



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

eesa

MEMORY

observe  
the Earth

# SWOT

## SATELLITE FOR STUDYING THE OCEANS AND MONITORING WATER RESOURCES

- *Orbit: 891 km altitude*
- *Mass: 2000 kg*
- *Resolution: 10 to 70 m*
- *Radar altimetry (measures ocean elevation)*
- *Observation of oceans, rivers, lakes and flooded areas*
- *Study of ocean circulation*



France

esero

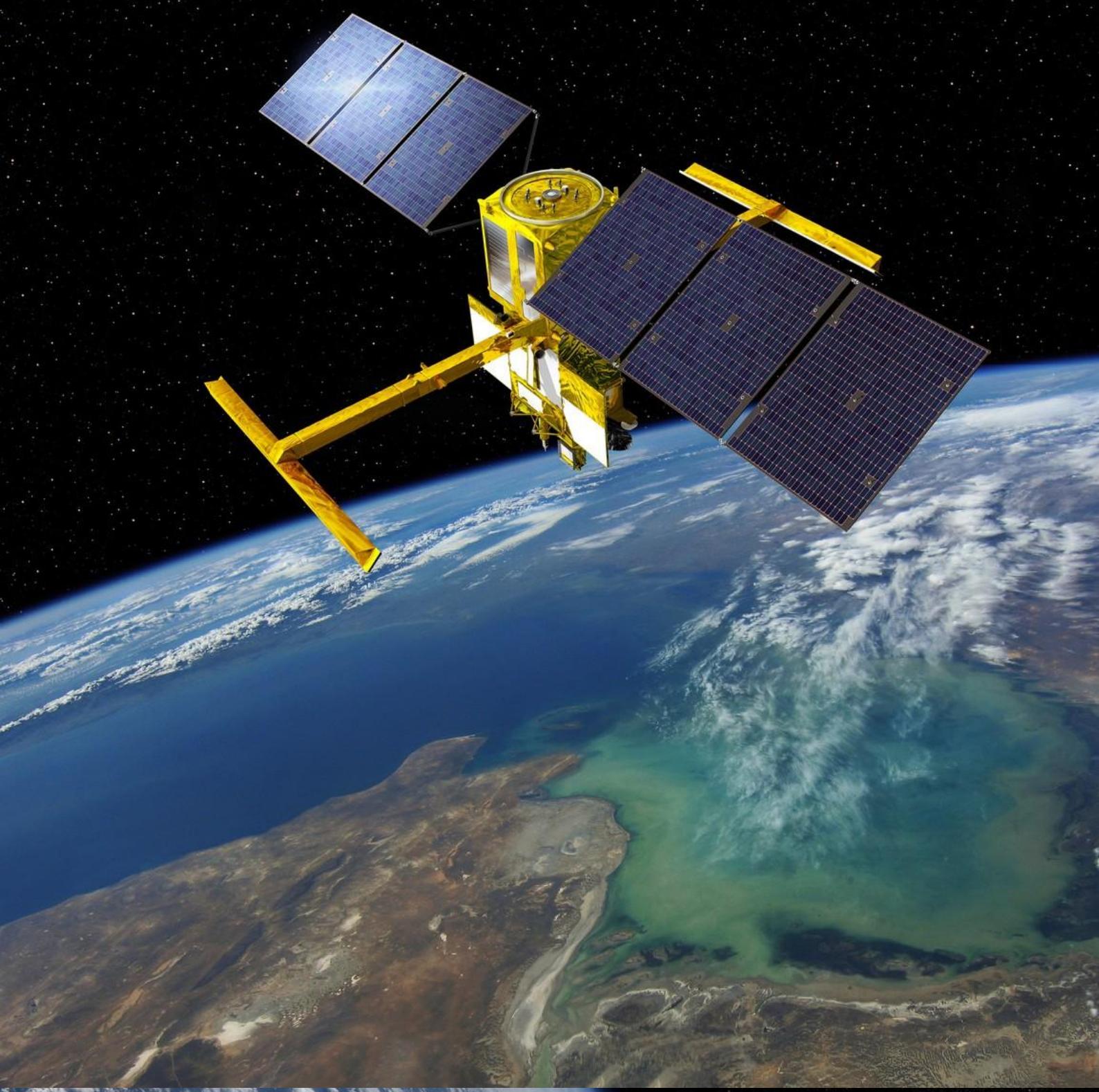
cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

