Prospects for greater involvement of local and regional authorities in the future EU space policy and use of satellite technologies

The file note was written by
Progress Consulting S.r.l. and Living Prospects Ltd.
It does not represent the official views of the Committee of the Regions.

More information on the European Union and the Committee of the Regions is available on the internet through http://www.europa.eu and http://www.cor.europa.eu respectively.

Catalogue number: QG-30-13-386-EN-N
ISBN: 978-92-895-0703-5
DOI: 10.2863/80032

Table of Contents

1 Policy developments and trends 1
1.1 Introduction 1
1.2 Policy developments and trends in EU space policy 1
2 Latest technology development and market situation for LRAs as potential end users 7
2.1 Technology developments 7
2.2 Market for LRAs as potential users 12
3 Local and regional advocacy and involvement in EU space policy process 17
3.1 Analysis of the role of networks in EU space policy 19
3.2 Summary of results and impacts of networks' activities 22
4 Overall assessment of current and potential role of LRAs in EU space policy issues and as end-users 25
5 Appendix I – References 29

1 Policy developments and trends

1.1 Introduction

Past and ongoing European Union (EU) Framework Programmes (FP) for research and technological development, notably FP6 and FP7, have significantly supported the deployment of new space technologies, while also laying the foundations for future exploitation of space, with technologies that are currently under development. Space programmes and networks such as the Galileo European Global Navigation Satellite System (GNSS), EURISY, NEREUS and the Global Monitoring for Environment and Security (GMES), originate from EU initiatives and have already achieved, or aim to achieve, worldwide recognition and use. Due to the significant rise in EU space applications and in related expectations, new products and services have emerged, with a view to capitalising on available space technologies, often to the benefit of local and regional authorities (LRAs).

Technological advances have progressed hand in hand with policy developments, laying the ground for the establishment of a space policy at European level. Considering the importance of space-based applications in Europe's effort to address a wide range of challenges – from tackling economic crisis, ensuring citizens' well-being and enhancing innovation and job creation, to fighting against climate change and facilitating the provision of health services in remote areas – the European Space Policy (ESP) strategically develops towards ensuring a technologically autonomous future for Europe, involving players at regional, national and international levels.

1.2 Policy developments and trends in EU space policy

The ESP, adopted in April 2007 by the European Commission (EC) and the European Space Agency (ESA), was a strategic milestone for Europe, setting the foundations for global leadership in policy areas representing European interests and values.[1] The ESP sought to address Europe's needs in terms of: (i) public policy objectives, including the priorities of enterprises and citizens, through space applications, related services and infrastructure; (ii) space-related security and defence; (iii) development of space-based industrial potential, aimed at fostering innovation, competitiveness and growth; (iv) progress in space-based science; and (v) autonomy in space applications, with regard to access to new and critical technologies, systems and capabilities.

[1] European Commission (2007).

From the outset, the ESP made clear the importance of the development and exploitation of space applications as a way to maximise political, economic and social gains. It clearly stated Europe's commitment to strategic infrastructure, notably with regard to satellite navigation (EGNOS[2], Galileo), earth observation (GMES/Copernicus, GEOSS[3]) and satellite communications, as well as security and defence.

In its September 2008 resolution, the fifth 'Space Council'[4] identified the following four priority implementation areas with a view to developing a space policy based on the findings of the ESP progress report[5]: (i) climate change, calling on the scientific community, the EC, ESA and EUMETSAT[6], among others, to define the most suitable way of exploiting space-based information for the benefit of climate research; (ii) contribution to the Lisbon Strategy, underlining, among other issues, the capacity of space applications to foster innovation and create market opportunities globally; (iii) security, also noting the potential of Galileo, GMES and satellite communications systems to provide services that are useful for security applications; and (iv) space exploration.

[2] European Geostationary Navigation Overlay Service.
[3] Global Earth Observation System of Systems.
[4] Concomitant meeting of the Council of the European Union and of the Council of the ESA.
[5] European Commission (2008).
[6] European Organisation for the Exploitation of Meteorological Satellites.

GALILEO

Given that almost 7% of the EU economy (EUR 800 billion) depends on navigation applications, it is considered imperative for the EU to secure an independent operational capacity in this strategic sector. Galileo provides a solution to Europe's concerns over GNSS, since both GPS and GLONASS – controlled by the USA and the Russian Federation, respectively – come with no guarantee of availability or accuracy. Galileo is under civilian administration and management and has three operational phases:

- In Orbit Validation (IOV): this is the current testing and validation phase, with two operational satellites (GIOVE-A and GIOVE-B);
- Initial Operational Capability (IOC): Galileo will enter this phase in 2011 with four operational satellites; and
- Full Operational Capability (FOC): Galileo will be fully operational in 2013, with a complete constellation of 30 satellites (27 active and 3 active backups).

Galileo will deliver real-time position accuracy to the range of one metre. It will also guarantee availability except in the most extreme conditions, and, additionally, information to the user if any of the system's parts fail. This information will be available to the user within seconds of the failure event, thus leading to a system suitable for safety-critical applications such as railway and transportation management, aircraft landing, etc. It will also provide a global Search and Rescue (SAR) function to inform the user that help is on the way. Potential applications relevant to LRAs are expected to include social services to disabled or elderly people, tailored Location Based Services and Information (e.g. tourism and sightseeing specific), high precision agriculture (notably livestock management and tracking), public works management, city planning, vehicle tracking, and fleet management.

In this context, Galileo and GMES feature as the flagship programmes of the ESP, whose timely implementation has been agreed by both the Council and the European Parliament (EP).

