

# STEPHANIE

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European Union  
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# STEPHANIE: Space TEchnology with PHotonics for market and societal challenges



## Space technologies based on photonics are considered as one of Europe's areas of key industrial competence.

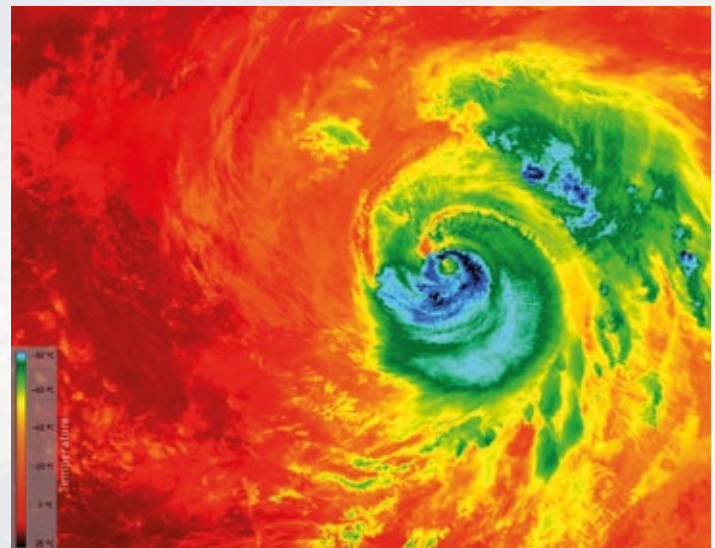
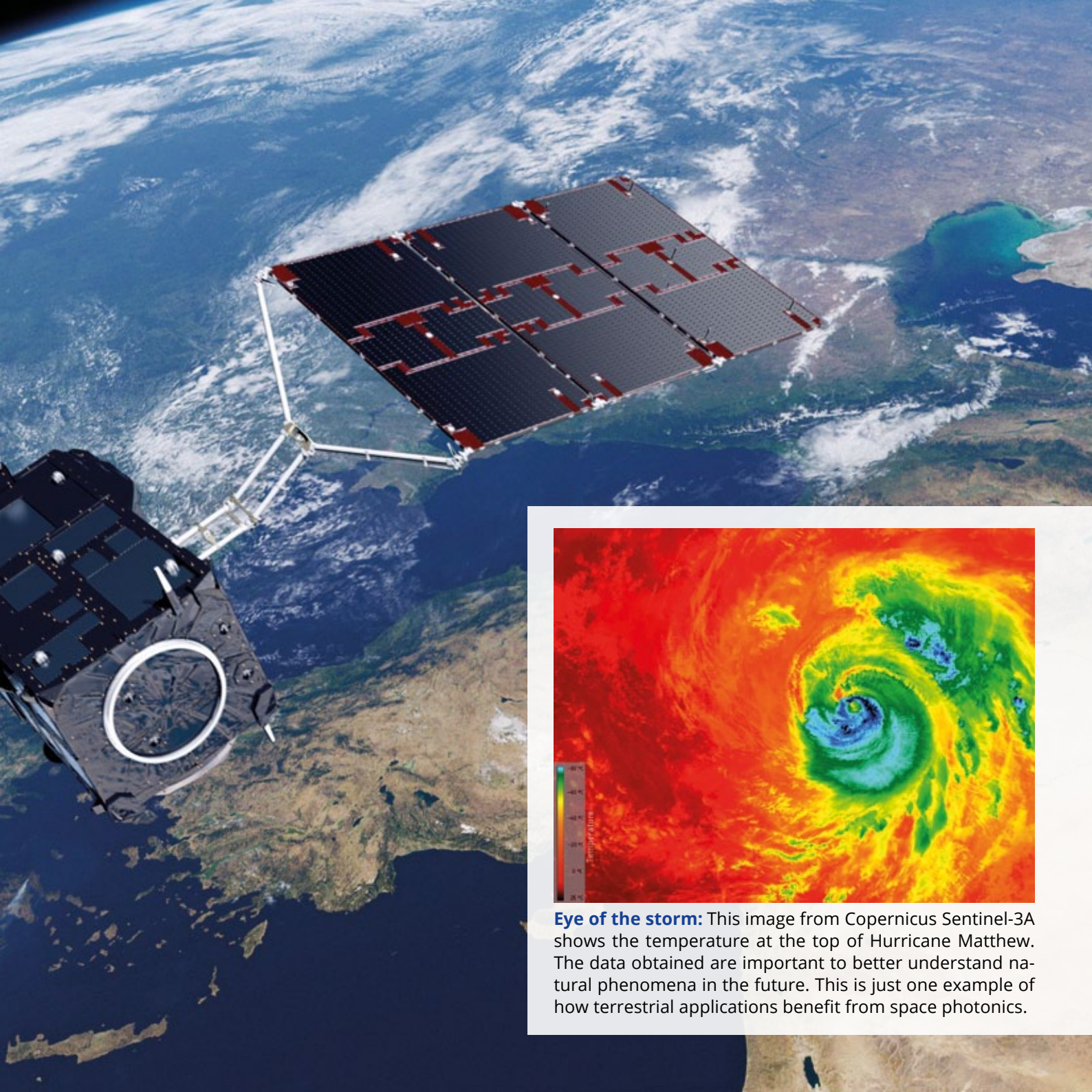
They have huge potential to address a number of today's grand societal challenges, in particular health and wellbeing, climate action and secure societies. However, this potential will be wasted if public policy fails to address the gap between space research and its application on the ground. A long-term challenge is to ensure that R&I investments exploit the opportunities offered by space (e.g. huge availability of data) by ensuring that applications and services are produced to address societal challenges and that they reach the market.

