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**CAR/SAM Planning and Implementation Regional Group (GREPECAS) Twenty Third Scrutiny  
Working Group Meeting  
(GTE/23)**

Lima, Peru, 11 to 15 September 2023

**Agenda Item 5: Other Business**

**NAARMO TRAFFIC COMPLIANCE**

(Presented by NAARMO)

**EXECUTIVE SUMMARY**

This information paper provides an assessment of operations without an approval record on file using the Reduced Vertical Separation Minimum (RVSM) airspace overseen by the North American Approvals Registry and Monitoring Organization (NAARMO) within the North American airspace as well as New York West portions of the NAARMO-delegated oceanic airspace. The monthly assessment process is described and the results for period September 2022 – June 2023 are presented for the contiguous United States (CONUS), and from September 2022 – May 2023 for New York West (NYWest). Results for Canada and Mexico traffic samples were assessed for December 2022. NAARMO approvals records up to July 2023 were used in this assessment.

*Strategic Objectives:*

- Safety

*References:*

- *ICAO Doc 9937 - Operating Procedures and Practices for Regional Monitoring Agencies in Relation to the Use of a 300 m (1000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive*, International Civil Aviation Organization, First Edition - 2010.
- *Summary of Discussions (RMACG/6)*, Cornwall, Canada, 6-10 June 2011: Task #10 "All RMAs conduct traffic scrutiny survey during the same time frame [December] in order to understand the magnitude of the situation."
- *Summary of Discussion (RMACG/10)*, Bangkok, Thailand, 18 - 22 May 2015: Paragraph 3.2.33 "The meeting discussed the need of the fixed month for scrutiny activities as decided at the RMACG/6 meeting and agreed that with the maturity of most of the monitoring programs, and with most of the RMAs performing monthly verification

## **1. Introduction**

1.1 The North American Approvals Registry and Monitoring Organization (NAARMO), a service provided by the U.S. Federal Aviation Administration's William J. Hughes Technical Center, has served since 2003 as the Regional Monitoring Agency (RMA) for the airspace covering the United States, Canada, and Mexico.

1.2 As part of the duties of an RMA, outlined in ICAO Doc 9937 (Reference 1), the NAARMO performs regular checks of the operator compliance with State approval requirements within the North American airspace as well as New York West portions of the NAARMO-delegated oceanic airspace. The purpose of these checks is to identify non-approved operators and aircraft using the RVSM airspace to ensure the safety of the airspace.

1.3 At RMACG/6 it was decided that all RMAs would conduct a traffic scrutiny survey for their region of jurisdiction every December. (Reference 2) At RMACG/10 the requirement for a December traffic scrutiny survey was amended to allow the traffic scrutiny survey to be performed on any month. (Reference 3).

1.4 To address the issue of false identification, quantify the lag from individual States, and identify aircraft that are consistently filing incorrectly, NAARMO is conducting more frequent audits within the contiguous United States. (CONUS) and New York West portions of the NAARMO-delegated airspace.

1.5 NAARMO implemented monthly Traffic Sample audits for CONUS and New York West, and this paper describes the process used by NAARMO to identify non-approved airframes operating within RVSM airspace, FL290 to FL410, inclusive. The Traffic Sample audits were accomplished through a systematic process of matching air traffic movement data and airframe approval records. The audit results are presented for CONUS during the period between September 2022 – June 2023, and for New York West during the period between September 2022 – May 2023.

1.6 The audit results for the period of December 2022 within RVSM are presented for Canada and Mexico.

## **2. Discussion**

2.1 The air traffic movement data used for the contiguous United States traffic scrutiny is obtained from the FAA's Traffic Flow Management System (TFMS) (previously Enhanced Traffic Management System or ETMS) merged with NASQuest, an internal FAA database containing flight information data. The TFMS is a data exchange system that supports the management and monitoring of national air traffic. This system uses various data inputs, including National Airspace System (NAS) messages, to create a continuously updated status of the collective air traffic flow. The TFMS records containing position and flight plan data, which are used for the traffic scrutiny.

2.2 Appendix K of ICAO Doc 9937 (Reference 1) contains the sample content and format for collection of samples of traffic movements. In this table, the aircraft registration number is listed as optional. Registration number is not available in the TFMS traffic sample unless the flight is using the registration number as the call sign, i.e., for International General Aviation (IGA). A sample of data from NASQuest was merged with the TFMS sample to provide confirmation of the information filed in field 18.

