 0481 DOVEX E{{t+0,34}} 350 KIAD./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..GAPLI.UM197.REDFA..EHAM/0607 ùTCAS AGCS 120 EROPS* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV SD ALA EBBR OTH ++EET/KZNY0024 KZBW0030 KZNY0053 CZQX0315 EGGX0405 EGTT0551 EHAA0643 REG/N775UA SEL/AQGL DAT/SV NAV/RNVA1D1E2 RNP4 RALT/CYJT LPLA EINN++
23:32:08	N774 FP AAL172 B752/Q 6667 0453 DOVEX E{{t+0,34}} 350 KJFK./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..GAPLI.UN20.BUMUX.UN20.SAM.UM140.DVR.M140.VABIK.UQ70.KOK..EBBR/0638 FLR I FLT S WAK M EQP SXZJHGWRPY SRV S ALA LFPG OTH ++EET/KZNY0042 060W0119 050W0214 CZQX0306 EGGX0359 020W0451 EISN0517 NERTU0522 EGTT0553 EBUR0644 REG/N197AN SEL/CJKM DAT/V NAV/RNVA1D1E2++
23:41:09	N804 FP UAL950 H/B772/Q 7002 0482 DOVEX E{{t+0,34}} 350 KIAD./.YAHOO..DOVEY.NATW.BEDRA.NATW.NERTU..GAPLI.UN20.SAM.UM140.DVR.M140.VABIK.Q70.KOK..EBBR/0624 ùTCAS AGCS 120 EROPS* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV SD ALA EHAM OTH ++EET/KZNY0023 KZBW0029 KZNY0052 CZQX0314 EGGX0403 EGTT0550 EBBU0638 REG/N225UA SEL/KMEP DAT/SV NAV/RNVA1D1E2 RNP4 RNAV1 RNAV5 RALT/CYJT LPLA EINN++
23:46:15	N825 FP SWR17P H/A333/Q 2752 0456 DOVEX E{{t+0,30}} 330 KJFK./.HTO255052..DOVEY.NATW.4200N/06000W.NATW.4900N/02000W.NATW.BEDRA.NATW.NERTU..TAKAS.UN491.LGL.UL851.MELKO.UM606.BLM..LSZH/0649 ùCALLSIGN SWISS-ACAS II EQUIPPED-ADSB-AGCS EQUIPPED-ID LX017* FLR I FLT S WAK H EQP SGXJWRYPZ SRV SD AL
23:51:09	N841 FP VIR4 H/A346/Q 6666 0460 DOVEX E{{t+0,29}} 310 KJFK./.HTO249049..DOVEY.NATW.NERTU..GAPLI.UL620.GIBSO..EGLL/0620 ù02.V340 ACAS II* FLR I FLT S WAK H EQP SPRWXYJGDZ SRV SD ALA ++EGKK EGSS++ OTH ++DOF/101124 RVR/75 EET/KZBW0008 KZNY0034 CZQX0301 EGGX0352 EGTT0543 REG/GVFIZ SEL/DJHS OPR/VIR DAT/SV NAV/RNVA1D1E2 RNP10 RALT/CYYT LPLA EINN++
23:54:45	N855 FP AFR017 H/A343/Q 1152 0476 DOVEX E{{t+0,29}} 350 KJFK./.HTO253050..DOVEY.NATW.4500N/04000W.NATW.4700N/03000W.NATW.BEDRA.NATW.NERTU..RATKA.UN502.JSY.UY111.INGOR.UM25.DVL..LFPG/0631 ùADSB

12/02/10	DATA SET TWO: JOBOC