eesa

MEMORY

observe  
the Earth

# SWOT



© CNES/ David Ducros



France



MEMORY

Observe the  
Earth

# CALIPSO

## SATELLITE FOR ANALYSING CLOUDS AND AEROSOLS

- *Orbit: 705 km altitude*
- *Mass: 635 kg*
- *Resolution: 125 m*
- *Wide field camera*
- *Infrared radiometer*
- *Lidar (laser remote sensing)*
- *Study of particle size in clouds  
and atmospheric composition*



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

eesa

MEMORY

observe  
the Earth

# CALIPSO



© CNES/Pierre Carril



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# SENTINEL-2

SATELLITE FOR OBSERVING  
LAND AND COASTAL AREAS  
AT A HIGH SPATIAL RESOLUTION

- *2 satellites launched in 2015 and 2017*
- *Orbit: 786 km altitude*
- *Mass: 1200 kg*
- *Multi-spectral imager (visible and near infrared)*
- *Resolution: 20 m*
- *Multi-spectral study to monitor changes in vegetation and land use, and the impact of global warming*



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

eesa

MEMORY

observe  
the Earth

# SENTINEL-2



© ESA/Pierre Carril



France

esero



cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES



esa

MEMORY

observe  
the Earth

# SENTINEL-1

## SATELLITES MAKING RADAR OBSERVATIONS OF THE EARTH

- *2 satellites launched in 2014 and 2016*
- *Polar orbit: 693 km altitude*
- *Mass: 2300 kg*
- *Resolution: up to 5 m*
- *Radar observations of the Earth*
- *Images of the Earth in all types of weather, enabling virtually constant monitoring of the Earth's surface*



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# SENTINEL-1



© ESA



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# METEOSAT

## WEATHER SATELLITES OBSERVING CHANGES IN THE SURFACE, CLOUDS AND ATMOSPHERE

- *3 generations of satellites launched since 1977*
- *Geostationary orbit (35,786 km)*
- *Mass: 2040 kg*
- *Resolution: 1 to 3 km*
- *Analysis of air masses*
- *Monitoring of changes in the clouds*
- *Measurement of wind and surface temperature*



