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Agenda Item 4: Other business

NEW YORK WEST AIRSPACE HORIZONTAL SAFETY MONITORING REPORT - 2020

(Presented by NAARMO)

EXECUTIVE SUMMARY

This paper provides the horizontal safety monitoring report for the continued-safe use of the reduced lateral and longitudinal separation minima in New York West Airspace. The safety assessment is conducted according to the methodology endorsed by the International Civil Aviation Organization (ICAO). This work makes use of reported Large Lateral Deviations (LLDs) and Large Longitudinal Errors (LLEs) and Traffic Sample Data (TSD) for calendar year 2020. Overall, there is a decrease in the number of reported LLDs/LLEs for calendar year 2020 compared to 2019; this result was expected due to the COVID-19 pandemic and associated reduction in air travel.

There were forty reported occurrences from calendar year 2020 reviewed. Twelve of these occurrences were determined to be risk-bearing LLDs/LLEs. This report contains a high-level summary of the reported events and evaluates the application of reduced horizontal separation minima.

Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• Reported occurrences from calendar year 2020 • 2020 Traffic Sample Data • ICAO Doc 9689 Manual on Airspace Planning Methodology for the Determination of Separation Minima • ICAO Doc 9869 Performance-based Communication & Surveillance (PBCS) Manual • ICAO Doc 10063 Manual on Monitoring Application of Performance-based Horizontal Separation Minima

1. Introduction

1.1 The North American Approvals Registry and Monitoring Organization (NAARMO), a service provided by the U.S. Federal Aviation Administration at the William J. Hughes Technical Center (WJHTC), fulfills the role of Regional Monitoring Agency (RMA) for the Miami Oceanic, New York West, and San Juan airspace. In addition to the vertical safety monitoring, the NAARMO conducts airspace analyses studies to support the introduction and ongoing use of reduced horizontal separation minima in oceanic airspace.

1.2 In June 2008, a significant restructure of the airways within the New York West airspace was implemented in an effort to increase capacity and efficiency. The fixed route system residing in New York West airspace is referred to as the Western Atlantic Route System (WATRS). With the reorganization of the route system, the 50-NM lateral separation standard was introduced. The WJHTC conducted the safety assessment for the implementation of the 50-NM lateral separation standard in WATRS airspace.

1.3 In December 2013, the 50-NM longitudinal, 30-NM lateral, and 30-NM longitudinal separation minima were introduced in New York West airspace. The reduced horizontal separation minima are available for suitably equipped aircraft pairs. The application of the reduced horizontal separation standards is accomplished ad hoc between pairs of eligible aircraft; this means that the application of the separation minima is not planned prior to oceanic entry. The WJHTC conducted the pre-implementation safety assessment and the post-implementation monitoring activities for these reduced horizontal separation standards in the New York West FIR.

1.4 While data link equipage has not been mandated in New York oceanic airspace (KZWY), in March 2018, the Performance-Based Communication and Surveillance (PBCS) requirements and monitoring were implemented in New York West airspace. PBCS involves globally coordinated and accepted specifications for Required Surveillance Performance (RSP) and Required Communication Performance (RCP). Beginning 29 March 2018, the PBCS specifications for RCP 240 and RSP 180 and Required Navigation Performance (RNP) 4 specification were required for the application of reduced horizontal separation minima.

2 Discussion

2.1 The flight operations within the New York Oceanic Control Area (OCA) West are comprised of two distinct traffic flows. The two main traffic flows are East-West (North Atlantic (NAT) routes) and North-South (North America (NAM)-Caribbean (CAR) routes).

2.2 The source of traffic data for New York OCA West is the FAA Advanced Technologies and Oceanic Procedures (ATOP) oceanic automation system Data Reduction and Archives (DR&A). These data contain all the reported aircraft positions, as well as the pilot-ATC High Frequency (HF) radio communications and controller pilot data link communications (CPDLC) messages. **Figure 2-1** shows the archived reported positions within New York OCA West for 10 December 2020. Position reports received via Automatic Dependent Surveillance - Contract (ADS-C) are contained in the DR&A archives.

