

# Advanced Sounders Working Group

*co-chairs: Dave Tobin and Dorothee Coppens*

## ITSC-23

Summary of Virtual WG meeting  
on 16<sup>th</sup> of June 2021

# Participants (~90)

Aya Kasai (JMA)	Dieter Klaes	Indira Rani S (NCOMRWF, MoES)	Liam Gumley	Peter Beierle	Vinia Mattioli - EUMETSAT
Alain Beaulne	Nico Cimini	Ishida Haruma	Luca Palchetti	Chengli Qi - CMA	Wei Han
Alan Geer ECMWF	Dorothee Coppens - EUMETSAT	Jianjun Jin	MasamiMoriya	Reima Eresmaa	William Mccarty
Agnes Lim	Emily Liu	James Jung	Mitch Goldberg	Rich Kelley	Bill Smith
Awdhesh Sharma	Eric Fetzer	Joe Predina	Miguel-Angel Martinez	Robert (Bob) Tubbs	Xavier Calbet
Benjamin Johnson	Erin Lynch	Jeon-Ho Kang_(KIAPS)	Hidehiko Murata (JMA)	Robert Knuteson	Zhenglong Li
Lei Bi	Evan Fishbein	Katie Lean - ECMWF	Nick Nalli	Hiroyuki Shimizu (JMA)	Zhipeng Ben Wang
William Campbell	Fabien Carminati	Masahiro Kazumori	Niels Bormann	Silke May	Zhiyu Yang
Bill Smith	Filomena Romano	Keiichi Kondo	Nigel Atkinson	Scott Mindock	
Chawn Harlow	Fiona Smith	Kirsti Salonen	Ninghai Sun	Stegmann	
Chenke	Flavio Iturbide	Toshiyuki Kitajima (JMA)	Noelle Scott	Stephen English ECMWF	
Chris Burrows	Graeme Martin	Kozo Okamoto (JMA/MRI)	Olaf Stiller	Sylvain Heilliette	
Christina Köpken-Watts (DWD)	Haixia Liu (Ext)	Kristen Bathman	Olivier Coopmann	Tim Hultberg	
Cristina Lupu	Hank Revercomb	Naoto Kusano, JMA	Norio Kamekawa	Tom Atkins	
David Tobin	Hejun Xie	Lambrigtsen, Bjorn	Yoshifumi Ota (JMA)	Yong Chen	
David Duncan	Heikki Pohjola WMO	Leanne Avila	Paul Menzel	Vincent Guidard	

# Advanced Sounders Working Group (ASWG) June 16 Meeting Agenda

<b>ITSC-23 ASWG Meeting Agenda</b>		
<b>ASWG Introduction / Goals / Review of the Agenda</b>	5 min	Co-chairs
<b>Review of progress of action items and recommendations from the last meeting</b>	20 min	Co-chairs/all
<b>WMO Coordination Group for Meteorological Satellites (CGMS) High Level Priority Plan Items</b>	5 min	Co-chairs/all
<b>Hybrid PC approach for the hyperspectral sounder radiances</b> <b>Current status at EUMETSAT (dissemination and ongoing studies)</b> <b>Current status for CrIS</b>	20 min	Tim Hultberg D.Tobin
<b>Latest status of FY-3D/3E and FY-4A/4B</b>	20 min	Chengli Qi
<b>Presentation of the FORUM mission</b>	20 min	Luca Palchetti
<b>User readiness for ICI</b>	15 min	Alan Geer
<b>Information on NOAA future missions</b>	30 min	Mitch Goldberg
<b>Coming End Of Life activities</b> <b>IASI EOL</b> <b>AIRS EOL</b>	20 min <i>(if time permits)</i>	Dorothee Coppens D.Tobin for S.Broberg
<b>Open discussion, Candidate recommendations/actions</b>	20-30 min	All
<b>ASWG Website</b>	5 min	
<b>AOB</b>		

Presentations are available at: [https://cimss.ssec.wisc.edu/itwg/itsc/itsc23/working\\_groups.html](https://cimss.ssec.wisc.edu/itwg/itsc/itsc23/working_groups.html)

Click “Working Group Meetings” from the main ITSC-23 web-site

# Planned sensors and data

**Review of progress of action items and recommendations from the last meeting.**

**Discussion on having IR+MW on the same platform like it was recommended at the last ITSC, instead of having IR+imager to get the cloud information. Cloud information are used by NWP centres among other methodologies, as well as other users like atmospheric composition community.**

**Discussion on the methodology to include cluster information from the imager in the IR FOV. The methodology of the Nuees dynamiques for the AVHRR/IASI could be used by other instruments. EUMETSAT NWP/SAF has applied that methodology to VIIRS/CrIS.**

## **Recommendation ITSC23-AS-1 to Space Agencies:**

To develop a methodology to include the imager clusters in the hyperspectral IR sounders field of view and to study different clustering technics and compare them.