23:12:27	N010 FP UAL914 H/B772/Q 1323 0432 JOBOX E2347 350 KIAD./.SIE..JOBOC.NATX.BEDRA.NATX.NERTU..RATKA.UN502.JSY.UY111.INGOR.UM25.DVL..LFPG/0608 ùTCAS AGCS 120 EROPS* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV SD ALA EDDL OTH ++EET/KZNY0031 LPPO0343 CZQX0408 EGGX0437 EGTT0626 LFFF0639 REG/N781UA SEL/ARBE DAT/SV NAV/RNVA1D1E2 RNP4 RALT/CYJT LPLA EGFF++
23:13:27	N012 FP DAL130 H/B764/Q 3512 0454 JOBOX E2348 310 KATL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..TAKAS.UN491.GALBO.UN491.LGL.UL851.TABOV.UN858.NOSPA.UL984.BOMBI.T104.BURAM..EDDM/0718 ùTCAS AGCS EQUIPPED NRP USA O2.W320 O3.Y320* FLR I FLT S WAK H EQP SDGHIPRWXYZ SRV S ALA EDDF OTH ++EET/KZDC0035 KZNY0108 LPPO0434 CZQX0500 EGGX0531 EGTT0726 EDUU0842 REG/N845MH SEL/RSLQ NAV/RNVA1D1E2 RNP10++
23:19:33	N031 FP COA80 H/B764/Q 1005 M082 JOBOX E2354 330 KEWR./.LINND..JOBOC.NATX.BEDRA.NATX.NERTU..TAKAS.UN491.LGL.UL851.RESMI.UM975.LUSAR.LUSA1R.LSGG/0636 ùADS AGCS O2.X330 O3.W340* FLR I FLT S WAK H EQP SHGXWYRJPZ SRV SD ALA LIMJ OTH ++EET/JOBOC0048 41N060W0126 42N050W0221 44N040W0317 CZQX0343 EGGX0410 49N020W0501 EISN0524 EGTT0557 LFFF0601 LSAS0721 REG/N76054 SEL/AMDR COM/TCAS DAT/VHS NAV/RNVA1D1E2 RNP4 RALT/CYJT EGPK++
23:24:21	N049 FP UAL974 H/B763/Q 7012 0472 JOBOX E2359 330 KIAD./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..TAKAS.UN491.LGL.UL851.RESMI.UM975.LUSAR..LSGG/0700 ùTCAS AGCS 180 EROPS* FLR I FLT S WAK H EQP SDHIPRWXYZ SRV S ALA LSZH OTH ++EET/KZNY0029 LPPO0345 CZQX0410 EGGX0440 EGTT0631 LFFF0635 LFEE0742 LFMM0752 LSAS0756 LFFF0801 LSAS0803 REG/N647UA SEL/AGER NAV/RNVA1D1E2 RNP10 RALT/CYJT EGPK++
23:25:51	N055 FP DAL66 H/B763/Q 2662 0469 JOBOX E0001 310 KATL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..TAKAS.UN491.LGL.UL851.MELKO.UM606.BLM..LSZH ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDHIPRWXYZ SRV S ALA EDDF OTH ++EET/KZDC0034 KZNY0106 LPPO0427 CZQX0453 EGGX0522 EGTT0713 REG/N1501P SEL/MSFQ NAV/RNVA1D1E2 RNP10++
23:36:21	N089 FP AUA94 H/B763/Q 3643 0430 JOBOX E0011 310 KIAD*./.LACKS..JOBOC.NATX.NERTU..RATKA.UN502.JSY.UN160.PIGOP.UL851.DEGES.UN871.BADVI.UL725.GAMLI.GAMLI4W.LOWW/0744 ùAGCS* FLR I FLT S WAK H EQP SEHPRWXYJIG SRV S ALA LHBP OTH ++DOF/101202 RVR/75 EET/KZNY0029 LPPO0342 CZQX0407 EGGX0435 EGTT0623 LFFF0637 LFEE0732 LSAS0746 LHCC0832 REG/OELAX SEL/CEBR OPR/AUA DAT/SV NAV/RNVA1D1E1 RNP1 ADSB RALT/KBGR CYJT LPLA EINN++
