



International Radio Occultation Working Group

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Welcome – Conference Overview

- 2nd International Radio Occultation Working Group Conference
 - 1st held in GRAZ, Sep 2010 – concurrently with OPAC 4 – 60 in attendance
 - 90 expected this week – 20 countries represented
 - 28 March – 3 April – Weekend working groups and activities

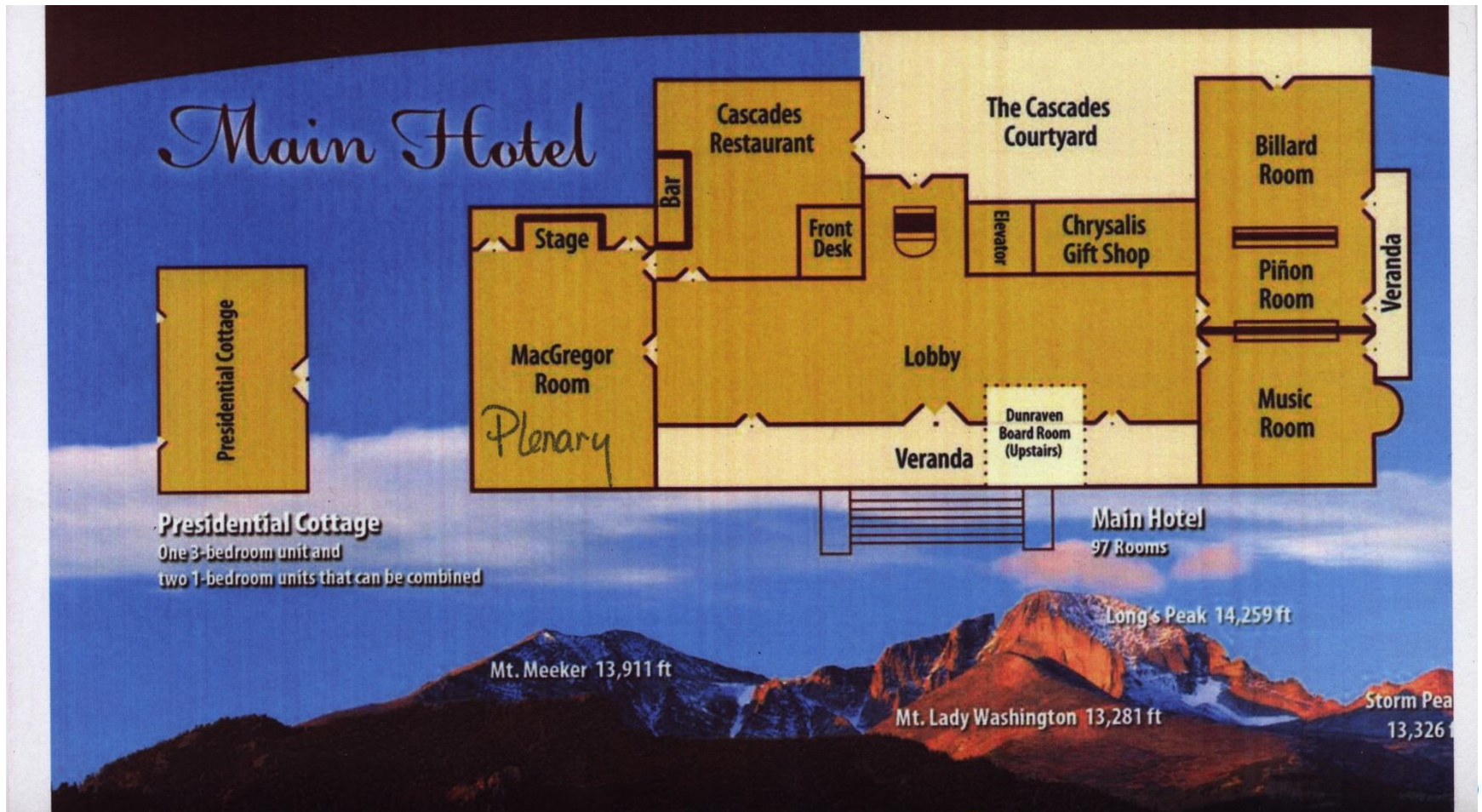
Conference Details

- All abstracts available at www.irowg.org
- Open Internet available: stanleyhotel
- Please provide presentations on a stick 8:30 am on day of talk
- **Make SURE your name is on the file label !!!!**
- Posters in McGregor Room (here)
- Questions or requests, please contact Loretta Quinn at registration.

