ENR 1.8 REGIONAL SUPPLEMENTARY PROCEDURES (DOC 7030)

1 Application of Instrument Flight Rules

1.1 All flights in controlled airspace in Hong Kong FIR shall be flown in accordance with IFR except local flights as set out in ENR 1.2.

2 Submission of Flight Plan

2.1 A flight plan shall be submitted for every IFR flight except as notified in ENR 1.10.

3 Clearances Relating to Flights Subject to Maintaining Own Separation and Remaining in VMC

3.1 An ATCU shall only grant to an IFR flight a clearance subject to maintaining own separation and remaining in visual meteorological conditions, when so requested by a pilot and then only for the climb, descent or approach portion of the flight by day. In Hong Kong such clearances will only be granted subject to the aircraft being at or below FL150.

4 Longitudinal Separation Minima and Mach Number Technique

4.1 Mach Number Technique may be applied between turbo-jet aircraft to establish the required longitudinal separation minima between the aircraft, whether in level, climbing or descending flight.

4.2 When ATC issues a clearance based on Mach Number Technique, the pilot shall maintain the specified Mach Number. If for operational reasons, it is not feasible to maintain the last assigned Mach number, pilots shall advise ATC and request subsequent re-clearance.

4.3 Mach Number Technique may be used on the following routes :

a) ATS Routes
A1, A461, A583, B330, G86 and R473.

b) PBN Routes
L642, M771 and P901.

5 Reduced Vertical Separation Minima (RVSM) Airspace Procedures

5.1 IDENTIFICATION OF RVSM AIRSPACE

5.1.1 Within the Hong Kong FIR, controlled airspace from FL290 to FL410 inclusive is prescribed as Reduced Vertical Separation Minima (RVSM) airspace.

5.2 AIRWORTHINESS AND OPERATIONAL APPROVAL AND MONITORING

5.2.1 Operators must obtain airworthiness and operational approval from the State of registry or State of the Operator, as appropriate, to conduct RVSM operations. On behalf of Pacific ATS providers, the FAA maintains a web-site containing information on RVSM approval. The internet address is :
http://www.faa.gov/air_traffic/separation_standards/parmo/

5.3 IN-FLIGHT PROCEDURES WITHIN RVSM AIRSPACE

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

i) two primary altimetry systems;
ii) one automatic altitude-keeping device;
iii) one altitude-alerting device.

5.3.2 The pilot shall notify ATC whenever the aircraft :

i) is no longer RVSM compliant due to equipment failure;
ii) experiences loss of redundancy of altimetry systems;
iii) encounters turbulence that affects the capability to maintain flight level.

5.4 During climb or descent, aircraft should not exceed the assigned level by more than 150 ft.

5.5 Except in a radar environment, pilots shall report reaching any level assigned within RVSM airspace.

5.6 See para 16 for RVSM in-flight contingency measures.

6 Procedures for the Suspension of RVSM

6.1 The ATC Watch Manager shall suspend RVSM procedures within Hong Kong FIR when there is pilot reports of greater than moderate turbulence. When RVSM procedures are suspended, the vertical separation minima between all aircraft shall be 2 000 ft. In the assignment of levels, aircraft operating on the two primary RNAV routes (L642 and M771) will have priority. Aircraft operating on routes that cross the six major routes, plus ATS Routes A1, A202 and RNAV Route P901, will be assigned levels subject to co-ordination with the adjacent FIRs.

7 Procedures for the Operation of Non-RVSM Compliant Aircraft in RVSM Airspace

7.1 Non-RVSM compliant aircraft may not flight plan between F290 and F410 inclusive within Hong Kong RVSM airspace, except under the following circumstances:

a) humanitarian or SAR flights;

b) State aircraft with a senior State person on board;

c) when specific prior approval has been given by Director-General of Civil Aviation.

7.2 Operators shall include the following information in Flight Plan Item 18: e.g. STS/HUM, STS/SAR, STS/HEAD, STS/STATE or STS/NONRVSM[1].

Note[1]: Operators of non-RVSM approved aircraft capable of operating at FL280 or above regardless of the requested flight level, shall insert in Item 18 'STS/NONRVSM'.