23:37:22	N093 FP DLH429 H/A343/Q 3332 0480 JOBOX E0012 350 KCLT./.LARGE..JOBOC.NATX.4200N/05000W.NATX.NERTU..TAKAS.UN491.LGL.UL851.LASAT.UL851.KUDES.T103.OSDER.OSDER1A.EDDM/0703 ùTCAS* FLR I FLT S WAK H EQP SGHIJPRXWYZ SRV SD ALA EDDS OTH ++DOF/101
23:41:21	N103 FP AWE710 H/B762/Q 2672 0455 JOBOX E0016 330 KPHL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..TAKAS.UN491.LGL.UL851.TABOV.UL851.MELKO.UM606.BLM.BLM1G.LSZH/0707 ùETOPS 180MIN 1263NM RULE ENRTE ALTNS CYJT EGFF* FLR I FLT S WAK H EQP SIDHXWRYZP SRV S ALA EDDF OTH ++EET/JOBOC0049 060W0129 050W0226 LPPO0325 CZQX0351 EGGX0421 020W0516 EISN0540 NERTU0545 EGTT0614 LFFF0617 REG/N252AU SEL/BFKP NAV/RNVA1D1E2 RNP10++

12/02/10	**DATA SET TWO: JOBOC CONTINUED**
23:46:21	N120 FP UAL936 H/B763/Q 6515 0475 JOBOX E0021 330 KIAD./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..TAKAS.UN491.LGL.UL851.MELKO.UM606.BLM..LSZH/0728 ùTCAS AGCS 180 EROPS* FLR I FLT S WAK H EQP SDHIPRWXYZ SRV S ALA EDDF OTH ++EET/KZNY0030 LPPO0346 CZQX0411 EGGX0441 EGTT0633 LFFF0637 LFEE0739 EDGG0753 LSAS0755 REG/N660UA SEL/CFAR NAV/RNVA1D1E2 RNP10 RALT/CYJT EGPK++
23:48:57	N132 FP UAL982 H/B772/Q 2412 0483 JOBOX E0023 310 KIAD./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..TAKAS..OKBK/1144 ùTCAS AGCS 120 EROPS IRAQ RALT LTAF OKBK TURKEY CAST164* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV SD ALA OBBI OTH ++EET/KZNY0030 LPPO0338 CZQ
23:55:27	N156 FP DLH427 H/A343/Q 1536 0441 JOBOX E0030 350 KPHL./.LACKS..JOBOC.NATX.NERTU..GAPLI.UN20.SAM.UM140.DVR.UL9.KONAN.UL607.SPI.UT180.DITEL.T180.OSMAX.OSMAX2W.EDDF/0701 ùTCAS* FLR I FLT S WAK H EQP SGHIJPRXWYZ SR
12/3/10	
0:02:51	N179 FP DAL74 H/B763/Q 1504 0470 JOBOX E0038 310 KATL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..TAKAS.UN490.TERPO.UM616.BEBIX.UP860.GIPNO.UP860.BALSI.UY11.TOSMI.UY11.TOP..LIMC/0740 ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV S ALA LFMN OTH ++EET/KZDC0034 KZNY0106 LPPO0426 CZQX0452 EGGX0521 EGTT0713 REG/N175DZ SEL/DLCS DAT/SV NAV/RNVA1D1E2 RNP10++