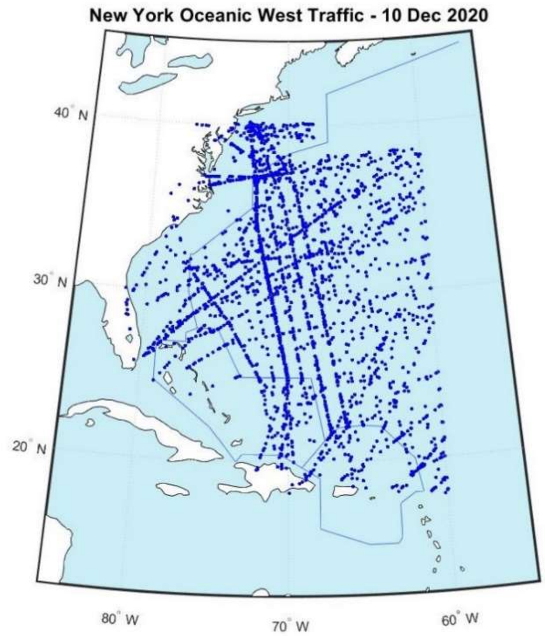

Figure 2-1. Aircraft/Pilot Reported Positions within New York OCA West - 10 December 2020

2.2.1 **Figure 2-2** shows the number of flight operations per month for the New York West FIR for calendar year 2020. The vertical bars represent the total number of flight operations observed each month during calendar year 2020. The average number of flight operations per day varies by month due to the COVID-19 pandemic and the associated reduction in air travel during 2020. In January 2020, the average number of flight operations per day was more than 700 in the New York West FIR. In April 2020, the average number of flight operations per day was less than 60 flight operations.

2.2.2 In normal times, seasonal variations in traffic volume are expected. Typically, the high traffic period for New York West airspace begins in November and ends in April/May. Figure 2-2 shows that by the end of calendar year 2020, traffic levels are increasing; in December 2020, the average number of flight operations per day reached 400 flight operations.

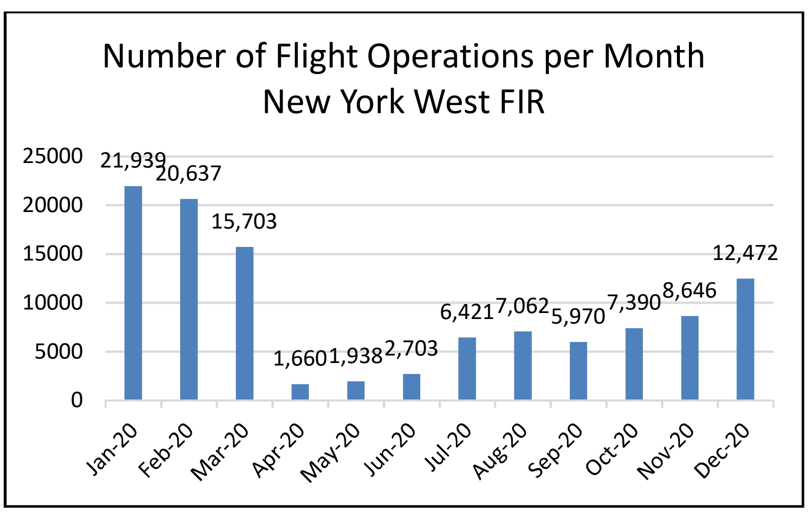

Figure 2-2. New York West FIR, Number of flight operations per month – calendar year 2020

2.3 **Appendix A** contains the most current data link performance analysis summary conducted for New York OCA West.

2.4 Event Scrutiny Methodology

2.5 The lateral Collision Risk Model (CRM) methodology is analogous to, and aligns with, the vertical operational risk model, in that it explicitly accounts for the risk due to the number of tracks or routes crossed without clearance, and the risk due to time spent on the incorrect track or route. To employ this methodology, it is necessary to assess the number of tracks or routes crossed without clearance and the time spent on the incorrect track or route for each reported LLD.

2.6 Due to the variety of possible lateral separation standards available to aircraft operations in New York OCA West, the magnitude of the deviation along with the aircraft capabilities are used to determine the number of tracks crossed and time spent on the incorrect track.

2.7 In 2020, the possible lateral separation standards varied depending on the filed Performance-Based Navigation (PBN), Performance-Based Communication (PBC), and Performance-Based Surveillance (PBS) status of the aircraft. **Table 2-1** summarizes the possible reduced horizontal separation standards available for aircraft operations within New York OCA West in 2020.

Table 2-1. Horizontal Separation Standards Available in New York OCA West – 2020

Lateral/ Longitudinal	Separation Standard	Minimum PBN	Minimum PBC	Minimum PBS
Lateral	50 NM	RNP 10	-	-
Lateral	30 NM[1]	RNP 4	RCP 240	RSP 180
Longitudinal	10 minutes	-	-	-
Longitudinal	50 NM	RNP 10	RCP 240	RSP 180
Longitudinal	30 NM	RNP 4	RCP 240	RSP 180

2.8 During the scrutiny of each reported event, the filed Communication, Navigation, and Surveillance (CNS) capabilities of the aircraft involved are recorded. This information is used to assess the associated risk impact for each LLD and LLE. For LLD events, the deviation magnitude from the cleared route is examined to determine whether a track crossed should be counted. **Table 2-2** shows the Lateral Infringement Distance (LID) used for LLD events to determine the number of tracks crossed. The Number of Tracks crossed, (NT), is determined from the deviation magnitude and the associated LID for the aircraft operation. The LID corresponds to the eligibility of the aircraft based on the filed flight plan not the separation standard applied at the time of the event.

