

# SATELLITES GOING LOCAL



30 REGIONS,  
CITIES AND SMEs  
**SHARE GOOD  
PRACTICE**

*2012 EDITION*

**eurisy**  
acting collectively to  
bridge space and society





Eurisy would like to thank the contributors to this publication for their readiness to share their experiences, and the time and effort they have put into helping Eurisy to produce this collection of good practices.



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### **Dear Reader,**

We are proud to bring you this second edition of “*Satellites Going Local – 30 Regions, Cities and SMEs share good practice*”. The 2011 edition enjoyed a wide-spread interest: on the one hand, regions, cities and SMEs welcomed the opportunity to learn from practical examples from their peers; on the other hand, the European space community found evidence of the way investments in satellite infrastructure are delivering real services and benefits for the citizen.

This second edition capitalises on that interest by identifying some of the most successful examples of satellite services in use today. In choosing and describing these examples, we have taken care not to focus on the technology itself, but on how real problems are being addressed.

Satellite services help us harness the power of information and communication better than ever before. They also enable better informed decisions, better communication among stakeholders, and more efficient work processes. How is that being achieved? Read the examples and learn from the regions, cities and SMEs who have talked to us about it.

Even at a time when the global economic crisis puts any kind of investment into question, such examples give us every reason to argue that a long-term view on solving society’s problems should remain a priority in Europe.

**Colin Hicks**, *President, Eurisy*



## Endorsements



*“AEBR welcomes the second edition of this publication as a tool to foster dialogue among regions on the use of satellite services to better address global and local challenges of today.”*

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**Martín Guillermo Ramírez**, Secretary General,  
Association of European Border Regions - **AEBR**



*“European Regions play a crucial role in incorporating innovation into local and regional strategies to improve the quality of life of their citizens and the prosperity of their territories.”*

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**Pascal Goergen**, Secretary General, Assembly of  
European Regions - **AER**



*“Exchange between local governments is at the heart of CEMR work. Thus, we truly welcome this publication as it allows them to share their success stories in the use of satellite solutions and learn from one another.”*

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**Frédéric Vallier**, Secretary General, Council of European  
Municipalities and Regions - **CEMR**



*“Satellite information and services can bring many practical advantages to the daily lives of each of us. A technology driven, innovative approach to Earth Observation and GMES must therefore be broadened by focusing further on the user. More and more cities and regions are ready to become partners in the development and use of services like monitoring of air quality, civil protection and spatial planning. But in order to develop all the potential of satellite services further information, cooperation and exchange of good practices is needed.”*

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**Gerhard Stahl, Secretary General, EU Committee of the Regions - CoR**



*“The good practices in this publication underline the importance of SMEs’ access to innovative satellite applications to become more competitive and contribute to the growth of the European economy.”*

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**Andrea Benassi, Secretary General, European Association of Craft, Small and Medium-sized Enterprises - UEAPME**



## Introduction

Professionals working in European local and regional authorities, as well as in small and medium-sized enterprises, are looking for innovative solutions to improve their services in a range of sectors, going from risk management to environmental protection, agriculture, energy, transport, culture and many others. Satellite imagery, as well as satellite navigation and communication, offer today a number of tools to help better organise our daily activities and respond to citizens' needs in innovative ways.

This publication offers examples of how satellite information and services have helped professionals engaged in different activities and sectors to improve their services and workflows. It aims to foster the exchange of good practices among professional communities and to inspire peers to come up with new ideas and get in touch. The articles are voluntarily reduced to three dimensions: challenge, solution and result, as a way to focus on the benefits of the technology for you, the end-user, and not the technology itself.

This publication is one of the awareness-raising tools of Eurisy's User Programme, which informs regions, cities, and SMEs about innovative satellite services in order to prepare them to make the most of European investments in space. Indeed, by making better satellite information and services available to citizens, European programmes such as GMES (Global Monitoring for Environment and Security) and the Galileo positioning system will allow for further improvements and innovation in business



processes and services. Cities, regions and SMEs can contribute to unveiling this range of possibilities by becoming aware of what satellite information and services can do for them and by taking them into account when considering solutions to respond to our needs and those of the planet.

Eurisy wishes to thank the professionals who helped us in producing this publication by sharing their experiences and making them available for others. We hope you will learn and be inspired by them. For further information about good practices, and Eurisy's User Programme, we will be happy to respond to your enquiries, ideas and proposals.





# ENERGY



## SOLAIREDIRECT: MANAGING SOLAR ENERGY PRODUCTION USING SATELLITE COMMUNICATION

The French company Solairedirect monitors its photovoltaic parks remotely thanks to satellite communication.

### The company

Founded in October 2006 in France, Solairedirect is an integrated operator of solar electricity with an international presence in four continents and a workforce of approximately 300 people. Solairedirect builds and installs solar panels, operates solar plants and provides consultancy on photovoltaic energy.

### The challenge

The company's market is rapidly expanding, requiring innovative and efficient management solutions, especially to evaluate solar potential and monitor solar parks constantly and efficiently, in real time, ensuring data security worldwide from the company's headquarters in France. The monitoring system also had to have a constant pricing model, enabling a step-by-step deployment. The company evaluated several technical and economic solutions, including contracting the services of local companies for monitoring and maintenance, which did not prove cost-efficient enough.

### The satellite solution

After an in-depth review of existing possibilities,

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© Solairedirect

Solairedirect found that satellite communication was the most cost-efficient solution to control the installations. In 2011, Solairedirect contracted Telespazio to provide satellite communication connections of its remote solar plants. These enable Solairedirect to constantly monitor the solar plants wherever they are, from its Paris headquarters. Solairedirect can now get real-time information on how well the photovoltaic system performs (assessing actual VS projected energy outputs), on technical and security problems, weather forecast as well as remote video surveillance.

## Saving cost on field visits through remote monitoring

### The result

The solution is easy to use and requires minimal equipment, can adapt to local conditions and its cost is proportional to the number of photovoltaic

installations connected. The system is suitable for existing and future installations worldwide. Moreover, compared to other solutions, cost remains constant in time, allowing Solairedirect to better plan their investments.

The system, first tested in three solar parks, proved to be so efficient that it was implemented in all Solairedirect's solar parks (16 installations) in 2011 and should be extended to another 20 sites during 2012.

“The solution can be adapted to any location in the world, while ensuring stability of costs.”

**Benjamin Drieux**, Solairedirect

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## SOLAR ENERGY PRODUCTION MONITORING IN LYON, USING SATELLITE INFORMATION

Satellite data are used in the Lyon-Confluence area to estimate the hourly output of photovoltaic (PV) plants installed within the EU funded CONCERTO Renaissance project.

### The organisation

The Urban Community of Lyon (Grand-Lyon) is the second largest agglomeration in France and is composed of 58 municipalities. With a population of 1,3 million inhabitants, it is the heart of the country's second economic pole. For some years now, Grand-Lyon has been deeply involved in considerations about post-carbon cities and the implementation of procedures aiming at preparing the conditions for a change paradigm in the field of climate and energy. They include the signature of the Covenant of Mayors, the Confluence urban project supported by the European Commission and the reinforcement of the competences of Grand-Lyon in the field of energy.

### The challenge

Within the EU-funded CONCERTO Renaissance project coordinated by Grand-Lyon, a group of energy efficient buildings for a total floor area of 79 000 m<sup>2</sup> has been built in the Lyon-confluence area by three real estate developers, according to specific guidelines that included targets in terms of energy consumption and use of renewable energy systems. Thus, in addition to wood chip boilers and solar thermal systems, 11 PV systems have been installed for a total power output of approx. 250 kWp.

## Quick detection of PV malfunctions

“Satellite data provide an easy way to assess the hourly irradiation data of many different sites.”

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© Grand Lyon

As it was difficult to ask each company in charge of the design and installation of a photovoltaic system to use the same monitoring system, a “district scale monitoring system” has been tailor-made to ensure that all PV systems operate properly on the long term.

### The satellite solution

Satellite irradiation data are used by this district scale monitoring system in order to assess the expected hourly output of each PV system. The estimated hourly output is compared with actual production data. In case of difference, an alert is sent to one of the project participants so that the faulty PV system can be repaired as soon as possible.

### The results

Thanks to satellite data, all PV systems of the CONCERTO Renaissance project installed in the Lyon-Confluence area are controlled each day to make sure that they operate properly, and malfunction is rapidly detected.



## SUNNERGY: REMOTE PV PLANT CONTROL AND SURVEILLANCE

The company uses satcom to connect to remote surveillance equipment.

### The company

Sunnergy Group S.p.A. is an Italian company existing since 2007. The company develops, designs and invests in medium-sized photovoltaic plants in the South Italian regions of Puglia, Sardinia and Sicily. At the moment, it manages several plants with a medium power output of 1MW.

### The challenge

The company needs to centrally and permanently monitor its remote photovoltaic plants by connecting the surveillance equipment on site with the monitoring systems in-house. It needs to do so reliably, respecting security requisites, with a system that is easy and flexible enough to unroll according to needs.

