

CHINA RVSM



China through the work of the ICAO Asia/Pacific RVSM Implementation Task Force, which included IFALPA representatives, implemented RVSM 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 on 21 November 2007 (refer to AIP for specific procedures).

The Airspace between 8,900m (FL291) and 12,500m (FL411) inclusive is defined as RVSM airspace. The China RVSM airspace is exclusive RVSM airspace and aircraft that are not RVSM compliant may not operate into Chinese RVSM airspace between 8,900m (FL291) and 12,500m (FL411) except for the situations as detailed in below:

The Flight Level Allocation Scheme (FLAS) is the foundation for the Reduced Vertical Separation Minimum (RVSM) program. As this major change to the vertical separation standard has spread across the globe, each implementing State has been able to build on previous implementations and to profit from previous lessons learned. Nearly all of these implementations have had the benefit of a consistent FLAS based upon flight levels expressed in the unit of feet.

The China FLAS was chosen because it satisfies military requirements of applying metric flight levels, and overcomes the relatively big altitude difference between RVSM metric flight level and feet flight levels of neighbouring countries; eliminates the phenomena of 900 feet vertical separation and makes the vertical separation between aircraft be 1000 feet or more. For this reason it is of utmost importance to use only the feet altimeter for reference in the China RVSM flight levels regardless of the metre reading.

For example; if an aircraft is cleared to 8900m and flies with the metre altimeter and does not use the China RVSM conversion table his actual altitude in feet would be 29,200 instead of 29,100. This compromises the 1000ft vertical separation!

China RVSM Airspace

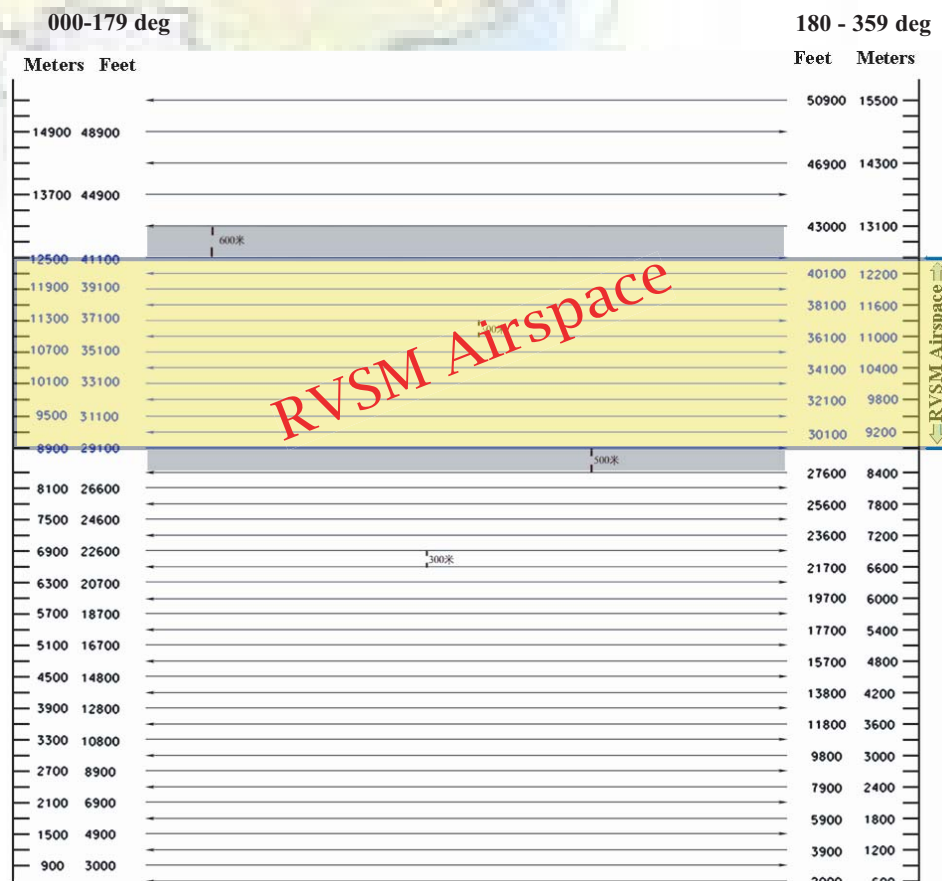


Fig 1: RVSM airspace occupies a block between 8900m (FL291) and 12500m (FL411) with buffers of 500m below and 600m above.