7.3 These procedures are intended exclusively for the purposes listed in para 7.1 above, and not as a means to circumvent the normal RVSM approval process.

7.4 When non-RVSM approved aircraft are permitted to operate in RVSM airspace, RVSM approved aircraft shall be given priority for level allocation over non-RVSM approved aircraft and the vertical separation between non-RVSM compliant aircraft operating in RVSM airspace and all other aircraft shall be 2 000 ft.

7.5 A non-RVSM compliant aircraft may be cleared to climb to and operate above F410 or descend and operate below F290 provided that it:

a) climbs or descends at not less than the normal rate for that type of aircraft;

b) does not maintain an intermediate level while passing through RVSM airspace.

7.6 An aircraft that is RVSM compliant on delivery may operate in Hong Kong RVSM airspace provided that the crew is trained on Hong Kong RVSM policies and procedures and the Director-General of Civil Aviation has issued the operator with a letter of authorization approving the operation. State notification to the Monitoring Agency for Asia Region (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 and aircraft type / series should be included. The MAAR e-mail address is: maar@aerothai.co.th

7.7 Where necessary the ATC Watch Manager should be consulted as follows:

Telephone	+852 2910 6821
Fax	+852 2910 1177
AFTN	VHHKZQZX or VHHKZRZX.

8 Flight Level Assignment Scheme (FLAS)

8.1 With the guidance ICAO Asia/Pacific RVSM Task Force, the regional ATS providers have developed a Flight Level Assignment Scheme (FLAS) that is applicable to the South China Sea airspace and adjacent areas.

8.2 Flights departing or entering Hong Kong FIR will be allocated specific flight levels depending on the flight planned route as indicated in the following tables:

a) FLAS between Hong Kong and Manila FIR

Routes	Direction	FLAS Levels
A461/M501 and A583	Hong Kong FIR to Manila FIR	F290, F330, F370 and F410.
	Manila FIR to Hong Kong	F300, F340 and F380.
M772	Manila FIR to Hong Kong	F300 and F380.

b) FLAS between Hong Kong and Guangzhou FIR

Routes	Direction	FLAS Levels
A461	Departing Hong Kong – Landing Guangzhou	Primary S0420 Secondary S0450
	Departing Hong Kong – Transiting Guangzhou FIR	S0690
	Transiting Hong Kong and Guangzhou FIR	S0890*, S0950, S1010, S1070, S1130, S1190
B330	Transiting Guangzhou and Hong Kong FIRs	S0840, S0920, S0980, S1040, S1100, S1160, S1220*
W68	Transiting Hong Kong FIR – Landing Guangzhou	Primary S0450 Secondary S0420
R473	Transiting Guangzhou FIR – Landing Hong Kong, or	F190, F210, F230,
	Departing Guangzhou – Transiting Hong Kong FIR	F230, F250
A470	Transiting Guangzhou FIR – Landing Hong Kong or Macao	S0660, S0720, S0780, F280, F300
	Transiting Guangzhou and Hong Kong FIRs	S0660, S0720, S0780, F280, F300, F360, F380
	Exit Hong Kong FIR – landing at:	
	Xiamen or Jinjiang	S0690, S0750
	Fuzhou or Wuyishan	S0690, S0750, S0810, F290
	Aerodromes other than those listed above	F290, F330, F350, F390
M503	Departing Hong Kong or Macao and landing at:	
	Shanghai Pudong	F330
	Qingdao, Yantai or Dalian	F330, F350
	Departing Shanghai Pudong, Qingdao, Yantai or Dalian and landing Hong Kong	F300

