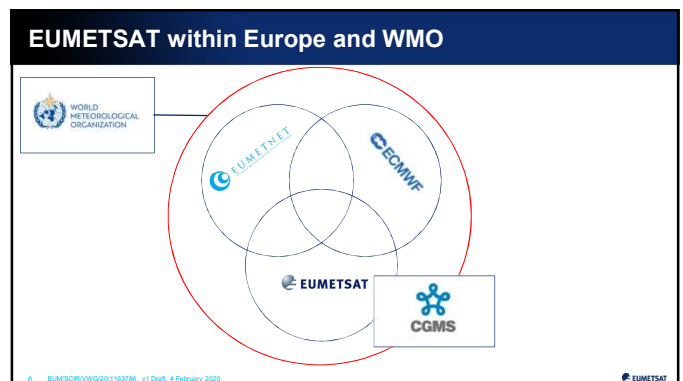
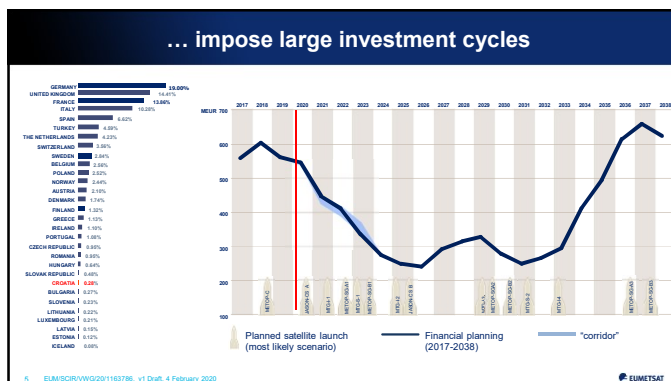
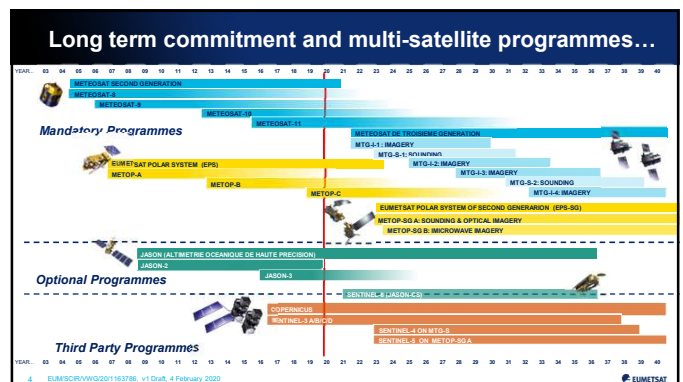





EUMETSAT: mandate and programmes

- Mandate**
 - Establish, maintain and exploit European systems of operational meteorological satellites
 - Contribute to operational monitoring of climate
- Activity structured by programmes approved by Member States**
 - Mandatory programmes
 - Optional programmes
 - Third-party programmes



Meteorology needs two types of satellites

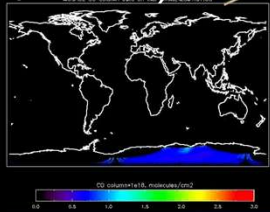
Meteosat



00:00

Geostationary orbit
Nowcasting and forecasts up to a few hours

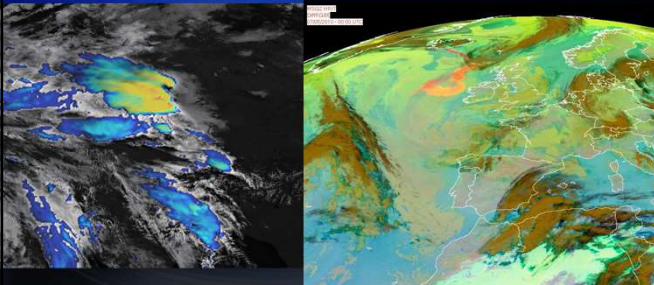
EUMETSAT Polar System



Polar orbit
Global forecasts up to 10 day

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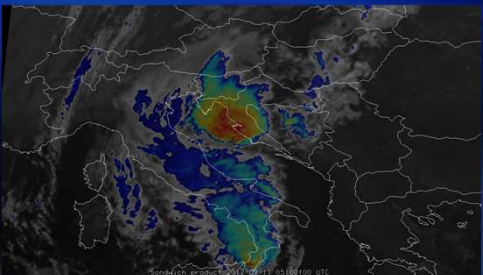
Meteosat for nowcasting of fast developing high impact weather



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MSG Animation over Croatia

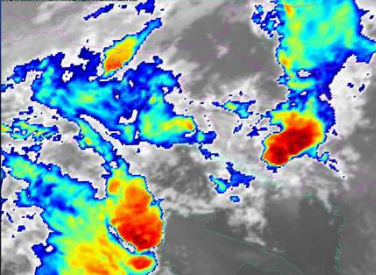
Flash floods in Zadar Region – 11 September 2017



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MSG Animation over Croatia

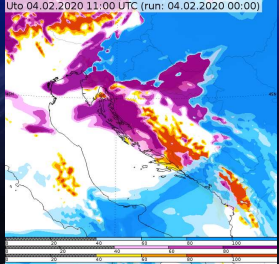
Flash floods in Zadar Region – 11 September 2017



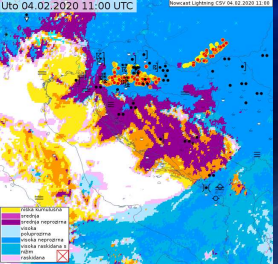
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Use of EUMETSAT data at the Croatia DHZ

Uto 04.02.2020 11:00 UTC (run: 04.02.2020 00:00)



Uto 04.02.2020 11:00 UTC



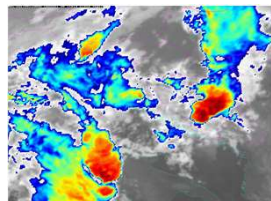
11 EUMETSAT/VV0201103786 v1 Draft 4 February 2020 EUMETSAT