## Constant remote monitoring

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### The satellite solution

Sunnergy Group S.p.A. has chosen to use bi-directional satellite technology combined with an integrated network (wired, wireless, satellite) provided by IcarusNet. Bi-directional "D-Star" satellite dishes have been installed in the various photovoltaic fields to complement the terrestrial network. The network was specifically configured to meet particular territorial needs and so that it could deliver the best value for money.

### The result

The satellite connections allow for constant access to measure, control and video surveillance applications from the headquarters, as well as from territorial branches where workers are in charge of control and maintenance. The connections are noticeably fluid and quick. Costs have been contained.

“The personalised network configuration meets the requirements of our control and video surveillance applications. The excellent performance of the connection links makes the network safe, reliable and scalable for future requirements.”

**Lorenzo Podestà**, Manager, Sunnergy Group

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# HEALTH



## STOCKHOLM IMPROVES ACCESSIBILITY FOR CITIZENS WITH DISABILITIES

Stockholm's Traffic Administration uses satellite navigation to provide route planning assistance for pedestrians and itinerary guidance for citizens with disabilities and the elderly.

### The city

Stockholm is Sweden's capital and largest city with approximately 850 000 inhabitants. The city's Traffic Administration is responsible for the construction and maintenance of the urban road infrastructure. This includes managing the pedestrian road network (sidewalks, pedestrian crossings, access to public transport facilities) and making it accessible for citizens and visitors with disabilities.

### The challenge

In 1999, the city set itself the goal of becoming the world's most accessible capital city for visually and mobility impaired persons. Initially, the Traffic Administration adapted the urban infrastructure to their needs, for instance, by rebuilding pedestrian crossings and reducing the gap between the kerb and buses in bus stops.

Yet the changes in the urban infrastructure addressed accessibility issues only partially. In particular, the guidance of visually impaired persons with elements such as raised bands only was insufficient.

### The satellite solution

The e-Adept solution enables citizens with reduced mobility to plan their walking routes, receive precise navigation guidance and call for help in case of emergencies, thanks to audio-visual guidance. The system combines a downloadable software for mobile

## LRA SUPPORT INITIATIVE



© City of Stockholm Traffic Administration

phones, adapted for the visually impaired, based on a city map of streets and roads and a GPS device connected to the mobile phone via Bluetooth.

## Inclusive transport managed locally

The Municipality constantly updates the system's information to take into account any changes in the urban landscape.

e-Adept was developed by the Traffic Administration in partnership with the Swedish Post and Telecom Agency, the Swedish Road and Rail Administrations, the city of Malmö,

the ICT Programme of VINNOVA and with associations of the visually impaired.

### The result

e-Adept is currently being used on a trial basis by visually impaired citizens and proves to be a valuable support tool to increasing their urban mobility. In order to be able to market the solution more widely to other groups of citizens and visitors with reduced mobility, the Traffic Administration is currently exploring cooperation with public transport operators to integrate it with their accessibility strategies.

“By developing e-Adept we are giving people with visual impairments the same freedom the rest of our citizens have.”

**Pernilla Johnni**, City of Stockholm Traffic Administration.

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## MERSEY CARE NHS TRUST: OPTIMISING HEALTH SERVICES FOR THE DISABLED

Mersey Care uses a satellite-navigation system to improve patient transport times and efficiency.

### The organisation

Mersey Care NHS Trust is an English clinic set up in 2001 to provide specialist health services in Liverpool, Sefton, and Kirkby. Mersey Care helps people with learning disabilities and mental health difficulties to optimise their health, life experience and citizenship.

### The challenge

Since July 2006, Mersey Care brings mental health patients to hospitals in the morning for their treatment and back home in the afternoon. In the time between the vehicles are available for other jobs. Before implementing TomTom, an integrated vehicle tracking and satellite navigation system, each driver had to pull over to the side of the road to take calls about a new job. The dispatch officer would communicate the necessary details to the driver, who would write them down on paper. As the jobs vary a lot, it was important that the details be correct. For more remote addresses, the drivers sometimes had to look up the destination on a map, before getting on with the job. This was highly time-consuming.

## Responsive health service

### SME SUPPORT INITIATIVE



### The satellite solution

Mersey's transport team implemented a vehicle tracking and satellite navigation-based solution from TomTom Business Solutions. This enables dispatchers to see exactly where vehicles are and to dispatch jobs directly to the drivers via the satellite navigation units in the vehicles. Once job orders are received, drivers can simply tap the screen and navigate the next job. The system offers live traffic information, suggests alternative routes and calculates estimated arrival times based on real-speed data, which means patients can be kept informed if there are to be delays.

### The result

The vehicle dispatcher can now send details of new jobs to the drivers as soon as received, rather than having to plan at the beginning of the day or waste time contacting each driver to check where they are. In this way, Mersey Care is able to operate a much more efficient, flexible business, while also benefitting the patients and their families.

“TomTom has been brilliant! It's really made my job easier.”

Jenny Cross, Dispatch Centre, Mersey Care



## MILAN: KEEPING MOSQUITOES AT BAY WITH THE SUPPORT OF SATELLITE NAVIGATION

The Municipality of Milan experiments a system of geolocalised bat boxes to fight mosquitoes in the summer.

### The city

With a population of approximately 1,3 million, Milan, capital of the Lombardy region, is placed in the heart of the Po Valley, in a historically marshy area. Given the numerous subterranean rivers, open canals and ground waters in the area, mosquitoes are a persisting problem during the summer.

The Milan Disinfestations Office coordinates pest control, with the support of specialised research centres.

### The challenge

To protect citizens against the nuisance caused by mosquitoes, the Disinfestations Office carries out regular awareness raising campaigns. The Office targets grubs and adult insects by spreading chemical products. For instance, a biological pesticide (*Bacillus thuringiensis* subsp. *israelensis*) is spread with helicopters on flooded paddy fields. Though these chemicals are not a threat for humans and the environment, spreading them is costly in terms of money, time and human resources. As part of a biointegrated pest control strategy, the Municipality has recently decided to introduce a complementary, fully ecological solution: "bat boxes" aimed to attract the bats, which feed on mosquitoes.

### The satellite solution

Helicopter flights that spread pesticides to relevant areas are planned and monitored using satellite navigation. Furthermore, the 400 bat shelters installed

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in city parks and gardens are geolocalised, making it easier for the Disinfestations Office to keep an accurate record of the shelters, and to better re-evaluate their location.

The application is the result of a lengthy research coordinated by the Disinfestations Office in collaboration with the Milan Agency for Environmental Services (Azienda Milanese Servizi Ambientali). The satnav

system is managed by Milan's Volunteer Ecological Troops (Guardie Ecologiche Volontarie), who are actively engaged in environmental protection on the territory.

### The result

By the end of 2012, 1 200 bats will find refuge in as many bat boxes. The bat boxes serve the twofold objective of fostering the reproduction of bats, and to rely on the predatory instinct of the mammals to reduce the number of mosquitoes. Since bats can eat between 2000 and 4000 insects per night, citizens will benefit from the reduction of the number of mosquitoes, and the prospective reduction in the chemicals used to fight these. Although apparently marginal, the satnav component of the application is important for a smooth running of the initiative.

## Biointegrated campaign against mosquitoes

“The use of the bat boxes in fighting mosquitoes shows how it is possible to combine innovation and respect for the environment.”

**Pierfrancesco Maran**, Councillor for Mobility, Environment, Urban Architecture and Parks of the City of Milan

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# ENVIRONMENT



## LAKE GARDA COMMUNITY: MONITORING WATER QUALITY WITH REMOTE SENSING

Satellite imagery provides information to monitor the effects of climate change on the lake's ecosystem.

### The organisation

Lake Garda is the largest fresh-water basin in Italy and an important tourist destination. The Lake Garda Community is an interregional body representing 70 municipalities in the three regions neighbouring the lake: Lombardy, Veneto and Trentino-Alto Adige. It is in charge of coordinating the sustainable development of the Lake's territory for land use, environment, water quality, safety, transport and road system, tourism, culture, agriculture and inland navigation.

### The challenge

Habitat fragmentation, urban sprawl, tourist activities and air and water pollution are stressing lake ecosystems everywhere in Europe. Since Lake Garda is a major tourist destination and its water is used in agriculture and as drinking water, it is fundamental to monitor its quality and temperature. Specific investigations are focusing on the qualitative and quantitative distribution of vegetation and on the proliferation of cyanobacteria, which seem to thrive in warmer water temperatures and that produce toxins that can cause adverse effects on human and animal health. Because of such potential risks on health and economy, the Lake Garda Community has a particular interest in evaluating the local consequences of a future increase in global temperatures.

### The satellite solution

Since 2010, the Lake Garda Community is part of EULAKES (European Lakes Under Environmental Stressors). The European-funded project aims at

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## Pollution prevention and monitoring

enabling territorial administrators to prevent and manage the impact of climate change with the support of modern technologies. Within the framework of the project, satellite imagery is used to reveal water's qualitative characteristics varying according to the temperature, such as water clarity, algal biomass and class composition. For Lake Garda, the various species of macrophytes (aquatic plants particularly sensitive to pollution) have been mapped and classified according to their sensibility. Macrophytes are especially important to evaluate the effects of pollution on aquatic ecosystems, since the most sensible species

tend to diminish when pollution increases, and their quantity indicates whether or not the water is suitable for human and agriculture consumption.

