

# EUMETSAT Updates and Collaboration with NOAA

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on behalf of EUMETSAT teams



# EUMETSAT is an intergovernmental organisation with 30 Member States and 1 Cooperating State

## Member States



AUSTRIA



BELGIUM



BULGARIA



CROATIA



CZECH REPUBLIC



DENMARK



ESTONIA



FINLAND



FRANCE



GERMANY



GREECE



HUNGARY



ICELAND



IRELAND



ITALY



LATVIA



LITHUANIA



LUXEMBOURG



THE NETHERLANDS



NORWAY



POLAND



PORTUGAL



ROMANIA



SLOVAK  
REPUBLIC



SLOVENIA



SPAIN



SWEDEN



SWITZERLAND



TURKEY



UNITED KINGDOM

## Cooperating States



SERBIA



# EUMETSAT's mission

To **establish, maintain** and **exploit** European **operational** meteorological satellite systems, while considering the recommendations of **WMO** as much as possible

A further objective is to contribute to **operational climate monitoring** and detection of **global climatic changes**

By fulfilling these objectives, contribute to **environmental monitoring**, where **interactions** with the **ocean** and the **atmosphere** are involved

# The Current EUMETSAT satellite fleet

## METOP -A and -B

(LOW-EARTH, SUN – SYNCHRONOUS ORBIT)

EUMETSAT POLAR SYSTEM/INITIAL JOINT POLAR SYSTEM

## Sentinel -3a

(LOW-EARTH, SUN-SYNCHRONOUS ORBIT)

Copernicus Global Marine and Land Environment Mission  
Operated by EUMETSAT

## JASON-2, -3

(LOW-EARTH, 63° INCL. NON SYNCHRONOUS ORBIT)

OCEAN SURFACE TOPOGRAPHY MISSION

## METEOSAT SECOND GENERATION -9, -10, -11

(GEOSTATIONARY ORBIT)

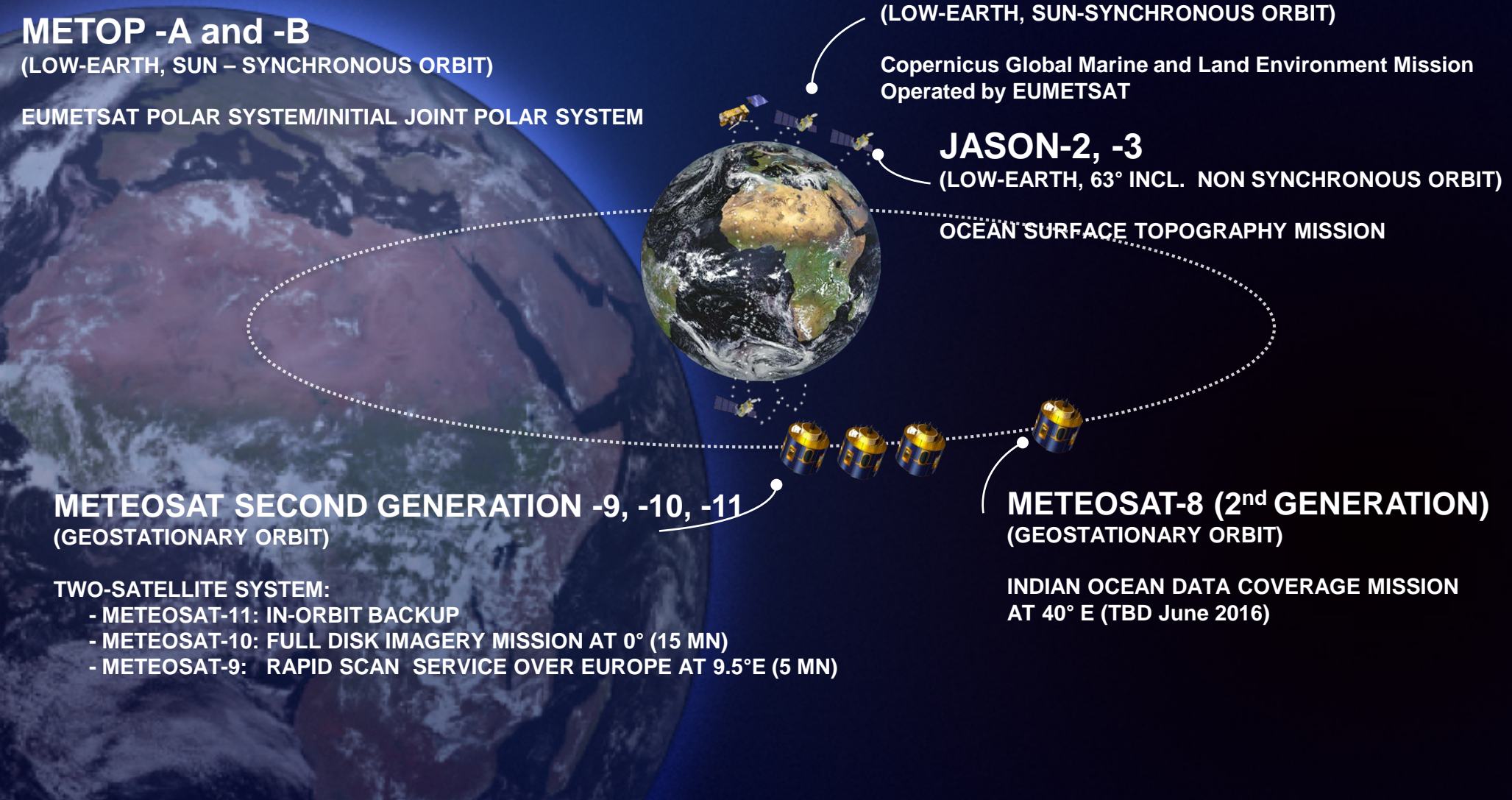
TWO-SATELLITE SYSTEM:

