THE DIGITAL TWIN FACTORY

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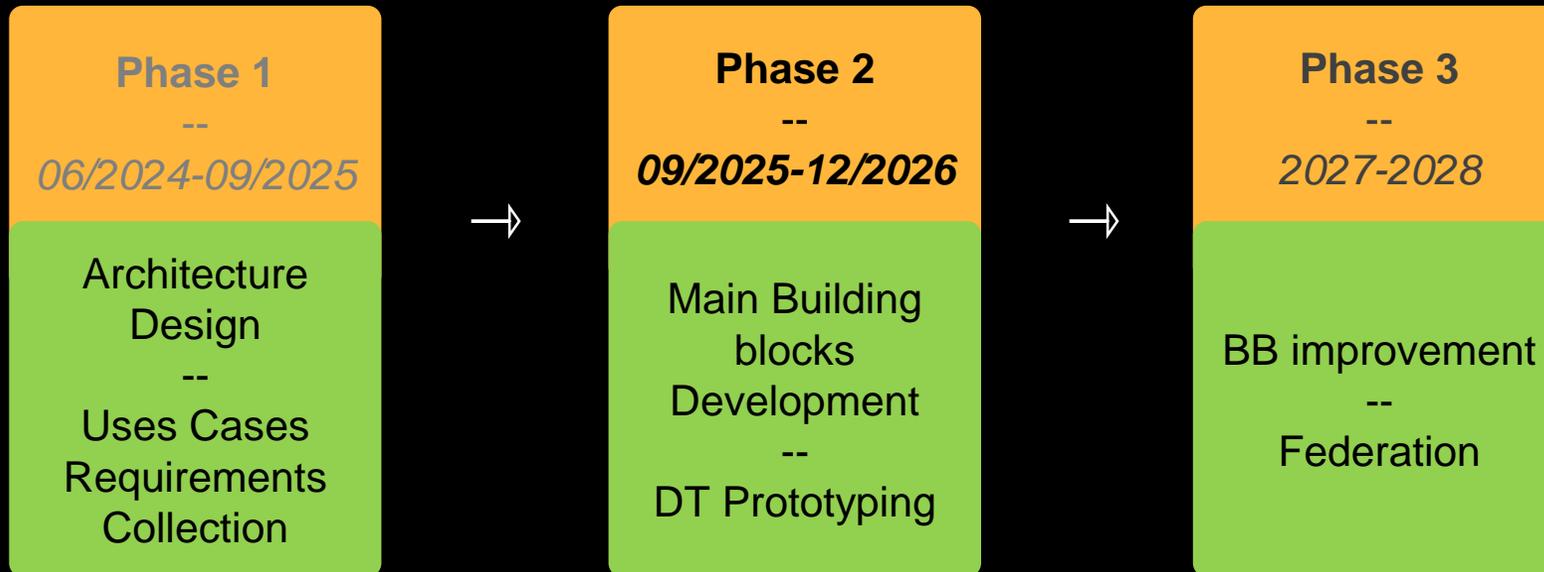
WGISS-61
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CNES DATA CAMPUS

DTF R&D PROJECT

DTF : shared toolbox with advanced algorithms to support the community in building their own Thematic & Local digital twins

➔ Interoperable building blocks (portability, generic orchestration, standard API)
➔ Benefit from CNES fields of expertise (methods, algorithms, and uncertainty quantification)

Phase 1 -- 06/2024-09/2025		Phase 2 -- 09/2025-12/2026		Phase 3 -- 2027-2028
Architecture Design -- Uses Cases Requirements Collection	➝	Main Building blocks Development -- DT Prototyping	➝	BB improvement -- Federation

