CALLBACK ASRS
From NASA's Aviation Safety Reporting System
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# Domestic RVSM Reporting

On January 20, 2005 the FAA and NAV CANADA implemented Reduced Vertical Separation Minimum (RVSM) from FL290 through FL410 inclusive. The vertical separation minimum is reduced from 2,000 feet to 1,000 feet and provides six additional flight levels. RVSM is effective in the lower 48 states of the United States, Alaska, Atlantic and Gulf of Mexico High Offshore Airspace, and the San Juan FIR. Canada, Mexico, Caribbean, and South American regions have also implemented RVSM in their airspace.

Details on documentation, certification, and operational policy and procedures related to U.S. Domestic RVSM airspace are found in FAA Notice GEN04009.

**Reports on incidents or concerns related to any aspect of Domestic RVSM operations can be submitted to NASA ASRS on the appropriate NASA ARC 277 General reporting form.**

**In addition, the FAA is specifically requesting that pilots report wake turbulence events that occur in RVSM airspace in the lower 48 states of the United States, Alaska, Offshore Airspace, and the San Juan FIR.**

## Reporting Procedures:

General DRVSM operational incidents and observations should be reported on the appropriate NASA ASRS reporting form (available at: http://asrs.arc.nasa.gov/forms_nf.htm ).

FAA Notice GEN04009 stipulates that pilots reporting on wake turbulence incidents submit two forms:

1.) The NASA ASRS General reporting form for Pilots (NASA ARC 227B). The "Type of Event/Situation" block on this form should be annotated with the words, "Wake Turbulence."

2.) The FAA "Supplemental Wake Turbulence Information" form (Fig. 1).

Pilots reporting on wake turbulence incidents are encouraged to file individual NASA ASRS reports even if a report has been filed through the Aviation Safety Action Program (ASAP).

## Report Forms:

The "Safety Reporting" section of the FAA's RVSM Documentation Web Page provides links to the NASA ASRS General Report form and the "Supplemental Wake Turbulence Information" form. The links are found at the bottom of the page. ( http://www.faa.gov/ats/ato/rvsm_documentation.htm [Fig. 2] ).

**Supplemental Wake Turbulence Information**
**Domestic U.S. RVSM Airspace (Flight Levels 290-410)**

**Name:** **Date/Time of Occurrence:**

**Instructions**
1. Complete the NASA Aviation Safety Reporting System (ASRS) "General Form" (NASA ARC 277B).
2. Annotate the "Type of Event/Situation" block on the NASA ASRS form with the words: "Wake Turbulence".
3. Include comments/narrative in the "Event/Situation" section of the NASA ASRS form.
4. Mail this "Supplemental Information" form with the "General Form" **or** write the information in the "Event/Situation" section of the ASRS form.

**Information**
Were you aware of the other aircraft before the event? YES ☐ NO ☐

If so, how? Visual ☐ ATC Traffic Advisory ☐ TCAS ☐ Other ☐

What was the position of the **OTHER AIRCRAFT**, when you encountered wake turbulence?

| | | |
|---|---|---|
| ☐ Level | Flight Level | |
| ☐ Climbing | ☐ Descending | |
| ☐ Opposite direction | Feet above | Miles past |
| ☐ Same direction | Feet above | Miles in front |
| ☐ Converging | Feet above | Miles away |
| ☐ Crossing | Feet above | Miles in front |

Briefly characterize the magnitude of the wake turbulence:

Did you experience VERTICAL ACCELERATION?

YES ☐ NO ☐

What was the change in ALTITUDE? Feet up Feet down

What was the change in aircraft ATTITUDE? Estimate angle of change in:

PITCH ROLL YAW

Was there buffeting? YES ☐ NO ☐

Was there stick shake? YES ☐ NO ☐

Was the autopilot engaged? YES ☐ NO ☐

Was the auto throttle engaged? YES ☐ NO ☐

**Website Addresses**
1. NASA ASRS Website: http://www.asrs.arc.nasa.gov.main nf.htm

2. FAA RVSM Documentation Webpage: http://www.faa.gov/ats/ato/rvsm_documentation.htm



Fig. 1

http://www.faa.gov/ats/ato/rvsm_documentation.htm


Fig.2

| ASRS Recently Issued Alerts On… |
|---|
| LR25 engine flameout incidents |
| SAAB 340B floor connector wiring fire |
| MD80 dual erroneous Primary Flight Displays |
| Western U.S. airport taxiway lighting deficiency |
| Midwest U.S. airport erratic localizer indications |

*A Monthly Safety Bulletin from*

**The Office of the NASA Aviation Safety Reporting System,**
**P.O. Box 189,**
**Moffett Field, CA 94035-0189**

**http://asrs.arc.nasa.gov/**

| January 2005 Report Intake | |
|---|---|
| Air Carrier/Air Taxi Pilots | 2736 |
| General Aviation Pilots | 625 |
| Controllers | 38 |
| Cabin/Mechanics/Military/Other | 154 |
| **Total** | **3553** |

# RVSM Incidents

**These reports to NASA/ASRS were received prior to the implementation of DRVSM, however the "lessons learned" deal with issues that are relevant to flight within all RVSM airspace.**

## High Altitude Maneuvering

While this incident resulted from an encounter with "same altitude" traffic, an increase in traffic-related maneuvering is possible with the implementation of DRVSM. As this A320 crew suggests, a simulator refresher on high altitude maneuvering might prevent the need for adjusting passenger attitudes later.