RVSM Compliance Operations:

Qualifications

The operator shall ensure that the pilot has been trained on China RVSM Flight Level Allocation Scheme (FLAS) before the pilot can operate into China airspace.

Equipment

Although ACASII (TCAS Version 7.0) is not specifically required for RVSM it is a requirement in Chinese airspace. Additionally the ICAO Asia/Pacific RVSM Implementation Task Force recommends that those aircraft equipped with ACAS and operated in RVSM airspace shall be equipped with ACAS II. (TCAS II systems with Version 7.0 incorporated meet ICAO ACAS II standards).

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;
- b) one automatic altitude-keeping device; and
- c) one altitude-alerting device.

Note: *The altimetry system requirement shall allow the aircraft to be flown using FEET flight levels.*

Communications

“Pilot level call”- Except in an ADS or radar environment, pilots shall report reaching any altitude assigned within RVSM airspace.

Wake turbulence procedures

Pilots encountering or anticipating wake turbulence in Chinese RVSM airspace have the option of requesting;

- a) FL change, or
- b) a vector (if possible) or
- c) a lateral offset (no clearance required in remote continental airspace).

Altitude/ Flight Level Clearances

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;

- a) ATC will issue the Flight Level clearance in metres. 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.
- b) 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 metres, however, the difference will never be more than 30 metres.
- c) Aircraft equipped with metric and feet altimeters such as the Il-96, Il-62, Tu-214 or Tu-154 shall use the feet altimeter in RVSM airspace. 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 China AIP section 9 (Contact information can be found in section 9.4.3).

Outside of the RVSM FL band, metre altimeters may be used.

Deviation actions taken by Pilot

Pilots 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.

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).

Note: Radar airspace and Non-radar airspace is defined in AIP section ENR 1.6.

Transition Areas

Transition areas and procedures for transition between China RVSM and adjacent FIRs in neighbouring countries are identified in Attachment E of the AIP Supplement.

Dispatchers and pilots shall identify the transition area on the particular route that will be used into China airspace (see Fig 4).

Special attention shall be given to the moment when the China metre to feet converse table shall be used for aircraft entering Chinese RVSM airspace;

On transition procedures maps, metric FL followed by the corresponding feet FL in brackets such as “12500m (FL411)” will depict when the pilot shall use the China RVSM conversion table to fly in FEET.

- a) Aircraft with primary FEET altimeters (Airbus, Boeing, etc.) shall fly using the feet altimeter and use the China RVSM conversion table from the initial clearance to a FL in the China FLAS,
- b) Aircraft with primary METRE altimeters (Il-96, Il-62, Tu-214, Tu-154, etc.) shall switch and fly using the feet altimeter and use the China RVSM conversion table from the initial clearance to a FL in the China FLAS,

Note: It is highly recommended that the CAAC & IFALPA China RVSM Conversion Table be used; substantial human factor considerations were accounted for during its development.

Rule of thumb for transitions from ICAO Feet RVSM airspace to Chinese RVSM airspace: Flights entering China climb 100ft, flights leaving China RVSM descend 100ft.

Flight Plan Requirements

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 representing 12,500m, 12,200m, 11,900m, respectively). Procedures for Operation of Non-RVSM Approved Aircraft in RVSM Airspace – **See the China AIP supplement section 9.**

Suspension of RVSM

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).

The same RVSM FLAS will be used.

RVSM Non-compliance exceptions:

(refer to AIP for specific procedures)

Special coordination procedures for cruise operation of Non-RVSM approved aircraft in RVSM airspace are required. Aircraft that are not RVSM compliant may not flight plan between 8,900m (FL291) and 12,500m (FL411) inclusive, except for the following situations:

- a) The aircraft is being initially delivered to the State of Registry or Operator; 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 utilised for mercy or humanitarian purposes; or
- d) State aircraft (those aircraft used in military, custom and police services shall be deemed state aircraft).