2.9 The LIDs for the New York OCA West shown in Table 2-2 are calculated in the following manner:

- In preparation for the 23NM lateral separation minimum, the LID for aircraft operations eligible for 23NM lateral separation standard is 15NM = 23NM - 4NM [for RNP4] - 4NM [2 × SLOP to account for opposite direction traffic].

[1] The 23NM lateral separation minimum replaced the 30MM lateral separation minimum. The US FAA is planning to implement the 23NM lateral separation minimum in the near future.

- For aircraft operations eligible for 50NM lateral separation standard, the LID is 36NM = 50NM - 10NM [for RNP10] - 4NM [2 × SLOP to account for opposite direction traffic].

Table 2-2. Lateral Infringement Distances (LIDs) for LLD Events

Separation Standard for which the aircraft operation is eligible	Lateral Buffer (NM)
23NM	15
50NM	36

2.10 The methodology to determine the number of tracks/routes crossed and time spent on the incorrect track/route is similar to the methodology used to determine the number of flight levels crossed and time spent on incorrect flight level for the estimate of vertical risk. For example, a reported occurrence indicates an aircraft, which is eligible for the 23NM lateral separation minima, deviated 35NM. This case would result in time spent on the incorrect route and zero tracks crossed. This time would begin when the aircraft is estimated to have reached the 15NM lateral infringement distance, and ends when the deviation amount reaches its maximum or the end of the event.

2.11 Reported Large Lateral Deviations (LLD) and Large Longitudinal Errors (LLE)

2.12 The NAARMO utilizes the FAA's Comprehensive Electronic Data Analysis and Reporting (CEDAR) database, which is a collection of safety-related events reported from various internal FAA sources. There were forty reported occurrences for the airspace during calendar year 2020. The scrutiny group consists of operational experts from the New York air traffic control facility, representatives from FAA Flight Standards and Airspace Safety, and safety analyses experts from the NAARMO. The scrutiny group met virtually four times and reviewed all the reported occurrences from calendar year 2020. After scrutiny group review, twelve of these occurrences were determined to be risk-bearing LLDs/LLEs.

- There were two reported LLEs during calendar year 2020.
- There was one report of a prevented LLD, in this case a deviation was prevented by ATC action.
- There were three reported occurrences classified as mitigated and non-risk bearing because the expected communication failure procedures were correctly followed.

2.13 **Table 2-3** contains a summary of all the risk-bearing LLDs/LLEs by month. The third column of Table 2-3 shows the number of tracks crossed without clearance. The fourth column of Table 2-3 contains the sum of the at-risk time for reported LLD/LLE occurrences.

Table 2-3. Risk-bearing LLDs and LLEs - 2020

Date	LLD/LLE Count	LLD Tracks Crossed	LLD/LLE Duration (min)
Jan 2020	2	0	7
Feb 2020	5	0	7
Mar 2020	3	0	0
Apr 2020	0	0	0
May 2020	0	0	0
Jun 2020	0	0	0
Jul 2020	0	0	0

Date	LLD/LLE Count	LLD Tracks Crossed	LLD/LLE Duration (min)
Aug 2020	0	0	0
Sep 2020	0	0	0
Oct 2020	0	0	0
Nov 2020	1	0	0
Dec 2020	1	0	0
TOTAL	**12**	**0**	**14**

2.14 The scrutiny review determined a general cause for each of the 12 risk-bearing LLDs and LLEs. **Table 2-4** summarizes the reported occurrences by primary cause category.

Table 2-4. Risk-bearing LLDs/LLEs by Cause Category

Category Code	Category Description	Number of Occurrence Reports	LLD / LLE Duration (min)	Number Tracks Crossed
A	Flight crew deviate without ATC Clearance	1	4	0
B	Flight crew incorrect operation or interpretation of airborne equipment (e.g., flight plan followed rather than ATC clearance, original clearance followed instead of re-clearance etc.)	1	0	0
D	ATC system loop error	1	3	0
E	Coordination errors in the ATC-unit-to-ATC-unit transfer of control responsibility	3	7	0
J	Other	5	0	0
	TOTAL	**12**	**14**	**0**

2.15 Overall, there is a decrease in the number of reported LLDs/LLEs for calendar year 2020 compared to 2019; this result was expected due to the COVID-19 pandemic and associated reduction in air travel. In calendar year 2019, there were ten reported LLD occurrences involving flight crews deviating without ATC clearance, category A. During calendar year 2020, there was one reported LLD occurrence classified as category A.

