

GESTION DE L'EAU ET ADAPTATION CLIMATIQUE

LE DOUBLE DÉFI DE LA CONNAISSANCE ET DE LA COOPÉRATION

CONNAISSANCE ET OPÉRATIONNEL

10 NOVEMBRE 2025

ERIC BREL

Espace pour la Guyane
Centre Spatial Guyanais

CNES – Agence française de l'Espace / Expertise technique française

L'ÉCOSYSTÈME SPATIAL FRANÇAIS EN CHIFFRES

3 milliards €

Le budget spatial institutionnel français en 2024, ce qui représente :



45 €

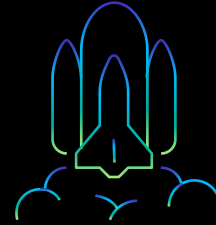
par an et par
habitant

5^e

pays, après USA,
Chine, Japon et la
Russie

1^{er}

budget national
en Europe



1 000

entreprises françaises dans la
filière spatiale, qui représentent

1 500 établissements

90 % de PME et ETI (entreprises
de taille intermédiaire)

Plus de

80

formations académiques
spécialisées dans le spatial



Plus de

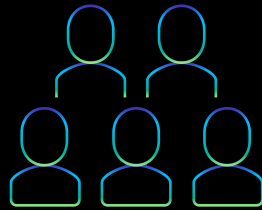
15

Centres Spatiaux Universitaires
collaborant avec le CNES

70 000

personnes

travaillent dans la filière spatiale en France, dans
l'industrie manufacturière et de services et le
secteur académique.



