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COMMISSION FOR BASIC SYSTEMS  
OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

INTER-PROGRAMME EXPERT TEAM ON SATELLITE UTILIZATION AND  
PRODUCTS

ITEM: 1.2

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## **Outcomes of the 20<sup>th</sup> International TOVS Study Conference**

*(Submitted by Stephen English, ECMWF)*

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### **Summary and Purpose of Document**

The International TOVS Working Group (ITWG) brings together operational and research users and providers of infrared and microwave satellite sounding data. It is convened as a sub-group of the International Radiation Commission (IRC) of the International Association of Meteorology and Atmospheric Physics (IAMAP) and the Coordination Group for Meteorological Satellites (CGMS). The ITWG organises International TOVS Study Conferences (ITSCs) which have met approximately every 18 to 24 months since 1983. Through this forum, relevant experts exchange information on all aspects of the data processing and use, with a focus on inferring information on atmospheric temperature, moisture, and cloud fields. This includes evaluation of new data, processing algorithms, derived products, impacts in numerical weather prediction (NWP) and climate studies. The group considers data from all sounding instruments that build on the heritage of the TIROS Operational Vertical Sounder (TOVS), including hyperspectral infrared instruments.

At each ITSC a Working Group Report summarises the outcomes and brings together the recommendations of the individual Working Groups within ITWG into a coherent set of key recommendations. Furthermore the ITWG Web site contains electronic versions of the conference presentations, posters and publications. In this brief paper those key recommendations relevant to IPETSUP are highlighted.

ITSC-XX was co-chaired by Mitch Goldberg (NOAA) and Niels Bormann (ECMWF) and was sponsored by industry and government agencies, including ABB, EUMETSAT, Exelis, NOAA/JPSS Program Office, JCSDA, Met Office, Météo France, Orbital Systems, SCISYS, the World Meteorological Organization (WMO), and STC.

IPET-SUP is asked to note that the final WG report from ITSC-20 is not yet available, therefore this is a preliminary list of key recommendations and actions, which may differ slightly from the final report, which is expected to become available in the very near future.

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### **ACTION PROPOSED**

The second session is invited to note the relevant recommendations and actions from ITSC-20;

### **DISCUSSION**

## 1. Introduction

Note that many key actions and recommendations relate to the design of WIGOS, not the exploitation of the data available and being planned, and these are not listed here, being more relevant to ET-SAT. IPET-SUP is reminded that there are six individual WGs in ITWG which consider recommendations separately, and the ITWG co-chairs draw the key recommendations from ITSC from the reports of the six WGs. The WGs are organised in these six areas:

- Radiative Transfer,
- Climate,
- Data Assimilation and Numerical Weather Prediction,
- Advanced Sounders,
- International Issues and Future Systems, and
- Products and Software.

The conference agenda and all of the talks and many of the posters can be viewed at the ITWG Web site, located at <http://cimss.ssec.wisc.edu/itwg/itsc/itsc20/program/index.html>

## 2. Recommendations and actions relevant to IPETSUP

For ease of reference the numbering used in the preliminary draft report from ITSC-20 is retained, though note of course that this may yet change in the final version.

**5. To space agencies:** ITWG recommends to develop, test, and implement an SI Traceable radiometric standard in space as soon as feasible.

**6. To space agencies and NWP centres:** noting the urgent need for realistic trade-off studies regarding the field-of-view size, instrument noise and spectral resolution of future infrared sounders, and the continued lack of a coherent analysis of these aspects, ITWG recommends dedicated studies to investigate these trade-offs in an NWP context. Such studies should also consider the effects of clouds and other geophysical uncertainties. Space agencies should consider commissioning such studies to optimize the usefulness of future infrared sounders.

**7. To WMO/CGMS:** ITWG recommends to secure full government control for observations classed as essential under WMO Res 40.

**8. To space agencies and all agencies involved in GRUAN/ARM:** ITWG recommends the provision of more GRUAN and tropical ARM sites, noting the continued need for and scarcity of ground-based reference measurements.

**9. To WMO/CGMS:** ITWG recommends to further maintain OSCAR and SATURN, noting the strong positive feedback from ITWG Members.

**10. To CGMS and other space agencies:** ITWG recommends to assign Digital Object Identifiers (DOIs) to their data sets of heritage instruments and provide these DOIs to a central portal like WMO-OSCAR.

**11. To WMO/CGMS/GSICS:** to develop best practices in pre-flight characterisation of MW sensors, and to make instrument channel characterization data for future instruments publically available.

**12. To IRC and agencies involved in radiative transfer developments:** Noting the progress made in characterising observation uncertainty for hyperspectral sounders encourage further characterisation of LBL model error and errors arising from cloud screening, with a view to considering hyperspectral sounders as an absolute reference.

**13. To NWP centres:** Consider studies into the use of physical methods as well as diagnostic methods to characterise observational uncertainties, including their correlations, to improve the assimilation of satellite radiances.

**14. To IRC and agencies involved in radiative transfer developments:** ITWG recommends the continued support of LBL model development, both the forward model software and the measurements/calculations to improve the spectroscopy.

**15. To WMO/CGMS/space agencies:** ITWG continues to support low-cost fast delivery initiatives and welcomes the DBNet initiative for renewed coordination of such activities.

- 16. To satellite agencies:** ITWG recommends open access to new satellite data during the calibration/validation phase (particularly for all NWP centres) to help with calibration and validation.
- 17. To WMO/CGMS/space agencies:** ITWG supports initiatives to make data from R&D and pre-operational missions available, with a timeliness suitable for operational near-real time applications (related to CGMS HLPP 2.3).
- 18. To satellite agencies:** If PC compression is used to disseminate hyperspectral IR observations, a conservative approach should be taken in order to mitigate information loss (e.g., by retaining as many principal components as possible).
- 19. To satellite agencies in dialogue with users:** devise and document a mutually acceptable update strategy for the principal component basis when a principal component scores product is disseminated to users. Users are encouraged to monitor reconstructed radiances in parallel to operations so that the PC update strategy can be properly tested.
- 20. To funding bodies of NWP centres and satellite agencies:** consider, as part of the cost of satellite programs, providing computational and personnel resources targeted at operational NWP centres to optimise the public's return on investment from these expensive measurement systems.
- 21. To the NWP community:** in support of continued efforts for frequency protection, national meteorological services should attempt to provide an assessment of the economic value of bands based on an impact assessment, as was done by the Met Office in 2005.

The next meeting of the ITWG will be held in Darmstadt, Germany, 29 November – 5 December 2017. More information about ITWG and other ITSCs may be found at: <http://cimss.ssec.wisc.edu/itwg/>

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