Notes: * -- Subject to prior co-ordination

c) FLAS between Hong Kong and Sanya FIR

Routes	Direction	FLAS Levels
A1/P901[1]	Sanya FIR to Hong Kong FIR	F270, F290, F330, F370, F390[2], F410 and F450. Note 2: 'No pre-departure coordination' 1601 - 2300 UTC for flights to FIRs in the People's Republic of China or beyond, destinations in Hong Kong FIR including Macao International Airport and Taipei FIR only
	Hong Kong FIR to Sanya FIR	F280, F300, F340, F380, F400 and F430.
Note 1: P901 in Hong Kong FIR only. Vertical Limits - FL285 – UNL. Vertical Limits of A1 between CH DVOR and IKELA in Hong Kong FIR – SFC to FL285. Vertical Limits of A1 in Sanya FIR – See AIP China.		
L642	Hong Kong FIR to Sanya FIR	F280, F310, F320, F350, F360, F390[3] and F400. Note 3: 'No pre-departure coordination' 2301 to 1600 UTC
M771	Sanya FIR to Hong Kong FIR	F270, F310, F320, F350, F360, F390[4] and F400. Note 4: 'No pre-departure coordination' 2301 to 1600 UTC

d) FLAS between Hong Kong FIR and Shantou Control Area

Route	Direction	FLAS Levels
A470	Depart Shantou for Hong Kong FIR	S0420
	Exit Hong Kong FIR landing at Shantou Airport	S0450

e) FLAS between Hong Kong FIR and Zhanjiang Control Area

Routes	Direction	FLAS Levels
A202	Zhanjiang Control Area to Hong Kong FIR:	
	Departing Haikou	S0630
	Departing Sanya	S0810, S0890
	Points beyond ASSAD	S1010, S1070, S1130, S1190, S1250 (Note 1)
	Hong Kong FIR to Zhanjiang Control Area:	
	Landing Haikou	S0660, S0720.
	Landing Sanya	S0840
	Points beyond ASSAD	S1040, S1160, S1220.
R339	Departing Zhanjiang to Hong Kong FIR	S0570
	Hong Kong FIR to Zhanjiang Control Area:	
	Landing Zhanjiang	S0600
	Landing Beihai/Nanning	S0720, S0780
	Points beyond Nanning	S0980, S1040, S1100, S1160, S1220.

Note 1: S1250 for Traffic overflying HK FIR without prior coordination.

f) FLAS between Hong Kong and Taipei FIR

Routes	Direction	FLAS Levels
A1	Taipei FIR to Hong Kong FIR	In accordance with ICAO Annex 2 Appendix 3 Table a).
	Hong Kong FIR to Taipei FIR	At or below F270: In accordance with ICAO Annex 2 Appendix 3 Table a).
G581	Taipei FIR to Hong Kong FIR	In accordance with ICAO Annex 2 Appendix 3 Table a).
	Hong Kong FIR to Taipei FIR [1]	At or below F250 within Hong Kong FIR: In accordance with ICAO Annex 2 Appendix 3 Table a).
M750	Hong Kong FIR to Taipei FIR	1. At or above F270: In accordance with ICAO Annex 2 Appendix 3 Table a). [2] 2. F290 not available between 2300-1159 UTC.
G86 [3]	Taipei FIR to Hong Kong FIR	1. Within RVSM airspace: F300, F340, F380 and F400. 2. Outside RVSM airspace: In accordance with ICAO Annex 2 Appendix 3 Table a).
	Hong Kong FIR to Taipei FIR	1. Within RVSM airspace: F290, F330, F370, F390 [4] and F410. 2. Outside RVSM airspace: In accordance with ICAO Annex 2 Appendix 3 Table a).

Note 1: Traffic from Hong Kong FIR to Taipei FIR at F270 or above shall route via M750 DADON G581.

Note 2: For traffic via M750 DADON G581:
i). Within RVSM airspace: F290, F330, F370 and F410.
ii). Outside RVSM airspace: In accordance with ICAO Annex 2 Appendix 3 Table a).

Note 3: ATS Route G86 within Hong Kong FIR is a unidirectional eastbound route. East of KAPLI, this route is bi-directional.

Note 4: For destinations in Taipei FIR only.

Note 5: FL300 not available for traffic via A1/G581 ELATO joining J101 in Hong Kong FIR due traffic.

