

STUDY SUMMARY

Satellite data, key allies for energy network management

Fact Sheet 1

The Basics of Satellites and Geospatial Data

Understand the main principles before exploring their uses



Some key figures dating from 2023

- **7,300 active satellites** worldwide, including more than **1,200** dedicated to Earth observation.



What is an observation satellite?

A satellite is a device placed in orbit around the Earth. Observation satellites, in particular, are designed to **observe, photograph, or measure** what is happening on the Earth's surface.

They are used in particular to:

- map a territory
- monitor changes (climate, vegetation, urbanization, etc.)
- track and analyze infrastructure (such as power grids)



How does it work in practice?



Satellites revolve around the Earth in a precise orbit (often polar to cover the entire planet).



They take images or measurements using on-board sensors (cameras, radars, infrared sensors, etc.).



The data is then sent to ground stations for processing and analysis.



3 key resolutions for defining geospatial data

Spatial resolution

Minimum visible size
(e.g.: 10 m, 1 m, 25 cm, etc.)

Time resolution

Frequency of revisiting the same location
(e.g., every 2 days)

Spectral resolution

Type of radiation observed
(visible light, infrared, microwaves, etc.).

These criteria determine the possible use of each image or measurement according to needs: mapping, fine detection, weather, etc.



Major types of satellite data

Data type	Main use	Specificities
GNSS (GPS, Galileo...)	Geolocate infrastructure (Pylons, etc.) synchronize network equipment (Posts, etc.)	Very high precision (less than a microsecond)
Optical images	Observe, map, identify inhabited areas, vegetation, infrastructure.	Sensitive to weather (clouds)
SAR / InSAR radar	Monitoring natural hazards, motion detection, measuring relief, detecting ground movements	Operates day and night, through the clouds