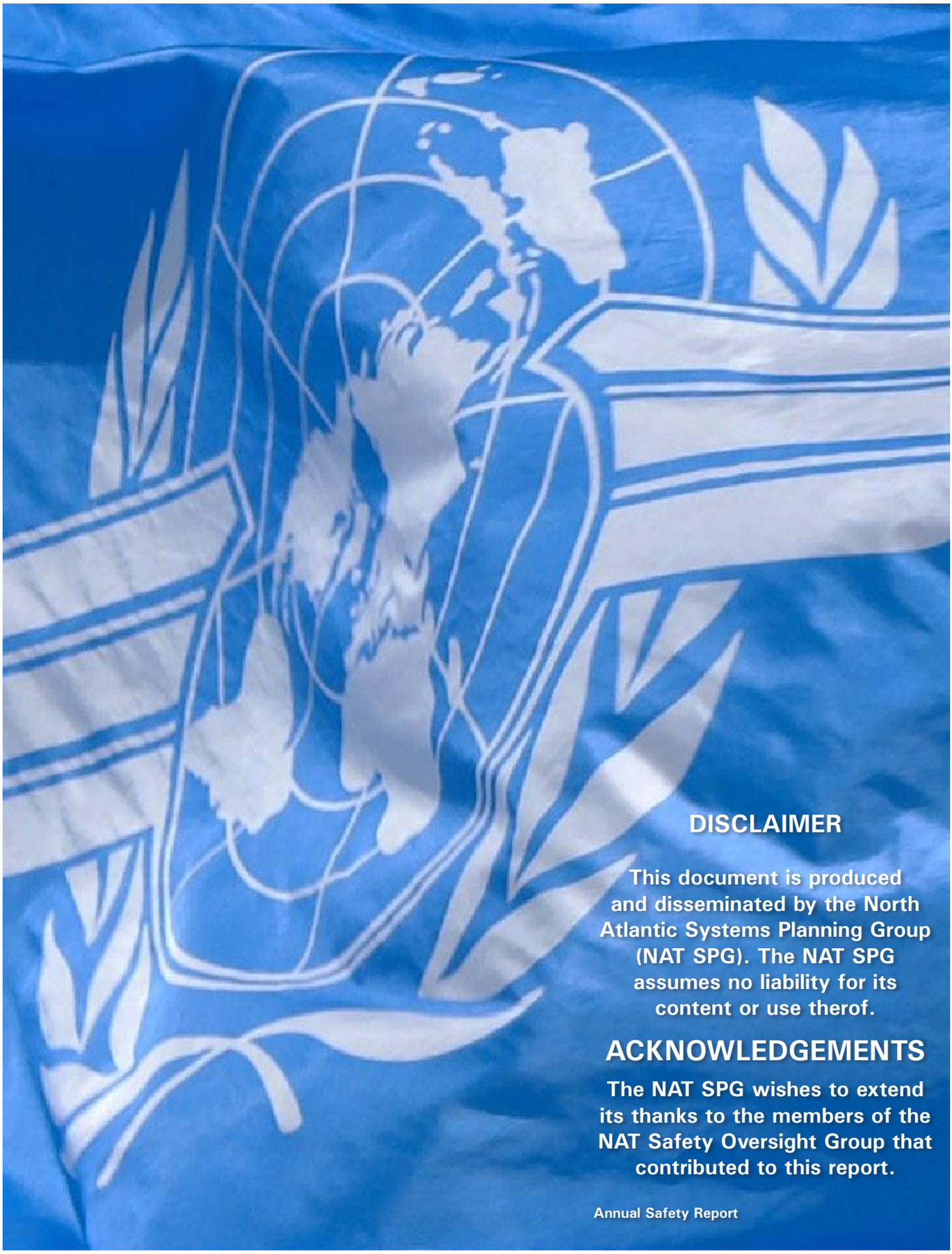
ICAO

SAFETY

North Atlantic Region

2015 Annual Safety Report

June 2016



DISCLAIMER

ACKNOWLEDGEMENTS

The NAT SPG wishes to extend its thanks to the members of the NAT Safety Oversight Group that contributed to this report.

Annual Safety Report

Contents

Executive Summary

The North Atlantic Region's third annual safety report is issued by ICAO's North Atlantic (NAT) Systems Planning Group (NAT SPG). As stipulated in its terms of reference, the NAT SPG shall continuously study, monitor and evaluate the air navigation system in the NAT Region in light of changing traffic characteristics, technological advances and updated traffic forecasts. This report is based on data from January to December 2015 and provides basic information on the Region, its safety principles, and its risks. The report also describes some of the NAT SPG's collaborative safety management efforts.

The management of safety in the NAT Region is partly conducted by the use of safety Key Performance Indicators (KPIs) that have been developed and established by the NAT SPG. The NAT SPG has agreed on targets for eleven safety KPIs. For the year 2015, targets were met for 2 of 2 KPIs and the Region continues on track to meet an additional two targets in 2018 (see Table 3 for more detailed information).

Alignment with the Global Aviation Safety Plan (GASP) is an important part of regional safety management. For the NAT Region, the required alignment is underway, and the Region considers itself to have met the near-term objective of the GASP and is working toward the mid-term and long-term objectives.

In 2015, the Region adopted a tiered approach to safety planning, which endeavors to ensure that:

- the safety indicators are sufficient for analyzing safety performance in the NAT;
- the KPIs are used to inform the NAT SPG of trends;
- the establishment of project teams to identify potential mitigations to reverse adverse trends are encouraged;
- the effectiveness of any mitigations taken are reviewed; and
- the trends, the status of any initiatives or mitigations recommended and adopted, and the effectiveness of any the mitigations taken, are reported to the NAT SPG.

