

WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS
OPAG ON INTEGRATED OBSERVING SYSTEMS

**EXPERT TEAM ON
OBSERVATIONAL DATA REQUIREMENTS AND
REDESIGN OF THE GLOBAL OBSERVING SYSTEM**
Seventh Session

Geneva, Switzerland, 12-16 July 2004

Dist.: RESTRICTED

CBS/OPAG-IOS/
ODRRGOS-7/Doc. 2.1

(1.VII.2004)

Item 2

Original: ENGLISH

UPDATE from the Chairman of OPAG on IOS

(Submitted by Dr J. Purdom, Chairman of OPAG-IOS)

Summary and Purpose of Document

The purpose of the document is to update the Expert Team of the activities since the previous Expert Team meeting with regard to GOS issues.

ACTION PROPOSED

The meeting is invited to take into consideration the report in its deliberations.

DISCUSSION

Background

1. The Chair OPAG IOS presented a complete report of activity within the OPAG at CBS-Ext.(02) in Cairns, Australia in December 2002.
 - Terms of reference for the ET's were reviewed and work plans modified to reflect successes and pertinent activities for the next two years.
2. Guidelines from Cg-XIV
 - Comments concerning GOS and redesign issues
 - Satellite Activities elevated to status of Major WMO Programme by Cg-XIV
 - GCOS Climate Monitoring Principles accepted by CG-XIV
3. New Rapporteur on GCOS Matters. New mesoscale Rapporteur on OSEs and OSSEs.
4. CBS-Management Group Meeting in Langen, Germany, October 13-17, 2003.

Actions resulting from CBS Ext-2002 that impact the OPAG-IOS

CBS reviewed the work plans of the ETs and produced the action sheet (excerpts extracted to IOS relevant actions) in Appendix A of this document.

Notes from Cg-XIV

Comments concerning the GOS and redesign issues:

- Report reflects the status of the GOS, revealing deficiencies and opportunities

Satellite Activities elevated to status of Major WMO Programme:

GCOS Climate Monitoring Principles accepted by Cg-XIV.

Replacement of certain Rapporteurs

Rapporteur on GCOS Matters

Rapporteur on Scientific Evaluation of Observing System Experiments (OSEs) and Observing System Simulation Experiments (OSSEs) for Regional Scale Applications

Note: Mr Jean Pailleux (Météo-France) is the synoptic scale rapporteur and will continue in that capacity, although he is unable to attend this meeting and will have his report presented by others concerning the Alpbach meeting.

CBS Management Group Meeting in Langen, Germany

- COSNA SEG discussions.

Other Items expected to impact ET ODRRGOS Activity

Third WMO Workshop on the Impact of Various Observing Systems on NWP in Alpbach, Austria during 9–11 March 2004

Scientists from lead centers across the globe addressed advances in NWP for both global and regional scale modeling with focus on advanced observing system impacts

- At global scale satellite dominate as the data set of primary importance, this was especially evident at ECMWF
 - Impacts of ATOVS (AMSU) notable
 - Still need to improve use of satellite data in cloudy areas and over land
 - Models are beginning to look at selective thinning
 - AIRS impact expected to improve as cloud clearing techniques mature
- Regional and local scale NWP systems are too immature to effectively utilize satellite data and this situation will likely not improve for several years, but with proper investment this capability should be in place by NPOESS and GOES-R timeframes
 - Poor assimilation of satellite data over land
 - Model physics is in need of improvement
 - Models do not handle moisture fields well, and this is a long lead time research activity
 - Models cannot effectively handle fine scale information like precipitation

CGMS XXXII

- Role of R&D satellites in redesign of GOS
- CGMS Members to request representation in observer status on the THORPEX ICSC and designate a Rapporteur for that purpose. CGMS Members to contribute to development of the THORPEX Implementation plan in coordination with WMO Space Programme. THORPEX is an exceptionally important International programme in which satellite observations will play a major role. The programme's success will help insure optimal utilization of satellite data across forecast scales from 1 day to two weeks, and likely into seasonal to inter-annual scales. Results from THORPEX will help guide the utilization of satellite data and future satellite roles as part of the Global Observing System. Information gleaned from THORPEX will help guide the future development of satellite systems. To ensure maximum realization of satellites potential as a part of the THORPEX program, CGMS should request observer status on the THORPEX ICSC and contribute to the THORPEX planning in coordination with WMO Space Programme.
- International EARS: The success of the EARS program points to the possibility of extending such activity globally. Near real time access to ATOVS data are important for GDPS centers as well as other WMO Members with NWP capability. Access to near real time ATOVS data are also important for WMO activities such as implementation planning for the redesign (evolution) of the GOS and THORPEX. It was agreed that CGMS Members, with help from EUMETSAT, would form local consortiums to

develop regional ATOVS Retransmission Services in conjunction with EARS. This activity should be focused within the WMO Space Program.