France

esero

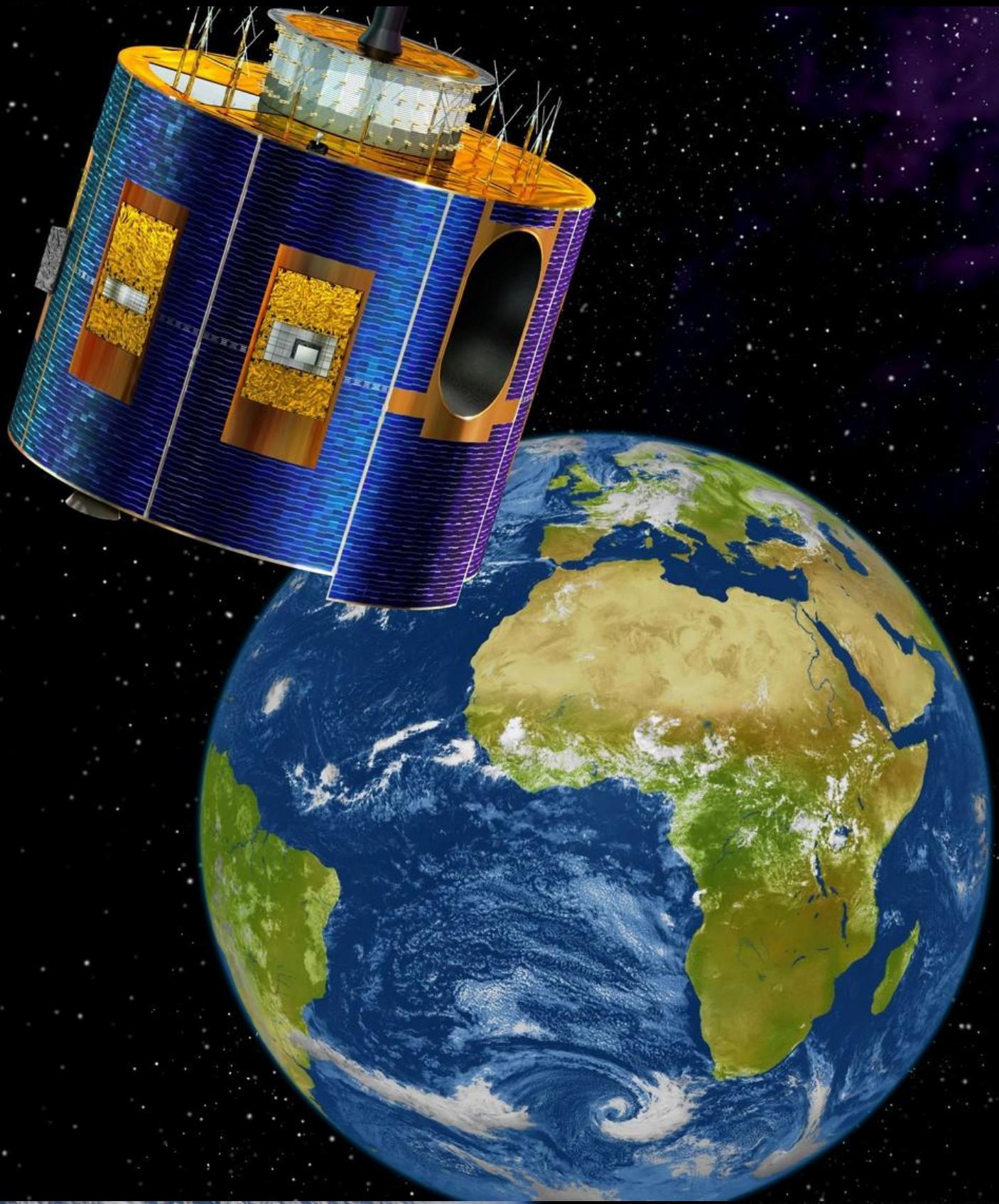
cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

