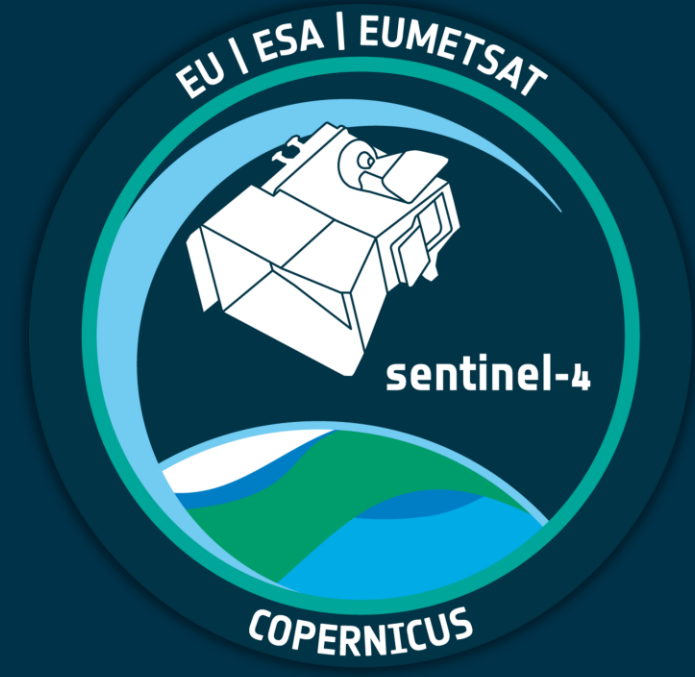


Copernicus Sentinel-4

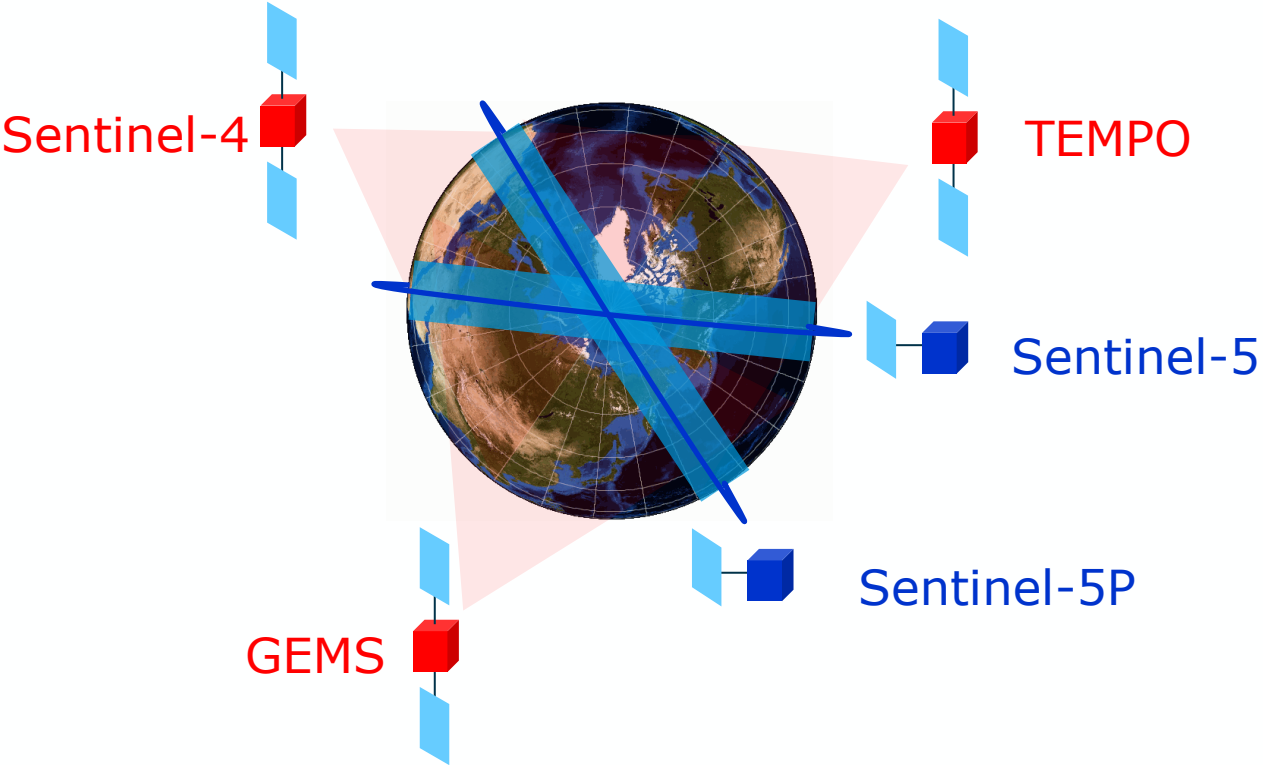


Ben Veihelmann, ESA Mission Scientist for Sentinel-4 and Sentinel-5

Thanks to

S4 Teams at ESA, EUMETSAT, DLR,
Consortium led by Airbus, EC, CAMS

AC-VC#22, 1-4 May 2026, SRON, Leiden, Netherlands

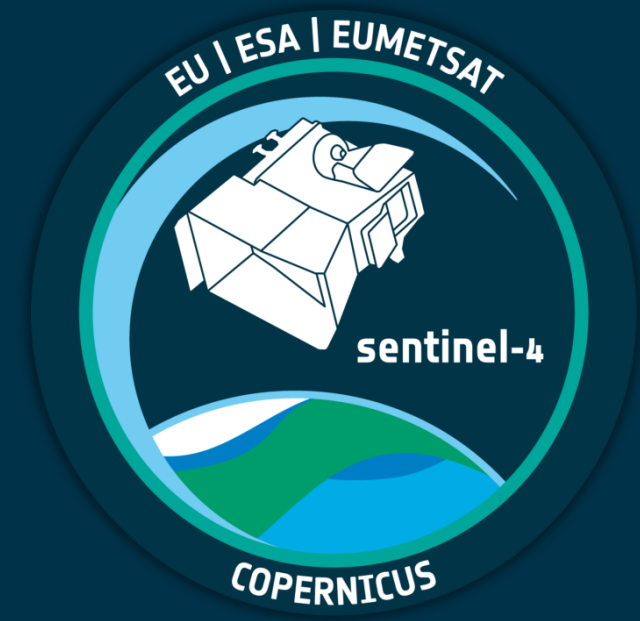


AC-VC whitepaper on
GeoAQ Validation Needs

Consistency Targets		
O ₃	Total column	1%
	Stratospheric	5%
	Tropospheric	20%
NO ₂	Total column	1×10 ¹⁵ molec/cm ²
	Tropospheric	1×10 ¹⁵ molec/cm ²
SO ₂		1×10 ¹⁶ molec/cm ²
HCHO		1×10 ¹⁶ molec/cm ²
CHOCHO		4×10 ¹⁴ molec/cm ²
AOD		0.05 @ 440 nm
Earth radiance		2-5%
Solar irradiance		1-2%
Reflectance		2-5%

2000 +	17	18	19	20	21	22	23	24	25	26	27	28	...		
S5P												...			
GEMS														...	
TEMPO													...		
S4													...	FM2	
S5													...	FM2	FM3

For observing air quality over Europe with hourly revisit time on a long-term operational basis



UV-Vis-NIR (UVN) Imaging Spectrometers on MTG-S series

- Built under the responsibility of ESA
 - Instruments and L1 Prototype Processor by a consortium led by Airbus
 - L1 Reference Processor by Huld
 - L2 Operational Processor by a consortium led by DLR
- Operated by EUMETSAT
- Hourly coverage of Europe enabled by geostationary orbit
- Mission lifetime of >16.5 years: two S4 in sequence