9 Phraseology Related to RVSM Operations

9.1 The following recommended phraseology should be used in RVSM operations: (Controller phraseology is in standard text, *pilot phraseology is in italic text*:)

Phraseology	Purpose of Message
(call sign) CONFIRM RVSM APPROVED	For a controller to ascertain the RVSM approval status of an aircraft.
NEGATIVE RVSM	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 F290 or F410. *See examples that follow.*
AFFIRM RVSM	For a pilot to report RVSM approval status.
NEGATIVE RVSM STATE AIRCRAFT	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) UNABLE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [or DESCEND TO, or CLIMB TO] FLIGHT LEVEL (number)	For a controller to deny clearance into the RVSM airspace.
UNABLE RVSM DUE TURBULENCE	For a pilot to report when severe turbulence affects the aircraft's capability to maintain the height-keeping requirements for RVSM.

Phraseology	Purpose of Message
UNABLE RVSM DUE EQUIPMENT	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.)*
READY TO RESUME RVSM	For a pilot to report the ability to resume operations within the RVSM airspace after an equipment or weather-related contingency.
REPORT ABLE 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.

10 PBN NAVIGATION REQUIREMENTS

10.1 ATC shall be advised as soon as possible when the navigational capability of the aircraft deteriorates below the requirement.

10.2 RNP 10 Navigation Requirements

10.2.1 ATC will apply as follows lateral separation minima to aircraft, which are approved for RNP 10 operations on those segments of the following routes which fall within the Hong Kong FIR:

a)	L642	CHEUNG CHAU to EPKAL	50NM
b)	M771	DOSUT to CHEUNG CHAU	50NM
c)	P901	CHEUNG CHAU to IKELA	60NM
d)	M772	ASOBA to DULOP	60NM
e)	Q1	DULOP to CARSO	50NM

10.2.2 Pilots must advise ATC of any deterioration or failure of the navigation systems below the navigation requirements for RNP 10. ATC shall then provide alternative separation and/or alternative routeing.

10.2.3 Pilots of aircraft meeting RNP 10 requirements must indicate 'R' in Item 10a and 'PBN/A1' in Item 18 of the ICAO Flight Plan.

11 OPERATIONS BY AIRCRAFT NOT MEETING RNP 10 REQUIREMENTS

11.1 An aircraft that is unable to meet the minimum navigational requirements for RNP 10 must flight plan at FL280 or below. Operations above FL280 for these aircraft will be subject to ATC approval, in accordance with the provisions of para.11.3 below.

11.2 Pilots of such aircraft wishing to operate on PBN routes specified in para 10.1 a), b) or c) above, at or above FL290, must indicate their level requirements in Item 18 of the ICAO Flight Plan as RMK/REQ FL *(insert level)*. Approval to operate at the preferred level will be subject to ATC co-ordination and clearance. Flights that are not approved will be required to operate at FL280 or below or via alternative routes.

11.3 ATC units receiving a request for non-RNP10 approved aircraft to operate on PBN routes specified in para 10.1 a), b) or c) above, at or above FL290, will co-ordinate with adjacent ATC units affected by the flight. In deciding whether or not to approve the flight, each ATC unit will take into consideration :

a) traffic density;
b) communications, including the non-availability of normal communications facilities;
c) weather conditions en-route; and
d) any other factors pertinent at the time.

12 SAFETY ASSESSMENT CRITERIA

12.1 The safety criteria associated with the introduction of the reduced lateral separation minima of 60 NM will be in accordance with the requirements for RNP10 navigation performance, i.e. aircraft navigation performance shall be such that the standard deviation of lateral track errors shall be less than 8.7 km (4.7 NM).

13 MONITORING OF AIRCRAFT NAVIGATION PERFORMANCE

13.1 Monitoring of aircraft navigation performance is a joint responsibility between operators, States of Registry or States of Operators (as applicable), regulatory authorities and the ATS providers. The detection and reporting of non-conformance with the navigation requirements against the following parameters will rely primarily on radar monitoring by ATC units :

a) Lateral Deviations
a deviation of 15 NM or more from track centreline based on radar observations;
b) Longitudinal Deviations
(i) where time separation is being applied by ATC - when the reported separation based on ATC verified pilot estimates varies by 3 minutes or more from the expected separation at the reporting point; or,
(ii) where a distance-based standard is being applied by ATC based on either ADS, radar observation or RNAV distance reports - when the distance varies by 10 NM or more from the expected distance.

