

The Domino-E Webinar Series: Unlocking the Future of Earth Observation

Webinar Session 1: The Domino Architecture
A New Era of Earth Observation

19.03.2025, 10:30 - 12:00 CET



www.domino-e.eu



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History and State of the Art for EO Mission Management

Michael Anranter (OIKOPLUS GmbH)



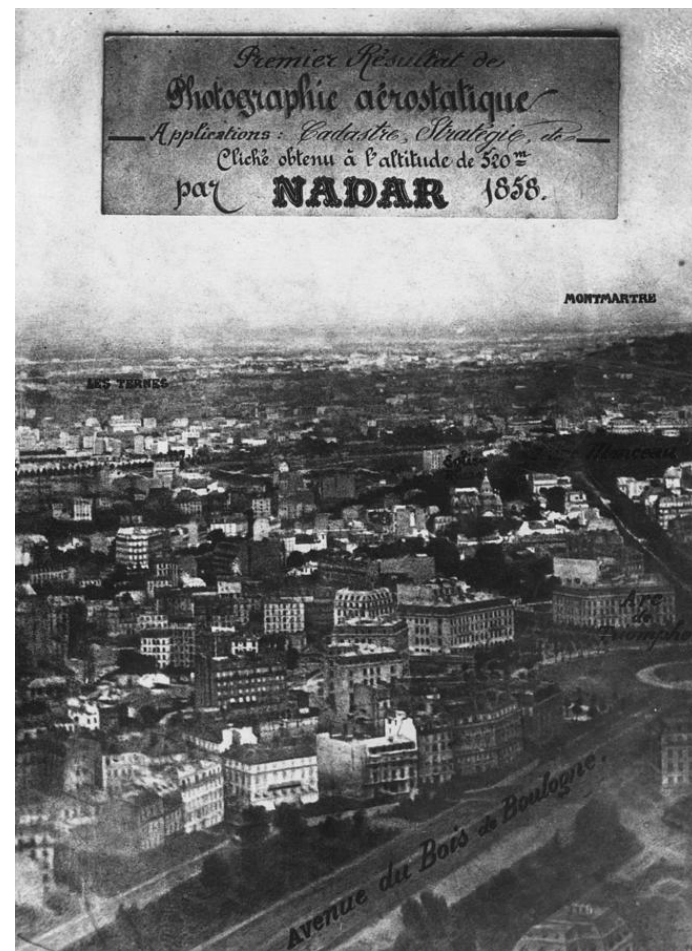
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The Early Days of EO

1858-1942



1858, Félix Nadar

Photograph taken from hot air balloon



1906, George Lawrence

Photograph taken from kite



1907, Julius Neubronner

Pigeon photography



1942, n.n.

Photograph taken from airplanes

Space-based Earth Observation

24.10.1946

First photo of Earth taken from space.