- METEOSAT-11: IN-ORBIT BACKUP
- METEOSAT-10: FULL DISK IMAGERY MISSION AT 0° (15 MN)
- METEOSAT-9: RAPID SCAN SERVICE OVER EUROPE AT 9.5°E (5 MN)

## METEOSAT-8 (2<sup>nd</sup> GENERATION)

(GEOSTATIONARY ORBIT)

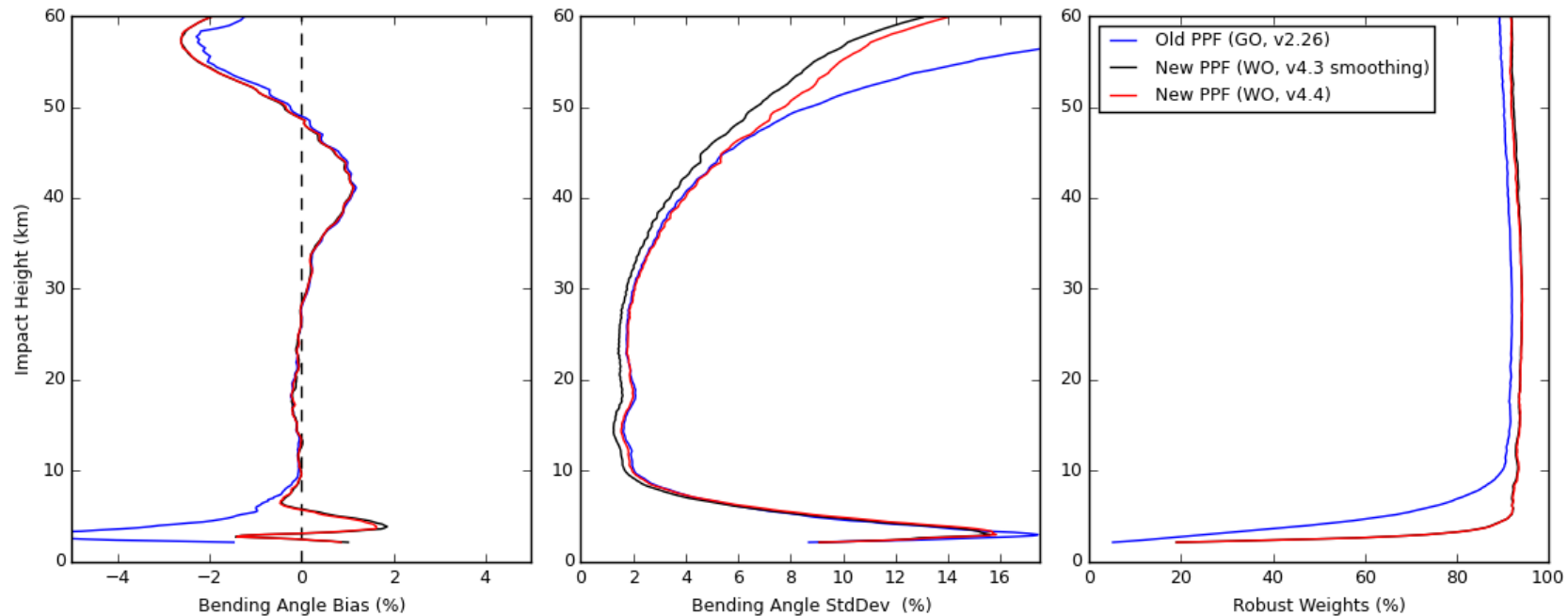
INDIAN OCEAN DATA COVERAGE MISSION  
AT 40° E (TBD June 2016)





# Metop: RO Wave Optics

Wave Optics: Role of Smoothing (Metop-A & B, 15-30 June 2016)

