INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

REPORT OF THE THIRTY-FIRST MEETING OF
THE ICAO RVSM IMPLEMENTATION TASK FORCE (RVSM/TF/31)

BANGKOK, THAILAND

31 July – 3 August 2007

The views expressed in this Report should be taken as those of the Task Force and not the Organization

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1.1 Introduction

1.1.1 The Thirty-first Meeting of the ICAO Reduced Vertical Separation Minimum Implementation Task Force (RVSM/TF/31) was held at ICAO Asia and Pacific Office, Bangkok, Thailand from 31 July to 3 August 2007.

1.1.2 The Terms of Reference (TOR) for the Task Force are as follows:

- *To develop strategic, benefits-driven implementation plans (based on cost benefit studies), in concert with airspace users, for RVSM operations within selected areas and airspace of the Asia/Pacific Region, ensuring inter-regional harmonization;*

- *To consider any amendments to RVSM guidance material that may be proposed by States and international organizations;*

- *To address any other matters as appropriate and relevant to the implementation of RVSM;*

- *The Task Force will include participation from States and International Organizations that are considering or involved with the implementation of RVSM; and*

- *The Task Force will report to the ATS/AIS/SAR Sub-Group.*

(Adopted by the tenth meeting of the ATS/AIS/SAR Sub-group, 2000)

1.1.3 The TORs of the Task Force Work Groups are as follows:

Safety & Airspace Monitoring Work Group (SAM/WG)

The SAM/WG is responsible for mathematical and statistical analysis to assist with the maintenance and on-going monitoring of safety through the assessment of collision risk for Asia/Pacific Region RVSM and other tasks as agreed with the RVSM Task Force. The main tasks of the SAM/WG are:

- *To develop a monitoring program to ensure that the quantity and quality of data are collected to allow an assessment of vertical collision risk;*

- *To review existing mathematical and statistical techniques to assure their appropriateness for Asia/Pacific Region RVSM;*

- *To ensure the transferability of aircraft data collected from other airspace regions;*

- *To support the assessment of the safety of RVSM prior to and during the Verification and Operational Trials by the production of collision risk assessments based on altitude deviation incidents and altitude monitoring data to determine whether the TLS is being met;*

- *To devise suitable methodologies for incorporating the effects of projected traffic increases and system changes on occupancy and collision risk in the future environment;*

- *To identify those elements which are critical in the assessment of collision risk and suggest areas where improvements might be effective in reducing risk;*

- *To establish a policy for investigating those errors that may jeopardise satisfaction of the Target Level of Safety (TLS);*

- *To estimate periodically the vertical occupancies (traffic densities, passing frequencies, etc.) in the Asia/Pacific Region; and*

- *To perform periodically other data collections (e.g. ASE stability) in order to ensure that the parameter values used in the mathematical collision risk models remain current.*

ATC Operations Work Group (ATC/WG)

The ATC/WG is responsible for addressing all matters relating to air traffic services within the RVSM and transition airspace, to include the following:

- *To identify airspace in which RVSM will be applied based on statement of application and develop a regional operational concept, ensuring inter-regional harmonization;*

- *To develop procedures to mitigate wake turbulence;*

- *To establish transition areas and develop transition procedures;*

- *To develop contingency procedures;*

- *To consider workload issues and identify the need for controller simulations;*

- *To provide the RVSM monitoring organization with traffic movement data as required; and*

- *To report large height deviations and operational errors involving level assignment to the RVSM monitoring organization on a monthly basis.*

(Revised by the RVSM/TF/15, 2002)

1.2 **Attendance**

1.2.1 RVSM/TF/31 was attended by 50 participants from China, Hong Kong China, Japan, Kazakhstan, Philippines, Republic of Korea, Russian Federation, Singapore, Thailand, United States, Uzbekistan, IATA, IFALPA and IFATCA. A complete list of participants is at **Appendix A** to this Report.

1.3 **Officers and Secretariat**

1.3.1 Mr. Kuah Kong Beng, Chief Air Traffic Control Officer, Civil Aviation Authority of Singapore served as the Chairperson of the Task Force. Mr. Kyotaro Harano, Regional Officer Air

Traffic Management (ATM), ICAO Asia and Pacific Office continued as the Secretary of the Task Force. He was assisted by Mr. Andrew Tiede, Regional Officer ATM.

1.3.2 In the absence of Ms. Zhang Jing, the Chairperson of the ATC/WG, Mr. Kuah Kong Beng stood in to chair the ATC/WG. Mr. Nopadol Sangngurn, Executive Expert, Aeronautical Radio of Thailand Ltd. continued as the Chairperson of the SAM/WG.

1.4 Opening of RVSM/TF/31

1.4.1 Mr. Kyotaro Harano welcomed all the delegates to ICAO Asia and Pacific Office and the RVSM/TF/31. He recalled that China had indicated at the previous meetings that RVSM would be most possible way to cope with the significant traffic growth expected in China and its implementation would be best progressed under the auspices of ICAO RVSM Implementation Task Force.

1.4.2 Mr. Harano informed the meeting that Mr. Lalit B. Shah, Regional Director of the Regional Office, visited China on the occasion of the COSCAP North Asia Steering Meeting in June and met officials of the General Administration of Civil Aviation of China (CAAC) and the Air Traffic Management Bureau (ATMB). They had agreed that the additional meeting should be held about six weeks before the Go/No-Go Meeting in September to expedite the coordination with neighboring States. Therefore, the objective of the meeting was to accelerate the implementation process for China RVSM by providing the opportunity for China and neighboring States to coordinate remaining bilateral matters, including transition arrangements and the conclusion/amendment of operational letters of agreement (LOAs).

1.4.3 Mr. Harano reminded the meeting that there were only seven weeks to the Go/No-Go meeting in September and there were still many tasks to be completed. He hoped that the meeting could resolve some of outstanding transition issues between States concerned and that advance information could be provided to the users. With the understanding and good cooperation by the participants, he was sure they would have a successful meeting.

1.4.4 On behalf of Mr. Shah, Mr. Rod Graff, Deputy Regional Director of the Regional Office, welcomed participants to the ICAO Asia and Pacific Regional Office for the RVSMTF/31, which focuses on further coordination of RVSM implementation in China's airspace. He noted that RVSM provided important benefits to more fully utilize airspace, including the provision of more levels for aircraft use to increase airspace capacity. He noted that RVSM also provided important environmental benefits with the provision of more levels allowing aircraft a better chance to operate in the most fuel efficient manner.

1.4.5 Mr. Graff indicated that as with any efficiency improvements, safety was a vital consideration. States, through ICAO, had developed an implementation process which detailed several activities that need to be adequately addressed before implementation and also some monitoring activities after implementation to address ongoing safety. He was very grateful to see a number of participants in this meeting and greatly appreciated the generous support being provided.

1.4.6 Mr. Kuah Kong Beng reminded the meeting that the next Task Force would meet at the September Go/No-Go meeting for the RVSM implementation scheduled on 21 November 2007 at 1600 UTC. The September meeting was only one and half months away. There were still many tasks to be completed and hopefully, at this meeting, the Task Force could resolve some of the main issues or at least indicate that they would be completed before the Go/No-Go meeting. The benefits of RVSM operations to the users and providers have been reiterated at a number of meetings. As such,

he said it was important for the Task Force to work a bit harder to ensure the implementation of RVSM in China airspace as scheduled. He wished all a successful meeting.

1.5 Documentation and Working Language

1.5.1 The working language of the meeting as well as all documentation was in English. Translation between Russian to English was undertaken by Kazakhstan and the Russian Federation for their delegations.

1.5.2 Fourteen Working Papers, eight Information Papers and one Flimsy were presented to the RVSM/TF/31. A list of papers is included at **Appendix B** to this Report.

Agenda Item 1: Adoption of Agenda

1.1 The meeting reviewed the provisional agenda proposed by the Chairperson of the Task Force for the RVSM/TF/31. In the absence of Mr. Yusfandri Gona, the Chairperson of the OPS/AIR/WG, and as there was no outstanding work items to be dealt with immediately, the meeting agreed that there was no need to discuss the aircraft operations and airworthiness matters. However, these matters should be fully considered at the Go/No-Go meeting in September. Accordingly, the meeting adopted the following agenda.

Agenda Item 1:	Adoption of Agenda
Agenda Item 2:	Operational Considerations
Agenda Item 3:	Issues Relating to Airworthiness and Approval of Aircraft *(Note: No Discussion)*
Agenda Item 4:	Safety and Airspace Monitoring Considerations
Agenda Item 5:	Implementation Management Considerations
Agenda Item 6:	Future Work – Meeting Schedule
Agenda Item 7:	Any Other Business

1.2 The meeting adopted agendas for the ATC/WG and the SAM/WG, as shown in **Appendices C** and **D** to this Report, respectively.

Agenda Item 2: Operational Considerations

Review of the RVSM/TF/30 and the Special Coordination Meeting for the RVSM Implementation by China (SCM/RVSM China)

2.1 The meeting reviewed the outcomes of the RVSM/TF/30 (March 2007, Bangkok) and the Special Coordination Meeting for the RVSM Implementation by China (SCM/RVSM China, May 2007).

RVSM/TF/30

2.2 The meeting recalled that the RVSM/TF/30 recognized the responsibility to determine whether RVSM should be introduced lay with the appropriate regional planning group.

2.3 IATA requested information on transition activities in regard to area control centers (ACCs) of the neighboring flight information regions (FIRs). This information would facilitate the coordination by China to amend LOAs to incorporate the transition activities. IATA was of view that operators needed to clearly understand the transition procedures, and requested the information on the procedures to be available as soon as possible.

2.4 Three hazards and associated causes had been identified in the safety risk management document (SRMD) for RVSM program in China undertaken by the United States Federal Aviation Administration (FAA). Mitigation measures were identified as detailed below.

a) The use of memory aids on the controller workstation showing the FLAS;
b) Assign additional resources in the form of subject matter experts;
c) Use of automation to provide visual indicators on the controllers' radar;
d) Dissemination and publication for aeronautical information, etc; and
e) Coordination with user groups to ensure familiarity with China RVSM.

2.5 RVSM/TF/30 noted that China would adopt the 90 % measurement of the RVSM approved aircraft operating in the planned RVSM airspace to ensure the readiness of the RVSM implementation.

2.6 RVSM/TF/30 was informed that the mechanism to collect the required traffic sample data (TSD) was being developed, and expected to be completed by June 2007. Meanwhile, the appropriate time period for the collection was to be determined. Finally, the RVSM/TF/30 agreed that the preliminary safety assessment should be conducted early before the Go/No-Go Meeting in September 2007 so that any safety-related problem could be identified and resolved at the early stage of the preparation for the RVSM implementation in China.

SCM/RVSM China

2.7 In order to identify the transition activities resulting from the implementation of RVSM with the metric system in China and to facilitate the amendment process of the LOAs by China and States concerned, the RVSM/TF/30 had worked out a table of the transition activities listing the Chinese FIRs, the respective neighboring FIRs, the necessary transition activities and the responsible parties for the transition. SCM updated the table.

2.8 SCM expressed concerns about the breakdown of vertical separation during the transition between China RVSM levels and ICAO RVSM flight levels, which would happen when, for example, a Chinese ACC assigns an eastbound aircraft 8 900 m, which corresponds to FL 291, and the westbound aircraft is operating at FL 300 from a neighboring FIR. SCM was of view that the procedures should be established to mitigate the breakdown of separation.

2.9 China informed the SCM that China would identify the transition areas and study whether the areas would be covered by radar. China noted the concerns on the breakdown of separation and advised the SCM that they would hold bilateral meetings with the neighboring States to consider the amendments to LOAs and the transition issue would be addressed in the process.

2.10 China reported that they conducted risk analysis and safety evaluations for RVSM implementation, to improve its capabilities to identify, avoid and prevent risks, based on the requirements of safety management system. Taking the actual situation of each unit into consideration, based on risk analysis, each unit develops suitable safety prevention measures for each risk.

2.11 China reported that the ATMB headquarters would develop relevant procedures and requirements on implementing RVSM China, modify the rules on the use of airspace and air routes, and publish them abroad through AIP and national AIP (NAIP) by 27 September 2007. China would issue a trigger NOTAM one week before the implementation date to remind relevant personnel of the RVSM implementation.

Amendment Proposal to Annex 2 – *Rules of the Air*

2.12 The Secretariat presented the meeting with a draft amendment to Appendix 3 – *Tables of Cruising Levels* of Annex 2 – *Rules of the Air* proposed by the ICAO Headquarters to incorporate the metric RVSM levels to be used by China. The meeting reviewed the proposal shown in **Appendix E** to this Report. The meeting noted that this proposal would be presented to the Air Navigation Commission in October 2007 and, subject to review by the Commission, be circulated to States for review in accordance with normal procedures.

China – Progress on RVSM Implementation

2.13 China informed the meeting that, in regard to the progress of RVSM implementation, regulations on RVSM for operators and ATC were at the final process of publication, and training for both ATC and pilots had begun. Substantial RVSM documentation was now available from the China RVSM website at www.atmb.net.cn/rvsm and although this was predominantly in Chinese, some information was also available in English language.

2.14 In addition to the ongoing coordination with IFALPA, China thanked the delegations from Japan, Kazakhstan, the Republic of Korea, Russian Federation and Vietnam that had visited China for discussions on the operational LOAs. China advised the meeting that Chinese delegations would also be sent to Japan, the Republic of Korea and other adjacent States to continue the discussions on the respective LOAs on RVSM operations.

2.15 The meeting recalled that the China RVSM airspace was exclusive RVSM airspace. In addition, ATC would issue the flight level clearance in meters and the aircraft shall be flown using the flight level in feet. Pilot shall use the China RVSM FLAS table to determine the corresponding flight level in feet.

2.16 As there were concerns on possible operational impact with aircraft capable of flying only in meters, the meeting sought clarification on the altimetry systems capability of the Russian-made aircraft. In this regard, the Russian Federation confirmed that the RVSM approved Russian fleets were capable of operating in both feet and meters. Accordingly, the meeting concluded that there would not be the case of aircraft using the different units of measurement when operating in China RVSM airspace. As such, the meeting agreed that aircraft capable of only operating in meters should not flight plan to operate in China RVSM airspace.

2.17 The meeting noted that China had conducted an RVSM survey of foreign operators. The letter and survey table are reproduced as **Appendix F** to this Report. The meeting was informed that presently there were 129 foreign operators certificated by CAAC CCAR129.

Review of Draft AIP Supplement for RVSM Implementation in China

2.18 China provided the meeting with a draft AIP Supplement for the RVSM implementation in China airspace for review.

Identification of RVSM Airspace and RVSM Flight Level Allocation

2.19 In light of the information, the meeting agreed with the China proposal to amend the paragraph 2.4 and its note in the draft AIP Supplement to paragraphs 2.4 through 2.8 as shown in **Appendix G** to the Report.

In-flight Procedures within RVSM Airspace

2.20 In light of the fact that the primary altimetry systems required by the RVSM Minimum Aircraft System Performance Specification (MASPS) would operate in feet, the meeting agreed to delete the words “in feet” in paragraph 6.1 (a) of the draft AIP Supplement to avoid any confusion. A note that “*Altimetry system requirement should be in accordance with paragraph 2.5”* would be included in the paragraph 6.1 (a).

Procedures for Strategic Lateral Offsets

2.21 China also proposed to include the Strategic Lateral Offsets Procedures (SLOP) of the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) in the AIP Supplement for RVSM implementation. The Secretariat thanked China for considering the implementation of the SLOP in the Chinese non-radar airspace.

2.22 IATA considered that the inclusion of the SLOP in the AIP Supplement for RVSM implementation, rather than publication by the separate AIP supplement, would be beneficial for the easy reference by operators. The meeting agreed that the procedures could be included in the AIP Supplement.

2.23 The Secretariat advised the meeting that the SLOP apply only in oceanic and remote continental airspace in accordance with PANS-ATM. Once aircraft enter radar airspace, the lateral offset would no longer be the Strategic Lateral Offsets and the lateral offset would require an approval from ATC. Accordingly, the meeting agreed to delete the word "strategic" and to reword the paragraph to require pilots to obtain the approval from ATC to continue offset tracking after entering radar airspace as shown in Appendix G to this Report.

Diagram/Conversion Table of Flight Level Allocation

2.24 As the three diagram/tables in Attachment A to the draft AIP Supplement contained the same information on the flight level allocation, the meeting agreed that only the semi-circular Diagram of Flight Level Allocation on the first page of the Attachment A should be used in the AIP Supplement.

2.25 In the course of reviewing the flight level allocation system (FLAS), the Russian Federation expressed concerns in relation to the adoption of what appeared to be a hybrid FLAS arrangement for the China RVSM implementation. Russian Federation recognized that although flight level clearances would be issued in metric, the actual flight levels to be flown were in feet and that this was neither a true metric or true imperial system. In their view, the introduction of a hybrid FLAS for the China RVSM level band undermined the position intended by the Secretariat at the SCM, in which only two FLAS would be in use in harmonized manner globally – feet and meters.

2.26 The meeting noted the concerns expressed by the Russian Federation. The Secretariat highlighted to the meeting that the amendment to Appendix 3 of Annex 2 that had been proposed by the ICAO Secretariat (Appendix E to this Report refers) was intended to prompt discussions in relation to these matters. It was important to recognize that the amendment proposal would only proceed in accordance with the normal amendment processes, which would include an examination by both the Air Navigation Commission and the ICAO Council. The Secretariat sought clarification from the Russian Federation on their support for the China RVSM FLAS. The Russian Federation agreed to continue discussions with China on the implementation of RVSM in China airspace.

2.27 Notwithstanding, the Russian Federation confirmed to the meeting that all aircraft of Russian manufacture that were approved for RVSM operations had operational altimetry systems that were capable of flying in feet as well as meters in the flight level bands being adopted for China RVSM implementation.

Contingency Actions

2.28 The meeting reviewed the Contingency Actions in Attachment D to the draft AIP Supplement. The meeting noted that the format was different from that agreed at the RVSM/TF/30. IATA indicated that the contingency procedures should be harmonized across the region as much as

possible. Agreeing on this, the meeting made changes where applicable to be in line with that practiced in the other areas of the Asia and Pacific Region. China agreed to the proposed changes shown in Appendix G to the Report but would revert on the word 'or deviation from the intended route' to be included in the second bullet point in the table on Mountain Wave Activity.

Transition Areas

2.29 The meeting noted that transition procedures between China and adjacent States were intended to be included in Attachment E to the draft AIP Supplement. China had informed the SCM that they would identify the transition areas and study whether the areas would be within radar cover. As such, China agreed to provide a chart and the information on the radar cover of the transition areas in the AIP Supplement.

2.30 However, as the transition areas and procedures were not yet finalized, the meeting agreed to China's proposal to publish AIP Supplements for the RVSM implementation in two stages. An AIP Supplement, except for the transition procedures, would be published by 30 August 2007, and include the policy and general procedures of RVSM in China airspace as discussed during the meeting (Appendix G to this Report). The second stage of the AIP Supplement publication, containing the specific detail on the individual transition areas and procedures, would be coordinated by China with the affected States to enable the synchronized publication of respective AIP supplements at least 42 days before the RVSM implementation, i.e. not later than 11 October 2007.

2.31 The meeting recognized that in order to meet the 11 October publication date, arrangements between China and each affected State would need to be agreed in principle by the end of the Go/No-Go meeting in September. The meeting noted that details on the transition areas and procedures would also be available on the website at www.atmb.net.cn/rvsm.

IFALPA – Draft Guidance Material for Aircrews

2.32 The meeting recalled that during the SCM/RVSM China, IFALPA was requested to work with CAAC and the Air Traffic Management Bureau (ATMB) to provide training material. IFALPA graciously agreed to assist in the development of guidance material for pilots.

2.33 In order to have a human centered flight level conversion chart available to support the China RVSM implementation, IFALPA had consulted extensively with its Human Performance Committee and worked with the authorities in China to develop a suitable conversion chart. IFALPA would promulgate the flight level conversion chart reproduced as **Appendix H** to this report.

2.34 The meeting commended IFALPA for this conscientious effort to address human factor issues for crews whilst supporting the RVSM implementation. The close working relationships that had been established between IFALPA and the CAAC/ATMB in China had resulted in a functional arrangement that was acceptable to both parties. Whilst recognizing that airlines individually had created their own charts in the past and that the new conversion chart would not preclude any operator from making their own conversion chart, it was anticipated that the promulgation of the agreed conversion chart would harmonize flight level conversion arrangements for China RVSM operations from the very beginning.

2.35 In addition to the flight level conversion chart, IFALPA informed the meeting that the guidance material was also being developed for pilots. The meeting noted that IFALPA was working to make the guidance material available by the end of August 2007 as agreed at the SCM.

2.36 In reviewing the documentation presently available from IFALPA, the meeting fully supported the content and the initiatives being pursued by IFALPA and strongly encouraged IFALPA to continue this work. The meeting noted that all material prepared by IFALPA would be available though the IFALPA web site at http://www.ifalpa.org/ as well as on the ATMB web site, including the conversion table in its original form (as *.JPG format).

China RVSM Transition Procedures

2.37 China presented draft RVSM transition procedures as in **Appendix I** to this Report. The meeting noted that the draft transition procedures were only proposals and some of these procedures were yet to be coordinated with States concerned.

2.38 IATA noted that the tables provided showed the flight levels in meters and requested China to also include the flight levels in feet as aircraft will operate in accordance with the feet system although the ATC instructions would be in meters. China was agreeable to include the flight levels in feet in the tables. The meeting reviewed the proposal by China as follows:

Shanghai ACC – Fukuoka ACC

2.38.1 Republic of Korea drew to the meeting's attention that A593 was established between the Fukuoka and the Shanghai FIRs through the Incheon FIR, and advised the meeting that the proposal did not appear to consider B576. Republic of Korea was of view that FL 310 and FL 340 should not be added to A593 (China-Japan) due to operational and technical considerations. Republic of Korea advised the meeting that FL 310 and FL 340 had been already used by the Republic of Korea for the operations of B576 and A593 (China-Republic of Korea), and the usage ratio was almost 53 % out of 17 level band from FL 250 to FL410 inclusive. And also considering applicable separation minima, capacity on A593 (China-Japan) was almost 2.5 to 5 times higher than that of B576. With regard to this, Japan requested detailed information from the Republic of Korea on the data. Republic of Korea would provide detailed information to Japan.

2.38.2 In this regard, Japan and the Republic of Korea requested a side meeting by the States to discuss this matter urgently during the meeting. However, the Chinese delegation to the meeting was not in a position to discuss the matter in detail and, consequently, advised the meeting that they planned to hold a tripartite meeting at the end of August in China. Japan and the Republic of Korea would consider attending the meeting.

2.38.3 The Secretariat drew attention to the fact that this airspace was also subject to the provisions of the Memorandum of Understanding (MOU) for the Akara–Fukue Corridor that had been signed by ICAO and China, Japan and the Republic of Korea, respectively. In this regard, any change to the airspace arrangements would need to be considered in the context of the MOU. As the MOU arrangements were currently subject to review by high level officials from the States concerned and IATA, it was evident that any proposals from the Task Force would also have to be considered as part of the overall MOU review process.

2.38.4 IATA expressed disappointment that operators continued to suffer from the current arrangements and urged the concerned parties to improve operations in the area expeditiously.

2.38.5 Noting that this situation would restrict airspace capacity on A593, the Secretariat encouraged China, Japan and the Republic of Korea to continue with the tripartite technical meetings with a view to formulating a technical solution suitable for A593 operations. However, any technical solutions proposed would need the consensus of all parties to the MOU, including ICAO, before implementation could be considered.

Qingdao ACC – Incheon ACC

2.38.6 Republic of Korea advised the meeting that the coordination to revise the LOA between Incheon and Qingdao ACCs was ongoing. However, the Republic of Korea requested China to plan the transition area in the Shanghai FIR. In response, China was of view that transition areas should be established within radar coverage. The ACCs concerned would coordinate to revise the LOA, including the establishment of the transition area.

Kunming ACC – Yangon ACC

2.38.7 With the implementation of the RVSM by China in November 2007, new transition procedures based on the proposal by China would be implemented and therefore the current transition arrangement established in the Kunming FIR should be cancelled. In this regard, IATA requested China to progress the coordination with Myanmar to synchronize the information to be provided by both States.

Kunming ACC – Vientiane ACC

2.38.8 China advised the meeting that the coordination would be finalized shortly.

Kunming ACC – Hanoi ACC

2.38.9 China informed the meeting that a new route and a transition area were agreed by China and Viet Nam. The new route would be implemented at a later date. In the meantime, the existing routes would be continued to be used and the transition procedures on the existing routes would be amended accordingly.

Lhasa ACC – Kathmandu ACC

2.38.10 China informed the meeting that they had difficulties in communicating and coordinating with Nepal. In this regard, China requested the Regional Office to forward the proposal to Nepal. The Regional Office agreed to assist in this regard.

Shenyang ACC – Vladivostok ACC

2.38.11 Russian Federation advised the meeting that they had not been aware of the proposal and were unable to provide any update as they would need to review the proposal.

Shenyang ACC – Pyongyang ACC

2.38.12 China informed the meeting that Shenyang ACC would be sending a delegation to Pyongyang ACC in August 2007 to discuss the transition proposal.

Lanzhou ACC - Ulaanbaatar ACC

2.38.13 IATA advised China that the 8 400 m for the westbound should be 8 600 m. China noted and would confirm it with Lanzhou ACC.

Beijing ACC - Ulaanbaatar ACC

2.38.14 IATA advised China that the 8 400 m for the westbound should be 8 600 m. China noted and would confirm it with Beijing ACC. In addition, China informed the meeting that they would send a delegation to Mongolia in August to coordinate these proposals.

Urumqi ACC – Bishkek ACC

2.38.15 China informed the meeting that there were on-going discussions. IATA advised China that the westbound 11 000 m and 10 400 m would both merge into a single level of 10 600 m, and 9 200 m and 8 400 into 8 600 m. China would review the arrangement.

Urumqi ACC – Semipalatinsk ACC

2.38.16 IATA informed the meeting that with the RVSM implementation, there would be a loss of one flight level in each direction, i.e. 9 100 m and 11 600 m , and 9 200 m and 8 400 m into 8600 m as compared to current operations.

2.38.17 Kazakhstan advised the meeting that the coordination between China and Kazakhstan was ongoing. The issue on the loss of two available levels would be addressed by both States. One option was to use a flexible operation by ACCs. For example, when there was not a flight on the eastbound 11 100 m, the westbound 11 600 m might be approved.

2.38.18 Further, Kazakhstan recalled that at the previous meetings the possibilities of establishing two direct routes by China had been raised and requested China to consider the opening of the new routes. China responded that it would take time to establish the proposed direct routes and it could be after the RVSM implementation.

Urumqi ACC – Almaty ACC

2.38.19 IATA expressed the view that with the RVSM implementation, there would be a loss of one flight level in each direction, i.e. 9 100 m and 11 600 m as compared to current operations. China was requested to consider making the two flight levels available.

Review of the Second Meeting of the Western Pacific/South China Sea (WPAC/SCS) RVSM Scrutiny Group

2.39 The meeting noted that the following significant issues were identified and being progressed by the second meeting of the WPAC/SCS Scrutiny Group (June 2007, Bangkok):

a) as the regional TLS had been exceeded and an adverse trend exhibited, the initial attention and efforts of the WPAC/SCS RSG were heavily focused on reversing this adverse trend, with the objective of returning the safety assessment to compliance with the TLS as soon as possible;

b) Remedial actions taken by States as a result of discussions during the WPAC/SCS RSG/1 meeting (January 2007) were considered to have contributed directly to reversing the negative trend;

c) MAAR had identified that the main cause contributable to the RVSM TLS infringement was the significant number of operational errors;

d) Those affected had been urged to take urgent and effective action including ensuring that bi-lateral arrangements were in place to facilitate immediate notification between ACC Supervisors to enable immediate investigation and remediation action;

e) Any changes that were made to the WPAC/SCS fight level orientation scheme (FLOS) arrangements would need to be compatible with the FLAS adopted for China's RVSM implementation;

f) the Scenario 3 FLOS was adopted as the basis for the future work of the WPAC/SCS RSG Scrutiny Group and comprised an ICAO compliant single alternate FLOS, with the exception of the six unidirectional parallel routes (L642, M771, N892, L625, N884 & M767) on which special high capacity arrangements had been agreed that involved managed use of all odd and even flight levels;

g) the Scenario 3 FLOS provided for straightforward transitions of +/- 100 ft into/out of China to align the whole number feet flight levels with the '+ 100' feet flight levels of the China flight level allocations and, provided that no safety issues were identified during the safety analyses made by any of the affected States or MAAR and consensus was reached, the Scenario 3 FLOS would be implemented during early 2008;

Agenda Item 3: Issues Relating to Airworthiness and Approval of Aircraft

There was no discussion under this Agenda Item.

Agenda Item 4: Safety and Airspace Monitoring Considerations

Safety Assessment - Technical Cooperation and Authorization

Technical Cooperation with PARMO (FAA)

4.1 The United States summarized a cooperative program intended to assist China in its plan to implement RVSM in November 2007, highlighting that this cooperation began in July 2005. Recently, the ATMB and the FAA agreed to a change in emphasis in one item of the work plan in order to enhance further the possibility for maximum interchange between RVSM specialists.

4.2 Formal RVSM coordination between the Federal Aviation Administration (FAA) Air Traffic Office (ATO) and the ATMB began in July 2005 with a week-long session held at the FAA Technical Center devoted to an introduction to the duties and responsibilities of a regional monitoring agency (RMA). The RMA, as called for in relevant ICAO guidance material, supports RVSM introduction and continued safe use through provision of safety services. Within the Asia and Pacific Region, the Asia/Pacific Planning and Implementation Regional Group had recognized formally the following RMAs: the Monitoring Agency for the Asia Region (MAAR) - provided by AEROTHAI - Airservices Australia, and the Pacific Approvals Registry and Monitoring Organization (PARMO) - provided by the FAA.

4.3 Following advice from China in late 2006 that they would implement RVSM as a matter of priority, the Joint Air Traffic Steering Group agreed that work to support this implementation would be the principal priority of the 2007 cooperation program. In this regard, the following activities had taken place:

a) five ATMB specialists visited the FAA Technical Center in January 2007 for an intensive one-week discussion and familiarization with RMA functions;

b) during April 2007, the FAA air traffic specialist who managed the implementation of the RVSM in U.S. domestic airspace in January 2005 led a small team which visited several ACCs in China in order to review implementation planning and share experiences with ATMB counterparts;

c) in June 2007, approximately 30 air traffic managers and controllers representing a cross-section of service-provision facilities in China spent a week at the FAA's Forth Worth Air Route Traffic Control Center observing RVSM operations, receiving instruction in FAA RVSM procedures and conducting simulation-based RVSM training using Fort Worth's facilities;

d) also in June, five specialists from the FAA Technical Center visited Beijing for an intensive three-day training and technical assistance activity. The Technical Center team addressed matters relating to:

- establishment and application of the RMA approvals-database function;
- constituting and operating a scrutiny group to review LHDs;
- June 2007 TSD collection; and
- interchange on technical subjects.

4.4 Future cooperative activities planned mean that the principal contributors to the ATMB's pre-implementation safety and readiness assessments will visit the FAA Technical Center during the week of 20 August 2007. They would bring with them the complete June 2007 TSD covering all of sovereign Chinese airspace and also ATMB archives of LHD information as well as the results of the recently established program to collect LHD reports explicitly for analysis in connection with RVSM implementation.

4.5 The ATMB and the FAA ATO had agreed that the FAA focus during the August meeting would be on constructive review and independent checking of the readiness and safety assessment, as opposed to the sharing of experience and provision of tools and results which have characterized previous ATMB – FAA Technical Center cooperative activities. Accordingly, the FAA Technical Center will review all pertinent readiness and safety assessments with the ATMB specialists.

4.6 The Technical Center would examine the methodology used by the ATMB and examine the results through an independent crosscheck using its own databases of RVSM approvals. The Technical Center will review the overall approach to conducting the safety assessment. In particular, there will be a thorough examination of parameter values used in risk model calculations.

4.7 In addition, the FAA Technical Center will examine the analysis of metric-altitude factors which have not been encountered in previous RVSM implementations. Such factors may include the mixture of aircraft maintaining assigned flight level using metric-unit altimetry systems and those using imperial-unit systems. The Technical Center will also conduct an independent examination of risk values appearing in the draft safety assessment using its own software and procedures.

Technical Cooperation with MAAR (AEROTHAI)

4.8 ATMB and MAAR also shared ongoing technical cooperation in RVSM. From 19 to 20 March 2007, three engineers from ATMB visited MAAR in Thailand. The MAAR experts made a comprehensive preparation and gave the engineers training on the establishment of RMA, establishment of POC and RVSM approval database supporting RVSM implementation, and safety assessment.

4.9 Additionally, MAAR had been providing ongoing support in relation to airframe height-keeping performance monitoring. MAAR had agreed to continue to assist China in this role and was formally recorded in the China AIP Supplement as the contact point for these activities.

China - Preparation for Pre-Implementation Safety Assessment

4.10 China presented the meeting with information regarding their preparations for the conduct of the RVSM pre-implementation safety assessment and proposals for establishment by China an APANPIRG Regional Monitoring Agency (RMA).

Traffic Sample Data Collection

4.11 The meeting recognized that none of the radar systems had been able to collect the one month TSD automatically until software fixes had been implemented for some automated systems to resolve these problems. In other cases, data for non-automated radar systems and non-radar airspaces had been collected manually.

4.12 China had implemented a TSD collection mechanism through the establishment of working groups situated in every ACC. Directors of each ACC were responsible for the organization of the work within the group and the overall coordination with the ATMB.

4.13 After the working groups were established, China started the trial TSD collection procedure in May 2007, in order to identify problems and errors associated with the collection process. The official TSD collection was undertaken nationally from 1 June to 1 July 2007 and had resulted in a one month TSD (June 2007) for the whole China sovereign airspace that was suitable for the preliminary risk assessment. During the early stage of the collection period, additional monitoring was conducted to ensure that all the data collected were without errors.

4.14 The meeting noted that China would continue to collect monthly periods of TSD following implementation to assist with the conduct of ongoing safety assessments. In this respect, the Secretariat highlighted that APANPIRG had adopted with its Conclusion 16/4 December each year as the month of the TSD collection to satisfy airspace safety monitoring requirements and urged China to gather the TSD for December 2007 in order to align with Asia and Pacific regional programmes.

Large Height Deviation (LHD) Collection

4.15 China reported that a meeting for LHD data collection was convened in May 2007 in Haikou, China. Participants comprised ATC supervisors and controllers from all the ACCs around China, who were given an introduction and detailed explanation of RVSM, the LHD and the way to collect LHD data from their daily work. After the meeting, all ACCs concerned were requested to provide by the beginning of June 2007, monthly LHD reports for the period of one and half years, starting from January 2006 to June 2007 using the LHD report template distributed during the Haikou meeting.

4.16 China informed the meeting that while most of the content of LHD report template remained the same as the form recommended in the *RMA Handbook*, some adaptations had been made to suit China's requirements, as follows:

a) The LHD description in feet was replaced by the one in metric because of the flight level allocation in China, namely "90 m (300 ft) or more between 8 400 m and 12 500 m" instead of "300 ft or more between FL 290 and FL 410"; and

b) Two diagrams were added to the last part of the template.

4.17 Both the paper and electronic copies of the LHD report template were distributed to each ACC and all the LHD records were filed using this template.

4.18 The meeting noted that since this was the first occasion that China collected the LHD reports in this way, China had to research backing their historical flight event records for LHD-related occurrences that had occurred between January 2006 and May 2007. The historical LHD information was obtained mainly from two data sources:

a) the related height deviation information was extracted from the unsafe events reports resourced from regional ATMBs; and

b) records from ACCs of those events in the past that also had a height deviation equal to or more than 90 meters but not serious enough to cause airborne conflicts.

4.19 Since 1 June 2007, China had permanently implemented arrangements for ongoing direct reporting of LHD occurrences. The system requires that controllers on duty would complete the required information in the LHD report template when an LHD occurred. These records would then be submitted to the responsible RVSM data collection group in the ACC for further review and inclusion of any additional data, etc. Subsequently, LHD reports would be forwarded on a monthly basis to ATMB Headquarters for review and collation.

4.20 MAAR drew the attention of the meeting to the new LHD reporting template adopted by MAAR as a result of discussions during the Seventh Meeting of the Regional Airspace Monitoring and Advisory Group (RASMAG/7, June 2007). The meeting recognized that adoption of this template by China, albeit with the necessary adaptations to suit China's requirements, would be of assistance in standardizing between APANPIRG RMAs and encouraged China to consider using the MAAR LHD template, which was available from http://www.aerothai.co.th/maar.

RVSM Airworthiness Approvals

4.21 In discussing mechanisms for ensuring the operators had appropriate RVSM approvals, the meeting agreed that since RMAs exchanged their approval data on a monthly basis, China could obtain the global RVSM approval data for international operators from any one RMA. The latest data obtained by China was from PARMO for the month of May 2007, which included data from seven global RMAs and States who send their data to PARMO directly, as shown in **Table 1** below.