0:05:21	N187 FP COA56 H/B764/Q 1704 M081 JOBOX E0040 330 KEWR./.LINND..JOBOC.NATX.BEDRA.NATX.NERTU..RATKA.UN502.JSY.UY111.INGOR.UM25.DVL.DVL4E.LFPG/0653 ùADS AGCS O2.X320 O3.W330* FLR I FLT S WAK H EQP SHGXWYRJPZ SRV SD ALA EDDL OTH ++EET/JOBOC0049 41N060W0127 42N050W0222 44N040W0319 CZQX0345 EGGX0412 49N020W0504 EISN0527 EGTT0600 LFFF0613 REG/N59053 SEL/AMCP COM/TCAS DAT/VHS NAV/RNVA1D1E2 RNP4 RALT/CYJT LPLA EGPK++
0:09:21	N204 FP DAL24 H/B763/Q 5755 0476 JOBOX E0044 310 KATL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..GAPLI.UM197.IPRIL.UM197.REDFA.UL620.PAM.UP62.TEBRO..EDDL/0732 ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDHIJPRWXYZ SRV S ALA EDDF OTH ++EET/KZDC0034 KZNY0105 LPPO0426 CZQX0452 EGGX0521 EGTT0714 REG/N153DL SEL/MSGL DAT/SV NAV/RNVA1D1E2 RNP10++
0:12:21	N215 FP COA32 H/B764/Q 4007 0472 JOBOX E0047 330 KIAH./.WEBBB..JOBOC.NATX.BEDRA.NATX.NERTU..RATKA.UN502.JSY.UY111.INGOR.UM25.DVL.DVL4E.LFPG/0701 ùADS AGCS O2.X330 O3.X340* FLR I FLT S WAK H EQP SHGXWYRJPZ SRV SD ALA EDDL OTH ++EET/JOBOC0305 41N060W0343 42N050W0439 44N040W0537 CZQX0603 EGGX0630 49N020W0722 EISN0745 EGTT0819 LFFF0832 REG/N66056 SEL/JPGQ COM/TCAS DAT/VHS NAV/RNVA1D1E2 RNP4 RALT/CYJT LPLA EGPK++

12/02/10	DATA SET TWO: JOBOC CONTINUED
0:13:21	N220 FP AAL198 H/B763/Q 1175 0477 JOBOX E0048 350 KJFK./.LINND..JOBOC.NATX.BEDRA.NATX.NERTU..TULTA.UP197.TURAN.UN480.KOLEK.UN470.CNA.UN460.LMG.UN10.BEBIX.UP860.RUBLO.UP860.BALSI.UY11.LAPRI..KUMIN.UM730.TOP..LIMC/0740 FLR I FLT S WAK H EQP SXZJWHGRPY SRV S ALA ++LIRP LIRF++ OTH ++EET/JOBOC0043 060W0121 050W0216 LPPO0313 CZQX0337 EGGX0406 020W0458 EISN0521 NERTU0525 LFFF0554 REG/N374AA SEL/APKQ DAT/S NAV/RNVA1D1E2++
0:16:22	N228 FP MSR986 H/B77W/Q 1722 0482 JOBOX E0051 310 KJFK./.YAHOO..JOBOC.NATX.NERTU..TAKAS.UN491.MOSIS.UN490.DEGEX.UN490.TERPO.UM616.LERGA.UT183.OTROT.UM728.KISTO.UQ160.MEDAL.UM729.PNZ.UM603.SOR.UM736.CRN.UM601.TRL.UP50.SIT.UG400.KUMBI.G400.BLT.A16.CVO..HECA/1015 ùTCAS AGCS* FLR I FLT S WAK H EQP SDEGHIJPRXWYZ SRV SD ALA HESH OTH ++DO
0:19:57	N241 FP DAL124 H/B763/Q 3370 0470 JOBOX E0055 310 KATL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..GAPLI.UN20.SAM.UM140.DVR.M140.VABIK.Q70.KOK..EBBR ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV S ALA EDDK OTH ++EET/KZDC0034 KZNY0106 LPPO0426 CZQX0452 EGGX0521 EGTT0714 REG/N177DZ SEL/DLES DAT/SV NAV/RNVA1D1E2 RNP10++