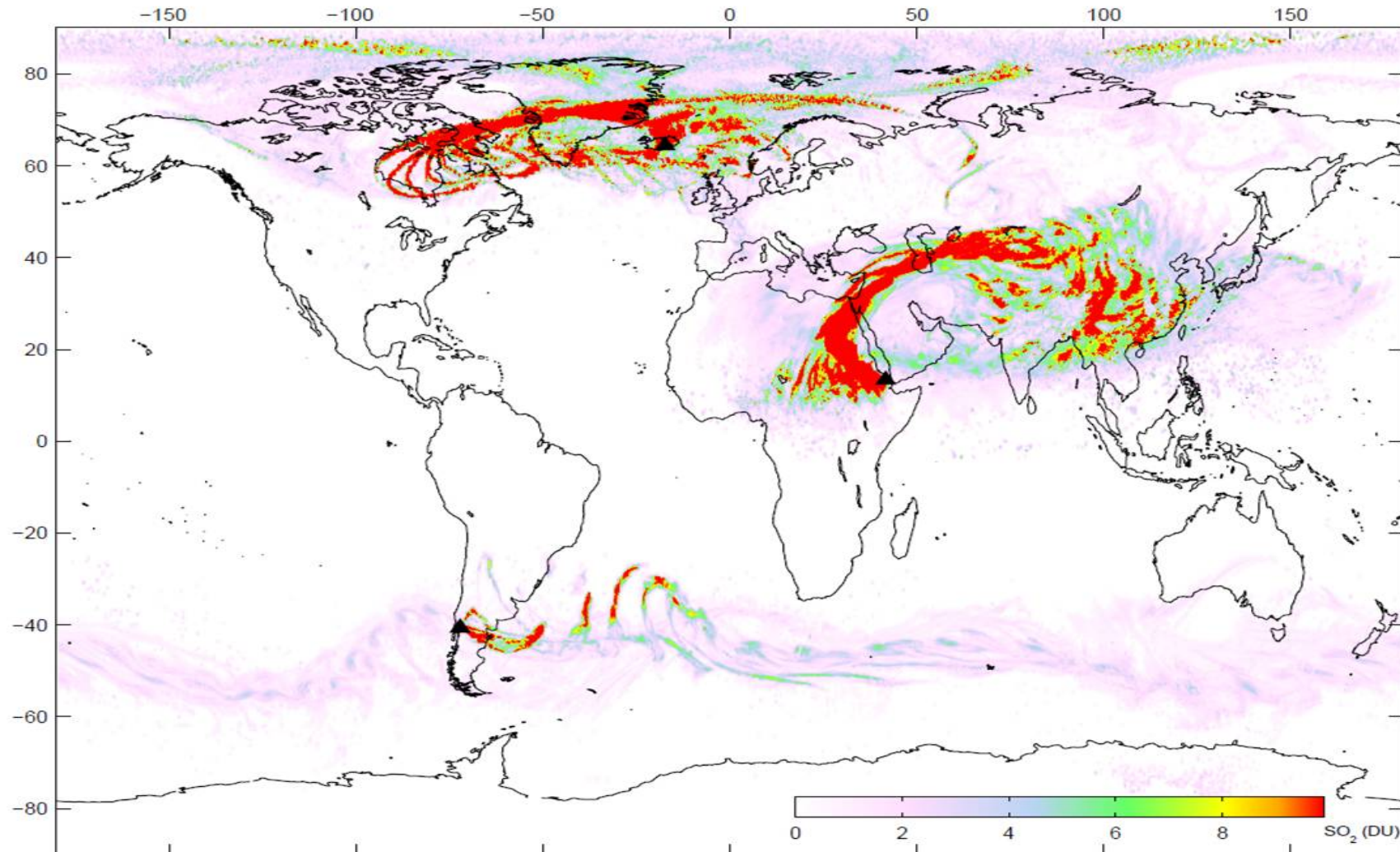


## Wave Optics PPF since Q3/2016

- Stratospheric bias structure as before; tropospheric biases improved; deeper penetration into the lower troposphere
- Upon extensive consultation/data evaluation with NWP users, preference for low correlations over smoothing
- The ECMWF and the UK MetOffice use the complete profile down to the lowest level → *positive impact*.

*Note: Low stratospheric standard deviations (as in v4.3) are possible, but come with larger vertical correlations*