Approval	Approval File
APARMO	2007_06_19_APARMOsnapshot.xls
Atlantic	NATCMA Approvals (15 May 07) QMAS.xls
Canada	RVSM 10 May 07 (Canada RVSM DB).xls
Carsamma	CARSAMMA Approvals (15 June 07).xls
Euro	Euro_Approvals (13 June 2007).xls
France	DGAC France Approvals_current as of 2007_01_22.xls
Maar	MAAR Approvals 18 Jun 2007.xls
Mecma	MECMA_Approvals (22 May 04).xls
Mexico	Mexico RVSM (20 Dec 2006).xls
US	2007_06_20_US_MASPSsnapshotACI_TrafficScrutiny.xls

Table 1: RVSM approval files used in Shanghai readiness assessment

4.22 Additionally, to ensure of the most accurate domestic approval data, ATMB had contacted the flight standards bureau of CAAC to collect up to date approvals data available from regional inspectors, as shown in **Table 2** below.

Note: blank means "None"

Series	Operators	Num of RVSM Operational Approval Aircraft	Num of RVSM A/W but not Ops Approval Aircraft	Num of the Survey aircraft(no RVSM A/W approval now but can get approval before implementation)	Num of no RVSM A/W approval aircraft until implementation
1	CHINA EASTERN AIRLINES	183			15（CRJ/EMB）
2	CHINA SOUTHERN AIRLINES	246	2	2	11（EMB/ATR）
3	AIR CHINA	201	3		
4	ZHEJIANG AIRLINES	18			
5	HAINAN AIRLINES	55	15		
6	SHANGHAI AIRLINES	39		2	3
7	SHANGHAI AIRLINES CARGO	4			
8	XIAMEN AIRLINES	47			
9	SHENZHEN AIRLINES	31	13		
10	UNITED EAGLE AIRLINES		4		
11	YANGTZE RIVER EXPRESS	6			
12	LUCKY AIR CO.		4		
13	OKAY AIRWAYS		6		
14	CHINA CARGO AIRLINES	7			
15	EAST STAR AIRLINES		3		
16	SHANDONG AIRLINES	21		10	
17	SICHUAN AIRLINES	13	1	11	5（EMB）
18	CHINA POSTAL AIRLINES	7			3（Y8-F100）
19	JADE CARGO	4			
20	DEER JET Co.			11	
	Totals	882	51	36	37

Table 2: Summary of Chinese domestic RVSM approvals- July 2007

Note:

- *Percentage of RVSM Ops Approval: 882 / (882+51+36+37) = 87.67%*
- *Percentage of RVSM A/W Approval: (882+51) / (882+51+36+37) = 92.74%*
- *Percentage of Survey: (882+51+36) / (882+51+36+37) = 96.32%*
- *Percentage of no approval until implementation: 37/ (882+51+36+37) = 3.78%*

4.23 Although final figures still had to be collated for international and domestic operations, it was evident from examination of global RMA databases and domestic data that the 90 percent figure for airframe approvals would be readily achieved and it was anticipated that the final outcome would be in the order of 95 percent.

Minimum Monitoring Requirements

4.24 China informed the meeting that it would adopt the airframe Minimum Monitoring Requirements (MMR) recommended by PARMO with small adjustments. The modified MMR which will be applied in China are shown in **Appendix J** to this Report.

Shanghai FIR - Preliminary Readiness Assessment

4.25 Recognizing that the Shanghai FIR represented some of the airspace with most heavy traffic in China, a decision had been taken by China to urgently complete a preliminary pre-implementation safety assessment for the Shanghai FIR (**Appendix K** refers) to enable review and comment by the meeting. As the 18 month LHD data and June 2007 TSD had already been collected nation-wide, calculation of relevant components of these data using the safety assessment model adopted for the Shanghai FIR would result in suitable final pre-implementation safety assessments for all affected airspaces in China for consideration by the next meeting.

Data Requirements

4.26 In preparing the preliminary Shanghai FIR readiness assessment, China used the following data:

- Shanghai FIR TSD of June 2007;
- RVSM approval data received via PARMO in May 2007 (see **Table 1** above); and
- Chinese domestic approval data collected from the CAAC in July 2007 (see **Table 2** above).

Safety Assessment Methodology

4.27 China informed the meeting that the internationally accepted collision risk model - the Reich Model, as also utilized by the MAAR and the PARMO - was applied in preliminary safety assessment of implementing RVSM in the Shanghai FIR. The technical risk referred to the ensemble of risk attributable to all causes arising from aircraft altimetry and altitude-keeping system performance. The estimate of operational risk was composed of two parts: that due to time spent at incorrect levels and that due to levels transitioned without clearance.

4.28 As envisioned by the ICAO Review of the General Concept of Separation Panel (RGCSP) and contained in the Regional Supplementary Procedures (Doc 7030), implementation of RVSM would be considered safe if target levels of safety were satisfied as follows:

- Collision risk due to aircraft height-keeping systems does not exceed 2.5 fatal accidents per 10^{-9} flying hours, and
- Collision risk due to all causes does not exceed 5 fatal accidents per 10^{-9} flying hours.

Shanghai Target Level of Safety is satisfied

4.29 The outcome of the preliminary readiness assessment for the Shanghai FIR demonstrated that, based on the collision risk estimates from the received TSD and LHD reports, the technical risk for the RVSM implementation in Shanghai FIR was 1.43×10^{-10} and the total risk attributed to all causes was 3.936×10^{-9} fatal accidents per flight hour. Therefore, the risk estimates **satisfy the agreed regional TLS** value of no more than 2.5×10^{-9} and 5.0×10^{-9} fatal accidents per flight hour due to the loss of a correctly established vertical separation standard of 300 m and to all causes, respectively.

APANPIRG RMA Oversight

4.30 The meeting recognized that, in accordance with regional requirements, the China safety and readiness assessments should be reviewed by one of APANPIRG RMAs to ensure that the processes adopted and the outcomes achieved were valid. In this context, the meeting noted the continuous and ongoing involvement of both MAAR and PARMO in the training and oversight of China's safety assessment matters. PARMO had provided training and oversight for RMA processes and, in August 2007, would conduct a full review of the China assessments.

4.31 Examination of the Shanghai FIR pre-implementation safety assessment had demonstrated that the processes used and presentation adopted were in accordance with the methodologies adopted by APANPIRG RMAs. Accordingly, the meeting considered that a satisfactory report by PARMO to the next meeting in relation to the matters described at paragraphs 4.6 to 4.7 above would be adequate to meet regional requirements for APANPIRG RMA oversight.

4.32 The meeting encouraged China to urgently undertake safety assessment for all airspace concerned, in order to allow any examples of risk estimates exceeding the TLS to be addressed in a timely manner. Individual areas of concern could, for example, be mitigated by reducing the passing frequency of flights in the airspace by realigning ATS routes or limiting traffic on a particular route. However, as such mitigators took time to implement, it was important that all safety assessments for the China implementation be completed as soon as possible.

4.33 The meeting commended the significant work that had already been completed by China in this regard and thanked MAAR and PARMO for their continued involvement and support of the China RVSM implementation.

Preparations for RMA Establishment

4.34 The meeting was informed that all aspects of work concerning the preparation for China to undertake full RMA functions and ongoing RVSM safety assessment had evolved smoothly since 2006. Recently, a draft written application on the establishment of RMA in China had already been submitted to the directors of ATMB for further review. In this application, some of the key elements concerning the establishment of RMA structure, the flow of RMA operations, RMA core functions and the system of administration RMA were demonstrated.

4.35 The meeting supported China in their intention and work programme to become an APANPIRG RMA. The Secretariat highlighted to China that RASMAG was expected to make recommendation to APANPIRG in this respect and, as such, full details of the China progress should be made available to RASMAG as soon as possible for review.

4.36 The Secretariat recalled that Japan was also advancing towards APANPIRG RMA status and the requirements in this regard had been considered by the RASMAG/7. China was encouraged to review the activities being undertaken taken by Japan, as recorded in paragraphs 5.61

to 5.65 of the RASMAG/7 report, and to prepare a full written submission for consideration by the RASMAG/8 in December 2007.

Asia/Pacific RVSM Safety Assessments

4.37 The meeting was presented with a summary of the most up-to-date safety assessments for RVSM operations in airspaces of the Asia and Pacific Region, as provided by APANPIRG RMAs to the RASMAG/7.

4.38 To facilitate ongoing safety assessment, the Asia and Pacific Regional RVSM airspaces were divided broadly into the Bay of Bengal (MAAR), WPAC/SCS (MAAR), Australian FIRs (Australian RMA), Fukuoka FIR (Japan Civil Aviation Bureau, ENRI, MAAR, PARMO), Pacific area (PARMO), and Northeast Asia (PARMO).

4.39 Safety assessments were conducted by APANPIRG RMAs on a periodic basis utilizing the continuous Large Height Deviation (LHD) reporting, including monthly "NIL LHD reports" and the annual December traffic sample data required under APANPIRG Conclusion 16/4. Safety assessments are submitted by RMAs to RASMAG for review.

4.40 With the exception of the Western Pacific/South China Sea area and the Fukuoka FIR, the RVSM TLS was being satisfied in Asia/Pacific RVSM airspaces.

Western Pacific/South China Sea area

4.41 **Table 3** below summarizes the results of the airspace safety oversight, as of April 2007, in terms of the technical, operational, and total risks for the RVSM implementation in the WPAC/SCS airspace.

Source of Risk	Lower Bound Risk Estimation	TLS	Remarks
Technical Risk	0.42×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	5.67×10^{-9}	-	-
Total Risk	**6.09×10^{-9}**	**5.0×10^{-9}**	**Exceeds Overall TLS**

Table 3: Risk Estimates for the Safety Assessment for the WPAC/SCS

4.42 The estimate of overall risk **exceeded the agreed TLS** values of 5.0×10^{-9} fatal accidents per flight hour due to all causes.

Fukuoka FIR

4.43 **Table 4** below summarizes the results of the airspace safety oversight for the Fukuoka FIR conducted by JCAB in coordination with PARMO and MAAR, as of January 2007, in terms of the technical, operational, and total risks for the RVSM implementation in the Fukuoka FIR.

Source of Risk	Lower Bound Risk Estimation	TLS	Remarks
Technical Risk	0.418×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	8.19×10^{-9}		
Overall Risk	**8.61×10^{-9}**	**5.0×10^{-9}**	**Exceeds the TLS**

Table 4: Risk Estimates for safety assessment of the Fukuoka FIR RVSM airspace

4.44 JCAB would continue to take remedial actions to reduce the overall risk and continue collecting TSD and LHD reports and coordinate safety assessments to ensure the continuing safety of RVSM operations.

Agenda Item 5: Implementation Management Considerations

Transition Arrangement Check List

5.1 The Chairperson had prepared the check list showing both Chinese and adjacent FIRs to be updated by China. However, China reported that they were still coordinating the transition arrangements with the States concerned and could not update the table.

5.2 IATA requested that the table be more detailed to show all the airways where the transition occurs and proposed the table as follows:

Chinese FIRs	**Adjacent FIRs**	**Airways (boundary) Airways**	**Transition Process**	**Responsible for Transition**	**√ when coordination completed**
Beijing	Ulaanbaatar	B339 (POLHO) B339/M520/ G218	China RVSM – 500 metre CVSM		
		A575 (INTIK) A575			
Guangzhou	Hanoi	R474 (TEBAK) R474	China RVSM – Feet		√
	Hong Kong	A470 (DOTMI) A470	China RVSM – Feet		
		A202 (SIKOU) A202			
Kunming	Hanoi		China RVSM – Feet		
	Kathmandu	B345 (NONIM) B345	China RVSM – Feet		
	Vientiane	A581 (SAGAG) A581	China RVSM – Feet		
	Yangon	A599 (LINSO) A599	China RVSM – Feet		
Lanzhou	Ulaanbaatar	B330 (MORIT) B480/B330	China RVSM – 500 meter CVSM		
Sanya	Hanoi	A202 (ASSAD) A202	China RVSM – Feet	Sanya ACC	√
	Ho Chi Minh				
	Hong Kong		N/A	N/A	-
	Manila		N/A	N/A	-
Shanghai	Fukuoka	A593 (SADLI) A593	China RVSM – Feet		
	Incheon	A593 (SADLI) A593	China RVSM – Feet		

Chinese FIRs	Adjacent FIRs	Airways (boundary) Airways	Transition Process	Responsible for Transition	√ when coordination completed
		G597/A591 (AGAVO) G597/Y64			
	Taibei		N/A	N/A	-
Shenyang	Chita	A345 (TELOK) A91	China RVSM – 500 meter CVSM		
	Khabarovsk	G212 (ARGUK) G212	China RVSM – 500 meter CVSM		
	Pyongyang	B332 (TOMUK) B332	China RVSM – 500 meter CVSM		
		A575/A345 (GOLOT) A345/A575			
	Vladivostok	B451 (BISUN) B451	China RVSM – 500 meter CVSM		
	Blagoveshchensk	A588 (SIMLI) G494	China RVSM – 500 meter CVSM		
	Ulaanbaatar		China RVSM – 500 meter CVSM		
Urumqi	Almaty	A460 (REVKI) A360/B142	China RVSM – 500 meter CVSM		
	Barnaul	B206 (GOPTO) B206	China RVSM – 500 meter CVSM		
	Bishkek	A468 (KAMUD) UB351/UB357/ UB358			
	Delhi	B215 (PURPA) G325	China RVSM – Feet		
	Dushanbe				
	Kathmandu		China RVSM – Feet		
	Lahore	B215 (PURPA) G325*	China RVSM – Feet		
	Osh				
	Semipalatinsk	A368 (SARIN) A368/G155	China Metric – Metric CVSM		
	Ulaanbaatar	G588 (TEBUS) G558	China Metric – Metric CVSM		

5.3 The meeting noted the tight time-line, i.e. six weeks before the Go/No-go meeting and there was still no update on the transition arrangements. To keep track of progress on the transition coordination process, the Chairperson suggested that the target date could be included in the "√" column.

5.4 IATA was of view that they should be hard target dates as the information on the transition areas and procedures would need to be circulated to the member-airlines and pilots in advance. Moreover, the briefing package on RVSM operations would have to be finalized by China and made available to IATA and IFALPA for circulation. The Secretariat advised the meeting that all the "√" boxes were supposed to be filled with "√" by the Go/No-Go meeting which would be held from 18-21 September 2007, and in this regard, 18 September 2007 should be the target date.

5.5 The meeting agreed to adopt 18 September 2007 as the target date for completion of the transition areas and procedures in order to enable publication the transition areas and procedures with AIP Supplements by 11 October as agreed during the meeting. The Chairperson requested China to keep contact with the Regional Office and update the list when transition arrangements were agreed upon.

Review of Task List

5.6 The meeting reviewed the Task List for the implementation of RVSM by China and identified outlining work items for the implementation of RVSM by China as updated in the **Appendix L** to the Report.

Agenda Item 6: Future Work – Meeting Schedule

6.1 The meeting agreed tentatively with the following schedule of Task Force meetings:

RVSM/TF/32 (Go/No-Go meeting)	18-21 September 2007	Beijing
RVSM/TF/33 (90 days review meeting)	1-4 April 2008	Beijing
RVSM/TF/34 (One year review meeting)	December 2008	TBD

Agenda Item 7: Any Other Business

Performance Based Navigation (PBN)

7.1 The meeting was presented information on the work done by the ICAO RNP Special Operational Requirements Study Group (RNP SORSG) as well as ICAO plans for implementation of performance based navigation (PBN) based on that work. State letter AN/11/45-07/22, *Guidance material for the issuance of performance based navigation (PBN) operational approvals*, dated 27 April 2007 is also posted on the ICAO-NET. This State letter provides the globally harmonized navigation specifications that can be used as the basis for operational approvals for PBN operations.

7.2 Nine "Introduction to PBN" Seminars would be conducted over the next year in different ICAO regions to familiarize States and stakeholders with the PBN concept and how to implement PBN. The next seminars were 11-14 September 2007 in Bangkok, Thailand and 17-21 September 2007 in New Delhi, India. Maximum participation by all stakeholders in PBN implementation is encouraged. A Web-based PBN training course has been developed by EUROCONTROL for ICAO and can be found on the ICAO PBN website www.icao.int/pbn. Completion of this training is recommended prior to attendance at the Introduction to PBN Seminars.

8. Closing of the Meeting

8.1 Mr. Kyotaro Harano, on behalf of Mr. Lalit B. Shah, thanked china for their hard work, and other States and international organization for the support for the meting. He particularly thanked Kazakhstan, Russian Federation and Uzbekistan for the long journey to Bangkok. It was only six weeks to the Go/No-Go meeting and he requested China to continue to work on the outstanding work items. He wished China the very good success for RVSM implementation in November. He wished all the participants a safe trip back to home.

8.2 Mr. Kuah Kong Beng thanked members for their patience and understanding. Through the efforts and hard works, the meeting achieved some success. The meeting finalized the AIP Supplement on the policy and general procedures on RVSM implementation in China airspace which would be published by China not later than 30 August 2007, thus giving ample advance notification to the users. The meeting also noted that discussions to finalize the LOAs on RVSM operations would continue to be held in August among States concerned. He wished them success and hoped to hear the good news in September. On the issue of airspace safety monitoring activities, China had completed the preliminary Safety Assessment for the Shanghai FIR which has the most heavy traffic movements in China and reported that the TLS had been satisfied. This was good news. However, the safety assessment for all the Chinese FIRs should be completed before the Go/No-Go meeting and he hoped for good results. It was a good and useful meeting and he wished participants a safe journey home.

……..……

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LIST OF WORKING PAPERS (WPs) AND INFORMATION PAPERS (IPs)

WORKING PAPERS

NUMBER	AGENDA	WORKING PAPERS	PRESENTED BY
WP/1	1	Provisional Agenda	Secretariat
WP/2	1, 2	Provisional Agenda for the ATC Operations Work Group (ATC/WG)	Chairperson of the ATC/WG
WP/3	1, 3	*- withdrawn -*	
WP/4	1, 4	Provisional Agenda for the Safety and Airspace Monitoring Work Group (SAM/WG)	Chairperson of the SAM/WG
WP/5	2, 4	Review of the 30th Meeting of the RVSM Implementation Task Force (RVSM/TF/30) and the Special Coordination Meeting for the RVSM Implementation by China (SCM/RVSM China)	Secretariat
WP/6	2, 4, 5	Task List for Implementation of Reduced Vertical Separation Minimum (RVSM) by China	Chairperson
WP/7	2	Amendment Proposal of Appendix 3 of Annex 2 – *Rules of the Air*	Secretariat
WP/8	4	Report on Activities of the RASMAG	Secretariat
WP/9	4	Asia/Pacific RVSM Safety Assessments	Secretariat
WP/10	4	The Process of Preliminary Assessment and Regional Monitoring Agency (RMA) Establishment in China Airspace	China
WP/11	2	RVSM Implementation Progress in China	China
WP/12	5	Review of Draft AIP Supplement for RVSM Implementation in China	China
WP/13	2	China RVSM Transition Procedures	China
WP/14	2	Draft Material for Aircrews	IFALPA

INFORMATION PAPERS

NUMBER	AGENDA	INFORMATION PAPERS	PRESENTED BY
IP/1	-	List of Working Papers (WPs) and Information Papers (IPs)	Secretariat
IP/2	-	Terms of Reference of RVSM/TF	Secretariat
IP/3	-	Terms of Reference of RVSM/TF Work Groups	Secretariat
IP/4	2, 4	Amendment Proposal of the Regional Supplementary Procedures (Doc 7030)	Secretariat
IP/5	2, 4	Review of the Outcomes of the Second Meeting of the Western Pacific/South China Sea RVSM Scrutiny Working Group	Secretariat
IP/6	4	RASMAG List of Competent Airspace Safety Monitoring Organizations	Secretariat

NUMBER	AGENDA	INFORMATION PAPERS	PRESENTED BY
IP/7	7	Implementation of the Performance Based Navigation (PBN)	Secretariat
IP/8	2	Update on Cooperation between China and the United States supporting Introduction of the Reduced Vertical Separation Minimum in Sovereign Chinese Airspace	United States

FLIMSY

NUMBER	AGENDA	FLIMSY	PRESENTED BY
Flimsy No. 1	2	Report of the ATC Operations Work Group	Chairperson of the ATC/WG

— END —

AGENDA FOR THE ATC OPERATIONS WORK GROUP (ATC/WG)

Agenda Item 1: Adoption of Proposed Agenda

Agenda Item 2: Finalization of Operational Plan for RVSM Implementation

- RVSM Airspace
- Flight Level Orientation Scheme
- Band of RVSM Levels
- Assignment of RVSM Levels
- Transition Procedures
- Contingency Procedures (Including Weather Deviation Procedures)

Agenda Item 3: Publication of Documents

- AIC
- AIP Supplement
- Trigger NOTAM

Agenda Item 4: Implementation Management Issues

- ATC Coordination Procedures
- Letters of Agreement

Agenda Item 5: Any Other Business

Agenda Item 6: Future work

…….

AGENDA FOR
THE SAFETY AND AIRSPACE MONITORING WORK GROUP (SAM/WG)

Agenda Item 1: Agree on Agenda

Agenda Item 2: Review Duties and Responsibilities of the Regional Monitoring Agency (RMA)

Agenda Item 3: Review the Readiness Assessment in the Planned RVSM Airspace

Agenda Item 4: Review the Progress of the Safety Assessments

Agenda Item 5: Review the RVSM/TF Task List

Agenda Item 6: Future SAM Work Program

Agenda Item 7: Any Other Business

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Proposal for Amendment to Appendix 3 of Annex 2

APPENDIX 3. TABLES OF CRUISING LEVELS

The cruising levels to be observed when so required by this Annex are as follows:

RVSM – FEET

a) in areas where feet is the primary unit of measurement for altitude or elevation, on the basis of regional air navigation agreements and in accordance with conditions specified therein, a vertical separation minimum (VSM) of 1 000 ft (300 m) is applied between FL 290 and FL 410 inclusive:*

TRACK**											
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Altitude			Altitude			Altitude			Altitude		
FL	Feet	Conversion to metres	FL	Feet	Conversion to metres	FL	Feet	Conversion to metres	FL	Feet	Conversion to metres
~~90~~			–	–	–	~~0~~			–	–	–
10	1 000	300	–	–	–	020	2 000	600	–	–	–
30	3 000	900	035	3 500	1050	040	4 000	1200	045	4 500	1350
50	5 000	1500	055	5 500	1700	060	6 000	1850	065	6 500	2000
70	7 000	2150	075	7 500	2300	080	8 000	2450	085	8 500	2600
90	9 000	2750	095	9 500	2900	100	10 000	3050	105	10 500	3200
110	11 000	3350	115	11 500	3500	120	12 000	3650	125	12 500	3800
130	13 000	3950	135	13 500	4100	140	14 000	4250	145	14 500	4400
150	15 000	4550	155	15 500	4700	160	16 000	4900	165	16 500	5050
170	17 000	5200	175	17 500	5350	180	18 000	5500	185	18 500	5650
190	19 000	5800	195	19 500	5950	200	20 000	6100	205	20 500	6250
210	21 000	6400	215	21 500	6550	220	22 000	6700	225	22 500	6850
230	23 000	7000	235	23 500	7150	240	24 000	7300	245	24 500	7450
250	25 000	7600	255	25 500	7750	260	26 000	7900	265	26 500	8100
270	27 000	8250	275	27 500	8400	280	28 000	8550	285	28 500	8700
290	29 000	8850				300	30 000	9150			
310	31 000	9450				320	32 000	9750			
330	33 000	10050				340	34 000	10350			
350	35 000	10650				360	36 000	10950			
370	37 000	11300				380	38 000	11600			
390	39 000	11900				400	40 000	12200			
410	41 000	12500				430	43 000	13100			
450	45 000	13700				470	47 000	14350			
490	49 000	14950				510	51 000	15550			
etc.	etc.	etc				etc.	etc.	etc			

* Except when on the base of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 1000 ft (300m) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.

** Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Note. — Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum between FL 290 and FL 410 Inclusive *(Doc 9574).*

RVSM – METRES

b) in areas where metres is the primary unit of measurement for altitude or elevation, on the basis of regional air navigation agreements and in accordance with conditions specified therein, a vertical separation minimum (VSM) of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive:*

TRACK**											
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Altitude			Altitude			Altitude			Altitude		
FL	Metres	Conversion to Feet	FL	Metres	Conversion to Feet	FL	Metres	Conversion to Feet	FL	Metres	Conversion to Feet
~~90~~			–	–	–	~~0~~			–	–	–
0030	300	1000	–	–	–	0060	600	2000	–	–	–
0090	900	3000	0105	1050	3500	0120	1200	3900	0135	1350	4400
0150	1500	4900	0165	1650	5400	0180	1800	5900	0195	1950	6400
0210	2100	6900	0225	2250	7400	0240	2400	7900	0255	2550	8400
0270	2700	8900	0285	2850	9400	0300	3000	9800	0315	3150	10300
0330	3300	10800	0345	3450	11300	0360	3600	11800	0375	3750	12300
0390	3900	12800	0405	4050	13300	0420	4200	13800	0435	4350	14300
0450	4500	14800	0465	4650	15300	0480	4800	15700	0495	4950	16200
0510	5100	16700	0525	5250	17200	0540	5400	17700	0555	5550	18200
0570	5700	18700	0585	5850	19200	0600	6000	19700	0615	6150	20200
0630	6300	20700	0645	6450	21200	0660	6600	21700	0675	6750	22100
0690	6900	22600	0705	7050	23100	0720	7200	23600	0735	7350	24100
0750	7500	24600	0765	7650	25100	0780	7800	25600	0795	7950	26100
0810	8100	26600	0825	8250	27100	0840	8400	27600	0855	8550	28100
0890	8900	29100				0920	9200	30100			
0950	9500	31100				0980	9800	32100			
1010	10100	33100				1040	10400	34100			
1070	10700	35100				1100	11000	36100			
1130	11300	37100				1160	11600	38100			
1190	11900	39100				1220	12200	40100			
1250	12500	41100				1310	13100	43000			
1370	13700	44900				1430	14300	46900			
1490	14 900	48900				1550	15500	50900			
etc.	etc.	etc.				etc.	etc.	etc.			

* Except when on the base of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 1000 ft (300m) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.

** Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

*Note.— Guidance material relating to vertical separation is contained in th*e Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive *(Doc 9574)*.

Non-RVSM - FEET

c) in other areas where feet is the primary unit of measurement for altitude or elevation.

TRACK*											
From 000 degrees to 179 degrees**						From 180 degrees to 359 degrees**					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Altitude			Altitude			Altitude			Altitude		
FL	Feet	Conversion to metres	FL	Feet	Conversion to metres	FL	Feet	Conversion to metres	FL	Feet	Conversion to metres
~~90~~			–	–	–	~~0~~			–	–	–
10	1 000	300	–	–	–	020	2 000	600	–	–	–
30	3 000	900	035	3 500	1050	040	4 000	1200	045	4 500	1350
50	5 000	1500	055	5 500	1700	060	6 000	1850	065	6 500	2000
70	7 000	2150	075	7 500	2300	080	8 000	2450	085	8 500	2600
90	9 000	2750	095	9 500	2900	100	10 000	3050	105	10 500	3200
110	11 000	3350	115	11 500	3500	120	12 000	3650	125	12 500	3800
130	13 000	3950	135	13 500	4100	140	14 000	4250	145	14 500	4400
150	15 000	4550	155	15 500	4700	160	16 000	4900	165	16 500	5050
170	17 000	5200	175	17 500	5350	180	18 000	5500	185	18 500	5650
190	19 000	5800	195	19 500	5950	200	20 000	6100	205	20 500	6250
210	21 000	6400	215	21 500	6550	220	22 000	6700	225	22 500	6850
230	23 000	7000	235	23 500	7150	240	24 000	7300	245	24 500	7450
250	25 000	7600	255	25 500	7750	260	26 000	7900	265	26 500	8100
270	27 000	8250	275	27 500	8400	280	28 000	8550	285	28 500	8700
290	29 000	8850	300	30 000	9150	310	31 000	9450	320	32 000	9750
330	33 000	10050	340	34 000	10350	350	35 000	10650	360	36 000	10950
370	37 000	11300	380	38 000	11600	390	39 000	11900	400	40 000	12200
410	41 000	12500	420	42 000	12800	430	43 000	13100	440	44 000	13400
450	45 000	13700	460	46 000	14000	470	47 000	14350	480	48 000	14650
490	49 000	14950	500	50 000	15250	510	51 000	15550	520	52 000	15850
etc.	etc.	etc	etc.	etc.	etc	etc.	etc.	etc	etc.	etc.	etc

* Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Non-RVSM - METRES

d) in other areas where metres is the primary unit of measurement for altitude or elevation.

TRACK*											
From 000 degrees to 179 degrees**						From 180 degrees to 359 degrees**					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Altitude			Altitude			Altitude			Altitude		
FL	Metres	Conversion to Feet	FL	Metres	Conversion to Feet	FL	Metres	Conversion to Feet	FL	Metres	Conversion to Feet
~~90~~			–	–	–	~~0~~			–	–	–
0030	300	1000	–	–	–	0060	600	2000	–	–	–
0090	900	3000	0105	1050	3500	0120	1200	3900	0135	1350	4400
0150	1500	4900	0165	1650	5400	0180	1800	5900	0195	1950	6400
0210	2100	6900	0225	2250	7400	0240	2400	7900	0255	2550	8400
0270	2700	8900	0285	2850	9400	0300	3000	9800	0315	3150	10300
0330	3300	10800	0345	3450	11300	0360	3600	11800	0375	3750	12300
0390	3900	12800	0405	4050	13300	0420	4200	13800	0435	4350	14300
0450	4500	14800	0465	4650	15300	0480	4800	15700	0495	4950	16200
0510	5100	16700	0525	5250	17200	0540	5400	17700	0555	5550	18200
0570	5700	18700	0585	5850	19200	0600	6000	19700	0615	6150	20200
0630	6300	20700	0645	6450	21200	0660	6600	21700	0675	6750	22100
0690	6900	22600	0705	7050	23100	0720	7200	23600	0735	7350	24100
0750	7500	24600	0765	7650	25100	0780	7800	25600	0795	7950	26100
0810	8100	26600	0825	8250	27100	0840	8400	27600	0855	8550	28100
0890	8900	29100	0920	9200	30100	0950	9500	31100	0980	9800	32100
1010	10100	33100	1040	10400	34100	1070	10700	35100	1100	11000	36100
1130	11300	37100	1160	11600	38100	1190	11900	39100	1220	12200	40100
1250	12500	41100	1280	12800	42100	1310	13100	43000	1370	13400	44000
1370	13700	44900	1400	14000	46100	1430	14300	46900	1460	14600	47900
1490	14900	48900	1520	15200	49900	1550	15500	50900	1580	15800	51900
etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.

* Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

中国民用航空总局
空中交通管理局
Air Traffic Management Bureau.CAAC

To:

Subject: RVSM Implementation in China

To meet the needs of aviation industry's development and to further improve the airspace capacity and operational efficiency, CAAC after in-depth research decided to implement reduced vertical separation minimum (RVSM) in China's whole airspace by the end of 2007.

Reduced Vertical Separation Minimum (RVSM) will be implemented in Beijing, Guangzhou, Kunming, Lanzhou, Shanghai, Shenyang, Urumqi and Wuhan FIRs and Sector AR01 (island airspace) of the Sanya CTA from 1600UTC on 21 November 2007. Sectors AR02 and AR03 of the Sanya CTA (oceanic airspace) has implemented RVSM along with the South China Sea region. Please refer to China AIP for the information, also you can visit China RVSM website: http://www.atmb.net.cn/rvsm/index_eg.asp Download section for the published AIC and the draft AIP SUP for detail information. Operators shall meet the requirements as specified in China RVSM AIC and AIP SUP. China RVSM Flight Level Allocation Scheme (FLAS) is based on Metric Flight Level, i.e. FL is expressed in meters. China RVSM Flight Level Allocation Scheme (FLAS) is attached in draft China AIP SUP. Operators shall ensure that the pilot has been trained on China RVSM Flight Level Allocation Scheme (FLAS) before the pilot can operate into China airspace.

In order to further understand the operator's readiness, please kindly fill out the China RVSM Operator Survey Table and send the feedback to us as soon as possible and no later than 24th July 2007. Your acknowledgement of this letter is appreciated.

Best regards.

China RVSM Contact Point:

Mr. Xiao Jing
Deputy Director of Air Traffic Control
Air Traffic Management Bureau of Civil Aviation Administration of China
12# Dongsanhuan Road Middle, Chaoyang District, Beijing, 100022, P.R.China
Tel: +86 10 87786812 Fax: +86 10 87786810
E-mail: xiaojing@263.net.cn

China RVSM Operator Survey Table for _____ Airlines

Aircraft M/M/S	Serial Number	Registration Number	Will be RVSM already Before 21 November 2007	Will NOT be RVSM already Before 21 November 2007	Altimeter setting in feet or meters

Note 1: The aircraft list is from The CAAC "OPERATIONS CERTIFICATION: FOREIGN AIR TRANSPORTATION CARRIERS(CCAR129)" website (http://www.castc.org.cn/ccar129/approved.asp).

Note 2: Please fill " √ " in the column to indicate whether the aircraft will be RVSM already before 21 November 2007, or the aircraft will NOT be RVSM already Before 21 November 2007.

Note 3: Most civil aircraft (Boeing and Airbus) use FEET as the primary altitude reference with a minimum selectable interval of 100 feet. Mode Control Panel (MCP) of Boeing 777 is shown below:
So for the "Altimeter setting in feet or meters" column, if the aircraft use FEET as the primary altitude reference with a minimum selectable interval of 100 feet, please fill out "in 100 feet" in the "Altimeter setting in feet or meters" column; if the aircraft use METER as the primary altitude reference with a minimum selectable interval of XX meters, please fill out "in XX meters" in the "Altimeter setting in feet or meters" column, for example, "in 10 meters" or "in 50 meters". If the aircraft can both use feet and meter, please also fill out both information in the "Altimeter setting in feet or meters" column. If possible, please also send me a picture of Mode Control Panel (MCP) and Primary Flight Display (PFD) for each type of the aircraft manufactured in Russia.

TELEGRAPHIC ADDRESS
AFTN: ZBBBYOYX
COMM: CIVIL AIR BEIJING
FAX: 8610 67347230

PEOPLE'S REPUBLIC OF CHINA
GENERAL ADMINISTRATION OF CIVIL AVIATION OF CHINA
AERONAUTICAL INFORMATION SERVICE
P. O. BOX 2272, BEIJING

AIP CHINA
Supplement
Nr.--/07

中国空域缩小垂直间隔的政策和程序
Policy and Procedures of RVSM in China Airspace

1.0 序言

1.1 国际民航组织(ICAO)第三次亚太地区空中航行会议建议：在北大西洋地区成功实施缩小的垂直间隔标准（RVSM）之后，在亚洲和太平洋地区也应当引入 RVSM。这主要是因为航空器营运人和空中交通服务(ATS)提供人将获得巨大收益。ICAO 9574 号文件—在 FL290 和 FL410 之间实施 300 米(1 000 英尺)的垂直间隔手册中包含有对 RVSM 的解释。

1.2 实行 RVSM 可获得的好处包括：

(a) 采用了 ICAO 支持的导航要求；
(b) 改善了空域的使用,有利于 ATC 调解冲突;
(c) 对于接近最佳巡航高度的飞行，节省燃油约 1%；
(d) 减小地面延误。

1.3 内容

ICAO 亚太地区实施 RVSM 工作组已经协调制订出本文件的基本内容。在本文件的各段中论述了以下政策:

2.0 RVSM 空域的范围
3.0 航空器适航和运行审批和监督
4.0 空域安全评估与监测
5.0 ACAS II 与应答机的装备
6.0 RVSM 空域中的飞行程序
7.0 过渡区域

1.0 Introduction

1.1 The International Civil Aviation Organization (ICAO) Third Asia/Pacific Regional Air Navigation Meeting recommended that Reduced Vertical Separation Minimum (RVSM) should be introduced in the Asia and Pacific region after successful implementation in the North Atlantic region. This is due to the significant benefits to be gained by aircraft operators and air traffic services (ATS) providers. ICAO Document 9574, Manual on Implementation of a 300m (1 000 ft) Vertical Separation Minimum between FL290 and FL410 inclusive contains an explanation of RVSM.

1.2 Benefits to be gained from RVSM include:

(a) Adoption of an ICAO endorsed navigation requirement;
(b)Improved utilization of airspace for ATC conflict resolution;
(c) Fuel savings of ≈ 1% for flight closer to optimum cruise altitude; and
(d) Reduction in ground delays.