Matching was achieved in 99.9% of the cases; however, operators do not always file their registration number in field 18. Operations that file information other than their registration number in field 18 could not be matched to any approval. This constitutes approximately 0.6% of the data.

2.3 The aggregate approvals database containing the approval records provided by the collective RMAs is used to verify the RVSM approval status of the operations identified in the traffic movement data sample. Updates to the aggregate database are provided by most of the RMAs monthly. The process used to determine non-approved operations, included analysis of the airframe approval records dated October 2022 to July 2023 for this assessment.

2.4 All records containing flight plan and position report information are compiled for operations within the RVSM airspace. A summary of unique operations is then produced. Contained exclusively within this summary are flights that are observed both to maintain an RVSM flight level during flight and to indicate RVSM approval in their flight plans. For the analysis period September 2022 – June 2023, the count of operations within the CONUS airspace FL290-FL410 inclusive are **1,214,982**.

2.5 To track the CONUS Section 9 operations, the NAARMO has produced a new database to screen US Registries that hold a Section 9 RVSM approval. The new process categorizes the approval status when auditing the traffic sample by looking at the date of the flight and any approvals it may hold or have held in that period. It allows the analyst to be able to take appropriate action based on the category returned and decide whether to follow up internally or by sending results to the responsible RMA as appropriate.

2.6 NAARMO developed nine steps to categorize the Traffic Sample data from CONUS and New York West into monthly Approved and Non-approved Operations:

- 1) combined all CONUS Flights from September 2022 to June 2023 where the Flight Plan contained a '/W'
- 2) substituted the Flight ID (ACID) for any Registrations that were blank.
- 3) aggregated the Operator and Aircraft Type to list unique Registrations where the aircraft type or operator was absent or slightly different
- 4) compared the Traffic Sample Registrations to the Combined Approvals registrations downloaded from the RMA KSN.
- 5) summed flights by Registration per month-year and showed if the aircraft had an approval that month
- 6) totaled flights by Registration per month-year
- 7) totaled the number of months flown non-approved
- 8) calculated total flights by Registration that were non-approved
- 9) filtered the results to show non-approved operations as of December which repeated over multiple months

2.7 These nine steps were repeated for the New York West traffic samples from September 2022 to May 2023. The results were filtered to show non-approved operations as of February which repeated over multiple months.

2.8 Displaying the approvals as each month passed gave more insight as to flow of the aircraft from either non-approved or approved.

2.9 For Canada and Mexico December 2022 traffic samples, each entry containing observed operations within Canada and Mexico airspace was compared with the collective approvals database as of January 2023 to determine the approval status of the airframe or operator/aircraft type combination. The entries for which no approval or an expired approval is found are output to a list for further verification. Due to issues experienced with the FAA’s web-based operations safety system data source, the NAARMO and PARMO January 2023 updates were not made until after the collective approval database update on January 11<sup>th</sup>. This created a larger lag than normal and many aircraft whose approvals were received in January are listed in this audit and are shown as unapproved. Continued monthly audits will serve as a method to identify these types of lags, and successive audit will separate true repeat offenders from aircraft incorrectly identified as unapproved due to lag.

2.10 The verification process involves the exploration of systematic reasons for removing entries from the list. These reasons include but are not limited to:

- Lags in State notification of approval to the RMA
- Lags in updates to the approvals database and the local version of ICAO Doc8585
- Issues with the RVSM letter of authorization (LOA) data source starting in January 2023, there has been a significant lag in determining RVSM status of NAARMO aircraft.
- As of March 2023, the issue was corrected and normal download and processing of RVSM resumed.
- Mistakes and typographical errors in the original traffic data
- Code-sharing and lease arrangements between airlines
- Mistakes related to ICAO aircraft type codes in approvals.

2.11 Table 1 provides a summary of the results of the NAARMO traffic RVSM compliance survey for the CONUS following the initial verification process. This list contains a total of **75** civilian non-approved operations listed alphabetically by RMA observed within RVSM airspace in the CONUS. The aircraft listed in the table were seen flying in RVSM airspace without an approval record in at least 4 months. The count next to the registration number represents the number of aircraft found to have no approval in at least 4 months.

