



From Innovation to Operation

A talk about concrete uses of satellite data and services to support cities

eurisy



Space for cities: from innovation to operation

A talk about concrete uses of satellite data and services to support cities' resilience and sustainability

Main messages from the workshop

Contents

The Eurisy "Space for Cities" Initiative	2
From innovation to operation	2
Main Messages	4



The Eurisy “Space for Cities” Initiative

The Eurisy “[Space for Cities](#)” initiative aims at fostering the use of satellite-based services where most people live, i.e. in urban areas. The initiative aims at exploring current and potential uses of satellite applications to make our cities healthier, cleaner, safer, and more efficient, and at promoting the development of increasingly efficient and user-friendly satellite-based services.

Within the Space for Cities initiative, Eurisy has identified and analysed several cases of cities using satellite-based services operationally. In partnership with local and regional authorities, the association has organised events in which these examples were showcased and discussed and has published several short articles that are accessible on the Eurisy [website](#).

At the same time, Eurisy has also identified a number of research institutes and private companies working with cities to co-develop software, methodologies and tools relying on satellite data to support decision-making at the local level. These entities work closely with local authorities to propose satellite-based solutions increasingly efficient, user-friendly and economically viable.

To bring the “Space for Cities” initiative to a larger audience, Eurisy also leads the [Geospatial Cities](#) initiative within the Smart Cities Marketplace, which aims at promoting the use of spatial data from different sources to improve city management and foster a sustainable urban development.



From innovation to operation

The satellite-based services that emerged from the “Space for Cities” initiative as being more mature and adapted to city needs were identified in the sectors of transport and mobility, energy, air quality monitoring, urban planning and infrastructure management.

In such sectors, satellite navigation and imagery provide concrete advantages to the public and private entities using them. Nevertheless, while satellite navigation is today broadly available to private and public entities, satellite imagery still remains a relative incognito for professionals without a scientific background. And if examples of cities using satellite imagery to improve decision-making exist, these are still considered as “pioneering experiences”.

Indeed, despite the many successful examples of use of satellite-based services at the regional and local levels, and despite the programmes implemented at national and European scales to make available funds to develop increasingly sophisticated services, satellite-based solutions are still considered as “innovation” rather than “practice”.

This online workshop has been organised with the aim of bringing together representatives of local administrations, SMEs, research centres and space organisations to discuss opportunities and challenges related to the operational uptake of satellite-based service in cities.

This objective has been achieved only partially, as out of the 83 people who attended the workshop, 27% worked for universities and research institutes, 17% for companies providing services in cities, and only 10% for city administrations, the remaining 46% serving in other kind of institutions, mainly within the space sector (indeed, three quarters of the audience had already used satellite data or services based on satellite data). While this demonstrates the interest of the space sector towards the transfer of space technologies to city administrations, it also pinpoints the difficulty of engaging public administrations into scientific discourses through online events.

The workshop included three sessions, each showcasing two emerging services relying on satellite applications to support cities in: a) managing solar energy production; b) monitoring geo-hazards and urban infrastructure; and c) monitoring urban health.

The full programme of the event, together with the presentations and the recording of the sessions can be accessed [here](#).

Satellite services that could support decision-making in cities exist, as well as funding mechanisms to develop new services better adapted to user needs.

During the workshop, the speakers provided different examples of uses of satellite-based services in cities.

