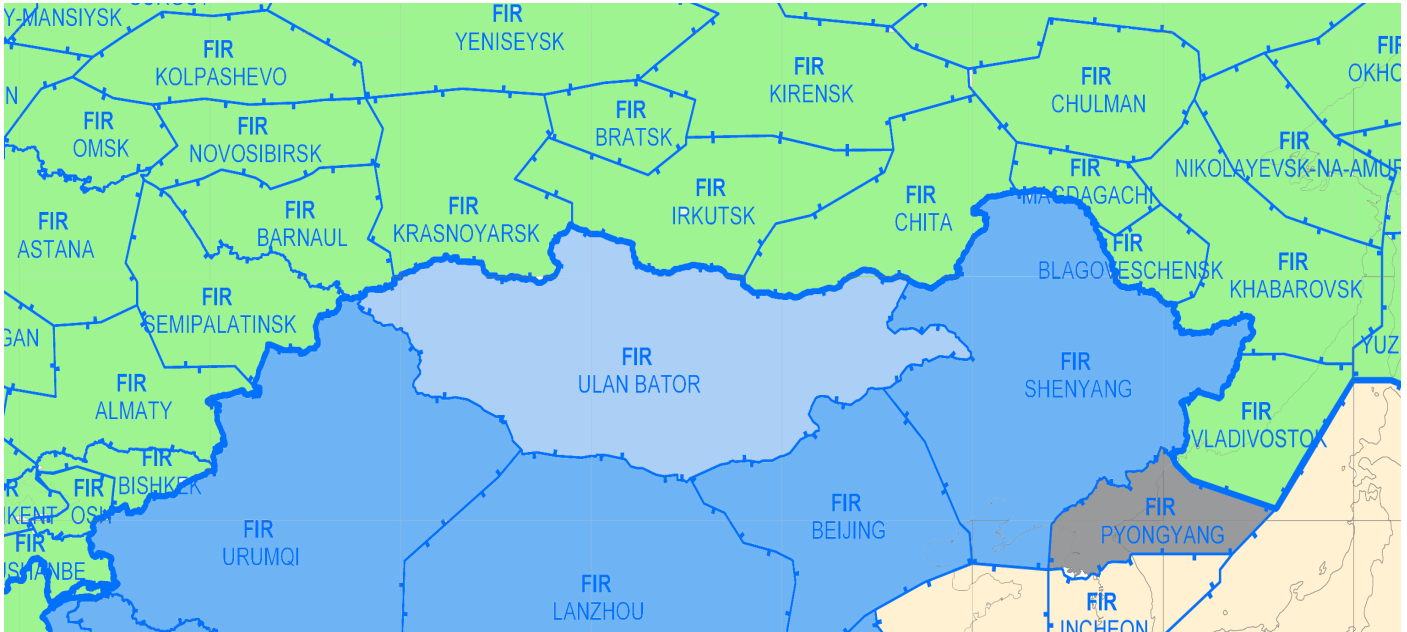


## Implementation of RVSM in Mongolian airspace



### Summary

At 0001 UTC 17 November Metric RVSM will be introduced in the Ulaanbataar FIR between 8900m (FL291) and 12500m (FL410). While all clearances will be given with metres used in the vertical plane, but based on altimetry measured in feet and converted to metres using the Mongolian FLAS conversion table. The procedure for change over day can be found by or referring to page 8 of this document).

### Background

At 0001UTC 17 November Metric Reduced Vertical Separation Minima (RVSM) procedures will be introduced within the Ulaan Bataar FIR. RVSM will be applied to the airspace between 29100 ft (8900m) and 41100ft (12500m) inclusive. Since the majority of aircraft use feet as the primary altitude reference and all clearances will be issued in metres it is important that crews use the Mongolia RVSM FLAS conversion table (see Fig 1) to determine the corresponding flight level in feet. Pilots should also take note that due to rounding differences in the conversion tables the metric readout shown by on-board avionics may not correspond to the cleared flight level in metres, however this difference should never be more than 30 metres. If the variation is greater than 30 metres then further investigation is warranted. 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 flight level band. When these aircraft are outside of RVSM flight level band, the aircraft can use the metric altimeter or feet altimeter. Aircraft not equipped with altimetry capable of measurement in feet will not be permitted in RVSM airspace.