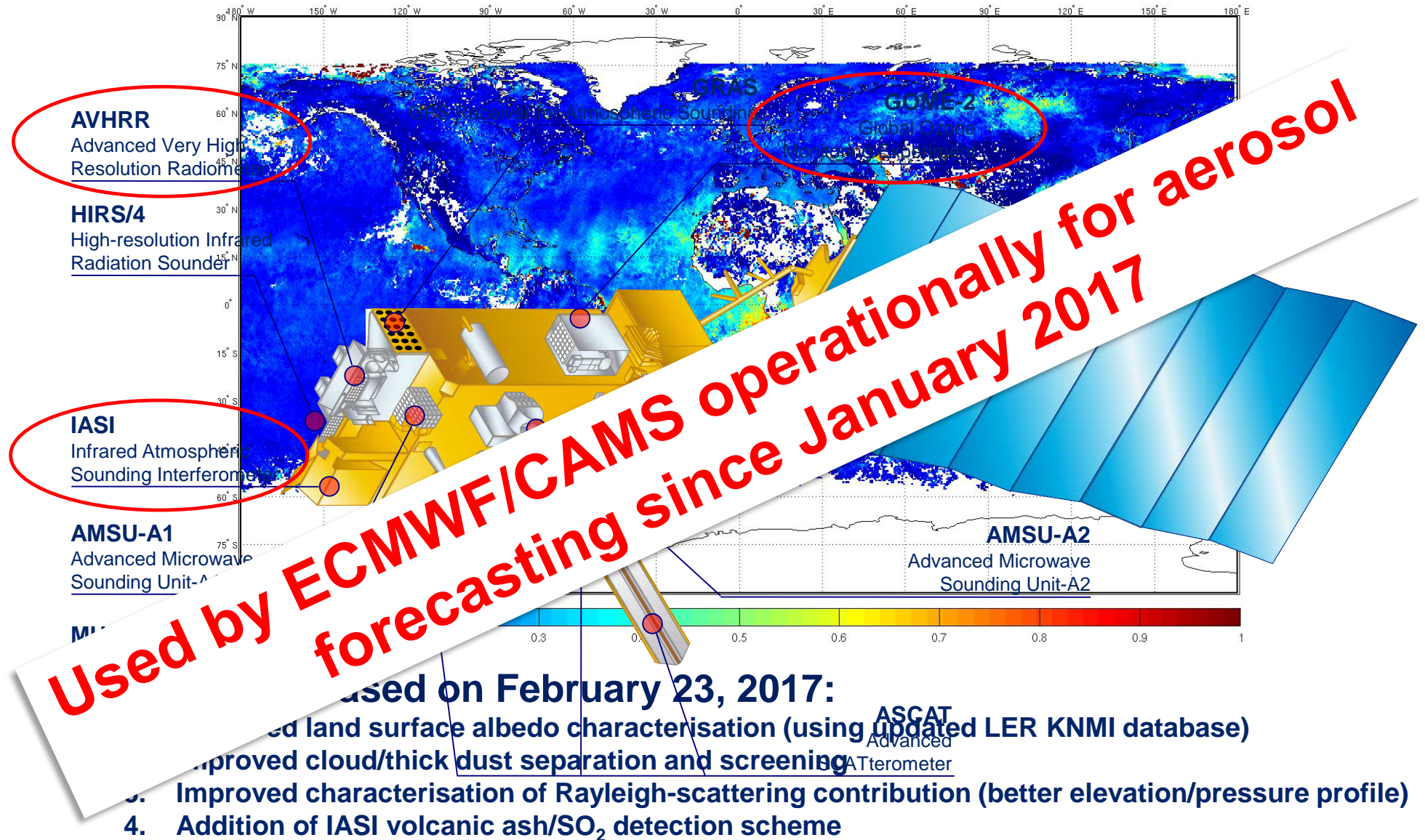
# Metop: IASI v6.3 - SO<sub>2</sub> from infrared sounding



**Cumulative SO<sub>2</sub> from volcanic eruptions (20 May and 30 June 2011)**

***Courtesy: Clarisse, et al., doi: 10.5194/amt-5-581-2012***

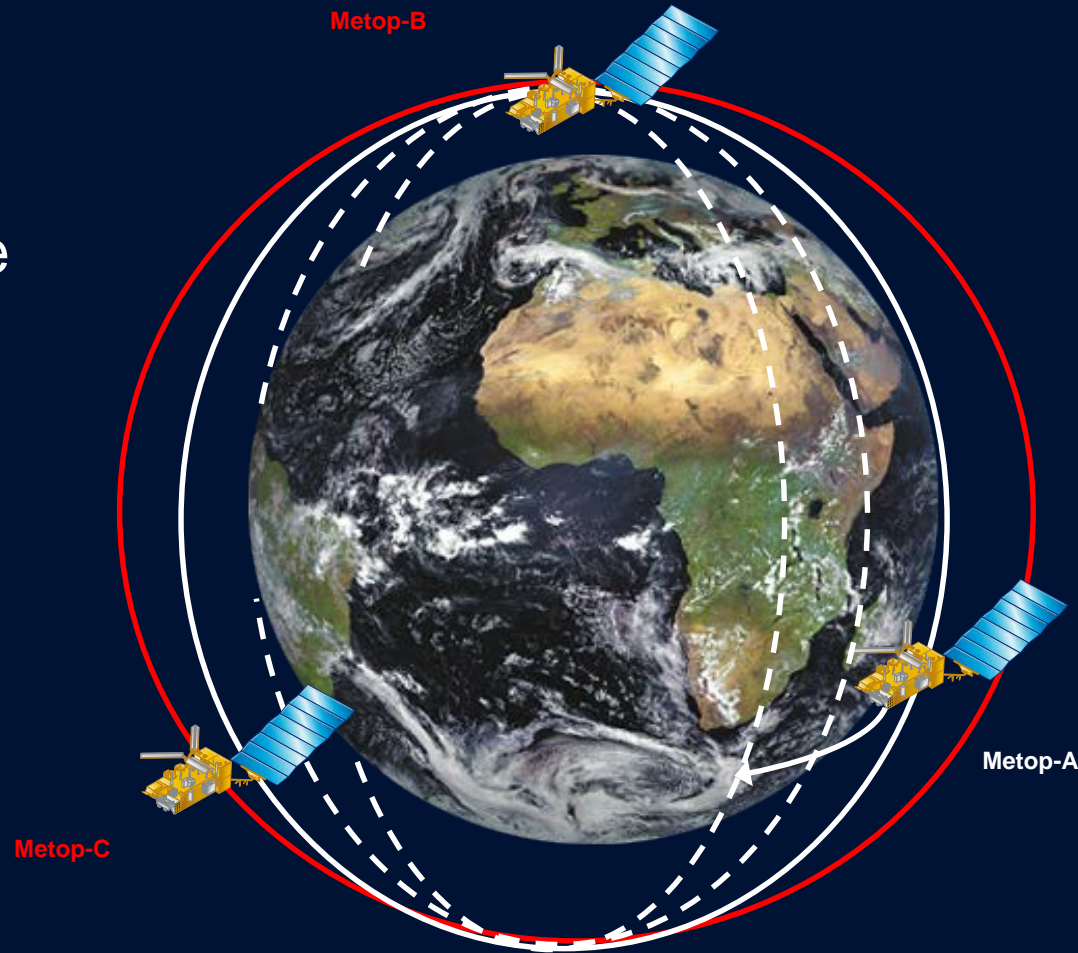
# Polar Multi-Sensor Aerosol Optical Properties - PMAp (August 2013 average)





