The IASI-NG mission

After the success story of IASI, CNES and EUMETSAT have decided to develop the next generation of atmospheric sounder, in the frame of the EPS-SG program. IASI-NG is an interferometer, that will scan the atmosphere in the infrared wavelengths with a radiometric noise and a spectral resolution twice smaller than for IASI.

See F. Bermudo’s poster for IASI-NG program overview.

In this collaboration, CNES is in charge of the development of the IASI-NG system, including the instrument but also the processing chain (in the space and ground segments). This Level 1 processing enables the transformation of raw interferograms to fully calibrated spectra (level 1C), correcting various instrument effect.

Development of the Ground Segment

The IASI-NG Ground Segment is composed of:
- IDS, a functional simulator of the instrument (dev' started in May 2016);
- IRIS, the scientific simulator of the system (dev' started in May 2016) used for prototype and validation purposes.
- L1cPOP, the operational Level 1 processing (dev' started in January 2017).
- IASTEC, the Technical Expertise Center.

The IASI-NG Level 1 processing and system performances budget

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The Level 1 processing chain

1) Pre-processing part

2) Core part

In the core part of the OGP science, the ISRF (estimated by the ISRF-EM chain) is removed and the radiometric calibration of the spectrum is performed, using Black Body and Cold Space views.


1) Principle of the instrumental response removal

In the IASI-NG level 1 processing, the ISRF is estimated for each spectrum acquisition through the SAS function (which is the Fourier transform of the ISRF).

This estimation is based on:
- A model of the instrument, called ISRF-Generator.
- The exploitation of 5 metrology beams.
- A Fabry-Perot interferometer and a database of atmospheric spectra, enabling the estimation of the spectral shift of the instrument.
- A Doppler correction, based on the exploitation of Navsat data and a prediction model.

2) Schema

3) SAS estimation

The estimation of the SAS function is based on the following equation:

On-Ground Processing - science:

On-Ground Processing - image:

Current system performances budget

System Performances Budget

The System performance budget includes contributions coming from the instrument, the satellite, the on-board and on-ground processing. The imperfection of the data are assessed at level 1C and are compared to the mission requirements, in terms of:
- Radiometric performances
- Spectral performances
- Geometric performances

This current budget is based on the best knowledge of the instrument design given by Airbus Defense and Space.

The IASI-NG mission started in January 2017. A future version of this budget should be provided early next year, with updated performances of the detectors and for heterogeneous scenes as well.

Synthesis: