FIRST ICAO SEMINAR ON RVSM IMPLEMENTATION IN THE CAR/SAM REGIONS

IATA/USERS PERSPECTIVES

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BRIEF DESCRIPTION OF THE RVSM PROGRAM

The Reduced Vertical Separation Minima commenced with the usage of the ATC separations, establishing 1.000 feet separation between flight levels, in 1940.

In the mid 1950's with the introduction of commercial jet propulsion aircraft flying above FL290, and due to the altimeters poor capacity of sensing pressure variations at this low air density, RVSM was discontinued above FL290.

By the mid 1970's the commercial air transportation bonanza is crippled by the world fuel shortage.

In 1983 ICAO creates the FANS committee addressed among other issues to alleviate the sky congestion.

By 1983 studies begin in order to eliminate the interruption of RVSM above FL290, so as to reduce airspace congestion thus increasing users' operational efficiency.

27 March 1997 – First RVSM operation between FL350 and FL390 in the North Atlantic.

August 2002 – All ICAO Regions are in RVSM implementation process or have already implemented RVSM.

GLOBAL RVSM PROGRAM STATUS

- North Atlantic – Implemented.
- Europe – Implemented.
- South Atlantic EUR/SAM corridor –Implemented.
- Northern and Central Pacific – Implemented.
- WATRS - Implemented .
- Middle East –In process of implementation for 2003.
- Australia – Implementation in process.
- Africa - Implementation in process.

RVSM IS NOT A REGIONAL PROGRAM ANYMORE,

IT IS A GLOBAL PROGRAM!!!

SAFETY FIRST

- **Safety Assessment – Calculates the index of risk of an airspace measured in accidents per aircraft flying hour.**

Different parameters play a roll in the calculation of the Safety Assessment, from the aircraft population wing span to the meteorological conditions of the region.

- **Full participation of the States and the Operators is required.**

Information provided by the Airlines on any kind of deviation from the planned route, with and with out ATC authorization, is collected to evaluate the safety level of the proposed RVSM airspace.

Reporting forms have been disseminated by IATA to the airlines.

BENEFITS FOR THE OPERATORS

- Increment eighty five percent of the flight levels.
- Congestion reduction of the airspace.
- Reduction of delays.
- Step climb improvement, before 4.000 feet steps; with RVSM 2.000 feet steps.
- In long routings up to 1.5 percent of fuel saving, some airlines claim up to 2.5 percent.
- Increment of the payload.
- Fast return of the investment made in upgrading the aircraft.
- Ability to cross traffic with a lower vertical deviation.
- Low cost technology.
- The most efficient ATM element to increase the airspace.

WHAT THE OPERATORS HAVE TO DO

GENERAL CHORES

- Coordinate with the local Civil Aviation Authority.
- Develop a cost/benefit analysis.
- Equip the aircraft with RVSM based on manufacturers' service bulletins.
- Obtain the airworthiness approval from the State of Registry.
- Monitor the aircraft altimetry for registration with the monitoring agency.
- Pilots, maintenance and dispatchers training.
- Obtain the operational approval from the State of Registry or through the State where the aircraft is based.
- Make sure that the operational approval is released to the regional monitoring agency CARSAMMA.

WHAT THE OPERATORS HAVE TO DO

APPROVAL PROCESS

Two main steps:

- **FIRST – AIRCRAFT AIRWORTHINESS APPROVAL.**
- **SECOND – AIRLINE OPERATIONAL APPROVAL.**

WHAT THE OPERATORS HAVE TO DO

AIRWORTHINESS APPROVAL PROCESS

- States evaluate and approve service bulletins, supplemental type certificate, aircraft modification, etc..
- Operators modify or inspect aircraft.
- Operators provide State with documents for each aircraft modified or inspected.
- State notifies CARSAMMA about aircraft airworthiness approval.
- Operators contact ARINC/CSSI/IATA for GMU monitoring, this process will be clarified in a near future.
- ARINC/CSSI notify CARSAMMA of the results of the GMU monitoring.
- CARSAMMA notifies States of results of GMU monitoring.
- This process is not necessary for aircraft already manufactured with RVSM equipment.