### The result

The maps of water characteristics produced on the basis of satellite imagery are already available to the authorities in charge of environmental protection in the territories neighbouring Lake Garda.

Satellite information allows authorities to monitor the effects of changing temperatures on the lake's ecosystem and to assess the level of pollutants and the potential risks for the environment, people and businesses. Compared to traditional methods, satellite imagery allows to sample large areas simultaneously and cost-efficiently, more frequently. Authorities can appreciate changes locally and in time, since images of the same areas can be produced every few days.

➤ *“Remote sensing provides information that can be used to simultaneously coordinate environmental protection activities of all the territorial authorities of the Lake Garda Community.”*

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## DANUBE RIVER BASIN DIRECTORATE: SATELLITE INFORMATION FOR RISK ASSESSMENT

The Bulgarian Danube River Basin Directorate produced a preliminary assessment of flood risk on the basis of satellite imagery.

### The organisation

The Danube River Basin Directorate – Pleven is a regional water management authority of the Bulgarian Ministry of Environment and Water. In line with the provisions of the EU Water Framework Directive, it is in charge of ensuring and providing public information on water quality and its efficient use, as well as of managing water and flood risk in the Bulgarian part of the basin.

### The challenge

The floods in Bulgaria in 2005-2006 and the overflow of several reservoirs in the past years raised the issue at a national level about the need to prevent and better manage floods. To do so, improving the accuracy of the information made available to managing authorities was crucial.

According to the EU Flood Directive, a preliminary flood risk assessment (PFRA) was first needed to prepare the flood risk management plans for the Danube River Basin district. To realise the assessment, the Directorate selected an external contractor (RESAC) through a tender procedure.

### The satellite solution

All standing water bodies, including reservoirs, were mapped using aerial and satellite imagery. Maps of past flood-events in the Sofia region and along the Danube, prepared also using satellite imagery and made available to the Directorate thanks to the

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© Danube River Basin Directorate – Pleven

## Assessment of flood risk

SAFER project, allowed to foresee location and extent of potential future floods and thus to simplify the procedure to perform the preliminary assessment in certain areas, to evaluate the methodology used and to verify the results. The final maps are more precise and user-friendly than the cartography produced in the past. All the maps elaborated for the preliminary assessment have been made available on the website of the Basin Directorate, together with an interactive map geolocalising historical flooding, infrastructures, topographic characteristics and information on the potential damages and the level of flood risk.

### The result

The information collected and analysed has provided the Danube River Basin Directorate with a solid basis to produce the flood-hazard and the flood-risk maps needed by the Danube River Basin Directorate to develop the district's flood risk management plan. Thanks to the software used to elaborate the geolocalised information (SAFER), reference mapping can be generated and made available to public authorities within just six hours after a flood situation arises, while assessment maps of the damages caused can be delivered within 24 hours. Furthermore, the use of satellite imagery will allow an easier and more accurate update of the available information on land use.

“The satellite solution enabled us to merge the information and the lessons learnt about past floods with the current status of the infrastructure and to optimise the preliminary flood risk assessment.”

**Rumeliya Petrova**, Danube River Basin Directorate

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## WATER BOARD DE STICHTSE RIJNLANDEN: INTEGRATED WATER MANAGEMENT USING SATELLITE INFORMATION

The Water Board De Stichtse Rijnlanden uses satellite-based information on water cycle variables for effective water allocation among the different users at the regional level.

### The organisation

The Water Board De Stichtse Rijnlanden is one of the 26 regional Dutch water administrations. The Board serves an area of 82000 hectares that cover most of the province of Utrecht and a small part of the province of Zuid-Holland. The Board's mission is to ensure safe dykes, clean surface water and correct water levels.

### The challenge

The Water Board manages the allocation of a limited supply of freshwater for agricultural, municipal and environmental uses – which may sometimes conflict. Planning such an integrated water management system relies on information related to a multitude of issues, such as water supply and demand, irrigation requirements, water discharge and treatment, water quality, etc. It is therefore important for the Water Board that the water balance is monitored precisely. Evapotranspiration, the process of water evaporation from the soil surface and through plants, is one factor that can lead to significant loss of water from drainage basins. Until adopting the satellite-based solution, the estimation of evapotranspiration relied on calculations

## Increased accuracy of water level measurement

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from state monitoring reports, which were not always sufficiently accurate.

### The satellite solution

The Water Board De Stichtse Rijnlanden now purchases daily satellite information on evapotranspiration and crop growth from eLEAF, a Dutch value-adding company. This near real-time information is delivered online covering 250x250m per pixel of its management area. To share experiences and for cost effectiveness, the information is purchased together with other Dutch Water Boards. This resulted in a group, SAT-WATER, which will ensure the continuity of the service in the future.

### The result

Satellite data enable the Water Board to estimate the water balance at different spatial and temporal scales more accurately than before, which results in better-informed decisions about water allocation in the region and therefore in a sustainable use of this scarce resource. The use of the satellite images is relatively inexpensive, not only thanks to the mutualisation of costs among the participants, but also when compared to field measurements.

“The focus for the next few years is to increase the types of satellite information we use on additional parameters (for instance soil moisture), and to increase cooperation with the other 26 Dutch Water Boards.”

**Joost Heijkers**, Water Board Hoogheemraadschap De Stichtse Rijnlanden

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## MURES FLOODPLAIN NATURAL PARK: SATELLITE INFORMATION HELPS MANAGE NATURAL HERITAGE

The Mures Floodplain Natural Park uses satellite-derived maps to make informed decisions on dealing with socio-economic and natural risk pressure factors on the park.

### The organisation

The protected area of the Mures river floodplain is located in the West of Romania, stretching from the city of Arad to the Hungarian border, along the river Mures, covering an area of 17 455 ha.

Since 2006, it is the fourth area in Romania that has been designated for inclusion in the Ramsar List of Wetlands of International Importance. The Park is also part of the Natura 2000 network, and a Special Bird Protection Area. The diversity of the Park's fauna and flora confers it an outstanding scientific value, in addition to its potential for the development of ecotourism.

### The challenge

The Mures Lower Floodplain is a typical wetland ecosystem that hosts approximately 200 species of birds, some of which are internationally protected. Being a wetland, it is also a highly sensitive area, exposed to floods and river erosion (flooding occurs about once every three years).

One of the development axes of the park is the promotion of eco-tourism as a source of economic welfare for the community. The associated socio-economic risks, as well as environmental ones, put pressure on the natural heritage conservation and require an integrated, sustainable management strategy. The Park Management Team, and its

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© Mures Floodplain Natural Park Administration

Scientific Committee, required a detailed knowledge of the area in order to make informed decisions over its sustainable use, and advise regional stakeholders (the Water Administration, the Forest Directorate etc.) accordingly.

## Monitoring natural heritage

### The satellite solution

Starting from 2005, the Park has used a combination of aerial and satellite images, Quickbird and WorldView 2, to chart and analyse the entire Park area. These images – part of a Geographic Information System (GIS) implemented by the park - have replaced old paper maps, which were more difficult to use and update. The satellite images used by the Park offer a unique opportunity for vegetation analysis and biomass studies (see more on [lm.geoportal-mediu.ro/home](http://lm.geoportal-mediu.ro/home)).

### The result

The digital maps obtained through a combination of aerial and satellite data have been evaluated as an excellent, independent, objective and transparent monitoring tool for decision-making related to the park activities. It is useful, when advising on new infrastructure development authorisations, calling for river bank protection measures against erosion, for trees to be replanted in areas of loss, and others. The web portal is an important tool for the promotion of eco-tourism in the region and biodiversity educational programmes.

“Since 2005, satellite images became a very important part of our everyday work at the Park. We use them for administrative purposes, eco-tourism and research.”

Paul Hac, Mures Floodplain Natural Park Administration

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## COUNTRYSIDE COUNCIL FOR WALES: UPDATING THE HABITAT MAP USING SATELLITE IMAGERY

Satellite imagery provides a quicker, more efficient, cheaper alternative to mapping habitats using aerial imagery or field visits.

### The region

The Countryside Council for Wales (CCW) is the advisory body in charge of ensuring the conservation and sustainable public access to the natural heritage of Wales. Protected areas represent 30% of its territory.

### The challenge

The CCW needs to take informed decisions about managing natural heritage, as well as public access to it. Furthermore, every year it must report to the Welsh Government on whether or not the targets set by Ministers are met. In doing so, the CCW has relied on a map based on field surveys between 1979 and 1997, complemented by aerial photography. As the landscape is subject to continuous change, the CCW needs a means of acquiring spatially accurate, up-to-date information on landscape change and habitats. Since updating the habitat map by using traditional technologies and methods would have proved very costly, the CCW needed to devise a new methodology and identify other sources of information to perform the update.

### The satellite solution

The existing field survey-based habitat map served as a base reference for investigating the potential of using satellite imagery to improve the spatial accuracy of areas of vegetation and the assignment of habitat

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classes. The result, an improved and updated habitat map, can now serve as base reference for future updates using satellite imagery (potentially freely available through GMES) permitting automated habitat classification and change detection. The habitat map is integrated into the CCW's internal geographic information system.