■ *ATC gave us a 20-degree right turn for traffic and said, "Make it a tight turn." I turned off the autopilot and immediately commenced a turn. Simultaneously, we got a TCAS Traffic Alert. The target was at the 11 o'clock position, amber, and closing at our altitude. While [we were] still turning, the target turned red and we got a TCAS II "Climb" Resolution Alert. I advanced the power to TOGA and pulled up. In doing so, I caused some G-loading and the airframe momentarily buffeted. I rolled wings level, and decreased the climb rate. After 500-600 feet of climb, I leveled and we got a "Clear of conflict" aural message. The flight attendants and several passengers were standing at the time. Some passengers were understandably concerned and upset. The Captain made an explanatory PA. I have recommended simulator training in high altitude RA maneuvers to my company. With Domestic RVSM, this situation may well become more commonplace. Better training is in order.*

## Sandwiched

Unable to coordinate with ATC, this B767 crew initiated lateral separation to get out of a turbulent situation.

■ *Two-thirds of the way across the North Atlantic, westbound, we began hearing aircraft-to-aircraft reports of moderate to severe turbulence at all altitudes approximately 200 miles ahead of our position. These reports were coming from all the tracks. HF radio communication was unavailable.... As we neared the North American coast, intermittent VHF communication started, however the frequency was swamped with position reports. No flights requesting altitude or flight plan changes were being cleared. It became obvious that we could not avoid the area of turbulence ahead vertically or laterally and, of course, we had insufficient fuel to return anywhere eastbound. We prepared the passengers, flight attendants, and cabin for moderate or greater turbulence and slowed our speed.*

*An aircraft on our track, 2,000 feet above, slowed more than us and we gradually flew beneath him. An aircraft on our track 1,000 feet below rapidly gained and flew beneath us.... Approximately 60 miles east of the area of reported moderate to severe turbulence, we encountered severe turbulence at FL340. The nose pitched up followed by a 30-degree left roll. Then the nose fell and the stick-shaker was accompanied by buffeting. At this time we received a TCAS Resolution Alert "Climb." Altitude varied from 34,100 to 33,600 feet. The aircraft 2,000 feet above us was approximately three-quarters of a mile ahead, however the aircraft 1,000 feet below was directly beneath us on the TCAS. Recovery to a climb to 34,000 feet and roll correction right was made and we immediately broke out right of track to exit this sandwich.*

## Altitude Creep

This crew was conscientious about their altitude, but an error caused by an altimeter malfunction still managed to creep up on them. The reporter's remarks regarding DRVSM are worth noting.

■ *Climbing through transition and resetting the altimeters to 29.92", the First Officer and I cross-checked the altimeters to find that they were within tolerance. We continued the climb to FL330 using autopilot "A" which derives its information from the Captain's equipment. Leveling at FL330, we again cross-checked the altimeters. Mine read 33,000 and the First Officer's read 33,160 feet. The standby altimeter read 33,140 feet. The First Officer's altimeter was reading slightly higher than normal, but the standby altimeter reading was normal (usually 150 feet high). The altimeters were within tolerance and there was no cause for alarm. Since the Captain's altimeter and the standby altimeters were reading their "normal" split, we agreed that the Captain's was most likely the closest to correct information and we kept autopilot "A" engaged.*

*After about 15 minutes, I cross-checked the altimeters again. This time the Captain's and the standby altimeters were unchanged, but the First Officer's altimeter was now reading 33,200 feet.... An onboard mechanic...deduced the same as the First Officer and I, that since the Captain's and the Standby altimeter showed their normal split, that information was most likely correct. We continued on autopilot "A" with the Captain's altimeter continuing to read 33,000 feet.*

*The First Officer's altimeter continued to slowly creep to 33,240. We were then advised by ATC that they were showing our aircraft at 33,300 feet. We knew then that the Captain's altimeter was the culprit and descended to FL330 using the First Officer's altimeter. The altitude alert that warns pilots when they have wandered 300 feet from their chosen altitude did not activate. There were no traffic conflicts. We continued the flight with the altitude based on the First Officer's altimeter without incident.*

*On the ground...the mechanic tested the air data computers and found both to be operating normally. He then cleaned all the cannon plugs in the altimeter system and the altimeters then agreed identically. For [the next leg], the altimeters agreed with less than 10 feet difference.*

*.... The Captain's altimeter had been slowly descending and the autopilot, in response, was ever so slowly climbing to maintain FL330. We didn't catch it. Looking back, I should have immediately queried the Center controller as to what he was showing on his screen and now that DRVSM has begun, rest assured that talking to the controller will be the first step should this or a similar problem with altitude occur.*

*I thought I should submit this report since it may help another crew in the future, especially since altitude deviations are now an even more critical event with DRVSM in effect. I know I am doubling my attention to altitude now.*