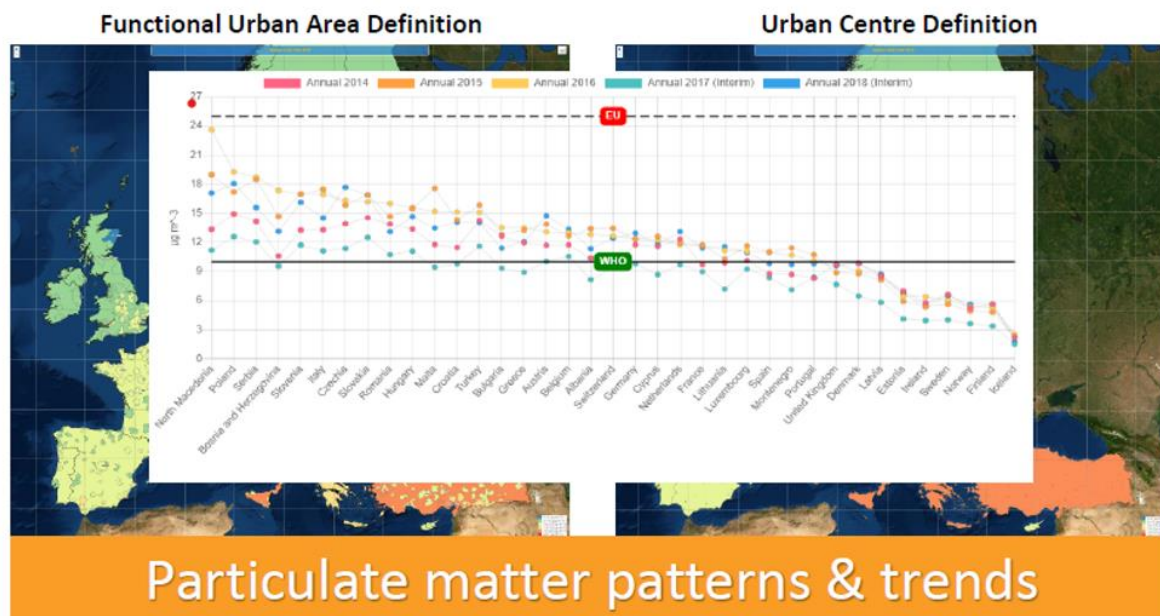
Earth observation also carries precious information to foresee soil subsidence and prioritise the maintenance of buildings, infrastructure and street pavements. In the last decade, local and regional authorities have been working with service providers to fully exploit the potential of these data to improve infrastructure management. This is the case for the Department of Engineering of the City of [Amsterdam](#), which has been working with SkyGeo to use EO data to better monitor bridges in the historical city centre. More recently, the Segura River Basin Authority has worked with the Spanish Geological and Mining Institute (IGME) to use EO data to foresee [soil subsidence](#) due to groundwater extraction in the Segura River Basin (in Spain) and identify safe pumping sites.

Moreover, EO data can help cities to monitor parameters — such as the presence of pollutants in the air — that can heavily affect urban health. Within the workshop, the National Observatory of Athens presented an online platform (the [SMURBS SDG indicator 11.6.2 Earth observation platform](#)) that makes available data on fine particulate matter in cities based on satellite imagery.



ERA-PLANET Annual Project Meeting, 10 October, 2019, Brussels

European air quality overview



Slide from the presentation of Evangelos Gerasopoulos, NOA

Horizon 2020
Call: Horizon 2020-SC1-2018-10101
Topic: SC1-2018-10101
Project acronym: CURE
Project start date: 01/01/2019
Project end date: 31/12/2021



Data on air quality derived from Earth observation can also be combined with other data to help local authorities define the best policies to make their cities more sustainable. Within the [CURE](#) project (Copernicus for Urban Resilience in Europe) satellite data originating from different Copernicus services is combined with demographic and economic data to help local authorities testing 'what if' scenarios, e.g. to estimate the health cost savings of low-carbon transport policies.

Apart from the case of Amsterdam, the solutions presented during the workshop have been all developed within the framework of EU-funded projects. To favour the development of innovative technological solutions that can benefit cities, **the European Commission makes available support and funding**, and under such frameworks, cities, private companies and research institutes are invited to collaborate to develop services that could support decision-making in the long term.

The European Green Deal action plan aims at boosting the efficient use of resources by moving to a clean, circular economy and at restoring biodiversity and cutting pollution.

In the second semester of 2020 only, the Horizon 2020-funded European Green Deal Call makes available more than a billion euros to boost the green and digital transition, with specific calls for urban solutions.

EU direct management programmes for smart cities and communities under H2020: the European Green Deal Call

- 1bn for R&I to support fighting climate change and biodiversity loss (8 areas)
- Topic 1.2 : Towards climate-neutral and socially innovative cities
- Scope:
 - Establish a one-stop shop platform to help cities develop and implement their climate action plans and related social innovation action plans:
 - Providing technical, regulatory, financial & socio-economic expertise and assistance to cities
 - Managing calls to support development of large scales pilots
 - Building on existing initiatives and programmes

DDL for submissions is 26 January 2021, with selected projects expected to start in autumn 2021.

