



ICAO

International Civil Aviation Organization

Twenty-Eighth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/28)

Bangkok, Thailand, 21 – 24 August 2023

Agenda Item 5: Airspace Safety Monitoring Activities/Requirements in the Asia/Pacific Region

CHINA RMA LTHM BURDEN ESTIMATE UPDATE

(Presented by China RMA)

SUMMARY

This paper presents the monitoring burden for the aircraft registered and operated under China RMA to meet the long-term height monitoring requirement. The data were based on the RVSM approval database by the end of June 2023.

1. INTRODUCTION

1.1. The Long-Term Height Monitoring Impact Statement developed by RASMAG was endorsed by APANPIRG/20 in September 2009. In RMACG/17 meeting China RMA provided the burden list to the meeting, and this paper is the update for the data.

2. DISCUSSION

2.1. In 2008, China RMA began its first monitoring task with two sets of EGMUs. After that, the organization has been fulfilling its duty with four sets of EGMU/E2GMUs. The ADS-B Height Monitoring System (AHMS) has also provided support for aircraft height keeping performance monitoring (HKPM) since 2014. With the use of ADS-B ground-based monitoring system, most aircraft of Chinese operators have seen compliant records, significantly reducing the on-board monitoring burden. Additionally, an increasing number of foreign aircraft could also receive valid monitoring records from the ADS-B monitoring system, helping to support these fleets in meeting long-term height monitoring requirements.

2.2. Based on the China RMA RVSM approval database by the end of June 2023, the total number of RVSM approved aircraft was 4,367, with a resultant monitoring burden of 787 and a total of 149 aircraft remaining to be monitored, according to minimum monitoring requirements (MMR).

2.3. For China, there are 4363 approved aircraft, with a resultant monitoring burden of 783 and a total of 145 aircraft remaining to be monitored.

2.4. For the Democratic People's Republic of Korea (DPRK), there is 1 operator with 4 aircraft that require monitoring. In the last three years, China RMA was unable to travel to DPRK for on-board HKPM for the 4 aircraft. China RMA is coordinating with DPRK for technical training and aircraft monitoring.

2.5. **Figure 1** describes the monitoring burden for China RMA from 2019 to 2023, in which data are extracted from the papers for RASMAG meeting. The number of total approved airframes and resultant monitoring burden is increasing yearly, while the remaining burden is reduced from 2019 to 2021 and then increased from 2021 to 2023. This is mainly caused by traffic decrease, AHMS upgrade, and operational limits of B38M (Boeing 737 MAX 8) in the past three years. There are 52 B38M aircraft from 12 operators remaining to be monitored accounting for 35% of the total (149) in 2023.