### Procedures within RVSM airspace

Before entering RVSM airspace, crews should review the status of required equipment. The following equipment should be operating normally:

- ▶ Two primary altimetry systems;  
(Note: Altimetry system requirement should be in accordance with the table on page 2 that aircraft shall be flown using the flight level in FEET.)
- ▶ One automatic altitude-keeping device; and
- ▶ One altitude-alerting device.

The crew must notify ATC whenever the aircraft:

- ▶ Is no longer RVSM compliant due to equipment failure; or
- ▶ Experiences loss of redundancy of altimetry systems; or
- ▶ Encounters turbulence that affects the capability to maintain flight level.

#### RVSM Levels

180° - 359° MAG		000° - 179° MAG	
Metres	Feet	Metres	Feet
15500	50900	14900	48900
14300	46900	13700	44900
13100	43000	12500	41100
12200	40100	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

Fig 1 Metric Flight levels and their corresponding values measured in feet. Data extracted from the AIC published by the Civil Aviation Authority of Mongolia 22 Sep 2011.

## Transition between FLs

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

### Pilot level call

Within RVSM airspace, pilots shall report reaching any assigned altitude.

### Procedures for wake turbulence

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

### Procedures for Strategic lateral offset (SLOP)

The flight crew may apply strategic lateral offset in remote continental airspace within the airspace of Mongolia 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.

IFALPA policy on the application of SLOP is that to maximize effectiveness it should be applied as a random offset of either 0, 1NM or 2NM (for more information click [here](#) for *11ATSBL03 – Strategic Lateral Offset Procedure*). However, within the airspace of Mongolia, the strategic lateral offset shall be established at a distance of 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.

### Phraseology related to RVSM operations

Message	Phraseology
For a controller to ascertain the RVSM approval status of an aircraft:	(call sign) CONFIRM RVSM APPROVED
For a pilot to report non-RVSM approval status:	
i) On the initial call on any frequency within the RVSM airspace (controller shall provide a read-back with the same phrase); and	
ii) In all requests for flight level changes pertaining to flight levels within the RVSM airspace; and	NEGATIVE RVSM
iii) In all read-backs to flight level clearances pertaining to flight levels within the RVSM airspace. <i>Additionally, except for State aircraft, pilots shall include this phrase to read back flight level clearances involving the vertical transit through 8900m or 12500m</i>	
For a pilot to report RVSM approval status:	AFFIRM RVSM
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:	NEGATIVE RVSM, STATE AIRCRAFT
Denial of clearance into the RVSM airspace:	(call sign) UNABLE ISSUE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [or DESCEND TO, or CLIMB TO] FLIGHT LEVEL
For a pilot to report when severe turbulence affects the aircraft's capability to maintain the height-keeping requirements for RVSM	UNABLE RVSM DUE TURBULENCE
For a pilot to report that the aircraft's equipment has degraded enroute below that required MASPS Minimum Aviation System Performance Standards for flight within the RVSM airspace.  <i>(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.)</i>	UNABLE RVSM DUE EQUIPMENT
For a pilot to report the ability to resume operations within the RVSM airspace after an equipment or weather-related contingency.	READY TO RESUME RVSM
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.	REPORT WHEN ABLE TO RESUME RVSM

**Example 1:**

A non-RVSM approved aircraft, maintaining 7800m, subsequently requests a climb to 9800m.

Pilot: (call sign) REQUEST 9800m, NEGATIVE RVSM

Controller: (call sign) CLIMB TO 9800m

Pilot: (call sign) CLIMB TO 9800m, NEGATIVE RVSM

**Example 2:**

A non-RVSM approved aircraft, maintaining 11000m, subsequently requests a climb to 11600m.