The decision to use remote sensing by satellite was facilitated by the assistance provided to the CCW by the British National Space Centre (BNSC – now UK Space Agency) in the framework of the GIFTSS programme (Government Information from the Space Sector), which supports the access of public authorities to satellite information and services.

### The result

The updated habitat map has been produced at a fraction of the cost of the previous version, and future updates are expected to be even faster and more cost-efficient. The map allows for the very detailed visualisation of the country's overall landscape, identification of the fragmentation of habitats and the spatial planning and mapping of potential ecosystem goods and services, such as carbon storage and biomass potential. CCW will use this information to draw up and implement long-term strategies for nature conservation and to advise the Welsh government.

## Sustainable map updating

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“Here in Wales we have proved how well satellite-based habitat mapping can work, and we encourage other regions to learn from our experience.”

**Alan Brown**, Remote Sensing Manager, Countryside Council for Wales

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# AGRICULTURE



## VOF SCHOOL JANSEN: “MORE CROP PER DROP” THANKS TO SATELLITE INFORMATION

The Dutch farming company VOF School Jansen uses a tailored advice service based on satellite information, to decide when and how crops should be irrigated for optimum yield.

### The company

VOF School Jansen is a small family-business that owns a 56-hectar farm. The crop fields consist of 40 ha grassland, 13,5 ha corn and 2,5 ha sugar beet. An extra 10 ha is used for food production for the farm’s livestock that consists of 130 milk cows with calves. The company is a member of ZLTO, an association of over 18 000 farmers that seeks to help its members innovate so as to cope with higher market demands, environmental standards, and to keep up with technological opportunities.

### The challenge

Agriculture cycles are full of uncertainties from one year to the next. The farmer’s decisions are largely based on experience, practice and advice from others. Adri School, the farm owner, decided to seize the opportunity of a tailored information service offered by ZLTO to improve his business decisions and outcomes.

### The satellite solution

Adri School receives a regular e-mail with an overview of all the fields that can be irrigated and with advice on irrigation priorities, depending on soil moisture. The e-mail also indicates the most appropriate time to irrigate for best results, taking into account rain forecast. Finally, an extra level of information reports to the user the economic implications of the

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© VOF School Jansen

options presented. For instance, the program is able to make reliable estimations on whether or not it is economically beneficial to irrigate the grass or to re-seed the grassland.

The satellite data that feeds into the system is provided by eLEAF, the same company that manages the running of the system. eLEAF works together with both ZLTO, and WUR Livestock Research from Wageningen.

The latter worked on the economic module of the service, seen as a way to provide the practical pros and cons of the options the farmer is presented with.

### The result

VOF School Jansen can now better mitigate the uncertainties of the farming seasons thanks to objective, reliable information on

the irrigation needs of the crops. The service is easy to use and allows the family business to save money and water. Information on the expected corn yield during the season allows to take a timely decision about purchasing additional corn or not for feeding the livestock.

As for ZLTO, not only does it offer a valuable decision-support to its members, but also contributes directly to environmental standards in the region, by encouraging a responsible use of groundwater.

## Minimised amount of freshwater for irrigation

“To reduce the amount of wasted freshwater globally, any agricultural company around the world should have the ability to gain reliable information on irrigation needs in order to save the scarce freshwater.”

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## ORMVAG: IRRIGATION MANAGEMENT USING SATELLITE IMAGERY

The Regional Office for Agricultural Development in the Region of Gharb (ORMVAG) in Morocco, manages the impact of population growth on the environment through more efficient water management.

### The region

The region of Gharb, with over 600 000 hectares of farmland and surface water resources estimated at 4,8 billion m<sup>3</sup>, i.e. 27% of the available national water resources, has a significant farming potential. ORMVAG was created in 1966 with the objective, amongst others, to better manage water use in farmlands, through a more efficient distribution of irrigation water, infrastructure maintenance, as well as providing training and advice to farmers.

### The challenge

ORMVAG operates 54 pumping stations and an irrigation network covering 3 000 km, that allows it to control water supply and demand. In particular, ORMVAG has to ensure the regularity and quality of the water distribution service to all users. Due to the growing infrastructure and water demand for home or industrial use, managing such a network has become increasingly complex.

### The solution

ORMVAG created its own Geographic Information System and developed new tools that provide an overview of the irrigated areas, based on high-resolution satellite images. These images are used in Tadla and will be used in the future in the Gharb to determine the rate of actual and potential evaporation and plant transpiration from the land surface to

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the atmosphere (evapotranspiration), as well as irrigation performance indicators. Furthermore, the high-resolution satellite images and GIS provide an in-depth overview of the region by highlighting the interactions between water and land, notably urban sprawl on farmlands, but also floods. The initial work was carried out in the surroundings of Tadla, using a Landsat satellite image (June 28, 2006), acquired within the Aquastress project. The results were similar to those determined by conventional methods, with the advantage of providing an overview

of the entire irrigated area of Tadla. This proved useful in mapping land use and monitoring and controlling farmlands irrigated by pumps, urban sprawl on farmlands, and the 2009 and 2010 flooding in the Gharb.

### The result

Satellite images have proved less expensive, as well as more reliable compared to conventional methods. They allow decision-makers to better manage water resources and land use, while ensuring the sustainability of the production system. As information became more reliable, it helped reinforce the trust between ORMVAG and its users. The water service has improved and management costs of the irrigated areas have been reduced (land use cartography, monitoring and control of pump irrigation, monitoring of urbanisation and flood control...).

## Reduced management costs

“Satellite imagery and GIS are two pillars for supporting and strengthening the management of agricultural areas.”

**Aziz Bellouti**, Chief of the Agriculture Activities, Development Division, ORMVAG

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## THE COOPERATIVE WINE INSTITUTE (ICV) MONITORS VINEYARDS WITH THE SUPPORT OF SATELLITE IMAGERY

Groupe ICV uses a system based on satellite imagery to increase the productivity of the vineyards.

### The company

Groupe ICV (Institut Coopératif du Vin) is a French cooperative company created in 1946, based in Montpellier. It ensures the analytical control for over 1200 enterprises in the Mediterranean basin and the Rhône Valley, producing over 800 000 grape, must and wine analyses every year. It also provides technical consultancy to 250 wine cooperatives and 1 500 private estates and carries out applied research to provide solutions to winegrowers' problems in specific fields.

### The challenge

The profitability of vineyard plots differs depending on the quality of the grapes, the soil, and the history and record of illnesses affecting plants, among others. Therefore, different sections of the plots require different interventions from winegrowers. However, field visits aiming to flag up sections for specific interventions are time consuming, and winegrowers are usually obliged to contract external personnel to do this assessment on big surfaces, which increases costs.

### The satellite solution

Groupe ICV and ASTRIUM developed Oenoview®,

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a system that provides a reliable and cost-effective assessment of the vineyards and enables producers to adapt treatments, fertilisers and irrigation according to the actual needs of the land and vineyards.

The system relies on aerial and satellite imagery to produce a detailed cartography allowing the identification of plot sections according to the vegetation coverage, quality, the soil types, the level of maturation of grapes and their weight.

With a cost varying from € 50-80 per hectare, the maps are ready-to-use for winegrowers, without the need for field visits.

### The result

While field visits would require three to four weeks to assess the characteristics of 1000 plots of vineyards of a cooperative, Oenoview® achieves the same result in barely eight seconds. Winegrowers can save money and time and maximise the productivity of vineyards, while also avoiding waste of fertilisers and water. Since 2009, Groupe ICV in cooperation with Astrium Services mapped over 15 000 hectares of vineyards throughout France, but also in Morocco and Greece.

Doing 4 weeks' work in 8 seconds

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“The system allows winegrowers to increase the added value of wines with a better selection of grapes at harvest. It also allows for a better use of fertilizers and increases the efficiency of technical surveys.”

Jacques Rousseau, Groupe ICV

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# SERVICES



## SHANAI RESTAURANT: USING SATELLITE NAVIGATION TO BOOST A FAMILY BUSINESS

The Indian Restaurant Shanai uses an online table-booking system based on the geolocalisation of restaurants and customers by satnav, to match offer and demand.

### The company

Shanai is a family-run Indian restaurant in the German city of Munich, preparing and serving a variety of traditional Indian dishes to students, families, and businessmen. The restaurant opened in 2006 with a staff of six and a capacity of 120 guests.

### The challenge

Shanai's managers face the challenge of getting known in Munich, a city with over 80 Indian restaurants in different neighbourhoods. In order to gain visibility among potential customers, the restaurant was looking for a solution that would save them the important costs associated with marketing and advertising.

### The satellite solution

While considering various possibilities, Shanai's owners came across an innovative online platform – ordofood.de – allowing restaurants in Munich to advertise special offers. Ordofood uses satellite-based information to match guests and restaurants according to location, offers and availability. Potential guests can check Shanai's proximity to their desired location, its dishes and prices, and make a reservation online by selecting the restaurant from the list of local eateries

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subscribed to the system. Customers can also use the service on their smartphones and hence get to know Shanai while they are looking for a restaurant nearby their position.