Strategic Lateral Offset Procedure (SLOP)

The flight crew may apply strategic lateral offsets on remote continental airspace (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. 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 en-route relative to the direction of flight. Pilots are not required to inform ATC that a strategic lateral offset is being applied. Within radar airspace, the strategic lateral offset procedure requires approval by ATC. 1 NM offsets are preferred within radar airspace. Pilots applying SLOP in non-radar airspace, may request approval from ATC to continue with the offset upon entering radar airspace.

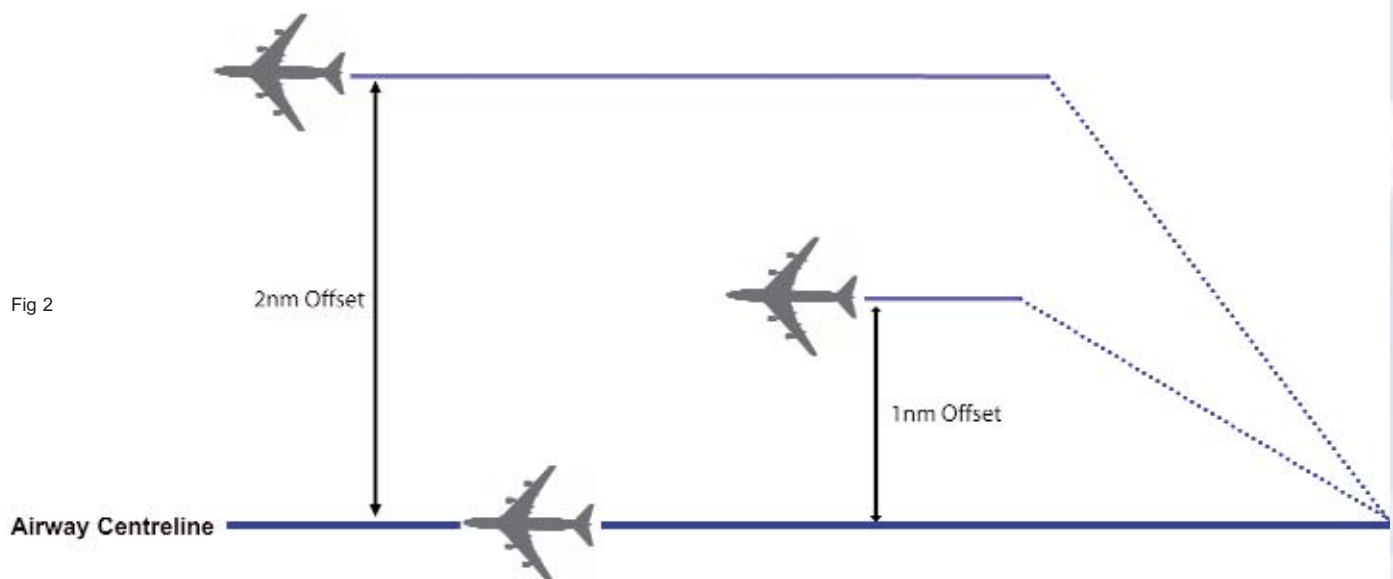
The CAAC & IFALPA China RVSM Conversion Table:

The CAAC & IFALPA China RVSM Conversion Table was created by the IFALPA Air Traffic Services and the Human Performance Committees in close cooperation with the Air Traffic Management Bureau (ATMB) and Civil Aviation Administration of China (CAAC). It meets the FL conversions of the China FLAS published in the AIP as well as taking into consideration human factors in the environment where it will be used.

China RVSM is introducing a new set of metre equivalences that do not correspond with previous ones. With the CAAC & IFALPA China RVSM Conversion Table one will be able to identify in a timelier manner whether one is being assigned a correct hemispherical altitude or not. The reason for this is that regardless of the metre altitude assigned, one enters the chart on the same column, once the metre altitude is found, depending on the shade of the cell; it will be simple to determine the corresponding hemispherical direction and the feet altitude to be flown.

The CAAC & IFALPA China RVSM Conversion Table is available both in its original format (Adobe Illustrator) and jpg at the IFALPA or ATMB web pages (www.ifalpa.org or www.atmb.net.cn/RVSM) and maybe used as deemed appropriate as long as proper credit is given.

