



# THE PILLARS OF THE EARTH

THE INSPIRE DIRECTIVE HAS HELPED TO DRIVE THE CREATION OF SPATIAL DATA INFRASTRUCTURES IN EUROPE, TO ACT AS THE FOUNDATIONS OF GEOSPATIAL SERVICES AND PRODUCTS. KRISTIAN JAAKOLA AND JAANA MÄKELÄ LOOK AT HOW VARIOUS COUNTRIES ACROSS THE REGION HAVE RESPONDED TO THE DIRECTIVE AND WHAT MORE NEEDS TO BE DONE

Spatial data infrastructure (SDI) has been growing and developing rapidly in the past five years in Europe. One of the drivers for this has been the EU's INSPIRE directive, which has driven public organisations to publish their spatial data as web services and, in many cases, open data.

Another important contributor has been the fact that spatial data is becoming more and more vital and useful in different kinds of processes, saving time and money. Examples include planning new schools or daycare centres by using the distribution of the population by age groups and statuses, creating electronic self-service systems to automate the granting of building permits, or planning efficient rescue and recovery operations during disasters. Private companies are also using an ever increasing number of spatial data sources to create new and innovative solutions for the general public, such as route planners, hiking guides, restaurant delivery services and analysis apps to see election results.

The spatial data is delivered by using spatial web services, the standards for which are created and maintained by the Open Geospatial Consortium (OGC). The typical OGC services are web map services (WMS) that provide map images of the desired data or web feature services (WFS) that enable access to or download of spatial data for further analysis or development. Spatial web services, as well as the policies and arrangements related to them in an organisation, make up an organisational SDI whereas all the (open) services in a particular country make up its national SDI (NSDI). Furthermore, all the services in Europe make up the European SDI. Key promoters of SDIs have been the national contact points for INSPIRE

in each of the countries, which typically are the national mapping agencies. They have been entrusted with the responsibility of overseeing and building the NSDIs for their respective countries. They have done a great deal of work to promote the benefits and value of spatial data accessed through standardised spatial web services. They have also been instrumental in pushing the drive to extend NSDIs.

## Northern Europe

Northern Europe is typically technology savvy and so many of the Northern European countries have been early adopters of spatial data technologies. Smaller countries have naturally found it easier to build NSDIs. Cooperation and the sharing of best practices between Denmark, Finland, Iceland, Norway and Sweden have sped up implementation of the INSPIRE directive and the development of NSDIs in these Nordic countries. The good availability of view and download services has enabled easy access to spatial data, as has the opening of the spatial databases of government agencies and municipalities in all user segments.

In Finland, the forerunners have been the Finnish Environment Institute, which opened up its environmental data in 2008, and the National Land Survey, which opened up all its topographic datasets including orthophotos, elevation models and topographic database in 2012. The open data of both the Finnish Environment Institute and the National Land Survey have promoted new business, especially in small and medium-sized companies. It has also enabled other organisations to make their internal

processes more effective. The Danish Geodata Agency opened up its address data in 2002, and did the same for topographic data and cadastral maps in 2013. In Norway, considerable open national spatial data is available on the national geoportals and in Sweden, the National Land Survey and the Swedish Transport Administration have opened some of their spatial databases in the past two years. This has enabled companies to create new routing apps for public transport and individual users to optimise the transport information at their disposal.

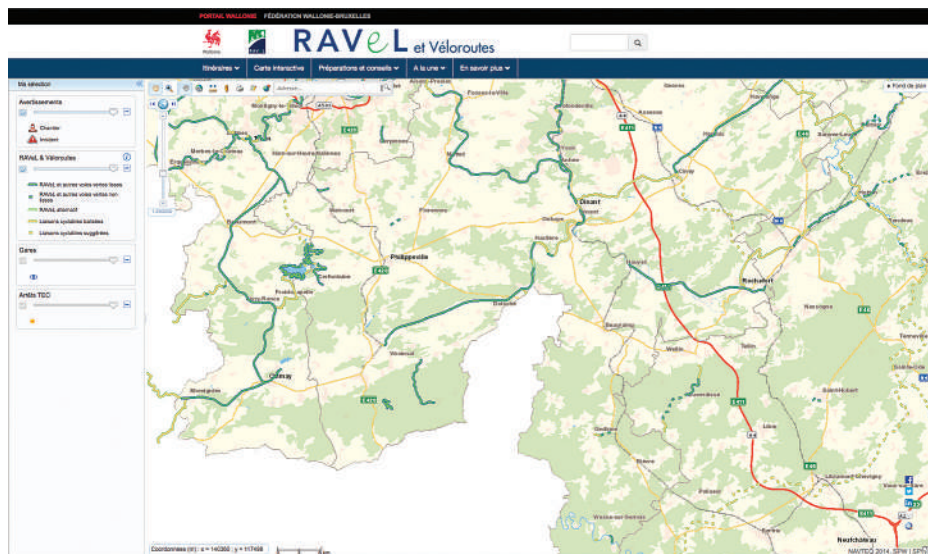
At the moment, one of the hottest topics is the evaluation of the benefits of open spatial data. Several studies have already been completed or are ongoing.