FIRST DT PROTOTYPES

France, Shoreline (IRD, Wave n'see)
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What-now? Historical shoreline
What-next-if? : Shoreline evolution modelling, Impact assessment, adaptation strategy
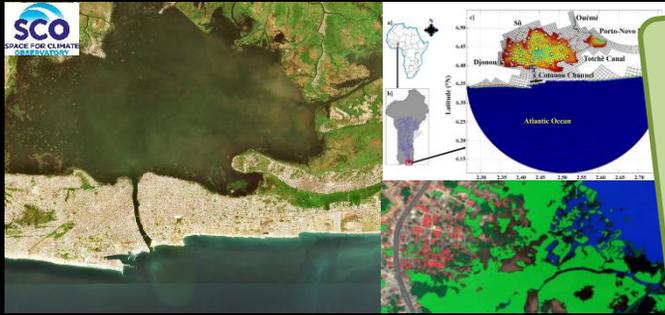
Nokoué lagoon (Benin), Flooding/Water Quality (IRD, CNRS/LEGOS, Snale)
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What-now? LULC, historical flood & quality
What-if ? : Hydrodynamic modelling, flooding impact, spreading pollutants
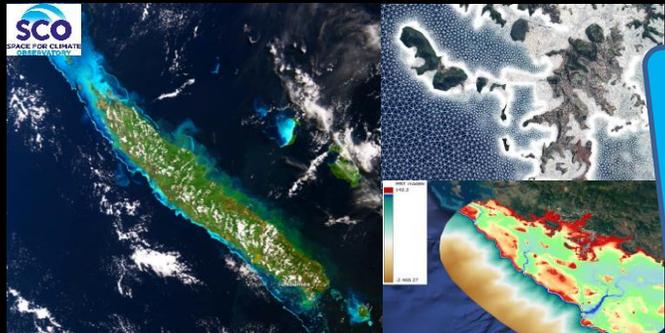
New Caledonia, Marine Submersion (BRGM, NC gvt)
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What-now? 3D Digital Repliqua
What-if? : Marine submersion impact assessment
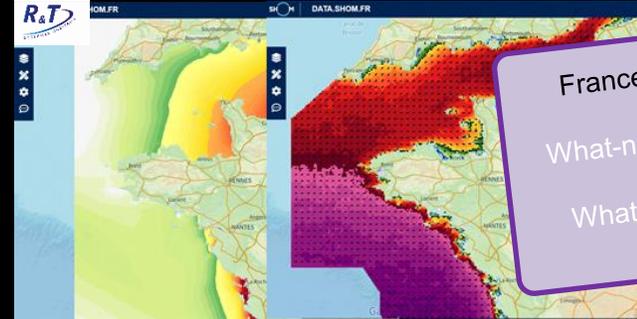
France, Marine submersion (SHOM)
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What-now? Multi scale & multi temporal DR
What-if? : Marine submersion impact assessment
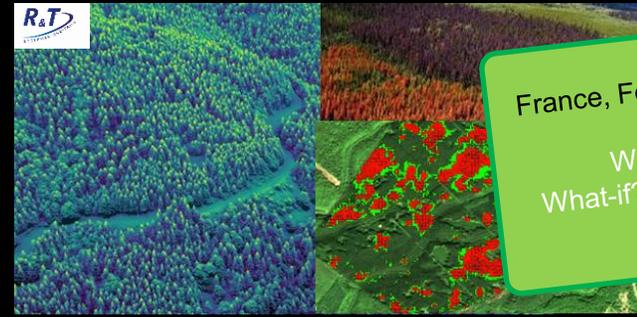
France, Forest monitoring (IGN, Nice city)
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What-now? Multi modal DR
What-if? : Forest disturbance mitigation strategies

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DTF BUILDING BLOCKS ROADMAP OVERVIEW

