

ITSC-16 Working Group on International Issues and Future Systems
Saturday 10 May 2008
Angra dos Reis, Brazil

Participants: John Eyre and Jerome Lafeuille (co-chairs), Bill Bell, Hal Bloom, David Griersmith, Richard Kelley, Thierry Phulpin, Jean Pla, Karen Saint-Germain, Peter Wilczynski.

Scope

After reviewing the actions and recommendations of the previous meeting, and bearing in mind the agenda items of the forthcoming plenary sessions dealing with international issues and future systems, the WG agreed to focus its discussions on the following issues:

- Future perspective for the Regional ATOVS Retransmission Service (RARS)
- Vision for the space-based Global Observing System in 2025 and adequacy of current plans
- Direct Broadcast access to polar orbiter data
- Frequency management issues

It was furthermore agreed that Education and Outreach would best be addressed in the WG on Satellite sounder science and products.

Future perspective for the RARS

The WG underlined the benefit of the RARS to enhance timely availability of ATOVS sounding data for regional and global NWP. It recalled recommendations of ITSC-15 to pursue the development of the RARS global network for a better coverage of the globe, while taking into account cost/benefit considerations since a 100% global coverage might not be achievable without unaffordable equipment and/or telecommunications costs.

It was recalled that RARS was a WMO project aiming to expand at global scale the concept initially implemented by EUMETSAT with EARS, i.e. to collect ATOVS data from various Direct Readout stations over a wide region and make this data available in near-real time over the GTS and possibly other means, in order to improve the timeliness with respect to global data. The current objective of RARS (as stated on the WMO RARS website) is to achieve 30 mn timeliness for ATOVS data from 90 % of the globe's surface. The current coverage is about 70 % and is expected to exceed 80 % within a year.

The WG welcomed this rapid progress. It noted that RARS had about doubled the amount of sounding data available to NWP centres before cut-off. The WG supported the objective to aim at 90% of global coverage.

The WG considered the potential expansion of the RARS objectives to include other sounding data beyond ATOVS. The applicability to IASI data was subject to the reactivation of Metop HRPT and the capability of RARS receiving stations to receive Metop. For the short term, the WG recalled that FY-3A was planned for launch by end of May 2008 and included an IR and MW sounding capability (IRAS, MWTS, MWHS) and a direct readout capability in X-band and L-band (MPT, AHRPT). While recognizing that FY-3A was an experimental satellite of a new series, it suggested that the RARS project take steps to make FY-3A sounding data timely available through the RARS.

For the longer term, the WG noted that the RARS should normally not be necessary for NPOESS data when the SafetyNet will be fully implemented, i.e. by the time of launching NPOESS-C2. However it was stressed that the SafetyNet will not be available for NPP and that by the launch of NPOESS-C1 it would only be partly implemented with McMurdo and Svalbard but not all the 14 stations. The WG thus recommended to initiate action in 2009 in order to be able to handle sounding data (CrIS, ATMS) from NPP and NPOESS as soon as possible. This would be a gap-filler until data timeliness can be ensured through the SafetyNet. Without aiming at a global coverage, it would enhance the benefit of the NPP and NPOESS missions and minimize the negative impact of phasing out the last ATOVS instruments. The WG recognized that NPP Direct Broadcast in X-Band would require enhanced receiving and communications capabilities.

The following practical steps were suggested:

- At the forthcoming Direct Readout Conference in Miami, December 2008, to announce the initiative of a NPP/NPOESS RARS phase, identify the available or planned X-band receiving stations and call for contributions to this network
- In the framework of the WMO RARS project, invite potential contributors to build this new phase of the RARS project following the successful example of the ATOVS phase.

The most efficient technical options (e.g. centralized or distributed processing) should be investigated, considering NWP requirements, data volumes and impact on telecommunications.

Recommendations

- [WMO and RARS partners] Welcoming the rapid progress of the RARS project to ensure timely availability of ATOVS data to NWP centres, and considering the demonstrated benefit to NWP, WMO and the RARS contributing organizations should pursue the implementation of the global RARS network with the aim to cover at least 90 % of the globe for ATOVS data.
- [WMO and RARS partners] WMO and the RARS Implementation Group are invited to consider an extension of the RARS project towards including FY-3 sounding data when this data will be operationally available.

- [WMO and RARS partners] WMO and the RARS Implementation Group are invited to consider an extension of the RARS project towards including NPP and NPOESS sounding data as a gap filling measure until timely availability of this data can be ensured worldwide through the SafetyNet.

Action

- [WMO, IPO] WMO, in collaboration with the IPO, to propose an extension of the RARS project to NPP and NPOESS sounding data at the December 2008 Direct Readout Conference, with the view to initiate action in 2009.