1^{er}



pays européen en terme
**d'investissements
privés** dans le spatial

NOS 4 PRIORITÉS STRATÉGIQUES



© CNES/ESA/Arianespace/Optique
Vidéo CSG/S Martin, 2023

RENFORCER

notre autonomie stratégique



© CNES/DE PRADA Thierry, 2022

SOUTENIR

la compétitivité de
l'écosystème spatial



© CNES/Distribution Airbus DS,
2020

S'ENGAGER

pour un monde durable



© CNES/GRIMAULT Emmanuel,
2021

FAIRE RAYONNER

notre excellence
scientifique

DES SERVICES POUR TOUS

Economie lunaire

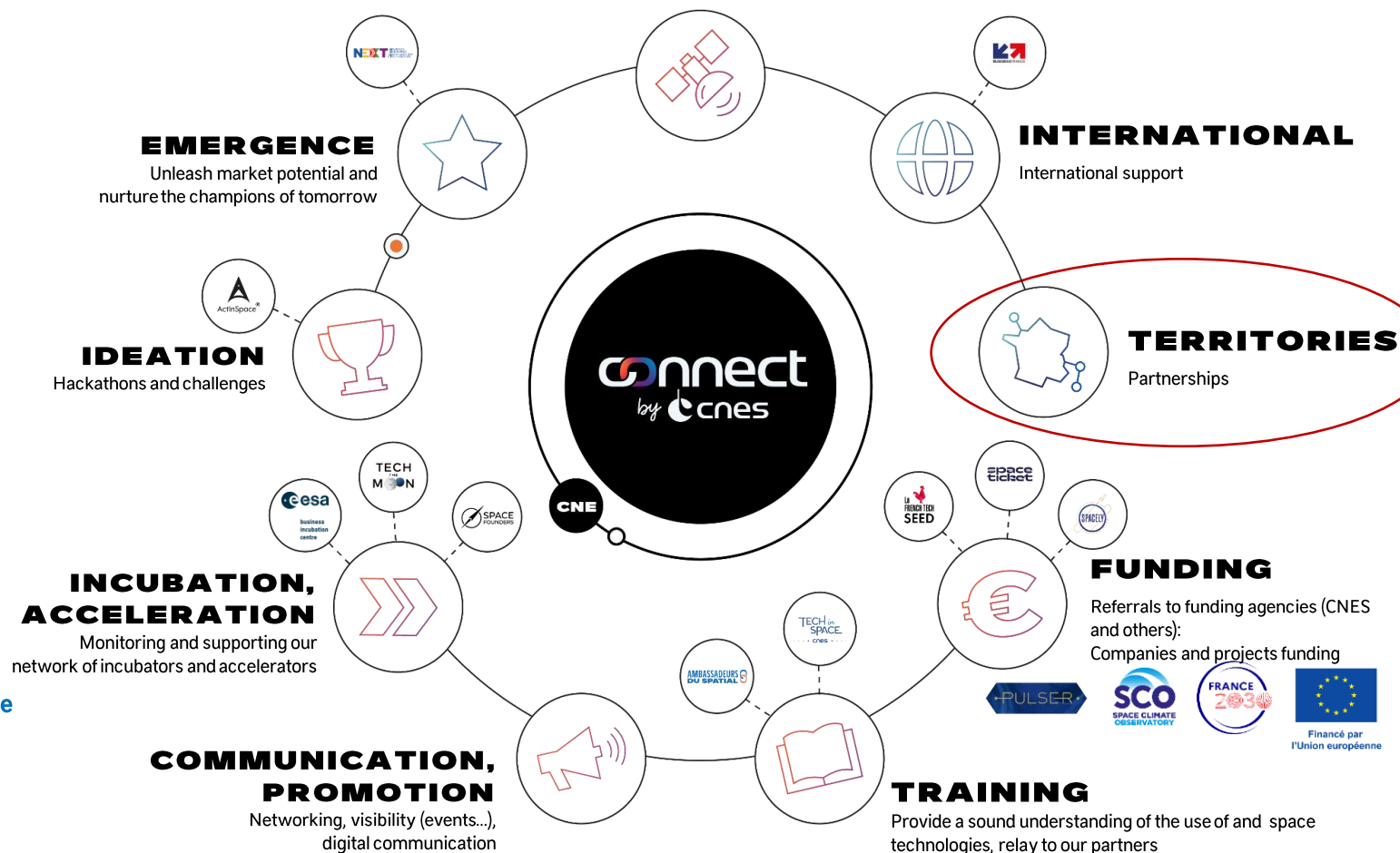
Logistique spatiale

Constellation infrastructure

Services en orbite

EXPERTISE, TECHNICAL RESOURCES,

Meet our experts for personalized support, get in touch with our laboratories, their technical resources and space data, our industrial patents



DES SECTEURS PRIORITAIRES

Télécom.