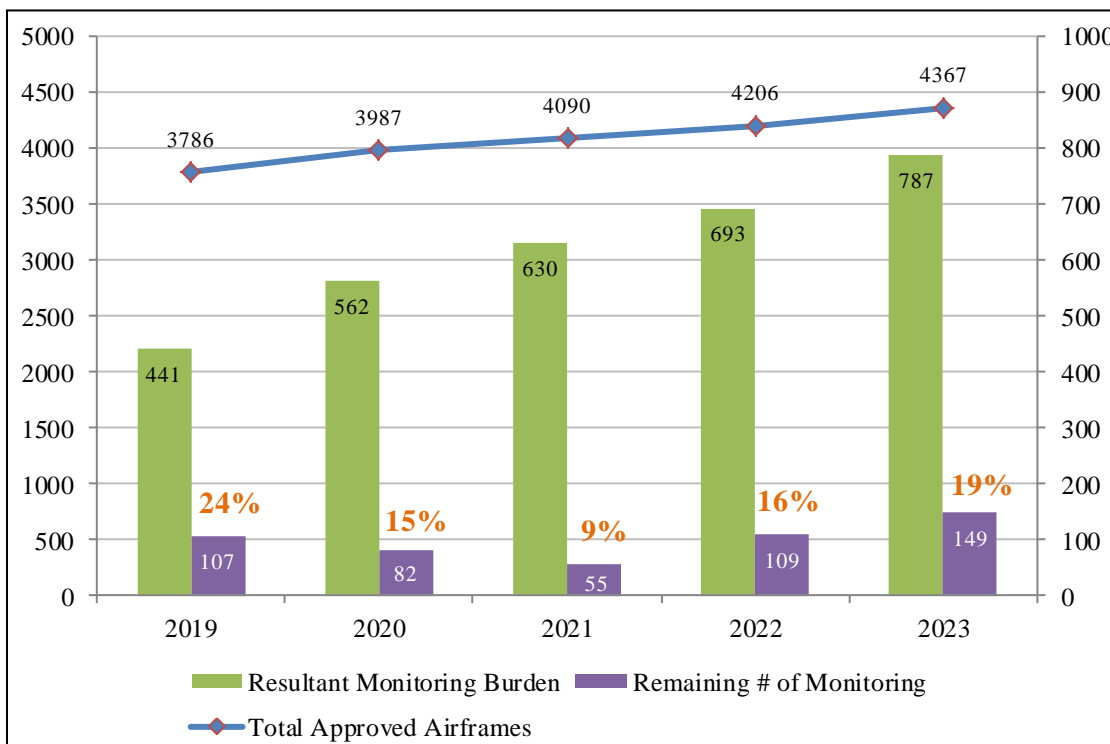


Figure 1: The monitoring burden for China RMA from 2019 to 2023

2.6. **Appendix A** provides details of the monitoring burden based on the MMR of China RMA.

3. CONCLUSION

- 3.1. The meeting is invited to:
- a) note the information contained in this paper; and
 - b) discuss any relevant matters as appropriate.

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**Appendix A: Estimated RVSM Monitoring Burden for Asia/Pacific Region as a result of Long
Term Height Monitoring Requirements of Annex 6**

China RMA Monitoring Burden (compiled July 2023)

| Operator | Aircraft Monitoring Group | MMR Category | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|----------|---------------------------|--------------|--------------------------|---|---------------------------|
| BDJ | GLF6 | 2 | 5 | 3 | 0 |
| | GLF5 | 1 | 6 | 2 | 0 |
| | GLF4 | 1 | 5 | 2 | 0 |
| | FA7X | 1 | 3 | 2 | 0 |
| | CL605 | 1 | 1 | 1 | 1 |
| | B737NX | 1 | 1 | 1 | 0 |
| | A320 | 1 | 2 | 2 | 0 |
| BJN | GLF5 | 1 | 2 | 2 | 1 |
| | FA7X | 1 | 1 | 1 | 0 |
| | B737NX | 1 | 4 | 2 | 0 |
| | A320 | 1 | 1 | 1 | 0 |
| | A20N | 2 | 1 | 1 | 0 |
| BNH | GLF5 | 1 | 1 | 1 | 0 |
| CAO | B772 | 1 | 9 | 2 | 0 |
| | B752 | 1 | 2 | 2 | 0 |
| | B744-10 | 1 | 3 | 2 | 0 |
| CBG | E290 | 2 | 1 | 1 | 1 |
| | E170-190 | 1 | 13 | 2 | 0 |
| | A320 | 1 | 7 | 2 | 0 |
| | A20N | 2 | 4 | 3 | 0 |
| CBJ | A330 | 1 | 11 | 2 | 0 |
| | A320 | 1 | 56 | 2 | 0 |
| | A20N | 2 | 9 | 6 | 0 |
| CBW | CARJ | 1 | 1 | 1 | 0 |
| CCA | B787 | 1 | 14 | 2 | 0 |
| | B773 | 1 | 28 | 2 | 0 |
| | B748 | 1 | 7 | 2 | 0 |
| | B744-LCF | 2 | 1 | 1 | 1 |
| | B744-10 | 1 | 2 | 2 | 1 |
| | B737NX | 1 | 112 | 2 | 0 |
| | B38M | 2 | 13 | 8 | 8 |
| | AJ27 | 2 | 16 | 10 | 3 |
| | A350 | 2 | 27 | 17 | 0 |
| | A330 | 1 | 54 | 2 | 0 |
| | A320 | 1 | 143 | 2 | 0 |
| | A20N | 2 | 73 | 44 | 0 |
| CCD | B737NX | 1 | 13 | 2 | 0 |
| CCO | B752 | 1 | 1 | 1 | 1 |
| CDC | A320 | 1 | 36 | 2 | 0 |