1.3 Content

The ICAO Asia/Pacific RVSM Implementation Task Force has harmonized the basic content of this document. The following policies are addressed in the paragraphs of this document:

2.0 Identification of RVSM Airspace
3.0 Airworthiness and Operational Approval, and Monitoring
4.0 Airspace Safety Assessment and Monitoring
5.0 ACAS II and Transponder Equipage
6.0 In-flight Procedures within RVSM Airspace
7.0 Transition Areas

Draft

8.0 飞行计划要求

9.0 RVSM 空域中不符合 RVSM 运行的航空器的运行程序

10.0 交付符合 RVSM 运行的航空器时的交付飞行

11.0 不具备 RVSM 运行能力的航空器在 RVSM 空域的连续爬升或下降

12.0 RVSM 的暂停程序

13.0 航空器系统故障或遇上中度以上颠簸的情况下,管制员和飞行员的行动指导

14.0 陆空通信失效的处置程序

2.0 RVSM 空域和飞行高度层配备

2.1 中国实施缩小垂直间隔的飞行情报区（FIR）

自协调世界时 2007 年 11 月 21 日 1600UTC 时起，中国将在沈阳、北京、上海、广州、昆明、武汉、兰州、乌鲁木齐情报区和三亚管制区 01 号扇区（岛内空域），高度层为 8900 米（FL291）至 12500 米（FL411）的空域内实施米制的缩小垂直间隔。在上述飞行情报区内 8900 米（FL291）以上至 12500 米（FL411）定义为缩小垂直间隔空域。中国 RVSM 空域为专用 RVSM 空域，即不符合 RVSM 运行的航空器不得在中国 RVSM 空域 8900 米（FL291）和 12500 米（FL411）（含）内飞行，但 9.4 中所列情况除外。

2.2 中国实施缩小垂直间隔飞行高度层配备标准使用米制飞行高度层。中国实施缩小垂直间隔飞行高度层配备标准见附件 A。

2.3 运营人应当确保航空器驾驶员在中国境内飞行之前，该驾驶员经过了针对中国米制缩小垂直间隔飞行高度层的专门培训。中国米制缩小垂直间隔飞行高度层参考培训材料可以从网站上下载（http://www.atmb.net.cn/rvsm/index_eg.asp）。

2.4 为防止在 RVSM 空域内触发 TCAS 虚警，大多数飞机使用英制且高度设置最小刻度为 100 英尺。

管制员将发布米制飞行高度层指令。航

8.0 Flight Planning Requirements

9.0 Procedures for Operation of Non-RVSM Approved Aircraft in RVSM Airspace

10.0 Delivery Flights for Aircraft that are RVSM Compliant on Delivery

11.0 Continuous Climb/Descent of Non-Compliant Aircraft through RVSM Airspace

12.0 Procedures for Suspension of RVSM

13.0 Guidance for Pilot and Controller for Actions in Event of Aircraft System Malfunction or Turbulence Greater than Moderate

14.0 Procedures for Air-Ground Communication Failure

2.0 Identification of RVSM Airspace and RVSM FLAS

2.1 China RVSM Implementation FIRs

From 21 November at 1600 UTC, RVSM will be implemented in the Shenyang, Beijing, Shanghai, Guangzhou, Kunming, Wuhan, Lanzhou, Urumqi FIRs and Sector AR01 (island airspace) of the Sanya CTA between 8 900m (FL291) and 12 500m (FL411) inclusive. The Airspace between 8 900m (FL291) and 12 500m (FL411) is defined as RVSM airspace. China RVSM airspace is exclusive RVSM airspace, aircraft that are not RVSM compliant may not operate into China RVSM airspace between 8 900m (FL291) and 12 500 m (FL411) except for the following situations as detailed in 9.4.

2.2 China RVSM Flight Level Allocation Scheme (FLAS) is based on Metric Flighe Level. China RVSM Flight Level Allocation Scheme (FLAS) is attached in ATTACHMENT A.

2.3 The operator shall ensure that the pilot has been trained on China RVSM Flight Level Allocation Scheme (FLAS) before the pilot operated into China airspace. The training reference material on China Metric RVSM Flight Level Allocation Scheme (FLAS) can be downloaded from the website（http://www.atmb.net.cn/rvsm/index_eg.asp）.

2.4 To prevent undesirable ACAS TA/RA triggering in RVSM airspace and since most civil aircraft use FEET as the primary altitude reference with a minimum selectable interval of 100 feet. ATC will issue the Flight Level clearance in meters.

空器驾驶员应当根据中国民航飞行高度层配备标准示意图（表）来确定对应的英制飞行高度层。航空器应当飞对应的英制飞行高度层。

航空器驾驶员应当知晓公英制转换带来的差异，驾驶舱仪表显示的米制高度与管制指令的米制高度不一定完全一致，但存在的差异不会超过 30 米。

注：部分航空器例如 Il-96, Il-62, Tu-214 or Tu-154 等同时具备米制高度表和英制高度表的，应当使用英制高度。 如果航空器不能使用英制高度表，只能使用米制高度表，航空器运营人应当按照 9.0 中规定的方式向中国民航 RVSM 项目办公室提出特别申请方可以在 RVSM 空域内运行（联系的信息间 9.4.3）。

3.0 航空器适航和运行审批和监督

3.1 获准日期

运营人/航空器应当在 2007 年 11 月 21 日之前获得批准，以便使 ATS 提供人能够顺利规划 RVSM 的实施方案。

3.2 批准手续

运营人必须取得适当的注册国或运营人所属国的适航和运行批准，方可实施 RVSM 运行。有关要求参见中国民用航空总局（CAAC）相关的 RVSM 适航和飞标政策。

已经取得中国民航《外国公共航空运输承运人运行规范》的民用航空器承运人，应当向中国民航地区管理局申请并获得 RVSM 补充运行合格审定，方可以在 RVSM 空域内运行。

中国民用航空总局《外国公共航空运输承运人运行合格审定规则》(CCAR129)网站（http://www.castc.org.cn/ccar129/）包含航空

2.5 Pilots shall use the China RVSM FLAS table to determine the corresponding flight level in feet. The aircraft shall be flown using the flight level in FEET.

2.6 Pilots should be aware that due to the rounding differences, the metric readout of the onboard avionics will not necessarily correspond to the cleared Flight Level in meters however the difference will never be more than 30 meters.

2.7 Note: Aircraft equipped with metric and feet altimeters such as the Il-96, Il-62, Tu-214 or Tu-154 shall use the feet altimeter within RVSM band~~. If unable to use the feet altimeter, the operator shall contact the China RVSM Program office and apply for special approval to operate into China RVSM as described in section 9 (Contact information can be found in section 9.4.3).~~ Aircraft equipped with altimetry systems not capable of flying in accordance with paragraph 2.5 should not flight plan in the RVSM airspace and shall comply with the paragraph 9.0, as required.

2.8 Operator shall make available to the pilots the conversion table for the China RVSM FLAS when operating in China RVSM airspace.

3.0 Airworthiness and Operational Approval, and Monitoring

3.1 Approval date

Operator/aircraft approval by 21 November 2007 will enable air traffic service providers to plan for orderly RVSM implementation.

3.2 Approval process

Operators must obtain airworthiness and operational approval from the State of Registry or State of the Operator, as appropriate, to conduct RVSM operations. Relevant requirements will be contained in General Administration of Civil Aviation of China (CAAC) RVSM airworthiness and flight standards policies.

Oprators who has been certified and approved the “Operations Specifications for a Foreign Air Transportation Carrier” shall

器或运营人获得批准的指导材料。运营人应尽快与中国民用航空总局协调，以保证获得自世界协调时 2007 年 11 月 21 日 16 时起执行 RVSM 运行的许可。

3.3 航空器的高度保持性能标准监控

运营人必须参加RVSM航空器监控计划。这是 RVSM 实施计划的一个重要组成部分，因为它可以确认航空器是否符合高度保持性能标准。亚洲地区监控组织（MAAR）将处理监控的结果。有关 RVSM 监控的进一步信息，可登陆 MAAR 网站：

(a) 进入 AEROTHAI 网站的“ MAAR (Monitoring Agency for Asia Region)”部分并点击“ Monitoring Program”， 或

(b) 使用网址：
http://www.aerothai.co.th/maar/

3.3.1 其它地区的监控结果可用来满足亚太地区的监控要求。MAAR 将与其它监控机构协调以获取该信息。运营人可按下面的地址与 MAAR 监控承包人联系，询问中国地区的监控服务：

联系人: Ms. Vichuporn Bunyasiriphant

MAAR 的联系地址:

Monitoring Agency for Asia Region (MAAR)

AEROTHAI

102 Ngamduplee Rd. Tungmahamek, Sathorn,

Bangkok 10120，THAILAND

电话: 66-2-287-8154

传真: 66-2-287-8155

电子邮箱: maar@aerothai.co.th

apply to and be issued the RVSM supplimentary Operations Specifications by the jurisdictional Regional Administration designated by the CAAC before it can conduct air transportation operation within China RVSM airspace.

The CAAC “OPERATIONS CERTIFICATION: FOREIGN AIR TRANSPORTATION CARRIERS(CCAR129)” website (http://www.castc.org.cn/ccar129/) contains guidance on aircraft/operator approval. Operators must begin coordination with CAAC as soon as possible to ensure that they are approved to begin RVSM operations on 1600UTC on 21 November 2007.

3.3 Aircraft altitude-keeping performance monitoring

Operators are required to participate in the RVSM aircraft monitoring program. This is an essential element of the RVSM implementation program in that it confirms that the aircraft altitude-keeping performance standard is being met. Monitoring Agency for Asia Region (MAAR) will process the results of monitoring. For further information on RVSM monitoring, the MAAR website can be accessed by:

(a) Accessing the “MAAR (Monitoring Agency for Asia Region)” section of AEROTHAI website and clicking” Monitoring Program” or…

(b) Using this Internet address:
http://www.aerothai.co.th/maar/

3.3.1 Monitoring accomplished for other regions can be used to fulfill the monitoring requirements for the Asia/Pacific region. MAAR will coordinate with other monitoring agencies to access this information. For monitoring services in the China airspace, operators should contact the MAAR monitoring contractor as follows:

Contact Person: Ms. Vichuporn Bunyasiriphant

MAAR Address:

Monitoring Agency for Asia Region (MAAR)

AEROTHAI

Draft

MAAR GMU 监控服务协调人: Mr. Chutintorn Pongpairoj

电话: 66-2-285-9448

传真：66-2-285-9575

电子邮箱:

chutin@aerothai.co.th www.aerothai.co.th/maar/

4.0 **空域的安全评估和监视**

4.1 按照 ICAO 9574 号文件的要求，为了进行空域安全评估和监视，需要收集大高度偏差的数据报告。报告中的数据将不会被用作空域安全评估和监视以外的其它目的。

4.2 进行数据收集的空域

收集中国所有情报区空域范围内的大高度偏差数据。

4.3 进行数据收集的高度层范围

收集从 8900 米（FL291）到 12500 米（FL411）范围内的大高度偏差数据。

4.4 飞行员应采取的措施

飞行员按仪表飞行规则在 RVSM 空域飞行时，一旦发生偏离 ATC 指定的高度层 90 米（300 英尺）或以上的情况时，必须通过无线电或数据链通知相关的空中交通服务部门。飞行结束后，飞行员同样要报告运营人偏差发生的具体情况。

4.5 航空器注册国和运营人应采取的措施

当有飞行员报告大高度偏差(如 4.4 所述情况）发生时，航空器注册国应按照 AIP 补充修订附件 B 的表格形式填写报告至地区监视组织并抄送至:

中华人民共和国北京市东城区东四西大街 155 号 644 信箱，邮编 100710，中国民航

102 Ngamduplee Rd. Tungmahamek, Sathorn,

Bangkok 10120, THAILAND

Phone: 66-2-287-8154

Fax: 66-2-287-8155

Email: maar@aerothai.co.th

MAAR GMU Monitoring Service Coordinator: Mr. Chutintorn Pongpairoj

Phone: 66-2-285-9448

Fax: 66-2-285-9575

Email: chutin@aerothai.co.thwww.aerothai.co.th/maar/

4.0 Airspace Safety Assessment and Monitoring

4.1 In order to conduct the airsapce safety assessment and monitoring required by the ICAO Doc 9574, large height deviation report will be collected. Information contained in the collected reports will not be used for other purpose than the airspace safety assessment and safety monitoring.

4.2 Applicable Airspace

Large height deviation occurences will be collected from the entire airspace of Chinese FIRs.

4.3 Applicable level startum

Large height deviation occrurences will be collected between 8 900m (FL291) and 12 500m (FL411).

4.4 Action Taken by Pilot

Pilot of aircraft operating in accordance with IFR, when deviating for any reason by 90m (300ft) or more from cleared flight level by ATC in RVSM airspace, shall report to the relevant ATS unit concerned via radio or data link, as soon as practicable, on the level deviation. After completion of the flight, the pilot shall also report to the operator the details of deviation.

Draft

总局空管局运行中心
AFTN: ZBBBZGZX
电话： (86-10) 64012907
电传： (86-10) 65135983

5.0 ACAS II 与应答机的装备

5.1 ICAO 亚太地区实施 RVSM 工作组建议在 RVSM 空域飞行装有 ACAS 的航空器装备 ACAS II（7.0 版本的 TCAS II 系统符合 ICAO ACAS II 标准）。

5.2 营运人应当按照中国 AIP 中的有关要求，为其航空器安装符合要求的 ACAS II 和二次雷达应答机。

6.0 RVSM 空域中的飞行程序

6.1 在进入 RVSM 空域之前，飞行员应当检查所要求设备的状况（有关飞行员的 RVSM 程序，见 CCAR 91 部 12.d 章节或 FAA IG 91-RVSM 的附件 4）。下列设备应当工作正常：

(a) 两套主用英制高度测量系统；
(b) 一套自动高度保持装置；及
(c) 一套高度告警装置。

6.2 有关在应急情况中飞行员和管制员的行动，参见本 AIP 补充资料的附件 A 或 FAA IG 91-RVSM 的附件 5。当航空器处于以下情况时，飞行员必须通知管制员：

(a) 由于设备失效，不再继续执行 RVSM；或
(b) 失去高度测量系统的冗余；或
(c) 遇上影响保持高度能力的颠簸。

6.3 飞行高度层间的穿越

在许可的高度层间进行穿越时，航空器在指定的高度层上改平不得提前或滞后超过 45

4.5 State and Aircraft Operators

When large height deviation is reported by a pilot as described in 4.4, the State of Registry of the operator shall submit the report, in principle, using the form in Attachment B to this AIP Supplement, as soon as possible to the RMA(Regional Monitoring Agency) and copy to the following address:

The Operational Management Center of ATMB of CAAC
P.O. Box 644,155 Dongsi Street West, Dongcheng
District Beijing 100710, People's Republic of China
AFTN: ZBBBZGZX
TEL: (86-10) 64012907
FAX: (86-10) 65135983

5.0 ACAS II and Transponder Equipage

5.1 The ICAO Asia/Pacific RVSM Implementation Task Force recommends that those aircraft equipped with ACAS and operated in RVSM airspace be equipped with ACAS II. (TCAS II systems with Version 7.0 incorporated meet ICAO ACAS II standards).

5.2 Operators shall equip their aircraft with ACAS II and SSR transponder as required by AIP China.

6.0 In-flight Procedures within RVSM Airspace

6.1 Before entering RVSM airspace, the pilot should review the status of required equipment (see 12.d of CAAC CCAR 91, or Appendix 4 of FAA IG 91-RVSM for pilot RVSM procedures). The following equipment should be operating normally:

(a) two primary altimetry systems in feet;
Note: Altimetry system requirement should be in accordance with paragraph 2.5
(b) one automatic altitude-keeping device; and
(c) one altitude-alerting device.

6.2 See Attachment A to this AIP Supplement or Appendix 5 of FAA IG 91-RVSM for pilot and controller actions in

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米（150 英尺）。

6.4 飞行员高度层报告

在 RVSM 空域内除有 ADS 或雷达管制的条件外，飞行员到达任何指定高度，都必须报告。

6.5 尾流颠簸程序

飞行员在中国 RVSM 空域内遇到或预计尾流颠簸，可以向管制员申请改变高度，如可能可申请雷达引导，或者横向偏置。

6.6 策略横向偏置程序

6.6.1 具备自动偏置航迹能力的航空器，飞行机组可以在中国民航未实施雷达管制空域的国际航路内实施策略横向偏置程序。决定是否实施策略横向偏置由飞行机组决定。

6.6.2 驾驶员实施策略横向偏置时应当在飞行航路中心线右侧 1 海里或 2 海里的距离上建立策略横向偏置。不要求驾驶员向空中交通管制报告正在施行策略横向偏置。

6.6.3 在实施雷达管制的空域，飞行机组实施策略横向偏置程序应当得到管制员的批准。在实施雷达管制的空域实施批准的偏置最好偏置 1 海里。当航空器驾驶员正按照 6.6.1 中描述的实施策略横向偏置程序时，一旦在其进入雷达管制空域时可以向管制员申请继续实施偏置程序。

注：雷达管制空域和非雷达管制空域见 AIP ENR 1.6 实施雷达管制的管制空域列表.

注：由于航空器中使用高精度导航系统（例如全球导航卫星系统(GNSS)）的比例越来越高，造成自航路中心线横向偏置值的降低，使得当同一航路上的航空器之间的垂直间隔丧失时，增加了碰撞的概率。横向偏置程序，既适用于减轻由于提高导航精度而造成增加的横向重叠概率，也适用于减轻所遇

contingencies. The pilot must notify ATC whenever the aircraft:

(a) Is no longer RVSM compliant due to equipment failure; or

(b) Experiences loss of redundancy of altimetry systems; or

(c) Encounters turbulence that affects the capability to maintain flight level.

6.3 Transition between FL's

During cleared transition between levels, the aircraft should not overshoot or undershoot the assigned FL by more than 45 m (150 ft).

6.4 Pilot level call

Except in an ADS or radar environment, pilots shall report reaching any altitude assigned within RVSM airspace.

6.5 Procedures for wake turbulence

Pilots encountering or anticipating wake turbulence in China RVSM airspace have the option of requesting FL change, or if capable, a vector, or a lateral offset.

6.6 Procedures for Stratigic lateral offsets

6.6.1 The flight crew may apply strategic lateral offsets on international route within Non-radar airspace when the aircraft is equipped with automatic offset tracking capability. The decision to apply a strategic lateral offset shall be the responsibility of the flight crew.

6.6.2 The strategic lateral offset shall be established at a distance of 1 NM or 2 NM to the right of the centre line of the route relative to the direction of flight. Pilots are not required to inform ATC that a strategic lateral offset is being applied.

6.6.3 Within radar airspace, ~~the strategic~~ lateral offset ~~procedure~~ requires approval by ATC. ~~1 NM offsets are preferred within radar airspace. Pilots applying SLOP as described in 6.6.1, may request approval from ATC to continue with the off set upon entering radar airspace.~~ Pilots applying the SLOP in remote continental airspace should obtain approval from ATC to coninue offset tracking when entering the radar airspce.

Note: Radar airspace and Non-radar airspace is defined in AIP

到的尾流紊流。

6.7 有关 RVSM 运行的用语

有关 RVSM 运行的用语见附件 C。

ENR 1.6 .

Note: The use of highly accurate navigation systems (such as the global navigation satellite system (GNSS)) by an increasing proportion of the aircraft population has had the effect of reducing the magnitude of lateral deviations from the route centre line and, consequently, increasing the probability of a collision, should a loss of vertical separation between aircraft on the same route occur. The lateral offset procedures for both the mitigation of the increasing lateral overlap probability due to increased navigation accuracy, and wake turbulence encounters.

6.7 Phraseology Related to RVSM Operations

Phraseology Related to RVSM Operations is in Attachment C.

7.0 过渡区域

7.1 过渡区域，以及中国 RVSM 空域与周边国家和地区 FIR 转换的运行程序在 AIP 补充资料附件 E 中。

7.0 Transition Areas

7.1 Transition areas and procedures for transition between China RVSM and adjacent FIRs in neihboring countries are identied in Attachemnt E to this AIP Supplement.

8.0 飞行计划要求

8.1 除有特殊情况外，在指定的 RVSM 空域内飞行，要求运营人和航空器取得 RVSM 批准。运营人必须确定有关国家当局已经给予他们 RVSM 运行准许并且满足填报的飞行航线与计划的备份航线的 RVSM 要求。在 ICAO 标准飞行计划的第 10 项（设备）中应当填入字母“ W”，表示航空器和运营人都已取得 RVSM 批准。在中国 RVSM 空域内申请的米制飞行高度，飞行计划中应当用 S 后跟 4 位数字表示 (例如：S1250、S1220、S1190 分别表示 12500m、12200m、11900m)。

8.0 Flight Planning Requirements

8.1 Unless special arrangement is made as detailed below, RVSM approval is required for operators and aircraft to operate within designated RVSM airspace. The operator must determine that the appropriate State authority has granted them RVSM operational approval and they will meet the RVSM requirements for the filed route of flight and any planned alternate routes. The letter “W” shall be inserted in item 10 (Equipment) of the ICAO standard flight plan to indicate that both the aircraft and operator are RVSM approved. The request metric flight level within China RVSM in Flight Plan shall be expressed as S followed by 4 figures (such as S1250、S1220、S1190 represent 12500m、12200m、11900m, respectively).

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9.0 RVSM空域中不符合RVSM运行的航空器的运行程序

9.1 飞行优先权

应当注意到：在高度层分配时，符合RVSM 运行的航空器将获得优于不符合RVSM运行的航空器。

9.2 应用的间隔

在RVSM空域内飞行的不符合RVSM运行的航空器与所有其它航空器之间的垂直间隔标准为600米（2 000英尺）。

9.3 用语

在RVSM空域内飞行的不符合RVSM运行的航空器应当使用附件C中的用语。

9.4 不符合RVSM运行的航空器在RVSM空域做巡航飞行的特殊协调程序

不符合RVSM运行的航空器不得计划在RVSM空域内8900米（FL291）和12500米（FL411）之间飞行，但下列情况除外：

(a) 正在被起始交付给注册国或运营人的航空器（见：11.0中的附加详细资料）；或

(b) 以前取得了RVSM批准,但在经历设备失效之后，为了满足RVSM要求或取得批准，正在飞往维修设施进行修理的航空器；或

(c) 正在用作慈善或人道主义目的的航空器；或

(d) 国家航空器（用作军事、海关和警用的航空器被认作为国家航空器）。

9.4.1 航空器运营人从中国境内的机场起飞时，需要提前4到72小时向中国民航总局空管局运行中心提出申请。运行中心将通过电话、AFTN、传真或邮件通知批准情况；

9.4.2 9.4节(a)至(d)中所述的不符合RVSM

9.0 Procedures for Operation of Non-RVSM Approved Aircraft in RVSM Airspace

9.1 Flight priority

It should be noted that RVSM approved aircraft will be given priority for level allocation over non-RVSM approved aircraft.

9.2 Vertical separation applied

The vertical separation minimum between non-RVSM aircraft operating in the RVSM stratum and all other aircraft is 600 m (2 000 ft).

9.3 Phraseology

Non-RVSM approved aircraft operating in RVSM airspace should use the phraseology contained in Attachment C.

9.4 Special coordination procedures for cruise operation of Non-RVSM-approved aircraft in RVSM airspace.

Aircraft that are not RVSM compliant may not flight plan between 8 900m (FL291) and 12 500 m (FL411) , except for the following situations:

(a) The aircraft is being initially delivered to the State of Registry or Operator (see Paragraph 11.0 for additional details and information); or

(b) The aircraft was RVSM approved but has experienced an equipment failure and is being flown to a maintenance facility for repair in order to meet RVSM requirements and/or obtain approval; or

(c) The aircraft is being utilized for mercy or humanitarian purposes; or

(d) State aircraft (those aircraft used in military, custom and police services shall be deemed state aircraft)

9.4.1 Aircraft operators requesting that approval shall, if departing from an airport within China FIRs, obtain approval from the Operational Management Center of ATMB of CAAC normally between 4 - 72 hours prior to the expected departure time. The Operational Management Center will provide notification of approval via telehpone, AFTN, Fax or email as appropriate; and

9.4.2 The assignment of cruising levels to non-RVSM

运行的航空器飞行高度层的分配按照管制指令执行，航空器运营人应当在ICAO飞行计划中第18项中填写“ STS/任务性质(即FERRY/HUMANITARIAN/MILITARY/CUSTOMS/POLICE)/NON-RVSM COMPLIANT”。

9.4.3 可以与有关单位联系：

中华人民共和国北京市东城区东四西大街 155 号 644 信箱，邮编 100710，中国民航总局空管局运行中心

AFTN: ZBBBZGZX

电话： (86-10) 64012907

电传： (86-10) 65135983

9.4.4 本批准手续仅供以上指明的目的，不得用作逃避正常批准手续的手段。

10.0 不具备 RVSM 运行能力的航空器在 RVSM 空域的连续爬升或下降。

10.1 不具备 RVSM 运行能力的航空器获准穿越 RVSM 空域上升至 12500 米(FL411)以上 ,或穿越RVSM空域下降至8900米(FL291)以下的指定高度层运行时：

(a) 禁止以低于正常上升率或下降率的速率上升或者下降；

(b)禁止在穿越 RVSM 的高度层范围时平飞。

11.0 交付符合RVSM要求的航空器时的交付飞行

11.1 符合 RVSM 要求的航空器 ,在交付时，可在 RVSM 空域飞行，但机组必须经过空域内有关的 RVSM 政策和程序的培训，并且有关国家为运营人颁发有准许运行的批准书。国家应当以书信、电子邮件或传真形式通知 MAAR，为该一次性飞行出具证明文件。其中应当包括：计划飞行日期，飞行代号，注册号和机型/系列等。

approved aircraft listed in paragraph 9.4 (a) to (d) shall be subject to an ATC clearance. Aircraft operators shall include the “STS/ Category of operations (i.e. FERRY/HUMANITARIAN/ MILITARY/CUSTOMS/POLICE)/NON-RVSM COMPLIANT” in Field 18 of the ICAO Flight Plan.

9.4.3 The unit may be contacted as follows:

The Operational Management Center of ATMB of CAAC

P.O. Box 644,155 Dongsi Street West, Dongcheng

District Beijing 100710, People’s Republic of China

AFTN: ZBBBZGZX

TEL: (86-10) 64012907

FAX: (86-10) 65135983

9.4.4 This approval process is intended exclusively for the purposes indicated above and not as a means to circumvent the normal RVSM approval process.

10.0 Continuous Climb/Descent of Non-compliant Aircraft through RVSM Airspace

10.1 Non-RVSM compliant aircraft may be cleared to climb to and operate above 12 500m (FL411) or descend to and operate below 8 900m (FL291) provided that they:

(a) Do not climb or descend at less than the normal rate for the aircraft and

(b) Do not level off at an intermediate level while passing through the RVSM stratum.

11.0 Delivery Flights for Aircraft that are RVSM Compliant on Delivery

11.1 An aircraft that is RVSM compliant on delivery may operate in RVSM airspace provided that the crew is trained on RVSM policies and procedures applicable in the airspace and the responsible State issues the operator a letter of authorization approving the operation. State notification to MAAR should be in the form of a letter, e-mail or fax documenting the one-time flight. The planned date of the flight, flight identification, registration number and aircraft type/series should be included.

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12.0 RVSM 的暂停程序

12.1 当飞行员报告有中度以上颠簸时，空中交通服务将考虑在中国空域受影响的区域内暂停 RVSM 程序。在 RVSM 程序被暂停的区域内，所有航空器之间的垂直间隔标准为 600 米（2000 英尺）。

13.0 航空器系统故障或遇上中度以上颠簸情况下，管制员和飞行员的行动指导

13.1 在这些情况下的指导，见附件 D。

14.0 陆空通信失效程序的处置程序

14.1 结合中国 AIP，按照 ICAO 空中导航服务程序·空中交通管理—4444 文件中所规定的陆空通信失效程序。

12.0 Procedures for Suspension of RVSM

12.1 Air traffic services will consider suspending RVSM procedures within affected areas of Chinese FIRs when there are pilot reports of greater than moderate turbulence. Within areas where RVSM procedures are suspended, the vertical separation minimum between all aircraft will be 600m(2 000ft) .

13.0 Guidance for Pilots and Controllers for Actions in the Event of Aircraft System Malfunction or Turbulence Greater than Moderate

13.1 See Attachment D for guidance in these circumstances.

14.0 Procedures for Air-Ground Communication Failure

14.1 The air-ground communication failure procedures specified in ICAO PANS-ATM Doc 4444 should be applied, in conjunction with AIP China.

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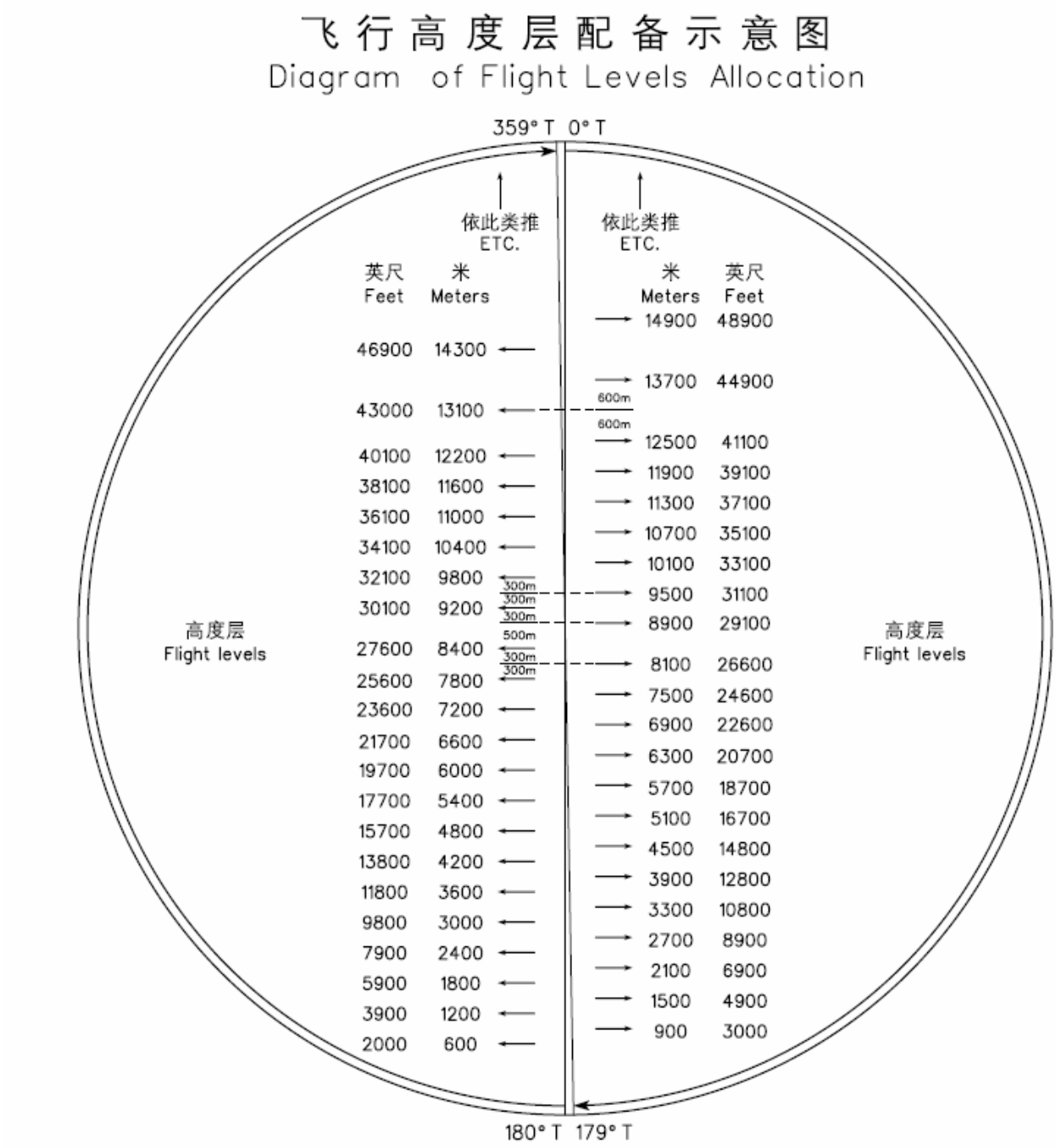
ATTACHMENT A



注：管制员将发布米制飞行高度层指令。航空器驾驶员应当根据中国民航飞行高度层配备标准示意图（表）来确定对应的英制飞行高度层。航空器应当飞对应的英制飞行高度层。航空器驾驶员应当知晓公英制转换带来的差异，驾驶舱仪表显示的米制高度与管制指令的米

Note: ATC will issue the Flight Level clearance in meters. Pilots shall use the China RVSM FLAS table to determine the corresponding flight level in feet. The aircraft shall be flown using the flight level in FEET. Pilots should be aware that due to the rounding differences, the metric readout of the onboard avionics will not necessarily correspond to the cleared Flight Level in meters however the difference will never be more than 30 meters.

制高度不一定完全一致，但存在的
差异不会超过 30 米。

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~~飞行高度层配备标准表~~

~~Table of Flight Levels Allocation Scheme~~

~~000° - 179°T~~		~~180° - 359°T~~	
~~Flight Levels~~		~~Flight Levels~~	
~~m~~	~~ft~~	~~m~~	~~ft~~
~~ETC.~~	~~ETC.~~	~~ETC.~~	~~ETC.~~
~~†~~	~~†~~	~~†~~	~~†~~
~~14900~~	~~48900~~	~~15500~~	~~50900~~
~~13700~~	~~44900~~	~~14300~~	~~46900~~
		~~13100~~	~~43000~~
~~12500~~	~~41100~~		
~~11900~~	~~39100~~	~~12200~~	~~40100~~
~~11300~~	~~37100~~	~~11600~~	~~38100~~
~~10700~~	~~35100~~	~~11000~~	~~36100~~
~~10100~~	~~33100~~	~~10400~~	~~34100~~
~~9500~~	~~31100~~	~~9800~~	~~32100~~
~~8900~~	~~29100~~	~~9200~~	~~30100~~
~~8100~~	~~26600~~	~~8400~~	~~27600~~
~~7500~~	~~24600~~	~~7800~~	~~25600~~
~~6900~~	~~22600~~	~~7200~~	~~23600~~
~~6300~~	~~20700~~	~~6600~~	~~21700~~
~~5700~~	~~18700~~	~~6000~~	~~19700~~
~~5100~~	~~16700~~	~~5400~~	~~17700~~
~~4500~~	~~14800~~	~~4800~~	~~15700~~
~~3900~~	~~12800~~	~~4200~~	~~13800~~
~~3300~~	~~10800~~	~~3600~~	~~11800~~
~~2700~~	~~8900~~	~~3000~~	~~9800~~
~~2100~~	~~6900~~	~~2400~~	~~7900~~
~~1500~~	~~4900~~	~~1800~~	~~5900~~
~~900~~	~~3000~~	~~1200~~	~~3900~~
~~—~~	~~—~~	~~600~~	~~2000~~
~~m~~	~~ft~~	~~m~~	~~ft~~

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~~飞行高度层对照表~~

~~China RVSM Conversion Table~~

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URUMQI FIR
SHENYANG FIR
BEIJING FIR
LANZHOU FIR
WUHAN FIR
SHANGHAI FIR
KUNMING FIR
GUANGZHOU FIR
ARO1
SANYA FIR

附件 B

高度偏差报告

报告每月进行一次，将本月内高度偏差在 90 米或以上（300 英尺）的事件向空管局进行报告，当没有大高度偏差（即上文提到的 90 米的偏差）发生时，需发送“零大高度偏差报告”。高度偏差报告能够帮助我们对 RVSM 空域的运行风险进行有效地评估，保证空域的安全，因此高度偏差报告收集的数据对我们的 RVSM 空域安全评估至关重要。

飞行情报区名称：

请根据需要完成第一部分或第二部分，即：

如果本月没有大高度偏差，在第一部分填写当月月份，在第二部分中填写“0”

如果本月出现了大高度偏差，则第一部分不用填写，在第二部分中具体填写相应内容。

第一部分：

_____月份，无高度偏差报告。

第二部分：

在 F290 至 F410 之间有_____起高度偏差在 300 呎或以上的高度偏差报告。

详细情况见附后表 A（请在中具体描述一起大高度偏差的内容，填写方法见样表）

注意：（每起高度偏差报告均需填写表 A 一次）

第三部分：

完成后，请将数据反馈以下电子邮箱（推荐），传真或邮寄地址：

(中国安全监测机构) 传真： 010-87786810 地址：北京东三环中路 12 号 100022

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表 B

在 FL290 和 FL410 之间高度偏差在 300 呎或以上事件的报告

注意：（请将每起高度偏差报告分别填表）

(0) 这是本月该报告单位报告的第_____起大高度偏差事件

(1) 报告人（单位、部门）：

(2) 该事件发生高度偏差的地点：

- 航路／航线：
- 航路点：

(3) 发生该事件的日期、时间（UTC）

(4) 航空器识别和机型

(5) 应飞飞行高度层

(6) 观察到/模式 C 显示/飞行员报告的飞行高度层

(7) 该飞行高度层持续时间

(8) 造成偏差的原因

(9) 其他空中活动（冲突）

(10) 机组评论（如果有）

(11) 气象条件

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ATTACHMENT B

LARGE HEIGHT DEVIATION REPORT

Message format for a report to CAAC of any altitude deviation of 90 m (300 ft) or more, including those due to Airborne Collision Avoidance System (ACAS), turbulence and contingency events.