Strategic Lateral Offset Procedure (SLOP)



In SLOP crews randomly elect to either track the airway centreline or offset their track 1 or 2 nautical miles to the **RIGHT** of the centreline

IFALPA China RVSM Conversion Table

	Cleared	Select		
	<small>Metre FL</small>	<small>FL in Feet</small>		
<div style="border: 1px solid black; padding: 10px; width: 200px; margin: 0 auto;"> <p style="text-align: center;">RVSM airspace</p> <p style="text-align: center;">180° to 359°</p> </div>	15500	50900	<div style="border: 1px solid black; padding: 10px; width: 200px; margin: 0 auto;"> <p style="text-align: center;">RVSM airspace</p> <p style="text-align: center;">0° to 179°</p> </div>	40,100
	14900	48900		39,100
	14300	46900		37,100
	13700	44900		35,100
	13100	43000		33,100
	12500	41100		31,100
	12200	40100		29,100
	11900	39100		
	11600	38100		
	11300	37100		
	11000	36100		
	10700	35100		
	10400	34100		
	10100	33100		
	9800	32100		
	9500	31100		
	9200	30100		
	8900	29100		
	8400	27600		
	8100	26600		
7800	25600			
7500	24600			
7200	23600			
6900	22600			
6600	21700			
6300	20700			
6000	19700			
5700	18700			
5400	17700			
5100	16700			
4800	15700			
4500	14800			
4200	13800			
3900	12800			
3600	11800			
3300	10800			
3000	9800			
2700	8900			
2400	7900			
2100	6900			
1800	5900			
1500	4900			
1200	3900			
900	3000			
600	2000			

IMPORTANT NOTES

- ATC will issue the Flight Level clearance in metres.
- 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 metres.

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).

Fig 3

Entering or leaving Chinese FIRs



Fig 4: Dispatchers and pilots shall identify the transition area on the particular route that will be used into China airspace
 Example 1: Entering at entry point 2 (the GOLOT intersection) use the vertical profile table in Fig. 5 (below) to find the China RVSM FL.
 Example 2: Entering from CVSM at point 9 (MORIT intersection) use the vertical profile in Fig 6 (overleaf) to find the correct China RVSM FL.