RMA	State	Registration Mark
<b>CARSAMMA</b>	Bahamas	C6ROV
	Trinidad and Tobago	9YANT
	Trinidad and Tobago	9YBAH
	Trinidad and Tobago	9YBAR
	Trinidad and Tobago	9YCAL
	Trinidad and Tobago	9YGUY
	Trinidad and Tobago	9YJAM
	Trinidad and Tobago	9YTTO
<b>CARSAMMA Total</b>		<b>8</b>
<b>NAARMO</b>	Canada	CFJQZ

	Canada	CGUAC
	Mexico	XAFUF
	Mexico	XAIZA
	Mexico	XAJAO
	Mexico	XAJCZ
	Mexico	XAMSA
	Mexico	XAPSO
	Mexico	XAPTR
	Mexico	XARUV
	Mexico	XATUB
	Mexico	XATZI
	Mexico	XAVBH
	Mexico	XAVRT
	United States	N1106M
	United States	N119JJ
	United States	N151BN
	United States	N183WW
	United States	N194ME
	United States	N2020H
	United States	N224JV
	United States	N224NC
	United States	N227VJ
	United States	N31HP
	United States	N325CJ
	United States	N33BL
	United States	N33EM
	United States	N360SM
	United States	N365PF
	United States	N386TA
	United States	N402GJ
	United States	N4047S
<b>RMA</b>	<b>State</b>	<b>Registration Mark</b>
	United States	N426HJ
	United States	N43TP
	United States	N466LJ
	United States	N480EB
	United States	N507AH
	United States	N510FC
	United States	N518AR
	United States	N525NC
	United States	N525NV
	United States	N535GR

	United States	N54CA
	United States	N550NM
	United States	N552CJ
	United States	N560CS
	United States	N6144
	United States	N618K
	United States	N61FT
	United States	N63NX
	United States	N680JK
	United States	N690AH
	United States	N698JT
	United States	N69DH
	United States	N715TW
	United States	N730AW
	United States	N733LC
	United States	N749AM
	United States	N771BK
	United States	N782TW
	United States	N787LP
	United States	N866TH
	United States	N8844
	United States	N916JL
	United States	N916KP
	United States	N920FF
	United States	N925JB
<b>NAARMO Total</b>		<b>67</b>
<b>Total</b>		<b>75</b>

*Table 1: Summary of the non-approved operations in CONUS*

2.12 As stated above, an issue with the FAA RVSM LOA database was corrected in March 2023. The KSN updates available to all other RMAs had an additional lag due to this error, which would potentially identify a larger number of unapproved US aircraft. NAARMO used the same KSN data available to all RMAs, which contained this lag and consequently there are many US registered aircraft present in this audit. In addition, the US audit contains aircraft that have been subsequently identified as operating under the provisions of the FAA Section 9 approval and would also be removed from this audit. These aircraft remain on the report to document some of the difficulties caused by lags in data, and to illustrate how the implementation of monthly audits will be of benefit to determine the correct status of the airframes. It is expected as NAARMO's monthly audit process progresses, the numbers of non-approved aircraft will significantly decrease.

2.13 Table 2 provides a summary of the results of the NAARMO traffic RVSM compliance survey for the New York West following the initial verification process. The traffic samples for New York West airspace containing **104,232** operations were compiled from September 2022 – May 2023 ATOP data provides a summary of the results of the NAARMO traffic RVSM compliance survey for New York West airspace following the initial verification process. The results contain **13** operations from **4** States and are

listed alphabetically by RMA. The count next to the registration number represents the number of aircraft found to have had no approval in at least 4 months.

RMA	State	Registration Mark
CARSAMMA	Trinidad and Tobago	9YANT
	Trinidad and Tobago	9YBAH
	Trinidad and Tobago	9YBAR
	Trinidad and Tobago	9YCAL
	Trinidad and Tobago	9YGRN
	Trinidad and Tobago	9YGUY
	Trinidad and Tobago	9YJAM
	Trinidad and Tobago	9YSUR
	Trinidad and Tobago	9YTTO
	<b>CARSAMMA Total</b>	<b>9</b>
EURASIA RMA	Russian Federation	RA73847
	<b>EURASIA RMA Total</b>	<b>1</b>
NAARMO	Mexico	XADHM
	Mexico	XASBT
	United States	N899TX
	<b>NAARMO Total</b>	<b>3</b>
	<b>Total</b>	<b>13</b>

Table 2: Summary of the non-approved operations in NY West Airspace

2.14 Canada provided traffic sample data from January 1<sup>st</sup> 2022 to December 31<sup>st</sup> 2022, only the most recent month of December 2022 was utilized for this assessment which contained **122,536** operations within RVSM airspace. Table 3 provides a summary of the results of the NAARMO traffic RVSM compliance survey for Canada following the initial verification process. Only airframes that were observed 10 or more times are listed in the table. The results contain **44** airframes for which no approval count be found and are listed alphabetically by RMA. The count next to the registration number represents the number of observations in the December 2022 traffic sample.