Use of EUMETSAT data at the Croatia DHZ



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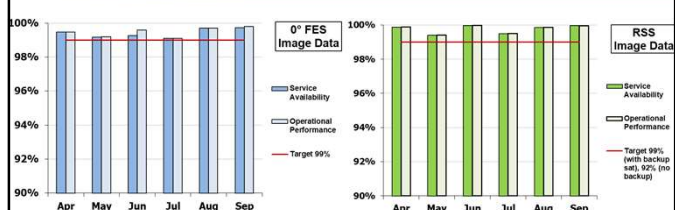
Information to the general public



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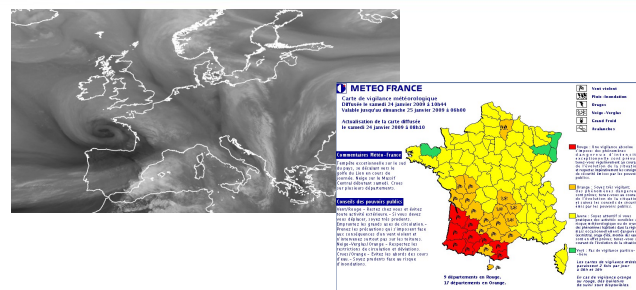
High targets for absolute availability



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Confirmation of forecast scenario



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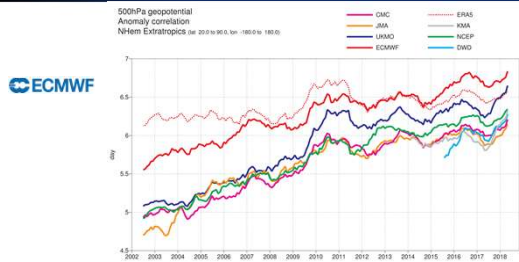
EUMETSAT Polar System: contribution to a Joint Polar System shared with the US



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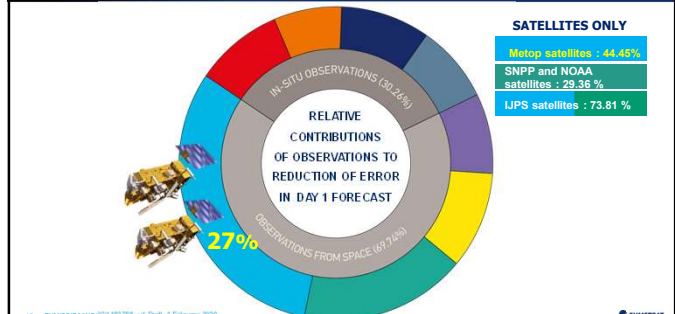
Europe world leader of medium range numerical weather prediction



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EUMETSAT

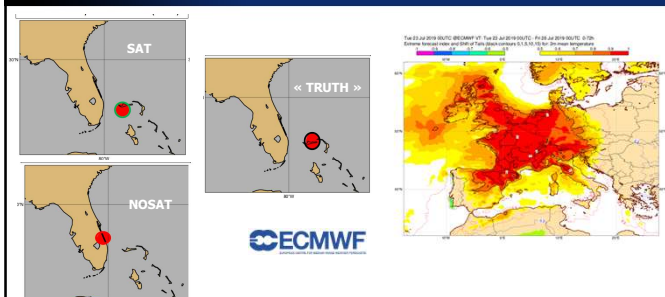
The EUMETSAT Polar System satellites has the highest impact on Global Numerical Weather Prediction



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Some forecasts matter more than others



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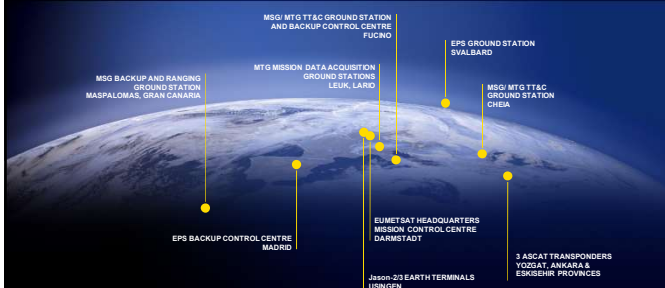
EUMETSAT currently exploits 10 satellites



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EUMETSAT ground systems across Europe...



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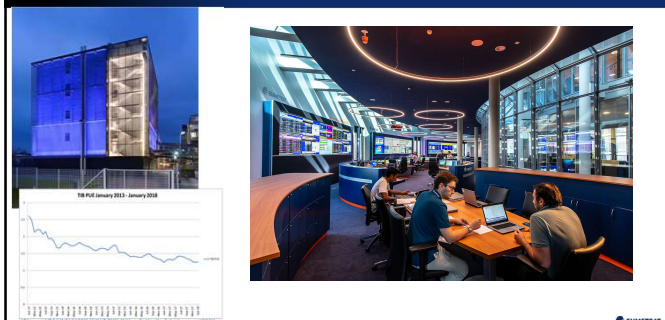
Ground stations for controlling satellites and acquiring their data



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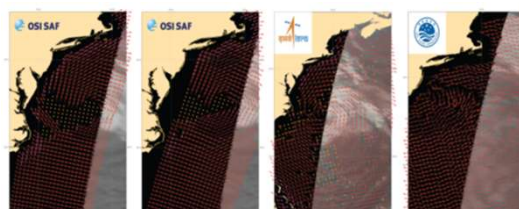
World class infrastructure