13.2 ATC will advise the pilot when such deviations are observed and implement the required investigation procedures.

13.3 The ATC authority will investigate the causes of such deviations in conjunction with the aircraft operator and the State of Registry, or the State of the Operator, as applicable.

14 Weather Deviation Procedures for Use in the Hong Kong FIR

14.1 General

14.1.1 Regional ATS providers and airspace users have developed contingency procedures for weather deviations applicable in the South China Sea airspace, particularly in areas outside of direct controller-pilot VHF communication.

14.1.2 These procedures are intended to enhance ICAO Regional Supplementary Procedures (DOC 7030), however, it must be recognised that all circumstances cannot be covered. The pilot's judgement shall ultimately determine the sequence of actions taken and ATC shall render all possible assistance.

14.1.3 If an aircraft is required to deviate from its intended track to avoid weather and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. In the meantime, the pilot shall broadcast the position (including ATS route designator or the track code, as appropriate), and intentions, on the frequency in use, as well as on frequency 121.5 MHz, at suitable intervals until ATC clearance is received.

14.1.4 The pilot shall advise ATC when weather deviation is no longer required or when a weather deviation has been completed and the aircraft has returned to the centreline of its cleared route.

14.2 Priority For Obtaining ATC Clearance When Weather Deviation Is Required

14.2.1 When a pilot initiates communication with ATC, rapid response may be obtained by stating 'WEATHER DEVIATION IS REQUIRED', to indicate that priority is required on the frequency and for ATC response.

14.2.2 The pilot also retains the option of initiating the communication using the urgency call 'PAN, PAN', three times, to alert all listening parties of a special handling condition which will receive ATC priority for issuance of a clearance or assistance.

14.3 Actions To Be Taken When Controller-Pilot Communications Are Established

14.3.1 When two-way controller-pilot communications are established and a pilot identifies the need to deviate from the intended track to avoid weather, the pilot shall notify ATC and request clearance to deviate from track, advising where possible the extent of deviation expected. ATC will then take one of the following actions :

a) if there is no conflicting traffic , ATC will issue a clearance to deviate from track;

b) if there is conflicting traffic, and ATC is able to establish separation from the conflicting traffic, ATC will issue a clearance to deviate from track;

c) if there is conflicting traffic, and ATC is unable to establish separation from the conflicting traffic, ATC shall :
   i) advise the pilot that ATC is unable to issue clearance for requested deviation;

ii) advise the pilot of conflicting traffic;
iii) request pilot's intentions.

The following is an example of the phraseology that may be used:

'Unable requested deviation, traffic is (callsign. position, flight level, direction), advise intentions'.

14.3.2 The pilot shall take the following action :

a) inform ATC of intentions by the most expeditious means available;

b) comply with ATC clearance as issued;

c) execute the procedures detailed in para. 14.4.2 below, (ATC shall issue essential traffic information to all affected aircraft);

d) if necessary, establish voice communications with ATC to expedite co-ordination on the situation.

14.4 Actions To Be Taken When Controller-Pilot Communications Are Not Established Or Revised ATC Clearance Is Not Available

14.4.1 A pilot may take the following actions under the provision that the pilot may deviate from Rules of the Air when it is absolutely necessary in the interests of safety to do so, e.g. the requirement to operate on route or track centreline unless otherwise directed by ATC.

14.4.2 If a revised ATC clearance cannot be obtained and deviation from track is required to avoid weather, the pilot shall take the following actions :

a) if possible, deviate away from an organized track or route system;

b) broadcast the aircraft's position and intentions on the frequency in use, frequency 121.5 MHz and the inter-pilot air-to-air frequency 123.45 MHz, at suitable intervals, stating :

i) flight call-sign or identification;
ii) flight level;
iii) aircraft position, including ATS route designator or track code;
iv) intentions, including extent of weather deviation.

c) watch for conflicting traffic both visually and by reference to ACAS, if available;

d) turn on aircraft exterior lights commensurate with aircraft operating procedures;

e) for deviations of less than 10 NM or operations within a composite route system, aircraft should remain at a level assigned by ATC;

f) for deviations of greater than 10 NM, when the aircraft is approximately 10 NM from track, initiate a level change based on the following criteria and broadcast details on the appropriate frequencies :