In November 2008, the EP endorsed the new priorities of the ESP, requesting that the Council and the EC make specific recommendations or proposals on the afore-mentioned priority implementation areas, to set a roadmap for the governance and implementation of the GMES/Copernicus programme and to support synergies between civil and security space-related developments. Moreover, it raised the issue of an ESP-earmarked budget heading in the EU budget in accordance with stated commitments, while calling for the promotion

of investments in space-based science and technology. In this respect, the 2008 Galileo Regulation pushes forward the involvement of small- and medium-sized businesses in EU industrial policy in the area of space, opening up competition in procurement to new entrants, in particular SMEs across EU Member States (MS).

In its 2009 resolution, the 6th Space Council highlighted the potential of space to push forward an innovation economy and to assist in the economic recovery of Europe. It also emphasised the need to specify the requirements for the development of downstream services based on EGNOS, Galileo and GMES, as well as to take into consideration space applications when selecting new lead markets under the EC Lead Market Initiative. Moreover, it stressed the potential contribution of satellite communication technologies in the provision of broadband services to EU citizens and enterprises, particularly in rural and remote areas. As with Galileo, the Space Council considers it important that competition remains open on the supply of GMES services, and that the involvement of SMEs is encouraged.

In June 2010, the EC issued an Action Plan on GNSS applications, including 24 measures targeting the increase in the EU market share of GNSS applications, as well as the autonomy of the EU in this field. The accompanying impact assessment of the Action Plan demonstrated, among other things, the need for immediate, broad development of downstream applications in all domains where they may bring benefits.

The October 2010 Regulation of the EP and of the Council on GMES and its initial operations (2011-2013), introduced operational funding for GMES and ensured the sustainable operation of GMES services. In addition, it promoted a detailed data access and dissemination policy for the planned services, in line with the requirements of users.

GMES/COPERNICUS

GMES is Europe's effort to develop a sustained and reliable Earth observation system aiming at providing a safer environment and at safeguarding the lives of European citizens. Currently in a critical transition stage from research to operational status, GMES is a monitoring system, providing its users, from global to local scale, with the ability to act, make appropriate policy decisions and invest safely in relation to various assets, by making use of the available data and information, following a full and open access principle.

GMES/COPERNICUS (continued)

It can offer accurate information and on-time data delivery for managing natural resources and biodiversity, for environmental monitoring (including monitoring of the chemical composition of the atmosphere, of the water level and of climate change), as well as for security and protection. Further, it is user-driven, delivering information that corresponds to the actual needs and requirements of the user segment (a greatly beneficial aspect for LRAs as end-users) and it is highly dependent on Earth Observation (EO) data collected from satellites, air instruments, water or land observation and measurement instruments that collectively form the 'GMES infrastructure component'. The 'GMES service component' focuses on three main thematic areas: (i) land, marine and atmosphere information; (ii) climate change information; and (iii) emergency and security information. GMES gathers the already existing EO services (dispersed at national or regional level and unreliable for a sustainable observation capacity) into a single entity, providing services that monitor and forecast the condition of the earth's systems, namely:

Service	**Description**
GMES Land Monitoring Service	Providing cross-border harmonised EO data from global to local scale. The service's main themes are: land use; land cover; land cover change; soil; water quality; water availability; and spatial planning.
GMES Marine Monitoring Service	Providing information on oceanic and regional sea areas in four main domains: marine safety; marine resources; marine and coastal environment; and climate and seasonal forecasting
GMES Atmosphere Monitoring Service	Delivering information on atmospheric composition, for example on: greenhouse gases, reactive gases, the ozone layer, solar UV radiation, aerosols, etc.
GMES Emergency Management Service	Addressing emergency situations from local to global scale in a broad range of thematic fields such as: floods, forest fires, landslides, earthquakes and volcanic eruptions, humanitarian crises, etc.
GMES Security Service	Dealing with the thematic fields of: intelligence, early warning, and crisis management operations.

In December 2010, the 7th Space Council underlined the prospects of a significant contribution of space to 'Europe 2020 – A strategy for smart, sustainable and inclusive growth' and initiated action towards the joint development of an overall space strategy that: facilitates new economic growth and job creation, through innovation and scientific progress; addresses public policy objectives and user needs at regional, national and European level; and advances scientific and technical vocations in Europe. The Council emphasised seven main policy pillars: (i) strategy and investment; (ii) successful deployment and sustainable exploitation of the flagship programmes; (iii) contribution of the European Space Systems to the monitoring of climate change and its effects; (iv) space systems role for security policies and security of space systems; (v) European vision on space exploration, (vi) partnership on space with Africa; and (vii) governance of space activities in Europe.

The latest policy trends, as outlined by the 7th Space Council: continue to support innovation through space and create new opportunities for the scientific and technical workforce, while considering space an important asset in efforts to tackle the recession in the economy. Moreover, the new developments shift the focus directly onto the two EU space flagship programmes, Galileo and GMES, with the latter becoming a critical part of the lives of European citizens, of those businesses relying on GMES applications and services, and of EU R&D efforts based on GMES. In this context, EU organisations are to propose user requirements for each of the GMES services.

In addition, the ESP is expected to focus on tackling climate change through the use of space-based systems such as Galileo, GMES, Carbonsat and Envisat and through the collaboration of ESA, the EC and MS with space-related organisations such as EUMETSAT.

Following the entry into force of the Lisbon Treaty in December 2009, space has become a shared responsibility between the EU and the EU MS. The EC, the MS and ESA are the key actors in the formulation and implementation of the ESP, with the Council firmly supporting the strengthening of partnerships among them, towards the continued success of the ESP. LRAs are not directly involved in space policy, despite their increasing interest in using space applications, but as end-users LRAs may benefit from a wide range of space products and services already available on the market.

2 Latest technology development and market situation for LRAs as potential end users

2.1 Technology developments

The recent launch of the EC GNSS Action Plan[7] in June 2010 opens the way for significant commercial and research opportunities, as well as for potential users to enjoy a wide range of space-based products and services. LRAs are expected to particularly benefit from the deployment of the new technologies and applications, as these refer to sectors directly related to their powers and responsibilities, such as mapping and land registry, urban planning, civil protection and emergency management, law enforcement and environment, including climate change.