Relationship to THORPEX

- CBS is working in close coordination with CAS on THORPEX and how it impacts all CBS OPAGs activities
- THORPEX Implementation Plan is Under Development – a number of objectives and goals within that implementation plan deal directly with ODRRGOS activities and responsibilities. There are four core programs that make up THORPEX – Predictability and Dynamical Processes; Observing Systems; Data Assimilation and Observing Strategies; and Social and Economic Applications. Each of those programs has several tasks that need to be carried out as the program evolves.
- OPAG IOS Chair serving as focal point for two tasks:
 - 1) **Observing Systems:** “Carry out field-demonstrations of prototype remote - sensing systems for future airborne and satellite deployments.”
 - 2) **Data Assimilation and Observing Strategies:** “Improve the use of polar orbiting and geostationary satellite observations.” Improve the use of visible, infrared and water vapor image sequences to infer wind information.

Other relevant task areas for consideration

- **Determine the influence of flow regimes on the climatology of forecast skill** (seasonal to inter annual and climate implications); Investigate the relative effects of small and large-scale initial-condition uncertainty (this will provide guidance for the design of improved observation systems and observing strategies, i.e., should observations be targeted in localized regions of rapid forecast error growth, or is the reduction of initial uncertainty at the larger scales preferable);
- **Develop methods for efficient utilization of high-volume datasets** (this will develop and test adaptive methods for thinning large datasets so that the most useful observations are retained and develop techniques to extract the maximum information content from hyper-spectral sounders);
- **Targeting strategies** (several tasks deal with targeting strategies for the observational system, and in the long run should provide valuable information on how to best utilize the adaptive observing characteristics of the geostationary system);
- **Identify high-impact weather forecasts** (This effort will identify the global-to-regional weather forecasts that have major effects on selected sectors of society and economies within various geographical regions);
- **Assess the impact of improved forecast systems:** (the above identification of high-impact weather forecasts will provide the basis for estimating the value of improvements to forecast systems); and,
- **Develop advanced forecast verification measures** (this addresses the development of user-relevant verification of weather forecast information, i.e., sensible weather to the user rather than 500 mb anomaly correlations for example).

Next THORPEX Implementation Planning Meeting to be held in Beijing, China in early September (following OPAG-IOS Implementation Coordination Meeting in Geneva)

- If desired, input welcomed by OPAG IOS Chair prior to July 31, 2004.
 - Purdom@cira.colostate.edu

Relationship between satellite overpass and rawinsonde launches (discussion?)

International Winds Working Group, Helsinki, Finland, June 14-16, 2004

- All major NWP centers are now experiencing positive impact from MODIS winds in Polar Regions (both hemispheres). It is unfortunate that there will be a possible several year gap in those winds with NPOESS. It seems as though the NPOESS system and EDRs, while developed with the best of intentions, were frozen in late 20th century mentality and did not allow for planned growth as science evolved. In retrospect, it seems we didn't utilize our science community in the NPOESS genesis process – this will have a negative impact on NWP at the beginning of the NPOESS era when polar wind capability will be diminished.
 - Activity should be instituted to see how to fill the information gap over Polar Regions when the NPOESS era begins.
 - Secondly, to freeze system capabilities with today's requirements from operational entities is not wise – the science community's vision must be brought into that satellites end requirements process.
- Cloud height assignment remains a major issue.

EC-LVI: Link to GEOSS

- GEO to be addressed in ET Meeting by Dr. Hinsman.
- Resolution from EC-LVI ...
 - **Requests** relevant WMO constituent bodies to contribute fully the the development and implementation of GEOSS ...
 - **Specifically Requests** the technical commissions, ..., to rapidly evaluate the draft Implementation Plan, to provide advice to insure that the existing WWW GOS ... and other relevant observing systems are developed in a mode compatible with the Ten-year Implementation Plan; and, when the Plan is finalized, to provide advice as to how the WMO-coordinated systems should operate within the framework of the plan;

Actions for OPAG IOS Chair from ET-ODRRGOS#6

6.1 ... The ET also asked the OPAG IOS chair to encourage CGMS to undertake international coordination of equator crossing times that would maximize the temporal coverage of the polar orbiting global observing systems. **Discussed at CGMS XXXII under working group on contingency planning. Table being maintained. Russia and China agreed to consider placing their polar orbiting satellites into afternoon orbits in order to have a more optimum spacing.**