| Operator | Aircraft Monitoring Group | MMR Category | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|----------|---------------------------|--------------|--------------------------|---|---------------------------|
| CDG | A20N | 2 | 32 | 20 | 0 |
| | B737NX | 1 | 129 | 2 | 0 |
| | B38M | 2 | 7 | 5 | 4 |
| CES | C919 | 2 | 1 | 1 | 1 |
| | B773 | 1 | 20 | 2 | 0 |
| | B737NX | 1 | 66 | 2 | 0 |
| | A350 | 2 | 16 | 10 | 0 |
| | A330 | 1 | 55 | 2 | 0 |
| | A320 | 1 | 293 | 2 | 0 |
| | A20N | 2 | 86 | 52 | 0 |
| | CES-YN | B787 | 1 | 3 | 2 |
| B737NX | | 1 | 71 | 2 | 0 |
| B737C | | 1 | 2 | 2 | 0 |
| B38M | | 2 | 3 | 2 | 2 |
| CFI | GLF4 | 1 | 1 | 1 | 1 |
| | C680 | 1 | 3 | 2 | 0 |
| | C56X | 1 | 16 | 2 | 0 |
| CFZ | C560 | 1 | 1 | 1 | 1 |
| CGH | A320 | 1 | 11 | 2 | 0 |
| CGN | B737NX | 1 | 11 | 2 | 0 |
| CGZ | E170-190 | 1 | 9 | 2 | 0 |
| | A20N | 2 | 9 | 6 | 0 |
| CHB | A320 | 1 | 33 | 2 | 0 |
| | A20N | 2 | 5 | 3 | 0 |
| CHH | B787 | 1 | 38 | 2 | 0 |
| | B737NX | 1 | 136 | 2 | 0 |
| | B38M | 2 | 11 | 7 | 7 |
| | A350 | 2 | 2 | 2 | 2 |
| | A330 | 1 | 32 | 2 | 0 |
| CHJ | GLF4 | 1 | 1 | 1 | 0 |
| CJX | B737NX | 1 | 11 | 2 | 0 |
| | AJ27 | 2 | 5 | 3 | 0 |
| CKK | B772 | 1 | 16 | 2 | 0 |
| | B744-10 | 1 | 2 | 2 | 0 |
| CNM | B737NX | 1 | 8 | 2 | 0 |
| CNW | B752 | 1 | 3 | 2 | 1 |
| | B737CL | 1 | 1 | 1 | 1 |
| CQH | A320 | 1 | 79 | 2 | 0 |
| | A20N | 2 | 39 | 24 | 0 |
| CQN | A320 | 1 | 18 | 2 | 0 |
| | A20N | 2 | 12 | 8 | 0 |
| CSC | A350 | 2 | 5 | 3 | 0 |
| | A330 | 1 | 15 | 2 | 0 |
| | A320 | 1 | 130 | 2 | 0 |