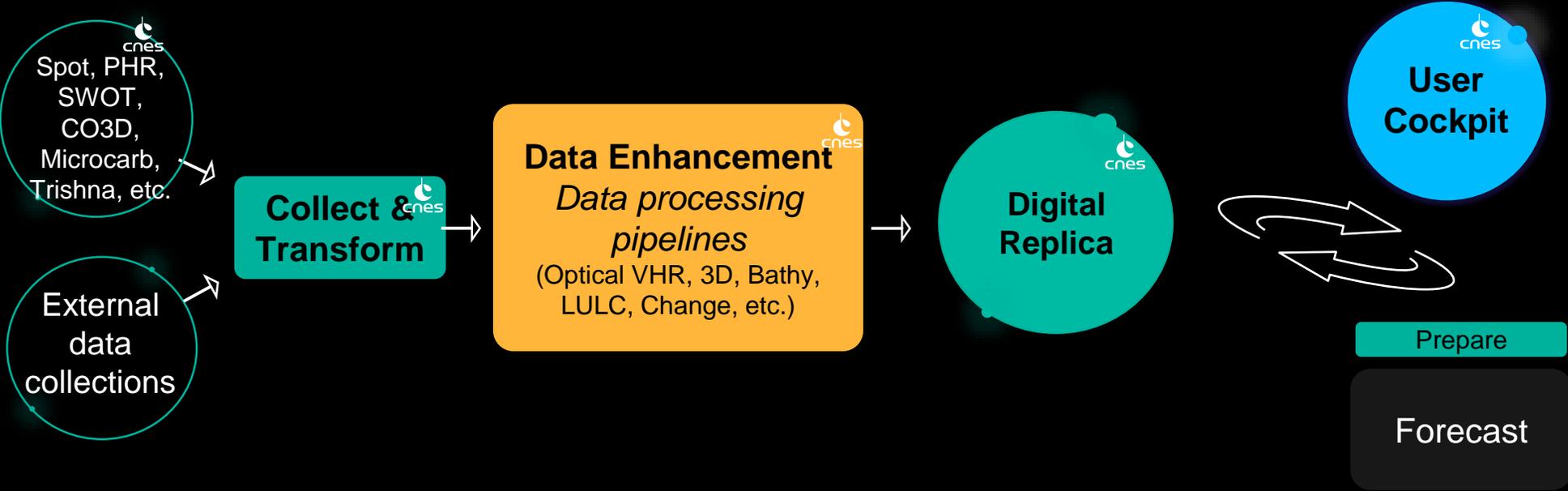| 2025-T4	2026-T1	2026-T2	2026-T3	2026-T4	2027-T1	2027-T2	2027-T3	2027-T4	2028

THEMATIC
- SCOast – Marine Submsersion (Noumea city, New Caledonia), BRGM
- SCOast – Water Quality – (Cotonou Lagoon, Benin), CNRS/LEGOS, IRD
- SCOast – Shoreline evolution (France)
- R&T – Forest disturbance – IGN, Nice City
- Operationalization TBD
- JNFT
- R&T - Marine Submersion - SHOM

BB DATA
- Optical VHR (PHR, PNEO, CO3D), Historical (SPOT), HR (Copernicus)
- TIR (Trishna)
- In-situ, Climate, Socio-Economic
- SAR (SWOT, Copernicus, NewSpace

BB 3D
- BB 3D DSM, DTM, DHM
- BB new 3D NeRF, GS
- BB LoD2
- BB 3D Bathy

BB SEMANTIC
- BB LULC - UNET
- BB FM
- BB Change detection
- BB Change identification

BB HCI
- BB DT Cockpit
- BB DT DataLabs
- R&D VLM

BB MODELING
- BB Data Model ingester
- R&D Surrogate Modeling

BB PLATFORM
- BB HPC & Cloud orchestration
- BB Federation

DTF DEMO, CORE PRINCIPLE

Spot, PHR, SWOT, CO3D, Microcarb, Trishna, etc.

External data collections

Collect & Transform

Data Enhancement
Data processing pipelines
(Optical VHR, 3D, Bathy, LULC, Change, etc.)

Digital Replica

User Cockpit

Prepare

Forecast

HPC / CLoud

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

cnes

DTF
DIGITAL TWIN FACTORY

TAKE-AWAY MESSAGES

DTF : advanced & interoperable building blocks designed to facilitate the creation of thematic, local & very high resolution digital twins

Support research and the industrial network in national and European activities. Promote technology transfer for the development of application services based on spatial data

Open Science, Open to collaborations ☺