OPERATIONAL APPROVAL PROCESS

WHAT THE OPERATORS HAVE TO DO

Operators provide Sates with:

- **Crew procedures.**
- **Maintenance procedures.**
- **Dispatch procedures.**
- **Training programs**
- **Aircraft manuals.**
- **Aircraft maintenance records.**

- **State grant RVSM operational approval.**
- **State notifies operator of the operational approval.**
- **State will notify the CARSAMMA of the operational approval.**

WHAT THE OPERATORS HAVE TO DO

AIRCRAFT REQUIREMENTS

- Two independent Altitude Measuring Systems.
- One altitude reporting transponder, capable of operating from either system.
- SSEC (Static Source Error correction) and/or PEC (Pitot Error Correction) if required to meet MASPS.
- An Altitude Alert Device.
- An Automatic Altitude Control System (Automatic Altitude Keeping Device).

WHAT THE OPERATORS HAVE TO DO

SERVICE BULLETINS

- B727-100/200 – New DADC (Digital Air Data Computer) – SSEC (Static Source Error Correction) required to meet altimetry system error - Update flight manual.
- B737-200 – New DADC – possible new altimeter system.
- B737-300/400/500 – Visual inspection skin. Production after Sep 1995 are delivered RVSM approved.
- B737 600/700/800/900 - Are RVSM approved.
- B757-200 – DADC upgrade or new - Visual check static port - Wiring change to activate new SSEC. Production after Oct 1995 are delivered RVSM approved.
- MD80's – Skin check – Static port plate.
- DC8's - No service bulletin – DADC new or upgrade – New SSEC - Detailed measurement and corrections on static plate and skin.
- DC9's - No service bulletin – DADC new or upgrade – New SSEC - Detailed measurement and corrections on static plate and skin.
- B707 and B737-100 – No service bulletin.
- All B747, B767 and B777 based in CAR/SAM are already approved for RVSM.

WHAT THE OPERATORS HAVE TO DO

SERVICE BULLETINS

- A319 – Skin check.
- A320 – Air Data Computer relocation – Skin check.
- A321 – ADC modifications – Skin check.
- A310GE – Visual skin check.
- A310PW- ADC modification.
- A300-600 B2/B4 - Skin check.
- A340 and A330 already approved for RVSM.

REFERENCE DOCUMENTS

- Manufacturer Service Bulletins.
- Manual on the Implementation of 1.000 feet Vertical separation Minimum Between FL290 and FL410 inclusive- ICAO Doc 9574.
- Regional Supplementary Procedures ICAO Doc 7030.
- CAR/SAM Guidance Doc for RVSM Implementation, which includes FAA Interim Guidance material 91-RVSM+Change 1 and the JAA Temporary Guidance Leaflet No. 6.

MONITORING

MONITORING THE AIRCRAFT ALTIMETRY SYSTEM

- Aircraft and/or operators approved for any RVSM region are approved for CAR/SAM Region.
- Once the aircraft has obtained its airworthiness approval by the State of Registry, then aircraft can be monitored.
- Operators will contact CSSI or ARINC (to be determined), IATA will bill operators for the monitoring services, this procedure will be clarified in the near future.
- Monitorization is realized with GMU (Global Position System Monitoring Unit), and collects GPS data, pressure altitude and mode-C data, and meteorological data during a straight flight of about 30 minutes. Once this data analyzed the airline, the State of Registry and CARSAMMA is notified, and the aircraft included is registered for RVSM operations.
- Cost of the monitoring process from $1.000 to $5.000 on the service provided.

MONITORING

POST-APPROVAL/IMPLEMENTATION MONITORING

- In order to maintain the integrity of the risk level of the CAR/SAM Region a post approval-monitorization has to be maintained.

- Operators must maintain procedures, training and records maintenance checks of the aircraft.

- State Authorities must inspect airline procedures periodically.

- CARSAMMA might request post implementation monitoring of any aircraft, fleet or operator when it is considered necessary.