| Operator | Aircraft Monitoring Group | MMR Category | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|----------|---------------------------|--------------|--------------------------|---|---------------------------|
| | A20N | 2 | 42 | 26 | 0 |
| CSG | B772 | 1 | 4 | 2 | 0 |
| CSH | B787 | 1 | 7 | 2 | 0 |
| | B737NX | 1 | 71 | 2 | 0 |
| | B38M | 2 | 6 | 4 | 4 |
| | A330 | 1 | 1 | 1 | 0 |
| CSN | B787 | 1 | 27 | 2 | 0 |
| | B773 | 1 | 15 | 2 | 0 |
| | B772 | 1 | 13 | 2 | 0 |
| | B737NX | 1 | 195 | 2 | 0 |
| | B38M | 2 | 17 | 11 | 11 |
| | AJ27 | 2 | 16 | 10 | 4 |
| | A350 | 2 | 18 | 11 | 0 |
| | A330 | 1 | 40 | 2 | 0 |
| CSS | A320 | 1 | 314 | 2 | 0 |
| | B767 | 1 | 19 | 2 | 0 |
| | B752 | 1 | 42 | 2 | 0 |
| | B744-10 | 1 | 3 | 2 | 0 |
| CSZ | B737CL | 1 | 17 | 2 | 0 |
| | B737NX | 1 | 78 | 2 | 0 |
| | B38M | 2 | 5 | 3 | 3 |
| | A330 | 1 | 6 | 2 | 0 |
| | A320 | 1 | 82 | 2 | 0 |
| CTJ | A20N | 2 | 28 | 17 | 0 |
| | B737NX | 1 | 4 | 2 | 0 |
| | B737CL | 1 | 2 | 2 | 2 |
| CUA | B737NX | 1 | 59 | 2 | 0 |
| CUH | B737NX | 1 | 17 | 2 | 0 |
| CXA | B787 | 1 | 12 | 2 | 0 |
| | B737NX | 1 | 126 | 2 | 0 |
| | B737C | 1 | 2 | 2 | 0 |
| | B38M | 2 | 10 | 6 | 6 |
| | A320 | 1 | 2 | 2 | 2 |
| CYE | E55P | 1 | 1 | 1 | 1 |
| CYN | E55P | 1 | 2 | 2 | 0 |
| CYZ | B772 | 1 | 2 | 2 | 2 |
| | B752 | 1 | 6 | 2 | 1 |
| | B737NX | 1 | 8 | 2 | 0 |
| | B737CL | 1 | 16 | 2 | 0 |
| DER | GLF6 | 2 | 3 | 2 | 0 |
| | GLF5 | 1 | 5 | 2 | 0 |
| | GLF4 | 1 | 2 | 2 | 1 |
| | GALX | 1 | 1 | 1 | 1 |
| | G280 | 2 | 1 | 1 | 1 |

| Operator | Aircraft Monitoring Group | MMR Category | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|----------|---------------------------|--------------|--------------------------|---|---------------------------|
| | FA7X | 1 | 3 | 2 | 0 |
| | A320 | 1 | 1 | 1 | 0 |
| DJH | G280 | 2 | 1 | 1 | 0 |
| DKH | B787 | 1 | 6 | 2 | 0 |
| | A320 | 1 | 64 | 2 | 0 |
| | A20N | 2 | 25 | 15 | 0 |
| DLJ | CL600 | 1 | 1 | 1 | 0 |
| EPA | B737NX | 1 | 23 | 2 | 0 |
| EPB | CL600 | 1 | 2 | 2 | 0 |
| FJT | E135-145 | 1 | 1 | 1 | 0 |
| FZA | B737NX | 1 | 14 | 2 | 0 |
| | B38M | 2 | 2 | 2 | 2 |
| GCR | E170-190 | 1 | 49 | 2 | 0 |
| | A330 | 1 | 6 | 2 | 0 |
| | A320 | 1 | 31 | 2 | 0 |
| | A20N | 2 | 10 | 6 | 2 |
| GDC | B737NX | 1 | 3 | 2 | 0 |
| HBH | E170-190 | 1 | 6 | 2 | 0 |
| | B737NX | 1 | 27 | 2 | 0 |
| HFJ | GL5T | 1 | 1 | 1 | 0 |
| | G280 | 2 | 1 | 1 | 0 |
| | CL605 | 1 | 1 | 1 | 1 |
| HHG | GLF5 | 1 | 2 | 2 | 0 |
| HLF | B772 | 1 | 1 | 1 | 0 |
| | B737NX | 1 | 2 | 2 | 2 |
| | B737CL | 1 | 5 | 2 | 0 |
| | B737NX | 1 | 2 | 2 | 2 |
| HNJ | GLF4 | 1 | 1 | 1 | 0 |
| | GLEX | 1 | 1 | 1 | 0 |
| HXA | CRJ9 | 1 | 38 | 2 | 0 |
| | AJ27 | 2 | 6 | 4 | 1 |
| | A320 | 1 | 11 | 2 | 0 |
| | A20N | 2 | 10 | 6 | 0 |
| HYJ | GLF5 | 1 | 1 | 1 | 1 |
| HYN | GLF4 | 1 | 2 | 2 | 2 |
| HYT | B767 | 1 | 2 | 2 | 1 |
| | B752 | 1 | 10 | 2 | 0 |
| ICU | LJ60 | 1 | 1 | 1 | 1 |
| | G280 | 2 | 1 | 1 | 0 |
| IGA-CG | C56X | 1 | 1 | 1 | 0 |
| IGA-GW | GLF4 | 1 | 1 | 1 | 1 |
| JBE | GLF6 | 2 | 3 | 2 | 1 |
| | GLF5 | 1 | 2 | 2 | 0 |
| | GLF4 | 1 | 1 | 1 | 0 |

