

Minutes of Meeting

Meeting Name : IRSMAG Oct 2017 minutes
Meeting Reference : EUM/RSP/MIN/17/952216, v1D
Meeting Date : 18-19 October 2017
Meeting Location : EUMETSAT
Minuted by : Dorothee Coppens/Françoise Labonte
Participants : See table below
Distribution : Participants + Tobias Guggenmoser (ESA)
Attachments : *None*

List of participants:

Name	Institute
MAG co-chairs	
Herve Roquet	Météo-France
Bojan Bojkov	EUMETSAT
MAG secretary	
Dorothee Coppens	EUMETSAT
MAG members	
Antonia Gambacorta	NOAA/NESDIS/STAR
Christina Koepken-Watts	DWD
Claude Camy-Peyret	IPSL
Dave Tobin	CIMSS
Erik Gregow	FMI
Johannes Orphal	KIT
Mateja Irsic-Zibert	ARSO
Miguel A. Martinez	AEMET
Nadia Fourie	Météo-France
Nigel Atkinson	MetOffice - UK
Pierre-François Coheur	ULB
Tony McNally	ECMWF
Presenters	
Daniel Lamarre	ESA
Bertrand Theodore	EUMETSAT
Gary Fowler	EUMETSAT
Remy Perin	EUMETSAT
Denis Fayard	EUMETSAT
Stefano Gigli	EUMETSAT
Jochen Grandell	EUMETSAT
Stephen Tjemkes	EUMETSAT
Thomas August	EUMETSAT
Tim Hultberg	EUMETSAT

Name	Institute
Additional internal participants	
Dieter Klaes	EUMETSAT
Olivier Samain	EUMETSAT

Introduction - co-chairs

Introduction of the new MAG and tour de table.

On-going actions – co-chairs

Id	Description	Comments
Action L1.A1	EUMETSAT Secretariat to make the Algorithm Theoretical Basis Document for the Level 1 processing of the MTG Infra-Red Sounder Data describing the physical principles of the processing functions to transform MTG-IRS level 0 data into level 1b products prepared in support of the IDPF-S procurement available.	Closed. The MTG IRS Level 1 ATBD has been circulated.
Action L1.A2	EUMETSAT Secretariat to prepare a discussion note on the impact of LWIR and MWIR focal planes misalignment on co-registration error of the two bands for relevant scenarios	Closed , but this is a topic which should be revisited later.
Action L1.A.4	E. Holm with support of E. Pavelin to coordinate with EUMETSAT Secretariat on open issues IRS level 1b format specifications, and take the lead in discussion of this at next IRS-MAG meeting.	Discussion will come along with the presentation of today. To be closed.
Action M3.A.1	The secretariat to liaise with Met Office to further clarify the details of the calibration data	Discussion has happened but nothing has been traced. Need of extra information if the users want to perform the calibration themselves. Data will be made available on EUMETSAT side for specific users. Action to collect the outcome of the discussion. Action on N. Atkinson and Gary Fowler to gather the information and send the notes to MAG secretariat.
Action M3 A.2	M. Martinez to prepare a technical report on the non-compliances of the proposed NETcdf format, and to present potential solutions	Report will be distributed in 2 weeks time. To be closed.
Action M3 A.4	The Secretariat to liaise with ESA to explore the potential of making planned measurements with MTG-IRS breadboard available	Breadboard data will be made available next year. J. Orphal is interested in having a deeper look into the data themselves. Responsivity of the detectors will be made available in 2 or 3 weeks. Instrument response will be next year. Action to get a list of what is needed from

		Johannes Orphal, Dave Tobin, and Claude Camy-Peyret. Claude is mentioning that noise information (radiometric and Laser) is necessary for the users.
Action M3 A.6	EUMETSAT Secretariat to liaise with CMA regarding the availability of documentation describing the GIIRS instrument, and further explore availability of observations after a successful launch and Cal/Val	Closed. New action to give a feedback from the visit at CMA by email when back.
Action M3 A.7	EUMETSAT Secretariat to liaise with N. Atkinson P. Antonelli and T. Hultberg to prepare a discussion note on the relative merits of the two different compression methods for the compression of MTG-IRS observations.	Presentation on this subject during the meeting + a proceeding prepared at the SPIE conference can be circulated. To be closed.
Action M3 A.8	EUMETSAT Secretariat to distribute documentation and sample of data prepared for NRT Demo project	New NRT experiment will be presented tomorrow. To be closed.