Slide from the presentation of Cristina Martinez, DG CONNECT



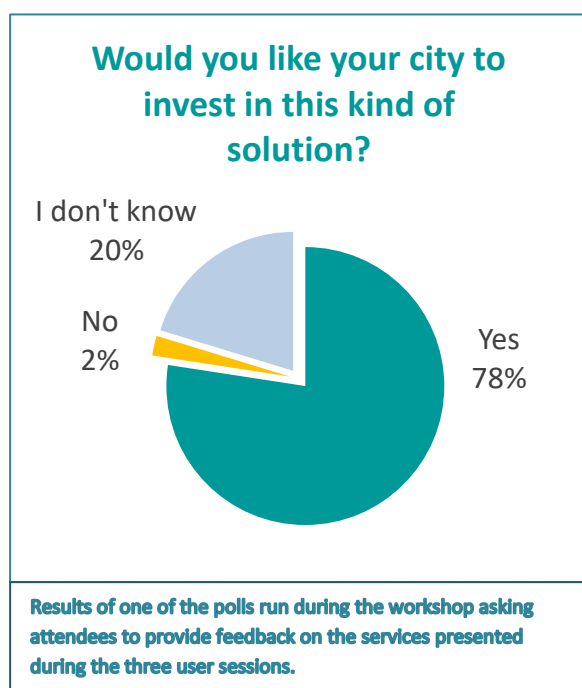
Nevertheless, innovation produced within projects struggles to be integrated operationally into cities' procedures.

“Usually those products are perceived as being too technical, especially for small and medium-sized cities that lack technical staff.” Pablo Ezquerro Martin, Spanish Geological and Mining Institute (IGME)

Over the past years, the European Commission and space agencies have supported and funded the development of many services based on satellite navigation and communication that nowadays have been integrated into the policies of several European cities. Satellite navigation has become crucial to support transport and mobility and emergency operations, while satellite communication is increasingly used to monitor strategic infrastructure remotely or to connect villages in remote areas.

Many services based on satellite Earth observation have also been funded, and in Europe this effort coincided with the development of the Copernicus services and the creation of the DIAS ([Data and Information Access Services](#)).

Nevertheless, many of the products developed within projects still struggle to become practice within the cities testing them, hence limiting the number of “success stories” that could stimulate replication and the broad diffusion of such services in other cities.



Indeed, while most attendees to the Eurisy workshop considered that the services presented were worth investing in, some of the speakers also pointed out that these solutions are still perceived as being expensive and difficult to integrate into the decision-making processes of city departments.

This is particularly true when they lack in-house technical skills to process the data. In other cases, the uptake of satellite-based services is hindered by the cost of the high-resolution images needed to obtain relevant information on precise city areas.

But the main obstacle remains the **lack of awareness** about the existence of such services by city authorities at large.

Challenges

- Language, mismatched terminology
- Unrealistic, mismatched expectations
- How to obtain and deal with data?
- Difficulty to embed effectively technologies
- Difficulty engaging stakeholders
- Power imbalances, intellectual property
- Lack of capacity, political commitment, time and resources
- Communication: remote, insufficient, non-transparent?
- How to prioritize funding when priorities are always changing?
- When do you start? When do you stop?

© ICLEI 2020

www.iclei.org

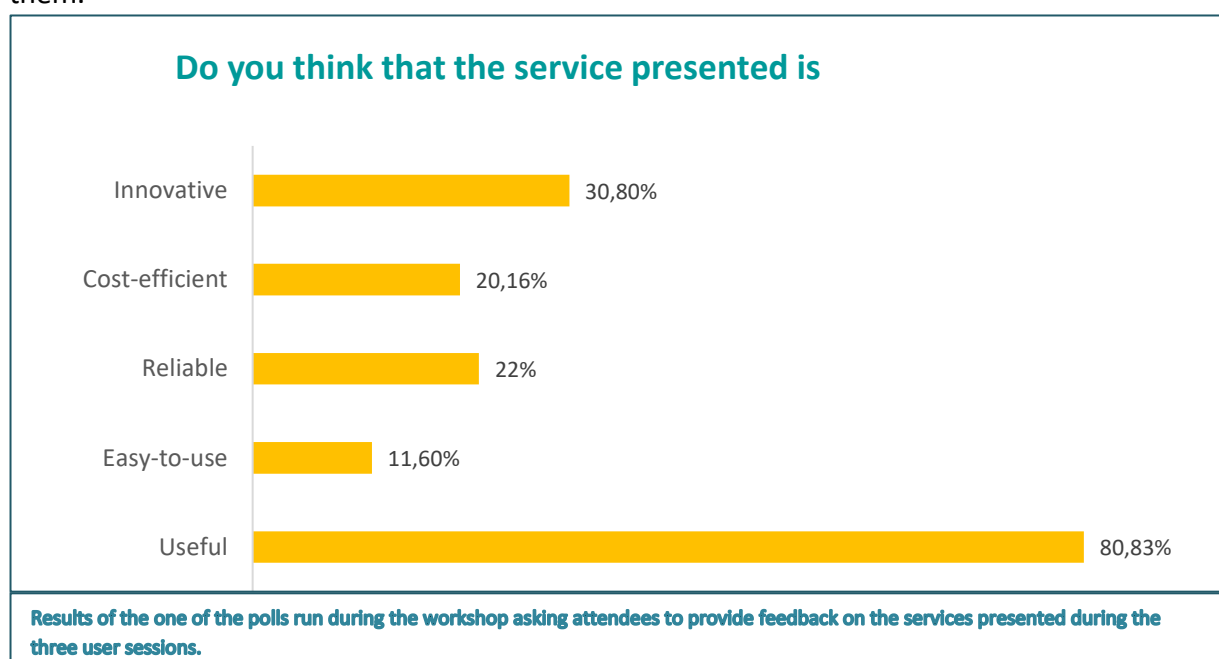
There is still a lack of awareness among public administrations about the existence of services based on satellite applications, and in particular on Earth observation.