0. It is the [ ] LHD which has been reported in this month

1. Data and time of occurrence [UTC]

2. Location of deviation [ ]

3. Aircraft operator [ ]

4. Name/telephone [/]

5. Flight identification, registration-number and aircraft type
[/ /]

6. Level assigned [FL]

7. Deviated final level [FL]

8. Duration at or above 90 m (300 ft) from the cleared flight level
[min sec]

9. Cause of deviation [ ]

10. Other traffic if found [ ]

11. Crew comments [ ]

12. Weather condition [ ]

13. Remarks [ ]
(in the event of contingency plan, indicate whether prior clearance was obtained.)

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附件 C **ATTACHMENT C**

有关 RVSM 运行的用语 **Phraseology Related to RVSM Operations**

管制员—飞行员用语： Controller-pilot phraseology:

语义 Message	用语 Phraseology
用于管制员确认航空器的 RVSM 准许状况： For a controller to ascertain the RVSM approval status of an aircraft:	（航空器呼号），证实 RVSM 已批准。 (call sign) COMFIRM RVSM APPROVED
用于飞行员报告非 RVSM 准许状况： i) 在 RVSM 空域的频率上首次呼叫（管制员将复诵相同的短语），及 ii) 在申请所有有关 RVSM 空域的飞行高度层的飞行高度层改变时；及 iii) 在复诵所有有关 RVSM 空域的飞行高度层的飞行高度层许可时。 此外，除国家航空器外，飞行员在复诵涉及垂直穿越 8900 米(FL291)或 12500 米 (FL411)的飞行高度层许可时应当包括该短语。 见下面的例子。 For a pilot to report non-RVSM approval status: i) on the initial call on any frequency within the RVSM airspace (controllers shall provide a readback with this same phrase), and ii) in all requests for flight level changes pertaining to flight levels within the RVSM airspace; and iii) In all read-backs to flight level clearances pertaining to flight levels within the RVSM airspace. Additionally, except for State aircraft, pilots shall include this phrase to read back flight level clearances involving the vertical transit through 8 900m (FL291) or 12 500m (FL411). See examples that follow.	不是 RVSM。 NEGATIVE RVSM*
用于飞行员报告 RVSM 准许状况。 For a pilot to report RVSM approval status.	是 RVSM。 AFFIRM RVSM*
用于非 RVSM 准许的国家航空器的飞行员在回答短语“(呼号)CONFIRM RVSM APPROVED”时，报告非 RVSM 准许状况。 For a pilot of a non-RVSM approved State aircraft to report non-RVSM approval status, in response to the phrase (call sign) CONFIRM RVSM APPROVED.	不是 RVSM，是国家航空器。 NEGATIVE RVSM, STATE AIRCRAFT*

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用于拒绝进入 RVSM 空域 Denial of clearance into the RVSM airspace:	（呼号）不能许可进入 RVSM 空域，保持[上升或下降到]高度层（数字） （呼号 call sign)UNABLE ISSUE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [or DESCEND TO, or CLIMB TO] FLIGHT LEVEL
用于飞行员报告严重颠簸影响航空器保持 RVSM 的高度保持要求的能力 For a pilot to report when severe turbulence affects the aircraft's capability to maintain the height-keeping requirements for RVSM.	[由于颠簸，不能保持 RVSM。 UNABLE RVSM DUE TURBULENCE*
用于飞行员报告航空器的设备等级已经降低到 RVSM 空域内飞行所要求的 MASPS 以下。 (该短语用来表示不符和 MASPS，既用于起始时，也用于在问题消除之前或航空器脱离 RVSM 空域之前，在 RVSM 空域的侧向界限之内的所用频率上的首次联络时。) For a pilot to report that the aircraft's equipment has degraded enroute below that required for flight within the RVSM airspace. (This phrase is to be used to convey both the initial indication of the non-MASPS compliance, and henceforth, on initial contact on all frequencies within the lateral limits of the RVSM airspace until such time as the problem ceases to exist, or the aircraft has exited the RVSM airspace.)	由于设备原因不能保持 RVSM。 UNABLE RVSM DUE EQUIPMENT*
用于在设备或与天气有关的应急情况之后，飞行员报告可恢复在 RVSM 空域飞行的能力。 For a pilot to report the ability to resume operations within the RVSM airspace after an equipment or weather-related contingency.	准备好恢复 RVSM 运行 READY TO RESUME RVSM
用于管制员确认航空器已经再次取得 RVSM 准许的状况，或确认飞行员已经准备好恢复 RVSM 飞行。 For a controller to confirm that an aircraft has regained its RVSM approval status or to confirm that the pilot is ready to resume RVSM operations.	能够恢复 RVSM 时报告 REPORT WHEN ABLE TO RESUME RVSM

例 1： 非 RVSM 准许的国家航空器，现在保持 7 800 米（FL256），随后申请上升到 9800 米（FL321）。

Example 1: A non-RVSM approved aircraft, maintaining 7 800m(FL256), subsequently requests a climb to 9 800 m (FL321).

Pilot: (call sign) REQUEST 9 800 m (FL321), NEGATIVE RVSM

Controller: (call sign) CLIMB TO 9 800 m (FL321)

Pilot: (call sign) CLIMB TO 9 800 m (FL3211), NEGATIVE RVSM

例 2： 非 RVSM 准许的国家航空器，现在保持 11000 米（FL361），随后申请上升到 11600 米（FL381）。

Example 2: A non-RVSM approved aircraft, maintaining 11 000 m (FL361), subsequently requests a climb to 11 600 m (FL381).

Pilot: (call sign) REQUEST 11 600 m (FL381), NEGATIVE RVSM

Controller: (call sign) CLIMB TO 11 600 m (FL381)

Pilot: (call sign) CLIMB TO 11 600 m (FL381), NEGATIVE RVSM

例 3： 非 RVSM 准许的民用航空器，现在保持 8 400 米（FL276），随后申请上升到 9 800 米（FL321）。

Example 3: A non-RVSM approved civil aircraft maintaining 8 400 m (FL276), subsequently requests a climb to 9 800 m (FL 321).

Pilot: (call sign) REQUEST 9 800 m（FL321）, NEGATIVE RVSM

Controller: (call sign) UNABLE ISSUE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN 8 400 m (FL276)

例 4： 管制员指挥 RVSM 准许的民用航空器保持高度 9200 米，但是管制员通过雷达发现航空器在 FL302 高度飞行（注：飞行员应当飞 FL301，这时雷达标牌显示为 0917；如果飞行员实际在飞 FL302，这时雷达标牌显示为 0920）。这时，管制员提醒航空器驾驶员按照中国民航飞行高度层配备标准示意图（表）飞对应的英制飞行高度层。

Example 4: Air traffic controller instructs a RVSM approved civil aircraft to maintain 9200 m, but he finds the aircraft is actually flying FL302. ATC will inform the Pilot to use the China RVSM FLAS table to determine the corresponding flight level in feet.

Controller: (call sign) MAINTAIN 9200m.

Pilot: (call sign) MAINTAIN 9200m.

Controller: (call sign) MAINTAIN 9200m, CONVERT ALTITUDE WITH CHINA RVSM FLIGHT LEVEL CHART.

The Pilot shall use the China RVSM FLAS table to determine that, for 9200m, the corresponding flight level in feet is FL301, then fly the aircraft at FL301, and then:

Pilot: (call sign) MAINTAIN 9200m.

ATS 部门之间的协调 **Coordination between ATS units:**

段落 Para	语义 Message	用语 Phraseology
1	口头补充未能自动传输的第 18 项飞行计划信息的自动化预计电报交换 To verbally supplement an automated estimate message exchange which does not automatically transfer Item 18 flight plan information.	不是 RVSM 或 不是 RVSM，是国家航空器 [根据可应用性] NEGATIVE RVSM or NEGAVIVE RVSM STATE AIRCRAFT [根据可应用性 as applicable]

2	口头补充非 RVSM 准许航空器的预计电报 To verbally supplement estimate messages of non-RVSM approved aircraft.	不是 RVSM 或 不是 RVSM，是国家航空器[根据可应用性] NEGATIVE RVSM or NEGAVIVE RVSM STATE AIRCRAFT [根据可应用性 as applicable]
3	交流有关航空器由于严重颠簸或严重的天气现象[设备失效，根据可应用性]造成的不能进行 RVSM 飞行的原因 To communicate the cause of a contingency relating to an aircraft that is unable to conduct RVSM operations due to severe turbulence or other severe weather-related phenomenon [or equipment failure, as applicable].	由于颠簸[或设备原因]，不能保持 RVSM。 UNABLE RVSM DUE TURBULENCE [or EQUIPMENT，根据可应用性 as applicable]

对符合我国高度层配备标准的高度，其高度的读法示例见表 B。

Pronunciation of Flight Levels in metric system is published in the table B as follows:

高度层 Flight Level	汉语读法 Chinese Pronunciation	英语读法 English Pronunciation
600m	六百	SIX HUN-dred METERS
900m	九百	NIN-er HUN-dred METERS
1200m	一千二 或 幺两	WUN TOU-SAND TOO HUN-dred METERS
1500m	一千五 或 幺五	WUN TOU-SAND FIFE HUN-dred METERS
1800m	一千八 或 幺八	WUN TOU-SAND AIT HUN-dred METERS
2100m	两幺	TOO TOU-SAND WUN HUN-dred METERS
2400m	两千四	TOO TOU-SAND FOW-er HUN-dred METERS
2700m	两千七 或 两拐	TOO TOU-SAND SEV-en HUN-dred METERS
3000m	三千	TREE TOU-SAND METERS
3300m	三千三	TREE TOU-SAND TREE HUN-dred METERS
3600m	三千六	TREE TOU-SAND SIX HUN-dred METERS
3900m	三千九	TREE TOU-SAND NIN-er HUN-dred METERS
4200m	四千二 或 四两	FOW-er TOU-SAND TOO HUN-dred METERS

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4500m	四千五	FOW-er TOU-SAND FIFE HUN-dred METERS
4800m	四千八	FOW-er TOU-SAND AIT HUN-dred METERS
5100m	五千一 或 五幺	FIFE TOU-SAND WUN HUN-dred METERS
5400m	五千四	FIFE TOU-SAND FOW-er HUN-dred METERS
5700m	五千七 或 五拐	FIFE TOU-SAND SEV-en HUN-dred METERS
6000m	六千	SIX TOU-SAND METERS
6300m	六千三	SIX TOU-SAND TREE HUN-dred METERS
6600m	六千六	SIX TOU-SAND SIX HUN-dred METERS
6900m	六千九	SIX TOU-SAND NIN-er HUN-dred METERS
7200m	拐两	SEV-en TOU-SAND TOO HUN-dred METERS
7500m	七千五	SEV-en TOU-SAND FIFE HUN-dred METERS
7800m	七千八	SEV-en TOU-SAND AIT HUN-dred METERS
8100m	八千一	AIT TOU-SAND WUN HUN-dred METERS
8400m	八千四	AIT TOU-SAND FOW-er HUN-dred METERS
8900m	八千九	AIT TOU-SAND NIN-er HUN-dred METERS
9200m	九千二	NIN-er TOU-SAND TOO HUN-dred METERS
9500m	九千五	NIN-er TOU-SAND FIFE HUN-dred METERS
9800m	九千八	NIN-er TOU-SAND AIT HUN-dred METERS
10100m	幺洞幺	TEN TOU-SAND WUN HUN-dred METERS Or WUN ZE-RO TOU-SAND WUN HUN-dred METERS
10400m	幺洞四	TEN TOU-SAND FOW-er HUN-dred METERS Or WUN ZE-RO TOU-SAND FOW-er HUN-dred METERS
10700m	幺洞拐	TEN TOU-SAND SEV-en HUN-dred METERS Or WUN ZE-RO TOU-SAND SEV-en HUN-dred METERS
11000m	幺幺洞或一万一千米	ELEVEN TOU-SAND METERS Or WUN WUN TOU-SAND METERS

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11300m	幺幺三	ELEVEN TOU-SAND TREE HUN-dred METERS Or WUN WUN TOU-SAND TREE HUN-dred METERS
11600m	幺幺六	ELEVEN TOU-SAND SIX HUN-dred METERS Or WUN WUN TOU-SAND SIX HUN-dred METERS
11900m	幺幺九	ELEVEN TOU-SAND NIN-er HUN-dred METERS Or WUN WUN TOU-SAND NIN-er HUN-dred METERS
12200m	幺两两	WUN TOO TO-SAND TOO HUN-dred METERS
12500m	幺两五	WUN TOO TO-SAND FIFE HUN-dred METERS
13100m	幺三幺	WUN TREE TOU-SAND WUN HUN-dred METERS
13700m	幺三拐	WUN TREE TOU-SAND SEV-en HUN-dred METERS
14300m	幺四三	WUN FOW-er TOU-SAND TREE HUN-dred METERS
14900m	幺四九	WUN FOW-er TOU-SAND NIN-er HUN-dred METERS

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附件 D **ATTACHMENT D**

应急处置程序：遭遇危险天气和航空器系统失效
Contingency Actions: Weather Encounters and Aircraft System Failures

应急情况下飞行员的初始行动
Initial Pilot Actions in Contingency Situations

当不能够保持飞行高度（FL）或者不能确定航空器高度保持性能时飞行员的初始行动 **Initial Pilot Actions when unable to maintain flight level (FL) or unsure of aircraft altitude-keeping capability:**
• 通知管制员并请求下列协助 • Notify ATC and request assistance as detailed below. • 尽可能保持管制许可的飞行高度，同时评估当时的情况 • Maintain cleared flight level, to the extent possible, while evaluating the situation • 通过目视，或者使用 TCAS（如果装备有）观察空中交通 • Maintain watch for conflicting traffic both visually and by reference to TCAS~~, if equipped~~ • 打开外部灯光用以警示附近的其他航空器 • Alert nearby aircraft by illuminating exterior lights (commensurate with aircraft limitations) • 在 121.5 MHz 频率（作为备份，可以使用驾驶员之间空对空 123.45 MHz 频率）上广播航空器位置、飞行高度和机组行动意图 If unable to contact ATC, broadcas~~ting~~ position, flight level and intention ~~activity~~ on 121.5 MHz.

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严重颠簸和/或者山地波所导致的约 60 米（200 英尺）的高度偏差
Severe Turbulence and/or Mountain Wave Activity (MWA) Induced Altitude Deviations of Approximately 200 feet

飞行员：	管制员：
• 当遭遇严重颠簸和/或者山地波导致约 60 米（200 英尺）或以上的高度偏差时，飞行员应向管制员报告“ 由于颠簸，不能保持 RVSM ”。 • 如果管制员没有发出指令，要求管制引导指令以避开附近高度上的空中交通。 • 如果需要，向管制员申请改变高度。 • 向管制员报告颠簸和/或者山地波的地理位置和严重程度	• 在允许的情况下，引导航空器避开在临近的空中交通放行飞行高度上的其它航空器或者为航空器提供 600 米（2000 英尺）垂直间隔或者使用水平间隔。。 • 向飞行员通报飞行冲突的情况。 • 发布新的空中交通许可，指挥航空器改变飞行高度。 • 向其他航空器通报驾驶员空中报告的情况
Pilot will:	Controller will:
• When experiencing severe turbulence and/or MWA induced altitude deviations of approximately 200 feet or greater, pilot will contact ATC and state “Unable RVSM Due (state reason)” (e.g., turbulence, mountain wave) • If not issued by the controller, request vector clear of traffic at adjacent FL’s • If desired, request FL change • Report location and magnitude of turbulence or MWA to ATC	• ~~Vector aircraft to avoid merging target with traffic at adjacent flight levels, traffic permitting. or Provide 2,000 ft. vertical separation or appropriate horizontal separation. Advise pilot of conflicting traffic. Issue FL change, traffic permitting Issue PIREP to other aircraft.~~ • ~~Vector aircraft to avoid merging target with traffic at adjacent flight levels, traffic permitting~~ • Assess the traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal or increased vertical separation and, if so, apply the appropriate minimum. • Advise pilot of conflicting traffic • Issue FL change, traffic permitting • Issue PIREP to other aircraft

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遭遇山地波
Mountain Wave Activity (MWA) Encounters – General

注： 遭遇不会导致近似 60 米（200 英尺）或以上高度偏差的山地波。下列程序用于指导飞行员在遭遇程度较轻的山地波时的处置程序。

Note：MWA encounters do not necessarily result in altitude deviations on the order of 200 feet. The guidance below is intended to address less significant MWA encounters.

飞行员的行动：	管制员的行动：
• 向管制员报告遭遇了山地波。 • 向管制员报告山地波的地理位置和严重程度。 • 如需要，向管制员申请改变飞行高度。	• 向驾驶员通报临近飞行高度上的空中交通冲突。 • 如果驾驶员请求，在空中交通允许的情况下指挥或引导航空器避开附近高度上的其它航空器。 • 在空中交通允许的情况下，指挥航空器改变飞行高度层。 • 向其他的航空器通报驾驶员空中报告的情况
Pilot actions: • Contact ATC and report experiencing MWA • If so desired, pilot may request a FL change or deviation from the intended route. • Report location and magnitude of MWA to ATC	**Controller actions:** ● Advise pilot of conflicting traffic at adjacent FL ● If pilot requests, vector aircraft to avoid merging target with traffic at adjacent RVSM flight levels, traffic permitting ● Issue FL change or re-route, traffic permitting ● Issue PIREP to other aircraft

遭遇颠簸
Wake Turbulence Encounters

飞行员应当：	管制员应当：
● 报告管制员并申请雷达引导、改变高度，如可能，实施侧向偏置，航空器向右偏置 1-2 海里。	● 发布雷达引导、改变高度的指令，如可能，实施侧向偏置，指挥航空器向右偏置 1-2 海里（在情况允许时）。
Pilot should: ● Contact ATC and request vector, FL change or, if capable, a lateral offset	**Controller should:** ● Issue vector, FL change or lateral offset clearance, traffic permitting

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“ 由于设备原因不能保持 RVSM ”
自动高度控制系统、高度告警系统或所有主高度表失效
“Unable RVSM Due Equipment”
Failure of Automatic Altitude Control System, Altitude Alerter or All Primary Altimeters.

飞行员将：	管制员将：
• 报告管制员“ 由于设备原因不能保持 RVSM ”。 • 向管制员申请离开 RVSM 空域的指令，除非运行情况允许采取其他方法。 • 考虑宣布航空器紧急状态，将失效情况和行动意图通知管制员。 • 如果管制员提供测向、纵向或常规垂直将各，应当保持管制员指定的高度飞行。 • 如果无法 ATC 无法与其他航空器足够的间隔，申请上升或下降到 RVSM 空域以外的高度层飞行。	• 为航空器提供 600 米（2000 英尺）垂直间隔，或者使用适当的水平间隔。 • 指挥航空器离开 RVSM 空域，除非运行情况允许采取其他方法（例如，如果空中交通量少时，管制员可以允许其仍保持在 RVSM 空域内飞行，并提供 600 米垂直间隔）。
Pilot will: • Contact ATC and state “Unable RVSM Due Equipment” • Request clearance out of RVSM airspace unless operational situation dictates otherwise	**Controller will:** • Provide 2,000 ft. vertical separation or appropriate horizontal separation • Clear aircraft out of RVSM airspace unless operational situation dictates otherwise

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一个主高度表仍然处于正常运行状态
One Primary Altimeter Remains Operational.

飞行员将： • 交叉检查备用高度表。 • 通知管制员目前依靠一个主高度表运行。 • 如不能确定主高度表的精确度，按照全部主高度表失效的程序采取行动。 **Pilot will:** • Cross check stand-by altimeter • Notify ATC of operation with single primary altimeter • If unable to confirm primary altimeter accuracy, follow actions for failure of all primary altimeters	管制员将： • 确实收到目前航空器依靠一个主高度表运行的情况（注：这时航空器仍可处于 RVSM 空域内飞行，除非航空器报告“由于设备原因不能保持 RVSM”）。 **Controller will:** • Acknowledge operation with single primary altimeter • Relay to other controllers or facilities who will subsequently handle the aircraft and any special handling requirement or being provided.

应答机失效
Transponder Failure

飞行员将： • 报告管制员并申请继续在许可的高度上运行。 • 如果管制员发出新的管制指令，按照管制指令执行。 **Pilot will:** • Contact ATC and request authority to continue to operate at cleared flight level • Comply with revised ATC clearance, if issued	管制员将： • 考虑允许航空器继续在许可的高度上运行，必要时指挥其他航空器避让。 • 如果需要，发出新的管制指令。 **Controller will:** • Consider request to continue to operate at cleared flight level • Issue revised clearance, if necessary

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紧急下降或者改变高度

~~Pilot Decision when flight safety is threatened in an emergency~~

Contingency Procedures for Aircraft Requiring Rapid Descent

因航空器故障、推力下降、发动机失效、增压系统失效等原因需要紧急下降或者改变高度层

~~Emergency Descend or FL change due to aircraft failure, thrust descend, engine failure, depressurization, etc.~~

飞行员：	管制员：
• 向管制员报告航空器的准确位置，以及请求另行配备飞行高度层。 • Notify ~~Report to~~ ATC and request FL change ~~clearance~~ as required. • 当航空器遇有紧急情况，飞行安全受到威胁时，机长可以决定改变原配备的飞行高度层，但必须立即报告管制员，并对该决定负责。 • ~~When flight safety is threatened in an emergency, the pilot in command may decide to change the last assigned flight level, but shall notify ATC immediately and be held responsible for the decision~~. • 改变高度层的方法是：从航空器飞行的方向向右转 30 度，并以此航向飞行 20 公里，再左转平行原航线上升或者下降到新的高度层，然后转回原航线。 If unable to contact ATC and rapid descent required, • Deviation procedure: ~~the level change procedure is:~~ turn 30° ~~to the~~ right and ~~from the aircraft flying direction ,~~ track out 20 kilometres (i.e. deviate right of airway centreline by 10 km or 5 nm), then turn left to track parallel the original ~~air~~ route, and ~~then~~ descend to new level. ~~then climb or descend to the new level, and then return to the original one.~~ • Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position and intention on the frequency in use, as well as on frequency 121.5Mhz (or, as a backup, the VHF inter-pilot air-to-air frequency 123.45Mhz) • Establish visual contact with conflicting traffic. • Turn on all aircraft exterior lights	• 管制员批准航空器改变飞行高度层时，必须明确改变的高度层以及改变高度层的地段和时间。 • Issue ATC clearance to change flight level.

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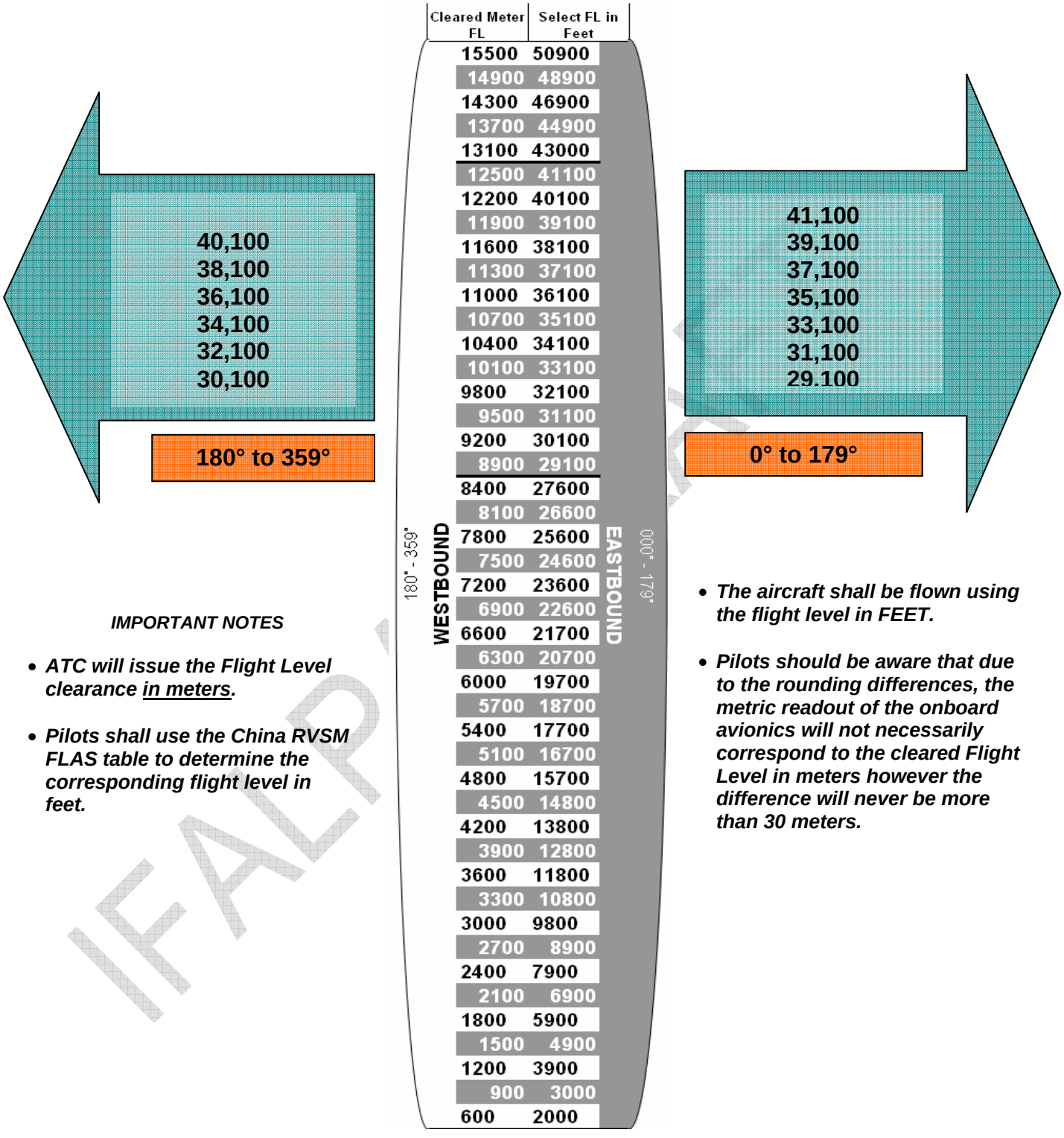
附录 E **ATTACHMENT E**

不同飞行高度层系统之间的高度转换程序
Flight Level Transition Procedures between Different FLAS system

2007 年 11 月 21 日 16：00（世界时），北京、广州、昆明、兰州、上海、沈阳、乌鲁木齐和武汉情报区，以及三亚管制区 01 号扇区（岛内空域）实施缩小垂直间隔后，在与中国相邻的所有国家/飞行情报区内出现两种不同的飞行高度配备方案。所以需要制定专门的管制移交程序规定航空器如何进入和离开中国空域。	There will be two different FLAS in adjacent FIR when China implements RVSM in the Beijing, Guangzhou, Kunming, Lanzhou, Shanghai, Shenyang, Urumqi and Wuhan FIRs and Sector 01 (airspace over the island) of the Sanya FIR on 1600UTC on 21 November 2007. So the transition procedures will be needed for aircraft enter or exit China airspace
（A）中国缩小垂直间隔飞行高度层配备方案与 ICAO 缩小垂直间隔飞行高度层配备方案的比较 ICAO 缩小垂直间隔飞行高度层配备方案已经在福冈、香港和仁川等飞行情报区使用。因此，相对于实施缩小垂直间隔之前的情况，管制移交程序更简单和平顺。	(A) China RVSM FLAS vs ICAO RVSM FLAS ICAO RVSM FLAS is implemented in Fukuoka, Hong Kong, Incheon FIRs, etc. The transition procedures are relatively easier and smother than the situation before Chinese RVSM implementation. All China RVSM Flight level in feet is 100 feet above the ICAO RVSM Flight level.
（B）中国缩小垂直间隔飞行高度层配备方案与米制传统垂直间隔飞行高度层配备方案的比较 在实施缩小垂直间隔之前，中国与俄罗斯、蒙古和朝鲜等使用米制传统垂直间隔高度层的国家之间需要进行飞行高度层的过渡。中国实施缩小垂直间隔之后，如果俄罗斯、蒙古和朝鲜等国不在其空域内实施缩小垂直间隔，中国仍然需要与这些国家之间进行飞行高度层的过渡。	(B) China RVSM FLAS vs Metric CVSM FLAS Before RVSM, China need conduct flight level transition with Russia, Mongolia and DPRK, etc. Metric CVSM FLAS. After China RVSM, China still need conduct flight level transition with Russia, Mongolia and DPRK, etc. Metric CVSM FLAS unless these countries also implement RVSM within their airspace.
关于中国实施缩小垂直间隔后与周边国家/情报区管制移交程序的有关信息请登陆中国实施缩小垂直间隔专题网站下载。网址是： http://www.atmb.net.cn/rvsm/index_eg.asp.	Information concerning China RVSM Transition Procedures with adjacent countries/FIRs can be downloaded from China RVSM website: http://www.atmb.net.cn/rvsm/index_eg.asp.

Draft

IFALPA China RVSM Conversion Table



IMPORTANT NOTES

- ***ATC will issue the Flight Level clearance <u>in meters</u>.***
- ***Pilots shall use the China RVSM FLAS table to determine the corresponding flight level in feet.***
- ***The aircraft shall be flown using the flight level in FEET.***
- ***Pilots should be aware that due to the rounding differences, the metric readout of the onboard avionics will not necessarily correspond to the cleared Flight Level in meters however the difference will never be more than 30 meters.***

Note: Aircraft equipped with metric and feet altimeters such as the Il-96, Il-62, Tu-214 or Tu-154 shall use the feet altimeter. If unable to use the feet altimeter, the operator shall contact the China RVSM Program office and apply for special approval to operate into China RVSM as described in section 9 of the China AIP (Contact information can be found in section 9.4.3).

RVSM Transition Procedures Proposed by China

China RVSM Flight Level Allocations vs. ICAO RVSM Flight Level Allocations

SHANGHAI ACC - FUKUOKA ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： SADLI AIR ROUTE：A593

Direction of flight	FL in SHANGHAI ACC	FL in FUKUOKA ACC	Transition Area
East Bound 0°-179°	FL390 →	FL390 →	None
	FL310 →	FL310 →	
	FL290 →	FL290 →	
	FL250 →	FL250 →	
West Bound 180°-359°	FL400 ←	FL400 ←	
	FL340 ←	FL340 ←	
	FL280 ←	FL280 ←	
	FL240 ←	FL240 ←	

QINGDAO ACC - INCHEON ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： AGAVO AIR ROUTE：G597

Direction of flight	FL in Qingdao ACC	FL in Incheon ACC	Transition Area From XX to XX(XXNM)
East Bound 0°-179°	12,500m (FL411) →	→ FL410	AGAVO - ARIVA (86NM)
	11,900 m (FL391) →	→ FL390	
	11,300m (FL371) →	→ FL370	
	10,700m (FL351) →	→ FL350	
	10,100m (FL331) →	→ FL330	
	9,500 (FL311) →	→ FL310	
	8,900 (FL291) →	→ FL290	
	8,100 (FL266) →	→ FL270	
	7,500 (FL246) →	→ FL250	

	6,900 (FL227) →	→ FL230	
West Bound 180°-359°	12,200m (FL401) ←	FL400 ←	NOPIC -AGAVO(83NM)
	11,600m (FL381) ←	FL380 ←	
	11,000 (FL361) ←	FL360 ←	
	10,400 (FL341) ←	FL340 ←	
	9,800 (FL321) ←	FL320 ←	
	9,200 (FL301) ←	FL300 ←	
	8,400 (FL276) ←	FL280 ←	
	7,800 (FL256) ←	FL260 ←	
	*7,200 (FL236) ←	FL240 ←	
	*6,600 (FL217) ←	FL220 ←	

KUNMING ACC – YANGOON ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： LINSO AIR ROUTE：A599

Direction of flight	FL in KUNMING ACC	FL in YANGOON ACC	Transition Area 50KM
East Bound 0°-179°	12500M AND ABOVE	FL410 AND ABOVE	FROM 75KM WEST OF GULOT TO 25KM WEST OF GULOT
	11900m	FL390	
	11300m	FL370	
	10700m	FL350	
	10100m	FL330	
	9500m	FL310	
	8900m AND BELOW	FL290 AND BELOW	
West Bound 180°-359°	12200m	FL400 AND ABOVE	FROM 25KM WEST OF GULOT TO 75KM WEST OF
	11600m	FL380	
	11000m	FL360	

	9800m	FL320	GULOT
	9200m	FL300 (COORDINATE 30 MINUTES IN ADVANCE)	
	8400m AND BELOW	FL280 AND BELOW	

NOTE: Flight level change from Standard Chinese Metric (Meter) system to ICAO VSM/RVSM (Feet) system, or vice versa, shall be made within Kunming FIR. Kunming ACC shall conduct the transition.
FL340 NOT USED DUE YANGON REQUEST, FL300 NEED TO BE COORDINATED 30 MINUTES IN ADVANCE.

KUNMING ACC - VIENTIANE ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： SAGAG AIR ROUTE：A581

Direction of flight	FL in KUNMING ACC	FL in VIENTIANE ACC	Transition Area 50KM
East Bound 0°-179°	12500M AND ABOVE	FL410 AND ABOVE	FROM 75KM SOUTH OF ELASU TO 25KM SOUTH OF ELASU
	11900m	FL390	
	11300m	FL370	
	10700m	FL350	
	10100m	FL330	
	9500m	FL310	
	8900m AND BELOW	FL290 AND BELOW	
West Bound 180°-359°	12200m	FL400 AND ABOVE	FROM 25KM SOUTH OF ELASU TO 75KM SOUTH OF ELASU
	11600m	FL380	
	11000m	FL360	
	10400m	FL340	
	9800m	FL320	
	9200m	FL300	
	8400m AND BELOW	FL280 AND BELOW	

NOTE: Flight level change from Standard Chinese Metric (Meter) system to ICAO VSM/RVSM (Feet) system, or vice versa, shall be made within Kunming FIR. Kunming ACC shall conduct the transition.

KUNMING ACC - HANOI ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： XXXXX AIR ROUTE：XXX

Direction of flight	FL in KUNMING ACC	FL in HANOI ACC	Transition Area 50KM
East Bound 0°-179°	12500M AND ABOVE	FL410 AND ABOVE	FROM 75KM NORTH OF XXXXX TO 25KM NORTH OF XXXXX
	11900m	FL390	
	11300m	FL370	
	10700m	FL350	
	10100m	FL330	
	9500m	FL310	
	8900m AND BELOW	FL290 AND BELOW	
West Bound 180°-359°	12200m	FL400 AND ABOVE	FROM 25KM NORTH OF XXXXX TO 75KM NORTH OF XXXXX
	11600m	FL380	
	11000m	FL360	
	10400m	FL340	
	9800m	FL320	
	9200m	FL300	
	8400m AND BELOW	FL280 AND BELOW	

NOTE: Flight level change from Standard Chinese Metric (Meter) system to ICAO VSM/RVSM (Feet) system, or vice versa, shall be made within Kunming FIR. Kunming ACC shall conduct the transition.