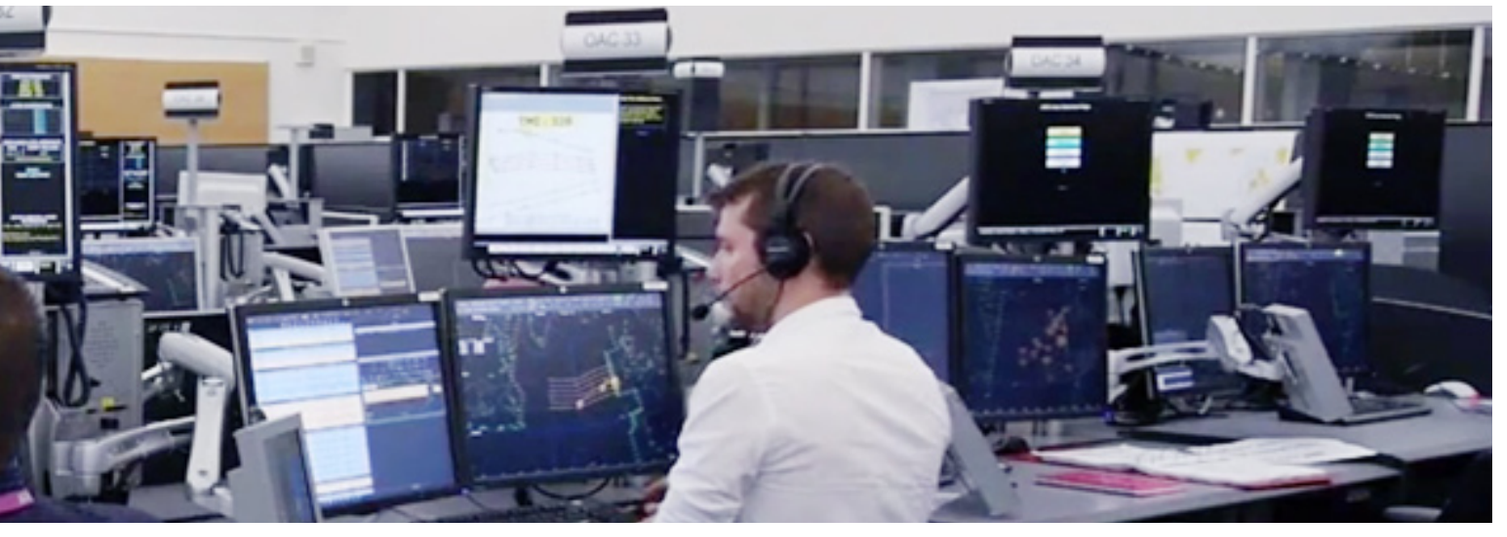
The North Atlantic Scenario

The airspace of the North Atlantic, which links Europe and North America, is the busiest oceanic airspace in the world. The NAT Economic, Financial, and Forecast Group (NAT EFFG) estimates that in 2015, approximately 717,000 flights crossed the North Atlantic. The NAT EFFG expects traffic in this Region to grow at a rate of 3.6 percent over the next 5 years, as shown in Table 1 below.

	ACTUAL	FORECAST							
Scenario	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2025**	**2030**	**2035**
Pessimistic							946	1,043	1,150
Baseline	717	749	765	789	816	858	994	1,153	1,337
Optimistic							1,079	1,358	1,709

***Table 1**. Forecasts of aircraft movements in the ICAO NAT Region (thousands)*

Traffic mainly flows in a broadly East-West orientation in a twice daily pattern, whose timing reflects the needs of passengers in North America and Europe, and where a daily organized track system takes account of airspace users' needs and weather patterns. This core traffic operates for a large part without radar surveillance and increasingly with the use of Automatic Dependent Surveillance-Contract (ADS-C) and Automatic Dependent Surveillance-Broadcast (ADS-B). Communication is to a large extent based on High Frequency radio but increasingly on satellite based data link. This makes any comparison with the domestic airspace of North America and Europe difficult. NAT core traffic flow is almost exclusively jet transport aircraft that operate in the upper airspace in the en-route phase of flight. This leads to air traffic management and operation that is fundamentally different in concept to typical domestic operations, with a greater focus on strategic rather than tactical techniques.



NAT SPG Working Structure

The ICAO structure for the North Atlantic is governed by the NAT SPG, which was established in 1965 by the Council of ICAO. The NAT Region joins Canada, Denmark, France, Iceland, Ireland, Norway, Portugal, UK, and the USA, which are responsible for providing air navigation service and oversight, thereof, in the NAT Region. Denmark, Iceland, Norway, Portugal and the UK have sovereign airspace within the region. Within the NAT SPG structure, States, along with other stakeholders, work together with the joint goal of safe aircraft operations.

All of the NAT service provider States support the NAT SPG's safety management activities by contributing certain occurrence data to the Central Monitoring Agency (NAT CMA), which is the Regional Monitoring Agency for the NAT region. This information is analyzed by the NAT Scrutiny Group (NAT SG) and the NAT Mathematicians Working Group (NAT MWG), both subgroups of the NAT Safety Oversight Group (NAT SOG). The substance of this annual safety report is derived from the work of these groups and bodies.

Periodically, the ICAO Secretariat for the NAT Region and member States review its organizational structure and look to optimize it. In 2014, the NAT SPG reaffirmed the current structure at the highest levels, but consolidated subgroups under the Implementation Management Group (IMG). The new organizational structure diagram of the IMG is illustrated in Figure 1 below.

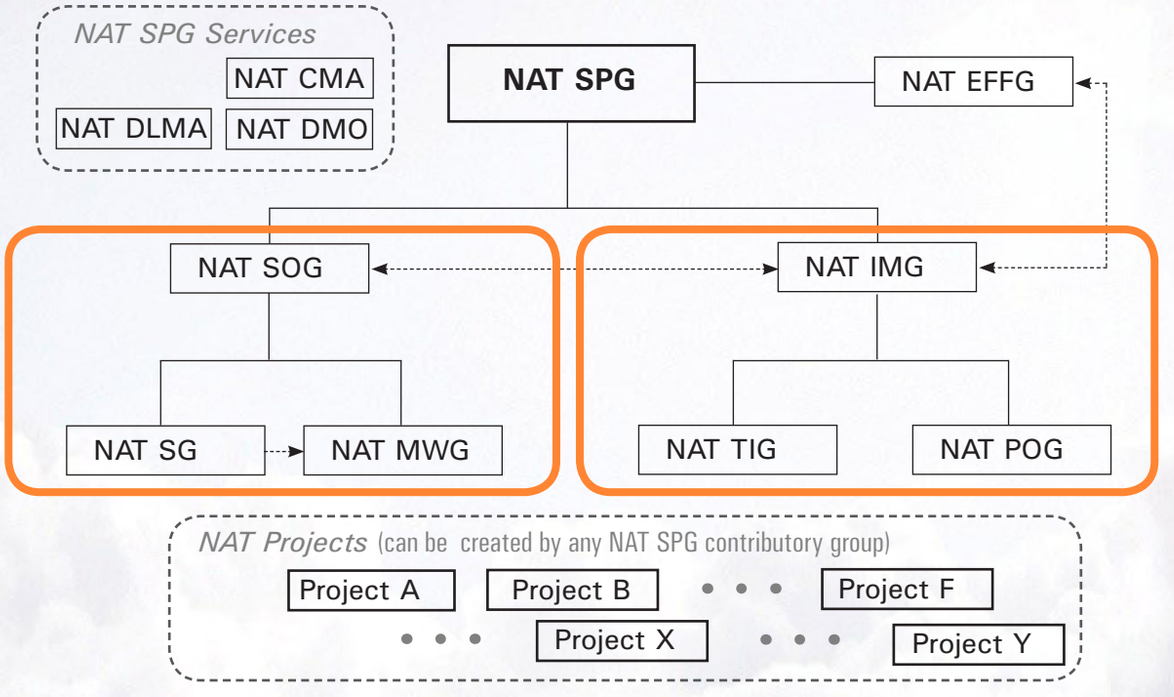


***Figure 1**: NAT SPG Working Structure*

The North Atlantic Economic and Financial Group was renamed the NAT EFFG. The NAT SOG subgroups remained intact with a minor adjustment for the NAT MWG. Calendar year 2015 saw the smooth transition to this new structure and the Region is expected to reap its benefits in 2016.

Safety Policy

Safety is one of the NAT SPG's core business functions. The NAT SPG is committed to developing, implementing, maintaining and constantly improving strategies and processes to ensure that all our aviation activities take place under a balanced allocation of organizational resources. The NAT SPG will aim to achieve the highest level of safety performance and meet regional safety objectives in line with national and international standards, the GASP, and the Global Air Navigation Plan.

