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LUXEMBOURG
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IRMA AND HARVEY : USA USED FLOOD MAPS MADE IN LUXEMBOURG

The Luxembourg Institute of Science and Technology generates flood maps in real time based on the latest-generation satellite images used by the US authorities to manage the flooding caused by hurricanes Harvey and Irma.

For a number of years now, Luxembourg Institute of Science and Technology's (LIST) researchers have been working relentlessly to develop a method of automatically picking out surface water from satellite radar images. This method is attracting real interest from flood management professionals because it makes it possible to quickly create maps of flood-hit areas, which are very useful in monitoring and predicting floods. Even in the very early stages in its development, this algorithm was implemented in the European Space Agency's (ESA) Grid Processing On Demand platform, proof, if proof were needed, of its effectiveness. An integration like this gives both LIST's researchers and external users rapid access to the images acquired by the ESA and enables them to process them very effectively. This algorithm is still being developed and improved by researchers as part of several ongoing research projects. The first project, "MOnitoring and predicting urban floods using Sar InTerferometric Observations" (MOSQUITO), funded by the Luxembourg National Research Fund (FNR), aims to improve the reliability of flood mapping tools in urban areas and to use flood maps to improve flood prediction models. A second project, entitled SAPSAN, "The World's first Synthetic Aperture Radar-based flood hazard map", fully funded by LIST, aims to build a global archive of maps of floods observed by the ESA's ENVISAT satellite over more than a decade, from 2002 to 2012. Lastly, a third project, PUBLIMAPE ("Public Information Mapped to Environmental Events"), also funded by the FNR, is designed to combine satellite flood maps with information drawn from social media in order to build a better picture of affected areas and improve flood prediction models. Thanks to the tools developed in recent years by its researchers, LIST is now often the first to produce such maps from images acquired from the ESA's two Sentinel-1 A/B satellites.

The US authorities call on LIST's expertise

Hurricanes Harvey and Irma ravaged the United States in the end of summer 2017, bringing catastrophic flooding to Houston, south-eastern Texas, and Florida. To deal with this situation, the US authorities called on the "Global Flood Partnership" (GFP), a collaboration between scientific organisations and managers of massive floods across the world, in order to develop flood observation and modelling tools. LIST's researchers developed the algorithm used by the ESA and are members of this network. As part of LIST's contributions to it, they also regularly take part in community efforts to test, in an operational context, the methods they have developed. The aim of these tests is to produce flood maps for flood management stakeholders in various regions of the world and, more generally, to demonstrate the usefulness of such methods to the public.

In calling on the GFP, the US authorities used the maps extracted using the algorithm developed by LIST. LIST's proven expertise gave the US authorities an overview of the areas worst affected by flooding.

These maps, published on the Dartmouth Flood Observatory website set up by the University of Colorado in the United States, are being made available to the Federal Emergency Management Agency (FEMA). They are allowing them to perfect their management of the various phases of this major natural disaster. The maps highlight the areas worst hit by the event, thus enabling them to deploy protective measures to reduce risk. The maps made available to the US authorities for Hurricane Harvey can be viewed at: http://floodobservatory.colorado.edu/Events/2017USA4510/2017USA4510.html

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY (LIST)
The Luxembourg Institute of Science and Technology (LIST) is a mission-driven Research and Technology Organization (RTO) that develops advanced technologies and delivers innovative products and services to industry and society. As a major engine of the diversification and growth of Luxembourg's economy through innovation, LIST supports the deployment of a number of solutions to a wide range of sectors, including energy, IT, telecommunications, environment, agriculture, and advanced manufacturing at national and European level. Thanks to its location in an exceptional collaborative environment, namely the Belval Innovation Campus, LIST accelerates time to market by maximizing synergies with different actors, including the university, the national funding agency and industrial clusters.