23 EUMETSAT/VV0201163786 v1 Draft 4 February 2020

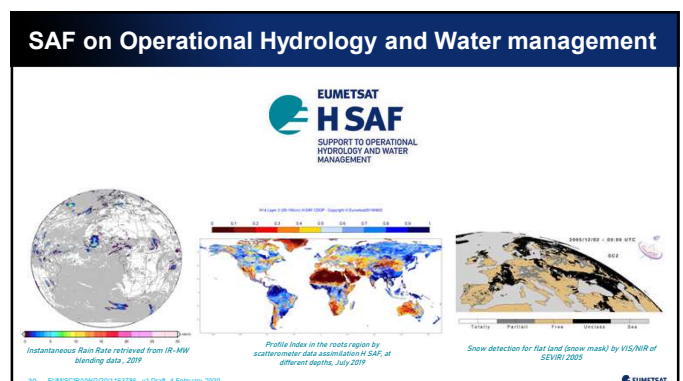
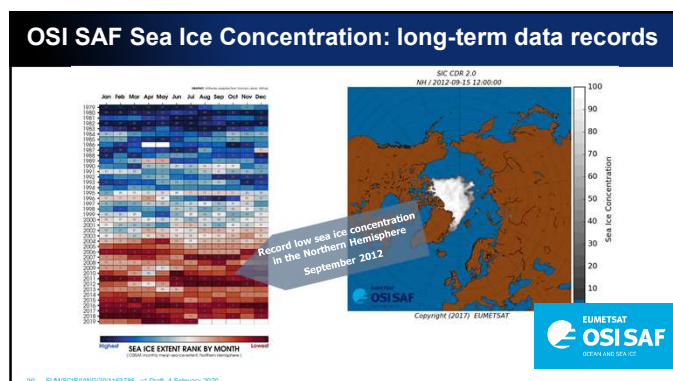
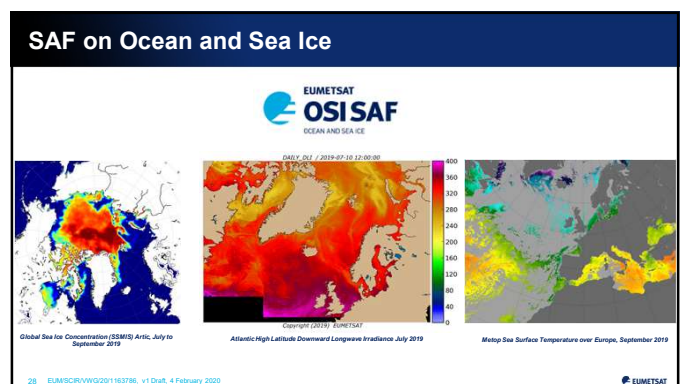
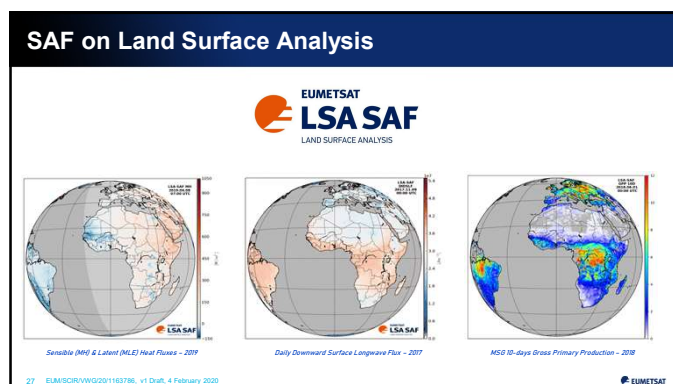
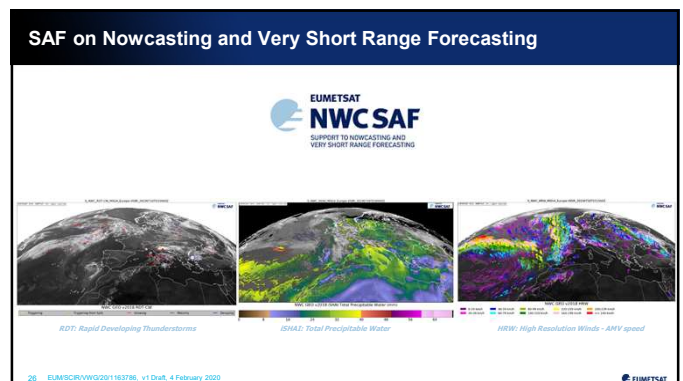
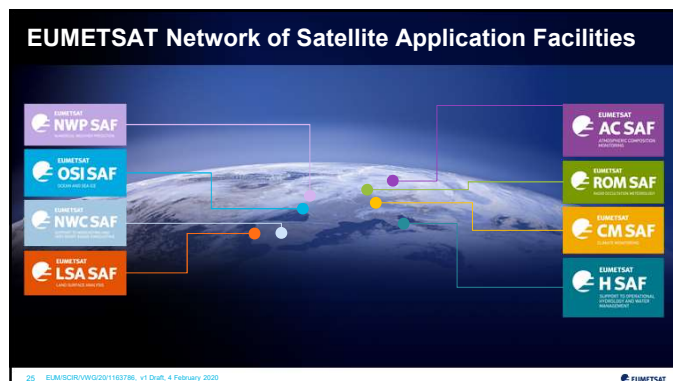
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Extracting products from observations

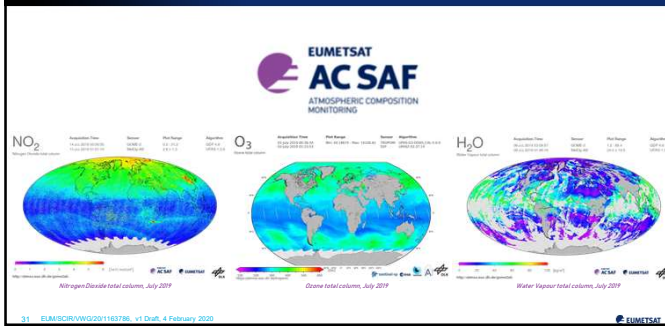


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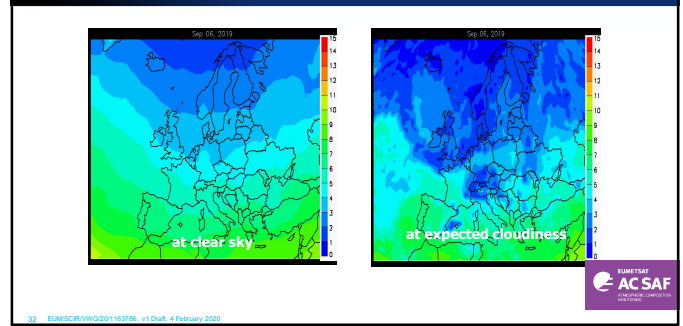
EUMETSAT