2.16 There were three reported LLD/LLE occurrences in 2020 involving errors in ATC-unit to ATC-unit coordination, category E. In 2019, there were also three category E LLDs/LLEs. Two of the 2020 reports were LLDs and occurred at boundary crossings with surveillance resulting in zero at-risk time. The remaining reported category E report was an LLE that occurred over a boundary crossing without surveillance. In this case, the aircraft arrived at the airspace boundary seven minutes earlier than coordinated.

2.17 There are five reported occurrences classified as Other, category J. In these cases there were discrepancies between the ATC expected route and the route being flown by the air crew. The Filed Flight Plan (FPL) Monitoring Ad hoc Group, which reports to the AIDC/FPL Task Force in the CAR/SAM Region, is investigating these issues. In previous years, the NAARMO analysis classified these types of occurrences as category B or E. However, for the 2019 scrutiny review, the NAARMO analysis was informed of the progress of the Filed FPL Monitoring Ad hoc Group. To better observe trends in the various probable causes, a secondary category was created and assigned to each of these occurrences. Currently there are three possible causes for these occurrences.

- Reroute entered into the ATC system by a central Traffic Flow Management Departure unit, which modifies the routing of an original filed ICAO FPL with or without coordination with the AOC dispatch. There is no assurance that the amended routing is provided to the aircraft by the airport ATC clearance delivery.
- Multiple flight plans in the ATC system
- Operator dispatch/flight planner incorrectly issue amendment or change to existing flight plan.

2.18 **Figure 2-3** shows the probable causes assigned to each of the five category J occurrences by the scrutiny review group. Figure 2-3 also shows the comparison to the 2019 data. In 2019, four of the reported category J occurrences involved a departure unit reroute. In 2020, there were zero reported category J occurrences involving a departure unit reroute. In 2020, four of the reported category J occurrences were caused by the aircraft operator dispatch or flight planner. The Filed FPL Monitoring Ad hoc Group investigates reported occurrences that involve flight plan anomalies. The focus areas include flight plan formatting and refiling procedures. The FAA maintains a website that provides flight plan guidance to airspace users:

[https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/air_traffic_services/flight_plan_filing/]. There also is a monthly teleconference available for flight plan filing services to discuss flight planning filing issues and standards. The bottom of the website provides the contact information to attend the teleconference.

2.19 Flight plan filing is an important issue due to the dependencies on automated ATC system interfaces. Once errors are observed, the FAA automation experts can develop additional checks for the ATC system. The monthly teleconference provides guidance to the airspace users and provides an opportunity for ATC operations to update users on the observed issues. One of the objectives of the monthly teleconference is to reduce the number of observed errors.

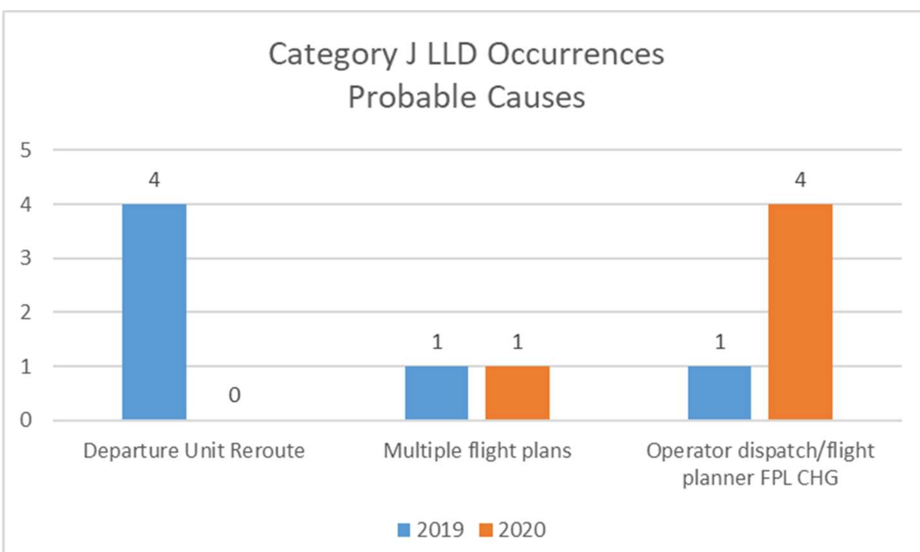

Figure 2-3. Category J Occurrences

2.20 **Figure 2-4** shows the locations of the risk-bearing LLDs/LLEs in 2020. The size of the circle is determined by the relative ratio of the associated duration at that location. There were ten LLD/LLE reports that had zero duration associated with the reported occurrence. Figure 2-4 includes these ten zero-duration reports, which are represented with the smallest circles.