Each time someone reserves a seat at Shanai through the online platform, the restaurant pays a small fee of € 0,99 to ordofood. The restaurant can choose the days in which the offers will be valid according to the workload expected.

## Online reservation system

### The result

Shanai has now been using the service for eight months. Thanks to the satnav solution, Shanai is attracting enough customers to keep its tables busy, offering up to 20% discounts to new customers according to the desired capacity. Thus, the restaurant's managers can better predict and manage the number of guests on a given day, and hence optimise workload and staff working times. The restaurant has also made itself known to more people, some of which become regulars.

“The solution based on geo-localisation made us known to a wider public and attracts new customers.”

Rasil Mahamud, Shanai

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## SARA ASSICURAZIONI: COMPETITIVE VEHICLE INSURANCE PRICING USING SATELLITE NAVIGATION

The Italian insurance company Sara Assicurazioni offers an attractive, pay-as-you-go policy for drivers who make limited use of their cars.

### The company

Sara Assicurazioni is a medium-sized Italian insurance company, with about 400 agencies and a staff of 660 people on the national territory. Created over 60 years ago, the company covers a wide range of insurance needs, including the protection of family, properties and life standards.

### The challenge

Italians are changing the way they are using cars: they now do less kilometres (around 12000 per year) and when possible, they take public transport, out of environmental concerns, but also to save money. Sara considered new technologies to offer innovative insurance policies adapted to the individual needs of such drivers who make less use of their cars.

### The satellite solution

Since 2005, Sara Assicurazioni created an insurance policy, SaraFree, which allows customers to pay according to the number of kilometres run with their vehicle. It is the first pay-as-you-go insurance policy for vehicles in Italy. A GPS device is provided to the subscribing customer: it automatically records the number of kilometres run and sends the information

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**Up to 55% saving  
compared to  
a traditional  
insurance policy**

to a central unit. The insurance company adapts the monthly price of the policy accordingly. Furthermore, the GPS device enables the location and recovery of the vehicle in case of theft. Finally, the device can also contain an emergency button allowing the customer to send a geo-localised distress call in case of emergency.

### The result

Customers benefit from the same level of insurance coverage while saving up to 55% on the price of a traditional insurance policy. Moreover, the GPS application enables to reconstruct the dynamic of an accident, to assess responsibilities objectively, and to contest unjust fines by proving the position and speed of the vehicle at any given time.

SaraFree raised a considerable interest among customers and enabled the insurance company to distinguish itself from competitors by offering an innovative solution adapted to the real needs of customers.

“SaraFree relies entirely on a GPS device that allows to calculate dues according to the number of kilometres run and enables the recovery of the vehicle in case of theft.”

**Germana Andriani**, Sara Assicurazioni

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# CULTURE AND LEISURE



## GAÎTÉ LYRIQUE: CHANGING THE RELATIONSHIP BETWEEN AUTHOR, ARTWORK AND SPECTATOR USING SATNAV

The French gallery La Gaîté Lyrique allows visitors to interact with and reflect on artworks.

### The gallery

The Parisian theatre La Gaîté Lyrique was restored in 2001 by the City of Paris. Managed under a public service delegation contract, La Gaîté Lyrique offers a space to experience all forms of digital culture, from theatre and dance, to film-making, animation, web games, music and visual arts, among others.

### The challenge

Starting 1st of February 2012, La Gaîté Lyrique proposed an eight-week exhibition and a series of events under the theme "2062 Back and Forth to the Future". In light of the bicentenary of the theatre in 2062, the event included an exhibition, theatre performances and concerts inviting the public to read the present and imagine the future by reflecting on the links among technology, art, media and society. In order to foster such interaction, the organisers looked for a tool that would both stimulate active participation of visitors and explore new forms of shaping the relationship between author and spectator.

### The satellite solution

The Audioguide@, created by the interdisciplinary art collectives Kom.post and Orbe for La Gaîté Lyrique, is a geolocalised sound device that captures and broadcasts the voices of visitors that have contributed their thoughts, over time. Such a sound device was installed in strategic spots around the gallery and flagged with a barcode. A sentence is associated to each

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© La Gaîté Lyrique

strategic spot (as "I walk towards..." or "I remember that...") to stimulate thought, while a series of audio testimonials have been uploaded on the Audioguide@ to provide a first base of exchange. Visitors of the 2062

event can borrow a smartphone at the entrance and use it to activate the contents associated to the strategic spots. The device acts like a compass with the user in its centre. Visitors can comment on the content already available or attach new contents to a specific point in

space, sharing experiences, ideas and points of view on the artworks.

### The result

The Audioguide@ is meant to transform the way artist and public interact: it enables visitors to become active subjects of the artistic process, showing that there is more than one way to observe an object. It has been kept by La Gaîté after the end of the exhibition to become, as envisaged by the theatre's artistic coordinator Vincent Cavaroc, a "living archive" documenting the history of the art centre through the experiences of those that passed through it. Moreover, the application could be further developed and adapted as a programmatic tool to future exhibitions. In October 2012, the Parisian Collège des Bernardins will launch an adapted version of the application on the occasion of the 2012 National Heritage Days.

## Enhancing the art experience

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↳ *"The Audioguide@ represents a new tool to stimulate interaction with artworks and the exchange of points of view."*

Vincent Cavaroc, Artistic Coordinator, La Gaîté Lyrique

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## MICROCINEMA: ENHANCING SMALL AND MEDIUM-SIZED CINEMAS' OFFER BY USING SATELLITE COMMUNICATION

The Italian digital film network Microcinema uses bidirectional satellite communication to distribute films and broadcast live events to cinemas and theatres across Italy.

### The company

Microcinema SpA was founded in 1997 with the technological support of RAI's (Radiotelevisione Italiana SpA) Research and Technical Innovation Centre in Turin. The company was created with the aim of supporting Italian cinemas and theatres to find an economically sustainable solution for film distribution. Since 2007, with a staff of approximately 25 people, Microcinema offers audiovisual distribution services to 450 cinemas and theatres all around Italy.

### The challenge

Cinemas have been facing a number of problems related to the availability of new films, the difficulty of distributing them to remote areas and the wear of reels over time. Especially small cinemas, that are mostly mono-screen, needed more flexible distribution processes than the ones offered to bigger auditoriums. To overcome such distribution problems and ensure a consistent quality of films throughout time, the film industry had been looking for innovative solutions that would provide small and medium-sized cinemas with flexible and affordable tools to manage their programming.

### The satellite solution

In 2007, with the support of the European Space Agency, the company started using the ISIDE system (Innovative Satellite Interactive Digital Entertainment).

“The satellite solution is less expensive than an internet connection, and can reach any auditorium worldwide, thus overcoming obstacles connected to the digital divide.”

Silvana Molino, Microcinema

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© Microcinema

## Real-time film distribution

Via a website, the system makes a catalogue of 300 HD movies available to every cinema of the network via a bidirectional satellite connection. Cinemas download the movies in real-time, together with the requested certificates of use, while paying only for the contents actually screened. Statistics on data usage and the number of tickets sold are stored in the system's database and can be consulted on the reserved area of Microcinema's website.

Moreover, the system allows the projection of live events: In 2011, the premiere of "Don Giovanni", inaugurating the Opera season of La Scala Theatre in Milan, was broadcast live in 130 cinemas and over 150 connected digital screens, reaching 40 000 spectators all over Italy.

### The result

With 300 auditoriums connected to the network via the bidirectional satellite connection, Microcinema is today a leading provider of films and audiovisual contents. Auditoriums can decide on their programming in a flexible and autonomous fashion, saving time and costs of management, transport and setting up of film reels. Furthermore, the digital contents of the catalogue have no environmental impact and preserve the same quality for future projections.



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## CITY OF PORTO: PROMOTING TOURISM THROUGH SATNAV APPLICATIONS

The Tourism Department of the Municipality of Porto supports the development of mobile tourist guides, using satellite navigation applications.

### The organisation

Porto is the second largest city of Portugal and one of the oldest urban centres in Europe. Its Tourism Department is in charge of making information available to orient visitors through the city's many sites of cultural interest, while seeking for opportunities and partnerships to increase the cost-effectiveness of measures to promote Porto's heritage with locals and foreign tourists. The Tourism Department also offers a tourist information web portal that includes a special section dedicated to mobile applications for smartphones and tablets.

### The challenge

Today, tourists tend to travel more frequently than in the past and for shorter periods of time. Traditional means of planning holidays and guiding visitors are not sufficiently flexible to adapt to the needs of such "touch-and-go" tourists, often needing precise and relevant information on the spot during such brief holidays. Statistics on the profiles of short-stay visitors revealed that they tend to have a high level of education and income and are familiar with technology and innovative applications. The latter finding encouraged the Tourism Department to investigate the potential of mobile applications.

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© Tourism Department of the Porto City Council

### The satellite solution

The Municipality partnered with the private company LatitudeN in developing "Farol Porto", a travel application relying on Porto tourist information. Tourists can download "Farol Porto" on their smartphones and access geo-localised information and tips during short trips, with no need for extensive planning. The mobile application generates fully personalised tours, adapted to the user's interests and available time, and alerts the tourist of places worth seeing in real time, according to their proximity.