# There will be three Metops in orbit 2018 – 2021

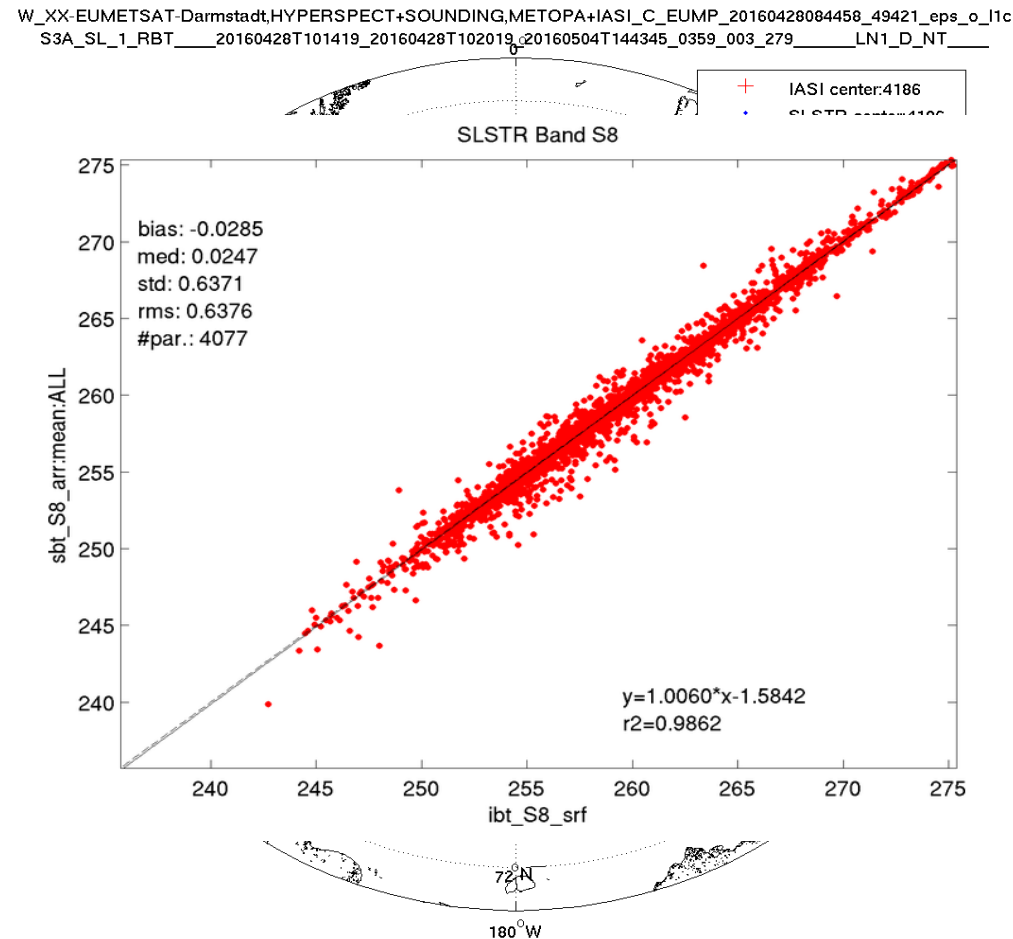
- Metop-A in drifting orbit; last OOP manoeuvre in August 2016 (EOL end 2021/early 2022)
- Metop-B prime satellite  
LTDN 9:30 LST
- Metop-C launch  
planned for late 2018  
LTDN 09:30 LST