NOTE: Example for training purposes only. Not to be used for navigation

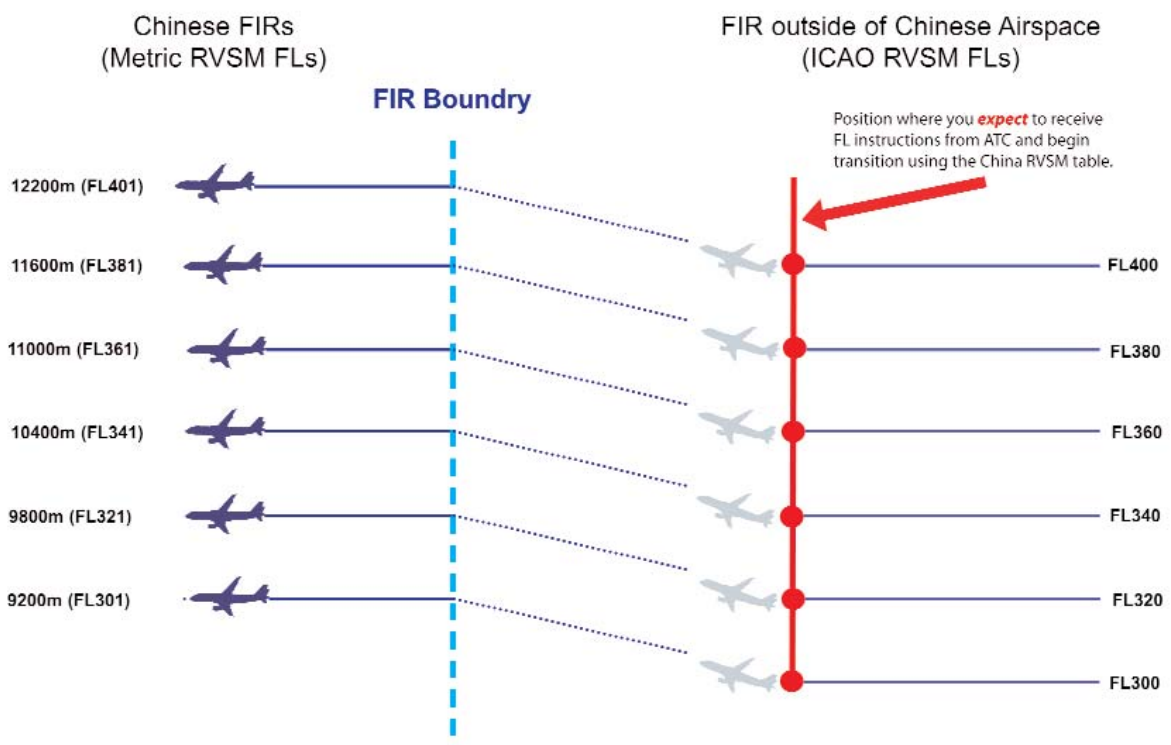


Fig 5 Begin using the China RVSM conversion table from the initial clearance to a FL in the China FLAS

NOTE: Example for training purposes only. Not to be used for navigation

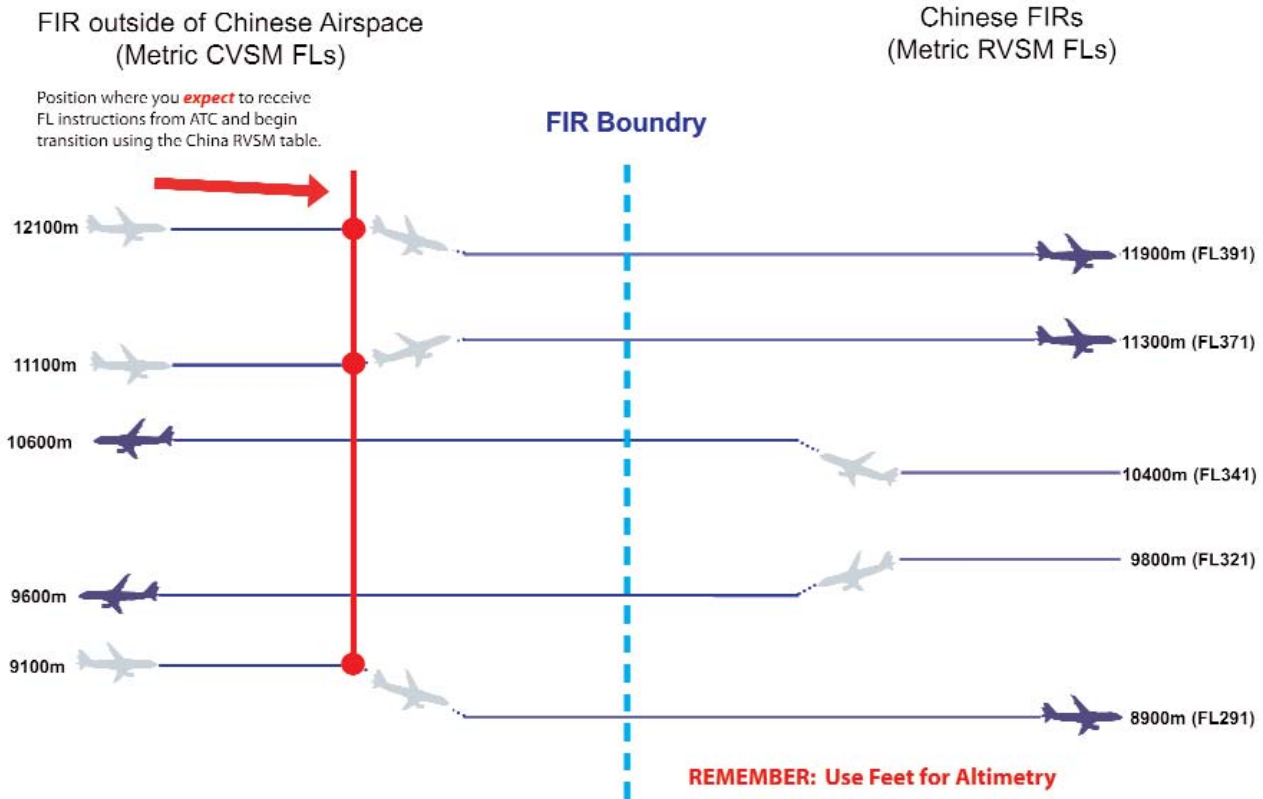


Fig 6 Aircraft with primary METRE altimeters (Il-96, Il-62, Tu-214, Tu-154, etc.) shall switch and fly using the feet altimeter and use the China RVSM conversion table from the initial clearance to a FL in the China FLAS