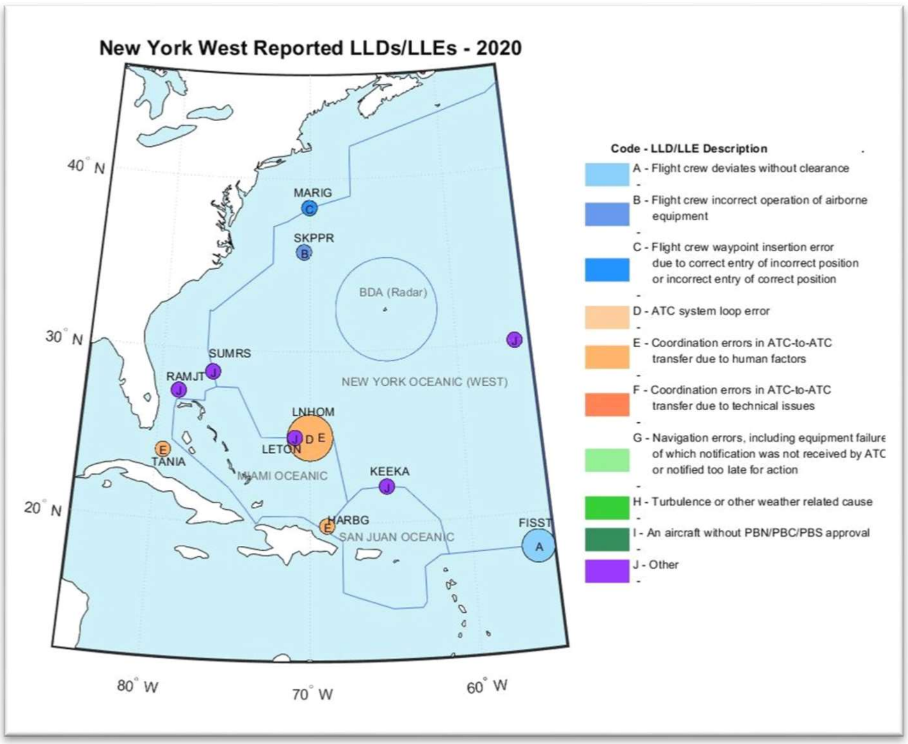

Figure 2-4. Locations of Risk-bearing LLDs/LLEs

2.21 The standard lateral separation in New York OCA West is 50NM; aircraft indicating RNP 10 in the filed flight plan are eligible for this separation, there is no PBCS requirement for the 50NM lateral separation standard.

2.22 The standard longitudinal separation is 10 minutes. The airspace is not exclusive with regard to airspace user satisfaction of horizontal-plane navigation standards as a requirement for airspace use and does allow for non-RNP 10 operations.

2.23 Eligible flight operations for the 23NM lateral separation standard must file RCP240, RSP180 and RNP4 in their flight plan. The proportion of RCP240, RSP180 and RNP4 operations in New York OCA West observed in December 2020 is 36 percent. This is an increase over the 30 percent observed for December 2019.

2.24 Lateral Collision Risk Estimation

2.25 This section of the paper provides the parameter estimates used in the ICAO lateral risk model. The collision risk methodology consists of a mathematical model to estimate risk for comparison to the safety criterion, the Target Level of Safety (TLS). The section also provides information on the sources of data used to estimate risk model parameters. Based on the December 2020 traffic data, the

NAARMO estimates approximately 170,094 annual flying hours for New York OCA West. This represents a 39 percent decrease in air traffic operations the same estimate for 2019. The COVID-19 pandemic and associated reduction in air traffic is a factor in the observed decrease in the estimated annual flying hours.

2.26 Aircraft Types Observed in New York OCA West

2.27 **Figure 2-5** provides the top 25 aircraft types observed in the December 2020 traffic data by flying hours. The aircraft types in Figure 2-5 account for more than 93 percent of total flying hours observed the airspace. The flying hours associated with the Airbus A320 family; including A319, A320, and A321, account for the most observed aircraft in the traffic sample at 32 percent. The Boeing 737 NGX; including the B737, B738, and B739 accounts for 16 percent of all flying hours observed in the traffic data.