0:22:27	N249 FP AAL100 H/B772/Q 1074 0490 JOBOX E0057 330 KJFK./.LINND..JOBOC.NATX.BEDRA.NATX.NERTU..GAPLI.UL620.GIBSO..EGLL/0701 FLR I FLT S WAK H EQP SXZJWHGRY SRV SD ALA LFMN OTH ++EET/JOBOC0052 060W0129 050W0221 LPPO0314 CZQX0338 EGGX0406 020W0455 EISN0517 NERTU0522 EGTT0550 REG/N766AN SEL/AHDQ DAT/S NAV/RNVA1D1E2++
0:31:57	N284 FP DAL238 H/A333/Q 6314 0471 JOBOX E0107 350 KATL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..GAPLI.UM197.REDFA..EHAM ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV SD ALA EDDF OTH ++EET/KZDC0036 KZNY0108 LPPO0429 CZQX0454 EGGX0524 EGTT0716 REG/N806NW SEL/FHEK DAT/SV NAV/RNVA1D1E2 RNP10++

12/02/10	DATA SET TWO: JOBOC CONTINUED
0:43:57	N317 FP DAL176 H/B763/Q 6051 0479 JOBOX E0119 350 KATL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..SUTEX..EIDW/0703 ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV SD ALA EGPK OTH ++EET/KZDC0034 KZNY0105 LPPO0423 CZQX0448 EGGX0517 EISN0702 REG/N156DL SEL/PQDK DAT/SV NAV/RNVA1D1E2 RNP10++
0:44:21	N320 FP AAL104 H/B772/Q 2224 0493 JOBOX E0119 310 KJFK./.LINND..JOBOC.NATX.BEDRA.NATX.NERTU..GAPLI.UL620.GIBSO..EGLL/0718 FLR I FLT S WAK H EQP SXZJWHGRY SRV SD ALA LFMN OTH ++EET/JOBOC0051 060W0127 050W0219 LPPO0312 CZQX0335 EGGX0403 020W0453 EISN0514 NERTU0519 EGTT0547 REG/N785AN SEL/JMQS DAT/S NAV/RNVA1D1E2++
0:45:51	N325 FP AFR681 H/B772/Q 7054 0489 JOBOX E0120 350 KATL./.SBY202044..JOBOC.NATX.4400N/04000W.NATX.4900N/02000W.NATX.BEDRA.NATX.NERTU..RATKA.UN521.NERLA.UN491.BASIK. UZ57.LATGO
0:49:51	N340 FP CKS329 H/B742/Q 1013 0489 JOBOX E0124 310 KEWR./.LINND..JOBOC.NATX.4100N/06000W.NATX.NERTU..LULOX.UN12.MABUG.UL739.LIZAD.UN160.PIGOP.UL851.TABOV.UN858.TSU. UN858.RANUX.UN858.NOSPA.UL984.RU
0:52:51	N349 FP DAL160 H/A332/Q 1727 0476 JOBOX E0128 350 KJFK./.LINND..JOBOC.NATX.BEDRA.NATX.NERTU..RATKA.UN502.JSY.UN160.PIGOP.UL851.RESMI.UL612.MILPA.UM135.MOBLO.UM135.T OP..LIMC/0833 ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDGHIJPRWXYZ SRV SD ALA LIMJ OTH ++EET/KZBW0004 KZNY0007 LPPO0316 CZQX0341 EGGX0410 EGTT0559 REG/N861NW SEL/CJAK DAT/SV NAV/RNVA1D1E2 RNP10++