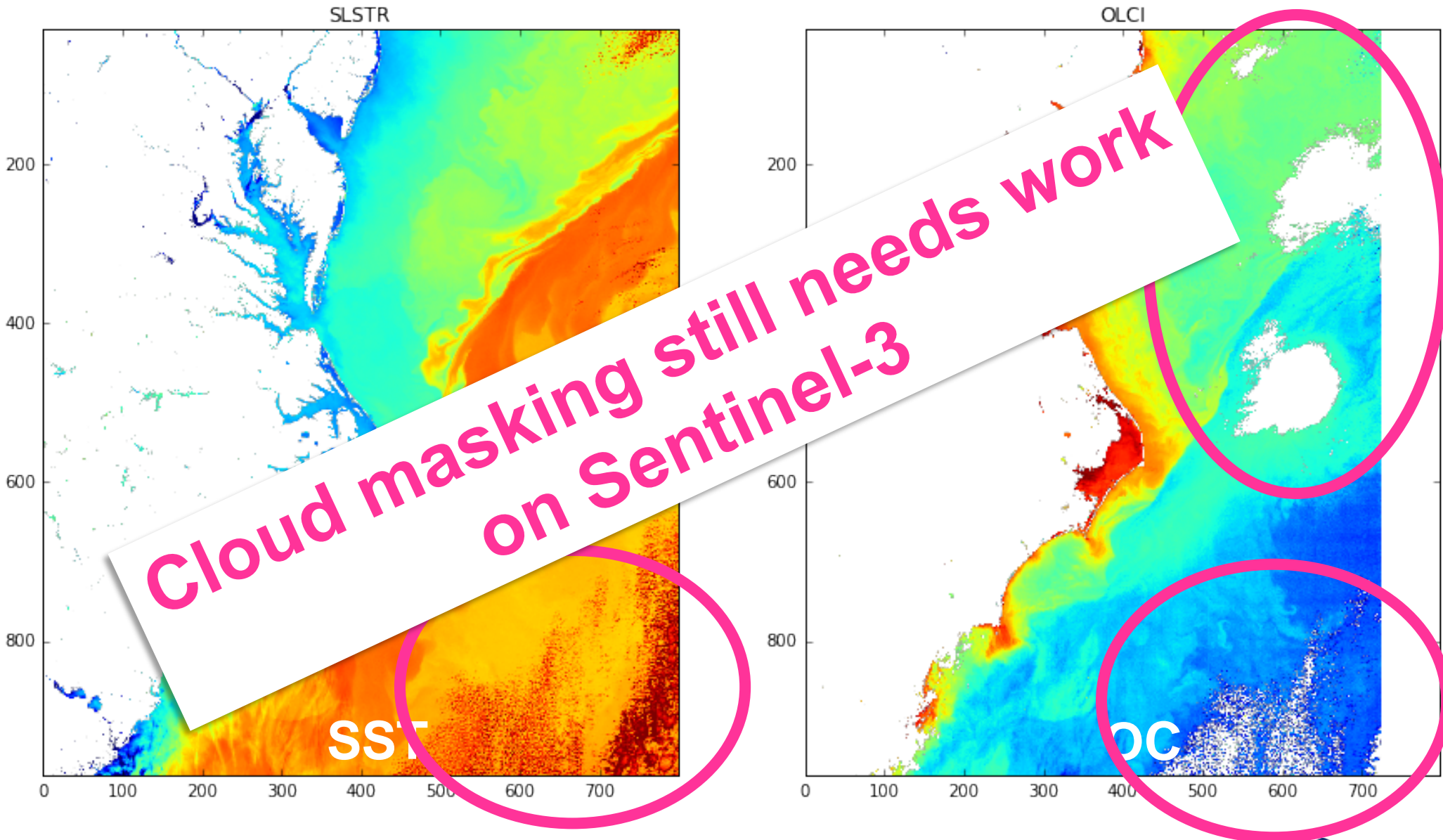
# Sentinel-3/SLSTR first calibration check (20160428)

- Apply GSICS Simultaneous Nadir Observations (SNO) methodology to intercompare the Sentinel-3/SLSTR with Metop-IASI instruments as a first check:
  - 10 min. satellite co-location, pixel aggregation without stray-light correction
- Extremely challenging process because of the data volumes involved and the complexity of the matching of the instrument fields of views
  - *this pragmatic approach to monitor the performance of the Sentinel-3/SLSTR using accepted international best practices to be implemented into the operational chain – especially in light of the launch of Sentinel-3b*



I. Tomazic, Marine Applications

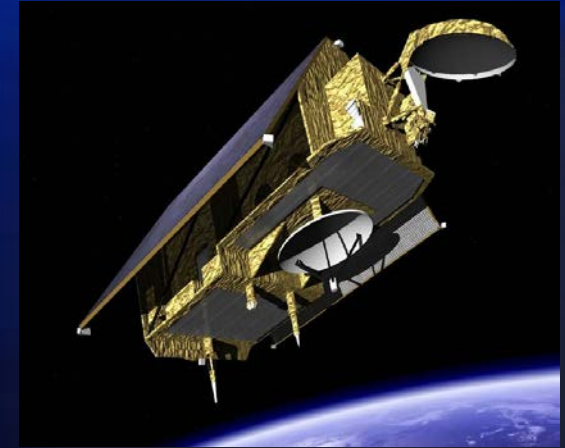
# Sentinel-3 SLSTR and OLCI L2 operational as of July



# Future Programmes and Programmes under Development



MTG: Approved, under development  
*Sentinel-4 on board MTG-S Satellites*



Jason-CS/ *Sentinel-6*  
Approved in December 2015



EPS-SG: Approved, under development  
Metop-SG programme approved at ESA-CMIN12  
*Sentinel-5 on board Metop-SG-A Satellites*



# EPS-SG A: sounding and imagery mission

## Metop-SG A

- 
1. **IASI-NG**  
Infrared Atmospheric Sounding
  2. **MWS**  
Microwave Sounding
  3. **METImage**  
Visible-Infrared Imaging
  4. **RO**  
Radio Occultation
  5. **3MI**  
Multi-viewing, -channel, -  
polarisation Imaging
  6. **Copernicus Sentinel-5**  
UN/VIS/NIR/SWIR Sounding