## Project Objectives

The Interreg Europe project STEPHANIE groups together 8 partners from 7 European regions to improve regional innovation policies towards a more effective use of R&I in space technology based on photonics to develop products with strong market potential and capacity to address socio-environmental challenges.

## The immediate objectives of STEPHANIE are:

- to promote the involvement of stakeholders in the inter-regional learning process through the creation of local stakeholder groups,
- to develop regional visions for a better understanding of challenges and opportunities of regional R&I policies applied to photonics-based space technology,
- to identify and share regional Good Practices related to policy instruments supporting product developments and services with market potential and addressing socio-environmental challenges,
- to prepare, apply and monitor regional Action Plans for integrating and deploying Good Practices in the space technology sector.



**Eye of the storm:** This image from Copernicus Sentinel-3A shows the temperature at the top of Hurricane Matthew. The data obtained are important to better understand natural phenomena in the future. This is just one example of how terrestrial applications benefit from space photonics.

**Coordinated actions** for improving **regional**  
**innovation strategies**





STEPHANIE brings together regional Space and Technology Innovation Actors (SPIA) to exchange ideas and experiences on policy models. The approach is designed to improve innovation delivery in the field of photonics-based space technology by addressing two main policy challenges:

- Quadruple helix cooperation of academia, industry, government and users along the technology value chain at regional and interregional level.
- Strengthening of existing and new regional and international funding schemes and simplification of access and administration.

### **Project Road Map**

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#### **Phase 1 – Sharing Solutions and Development of Action Plans**

**(01.2017 to 12.2019)**

- Exchange of experience on challenges, needs, current strategies and good practices.
- In-depth analysis of Good Practices and their potential for transfer.
- Drafting of recommendations for regional policy action.
- Development of Action Plans.

#### **Phase 2 – Implementation and Monitoring**

**(01.2020 to 12.2021)**

- Implementation and monitoring of regional action plans.
- Finalising the monitoring activities and summarising the results.