Transfer of control point for ATS route XXX(TO BE NAMED) shall be at XXXXX(N23 20.8 E105 17.5) (TO BE NAMED)

LHASA ACC - KATHMANDU ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT：NONIM AIR ROUTE：B345

Direction of flight	FL in LHASA ACC	FL in	Transition Area
East Bound 0°-179°	9500m	FL310	To be developed
	10100m	FL330	
West Bound 180°-359°	9800m	FL320	To be developed
	10400m	FL340	

China RVSM FLAS vs. Metric CVSM FLAS

SHENYANG ACC - VLADIVOSTOK ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT：BISUN AIR ROUTE：B451

Direction of flight	FL in ShenYang ACC	FL in Vladivostok ACC	Transition Area From ShenYang to Vladivostok (60KM)
East Bound 0°-179°	11300m→	11100m→	30km from BISUN to each side
	10100m→	10100m→	
	8900m→	9100m→	
West Bound 0°-179°	12200m←	11600m←	
	11000m←	10600m←	
	9800m or 9200m←	9600m←	
	9200m or 8400m←	8600m←	

SHENYANG ACC - PYONGYANG ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： GOLOT AIR ROUTE：A345

Direction of flight	FL in ShenYang ACC	FL in Pyongyang ACC	Transition Area From ShenYang to Pyongyang (60KM)
East Bound 0°-179°	11300m→	11100m→	30km from GOLOT to each side
	10100m→	10100m→	
	8900m→	9100m→	
West Bound 0°-179°	12200m←	11600m←	
	11000m←	10600m←	
	9800m or 9200m←	9600m←	
	9200m or 8400m←	8600m←	

LANZHOU ACC - ULAANBAATAR ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： MORIT AIR ROUTE: B330 B480

Direction of Flight	FL in LANZHOU ACC	FL in ULAANBAATAR ACC	Transition Area
East Bound 0°-179°	→8100m	8100m→	
	→8900m	9100m→	

	→10100m	10100m→	75km before MORIT
	→11300m	11100m→	
	→11900m	12100m→	
West Bound 180°-359°	7800m←	7800m←	
	8400 8600m←	8400 8600m←	
	9800m←	9600m←	
	10400m←	10600m←	
	12200m←	12600m←、	

BEIJING ACC - ULAANBAATAR ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT：INTIK POLHO AIR ROUTE: A575 B458 B339 G218

Direction of Flight	FL in BEIJING ACC	FL in ULAANBAATAR ACC	Transition Area
East Bound 0°-179°	→8900m	9100m→	50km before INTIK (POLHO)
	→10100m	10100m→	
	→11300m	11100m→	
	→11900m	12100m→	
West Bound 180°-359°	8400 8600m←	8400 8600m←	
	9800m←	9600m←	
	10400m←	10600m←	
	11600m←	11600m←	

URUMQI ACC - BISHKEK ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： KAMUD AIR ROUTE：A468

Direction of flight	FL in Urumqi ACC	FL in Bishkek ACC	Transition Area From KAMUD to UB358 From KAMUD to B\UB351
East Bound 0°-179°	11300m→	11100m→	KAMUD — UB358 KAMUD — B\UB351 Transition zone in Kirgizstan, No definition exact distance
	10100m→	10100m→	
	9500m→	9100m→	
	8100m→	8100m→	
	7500m→	7500m→	
West Bound	12200m←	13100m ←	KAMUD — UB358

180°-359°	11600m←	11600m ←	KAMUD — B\UB351 Transition zone in Kirgizstan, No definition exact distance
	11000m←	10600m←	
	10400m←	10600m←	
	9800m←	9600m←	
	9200m←	8600m←	
	8400m←	8600m←	
	7800m←	7800m←	

URUMQI ACC - SEMIPALATINSK ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： SARIN AIR ROUTE：A368

Direction of flight	FL in Urumqi ACC	FL in Semipalatinsk ACC	Transition Area 75 km From SARIN to each side has been defined Level-off Zone
East Bound 0°-179°	→ 13700m	14100m→	75 km From SARIN to each side has been defined Level-off Zone, transition shall be done before level-off zone
	→ 11900m	12100m→	
	→ 11300m	11100m	
	→ 10100m	→ 10100m	
	→ 8100m	→ 8100m	
	→ 7500m	→ 7500m	
	→6900m	→6900m	
	→6300m	→6300m	
	→5700m	→5700m	
West Bound 180°-359°			75 km From SARIN to each side has been defined Level-off Zone, transition shall be done before level-off zone
	13100m←	13100m←	
	10400m←	10600m←	
	9800m←	9600m←	
	8400m←	8600m←	
	7800m←	7800m←	
	7200m←	7200m←	
	6600m←	6600m←	
	6000m←	6000m←	

URUMQI ACC - ALMATY ACC

~~TRANSITION POINT~~TRANSFER CONTROL POINT： REVKI AIR ROUTE：A460

Direction of flight	FL in Almaty ACC	FL in Urumqi ACC	Transition Area 75 km From Revki to each side has been defined Level-off Zone
East Bound 0°-179°	14100m→	→ 13700m	75 km From Revki to each side has been defined Level-off Zone, transition shall be done before level-off zone
	12100m→	→ 11900m	
	11100m	→ 11300m	
	→ 10100m	→ 10100m	
	→ 8100m	→ 8100m	
	→ 7500m	→ 7500m	
West Bound 180°-359°			75 km From Revki to each side has been defined Level-off Zone, transition shall be done before level-off zone
	13100m←	13100m←	
	10600m←	10400m←	
	9600m←	9800m←	
	8600m←	8400m←	
	7800m←	7800m←	

CHINESE RVSM
MINIMUM MONITORING REQUIREMENTS

EFFECTIVE AUGUST 1, 2007

1. UPDATE OF MONITORING REQUIREMENTS CHART AND WEBSITE. The Minimum Monitoring Requirements Chart is a living document. As significant performance data is obtained on specific aircraft groups or types, General Administration of Civil Aviation of China (CAAC) will update the minimum monitoring requirements for those types or groups. Experience has shown that performance data will normally justify reducing the requirements. Updates to the Minimum Monitoring Requirements chart, will be posted on the CAAC RVSM Documentation webpage. The RVSM Documentation page can be accessed from the CAAC RVSM Homepage:

http://www.atmb.net.cn/rvsm/index_eg.asp

2. INITIAL MONITORING. All operators that operate or intend to operate in airspace where RVSM is applied are required to participate in the RVSM monitoring program. The attached chart of monitoring requirements establishes requirements for initial monitoring associated with the RVSM approval process. In their application to the appropriate civil aviation authority for RVSM approval, operators must show a plan for meeting the applicable initial monitoring requirements.

3. AIRCRAFT STATUS FOR MONITORING. Aircraft engineering work that is required to bring aircraft into compliance with RVSM standards must be completed prior to the aircraft being monitored. Any exception to this rule will be coordinated with the responsible civil aviation authority.

4. APPLICABILITY OF MONITORING FROM OTHER REGIONS. Monitoring data obtained in conjunction with RVSM monitoring programs from other regions can be used to meet Chinese RVSM monitoring requirements.

5. **MONITORING PRIOR TO THE ISSUE OF RVSM OPERATIONAL APPROVAL IS NOT A REQUIREMENT.** Operators should submit monitoring plans to the responsible civil aviation authority that show how they intend to meet the requirements specified in the table below. Monitoring will be carried out in accordance with this table.

6. AIRCRAFT GROUPS NOT LISTED ON THE CHART. Contact CAAC for clarification if an aircraft group is not listed on the Minimum Monitoring Requirements chart or for clarification of other monitoring related issues. An aircraft group not listed in the table below will probably be subject to Category 2 monitoring requirements.

7. TABLE OF MONITORING GROUPS. A table of monitoring groups is provided in the pages following the Minimum Monitoring Requirements Chart. The table shows the aircraft types and series that are grouped together for operator monitoring purposes.

8. TRAILING CONE DATA. Altimetry System Error estimations developed using Trailing Cone data collected during RVSM certification flights can be used to fulfil monitoring requirements. It must be documented, however, that aircraft RVSM systems were in the approved RVSM configuration for the flight.

9. MONITORING OF AIRFRAMES THAT ARE RVSM COMPLIANT ON DELIVERY. If an operator adds new RVSM compliant airframes of a type for which it already has RVSM operational approval and has completed monitoring requirements for the type in accordance with the attached chart, the new airframes are not required to be monitored. If an operator adds new RVSM compliant airframes of an aircraft type for which it has NOT previously received RVSM operational approval, then the operator should complete monitoring in accordance with the attached chart.

10. FOLLOW-ON MONITORING. Monitoring is an on-going program that will continue after RVSM implementation. The expiry date of monitoring results is two years. The fleets of the operators are required to be re-monitored when their monitoring results expire. The requirements of the re-monitoring are same as the initial MMR. **The CAAC will coordinate a follow-on monitoring program with industry after implementation.**

CHINESE RVSM
MINIMUM MONITORING REQUIREMENTS CHART

EFFECTIVE August 1, 2007

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS CHART, HOWEVER, IT IS NOT REQUIRED TO BE COMPLETED PRIOR TO OPERATIONAL APPROVAL

MONITORING CATEGORY		AIRCRAFT TYPE	MINIMUM OPERATOR MONITORING FOR EACH AIRCRAFT GROUP
1	Group approved and monitoring data indicates performance in accordance with RVSM standards. **Group Definition:** aircraft have been manufactured to a nominally identical design and build and for RVSM airworthiness approval fall into a group established in an RVSM certification document (e.g., Service Bulletin, Supplemental Type Certificate, Type Certificate Data Sheet).	[A30B, A306], [A312 (GE), A313(GE)], [A312 (PW), A313(PW)], A318, [A319, A320, A321], [A332, A333], [A342, A343], A344, A345, A346 B712, [B721, B722], [B733, B734, B735], B737(Cargo) [B736, B737/BBJ, B738/BBJ, B739], [B741, B742, B743], B74S, B744 (5" Probe), B744 (10" Probe), B752, B753, [B762, B763], B764, B772, B773 CL60(600/601), CL60(604), C560, [CRJ1, CRJ2], CRJ7, DC10, [E135, E145], F100, GLF4, GLF5, LJ60, L101, MD10, MD11, MD80 (All series), MD90	Two airframes from each fleet* of an operator to be monitored as soon as possible but **not later than 6 months after the issue of RVSM operational approval or not later than 6 months after the start of Chinese RVSM operations, whichever occurs later.** * *Note. For the purposes of monitoring, aircraft within parenthesis [ ] may be considered as belonging to the same monitoring group. For example, an operator with six A332 and four A333 aircraft may monitor one A332 and one A333 **or** two A332 aircraft **or** two A333 aircraft.*
2	Group approved but insufficient monitoring data collected to move aircraft to Monitoring Category 1. Group definition applies.	Other group aircraft other than those listed above including: A124, ASTR, B703, B731, B732, BE20, BE40, C500, C25A, C25B, C525, C550**, C56X, C650, C750, CRJ9, [DC86, DC87], DC93, DC95, E170, F2TH, [FA50 FA50EX], F70, [F900, F900EX], FA20, FA10, GLF2(II), GLF(IIB), GLF3, GALX, GLEX, H25B(700), H25B(800), H25C, IL62, IL76, IL86, IL96, J328, L29(2), L29(731), LJ31, [LJ35, LJ36], LJ45, LJ55, [RJ70, RJ85, RJ1H], SBR1, T134, T154, T204, P180, PRM1,YK42	60% of airframes from each fleet of an operator (round up if fractional), as soon as possible but **not later than 6 months after the issue of RVSM operational approval or not later than 6 months after the start of Chinese RVSM operations, whichever occurs later.** ** Refer to aircraft group table for detail on C550 monitoring
3	Non-Group **Non-group Definition:** aircraft that do not fall under the group definition and for RVSM airworthiness approval are presented as an individual airframe.	Non-group approved aircraft	100% of aircraft shall be monitored as soon as possible but **not later than 6 months after the issue of RVSM operational approval or not later than 6 months after the start of Chinese RVSM operations, whichever occurs later.**

Monitoring Groups for Aircraft Certified under Group Approval Requirements

Monitoring Group	ICAO Desig-nator	A/C Type	A/C Series
A124	A124	AN-124 RUSLAN	ALL SERIES
A300	A306 A30B	A300 A300	600, 600F, 600R, 620, 620R, 620RF B2-100, B2-200, B4-100, B4-100F, B4-120, B4-200, B4-200F, B4-220, C4-200
A310-GE	A310	A310	200, 200F,300, 300F
A310-PW	A310	A310	220, 220F,320
A318	A318	A318	ALL SERIES
A320	A319 A320 A321	A319 A320 A321	CJ , 110, 130 110, 210, 230 110, 130, 210, 230
A330	A332, A333	A330	200, 220, 240, 300, 320, 340
A340	A342, A343,	A340	210, 310
A345	A345	A340	540
A346	A346	A340	640
A3ST	A3ST	A300	600R ST BELUGA
AN72	AN72	AN-74, AN-72	ALL SERIES
ASTR	ASTR	1125 ASTRA	ALL SERIES
ASTR-SPX	ASTR	ASTR SPX	ALL SERIES
AVRO	RJ70, RJ85, RJ1H	AVRO	RJ70, RJ85, RJ100
B712	B712	B717	200
B727	B721 B722	B727	100, 100C, 100F,100QF, 200, 200F
B732	B732	B737	200, 200C
B737 (Classic)	B733 B734 B735	B737	300, 400, 500
B737 New Generation (NG)	B736 B737 B738 B739	B737 B737 B737 B737	600 700, 700BBJ 800 900
B737 (Cargo)	B737	B737	700C
B747Classic (CL)	B741 B742 B743	B747	100, 100B, 100F, 200B, 200C, 200F, 200SF, 300
B74S	B74S	B747	SR, SP
B744-5	B744	B747	400, 400D, 400F (With 5 inch Probes)

B744-10	B744	B747	400, 400D, 400F (With 10 inch Probes)
B752	B752	B757	200, 200PF
B753	B753	B757	300
B767	B762 B763	B767	200, 200EM, 200ER, 200ERM, 300, 300ER, 300ERF
B764	B764	B767	400ER
B772	B772	B777	200, 200ER, 300, 300ER
B773	B773	B777	300, 300ER
BE40	BE40	BEECHJET 400A	ALL SERIES
BE20	BE20	BEECH 200 -KINGAIR	ALL SERIES
C500	C500	500 CITATION, 500 CITATION I, 501 CITATION I SINGLE PILOT	ALL SERIES
C525	C525	525 CITATIONJET, 525 CITATIONJET I	ALL SERIES
C525-II	C25A	525A CITATIONJET II	ALL SERIES
C525 CJ3	C25B	CITATIONJET III	ALL SERIES
C550-552	C550	552 CITATION II	ALL SERIES
C550-B	C550	550 CITATION BRAVO	ALL SERIES
C550-II	C550	550 CITATION II, 551 CITATION II SINGLE PILOT	ALL SERIES
C550-SII	C550	S550 CITATION SUPER II	ALL SERIES
C560	C560	560 CITATION V, 560 CITATION V ULTRA, 560 CITATION V ULTRA ENCORE	ALL SERIES
C56X	C56X	560 CITATION EXCEL	ALL SERIES
C650	C650	650 CITATION III , 650 CITATION VI , 650 CITATION VII	ALL SERIES
C750	C750	750 CITATION X	ALL SERIES
CARJ	CRJ1, CRJ2	REGIONALJET	100, 200, 200ER, 200LR
CRJ-700	CRJ7	REGIONALJET	700
CRJ-900	CRJ9	REGIONALJET	900
CL600	CL60	CL-600 CL-601	CL-600-1A11 CL-600-2A12, CL-600-2B16
CL604	CL60	CL-604	CL-600-2B16
BD100	CL30	CHALLENGER 300	ALL SERIES
BD700	GL5T	GLOBAL 5000	ALL SERIES
CONC	CONC	CONCORDE	ALL SERIES
DC10	DC10	DC-10	10, 10F, 15, 30, 30F, 40, 40F
DC86-7	DC86, DC87	DC-8	62, 62F, 72, 72F

DC93	DC93	DC-9	30, 30F
DC95	DC95	DC-9	SERIES 51
E135-145	E135, E145	EMB-135, EMB-145	ALL SERIES
E170	E170	EMB-170	
F100	F100	FOKKER 100	ALL SERIES
F2TH	F2TH	FALCON 2000	ALL SERIES
F70	F70	FOKKER 70	ALL SERIES
F900	F900	FALCON 900, FALCON 900EX	ALL SERIES
FA10	FA10	FALCON 10	ALL SERIES
FA20	FA20	FALCON 20 FALCON 200	ALL SERIES
FA50	FA50	FALCON 50, FALCON 50EX	ALL SERIES
GALX	GALX	1126 GALAXY	ALL SERIES
GLEX	GLEX	BD-700 GLOBAL EXPRESS	ALL SERIES
GLF2	GLF2	GULFSTREAM II (G-1159),	ALL SERIES
GLF2B	GLF2	GULFSTREAM IIB (G-1159B)	ALL SERIES
GLF3	GLF3	GULFSTREAM III (G-1159A)	ALL SERIES
GLF4	GLF4	GULFSTREAM IV (G-1159C)	ALL SERIES
GLF5	GLF5	GULFSTREAM V (G-1159D)	ALL SERIES
H25B-700	H25B	BAE 125 / HS125	700B
H25B-800	H25B	BAE 125 / HAWKER 800XP, BAE 125 / HAWKER 800, BAE 125 / HS125	ALL SERIES/A, B/800
H25C	H25C	BAE 125 / HAWKER 1000	A , B
IL86	IL86	IL-86	NO SERIES
IL96	IL96	IL-96	M , T, 300
J328	J328	328JET	ALL SERIES
L101	L101	L-1011 TRISTAR	1 (385-1), 40 (385-1), 50 (385-1), 100, 150 (385-1-14), 200, 250 (385-1-15), 500 (385-3)
L29B-2	L29B	L-1329 JETSTAR 2	ALL SERIES
L29B-731	L29B	L-1329 JETSTAR 731	ALL SERIES
LJ31	LJ31	LEARJET 31	NO SERIES, A
LJ35/6	LJ35 LJ36	LEARJET 35 LEARJET 36	NO SERIES, A
LJ40	LJ40	LEARJET 40	ALL SERIES
LJ45	LJ45	LEARJET 45	ALL SERIES
LJ55	LJ55	LEARJET 55	NO SERIES B, C

LJ60	LJ60	LEARJET 60	ALL SERIES
MD10	MD10	MD-10	ALL SERIES
MD11	MD11	MD-11	COMBI, ER, FREIGHTER, PASSENGER
MD80	MD81, MD82, MD83, MD87, MD88	MD-80	81, 82, 83, 87, 88
MD90	MD90	MD-90	30, 30ER
P180	P180	P-180 AVANTI	ALL SERIES
PRM1	PRM1	PREMIER 1	ALL SERIES
T134	T134	TU-134	A, B
T154	T154	TU-154	A , B, M, S
T204	T204, T224, T234	TU-204, TU-224, TU-234	100, 100C, 120RR, 200, C
YK42	YK42	YAK-42	ALL SERIES

DRAFT PRELIMINARY ASSESSMENT REPORT

AIRSPACE SAFETY ASSESSMENT FOR THE RVSM IMPLEMENTATION IN SHANGHAI FIR AIRSPACE

上海情报区 RVSM 实施安全评估报告

July 2007

Submitted to:

ICAO Asia/Pacific RVSM Implementation Task Force 31

Air Traffic Management Bureau (ATMB)

General Administration of Civil Aviation of China (CAAC)

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EXECUTIVE SUMMARY

This report provides some preliminary results of readiness and safety assessments of implementing RVSM in China, which have been conducted by Air Traffic Management Bureau (ATMB) of General Administration of Civil Aviation of China (CAAC). The target airspace having been assessed here is the Shanghai Flight Information Region (FIR) of Eastern China airspace. For the completion of the safety assessment, this report presents a comprehensive traffic analysis of the collected traffic sample data (TSD). In this regard, flight operation statistics, traffic flow characteristics, operator and aircraft profiles, and flight level utilization are given.

The report demonstrates that, based on the collected TSD, approximately 92% of the aircraft operations in the Shanghai FIR where RVSM is to be implemented have been conducted by RVSM airworthiness approved aircraft and 88% by State approved operators and aircraft. Nonetheless, approximately 5% of aircraft operations in the collected TSD are in the process of obtaining the State RVSM approval; the process is expected to be completed in October 2007, before the planned RVSM implementation date. Therefore, it is expected that approximately 93% of aircraft operations will be RVSM State approved by November 2007.

In regards to the risk estimation for Shanghai FIR RVSM implementation, the large height deviation (LHD) occurrences in Shanghai FIR airspace since January 2006 were examined. There have been 12 LHD occurrences, accounted for the duration of 11.467 minutes. Based on the collected TSD and LHD reports, both technical and total risks were found to satisfy the agreed TLS value of no more than 2.5×10^{-9} and 5.0×10^{-9} fatal accidents per flight hour due to the loss of a correctly established vertical separation standard of 300m (1,000ft) and to all causes, respectively.

1. INTRODUCTION

This report provides the summary of airspace safety assessment for the RVSM implementation in the Shanghai FIR of Eastern China airspace. The content of the report includes:

- Background,
- Summary of Know Your Airspace (KYA) analyses,
- Result of RVSM readiness assessment,
- Summary of Large Height Deviation (LHD) occurrences, and
- Results of RVSM risk assessment

2. BACKGROUND

China will implement RVSM between 8,900 meters (290,100 feet) and 12,500 meters (410,100 feet), inclusive, in domestic airspace on November 22, 2007. According to ICAO *Manual on the implementation of a 300 m (1,000 ft) Vertical Separation Minimum Between FL290 and FL410 Inclusive, ICAO Doc 9574*, a preliminary safety assessment of airspace where RVSM will be implemented is necessary. ATMB of CAAC has assumed this responsibility since 2006, and a group of technical specialists was formed to study the RVSM safety assessment methodology and procedures.

China plans to establish a Regional Monitoring Agency (RMA) of CAAC which will be responsible for China domestic airspace. ATMB has established close coordination with the existing RMAs, the Pacific Approval Registration and Monitoring Organization (PARMO) and the Monitoring Agency for Asia Region (MAAR). The experts from PARMO and MAAR have respectively provided several times of training for the technical group of ATMB, regarding to RMA operations, aircraft height-keeping performance monitoring and safety assessment. With the help of PARMO and MAAR, the technical group of ATMB has been capable of conducting safety assessment for the RVSM airspace.

Based on the TSD and LHD data collected from Shanghai FIR of Eastern China airspace, ATMB technical group has tried to assess the safety of this region as a sample assessment, utilizing the internationally accepted collision risk methodology. The purpose of this report is to present the preliminary results of this assessment. In addition, this report will not directly support the Go/No-Go decision for the planned RVSM implementation in China domestic airspace in RVSM TF32 on September 17, 2007. The final readiness and safety assessments supporting implementation of the RVSM in sovereign Chinese airspace will be reviewed constructively and checked independently by the PARMO, and will be presented by China to RVSM/TF/32.

2.1 ACCs Implementing RVSM

The geographical area included in the safety assessment is Shanghai FIR. The Area Control Centers (ACCs) included in this airspace are summarized in **Table 1**.

FIR	ACCs
Shanghai	Shanghai
	Qingdao
	Jinan
	Hefei
	Nanchang
	Xiamen

Table 1: ACCs in Shanghai FIR Implementing RVSM

2.2 Data Inquiry for Shanghai FIR RVSM Readiness and Safety Assessments

The readiness and safety assessments for the RVSM implementation in Shanghai FIR are conducted based on:

- 1-month traffic sample data (TSD) collected in June,2007,
- State RVSM approval records of operators and aircraft using RVSM airspace,
- Monthly Large Height Deviation (LHD) reports collected from June,2007 and
- LHD related Incident reports from January, 2006 to May, 2007.

Both TSD and LHD reports are significant pieces of information for estimating risks from technical and operational errors, which would facilitate the completion of the safety assessment for the Shanghai FIR where RVSM is to be implemented.

3. KNOW YOUR AIRSPACE ANALYSES

3.1 Traffic Sampling

The template used for Traffic Data Sampling is provided in appendix A. It includes the information requested for an individual traffic movement, or flight.

3.2 Received Traffic Data

Table 2 contains a summary of the traffic data collected from 1 to 30 June 2007 for use in the analysis.

FIR Name	FIR Code	Data Collected in ACCs	Collecting Method	Status	Remarks
Shanghai	ZSHA	Shanghai	Automatic system	Received	Data completed
		Qingdao	Automatic system	Received	Data completed
		Jinan	Automatic system	Received	Data completed
		Xiamen	Automatic system	Received	Data completed
		Nanchang	-	-	Included in Shanghai ACC
		Hefei	-	-	Included in Shanghai ACC

Table 2: Summary of Traffic Data of June 2007 in Shanghai FIR of China

Note that the data collected in Nanchang and Hefei ACCs are included in the data collected in Shanghai ACC.

The results of the KYA analysis of the Shanghai FIR collected TSD received by ATMB of CAAC are presented in the following contents:

- Flight operation statistics
- Traffic flow characteristics
- Operator and aircraft profiles, and
- Flight level utilization.

3.3 Flight Operation Statistics

The provisional flight operational statistics in the planned RVSM domestic airspace in the Shanghai FIR include:

- Number of flights by ten days(**Table 3**)
- Average number of flights per day (**Figure 1**)

FIR	Number of Flights		
	06/01-06/10	06/11-06/20	06/21-06/30
Shanghai	19436	18038	18469
Total	55943		

Table 3: Number of Flights in Shanghai FIR Airspace from the Collected TSD

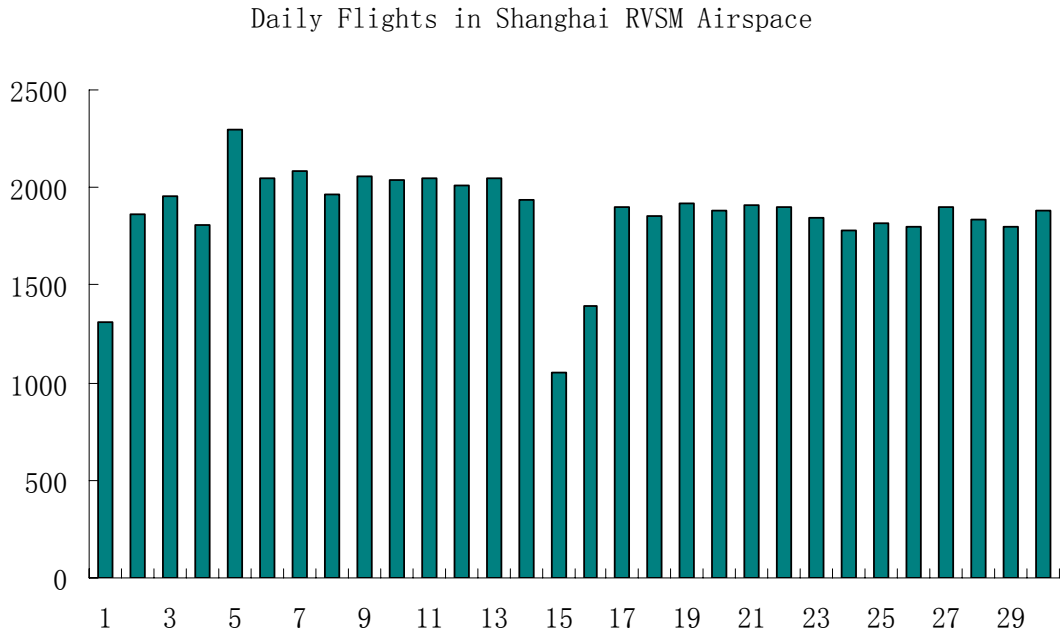


Figure 1: Average Number of Flights per Day in Shanghai RVSM Airspace

3.4 Traffic Flow Characteristics

The analyzed characteristics of traffic flow in the planned RVSM domestic airspace in Shanghai FIR include:

- Top-15 city pairs (**Figure 2**)

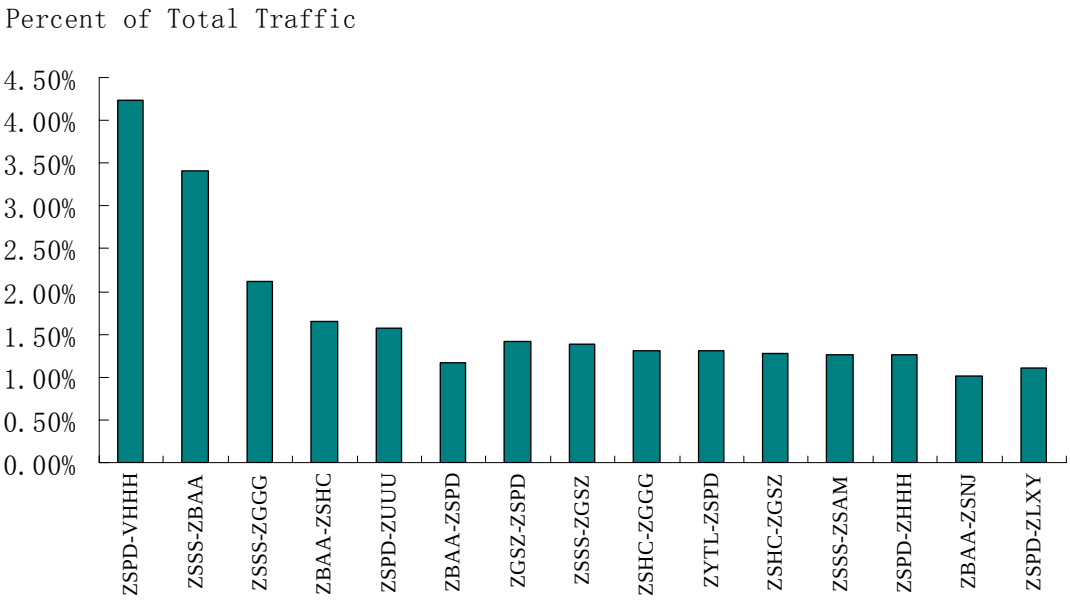


Figure 2: Top-15 City Pairs

3.5 Operator and Aircraft Profiles

The information regarding the airspace users for the planned RVSM domestic airspace in Shanghai FIR includes:

- Top-15 operators (**Figure 3**)
- Top-15 aircraft types (**Figure 4**)

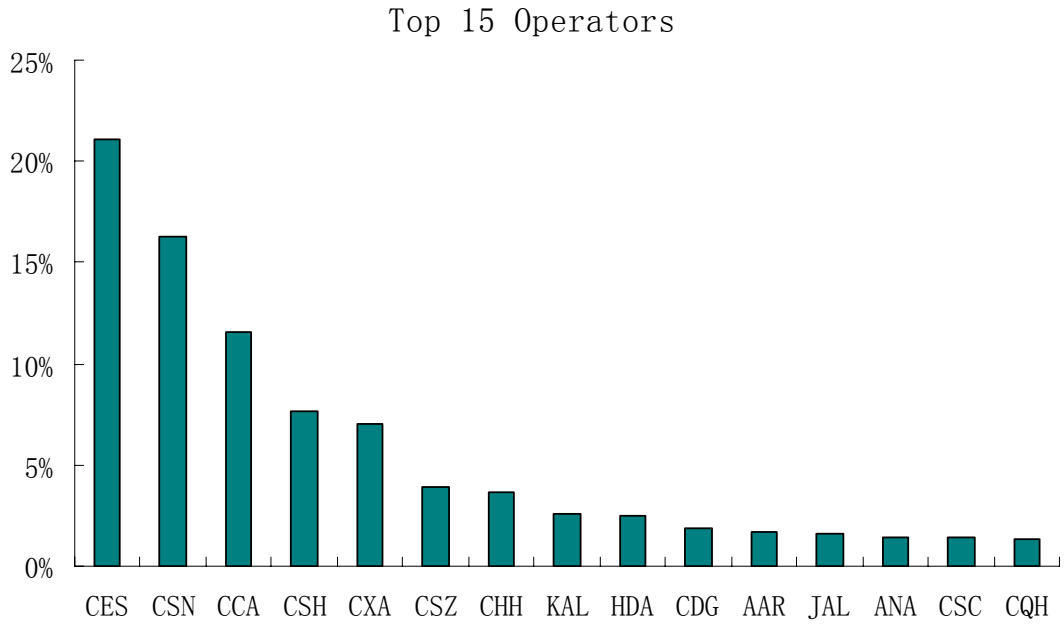


Figure 3: Top-15 Active Operators in the Planned RVSM Domestic Airspace of Shanghai FIR

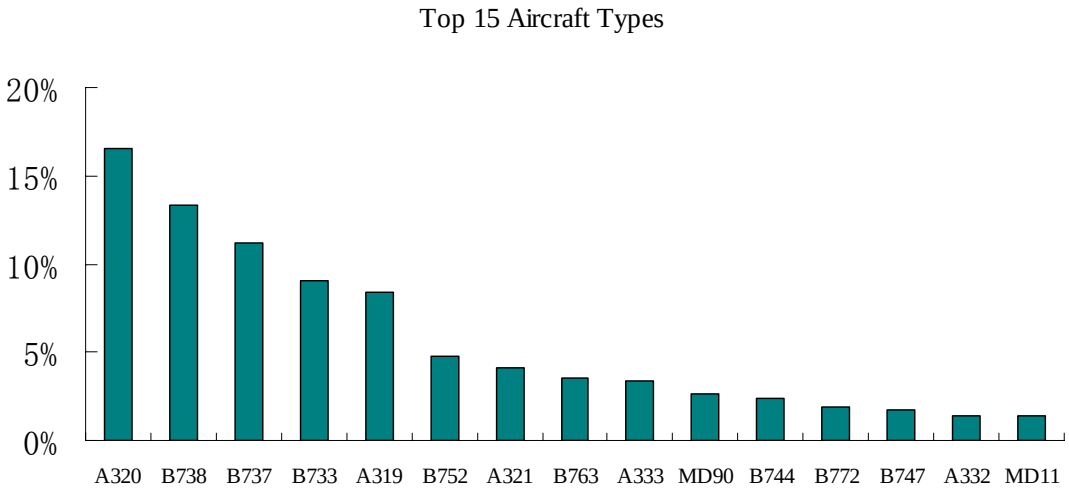


Figure 4: Top-15 Aircraft Types Operated in the Planned RVSM Domestic Airspace of Shanghai FIR

3.6 Flight Level Utilization

Figure 5 presents the utilization of flight levels (FL) in the current non-RVSM airspace of the Shanghai FIR. Note that, for the RVSM implementation in Shanghai FIR airspace, the Single Alternate Flight Level Orientation Scheme (FLOS) will be applied full band between 8,900 meters and 12,500 meters.

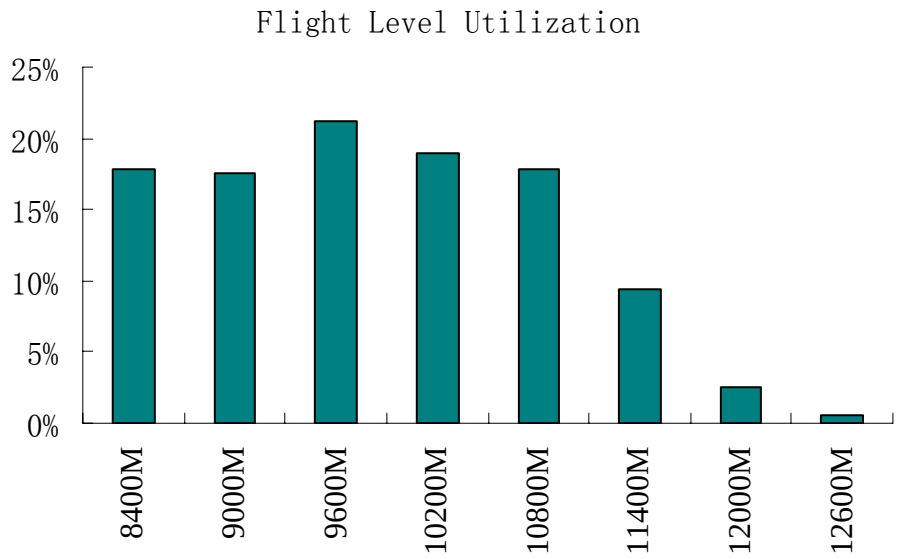


Figure 5: Flight Level Utilization in the Planned RVSM Domestic Airspace of the Shanghai FIR

Note: The risk between 8400 meters and 9000 meters is also taken into account in the preliminary assessment.

4. RVSM READINESS ASSESSMENT

This section provides the results of the readiness assessment using the traffic sample data from 1st to 30th June 2007 within the airspace of Shanghai FIR. The criterion China adopted in this readiness assessment as a prerequisite for the RVSM implementation is that **90** percent of operations between 8900 meter and 12500 meter (inclusive) in the collected traffic sample would be conducted by State-approved operators and aircraft after the implementation of RVSM.

Table 4 shows that approximately **92** percent of the operations have been conducted by RVSM airworthiness Approved aircraft in the airspace of Shanghai FIR planned for RVSM implementation, and **88** percent by State approved operators and aircraft. The collected TSD were compared to the latest data from the State RVSM approval databases and other RMAs around the world of:

- AFI RMA,
- Austria,

- Australia,
- CAAC,
- Canada,
- Caribbean and South American Monitoring Agency (CARSAMMA),
- Eurocontrol,
- France,
- Monitoring Agency for Asia Region (MAAR),
- Middle East Monitoring Agency (MID RMA) ,
- North America Approval and Registry Monitoring Organization (NAARMO),
- North Atlantic Central Monitoring Agency (NAT CMA),
- Pacific Approval and Registry Monitoring Organization (PARMO), and
- US MASP

Note that the State RVSM approval records provided by China were last updated on July 25th 2007. The State RVSM approval records provided by PARMO were last updated on 24th July 2007. The State RVSM approval records from the Regional Monitoring Agencies (RMAs) were last updated on June 2007 (Note: the RVSM Approval data resources are provided by MAAR and PARMO/NAARMO).

Approval Category	Number of Operations in Traffic Sample	Percent Of Total Sample
RVSM airworthiness Approved Only	54287	**92.171%**
RVSM airworthiness Unapproved	4611	**7.829 %**
Full approved	52134	**88.516 %**
Total	58898	**100 %**

Table 4: Summary of the Readiness of Operators and Aircraft Types Operating in the airspace of Shanghai FIR where RVSM is to be implemented

The detailed information regarding the State RVSM approval status of operations observed in the collected traffic sample is provided in the **Appendix B**.

Based on the results of the readiness assessment, it was found that the number of the aircraft currently operating in the airspace of Shanghai FIR is in the process of obtaining the State RVSM approval. **Table 5** lists the top 15 Non-RVSM operators and aircraft types, as well as the number of traffic operations and its proportion in the collected traffic sample data.