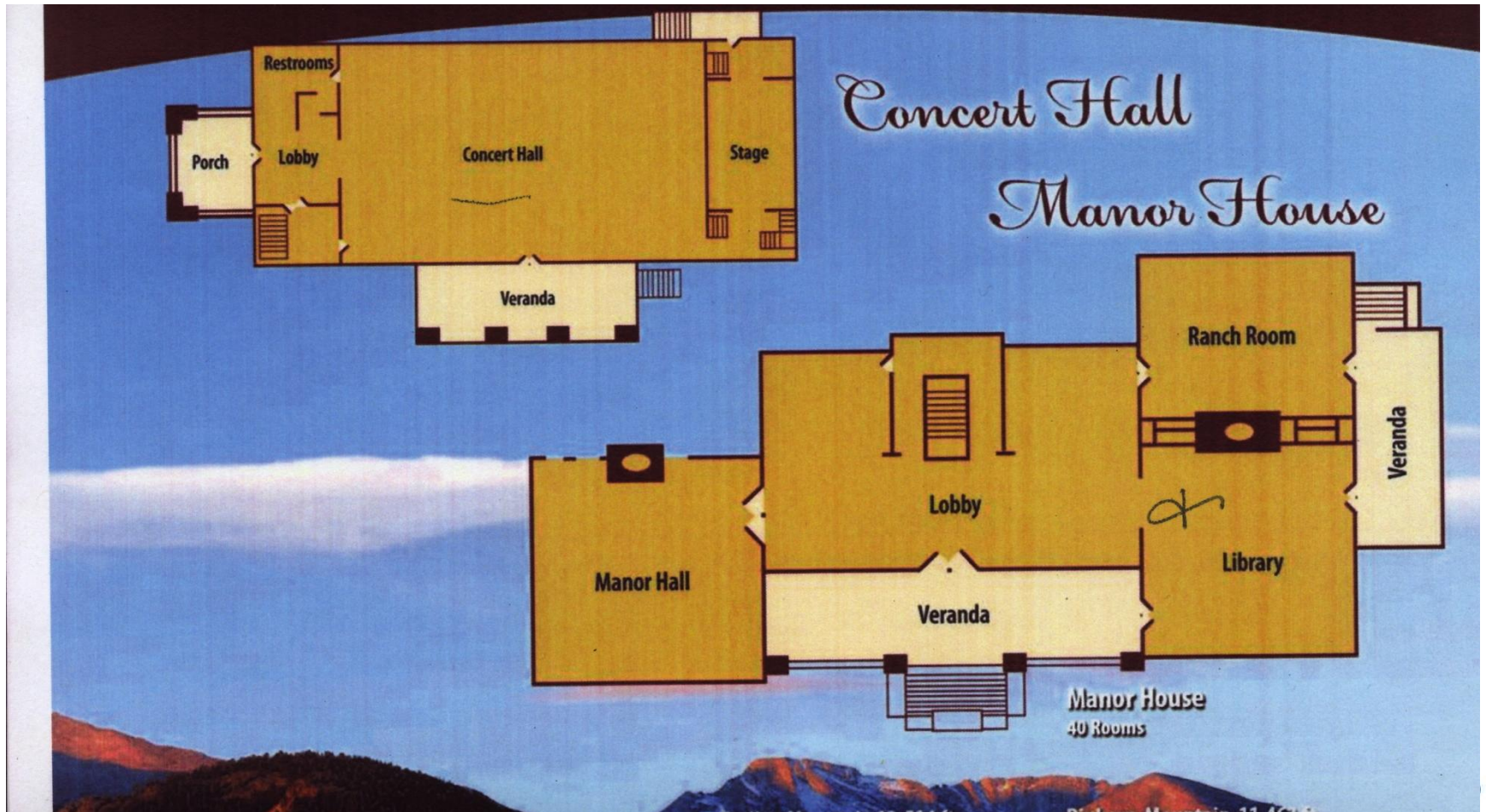
Conference Details

- Meals
 - Breakfast and Lunch – included with your registration.
- Reception today – 5:30 – 8:30 - hosted by UCAR and EUMETSAT
- Friday Murder Mystery Dinner – included with your registration. 6pm – 11. Open bar hosted by EUMETSAT