## **Action ITSC23-AS-2 to Mitch Goldberg (?):**

To investigate why the VIIRS/CrIS software developed by EUMETSAT Via NWP/SAF is not used.

## **Recommendation ITSC23-AS-2 to Space Agencies (CMA):**

To get the MERSI loud amount and MERSI radiances. They can provide those products

# Planned sensors and data

*From Recommendation ITSC22-AS-10 to NWP centers to investigate the use of theoretical PC reconstructed radiances, for a representative set of spectral channels, to be used in the radiance assimilation process.*

*Recommendation ITSC22-AS-8 EUMETSAT hybrid method should be taken as the best practice to establish PC for IRS on MTG*

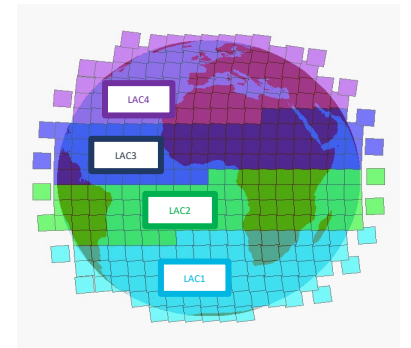
*Action ITSC22-AS-4 to ASWG co-chairs: To circulate to ASWG the information to the bandwidth for the MTG IRS L1 PC dissemination as soon as it is available.*

*From CGMS: To establish together with the user community a commonly agreed approach for retrieval of Principal Component scores and associated parameters from hyperspectral infrared data, minimizing information loss including the mutually acceptable update strategy for the principal component basis and to implement such an approach in a coordinated manner.*

**EUMETSAT presented the status of the hybrid approach development and the activities related to the use of reconstructed radiances in NWP and Atmospheric Composition (AC) user communities. The hybrid methodology is being refined at the very moment to capture all atmospheric signal to answer the AC user needs.**

**CIMSS/SSEC mentioned that the hybrid approach is currently being implemented for the CrIS products.**

**The dissemination of a Local Area Coverage (LAC) the MTG IRS L1 PC ~ 1.1 Gb**



# Planned sensors and data

*From ITSC22-AS-2 to Space Agencies (CMA) to Consider to make available as soon as possible the HIRAS spectra at full spectral resolution for all bands. This also applies to all future hyperspectral sounders.*

*From Recommendation ITSC22-AS-1 to Space Agencies (CMA)*

*Disseminate the HIRAS and GIIRS data 6 months after launch if possible, and not only via EUMETCAST but also to the Global User Community.*

*Recommendation ITSC22-AS-3 to Space Agencies (CMA)*

*FY-4B GIIRS data has good noise performance below the current longwave cutoff of 700  $1/cm$ ; CMA to investigate and consider extending the output range of FY-4B GIIRS spectra to  $\sim 680$   $1/cm$ .*

**Updated presentation from CMA of the status of upcoming FY-3D/FY-3E and F-4A/FY-4B. Lots of new information given, including the following points to answer the recomm of the ITSC-22:**

- **HIRAS/FY-3E spectra will be available at full spectral resolution for all bands**
- **HIRAS/FY-3E spectral coverage will be continuous like the IASI spectra**
- **Data of FY3E/HIRAS and FY4B/GIIRS will be disseminated 6 months after launch: in December 2021 for FY4B/GIIRS and January 2022 for FY3E/HIRAS**
- **LWIR of FY4B/GIIRS is 680-1130  $cm^{-1}$**

# Planned sensors and data

**No discussion on IKFS-2 data and the possibility to have a direct broadcast.**

The only information on EUMETSAT side is: MTVZA-GY (Conical scanning imaging/sounding microwave radiometer with 21 frequencies and 29 channels) data from Roshydromet Meteor-M N2-2 satellite will be available on EUMETCast from 6 May 2021. No information on IKFS-2.