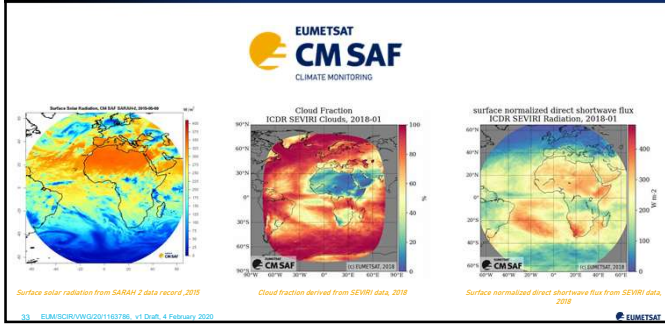
SAF on Atmospheric Composition Monitoring



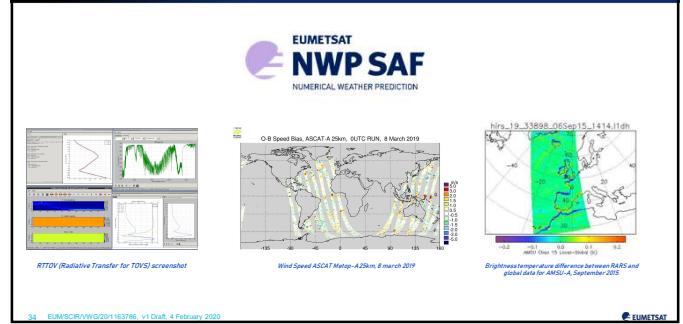
AC SAF UV Index from EPS GOME-2 satellite data



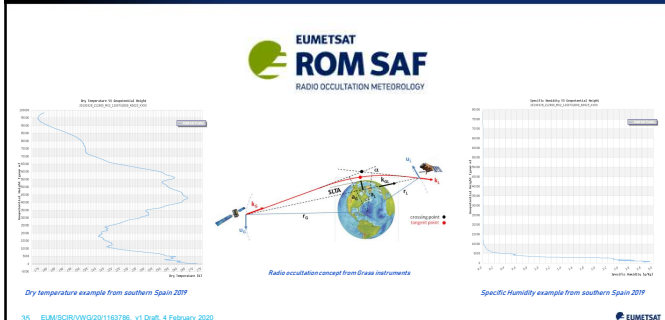
SAF on Climate Monitoring



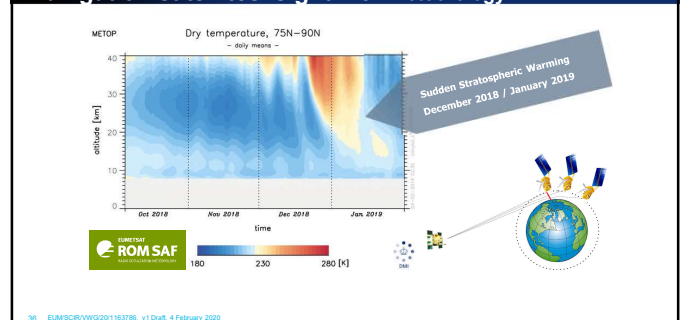
SAF on Numerical Weather Prediction

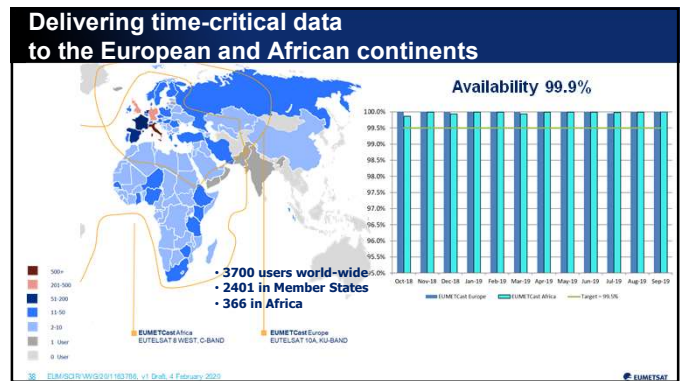
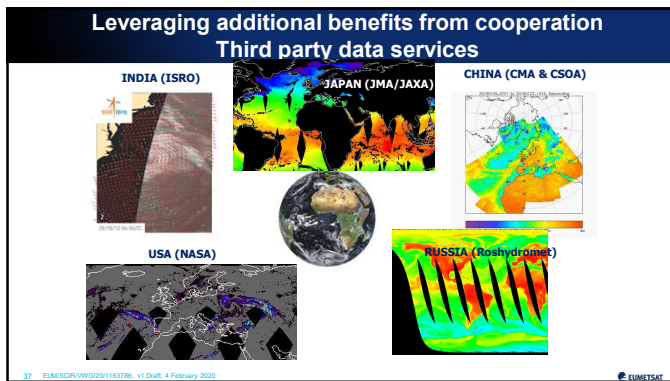


SAF on Radio Occultation Meteorology



Radio Occultation: Navigation satellites' signal for meteorology





EUMETSAT in a multilateral world

- CGMS: coordination group on meteorological satellites (under WMO)
- CEOS: coordination on Earth observation satellites
CEOS-SIT meeting in Zagreb in September 2020
- GEO: Group on Earth observation

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EUMETSAT user support, training and conference