### The result

Farol Porto became the official city guide in 2011. It makes the web portal more effective and easy to use on the go, and matches the needs of short-term tourists, enabling them to make the most of their time in Porto without having to carry around paper maps and guides. The Tourism Department recognises the value added by the application, which contributes to enhancing the Porto brand. According to the data provided by LatitudeN, Farol Porto has been downloaded over 2000 times.

## Tourism information on-the-go

*"The mobile city guide increases the offer of the Porto's Tourism Department meeting the demand of visitors in an innovative way."*

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## TOURBIKE: AN INNOVATIVE, SATNAV-BASED BICYCLE TOURISM SERVICE

TourBike is a Polish start-up pioneering a biking tour service enabled by satellite navigation.

### The company

TourBike is a tour operator created in Poland in 2011 by two young women sharing a passion for travelling and two-wheels. With the ambition of promoting green tourism in their country, TourBike started organising cycling and kayaking trips in the beautiful landscapes surrounding Gdansk. The company provides high quality mountain bikes to people of any age (individuals, couples or families) willing to discover Polish cultural, natural and historical heritage in a sustainable and healthy fashion.

### The challenge

The Polish are becoming more and more interested in green tourism and cycling, as shown by the important volume of bikes sold in Poland in recent years. Foreign tourists, traditionally more keen on bike tours, such as Germans and Scandinavians, are showing a growing interest in visiting less known and less accessible parts of Poland. Despite this growing interest in green tourism, the cycling infrastructure is still limited. Many attractive spots, especially in the countryside, have no bicycle paths and are not included in tourist itineraries and maps.

### The satellite solution

In order to respond to the growing demand from bike enthusiasts, TourBike decided to use satellite

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## Geolocalised bike itineraries

navigation to draw new bicycle itineraries for tourists. TourBike operators, equipped with a GPS device, have tested and recorded new routes that are accessible by bike, and complemented them with information on points of interest along the track. The new routes and information are made available on GPS devices to tourists who rent bikes from the company.

The GPS device is mounted on the bike handlebars and can capture a signal even in isolated areas and deep canyons. It also locates the position of the customers in real-

time with accuracy and reliability, allowing them to transfer their own tracks on a personal computer, as a souvenir, or to share with friends.

### The result

The satnav solution enables a safe bike journey in unknown or isolated areas, at an affordable price. The preloaded tracks allow tourists to choose among a wide range of itineraries with diverse thematic focuses and for different levels of bike expertise of the users, who can tailor their trip according to their own needs.

TourBike has been awarded the "Mercurius Gedanensis" Medal at the International Fair of Tourism held in Gdansk in 2011 for the best tourist site.

“Satellite navigation allows us to provide an innovative service and to differentiate our offer.”

Monika Zacha, Tourbike



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## VESTFOLD COUNTY: ARCHAEOLOGICAL SITE DETECTION

Vestfold County Council uses satellite information to discover archaeological sites and successfully manage potential land use conflicts when developing public infrastructure.

### The county

The County of Vestfold, situated in the south of Norway, is the smallest and one of the most densely populated Norwegian counties. Vestfold County Council is a regional public authority in charge of education, public transport, county roads, culture, public health, as well as the management of a particularly rich cultural heritage. Indeed, Vestfold County was a centre of power during the Scandinavian Viking Age. Several of the greatest archaeological discoveries from that era have been made there.

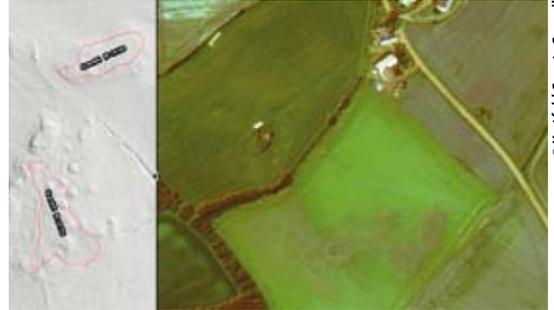
### The challenge

The modern demands for efficient land use are exerting a growing pressure on cultural heritage sites. When considering new infrastructure developments, Vestfold County Council needs to ensure these do not conflict with known and potential archaeological sites. To identify the latter, the County conducts archaeological field surveys, as well as excavation works in some cases. However, the traditional mapping methods, mainly based on chance discovery and poor positioning, meant that such maps could not be trusted when planning new infrastructure. The County sought to develop more cost-effective, non-intrusive methods of carrying out these assessments.

### The satellite solution

CultSearcher, a software that provides computerised assistance in the analysis of satellite images, allows archaeologists to detect and locate circular structures

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© Vestfold County Council

as e.g. burial mounds and ring ditches which may date back to 1 500-2 500 years ago. Even though the remains are buried, they affect crop growth by leaving ring-shaped marks in the fields that can be detected from space.

CultSearcher was developed and tested over several years in cooperation with the Norwegian Directorate for Cultural Heritage who has also funded the project. The system is fully operational since 2008, and continuously enhanced to improve the detection methods. The Norwegian Computing Center has been central in developing the software for CultSearcher.

**Over 30  
new sites  
identified  
in the last  
3 years**

### The result

Over 30 new ring ditches surrounding a grave mound have been discovered in the last three years in Vestfold. The system gives

archaeologists a valuable first layer of information that can guide them as to whether or not to begin site excavations, or alternatively, infrastructure works. The risk to miss certain buried sites is minimised, and their location on site maps is more reliable, enabling territorial planners to take better-informed decisions. Using satellite images is also a valuable information and communication tool for dialoguing with land owners where such remains may be located.

On the basis of the Vestfold experience, the Norwegian Directorate for Cultural Heritage envisages a roll-out of the solution on a national level in order to establish the system as an integrated working tool in cultural heritage management.

“By having easy access to information about where it will be possible to find archaeological remains we can go into a dialogue and help finding a good solution at an early stage in the planning process.”

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# TRANSPORT AND MOBILITY



## AUTOLIB': SHORT-DISTANCE ELECTRIC CAR RENTAL NETWORK FOR THE PARIS REGION

Paris and the Île-de-France Region manage an electric vehicle rental service using an innovative satnav application.

### The region

Paris and the Île-de-France region account for an overall population of over ten million inhabitants. Car traffic in the region is intense: in Paris alone, there are 330 cars for every 1 000 inhabitants, running for a mere four kilometres per day on average.

### The challenge

While measures to encourage alternative means of transport have decreased motorcar traffic by 24% in the last decade, the public transport offer did not provide sufficient alternatives to owning a private vehicle, especially for daily commuters (40% of the Paris car traffic), but also in other situations (insufficient taxis, short business trips etc.).

### The satellite solution

In December 2011, Paris and other municipalities in Île-de-France have launched Autolib', an electric car-for-rent public transport network for short distances. The service consists of 250 4-seat electric cars and 250 stations, spread throughout the region. The cars can run autonomously for about 250km. The satnav application enables service subscribers to find the closest available car, on a website or using

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their smartphones, thanks to a free iPhone app. Each car is equipped with a GPS that enables itinerary planning, finding the location of recharging stations, and booking parking spaces. This means vehicles can be returned to any charging station.

The GPS is an indispensable tool for fleet management, for service operators to know when a vehicle is driven out of the Paris Île-de-France Region, and to locate users in case of emergency.

## An alternative to owning a private vehicle

### The result

Autolib' provides an affordable and eco-friendly service fully integrated with the overall public transport network in the region. Those who cannot afford a car can now use one, without the ownership costs. Early surveys show that 92% of the Autolib' users would recommend it to their friends and family and 86% think that the service will reduce pollution and traffic stress. By the end of 2012, 1 100 stations, with nearly 6 600 recharging points and 3 000 electric cars will be available. In the long term, the extension of the service is expected to lead to an estimated annual reduction of nearly 300 000t of CO<sub>2</sub>.

“Autolib' is a tool to facilitate the process of sharing and exchange between our territories, and brings the promise of modern solidarity.”

**Bertrand Delanoë**, Mayor of Paris

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## PRAGUE: PROMOTING PUBLIC TRANSPORT USING SATNAV APPLICATIONS

Prague created an interactive map providing accurate and reliable information on all means of public transport in the city.

### The city

Prague, capital of the Czech Republic, has one of the highest rates of public transport usage in the world, thanks to an integrated transport system including 35 tram lines, 30 suburban railway lines, three major underground lines, a funicular, six ferries and a widespread bus service managed by several operators. Since 1993, ROPID (the Regional Organiser of Prague Integrated Transport) has been in charge of harmonising and coordinating public transport in Prague and part of the Middle Bohemia Region.

### The challenge

ROPID's challenge was to respond to the increasing car traffic levels by enabling the combined use of private and public transport and encouraging the use of the latter. Different public transport alternatives, timetables, route-finders and traffic maps were already available to passengers in stations and online. However, before the implementation of a new satnav solution, there was no one-stop-shop information source for travellers covering all means of public transport.