Pilot: (call sign) REQUEST 11600m, NEGATIVE RVSM

Controller: (call sign) CLIMB TO 11600m

Pilot: (call sign) CLIMB TO 11600m, NEGATIVE RVSM

**Example 3:**

A non-RVSM approved civil aircraft maintaining 8400m, subsequently requests a climb to 9800m.

Pilot: (call sign) REQUEST 9800m, NEGATIVE RVSM

Controller: (call sign) UNABLE ISSUE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN 8400m

**Example 4:**

Air traffic controller instructs a RVSM approved civil aircraft to maintain 9200m, but he finds the aircraft is actually flying FL302. ATC will inform the Pilot to use the Mongolia RVSM FLAS Diagram 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 MONGOLIA RVSM FLIGHT LEVEL CHART.

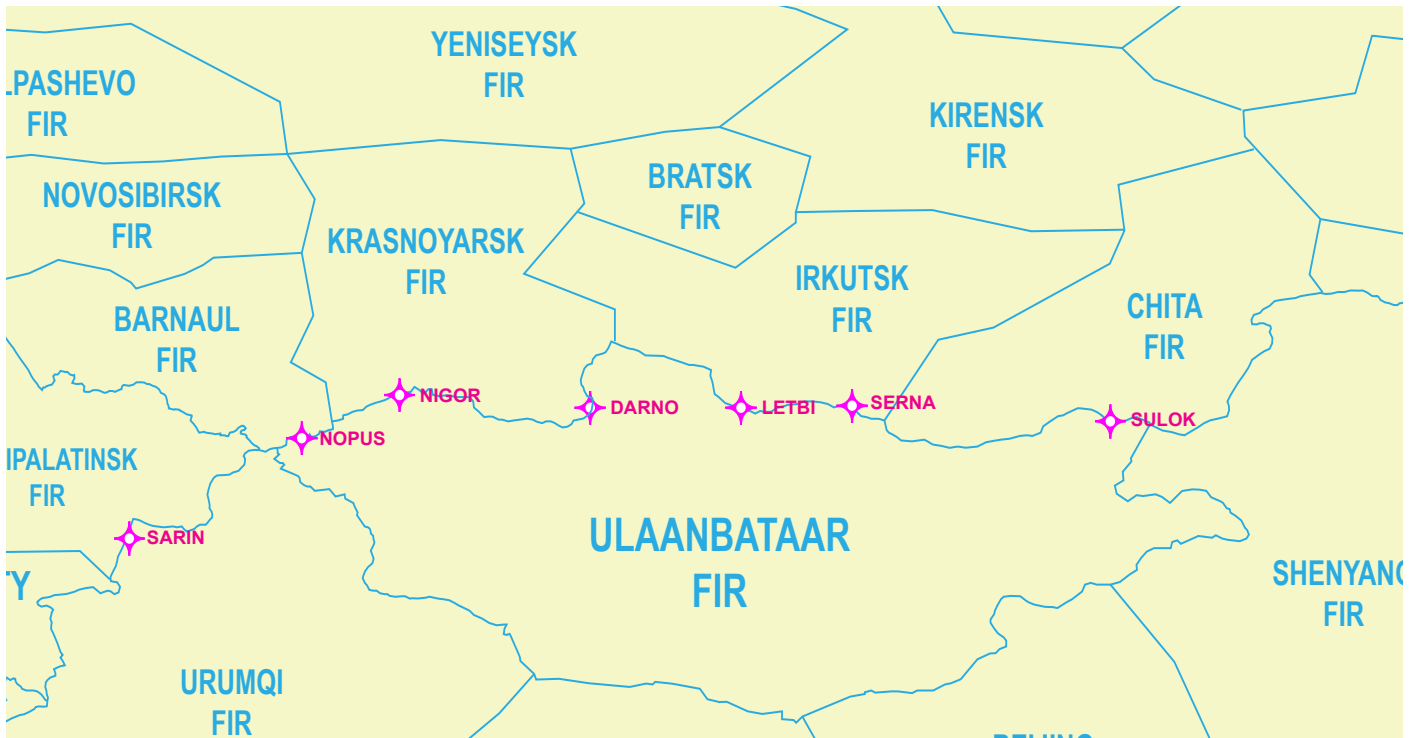
*The Pilot shall using the Mongolia RVSM FLAS Diagram to determines that, for 9200m, the corresponding flight level in feet is FL301, then flies the aircraft at FL301, and then:*