Most space applications benefit from the massively improved accuracy of the European Geostationary Navigation Overlay Service (EGNOS). EGNOS is the first pan-European satellite navigation system, closely connected to Galileo as a predecessor and in service since October 2009. Its mission is to provide higher accuracy and reliability and indeed EGNOS provides a level of accuracy much higher than GPS, thus making it a satellite navigation system suitable for safety-critical applications. The system comprises three geostationary satellites and a network of ground stations through which it transmits, to all the compatible receivers, a signal containing information on the reliability and accuracy of the positioning signals sent out by GPS; this allows for an accuracy in Europe of up to 1.5 metres, creating a large downstream services market and a wide range of potential applications, from high-precision agriculture to emergency management.

Equally important for LRAs are applications that have been developed based on the GMES programme. In general, the importance of GMES to LRAs can be consolidated into precise monitoring, risk assessment and management, emergency response, protection of assets and support of economic growth. Latest technological developments in this field include the following two applications:

- ***Carbonsat*** will be Europe's latest effort to measure the two most important – in terms of their effect on global warming – anthropogenic greenhouse gases (GHG), i.e. Carbon Dioxide (CO_2) and Methane (CH_4).

[7] EC (2010a).

Carbonsat will provide the information required to successfully monitor these gases and will support research on their importance and effect in global warming. It will map the detailed spatial pattern of CO_2 emissions from moderate to strong localised emission sources, such as coal-fired power plants, and may thereby potentially play an important role in the measurement, reporting and verification (MRV) systems for anthropogenic GHG emissions that have recently been developed as part of the international 'post-Kyoto/post-Copenhagen/Cancun' climate negotiations and agreements (including the carbon*n* Cities Climate Registry – cCCR). The application shifts the focus of monitoring GHG from the global to the local level, providing information at a level that allows the direct involvement of LRAs in both monitoring and mitigation actions.

- ***Envisat*** is an advanced polar-orbiting Earth Observation (EO) satellite carrying an array of nine EO instruments. These provide measurements and information on the atmosphere, oceans, land, and ice. It is also equipped with a navigation guidance and control system. The data provided by the satellite create a supporting infrastructure for various earth sciences that monitor change, and facilitate the development of operational and commercial applications. Envisat is used for the monitoring of the evolution of environmental and climate change, in line with the requirements of the 6th and 7th Space Council resolutions. Besides the monitoring of climate change and its effects, its data are used in a wide range of other sectors, including, for example, atmospheric pollution, oceanography, hydrology, agriculture, natural hazards, maritime traffic, cartography and marine pollution. Collected information can be fed into the databases of sub-national environmental departments, particularly those related with environmental impact assessment clearance, air pollution monitoring, etc.

Two GMES-based technology developments with a broad application for LRAs, as potential end-users, are presented in detail in Table 1.

Table 1

Geoland2	
Description	The Geoland2 project is the pre-operational working concept of the GMES Land Monitoring Service, mainly aiming at organising a qualified production network of land monitoring data and information, and at providing a quality assurance process based on the requirements of the GMES user segment. It offers geo-information with accuracy and cross-border consistency at all scales, from global to local.
Key actors involved and their role	The project is collaborative and is funded under the 7th FP. The consortium consists of 51 European public and private partners, involving private companies, research institutes and universities. Roles are intermixed between the actors of the project. Key tasks of the project are Spatial Planning, Global Crop Monitoring, Natural Resource Monitoring, Agri-Environment, Water and Forest Monitoring. The user segment of the project consists of more than 80 national, local, regional, European and international organisations. Uses of Geoland2 include land monitoring, bio-geophysical parameters monitoring, seasonal and annual change monitoring, spatial planning, agricultural – environmental applications, water, forest and land carbon monitoring, natural resource monitoring in Africa, and global crop monitoring.
Relevance to EU space policy	Geoland2 is tightly connected to the ESP in the strategic and investment policy pillar, in the exploitation of the abilities of the flagship programmes (namely the GMES) and in climate change monitoring and management through the use of space-based equipment. Geoland2 offers the means to successfully monitor land and at the same time provides for a new market of land management-based products and applications (hence is relevant to the development of the GMES downstream applications market). Additionally, through the NARMA (Natural Resource Monitoring in Africa) products, it connects to the 6th ESP pillar, which refers to the collaboration of Europe with Africa.
Application to LRAs	Geoland2 (and in general GMES) facilitates monitoring of areas, including urban and peri-urban areas, and can therefore be used as a spatial planning tool, for example to identify and stop uncontrolled construction. Moreover, through Geoland2, the GMES Land Monitoring Service can calculate quality factors connected to soil and water and lead to better management by LRAs of these resources.

Importance to LRAs	Land monitoring is important to LRAs as it can provide them with useful information pertaining to management tasks within their administrative boundaries. Indeed, through land use and land coverage, Geoland2 sets the basis for spatial planning and management efforts to minimise uncontrolled construction and that being undertaken outside permitted areas. Similarly, monitoring soil and water quality is a key factor in sustainable development, particularly in rural regions where economic growth is closely connected to water and soil quality. Indeed, in rural areas, monitoring soil and water using Geoland2 applications may facilitate the sustainable management of land used for agriculture and stock-breeding.