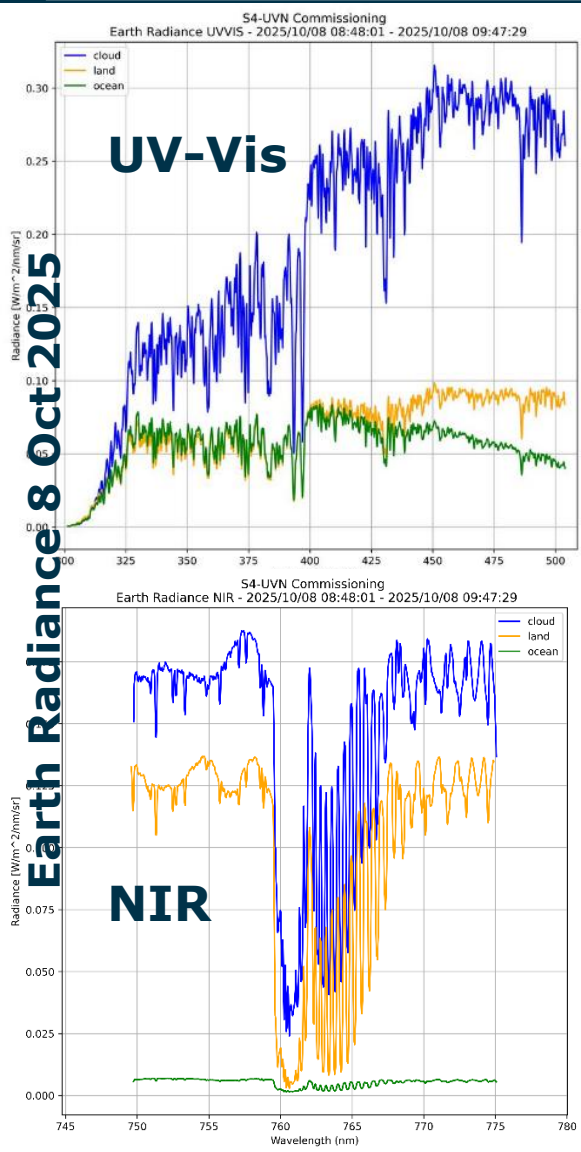
Copernicus Atmosphere Monitoring Service (CAMS) is committed to exploit S4 data for operational information services

Copernicus Sentinel-4

Sentinel-4
Proto Flight Model

Sentinel-4
on MTG-S1
satellite

Launch of MTG-S1
with a Falcon 9
1 Juli 2025



Proto Flight Model on MTG-S1

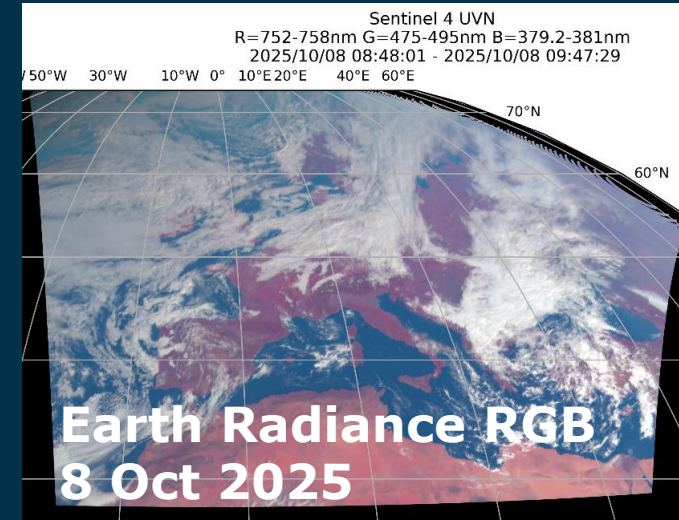
- Launched with a Falcon 9 on 1 July 2025
- Switched on 15 September
- Nominal acquisitions since mid November
- S4/UVN Commissioning Results Review January 2026
- In-flight commissioning of L1 and L2
- Ongoing tests: full disc, fast scans, PICS, planets
- Re-location 3.6°W to final position 0°E