Chinese - English Pronunciation

FL Chinese-English Pronunciation

600m	SIX HUN-dred METERS
900m	NIN-er HUN-dred METERS
1200m	WUN TOU-SAND TOO HUN-dred METERS
1500m	WUN TOU-SAND FIFE HUN-dred METERS
1800m	WUN TOU-SAND AIT HUN-dred METERS
2100m	TOO TOU-SAND WUN HUN-dred METERS
2400m	TOO TOU-SAND FOW-er HUN-dred METERS
2700m	TOO TOU-SAND SEV-en HUN-dred METERS
3000m	TREE TOU-SAND METERS
3300m	TREE TOU-SAND TREE HUN-dred METERS
3600m	TREE TOU-SAND SIX HUN-dred METERS
3900m	TREE TOU-SAND NIN-er HUN-dred METERS
4200m	FOW-er TOU-SAND TOO HUN-dred METERS
4500m	FOW-er TOU-SAND FIFE HUN-dred METERS
4800m	FOW-er TOU-SAND AIT HUN-dred METERS
5100m	FIFE TOU-SAND WUN HUN-dred METERS
5400m	FIFE TOU-SAND FOW-er HUN-dred METERS
5700m	FIFE TOU-SAND SEV-en HUN-dred METERS
6000m	SIX TOU-SAND METERS
6300m	SIX TOU-SAND TREE HUN-dred METERS
6600m	SIX TOU-SAND SIX HUN-dred METERS
6900m	SIX TOU-SAND NIN-er HUN-dred METERS
7200m	SEV-en TOU-SAND TOO HUN-dred METERS
7500m	SEV-en TOU-SAND FIFE HUN-dred METERS
7800m	SEV-en TOU-SAND AIT HUN-dred METERS
8100m	AIT TOU-SAND WUN HUN-dred METERS

FL Chinese-English Pronunciation

8400m	AIT TOU-SAND FOW-er HUN-dred METERS
8900m	AIT TOU-SAND NIN-er HUN-dred METERS
9200m	NIN-er TOU-SAND TOO HUN-dred METERS
9500m	NIN-er TOU-SAND FIFE HUN-dred METERS
9800m	NIN-er TOU-SAND AIT HUN-dred METERS
10100m	TEN TOU-SAND WUN HUN-dred METERS or WUN ZE-RO TOU-SAND WUN HUN-dred METERS
10400m	TEN TOU-SAND FOW-er HUN-dred METERS or WUN ZE-RO TOU-SAND FOW-er HUN-dred METERS
10700m	TEN TOU-SAND SEV-en HUN-dred METERS or WUN ZE-RO TOU-SAND SEV-en HUN-dred METERS
11000m	eleven TOU-SAND METERS or WUN WUN TOU-SAND METERS
11300m	eleven TOU-SAND TREE HUN-dred METERS or WUN WUN TOU-SAND TREE HUN-dred METERS
11600m	eleven TOU-SAND SIX HUN-dred METERS or WUN WUN TOU-SAND SIX HUN-dred METERS
11900m	eleven TOU-SAND NIN-er HUN-dred METERS or WUN WUN TOU-SAND NIN-er HUN-dred METERS
12200m	WUN TOO TOU-SAND TOO HUN-dred METERS
12500m	WUN TOO TOU-SAND FIFE HUN-dred METERS
13100m	WUN TREE TOU-SAND WUN HUN-dred METERS
13700m	WUN TREE TOU-SAND SEV-en HUN-dred METERS
14300m	WUN FOW-er TOU-SAND TREE HUN-dred METERS
14900m	WUN FOW-er TOU-SAND NIN-er HUN-dred METERS

RVSM Phraseology

Message

Phraseologies

A. For a controller to ascertain the RVSM approval status of an aircraft

“(CALL SIGN) CONFIRM RVSM APPROVED”

B. For a pilot to report non-RVSM approval status:

1. On the initial call on any frequency within the RVSM airspace **and**

2. In all requests for Flight Level changes pertaining to Flight Levels within RVSM airspace

“(CALL SIGN) NEGATIVE RVSM ”

Except for State aircraft, pilots shall include this phrase to read back flight level clearances involving the vertical transit through 8900m (FL291) or 12 500m (FL411).