"In the scientific community, we are used to talk about our products in a scientific way, taking for granted that our audience is also an expert. In our experience, we have tried to explain our

results to the stakeholders always relating them to their necessities and they usually thank us for this effort.” Pablo Ezquerro Martin, Spanish Geological and Mining Institute (IGME)

While big cities may have in-house staff with the technical skills to understand and use satellite-based services, most small and medium-sized cities do not get interested in these services until they are properly marketed to them.

Pressed by the need of prioritising expenditures to respond to changing priorities, local administrations are generally uncertain about the extent of time and resources needed to uptake services based on satellite data, and have often unrealistic or mismatched expectations towards them.



Indeed, while attendees of the workshop gave a very positive feedback about the usefulness of the satellite-based solutions presented to them, only a minority considered them as being “easy-to-use”.

The **need to better communicate** about the existence and the potential of such services among public administrations has been highlighted by Eurisy since the beginning of its User programme more than ten years ago and it is still extremely relevant today.

Since then, space agencies and the European Commission have been working to better communicate about the availability and the potential of Earth observation data, but these efforts still fail to reach out to the general public.

This is particularly true when considering the awareness of the general public of the portals providing access to the satellite-based data they would need. If satellite-based data are available and experts know where to find them, the information carried by Earth observation data still remains difficult to find for the local managers who could use it to better manage their cities.

During our workshop, two different portals to access information on solar radiation have been presented, together with a portal to freely access data on air quality in at local scale. Cities have a lot to gain from this information, which could be used to favour their transition towards green energies and diminish their carbon footprint. Unfortunately, only a few of the many cities that could profit from them are currently aware of their existence.

In previous events organised under the “Space for Cities” initiative, participants also stressed the importance of communicating about such portals or of embedding the information extracted from satellite imagery in the websites of the regional and local entities dedicated to different public services, i.e. where the intended users look for information. This message remains valid today.

Marketing satellite-based services can be a challenge for both academics, researchers and private companies developing these solutions. To interest local managers towards innovative solutions, these need to become mainstream.

“People need to see the benefits for their everyday life through TV commercials and interviews, with no scientific and complex concepts. They just want simple solutions for effortless benefit and profit. The urban planners and decision makers necessarily follow the popular trends, so public opinion is the first to be convinced of the viability of satellite-based services. It’s not an easy task.” Panagiotis Kosmopoulos, National Observatory of Athens

Academics and researchers are not always able to explain the functioning and benefits of satellite-based services to their intended users. They spend a good part of their life learning the technical jargon and they are used to interact with other people who understand it. Nevertheless, they also have the ability to engage public administrations in the development and testing of innovative services embedding satellite data.

Indeed, the proximity of universities and research centres with local administrations makes them quite aware of their needs and often favours relationships of trust that can allow them to co-operate on research projects and to test innovative solutions. In this sense, universities and research centres can make the link between the space sector and civil society and they often favour the creation of spin-off companies that will turn R&D into marketable products.

If researchers struggle to communicate on satellite-based services to cities, also private companies face challenges to convince local administrations of the reliability and cost-efficiency of such solutions.

During the implementation of the “Space for Cities” initiative, we could appreciate the important role played by private service providers to bring satellite-based services to the market. Indeed, private companies are often responsible for both convincing local administrations of the

usefulness, viability and cost-efficiency of their satellite-based services, and for training them to use them. Also, service providers often work with local administrations to create custom-made solutions adapted to their specific needs.

Recognising the importance of private companies to create innovative and appealing services based on satellite data, space agencies and the European Commission have also launched many initiatives to sustain private actors through awarding, funding and incubation mechanisms. Nevertheless, the real challenge for private companies selling products based on satellite data starts once the products are developed and they need to be marketed to their potential users.

The main difficulty reported by private companies when trying to sell their services to local administrations is their resistance to trust products that are not yet of common use. Culture and resistance to change are hence identified as important issues to be addressed to stimulate the uptake of innovation in cities.

