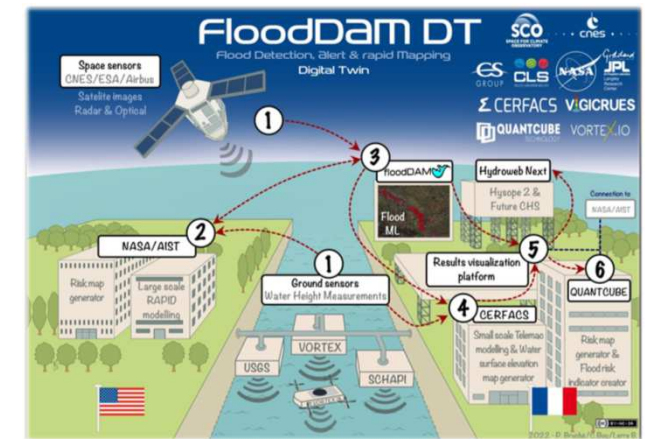


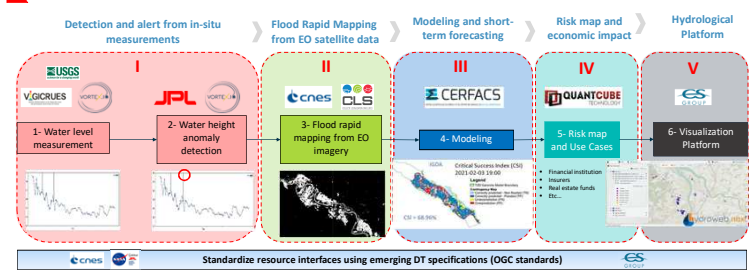
The SCO-FLOODAM project: towards a digital twin for flood detection, prediction and flood risk assessments

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PIPELINE AND SELECTED AREAS



Federated Earth System Digital Twin solution between NASA IDEAS and SCO FloodDAM (Flood Detection Alert and Mapping) for alert systems and flood risk maps on local and global scales using space technologies focused on flooding.

FloodDAM PRODUCTS

I) Flooding detection and alert service

Images **Surface Speed** **Water Level**

Real Time Measurements API Interface

Micro-station

- LIDAR technology with cm-level accuracy
- 8 Mpx camera
- Fully autonomous (power supply)
- Compact : 10 cm – 800g
- Fully connected (4G & Space IoT)

Drone Flight

- LIDAR
- cm level accuracy
- from 50 to 90 m range
- 8 Mpx Camera
- water mask and orthophotos
- 900 g
- Autonomy : 3h

II) Flood extent rapid mapping from EO data

Flood rapid mapping from SAR and optical data over the world

FloodML flood extent map from Sentinel-2 data, ESA World Cover and GSWO over the Ohio river flood event on the 27th February 2018

FloodML algorithm based on Random Forest flood extent detection from EO satellite data (Sentinel 2, Sentinel-1 VV-VH images, Landsat 8&9, Terrasar-X), MERIT DEM and ESA World Cover. FloodML is trained on Copernicus EMRS samples having >90% water occurrence.

Systematic report generation on each flood event

III) Short-term flood surface forecasting and modeling

Assimilation of SAR-derived flood extent

Assimilation of S6-derived WSE

Improvement of simulated flood extent maps using Data Assimilation of in-situ and RS data

Improvement of simulated WSE using Data Assimilation S6 nadir altimetry

IV) Risk assessment and economic impact

a) damage map computing in Marmande

b) Cost assessment for Cropland Aggregation in Marmande during flood event

Total cost = 1 283 000 €

- Environmental Intelligence Platform and API
- Real time product on financial risk estimation and risk map generation of flooding for different type of assets

V) Hydroweb.next platform

<https://hydroweb-pp.next.theia-land.fr/>

- An open distribution and visualization portal of hydrological products
- FloodDAM-DT processing chain will be integrated in 2024

Hydrology-Hydrodynamic coupling with data assimilation

	RMSE (m)	Tonneins	Marmande	La Réole
FR ^v	0.106	0.392	0.536	
IGDA ^v	0.073	0.074	0.09	
FR ^c	1.209	1.405	1.598	
IGDA ^c	0.166	0.160	0.141	

Case study: Ohio River 2D hydrodynamics model

2018 flood event on Ohio river between 06/02/2018 and 30/04/2018 (Flood peak around 29/02/2018) :

- preliminary results of T2D modeling with in-situ DA
- Two in-situ stations (Cannelton and Newburgh)

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