

NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

N7110.406

5/5/05

Cancellation
Date: 5/11/06

SUBJ: DOMESTIC REDUCED VERTICAL SEPARATION MINIMUM (DRVSM)

- 1. PURPOSE.** This Notice provides additional clarification on procedures to be used when operating in Domestic Reduced Vertical Separation Minimum (DRVSM) airspace.
- 2. DISTRIBUTION.** This notice is distributed to select offices in Washington headquarters, the service area offices, Mike Monroney Aeronautical Center, and all air traffic field facilities.
- 3. EFFECTIVE DATE.** This notice is effective May 12, 2005, and will remain in effect for 1 year or until the changes are published in FAA Order 7110.65, whichever occurs first.
- 4. CANCELLATION.** Notice N7110.397, Domestic Reduced Vertical Separation Minimum (DRVSM), dated January 7, 2005.
- 5. BACKGROUND.** The vertical separation minimum at flight levels 290 thru 410 has been reduced from 2000 feet to 1000 feet within many areas of the world. This reduced vertical separation minimum will also become effective within the domestic United States and specified adjoining airspace on January 20, 2005.

Recently, the DRVSM Post-Implementation Analysis and Review Team (PART) conducted a follow-up analysis of DRVSM since its implementation. As a result they have made several recommendations for improvements and changes to current procedures, which are included in this NOTICE.

- 6. EXPLANATION OF CHANGES.** This Notice is identical to Notice N7110.397 except for the following changes and additions.

Subparagraph 2-1-13b - Adds requirements for handling formation flights in RVSM airspace.

Subparagraph 2-1-28a2 - Defines non-RVSM STORM flight.

Subparagraph 2-1-28a3 - Renumbered.

Subparagraph 2-1-28a4 – Requires controllers to inform the operational supervisor/CIC when a non-RVSM exception flight is denied clearance into RVSM airspace or is removed from RVSM airspace.

Subparagraph 2-1-28b2 - Deletes requirement to coordinate non-RVSM aircraft traversing interfacility boundaries above FL410.

Subparagraph 2-2-28e1 - Deletes phraseology for ascertaining the RVSM approval status of an aircraft.

Subparagraph 2-2-28e2 - Renumbered.

Subparagraph 2-2-28e3 - Renumbered.

Subparagraph 4-5-1b - Deletes NOTE and REFERENCE concerning formation flight status.

Paragraph 4-5-2, Table 4-5-1 - Adds oceanic to aircraft operating within RVSM or RVSM transition airspace.

Subparagraph 5-5-8c - Deletes NOTE and REFERENCE concerning non-standard formation flight separation.

7. PROCEDURES. Amend FAA Order 7110.65P subparagraph a of Paragraph 2-1-7, Inflight Equipment Malfunctions, to read as follows:

2-1-7. Inflight Equipment Malfunctions.

a. When a pilot reports an inflight equipment malfunction, determine the nature and extent of any special handling desired.

NOTE-

Inflight equipment malfunctions include partial or complete failure of equipment, which may affect either safety, separation standards, and/or the ability of the flight to proceed under IFR, or in RVSM airspace, in the ATC system. Controllers may expect reports from pilots regarding VOR, TACAN, ADF, GPS, RVSM capability, or low frequency navigation receivers, impairment of air-ground communications capability, or other equipment deemed appropriate by the pilot (e.g. airborne weather radar). Pilots should communicate the nature and extent of any assistance desired from ATC.

Amend paragraph 2-1-13, Formation Flights, to read as follows:

2-1-13. FORMATION FLIGHTS.

a. Control formation flights as a single aircraft. When individual control is requested, issue advisory information which will assist the pilots in attaining separation. When pilot reports indicate separation has been established, issue control instructions as required.

NOTE-

1. Separation responsibility between aircraft within the formation during transition to individual control rests with the pilots concerned until standard separation has been attained.

2. Formation join-up and breakaway will be conducted in VFR weather conditions unless prior authorization has been obtained from ATC or individual control has been approved.

REFERENCE-

*FAAO 7110.65, Additional Separation for Formation Flights, Para 5-5-8.
P/CG Term- Formation Flight.*

b. Military and civil formation flights in RVSM airspace.

- 1. Utilize RVSM separation standards for a formation flight, which consists of all RVSM approved aircraft.**
- 2. Utilize non-RVSM separation standards for a formation flight above FL290, which does not consist of all RVSM approved aircraft.**
- 3. If aircraft are requesting to form a formation flight to FL290 or above, the controller who issues the clearance creating the formation flight is responsible for ensuring that the proper equipment suffix is entered for the lead aircraft.**
- 4. If the flight departs as a formation, and is requesting FL290 or above, the first center sector shall ensure that the proper equipment suffix is entered.**
- 5. If the formation flight is below FL290 and later requests FL290 or above, the controller receiving the RVSM altitude request shall ensure the proper equipment suffix is entered.**
- 6. Upon break-up of the formation flight, the controller initiating the break-up shall ensure that all aircraft or flights are assigned their proper equipment suffix.**

Add paragraph 2-1-28, RVSM Operations, to read as follows:

2-1-28. RVSM Operations.