MTG IRS program status – Remy Perin (EUMETSAT)

Summary

Presentation of the full MTG mission. Two MTG-I for one MTG-S in orbit.

Introduction of each instrument, and platform. Flight acceptance review for MTG-S in August 2022, tentative launch date Q1 2023.

L2PF CDR mid-2018. For the IDPF-S: ITT has been released. The offers are being studied.

IRS instrument CDR in January 2019, IRS proto flight in early 2021.

Discussion:

Question from Johannes Orphal: Who from MAG will participate in the CDR?

⇒ Answer: No answer needed at this time, just that a MAG representative would be beneficial.

MTG dissemination evolution – Denis Fayard (EUMETSAT)

Summary:

Presentation of the status of the dissemination with a foreseen evolution: going from 2 Mbps to 112 Mbps with one MTG-S and 2 MTG-I. The annex of the EURD regarding this will be updated and presented to the Council in winter 2018. Update should be written by next summer.

New specification of the timeliness is 15 min for the IRS level 1 (dwell based). Level 2 processing timeliness has been revisited. All LACs will be processed (instead of LAC-4 only). The goal for the end-to-end timeliness is 30 min.

Discussion:

Question from Dave Tobin: What about the CO?

⇒ Answer: This is not foreseen at day-1, but this will be investigated for day-2.

Question from Tony McNally: Has new level 2 timeliness an impact on level 1 timeliness?

⇒ Answer: No, they are independent.

Question from Herve Roquet: Has a change of the scanning pattern an impact on the timeliness?

⇒ Answer: The processing is dwell based so it should not have any impact.

[IRS instrument status – Daniel Lamarre \(ESA\)](#)

Summary:

Presentation of the IRS instrument status. IRS PFM (Prototype Flight Model) instrument tests are foreseen in Q3 2019.

Performances testing:

- ✓ Problem with the beam splitter: qualification results are currently not satisfactory.
- ✓ Cube Corner Mechanism: sensitive to micro-vibration as with IASI. Successful testing. Risk has decreased.
- ✓ Cube Corners: baseline fused silica. Backup with beryllium.
- ✓ Detectors: etalon effect (multiple reflexion at the detector level) is higher than expected. Investigation

Discussion:

Question from Dorothee Coppens: Is there a compensation device for the corner cube (because for IASI the micro-vibration was mainly coming from this device)?

⇒ Answer: There is no compensation device, IRS is moving too slow and is too sensitive to micro-vibration. A compensation device would double the micro-vibration.

Question from Claude Camy-Peyret: What is the main driver for the micro-vibration?

⇒ Answer: The main source is the cooler, and a bit the rotation wheels.

Question from Bojan Bojkov: Would it be possible to speed up the movement by a factor of 2 (5 sec instead of 10)?

⇒ Answer: This is not possible due to hardware constrain. The electronics can't follow.

[L1 processing status \(ATBD/PS\) and open points and studies – Dorothee Coppens \(EUMETSAT\)](#)

Summary/Discussion

Presentation of IRS L1 overall on-board and on-ground processing, raising the open issues and current investigations. The presentation is focusing on five open issues/investigations: uniformisation, spectral sampling, apodisation, cloud/heterogeneity information and metadata needed by the users.

Discussion:

General comment on the Metadata: Even if normally the data are not dependent on the corner cube direction, the information on the direction should be part of the products.

Comment from Claude Camy-Peyret: the variability of the cloud within the pixel is as important as the cloud information itself.

Comment from Tony McNally: The use of FCI for cloud information would introduce a dependency between the two instruments which is not desirable.

Comment from Mateja Irzic-Zibert: She is in favour of having a synergy with FCI.

Comment from Christina Köpkens-Watts: Several methodologies can be used. The ones only using radiances should stay in the level 1 products, for the rest it might be better to put them in the level 2 processing, not to delay too much the level 1 processing.

