



International Civil Aviation Organization

**Fifteenth Meeting of the APANPIRG ATM/AIS/SAR Sub-Group
(ATM/AIS/SAR/SG/15)**

Bangkok, Thailand, 25 – 29 July 2005

Agenda Item 7: Review developments relating to CNS/ATM implementation

**RVSM SEPARATION FOR RVSM COMPLIANT AIRCRAFT OPERATING IN
FORMATION FLIGHTS**

(Presented by the United States of America)

SUMMARY

Effective 12 May 2005 the Federal Aviation Administration (FAA) began to utilize RVSM separation for a formation flight, which consists of all RVSM approved aircraft.

1. INTRODUCTION

- 1.1 Reduced vertical separation minimum (RVSM) is in effect across much of the world's airspace.
- 1.2 The U.S. Department of Defense (DoD) and many military air forces routinely operate aircraft as a formation flight. Formation flight is defined as more than one aircraft operating as a single aircraft with regard to navigation and position reporting.
- 1.3 Though not specifically mentioned in all aeronautical information publications (AIP), it is generally assumed that formation flights continue to have 2,000 feet vertical separation standards applied above FL290.
- 1.4 Continuing to provide 2,000 feet vertical separation for formation flights made up completely of RVSM compliant aircraft is inefficient use of the airspace. (Diagram 1)

2. DISCUSSION

- 2.1 Formation flying was born as a means of mutual support and protection in times of aerial warfare. It was quickly discovered that multiple aircraft working together achieve far greater results while also reducing risk to all formation members. Flying large numbers of aircraft in formation meant organization was necessary for safety and efficiency. With time and experience, standards and conventions were developed for formation flying. Some of these conventions vary depending on the country of origin, the organization, or the type of flying and is a routine element of day-to-day flight operations.
- 2.2 A standard formation is one in which a proximity of no more than 1 mile laterally or longitudinally and within 100 feet vertically from the flight leader is maintained by each wingman. Non-standard formations are those operating under conditions other than standard formation dimensions that the flight leader has requested and air traffic control (ATC) has approved, or when operating within an authorized altitude reservation (ALTRV).
- 2.3 It is the U.S DoD policy and that of many military air forces that military platforms conducting peacetime operations will conform to applicable civil aviation rules to ensure interoperability

and transparency within controlled airspace. As such, many military airframes are becoming RVSM compliant.

- 2.4 With the implementation of domestic RVSM (DRVSM) within the U.S. National Airspace System, the FAA and DoD conducted a follow-up analysis of DRVSM. As a result, there were several recommendations for improvements and changes to current procedures. The recommendation to provide RVSM separation to formation flights consisting of all RVSM compliant aircraft was one of those improvements. Providing RVSM separation to formation flights comprised completely of RVSM compliant aircraft is efficient use of airspace and provides less impact to air traffic controllers working formation flights. (Diagram 2)

3. FAA FORMATION FLIGHT PROCEDURES (FAA NOTICE 7110.406 DATED 5 MAY 2005)

- 3.1 Effective 12 May 2005, the following apply for all formation flights, civilian and military:

3.1.1 RVSM separation standards will be applied to a formation flight, which consists of all RVSM aircraft.

3.1.2 Formation flights, which do not consist of all RVSM aircraft, continue to have 2,000-foot separation standards applied above FL290.

3.1.3 Responsibilities for proper equipment suffix on form-up:

- (1) If aircraft are requesting 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.
- (2) If the flight departs as a formation flight, and is requesting FL290 or above, the first center sector controller ensures that the proper equipment suffix is entered.
- (3) If the formation flight is below FL290 and later requests FL290 or above, the controller receiving the RVSM altitude request ensures the proper equipment suffix is entered.

3.1.4 Responsibilities for proper equipment suffix on break-up: Upon break-up of the formation flight, the controller initiating the break-up ensures that all aircraft or flights are assigned their proper equipment suffix.

4. FURTHER CLARIFICATION AND GUIDELINES

4.1 RVSM formation flights are acceptable when all aircraft are RVSM compliant aircraft; and

4.1.1 Does not apply to RVSM compliant aircraft conducting aerial refueling; and

4.1.2 RVSM formation flights must use an automatic altitude control system to hold assigned altitude. If RVSM formation flights will be manoeuvring within a block altitude, they must ensure they do not go below or above assigned block by use of an altitude alerting system.

- 4.2 Standard formation flights comprised of all RVSM compliant aircraft can file for a single altitude if all formation aircraft fly the assigned altitude, either offset from each other or in trail. (ex. Formation flight assigned FL350)
- 4.3 Non-standard formation flights comprised of all RVSM compliant aircraft in which one or all will manoeuvre, must request a block altitude. Air traffic control will then assign other RVSM aircraft appropriate RVSM separation standards. (ex. Formation flight assigned FL320-330. Air traffic will then assign other RVSM aircraft at FL310 and FL340.)
- 4.4 In short, formation flights are acceptable but must conform to RVSM standards.

5. ACTION BY THE MEETING

- 5.1 The meeting is invited to note the information in this paper.
- 5.2 U.S. representatives are prepared to provide further information or respond to questions.

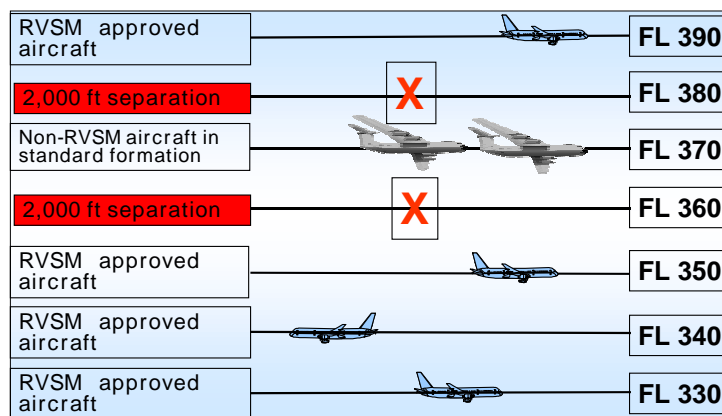


Diagram 1

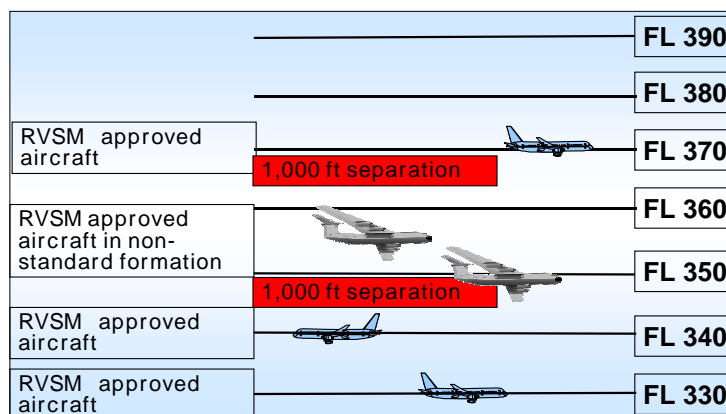


Diagram 2