Vision for the space-based GOS in 2025 and adequacy of current plans

The Vision is a new high-level architecture of the Global Observing System (GOS) that is being defined by WMO under the leadership of the Expert Team on Evolution of the GOS (ET-EGOS), with contribution of the Expert Team on Satellite Systems (ET-SAT) and Expert Team on Satellite Utilization and Products (ET-SUP) as concerns its space-based component. The initiative to develop this new Vision was taken in response to the requirements issued by GCOS in the Satellite Supplement to the GCOS Implementation Plan; it also takes into account the rapid evolution of users' requirements and of satellite capabilities since 2001 when the earlier Vision was developed.

The new Vision will expand the GOS from its initial scope on operational meteorology to a wider scope encompassing the observations needed for climate monitoring, and ultimately oceanography, hydrology, disaster management and other areas. An important change from the earlier Vision is that a number of observations of Essential Climate Variables that were so far provided by Research & Development missions should in future be provided in an operational framework to ensure their continuity.

A draft is currently available from the Expert Teams and was brought to the attention of CGMS, CEOS and the WMO Consultative Meetings on High-level Policy on Satellite Matters. Once finalized, it will be submitted to the WMO Commission for Basic Systems (CBS) in March 2009. After endorsement by CBS, the Vision will be an important reference to ensure that there is no observation gap and that individual agencies' plans contribute in an optimal way to meet the global needs. The new GOS will be a major component of GEO's Global Earth Observation System of Systems (GEOSS).

The WG reviewed a document presenting the draft Vision and in particular its Table 2 summarizing the space-based component. The WG recalled Recommendation II/FS-3 from ITSC-15 on a water vapour channel centered at 6.7 microns and agreed that this should be specified in the Vision. It also suggested to emphasize the observation of aerosols. The WG then discussed the compliance of current satellite plans with the proposed Vision and identified two main issues: the availability of an IR hyperspectral sounder on all GEOs, and the Low Earth Orbit (LEO) sounding on 3 orbital planes including an early morning orbit.

Regarding hyperspectral IR capability on GEO satellites, the WG recalled that this was part of the Phase A baseline for EUMETSAT's Meteosat Third Generation (MTG) for 2018, was planned for CMA's FY-4-O (Optical series) in the 2015 timeframe, and was under consideration by JMA and JAXA for MTSAT follow-on. As concerns the GOES-R series, it was no longer planned for GOES-R but could be re-considered for GOES-S or beyond. The WG confirmed that an IR hyperspectral capability on all operational geostationary satellites should be required in particular for regional and convective-scale NWP and would help to overcome current limitations of rapidly evolving severe weather forecasting. In order to ensure an optimal preparation of the user community without delay, and as a risk reduction measure to refine the specifications of the relevant operational ground segments, the WG recommended proceeding with a preparatory mission in advance of 2015. Such a preparatory mission would further demonstrate the benefits of this capability thus strengthening the case to confirm or enhance current operational plans. The WG recalled that given the availability of a prototype and a proposed flight opportunity, such a preparatory mission could be considered for the 2010-2015 time frame with international partnership.

Regarding LEO IR and MW sounding capability on 3 orbital planes, the WG confirmed that this would be essential to ensure a proper temporal sampling of atmospheric temperature and humidity vertical profiles. The WG noted that such a capability was expected to be present on the mid-morning and afternoon orbits but not fully implemented on the early morning orbit. Indeed, no IR sounder was currently planned on the early morning orbit, and there is currently no precise information on the expected performance of the MIS sounding channels of NPOESS-C2 and -C4. The WG thus recommended to investigate this aspect in detail and, if relevant, to consider optimization or enhancement of current plans.

In addition, while recognizing the potential value of a MW sounding capability from the geostationary orbit, the WG considered that the technology needed further development and demonstration before such a mission could be recommended in operational plans.

Recommendations

- [Space agencies] Space agencies, in consultation with WMO, CGMS and CEOS, to consider contributing to implement the Vision for the GOS and to ensure long-term continuity of its operational components.
- [WMO, space agencies] WMO and space agencies to consider establishing a partnership to fly a preoperational hyperspectral sounder in geostationary orbit in advance of 2015, as a preparatory mission, in order to allow optimization of the implementation and use of the planned operational IR hyperspectral geostationary missions.
- [IPO, other organizations] The expected performance of the MIS sounding channels

should be evaluated in order to assess to what extent the requirements for microwave atmospheric temperature and humidity sounding will be met for the early morning orbit by NPOESS-C2 and, if relevant, to identify optimization measures or additional capabilities that should be implemented by 2025.

- [WMO, CGMS, CEOS] Scenarios should be investigated to provide IR sounding capability from an early morning orbit.

Actions

- John Eyre to highlight the need for Water Vapour channel imagery and for observation of aerosols in the revised draft Vision for the GOS. (31 May 2008)
- John Eyre to distribute the (updated) draft Vision of the GOS to the ITWG list, with an explanatory note calling for comments. (30 June 2008)
- ITWG Members to send comments on the draft Vision for the GOS to J. Eyre (john.eyre@metoffice.gov.uk) and J. Lafeuille (JLafeuille@wmo.int) . (15 August 2008)

Direct Broadcast access to polar orbiter data

The WG reaffirmed Recommendation II/FS-4 from ITSC-15 to maintain a Direct Broadcast capability on all polar environmental satellites and to make available relevant processing software.

