Sounder WG

Co-Chairs:

Dorothee Coppens (EUMETSAT) and Joe Taylor on behalf of David Tobin (Univ. of Wisconsin)

1. **ASWG goals**
2. **Brief Review of ITSC-24 ASWG Recommendations**
3. **Draft Agenda for the ASWG meeting on Saturday morning (9am to noon)**

ITSC-25

Goa, India

Thursday, 8 May 2025

Working group goal

The advanced Sounder Working Group (ASWG) focuses on scientific issues affecting the optimal performance of advanced sounder systems.

The working group reviews the status of the development of advanced sounder systems and recommends changes pertaining to instrument specification, performance , data processing and utilisation.

For the purpose of this group, "Advanced Sounders" are defined as instruments that present significant new scientific and technological challenges and which require new methods for data processing and utilisation.

➔ Advanced Sounders currently include high spectral/spatial resolution passive infrared and microwave sounders and active sensors.

Brief Review of ITSC-24 ASWG Recommendations (1 of 2)

1. Discussion on the possibility to switch SNPP CrIS to SWIR+MWIR

- **Action ITSC24-AS-1: To discuss the 3 CrIS configuration + the drifting at the wind workshop in May ('23)**
- **Recommendation ITSC24-AS-1 to NOAA: To keep the LWIR band**

2. Discussion on the impact of having a HS IR sounder in the 5.30 AM orbit

- **Action ITSC24-AS-2 to CMA: to circulate to ASWG the preliminary findings of the impact when using the 5:30am orbit**
- **Recommendation ITSC24-AS-2 to NOAA: to take into account the outcome of the impact study of the 5:30 am orbit and possibly to consider the 5:30 am orbit as beneficial to the community.**

3. Discussion on how future GEO IR sounders and LEO sounders complement each other

- **Context wrt NOAA programs: With LEO and GEO both planning to launch IR sounders, the complementarity of similar measurements in LEO and GEO needs better justification. The WIGOS vision says we need them but does not say why.**
- **Recommendation ITSC24-AS-3 to NOAA: to pursue with the LEO (and GEO) programs**

4. Discussion on GEO MW

Recommendation ITSC24-AS-4 to NOAA: GEO MW sounder demo mission to be implemented as soon as possible, so that the basis for planning joint operational systems can be established in a timely manner and MW can catch up with IR

Recommendation ITSC24-AS-5 to Space agencies: who are implementing GEO IR sounders should also implement companion GEO MW sounders

Brief Review of ITSC-24 ASWG Recommendations (2 of 2)

5. Discussion of Sub-mm and ICI, hyperspectral MW sounders, and ultra-low-noise MW sounders

- **Recommendation ITSC24-AS-6 to ISTC cochairs: To consider including a dedicated session at the next ITSC on sub-mm instruments such as ICI and AWS (→ Presentation foreseen in the meeting by EUMETSAT)**
- **Recommendation ITSC24-AS-7 space agencies: To pursue very low noise technology for MW sounders**

6. Discussion on having more LEO orbits

- **Discussion on the benefits of having better footprints, better than 4km, and 2 hour delta time had unanimous support from the group.**
- **Recommendation ITSC24-AS-8 to space agencies and data providers: to expand the backbone system with 3 additional orbits between the current 1330, 0930, and 0530 local times**

7. Discussion on using more spectral information in NWP

- **Recommendation ITSC24-AS-9 to operational centres: To aim to utilize the full spectral, temporal, and spatial information content provided by the international system of satellite hyperspectral sounding sensors**

8. Re-iterating previous high priority ASWG recommendations to Space agencies

- **Fill gaps in the IR hyperspectral Geo-Ring**
- **Maintain the three primary LEO orbits (early morning, morning, afternoon) with full IR+MW sounding capability**
- **Implement high spatial resolution and contiguous spatial sampling in future IR sounding instruments**
- **Develop, test, and implement an SI-traceable radiometric standard in space as soon as feasible**

- **Action to ITWG Co-chairs: To re-iterate these recommendations to Space Agencies via CGMS**

Agenda items for ASWG meeting on Saturday morning (1 of 2)

IR

- MTG-S/IRS (EUMETSAT)
  - MTG-S1 IRS status (EUMETSAT) and impact of IR in GEO on NWP (JMA/ECWMF)
  - Direct forecasting from observations in the context of IRS (EUMETSAT)
- Impact of IR sounders (CrIS/IASI/HIRAS…) on the Forecasts (+ Discussion for the NWP working group?)
- Early morning orbit at 5:30 am, HIRAS-2 on FY-3E – Any impact observed?
- Smaller footprint for LEO IR orbit missions
- Short presentation NEON Program Initial Scope – SMBA/SIRBA → Any feedback of such mission?

MW

- Advanced Microwave Technology and Data Exploration (Allen Huang)
- Considering the ongoing preparation for EPS-Sterna, what about considering also the low inclination orbits in LEO to complement the MW sounding capabilities offered by Sterna?
- Synergistic importance of both WV and T sounding capabilities (e.g. a small sounder with 50-57 GHz, 89 GHz, 118 GHz +183 GHz)? Any new agency plans?
- Early feedback from the AWS evaluation workshop (EUMETSAT and ECMWF). AWS is supported by several presenters that contributed earlier this year to the AWS evaluation workshop
- For information: Development of radiative transfer at sub-mm wavelengths → Presentation in the RT WG

Agenda items for ASWG meeting on Saturday morning (2 of 2)

Discussion of CGMS HLPP items:

- 1.2.2 Advance the new generation of GEO satellites, including advanced imaging, lightning mapping and Hyperspectral IR sounding for the whole geostationary ring.
- 1.2.4 Work towards ensuring optimised Hyperspectral IR measurements from LEO and GEO orbits to improve time sampling, spatial and spectral resolution and timeliness of observations, including the deployment of HSIR instruments across the GEO ring as per WIGOS vision 2040.
- 1.2.9 Work towards operational 3D wind profile observations from space-based lidar.
- 4.1.1 Maintain within GSICS a framework for inter-calibration of hyper-spectral sounders.
- 4.1.2 Establish within GSICS a consistent inter-calibration for thermal IR channels using hyper-spectral sounders as reference. The implementation will be done successively by the individual satellite operators.
- 4.3.2 Conduct an intercomparison study between the different methods to derive level 2 data from infrared hyperspectral sounders, recognising that there are several software packages available that utilize AIRS/IASI/CrIS data.
- 4.5.1 Report on the progress within the Nowcasting community toward the use of hyperspectral sounders and work toward common products to serve the requirements of the global community. ➔ What is the feedback for future missions?
- 4.9 Identify AI/ML technologies for applying to the product processing and data management infrastructure and develop best practices

➔ **Any other topic you would like to discuss on Saturday ???**

Sounder WG

Co-Chairs:

Dorothee Coppens (EUMETSAT) and Joe Taylor on behalf of David Tobin (Univ. of Wisconsin)

See you on Saturday 10th morning (9am to noon) !!!

➔ For any additional points or slides you want to present, please **send us** an email by Friday lunch time!

Contacts: *dorothee.coppens@eumetsat.int, joe.taylor@ssec.wisc.edu, dave.tobin@ssec.wisc.edu*

itwg_aswg@g-groups.wisc.edu,