# Eight partners identifying good practices in seven European regions

## 1 Tuscany (Italy)



'Nello Carrara' Institute of Applied Physics - National Research Council of Italy (Lead Partner)

REGIONE  
TOSCANA



Regional Government of Tuscany

## 2 Prague (Czech Republic)



City of Prague

## 3 Bretagne (France)



Photonics Bretagne

## 4 North Rhine-Westphalia (Germany)



NanoMicroMaterials-Photonics.NRW Cluster of NMWP Management GmbH

## 5 Andalusia (Spain)



Andalusian Foundation for Aerospace Development - Center for Advanced Aerospace Technologies

## 6 Durham County (United Kingdom)



Durham County Council



## 7 Wallonia (Belgium)



Liège Space Centre - University of Liège





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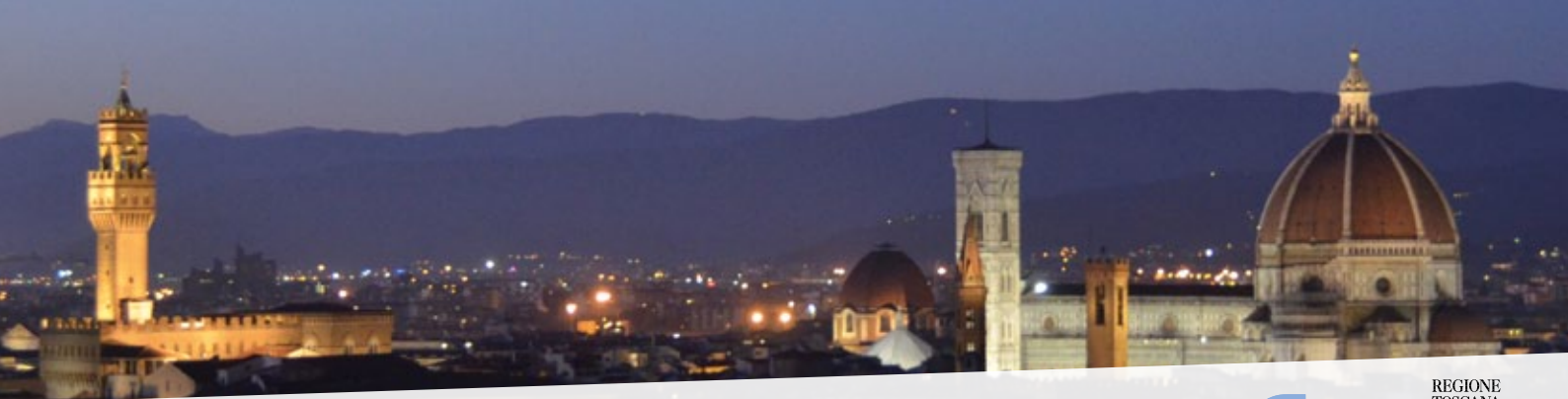
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## 40 years of experience in space and a regional government build a source for promoting technology transfer in Tuscany

The “Nello Carrara” Institute of Applied Physics (IFAC) is part of the National Research Council (CNR), which is the main public organisation pursuing research and innovation in Italy. Its main aim is to carry out frontier research and to

develop new technologies and methodologies in different fields. The main research areas are optoelectronics, spectroscopy and ICT. Research mainly focuses on sensors, remote sensing, laser technology, micro optics, microwaves, and image and signal processing. IFAC owns a 40-year experience in the Space sector, with the development of breadboards, level 1 and level 2 procedures, product-oriented algorithms, calibration and validation activities. IFAC contributes to research and innovation programs at international, national and regional (i.e. Tuscany) level in the Space sector, collaborating also with the Italian Space Agency (ASI), the European Space Agencies (ESA) and other space agencies, such as: CNES, NASA, JAXA.



### The Regional Vision in Tuscany

The Regional Government (RG) of Tuscany is in charge of the management of funding of ERDF ROP 2014-2020. The Department „Politiche di sostegno alle imprese“ works closely with the RG of Tuscany ERDF-ROP Managing Authority in implementing regional policies in areas of



## QUADRUPLE HELIX

### Needs

- Define the end-user (often not homogenous and widely distributed in the region)
- Identify what photonics can offer to end-users
- Identify indicators for benefits and results
- Find large companies that can act as catalysers
- Attract more companies, also from outside the region
- Find a common language among different actors