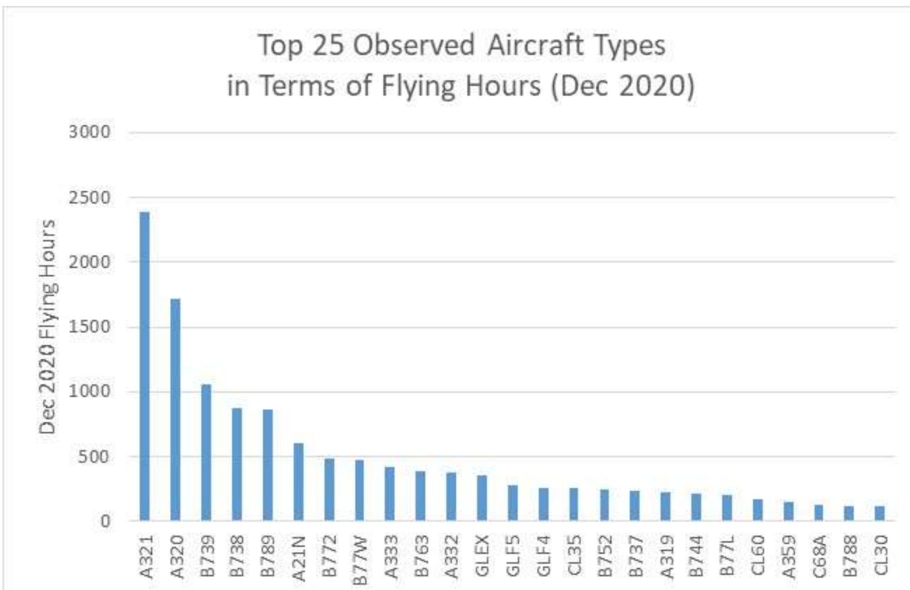

Figure 2-5. Observed Aircraft Types in Terms of Flying Hours in New York OCA West

2.28 Aircraft Size

2.29 The collision risk model parameters related to the aircraft size are: length, wingspan, and height. These parameters are estimated directly from the ATOP DR&A December 2020 data and related aircraft specifications. The weighted dimensions are calculated using the actual dimensions of the aircraft type multiplied by the proportion of total flying time observed for the type in the traffic sample. The resulting CRM parameters for the aircraft length, wingspan, and height are presented in **Table 2-5**.

Table 2-5. CRM Parameter Estimates for Aircraft Size

Airspace	Length λ_x (NM)	Wingspan λ_y (NM)	Height λ_z (NM)
New York West	0.0243 *(148 ft)*	0.0217 *(132 ft)*	0.0069 *(42 ft)*

2.30 Same-Direction and Opposite-Direction Lateral Occupancy

2.31 The traffic data are used to estimate the number of lateral aircraft pairs. A lateral aircraft pair is observed when two aircraft, operating on the same flight level and on laterally separated routes, have reported positions within 15 minutes. **Table 2-6** shows the same and opposite-direction lateral occupancy estimates for New York OCA West. Because most of the aircraft operations occur on fixed routes with a Flight Level Allocation Scheme (FLAS) in place, there were very few observed opposite-direction lateral aircraft pairs in the traffic data. The lateral separation used to determine the lateral occupancy values is 50NM.

Table 2-6. Same and Opposite direction lateral occupancy values

Airspace	Same Direction Lateral Occupancy Value	Opposite Direction Lateral Occupancy Value
New York OCA West	0.0561	0.0007

2.32 Probability of Vertical Overlap

2.33 The probability of vertical overlap accounts for contributions to vertical error arising from the effects of turbulence, loss of altitude hold and crew response to airborne collision avoidance system alerts as well as from errors in aircraft altimetry and altitude-keeping system performance.

2.34 Estimates of aircraft Altimetry System Error (ASE) are obtained from aircraft height monitoring processes developed by NAARMO. These processes require several data sets, including meteorological and aircraft geometric height data. Aircraft geometric data is obtained from either the U.S. Aircraft Geometric Height Measurement Element (AGHME), Automatic Dependent Surveillance - Broadcast (ADS-B) data, or the GPS Monitoring Unit (GMU) system. Control of aircraft ASE is one of the principal objectives of the State Reduced Vertical Separation Minimum (RVSM) approval process, which must be held by operators in airspace where the RVSM is applied.

2.35 The NAARMO estimate for the probability of vertical overlap for aircraft pairs operating on the same flight level, $P_z(0)$,used in the estimation of vertical operational risk is 0.42.