0:56:51	N364 FP AFR639 H/B772/Q 2523 0487 JOBOX E0132 350 KIAH./.ORF264033..JOBOC.NATX.4400N/04000W.NATX.4900N/02000W.NATX.BEDRA.NATX.NERTU..RATKA.UN521.NERLA.UN491.BASIK.U Z57.LATGO..LFPG ùADSB TCAS EQUIPPED* FLR I FLT S WAK H EQP SPRIJWYGXZ SRV SD ALA LFPO OTH ++DOF/101202 EET/KZNY0225 41N060W0338 050W0432 LPPO0528 CZQX0551 EGGX0621 020W0712 EISN0735 EGTT0808 LFRR0816 LFFF0844 REG/FGSPC SEL/GMDJ DAT/SV NAV/RNVA1D1E2 RNP10++
0:58:21	N369 FP DAL116 H/B763/Q 6007 0476 JOBOX E0133 310 KATL./.LACKS..JOBOC.NATX.BEDRA.NATX.NERTU..GAPLI.UN20.SAM.UM140.DVR.UL9.KONAN.UL607.MATUG.UZ112.POBIX.T180.AKIG O.T180.OSMAX.Z112

12/02/10	DATA SET THREE: SLATN
23:29:51	N067 FP AAL94 B752/Q 2611 0457 SLATX E0005 330 KJFK./.LINND..SLATN.NATY.BANAL.NATY.DIRMA..RIVRO.UM191.BARDI..LEMD/0600 FLR I FLT S WAK M EQP SXZJHGWRPY SRV S ALA LEVC OTH ++EET/SLATN0044 060W0123 050W0221 LPPO0319 030W0415 020W0505 LPPC0529 REG/N197AN SEL/CJKM DAT/V NAV/RNVA1D1E2++
23:44:21	N113 FP EIN6963 H/A332/Q 2102 0405 SLATX E0019 370 KIAD*./.LARGE..SLATN.NATY.BANAL.NATY.DIRMA..VIS..RIVRO.UM191.BARDI..LEMD/0603 ùAGCS EQUIPPED* FLR I FLT S WAK H EQP SGHPRXWYZ SRV S ALA LEVC OTH ++DOF/101202 RVR/075 EET/KZDC0023 KZNY0029 40N060W0148 41N050W0245 LPPO0344 43N030W0439 43N020W0529 LPPC0554 LECM0635 REG/EIDAA SEL/FLCS OPR/EIN NAV/RNP10 RALT/CYJT LPPR++
23:47:21	N124 FP DAL94 H/B763/Q 3071 0476 SLATX E0022 350 KJFK./.LINND..SLATN.NATY.DIRMA..VIS..RIVRO.UM191.DIPOL.UN870.KOTEX.UN870.PONEN.UW800.CASPE.CASPE1U.LEBL/0652 ùTCAS AGCS EQUIPPED NRP USA* FLR I FLT S WAK H EQP SDHIPRWXYZ SRV S ALA LEMD OTH ++EET/KZBW0004 KZNY0006 KZBW0011 KZNY0011 LPPO0315 LPPC0525 REG/N173DZ SEL/DFQS NAV/RNVA1D1E2 RNP10++
23:49:57	N134 FP COA40 H/B762/Q 4060 0475 SLATX E0025 330 KEWR./.LINND..SLATN.NATY.BANAL.NATY.DIRMA..RIVRO.UM191.DIPOL.UH100.CJN.UN733.VLC.UN733.MJV.UN851.MHN.UM603.ALG.UL5.VALMA..LIRF/0727 ùLECM FIR AT 4038N00652W AGCS O2.Y
0:04:51	N185 FP IBE6250 H/A346/Q 3353 M082 SLATX E0039 350 KJFK./.KENDA.N7A.SLATN.NATY.DIRMA..RIVRO.UM191.BARDI.BARD1A.LEMD/0630 FLR I FLT S WAK H EQP SDHIPRWXYZJG SRV SD ALA LEVC OTH ++DOF/101202 RVR/150 EET/40N060W0121 050W0216 LPPO0312 030W0406 020W0455 LPPC0519 LECM0559 REG/ECINO SEL/DQBS DAT/SV NAV/RNVA1D1E2 RNP10 RALT/CYJT LPLA LPPT++