### Barriers

- End-users involvement is still a barrier
- Fragmentation of the productive fabric, which features only few large companies able to tow the small companies
- Limited involvement of small companies in clustering actions
- Lack of methods to get the needs from end-users
- Lack of common indicators to evaluate project performance

„smart specialisation“, such as photonics and space technologies. This is involved at national level in the definition of the national Space Economy Strategic Plan. Particularly, the ERDF ROP Axis 1 is about „Strengthen RTD and Innovation“, that is a significant tool for technological development. Tuscany can boast scientific excellence in the photonics research ecosystem, a unique reality at national level and one of the few European centres of excellence in the field, in terms of critical mass, technological fields, and of value of major research and industrial development centres, academic centres of excellence and Small- and Medium-sized Enterprises (SMEs). Over the last two decades, the RG of Tuscany has invested in technology transfer in order to fill the gap between Research and Industry.

The structure of the space manufacturing sector in Tuscany reflects the national one: the Large Enterprises (LE) plays a strategic role on key technologies (in Tuscany, mainly optics and optoelectronics), while SMEs are mainly involved in the

## FUNDING SCHEMES

### Strengths

- Good collaboration between companies and research centres
- Funding schemes at regional level offering new opportunities for SMEs
- Presence of strong research and education centres in the regional territory
- Funding schemes at regional level offer the opportunity of paying non-recurrent activities for large companies

### Weaknesses

- Lack of continuity of funding
- Small or no national support
- Space is often funded at international/national level, with local funding lagging behind
- High level bureaucracy
- Low level of funding rate
- In interregional funding schemes, different rules from one country to another
- Slow evaluation process for technological delivery

design and development of payload components. Several Research Centres and Universities are active in the space sector. In Tuscany, the only Space sector has a turnover of over 210 million Euros, with almost 1,000 employees, while the overall Space sector in Italy accounts for about 1,500 million euros and 7,000 employees (figures from ASI).

Starting from the analysis of the regional context of Research & Innovation (R&I) policies looking at Quadruple Helix (QH) development, as well as available funding schemes (FS), the Tuscany Regional Vision (RV) has been outlined with the involvement of key local stakeholders (LEs, SMEs, research centres, Public Administrations and end-users).

The regional regulatory context towards an effective use of R&I has gone through the establishment of Innovation Poles first, then through the Districts and, recently, through the Advanced Manufacturing 4.0 district, which includes Space.

Based on a bottom-up approach, the Innovation Poles gathered representatives from the QH, working together to develop the Smart Specialisation Strategy (RIS3). RIS3 was set up and main priorities identified, with a specific roadmap for space with photonics technology. The Advanced Manufacturing 4.0 district is now upgrading the RIS3 through a SWOT analysis for the sector.

The FS available for Space, typically comprehended under broader subjects (e.g. Photonics), are:

- POR ERDF 2014/2020- R&D Calls, to provide support for R&I in enterprises.
- ERANET-Plus/Cofund projects: joint initiatives among selected EU countries and regions.
- Other calls for MSMEs: innovative start-ups, micro-innovations and innovative projects.

One of the major limitations, intrinsic to this sector, is its strong dependence on public budgets, also due to the large investment often required for meaningful advance, and possible market bias introduced by international strong competitors.



Hyperspectral image simulations over the Florentine area.

From the analysis of needs and barriers faced by QH actors, and strengths and weaknesses characterising FS, a critical analysis and reflection about “Main Ideas” to tackle those results has been developed to build the RV. The Tuscany RV is oriented towards:

- enhancing the collaboration among QH actors through participation in H2020 Public-Private-Partnership initiatives;
- enhancing the involvement of all QH actors, especially SMEs, by organising targeted workshops;
- identifying end-users and creating a shared simplified language;
- limiting the high level of bureaucracy during application phases of FS through the identification of an “ideal” FS (simple, fast and effective);
- supporting SMEs to access ambitious and competitive Programmes (i.e. H2020) by promoting lean, fast financial support for EU proposals;
- promoting the involvement of end-users in space applications.