Pilot: (call sign) MAINTAIN 9200m

## Pronunciation of Flight Levels

Flight Level	English Pronunciation	Flight Level	English Pronunciation
600m	SIX HUN-dred METERS	7200m	SEV-en TOU-SAND TOO HUN-dred METERS
900m	NIN-er HUN-dred METERS	7500m	SEV-en TOU-SAND FIFE HUN-dred METERS
1200m	WUN TOU-SAND TOO HUN-dred METERS	7800m	SEV-en TOU-SAND AIT HUN-dred METERS
1500m	WUN TOU-SAND FIFE HUN-dred METERS	8100m	AIT TOU-SAND WUN HUN-dred METERS
1800m	WUN TOU-SAND AIT HUN-dred METERS	8400m	AIT TOU-SAND FOW-er HUN-dred METERS
2100m	TOO TOU-SAND WUN HUN-dred METERS	8900m	AIT TOU-SAND NIN-er HUN-dred METERS
2400m	TOO TOU-SAND FOW-er HUN-dred METERS	9200m	NIN-er TOU-SAND TOO HUN-dred METERS
2700m	TOO TOU-SAND SEV-en HUN-dred METERS	9500m	NIN-er TOU-SAND FIFE HUN-dred METERS
3000m	TREE TOU-SAND METERS	9800m	NIN-er TOU-SAND AIT HUN-dred METERS
3300m	TREE TOU-SAND TREE HUN-dred METERS	10100m	WUN ZE-RO TOU-SAND WUN HUN-dred METERS
3600m	TREE TOU-SAND SIX HUN-dred METERS	10400m	WUN ZE-RO TOU-SAND FOW-er HUN-dred METERS
3900m	TREE TOU-SAND NIN-er HUN-dred METERS	10700m	WUN ZE-RO TOU-SAND SEV-en HUN-dred METERS
4200m	FOW-er TOU-SAND TOO HUN-dred METERS	11000m	WUN WUN TOU-SAND METERS
4500m	FOW-er TOU-SAND FIFE HUN-dred METERS	11300m	WUN WUN TOU-SAND TREE HUN-dred METERS
4800m	FOW-er TOU-SAND AIT HUN-dred METERS	11600m	WUN WUN TOU-SAND SIX HUN-dred METERS
5100m	FIFE TOU-SAND WUN-HUN-dred METERS	11900m	WUN WUN TOU-SAND NIN-er HUN-dred METERS
5400m	FIFE TOU-SAND FOW-er HUN-dred METERS	12200m	WUN TOO TOU-SAND TOO HUN-dred METERS
5700m	FIFE TOU-SAND SEV-en HUN-dred METERS	12500m	WUN TOO TOU-SAND FIFE HUN-dred METERS
6000m	SIX TOU-SAND METERS	13100m	WUN TREE TOU-SAND WUN HUN-dred METERS
6300m	SIX TOU-SAND TREE HUN-dred METERS	13700m	WUN TREE TOU-SAND SEV-en HUN-dred METERS
6600m	SIX TOU-SAND SIX HUN-dred METERS	14300m	WUN FOW-er TOU-SAND TREE HUN-dred METERS
6900m	SIX TOU-SAND NIN-er HUN-dred METERS	14900m	WUN FOW-er TOU-SAND NIN-er HUN-dred METERS

## Transition between Ulaanbataar and adjacent FIRs



Click on the waypoint name to see the transition procedure for that waypoint.