Next steps

- Hand-over to EUMETSAT
- Cal/Val activities
- Public release of data products in staggered approach

Flight Model 2

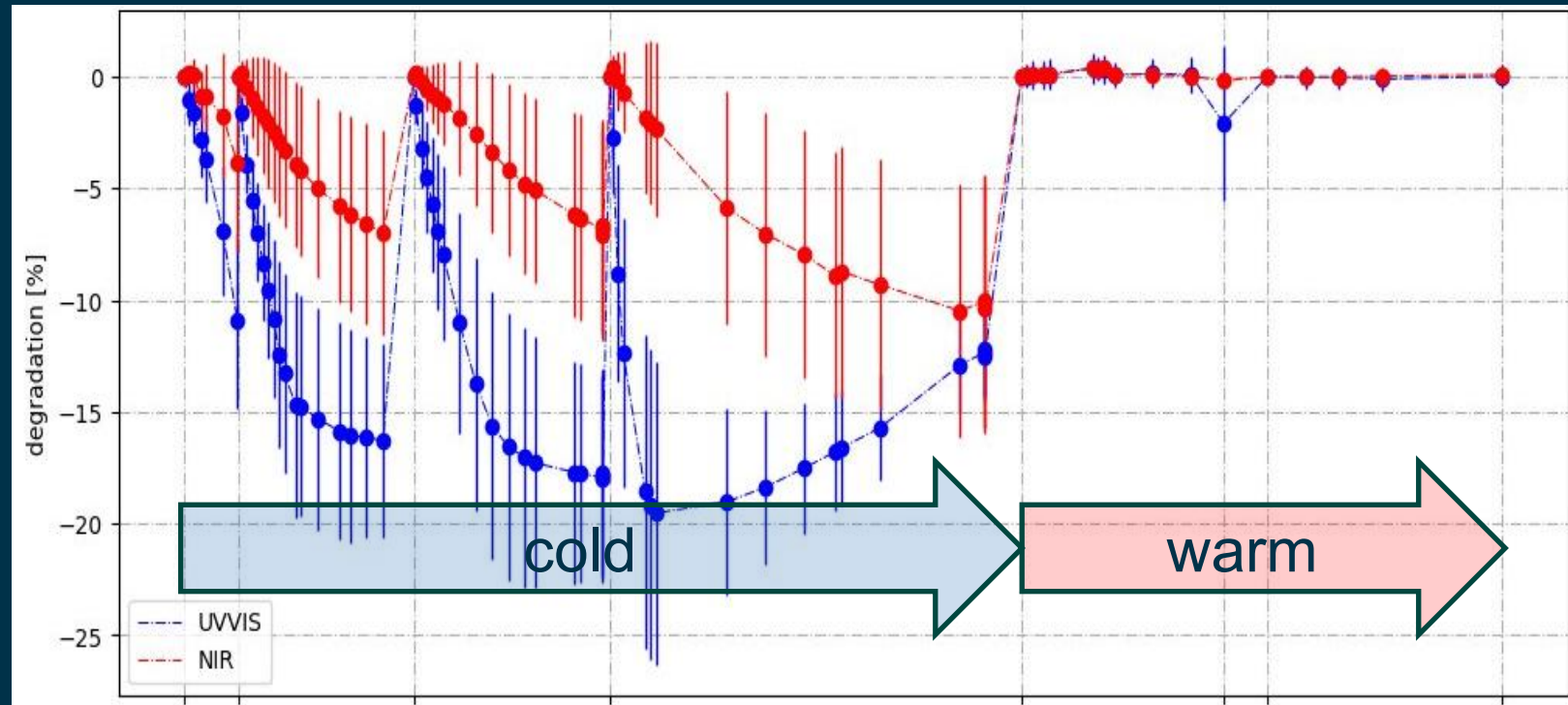
- On-ground characterization & calibration completed April 2026
- Outlook: tests at satellite level, long-term storage, re-calibration