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VERITÀ  
PER  
GIULIO  
REGENI



## The City of Prague - the centre for education and innovation within the Czech Republic

Prague is the capital city of the Czech Republic and the centre of politics, international relations, education, culture and

the economy of the country. It is the seat of the supreme legislative, administrative and political bodies of the state. For many years, Prague has also been the centre of education and innovation in the whole Central European region. There are nine public universities and thirty six private universities located in the city. It is also the seat of 39 out of 54 institutes of the Czech Academy of Sciences, which is a main actor in Czech basic research together with both major institutes (Institute of Physics, Institute of Photonics and Electronics, Astronomical Institute) which are also located in Prague. There are ten public research institutes, many business incubators and large hospitals performing world-class research and development activities. Therefore, the City of Prague has extensive experience in designing and implementing policy in the R&D field. For instance, with a specific focus on space technologies, it has launched the centre for business support – the Prague Start-up Centre - focusing besides other fields also on space technologies (ESA Innovation centre) with an aim to bring together stakeholders from the private, public and academic spheres. There are other stakeholders in space technology sector such as Global Navigation Satellite Systems Agency – GSA or Czech Space Office.



## QUADRUPLE HELIX

### Needs

- Strengthen national position of The Czech Rep. in ESA; Better coordination/focusing of space activities; Set up condition for more effective technology transfer; Increase the participation of Czech organisations in EU projects (ESA, H2020); Better PR of space activities.

### Barriers

- Low national ESA payments to volunteering activities; Lack of cooperation between public research organisation and business organisations; Administrative burden of EU/ESA project for micro SMEs/SMEs; Technology development often stops in lower TRL stages.

## FUNDING SCHEMES

### Strengths

- Photonics is included in national S3/key enabling technology document; The Czech Rep. is a member of key sector organisations – ESA, EUMETSAT, ESO; Operational programmes are strongly focused on support of intersectoral cooperation; H2020 provides strong funding to space technology sector.

### Weaknesses

- Public research funding scheme does not motivate to intersectoral projects, applied research outputs; Low intensity of public R&D funding from private business sector; Administrative burden and insufficient flexibility related to the project implementation in operational programmes.

## The Regional Vision in Prague


Prague City is the important regional public authority with annual budget ca 2.7 bill EUR. Prague City established its own strategic office – Prague Institute of Planning and Development (<http://en.iprpraha.cz/>), which is in charge of setting up the S3 strategy compilation and actualization. The Prague City distributes the public funding to research and development activities (R&D) –the Prague Operational Programme is the main financial tool in that R&D sector. The operational programme is focused on these main pillars in R&D (Priority Axes I): i) intersectoral cooperation; ii) innovative demand of public sector (public procurement of innovation concept); iii) support of development of the innovative companies incl. science parks and incubators; iv) targeted support of innovative start-ups. There have been allocated nearly 112.5 mil € of public funding in those priority axes.




So Prague region has many strengths (broad expertise in space technologies; strong public funding in R&D, qualified employees) and also opportunities (GSA seat in Prague, ESA technology transfer broker) in space technology sector. The main goal is to connect these major stakeholders and provide them effective framework for long term activities and cooperation in space technology projects. The overall profit from these projects would be not only in the sector itself but could help to bring new innovative technologies closer to the market to the end users in Prague region.

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## A strong community of photonics related industry and institutes, represented by an Innovation Hub in Lannion

The Brittany region has a strong community of photonics related industry and research labs. Photonics is identified as a sub-topic of the domain “Advanced technologies for industrial applications” in the Bretagne RIS-3 published in October 2013.

The RIS-3 identifies seven strategic innovation domains:

- Social innovation for an open and creative society
- Sustainable food-chain for quality alimentation
- Maritime activities for a blue growth
- Technologies for the digital society
- Health and well-being for an improved quality of life
- Advanced technologies for industrial applications
- Ecology and energy observation and engineering for the environment

Photonics in Brittany is represented by Photonics Bretagne, a Photonics Innovation Hub located in Lannion (Brittany, France) integrating a cluster supporting innovation in the field of Photonics and its applications, and a research and technology organisation (RTO) expert in the development of specialty optical fibres and components. The cluster supports industrial and technological development of its members (more than 100 including companies, research

centres and schools) in order to generate economic growth and create jobs in Photonics, in Brittany.