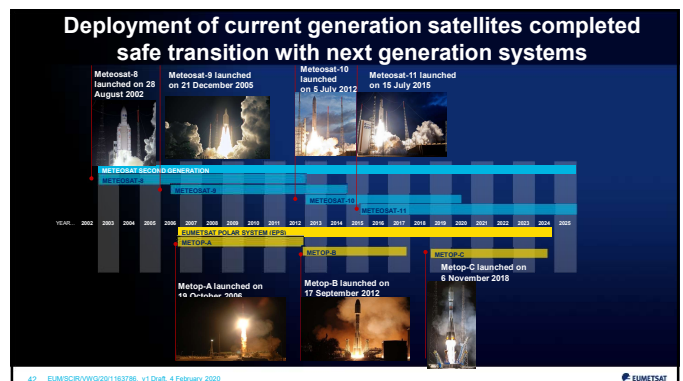
- EUMETSAT training programme
 - <https://training.eumetsat.int/>
 - <http://www.eumetrain.org>
- EUMETSAT help desk
 - ops@eumetsat.int
- EUMETSAT Meteorological Satellite Conference
 - 28 September - 2 October 2020 in Würzburg, Germany

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Cooperation with Western Balkan

- Facilitate access and use of EUMETSAT data by Western Balkan NMHS
- DAWBEE project: supported by DHMZ expert
- Biennial Information Day in western Balkan
- Dedicated training programme (SEEMET)

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MSG et EPS in retrospect

- **MSG**
 - Has been the best geostationary imagery mission for 12 years, is still the best over the Indian Ocean
 - End-to-end availability: 99%
 - Longevity: 4 satellites in orbit, Meteosat-8 over the Indian Ocean until mid-2022
- **EPS**
 - After 12 years in orbit, EPS has still the highest impact on NWP
 - IASI was the first operational hyperspectral infrared sounder
 - End-to-end availability: 98%
 - Longevity: 3 satellites in orbit, Metop-A until end of 2021
 - Socio-economic benefit in the EU:
 - At least 5.4 B€/year, 32 times the annualised operations cost

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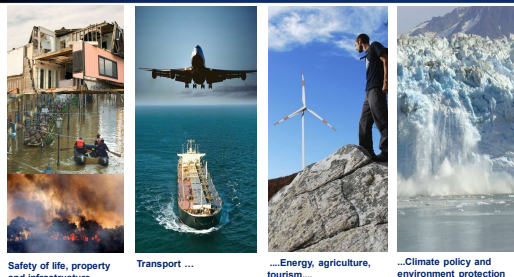
Benefits



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Benefits areas of weather forecasting



Safety of life, property and infrastructure...

Transport ...

...Energy, agriculture, tourism...

...Climate policy and environment protection

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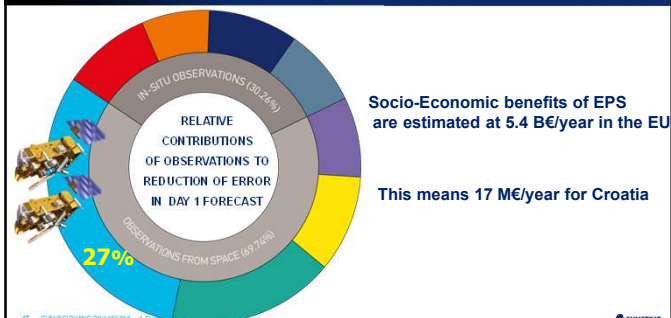
Socio economic benefits of weather forecasts (proportional to GDP in developed economies)

AREA FOR WHICH BENEFITS CAN BE QUANTIFIED	ESTIMATED BENEFIT IN EU 27
Protection of property and infrastructure	€5.4 billion/year
Added value to economy	€41.0 billion/year
Private use by citizens	€15.0 billion/year
TOTAL ESTIMATED BENEFIT FOR EU 27	€ 61.5 billion/year
TOTAL ESTIMATED BENEFIT FOR CROATIA (assuming GDP is 0.32% of EU 27 GDP)	€ 190 million/year

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The EUMETSAT Polar System satellites has the highest impact on Global Numerical Weather Prediction



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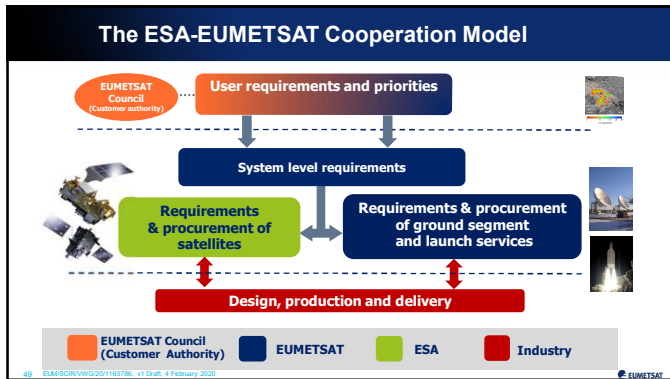
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EUMETSAT Next Generation Satellite Systems

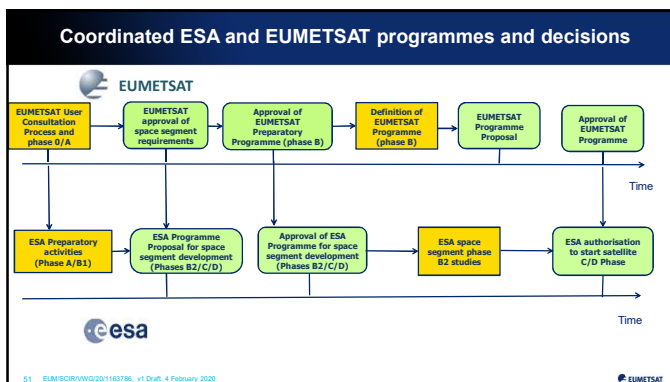


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- ### EUMETSAT Procurement Policy
- Overarching principle: Best Value for Money
 - No georeturn
 - Open competition within Member States
 - “EUMETSAT shall take maximum advantage of the technologies developed in Europe”
 - Procurements of recurrent satellites delegated to ESA
 - Block procurement with development of first (prototype) satellites funded 70% by an ESA optional programme