Film: 35mm

**Source: White Sands Missile Range/Applied
Physics Laboratory**



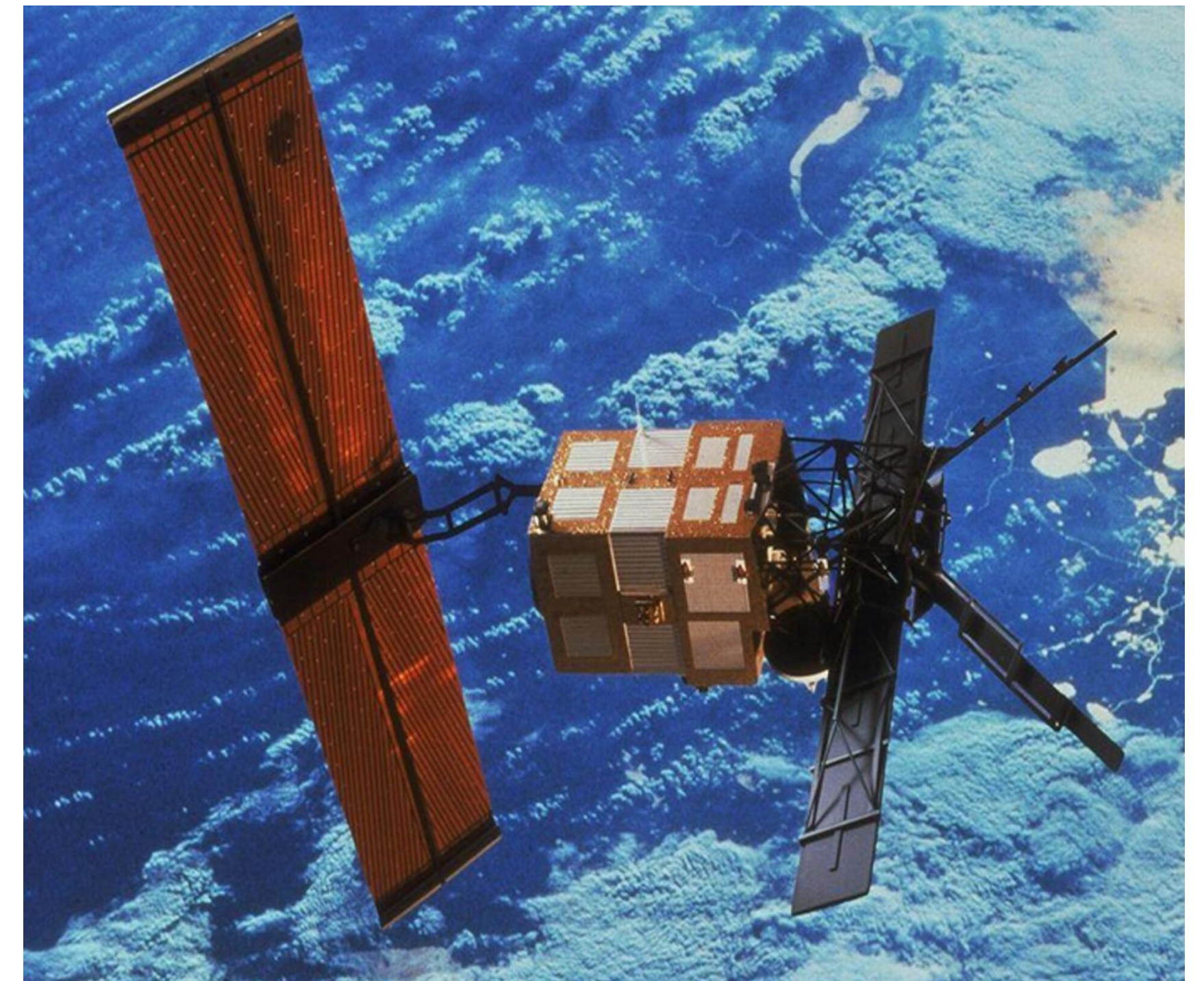
Sattelite-based Strategic Earth Observation since 1950's

Selected EO programmes in chronological order

LANDSAT — NASA, 1972 - today. 1st civic acquisition of satellite imagery (for agriculture, cartography, geology, forestry, regional planning, surveillance, education)

SPOT Système Probatoire d'Obersvation de la Terre — CNES, 1986-2024. 1st European high-resolution commercial EO satellite.

ERS 1&2 European Remote Sensing Satellites — ESA, 1991-2011. Highlight: C-Band Synthetic Aperture Radar with 30m*30m resolution.



ESA, 2011. Url: [https://www.esa.int/ESA_Multimedia/Missions/ERS-2/\(result_type\)/images](https://www.esa.int/ESA_Multimedia/Missions/ERS-2/(result_type)/images)

Current EO Missions

Selected satellite-based EO missions

Governmental EO Constellations

- Copernicus Programme (Sentinel 1, 2 and 3) — ESA
- Earth Observing System (Terra & Aqua Satellites) — NASA
- EarthCARE — ESA & JAXA
- Pleiades (ADS & CNES)

Next

- Copernicus Expansion Mission, ESA
- NISAR (NASA & ISRO)