Operator	Operator ICAO Code	AC Type	Total Operations Observed in Sample	Percent of Total Operations in Sample
Spring Airlines	CQH	A320	794	1.346 %
China Southern	CSN	MD90	633	1.073 %

Operator	Operator ICAO Code	AC Type	Total Operations Observed in Sample	Percent of Total Operations in Sample
Airline		A300	105	0.178 %
China Eastern Airlines	CES	E145	242	0.410 %
		A30B	78	0132 %
Hainan Airlines	CHH	A319	208	0.353 %
ALL NIPPON AIRWAYS	ANA	B737	144	0.244 %
OK Airways	OKA	B735	107	0.181 %
		B733	63	0.107 %
China United Airlines	CUA	B737	100	0.170 %
Shenzhen East Pacific Airlines	EPA	B733	85	0.144%
China Express Airlines Company	HXA	CRJ2	76	0.129 %
Miat Mongolian Airlines	MGL	B737	68	0.115 %
United Eagle Airlines	UEA	A319	65	0.110 %
Sichuan Airlines	CSC	E145	59	0.100%

Table 5: List of TOP 15 Relatively High Proportion of Non-RVSM Approved Aircraft Operating in the RVSM airspace of Shanghai FIR

The approval of these aircraft would increase the percentage of RVSM approved aircraft in the collected traffic sample by approximately **4.792** percents. Based on the given RVSM approval status of the listed aircraft, the percentage of operations that have been conducted by operators and aircraft in the planned RVSM airspace would increase to approximately 96% in the RVSM airspace of Shanghai FIR. Meanwhile, the RVSM approval data of the airlines in China have been under collection, so the final percentages of proportion will be higher than the values given in this report.

5. LARGE HEIGHT DEVIATION OCCURRENCES

This section provides the summary of the large height deviation (LHD) occurrences associated with the RVSM implementation in the airspace of Shanghai FIR, China. The data gathered from the LHD reports are used to estimate risk from operational errors. Such risk estimate would assist China in performing the preliminary safety assessment, which would demonstrate whether the target level of safety (TLS) for the RVSM implementation in the airspace of Shanghai FIR is met.

A meeting focused on LHD data collection was convened in May in Haikou, China this year. The attendant supervisors and controllers from all the area control centers around China were given a detail introduction and explanation of RVSM, LHD and the way to collect LHD data from their daily work. After the meeting, all these control centers were requested to provide us with monthly LHD reports of 1.5 year, starting from January 1st 2006 to June 30th 2007 at the beginning of July, using the LHD report form distributed during the meeting.

Appendix C demonstrates the LHD report template we use to keep the records. While most of the content remained the same as the suggested form recommended in the RMA handbook, some parts were changed for our requirement. First, the feet-based LHD description was replaced by the metric-based one because of the FL allocation scheme in China. So here we use "90m (300 ft) or more between 8400m and 12500m" instead of '300 ft or more between FL290 and FL410'. Second, two pictures were added to the last part of the report to provide further information concerning the descending and climbing phases of LHD occurrences, which is used to estimate the operational risk associated with an aircraft climbing/descending through a flight level without proper clearance. Both of the paper and electronic copy of this form were distributed to each ACC and all the LHD records were filled in using this template.

Since it is our first time to collect LHD information, we have to date back to the historical flight event records for the information of LHD occurred between January 2006 and May 2007. The historical LHD information was mainly from two data resources. One was extracted from the Incident reports resource from ATMB. This resource kept records of those events that lead to airborne conflicts and in-flight incidents, among which some were due to height deviation. The other data resource was the records from the area control centers which kept records of those events in the past that also had a height deviation equal to or more than 90 meter but not serious enough to cause airborne conflicts.

From 00:00:00 June 1st 2007 UTC time, all the LHD events are directly recorded by the controllers on duty, who wrote down a literal description that provided the required information in the LHD report form when an LHD event occurred. These records were then be submitted to the responsible RVSM data collection group in the ACC for further review.

After receiving all these data, the information was then be reviewed, checked and then filled into the LHD report template by supervisors from the RVSM data collection group of each control center and sent to us by email at the beginning of July.

In this report, the data from Shanghai FIR are analyzed. Based on the received LHD reports shown in **Table 6**, the LHD occurrences in the airspace of Shanghai FIR since January 2006 are summarized as follow:

- Number of LHD occurrences in Shanghai FIR and associated LHD duration by month
- Number of LHD occurrences and associated LHD duration (in minutes)
- Number of LHD occurrences by cause

Table 6 and Figure 6 summarize the number of LHD occurrences and associated LHD duration by month in Shanghai FIR airspace from January 2006 to June 2007.

Month -Year	No. of LHD Occurrences	LHD Duration (Min)	Cumulative No. of LHD in the latest 12 month	Cumulative LHD Duration	Climb	Descend	Levels Crossed	Remarks	ATC Status
2006									
Jan	1		1	0	1	0	1		radar
Feb	0		1	0					
Mar	0		1	0					
Apr	1		2	0		1	4		radar
May	0		2	0					
Jun	0		2	0					
Jul	2	0.55	4	0.55	1	1	2		radar
Aug	0		4	0.55					
Sep	0		4	0.55					
Oct	1	0	5	0.55	1		0		
Nov	1	0	6	0.55	1		1		
Dec	0		6	0.55					radar
2007									
Jan			5	0.55					
Feb			5	0.55					
Mar	1	0	6	0.55		1	0		radar
Apr	1	0.6	6	1.15	1		0		radar
May			6	1.15					
Jun	4	10.317	10	11.467	1		0	7min equipment failure	radar

Table 6: Summary of LHD Occurrences and Duration in Shanghai FIR airspace

Note 1: In all these LHD events, 1 level equal to 300 meter

Note 2: The fields named 'Climb' and 'Descend' indicate the transition of climbing and descending without proper clearances.

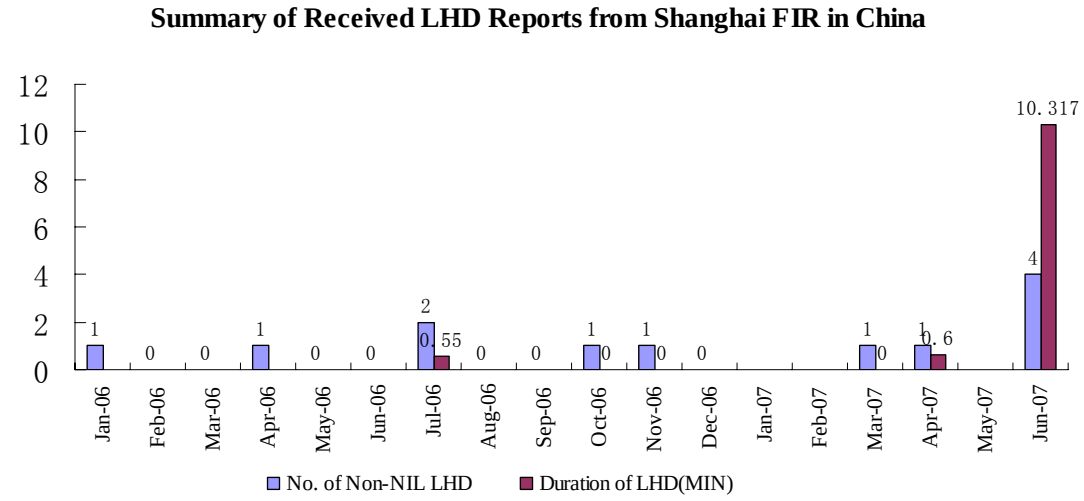


Figure 6: Summary of LHD Occurrences (by Month) in Shanghai FIR airspace

Fig. 7 demonstrates the LHD events in which a climbing/descending through a flight level without proper clearances occur.

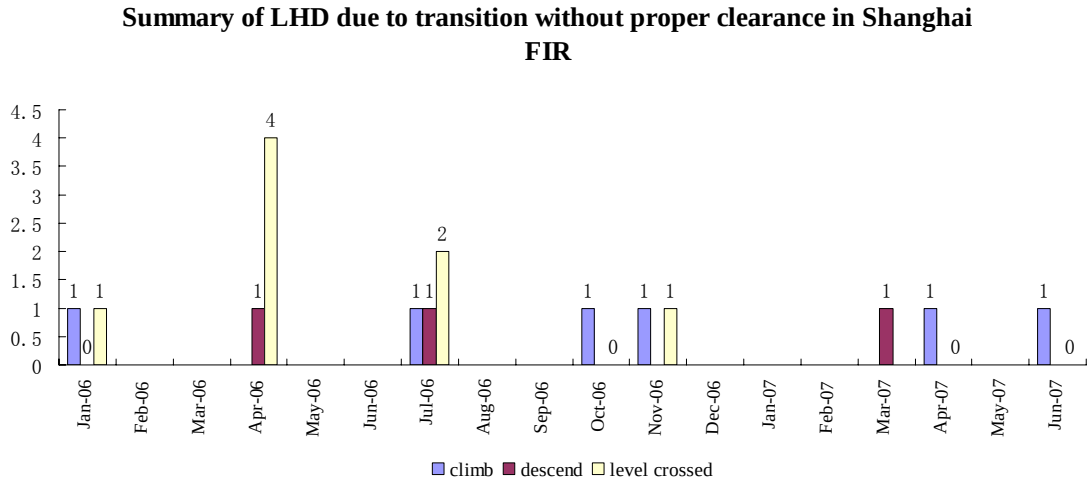


Figure 7: Summary of LHD due to transition without proper clearance in Shanghai FIR

In RASMAG/07(June 2007), the proposal for the LHD plain language definition and the revision of LHD categorization were finalized. It was agreed that all Asia Pacific RMAs shall promote the LHD plain language definition and use the revised LHD categorization. So, we adopted it and use this revised LHD category from then on. The analyzing result of the LHD events in this report is based on the latest version of LHD category.

Deviation Code	Cause of Deviation
Operational Errors	
A	flight crew failing to climb/descend the aircraft as cleared;

Deviation Code	Cause of Deviation
B	flight crew climbing/descending without ATC clearance;
C	Incorrect operation or interpretation of airborne equipment (e.g. incorrect operation of fully functional FMS, incorrect transcription of ATC clearance or re-clearance, flight plan followed rather than ATC clearance, original clearance followed instead of re-clearances etc);
D	ATC system loop error; (e.g. ATC issues incorrect clearance or flight crew misunderstands clearance message);
E	coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues (e.g. late or non-existent coordination, incorrect time estimate/actual, flight level, ATS route etc not in accordance with agreed parameters);
F	coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues;
Aircraft Contingency Events	
G	aircraft contingency event leading to sudden inability to maintain assigned flight level (e.g. pressurization failure, engine failure);
H	airborne equipment failure leading to unintentional or undetected change of flight level (e.g. altimetry errors);
Deviation due to Meteorological Condition	
I	turbulence or other weather related causes;
Deviation due to TCAS RA	
J	TCAS resolution advisory; flight crew correctly following the resolution advisory; ***Note:*** *LHD resulting from actions complying with a TCAS RA would not reflect risk in the RVSM airspace since it is a proper remedial action of flight crew. Nonetheless, it is strongly recommended that all LHD occurrences related to TCAS resolution advisory be reported to the responsible RMA for detailed airspace safety analysis.*
K	TCAS resolution advisory; flight crew incorrectly following the resolution advisory
Others	
L	An aircraft being provided with RVSM separation is not RVSM approved (e.g. flight plan indicating RSVM approval but aircraft not approved, ATC misinterpretation of flight plan)
M	Other

Table 7: Latest Version of Codes Defining Causes of LHD Occurrences

Table 8 presents the summary of the total number of LHD occurrences by the cause of deviation, using the LHD letter-coding scheme in **Table 7**.

Code	No. of LHD Occurrences in Shanghai	Remarks
A		
B	**2**	
C	**1**	
D	**2**	
E		
F		
G		
H	**5**	3 LHDs due to slow climb rate 1 LHD due to pitot malfunction 1 LHD due to aircraft altimetry errors Contribute to technical risk
I	**1**	
J		
K		
L		
M	**1**	Jump of radar display
Sum	**12**	

Table 8: Cause of LHD Occurrences in Shanghai FIR

Fig.8 summarizes the LHD Occurrences by categories using table 7 and 8

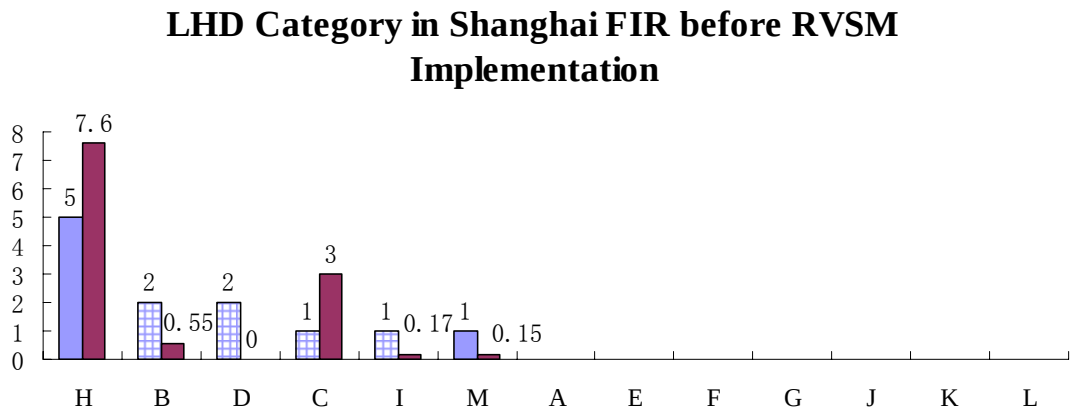


Figure 8: Summary of LHD Occurrences by category in Shanghai FIR

Note: the bars with grids illustrate the LHD occurrences contribute to operational risks

In light of the above, the LHD occurrences in the airspace of Shanghai FIR, China are summarized as follow:

- Total of 12 LHD occurred in the airspace of Shanghai FIR, account for 10.32 minutes since January 2006 (with 6 months historical LHD data)

- Within 12 LHD occurrences, 5 LHD occurrence of 7.6 minute involved the airborne equipment failure leading to unintentional or undetected change of flight level (Category H). 1 is due to jump of radar display. They accounted for technical errors (Category M). These LHD occurrences were reported for July and October 2006, and March, April and June 2007.
- Thus, the other 6 occurrences of LHD occurred, account for 2.72 minutes, are subject to the operational errors.
- 2 of 6 LHD occurrences are subject to flight crew climbing / descending without ATC clearance (Category B); all 2 cases are subject to operational errors.
- 2 of 6 LHD occurrences are subject to ATC system loop error (Category D), in which one was due to the controller's error and the other was due to pilot's error.
- 1 of 6 LHD occurrences is subject to incorrect operation or interpretation of airborne equipment (Category C).
- 1 of 6 LHD occurrences is subject to turbulence (Category I).

The detailed information of the reported LHD occurrences in Shanghai FIR is kept in the ATMB headquarters.

6. RISK ASSESSMENT AND SAFETY OVERSIGHT

The purpose of this section is to process the risk assessment and the results of safety oversight for the RVSM implementation over Shanghai FIR of China airspace. Accordingly, the internationally accepted collision risk methodology is applied in assessing the safety of implementing the RVSM in the Shanghai FIR of China airspace.

As envisioned by the Review of the ICAO General Concept of Separation Panel (RGCSP), introduction of RVSM would be safe if:

- ✈ Collision risk due to all causes does not exceed 5 fatal accidents per 10^9 flying hours;
- ✈ Collision risk due to aircraft height-keeping systems does not exceed 2.5 fatal accidents per 10^9 flying hours.

The traffic sample data (TSD) of June 2007 and the continuous LHD reports associated with the China airspace (since Jan 2006) are used to produce the risk estimates presented in this report.

For the safety assessment of the RVSM implementation in the Shanghai FIR of China airspace, the risk estimation is conducted based on the single alternate flight orientation scheme (FLOS) applied on the ATS routes structure in this region.

6.1 Estimate of the CRM Parameters

Table 9 summarizes the value and source material for estimating values for each of the parameters of the internationally accepted Collision Risk Model (CRM), which is used to conduct the risk assessment and the safety oversight for the RVSM implementation in Shanghai FIR of China.

Parameter Symbol	Parameter Definition	Parameter Value	Source for Value
T	Annual flight hours	501,770.8	Estimated based on the submitted TSD
E_z(same)	Same-direction vertical occupancies	0.0555	Estimated based on the submitted TSD
E_z(opposite)	Opposite-direction vertical occupancies	0.2588	Estimated based on the submitted TSD
S_x	Longitudinal separation standard for a region, or Length of longitudinal window used to calculate occupancy	80Nm	Standard value in a region
S_h	Planned Horizontal Separation	80Nm	Standard value in a region
Pz(0)	Probability of vertical overlap (with planned vertical separation equal to zero)	0.2557	Estimated based on TVE data collected from Monitoring results of aircraft registered in China
$P_z(S_z)$	Prob. that 2 aircraft nominally separated by the vertical separation minimum S_z are in vertical overlap.	1.645×10^{-9}	Estimated based on TVE data collected from Monitoring results of aircraft registered in China
$P_y(0)$	Probability of Lateral Overlap	0.0525	Value used in NAT RVSM safety assessments
Ph(theta)	Probability of Horizontal Overlap	6.88×10^{-7}	Value used in the Western Pacific/South China Sea safety assessment
$\overline{\lvert h(\dot{\theta}) \rvert}$	Average relative horizontal speed during overlap for aircraft pairs on routes with crossing angle θ (let θ=45°)	367.4 knots	Value used in Western Pacific/South China Sea safety assessment (corresponds to an average aircraft speed of 480 knots)
$\overline{\lvert \dot{y} \rvert}$	Average absolute relative cross track speed for an aircraft pair nominally on the same track	5 knots	Estimated from processing GMU-collected GPS-derived positions of aircraft monitored in connection with Pacific RVSM

Parameter Symbol	Parameter Definition	Parameter Value	Source for Value
$\lvert\bar{\dot{z}}\rvert$	Average absolute relative vertical speed of an aircraft pair that has lost all vertical separation	1.5 knots	Value used in NAT RVSM safety assessment
λ_x	Average aircraft length	0.02325Nm	Estimated based on the submitted TSD
λ_y	Average aircraft wingspan	0.021Nm	
λ_z	Average aircraft height	0.0046Nm	
λ_h	Diameter of the disk representing the shape of an aircraft in the horizontal plane	0.02325Nm	
$\overline{\lvert\Delta V\rvert}$	Average relative along-track speed between aircraft on same direction routes	56.178knots	Estimated based on the submitted TSD
$\overline{\lvert V\rvert}$	Average absolute aircraft ground speed	456.34knots	Estimated based on the submitted TSD

Table 9 Estimate of the Parameters in the CRM

6.2 Safety Oversight for the RVSM implementation in Shanghai FIR of China

This section summarizes the results of the safety assessment for the Shanghai FIR. **Table 10** provides the estimates of technical, operational, and total risks for the RVSM implementation in the Shanghai FIR.

Source of Risk	Lower Bound Risk Estimation	TLS	Remarks
Technical Risk	1.43×10^{-10}	2.5×10^{-9}	Below Technical TLS
Operational Risk	3.79×10^{-9}	-	-
Total Risk	3.936×10^{-9}	5.0×10^{-9}	Below Overall TLS

Table 10: Risk Estimates for the RVSM Implementation in Shanghai FIR

Figure 9 presents the trends of collision risk estimates for each month using the appropriate 18-month interval of LHD reports since January 2006.

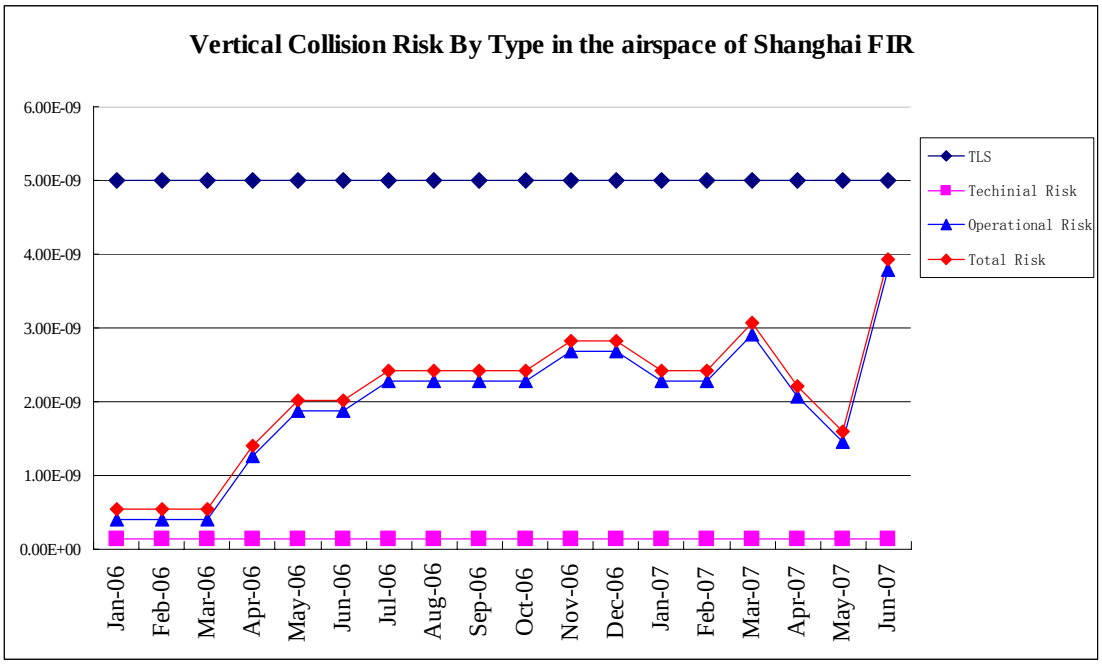


Figure 9: Trends of Risk Estimates for the RVSM Implementation in Shanghai FIR in China

Based on the collision risk estimates from the received TSD and LHD reports, the technical risk for the RVSM implementation in Shanghai FIR is 1.43 x 10^{-10} fatal accidents per flight hour. The total risk attributed to all causes is 3.936 x $10^{-9.}$ Therefore, **the estimates of both technical and total risks from the available TSD and LHD reports satisfy the agreed TLS value of no more than 2.5 x 10^{-9} and 5.0 x 10^{-9} fatal accidents per flight hour due to the loss of a correctly established vertical separation standard of 300m and to all causes, respectively.**

REFERENCES

1. Airspace Safety assessment for The RVSM Implementation in Japan/republic of Korea domestic airspace, July 2005, ICAO Asia/Pacific RVSM Implementation Task Force26 WP, MAAR

2. *Manual on Implementation of a 300 m (1,000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive*, International Civil Aviation Organization, Doc 9574, Montreal, March 1992.

3. Review of the General Concept of Separation Panel, Sixth Meeting, Montreal, 28 November – 15 December 1988, ICAO Doc 9536, RGCSP/6, Volumes 1 and 2.

4. Review of the General Concept of Separation Panel, Seventh Meeting, Montreal, 30 October – 20 November 1990, ICAO Doc 9572, RGCSP/7.

5. Post Implementation Estimate of the Risk Associated with the Domestic Reduced Vertical Separation Minimum (D-RVSM), 1 June 2005, FAA Technical Center

APPENDIX A

Traffic Sample Data collecting template

The TSD template used in China is as follows, it presents the information requested for an individual traffic movement, or flight, and sometime it is also called "Know Your Airspace (KYA)" analysis.

Item No.	Item	Example	Mandatory/ Required if Available
1	Date (DD/MM/YY format)	01/06/07	Mandatory
2	Aircraft Call Sign	CCA968	Mandatory
3	Reg_No	9VSFA	Mandatory
4	Aircraft Type	A343	Mandatory
5	Origin Aerodrome	ZBAA	Mandatory
6	Destination Aerodrome	ZSPD	Mandatory
7	Entry Fix into RVSM Airspace	EPGAM	Mandatory
8	Time at Entry Fix (UTC)	12:23	Mandatory
9	Flight Level at Entry Fix	10200	Mandatory
10	Airway at Entry Fix	A599	Mandatory
11	Exit Fix from RVSM Airspace	AKOTO	Mandatory
12	Time at Exit Fix (UTC)	01:29	Mandatory
13	Flight Level at Exit Fix	11400	Mandatory
14	Airway at Entry Fix	G204	Mandatory
15	Speed	897.289 km/h	Optional
A1	Fix 1 Within RVSM Airspace after Entry Fix	NIRAT	Required if Available
A2	Time at Fix 1	01:14	Required if Available
A3	Flight Level at Fix 1	310	Required if Available
A4	Airway at Fix 1	A593	Required if Available
B1	Fix 2 Within RVSM Airspace after Fix 1	-	Required if Available
B2	Time at Fix 2	-	Required if Available
B3	Flight Level at Fix 2	-	Required if Available
B4	Airway at Fix 2	-	Required if Available
(Continue with as many Fix/Time/Flight-Level entries as are required to describe the flight's movement within RVSM airspace)			
N1	Fix …N Within RVSM Airspace after Fix N-1	-	Required if Available
N2	Time at Fix N	-	Required if Available
N3	Flight Level at Fix N	-	Required if Available
N4	Airway at Fix N	-	Required if Available
Note: Fix N = Fix before the Exit Fix			

Note:

(1) We collect TSD from all Fixes in China instead of only the fixes where there is FL or Route change, thus we assess the safety risk of Chinese airspace more conservatively;
(2) The Flight level is recorded in the unit of meter instead of feet;
(3) Reg_no information is added for Readiness Assessment;
(4) Speed is also collected but is optional;

APPENDIX B

RVSM Approval Records of Operator and aircraft Operated in the Airspace of Shanghai FIR based on Collected Traffic Sample Data (sorted by FLIGHTS)

The RVSM Approval Records of Operator and aircraft table format

Name of Field	Field Identifier	Explanation
1	No.	Serial number
2	OPR	Operator Name
3	Type	Aircraft Type using ICAO Standard
4	FLIGHTS	Number of flights
5	Proportion of Overall Sample (%)	Total number of flights divided by FLIGHTS
6	Overall Sample Cumulative (%)	Cumulative Proportion of Field 5
7	AW Only	The number of Flights that flied by aircraft having an RVSM airworthiness approval
8	Proportion of AW Only	Total number of flights divided by AW Only
9	AW Cumulative (%)	Cumulative Proportion of Field 8
10	FULL	The number of Flights that flied by aircraft having a RVSM full approval
11	Proportion of Full	Total number of flights divided by FULL
12	Full Cumulative	Cumulative Proportion of Field 11

RVSM Approval Records of Operator and aircraft Operated in the Airspace of Shanghai FIR based on Collected Traffic Sample Data sorted by FLIGHTS

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
1	CES	A320	4522	7.677680057	7.677680057	4522	7.677680057	7.677680057	4522	7.677680057	7.677680057
2	CSN	A320	2305	3.913545451	11.59122551	2305	3.913545451	11.59122551	2305	3.913545451	11.59122551
3	CSH	B738	1802	3.059526639	14.65075215	1802	3.059526639	14.65075215	1802	3.059526639	14.65075215
4	CES	B737	1629	2.765798499	17.41655065	1629	2.765798499	17.41655065	1629	2.765798499	17.41655065
5	CCA	A319	1609	2.731841489	20.14839214	1609	2.731841489	20.14839214	1609	2.731841489	20.14839214
6	CXA	B737	1385	2.351522972	22.49991511	1385	2.351522972	22.49991511	1385	2.351522972	22.49991511
7	CSN	B738	1279	2.171550817	24.67146592	1279	2.171550817	24.67146592	1279	2.171550817	24.67146592
8	CSH	B752	1250	2.122313152	26.79377908	1250	2.122313152	26.79377908	1250	2.122313152	26.79377908
9	CSN	A319	1235	2.096845394	28.89062447	1235	2.096845394	28.89062447	1235	2.096845394	28.89062447
10	CXA	B738	1086	1.843865666	30.73449014	1086	1.843865666	30.73449014	1086	1.843865666	30.73449014
11	CES	A319	1039	1.764066692	32.49855683	1039	1.764066692	32.49855683	1039	1.764066692	32.49855683
12	CCA	B733	958	1.626540799	34.12509763	958	1.626540799	34.12509763	958	1.626540799	34.12509763
13	CES	MD90	928	1.575605284	35.70070291	928	1.575605284	35.70070291	928	1.575605284	35.70070291
14	CCA	B738	915	1.553533227	37.25423614	915	1.553533227	37.25423614	915	1.553533227	37.25423614
15	CHH	B738	895	1.519576217	38.77381235	895	1.519576217	38.77381235	895	1.519576217	38.77381235
16	CCA	B737	828	1.405820232	40.17963259	828	1.405820232	40.17963259	828	1.405820232	40.17963259
17	CSN	A321	802	1.361676118	41.5413087	802	1.361676118	41.5413087	802	1.361676118	41.5413087
18	CQH	A320	794	1.348093314	42.88940202	0	0	41.5413087	0	0	41.5413087
19	CSN	B733	773	1.312438453	44.20184047	773	1.312438453	42.85374716	773	1.312438453	42.85374716
20	CES	A333	764	1.297157798	45.49899827	764	1.297157798	44.15090495	764	1.297157798	44.15090495

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
21	CSZ	B737	721	1.224150226	46.72314849	721	1.224150226	45.37505518	721	1.224150226	45.37505518
22	CXA	B752	720	1.222452375	47.94560087	720	1.222452375	46.59750756	720	1.222452375	46.59750756
23	CSH	B763	713	1.210567422	49.15616829	713	1.210567422	47.80807498	713	1.210567422	47.80807498
24	CES	B733	648	1.100207138	50.25637543	648	1.100207138	48.90828211	648	1.100207138	48.90828211
25	CSN	B737	646	1.096811437	51.35318687	646	1.096811437	50.00509355	646	1.096811437	50.00509355
26	CSN	MD90	633	1.07473938	52.42792625	0	0	50.00509355	0	0	50.00509355
27	CDG	B733	626	1.062854426	53.49078067	626	1.062854426	51.06794798	626	1.062854426	51.06794798
28	CSZ	B733	586	0.994940405	54.48572108	586	0.994940405	52.06288838	586	0.994940405	52.06288838
29	CSN	B752	585	0.993242555	55.47896363	585	0.993242555	53.05613094	585	0.993242555	53.05613094
30	CES	B738	584	0.991544704	56.47050834	584	0.991544704	54.04767564	584	0.991544704	54.04767564
31	HDA	A333	573	0.972868349	57.44337669	573	0.972868349	55.02054399	573	0.972868349	55.02054399
32	CES	A321	550	0.933817787	58.37719447	550	0.933817787	55.95436178	550	0.933817787	55.95436178
33	CES	A306	546	0.927026385	59.30422086	546	0.927026385	56.88138816	546	0.927026385	56.88138816
34	CXA	B735	525	0.891371524	60.19559238	525	0.891371524	57.77275969	525	0.891371524	57.77275969
35	CSH	B737	490	0.831946755	61.02753914	490	0.831946755	58.60470644	490	0.831946755	58.60470644
36	CSC	A320	475	0.806478998	61.83401813	475	0.806478998	59.41118544	0	0	58.60470644
37	KAL	B747	471	0.799687596	62.63370573	471	0.799687596	60.21087303	471	0.799687596	59.40439404
38	JAL	B763	463	0.786104791	63.41981052	463	0.786104791	60.99697783	463	0.786104791	60.19049883
39	CCA	A320	459	0.779313389	64.19912391	459	0.779313389	61.77629122	459	0.779313389	60.96981222
40	CSZ	B738	458	0.777615539	64.97673945	458	0.777615539	62.55390675	458	0.777615539	61.74742776
41	CHH	B734	448	0.760637034	65.73737648	448	0.760637034	63.31454379	448	0.760637034	62.50806479
42	HDA	A321	432	0.733471425	66.47084791	432	0.733471425	64.04801521	432	0.733471425	63.24153622
43	CSN	MD82	426	0.723284322	67.19413223	426	0.723284322	64.77129953	0	0	63.24153622
44	YZR	B733	376	0.638391796	67.83252402	376	0.638391796	65.40969133	376	0.638391796	63.87992801
45	HDA	A320	373	0.633298244	68.46582227	373	0.633298244	66.04298958	373	0.633298244	64.51322626

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
46	CSN	B772	354	0.601039085	69.06686135	354	0.601039085	66.64402866	354	0.601039085	65.11426534
47	CYZ	B733	351	0.595945533	69.66280689	351	0.595945533	67.23997419	351	0.595945533	65.71021087
48	CHH	B733	349	0.592549832	70.25535672	349	0.592549832	67.83252402	349	0.592549832	66.3027607
49	CXA	B733	332	0.563686373	70.81904309	332	0.563686373	68.3962104	332	0.563686373	66.86644708
50	ANA	B763	322	0.546707868	71.36575096	322	0.546707868	68.94291827	322	0.546707868	67.41315495
51	CCA	A332	320	0.543312167	71.90906313	320	0.543312167	69.48623043	320	0.543312167	67.95646711
52	CDG	B738	267	0.453326089	72.36238922	267	0.453326089	69.93955652	267	0.453326089	68.4097932
53	AAR	A321	259	0.439743285	72.8021325	259	0.439743285	70.37929981	259	0.439743285	68.84953649
54	CCA	B772	255	0.432951883	73.23508438	255	0.432951883	70.81225169	255	0.432951883	69.28248837
55	CES	E145	242	0.410879826	73.64596421	0	0	70.81225169	0	0	69.28248837
56	DKH	A320	237	0.402390574	74.04835478	237	0.402390574	71.21464226	0	0	69.28248837
57	DKH	A319	235	0.398994872	74.44734966	235	0.398994872	71.61363714	0	0	69.28248837
58	ANA	B767	234	0.397297022	74.84464668	234	0.397297022	72.01093416	234	0.397297022	69.67978539
59	CES	A332	229	0.388807769	75.23345445	229	0.388807769	72.39974193	229	0.388807769	70.06859316
60	JAL	B767	229	0.388807769	75.62226222	229	0.388807769	72.7885497	229	0.388807769	70.45740093
61	CCA	A343	223	0.378620666	76.00088288	223	0.378620666	73.16717036	223	0.378620666	70.8360216
62	CSC	A321	218	0.370131414	76.3710143	218	0.370131414	73.53730178	0	0	70.8360216
63	KAL	A333	217	0.368433563	76.73944786	217	0.368433563	73.90573534	217	0.368433563	71.20445516
64	CHH	A319	208	0.353152908	77.09260077	0	0	73.90573534	0	0	71.20445516
65	CSZ	A320	208	0.353152908	77.44575368	208	0.353152908	74.25888825	208	0.353152908	71.55760807
66	CES	A343	207	0.351455058	77.79720873	207	0.351455058	74.61034331	207	0.351455058	71.90906313
67	AAR	B763	206	0.349757207	78.14696594	206	0.349757207	74.96010051	206	0.349757207	72.25882033
68	FDX	MD11	204	0.346361506	78.49332745	204	0.346361506	75.30646202	204	0.346361506	72.60518184
69	KAL	B738	193	0.327685151	78.8210126	193	0.327685151	75.63414717	193	0.327685151	72.93286699
70	CSZ	B739	185	0.314102346	79.13511494	185	0.314102346	75.94824952	185	0.314102346	73.24696934

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
71	CHH	B737	176	0.298821692	79.43393664	176	0.298821692	76.24707121	176	0.298821692	73.54579103
72	SIA	B773	175	0.297123841	79.73106048	175	0.297123841	76.54419505	175	0.297123841	73.84291487
73	CCA	A333	172	0.29203029	80.02309077	172	0.29203029	76.83622534	172	0.29203029	74.13494516
74	CCA	B736	172	0.29203029	80.31512106	172	0.29203029	77.12825563	172	0.29203029	74.42697545
75	CKK	MD11	172	0.29203029	80.60715135	172	0.29203029	77.42028592	172	0.29203029	74.71900574
76	AAR	B747	167	0.283541037	80.89069238	167	0.283541037	77.70382696	167	0.283541037	75.00254678
77	KLM	B744	162	0.275051784	81.16574417	162	0.275051784	77.97887874	162	0.275051784	75.27759856
78	AMU	A321	162	0.275051784	81.44079595	162	0.275051784	78.25393052	162	0.275051784	75.55265034
79	CRK	B738	156	0.264864681	81.70566063	156	0.264864681	78.51879521	156	0.264864681	75.81751503
80	GEC	MD11	154	0.26146898	81.96712961	154	0.26146898	78.78026419	154	0.26146898	76.07898401
81	CCA	B744	154	0.26146898	82.22859859	154	0.26146898	79.04173317	154	0.26146898	76.34045299
82	AMU	A319	151	0.256375429	82.48497402	151	0.256375429	79.29810859	151	0.256375429	76.59682842
83	CCA	B763	150	0.254677578	82.7396516	150	0.254677578	79.55278617	150	0.254677578	76.85150599
84	ANA	B737	144	0.244490475	82.98414208	0	0	79.55278617	0	0	76.85150599
85	CSZ	A319	142	0.241094774	83.22523685	142	0.241094774	79.79388095	142	0.241094774	77.09260077
86	CDG	B737	140	0.237699073	83.46293592	140	0.237699073	80.03158002	140	0.237699073	77.33029984
87	CES	A346	138	0.234303372	83.6972393	138	0.234303372	80.26588339	138	0.234303372	77.56460321
88	DXH	A319	136	0.230907671	83.92814697	136	0.230907671	80.49679106	0	0	77.56460321
89	DER	B733	135	0.22920982	84.15735679	135	0.22920982	80.72600088	135	0.22920982	77.79381303
90	CSH	CRJ2	131	0.222418418	84.3797752	131	0.222418418	80.9484193	0	0	77.79381303
91	AAR	A320	125	0.212231315	84.59200652	125	0.212231315	81.16065062	125	0.212231315	78.00604435
92	CCA	B757	118	0.200346362	84.79235288	118	0.200346362	81.36099698	118	0.200346362	78.20639071
93	KAL	A330	118	0.200346362	84.99269924	118	0.200346362	81.56134334	118	0.200346362	78.40673707
94	CCA	B777	116	0.19695066	85.1896499	116	0.19695066	81.758294	116	0.19695066	78.60368773
95	HKE	B738	112	0.190159258	85.37980916	112	0.190159258	81.94845326	112	0.190159258	78.79384699