# EPS-SG B: microwave imagery mission



## Metop-SG B

1. SCA  
Scatterometer
2. RO  
Radio Occultation
3. MWI  
Microwave Imaging for  
Precipitation
4. ICI  
Ice Cloud Imager
5. ARCS-4  
Advanced Data Collection System



# Meteosat Third Generation (MTG): Mission overview

## ▪ Imagery missions (MTG-I):

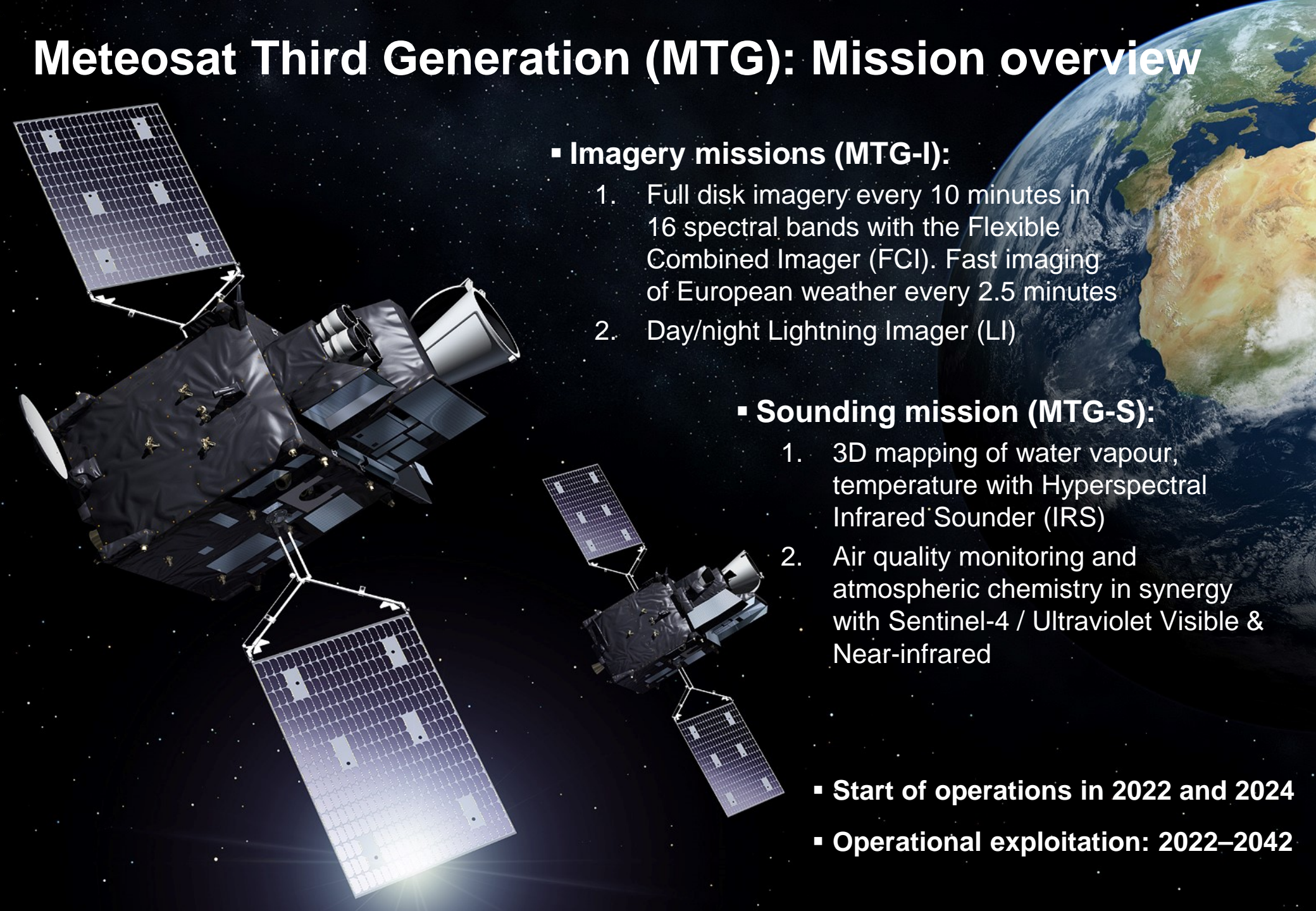
1. Full disk imagery every 10 minutes in 16 spectral bands with the Flexible Combined Imager (FCI). Fast imaging of European weather every 2.5 minutes
2. Day/night Lightning Imager (LI)

## ▪ Sounding mission (MTG-S):

1. 3D mapping of water vapour, temperature with Hyperspectral Infrared Sounder (IRS)
2. Air quality monitoring and atmospheric chemistry in synergy with Sentinel-4 / Ultraviolet Visible & Near-infrared