Objective

The objective of the NAT SPG member States is to maintain and, where possible, improve the agreed safety standards in all activities supporting the provision of air navigation services in the North Atlantic Region:

- All involved States are accountable for the delivery of the agreed level of safety performance in the provision of air navigation services in the North Atlantic Region.
- All involved States are accountable for the delivery of the agreed level of safety performance in aircraft operations in the North Atlantic Region.
- Safety in the NAT Region is managed through the organization and activities of the relevant implementation and oversight groups established by the NAT SPG, in coordination with the non-member States and observers, to achieve its Safety Objective.

Guiding Principles

The NAT SPG will act to:

- Clearly define all accountabilities and responsibilities for the delivery of safety performance with respect to the provision of air navigation services and participation in the NAT SPG and its contributory bodies;
- Support the safety management activities that will result in an organizational culture that fosters safe practices, encourages effective safety reporting and communication, and actively manages safety within the NAT Region;
- Share safety related data, knowledge and expertise with concerned stakeholders;
- Disseminate safety information and NAT operating requirements to stakeholders;
- Establish and implement hazard identification and risk management processes in order to eliminate or mitigate the safety risks associated with air navigation services supporting aircraft operations in the North Atlantic Region;
- Establish and measure NAT Region safety performance against agreed safety standards; and
- Continually improve our safety performance through safety management processes.

Safety Performance

Table 2 below lists the most common event types reported in the NAT High Level Airspace (HLA)[1].

2015 Reported Events		Primary error(s) as defined by the NAT SG
Vertical Large Height Deviations (LHDs)	**100**	Climb/descent without Air Traffic Control (ATC) clearance (**31**)
		ATC failure to correctly record, coordinate or follow through on FL changes and/or other clearances (**28**)
		Aircrew not maintaining level as cleared (**20**)
Lateral deviation < 25 Nautical Mile (NM)	**88**	Crew error (**50**)*
		Incorrect transcription of ATC clearance or re-clearance into the FMS (**25**)*
		Wrong information faithfully transcribed into the FMS (**17**)*
		Weather (**9**)**
		Other (**9**)**
		Crew error (**8**)**
ATC Interventions *and* Preventions to prevent a Gross Navigation Error (GNE)	**137**	

***Table 2**. Most common errors within the NAT HLA*
** - identified by ATC*
*** - identified by operators*

[1] Formerly Minimum Navigation Performance Specification (MNPS) airspace

Note that ATC interventions and preventions are positive indicators that the ATC system has recognized error, often through data link equipage capabilities, warning the controllers in sufficient time to take preemptive action. ATC Interventions are events where the Air Traffic Controller (ATCO) caught and corrected a lateral deviation before it developed into a GNE. An ATC Prevention is an event where the ATCO intervened to prevent a lateral deviation. Underlying causes of all lateral deviations (incipient or actual) are often identical – the magnitude depends upon the timeliness of identification and corrective action.

The NAT SPG has established eleven Safety KPIs and corresponding targets for the ICAO NAT Region. Targets are reviewed annually by the NAT SOG. The NAT Region's performance in 2015 against the KPIs and targets is shown in Table 3 below.

Safety performance in the vertical and lateral dimensions is evaluated according to the estimated collision risk, which is calculated in units of fatal accidents per flight hour (FAPFH) x 10^{-9} and compared to the Target Level of Safety (TLS) of 5 x 10^{-9}.

Safety KPI			Target	2012 Value	2013 Value	2014 Value	2015 Value
i	Number of hull loss events		0	0	0	0	0
ii	Number of Airborne Collision Avoidance System (ACAS) Resolution Advisory (RA) events		Target not set	1	1	1	1
iii	Number of LHD events involving data link equipped aircraft		1) Not exceeding 85 events per year by 2018 (total LHDs)	42[2]	54	69	73
iv	Number of LHD events involving non data link equipped aircraft		2) Eliminate LD LHD events by end of 2018 (total LHDs)	51	51	32[3]	26
v	Number of minutes that data link equipped aircraft spent at the wrong flight level		Target not set	490[4]	153	288	116
vi	Number of minutes that non data link equipped aircraft spent at the wrong flight level		Target not set	251	69	315[5]	144
vii	Performance in the vertical dimension against the vertical TLS		5 x 10^{-9}fapfh	16.8 x 10^{-9} fapfh[6]	11.5 x 10^{-9} fapfh[7]	15.9 x 10^{-9} fapfh[8]	16.4x10^{-9} fapfh[8]
viii	Number of GNE events involving data link equipped aircraft	GNEs ≥ 25 NM	Target not set	6	4	8	6
		GNEs ≥ 10 NM < 25 NM	Target not set	9	8	18	23
		Total GNEs DL a/c	Target not set	15	12	26	29
ix	Number of GNE events involving non data link equipped aircraft	GNEs ≥ 25 NM	Target not set	22	12	23	4
		GNEs ≥ 10 NM < 25 NM	Target not set	12	16	24	1
		Total GNEs non DL a/c	Target not set	45	28	47	5
x	Performance in the lateral dimension against the lateral TLS		20 x 10^{-9} fapfh	0.0 x 10^{-9} fapfh	0.2 x 10^{-9} fapfh	0.0 x 10^{-9} fapfh	0.0 x 10^{-9} fapfh
xi	Number of losses of separation		Target not set	44	32	42	46

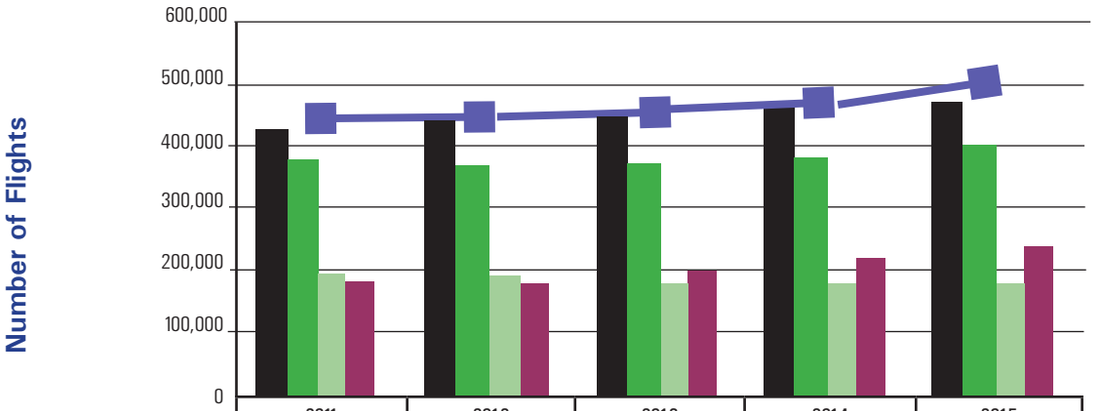
***Table 3**. NAT Safety KPIs*

Note: Over the period 2010-2015 there was a significant increase of datalink equipped aircraft and corresponding decrease of non-equipped aircraft that may account to the changes in numbers of events.

[2] Note: Not routinely reported. May be estimated from supporting event data but inconsistently available.
[3] For this number "data link equipped" is to be read as "equipped and using datalink for communication".
[4] Includes 3 very long duration events (total 383 minutes) where aircraft were CPDLC/ADS-equipped but not logged on.
[5] Includes one very long duration event (127 minutes)
[6] Fatal accidents per flight hour
[7] Incorporating the effect of the Strategic Lateral Offset Procedure (SLOP)
[8] Incorporating the effect of SLOP

Risk Estimates

Estimates of lateral and vertical occupancies were made for the calendar year 2015 as part of the annual analysis of lateral and vertical collision risk in the NAT Region and can be found in Table 4 below.