Controller responsibilities shall include but not be limited to the following:

- a. Non-RVSM aircraft operating in RVSM airspace.

1. Ensure non-RVSM aircraft are not permitted in RVSM airspace unless they meet the criteria of excepted aircraft and are previously approved by the operations supervisor/controller-in-charge. The following aircraft are excepted: DoD, Lifeguard, manufacturer aircraft being flown for development/certification, and Foreign State aircraft. These exceptions are accommodated on a workload or traffic-permitting basis.

NOTE-

The operations supervisor/CIC is responsible for system acceptance of a non-RVSM aircraft beyond the initial sector to sector coordination following the pilot request to access the airspace. Operations supervisor /CIC responsibilities are defined in FAA Order 7210.3, Chapter 6, Section 9, Reduced Vertical Separation Minimum (RVSM).

- 2. A non-RVSM exception designated by the DoD for special consideration via the DoD Priority Mission website shall be referred to as a STORM flight.**
- 3. Ensure sector-to-sector coordination for all non-RVSM aircraft operations within RVSM airspace.**
- 4. Inform the operational supervisor/CIC when a non-RVSM exception flight is denied clearance into RVSM airspace or is removed from RVSM airspace.**

- b. Non-RVSM aircraft transitioning RVSM airspace.

Ensure that operations supervisors/CICs are made aware when non-RVSM aircraft are transitioning through RVSM airspace

c. Apply appropriate separation standards and remove any aircraft from RVSM airspace that advises it is unable RVSM due to equipment while en route.

d. Use “negative RVSM” in all verbal ground-to-ground communications involving non-RVSM aircraft while cleared to operate within RVSM airspace.

EXAMPLE-

“Point out Baxter21 climbing to FL360, negative RVSM.”

- e. **For the following situations, use the associated phraseology:**

- 1 To deny clearance into RVSM airspace.**

PHRASEOLOGY-

“UNABLE CLEARANCE INTO RVSM AIRSPACE.”

- 2 To request a pilot to report when able to resume RVSM.**

PHRASEOLOGY-

“REPORT ABLE TO RESUME RVSM.”

f. In the event of a change to an aircraft’s navigational capability amend the equipment suffix in order to properly identify non-RVSM aircraft on the controller display.

Amend TBL 2-2-3, Aircraft Equipment Suffixes, of Paragraph 2-3-7, Aircraft Equipment Suffix, to read as follows:

TBL 2-3-3

Aircraft Equipment Suffixes

Suffix	Aircraft Equipment Suffixes
	NO DME
/X	No transponder
/T	Transponder with no Mode C
/U	Transponder with Mode C
	DME
/D	No transponder

/B	Transponder with no Mode C
/A	Transponder with Mode C
	TACAN ONLY
/M	No transponder
/N	Transponder with no Mode C
/P	Transponder with Mode C
	AREA NAVIGATION (RNAV)
/Y	LORAN, VOR/DME, or INS with no transponder
/C	LORAN, VOR/DME, or INS, transponder with no Mode C
/I	LORAN, VOR/DME, or INS, transponder with Mode C
	ADVANCED RNAV WITH TRANSPONDER AND MODE C (If an aircraft is unable to operate with a transponder and/or Mode C, it will revert to the appropriate code listed above under Area Navigation.)
/E	Flight Management System (FMS) with en route, terminal, and approach capability. Equipment requirements are: (a) Dual FMS which meets the specifications of AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC 20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. NAS and Alaska; AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors; or equivalent criteria as approved by Flight Standards. (b) A flight director and autopilot control system capable of following the lateral and vertical FMS flight path. (c) At least dual inertial reference units (IRUs). (d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan. (e) An electronic map. (U.S. and U.S. territories only unless otherwise authorized.)
/F	FMS with en route, terminal, and approach capability. Unless otherwise authorized by the Administrator, equipment requirements are: (a) Single FMS which meets the specifications of AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC 20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. NAS and Alaska; AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors; or equivalent criteria as approved by Flight Standards. (b) A demonstrated capability of depicting and following the lateral and vertical path. (c) An FMS with DME/DME updating and one or more of the following: Single Global Positioning System (GPS) - Single inertial reference unit (IRU). (d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan. (U.S. and U.S. territories only unless otherwise authorized.)
/G	Global Navigation Satellite System (GNSS), <u>including GPS or WAAS</u> , with en route and terminal capability.
/R	Required Navigational Performance. <u>The aircraft meets the RNP type prescribed for the route segment(s), route(s) and/or area concerned.</u>
	<u>Reduced Vertical Separation Minimum (RVSM). Prior to conducting RVSM operations within the U.S., the operator must obtain authorization from the FAA or from the responsible authority, as appropriate.</u>
/Q	<u>RVSM with /E, /F, /G, or /R capability, except aircraft operating in Oakland Oceanic or Anchorage Oceanic</u>

	<u>CTA/FIRs must be RVSM with /R capability.</u>
<u>/W</u>	<u>RVSM</u>

Amend subparagraphs a and b, and add subparagraph c of Paragraph 4-5-1, Vertical Separation Minima, to read as follows:

Separate instrument flight rules (IFR) aircraft using the following minima between altitudes:

- a. Up to and including FL 410- 1,000 feet.
- b. Apply 2,000 feet at or above FL 290 between Non-RVSM aircraft and all other aircraft at or above FL 290.**
- c. Above FL 410- 2,000 feet except:
 - 1. In oceanic airspace, above FL 450 between a supersonic and any other aircraft – 4,000 feet.
 - 2. Above FL 600 between military aircraft – 5,000 feet.