Mobilité

Santé

Assurances

Forêts

Agriculture

Energie

Gestion des territoires

Maritime



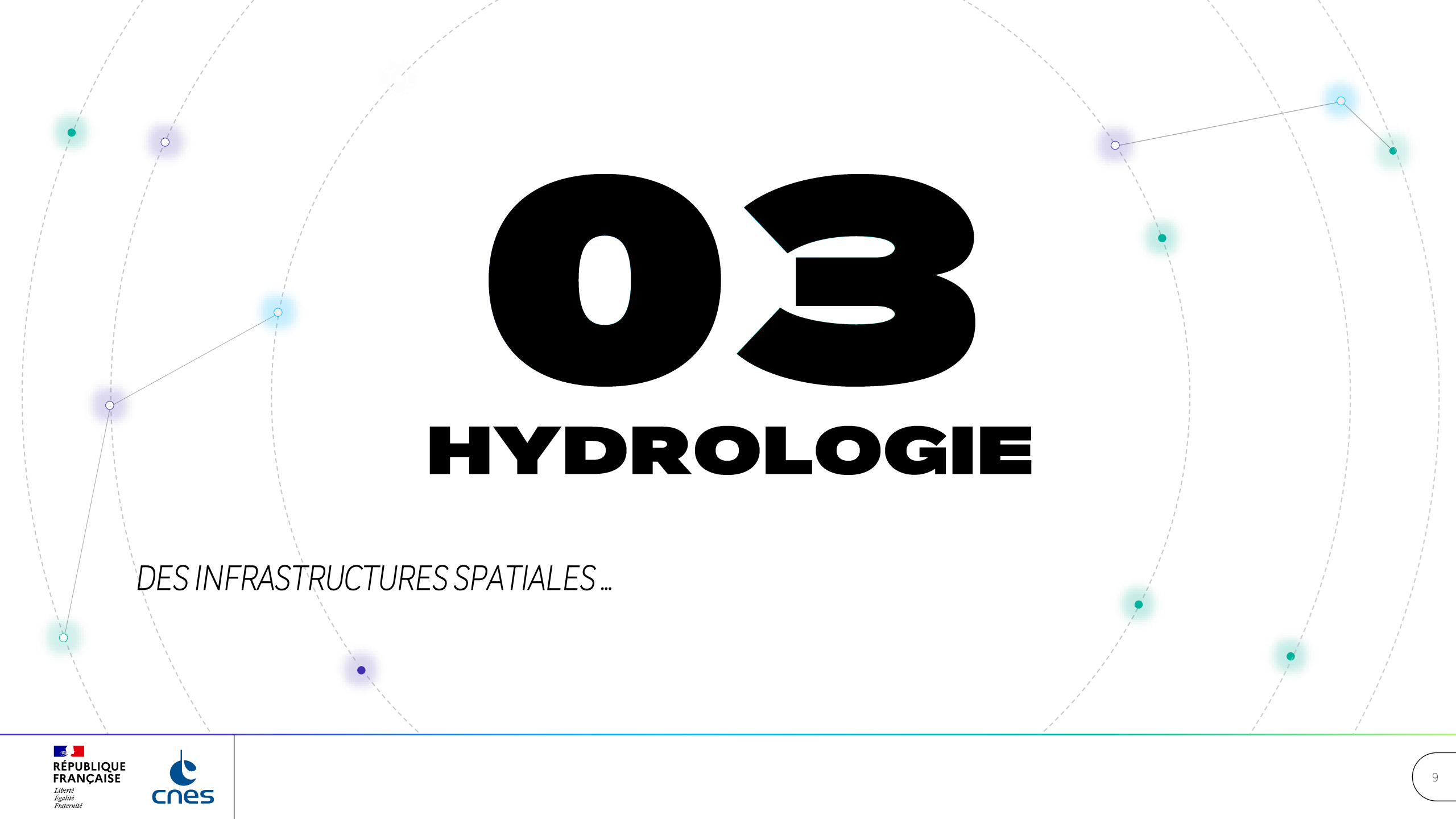
02

**DES APPLICATIONS
DANS TOUS LES
DOMAINES**

rayon de 2500 km autour de sa position



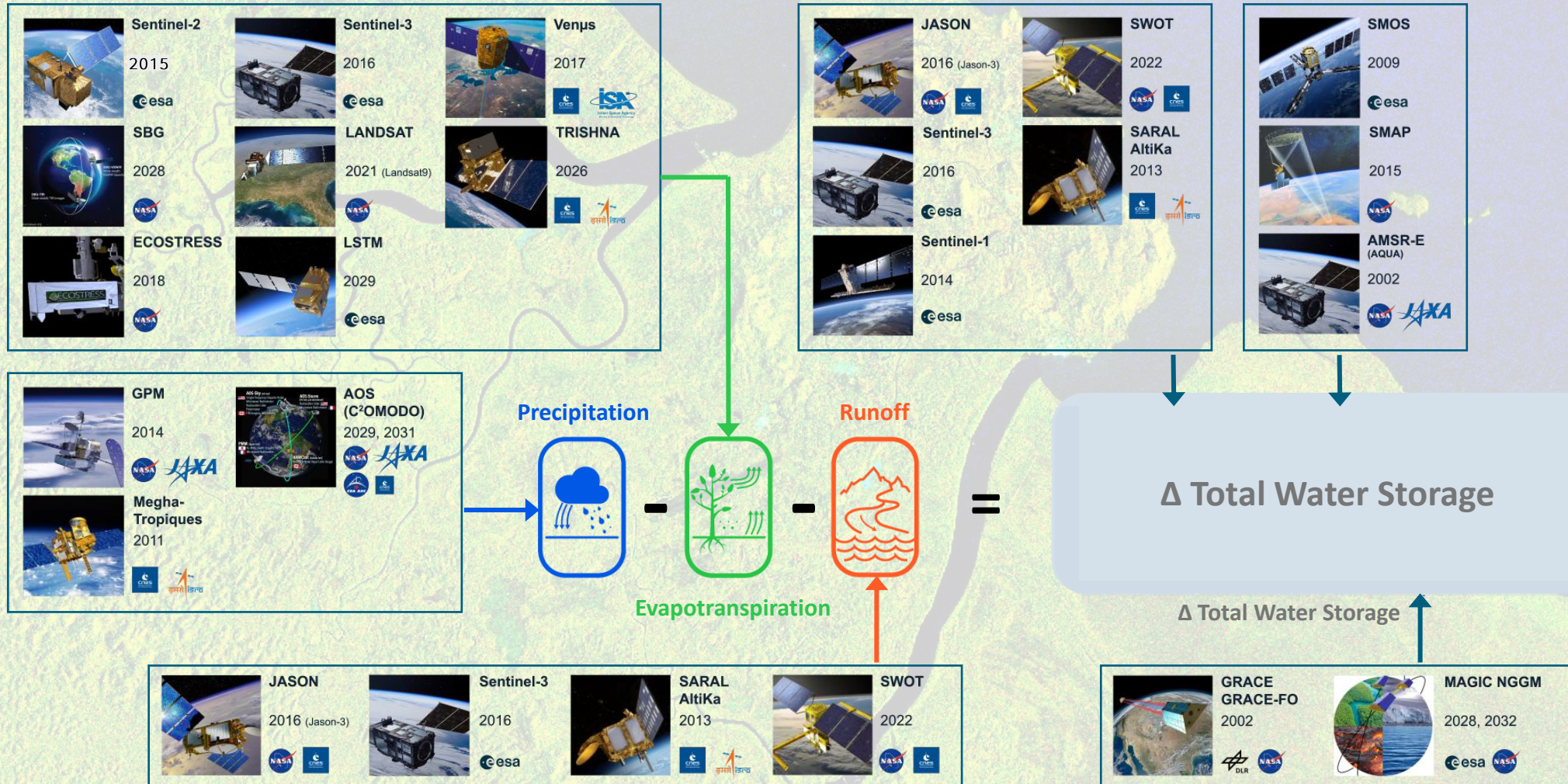




03

HYDROLOGIE

DES INFRASTRUCTURES SPATIALES...



TRISHNA



Bilateral programs devoted to water

Land, Coastal, Ocean
Water

Satellite precursors
LSTM, S3-NG TOPO
Downstream Programs

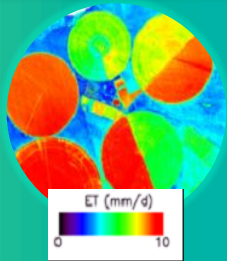
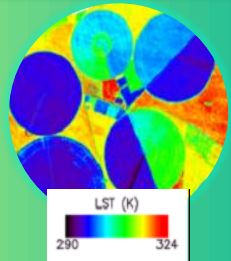