▪ **Start of operations in 2022 and 2024**

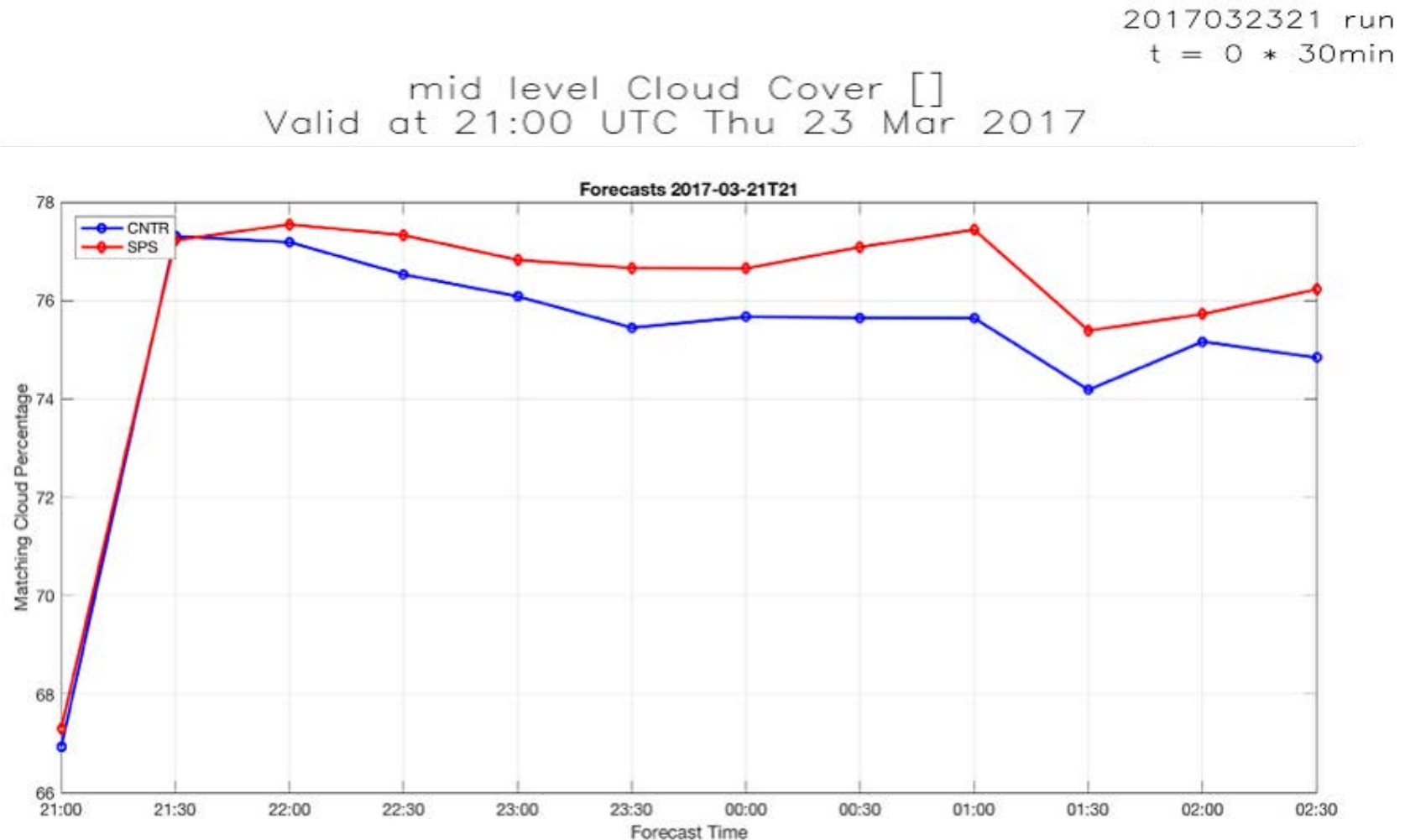
▪ **Operational exploitation: 2022–2042**





# MTG IRS preparations using IASI-L2VDP prototype

- Testing of Scaled Projected States (SPS) transformation of Migliorini (2012) using the CETEMPS (L'Aquila, IT) severe weather regional model (coop. P. Antonelli, SSEC)



# EUMETSAT-NOAA areas of collaboration

- EUMETSAT and NOAA have long standing cooperation at many levels:
  - IJPS and JPS operations and data sharing
  - Instrument hosting (e.g. AVHRR on Metops)
  - System interoperability (data flows)
  - Short- to long-term staff exchanges
- The Intention, as of the 2016 EUM-NOAA hi-level bilateral meeting, is to extend the operational exchanges to scientific areas, with the goal of product interoperability for the end-user communities through common algorithms, applications and tools developments, Fiducial Reference Measurements (FRM) developments, Cal/Val data sharing, etc.

# EUMETSAT-NOAA areas of collaboration (ii)

- As of today, more than a dozen face-2-face meetings, and telecons haven't take place, including a dedicated marine workshop last March
- Current activities under discussion with the NESDIS/STAR teams:
  - Joint Sentinel-3 Ocean Colour and SST product validation (protocols/tools)
  - Development of a joint NOAA-EUM Ocean Colour algorithm (under the auspice of IOCCG)
  - Development of FRM instruments and the related data collection protocols, for example the design of a European “MOBY-type” buoy
  - Joint development of the RADS altimetry QA tool for Jason(s)/Sentinel-3
  - Staff exchanges/reviews for hyperspectral IR L1 processing/intercalibration
  - Initiate the development of a joint hyperspectral IR “full physics” retrievals  
→ *with the goal of interoperability for the forecasters*
  - Include NOAA experts in EUMETSAT Mission Advisory Groups such as for IASI/IASI-NG and IRS, MWI/ICI, etc.

***More to be formalised in the next days and months***



# EUMETSAT future programmes overview – Thank you!