NOTE-

Oceanic separation procedures are contained in Chapter 8; Section 7, Section 8, Section 9, and Section 10.

REFERENCE-

FAAO 7110.65, Vertical Application, Para 5-5-5.

FAAO 7110.65, Application, Para 6-6-1.

FAAO 7110.65, Military Operations Above FL 600, Para 9-3-13.

Amend TBL 4-5-1, Altitude Assignment, of Paragraph 4-5-2, Flight Direction, to read as follows:

TBL 4-5-1

Altitude Assignment

Aircraft Operating	On course degrees magnetic	Assign	Examples
Below 3,000 feet above surface	Any course	Any altitude	
At and below FL 410	0 through 179	Odd cardinal altitude or flight levels at intervals of 2,000 feet	3,000, 5,000, FL 310, FL 330

	180 through 359	Even cardinal altitude or flight levels at intervals of 2,000 feet	4,000, 6,000, FL 320, FL340
Above FL 410	0 through 179	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 450	FL 450, FL 490, FL 530
	0 through 359	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 430	FL 430, FL 470, FL 510
One way routes (except in composite systems)	Any course	Any cardinal altitude or flight level below FL 410 or any odd cardinal flight level above FL 410	FL 270, FL 280, FL 290, FL 300, FL 310, FL 410, FL 430, FL 450
Within an ALTRV	Any course	Any altitude or flight level	
In transition to/from or within Oceanic airspace where composite separation is authorized	Any course	Any odd or even cardinal flight level including those above FL 290	FL 280, FL 290, FL 300, FL 310, FL 320, FL 330, FL 340
In aerial refueling tracks and anchors	Any course	Altitude blocks as requested. Any altitude or flight level	050B080, FL 180B220, FL 280B310
Aircraft within Oceanic RVSM or RVSM transition airspace	Any course	Any designated cardinal altitude	FL 330, FL 340, FL 350, FL 360

NOTE-
Oceanic separation procedures are supplemented in Chapter 8; Section 7, Section 8, Section 9, and Section 10.

Amend Paragraph 4-5-3, Exceptions, to read as follows:

When traffic, meteorological conditions or aircraft operational limitations prevent assignment of altitudes prescribed in para 4-5-2, Flight Direction, assign any cardinal altitude or flight level below FL 410 or any odd cardinal flight level at or above FL 410 without regard to direction of flight as follows:

NOTE-
Same.

Amend subparagraphs c and d, and add subparagraph e of Paragraph 5-1-8, Merging Target Procedures, to read as follows:

c. When both aircraft in subpara b are in RVSM airspace, and vertically separated by 1,000 feet, if either pilot reports they are unable to maintain RVSM due to turbulence or mountain wave, vector either aircraft to avoid merging with the target of the other aircraft.

EXAMPLE-

“Delta One Twenty Three, fly heading two niner zero, vector for traffic. Traffic twelve o’clock, one zero miles, opposite direction, MD-80 eastbound at flight level three two zero.”

d. If the pilot requests, vector his/her aircraft to avoid merging with the target of previously issued traffic.

NOTE-

Aircraft closure rates are so rapid that when applying merging target procedures, controller issuance of traffic must be commenced in ample time for the pilot to decide if a vector is necessary.

e. If unable to provide a vector, inform the pilot.

Note-

The phraseology “Unable RVSM due turbulence (or mountain wave)” is only intended for severe turbulence or other weather encounters with significant altitude deviations of approximately 200 feet or more.

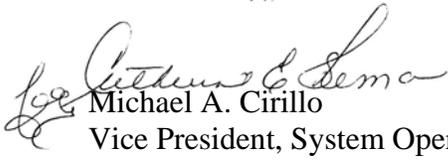
Amend subparagraph c of Paragraph 5-5-8, Additional Separation for Formation Flights, to read as follows:

c. Separate a nonstandard formation flight by applying the appropriate separation minima to the perimeter of the airspace encompassing the nonstandard formation or from the outermost aircraft of the nonstandard formation whichever applies.

Amend subparagraph a of Paragraph 9-5-4, Separation Minima, to read as follows:

a. IFR aircraft by one of the following:

1. *1,000 feet* above it; or in accordance with para 4-5-1, Vertical Separation Minima, whichever is greater.
2. *2,000 feet* below it.
3. *5 miles* radar.
4. *5 miles* laterally.


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