DATA
TERRA

Theia

hydroweb.next

Ground surface temperature
and daily evapotranspiration

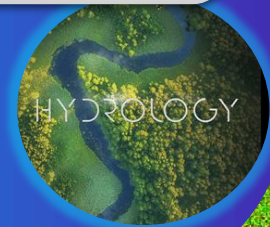


Launch scheduled in 2026-27

SWOT



First global survey of
Earth's surface waters



Launched Dec 16, 2022



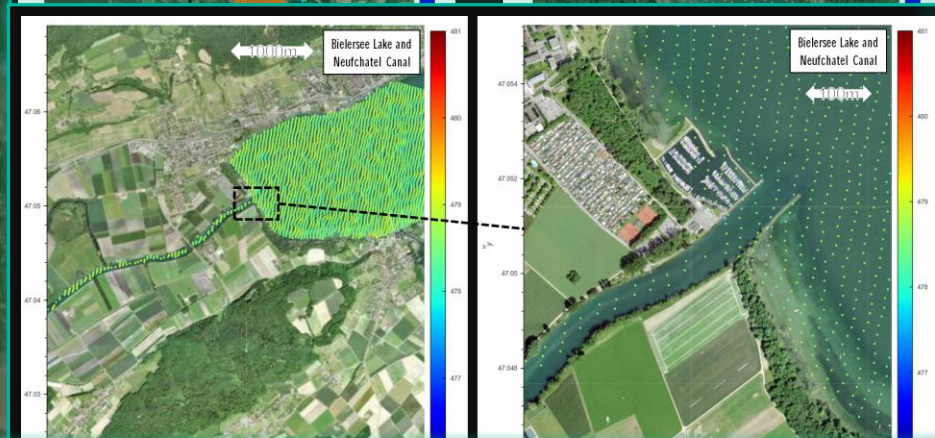
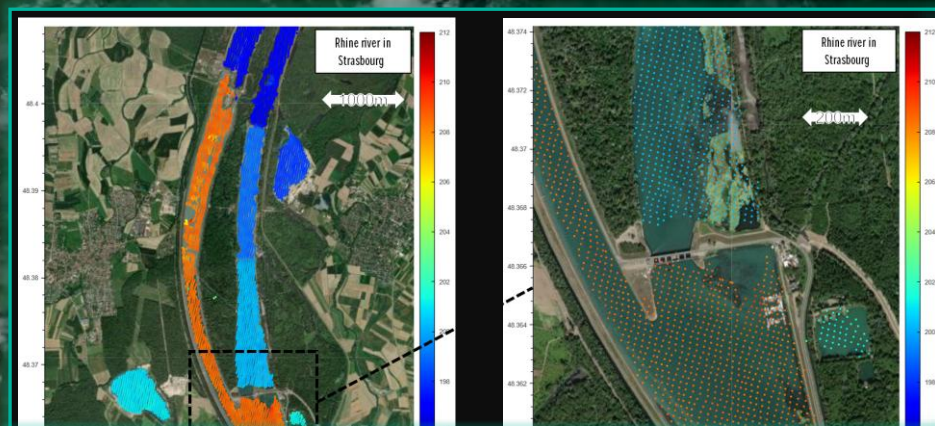
- **SWOT** works extremely well on large lakes & rivers
 - 100 m rivers & (250 m)² lakes
 - Mission requirements
 - Global inventory of surface water (21-day cycle)



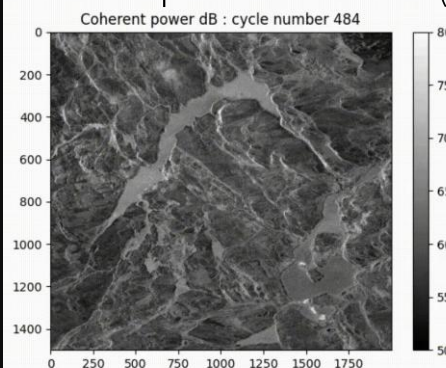
- **SWOT** outperforms its optional goals
 - 50 m rivers & (100 m)² lakes
 - Better monitoring of water cycle
 - 6 million lakes are monitored



- **SWOT** delivers on frozen lakes & rivers
 - Ice is bright enough for heights
 - Frozen/Liquid state from σ_0
 - 1-day phase captured thaws



SWOT captures the lake thaw (left)



Confirmed with local webcam (right)