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
96	OKA	B735	107	0.181670006	85.56147917	0	0	81.94845326	0	0	78.79384699
97	CSN	A300	105	0.178274305	85.73975347	0	0	81.94845326	0	0	78.79384699
98	AMU	A30B	104	0.176576454	85.91632993	104	0.176576454	82.12502971	104	0.176576454	78.97042344
99	KAL	B739	101	0.171482903	86.08781283	101	0.171482903	82.29651262	101	0.171482903	79.14190635
100	THA	A333	101	0.171482903	86.25929573	101	0.171482903	82.46799552	101	0.171482903	79.31338925
101	UPS	MD11	101	0.171482903	86.43077863	101	0.171482903	82.63947842	101	0.171482903	79.48487215
102	CUA	B737	100	0.169785052	86.60056369	0	0	82.63947842	0	0	79.48487215
103	CSN	A330	99	0.168087202	86.76865089	99	0.168087202	82.80756562	99	0.168087202	79.65295935
104	ANA	A320	99	0.168087202	86.93673809	99	0.168087202	82.97565282	99	0.168087202	79.82104656
105	CSN	A332	98	0.166389351	87.10312744	98	0.166389351	83.14204217	98	0.166389351	79.98743591
106	SIA	B772	98	0.166389351	87.26951679	98	0.166389351	83.30843153	98	0.166389351	80.15382526
107	AFR	B772	97	0.164691501	87.43420829	97	0.164691501	83.47312303	97	0.164691501	80.31851676
108	GWL	B744	94	0.159597949	87.59380624	94	0.159597949	83.63272098	94	0.159597949	80.47811471
109	NWA	B742	92	0.156202248	87.75000849	92	0.156202248	83.78892322	92	0.156202248	80.63431695
110	KAL	B744	87	0.147712995	87.89772148	87	0.147712995	83.93663622	87	0.147712995	80.78202995
111	EPA	B733	85	0.144317294	88.04203878	0	0	83.93663622	0	0	80.78202995
112	CCA	B752	83	0.140921593	88.18296037	83	0.140921593	84.07755781	83	0.140921593	80.92295154
113	UAE	A340	81	0.137525892	88.32048626	81	0.137525892	84.2150837	81	0.137525892	81.06047744
114	CSN	B744	79	0.134130191	88.45461646	79	0.134130191	84.3492139	79	0.134130191	81.19460763
115	HDA	B744	79	0.134130191	88.58874665	79	0.134130191	84.48334409	79	0.134130191	81.32873782
116	CES	A30B	78	0.132432341	88.72117899	0	0	84.48334409	0	0	81.32873782
117	CPA	B744	77	0.13073449	88.85191348	77	0.13073449	84.61407858	77	0.13073449	81.45947231
118	HXA	CRJ2	76	0.12903664	88.98095012	0	0	84.61407858	0	0	81.45947231
119	KAL	B737	75	0.127338789	89.10828891	75	0.127338789	84.74141737	75	0.127338789	81.5868111
120	CSC	A319	74	0.125640939	89.23392984	74	0.125640939	84.8670583	0	0	81.5868111

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
121	CCA	B762	73	0.123943088	89.35787293	73	0.123943088	84.99100139	73	0.123943088	81.71075419
122	KAL	A306	73	0.123943088	89.48181602	73	0.123943088	85.11494448	73	0.123943088	81.83469727
123	UPS	B752	71	0.120547387	89.60236341	71	0.120547387	85.23549187	71	0.120547387	81.95524466
124	AAR	B767	71	0.120547387	89.72291079	71	0.120547387	85.35603925	71	0.120547387	82.07579205
125	CLX	B744	69	0.117151686	89.84006248	69	0.117151686	85.47319094	69	0.117151686	82.19294373
126	MGL	B737	68	0.115453835	89.95551632	0	0	85.47319094	0	0	82.19294373
127	CCA	B742	67	0.113755985	90.0692723	67	0.113755985	85.58694693	67	0.113755985	82.30669972
128	LKE	B737	67	0.113755985	90.18302829	67	0.113755985	85.70070291	0	0	82.30669972
129	UEA	A319	65	0.110360284	90.29338857	0	0	85.70070291	0	0	82.30669972
130	CSN	B735	64	0.108662433	90.402051	64	0.108662433	85.80936534	64	0.108662433	82.41536215
131	DLH	B744	63	0.106964583	90.50901559	63	0.106964583	85.91632993	63	0.106964583	82.52232673
132	OKA	B733	63	0.106964583	90.61598017	0	0	85.91632993	0	0	82.52232673
133	PAL	A320	63	0.106964583	90.72294475	63	0.106964583	86.02329451	63	0.106964583	82.62929132
134	SQC	B744	63	0.106964583	90.82990933	63	0.106964583	86.13025909	63	0.106964583	82.7362559
135	CES	A340	62	0.105266732	90.93517607	62	0.105266732	86.23552582	62	0.105266732	82.84152263
136	DLH	A346	62	0.105266732	91.0404428	62	0.105266732	86.34079256	62	0.105266732	82.94678936
137	KLM	B747	62	0.105266732	91.14570953	62	0.105266732	86.44605929	62	0.105266732	83.0520561
138	KAL	A332	62	0.105266732	91.25097626	62	0.105266732	86.55132602	62	0.105266732	83.15732283
139	AAR	B777	62	0.105266732	91.356243	62	0.105266732	86.65659275	62	0.105266732	83.26258956
140	JAL	B772	61	0.103568882	91.45981188	61	0.103568882	86.76016164	61	0.103568882	83.36615844
141	CSC	E145	59	0.100173181	91.55998506	0	0	86.76016164	0	0	83.36615844
142	NWA	B752	59	0.100173181	91.66015824	59	0.100173181	86.86033482	59	0.100173181	83.46633162
143	MAS	B772	58	0.09847533	91.75863357	58	0.09847533	86.95881015	58	0.09847533	83.56480695
144	SHQ	B752	57	0.09677748	91.85541105	57	0.09677748	87.05558763	57	0.09677748	83.66158443
145	AFR	B744	57	0.09677748	91.95218853	57	0.09677748	87.15236511	57	0.09677748	83.75836191

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
146	UAE	B773	56	0.095079629	92.04726816	56	0.095079629	87.24744473	56	0.095079629	83.85344154
147	CHB	B733	54	0.091683928	92.13895209	0	0	87.24744473	0	0	83.85344154
148	CSH	B757	54	0.091683928	92.23063601	54	0.091683928	87.33912866	54	0.091683928	83.94512547
149	MAS	A333	54	0.091683928	92.32231994	54	0.091683928	87.43081259	54	0.091683928	84.0368094
150	AFL	B763	54	0.091683928	92.41400387	54	0.091683928	87.52249652	54	0.091683928	84.12849333
151	NWA	A330	53	0.089986078	92.50398995	53	0.089986078	87.6124826	53	0.089986078	84.21847941
152	QTR	A332	52	0.088288227	92.59227818	52	0.088288227	87.70077082	52	0.088288227	84.30676763
153	THY	A332	52	0.088288227	92.6805664	52	0.088288227	87.78905905	52	0.088288227	84.39505586
154	BAW	B772	51	0.086590377	92.76715678	51	0.086590377	87.87564943	51	0.086590377	84.48164624
155	CES		51	0.086590377	92.85374716	0	0	87.87564943	0	0	84.48164624
156	CXA	B757	51	0.086590377	92.94033753	51	0.086590377	87.9622398	51	0.086590377	84.56823661
157	JAL	B738	50	0.084892526	93.02523006	50	0.084892526	88.04713233	50	0.084892526	84.65312914
158	DLH	A340	49	0.083194676	93.10842473	0	0	88.04713233	0	0	84.65312914
159	SHQ	MD11	49	0.083194676	93.19161941	49	0.083194676	88.13032701	49	0.083194676	84.73632381
160	CCA	B767	48	0.081496825	93.27311623	48	0.081496825	88.21182383	0	0	84.73632381
161	DER	H25B	48	0.081496825	93.35461306	0	0	88.21182383	0	0	84.73632381
162	FIN	A343	48	0.081496825	93.43610988	48	0.081496825	88.29332066	48	0.081496825	84.81782064
163	AFL	IL96	48	0.081496825	93.51760671	48	0.081496825	88.37481748	48	0.081496825	84.89931746
164	CES	B763	47	0.079798974	93.59740568	47	0.079798974	88.45461646	47	0.079798974	84.97911644
165	JAL	B747	47	0.079798974	93.67720466	47	0.079798974	88.53441543	47	0.079798974	85.05891541
166	CES	ERJ	46	0.078101124	93.75530578	0	0	88.53441543	0	0	85.05891541
167	MAS	B742	46	0.078101124	93.83340691	46	0.078101124	88.61251655	46	0.078101124	85.13701654
168	AHK	A306	46	0.078101124	93.91150803	46	0.078101124	88.69061768	46	0.078101124	85.21511766
169	MSR	A340	45	0.076403273	93.9879113	0	0	88.69061768	0	0	85.21511766
170	QFA	A333	45	0.076403273	94.06431458	45	0.076403273	88.76702095	45	0.076403273	85.29152093

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
171	UAE	B744	45	0.076403273	94.14071785	0	0	88.76702095	0	0	85.29152093
172	JAE	B744	44	0.074705423	94.21542327	44	0.074705423	88.84172637	44	0.074705423	85.36622636
173	UAE	A345	44	0.074705423	94.2901287	44	0.074705423	88.9164318	44	0.074705423	85.44093178
174	HVN	B777	43	0.073007572	94.36313627	43	0.073007572	88.98943937	43	0.073007572	85.51393935
175	OKA	B738	43	0.073007572	94.43614384	0	0	88.98943937	0	0	85.51393935
176	DER	A319	42	0.071309722	94.50745356	0	0	88.98943937	0	0	85.51393935
177	CCA	B747	41	0.069611871	94.57706544	41	0.069611871	89.05905124	41	0.069611871	85.58355122
178	ABW	B742	41	0.069611871	94.64667731	41	0.069611871	89.12866311	41	0.069611871	85.6531631
179	CDG	CRJ7	40	0.067914021	94.71459133	40	0.067914021	89.19657713	40	0.067914021	85.72107712
180	CHH	B763	40	0.067914021	94.78250535	40	0.067914021	89.26449115	40	0.067914021	85.78899114
181	KAL	A300	40	0.067914021	94.85041937	40	0.067914021	89.33240518	40	0.067914021	85.85690516
182	UAL	B744	40	0.067914021	94.91833339	40	0.067914021	89.4003192	40	0.067914021	85.92481918
183	AZA	B763	39	0.06621617	94.98454956	39	0.06621617	89.46653537	39	0.06621617	85.99103535
184	MAS	B744	38	0.06451832	95.04906788	38	0.06451832	89.53105369	38	0.06451832	86.05555367
185	ANA	B772	38	0.06451832	95.1135862	38	0.06451832	89.59557201	38	0.06451832	86.12007199
186	CSN	B757	37	0.062820469	95.17640667	37	0.062820469	89.65839248	37	0.062820469	86.18289246
187	DLH	A343	37	0.062820469	95.23922714	37	0.062820469	89.72121294	37	0.062820469	86.24571293
188	CDG	CRJ2	35	0.059424768	95.29865191	0	0	89.72121294	0	0	86.24571293
189	CES	MD11	35	0.059424768	95.35807667	35	0.059424768	89.78063771	35	0.059424768	86.3051377
190	KAL	B777	35	0.059424768	95.41750144	35	0.059424768	89.84006248	35	0.059424768	86.36456246
191	UPS	B763	35	0.059424768	95.47692621	35	0.059424768	89.89948725	35	0.059424768	86.42398723
192	CSN	A306	33	0.056029067	95.53295528	0	0	89.89948725	0	0	86.42398723
193	VIR	A346	32	0.054331217	95.5872865	32	0.054331217	89.95381847	32	0.054331217	86.47831845
194	AFR	B777	32	0.054331217	95.64161771	32	0.054331217	90.00814968	32	0.054331217	86.53264967
195	AZA	MD11	32	0.054331217	95.69594893	32	0.054331217	90.0624809	32	0.054331217	86.58698088

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
196	DLH	B747	31	0.052633366	95.74858229	0	0	90.0624809	0	0	86.58698088
197	FDX	A310	31	0.052633366	95.80121566	31	0.052633366	90.11511427	31	0.052633366	86.63961425
198	AAR	B772	31	0.052633366	95.85384903	31	0.052633366	90.16774763	31	0.052633366	86.69224761
199	CPA	A333	30	0.050935516	95.90478454	30	0.050935516	90.21868315	30	0.050935516	86.74318313
200	GIA	A333	30	0.050935516	95.95572006	30	0.050935516	90.26961866	0	0	86.74318313
201	TAY	B744	30	0.050935516	96.00665557	30	0.050935516	90.32055418	30	0.050935516	86.79411865
202	VIR	A340	30	0.050935516	96.05759109	30	0.050935516	90.37148969	30	0.050935516	86.84505416
203	KAL	B772	30	0.050935516	96.10852661	30	0.050935516	90.42242521	30	0.050935516	86.89598968
204	AIC	A310	30	0.050935516	96.15946212	30	0.050935516	90.47336073	30	0.050935516	86.94692519
205	AMU	A320	30	0.050935516	96.21039764	30	0.050935516	90.52429624	0	0	86.94692519
206	CES	A300	29	0.049237665	96.2596353	29	0.049237665	90.57353391	29	0.049237665	86.99616286
207	JAL	B744	29	0.049237665	96.30887297	29	0.049237665	90.62277157	29	0.049237665	87.04540052
208	QFA	B744	29	0.049237665	96.35811063	29	0.049237665	90.67200924	29	0.049237665	87.09463819
209	QTR	A330	29	0.049237665	96.4073483	0	0	90.67200924	0	0	87.09463819
210	YZR	B737	29	0.049237665	96.45658596	29	0.049237665	90.7212469	29	0.049237665	87.14387585
211	OMA	B737	28	0.047539815	96.50412578	0	0	90.7212469	0	0	87.14387585
212	CSN		27	0.045841964	96.54996774	0	0	90.7212469	0	0	87.14387585
213	CES	A330	26	0.044144114	96.59411185	26	0.044144114	90.76539101	26	0.044144114	87.18801997
214	RBA	A320	26	0.044144114	96.63825597	26	0.044144114	90.80953513	0	0	87.18801997
215	CPA	B742	25	0.042446263	96.68070223	25	0.042446263	90.85198139	25	0.042446263	87.23046623
216	UAL	B747	25	0.042446263	96.72314849	25	0.042446263	90.89442765	25	0.042446263	87.27291249
217	UZB	B767	25	0.042446263	96.76559476	0	0	90.89442765	0	0	87.27291249
218	CKK	B744	23	0.039050562	96.80464532	23	0.039050562	90.93347822	23	0.039050562	87.31196305
219	CXA	B73G	23	0.039050562	96.84369588	23	0.039050562	90.97252878	23	0.039050562	87.35101362
220	RBA	A319	23	0.039050562	96.88274644	0	0	90.97252878	0	0	87.35101362

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
221	RCF	DC10	23	0.039050562	96.921797	23	0.039050562	91.01157934	23	0.039050562	87.39006418
222	THY	A330	23	0.039050562	96.96084757	0	0	91.01157934	0	0	87.39006418
223	UEA	A320	23	0.039050562	96.99989813	0	0	91.01157934	0	0	87.39006418
224	ABW	B747	23	0.039050562	97.03894869	0	0	91.01157934	0	0	87.39006418
225	AAL	B772	22	0.037352711	97.0763014	22	0.037352711	91.04893205	22	0.037352711	87.42741689
226	AAR	B744	22	0.037352711	97.11365411	22	0.037352711	91.08628476	22	0.037352711	87.4647696
227	CCA	CRJ2	21	0.035654861	97.14930897	0	0	91.08628476	0	0	87.4647696
228	CHH	D328	21	0.035654861	97.18496384	0	0	91.08628476	0	0	87.4647696
229	CLX	B747	21	0.035654861	97.2206187	0	0	91.08628476	0	0	87.4647696
230	CYZ	B737	21	0.035654861	97.25627356	21	0.035654861	91.12193962	21	0.035654861	87.50042446
231	SVA	MD11	21	0.035654861	97.29192842	21	0.035654861	91.15759449	21	0.035654861	87.53607932
232	CCA		20	0.03395701	97.32588543	0	0	91.15759449	0	0	87.53607932
233	HVN	B772	20	0.03395701	97.35984244	20	0.03395701	91.1915515	20	0.03395701	87.57003633
234	ACA	A343	20	0.03395701	97.39379945	20	0.03395701	91.22550851	20	0.03395701	87.60399334
235	PAC	B744	19	0.03225916	97.42605861	19	0.03225916	91.25776767	19	0.03225916	87.6362525
236	CPA	A343	19	0.03225916	97.45831777	19	0.03225916	91.29002683	19	0.03225916	87.66851166
237	AAR	A333	19	0.03225916	97.49057693	19	0.03225916	91.32228599	19	0.03225916	87.70077082
238	AIC	B747	19	0.03225916	97.52283609	0	0	91.32228599	0	0	87.70077082
239	PIA	A310	18	0.030561309	97.5533974	18	0.030561309	91.3528473	18	0.030561309	87.73133213
240	THY	A340	18	0.030561309	97.58395871	0	0	91.3528473	0	0	87.73133213
241	CSH		17	0.028863459	97.61282217	0	0	91.3528473	0	0	87.73133213
242	DER	B732	17	0.028863459	97.64168563	0	0	91.3528473	0	0	87.73133213
243	GWL	B747	17	0.028863459	97.67054908	0	0	91.3528473	0	0	87.73133213
244	HVN	A332	17	0.028863459	97.69941254	0	0	91.3528473	0	0	87.73133213
245	NWA	B744	17	0.028863459	97.728276	17	0.028863459	91.38171075	17	0.028863459	87.76019559

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
246	BAW	B744	17	0.028863459	97.75713946	17	0.028863459	91.41057421	17	0.028863459	87.78905905
247	CXA		16	0.027165608	97.78430507	16	0.027165608	91.43773982	16	0.027165608	87.81622466
248	UPS	B757	16	0.027165608	97.81147068	0	0	91.43773982	0	0	87.81622466
249	YZR	B742	16	0.027165608	97.83863629	16	0.027165608	91.46490543	16	0.027165608	87.84339027
250	ACA	B763	16	0.027165608	97.86580189	16	0.027165608	91.49207104	16	0.027165608	87.87055588
251	ANZ	B744	16	0.027165608	97.8929675	16	0.027165608	91.51923665	16	0.027165608	87.89772148
252	CSN	AB6	15	0.025467758	97.91843526	0	0	91.51923665	0	0	87.89772148
253	NCA	B744	15	0.025467758	97.94390302	15	0.025467758	91.5447044	15	0.025467758	87.92318924
254	CES	CRJ2	14	0.023769907	97.96767293	0	0	91.5447044	0	0	87.92318924
255	CRG	MD11	14	0.023769907	97.99144283	0	0	91.5447044	0	0	87.92318924
256	CSH	B73G	14	0.023769907	98.01521274	0	0	91.5447044	0	0	87.92318924
257	ELY	B742	14	0.023769907	98.03898265	14	0.023769907	91.56847431	14	0.023769907	87.94695915
258	FIN	MD11	14	0.023769907	98.06275256	14	0.023769907	91.59224422	14	0.023769907	87.97072906
259	KAL		14	0.023769907	98.08652246	0	0	91.59224422	0	0	87.97072906
260	KZR	B757	14	0.023769907	98.11029237	0	0	91.59224422	0	0	87.97072906
261	MAS	B74F	13	0.022072057	98.13236443	0	0	91.59224422	0	0	87.97072906
262	TSE	MD11	13	0.022072057	98.15443648	13	0.022072057	91.61431628	13	0.022072057	87.99280111
263	CCA	A340	12	0.020374206	98.17481069	12	0.020374206	91.63469048	12	0.020374206	88.01317532
264	CES	EMB1	11	0.018676356	98.19348705	0	0	91.63469048	0	0	88.01317532
265	CSN	E145	11	0.018676356	98.2121634	0	0	91.63469048	0	0	88.01317532
266	CSZ		11	0.018676356	98.23083976	0	0	91.63469048	0	0	88.01317532
267	CSZ	B73G	11	0.018676356	98.24951611	0	0	91.63469048	0	0	88.01317532
268	JAL	B777	11	0.018676356	98.26819247	0	0	91.63469048	0	0	88.01317532
269	MAS	B747	11	0.018676356	98.28686882	0	0	91.63469048	0	0	88.01317532
270	MPH	B742	11	0.018676356	98.30554518	11	0.018676356	91.65336684	11	0.018676356	88.03185168

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
271	OMA	IL76	11	0.018676356	98.32422154	0	0	91.65336684	0	0	88.03185168
272	OMA	T154	11	0.018676356	98.34289789	0	0	91.65336684	0	0	88.03185168
273	AAR		11	0.018676356	98.36157425	0	0	91.65336684	0	0	88.03185168
274	AEW	B763	11	0.018676356	98.3802506	11	0.018676356	91.67204319	11	0.018676356	88.05052803
275	ANA	B762	11	0.018676356	98.39892696	0	0	91.67204319	0	0	88.05052803
276	ANZ	B772	11	0.018676356	98.41760331	11	0.018676356	91.69071955	11	0.018676356	88.06920439
277	CCA	B74F	10	0.016978505	98.43458182	0	0	91.69071955	0	0	88.06920439
278	CYZ		10	0.016978505	98.45156032	10	0.016978505	91.70769805	10	0.016978505	88.08618289
279	KAL	B773	10	0.016978505	98.46853883	10	0.016978505	91.72467656	10	0.016978505	88.1031614
280	MGL	A310	10	0.016978505	98.48551734	0	0	91.72467656	0	0	88.1031614
281	OMA	CRJ	10	0.016978505	98.50249584	0	0	91.72467656	0	0	88.1031614
282	RCF	MD11	10	0.016978505	98.51947435	0	0	91.72467656	0	0	88.1031614
283	VCX	B742	10	0.016978505	98.53645285	10	0.016978505	91.74165506	10	0.016978505	88.1201399
284	ACA	MD11	10	0.016978505	98.55343136	0	0	91.74165506	0	0	88.1201399
285	CSH	B742	9	0.015280655	98.56871201	0	0	91.74165506	0	0	88.1201399
286	CSN	B73G	9	0.015280655	98.58399267	0	0	91.74165506	0	0	88.1201399
287	DKH		9	0.015280655	98.59927332	9	0.015280655	91.75693572	0	0	88.1201399
288	EXH	GLF5	9	0.015280655	98.61455397	9	0.015280655	91.77221637	9	0.015280655	88.13542056
289	JAL	B762	9	0.015280655	98.62983463	0	0	91.77221637	0	0	88.13542056
290	MAS	B777	9	0.015280655	98.64511528	0	0	91.77221637	0	0	88.13542056
291	ELY	B74F	9	0.015280655	98.66039594	0	0	91.77221637	0	0	88.13542056
292	HVN	A321	8	0.013582804	98.67397874	8	0.013582804	91.78579918	8	0.013582804	88.14900336
293	JAL	B737	8	0.013582804	98.68756155	0	0	91.78579918	0	0	88.14900336
294	JAL	B742	8	0.013582804	98.70114435	8	0.013582804	91.79938198	8	0.013582804	88.16258617
295	KLM	B777	8	0.013582804	98.71472716	0	0	91.79938198	0	0	88.16258617

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
296	THA	B772	8	0.013582804	98.72830996	8	0.013582804	91.81296479	8	0.013582804	88.17616897
297	THY	A343	8	0.013582804	98.74189276	8	0.013582804	91.82654759	8	0.013582804	88.18975177
298	TIS	B742	8	0.013582804	98.75547557	8	0.013582804	91.84013039	8	0.013582804	88.20333458
299	AFR	B747	8	0.013582804	98.76905837	0	0	91.84013039	0	0	88.20333458
300	CCA	B73G	7	0.011884954	98.78094333	0	0	91.84013039	0	0	88.20333458
301	CHH		7	0.011884954	98.79282828	0	0	91.84013039	0	0	88.20333458
302	CKK	A300	7	0.011884954	98.80471323	0	0	91.84013039	0	0	88.20333458
303	CPA	B773	7	0.011884954	98.81659819	7	0.011884954	91.85201535	7	0.011884954	88.21521953
304	CSC		7	0.011884954	98.82848314	0	0	91.85201535	0	0	88.21521953
305	CSH	A320	7	0.011884954	98.84036809	0	0	91.85201535	0	0	88.21521953
306	CSH	B767	7	0.011884954	98.85225305	0	0	91.85201535	0	0	88.21521953
307	DER	GLF2	7	0.011884954	98.864138	0	0	91.85201535	0	0	88.21521953
308	OMA	CRJ2	7	0.011884954	98.87602295	0	0	91.85201535	0	0	88.21521953
309	ALK	A343	7	0.011884954	98.88790791	7	0.011884954	91.8639003	7	0.011884954	88.22710449
310	AMU	A300	7	0.011884954	98.89979286	0	0	91.8639003	0	0	88.22710449
311	CAL	B744	6	0.010187103	98.90997997	6	0.010187103	91.87408741	6	0.010187103	88.23729159
312	CDG		6	0.010187103	98.92016707	0	0	91.87408741	0	0	88.23729159
313	CPA	B743	6	0.010187103	98.93035417	0	0	91.87408741	0	0	88.23729159
314	CPA	B772	6	0.010187103	98.94054127	6	0.010187103	91.88427451	6	0.010187103	88.24747869
315	CSH	CRJ	6	0.010187103	98.95072838	0	0	91.88427451	0	0	88.24747869
316	CSH	B733	6	0.010187103	98.96091548	6	0.010187103	91.89446161	0	0	88.24747869
317	CXA	A320	6	0.010187103	98.97110258	6	0.010187103	91.90464871	6	0.010187103	88.2576658
318	EIA	B747	6	0.010187103	98.98128969	0	0	91.90464871	0	0	88.2576658
319	EPA	B737	6	0.010187103	98.99147679	0	0	91.90464871	0	0	88.2576658
320	EVA	A332	6	0.010187103	99.00166389	6	0.010187103	91.91483582	6	0.010187103	88.2678529

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
321	IRA	B747	6	0.010187103	99.011851	0	0	91.91483582	0	0	88.2678529
322	MAS	A332	6	0.010187103	99.0220381	6	0.010187103	91.92502292	6	0.010187103	88.27804
323	MDA	B744	6	0.010187103	99.0322252	0	0	91.92502292	0	0	88.27804
324	OMA	B733	6	0.010187103	99.04241231	0	0	91.92502292	0	0	88.27804
325	PIA	B747	6	0.010187103	99.05259941	0	0	91.92502292	0	0	88.27804
326	TAY	B747	6	0.010187103	99.06278651	0	0	91.92502292	0	0	88.27804
327	UAL	B777	6	0.010187103	99.07297362	0	0	91.92502292	0	0	88.27804
328	YZR		6	0.010187103	99.08316072	6	0.010187103	91.93521002	6	0.010187103	88.2882271
329	THA	B744	6	0.010187103	99.09334782	6	0.010187103	91.94539713	6	0.010187103	88.29841421
330	AAL	B777	6	0.010187103	99.10353492	0	0	91.94539713	0	0	88.29841421
331	ABW		6	0.010187103	99.11372203	0	0	91.94539713	0	0	88.29841421
332	AFL	DC10	6	0.010187103	99.12390913	6	0.010187103	91.95558423	6	0.010187103	88.30860131
333	ALK	A332	6	0.010187103	99.13409623	6	0.010187103	91.96577133	6	0.010187103	88.31878841
334	AZA	B777	6	0.010187103	99.14428334	0	0	91.96577133	0	0	88.31878841
335	CFI	C560	5	0.008489253	99.15277259	0	0	91.96577133	0	0	88.31878841
336	CKK	B742	5	0.008489253	99.16126184	0	0	91.96577133	0	0	88.31878841
337	CQH		5	0.008489253	99.1697511	0	0	91.96577133	0	0	88.31878841
338	CSC	EMB1	5	0.008489253	99.17824035	0	0	91.96577133	0	0	88.31878841
339	CXA	B73C	5	0.008489253	99.1867296	5	0.008489253	91.97426059	5	0.008489253	88.32727767
340	DER	B737	5	0.008489253	99.19521885	0	0	91.97426059	0	0	88.32727767
341	GWL		5	0.008489253	99.20370811	0	0	91.97426059	0	0	88.32727767
342	JAE	B747	5	0.008489253	99.21219736	5	0.008489253	91.98274984	5	0.008489253	88.33576692
343	KAL	B767	5	0.008489253	99.22068661	0	0	91.98274984	0	0	88.33576692
344	ABW	B743	5	0.008489253	99.22917586	5	0.008489253	91.99123909	5	0.008489253	88.34425617
345	AFL	B777	5	0.008489253	99.23766512	0	0	91.99123909	0	0	88.34425617

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
346	BKH	GLF4	4	0.006791402	99.24445652	0	0	91.99123909	0	0	88.34425617
347	BLM	GALX	4	0.006791402	99.25124792	0	0	91.99123909	0	0	88.34425617
348	CDG	CRJ	4	0.006791402	99.25803932	0	0	91.99123909	0	0	88.34425617
349	CKK		4	0.006791402	99.26483072	0	0	91.99123909	0	0	88.34425617
350	CKK	A306	4	0.006791402	99.27162213	0	0	91.99123909	0	0	88.34425617
351	DER		4	0.006791402	99.27841353	0	0	91.99123909	0	0	88.34425617
352	ELY	B777	4	0.006791402	99.28520493	0	0	91.99123909	0	0	88.34425617
353	FEA	B752	4	0.006791402	99.29199633	4	0.006791402	91.99803049	4	0.006791402	88.35104757
354	FPG	F900	4	0.006791402	99.29878773	4	0.006791402	92.0048219	4	0.006791402	88.35783898
355	GIA	B744	4	0.006791402	99.30557914	4	0.006791402	92.0116133	0	0	88.35783898
356	JAL		4	0.006791402	99.31237054	0	0	92.0116133	0	0	88.35783898
357	JAL	B74D	4	0.006791402	99.31916194	4	0.006791402	92.0184047	4	0.006791402	88.36463038
358	JAL	JA60	4	0.006791402	99.32595334	0	0	92.0184047	0	0	88.36463038
359	NWA	B747	4	0.006791402	99.33274475	0	0	92.0184047	0	0	88.36463038
360	OMA	B738	4	0.006791402	99.33953615	0	0	92.0184047	0	0	88.36463038
361	OYM	GLEX	4	0.006791402	99.34632755	0	0	92.0184047	0	0	88.36463038
362	PAC	B747	4	0.006791402	99.35311895	0	0	92.0184047	0	0	88.36463038
363	QFA	B74F	4	0.006791402	99.35991035	0	0	92.0184047	0	0	88.36463038
364	SED	F900	4	0.006791402	99.36670176	0	0	92.0184047	0	0	88.36463038
365	SOO	B742	4	0.006791402	99.37349316	4	0.006791402	92.0251961	4	0.006791402	88.37142178
366	SQC		4	0.006791402	99.38028456	0	0	92.0251961	0	0	88.37142178
367	TNA	A320	4	0.006791402	99.38707596	4	0.006791402	92.0319875	4	0.006791402	88.37821318
368	TNA	A321	4	0.006791402	99.39386736	4	0.006791402	92.03877891	4	0.006791402	88.38500458
369	UAE	A343	4	0.006791402	99.40065877	4	0.006791402	92.04557031	4	0.006791402	88.39179599
370	VDA	A124	4	0.006791402	99.40745017	4	0.006791402	92.05236171	4	0.006791402	88.39858739

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
371	VPB	F900	4	0.006791402	99.41424157	0	0	92.05236171	0	0	88.39858739
372	ADB	AN12	4	0.006791402	99.42103297	0	0	92.05236171	0	0	88.39858739
373	AFL	B767	4	0.006791402	99.42782437	0	0	92.05236171	0	0	88.39858739
374	ANZ	B747	4	0.006791402	99.43461578	0	0	92.05236171	0	0	88.39858739
375	CKK	MD1F	3	0.005093552	99.43970933	0	0	92.05236171	0	0	88.39858739
376	CSM	A321	3	0.005093552	99.44480288	0	0	92.05236171	0	0	88.39858739
377	CSZ	B734	3	0.005093552	99.44989643	0	0	92.05236171	0	0	88.39858739
378	CXA	B734	3	0.005093552	99.45498998	3	0.005093552	92.05745526	3	0.005093552	88.40368094
379	DER	A320	3	0.005093552	99.46008353	0	0	92.05745526	0	0	88.40368094
380	DER	G200	3	0.005093552	99.46517709	0	0	92.05745526	0	0	88.40368094
381	GLG	CL60	3	0.005093552	99.47027064	0	0	92.05745526	0	0	88.40368094
382	HL7	GLEX	3	0.005093552	99.47536419	0	0	92.05745526	0	0	88.40368094
383	NCA	B742	3	0.005093552	99.48045774	3	0.005093552	92.06254881	3	0.005093552	88.40877449
384	OMA	IL76	3	0.005093552	99.48555129	0	0	92.06254881	0	0	88.40877449
385	PAC	B742	3	0.005093552	99.49064484	3	0.005093552	92.06764236	3	0.005093552	88.41386804
386	QTR		3	0.005093552	99.4957384	0	0	92.06764236	0	0	88.41386804
387	SAZ	CL60	3	0.005093552	99.50083195	3	0.005093552	92.07273592	3	0.005093552	88.41896159
388	SMJ	DC10	3	0.005093552	99.5059255	0	0	92.07273592	0	0	88.41896159
389	TAG	F900	3	0.005093552	99.51101905	3	0.005093552	92.07782947	3	0.005093552	88.42405515
390	TSO	B762	3	0.005093552	99.5161126	3	0.005093552	92.08292302	3	0.005093552	88.4291487
391	TXC	IL76	3	0.005093552	99.52120615	3	0.005093552	92.08801657	3	0.005093552	88.43424225
392	UAE		3	0.005093552	99.5262997	0	0	92.08801657	0	0	88.43424225
393	UAE	B747	3	0.005093552	99.53139326	0	0	92.08801657	0	0	88.43424225
394	AFR	B773	3	0.005093552	99.53648681	3	0.005093552	92.09311012	3	0.005093552	88.4393358
395	AIC		3	0.005093552	99.54158036	0	0	92.09311012	0	0	88.4393358

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
396	AMU	A306	3	0.005093552	99.54667391	3	0.005093552	92.09820367	3	0.005093552	88.44442935
397	BKM	GALX	2	0.003395701	99.55006961	0	0	92.09820367	0	0	88.44442935
398	BKS	GALX	2	0.003395701	99.55346531	0	0	92.09820367	0	0	88.44442935
399	CFI	C650	2	0.003395701	99.55686101	0	0	92.09820367	0	0	88.44442935
400	CHH	A320	2	0.003395701	99.56025671	0	0	92.09820367	0	0	88.44442935
401	CHS	B738	2	0.003395701	99.56365242	0	0	92.09820367	0	0	88.44442935
402	CLX		2	0.003395701	99.56704812	0	0	92.09820367	0	0	88.44442935
403	CRG		2	0.003395701	99.57044382	0	0	92.09820367	0	0	88.44442935
404	CSG	B733	2	0.003395701	99.57383952	0	0	92.09820367	0	0	88.44442935
405	CSN	A333	2	0.003395701	99.57723522	0	0	92.09820367	0	0	88.44442935
406	CSN	B747	2	0.003395701	99.58063092	0	0	92.09820367	0	0	88.44442935
407	CUA	B738	2	0.003395701	99.58402662	0	0	92.09820367	0	0	88.44442935
408	CXA	738	2	0.003395701	99.58742232	2	0.003395701	92.10159938	2	0.003395701	88.44782505
409	CXA	A752	2	0.003395701	99.59081802	2	0.003395701	92.10499508	2	0.003395701	88.45122075
410	CXA	B732	2	0.003395701	99.59421373	2	0.003395701	92.10839078	2	0.003395701	88.45461646
411	DCF	LJ60	2	0.003395701	99.59760943	0	0	92.10839078	0	0	88.45461646
412	DCS	GLEX	2	0.003395701	99.60100513	2	0.003395701	92.11178648	2	0.003395701	88.45801216
413	DER	HAW	2	0.003395701	99.60440083	0	0	92.11178648	0	0	88.45801216
414	DXH	B737	2	0.003395701	99.60779653	0	0	92.11178648	0	0	88.45801216
415	ELY	B747	2	0.003395701	99.61119223	0	0	92.11178648	0	0	88.45801216
416	ETD	A306	2	0.003395701	99.61458793	0	0	92.11178648	0	0	88.45801216
417	FDX		2	0.003395701	99.61798363	0	0	92.11178648	0	0	88.45801216
418	GEC		2	0.003395701	99.62137933	0	0	92.11178648	0	0	88.45801216
419	GEC	B747	2	0.003395701	99.62477503	0	0	92.11178648	0	0	88.45801216
420	HDA	321	2	0.003395701	99.62817074	0	0	92.11178648	0	0	88.45801216