2.36 Time Spent on Unexpected/Incorrect Route

2.37 The proportion of flying time spent on unexpected/incorrect routes is determined as the ratio of the amount of time spent on unexpected/incorrect routes to the total amount of flying time in the airspace during the period when the incorrect route events occurred. The risk-bearing LLDs for calendar year 2020 contain four minutes of flying time spent on unexpected/incorrect routes. This is a decrease in the number of minutes spent on unexpected/incorrect routes compared to that reported for calendar year 2019. In calendar year 2019, there were forty-three minutes of flying time spent on unexpected routes.

2.38 The proportion of flying time spent on unexpected/incorrect routes is estimated using the reported LLD duration and dividing by the estimated flying hours. The estimated annual flying hours for New York OCA West obtained from the ATOP DR&A data are 170,094 hours. The resulting ratio of time spent on unexpected/incorrect routes is 3.9×10^{-7} for New York OCA West, this value is an order of magnitude lower than estimated for calendar year 2019.

2.39 Probability of Lateral Overlap

2.40 The probability of lateral overlap accounts for contributions to lateral error arising from navigation system performance. The probability that two aircraft operating on the same route and flight level are in lateral overlap, $P_y(0)$, is 0.1. This value is currently used in lateral risk estimates in the Asia and Pacific Region. This value is expected to increase with the use of Global Navigation Satellite System (GNSS) in aircraft navigation systems.

2.41 The probability that two aircraft operating on adjacent routes and the same flight level are in overlap, $P_y(S_y)$, is determined from the value of $P_y(0)$ and the risk-bearing LLDs. The lateral separation standard is represented by the term S_y. There are two estimates of $P_y(S_y)$, one for the time spent on unexpected/incorrect route and another for the number of unexpected/incorrect routes crossed. The $P_y(S_y)$ value for time spent on unexpected/incorrect routes is shown below.

$$P_y(S_y)_T = \frac{T_r}{F(NY)} \times P_y(0)$$

2.42 The total time spent on unexpected/incorrect routes during a calendar year is represented by the term T_r. The estimated annual flying hours for New York OCA West is given by $F(NY)$. The $P_y(S_y)$ value for the number of unexpected/incorrect routes crossed is shown below.

$$P_y(S_y)_X = \frac{N_r}{F(NY)} \times \frac{2\lambda_y}{\overline{|\dot{y}_r|}}$$

2.43 The number of routes unexpected/incorrect routes crossed is represented by the term N_r. The term $\overline{|\dot{y}_r|}$ represents the lateral closer rate of aircraft crossing through an unexpected/incorrect route.

2.44 Collision Risk Model Parameters

2.45 The individual parameters of the models, their definitions, estimates, and sources are given in **Table 2-7**.

Table 2-7. Lateral Collision Risk Model Parameter Estimates

Term	Definition	Estimate	Source
$P_z(0)$	Probability that two aircraft operating on the same flight level are in vertical overlap	0.42	Value used in the vertical risk estimates for Pacific airspace
$P_y(S_y)_T$ *for time spent on unexpected / incorrect route*	Probability that two aircraft assigned to laterally adjacent tracks lose all planned lateral separation and are in lateral overlap due to time spent on unexpected/incorrect route.	0.39×10^{-7}	Estimated from traffic data, and risk-bearing LLDs (4 minutes spent on unexpected / incorrect route
$P_y(S_y)_X$ *for unexpected / incorrect routes crossed*	Probability that two aircraft assigned to laterally adjacent tracks lose all planned lateral separation and are in lateral overlap due unexpected / incorrect routes crossed.	0	Estimated from traffic data, and risk-bearing LLDs (zero unexpected / incorrect routes crossed)

Term	Definition	Estimate	Source
$P_y(0)$	Probability that two aircraft on the same track are in lateral overlap	0.1	Value used in the vertical risk estimates for Pacific airspace
λ_x	Average aircraft length.	0.0243 NM	Estimated from New York West OCA traffic data
λ_y	Average aircraft wingspan.	0.0217 NM	Estimated from New York West OCA raffic data
λ_z	Average aircraft height with undercarriage retracted.	0.0069 NM	Estimated from New York West OCA traffic data
$E_y(same)$	Same-direction lateral occupancy for a pair of aircraft on same flight level on adjacent routes.	0.0561	Estimated from New York West OCA traffic data
$E_y(opp)$	Opposite-direction lateral occupancy for a pair of aircraft on same flight level on adjacent routes.	0.0007	Estimated from New York West OCA traffic data
$\overline{\lvert\Delta V\rvert}$	Average absolute relative along-track speed between aircraft on same-direction routes.	13 knots	Value used in the North Atlantic, Pacific, and US Domestic airspace lateral risk estimates
$\overline{\lvert V\rvert}$	Average absolute aircraft ground speed.	480 knots	Value used in the North Atlantic, Pacific, and US Domestic airspace lateral risk estimates
$\overline{\lvert\dot{y}\rvert}$	Average absolute relative cross-track speed for an aircraft pair assigned to adjacent routes as the y lose all planned lateral separation, S_y.	5 knots	Value used in the North Atlantic, Pacific, and US Domestic airspace lateral risk estimates
$\overline{\lvert\dot{y}_r\rvert}$	Average lateral closure rate of aircraft crossing through an unexpected/incorrect route	80 knots	Value used in the NAT lateral risk estimates
$\lvert\overline{\dot{z}}\rvert$	Average absolute relative vertical speed of an aircraft pair assigned to the same flight level which are in vertical overlap	1.5 knots	Value used in the North Atlantic, Pacific, and US Domestic airspace lateral risk estimates
$F(NY)$	Estimated flying hours within New York West FIR	170,094	Estimated from FAA ATOP DR&A for New York West OCA