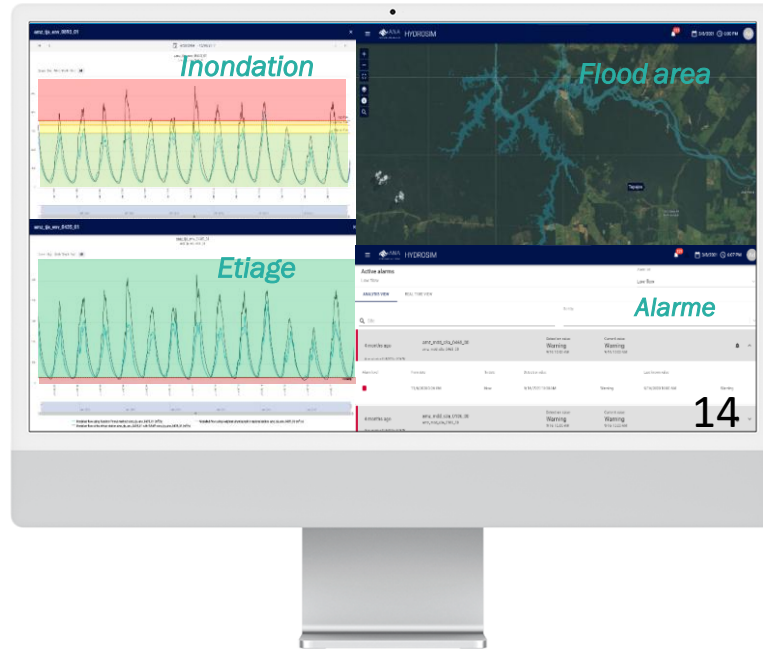


04

HYDROLOGIE

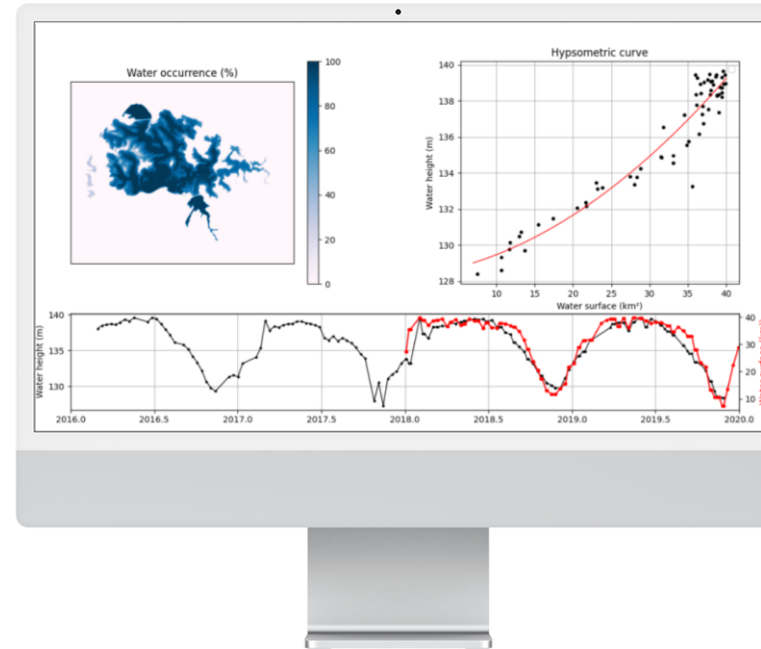
... ET DES APPLICATIONS

ALTIMETRY: SOME EXAMPLES



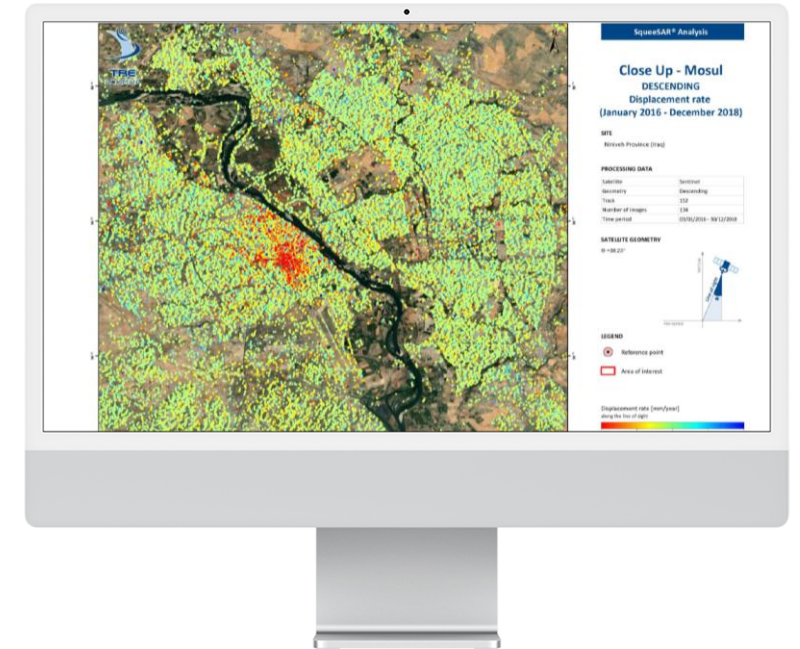
The Amazon and Paraná basins (AmSudSat project)

using altimetry and EO data to support hydropower management and understand flood and drought dynamics.