### Flight planning

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 for specific metric flight level within Mongolia RVSM airspace in Flight Plan shall be expressed as S followed by four figures (such as S1250, S1220 and S1190 which represent 12500m, 12200m and 11900m respectively).

### Procedures for operation of non-RVSM approved aircraft in RVSM airspace

It should be noted that RVSM approved aircraft will be given priority for level allocation over non-RVSM approved aircraft. The vertical separation minimum between non-RVSM aircraft operating in the RVSM levels and all other aircraft is 600m (2000ft). Aircraft that are not RVSM compliant may not flight plan between 8900m (29100ft) and 12500m (41100ft), except for the following situations:

- ▶ The aircraft is being initially delivered to the State of Registry or Operator (see paragraph 11 for additional details and information); or
- ▶ 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
- ▶ The aircraft is being used for mercy or humanitarian purposes; or
- ▶ State aircraft (*aircraft used by military, customs and police services shall be deemed state aircraft*).

Aircraft operators requesting that approval shall, if departing from an airport within Ulaanbataar FIR, obtain approval from the ATFM and Flight Permit Department of Civil Aviation Authority of Mongolia and Tactical Planning Unit of Air Traffic Services Division of Civil Aviation Authority of Mongolia. ATFM and Flight Permit Department and Tactical Planning Unit will provide notification of approval via AFTN, SITA or e-mail as appropriate;

Aircraft operators shall include the 'STS/Category of operations (i.e. FERRY/HUMANITARIAN/MILITARY/CUSTOMS/POLICE/STATE)/ NON-RVSM COMPLIANT' in Field 18 of the ICAO Flight Plan;

### Continuous climb/descent of non-compliant aircraft through RVSM airspace

Non-RVSM compliant aircraft may be cleared to climb to and operate above 12500m (41100ft) or descend to and operate below 8900m (29100ft) provided that they:

- ▶ Do not climb or descend at less than the normal rate for the aircraft; and
- ▶ Do not level off at an intermediate level while passing through the RVSM stratum.

### Delivery flights for aircraft that are RVSM compliant on delivery

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.

### Procedures for Suspension of RVSM

Air traffic services will consider suspending RVSM procedures within affected areas of Ulaanbaatar FIR 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 (2000ft).

### Guidance for pilots in the event of aircraft system malfunction or turbulence greater than moderate

#### 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.
- Maintain watch for conflicting traffic both visually and by reference to TCAS.
- Alert nearby aircraft by illuminating exterior lights.
- If unable to contact ATC, broadcast position, flight level and intention on 121.5 MHz (or, as a backup 5680KHZ).

#### Severe turbulence and/or mountain wave activity (MWA) induced altitude deviations of more than approx 60m (200ft)

Pilot actions:

- When experiencing severe turbulence and/or MWA induced altitude deviations of approximately 60m (200ft) 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.

#### MWA Encounters - general

*Note: MWA encounters do not necessarily result in altitude deviations on the order of 60m (200ft). The guidance below is intended to address less significant MWA encounters.*

Pilot actions:

- Contact ATC and report experiencing MWA.
- Report location and magnitude of MWA to ATC.
- If so desired, pilot may request a FL change or deviation from the intended route.

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.



### Wake turbulence encounters

<p>Pilot actions:</p> <ul style="list-style-type: none"> <li>• Contact ATC and request vector, FL change or, if capable, a lateral offset to right 2NM.</li> </ul>	<p>Controller actions:</p> <ul style="list-style-type: none"> <li>• Issue clearance of vector, FL change or lateral offset to right 2NM, traffic permitting.</li> </ul>
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### Unable RVSM due to equipment (*Failure of automatic altitude control system, altitude alerter or all primary altimeters*)