### The satellite solution

ROPID created a unified information system on public transport, accessible for travellers online at any time. With the support of SmartGIS, a company specialised in providing innovative transport and logistic

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## Intermodal transport information system

solutions, ROPID collected geolocalised information on itineraries, stops and departure and arrival times of all means of public transport in the city. These were then made available through an interactive map on the online portal of the Prague Integrated Transport System ([praha.planydopravy.cz](http://praha.planydopravy.cz)). The map gives an overview of the transport situation in the city and provides real-time information on traffic events. Main sites of interest, as monuments, public offices and police stations are also shown on the map, together with the nearest stations to reach them.

All the data are collected in GIS format and made available in the stations and on the web portal in real-time by SmartGIS.

### The result

The interactive map provides online accurate and reliable information on all means of public transport in Prague. The application, also available on smartphones, is proving to be extremely useful for Prague's inhabitants and tourists, and it also benefits ROPID in terms of customer satisfaction and efficiency of the management system. ROPID expects the service to diminish the car traffic, hence contributing to lowering CO<sub>2</sub> emissions in the city.

“For many customers, the interactive map became the most complete source of information on public transport in Prague.”

Filip Drápal, Prague Integrated Transport System

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## “RENT AND SHARE” PROGRAMME IN VILNIUS: SATNAV TO MANAGE ELECTRIC BIKES

Vilnius uses satnav to monitor the whereabouts of rented bikes at all times.

### The city

Vilnius has a population of approximately 560 000 inhabitants, half of whom use the city’s public transportation system on a regular basis. The city centre and the Old Town are part of the UNESCO World Heritage List since 1994.

### The challenge

One of Vilnius’ goals is to become a world leader in making the latest environmentally friendly transportation technologies widely available. In order to address urban congestion issues, the municipality decided to implement a rent-a-bike scheme for residents and tourists, on the occasion of the Eurobasket 2011 championship in Vilnius.

The “Rent and Share” programme allows residents and tourists to rent electric bicycles at four Tourism Information Centres located in the downtown and Old Town areas. The bike fleet had to be managed efficiently so as to avoid theft and to optimise the renting process for the users.

### The satellite solution

The electric “e-orange” bikes are equipped with a built-in satnav system monitoring the whereabouts of the bicycles at any given time. Service managers can

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localise each bike of the fleet on a digital map, as well as the bikes’ history and reports. It is hence always possible to know which customer was using which bicycle at any given time, the itineraries covered, the number of kilometres driven, the duration of the itineraries and the maximum and average speeds. Such

information allows administrators to control how bikes are used and provides a base to further improve the service according to citizens’ transport behaviour and traffic analysis.

## Encouraging green transport

### The result

The electric bike “Rent and Share” programme is shaping citizens behaviour, encouraging them to adopt more environmentally friendly attitudes. Tracking the bikes with satnav allows the authority to maintain them in good condition and to gain insights into user behaviour to continuously improve the service. The initiative already inspired other similar services in Spain, Italy and the United Kingdom. The next step for Vilnius is a mobile application allowing bike users to easily identify rental points and itineraries.

“Encouraging biking in Vilnius will improve the quality of the air and change behaviours in the city.”

Irma Juskenaite, Public Relations Department, Vilnius

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## LOMBARDY REGION: HAZARDOUS WASTE MANAGEMENT USING SATNAV

The Italian Lombardy Region experiments an advanced tracking system to monitor hazardous waste transnational transport.

### The region

In accordance with European and Italian regulations, the Lombardy Region is in charge of supervising waste management and transnational transport in its territory. Within the General Direction for Territory and Urban Planning, the Structure for Waste Authorisations and Innovations is responsible for authorising waste treatment and disposal, regulating the shipping of waste towards foreign countries and overseeing the scoping of ways to optimise the execution of these tasks through innovative solutions.

### The challenge

The volume of hazardous industrial waste transported from the origin to the treatment plants has increased for decades. One of the main issues for Lombardy and other regions has been to avoid illegal industrial and hazardous waste transport and disposal.

### The satellite solution

In 2007, the Region created the Information System for the Transnational Transport of Waste (S.I.T.T. - Sistema Informativo per i Trasporti Transfrontalieri di Rifiuti). S.I.T.T. allows for the complete dematerialisation of the administrative records submitted by the waste-management companies (including itineraries, weight of cargoes, and departure and arrival dates and times). The registered companies' trucks and cargoes are equipped with low cost GPS receivers, which

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automatically transfer in real-time the recorded data from the vehicles to the control centre, via the GSM/GPRS mobile communication network. The system is based on GPS Lombardia ([www.gpslombardia.it](http://www.gpslombardia.it)), the regional network of permanent satellite navigation signal stations for public and private entities, which improves the accuracy of the basic GPS signal.

### The result

The system is currently in its pre-operational phase: since 2008, 200 vehicles including trucks and trailers are monitored on a daily basis, most of them travelling from Italy to Germany, Eastern Europe and the Netherlands through Austria and Switzerland. The registered companies benefit from real-time monitoring of their fleet and freight without paying for the service or the equipment. By digitalising the waste authorisation process, the web component permits considerable savings in time and money both for the region and for the transport companies. Since each cargo is equipped with a GPS receiver corresponding to the relevant truck, the system immediately detects if a cargo is illicitly transported to a different destination from the original. The region is currently looking for possible partnerships to continue financing the system and extend its coverage.

## Monitoring transnational waste transport



“Satellite navigation allows us to monitor vehicles transporting hazardous waste in real-time and with a high level of accuracy.”

Dario Sciunnach, Regione Lombardia, D.G. Territorio e Urbanistica

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# INFRASTRUCTURE AND MAINTENANCE



## CITY OF DIEMEN: INFRASTRUCTURE MAINTENANCE USING SATELLITE IMAGERY

The Dutch City of Diemen uses satellite images to optimise the planning of infrastructure maintenance cycles.

### The city

Diemen is a municipality in the Netherlands with a population of around 24 000 inhabitants. The city is located in the province of North Holland, east of Amsterdam, within the capital's metropolitan area. The Diemen Department of Infrastructure has a yearly budget of about four million Euros for maintenance of roads, sewers, and other infrastructure.

### The challenge

The city of Diemen is built on soft soil, which means it can sink up to 2 cm per year. Subsidence rates however vary substantially between neighbourhoods, due to variations in soil composition. Over time, differences in subsidence can cause serious damage to infrastructure. It is therefore necessary to rebuild and elevate roads and sewer systems periodically as a prevention measure. The preventive maintenance cycles are usually planned based on visual inspection and experience of individual inspectors. Visual inspection is neither precise, nor does it offer complete coverage. As a result, in many cases maintenance work is performed either unnecessarily early or too late.

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### The satellite solution

The city of Diemen ordered a city-wide deformation map from Hansje Brinker B.V., a service provider specialised in infrastructure monitoring. Satellite data captured from 1992 to 2010, the Department of Infrastructure can determine how quick infrastructure is sinking in Diemen with millimetre accuracy. The deformation map allows practitioners to accurately identify damage and therefore correctly prioritise maintenance activities.

### The result

The deformation map enables the city to accurately calculate maintenance cycles at every level (streets, neighbourhoods and districts). In addition, it shows the dynamics of the subsidence measured at

each location, so the city can better prevent possible sewer emergencies. The deformation map also indicates that maintenance can be safely postponed in many neighbourhoods, leading to a reduction of the inconvenience and associated costs of construction works. Thanks to the accurate mapping of subsidence, the City of Diemen is capable of providing a more efficient planning of road and sewer maintenance, together with a better service to citizens.

**Millimetre  
accuracy in  
determining  
the rate of  
subsidence**

“The City of Diemen provides a more efficient planning of road and sewer maintenance.”

Ron Kaptijn, City of Diemen

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## ENERGY OPERATOR SIEA : ENSURING THE ACCURACY OF NEWLY BUILT INFRASTRUCTURE

SIEA uses a satellite navigation application to verify that optic fibre, gas and electric lines in the French region of Ain are installed as per plan.

### The organisation

SIEA (Syndicat Intercommunal d'énergie et de e-communication de l'Ain) is a public body created in 1950 to manage energy, gas and IT infrastructure for the 419 municipalities of the French region of Ain. SIEA is run by a committee of 508 delegates elected by the town councils.

### The challenge

SIEA is responsible for assessing building plans for the installation of electric, gas and IT cables in the region. Once the work is completed, SIEA also verifies the accuracy of the building works as per plans, and documents the position of the newly installed cables for future reference.

The syndicate was looking for an affordable, reliable and more precise check-up and mapping system to carry out these duties.

### The satellite solution

SIEA adopted a solution provided by Ashtech, a designer and developer of satnav technology, which enables SIEA staff to compare the position of the cables as recorded by themselves in several check-points, with the position of the cables as indicated by building contractors in their project plans. The GIS software



© SIEA

that allows this precision check automatically labels cable positions as "accepted" or "rejected" according to whether they are actually located there. This results in the production of a highly accurate map of the cable infrastructure for the authority.

The application is possible thanks to a real-time connection of GPS receivers with TERIA, the French GNSS reference station network, which allows for a centimetre-accuracy of the final result.