Route Centreline Track	Deviation in Excess of 10 NM	Level Change
000ºM- 179ºM (East)	LEFT	*DESCEND **300 ft***
	RIGHT	*CLIMB **300 ft***
180ºM- 359ºM (West)	LEFT	*CLIMB **300 ft***
	RIGHT	*DESCEND **300 ft***

NOTE 1 : If the pilot determines there is another aircraft at or near the same flight level with which his aircraft may conflict, the pilot is expected to adjust the path of the aircraft as necessary to avoid the confliction. In the event of a TCAS RA during weather deviation manoeuvres, the pilot may initiate other level changes to resolve the situation.

NOTE 2 : In accordance with paras. (b) and (c) above the pilot is required to communicate air-to-air with near-by aircraft and broadcast position and intentions with conflicting traffic.

g) when returning to track, be established at the assigned flight level or altitude, when the aircraft is within approximately 10 NM of centreline;

h) if communication was not established prior to the deviation, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

15. Large Scale Weather Deviation Contingency Procedure (LSWDCP)

15.1 To mitigate the effects of widespread adverse weather and a potential loss of lateral separation between ATS routes served by the same 'no pre-departure co-ordination required' flight levels, a LSWDCP has been developed for application by Fukuoka ATMC, Hong Kong ATCC, Ho Chi Minh, Kota Kinabalu, Manila, Naha, Sanya, Singapore and Taipei ACCs.

15.2 Flight Level Allocation Scheme

15.2.1 When LSWDCP is implemented, the ATS provider/ANSP concerned will apply a LSWDCP Flight Level Allocation Scheme (LSWDCP FLAS) within the RVSM airspace on the affected route(s) as follows:

N892	**L625**	**N884** (South of LBG)	**N884** (North of CAB)	**M767**	**A582/B462**		**A590**		**L642**	**M771**
SW	NE	NE	NE	SW	E	W	E	W	SW	NE
			FL410							
FL400				FL400				FL400	FL400	
	FL390	FL390			FL390		FL390			FL390
						FL380				
			FL370							
FL360				FL360				FL360	FL360	
	FL350	FL350			FL350		FL350			FL350
						FL340				
			FL330							
FL320				FL320				FL320	FL320	
	FL310	FL310			FL310		FL310			FL310
						FL300				
			FL290							

15.3 Action in the event of activating the LSWDCP FLAS

15.3.1 Hong Kong ATCC will issue a NOTAM when activating the LSWDCP FLAS.

16 Actions in the Event of Aircraft System Malfunction or Turbulence Greater than Moderate

16.1 These actions are intended to mitigate the potential conflict with other aircraft in certain contingency situations and should be read in conjunction with the relevant procedures in para. 14 above. (Note that paras. 16.2 – 16.8 contain material suitable for training programmes.)

16.2 Scenario 1: The pilot is:

a) unsure of the vertical position of the aircraft due to the loss or degradation of all primary altimetry systems, or
b) unsure of the capability to maintain cleared flight level (CFL) due to turbulence or loss of all automatic altitude control systems.

Pilots Actions	Controllers Actions
Maintain CFL while evaluating the situation;	
Watch for conflicting traffic both visually and by reference to ACAS, if equipped;	
If considered necessary, alert nearby aircraft by 1) making maximum use of exterior lights; 2) broadcasting position, flight level, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency, 123.45 MHz, may be used).	
Notify ATC of the situation and intended course of action. Possible courses of action include: 1) Maintaining the cleared flight level and route provided that ATC can provide lateral, longitudinal or conventional vertical separation. 2) Requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain cleared flight level and ATC cannot establish adequate separation from other aircraft. 3) Executing the contingency manoeuvre listed in para. 14.4.2 above to offset from the assigned track and flight level, if ATC clearance cannot be obtained and the aircraft cannot maintain cleared flight level.	Obtain the pilot's intentions and pass essential traffic information. 1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum. 2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible. 3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation. 4) Notify adjoining ATC facilities/ sectors of the situation.