→ ~~We keep the action from ITSC-22:~~

~~Action ITSC23-AS-3 to ITWG Co-chairs to follow the data release date, 2 or 3 months after the launch of Meteor-M N2-2 (January 2020?) and circulate the information at ASWG~~

**Update:** IKFS-2 for Meteor N2-2 is stated “inactive” in OSCAR website... It was stopped on the 18th of December 2019.

# Next generation sensors and data

*From Action ITSC22-AS-5 to Karen St Germain to provide information on the new NOAA trade study mission*

Presentation from Mitch Goldberg, NESDIS Chief Scientist, on the new NOAA Next-Gen systems

- **GEO:**



- **LEO: Next-Gen plan to be in place in a couple years from now.** Continuing the backbone observations in the 13:30 orbit and other application driven assets for higher temporal coverage, etc.





# Next generation sensors and data.

## Draft recommendations from the WG meeting:

**Recommendation ITSC23-AS-3 to space agencies** to consider LEO constellations of small satellites to improve the temporal refresh. However the backbone of high quality stable measurements of visible, infrared, microwave, UV, established by NASA (AQUA), NOAA (JPSS), and EUMETSAT (Metop) measurements are still needed. With an observatory of at least microwave , infrared, imagery and ozone to allow continuation of climate data records in fixed stable orbits with two satellites in each orbit for intercalibration enabling - continuation of climate data records, and for intercalibration of smallsats in extended orbits, as well as a stable long-term observations for NWP.

**Recommendation ITSC22-AS-4 to space agencies** to continue to employ the traditional longwave infrared spectral radiance measurement band on all future hyperspectral IR satellite sensors

**Recommendation ITSC22-AS-5 to NOAA** to more quickly develop the plan for its Next-Gen LEO mission/payloads and incorporate feedback from international partners.

# Next generation sensors and data

## Discussion about the ICI mission

Recommendation ITSC23-AS-6 to space agencies to ensure the ICI readiness.

### Summary (bold: user preparations still to do?)

- ICI – to be launched 2024
  - Operational radiance measurements at 183 GHz – 664 GHz on Metop-SG
  - Co-flown with Microwave Imager (MWI) and scatterometer on B-satellite
- Test data in NetCDF available now
  - **BUFR format still in preparation** (aim: this year)
- Radiative transfer modelling (e.g. RTTOV-SCATT, **CRTM?**):
  - Sub-mm spectroscopy, error characterisation (**ongoing EUMETSAT / Met Office study**)
  - Ice hydrometeors (**shape, orientation, polarisation, PSD**)
  - Surface emissivity (ocean, **sea-ice, snow, land**)
- Data processing:
  - Possible ECMWF approach: **Assimilate L1B radiances with superobbing (e.g. 40 by 40 km) and combine into one super-sensor with MWI**
  - Alternative possibility: **Optimal convolution onto a single FOV**; to be part of L2 processing

# Re-iterating previous high priority ASWG recommendations:

**Recommendation to Satellite Agencies (NOAA, JAXA):** Consistent with numerous previous ITWG and ASWG recommendations, and consistent with the WMO Integrated Global Observing System (WIGOS) Vision for the Global Observing System in 2025 and 2040, the ASWG strongly recommends that space agencies develop and implement plans to fill the gaps in IR hyper-spectral sounding within the Geostationary constellation.

**Recommendation to Satellite Agencies:** The constellation of at least three polar orbits (early morning, morning, and afternoon), each with full sounding capabilities (IR and MW), should be maintained. The overpass times of operational satellites with sounding capability (IR and MW) should be coordinated between agencies to maximize their value.

**Recommendation to Satellite Agencies:** Implement high spatial resolution and contiguous sampling detector arrays in future hyperspectral infrared sounding instruments.

**Recommendation to Satellite Agencies:** To 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.

# ASWG Next Steps:

- **WG members to continue to send the Co-Chairs your suggestions for recommendations/actions**
- **Co-Chairs to circulate a draft WG report in ~1 week**
- **WG report with final Recommendations and Actions to be finalized in ~2 weeks**
- **Co-chairs to organize the ASWG website**