SAFER	
Description	SAFER is the pre-operational concept product of the GMES Emergency Monitoring Service and provides an initial assessment of that GMES service.
Key actors involved and their role	The project is collaborative. The consortium consists of European public and private partners, involving companies, research institutes and universities. The project has three main types of stakeholders: end-users, service providers and the EC. The end-users (mainly civil protection authorities from EU MS – indirectly involving LRAs – and relevant services of UN agencies, but also funding agencies and insurance companies) are the receivers of the services provided by the project. The service providers are connected to GMES and provide GMES-related services (data, emergency mapping, geo-location, EO information) to the end-user segment. The EC provides administrative and financial support to the development and operation of the project.
Relevance to EU space policy	SAFER is relevant to the ESP pillar that focuses on the exploitation of the flagship programmes of the policy, as well as to the strategic and investment pillar pertaining to the creation of new opportunities and markets.
Application to LRAs	Via the connected GMES service, SAFER can provide for, and address, emergency conditions ranging from global to local scale; in particular Rapid Mapping – one of the SAFER services – can provide LRAs with quick information on a disaster that has struck a particular area of their administrative vicinity. The service can produce reference maps for the LRA concerned in less than six hours. The use of the service can lead to faster emergency unit deployment and less harm to the local population, which in consequence means less harm to the authority. SAFER, through GMES, particularly addresses the following situations: • Floods • Forest fires • Landslides • Earthquakes and volcanic eruptions • Humanitarian crises
Importance to LRAs	In general, disasters that strike a particular area are managed at a national level; however, the involvement of LRAs is also required due to the fact that the latter are closer to the citizen and are the first to respond. Moreover, the first response units are in most cases directly managed by LRAs. SAFER may greatly assist LRAs in their tasks in case of natural or man-made disasters, where fast response and quick delivery of

management actions are needed. Using SAFER information, LRAs can quickly take stock of the situation and respond appropriately to save lives and minimise damage.

2.2 Market for LRAs as potential users

The EC is committed to the following six priority domains of space applications, as described in the impact assessment report[8] accompanying the Action Plan on GNSS Applications: (i) individual handsets and mobile phones (LBS – Location Based Services); (ii) road transport; (iii) aviation; (iv) maritime transport; (v) precision agriculture and environmental protection; and (vi) civil protection and surveillance. The space-based market has great potential for LRAs, as users of this segment, considering GNSS capabilities in terms of positioning, navigation and timing. In particular, LRAs can make best use of applications regarding LBS, road transport and the last two of the afore-mentioned domains (agriculture/environment and civil protection), e.g. use of fleet management, space applications in fire brigades, city cleaners, Emergency and First Response Units, etc.

When combining Galileo open services with GPS, space applications may be used even in obscured environments, where barriers such as buildings and trees block parts of the sky. The combined services use a larger number of satellites, increasing positioning accuracy and availability, thus further extending the market of space applications to densely built urban areas as well as to forest areas, making them practically relevant to LRAs and their competent planning services.

The GNSS market is increasing at an accelerating pace, with new innovations coming out each year. The size of the global GNSS market is estimated to be worth about EUR 100 billion. The EU currently controls about 20% of the market, though aims to increase its share so as to reach 33%, as in other high-tech sectors. It is expected that market allocation to products and services will be dominated by mobile telecommunications and personal handset applications (75% market share), followed by intelligent transport systems (20% market share).

[8] European Commission (2010b).

Agricultural water use management in the region of Campania, Italy

An example of the use of Earth Observation **(**EO) data for improved management of agricultural water use is provided by a project implemented in the region of Campania, Italy. The project has developed an environment for informed water management. EO technologies have been used to produce objective information for the efficient management of irrigation water resources. The assessment of crop water requirements is based on EO data integrated with ICT solutions. Canopy development is monitored through high-resolution multispectral images, and calculations for crop water requirements are based on a '1-step' standard FAO procedure. Using the acquired information, a water management (irrigation) plan is drawn up, with a view to providing personalised irrigation information directly to the farmers. The validation method used for the calculation of water requirements is based on ground measurements and observations. A post-evaluation of the project determined that informed water management had both direct and indirect economic and environmental benefits for various stakeholders, mainly farmers and local authorities. The project adds a new dimension to irrigation water management, by introducing spatially distributed information to a wide range of stakeholders, at a spatial and temporal resolution suited to their requirements and needs. In terms of tangible results, the post-evaluation report indicated EUR 5 savings for each euro spent on the drawing-up of the irrigation plan.

The development of the GNSS downstream applications market is currently based on positioning and timing signals, but is expected to be enhanced by the planned introduction of authentication and encryption of signals, an innovation that will render GNSS applications more relevant for LRAs. This technological advance will, in fact, provide LRAs, among other users, with products and services of increased security and will allow the use of applications involving personal data processing and thus requiring safe and controlled access to information.

LRAs can also use space-based products and services coming from GMES for the benefit of their citizens, in applications related to the management of their assets, the monitoring of environmental conditions pertaining to their administrative vicinity, or in more complex projects, such as the drawing-up of environmental management plans in sensitive ecosystems. The GMES market offers high-resolution and high-precision products ranging from simple observations through remote sensing satellites to long-term monitoring of atmospheric conditions.

For the time being, the GMES market segment offers five basic services – monitoring of land, marine and the atmosphere, emergency management and security – through an equal number of pre-operational products, developed under EU FPs. Other applications, though not currently available, can be provided on a custom basis; this is a peculiarity of the GMES market, which is driven by the requirements of the user segment. Different combinations of the five basic GMES services make available abundant data that can in turn lead to a mass of final services and products for the end-user, thus covering a very wide range of needs. In this context, LRAs can easily access existing GMES products on the one hand and on the other develop customised applications offering solutions to their specific problems, either through SMEs, or through research institutes. The collaboration of LRAs with SMEs and/or research institutes is a key condition for technological developments to become relevant for LRAs, so as to ensure that their exact needs are explained and customised solutions are developed.

Example of space-based product used by LRAs: Sustainable Risk Management Initiative

This example shows how LRAs can combine GNSS and EO services and products to create a Sustainable Risk Management tool. The concept originated from the city of Tarascon in Southern France, an area which sustained heavy damage from flooding in 2003. The technology used includes a variety of integrated systems that provide information collected from ground observation, spatio-temporal data and location data. The integrated system uses satellite and ground-based communication arrays to provide real-time geo-location to the user of handheld and mobile devices. It also uses EO data to monitor and model conditions that may lead to the repetition of the events of 2003, thus allowing for the creation of an effective risk management strategy. All data collected at the local level are evaluated at the national level and coordinated actions are initiated. The project has resulted in the improvement of the local risk management strategy and the reconciliation of risk exposure and growth.