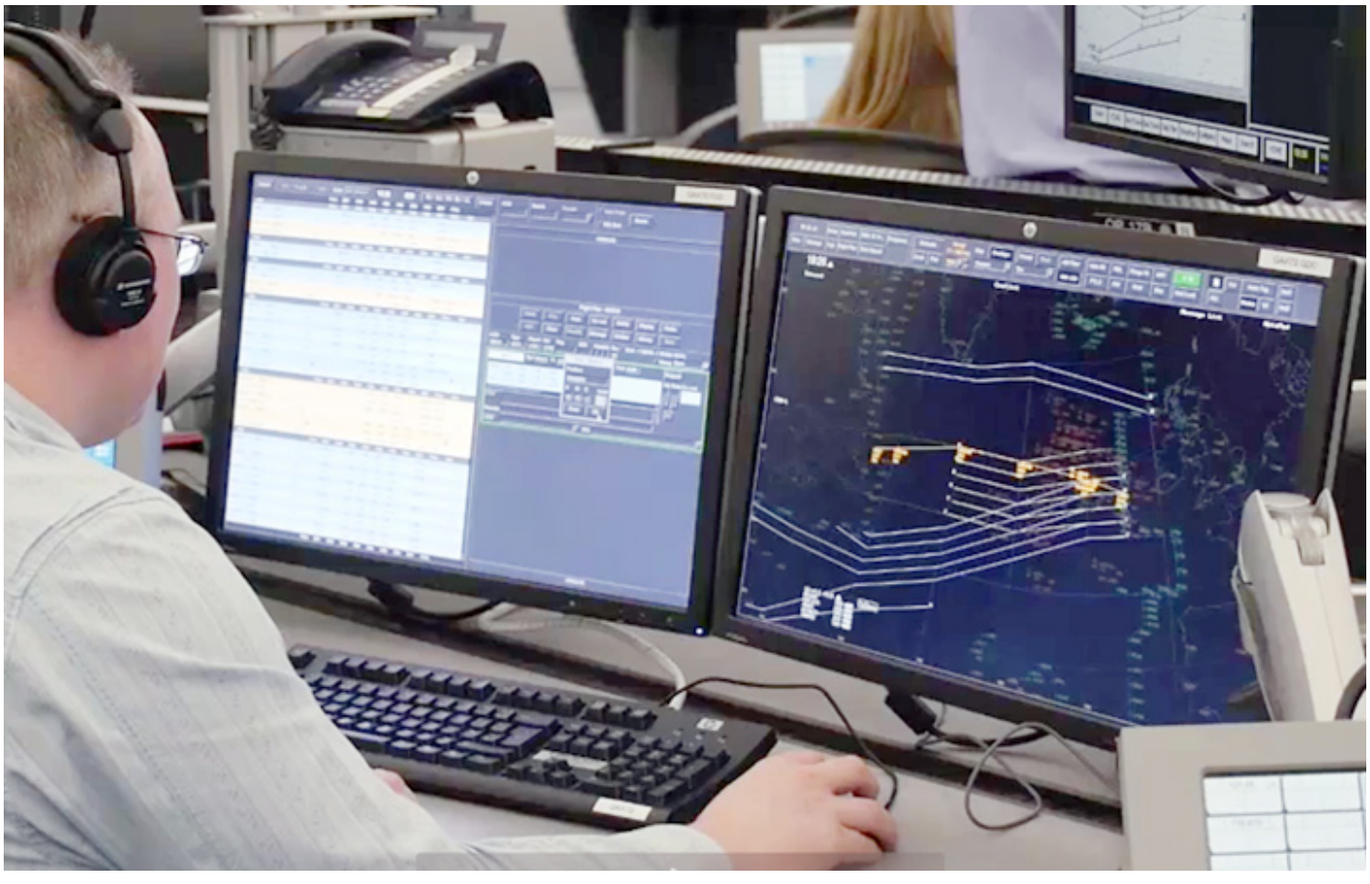


	2011	2012	2013	2014	2015
FL Sample inM NPS	434,674	439,547	444,111	461,675	477,191
FL at MonWin	377,628	366,223	366,570	384,292	396,372
OTS FL at MonWin	194,858	196,924	167,925	171,501	161,044
Ran Fl at MonWin	182,770	179,299	198,645	212,791	235,328
Es tAIINAT FL	444,700	449,700	456,000	474,240	489,890

***Table 3**. Traffic Numbers Used in Lateral and Vertical Risk Estimates*

Vertical Risk

Reduced Vertical Separation Minimum (RVSM) Vertical Operational Collision Risk Estimates in Table 5 and Figure 2 below are put in historical context. The Strategic Lateral Offset Procedure (SLOP), a mitigation that was put in place and has been tracked since 2007, has been very effective in curbing the upward trajectory of vertical risk in the Region. However, in 2015, the Vertical Operational Collision Risk Estimate increased slightly over the 2014 estimate. In this regard, it should be noted that a single, unusual event in 2014 involving an aircraft that did not follow the filed flight plan and did not communicate with air traffic control increased the risk estimate. Removing this event from the estimate reduces the resulting 2014 estimate to below the 2013 number and therefore represents a more significant increase in 2015.



Year	OTS	Random	Combined	Including SLOP
2015	12.6	110.3	77.4	16.4
2014	25.4	101.9	68.3	15.9
2013	24.2	62.4	48.0	11.5
2012	13.9	147.0	91.4	16.8
2011	69.0	100.2	86.2	23.9
2010	34.2	102.3	71.4	23.3
2009	15.0	100.9	61.6	27.2
2008	5.7	97.2	51.2	24.9
2007	5.9	75.6	41.1	23.8

Table 5. *RVSM Vertical Operational Collision Risk Estimates*
(FAPFH x 10^{-9}; operational risk plus technical risk is compared to the TLS = 5 x 10^{-9})