RMA	Unapproved Observation Count
<b>State</b>	
Registration Number	
<b>CARSAMMA</b>	
<b>Trinidad and Tobago</b>	
9YBAR	19
9YANT	14
9YGUY	12
<b>EURASIA RMA</b>	
<b>Russian Federation</b>	
RA73847	17
RA73341	12

<b>RMA State Registration Number</b>	<b>Unapproved Observation Count</b>
<b>EUR RMA</b>	
<b>Netherlands</b>	
PHBKL	41
<b>Austria</b>	
OELRG	26
<b>NAARMO</b>	
<b>Canada</b>	
CGXTB	169
CFJQZ	124
CGELJ	92
CGUAC	84
CGISM	78
CFJGZ	77
CFSFO	51
CFXDP	40
CFNJA	38
CGBSW	32
CGWFQ	28
CFRYS	27
CFOVD	25
CFGSX	24
CGMPP	23
CGSAB	22
CGGGT	21
CGKFQ	18
CGENL	17
CGKFP	15
CGFMX	14
CGUUL	14
CFGSU	12
CFJAI	11
CGMPW	11
<b>United States</b>	
N4064J	50
N415DX	34
N14019	26
N753YX	25
N517DN	24
N515EV	16
N920CG	16
N849TW	11

<b>RMA State</b>	<b>Registration Number</b>	<b>Unapproved Observation Count</b>
	N447PT	10
	N934AG	10
<b>Mexico</b>		
	XACST	10
<b>NATCMA</b>		
<b>Norway</b>		
	LNFNE	32
<b>Unapproved Airframe Total</b>		<b>44</b>

Table 2: Summary of the non-approved operations from Canadian airspace

2.15 Mexico provided traffic sample data from April 2022, August 2022 and December 2022, only the most recent month of December 2022 was utilized for this assessment which contained **66,229** operations within RVSM airspace. Table 4 provides a summary of the results of the NAARMO traffic RVSM compliance survey for Mexico following the initial verification process. Only airframes that were observed 10 or more times are listed in the table. The results contain **48** airframes for which no approval could be found and are listed alphabetically by RMA. The count next to the registration number represents the number of observations in the December 2022 traffic sample. Some airframes were observed in more than one FIR.

<b>RMA State</b>	<b>Registration Number</b>	<b>Unapproved Observation Count</b>
<b>CARSAMMA</b>		
<b>Dominican Republic</b>		
	HI1026	18
<b>NAARMO</b>		
<b>Canada</b>		
	CGELJ	37
<b>RMA State</b>	<b>Registration Number</b>	<b>Unapproved Observation Count</b>
	CFNJA	12
<b>Mexico</b>		
	XAVBH	194
	XAVXD	172
	XAVXF	155
	XAVBZ	146
	XAVYD	132
	XAVYB	123
	XAVBQ	103
	XAVBU	103

XAVYA	79
XAVRY	75
XAMCG	74
XAVRT	72
XAVRX	71
XAVSJ	68
XAMCM	63
XAMBN	62
XAGNS	60
XAVYE	57
XAEMX	54
XAMCU	40
XAMCB	37
XAMCD	34
XAMCT	33
XAMCN	28
XAASR	26
XASLG	23
XAPSO	19
XAVET	13
XADRE	11
XAUXS	11
XADHM	11
XAFOF	11
XAASP	10
XBFMG	10
XADLA	10
XAMSA	10
<b>United States</b>	
N868AM	85
N546VL	61
<b>RMA</b>	<b>Unapproved</b>
<b>State</b>	<b>Observation</b>
Registration Number	<b>Count</b>
N891AM	55
N545VL	55
N534VL	44
N966AV	33
N522TA	33
N524TA	28
N782TW	17
<b>Unapproved Airframe Total</b>	<b>48</b>

Table 3 Summary of the non-approved operations from Mexican airspace

**3. Conclusion**

3.1 Experience has shown that the primary systematic reason for failure to match operations and RVSM approvals is a delay in State notification of the approval status of some operators to the appropriate RMA. Thus, the importance of timely notification by States of operator approval status to RMAs is emphasized by these results.

3.2 The meeting is invited to:

- a) Note and review the contents of the NAARMO traffic scrutiny work presented in this paper; and
- b) provide any relevant updates on the records contained within the results.