GMES market solutions already in use and addressing LRAs comprise the following types of application:

- Environmental management tools including forestry monitoring. Examples of such applications include:

  - The use of EO data for the assessment and monitoring of Natura 2000 sites in areas that cannot be accessed due to firearms contamination (Brandenburg region, Germany).
  - The use of high resolution EO data, as a follow-up to a national strategy on ecological coherence, to map and understand the spatial distribution of various landscape elements, leading to the development of a regional plan for ecological coherence (Brittany and the Midi-Pyrenees regions, France).
  - The use of EO data for water quality assessment (Aquitaine and Brittany regions, France).
  - The use of EO data to monitor PM concentration (Bremen region, Germany).

- Urban planning tools, e.g. the use of CORINE data in combination with conventional maps to monitor urban sprawl (Warsaw region, Poland).

- Maritime services, e.g. the use of EO data for Coastline Monitoring (Midi-Pyrenees and Aquitaine regions, France).

- Natural disaster planning and response (Risk Management and Insurance), e.g. the use of EO data and monitoring techniques in forest fire mitigation (Basilicata region, Italy).

- Tourism, including the protection of natural and cultural heritage, e.g. the use of satellite communications for the provision of broadband Internet connections to remote areas, or winter resorts (Piemonte region, Italy)

- Health, e.g. the use of satellite communications for telemedicine purposes (North and South Aegean regions, Greece)

- Transport, e.g. the use of satellite information and navigation systems for public transport tracking and management.

- Education, e.g. the use of satellite communications for the creation of a virtual school in remote villages (North Aegean region, Greece)

- Energy, e.g. the use of satellite information to determine the solar potential of sites that qualify for solar panel investments, thereby facilitating the evaluation of the investment plan (Czech Republic – SME application).

- Agriculture, e.g. the use of satellite information-based advisory services for the provision of personalised irrigation advice to farmers through their mobile phones (Campania region, Italy)

3 Local and regional advocacy and involvement in EU space policy process

LRAs and 'non-space SMEs' are the two potential end-users of space technology with the greatest interest in being involved in advocacy activities within the EU space policy process. The former because they increasingly employ satellite technology applications in the services they deliver as well as because of their proximity to citizens who are the final beneficiaries of space technology applications; the latter because they are the largest group of economic actors in that process.[9]

The contribution of LRAs to the EU space policy process derives from their twofold role: (1) they are viewed as end-users of the products and services emerging from the technological developments that space policy brings forward; (2) they assume the role of technology intermediaries, by specifying the requirements that must be addressed by space products and services, in order to respond to the final needs of the citizens. More precisely, LRAs:

- have competences in several of the ESP policy pillars, including in environmental and security issues;

- use space applications and data in most of their day-to-day operations, particularly those related with the management of their territory, so they influence the configuration of relevant space products and services with their requirements; and

- provide a wide range of space-related services and products to citizens.

Regional – and in several cases local – experience in the use of space applications, provides valuable feedback to space SMEs and research centres, encouraging the creation of new products and services, as well as promoting the exploitation of emerging markets. LRAs also host the installation, development and maintenance of what is known as the 'ground segment' of space infrastructure, including launchers and satellite integration, along with related equipment and software.

LRAs promote the active participation of a large number of other users, from their contractors (e.g. planning, engineering and/or environmental consultancies, logistics services providers, etc.) to the citizens, all of which may further contribute to the development of emerging space applications.

[9] Eurisy (2010).

Finally, LRAs have a role in supporting research and the development of industrial clusters, through political support as well as financial and other incentives (such as availability of R&D staff, an attractive working environment, etc.). These clusters ideally include institutions and organisations with a major role in innovation and technology transfer, bringing together key players in space policy implementation, such as 'space SMEs', higher education and research institutes.

Example of regional initiatives for the creation of research clusters

The 'ERA-STAR Regions' Project, funded under FP6, is a network of regions and other public authorities supporting initiatives in the field of Space Applications (Galileo, GMES and other technologies, such as satellite technologies, launcher concepts, human space flight, etc.). The project links research programme managers from Austrian, Belgian, German, Czech, French, Hungarian, Italian, Dutch, Slovenian and Spanish regions, with the intention to build a trans-regional critical mass in RTD capacity that will allow the implementation of coordinated space-related research. Collaboration among the regional organisations involved facilitated the launch of calls for proposals, inviting 'space SMEs' and research institutions in the afore-mentioned regions to develop joint projects in the fields of Galileo and GMES.

3.1 Analysis of the role of networks in EU space policy

There are two main networks that provide for the involvement of LRAs in the development and monitoring of EU Space Policy: EURISY and NEREUS. Other relevant networks include:

- ERRIN, addressing issues related to the space applications market, with a particular focus on new and innovative applications, services and products, although it does not solely focus on space.

- ENCADRE, an informal European platform consisting of 16 clusters linked with satellite and space-based applications, aiming at '*supporting the creation of a market strategy in the field of space and Galileo-derived applications*'. [10] The network has implemented awareness-raising activities targeting companies, entrepreneurs and users, including LRAs, with a view to explaining existing opportunities that space and satellite technologies may offer.