Many cities would need support to procure satellite-based services

“When a city is eager to use a service, they need an expert to assist in drafting the technical specifications of their procurement tenders and to make sure that they get the best service for limited resources.” Carl Pucci, Urban Innovation Expert

Services based on Earth observation are still far from being mainstream, which makes it difficult for local administrations to consider them when writing their procurement tenders.

Moreover, even when city administrations are interested in satellite-based services, procuring them might not be obvious. Cities also often lack in-house experience to write the technical specifications to procure them and to select the service that would better respond to their needs.

Despite such challenges, pioneering experiences exist, and the case of Amsterdam is proof of it. In October 2020, the Engineering Department of the City launched, together with the Ministry of Economic Affairs and the Netherlands Enterprise Agency, an innovation competition for solutions to regularly survey all the infrastructure and detect early warning signals. Even if the tender does not call specifically for satellite-based services, it reflects the awareness of the Department of Engineering of the capabilities offered by Earth observation data, calling for solutions that are scalable and sharable among different city services.

To support the procurement of innovative solutions, the EU currently offers different supporting schemes, including Horizon 2020 funding for consortia of buyers and the EAFIP (European Assistance for Innovation Procurement) initiative, which provides free of charge technical and legal assistance to individual buyers and the COSME Programme (Competitiveness for Small and

Medium Enterprises), especially conceived to support SMEs accessing the public procurement market.

To favour the uptake of services based on Earth observation in cities there is need to expose the general public to convincing case studies.

“Beyond user requirements, cities are hampered by budget constraints and low innovation culture – however the effectiveness/ efficiency arguments supporting ICT investment are fully compelling and may be viewed as a solution to financial pressure. But for these arguments to win through, the services need to prove to be fit for purpose.” David Ludlow, CURE project “Copernicus for Urban Resilience in Europe”

If the attendees to the Eurisy workshop generally agree on the usefulness of the satellite-based services presented during the event, only a fraction of them was convinced of their reliability and cost-efficiency (see p.8).

This pinpoints to the **need for more case studies** to demonstrate the viability of satellite-based services. These should highlight the cost-effectiveness of the services and their capacity to respond to cities’ concrete operational needs. Additionally, they should indicate the amount of time and resources and the technical skills that local administrations are expected to deploy to acquire services targeted to their specific needs and, most importantly, to use them sustainably.

Finally, such case studies should not be showcased only to audiences with an interest towards ICTs and satellite applications. To favour their dissemination, these should be presented to local administrations in their language and avoid technical jargon, and be showcased in events, newsletters and webpages targeting city administrations and the general public.

The key to turn innovation into operation is to focus on needs

“Profitability is fully related to usefulness, and the notion that cities do not fully take up satellite, as well as other non-satellite ICT-enabled services, is surely founded on the failure to meet user requirements in the sphere of smart city urban governance.” David Ludlow, CURE project “Copernicus for Urban Resilience in Europe”

“I think that all panellists agreed on the importance of focusing our products on societal needs, and to me that is a step in the right direction.” Pablo Ezquerro Martin, Spanish Geological and Mining Institute (IGME)

The cost-efficiency argument is of paramount importance to convince cities to invest in innovation. When the use of products developed within pilot projects is discontinued after the end of the projects themselves, the reason might be that they failed to pass the cost-efficiency

test. This does not mean that such projects were not worth funding, as R&D is made out of trials and tests, and all experiences contribute to future improvements.

Eurisy's experience shows that the satellite-based services that are most likely to be used operationally and sustainably by local administrations, are those that are conceived to respond to their specific needs and that can be easily embedded into their operations, requiring little maintenance or technical skills.

To focus on needs means to involve city administrations actively in all phases of R&D projects, which requires a prior process of **mutual education** between city administrations and service providers (be them research institutes or private companies). On the one hand, service providers need to learn about the priorities and needs of city departments, and about their current structure, capabilities, and operational functioning. On the other hand, public administrations need to understand what parameters satellites can monitor, at what resolution and how often, and need to be aware of the time and resources they are expected to invest to obtain a viable service.

A lot is still to be done to turn innovation into operation, but the will to do so is very real among all the stakeholders involved in this process. The speakers contributing to our workshop are well aware that the transfer of satellite-based services to cities can only happen if these are clearly adapted to the operational needs and capabilities of local administrations. If all stakeholders focus their communications on such aspects, they can find the common language needed to co-design scalable satellite-based solutions that can be broadly used to improve life in cities. Eurisy will continue working in this direction and will keep creating spaces for dialogue among all the stakeholders interested in transferring the benefits of space to civil society.