5. (pg 22/31) Approach OPAG-DPFS regarding ownership of the SIA requirements and engage CCI, OPAG-DPFS, and AOPC in a further discussion to reach agreement on one SOG for SIA (OPAG IOS Chair, Mar 04). **Open (more or less) approached by ET Chair but no firm answer. CGMS XXXII and EC-LVI have both now requested single set of Climate related observational requirements.**

9. (pg 22/31) Request at CGMS that Windsat evaluation be performed in the manner similar to AIRS (with distribution of data sets for outside evaluation as soon as possible via CGMS) as a matter of urgency (OPAG IOS Chair, Nov 03). **Discussed at CGMS XXXII. Awaiting release by Navy, promise remains soon.**

12. (pg 22/31) Provide a draft letter to Chair OPAQ IOS that will contact the appropriate entity (that owns the user requirements) for each application area to request that

they assume responsibility for the RRR process and creation of that application area SOG (Secretariat, Dec 03). **Open**

Implementing the Recommendations for Evolution of Space-Based Component of GOS

Calibration

- 1 Recommendation: "A major issue for effective use of satellite data, especially for climate applications, is calibration. There should be more common spectral bands on GEO and LEO sensors to facilitate intercomparison and calibration adjustments; globally distributed GEO sensors can be intercalibrated using a given LEO sensor and a succession of LEO sensors in a given orbit (even with out the benefit of overlap) can be intercalibrated with a given GEO sensor. The advent of high spectral resolution infrared sensors will enhance accurate intercalibration."

Next Action: OPAG IOS ask CGMS to recognize this activity as the heart of the GCOS monitoring principles and request initiation of routine intercalibration of all GEO infrared sensors (both operational and R&D) as well as evolved microwave sensors (MSU transitioned to AMSU). **Discussed at CGMS-XXXII.**

High Priority System Specific Recommendations

Optimization of rawinsonde launches

7. Optimize the distribution and the launch times of the rawinsonde sub-system (allowing flexible operation while preserving the GUAN network and taking into consideration regional climate requirements). Examples include avoiding duplication of Automated Ship-borne Aerological Program (ASAP) soundings whenever ships are near a fixed rawinsonde site (freeing resources for observations at critical times) and optimizing rawinsonde launches to meet the local forecasting requirements. [EUCOS Studies, OPAG IOS Chairman]

Next Actions: ET suggestion to WMO to request a WMO funded-study, to develop guidelines of issues to be considered (e.g. local weather phenomena, local times of 0000 and 1200 UTC observations, other observations available, costs) when optimizing local/regional launch schedules for radiosondes. This should consider initiating a local study. **THORPEX related.**

Status query from ET-ODRRGOS#6

8.5 The ET started the draft of an implementation plan (see Annex IV). Each of the 42 recommendations for the evolution of the GOS was addressed. With regard to the recommendations for the space based part of the GOS, many of the next actions for implementation will rely on the WMO Space Programme to take them up with space agencies, via CGMS and WMO consultative meetings on high-level policy on satellite matters. For the surface based subsystem of the GOS, different strategies of implementation were suggested for the different components. The implementation plan will be iterated monthly, with the goal that a final version can be drafted at the next ET meeting (prior to the OPAG IOS ICT meeting in 2004).

APPENDIX A

Work Plan for ODRRGOS

1. Expert Team on Observational Data Requirements and Redesign of the GOS

- Given the massive changes anticipated for the GOS, to develop an implementation utilization of the evolving GOS, while continuing to evaluate redesign options for CBS consideration and paying particular attention to developing countries and the southern hemisphere:
- Given the urgent need to study comprehensive strategies for anticipating and evaluating changes to the GOS, to support a focused funded activity for the study of observing system design should be started:
- Given the importance of system and user characterization, to continue updating the database of user requirements and observing system capabilities and include user reviewed R&D expected performances:
- Given the success of the RRR to guide GOS evolution, to continue the RRR process in application areas already started and expand into new areas relevant to missing disciplines:
- Given the importance of NWP OSE implications for GOS evolution, to facilitate during the first quarter of 2004:
- Facilitate organization of the next Workshop on Impact of Various Observing Systems on NWP during the first quarter of 2004, while continuing to study hypothetical changes to the GOS with the assistance of NWP centres.

2. Rapporteurs on Scientific Evaluation of Observing System Experiments (OSEs) and Observing System Simulation Experiments (OSSEs)

- In coordination with the Expert Team on Observational Data Requirements and Redesign of the GOS to continue reviews of regional and global OSEs and OSSEs that are being undertaken by various NWP Centres. Take the leading part in organization of the next Workshop on Impact of Various Observing Systems on NWP during the first quarter of 2004.