



World Meteorological Organization

Weather • Climate • Water

**ITWG WORKING GROUP ON
INTERNATIONAL ISSUES AND FUTURE SYSTEMS
AND
RFI AND FREQUENCY MANAGEMENT**

ITSC-19, Jeju, 26 March – 1 April 2014

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Outline

- Status of actions and recommendations
 - RFI and frequency management
 - Future satellite missions
 - Data access
- Conclusions
 - Items for discussion



RFI and Frequency Management (1)

- **Action 1:** To draw all the frequency management and RFI information together on the ITWG web site, making the RFI issue visible on the first page. (Steve English, Jean Pla)
- **Action 2:** To update the frequency management pages taking into account the outcome of WRC-12.
(Input to be provided by J. Pla)

COMPLETED.

The Technical sub-group page on “Frequency management” was renamed “RFI and frequency management”.

Updates implemented by Leanne in Jan 2014.

See: <http://cimss.ssec.wisc.edu/itwg/groups/frequency/>



RFI and Frequency Management (2)

- **Action 3: All ITWG members detecting anomalies that are suspected to be caused by RFI in 1400-1427 MHz and other bands are requested to report to Jean Pla (jean.pla@cnes.fr) as the ITWG coordinator for frequency matters, and to their national radiofrequency management authority (Note: J. Pla can provide guidance on who the authority is and how to characterize and address the matter with the radio-frequency authorities).**

Jean did not receive any feedback.

- **Recommendation 1: All ITWG members to ensure that their Direct Readout stations are registered with the national radio frequency authorities.**

The recommendation was recalled in January 2014.

A few colleagues have replied (from Canada, Brazil and Germany.)



RFI and Frequency Management (3)

- **Action 4: WMO to perform a survey on whether there remains a requirement for a low data rate service in L-Band in addition to the X-Band High Data Rate for future LEO missions.**

COMPLETED

A survey was performed in July 2012, received replies from 33 WMO Members and was reported to the WMO Commission for Basic Systems (CBS-XV, Jakarta, Sept 2012). A large majority confirmed the need for both L-Band and X-Band for independent back-up, weather resilience and interference purposes. The CBS recommended maintaining a low data rate stream in L-band in addition to X-band, while supplementing the dissemination by retransmission services.



Future satellite missions (1)

- **Recommendation 2: CMA to consider the redeployment of LEO mission to an early morning orbit, in accordance with the following priority order (from an ITWG perspective):**
(1) Early morning, (2) Afternoon, (3) Mid-morning.
 - This recommendation was communicated to CMA and CGMS. WMO convened a Tiger Team to assess the benefits of an early morning orbit
 - OSEs & other impact studies were conducted by : ECMWF, MetOffice, JMA, DWD, KMA, CMA, JCSDA.
 - See [“LEO Tiger Team Workshop Report \(April 2013\)”](#) on the WMO Space Programme website
 - CMA and CAST investigated the platform, payload, and other implications of flying in early morning orbit.
 - The latest CMA plan is to launch FY-3E (2016) and possibly FY-3G (2020) on a 6:00 ECT orbit instead of 10:00 ECT. Payload would be adapted accordingly. These plans are subject to confirmation.

Assessment of the benefits of a satellite mission in an early morning orbit

Report from the WMO-CGMS Tiger Team
April 2013



1. INTRODUCTION

1.1 Scope

The scope of this report is to evaluate the benefits of a future satellite mission in a polar sun-synchronous “early morning” orbit, in response to a request from the Coordination Group for Meteorological Satellites (CGMS). This evaluation is addressed first from a generic standpoint and then applied more specifically to the potential deployment by the China Meteorological Administration (CMA) of a FY-3 mission in such an orbit.

The report is based on the work of the Tiger Team established on this matter by the World Meteorological Organization (WMO) and CGMS. It summarizes the outcome of the Tiger Team seminar hosted by CMA in Beijing on 25 and 26 April 2013.



Figure 1: Participants in the Tiger Team seminar.



Future Satellite Missions (2)

- **Recommendation 3: CGMS to consider the potential implications of various funding schemes and public-private partnership with respect to the global technical coordination of the space-based observing system pursued by CGMS, and with respect to data policy, and to establish an appropriate mechanism to ensure that such initiatives can be globally coordinated by CGMS and open data accessibility is guaranteed.**
 - This was raised at CGMS-40 (Nov 2012) by WMO and the ITWG Rapporteur.
 - CGMS responded *“it is essential to preserve global coordination and open data exchange in support of WMO programmes, which is achieved through agreements among agencies having a national or international responsibility for satellite programmes. Therefore CGMS Members are governmental or intergovernmental entities, notwithstanding the possible partnership that these CGMS Members may maintain, at the individual level, with the private sector.”*
 - Private entities willing to contribute to global observation coordinated by CGMS could do so in partnership with, or by delegation of, a CGMS member agency.