observe  
the Earth

# METEOSAT



© ESA/David Ducros



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

eesa

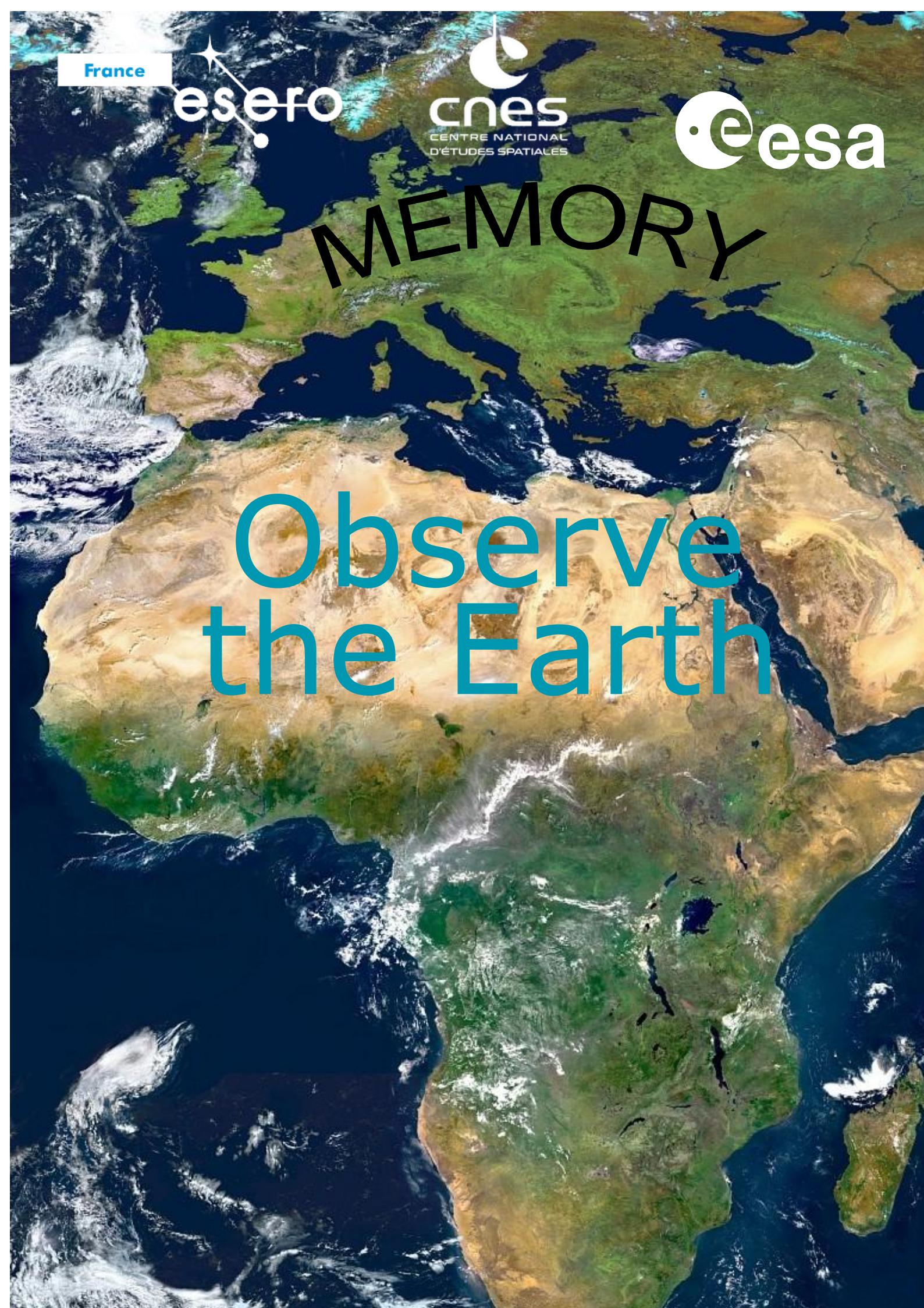
MEMORY

observe  
the Earth

# ISS

## SPACE STATION USED TO PREPARE FOR FUTURE CREWED FLIGHTS

- *In orbit since 1998*
- *Orbit: ~400 km altitude*
- *Mass: 450,000 kg*
- *Crewed at all times*
- *Scientific experiments in microgravity*
- *Photography of the Earth*
- *International collaboration (15 countries)*



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# ISS



© NASA/Roscosmos



France



MEMORY

Observe  
the Earth

# PLEIADES

## SATELLITES FOR OBSERVING THE EARTH'S SURFACE

- *2 satellites launched in 2011 and 2012*
- *Orbit: 694 km altitude*
- *Mass: 980 kg*
- *Resolution: 70 cm*
- *Very high-resolution images of the Earth*
- *Surface mapping*



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# PLEIADES



© CNES/David Ducros



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# JASON CS

## SATELLITE FOR STUDYING SEA-LEVEL RISE

- *Last of 4 satellites launched in 2001, 2008, 2016 and 2020*
- *Orbit: 1336 km altitude*
- *Mass: 1440 kg*
- *Radar altimeter that measures ocean topography*
- *Microwave radiometer that measures characteristics of the atmosphere*



France



MEMORY

Observe  
the Earth

# JASON CS



© ESA/ATG medialab



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# MICROCARB

## SATELLITE FOR STUDYING CO<sub>2</sub> SOURCES AND SINKS

- *Orbit: 650 km altitude*
- *Mass: 180 kg*
- *Resolution: 4.5 km x 9 km*
- *Array spectrometer for measuring atmospheric concentration*
- Measurement of the concentration of CO<sub>2</sub> to within 1 ppm



France



MEMORY

Observe the  
Earth

# MICROCARB



© CNES/Olivier Sattler



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# TRISHNA

## SATELLITE FOR STUDYING INLAND AND COASTAL SURFACE TEMPERATURE

- *Launch scheduled for 2026*
- *Orbit: 761 km altitude*
- *Mass: 770 kg*
- *Resolution: 57 to 90 m*
- Infrared sensor to measure surface temperature
- Visible and near infrared optical camera