While primarily connected to the Photonics companies, Photonics Bretagne has also the objective to reach the numerous end-users that are present in the region and beyond. Photonics, also known as the electronics of the 21st century, finds indeed applications in a vast array of business sectors ranging from telecom, agro-food, defense, industrial manufacturing, to smart lighting, self-driving car, submarine sensors and obviously space!

Photonics Bretagne has initiated the creation of a Photonics Park in Lannion. Located in a unique environment dedicated to Photonics, it aims at fostering technology transfer to local companies and more generally growth of the photonics business, already quite high (>15% per year), in the region. This new Photonics Park is a major project for Lannion and more broadly for the Brittany region traditionally anchored in the Photonics industry with numerous worldwide leaders in the field (Keopsys-Quantel, Ixblue, EXFO, Oxsius, Idil, Ekinops...), a large offer of photonics degrees from dedicated BSc to doctorate and also well-known CNRS research centres nearby. It also fosters the

## QUADRUPLE HELIX

### Needs

- No big players in Space applications so there is some needs to build bridges between local Photonics actors and end-users from other regions.
- More collaborative projects to facilitate the transfer of technology and the link between R&D labs, Tech companies and the end-users.

### Barriers

- Difficult to involve companies, citizens to define the funding tools in such a long term process.
- Difficulty to measure the outcome of the policies and funding at regional level.

## FUNDING SCHEMES

### Strengths

- A lot of small SMEs in Photonics.
- The region is focused with a clear/written strategy with specific S3 domains, including photonics.
- A brand new Photonics Park and a Photonics Innovation Hub very active to build bridges and reach the companies.

### Weaknesses

- No end-users in Space application
- No specific funding schemes on Space application or Photonics
- Photonics for Space application is a high-value domain but still a bit narrow to have specific calls at regional levels.
- No calls are currently suitable for interregional collaborations.

launch of start-ups and facilitates foreign investment looking to benefit from the vicinity of these first-class facilities.

On the other end, Space is not a domain identified in the S3 of the Brittany region. However, a lot of Photonics companies/labs works on space related applications with end users located outside the region.

## The Regional Vision in Brittany


Our regional vision devised during the first part of the project Stephanie made clear that a better connection between the world-class photonic ecosystem of Brittany with their European counterparts in the space application is a main challenge. It is clear that photonics for space is a high-value domain but also a relatively narrow field implying a lot of high technology that is usually not present in a single region.




Interregional collaboration is then key to build bridges between the SMEs and labs providing the high-tech photonics components/systems and the end-users in the space industry. Building interregional calls would then definitely improve the development of photonics projects for space application at European level and facilitate the emergence of disruptive innovation to keep the international lead in the domain!

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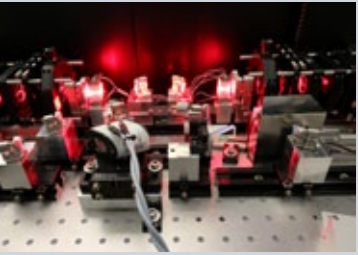


# Innovative photonic solutions for space applications – made in North Rhine-Westphalia

North Rhine-Westphalia (NRW) is Germany's No. 1 industrial region. Of Germany's top 100 corporations, about one third are based in North Rhine-Westphalia. At the same time,

NRW is not only the home of large companies; it also hosts a significant small and medium business sector. SMEs account for 99 percent of business enterprises, 70 percent of employees and over 80 percent of trainees.

The Regional Operational Programme EFRE.NRW 'Growth and Employment' 2014-2020 aims at improving the competitiveness and adaptability of the NRW economy, creating employment and promoting integration.



Laboratory demonstrator of a diode-pumped alexandrite laser for climate-relevant measurements at high altitude in the atmosphere.