Data Access Issues (1/5)

- **Recommendation 4: the Russian Federation to make the Meteor-M mission a fully contributing component of the GOS by providing the global data sets from this mission in a timely manner with all necessary ancillary information.**

No feedback yet from ROSHYDROMET.

EUMETSAT and ROSHYDROMET are exchanging data and will explore the possibility to disseminate SCAT data from Meteor-M3 (2017) over EUMETCAST.

- **Recommendation 6: CMA to facilitate the delivery of FY3 software and user support.** CMA has made the FY-3 Level0/Level1 preprocessing software available on line: [FY3LOPP V1.0](#) , [FY3L1PP V1.0](#)



Data Access Issues (2/5)

- **Recommendation 5: CGMS to consider defining a set of “best practices” that could include implementing Direct Broadcast capability, and provision of ingest and pre-processing software tools, documentation and training.**
 - At CGMS-41 (July 2013) WMO took an action to set up a ***Satellite User Readiness Navigator (SATURN)*** portal to prepare users for new satellite generations, starting with the forthcoming GEO.
 - SATURN will include a reference user preparedness plan, and a “Structured collaborative blog” containing links, posted by agencies, to on-line resources such as:
 - updated programme schedule,
 - payload characteristics (e.g. SRF),
 - data format specifications and proxy data samples,
 - Direct Broadcast protocol and pre-processing software,
 - prototype products, cal/val activities,
 - training tools, etc.
 - Planned release : May 2014 (after review by ET-SUP on 17-20 April)



Data Access Issues (3/5)

- **Recommendation 7: CGMS to inform the ITWG of the draft standard for LEO Direct Broadcast in X-Band and seek feedback from ITWG.**

The draft CGMS Global Specification for Direct Broadcast Services (LRPT/AHRPT) was adopted by CGMS-41 in 2013. It was circulated to ITWG Members on 21 January 2014.

- **Recommendation 8: JAXA to consider including a Direct Broadcast capability aboard GCOM-W2.**

No Direct Broadcast capability planned on GCOM-W2 (2016). GCOM-W1/AMSR-2 global data are available on a JAXA server and, through a JAXA/EUMETSAT agreement, disseminated in BUFR through EUMETCast over Europe (now in trial mode).



Data Access Issues (4/5)

- **Recommendation 9: Satellite operators, ITWG Members and WMO to advance the extension of RARS to new satellite systems.**
Addressed at the RARS meeting in Exeter in November 2012.
In 2013, after CGMS-41, EUMETSAT, NOAA and WMO discussed the interoperability of the RARS network with the NOAA “Real-Time Network for Receiving and Processing IR and WW data with Low Latency”, with the aim to allow the onward dissemination of data collected by NOAA.
Will be further discussed in the RARS-TSG and at CGMS-42
- **Recommendation 10: NOAA and EUMETSAT to explore dissemination of Principal Components of the full CrIS spectrum in the context of RARS.**
In the RARS, EUMETSAT retransmits IASI products (ops since April 2012) containing PCs plus a selection of channels, and CrIS products (since May 2013) containing the NOAA selection of 399 channels.
In the NOAA project, the plan for onward dissemination beyond NCEP is not yet defined.



Data Access Issues (5/5)

- **Recommendation 11: JMA to consider a broadcast service to facilitate access to Himawari-8 and -9 data in particular for users in Pacific islands that have limited Internet connectivity.**

JMA will implement a rebroadcast service, relying on a telecommunication satellite operator, to rebroadcast a reduced set of Himawari-8/9 data

- **Recommendation 12: CGMS satellite operators to investigate the potential use of satellite-to-satellite communication (e.g. Tracking and Data Relay Satellite System, TDRSS) as a mechanism to support timely collection and redistribution of polar-orbiting satellite data in future systems.**

Was not addressed by CGMS. Data Relay Satellites are particularly appropriate for applications where it is vital to maintain continuous communication (e.g. for astronauts aboard the ISS)

For LEO meteorological satellites, cost/timeliness trade-off generally leads to other options such as :

- dumping stored data on two high-latitude stations (Arctic, Antarctic), or to a whole network of ground stations (e.g. SafetyNet)
- Direct Broadcast and re-distribution (e.g. RARS).



Conclusions, issues to be discussed

- Very good progress on most actions and recommendations
 - Website, DB survey, FY-3 e.m., FY-3 L0/L1, Himawari broadcast, User preparedness, private/public,
- RFI and frequency management
 - need to check status
- Access to new mission data
 - GPM-Core, Meteor-M, INSAT-3D, FY-3C ...
 - Dissemination concept for hyperspectral IR (PCs, selection, timeliness) (RARS issues to be addressed by RARS TSG)
- Future systems
 - Pre-launch user interaction (requirements for SATURN)
 - Gap analysis and mitigation (www.wmo.int/oscar/space)
 - In-orbit calibration reference standard (CLARREO-like)