NEREUS

The Network of European Regions Using Space Technologies (NEREUS) is an association of a growing number of European regions, with a common mission to '*fully exploit the potential of the space technology market for the benefit of its Regions and their actors*'.[11]

NEREUS operates on two discrete, yet interconnected levels: political influence and operational matters. The network addresses three thematic fields of cooperation, namely GMES, Galileo/GNSS and telecommunications, with a view to improving the quality of services provided at the regional level. In this context, it promotes activities that may lead to a broader recognition and use of downstream applications by regions. In addition, it encourages actors within regions to exploit the potential of GNSS and GMES applications, making best use of EU programmes and funds; to this end, NEREUS may assist in the identification of thematic priorities, as well as in inter-regional networking and cooperation. In particular, the major fields of intervention of the network are:

(i) Creation of a solid political interface between the regions and the various European institutions in the field of space policy.[12] NEREUS maintains a close relationship with all EU space policy key actors, especially ESA and the National Space Agencies, as well as with the

[10] Europe INNOVA website.
[11] Nereus (2010a).
[12] Nereus (2010b).

European Inter-Parliamentary Space Conference (EISC). Through networking and advocacy, it promotes a regional dimension in the development of the policy. More precisely, it communicates the priorities of the regions concerning EU space policy and, additionally, influences this policy to accommodate the specific needs and requirements of regions as end-users of space applications.

(ii) Development of the space technology market. The network fosters the promotion and integration of regional space needs in EU space policy by emphasizing regional opportunities for space technology development and/or use. At the same time, NEREUS focuses on fully exploiting the potential of the technologies (services and products) that the space market offers for the benefit of EU regions.

(iii) Networking and promotion of inter-regional partnerships (including trans-national and cross-border cooperation). NEREUS brings together key experts and resource staff from regional, national and European institutions, with a view to facilitating the development of joint activities. Recommendations are made to relevant regional authorities for the development of joint initiatives and projects.

(iv) Acquisition and exchange of knowledge and information. The network acts as a training and information exchange node, organising conferences and meetings, keeping an updated web-portal, as well as creating and disseminating brochures and other information material. It targets regional and local administrations, as well as commercial enterprises, with the intention of making them familiar with space technologies; it therefore serves as an intermediary for potential end-users and businesses, a role that is more difficult to play for relevant EU or national bodies, due to the relatively distant position of the latter. Moreover, it promotes the wide communication of space policy and applications to citizens and companies, with a view to enhancing their involvement in European Space Policy and Programmes.

EURISY

Eurisy is an international non-profit association of public agencies, organisations and institutions, as well as of private businesses, with an active focus on space-related activities and a mission to facilitate '*the access of professional communities to satellite information and services*'.[13] Eurisy targets its action at two main communities, namely European LRAs and the 'non-space SMEs', while also considering the users of space-related services from the 'European neighbourhood' as a separate focus group.

Although Eurisy members are not directly connected to LRAs, the network includes a programme specifically addressing their needs related to satellite information and services: the LRA Support Initiative.[14] The LRA Support Initiative considers the role and functions of LRAs in promoting the use of space applications in decision-making, integrated planning and regional development; it consists of a variety of procedures for supporting the dissemination of satellite-based products and services for LRAs through:

- 'Self-contained' and 'on-request' information events, aiming at raising awareness and understanding of space policy and/or technological developments;

- Case-studies, comprising a local needs analysis (using a customised approach for each LRA), accompanied by a series of recommendations on how to make best use of available satellite technologies, in order to improve efficiency of service delivery;

- Free access to a network of multidisciplinary experts, facilitating access to space-based applications;

- Bottom-up feedback to European and national decision-makers based on direct input from LRAs and other users, and regarding support initiatives that may maximise the benefits of space applications for users.

Eurisy has an advisory role on end-user needs, specifications and requirements as far as financing, implementing and using space-based services and products are concerned. Additionally, it facilitates dialogue between end-users and space institutes; provides feedback to European and national decision-makers on the needs of end-users; and helps ensure that society benefits from European investments in space, notably in programmes such as Galileo and GMES

[13] Eurisy (2010a).
[14] Eurisy (2010c).

(Global Monitoring for Environment and Security), and in satellite telecommunications.

3.2 Summary of results and impacts of networks' activities

Both NEREUS and Eurisy include activities dedicated to addressing the needs of LRAs as end-users of space applications. However, each network follows a distinct approach to achieving its targets: NEREUS places great emphasis on influencing EU Space Policy developments in the direction of LRAs' requirements, while Eurisy focuses more on the exchange of good practices and on providing easy access to information on space-based technology and services.

More precisely, NEREUS has established links with the main actors of EU space policy and in this respect has: (i) supported the wide acceptance of the regions as key end-users; (ii) highlighted the need to take into account the specific requirements of the regions, as regarding their operational activities in a broad range of fields (from air pollution monitoring to forest management and coastal planning), in the development of space applications.

Furthermore, NEREUS has so far assisted its member regions in collectively utilising the products and services provided by GMES and GNSS technologies, with a particular focus on Galileo. [15] Through concerted inter-regional cooperation, it created and disseminated a publication illustrating 25 examples of space-based applications already in use in EU regions. The regional case-studies presented serve as a guide to other LRAs in their planning of the use of space technologies and in particular of EO data.

Additionally, several NEREUS members have been particularly active in mobilising local and regional action towards mainstreaming the use of space technologies and developing new space-based applications. For example, the Bavaria region held the annual European GNSS Competition, promoting market development of applications using satellite navigation, such as EGNOS and Galileo, and attracting 357 contestants from 44 European countries, including, among others, the regions of Aquitaine, Madrid, Baden-Württemberg, Hesse and Lombardia.

Following recent developments in NEREUS strategy, seeking to establish the network as '*the voice of European regions*' with regard to the application of space technologies, it is expected that action will now be taken to engage a

[15] Council Of the European Union (2009).

larger number of regions, as well as that a more balanced approach will be followed in the future, equally addressing advocacy for the regions in matters of space policy and knowledge-building on space issues and information exchange among its members.

The NEREUS – PEGASE Project

The FP7 funded NEREUS – PEGASE project aims at providing the European GNSS Agency (GSA) with expert knowledge throughout all the fields where Galileo and EGNOS technologies may be applied. In this project the focus of the network is on providing GSA and other key players in EU space policy with information on policy positions, needs and recommendations of European regions. In total, 56 regions from 21 European countries are referenced as being actively involved in supporting GNSS activities and NEREUS is spearheading the initiative.