Stanley Facility



Stanley Facility Layout



Weekend

- Saturday morning – key working group activities – formulation of recommendation for CGMS
- Sunday
 - RO Trends Splinter Meetings
 - 10 am - noon
 - 3 – 5 pm
 - Blackhawk Gambling Excursion – bus leaves at 10:30 am – returns 5:30 pm – must sign up today
 - Rocky Mountain National Park Jeep tour (3.5 hours) - \$55
 - 1 pm departure
 - 4:30 pm departure
 - Ad Hoc Hiking excursions
 - Have Fun!!!

CGMS/IROWG Info (1)

- CGMS provides an international forum for the exchange of technical information on geostationary and polar orbiting meteorological satellite systems.
- The Coordination Group for Meteorological Satellites (CGMS) came into being on 19 September 1972, when representatives of the European Space Research Organisation (since 1975 called the European Space Agency, ESA), Japan, the United States of America, Observers from the World Meteorological Organisation (WMO) and the Joint Planning Staff for the Global Atmosphere Research Programme met in Washington to discuss questions of compatibility among geostationary meteorological satellites.



CGMS/IROWG Info (2)

Scientific and User Readiness are supported by four CGMS science working groups:

- International ATOVS working group (ITWG)
- International Precipitation Working Group (IPWG)
- International Satellite Winds Working Group (IWWG)
- International Radio Occultation Working Group (IROWG)

WG can express specific recommendations to CGMS, which should generally be achievable within 1 to 2 years.

More info on CGMS: <http://www.cgms-info.org>



IROWG #1 Summary / Impact (1)

- IROWG #1 was in connection with OPAC, GRAS SAF Workshop in Graz, 9th to 10th of Sep 2010.
- Attended by more than 60 scientists
- Workshop summary published in ECMWF newsletter
- Summary reported to CGMS-38 by rapporteur

IROWG #1 Summary / Impact (2)

Priority Recommendations reported:

- GPSRO has demonstrated to be a very important element in the global data observing system for NWP. The continuity of GPSRO observations in the future is not sufficiently guaranteed. IROWG recommends that CGMS coordinates efforts between operational data providers and NWP agencies to establish **long term continuity plans**;
- Operational NWP centers should be aware of a substantial reduction of available GPSRO data in real time, that has already begun, and will continue (CHAMP down, COSMIC degrading, COSMIC II planned to be commissioned only in 2015). Processing of research data could fill the gap (TERRASAR-X, TANDEM-X, OCEANSAT-2, SAC-D, PAZ, etc, where the first 3 have already been launched). IROWG recommends that CGMS coordinates efforts between operational data providers, NWP agencies, and **research agencies, to investigate and potentially support NRT infrastructure for these data** (downlink, processing, dissemination and archiving);
- **Future missions should consider covering 360° in ascending node.** The sampling need not be regular in ascending node, but it should definitely extend well beyond 180°. If all 360° is not covered, sinusoidal sampling biases pole wards of 50° latitude with the period of constellation precession is present due to selected local time sampling;
- RO measurements are a valuable information source for NWP and climate. Within NWP, the number of RO instruments has not reached saturation level. Hence IROWG recommends that **operational and research organizations consider adding Global Navigation Satellite System (GNSS) RO payloads on all suitable satellite systems**;
- The value of RO data to ionospheric modeling is expected to grow as the amount of available data increases over time. A variety of science and operational missions are in the planning stages, and it seems likely that more may be planned in the near future. IROWG thus recommends to encourage **missions flying RO sensors to include a robust ionospheric measurement capability without interference to collection of lower atmosphere data**. IROWG also recommends to encourage the development of a standardized ionospheric scintillation measurement capability for RO sensors.

IROWG #1 Summary / Impact (3)

CGMS-38 gave following action/recommendation:

- **Action 38.30:** WMO to coordinate efforts between operational data providers and NWP agencies to establish long term continuity plans, including the use of research data in operational products and optimal configurations for climate applications. Deadline: CGMS-39.
- **Recommendation 38.16:** ISRO and partner Agencies to provide ROSA GPS RO data from Oceansat-2 and Megha-Tropiques to operational agencies in Near-Real-Time.