Actions:

Action M4 A.1: To test the effect of a stronger apodisation on their side and see by when this can be done (MAG Members)

Action M4 A.2: To give a feedback on missing metadata (MAG Members)

Action M4 A.3: To check if the corner cube direction information and the SRF shape error index are part of the IRS L1 products (Dorothee Coppens)

Recommendation:

Recom.M4.R1: Clear recommendation to perform the uniformisation in the IRS level 1 processing

Recom.M4.R2: Recommendation for the slight oversampling at 0.6 cm^{-1}

[Feedback on the ATBD – Herve Roquet \(Meteo-France\)](#)

Summary:

General feedback: Very good basis (more information on the cloud information is needed and which part is going to level 1 and to level 2 ATBD), impressive work. MAG member are pleased to finally have a clear information on the level 1 processing.

Discussion:

On-board processing: EUMETSAT statement is that MAG members can have access to all documents available at EUMETSAT. Daniel (ESA) has no comment so far since there is a NDA signed by all MAG members.

Yaw flip manoeuvre: Gary Fowler stated that pixel (1,1) is always the most south west one. To be checked.

Comment from Stefano Gigli: Not possible to have imager mode interferograms (at 1.3 km) even in the commissioning phase.

Monitoring: need to have a daily report on the web + information on the stability over time.

Comment from Miguel A. Martinez on the external compression: The baseline has changed, no external compression is anymore needed on the PC data.

Action:

Action M4 A.4: To check Gary's information in case of Yaw flip manoeuvre on the ordering of the dwells, etc... (Stefano Gigli)

Action M4 A.5: To give information on the duration expected for the outage, on top of the 64 minutes of the manoeuvre. (Stefano Gigli)

Recommendation:

Recom.M4.R3: MAG is in favour of having information of the monitoring in the EUM web page, as well as the information on the stability over time.

[IRS L1 Product Format Specification – Stefano Gigli \(EUMETSAT\)](#)

Summary:

Presentation of the latest version of the Product Format Specification.

Discussion:

Question from Herve Roquet on the geolocation lat/lon. If there is a problem of co-registration between the two bands, would the geolocation be band dependent?

⇒ Lat/lon given for one band and then provide the users on how to compute the other band.

Action:

Action M4 A.6: Co-registration issue between the two bands: To investigate and communicate on how to give the information (lat/lon per band?) to the users (Gary Fowler)

Action M4 A.7: To circulate the presentation from last year (Gary Fowler)

Action M4 A.8: To consider the dissemination of the imager mode data to the users and give feedback to the MAG (Denis Fayard)

PC compression – Tim Hultberg (EUMETSAT)Summary:

A monitoring is in place to make sure that, when looking at the residuals, no signal is lost. This is used to detect outliers, then the spectra would not be well reconstructed. There are also additional thresholding on the outlier classification linked to instrument manoeuvre (when no history is available), as well as for real missing signal.

The presented approach between local and global is a hybrid one, building on a core static global eigenvector basis as demonstrated with IASI. Rare spectral features happening very locally can be preserved with few extra eigenvectors evaluated for each data granule (dwell). This approach also mitigates the need for *ad hoc* updates of the core global eigenvector basis, which can remain global and unchanged over longer periods as requested by the Users.

Discussion:

Comment from Bojan Bojkov to say that global approach has proven a very high stability in 10 years, and when in 2011 there was an event, the eigenvectors have been updated and then stable for the last 6 years. Variable size of products is not good.

A possibility would be to add a number of (3?-TBC) local PCs per Band.

Comment from Tony McNally that it is hard for operational use of reconstructed radiances. A previous study has shown that reconstructed radiances have a positive impact for what concerns the water vapour, and negative for the temperatures.

Reply from Tim Hultberg: any existing assimilation scheme using raw radiances can take reconstructed radiances as input instead, without any negative impact. The negative impact for temperatures in the previous study mentioned above can't be attributed to the reconstructed radiances, since that would mean that addition of random noise would have a positive impact.

Comment from Pierre Coheur: to make analysis and large statistics.

Question from Dave Tobin: question on why local approach increases the noise?