C. For a pilot to report RVSM approval

“(CALL SIGN) RVSM AFFIRMATIVE”

D. 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”**.

“(CALL SIGN) NEGATIVE RVSM, STATE AIRCRAFT”

E. Denial of clearance into the RVSM airspace:

“(CALL SIGN) UNABLE ISSUE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [or DESCEND TO, or CLIMB TO] FLIGHT LEVEL... ”

F. For a pilot to report when severe turbulence affects the aircraft’s capability to maintain the height keeping requirements for RVSM

“(CALL SIGN) UNABLE RVSM DUE TO TURBULENCE”

G. For a pilot to report that the aircraft’s equipment has degraded enroute below that required for flight within the RVSM airspace.

“(CALL SIGN) UNABLE RVSM DUE TO EQUIPMENT”

(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.)

H. 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.

“(CALL SIGN) REPORT WHEN ABLE TO RESUME RVSM”

I. For a pilot to report the ability to resume operations within RVSM airspace after an equipment or weather related contingency.

“(CALL SIGN) READY TO RESUME RVSM”

Contingency scenarios

Weather Encounters and Aircraft System Failures Initial Pilot Actions in Contingency Situations

Initial Pilot Actions when unable to maintain flight level (FL) or unsure of aircraft altitude-keeping capability:

- * Notify ATC and request assistance as detailed below.
- * Maintain cleared flight level, to the extent possible, while evaluating the situation
- * Watch for conflicting traffic using all available means
- * Alert nearby aircraft by illuminating exterior lights (commensurate with aircraft limitations)
- * If unable to contact ATC, broadcast position, flight level and intention on 121.5 MHz

Severe Turbulence and/or Mountain Wave Activity (MWA) Induced Altitude Deviations of Approximately 200 feet

Pilot actions:

- * 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

Controller actions:

- * 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

Mountain Wave Activity (MWA) Encounters – General

Pilot actions:

- * Contact ATC and report experiencing MWA,
- * If so desired, pilot may request a FL change.
- * 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

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

Wake Turbulence Encounters

Pilot actions:

- * Contact ATC and request vector, FL change or, if capable, a lateral offset

Controller actions:

- * Issue vector, FL change or lateral offset clearance, traffic permitting

Unable RVSM Due to Equipment Failure of Automatic Altitude Control System, Altitude Alerter or All Primary Altimeters

Pilot actions:

- * Contact ATC and state “Unable RVSM Due Equipment”
- * Request clearance out of RVSM airspace unless operational situation dictates otherwise

Controller actions:

- * Provide 600m (2,000ft) vertical separation or appropriate horizontal separation,
- * Clear aircraft out of RVSM airspace unless operational situation dictates otherwise

One Primary Altimeter Remains Operational

Pilot actions:

- * 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

Controller actions:

- * Acknowledge operation with single altimeter
- * Relay to other controllers or facilities who will subsequently handle the aircraft and any special handling requirement or being provided

Transponder Failure

Pilot actions:

- * Contact ATC and request authority to continue to operate at cleared flight level
- * Comply with revised ATC clearance, if issued

Controller actions:

- * Consider request to continue to operate at cleared flight level
- * Issue revised clearance, if necessary

Aircraft Requiring Rapid Descent

Pilot actions:

- * Notify ATC of aircraft location and request FL change as required
- * Upon declaring an emergency a pilot may exercise his right and change his assigned flight level. He shall notify ATC immediately and submit a report upon arrival at the destination
- * If unable to contact ATC and rapid descent required:
 - * Deviation procedure for level change: turn 30° right and track out 20 kilometers (i.e. deviate right of airway centerline by 10 km or 5 nm), then, turn left to track parallel the original route, then climb or descend to the new level, and then return to the original one (when appropriate)

Note: when returning to the original route, be aware that there may be conflicting traffic on that route.

- * 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 121.5 MHz (or, as a backup, the VHF inter-pilot air-to-air frequency 123.45 MHz)

- * Establish visual contact with conflicting traffic

- * Turn on all aircraft exterior lights

Controller actions:

- * Issue ATC clearance to change flight level

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