Additional new info from CGMS-38:

- FY-3 to host a GNSS Occultation Sounder (GNOS)



IROWG #1 Summary / Impact (4)

CGMS-39 / Radio Occultation Actions:

- **Action 39.32:** CGMS agencies are encouraged to participate in the next IROWG Workshop in Estes Park. Details at www.irowg.org. Deadline: 01 March 2012.
- **Action 39.03:** IROWG to review the status of the global RO system and report to CGMS-40. Deadline: CGMS-40.
- **Action 39.33:** CGMS agencies are encouraged to report scientific progress on use of RO, opportunities to provide increased coverage by RO sensors as well as to report on data gap issues to IROWG, and directly to CGMS. Deadline: CGMS-40.
- **Action 39.41:** CGMS requests the Rapporteurs to discuss, at the upcoming Intern. Scientific Working Group meetings, the WG contributions to ECV production and reprocessing activities, and other relevant climate work. Deadline: CGMS-40.
- **Recommendation 39.33:** CGMS Satellite Operators to address the anticipated or potential gaps identified in the WMO Gap Analysis, in particular:
 - ...
 - long-term follow-on of radio-occultation constellation,
 - ...

IROWG #1 Actions

Actions from IROWG #1:

- Action IROW1-1: D. Ector to try to locate any missing GPS/MET data.
- Action IROW1-2: S. Leroy to provide CLARREO science requirements.
- Action IROW1-3: D. Ector to explore options for either NSPO or CWB to become more closely involved with CGMS activities.
- Action IROW1-4: J. Wickert to draft a letter of support for NRT operations of TerraSAR-X and Tandem-X from operational agencies.

WMO Message (1)

Acting as an "ambassador" for WMO, you may wish to emphasize:

- The high attention to the work of IROWG given by WMO and CGMS;
- The ongoing identification of linkages between IROWG and WMO priorities, such as on numerical weather prediction, world weather and climate research and applications; GNSS-RO measurements make a significant contribution to the WMO Integrated Global Observing System and the Global Climate Observing System;
- You provided a paper to the last session of the WMO Expert Team on satellite utilization (ET-SUP, December 2011). The Team stressed the need for enhanced/renewed interaction with the IROWG (see attached report). It recommended (6.13) that the IROWG, among others, better prioritize their recommendations to allow for more effective uptake by WMO and satellite operators (Background: IROWG was OK, but ITWG had 60+ recommendations...);



World Meteorological Organization
Working together in weather, climate and water



WMO Message (2)

- The evolving role and membership of ET-SUP has potential for future cross-membership with IROWG;
- Available assets that IROWG may use:
 - new observation requirements database <http://www.wmo-sat.info/db>
 - online database with all past, current and planned EO satellites and instruments (available soon, will replace the "Dossier" http://www.wmo.int/pages/prog/sat/gos-dossier_en.php)
 - Product Access Guide (under development at http://www.wmo.int/pages/prog/sat/product-access-guide_en.php - yet to include links to RO products)
- WMO Space Programme's commitment to facilitate data access
 - by interaction with and gentle pressure on all satellite operators
 - by focussed projects: RARS, Geonetcast
- User training: there is a well established and active WMO-CGMS Virtual Laboratory for Education and Training in Satellite Meteorology (VLab, <http://vlab.wmo.int>), where contributions by IROWG might be worth exploring.

Stephan Bojinski (WMO)

Suggested Sub-Working Groups

- (1) Numerical Weather Prediction
- (2) Climate
- (3) Research to Operations
- (4) Payload Technology
- (5) Innovative Occultation Techniques
- (6) Space Weather

Last workshop combined (3) and (4).
Each Sub-WG selects a chair / rapporteur.

Guidance to Working Groups

IROWG WG can express:

- recommendations to CGMS
 - achievable within 1-2 years
 - relevant at CGMS level
 - understandable also to the laymen
- recommendations to satellite operators, data providers
 - follow similar guidelines as to CGMS, however can be more specific
- recommendations / actions within IROWG / sub-group
 - actions need to be agreed with Actionee

All recommendations should be prioritized, i.e.
the most relevant ones first.