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
421	HDA	A33	2	0.003395701	99.63156644	0	0	92.11178648	0	0	88.45801216
422	HDA	B742	2	0.003395701	99.63496214	2	0.003395701	92.11518218	2	0.003395701	88.46140786
423	HDA	B743	2	0.003395701	99.63835784	2	0.003395701	92.11857788	2	0.003395701	88.46480356
424	HSS	B350	2	0.003395701	99.64175354	0	0	92.11857788	0	0	88.46480356
425	MAS		2	0.003395701	99.64514924	0	0	92.11857788	0	0	88.46480356
426	MSR	B747	2	0.003395701	99.64854494	0	0	92.11857788	0	0	88.46480356
427	OKA	B737	2	0.003395701	99.65194064	0	0	92.11857788	0	0	88.46480356
428	OMA		2	0.003395701	99.65533634	0	0	92.11857788	0	0	88.46480356
429	OMA	B737	2	0.003395701	99.65873205	0	0	92.11857788	0	0	88.46480356
430	OMA	A320	2	0.003395701	99.66212775	0	0	92.11857788	0	0	88.46480356
431	PKR	E135	2	0.003395701	99.66552345	0	0	92.11857788	0	0	88.46480356
432	PKT	F100	2	0.003395701	99.66891915	0	0	92.11857788	0	0	88.46480356
433	PLF	TU15	2	0.003395701	99.67231485	0	0	92.11857788	0	0	88.46480356
434	RCF	B747	2	0.003395701	99.67571055	0	0	92.11857788	0	0	88.46480356
435	RCF	IL76	2	0.003395701	99.67910625	0	0	92.11857788	0	0	88.46480356
436	SBI	A319	2	0.003395701	99.68250195	2	0.003395701	92.12197358	2	0.003395701	88.46819926
437	SHE	FA90	2	0.003395701	99.68589765	0	0	92.12197358	0	0	88.46819926
438	SNJ	B734	2	0.003395701	99.68929335	2	0.003395701	92.12536928	2	0.003395701	88.47159496
439	SVA		2	0.003395701	99.69268906	0	0	92.12536928	0	0	88.47159496
440	TAY	B74F	2	0.003395701	99.69608476	0	0	92.12536928	0	0	88.47159496
441	VDA	AN12	2	0.003395701	99.69948046	0	0	92.12536928	0	0	88.47159496
442	WGT	A319	2	0.003395701	99.70287616	2	0.003395701	92.12876498	2	0.003395701	88.47499066
443	OMA	CRJ7	2	0.003395701	99.70627186	0	0	92.12876498	0	0	88.47499066
444	AAR	B47	2	0.003395701	99.70966756	0	0	92.12876498	0	0	88.47499066
445	ABW	A330	2	0.003395701	99.71306326	0	0	92.12876498	0	0	88.47499066

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
446	ALK	A330	2	0.003395701	99.71645896	0	0	92.12876498	0	0	88.47499066
447	AME	A310	2	0.003395701	99.71985466	0	0	92.12876498	0	0	88.47499066
448	ANA	B736	2	0.003395701	99.72325037	0	0	92.12876498	0	0	88.47499066
449	ANA	B757	2	0.003395701	99.72664607	0	0	92.12876498	0	0	88.47499066
450	AZS	IL76	2	0.003395701	99.73004177	2	0.003395701	92.13216068	2	0.003395701	88.47838636
451	BAW	B747	1	0.001697851	99.73173962	0	0	92.13216068	0	0	88.47838636
452	BAW	B74F	1	0.001697851	99.73343747	0	0	92.13216068	0	0	88.47838636
453	BAW	B777	1	0.001697851	99.73513532	0	0	92.13216068	0	0	88.47838636
454	BKG	GLF5	1	0.001697851	99.73683317	0	0	92.13216068	0	0	88.47838636
455	CA8	B737	1	0.001697851	99.73853102	0	0	92.13216068	0	0	88.47838636
456	CAN	A319	1	0.001697851	99.74022887	0	0	92.13216068	0	0	88.47838636
457	CAN	B738	1	0.001697851	99.74192672	0	0	92.13216068	0	0	88.47838636
458	CAP	B742	1	0.001697851	99.74362457	0	0	92.13216068	0	0	88.47838636
459	CCA	A330	1	0.001697851	99.74532242	1	0.001697851	92.13385854	1	0.001697851	88.48008421
460	CCA	A3143	1	0.001697851	99.74702027	0	0	92.13385854	0	0	88.48008421
461	CDG	B739	1	0.001697851	99.74871812	0	0	92.13385854	0	0	88.48008421
462	CDH	B737	1	0.001697851	99.75041597	0	0	92.13385854	0	0	88.48008421
463	CE7	A320	1	0.001697851	99.75211382	0	0	92.13385854	0	0	88.48008421
464	CES	A738	1	0.001697851	99.75381167	0	0	92.13385854	0	0	88.48008421
465	CES	B747	1	0.001697851	99.75550952	0	0	92.13385854	0	0	88.48008421
466	CES	Z320	1	0.001697851	99.75720738	0	0	92.13385854	0	0	88.48008421
467	CGD	LJ35	1	0.001697851	99.75890523	0	0	92.13385854	0	0	88.48008421
468	CHH	A333	1	0.001697851	99.76060308	0	0	92.13385854	0	0	88.48008421
469	CHH	B767	1	0.001697851	99.76230093	0	0	92.13385854	0	0	88.48008421
470	CHH	MD82	1	0.001697851	99.76399878	0	0	92.13385854	0	0	88.48008421

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
471	CKK	A340	1	0.001697851	99.76569663	0	0	92.13385854	0	0	88.48008421
472	CKK	ZZZZ	1	0.001697851	99.76739448	0	0	92.13385854	0	0	88.48008421
473	CLA	A318	1	0.001697851	99.76909233	0	0	92.13385854	0	0	88.48008421
474	CLA	GLEX	1	0.001697851	99.77079018	1	0.001697851	92.13555639	1	0.001697851	88.48178206
475	CLX	A747	1	0.001697851	99.77248803	0	0	92.13555639	0	0	88.48178206
476	CLX	B757	1	0.001697851	99.77418588	0	0	92.13555639	0	0	88.48178206
477	CPA		1	0.001697851	99.77588373	0	0	92.13555639	0	0	88.48178206
478	CPA	B747	1	0.001697851	99.77758158	0	0	92.13555639	0	0	88.48178206
479	CQH	B737	1	0.001697851	99.77927943	0	0	92.13555639	0	0	88.48178206
480	CRG	B737	1	0.001697851	99.78097728	0	0	92.13555639	0	0	88.48178206
481	CRK	A320	1	0.001697851	99.78267513	0	0	92.13555639	0	0	88.48178206
482	CRK	B737	1	0.001697851	99.78437298	0	0	92.13555639	0	0	88.48178206
483	CSC	B737	1	0.001697851	99.78607083	0	0	92.13555639	0	0	88.48178206
484	CSE	A320	1	0.001697851	99.78776868	0	0	92.13555639	0	0	88.48178206
485	CSG	B737	1	0.001697851	99.78946654	0	0	92.13555639	0	0	88.48178206
486	CSG	B738	1	0.001697851	99.79116439	0	0	92.13555639	0	0	88.48178206
487	CSH	A306	1	0.001697851	99.79286224	0	0	92.13555639	0	0	88.48178206
488	CSH	A321	1	0.001697851	99.79456009	0	0	92.13555639	0	0	88.48178206
489	CSH	A763	1	0.001697851	99.79625794	0	0	92.13555639	0	0	88.48178206
490	CSH	H25B	1	0.001697851	99.79795579	0	0	92.13555639	0	0	88.48178206
491	CSH	HAWK	1	0.001697851	99.79965364	0	0	92.13555639	0	0	88.48178206
492	CSH	MD90	1	0.001697851	99.80135149	0	0	92.13555639	0	0	88.48178206
493	CSM	B744	1	0.001697851	99.80304934	0	0	92.13555639	0	0	88.48178206
494	CSM	B752	1	0.001697851	99.80474719	0	0	92.13555639	0	0	88.48178206
495	CSN	A19	1	0.001697851	99.80644504	0	0	92.13555639	0	0	88.48178206

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
496	CSN	A32	1	0.001697851	99.80814289	0	0	92.13555639	0	0	88.48178206
497	CSN	B319	1	0.001697851	99.80984074	0	0	92.13555639	0	0	88.48178206
498	CSN	MD58	1	0.001697851	99.81153859	0	0	92.13555639	0	0	88.48178206
499	CSN	MD80	1	0.001697851	99.81323644	0	0	92.13555639	0	0	88.48178206
500	CSN	A4134	1	0.001697851	99.81493429	0	0	92.13555639	0	0	88.48178206
501	CSX	B737	1	0.001697851	99.81663214	0	0	92.13555639	0	0	88.48178206
502	CSZ	B736	1	0.001697851	99.81832999	0	0	92.13555639	0	0	88.48178206
503	CSZ	B763	1	0.001697851	99.82002784	0	0	92.13555639	0	0	88.48178206
504	CSZ	MD90	1	0.001697851	99.8217257	0	0	92.13555639	0	0	88.48178206
505	CX8	B738	1	0.001697851	99.82342355	0	0	92.13555639	0	0	88.48178206
506	CXA	A306	1	0.001697851	99.8251214	1	0.001697851	92.13725424	1	0.001697851	88.48347991
507	CXA	A319	1	0.001697851	99.82681925	1	0.001697851	92.13895209	1	0.001697851	88.48517776
508	CXA	B73B	1	0.001697851	99.8285171	1	0.001697851	92.14064994	1	0.001697851	88.48687562
509	CXA	ZSQZ	1	0.001697851	99.83021495	1	0.001697851	92.14234779	1	0.001697851	88.48857347
510	DER	HAWK	1	0.001697851	99.8319128	0	0	92.14234779	0	0	88.48857347
511	DER	HS25	1	0.001697851	99.83361065	0	0	92.14234779	0	0	88.48857347
512	DER	PRM1	1	0.001697851	99.8353085	0	0	92.14234779	0	0	88.48857347
513	DIW	C25A	1	0.001697851	99.83700635	0	0	92.14234779	0	0	88.48857347
514	DLH	B742	1	0.001697851	99.8387042	1	0.001697851	92.14404564	1	0.001697851	88.49027132
515	DLH	B767	1	0.001697851	99.84040205	0	0	92.14404564	0	0	88.49027132
516	DRK	A320	1	0.001697851	99.8420999	0	0	92.14404564	0	0	88.49027132
517	DXH	A320	1	0.001697851	99.84379775	0	0	92.14404564	0	0	88.49027132
518	EIA	B742	1	0.001697851	99.8454956	1	0.001697851	92.14574349	1	0.001697851	88.49196917
519	ELY	B744	1	0.001697851	99.84719345	1	0.001697851	92.14744134	1	0.001697851	88.49366702
520	EPA	A320	1	0.001697851	99.8488913	0	0	92.14744134	0	0	88.49366702

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
521	FDX	B763	1	0.001697851	99.85058915	0	0	92.14744134	0	0	88.49366702
522	FYG	C750	1	0.001697851	99.852287	0	0	92.14744134	0	0	88.49366702
523	GWA	B747	1	0.001697851	99.85398486	0	0	92.14744134	0	0	88.49366702
524	GWL	A340	1	0.001697851	99.85568271	0	0	92.14744134	0	0	88.49366702
525	GWL	B74F	1	0.001697851	99.85738056	0	0	92.14744134	0	0	88.49366702
526	H87	A333	1	0.001697851	99.85907841	0	0	92.14744134	0	0	88.49366702
527	HAD	A320	1	0.001697851	99.86077626	0	0	92.14744134	0	0	88.49366702
528	HAD	A333	1	0.001697851	99.86247411	1	0.001697851	92.14913919	1	0.001697851	88.49536487
529	HDA	B747	1	0.001697851	99.86417196	0	0	92.14913919	0	0	88.49536487
530	HDA	B763	1	0.001697851	99.86586981	0	0	92.14913919	0	0	88.49536487
531	HKE	E170	1	0.001697851	99.86756766	1	0.001697851	92.15083704	1	0.001697851	88.49706272
532	HVN	A320	1	0.001697851	99.86926551	1	0.001697851	92.15253489	1	0.001697851	88.49876057
533	IJM	G5	1	0.001697851	99.87096336	0	0	92.15253489	0	0	88.49876057
534	IJM	GLF5	1	0.001697851	99.87266121	1	0.001697851	92.15423274	1	0.001697851	88.50045842
535	IRA	B703	1	0.001697851	99.87435906	0	0	92.15423274	0	0	88.50045842
536	IRA	B707	1	0.001697851	99.87605691	0	0	92.15423274	0	0	88.50045842
537	JAL	B752	1	0.001697851	99.87775476	0	0	92.15423274	0	0	88.50045842
538	JAL	B789	1	0.001697851	99.87945261	0	0	92.15423274	0	0	88.50045842
539	JTA	B737	1	0.001697851	99.88115046	0	0	92.15423274	0	0	88.50045842
540	KAC	G5	1	0.001697851	99.88284831	0	0	92.15423274	0	0	88.50045842
541	KAC	A320	1	0.001697851	99.88454616	1	0.001697851	92.15593059	1	0.001697851	88.50215627
542	KAL	A320	1	0.001697851	99.88624402	0	0	92.15593059	0	0	88.50215627
543	KAL	A339	1	0.001697851	99.88794187	0	0	92.15593059	0	0	88.50215627
544	KAL	A747	1	0.001697851	99.88963972	0	0	92.15593059	0	0	88.50215627
545	KAL	B74F	1	0.001697851	99.89133757	0	0	92.15593059	0	0	88.50215627

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
546	KAL	GLF4	1	0.001697851	99.89303542	0	0	92.15593059	0	0	88.50215627
547	KAL	BHL7725	1	0.001697851	99.89473327	0	0	92.15593059	0	0	88.50215627
548	KLM	B74B	1	0.001697851	99.89643112	0	0	92.15593059	0	0	88.50215627
549	MMD	F2TH	1	0.001697851	99.89812897	1	0.001697851	92.15762844	1	0.001697851	88.50385412
550	NWA	B738	1	0.001697851	99.89982682	0	0	92.15762844	0	0	88.50385412
551	PAC		1	0.001697851	99.90152467	0	0	92.15762844	0	0	88.50385412
552	PAL	A319	1	0.001697851	99.90322252	0	0	92.15762844	0	0	88.50385412
553	PIA		1	0.001697851	99.90492037	0	0	92.15762844	0	0	88.50385412
554	PLA	A320	1	0.001697851	99.90661822	0	0	92.15762844	0	0	88.50385412
555	PRD	G5	1	0.001697851	99.90831607	0	0	92.15762844	0	0	88.50385412
556	QFA	B747	1	0.001697851	99.91001392	0	0	92.15762844	0	0	88.50385412
557	RCH	C17	1	0.001697851	99.91171177	0	0	92.15762844	0	0	88.50385412
558	ROJ	GLF4	1	0.001697851	99.91340962	1	0.001697851	92.15932629	1	0.001697851	88.50555197
559	RPC	H25B	1	0.001697851	99.91510747	0	0	92.15932629	0	0	88.50555197
560	SDM	A320	1	0.001697851	99.91680532	0	0	92.15932629	0	0	88.50555197
561	SHQ		1	0.001697851	99.91850317	0	0	92.15932629	0	0	88.50555197
562	SHQ	B737	1	0.001697851	99.92020103	0	0	92.15932629	0	0	88.50555197
563	SHQ	B747	1	0.001697851	99.92189888	0	0	92.15932629	0	0	88.50555197
564	SHQ	B757	1	0.001697851	99.92359673	0	0	92.15932629	0	0	88.50555197
565	SIA		1	0.001697851	99.92529458	0	0	92.15932629	0	0	88.50555197
566	SLK	A320	1	0.001697851	99.92699243	1	0.001697851	92.16102414	1	0.001697851	88.50724982
567	SQC	B742	1	0.001697851	99.92869028	0	0	92.16102414	0	0	88.50724982
568	TAG	G5	1	0.001697851	99.93038813	0	0	92.16102414	0	0	88.50724982
569	TAO	MD11	1	0.001697851	99.93208598	0	0	92.16102414	0	0	88.50724982
570	TSE		1	0.001697851	99.93378383	0	0	92.16102414	0	0	88.50724982

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
571	TSO	B747	1	0.001697851	99.93548168	0	0	92.16102414	0	0	88.50724982
572	TSO	B767	1	0.001697851	99.93717953	0	0	92.16102414	0	0	88.50724982
573	UAE	A40	1	0.001697851	99.93887738	0	0	92.16102414	0	0	88.50724982
574	UAE	A320	1	0.001697851	99.94057523	0	0	92.16102414	0	0	88.50724982
575	UEA		1	0.001697851	99.94227308	0	0	92.16102414	0	0	88.50724982
576	UZE	A340	1	0.001697851	99.94397093	0	0	92.16102414	0	0	88.50724982
577	VHL	CRJ2	1	0.001697851	99.94566878	0	0	92.16102414	0	0	88.50724982
578	VIR	A343	1	0.001697851	99.94736663	1	0.001697851	92.16272199	1	0.001697851	88.50894767
579	YAR	B733	1	0.001697851	99.94906448	0	0	92.16272199	0	0	88.50894767
580	cxa	b737	1	0.001697851	99.95076233	0	0	92.16272199	0	0	88.50894767
581	CES	MD91	1	0.001697851	99.95246019	0	0	92.16272199	0	0	88.50894767
582	DXH		1	0.001697851	99.95415804	0	0	92.16272199	0	0	88.50894767
583	ANK	B737	1	0.001697851	99.95585589	1	0.001697851	92.16441984	1	0.001697851	88.51064552
584	AZA	B762	1	0.001697851	99.95755374	0	0	92.16441984	0	0	88.51064552
585	ABD	B742	1	0.001697851	99.95925159	1	0.001697851	92.16611769	1	0.001697851	88.51234337
586	ABW	A340	1	0.001697851	99.96094944	0	0	92.16611769	0	0	88.51234337
587	ABW	B744	1	0.001697851	99.96264729	0	0	92.16611769	0	0	88.51234337
588	AEW	B767	1	0.001697851	99.96434514	0	0	92.16611769	0	0	88.51234337
589	AFL	B747	1	0.001697851	99.96604299	0	0	92.16611769	0	0	88.51234337
590	AFR	B767	1	0.001697851	99.96774084	0	0	92.16611769	0	0	88.51234337
591	AHK	A300	1	0.001697851	99.96943869	0	0	92.16611769	0	0	88.51234337
592	AIC	A319	1	0.001697851	99.97113654	0	0	92.16611769	0	0	88.51234337
593	AIC	A320	1	0.001697851	99.97283439	0	0	92.16611769	0	0	88.51234337
594	AIQ	B733	1	0.001697851	99.97453224	1	0.001697851	92.16781555	1	0.001697851	88.51404122
595	AMA	B762	1	0.001697851	99.97623009	0	0	92.16781555	0	0	88.51404122

No	OPR	TYPE	FLIGHTS	Proportion of Overall Sample (%)	Overall Sample Cumulative (%)	AW Only	Proportion of AW Only	AW Cumulative (%)	FULL	Proportion of Full	Full Cumulative
596	ANA		1	0.001697851	99.97792794	0	0	92.16781555	0	0	88.51404122
597	ANA	A757	1	0.001697851	99.97962579	0	0	92.16781555	0	0	88.51404122
598	ANA	A763	1	0.001697851	99.98132364	0	0	92.16781555	0	0	88.51404122
599	ANA	B747	1	0.001697851	99.98302149	0	0	92.16781555	0	0	88.51404122
600	ANK	A306	1	0.001697851	99.98471935	0	0	92.16781555	0	0	88.51404122
601	ANK	B735	1	0.001697851	99.9864172	1	0.001697851	92.1695134	0	0	88.51404122
602	ANU	A30B	1	0.001697851	99.98811505	0	0	92.1695134	0	0	88.51404122
603	ANU	A320	1	0.001697851	99.9898129	0	0	92.1695134	0	0	88.51404122
604	ANU	A321	1	0.001697851	99.99151075	0	0	92.1695134	0	0	88.51404122
605	ANZ	B743	1	0.001697851	99.9932086	0	0	92.1695134	0	0	88.51404122
606	AUA	A340	1	0.001697851	99.99490645	0	0	92.1695134	0	0	88.51404122
607	AYZ	IL76	1	0.001697851	99.9966043	1	0.001697851	92.17121125	1	0.001697851	88.51573907
608	AZA		1	0.001697851	99.99830215	0	0	92.17121125	0	0	88.51573907
609	AZA	B767	1	0.001697851	100	0	0	92.17121125	0	0	88.51573907

The Approval Flies used in this readiness assessment:

Approval (alphabetical)	Approval File
AFI	AFIRMA Approvals 16 March 2007.xls
Atlantic	NATCMA Approvals (15 May 07) QMAS.xls
ATMB	Approval Data from parts of inspectors in China
Austria	RVSM 27 Apr 07 (Austria RVSM DB).xls
Australia	RVSM Approval 2000 (14 Nov 06).mdb
Canada	RVSM 10 May 07 (Canada RVSM DB).xls
Carsamma	CARSAMMA Approvals (15 May 07).xls
Euro	Euro_Approvals (13 February 2007).xls
France	DGAC France Approvals_current as of 2007_01_22 .xls
Maar	MAAR_RVSM_Approval_data_on_2007-06-18.xls
Mecma	MECMA_Approvals (22 May 04).xls
Mexico	Mexico RVSM (20 Dec 2006).xls
MIDRMA	MIDRMA_Approvals (10 September 2006).xls
PARMO	2007_07_24_APARMOsnapshot.xls
US	2007_06_20_US_MASPSsnapshotACI_TrafficScrutiny.xls

APPENDIX C

LARGE HEIGHT DEVIATION REPORT

Name of FIR:

Please complete Section I or II as appropriate:
If there were no reports of large altitude deviation, only Section I should be finished.
If there were reports of large altitude deviation, please finish both Section I and Section II. If there were more than one report, each report should write a separate piece of Form A..

Section I:

There were no reports of large altitude deviation for the month of

Section II:

There was/were_____ report(s) of an altitude deviation of 90m (300 ft) or more between 8400m and 12500m. Details of the altitude deviation are attached (Form A).
(Please use a separate form for each report of large height deviation).

Section III:

When complete, please return to the following email:

E-Mail: rvsmdata@sina.com

Form A

Report of an Altitude Deviation of 90m (300 ft) or More Between 8400m and 12500m

(Please use a separate form for each report of large height deviation).

(1) This is the _____ large height event reported this month.

(2) Reporting Agency

(3) Location of Deviation

- ATS Route:
- Fixes (Fixes between the location of deviation):

(4) Date of Occurrence (UTC) (yyyy-mm-dd)

(5) Flight Identification and Type

(6) Flight Level Assigned
(record in the picture is also admitted)

(7) Observed/Reported Final Level Mode C/Pilot Report
(record in the picture is also admitted)

(8) Cause of Deviation (a few words description of the event)

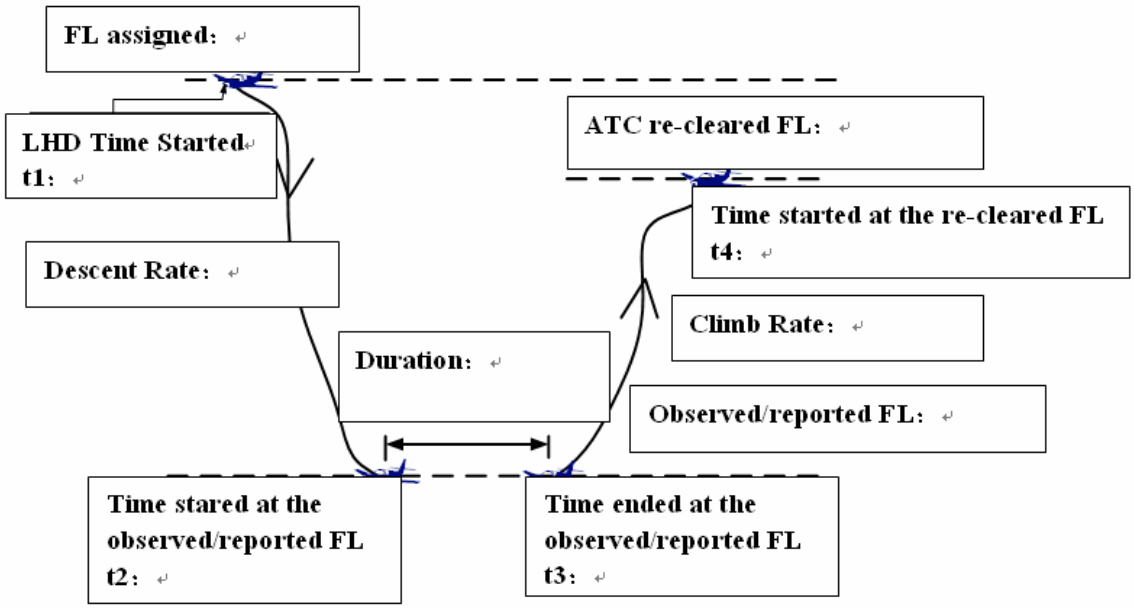
(9) Other Traffic

(10) Crew Comments (if any, when noted)

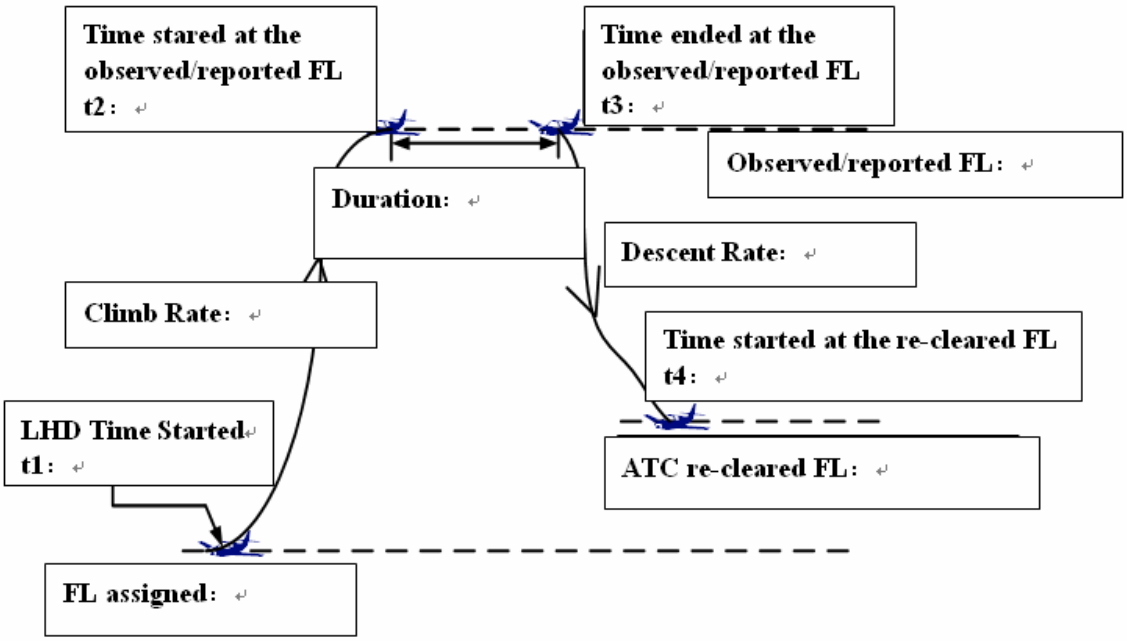
(11) Remarks

(12) Duration at Flight Level

A) Aircraft descended when large height deviation occurred



B) Aircraft ascended when large height deviation occurred



LHD event description:

SN	Activity Completed	Start	Target Date	Present Status	Group Responsible
1	**Identify Operational Need**				
~~2~~	~~Agree operational need for Chinese Airspace~~	~~12-Mar-07~~	~~16-Mar-07~~	**Completed**	~~China~~
3	**Safety Assessment**				
4	Review available summary data (non-compliant aircraft, aberrant aircraft, etc)	12-Mar-07		**Ongoing**	SAM/WG, RMA, RVSM Task Force
5	Examine history of height keeping errors relating to ATC clearances and assess possible RVSM impact	12-Mar-07		**Ongoing**	China, SAM/WG, RMA, RVSM Task Force
6	Confirm RVSM risk model assumptions/parameters are consistent with airspace where RVSM is to be applied	12-Mar-07		**Ongoing**	China, SAM/WG, RMA, RVSM Task Force
7	Conduct analyses to predict occupancy after RVSM implementation	12-Mar-07		**Ongoing**	China, SAM/WG, MAAR, RVSM Task Force
~~8~~	~~Collect weather and turbulence data for analysis~~	~~12-Mar-07~~	~~1-Jul-07~~	**Completed**	~~China, SAM/WG, OPS/AIR/WG, RVSM Task Force~~
9	Report monthly large height deviations (including operational errors) to the State	12-Mar-07	18-Sep-07		China, Users
11	**Feasibility Analysis**				
~~12~~	~~Examine the operational factors and workload associated with RVSM implementation~~	~~12-Mar-07~~	~~16-Mar-07~~	**Completed**	~~China, ATC/WG, RVSM Task Force~~
13	**Determination of Requirements (airborne & ground systems)**				
14	Assess the impact of RVSM implementation on controller automation systems and plan for upgrades/modifications	12-Mar-07	18-Sep-07	**Ongoing**	China
15	**Aircraft & Operator Approval Requirements**				
~~16~~	~~Promulgate the operational approval process~~	~~12-Mar-07~~		**Completed**	~~China, OPS/AIR/WG, RVSM Task Force~~
17	Notify China when significant changes occur to RVSM documentation	12-Mar-07			OPS/AIR/WG, RVSM Task Force
18	**Perform Rulemaking (if required)**				
19	Recommend State airspace regulatory documentation		30-Oct-07	**Ongoing**	RVSM Task Force
20	**Perform Necessary Industry & International Co-ordination**				
~~21~~	~~Establish target implementation date~~	~~12-Mar-07~~	~~16-Mar-07~~	**Completed**	~~RVSM Task Force, China~~
~~22~~	~~Report to ATM/AIS/SAR/SG/17~~	~~2-Jul-07~~	~~2-Jul-07~~	**Completed**	~~RVSM Task Force Chairman~~
	Report to ATM/AIS/SAR/SG/18		Jun-08		RVSM Task Force Chairman
23	Process Doc 7030 amendment	12-Mar-07	ASAP	**Ongoing**	China, ICAO Regional Office (to include China FIRs)
~~24~~	~~Publish advance AIC~~	~~12-Mar-07~~	~~7-Jun-07~~	**Complete**	~~China~~
25	Publish AIP Supplement containing RVSM policy/procedures	12-Mar-07	~~27-Sep-07~~ 30-Sep-07	**Ongoing**	China
	Publish AIP Supplement containing transition areas/procedures		11-Oct-07		China and States concerned
26	Review inter-facility coordination procedures		18-Sep-07		China
27	Finalize changes to Letters of Agreement		18-Sep-07		China
28	Disseminate information on RVSM policy and procedures through RVSM Website	30-Apr-07	Nov-07	**Ongoing**	OPS/AIR/WG, RVSM Task Force
29	**Approval of Aircraft & Operators**				
~~30~~	~~Establish approved operations readiness targets~~	~~12-Mar-07~~	~~16-Mar-07~~	**Completed**	~~ATC/WG, RVSM Task Force~~
31	Assess operator readiness	12-Mar-07	18-Sep-07	**Ongoing**	China, OPS/AIR/WG

SN	Activity Completed	Start	Target Date	Present Status	Group Responsible
32	**Develop Pilot & ATC Procedures**				
34	Review weather and contingency procedures for applicability under RVSM	12-Mar-07	18-Sep-07	**Ongoing**	China, RVSM Task Force
35	Publish appropriate Pilot/ATC policy & procedures on RVSM website	30-Apr-07	18-Sep-07	**Ongoing**	China, RVSM Task Force
36	Identify transition areas and procedures	12-Mar-07	18-Sep-07	**Ongoing**	China, ATC/WG
~~37~~	~~Conduct simulation modelling to assess impact of RVSM operations~~	~~Nov-06~~	~~Nov-06~~	**Completed**	~~China~~
~~38~~	~~Report on simulation activity~~	~~12-Mar-07~~	~~16-Mar-07~~	**Completed**	~~China, RVSM Task Force~~
~~39~~	~~Coordinate use of ACAS II (TCAS V.7) for RVSM operations~~	~~12-Mar-07~~	~~10-Oct-07~~	**Completed**	~~China, OPS/AIR/WG, RVSM Task Force~~
~~40~~	~~Develop procedures for handling non-compliant aircraft (inc ferry & mntce) in ATS documentation~~	~~12-Mar-07~~	~~1-Jul-07~~	**Completed**	~~China, OPS/AIR/WG, ATC/WG, RVSM Task Force~~
~~41~~	~~Develop mutually acceptable ATC procedures for non-approved State acft to transit RVSM airspace~~	~~12-Mar-07~~	~~17-Sep-07~~	**Completed**	~~States concerned, ATC/WG, RVSM Task Force~~
~~42~~	~~Implement procedures for suspension of RVSM~~	~~12-Mar-07~~	~~17-Sep-07~~	**Completed**	~~States concerned, ATC/WG, RVSM Task Force~~
~~43~~	~~Liaise with State defense authorities regarding military operations~~	~~started~~	~~17-Sep-07~~	**Completed**	~~China~~
44	**Pilot & ATC Training**				
45	Provide Pilot/ATC training documentation based on past experience	12-Mar-07	18-Sep-07	**Ongoing**	IATA, IFALPA, IFATCA, RVSM Task Force
46	Conduct local RVSM training for air traffic controllers	7-May-07	18-Sep-07	**Ongoing**	China,
47	**Perform System Verificiation**				
48	Height keeping performance monitoring needed to undertake initial safety analysis	started	31-Aug-07	**Ongoing**	China, RMA, SAM/WG, RVSM Task Force
49	Provide representative traffic movement data to RMA	started	31-Aug-07		China
50	Undertake initial safety analysis	started	31-Aug-07		China, RMA, SAM/WG, RVSM Task Force
51	Prepare/maintain regional status report detailing RVSM implementation plans	started	1-Sep-07		RVSM Task Force
52	**Final Implementation Decision**				RVSM Task Force
53	Review aircraft altitude-keeping performance and operational errors	12-Mar-07	1-Sep-07	**Ongoing**	China, SAM/WG, OPS/AIR/WG
~~54~~	~~Complete ATS State documentation~~		~~Aug-07~~	**Completed**	~~China~~
55	Publish Trigger NOTAM		Nov-07		China
56	Complete readiness assessment		18-Sep-07	**Ongoing**	China, RMA, SAM/WG, RVSM Task Force
57	Complete safety analysis		18-Sep-07	**Ongoing**	China, RMA, SAM/WG, RVSM Task Force
58	**Declare Initial Operational Capability**				China, SAM/WG, RVSM Task Force
59	**Monitor System Performance**				
60	Perform Follow-On Monitoring	21-Sep-07	1-Jul-08		China, RMA, OPS/AIR/WG, SAM/WG
~~61~~	~~Adopt Minimum Monitoring Requirements (MMR)~~	~~12-Mar-07~~	~~Aug-07~~	**Completed**	~~China~~
62	**Declare Full Operational Capability**				
~~63~~	~~Task Force/30 (Bangkok)~~	~~12-Mar-07~~	~~16-Mar-07~~	**Completed**	~~RVSM Task Force~~
~~64~~	~~Special Coordiantion Meeting (SCM)~~	~~16-May-07~~	~~18-May-07~~	**Completed**	~~China, Mongolia, Russia, Chairpersons, IATA, ICAO Regional Office, Kazakhstan~~
~~66~~	~~Special Coordiantion Meeting (SCM) or Follow-up Mission by the Regional Office~~	~~Jul-07~~	~~Jul-07~~		

SN	Activity Completed	Start	Target Date	Present Status	Group Responsible	
~~67~~	~~Task Force/31 (Bangkok)~~	~~31-Jul-07~~	~~3-Aug-07~~	**Completed**	~~RVSM Task Force~~	
68	Task Force/~~31~~ 32 (Beijing) - Go/No-Go Meeting - ~~5~~ 4 days	18-Sep-07	21-Sep-07		RVSM Task Force	
69	Task Force/~~32~~ 33 (TBD) - 90 day review China implementation - 3 days	Apr-08	Apr-08		RVSM Task Force	
70	Task Force/~~33~~ 34 (TBD) - one year review China implementation - 3 days	Jan-09	Jan-09		RVSM Task Force	