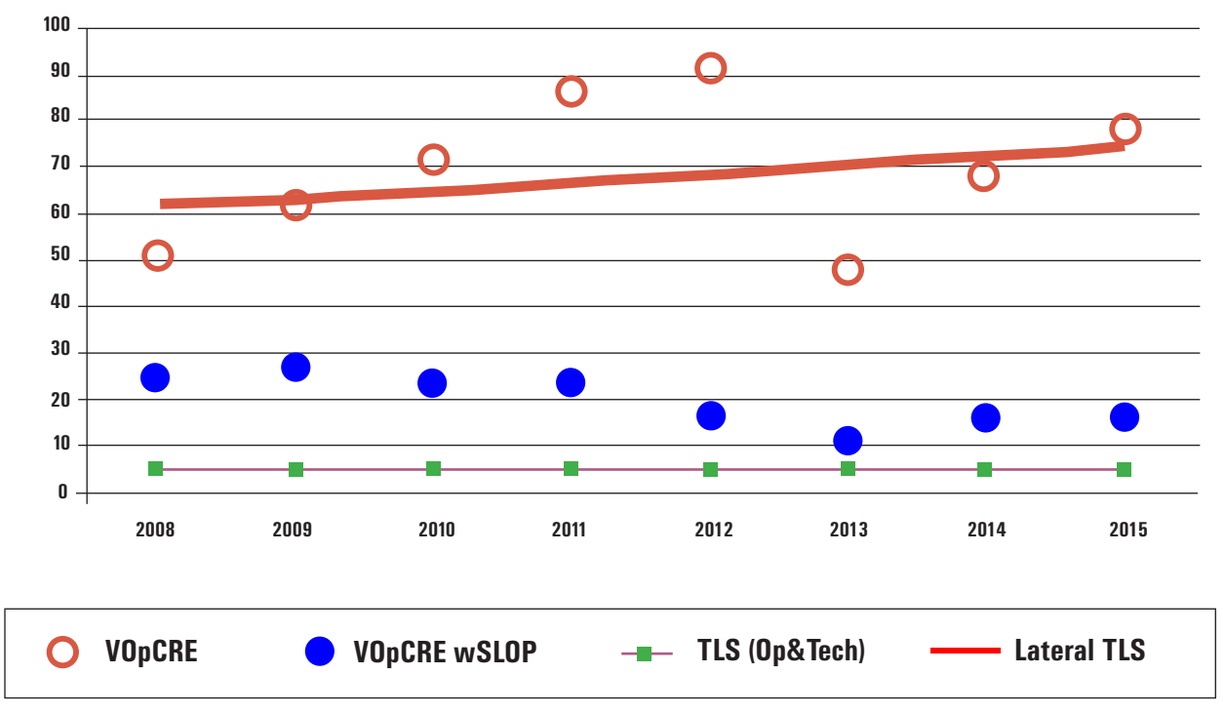


Figure 2. *RVSM Vertical Operational Collision Risk Estimates*

By combining the flight activity for three OCA „zones" – North (Reykjavik), Middle (Gander and Shanwick combined) and South (New York East and Santa Maria combined) the additional flight data resulted in the overall vertical risk estimate for NAT HLA to be 11.4 x 10-9 fapfh. This estimate takes into account the observed use of SLOP and is 30% lower than the risk estimated for 2015 based on current method using Gander and Shanwick flight data only.

Large Height Deviations

The NAT SPG has targeted vertical risk specifically for the last several years through an emphasis on reducing LHD events. At its 49th meeting in 2013, the NAT SPG agreed to a NAT Vertical Risk Reduction Implementation Plan and established targets for vertical risk. The NAT SPG Conclusion 49/16 – Target levels for the vertical risk, was as follows:

That:

a) long duration (LD) LHDs in the vertical dimension are defined as those events which are 10 minutes or more;

b) the definition of LD LHD be reviewed annually in order to maintain improvement in reduction to LHDs;

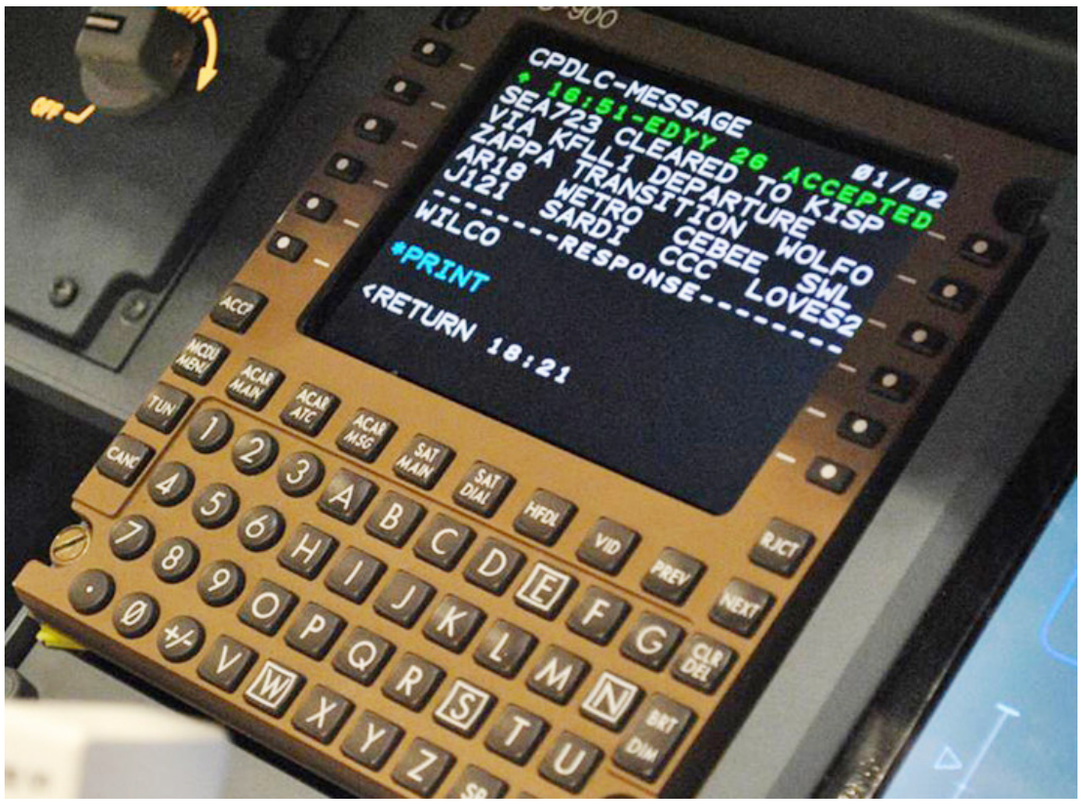
c) a target is to reduce the number of LHDs in the NAT RVSM airspace over a three year rolling average;

d) a target is to reach a total number of LHD events within the NAT RVSM airspace by 2018 not exceeding 85 per year;

e) a target is to reduce the total number of minutes associated with the three longest LHDs within the NAT RVSM airspace;

f) a target is to eliminate the number of LD LHD events within the NAT RVSM airspace by the end of 2018; and

g) the NAT SOG request trend-specific action when any adverse trend develops.



In 2015, there were 100 LHDs events at RVSM levels and 120 in the entire NAT airspace, which includes the HLA (shown in brackets in the text and in Table 6 below). Although this is an increase in comparison to 2014, these numbers are well within the 2015 target of 107 (135). Based on the three year rolling average (2013-2015), the Region is on target for meeting the 2018 goal.

LHD Data		2010	2011	2012	2013	2014	2015	2015 Target	2018 (Long Term Target)
# of EVENTS	# of LHDs Within RVSM (within entire NAT)	115 (138)	88 (107)	128 (163)	102 (128)	92 (116)	100 (120)	107 (135)	85
	# of LD LHDs (10mins +) within RVSM	13	14	15	3	5	6	–	0
	# of LHDs (< 10mins) within RVSM	102	74	113	99	87	94	–	–
TIME	# of LHD minutes within RVSM	621	707	718	217	266	260	–	–
	# of LD LHD (10mins +) within RVSM	409	582	564	42	171	170	20	0

Table 6. *LHD Summary Report*

In 2015, the number of LHD events involving data link equipped aircraft increased slightly in comparison to 2014; however, the 2015 number remains below the 2018 target of 85 as shown in Table 3 above. The number of LHD events involving non data link equipped aircraft continues to decrease, indicating a positive trend toward 2018 targets.

An LHD that results in a loss of separation is considered to be risk bearing. Collision Risk Estimates include only risk bearing LHDs in NAT HLA. In Figure 3 below, this "risk bearing" factor is compared to all LHDs in HLA in historical context. It is also compared to the number of LHDs attributed to aircrew and ATC errors.