Eurisy has held several conferences and workshops with LRAs and service providers, as part of a five-year programme to enhance LRAs' access to space applications. These events have been used for the presentation of practical examples on the use of space services by LRAs, as well as for the identification of obstacles and solutions to the broad diffusion of satellite technologies and services to the key end-users, notably LRAs.

One of Eurisy's main impacts is raising awareness by informing LRAs about current and future innovative satellite solutions and how these can be implemented and used. Examples of good practices along with numerous case studies have been elaborated to show how pioneering LRAs are currently using space-based applications. In addition, a small number of relevant papers and articles have been published, presenting ideas and solutions to encourage greater uptake of space technologies by the key user groups.

Eurisy 2010 workshop: 'Regions could profit more from satellite services to tackle climate change'

The focus of the Eurisy workshop held in Ljubljana, on 31 May – 1 June 2010, was on how LRAs can benefit from satellite services (GMES, EO, Galileo, EGNOS) in the area of tackling climate change, forest and water management, CO_2 emission reduction, transport and other fields of intervention. The workshop acknowledged the value of satellite information in the provision of facts and information for decision support systems. It called for strong political support to promote the use of space applications, while at the same time highlighting the need for local knowledge to contribute to global knowledge and collective solutions to climate change.

In 2010, Eurisy published a position paper that was endorsed by several key actors in space policy, including NEREUS and other networks of LRAs. The paper suggested practical actions aimed at facilitating rapid awareness-raising on existing high added-value space-related technologies and services, calling for:

- A re-direction of part of the EU space budget to directly reach the two main potential end-users, i.e. LRAs and 'non-space SMEs';
- The inclusion of EU space budget funds along with other resources in the current calls dedicated to the afore-mentioned end-users (e.g. within INTERREG for regions, Intelligent Energy Europe for SMEs, etc.)
- A clear reference in the afore-mentioned calls to the eligibility of funding for satellite information, services and enabling equipment, as well as to the space applications that can be employed.

4 Overall assessment of current and potential role of LRAs in EU space policy issues and as end-users

Combined satellite services can provide for a variety of LRA-related applications, as indicated in chapter 2. The use of space-based applications by LRAs is stimulated by the existence of the following main pull factors:

- A set of specific funding schemes directly or indirectly targeting LRAs as end-users of space-based technology. Such EU funding mechanisms are designed to enable the exchange of good practice and/or cover the initial risk of taking up innovative technologies. They include EC Framework Programmes, ESA specific calls and National Funding Schemes.

- Available 'good practices'. Showcasing of successful applications of space technologies and services for LRAs raises awareness among LRAs about existing applications and facilitates uptake and/or multiplication of use.

- Networks for the exchange of knowledge and experience. The activities of these networks have a similar impact as with 'good practices' on the uptake by LRAs of space services applications.

LRAs have to become more involved in space policy matters and in the development of new applications, services and products that will cover not only their current needs but also their future ones. A key factor in more rapid access to critical technology at a more affordable cost is the encouragement of the evolution of space policy by establishing specifications and requirements to be covered by new products, and by applying the required political and financial pressure through networking abilities. As highlighted in chapter 3, the contribution of LRAs to the EU space policy process derives from LRAs being viewed as end-users of space products and services in their daily operations; and from their playing the role of technology intermediaries, by specifying the requirements that must be addressed by such products and services in order to manage their areas of competence and to respond to increasing requests for services by their citizens. Additionally, LRAs may contribute as depositories of competences in several of the ESP policy pillars, including environmental and security issues.

The Committee of the Regions (CoR), the Council of European Municipalities and Regions (CEMR), the European Confederation of Associations of Small and Medium-sized Enterprises (CEA-PME) and the European Economic and Social

Committee have all confirmed the added value that satellite information and services have in various policy fields and sectors.[16] However, it has been noted that there is insufficient awareness of the available services, of modalities to deploy them according to needs and requirements, and of the benefits gained compared to the resources required for their use.

Indeed, one of the most important obstacles for the development of the satellite services downstream market for LRAs is that the latter, for the time being, do not have a very clear view of the available satellite services and the specific benefits that these provide. Moreover, the majority of LRAs fail to benefit from innovative satellite information and services because of weaknesses in their operational structure that do not allow for a direct use of off-the-shelf space applications. In particular, there seems to be a gap between the research and development phase and the full-scale operational phase and, more importantly, research institutes and SMEs, along with LRAs, seem to find very limited (if any) support in the transition from one phase to the other. A possible solution, at the regional level, would be to fund relevant transition actions through the Structural Funds; however, LRAs have limited (if any) past experience in the coordination of actions between FPs and the Structural Funds. In this context, LRAs should capitalise on the experiences gained in other EC-funded programmes, such as LIFE+, promoting the implementation and demonstration of innovative activities (often the outcomes of FP or other research projects) by LRAs, and INTERREG, promoting the exchange of experiences often with the participation of universities and research centres. An important but not exhaustive role will continue to be played by existing networking initiatives such as NEREUS and Eurisy.

Similarly, the opening up of the space market to LRAs is impeded by the weak links between the space technology development groups and the user communities, which in turn should be attributed to: (i) the generalisation of a rather simplified approach to demonstration, involving technical demonstration projects that have been developed without the involvement of the user community; (ii) the lack of efficient policy coordination mechanisms within LRAs, failing to facilitate the integration of innovation into other public policies and objectives; (iii) difficulties in integrating satellite services within the local culture and specifically the traditionally used tools and services.

Cooperation between the space industry and LRAs is also inhibited by the procurement rules set by LRAs. Changing the procurement approach and presenting a more transparent system of public procurement rules can benefit both sides from a bureaucratic and economic point of view, so LRAs should

[16] Eurisy (2010d).

accordingly use their procurement mechanisms to encourage demand for innovative space products and services.

