

## REGIONAL FLOOD MONITORING WITH SENTINELS DATA

*Complementary to the Copernicus Emergency Management Service, a dedicated service for local flood monitoring is also available at regional level for small and mid-size events.*

### The challenge

The importance of water resources and the increasing frequency of flood events around the world over the last few decades, emphasise the need for timely and cost-effective monitoring. Earth Observation technique has already demonstrated its capacity in detecting and monitoring flooded areas. For flood emergency situations, geo-information and maps related to large scale catastrophic events are provided to Civil Protection organisations or NGOs within the framework of the Copernicus Emergency Mapping Service (EMS Rapid Mapping).

In the case of regional (local) small and mid-size flood events, until now, no service has been available for systematic observation and monitoring of flood footprint evolution in space and time. This requested information should support application domains such as environment, biotopes, wetland and water management, flood prevention plan and flood modelling, land planning or the insurance sector.

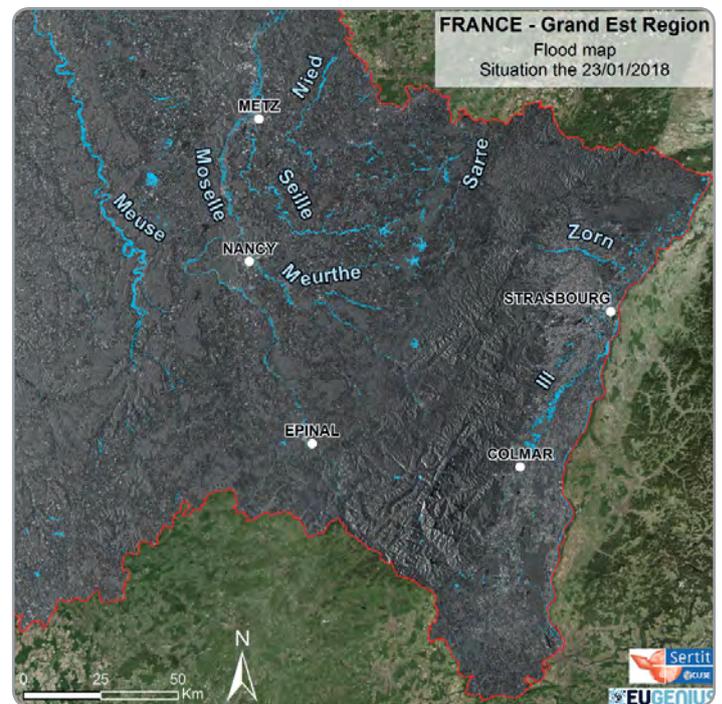
The Sentinels constellation constitutes a milestone in the spatial and temporal improvements of satellite systematic observations, which is of special interest for flood information collection. These satellites are able to ensure efficient routine surveillance mission, which has opened the door to the setting up of a regional systematic Flood Monitoring Service, filling the gap in flood related geo-information user demand at local level.

### The space based solution

Within the framework of the EUGENIUS H2020, an European network of service providers is delivering geo-information services to the regional and local European market; based on the combined

exploitation of Copernicus satellite data (especially Sentinel-1 and Sentinel-2) and local data, a common catalogue of thematic services has been set up, amongst which, the regional flood monitoring service delivered by SERTIT.

This service allows for the collection of geo-information related to ongoing regional plain floods. During the event, thanks to the high revisit frequency of the Sentinels satellites, the flood extent, observed at the time of acquisition, and its evolution, can be delivered shortly after EO data reception. After the event, flood maximum extent, impact, or duration, are also proposed. Geo-information related to past events may also be provided through the exploitation of archive satellite data.



Main rivers of the French Grand Est Region: flooding situation, the 23 January 2018.

Thematic Area



**BIODIVERSITY AND ENVIRONMENTAL PROTECTION**

Region of Application



**GRAND-EST**

Sentinel mission used



S1  
S2

Copernicus Service used



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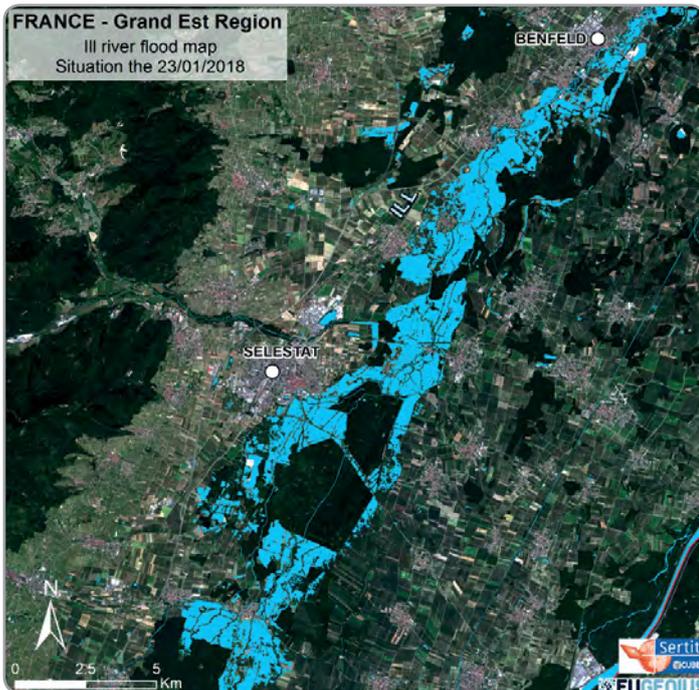
Usage Maturity Level



4

## Benefits to Citizens

Deployed in the French Grand Est Region during the first year of the project, the flood mapping service demonstrated its usefulness during the large flood events which have affected France in January 2018. Whereas Copernicus EMS, activated over the Northern part of France, and the surrounding areas of Paris, was in charge of the rapid mapping of the Seine river flooding, and its main tributaries (EMSR265), the regional flood mapping service was monitoring the evolution of the situation of the main rivers in the North East (e.g. Ill, Meuse, Meurthe, Sarre, Zorn), thanks to the 20 successive Sentinel-1 radar acquisitions (in ascending and descending modes) with an average of one observation every 1.5 days over the month. Maps were made available to the public through SERTIT's



Ill river flood extent, upstream of Strasbourg city, observed by Sentinel-1A satellite on 23 January 2018

“My colleagues from the environment and the flood departments are very interested; this information would complement the theoretical models very well.”

*Frank Pouvreau, Direction départementale des territoires du Bas-Rhin, French Ministry of Ecological and Solidarity Transition*

website and geo-information products provided through the EUGENIUS regional hub which is using INSPIRE standards and allows products to be downloaded by the users' community (local authorities, 10 departments of the Grand Est Region) for further analyses (e.g. situation management, flood model tuning, flood prevention action).

## Outlook to the future

Within EUGENIUS, the flood service is foreseen to be deployed in other European regions which are regularly subject to flooding (e.g. Occitania in France or Northern Greece). This downstream service illustrates the whole Copernicus value-chain benefits for the territory planning community, for flood risk prevention and management authorities as well as for individual citizens.

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## ABOUT COPERNICUS4REGIONS

This Copernicus User Story is extracted from the publication “**The Ever Growing use of Copernicus across Europe's Regions: a selection of 99 user stories by local and regional authorities**”, 2018, Edited by NEREUS, the European Space Agency and the European Commission.

The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains. The views expressed in the Copernicus User Stories are those of the Authors and can in no way be taken to reflect the official opinion of the European Space Agency or of the European Commission.

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