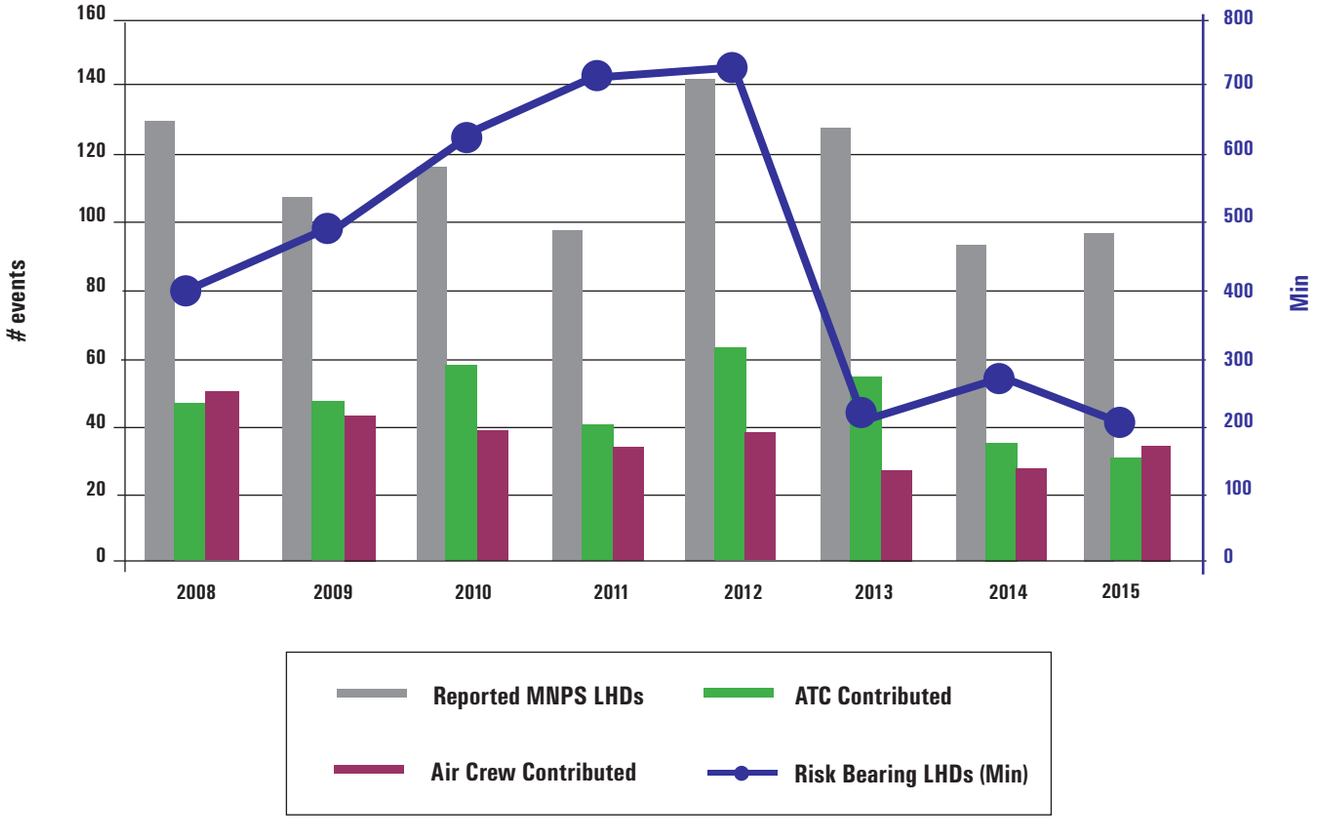


Figure 3[9]. 2015 Number of LHD Events

As previously noted, the RVSM Vertical Operational Collision Risk Estimate in 2015 has increased in comparison to 2014, which can potentially be attributed to the increased number of LHD events in 2015. However, as shown in **Figure 3** and **Table 6** above, the number of minutes that both equipped and non-equipped aircraft spent at the wrong flight level decreased substantially from 2014.

[9] MNPS airspace is now HLA

Lateral Risk

Lateral risk estimates are produced by combining the observed risk-bearing weighted GNEs with traffic numbers, both actual (for parts of the NAT airspace) and estimated. As shown in Table 3 above, total GNE events decreased slightly among data link equipped aircraft and more substantially among non-equipped aircraft. Table 7 below shows a lateral risk estimate in units of FAPFH that has decreased to zero from the 2014 estimate and remains well below the TLS of 20 x 10-9.

Year	OTS	Random	All HLA
2015	0	0	0
2014	0	0	0
2013	0	0.4	0.2
2012	0	0	0
2011	0	1.2	0.7
2010	0	0.3	0.2
2009	0	0	0
2008	0	0	0
2007	0	0.7	0.4
2006	1.2	0.6	0.9