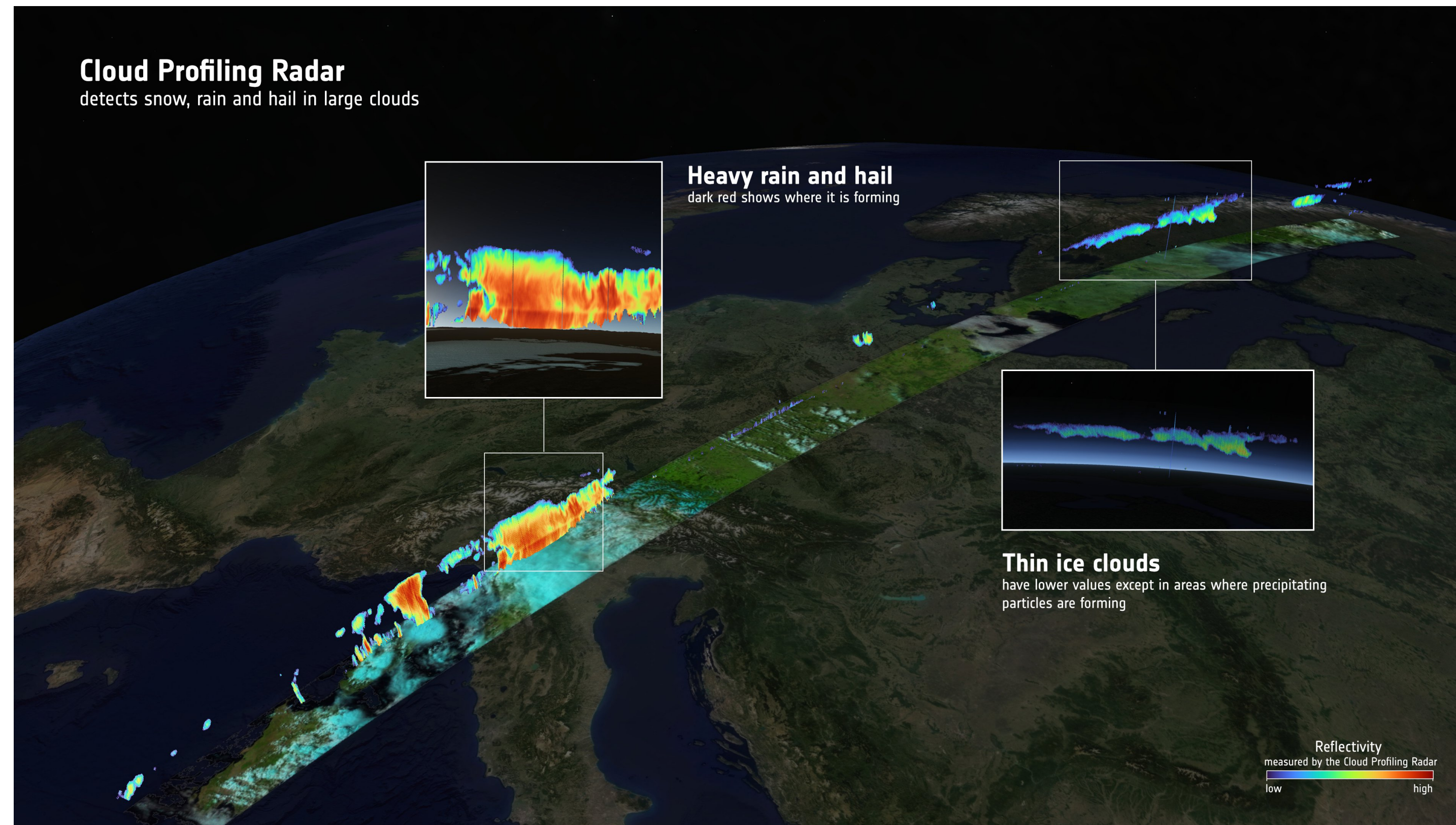


Photo: ESA, 2024. Url:

https://www.esa.int/ESA_Multimedia/Images/2024/10/EarthCARE_s_cloud_profiling_radar_detects_snow_rain_and_hail

