

## **INTERNATIONAL GEOSTATIONARY LABORATORY (IGEO LAB)**

*(Submitted by WMO)*

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### **Summary and purpose of document**

To inform CGMS on the progress with the IGeoLab concept and seek CGMS satellite operators' views on potential new opportunities that could lead to a fully successful IGeoLab mission. It should be noted that WMO WP-29 Add 1 contains a more detailed description of the latest status for the IGeoLab test proposals for GIFTS and GEO-Microwave. WMO WP-29 Add 1 should be read first followed by WMO WP 29 Rev 1.

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## Background

1. At the 32<sup>nd</sup> session of CGMS held in Sochi, Russia, 17-20 May 2004, CGMS discussed the concept of the International Geostationary Laboratory (IGeoLab) as a mean to implement demonstration missions in geostationary orbit in preparation for future operational systems that would be part of the space-based component of the Global Observing System. The demonstration mission should be implemented through international cooperation amongst space agencies each contributing to one, or more, system element(s) (instrument, platform, launch service, ground segment, etc).

2. In order to demonstrate the concept, two test cases were selected:

- GIFTS (Geostationary Imaging Fourier Transform Spectrometer), for frequent profiling of atmospheric temperature and humidity (and, derived, wind) through infrared spectroscopy;
- GOMAS (Geostationary Observatory for Microwave Atmospheric Sounding), for frequent observation of precipitation by sounding in the millimetre and submillimetre wave ranges.

3. Since CGMS-32, there have been a continuing series of meetings and workshops for both test proposals including:

- IGeoLab Preparatory Task Team meeting, (Geneva, 13-14 December 2004);
- 5th session of the WMO Consultative Meetings on High-level Policy on Satellite Matters (CM-5, Geneva 24-25 January 2005);
- 1st meeting of the IGeoLab Focus Group on GIFTS (Washington, DC, 6 June 2005);
- 1st meeting of the IGeoLab Focus Group on GOMAS (Washington, DC, 7 June 2005);
- Bilateral contacts USA-Russian Federation for possible embarkation of GIFTS on Elektro-L (June 2005 through January 2006);
- 2nd GOMAS Focus Group meeting (Rome, 24-25 October 2005). (A more detailed description for the GOMAS Focus Group meeting can be found in WMO WP-29 Add1. GOMAS was renamed at the end of FG-2 to GEO Microwave in order to make a distinction between the generic IGeoLab initiative and a specific design).
- 3<sup>rd</sup> GEO Microwave meeting held in Geneva concurrent to the CGMS Optimization Meeting, 28-29 August 2006.
- CM-6 held in Buenos Aires, Argentina 16-17 January 2006. (A more detailed description of the results from CM-6 can be found in WMO WP-29 Add1).

## Discussion and Recommendations

4. IGeoLab, as a concept, addresses the need for demonstration mission in geostationary orbit. Implicitly involved is the need for a continuum of missions from research instruments to operational missions. It is also appropriate to evaluate the progress of the IGeoLab concept up to now. In the case of the first two test proposals, we have examples of the success of the IGeoLab concept, albeit that neither resulted in a demonstration mission.

5. The GOMAS (GEO Microwave) concept has resulted in considerable more international awareness of the user requirements, the scientific background and the technical challenge for microwave sounding from geostationary orbit. The problem of the size of the antenna has been studied in-depth and more technical solutions have been conceived.

6. GIFTS was even more successful. An existing instrument with the potential to meet WMO requirements from geostationary orbit exists. A partner was willing to donate a satellite bus and a free launch was identified. Furthermore, the same partner felt it appropriate to elevate discussions on the topic to the Heads of State level at a G-8 meeting. WMO doubts that any meteorological mission has ever been given such prominence! (It is understood that a G-8 discussion on GIFTS did not occur). However, GIFTS remains almost fully successful but without a demonstration mission! The only element missing was financial support in order to bring GIFTS to full flight standard. Recently, NOAA/NESDIS cancelled the HES sounding instrument from its future GOES-R satellites in order to minimize the risks of the GOES-R series. The available funding released from flying the HES sounder certainly should have provided the necessary resources to test GIFTS. However, it is understood (through personal communications) that due to an internal USA decision, NOAA could not fund the effort to bring GIFTS to flight certified configuration. (NASA didn't have the money and NOAA had the money but because of "operational" mandates couldn't fund a demonstration mission).

7. This lamentable situation should be addressed through WMO's efforts to identify its role (and appropriate WMO Member's role) in the transition for appropriate R&D instruments to operations (see WMO WP-37).

### **The Future**

8. WMO remains convinced that international partnership remains the sole way forward for testing new concepts in geostationary orbit. Otherwise, individual operational organizations will persist (and history has taught us unsuccessfully) in attempting to fly as part of their operational series on the first satellite prototype instruments as demonstrations. This increases substantially the costs for the first satellite and the risks. The demise of HES-like sounding capability has left the operational meteorological geostationary community again with the challenge to fly operational instruments without any pre-operational experience.

9. The efforts by EUMETSAT to fly a sounding instrument (with capabilities to measure atmospheric chemistry constituents) in geostationary orbit is stark proof that the we have not learnt from our considerable experience. It is ironic that the sounding instrument now being considered by EUMETSAT has most of the attributes of GIFTS. If GIFTS had been flown, everyone would have benefited and yet no one was willing to support a flight model for an instrument with already proven capability. The international satellite community should reflect on its short-sightedness as a whole.

### **Proposal**

10. WMO's seventh session of its Consultative Meetings on High-level Policy on Satellite Matters (CM-7) will discuss the International Geostationary Laboratory (IGeoLab) concept. It is an agenda item for CM-7. It is recommended that CGMS-34 discuss potential new opportunities that could lead to a fully successful IGeoLab mission. There are many opportunities! Based on CGMS-34 discussions, it is WMO's intention to bring to the attention of the Director's of space agencies at CM-7 the future potential for IGeoLab.