An important step towards improving collaboration between LRAs (public sector) and the private sector is to successfully translate end-user needs into requirements for a product or service, which is difficult to achieve by simply asking the end-user to provide the requirements. Rather, addressing the needs should not be referred to one specific product or solution, but should be achieved through a long-lasting relationship that springs from the mutual needs of both the LRAs and the private sector. Through space technology clusters, for example, regions establish the basis for a long-term collaboration with SMEs that provides the backbone of space technology innovation and product development. Another example of cooperation is provided by the development of GMES and Galileo technologies that are driven by the requirements of the user segment, notably LRAs; this has created opportunities for cooperation between LRAs and SMEs, providing the former with products catering for the wide variety of needs, and the latter with funding to produce new and innovative solutions. Supporting LRAs' demands for satellite services will ensure an initial return on investment for GMES and Galileo and subsequently for other satellite-based services and products.

The future European Space Budget should enable demand-support measures focusing on end-user communities without cutting down on resources foreseen for the development of new applications and services by the industry. It is therefore necessary to fully take into account local/regional public administrations and private businesses as potential final users of satellite services either alone or in joint cooperation. This will enable them to access vital satellite services, creating a strong societal pull and eventually a healthy and self-sustained market ensuring Europe’s continued leadership in the strategic space sector. The above requires the mobilisation of private capital for the benefit of space programmes with a guarantee of investment return.

Finally, the definition of the role of LRAs as an end-user of satellite services requires clarification. The term ‘end-user’ is differently interpreted since every actor along the added-value chain is the ‘user’ of another upstream actor. It is therefore clear that there is a need to ‘locate’ LRAs along the value chain, since, depending on their position, they may be ‘end-users’, ‘promoters’, ‘intermediaries’ or even ‘developers’ within, for example, FP projects.

5 Appendix I – References

Committee on Methods for Estimating Greenhouse Gas Emissions, Board on Atmospheric Sciences and Climate, Division on Earth and Life Studies, National Research Council (2010), Verifying Greenhouse Gas Emissions: Methods to Support International Climate Agreements. The National Academia Press, Washington D.C., 2010.

Council of The European Union (2009), Council Resolution on the contribution of space to innovation and competitiveness in the context of the European Recovery Plan, and further steps. Outcome of Proceedings – Competitiveness Council of 29 May 2009, Council of the European Union, 29 May 2009, Brussels.

Council of The European Union (2008), Council Resolution – Taking Forward the European Space Policy – Adoption. Outcome of Proceedings – Competitiveness Council of 25-26 September 2008, Council of the European Union, 29 September 2008, Brussels.

Durao Barroso J.M. (2009), The Ambitions of Europe in Space. SPEECH/09/476, Conference on European Space Policy, 15 October 2009, Brussels.

ERA-STAR Regions (2004), ERA – Space Technologies Applications & Research for the Regions and medium-sized Countries, 2004.

Eurisy (2010a), Eurisy Accompanies User Communities in Making the Most of Satellite Information and Services. Mission statement, Eurisy website.

Eurisy (2010b), Creating Sufficient User Pull to Secure the Benefits of Satellite Services for Society. Eurisy Position Paper, October 2010.

Eurisy (2010c), Eurisy Local and Regional Authorities Support Initiative. Eurisy website.

Eurisy (2010d), Securing the Benefits of Satellite Services for European Society. Conference, Brussels, 19 November 2010.

Eurisy (2008), For a facilitated access for Local and Regional Authorities to the benefits of Satellite Information and Services. Position Paper, September 2008.

Europe INNOVA website.

European Commission (2010), GMES website.

European Commission (2010a), Action Plan on Global Navigation Satellite System (GNSS) Applications, Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. COM(2010) 308 final, 14 June 2010, Brussels.

European Commission (2010b), Summary of the impact assessment – accompanying document to the Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions 'Action Plan on Global Navigation Satellite System (GNSS) Applications'. Commission working paper, SEC (2010) 716 final, 14 June 2010, Brussels.

European Commission (2008), European Space Policy Progress Report, Commission working document, 11 September 2008, Brussels.

European Commission (2007), European Space Policy, Communication from the Commission to the Council and the European Parliament. COM(2007) 212 final, 26 April 2007, Brussels.

European Geostationary Navigation Overlay Service Portal (2010), About EGNOS. EGNOS Portal, 2010.

European Parliament (2008), European Parliament Resolution on the European Space Policy: how to bring space down to Earth. 20 November 2008, P6_TA(2008)0564.

European Space Agency (2010), History. Envisat Website, ESA, 2010.

European Space Agency (2010), Objectives. Envisat Website, ESA, 2010.

GEOLAND2 (2010), GMES Land Monitoring Service Pre-Operational Concept.

GSA (2010), What is EGNOS? GSA – EGNOS Website, GSA, 2010.

MACC (2010), GMES Atmosphere Monitoring Service Pre-Operational Concept.

MyOcean (2010), GMES Marine Monitoring Service Pre-Operational Concept.

NEREUS (2009), NEREUS Position Paper – A regional approach to the European Global Navigation Satellite System (GNSS) programme. NEREUS Working Group on GNSS, 16 November 2009.

NEREUS (2010a), NEREUS Mission Statement.

NEREUS (2010b), Charter on the Creation and the Implementation of NEREUS, the Network of European Regions Using Space Technologies. Nereus Political Charter.

SAFER (2010), GMES Emergency Monitoring Service Pre-Operational Concept.

7th Space Council (2010), Global Challenges: Taking full benefit of European space systems. 7th Space Council Resolution, 25 November 2010, Brussels.

Verhoef P. (2010), Space Conference – A new space policy for Europe. Keynote Speech, 26 – 27 October 2010, Brussels.