

# NEW SERVICES WILL STIMULATE MARKET GROWTH

## User-friendly Remote Sensing Data Infrastructure in France



Over the past decade, Geosud has contributed to successfully mitigating the various obstacles to the operational use of satellite imagery for environmental management and territorial development. Geosud's role in the project will soon come to an end but the services will continue, embedded in an even better infrastructure: Dynamis. As of next year, Dynamis will provide satellite images of land, sea, air or underground, and even online image processing, for organizations related to the public sector in France.

As you approach the Maison de la Télédétection in Montpellier, France, the first sight that greets you is a 5.5m-tall receiving station on an 8m-high platform. The centre employs around 175 people, all of whom are in some way involved in research and development, training and

putting GIS and remote sensing to good use for France's ecosystems. A substantial part of the budget over the past decade was linked to the Equipex [Geosud project](#), to which the country's Ministry of Research donated €11 million ('Investments for the Future' programme), with a further €10 million coming from the 13 project partners. "We started Geosud because we realized that France was not making sufficient use of satellite data. We wanted to help overcome limitations like knowledge, skills and costs. The project will end next year, but Geosud has changed the landscape for good," comments Pierre Maurel, coordinator of Geosud. He is proud of the results: the market growing from just a few companies offering commercial services to an open-innovation community with 540 member organizations.

The main service currently rendered is the free and easy distribution of satellite images from different suppliers to state agencies, regional GIS centres, local authorities, research laboratories, training centres and so on, all in the public sector. Private companies working for a public body can also have free access to the images for the job at hand. Small private companies are allowed to use the facilities on their own for R&D activities, e.g. the development of a new application. When the product is ready to be marketed, the free flow stops and the company has to negotiate the licence conditions with the provider of the images.



Searching in the Geosud catalogue of nearly 13,000 VHR images.

### Images on request

When Geosud started, French satellites – owned by the national space agency [CNES](#) – were already in orbit and delivering images known as SPOT (1 to 5). Nowadays, SPOT 6 and 7 are distributed by Airbus, which operates private satellites, while CNES owns the public Pleiades satellites. Maurel: "We can choose to buy for our members whatever images are available on the market, whether they are from French satellites or not. In the beginning we concentrated on improving the access to very-high-resolution (VHR) imagery so that the use of satellite images improved. Landsat and Sentinel decametric images are available for free, but our users need additional resolutions, combinations of satellite images and combinations of data sources. We have annual national coverage, the French overseas territories included. Nowadays, that means 1.5m panchromatic and 6m multispectral SPOT images. The main urban regions and sensitive areas (new infrastructures, coastlines, etc.) are covered by Pleiades at the 50cm and 2m level. Our Geosud archives now contain 13,000 VHR images."

Geosud members are allowed to access images that have already been archived. They can also request that a satellite obtains additional

images for free, anywhere in the world. The user simply completes the online form to indicate the desired area, resolution, time slot, number of images, mono, colour, purpose, etc. If users lack sufficient expertise, they can receive advice on the most suitable type of images or the most adequate combination. After checking whether the data is already available in the Geosud and/or Airbus archive, the request is validated and the satellites are programmed to acquire the images. After a quality check by an expert, users can then download the requested images. "Sentinel or Landsat satellites cannot be programmed. The other, more agile satellites can shift their place in orbit or take images of the same area from different angles. Mostly, the extra images are needed because of the resolution or a specific period. If they go directly to the supplier, they will have to pay full price; from us, they get the images for free or at a very low rate," says Maurel with respect to another bonus of membership. Members get to see the commercial cost of the images, so they are aware of what the service is worth.

## Online image processing

As of the end of this year, a new free service will be provided: online image processing. "You select an image and indicate what you want to do with it. The matching algorithms, developed by French scientific experts, are then tried out on a small part of the image. If this is satisfactory, the same algorithms are applied to the whole image and you can download the result. It is another step to democratization of remote sensing for people who are not equipped or lack the means to use it," continues Maurel.