2.46 Results and Conclusions

2.47 The reported risk-bearing LLDs within New York OCA West are applied to the estimated flying hours and lateral occupancy values for New York OCA West. There was zero incorrect routes crossed and 4 minutes spent on an unexpected/incorrect route. The lateral risk estimate is 0.14×10^{-9} fatal accidents per flight hour (fapfh). This estimate meets the overall safety goal of 5.0×10^{-9} fapfh.

2.48 NAARMO is developing a process to examine the application of reduced longitudinal separation using the archived ATOP DR&A data. This work is being accomplish along with the development of longitudinal monitoring through the ICAO Separation and Airspace Safety Panel (SASP). The COVID-19 situation has affected the progress of this work. The NAARMO expects to provide information on this method to the next GTE meeting.

Appendix A

Data Link Performance Summary
New York FIR OCA
June - December 2020

A.1. A summary of the data link performance monitoring for the New York FIR is contained in **Figure A-1**. The percentage of aircraft operations using Future Air Navigation System (FANS)-1/A data link in the New York West OCA is 56 percent. The percentage of aircraft operations filing RNP4, RCP240 and RSP180 in the New York West OCA is 36 percent in December 2020.

Monitoring period	Jun – Aug 2020	Jul – Sep 2020	Aug – Oct 2020	Sep – Nov 2020	Oct – Dec 2020
Total aircraft observed using data link	1,476	1,724	1,879	2,128	2,409
Have 100 or more ADS-C downlink reports and/or CPDLC transactions	650	757	844	950	1092
Observed below 95% for RSP180 and/or RCP240	23	21	23	35	38
Filed P2/RSP180	16	14	16	25	24
# Aircraft reported to NAARMO (OCA-West)	4	1	5	3	6
# Aircraft reported to NAT CMA (OCA-East)	0	1	2	0	2

Figure A-1. Data Link Usage Observed in the New York FIRs - June through December 2020

A.2. The data link performance observed by media type is provided in **Figure A-2**. The RSP 180 and RCP 240 criteria are used to determine whether the requirements are met for the airspace. These data show the aggregate performance using all the appropriate data link transactions collected during the period. There were 33,607 flight operations using data link during the period. The criteria are found in ICAO Doc 9869, Performance-based Communication and Surveillance (PBCS) Manual, Second Edition, 2017. The green colors indicate the specified performance criteria have been met. The red colors indicate the specified performance criteria have not been met. In the table, "ASP" stands for "Actual Surveillance Performance", "ACP" refers to "Actual Communication Performance", and "ACTP" refers to "Actual Communication Technical Performance".

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%
Performance Criteria		**RSP 180**			**RCP 240**			
Aggregate	1,019,366	98.8%	99.7%	60,300	99.7%	99.8%	99.4%	99.6%
SAT	733,204	98.7%	99.6%	42,949	99.7%	99.8%	99.4%	99.7%
VHF	285,334	99.4%	99.8%	14,500	99.9%	100.0%	99.6%	99.7%
HF	801	54.8%	67.9%	23	60.9%	65.2%	65.2%	65.2%

SAT-VHF		2,043	99.1%	99.3%	97.9%	98.5%
VHF-SAT		726	97.3%	99.0%	98.1%	98.9%
SAT-HF		8	87.5%	87.5%	87.5%	87.5%
HF-SAT		37	97.3%	97.3%	97.3%	97.3%
VHF-HF		2	100.0%	100.0%	100.0%	100.0%
HF-VHF		12	83.3%	91.7%	91.7%	91.7%

Figure A-2. Aggregate Data Link Performance Observed in New York FIR - July - December 2020

— END —