⇒ Answer: To reduce the noise, you need a large number of spectra to train the eigenvectors. Local has less than global ones.

Action:

Action M4 A.9: To give information on consolidated strategy about how to capture rare and special event by next MAG (It could be by providing additional local PC or residuals) (Tim Hultberg)

Recommendation:

Recom.M4.R4: MAG to recommend EUM to be proactive in getting the users prepared to use the PCs.

[Outcome of the ECMWF Assimilation of Hyper-spectral geostationary satellites observations workshop – Tony Mc Nally \(ECMWF\)](#)Summary:

Presentation of the workshop and the main recommendations on: Instrument Cal/Val, Level 1 data processing with the uniformisation, apodisation, PCA compression which must be global, Measurement sequence which should be reviewed, GIIRS on FY-4A, IRS wind product generation.

Discussion:

MTG-IRS data will be used very quickly if the users are prepared and if other similar data are made available before, like GIIRS data. Good example with IASI, which was used very quickly because AIRS data were available for quite a long time before.

[IRS PP \(regional processing\) - Nigel Atkinson \(Met Office UK\)](#)Summary

IRS PP would go from PCs in netCDF format to reconstructed radiances, with the possibility to encode them in BUFR. It could also apply an apodisation on the eigenvectors. It would be good if the eigenvectors are fixed as for the global approach. Some users might want to produce different eigenvectors for their own application. Other suggestions could be to compute and add the geolocation for the two bands.

Discussion:

Comment from Claude Camy-Peyret: the noise covariance matrix should be used if another apodisation is applied.

Action:

Action M4 A.10: MAG members to send more ideas that could be implemented in IRS PP to Nigel.

[Hyperspectral L2: Status and schedule @ EUM – Dieter Klaes \(EUMETSAT\)](#)Summary:

General presentation on the level 2 roadmap.

Discussion:

Comment from Pierre Coheur: AC SAF CDOP-3 does not include activities on MTG.

Comment from Bojan Bojkov: AC SAF CDOP-4 should include a clear part on MTG activities.

[MTG IRS L2 operational – Thomas August \(EUMETSAT\)](#)Summary:

Presentation of the new approach taking IASI level 2 heritage. Presentation of the PWLR³ approach (statistical method, all-sky), the cloud and dust estimation, as well as the implementation of the optimal estimation method (clear-sky). Open issues were tackled like using the ECMWF forecast as a-priori or not, the retrievals in the Rim zone, the apodisation, the expected sounding performances of IRS relative to IASI (including a pseudo-IRS retrieval) and the viewing geometry to reconstruct vertical profiles from slanted retrievals.

IRS L2 processing will also be done in cloudy conditions. In case of full cloud coverage, the profiles will be retrieved above the cloud. This will be completed below the cloud with the best statistical “background” profile being the most correlated one to the above profile.

Preliminary estimates indicate that doing retrievals in all pixels for all LACs is possible with reasonable computational resources.

Discussion:

Comment from Christina Köpkens-Watts: In case of cloudy retrieval, it is important to put in the products the information on which part of the profile is really coming from the measurement (above the cloud).

In general, MAG members are welcoming very well the new approach proposed using IASI heritage to retrieve IRS L2 products.

Action:

Action M4 A.11: Tony to provide EUMETSAT with quality control information on the radiosondes used at ECMWF.

Johannes Orphal presented a short video afterwards, and asked to make it available to the MAG.

Outcome of the NRT L2 dissemination – Stephen Tjemkes (EUMETSAT)

Summary:

NRT L2 dissemination was planned to be only CrIS/IASI retrievals. CrIS retrievals dissemination has been interrupted because of their bad quality. No MTG characteristics are being considered.

It's planned to use the IASI level 1b spectra with a varying spectral resolution within the band, which are far from MTG IRS spectral resolution and characteristics.

Discussion:

Questions from Herve Roquet: would it be possible to make systematic comparisons with radiosondes?

⇒ Answer: See **Action M4 A.12**.

Action:

Action M4 A.12: To present the results from the comparisons between L2VDP retrievals and radiosondes at the next MAG, linked to the **Recom.M4.R5**.