## Centimetre accuracy of the final result

### The result

The satellite solution enables SIEA to verify simply and efficiently the as-built plans for new buried optic fibre, gas and electric lines with centimetre-level accuracy in real-time. Moreover, the geo-referenced information collected on the field improves the overall accuracy and reliability of the geographic information system used by the Syndicate to avoid risks and accidents in future works.

While enabling SIEA's operators to save a considerable amount of time, these methods are expected to also increase building contractors' performances in the coming years.

“This solution permits us to locate our lines with high precision, without having recourse to topographic maps which cannot be updated for an entire department on a regular basis.”

**Bruno Forget**, Head of GIS, SIEA

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## PRAGUE: MONITORING URBAN SPRAWL USING SATELLITE INFORMATION

The City Development Authority of Prague uses satellite imagery to plan and monitor land use and development.

### The city

Over the period 2005-2010, a strong demand for new housing led to the construction of nearly 62 000 homes in the Prague metropolitan region, particularly concentrated in the close surroundings of the capital. In order to ensure the coherence and sustainability of urban expansion, the City Development Authority of Prague produces and maintains information on the urban and spatial development of the city. This informs the execution of the city's Strategic Plan, a long term document which determines goals and priorities of urban development for a period of 15-20 years.

### The challenge

Prague's land use plan divides the city's territory according to its functions - such as residential, industrial etc. In order to reconcile potentially conflicting uses of the land and resources, for instance the extent of green areas with respect to residential and industrial uses, the City's Development Authority needs reliable and precise geographic information about land use and territorial changes. While such information was widely available and relatively detailed for the city, it was missing for the more recent urban sprawl beyond the intra-muros boundaries - notably for the suburbs and city outskirts.

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### The satellite solution

The City Development Authority worked with the Czech company GISAT in acquiring historical aerial and satellite images of the city, suburbs and outskirts. The advantage of this additional layer of information is that it provides a homogenous overview and classification of current land use and long-term developments in and around Prague. City planners use this to study changes in built-up areas, farm land and green spaces and to take decisions on prioritising smaller intervention areas, such as transport 'hot spots'.

## Homogenous overview of land use

### The result

The Development Authority now disposes of an effective tool for the annual monitoring of the Master Plan. The tool is also used by the city planners as a means of communication with decision-makers. Site inspections are reduced to the essential, thus saving time and money.

“Land-use data based on satellite observation are unique in showing changes in the whole metropolitan area, irrespective of administrative boundaries.”

Mgr. Jiri Ctyroky, City Development Authority Prague

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## REGIONE VENETO: REAL-TIME GEOLOCALISATION SERVICE

The Cartographic Office of Regione Veneto supports public and private entities on its territory with a permanent network of positioning stations.

### The region

The Northern Italian Veneto region spreads over 18399 km<sup>2</sup> and hosts a population of approximately five million. The Regional Authority is in charge of coordinating and leading cartographic activities on its territory. The regional Cartographic Office provides regularly updated territorial data and cartography that offers municipalities, provinces and other professionals the tools necessary for an accurate knowledge of the territory.

### The challenge

As traditional paper-based cartography is being gradually and consistently substituted with digital cartography, a real-time positioning service becomes of paramount importance for those in charge of territorial management.

The Veneto region has set up a permanent network of GNSS stations in response to the request from private and institutional operators for a real-time positioning service. This infrastructure supports public and private entities operating on the territory in the fields of surveying, transport, fleet management, environmental protection, risk management and urban planning, among others. The system also needed to be compatible with other local and national positioning schemes and to be in line with European quality standards.

### The solution

Regione Veneto initiated collaboration with the University of Padua and several local institutions

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interested in the service, such as cadastral offices, fluvial and water authorities, surveying schools, municipalities, professional surveyors and other public institutions.

## Free real-time positioning service

Since 2008, the region offers free access to a permanent network of 25 positioning stations to public and private entities. Data and services are freely available through the web portal of the Veneto region. A call centre service is provided to support users with technical and practical questions and to report on problems and missing data to local managers.

### The result

The service guarantees real-time positioning on the regional territory, enhancing the accuracy, precision and reliability of GNSS signals for professionals working in surveying, transport and mobility, agriculture, energy, logistics and others. Furthermore, it represents a particularly useful tool for environmental and soil deformation monitoring and for professionals working in risk monitoring and prevention. In 2011, 200 users were registered in the system, a number set to further increase.

The service is compatible with the Italian National Dynamic Network of GPS permanent stations and it also complies with the INSPIRE EU Directive.

“*Surveying in the field and updating geographic databases has become very simple, with high quality standards, limited chances of human error and widespread compatibility with softwares for Geographic Information.*”

Alessandro Caporali, University of Padua

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## WALLONIA: USING A SATNAV APPLICATION TO MANAGE ROAD INCIVILITIES

Wallonia Road Administration uses a satnav-based, mobile solution to report and prosecute offenders for acts of incivility on the region's roads and motorways.

### The region

The Wallonia Region Administration (Service Public de Wallonie – SPW) is in charge of coordinating public services in the region in the areas of environment, natural resources, waste management, territorial planning, mobility, etc.

The Directorate General for Highways and Housing of Wallonia oversees operations related to road and highway infrastructure management and maintenance. The Regional Police for Roads and Highways is part of this Directorate.

### The challenge

Wallonia's roads have been afflicted by offenses, incivilities, or sometimes simply negligent behaviour from drivers and inhabitants, such as illegal dumping of waste, tagging, unauthorised posters, illegal occupation etc. While these are all small-time offenses, their recurrence disfigures the road landscape and fuels a feeling of insecurity. The specialised Regional Police Service (SPW) aimed to reduce offenses by introducing field inspections by public officers as well as an administrative fining system. Given the relatively reduced number of staff available, and their lack of policing competences, the Service had to provide officers with easy-to-use, efficient means to locate, report and fine offenders who would otherwise go unsanctioned.

### The satellite solution

SPW adopted an electronic system allowing public officers to report incidents in a uniform and simplified

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manner, in real time, via mobile phones used in the field. The application "Poldom" allows public officers to accurately geo-position the incident, send relevant information and photos to the central system by selecting different options from a drop-down menu, file a report, and sanction. Public officers can also remotely access information from other databases such as the Road Data Bank (RDB) and the Federal Public Justice System. The incident reports thus received are seamlessly integrated in the central management system.

### The result

The use of satellite navigation enables the Service to be effective despite a reduced number of staff and budgetary constraints. The duration of the administrative procedure in case of an offence is drastically reduced. Administrative fines are dealt with on the spot, reducing red-tape. The reports filed in the field using this application have legal value, as they allow the Regional Police to call for sanctions even when Public Prosecution drops a pursuit or does not react in the 60 days after receiving the offense report. The Wallonia government is now considering an extension of the service to other local authorities facing similar problems.

## Drastic reduction of red-tape

“Technology can transform a public service, but it should never be dehumanised, meaning it should be adaptable and have the capacity to evolve according to staff needs.”

**Freddy Ruggiero**, Regional Delegate of the Directorate General for Highways and Housing of Wallonia

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## DORMAGEN: ENHANCING CIVIC E-PARTICIPATION WITH SAT-NAV

Dormagen implements a complaint management system for malfunctioning or damaged public infrastructure.

### The city

Dormagen is a German city of about 60 000 inhabitants in the federal state of North Rhine-Westphalia. Among others, the Municipality of Dormagen is responsible for ensuring the quality of the urban environment and of the public infrastructure (roads, bus stops etc).

### The challenge

Until recently, the inhabitants of Dormagen could report malfunctioning of public facilities, tagging, illegal garbage dumping, potholes, and other incivilities and degradations by email or telephone only. Information on which administration department to report to was often difficult to find, and citizens were discouraged from reporting. As sending the administration's staff to survey the public space was time and resource consuming, the municipality was looking for an idea to encourage citizens to participate in the maintenance of public infrastructure by reporting faults themselves.

### The satellite solution

Using their smartphones, and a specially-designed smartphone app, Dormagen's inhabitants can report urban incidents, take pictures on the spot and indicate their precise location thanks to the satellite navigation system built into their smartphones. This information is then sent to managing authorities in real time,

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allowing them to geolocalise the defect, track it as a marker on a virtual map, process and delegate reports and allocate resources for repairs. Defects are then coloured in red, yellow or green on the virtual map, according to their processing state.

The website [maengelmelder.dormagen.de](http://maengelmelder.dormagen.de) was developed in collaboration with the internet communications firm Wer Denkt Was GmbH ([werdenktwas.de](http://werdenktwas.de)), in order to improve the flow of information from citizens to the city administrations.

## Better allocation of resources for repair works

### The result

Thanks to the smart phone application, citizens can report urban defects wherever they are and whenever they want, directly to the public authorities in charge, without searching for contact details or other information. The use of this satnav-based application enables the administration to work more efficiently by accurately geo-positioning the reported incidents, and allocating resources for repair works more efficiently. The application saves time and money and it empowers citizens to take personal action in protecting the urban environment.

“The application creates an immediate link between citizens and public administration when managing urban defects.”



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## About Eurisy

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**Eurisy is a non-profit association of space agencies and government offices dealing with space affairs in Europe.**

It is mandated and financed by its members to increase the access of society to the benefits of innovative satellite information and services.

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