Current EO Missions

Selected satellite-based EO missions

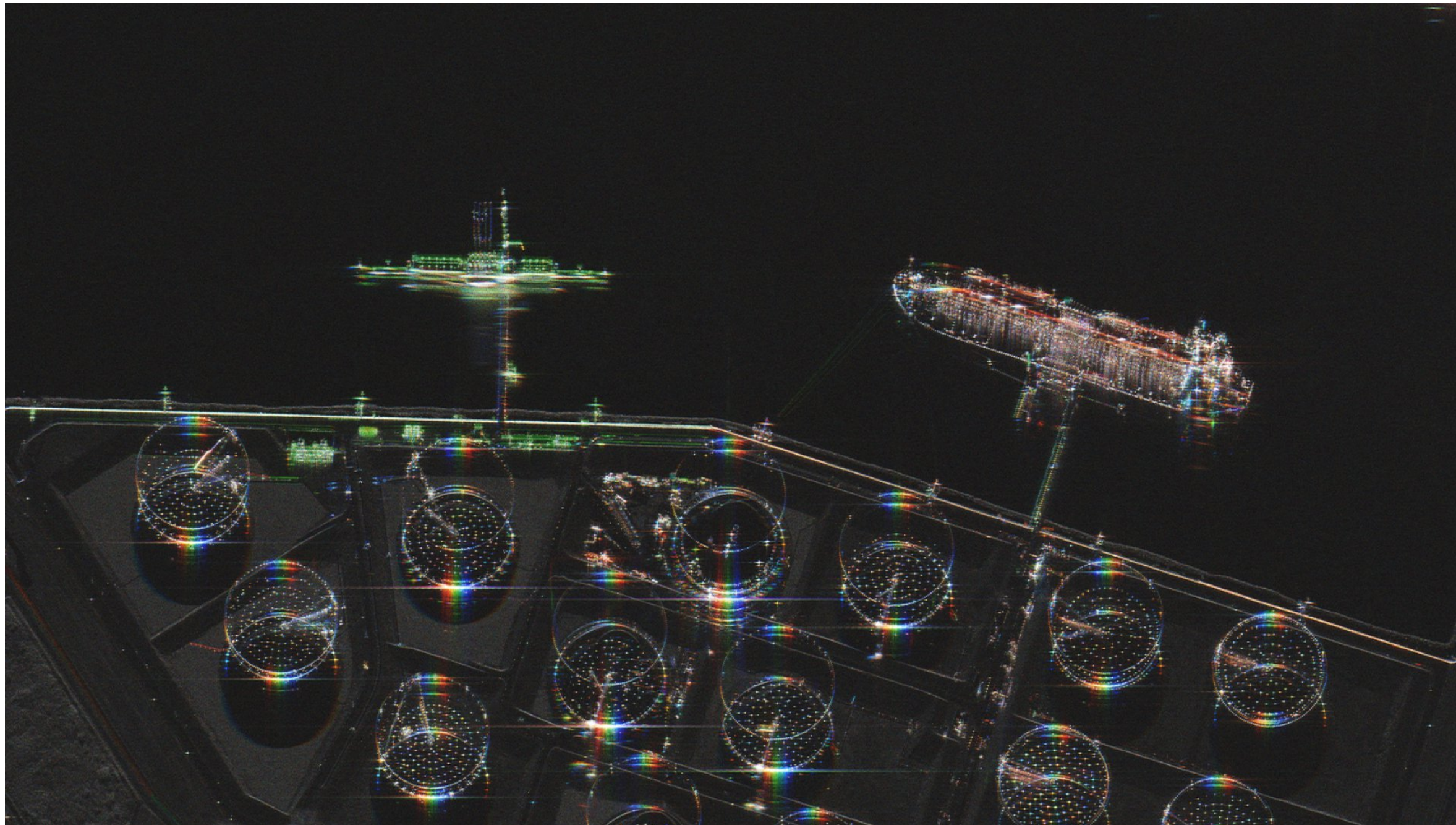
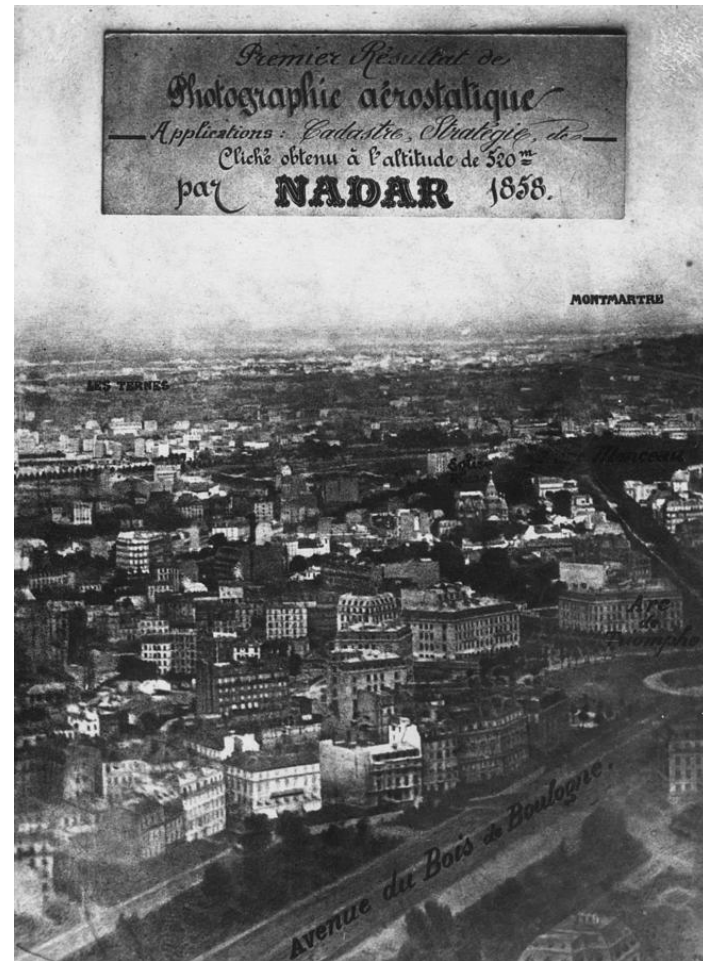