Recommendation:

Recom.M4.R5: Recommendation to make systematic comparisons between L2VDP retrievals and radiosondes.

User feedback on the NRT L2 dissemination - Erik Gregow (FMI)

Summary:

Full report can be found in DMT#85798. It will be made available to the MAG members. The data analysed by the test Users are level 2 products generated directly from plain IASI and CrIS observations with the L2VDP processor (introduced in the previous presentation). Some feedback to improve the situation for maybe later: The data latency was too long (>2.5h) wrt required timeliness requirements for nowcasting purposes. There were missing retrievals in large cloud-free areas, pointing to cloud mask inaccuracies and also strongly limiting the yield. Results of attempts in the Local Analysis and Prediction System (LAPS) and comparisons to sondes were showed. Typical RMS for temperature products of around 2 K, up to 3K, from IASI and between 3 and 4 K for profiles derived from CrIS, are found in the troposphere.

Discussion: Tony McNally noted confusing branding with validation results being associated to the IASI and CrIS missions, while they should more clearly relate to the experimental L2VDP processor version used in the NRT Demo exercise.

FMI informed that they started looking at the operational IASI L2 products (using also MW data) from the regional EARS-IASI L2 service. They have been looking at the viewing geometry, especially in the outer scan positions where the slant path strongly differ from the vertical profile.

FMI is interested in testing and validation of proxy-IRS data.

IRS measurement sequences - Impact on the applications – Gary Fowler (EUMETSAT)

Summary/Discussion

Different measurement sequences:

- ✓ Baseline of the LACs measurements sequences: 5 times the sequence (LAC4-LAC3), then 4 times the sequence (LAC4-LAC2) and then 3 times the sequence (LAC4-LAC1).
- ✓ Proposed LACs measurements sequences: 3 times the sequence (LAC4-LAC3), then 3 times the sequence (LAC4-LAC2) and then 3 times the sequence (LAC4-LAC1).
- ✓ From SWG-40 in March 2016: to put the sequence LAC4-LAC3 in between the others: 3 times the sequence (LAC4-LAC3), then 3 times the sequence (LAC4-LAC2), 3 times the sequence (LAC4-LAC3) and then 3 times the sequence (LAC4-LAC1).

General question: which scenario will be tested during commissioning?

- ⇒ Answer: Need to get first feedback from MAG members - **Action M4 A.13** and **Recom.M4.R6**.

Action:

Action M4 A.13: MAG to give comments on the measurement sequence, and this will be presented at the next MAG.

Recommendation:

Recom.M4.R6: The proposed measurement sequence (LAC4,LAC3)x3, (LAC4,LAC2)x3, (LAC4,LAC3)x3, (LAC4,LAC1)x3 should be tested during the commissioning.

L0/L1/L2 Test data: status – Bertrand Theodore (EUMETSAT)

Summary

Presentation of different tools available at EUMETSAT and test data sets already generated.

Discussion:

Comment from Johannes Orphal: spatial resolution of the emissivity atlas. 0.5 or 0.25 degrees. A new atlas has been produced recently and would be at a resolution of 0.05 degrees. There is a document on this.

Comment from Pierre Coheur: emissivity is a very important parameter.

Actions:

Action M4 A.14: To circulate the documentation on the latest emissivity atlas.

Action M4 A.15: MAG members to provide feedback to secretariat about any needs in terms of test data on their side.

[Limb measurements from satellite: possible combination and synergy with MTG-IRS – Claude Camy-Peyret \(IPSL - UPMC/UVSQ\)](#)

Because of the lack of time, this presentation will be done at the next MAG.

[Discussion on Cal/Val and Science Plans – All led by Jochen Grandell \(EUMETSAT\)](#)Discussion:

Science plan has been initiated in 2008 but was not followed up.

Comment from Herve Roquet: MAG members are owning the science plan and members have to be very active in this. Science plan has a much larger scope than just feeding the ATBDs for the central processing.

EUMETSAT will circulate a plan on EUMETSAT expectations to the members for which they can volunteer according to their expertise.

MTG cal/val plans are to be provided by system CDR, mid-2019 (CDR-1) and mid-2021 (CDR-2).