Table 7. *Lateral Risk Estimates*

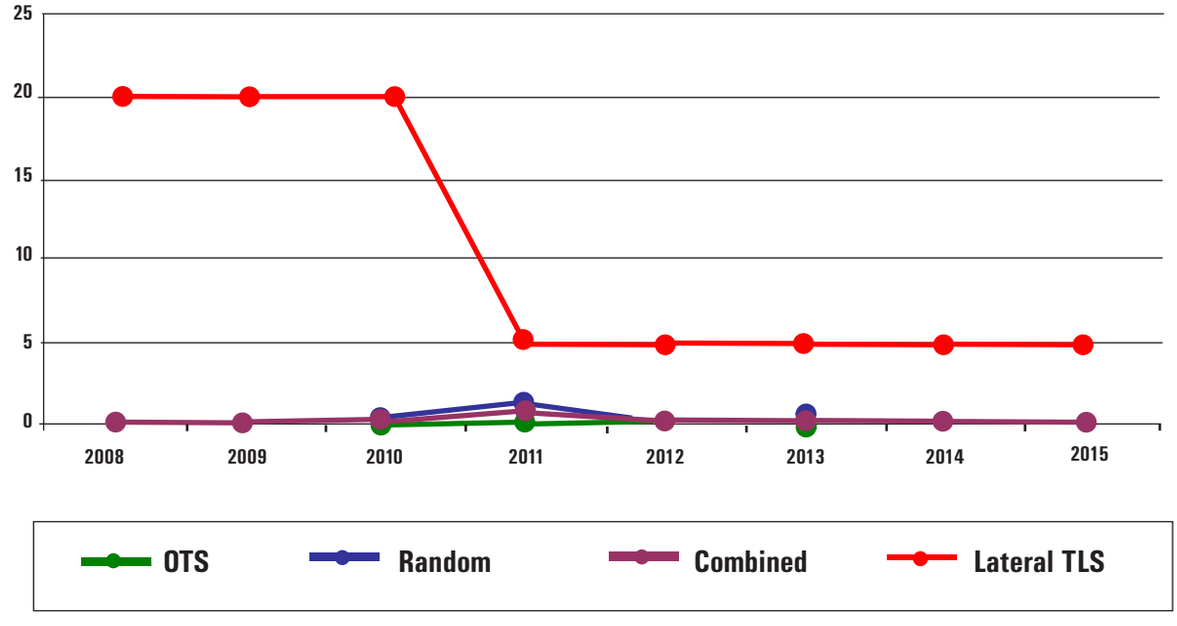


Figure 4. *NAT Lateral Risk Estimates*

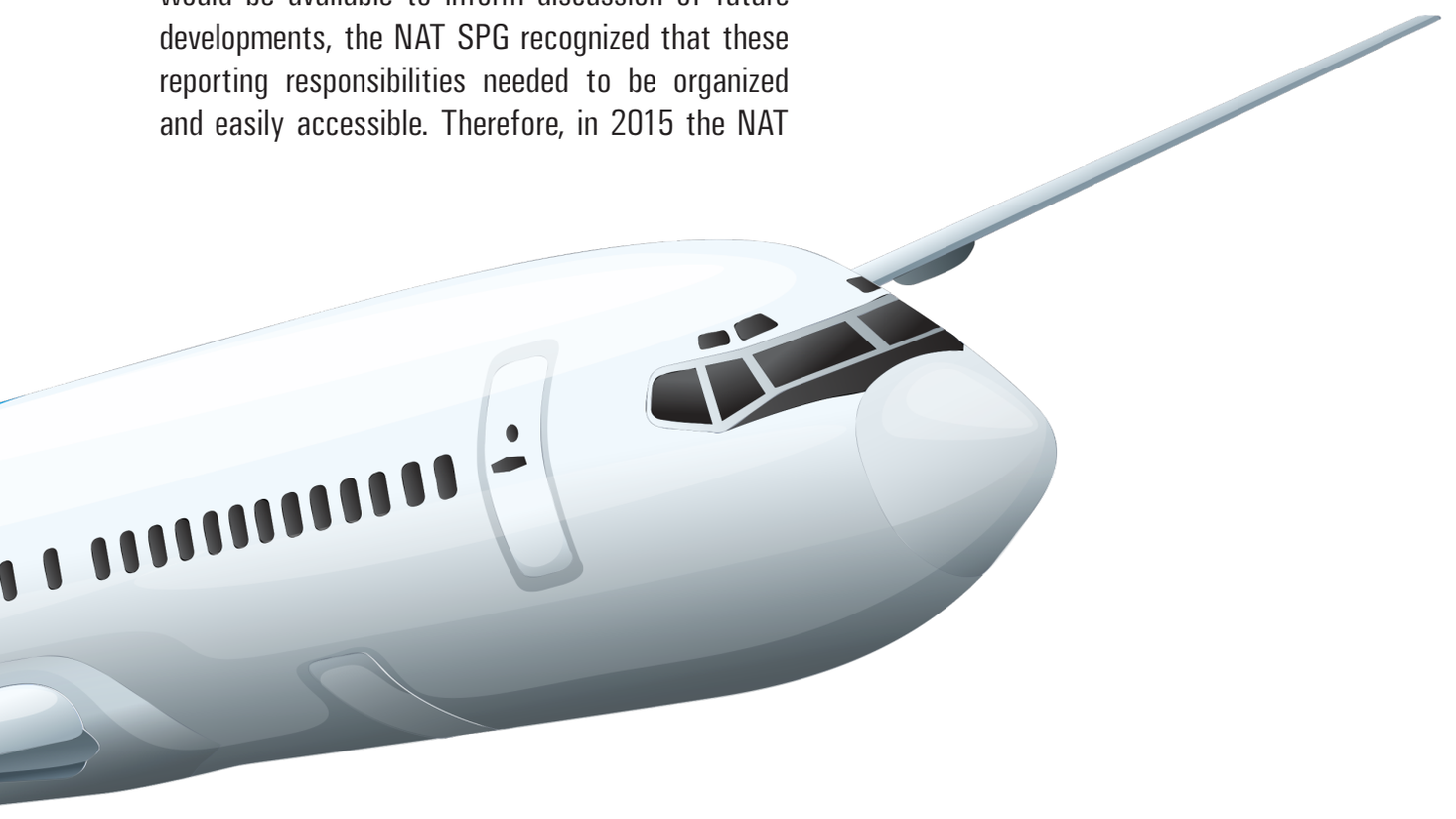

CHIME
POWER
RESET
VOL ON
VSCS
CONSOLE
PCP
1844 58
R59
ZMA FREQS
R1 125.32 270.32 (PBI)
R2 118.825 348.70 (MLB)
R17 128.65 343.75 (MIA)
R18 135.07 379.25 (MLB)
R19 123.675 (BMF)
R21 133.40 263.1 (PBI)
R21 LOW 132.95 (ZFP)
R21 132.25 MID (VRB)
R40 126.325 257.20 (MIA)
R43 123.775 256.8 (GTK)
R44 134.20 363.05 (ZFP)
R58 124.525 251.12 (FK7)
125.1 263.0 (GTK)
R60 127.225 239.02 (FK7)
R61 125.70 307.90 (ZQA)
R62 132.30 307.20 (GTK)
R63 135.20 327.00 (GTK)
ADJACENT FAC'S
JAX 134.85
MDSD 124.30
MKJK 128.10
MTPP 124.50
MUCU 119.40
MUGM 126.20 263.6
TJSJ 135.70 134.30 269.00
APCH FREQS
ZFP 126.50 269.40
ZQA 121.00 327.00 125.30
MBPV 126.00
TOWERS
GTK 118.60
MBPV 119.90
MBSC 118.90
MDPP 118.00
ZFP 118.50
ZQA 119.50 257.80
MUGM 134.1 RADAR
MUHA 123.70
TJSJ
APCH FREQS
ZFP 126.50 269.40
ZQA 121.00 327.00 125.30
ZFP MBPV 126.00
TOWERS
GTK 118.60
MYEF 118.0
MBPV 119.90
MBSC 118.90
MDPP 118.00
ZFP 118.50
ZQA 119.50 257.80
ZQA ATIS 118.70
BAHAMAS UNICOM 122.80
IFSS
MIA 118.40 314.10 (GTK/ZQA)
126.90 272.70 (ZFP)
122.00 FLT WATCH
ZFP 122.30
ZQA 124.30 rec only(ZMH)
128.00 (ZQA)
SJU 126.075 128.7
255.40

Alignment with the Global Aviation Safety Plan

The 2014-2016 GASP sets out a continuous improvement strategy for States and Regions to implement over the next 15 years through the establishment of core, and then more advanced, aviation safety systems. The target dates and the broad objectives are set out below:

Target Date	Broad Objective
(a) Near-Term (by 2017)	Implementation of an effective safety oversight system
(b) Mid-Term (by 2022)	Full implementation of the ICAO State safety program framework
(c) Long-Term (by 2027)	Advanced safety oversight system including predictive risk management.

The NAT reporting requirements have gradually expanded to meet the needs of system risk assessment, understanding of operational errors, and informing the safety assessments involved with reductions in separation. Formal reporting requirements have been introduced through the Conclusions of the NAT SPG. In order to ensure that the necessary data would be available to inform discussion of future developments, the NAT SPG recognized that these reporting responsibilities needed to be organized and easily accessible. Therefore, in 2015 the NAT SPG developed and endorsed the NAT Consolidated Reporting Responsibilities Handbook (NAT Doc 010). This document compiles relevant reporting requirements and guidance previously agreed to by the member States that make up the NAT SPG as outlined in the conclusions from its first meeting in 1965 through its 51st meeting in June 2015.



