

GLOBAL RARS NETWORK

(Submitted by WMO)

Summary and Purpose of Document

This working paper reports on the implementation of the global network of Regional ATOVS Retransmission Services (RARS) in light of the outcome of the 2nd and 3rd global RARS-IGDDS workshops.

The EUMETSAT EARS is fully operational for ATOVS data with 10 HRPT stations and has initiated pilot activities for retransmission of ASCAT and IASI data from METOP, as well as AVHRR data from METOP and NOAA.

The Asia-Pacific RARS has started pre-operational activities with contribution from China, Korea, Japan, Australia and will involve up to 15 stations by December 2006. ATOVS data from the Asia-Pacific RARS are transmitted over the GTS via Tokyo and Melbourne, and JMA reported on their value for NWP. Plans for the South-American RARS are being consolidated. A first phase will involve 6 HRPT stations in Brazil, concentrated by INPE/CPTEC in cooperation with INMET, and one station in Argentina through cooperation between SMN and CONAE. It is expected to become operational by the end of 2007.

It is planned to receive support from the EUMETSAT SAF on NWP operated by the UK Met Office for global monitoring of data consistency. WMO plans to develop a RARS website to inform the global user community.

Action is needed to complete the global coverage, in particular towards Africa and the Pacific. Expansion to other time-critical data beyond ATOVS is also considered. The 15th International ATOVS Scientific Conference (ITSC) expressed recommendations in this respect.

In order to continue and enhance the cooperation that has developed through the 3 global RARS workshops since 2004, it is proposed to establish a RARS Implementation Group.

CGMS Members are invited to note the progress made on RARS, to comment on the proposed expansion, and on the draft Terms of Reference of the proposed RARS Implementation Group.

DISCUSSION

Background

1. At CGMS-XXXIII WMO had reported on the value of the Regional ATOVS Retransmission Service (RARS) concept and its plans to hold second global RARS workshop to pursue the implementation of a global network of RARS.
2. Following the example of EUMETSAT with EARS, the principle of a RARS is to improve the availability and timeliness of time-critical polar-orbiting satellite data over the global domain by collecting these data from direct broadcast at a selection of HRPT stations, to concentrate them in near-real time at a regional centre and redistribute them for regional and global users, possibly after some processing. It provides an attractive trade-off between timeliness, taking advantage of direct broadcast to avoid the latency of on-board recorded data, and coverage, relying on several HRPT stations distributed around the globe, to avoid the limitation of a single local acquisition area.
3. The timeliness threshold requirement of global NWP centres has evolved from 1 hour to 30 mins in past years for sounding data, and this cannot be met by the global data flow based on on-board stored data. There is a clear requirement for, and proven benefit from, a RARS. The initial focus of the RARS network is on ATOVS data, but the same principle should apply to any type of data from polar-orbiting satellites that is time-critical for global users, to the extent that the data volume is compatible with affordable communication means.

Highlights of the second global RARS workshop

4. The 2nd global RARS-IGDDS workshop was held on 1-2 December 2005 in Geneva, with participants from Argentina, Australia, Brazil, Canada, China, EUMETSAT, Japan and WMO. Korea had sent written input. The workshop reviewed RARS regional and global requirements, discussed and agreed RARS operators standards and reviewed the outline of a RARS website. EUMETSAT reported on EARS. Following regional discussions at the Asia Pacific Satellite Data Exchange and Utilization (APSDEU) meeting, plans were developed for an Asia-Pacific RARS involving initially Australia, China, Japan and Korea, and coordinated by Dr D. Griersmith from ABoM. Following initial regional discussions in RA III, preliminary plans were also developed for a pilot South-American RARS.