© Picture: Fraunhofer Institute for Laser Technology ILT, Aachen

To achieve these goals, the Programme concentrates on three thematic subject areas (Priority axis) and a fourth 'mixed' axis:

- Strengthening research, technological development and innovation
- Improving the competitiveness of SME

- Supporting measures to reduce CO<sub>2</sub> emissions
- Sustainable urban development and town planning / Prevention

The Programme is based on the Regional Innovation Strategy, which merges NRW's research strategy, lead market strategy and transfer strategy into one joint concept and focuses on selected areas of activity to address a number of today's societal challenges.

Fields of activity, which are of relevance to key enabling technologies, can only be pointed out exemplarily.

They include:

- Laser based material processing
- Lighting devices for general and automotive applications
- Microsystems, materials and photonics for innovative approaches in production technology.
- Nano/micro technologies and new materials for environmental protection
- Advanced materials for an improved energy and resource efficiency
- Organic electronics for photovoltaic applications
- New materials for innovative applications in semiconductor electronics
- Lightweight construction based on advanced materials



## QUADRUPLE HELIX

### Needs

- Comprehensive overview of existing technologies and applications
- Extension from peace production to batch processes
- Strengthen of education and training

### Barriers

- Lack of regional system integrator as a technological beacon
- Value chains are organised nationally or internationally
- Market entry is too complex and barriers are too high

## FUNDING SCHEMES

### Strengths

- Networking in special sectors is already established
- Established technologies could be transferred from traditional branches
- Well-established structure of public & private investors

### Weaknesses

- Lack of well-known system integrator company
- Markets / Businesses in the space sector are very risky
- Space technology is not foreseen as application market in regional funding schemes

Within the field of photonics and space research and technology NRW is characterised by many universities, research institutes, companies and administrative facilities. They cover many aspects of space technologies, photonics and data analysis, especially in laser-based production technology, lightweight construction and material engineering as well in inspection technologies and vision systems.

## The Regional Vision in North Rhine-Westphalia

As a result of a SWOT analysis, several challenges have been identified that need to be overcome to strengthen this industry:

Many companies (mostly SMEs), working as component suppliers, have been identified with customers in the field of space technology applications. What is lacking are final system integrators. The most important task will be to support the integration of space photonics technologies in traditional applications and the transfer from know-how of traditional technologies in space applications.

Therefore, mutual awareness in science and business should be supported by virtual and real platforms, where companies and research groups can interact and share


their knowledge. New business models based on earth observation and space mission data offer new markets for start-ups and well-established companies. Many activities must be supported at the beginning by public programs as well as public / private venture capitalists.




The NanoMicroMaterialsPhotonic.NRW state cluster is a public service body, located in Düsseldorf and was set up in 2009 as part of the excellence initiative organised by the North Rhine-Westphalian state government, aiming at consolidating NRW's position in the fields of nanotechnology, microtechnology, new materials and photonics. Hence NMWP.NRW acts as a network for organisations from industry and commerce, science and politics. Specifically, it also supports cooperation ventures between the industry, research and authorities in North Rhine-Westphalia.

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## Andalusia – the versatile center for innovations in the aerospace sector in Spain

The Andalusian Foundation for Aerospace Progress (FADA) is a non-profit foundation constituted in January 2007. Its purpose is the impulse, the development and the promotion of R&D activities to foment the economic development of the aerospace sector in Andalusia, and to promote the generation and exploitation of new knowledge and technologies. FADA manages the advanced Center for Aerospace Technologies (CATEC) and the associated technological infrastructure, called ATLAS, a flight testing laboratory for unmanned Aircraft Systems (UAS).

The implementation of CATEC contributes in an outstanding way to the improvement of the competitiveness of the companies of the sector, by means of the impulse of the creation of knowledge, the management of the intellectual property of the R&D and the technological innovation. CATEC develops an important work of cooperation with the university and the industry, especially supporting the SMEs of the sector. It works hard to achieve an effective technological vigilance of the aerospace sector, giving also a special importance to its policy of strategic alliances and technological consortia to give rise to the most efficient use of the available capacities.