0:18:51	N235 FP AWE720 H/A332/Q 6603 0477 SLATX E0054 370 KCLT./.LARGE..SLATN.NATY.BANAL.NATY.DIRMA..RIVRO.UM191.DIPOL.UN870.BCN.UN725.ORKUM.UM603.ALG.UL5.VALMA.VALM3A.LIRF ùETOPS 180MIN 1263NM RULE. RALTNS CYJT LPPT.* FLR I FLT S WAK H EQP SPHXWRYJZG SRV S ALA ++LFMN LIRN++ OTH ++EET/KZNY0051 LARGE0115 060W0206 050W0302 LPPO0358 030W0453 020W0543 LPPC0606 LECB0721 LIRR0806 REG/N279AY SEL/BPJS DAT/VS NAV/RNVA1D1E2 RNP10++
0:19:21	N244 FP AWE718 H/A333/Q 1542 0468 SLATN330051 E0050 350 KPHL./.LACKS..SLATN.NATY.BANAL.NATY.DIRMA..RIVRO.UM191.DIPOL.UN870.BCN.UN725.ORKUM.UM603.ALG.UL5.VALMA.VALM3A.LIRF/0807 ùETOPS 180MIN1 263NM RULE. RALTNS CYJT LPPT.* FLR I FLT S WAK H EQP SPHXWRYJZG SRV S ALA ++LFMN LIRN++ OTH ++EET/KZWY0053 060W0131 050W0227 LPPO0324 030W0418 020W0508 LPPC0532 LECB0646 LIRR0730 REG/N276AY SEL/BPHS DAT/VS NAV/RNVA1D1E2 RNP10++
0:21:21	N244 FP AWE718 H/A333/Q 1542 0468 SLATN330051 E0050 350 KPHL./.LACKS..SLATN.NATY.BANAL.NATY.DIRMA..RIVRO.UM191.DIPOL.UN870.BCN.UN725.ORKUM.UM603.ALG.UL5.VALMA.VALM3A.LIRF/0807 ùETOPS 180MIN1 263NM RULE. RALTNS CYJT LPPT.* FLR I FLT S WAK H EQP SPHXWRYJZG SRV S ALA ++LFMN LIRN++ OTH ++EET/KZWY0053 060W0131 050W0227 LPPO0324 030W0418 020W0508 LPPC0532 LECB0646 LIRR0730 REG/N276AY SEL/BPHS DAT/VS NAV/RNVA1D1E2 RNP10++
0:23:51	N254 FP IBE6166 H/A343/Q 1463 0468 SLATX E0059 350 KBOS./.ACK.J97.SLATN.NATY.DIRMA..RIVRO.UM191.BARDI.BARD1A.LEMD/0655 FLR I FLT S WAK H EQP SDHIPRWXYZJG SRV SD ALA LEVC OTH ++DOF/101202 RVR/150 EET/40N060W0116 050W0211 LPPO0309 030W0403 020W0453 LPPC0517 LECM0557 REG/ECIIH SEL/JQAE DAT/SV NAV/RNVA1D1E2 RNP10 RALT/CYJT LPLA LPPT++
0:24:51	N259 FP AWE740 H/A333/Q 3047 0468 SLATN330051 E0053 370 KPHL./.LACKS..SLATN.NATY.BANAL.NATY.DIRMA..RIVRO.UM191.BARDI.BARD1A.LEMD/0645 ùETOPS 180MIN 1263NM RULE. RALTNS CYJT LPPT.* FLR I FLT S WAK H EQP SPHXWRYJZG SRV S ALA LEBL OTH ++EET/KZWY0053 060W0131 050W0227 LPPO0324 030W0418 020W0508 LPPC0532 REG/N275AY SEL/BPHR DAT/VS NAV/RNVA1D1E2 RNP10++

Appendix C ATOP software version and adaption notes information

ATOP Release #:	**A190005s**
Adaptation Version:	**N_A190005S_VT_41559_RNP10_3030_RNP4_1010_0223_535.tar** **located: oiiflc1:/oiif/ADS_B_ITP/ADS-B_Benifit/ADAPT**
Procedure:	**Setsystime 00:00:00 – inject scenario**