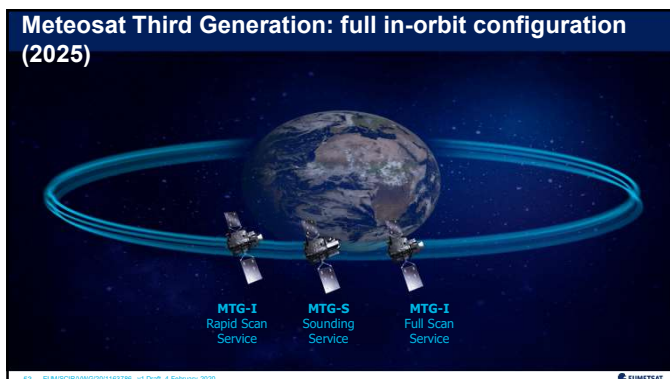
Meteosat Third Generation: two types of MTG satellites

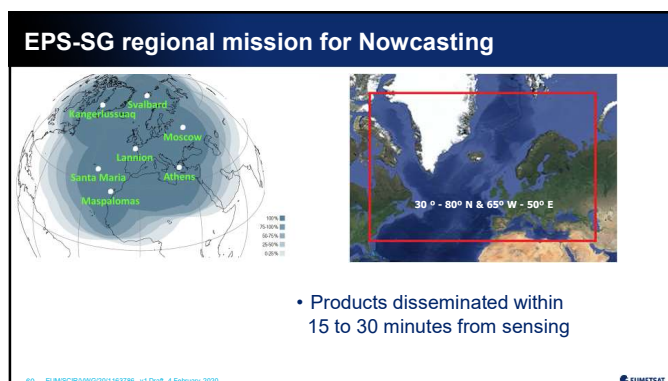
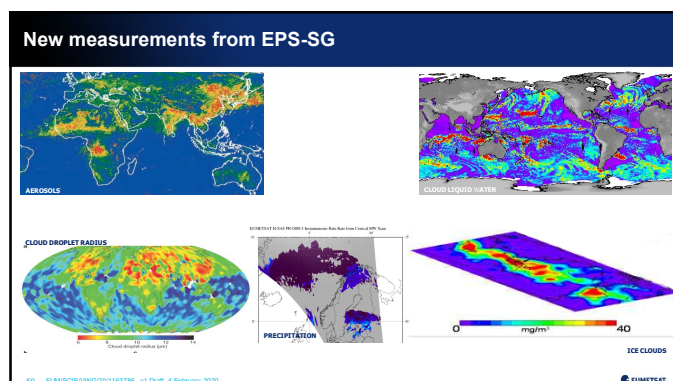
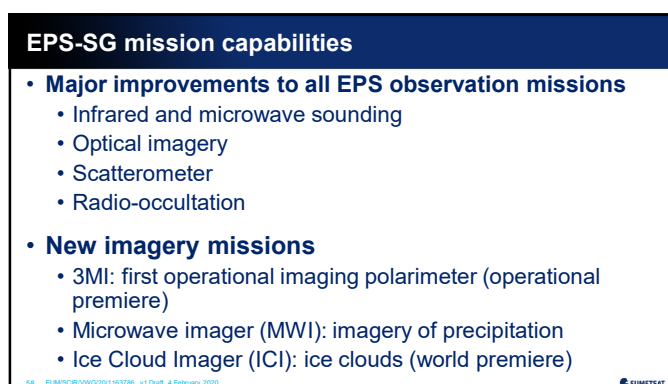
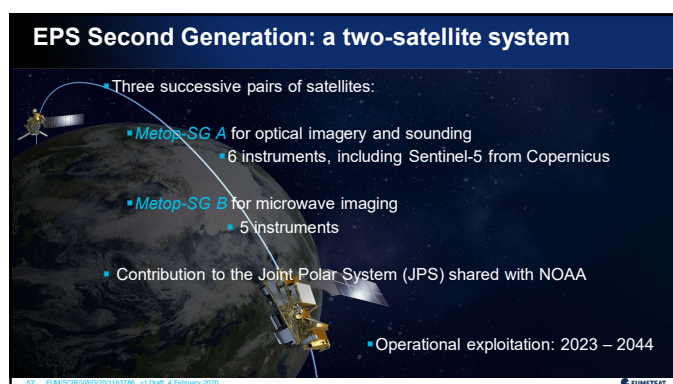
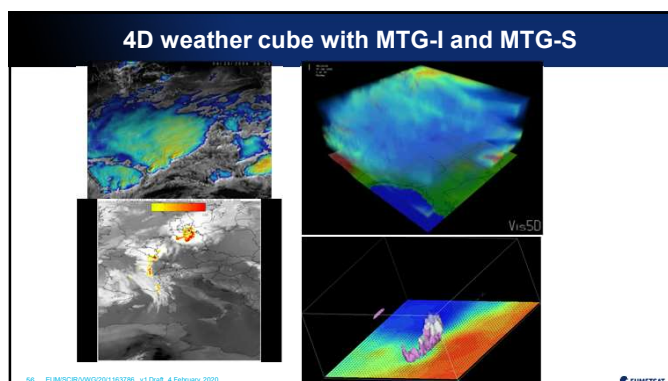
Imagery mission: MTG-I satellites

- Full disc every 10 minutes in 16 spectral bands (MTG-I1)
- Imagery of Europe every 2.5 minutes (MTG-I2)
- Full disc Lightning Imager