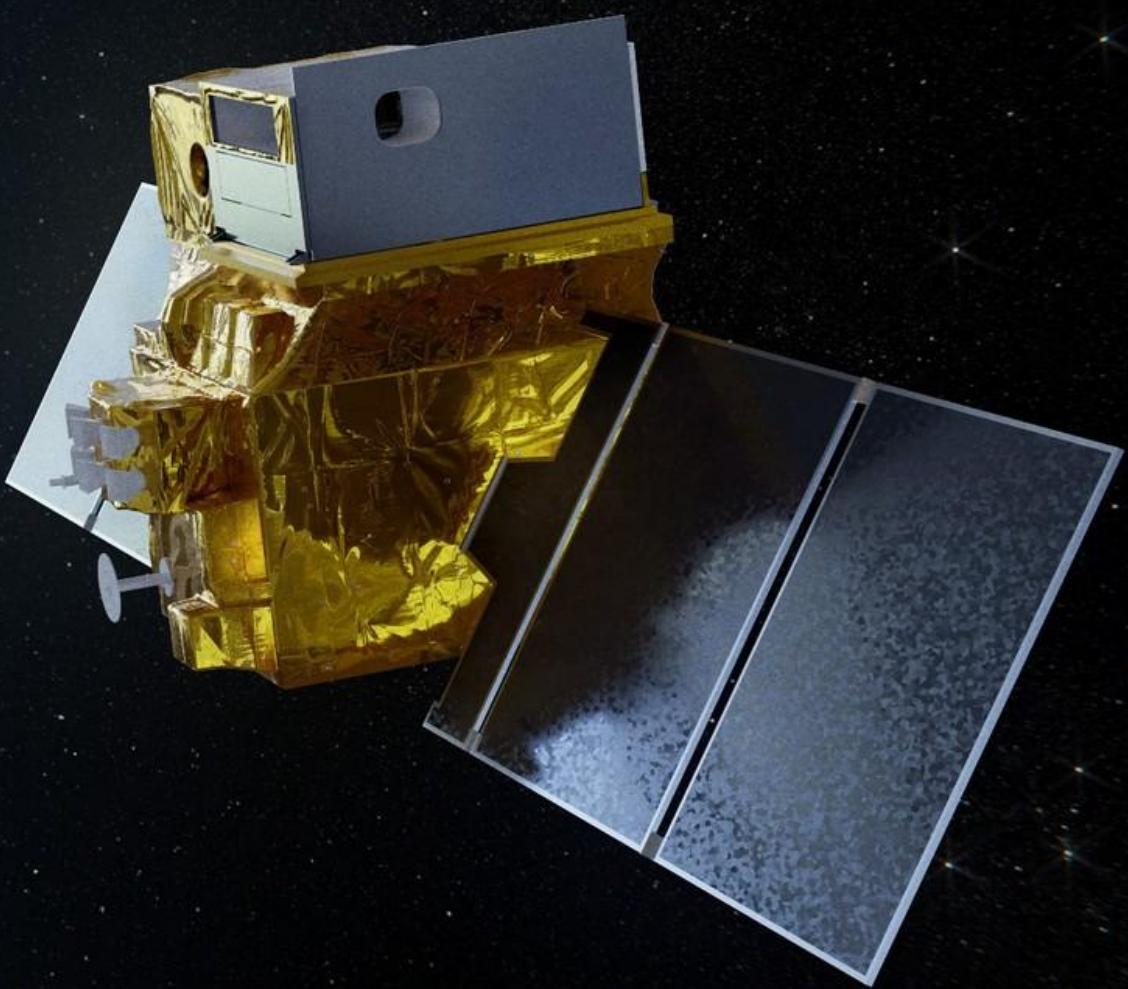
France



MEMORY

Observe  
the Earth

# TRISHNA



© Airbus



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

eesa

MEMORY

observe  
the Earth

# NESS

## SATELLITE FOR MEASURING THE EARTH'S MAGNETIC FIELD

- *Technology demonstration nanosatellite*
- *Orbit: 564 km altitude*
- *Mass: 4.9 kg*
- Magnetometer for measuring magnetic fields
- Test to detect interfering emissions that could disrupt communications satellites