Highlights of the third global RARS workshop

5. The 3rd global RARS-IGDDS workshop was held on 31st August-1st September 2006 in Geneva, with participants from Argentina, Australia, Brazil, China, EUMETSAT, Japan, Korea, the United States and WMO. Representatives from the GEO Secretariat and of the GEO-NETCast initiative also attended part of the meeting.
6. EUMETSAT reported on the status of EARS, which is operational with 10 stations covering a large part of the Northern hemisphere for ATOVS data. Collection of SCAT/ASCAT data has started in a pilot mode with 7 stations, for regional processing. Collection of AVHRR data has started in a pilot mode with 5 stations, using data segmentation in 1-minute granules, which allows the retransmission of concatenated AVHRR passes to EUMETCAST users within about 10 minutes timeliness. It is considered to relay IASI data after Metop commissioning.
7. The workshop was informed of the start of activities of the Asia-Pacific RARS with 10 HRPT stations operating and short-term plans to expand the coverage by the end of 2006. (See Table 1). Tokyo and Melbourne were injecting RARS data to the GTS. Positive feedback from NWP users was reported by JMA. Most of the data are actually collected and made available over the GTS within 30 minutes, but some adjustments remain necessary on communications, data handling and file naming conventions. Other stations are being considered to further extend the coverage.

Table 1. Implementation of the Asia-Pacific RARS

Processing/ Dissemination Centre	HRPT stations providing ATOVS data	
	Available in September 2006	To be added by December 2006
Tokyo	Tokyo-Kiyose Syowa (Antarctica) Seoul Beijing, Guangzhou, Urumuqi	
Melbourne	Melbourne-Crib Point (2 stations) Darwin Perth	Singapore Vladivostok Honolulu New Zealand Hong Kong

7. The workshop noted that Mr S.Pereira had been appointed as a coordinator by INPE/CPTEC for the South-American RARS in Brazil. The RARS was still in development and testing phase and was reviewing options for prep-processing software implementation and for telecommunications. The South-American RARS is planned to be operational by the end of 2007.

Table 2. Implementation of the South-American RARS

Processing/ Dissemination Centre	HRPT stations providing ATOVS data	
	Planned in first stage	Considered expansion
INPE/CPTEC (Brazil)	Fortaleza Natal Cachoeira Brasilia Manaus Cuiaba Paulista	Peru Chile (TBC) Central-America
Cordoba (Argentina)	Cordoba	Marambio (Antarctica)

8. The United Kingdom Met Office, in charge of the EUMETSAT SAF on NWP, has been asked to extend its EARS monitoring activities to include monitoring of the global RARS network, when implemented, in order to help ensuring global quality and consistency of the RARS data.

Further development

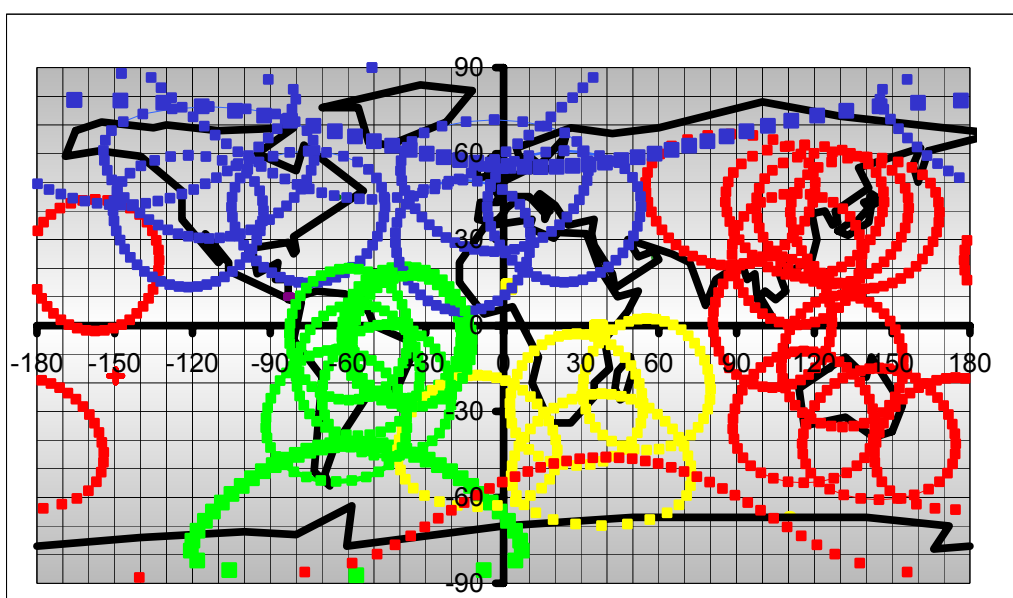
9. The first objective is to complete a near-global coverage for ATOVS data, to ensure the required timeliness and data consistency, and to set up a RARS website providing relevant and up-to-date information on RARS to interested users. After completion of the Asia-Pacific and South-American RARS, plans should be made to cover the Southern part of Africa.