All NAT provider States have met the near-term objective of the GASP and are working toward the mid-term and long-term objectives, particularly in the areas of proactively managing risks through the identification and control of existing or emerging safety issues. All of the NAT member States contribute experts to the NAT SPG, or one or more of its various subgroups, and so support the overall management of safety in the Region. The Region has a safety policy (refer to page 5 of this report) which is enhanced by the agreement of member States to use the information shared at NAT SOG meetings for the purposes of education and for making safety improvements within the Region. This has paved the way for members to discuss and share information and act upon it within the framework of the NAT SPG.

The NAT SPG assigned the task of reviewing the current safety KPIs and proposing new safety KPIs and targets to the NAT SOG. This is an on-going task for the NAT SOG which the group revisits at each of its meetings. The NAT CMA, which is the Regional Monitoring Agency for the NAT region, collects NAT event data and uses it along with the NAT SG and the NAT MWG to assess safety performance within the Region.

NAT Regional Priorities

A number of ANS initiatives are on-going in the NAT Region. In line with the safety policy and as stipulated in the terms of reference and the work structure of the NAT SPG, it is imperative that acceptable safety arguments are provided in relation to system developments in the NAT Region. The agreed policy is as stated above, to maintain and where possible improve the agreed safety standards in all activities. In this regard, the safety work that provides confidence that upcoming initiatives do not negatively affect the safety of the ICAO NAT Region, is ongoing. Such work is being undertaken by the NAT Regional subgroups on a number of significant initiatives that will take place in the ICAO NAT Region in 2016, including:

a) Reduced Lateral Separation Minima between FANS equipped aircraft (RLatSM) Trials (Phase 1);

b) The NAT Data Link Mandate (DLM) implementation (Phase 2A); and

c) The implementation of Performance Based Communication and Surveillance (PBCS) for applications of reduced separations.

Following are short summaries of the projects, stipulating how the NAT States will collaboratively ensure or have ensured (depending on the status of the project) the safe implementation and application on a regional level.

Reduced Lateral Separation Minima between FANS equipped aircraft (RLatSM)

An operational trial of RLatSM is based on suitably equipped aircraft assigned half degree track spacing making position reports via ADS-C and equipped with CPDLC. The goal of RLatSM is to decrease fuel cost to airlines by providing the opportunity for more optimal flight profiles within the NAT and without negative impact on collision risk.

The RLatSM Phase 1 trial commenced November 12, 2015 in the Gander and Shanwick Oceanic Control Areas. NAV CANADA, overseen by Transport Canada, led the project in conjunction with United Kingdom's NATS. RLatSM Phase 2 implementation is expected to begin in fall 2016. Dates have not yet been determined for Phase 3. Iceland's Isavia is planned to participate in the trial commencing in Phase 2.

Data link Mandate (DLM) for the NAT Region

The DLM for the NAT Region expanded to the entire Organized Track System (OTS) between FL 350 and FL 390. Data link performance in the NAT is monitored by the former NAT Communications, Navigation and Surveillance Group (NAT CNSG), now the Technology and Interoperability Group (TIG), using regular reports from the NAT Data Link Monitoring Agency (NAT DLMA) and NAT ANSPs. Data link performance information indicates a steadily increasing proportion of data link operations in the NAT Region, with an equipage rate as high as 85% in 2015[10]. The rates of usage and filing of equipage are observed to be greater within the OTS. While inconsistencies between data link capabilities filed in the flight plan and actual usage have continued to be observed, the International Air Transport Association and the International Business Aviation Council are working with their members to avoid future inconsistencies.

The NAT SPG continues to promote the use of SLOP and is monitoring its positive effect on system performance against the TLS in the vertical dimension.

Performance Based Communication and Surveillance (PBCS)

In 2015, the NAT Region hosted a workshop to facilitate the roll out of the new ICAO standards requiring PBCS in the application of reduced separations. The new standards will be applicable in November 2016. The workshop covered amendments to Annexes 4, 6, 11, 15, PANS-ATM, and new manuals related to new separation standards, PBCS, Global Operational Data Link Document (GOLD), Satellite Voice Operations Manual (SVOM) and Performance-Based Horizontal Separation Minima (PBHSM).

[10] According to data from the NAT Deviations and Error Monitoring Application, presented in NAT IMG/48 – WP/18

A Look Ahead

The NAT SPG is laying the groundwork towards enabling a seamless approach to deploying 15 NM separation throughout the NAT Region. As such, the NAT SPG is planning to coordinate through the working structure all required procedures, analyses, and planning documents related to Air Traffic Service (ATS) surveillance-enabled services using space-based Automatic Dependent Surveillance –Broadcast (SB ADS-B) planned for February 2018. The ANSPs providing services in the Gander and Shanwick OCAs, NAV CANADA and NATS, have begun coordinating on a common implementation strategy. Some of the prospective features for SB ADS-B include:

a) flights would continue to be planned and cleared on conflict free flight profiles from oceanic entry to exit between the Gander and Shanwick OCAs;

b) 15 NM ATS surveillance-enabled longitudinal separation between a pair of ADS-B equipped aircraft would be applied if both flights have active CPDLC connections with the appropriate ATS unit(s);

c) the application of 15 NM ATS surveillance-

enabled separation could be used to permit one ADS-B equipped aircraft to climb or descend to or through the level of another ADS-B equipped aircraft;

d) 15 NM ATS surveillance separation could be applied between same direction aircraft only while they were operating on the same exact track;

e) 15 NM ATS surveillance separation could be applied between opposite direction ADS-B equipped aircraft provided that they have both passed a common point.

f) ADS-B and CPDLC equipped aircraft pairs planning to operate on the same NAT OTS track could be planned into oceanic airspace with 15 NM longitudinal spacing; and

g) the application of 15 NM ATS surveillance separation could be tactically initiated between ADS-B equipped aircraft pairs operating on the same exact non-NAT OTS track.

Conclusion

The NAT Region continues to make progress toward achieving its safety targets, although LHDs and vertical risk continue to be of specific concern. At the same time, the Region also continues to conduct the safety analyses and operational trials necessary to introduce new technologies and procedures intended to increase the efficiency of the busy oceanic airspace.

Appendix A

Abbreviations

ACAS	Airborne Collision Avoidance System
ADS-B	Automatic Dependent Surveillance - Broadcast
ADS-C	Automatic Dependent Surveillance - Contract
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
DLM	Data Link Mandate
FAPFH	Fatal Accidents per Flight Hour
FL	Flight level
GASP	Global Aviation Safety Plan
GNE	Gross Navigation Error
HF	High Frequency
HLA	High Level Airspace
ICAO	International Civil Aviation Organization
KPI	Key Performance Indicator
LD LHD	Long Duration LHD
LHD	Large Height Deviation
NAT	North Atlantic
NAT CMA	North Atlantic Central Monitoring Agency
NAT EFFG	North Atlantic Economic, Financial, and Forecast Group
NAT MWG	North Atlantic Mathematicians Working Group
NAT SG	North Atlantic Scrutiny Group
NAT SOG	North Atlantic Safety Oversight Group
NAT SPG	North Atlantic Systems Planning Group
RMA	Regional Monitoring Agency
RA	Resolution Advisory (per ACAS/TCAS)
RVSM	Reduced Vertical Separation Minimum
SLOP	Strategic Lateral Offset Procedure
TLS	Target Level of Safety

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