France

esero

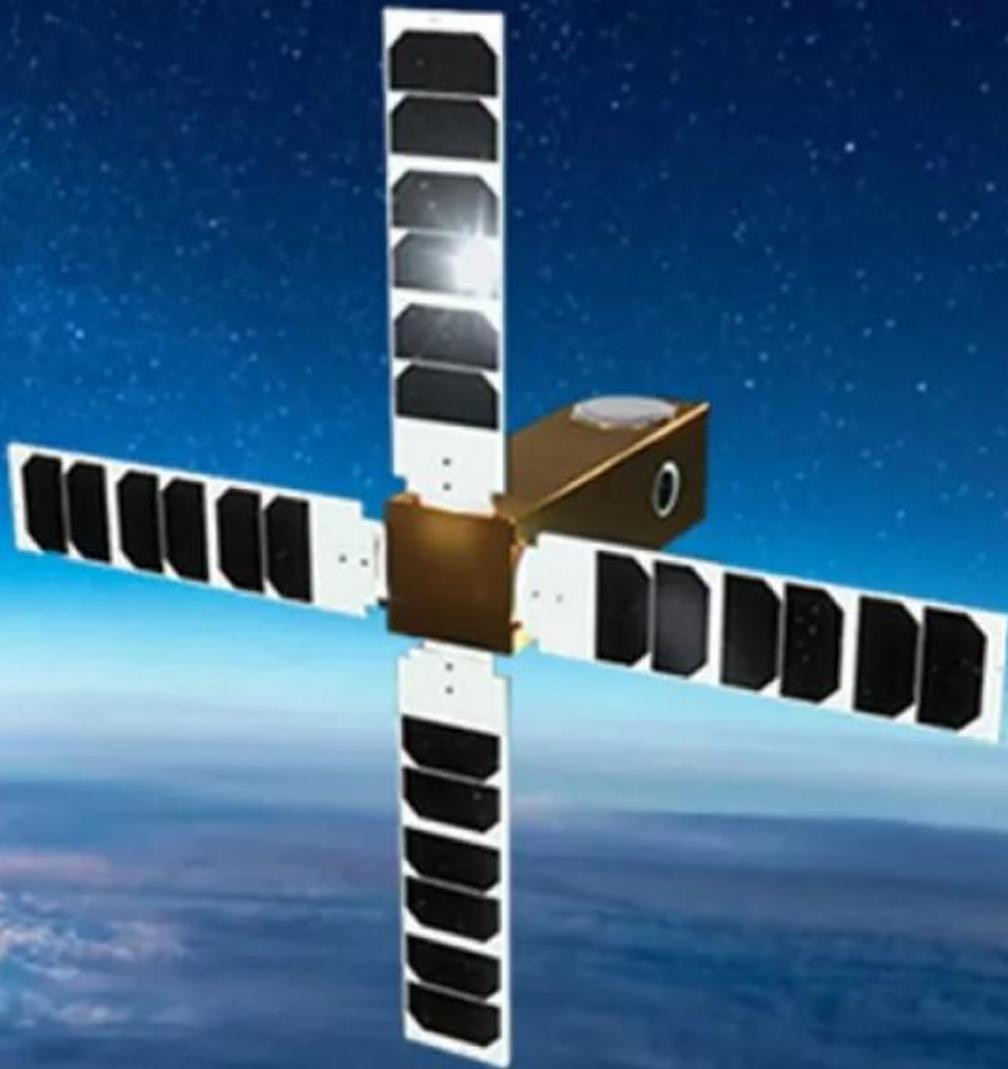
cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# NESS





France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# EARTH CARE

## SATELLITE FOR STUDYING CLOUD COVER

- *Orbit: 394 km altitude*
- *Mass: 2350 kg*
- Laser for remote sensing of cloud height
- Doppler radar for determining cloud composition
- Imager and radiometer for studying the cloud layer and the aerosols present



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

eesa

MEMORY

observe  
the Earth

# EARTHCARE



© ESA/Pierre Carill



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# MERLIN

## SATELLITE FOR MEASURING ATMOSPHERIC METHANE CONCENTRATIONS

- *Launch scheduled for 2028*
- *Orbit: ~500 km altitude*
- *Mass: 430 kg*
- *Resolution: 50 km*
- LIDAR: Laser beam towards the surface to analyse signal absorption due to atmospheric methane



France

esero

cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

eesa

MEMORY

observe  
the Earth

# MERLIN



© CNES



France

esero



cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES



esa

MEMORY

observe  
the Earth

# LANDSAT 9

## SATELLITE FOR OPTICAL AND INFRARED EARTH OBSERVATION

- *Landsat programme launched in 1972*
- *Orbit: 705 km altitude*
- *Mass: 2711 kg*
- *Resolution: 15 to 60 m*
- Visible and infrared imager
- Thermal infrared spectrometer for measuring surface temperature