| Operator | Aircraft Monitoring Group | MMR Category | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|----------|---------------------------|--------------|--------------------------|---|---------------------------|
| | GALX | 1 | 1 | 1 | 0 |
| | G280 | 2 | 1 | 1 | 0 |
| | FA7X | 1 | 2 | 2 | 1 |
| | E135-145 | 1 | 3 | 2 | 0 |
| | CL605 | 1 | 1 | 1 | 0 |
| JDL | B737NX | 1 | 5 | 2 | 0 |
| JOY | B737NX | 1 | 5 | 2 | 0 |
| JSU | CARJ | 1 | 4 | 2 | 1 |
| JYH | B737NX | 1 | 22 | 2 | 0 |
| | B38M | 2 | 1 | 1 | 1 |
| KNA | B737NX | 1 | 29 | 2 | 0 |
| | B38M | 2 | 2 | 2 | 2 |
| LHA | B744-10 | 1 | 1 | 1 | 1 |
| | B737NX | 1 | 5 | 2 | 0 |
| | B737CL | 1 | 6 | 2 | 2 |
| LKE | B737NX | 1 | 30 | 2 | 0 |
| | B38M | 2 | 3 | 2 | 2 |
| | A330 | 1 | 4 | 2 | 0 |
| | A320 | 1 | 7 | 2 | 0 |
| | A20N | 2 | 6 | 4 | 0 |
| LLJ | GALX | 1 | 2 | 2 | 2 |
| LNM | CL600 | 1 | 2 | 2 | 1 |
| MJC | GLF6 | 2 | 1 | 1 | 0 |
| | GLF4 | 1 | 1 | 1 | 1 |
| MZT | GLF6 | 2 | 2 | 2 | 1 |
| | GLEX | 1 | 6 | 2 | 0 |
| | GL7T | 2 | 1 | 1 | 1 |
| | GL5T | 1 | 1 | 1 | 0 |
| | G280 | 2 | 1 | 1 | 0 |
| | CL604 | 1 | 2 | 2 | 0 |
| | CARJ | 1 | 5 | 2 | 0 |
| NMG | AJ27 | 2 | 5 | 3 | 0 |
| NSJ | HDJT | 2 | 2 | 2 | 2 |
| | GLF5 | 1 | 2 | 2 | 0 |
| | GLF4 | 1 | 2 | 2 | 0 |
| OKA | B737NX | 1 | 25 | 2 | 0 |
| OTC | A320 | 1 | 9 | 2 | 0 |
| | A20N | 2 | 6 | 4 | 0 |
| OTT | GLF6 | 2 | 1 | 1 | 1 |
| | GLF5 | 1 | 3 | 2 | 0 |
| | G280 | 2 | 1 | 1 | 1 |
| | E135-145 | 1 | 3 | 2 | 1 |
| | BD100 | 1 | 1 | 1 | 0 |
| | AJ27 | 2 | 17 | 11 | 6 |