- S4 Proto Flight Model is behaving well in flight
- L1 radiometric, spectral, geometric performances are overall very good
- Ongoing work on remaining smaller features

... after solving an issue

- radiometric degradation and evolving pseudo-noise
- due to molecular contamination of detectors
- fixed by operating the instrument with a higher detector temperature, February 2026



S4 Level-2 Operational Processor (L2OP)



- Ongoing work at ESA & S4L2OP team to verify health of L2 products
- Then handover for integration in processing chains at EUMETSAT
 - L2OP V2.7 with Batch#1 of L2 products target end June 2026
 - L2OP V3.0 with Batch#2 of L2 products target October 2026
- Status of L2 Products
 - next presentation by Diego Loyola (DLR, lead S4L2OP consortium)

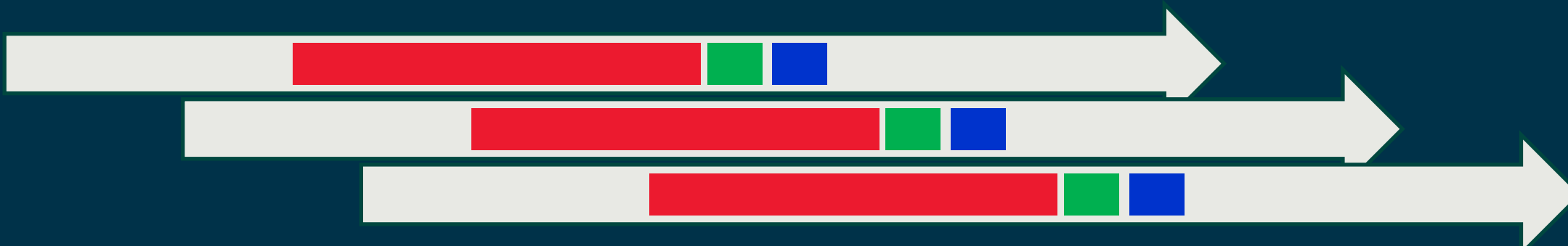
S4	
O ₃	TOC & TRC
NO ₂	TOC
SO ₂	TOC
HCHO	TOC
CHOCHO	TOC
Aerosol	AOD, Layer height UV index
Cloud	AUX
Surface	AUX
UV	

TOC = total column
TRC = tropospheric column



Joint ESA-EUMETSAT Approach to Calibration & Validation (Cal/Val) for Sentinel-4 and Sentinel-5 Operational Mission Products

- Joint Announcement of Opportunity Call issued July 2024
 - To trigger & coordinate Cal/Val activities
 - establish in-flight data quality, verify that performance targets are met, using independent reference data
- >20 Proposals received and accepted
- Cal/Val Projects → Cal/Val Reviews → Public Releases
- Staggered approach start Cal/Val
 - first batch of products late summer 2026
 - second batch Q4 2026



Sentinel-4 on MTG-S1 and -S2

UV-Vis-NIR Imaging Spectrometer

Geostationary orbit → hourly Europe

Air quality



End of presentation Thank you Questions?

O_3
 NO_2
 SO_2
Aerosol
HCHO
CHOCHO
 CH_4
CO

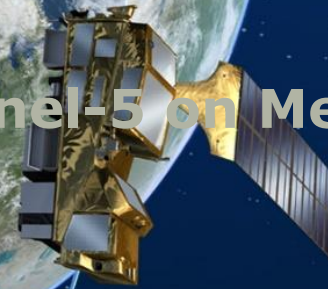
Sentinel-5 Precursor
TROPOMI

Early afternoon



Sentinel-5 on MetOp-SG-A1, -A2, -A3

Morning



UV-Vis-NIR-SWIR Imaging Spectrometer

Polar orbit → daily global

Air quality, climate, ozone & UV