Tonlé Sap and the Mekong (Cambodia)

mapping the seasonal evolution of water surfaces to prevent drought and safeguard rice production.



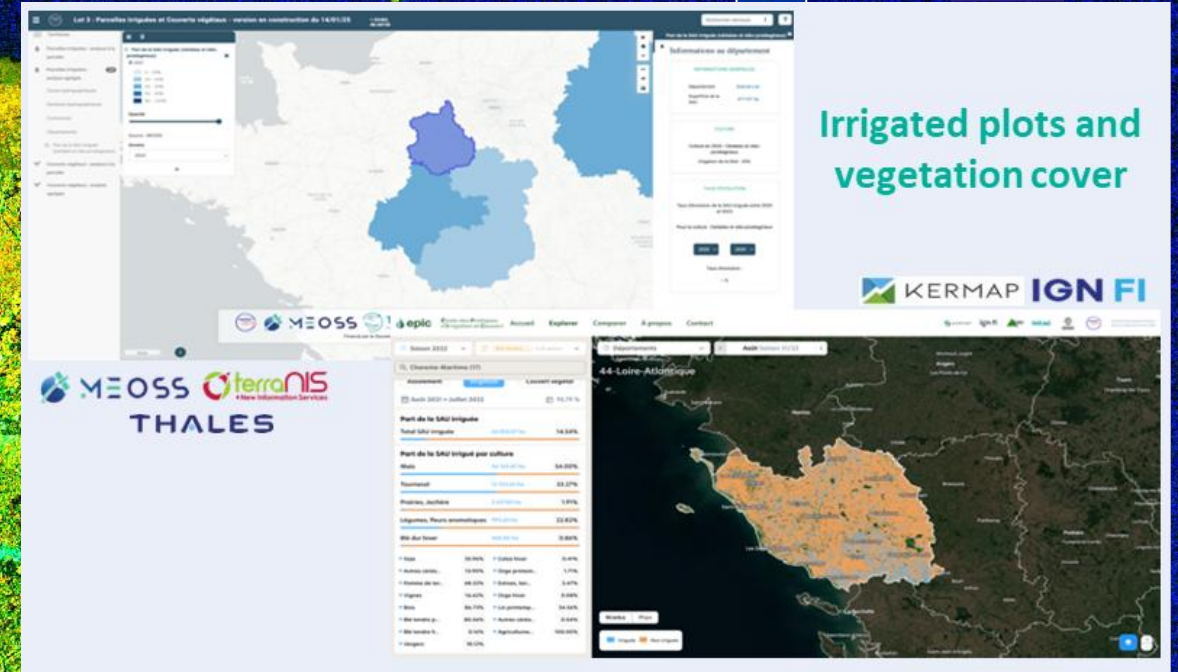
Murcia (Spain) and California (USA)

using radar interferometry (InSAR) to monitor land subsidence linked to groundwater overuse.