Photo: ICEYE, 2025. Url: https://www.iceye.com/hubfs/ICEYE_Rotterdam_zoom-in_2PR_webpage-1.png

Commercial Earth Observation Constellations:

- Planet Labs; large fleet of small satellites, providing HR imagery of Earth's entire landmass, supporting agriculture & disaster response)
- Maxar Technologies; offers VHR satellite imagery used in mapping, defense, and environmental monitoring
- ICEYE, specialises in synthetic aperture radar (SAR) satellites, delivering HR radar imagery for flood monitoring and maritime surveillance.
- AIRBUS, Pleiades Neo integrating optical and radar HR satellite imagery, daily coverage: 1.000.000 km²

Recap: Disruptions since 1858



Weather reliability reduced.
Continuity through long-term missions.

AI-supported supported data collection and data analysis.



Improved ability to control, co-ordinate and re-adjust data acquisition while assets remain in orbit.



Equipment size, weight etc. have been drastically reduced.



Different wavelength imagery (visual imaging + active and passive remote sensing) for different applications.

Smaller, more efficient and durable equipment makes EO missions more affordable.

Where we are Standing at: Contemporary EO Ground Segment Challenges

Fast & Reactive Image Acquisition

- Demand for higher-resolution and multi-wavelength images with larger amount of data
- Real-time or near-real-time imaging as a key goal, improved reactivity and faster image acquisition
- Ground segments enabling higher payload capacities and faster data transmission and processing



Image: KJpargeter, 2025. Url: <https://shorturl.at/sbzCM>

Where we are Standing at: Contemporary EO Ground Segment Challenges

Affordable Image Acquisition



Image: Wirestock, 2025. Url: <https://shorturl.at/cOWx4>

- **Decrease costs for mission planning, scheduling, and real-time data processing**
- **Automation to reduce manual tasks, lowering operational expenses and amount of consultancy needed**
- **Reduction of opportunity costs resulting from waiting times**

Thank you!

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