That same thought is behind the new national remote sensing data infrastructure, Data Terra, which is currently under development. It will include four remote sensing clusters; in addition to Theia for land services – which comprises the Maison de la Télédétection, CNES, the [Institut Géographique National](#) and other institutes – the clusters for oceans (Odatis), for underground (Form@Ter) and for air (Aeris) will participate. The users of all four clusters will obtain their satellite images through a single unified portal: Dinamis. A meta-catalogue service will help users to extract the right images from a variety of sources. Then, if needed, the online image processing services will be provided by the Theia infrastructure.



Next year, satellite images from all four remote sensing clusters will be accessed through a single portal: Dinamis. Cooperation will be intensified under the umbrella of Data Terra.

Now that the Geosud project is nearing the end, Maurel is rethinking his funding. Perhaps there will be a Geosud 2.0, to improve the services provided by Dinamis and Theia. Perhaps the main users, especially the Ministries of Agriculture, Research and the Environment, and also the regions – who are responsible for economic development and land planning – will donate more. If that is not enough, members could be asked to pay a membership fee or make a financial contribution after a certain amount of free on-request satellite images. Geosud has conducted a survey to investigate members' willingness to pay, but no decisions have been made yet.

## Market growth through networking

There are many new users joining each year as new products open up new market segments. Maurel: "Over the past two years we've grown from 700 to 1,000 individual users within the Geosud Theia community. Archaeology is one new up-and-coming market and another is insurance – companies use our images to see where drought or flooding are becoming fundamental problems. We're also seeing new users in the field of forest management, to detect diseases faster. Talking of diseases: the Ministry of Health is now researching the risk of tiger mosquitoes – initially in our overseas territories but now also in mainland France."

The growth in membership is particularly being stimulated by the many new applications created within the large national community of developers. In Theia alone, there are 25 research groups, 55 laboratories and 6 regional groups that can use the satellite images for free. In exchange, they have to prove fitness for use, mostly in close contact with potential user communities and their IT consultants. The groups write user guides, organize training sessions and suchlike.

Private companies do not complain about 'false competition', as far as Maurel is aware. "We work in an open innovation chain with private, public and academic players where every link is clear and respected. Companies, most of which are not specialized in remote sensing, can use our maps to support their added-value applications. We're helping to develop the market, not ruin it." Once the online processing service is available, he hopes to grow much more, especially at the local level. "By law, each region has a GIS platform where the local partners exchange experiences. We will work with them to introduce satellite imagery for their workflows."



Pierre Maurel: "We work in an open innovation chain where every link is clear and respected." (Image courtesy: VBB, Jeroen van Berkel)

## Impact studies

Its knowledge of the possible impact of such images at a micro-level – i.e. on workflows – is another of Geosud's specialities. The return on investment in satellite imaging is measured everywhere in the world. That mostly only leads to macro-economic studies, but not so in Montpellier: "With funding support from CNES, several students are working on a methodology for impact studies. We not only look at the macro level, but also at which changes satellite imaging has brought about in offices – both quantitatively and qualitatively." In 2015 Geosud started with a methodology to measure the impact of the French regional GIS platforms. It is now so mature that most of those platforms use it. It can lead to an aggregated indicator: from savings at several layers, to extra revenues, to better decisions. So what are the overall efficiency results? Maurel explains: "Every euro invested in a regional GIS platform saves or generates at least three euros. In forestry, to manage clearcutting in woodlands through satellite imagery, the ratio is between 1:20 and 1:30 euros. For the updating of land-use maps, the impact is 1:12 or 1:13 euros. We're using these studies to show how it can change a workflow and the management of certain public policies." And of course there has also been an overall study of the impact on the public budget of the images from Geosud and its receiving station: the savings for image acquisition amounted to €80 million between 2011 and 2017 (a ratio of approximately 1:4), and this figure will be even higher for 2017-2019.

The existence of public remote sensing data centres is not disputed in France. "It helps in the independence of the public sector and to develop private business. You can use Google Earth or other platforms, of course. But all these things are run by private companies with

their own business logic to make the highest profit, either directly or indirectly. That is not always in the interest of the public sector, even though such companies can be very helpful. For example, if the Americans get angry with Europe for political reasons, they could decide to impose tax measures or even close the service to all European users. Therefore, we advise our users not to do everything on those toolboxes. We also need independent, autonomous institutions in France to guarantee strategic public services.”

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<https://www.gim-international.com/content/article/user-friendly-remote-sensing-data-infrastructure-in-france-2>

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