Surfaces and volumes of water bodies



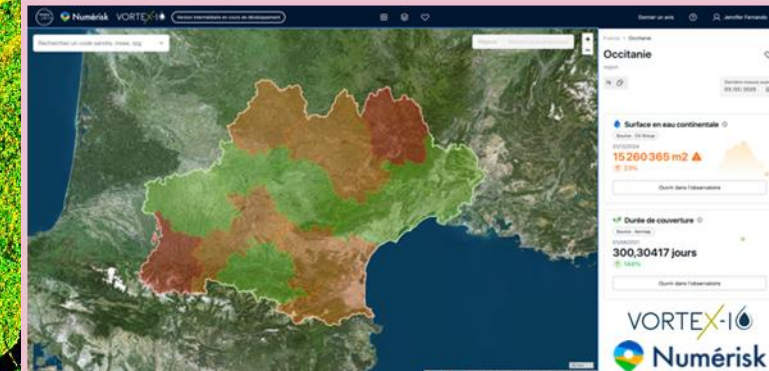
Irrigated plots and vegetation cover



Surface water quality



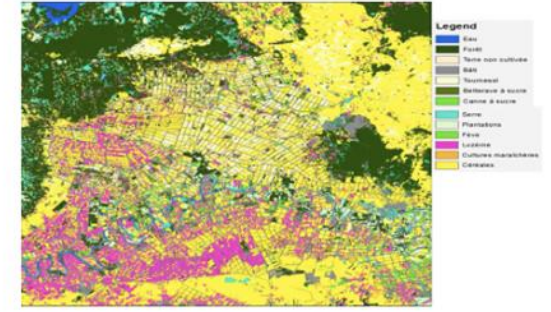
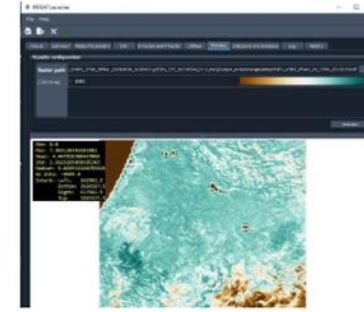
Visualization, exploitation and analysis



<https://hydroscopia.fr/>



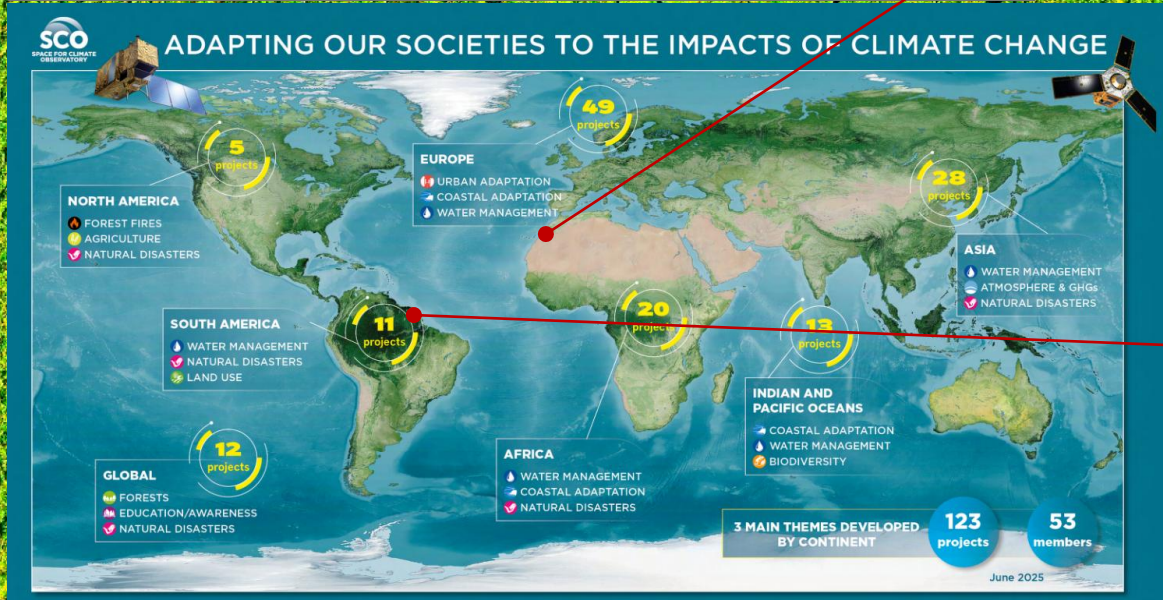
IRRISAT-MOROCCO – irrigation water optimization support system using satellite data



▲ Back-office interface for production and analysis of products and indicators on water consumption and productivity (display of daily ET). © CRTS

▲ Plot map of winter crops in the Gharb irrigated perimeter generated by IRRISAT from a time series of Sentinel-2 images between October 2022 and the end of May 2023. © CRTS

Satellite Data: VIIRS, Landsat, S1, S2, Mohammed VI A&B
SCO project: IRRISAT-MAROC | Space for Climate Observatory



OpHySE – Operational Hydrology from Space and models

SAGUI: Suivi hydrométéorologique de la Guyane depuis l'espace pour la société



Satellite Data: Jason-3, S3, S6, GPM (Megha-Trpiques)
SCO project: OpHySE | Space for Climate Observatory



MERCI !