10. The RARS concept was proven extremely valuable for ATOVS data and should be considered for other time-critical data from polar-orbiting satellites, taking into account priority requirements, financial and operational implications. Following the pilot activities undertaken by EUMETSAT, consideration should be given to the inclusion of IASI data and ASCAT data from METOP (assuming that the HRPT stations have been upgraded for METOP reception).

11. AVHRR retransmission can be considered as well, depending on requirements. It should be noted that AVHRR imagery involves much larger data rates than ATOVS, which requires suitable telecommunication infrastructure for data concentration from the HRPT stations. AVHRR imagery can be of particular interest over polar regions for the derivation of IR polar winds to be used in NWP. In addition, RARS offers the advantage of providing access to full resolution AVHRR imagery from NOAA/POES while global data from NOAA/POES are only available at GAC resolution.

12. The WMO Space Programme reported on the global RARS network at the Fifteenth International TOVS Study Conference (ITSC-XV) on 4-10 October 2006. ITSC-XV expressed strong support to this initiative and encouraged all involved parties to continue on this successful track. ITSC-XV recommended expanding the scope of RARS to include, as a priority, IASI data, to enhance user information through the planned WMO RARS website, and to improve the coverage. It encouraged the development of Asia-Pacific RARS towards the western Pacific, the completion of the South-American RARS, and the implementation of a RARS over South-Africa and the Indian Ocean.

Figure below: Near-global RARS coverage. Blue: EARS, Red: Asia-Pacific, Green: South-America, Yellow: potential extension to Africa.



RARS Implementation group

13. In order to continue and enhance the successful cooperation that has developed through the three global RARS workshops since 2004, it is proposed to establish a RARS Implementation Group. Draft Terms of reference for such a group are proposed in the Appendix to this working paper. For continuity purposes, it is suggested that the members of this future RARS Implementation Group be nominated by the organizations among the participants of previous RARS-IGDDS workshops.

Conclusion

14. CGMS Members are invited to note the progress made on RARS, to comment on the proposed directions for expansion, and on the draft Terms of Reference of the proposed RARS Implementation Group.

**CGMS-WMO RARS IMPLEMENTATION GROUP
DRAFT TERMS OF REFERENCE**

1. A RARS Implementation Group is established by the WMO Space Programme in order to support the development and implementation of a global network of Regional ATOVS Retransmission Services (RARS) as discussed by the Consultative Meeting on High-level Policy on Satellite Matters¹, the Commission for Basic Systems², the Executive Council³ and the CGMS.
2. Building on the model of the EUMETSAT ATOVS Retransmission Service (EARS) the goal of the global RARS network is to improve availability and timeliness of critical polar-orbiting satellite data from the global domain through the collection and redistribution of data sets acquired from multiple receiving stations that are co-ordinated and inter-connected. The WMO Space Programme is pursuing RARS activities as part of the IGDDS project.
3. The objective of the RARS Implementation Group is to co-ordinate and facilitate:
 - Establishment of new RARS to expand the RARS network towards global coverage;
 - Inter-regional data exchange of RARS data;
 - Standardisation in the areas of e.g.:
 - product processing software usage;
 - product formats;
 - quality-tagging of data;
 - service management.
 - Ensuring consistency with the IGDDS concept
 - Expansion of data types to be retransmitted as part of the global RARS network
 - Reviewing the RARS concept to ensure it fulfils regional and global requirements for improved timeliness of critical LEO data
4. The RARS Implementation Group shall be composed of technical experts designated by organizations contributing to the global RARS network, planning or considering to contribute to it, and of supporting staff from the WMO Space Programme.
5. The RARS Implementation group meets nominally once a year and report on its activities to CGMS and WMO
6. Unless otherwise agreed, the RARS Implementation group will cease its activities when its objectives will be completed or handed over to a new structure ensuring operational coordination of activities in the longer term.

¹ CM-5, January 2005

² CBS XIII, St Petersburg, February-March 2005, item 6.10

³ EC 57, Geneva, June-July 2005, item 3.10.7