### Central Europe

There is considerable variation in Central Europe. For larger countries, such as Germany, France and the UK, it takes more time to get the ball rolling to reach a critical mass where adoption starts to create additional benefits and public organisations have the maturity to step into the world of spatial data and start using it with the modern standards of an SDI.

The Netherlands is an early adopter in Central Europe. Its smaller size, fewer public organisations and single national legislator have made it easier to start faster.

For instance, the National Geoportals of the Netherlands combines open data from four different key organisations in the Netherlands and provides access to a variety of datasets,



Spatial data can be accessed through spatial web services. Wallonia Public Service Geoportals provides a huge number of datasets, varying from topographic data to environmental and transport data

including cadastral information, road networks, transport information and environmental data.

In Germany, there is considerable development occurring, and most larger organisations and cities are already quite far advanced with their SDIs.

However, the added challenge in Germany is its federalised nature, with the implementation and wording of the INSPIRE directive slightly different in each of the federal states, resulting in many different licensing models and legal structures that have to be taken into consideration.

The UK is one of the slowest adopters of SDI, as it has been lacking the coordination and thus the drive to push an SDI nationally. However, there have been many projects initiated. France has taken the middle road, being somewhere between Germany and the UK in its spatial data adoption.

### Southern Europe

In Southern Europe, the strongest driver of SDIs has been Spain. The country is one of the rare exceptions where an SDI has been extensively

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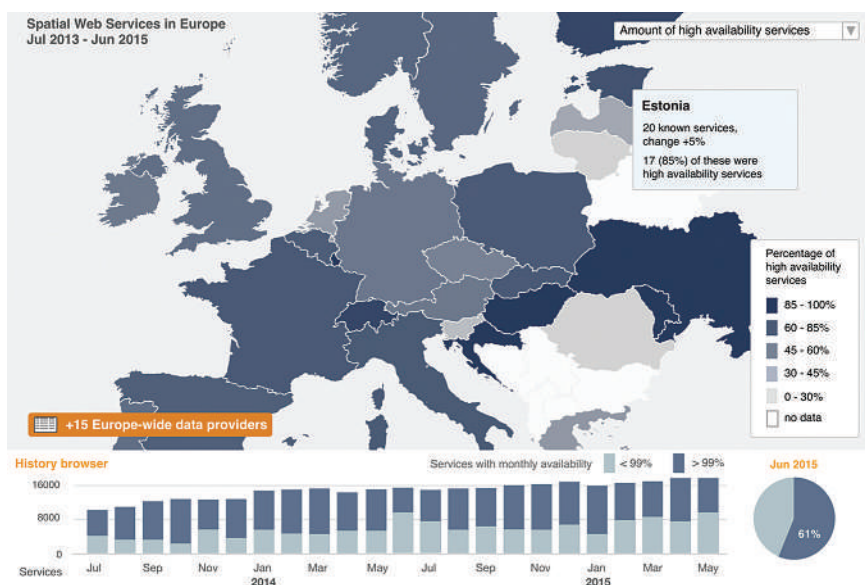


Southern Europe will be a hot spot for fast development of spatial data infrastructures in the near future

## VISUALISING THE EUROPEAN SPATIAL DATA INFRASTRUCTURE

It is only safe to base key processes on an SDI if it is sufficiently reliable. If it isn't, using it could cost money instead of save it, since when the services are not working, the spatial data is inaccessible and the processes are in the worst cases halted until the situation is corrected. Thus accurate and timely information on service quality is the key factor in assessing a SDI.

Spatineo offers a publicly availability map (<http://servicemap.spatineo.com/>) that shows the current status of European SDI development and overall trends. Users can examine Europe as a whole or focus on specific countries to compare different areas. The tool aggregates data by geographic areas and provides insight into the top spatial data providers in Europe. Data providers that have recently increased the availability or quantity of their services are highlighted.



The shading of each country indicates the percentage of high-availability services while the bars at the bottom show the number of total services and high-availability services over time

built even before and with little influence from the INSPIRE directive. Spain saw early on the potential that spatial data offers to improve efficiency and drive the cost-benefit ratio higher, and it enjoys a very good adoption of SDI.

However, this has been hit in the past few years by the financial crisis affecting most of the Southern European countries. Investments in SDIs pay for themselves two to three times over within two to three years, but financing even the most basic day-to-day operations became difficult, slowing or stopping investments in even mid-term projects. This means the full potential of SDI hasn't been realised yet. Nevertheless, this is a promising prospect for the future.

Portugal and Italy are somewhat behind in building their own SDIs. However, with the financial crisis starting to loosen its grip on these countries, there are many projects being planning or starting. These will be hot spots for fast development in the near future.

### The future with INSPIRE

The vision and goal of the INSPIRE legislation is to simultaneously open more data and increase its use. The value and benefits of this are realised when the spatial data is integrated into an organisation's service and planning processes, which is easily done when using standardised spatial web services. The quantity of spatial web services has continued to grow steadily over the past two years and the number of compliant services available is very promising. It seems that INSPIRE is meeting its goals.

*Kristian Jaakkola is VP of sales and marketing and founder of Spatineo Inc. Jaana Mäkelä is service director at Spatineo Inc ([www.spatineo.com](http://www.spatineo.com))*