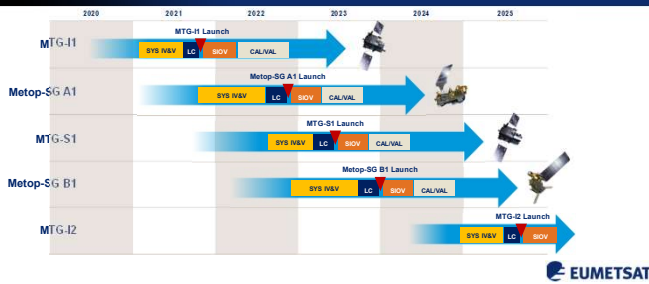
Sounding mission: MTG-S satellites

- IRS hyperspectral infrared sounder
 - Temperature, moisture profiles every 30 minutes (Europe)
- Atmospheric chemistry:
 - IRS/Copernicus Sentinel-4 synergy
- Operational exploitation: 2022-2042





One launch per year from 2021 to 2025



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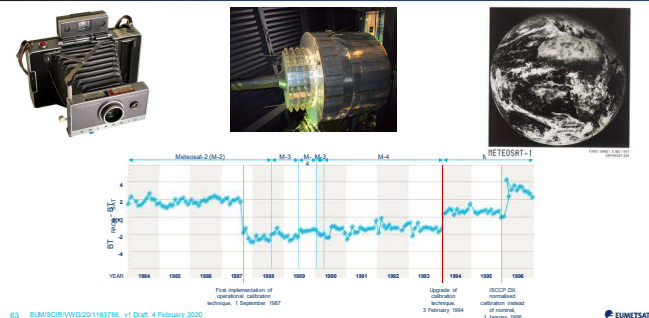


Climate monitoring



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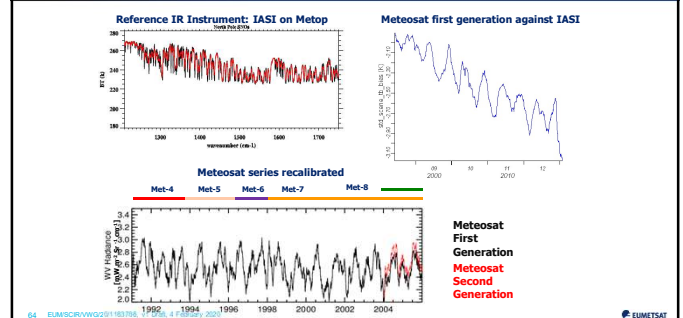
The challenge of climate monitoring from space



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Cross-calibration : IASI as an infrared calibrator

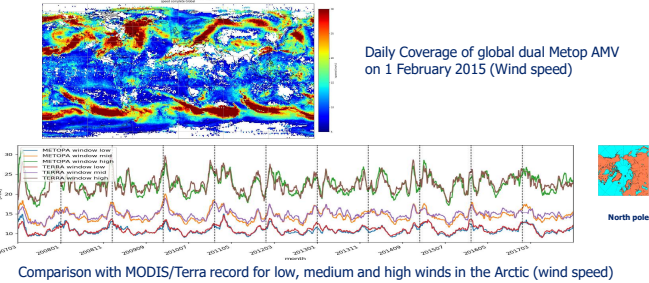


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Support to climate services New climate records

Records of Metop Atmospheric Motion Vector for C3S (2007-2017)