RVSM IN THE CAR SAM REGION

Aircraft that might need modifications in the CAR/SAM Region

(Long Range Aircraft not included)

Group aircraft – total 415

•B757-200	17
•BAC111-40	3
•CRJ-100	4
•CRJ-200	2
•MD-81	3
•MD-82	19
•MD-83	33
•MD-87	7
•MD-88	15
•ERJ-145	17
•A300	8
•A310-300	5
•A319–100	12
•A320-200	73
•B727-100	16
•B727–200	112
•B737-400	5
•B737-500	21
•B737-700	37
•B737-800	6

Non-Group aircraft – total 404

•SE210-10R	5
•YAK-42	13
•B737-200	173
•B737–100	1
•B707–320	19
•DC8/50s	5
•DC8-60S	2
•DC8-70s	9
DC9-10	22
•DC9-15	4
•DC9-30	62
•DC9-40	3
•DC9-50	9
•F-100	62
•F-28	15

Business aircraft that might need service bulletins or modification in the CAR/SAM Region – Total 153

Cessna	36
Learjet	45
Beech	11
Canadair	2
Dassault Falcon	18
GAC Grumman	7
Hawker	9
IAI	13
Lockheed	3
Misubishi	1
Saberliner	8

CAR/SAM Region RVSM readiness:

AIRCRAFT

Total Jet fleet 1.170, including cargo and business:

- **898 jet aircraft already RVSM or RVSM capable**
- **272 jet aircraft not economically feasible to be RVSM**

FLIGHTS

It is estimated in Dec 2004 that :

41.559 weekly flights will operate in the CAR/SAM Region.

87.76% are forecasted to be RVSM flights, this includes international and domestic, passenger and cargo of more than one hour flying time.

- **GREPECAS/10 Conclusion 10/11 mandates the implementation of RVSM in the CAR/SAM Region in two phases; first phase from FL350 to FL 390 by Apr 2004. Second phase at a date to be determined, implementation of RVSM from FL290 to FL350.**

- **IATA wishes an implementation of RVSM in a single phase from FL290 to FL410, based on the expected fleet and flights readiness for RVSM, and also based on the following reasons:**

- Cuba, Mexico and USA are implementing RVSM from FL290 to FL410.
- Implementing in two phases implies a more elaborated and expensive Safety Assessment.
- Implementing in two phases will benefit 12% of the flights and will penalize 88% of the flights.
- Implementing in two phases will require transition zones.
- Implementing in two phases increase the safety risk when controllers transfer aircraft in descent or climb, from a RVSM stratum to a non-RVSM stratum, and finally to a RVSM stratum again.
- Implementing in two phases can create confusion for crews flying from or into the CAR/SAM Region, using different IFR cruising levels depending on the altitude for the aircraft.
- The only experience of implementation in two phases was in the North Atlantic, where the traffic patterns are a one directional flow.
- If implementation occurs in two phases, it will be necessary to decide the duration of the first phase, needed to replace non-RVSM aircraft for RVSM aircraft.

IMPORTANT !!!

OPERATORS BASED IN THE CAR/SAM REGION MUST START THE RVSM APPROVAL PROCESS AS SOON AS POSSIBLE

GMU UNITS ARE LIMITED, THEREFORE TO MEET DEADLINES MONITORIZATION HAS TO START AS SOON AS POSSIBLE

ALWAYS REMEMBER THERE IS NEVER ENOUGH TIME

RVSM MISCONCEPTIONS

- **RVSM DOES INCREASE THE AMOUNT OF TRAFFIC - False!!!**

Operators are not going to buy more aircraft or increase the frequency of the flights because an air space is RVSM.

- **RVSM DOES INCREASE THE CONTROLLER WORK LOAD – False!!!**

On the contrary, it reduces it. RVSM from FL290 to FL410 increases the capacity of the air space by 86%; this means that the controller has 86% more flight levels available to accommodate their traffic.

- **RVSM IS AN EXCLUSIVE AIRSPACE FOR RVSM AIRCRAFT- False!!!**

Controllers can tactically separate non-RVSM aircraft from RVSM aircraft. RVSM will allow to displace those modern aircraft to higher level, leaving the lower levels available for controllers to accommodate those non-RVSM aircraft.

THANK YOU FOR YOUR ATTENTION