The WG noted that the user community was looking forward to the launch of FY-3A in May 2008 and Meteor-M1, later the same year. It expressed the wish that further details on format, transmission and processing software be made available as soon as possible to maximize the use of and benefit from these new missions.

The WG recalled that NPP was expected for launch in June 2010 and noted that information on NPP/NPOESS real time Low Rate Data (LRD) & High Rate Data (HRD) formats and other relevant details would be available through a website by September 2008 (date to be confirmed) and that the NPP pre-processing software was expected to be released by October 2009.

Recommendations

- [CGMS Satellite Operators] Satellite agencies operating environmental polar satellites to provide or continue to provide a Direct Broadcast capability on their polar environmental satellite systems, and to make available in a timely manner the Direct Broadcast data processing (L0 to L1, and/or L1 to L2) software, documentation, and related training.

- [CGMS Satellite Operators] Satellite agencies operating environmental polar satellites to provide expected formats of level 1b and level 2 datasets at least one year prior to launch, and to establish web sites to provide detailed information on instruments, schedule, products and formats.

Action

- [IPO] The IPO to provide information on NPP/NPOESS real time Low Rate Data (LRD) & High Rate Data (HRD) formats and other relevant details by September 2008 and to make available the NPP pre-processing software as soon as practical before the launch of NPP.
- CMA to provide detailed information on FY-3A Direct Broadcast protocols, formats and schedules, with Level 0/1 test data sets and pre-processing software, as soon as practical in advance of the FY-3A operational phase.

Frequency protection issues

The WG took note of the outcome of international activities to protect from contamination the frequency bands used for passive remote sensing. Strong efforts continue to be required at national level in support of these activities. The WG identified two issues requiring urgent attention: (i) the frequency range 275-3000 GHz and (ii) the quantification of impact of Radio-Frequency Interference (RFI) contamination.

The 275-3000 GHz frequency range

The WG recalled that, through the World Radio Conferences (WRC), the International Telecommunications Union (ITU) had agreed frequency allocations only up to 275 GHz. In 2011, the WRC-11 will address various agenda items including the use of the frequency range from 275 to 3000 GHz. It is important to identify the possible use of passive frequencies in this domain in order to request their protection at an early stage. A preliminary identification is provided in a working document "Preliminary document on the passive bands above 275 GHz" available on the ITWG website: <http://cimss.ssec.wisc.edu/itwg/groups/frequency/> (Annex 4 to Document 7C/32-E 11, ITU Radiocommunication Study Groups, April 2008). Comments should be expressed no later than July to allow preparing a synthesis for the Space Frequency Coordination Group (SFCG) meeting to be held in Quebec City in September 2008. The WMO Steering Group on Radio-Frequency Coordination should be informed in parallel.

RFI contamination impact

For currently allocated frequencies, including the case of frequency bands shared with other applications such as commercial telecommunications or unlicensed applications, the WG agreed that the current and/or potential impact of contamination should be evaluated and documented. It considered in priority the two following domains:

- 52.6-54.25 and 54.25-59.3 GHz bands, where RFI contamination is threatening the utilization of AMSU-A. The Met Office (UK) has performed a preliminary study on the impact of total loss of frequencies around 54 GHz.
- 86-92 GHz band, that is currently protected by the terms of footnote 5.340 (“All emissions are prohibited”). For this band which is used by several radiometer types, further investigation is needed to determine which environmental applications are the most sensitive to RFI contamination.

In line with previous recommendation II/FS-10 from ITSC-15, further studies should be conducted to assess the impact of corrupted data (perturbation exceeding the corresponding radiometric resolution of the passive sensor) on key applications. These studies should review available results, refine estimations as appropriate, highlight the impact on the end-user outcome and its significance at societal level.

Recommendation

- [ITWG Members] ITWG Members to encourage and contribute to studies on RFI contamination impact on key applications (mainly in the 50-60 GHz and 86-92 GHz bands); reports on these studies should be available in advance of ITSC-17.

Actions

- Jean Pla to contact ITWG Members and seek comments on the table containing a preliminary identification of frequencies to be used for Earth Observation (research or operational applications) in the 275-3000 GHz range. (End May 2008)
- ITWG members to review the table containing a preliminary identification of frequencies to be used for Earth Observation (research or operational applications) in the 275-3000 GHz range. (15 July 2008)
- William Bell, Stephen English, in consultation with other ITWG Members, to identify the application(s) most sensitive to RFI contamination of the 86-92 GHz band. (November 2008)
- Jean Pla, Stephen English, Richard Kelley, in consultation with other ITWG Members, to propose a work plan for studies of the impact of RFI contamination of the 50-60 GHz and 86-92 GHz bands. (November 2008).