MAG should give advices and support to EUM on requirements, methodologies, and data for instrument characterisation, calibration tools of the level 1. Same for the level 2.

We need the EURD. Update is foreseen for the next summer. Presentation of new EURD next MAG. Currently, the EURD doesn't include level 2 products requirements for the central processing.

Comment from Dieter Klaes: A Cal/Val plan is a plan for activities to be performed in e.g. commissioning, with a schedule. This is a system document, part of the document package for system review.

MAG members can give ideas in terms of campaigns, inter-comparison, methodologies.

Comment from Tony McNally: 80% of ideas coming from IASI should be taken on board, not starting from scratch.

[AOB – All](#)Summary/Discussion

Meeting will be at EUMETSAT next time. In Brussels in one year.

Action:

Action M4 A.16: To create a generic MAG email list.

To try to get all presentations from the previous MAG meeting in Ljubljana in May 2016.

Next IRS-MAG meeting on **24th-25th of May 2018**, at **EUMETSAT**.

Recommendations:

List of Recommendations	
Recom.M4.R1	Clear recommendation to perform the uniformisation in the IRS level 1 processing
Recom.M4.R2	Recommendation for the slight oversampling at 0.6 cm^{-1}
Recom.M4.R3	MAG is in favour of having information of the monitoring in the EUM web page, as well as the information on the stability over time
Recom.M4.R4	MAG to recommend EUM to be proactive in getting the users prepared to use the PCs
Recom.M4.R5	Recommendation to make systematic comparisons between L2VDP retrievals and radiosondes
Recom.M4.R6	The proposed measurement sequence (LAC4,LAC3)x3, (LAC4,LAC2)x3, (LAC4,LAC3)x3, (LAC4,LAC1)x3 should be tested during the commissioning

Actions:

List of Actions			
Action #	Action item description	Due date	Actionee
Action M4 A.1	To test the effect of a stronger apodisation on their side and see by when this can be done.	By next MAG	MAG members
Action M4 A.2	To provide feedback on missing meta data in L1 products	By next MAG	MAG members
Action M4 A.3	To check if the CD information and the SRF shape error index are part of the L1 products	By next MAG	EUM (Dorothee)
Action M4 A.4	To check Gary's information in case of Yaw flip manoeuvre on the ordering of the dwells and of the measurements within the data cubes in L0 and L1 products files	Next MAG	EUM (Stefano)
Action M4 A.5	To give information on the duration expected for the outage, on top of the 64 minutes of the manoeuver	Next MAG	EUM (Stefano)
Action M4 A.6	Co-registration issue between the two bands: To investigate and communicate on how to give the information (lat/lon per band) to the users	Next MAG	EUM (Gary)
Action M4 A.7	To circulate last's year presentation related to the previous Action M4 A.3	End of November 2017	EUM (Gary)
Action M4 A.8	To consider the dissemination of the imager mode data to the users and give feedback to the MAG	Next MAG	EUM (Remy)
Action M4 A.9	EUM to give information on consolidated strategy about how to capture rare and special event by next MAG (I could be additional local PC or to give residuals).	By next MAG	EUM (Tim)
Action M4 A.10	MAG members to send more ideas that could be implemented in IRS PP by emails to Nigel.	By next MAG	MAG members
Action M4 A.11	To provide EUMETSAT with available information at ECMWF on the quality of radio-soundings	Next MAG	ECMWF (Tony)
Action M4 A.12	Linked to the recommendation Recom.M4.R5 , to present the results from the comparisons between the L2VDP and radio-soundings	Next MAG	EUM (Stephen)
Action M4 A.13	MAG members to give comments on the measurement sequence, to be presented at the next MAG meeting.	By next MAG	MAG members

Action M4 A.14	To circulate the documentation on the latest emissivity maps mentioned by Miguel	End of November	EUM (Miguel)
Action M4 A.15	To give feedback to Secretariat about their needs in terms of IRS test data.	By next MAG	MAG members
Action M4 A.16	To create a MTG IRS MAG e-mail list mimag@eumetsat.int	November 2017	EUM

“by next MAG” should be circulated 2 to 3 weeks before the meeting.