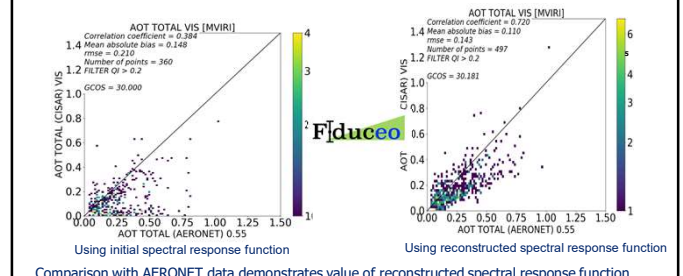


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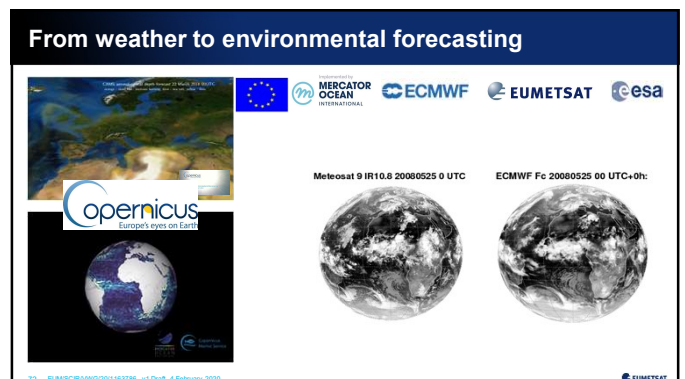
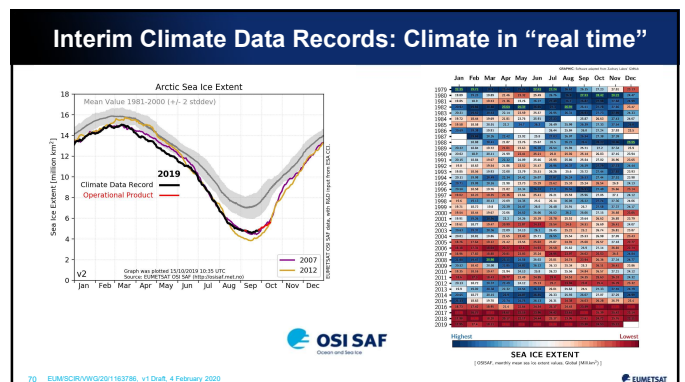
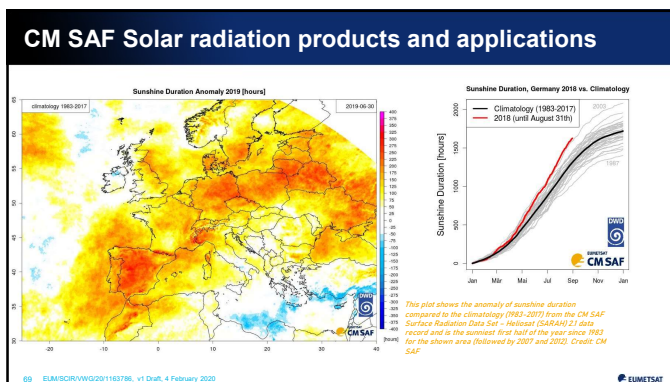
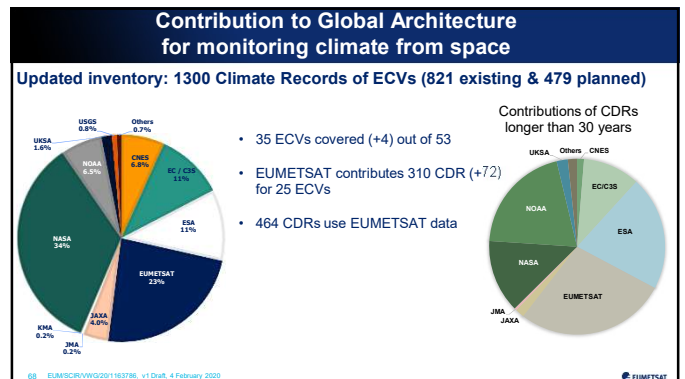
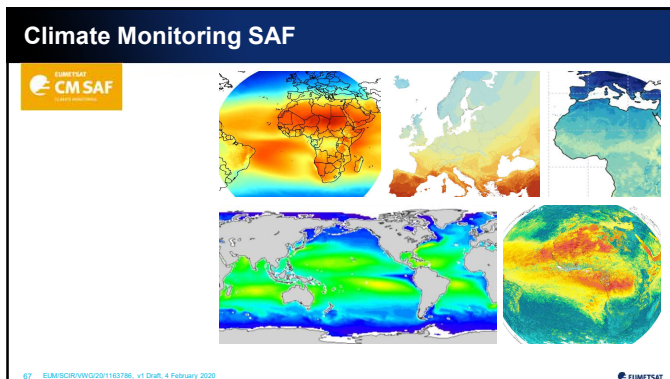
Support to climate services New climate records (2)

Meteosat 1st generation records of surface albedo & aerosol optical thickness (1991-2006 at 0°; 1998-2007) at 63°E



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EUMETSAT activities in support of Copernicus

- Legal Framework:
 - EUMETSAT: Third Party Programme foreseen by the Convention approved on 15 October 2014
 - EU: Copernicus Agreement signed on 7 November 2014, amended in January 2019 (254 M€ over 7 years)
- Focus: ocean and atmospheric composition monitoring
- Cooperation with ESA on development and operations
- Vision: *deliver integrated data streams (from Copernicus, EUMETSAT and third party missions)*

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EUMETSAT contributions to



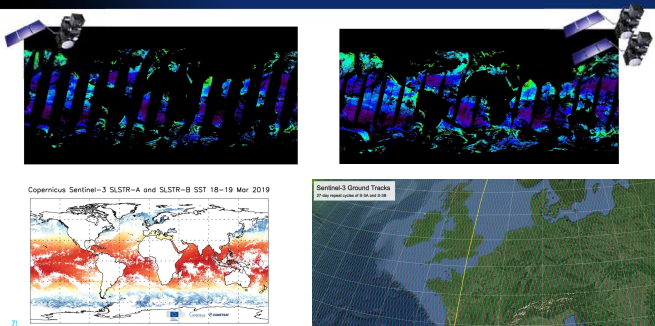
- Ocean monitoring
 - Dual satellite Sentinel-3 Marine mission
 - Jason-3 and Sentinel-6/Jason-CS cooperative missions
- Atmospheric Composition monitoring
 - Sentinel-4 as part of MTG(-S) system
 - Sentinel-5 as part of EPS-SG system
 - Preparation of CO2 monitoring mission
- Data access and support services



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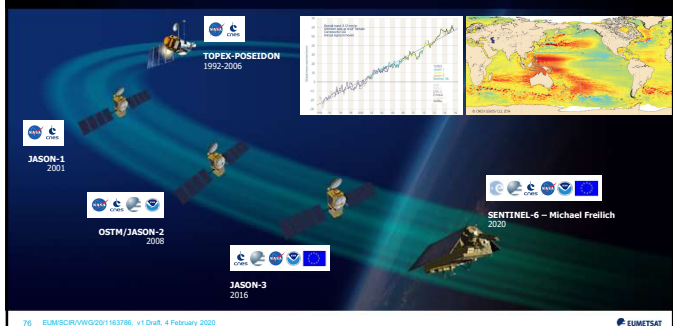
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26 March: dual Sentinel-3 marine mission in routine operations



75

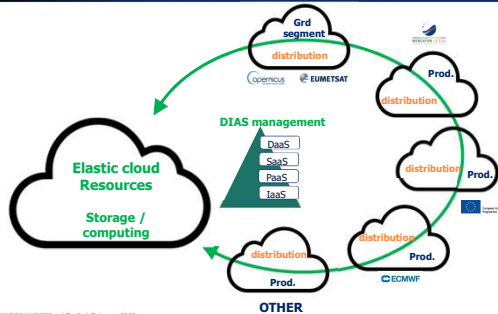
Monitoring Mean Sea Level and Ocean Circulation



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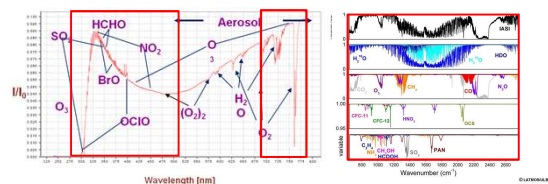
WEKEO Copernicus DIAS Platform with ECMWF and Mercator-Ocean



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Atmospheric chemistry: IASI-NG & Sentinel-5 on Metop-SG A



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