| Operator | Aircraft Monitoring Group | MMR Category | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|----------|---------------------------|--------------|--------------------------|---|---------------------------|
| QDA | A320 | 1 | 14 | 2 | 0 |
| | A20N | 2 | 20 | 12 | 0 |
| RLH | B737NX | 1 | 23 | 2 | 0 |
| SAJ | C56X | 1 | 2 | 2 | 1 |
| SJD | GLF6 | 2 | 2 | 2 | 1 |
| | A350 | 2 | 1 | 1 | 0 |
| SNG | A320 | 1 | 7 | 2 | 0 |
| STJ | C680 | 1 | 2 | 2 | 2 |
| SZA | H25B-800 | 1 | 1 | 1 | 1 |
| | GLF4 | 1 | 2 | 2 | 1 |
| | GALX | 1 | 1 | 1 | 1 |
| | CARJ | 1 | 2 | 2 | 2 |
| SZJ | FA7X | 1 | 1 | 1 | 0 |
| TBA | A330 | 1 | 5 | 2 | 0 |
| | A320 | 1 | 34 | 2 | 0 |
| TCI | LJ60 | 1 | 1 | 1 | 0 |
| | GLF4 | 1 | 4 | 2 | 2 |
| | GLEX | 1 | 1 | 1 | 1 |
| | F900 | 1 | 1 | 1 | 0 |
| | A318 | 1 | 1 | 1 | 0 |
| TXJ | GLF6 | 2 | 1 | 1 | 0 |
| | GLF5 | 1 | 3 | 2 | 2 |
| | GLF4 | 1 | 1 | 1 | 0 |
| | FA7X | 1 | 1 | 1 | 1 |
| UEA | AJ27 | 2 | 27 | 17 | 0 |
| | A320 | 1 | 41 | 2 | 0 |
| | A20N | 2 | 5 | 3 | 3 |
| UNA | GLF6 | 2 | 5 | 3 | 0 |
| | GLF5 | 1 | 4 | 2 | 0 |
| | GLF4 | 1 | 2 | 2 | 0 |
| | GLEX | 1 | 1 | 1 | 0 |
| | GL5T | 1 | 1 | 1 | 0 |
| | FA7X | 1 | 6 | 2 | 0 |
| | CARJ | 1 | 1 | 1 | 0 |
| A318 | 1 | 1 | 1 | 0 | |
| UTP | A300 | 1 | 6 | 2 | 2 |
| WFH | CL605 | 1 | 1 | 1 | 0 |
| XAI | CARJ | 1 | 4 | 2 | 2 |
| YZR | B787 | 1 | 2 | 2 | 1 |
| | B744-5 | 1 | 1 | 1 | 0 |
| | B744-10 | 1 | 3 | 2 | 0 |
| | B737NX | 1 | 10 | 2 | 0 |
| | B737CL | 1 | 7 | 2 | 2 |

| Operator | Aircraft Monitoring Group | MMR Category | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|-------------------------------|----------------------------------|---------------------|---------------------------------|--|----------------------------------|
| Total Chinese Mainland | | | 4363 | 783 | 145 |

| State | Operator | Operator Name | Aircraft Monitoring Group | MMR Category (1, 2 or 3) | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|-------------------|-----------------|----------------------|----------------------------------|---------------------------------|---------------------------------|--|----------------------------------|
| DPRK | KOR | Air Koryo | A148 | 2 | 2 | 2 | 2 |
| | | | T204 | 2 | 2 | 2 | 2 |
| Total DPRK | | | | | 4 | 4 | 4 |

| China RMA Grand Total (China + DPRK) | Total Approved Airframes | Resultant Monitoring Burden (# Airframes) | Remaining # of Monitoring |
|---|---------------------------------|--|----------------------------------|
| | 4367 | 787 | 149 |

— END —