France

esero

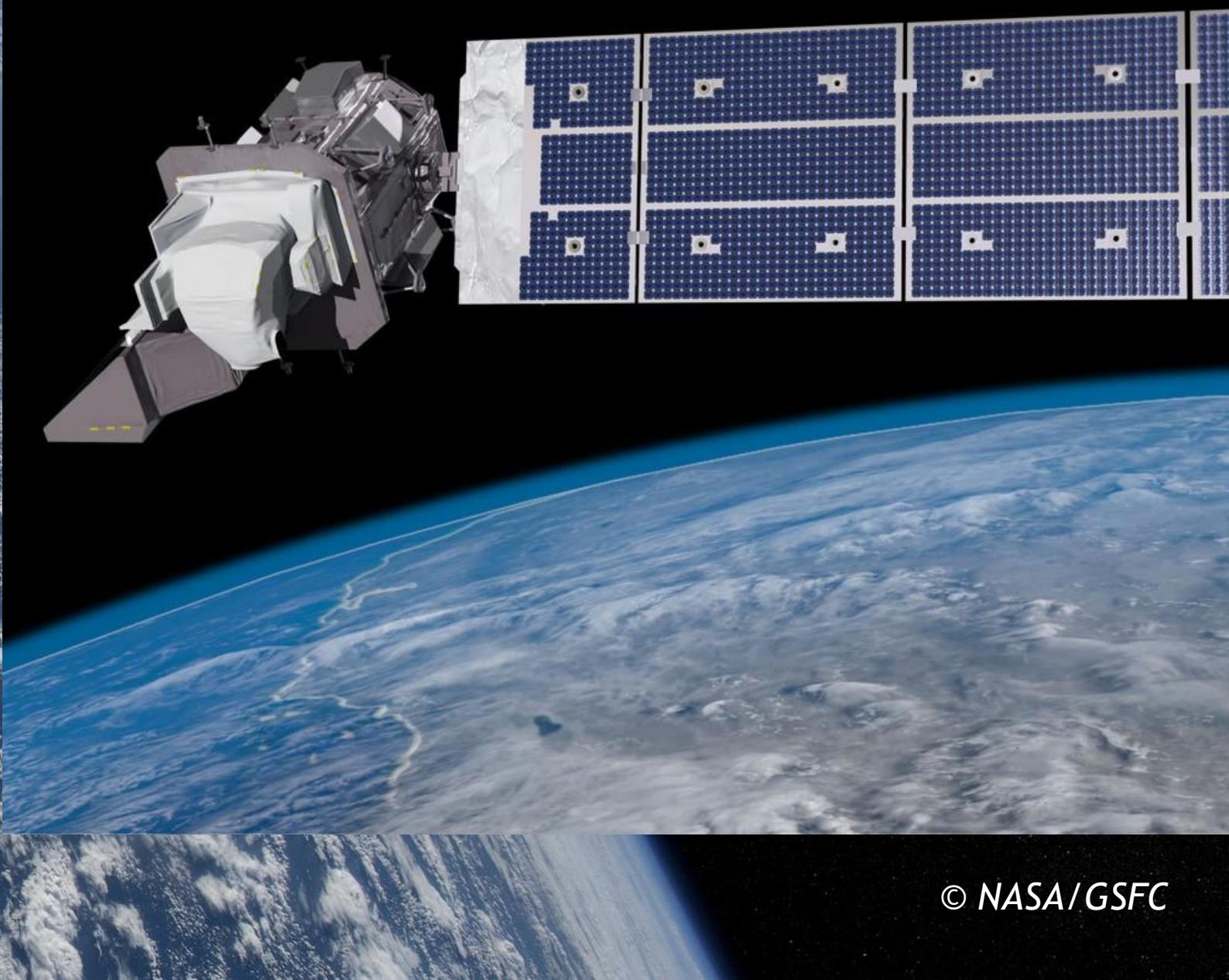
cnes  
CENTRE NATIONAL  
D'ÉTUDES SPATIALES

esa

MEMORY

Observe  
the Earth

# LANDSAT 9



© NASA/GSFC