16.3 Scenario 2: There is a failure or loss of accuracy of one primary altimetry system (e.g., greater than 200 foot difference between primary altimeters)

Pilots Actions	Controllers Actions
Cross check standby altimeter, confirm the accuracy of a primary altimeter system and notify ATC of the loss of redundancy. If unable to confirm primary altimeter system accuracy, follow pilot actions listed in the preceding scenario.	

16.4 Scenario 3: Loss of redundancy in primary altimetry systems

Pilots Actions	Controllers Actions
If the remaining altimetry system is functioning normally, couple that system to the automatic altitude control system, notify ATC of the loss of redundancy and maintain vigilance of altitude keeping.	Acknowledge the situation and continue to monitor progress

16.5 Scenario 4: The primary altimeters diverge by more than 200ft (60m)

Pilots Actions	Controllers Actions
Attempt to determine the defective system through established trouble-shooting procedures and/or comparing the primary altimeter displace to the standby altimeter (as corrected by the correction cards, if required).	
If the defective system can be determined, couple the functioning altimeter system to the altitude-keeping device.	
If the defective system cannot be determined, follow the guidance in Scenario 5 for failure or unreliable altimeter indications of all primary altimeters.	

16.6 Scenario 5: All automatic altitude control systems fail (e.g., Automatic Altitude Hold).

Pilots Actions	Controllers Actions
Initially Maintain cleared flight level and evaluate the aircraft's capability to maintain altitude through manual control.	
Subsequently Watch for conflicting traffic both visually and by reference to ACAS, if equipped.	
If considered necessary, alert nearby aircraft by 1) Making maximum use of exterior lights; 2) Broadcasting position, flight level, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency, 123.45 MHz, may be used.)	
Notify ATC of the failure and intended course of action. Possible courses of action include:	Notify adjoining ATC facilities / sectors of the situation
1) maintaining the cleared flight level and route, provided that the aircraft can maintain level.	1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain cleared flight level and ATC cannot establish lateral, longitudinal or conventional vertical separation.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
3) executing the contingency manoeuvre listed in para. 14.4.2 above to offset from the assigned track and flight level, if ATC clearance cannot be obtained and the aircraft cannot maintain cleared flight level.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.

16.7 Scenario 6 : All primary altimetry systems are considered unreliable or fail.

Pilots Actions	Controllers Actions
Maintain cleared flight level by reference to the standby altimeter (if the aircraft is so equipped).	
Alert nearby aircraft by 1) Making maximum use of exterior lights; 2) Broadcasting position, flight level, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency, 123.45 MHz, may be used).	
Consider declaring an emergency. Notify ATC of the failure and intended course of action. Possible courses of action include: 1) Maintaining cleared flight level and route provided that ATC can provide lateral, longitudinal or conventional vertical separation. 2) Requesting ATC clearance to climb above or descend below RVSM airspace if ATC cannot establish adequate separation from other aircraft. 3) Executing the contingency manoeuvre listed in para. 14.4.2 above to offset from the assigned track and flight level, if ATC clearance cannot be obtained.	Obtain pilot's intentions, and pass essential traffic information. 1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum. 2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible. 3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation. 4) Notify adjoining ATC facilities/ sectors of the situation.

16.8 Scenario 7 : Turbulence (greater than moderate) which the pilot believes will impact the aircraft's capability to maintain flight level.

Pilots Actions	Controllers Actions
Watch for conflicting traffic both visually and by reference to ACAS, if equipped.	
If considered necessary, alert nearby aircraft by: 1) making maximum use of exterior lights; 2) broadcasting position, flight level, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency, 123.45 MHz, may be used).	
Notify ATC of intended course of action as soon as possible. Possible courses of action include: 1) Maintaining cleared flight level and route provided ATC can provide lateral, longitudinal or conventional vertical separation. 2) Requesting flight level change, if necessary. 3) Executing the contingency manoeuvre listed in para. 14.4.2 to offset from the assigned track and flight level, if ATC clearance cannot be obtained and the aircraft cannot maintain cleared flight level.	1) Assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum. 2) If unable to provide adequate separation, advise the pilot of essential traffic information and request pilot's intentions. 3) Notify other aircraft in the vicinity and monitor the situation 4) Notify adjoining ATC facilities/ sectors of the situation.