<p>Pilot actions:</p> <ul style="list-style-type: none"> <li>• Contact ATC and state "Unable RVSM Due Equipment".</li> <li>• Request clearance out of RVSM airspace unless operational situation dictates otherwise.</li> </ul>	<p>Controller actions:</p> <ul style="list-style-type: none"> <li>• Provide 600m (2000ft) vertical separation or appropriate horizontal separation.</li> <li>• Clear aircraft out of RVSM airspace unless operational situation dictates otherwise.</li> </ul>
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### One primary altimeter remains in operation

<p>Pilot actions:</p> <ul style="list-style-type: none"> <li>• Contact ATC and request authority to continue to operate at cleared flight level.</li> <li>• Comply with revised ATC clearance, if issued.</li> </ul>	<p>Controller actions:</p> <ul style="list-style-type: none"> <li>• Consider request to continue to operate at cleared flight level.</li> <li>• Issue revised clearance, if necessary.</li> </ul>
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### Transponder failure

<p>Pilot actions:</p> <ul style="list-style-type: none"> <li>• Cross check stand-by altimeter.</li> <li>• Notify ATC of operation with single primary altimeter.</li> <li>• If unable to confirm primary altimeter accuracy, follow actions for failure of all primary altimeters.</li> </ul>	<p>Controller actions:</p> <ul style="list-style-type: none"> <li>• Acknowledge operation with single primary altimeter. <i>Note: Aircraft are able to operate in RVSM airspace with this situation except that pilots should report unable RVSM due equipment.</i></li> <li>• Relay to other controllers or facilities who will subsequently handle the aircraft and any special handling requirement or being provided.</li> </ul>
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### Procedures for aircraft requiring rapid descent

<p>Pilot actions:</p> <p>Notify ATC of aircraft location and request FL change as required.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• If unable to contact ATC and rapid descent required:             <ol style="list-style-type: none"> <li>a) Deviation procedure for level change: 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).</li> </ol> <i>Note: When return to the original route, it is possible to have conflict traffic on that route.</i> </li> </ul>	<p>Controller actions:</p> <ul style="list-style-type: none"> <li>• Issue ATC clearance to change flight level.</li> </ul>
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<p>Pilot actions (<i>continued</i>):</p> <p>b) 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 5680KHZ).</p> <p>c) Establish visual contact with conflicting traffic.</p> <p>d) Turn on all aircraft exterior lights.</p>	
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### Procedures for air-ground communication failure

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

### RVSM change over

Guidelines for operators during the transition to Mongolia RVSM on 17 November 2011 at 0001 UTC as follows:

All aircraft that operate or are planning to operate in the RVSM levels within the airspace of Mongolia at and beyond 0001 UTC on 17 November 2011 shall comply with the RVSM requirements in the AIP Mongolia.

All aircraft entering the airspace of Mongolia between 8900m (29100ft) and 12500m (41100ft) inclusive, at and beyond 0001 UTC on 17 November 2011 will be assigned a level in accordance with the Mongolia RVSM level allocation.

All aircraft departing from airports in the airspace of Mongolia that need to file a level between 8900m (29100ft) and 12500m (41100ft) inclusive, at and beyond 0001 UTC on 17 November 2011 will be assigned a level in accordance with the Mongolia RVSM level allocation. RVSM non-approved aircraft should not flight plan into the RVSM airspace if they expected to operate in the airspace after 0001 UTC 17 November 2011.

Aircraft operating within the airspace of Mongolia at 0001 UTC on 17 November 2011 can expect the following implementation programme between 2300 and 0030UTC:

**2300 UTC:** ATC will broadcast: “Attention all aircraft, RVSM operations will begin in 1 hour.”

**2300 - 2330 UTC:** ATC will accommodate RVSM non-approved aircraft at and below 8400m (27600ft).

**2340 UTC:** ATC will broadcast: “Attention all aircraft, RVSM operations will begin at 0001 UTC.”

### 0001 - 0030 UTC and onward

ATC will clear RVSM approved aircraft to climb or descend to the nearest appropriate RVSM level in accordance with the Mongolia RVSM level allocation. All aircraft operating in RVSM airspace will be cleared in accordance with the Mongolia RVSM level allocation.