### The Regional Vision in Andalusia

The Spanish aerospace industry is the fifth in Europe in terms of turnover (9,700 million € in year 2015) and employment (more than 54,400 employees in year 2015). The industry turnover has grown 3.2% in year 2015 and almost 100% over the last decade (since year 2006). It represents 0.7% of the Spanish GDP and 5.8% of the Spanish industrial GDP.

#### Spanish aerospace cluster

The Andalusian Aerospace Hélice Cluster is a business aerospace group established in 2004 with the aim of promoting the development of the aerospace sector in Andalusia and the growth of its member companies; in the same way it acts as a catalytic converter to foster R&D within the Andalusian aerospace cluster. The Andalusian Aerospace industry in general was composed by 117 companies in 2016. The companies by main activity are services, engineering & consulting and metallic parts processes.

## QUADRUPLE HELIX

### Needs

- Create a photonics ecosystem: Regional Innovation cluster.
- Find big companies that can catalyze the cooperation quadruple helix.
- No quantitative and qualitative monitoring tool.
- Involve more SMEs.

### Barriers

- Small number of innovative private companies.
- Small size of Andalusian SME's.
- Less Regional investment in Research and Innovation.

In 2016 the turnover was of €2,399 million and created 723 new jobs (raising a total of 14.463), sales raised 2.4% and employment the 5.3%, according to the 'Aerospace Annual Report 2016', carried out by HÉLICE Cluster. It can be observed that the Andalusian aerospace sector continues growing, representing 1,62% of the Andalusian GDP (€148.468 million). Over the last 10 years, the companies in the Cluster earmarked a total accumulated investment of €1.431 million for R&D, most of which (88%) was self-financed.

#### Photonic sector in Spain

The photonic sector in Andalusia and Spain is based on a very solid scientific base and a well-trained and recognized human capital, referring to the international level. However, the research effort is not channeled into the development of products and services that meet the requirements of the market.

There is a Spanish Photonics platform called 'Fotonica 21' located in Valencia and other consolidated initiatives in other regions such the Photonics cluster 'SECPHO' in Barce-

## FUNDING SCHEMES

### Strengths

- Collaboration between Companies and Research centers & Universities
- The Andalusian Government promotes Photonics technology as a Key Enable Technology (KET)
- Extensive experience in managing Funding schemes
- Andalusia is ERDF region
- Network of scientific and technological infrastructures.

### Weaknesses

- High level of bureaucracy during application phase.
- Slow evaluation process realized by authorities.
- H2020 Program is too ambitious and competitive for SME's.
- Situation of Andalusia (South European Union) impeded the formation of consortium easily.
- Lack of continuing of Grants.

lona. Some technological forums begin covering more and more the topic of photonics paving the way to some more understanding of the technology. In Andalusia, there is no presence of any Regional Innovation Cluster and the applicability of this technology and its potential to respond to the main challenges we face is large, representing a good opportunity for the region to consolidate its position.

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Business B  
Durham D



## A rich level of experience and a vivid infrastructure as drivers for economic growth – that's Durham

Business Durham is the economic development organisation for County Durham, delivering the environment for business and economic growth. As part Durham County Council, the local authority for the county, Business Durham works directly with local businesses and a range of partners in the public, academic and business support sectors to help innovate, maximise business opportunities and tackle some of the challenges that businesses face.

The organisation has a rich level of experience in engaging with technology firms including university spin out companies through its science park, NETPark in Sedgefield, various local engineering and manufacturing businesses, and Durham University – an university which has a high reputation for a number of disciplines including physics and astronomy. The county is also host to the Centre for Process Innovation which has expertise and capabilities to support businesses in printable electronics, formulations and some areas of photonics.

Government-led investments in R&D in photonics in the UK space sector are primarily, although not exclusively, through academic research councils, Innovate UK via programmes such as the Emerging and Technology strand, Centre for

Earth Observation Instrumentation and UK Space Agency.

### The Regional Vision in Durham

The regional vision that has been developed draws from the views of various stakeholders from within the North East region.

The current limitations that should and can be improved are largely within the scope of the STEPHANIE project; these relate to:

- Better connection of the stakeholders in the quadruple helix value chain. As some of the key participants may be leading in their field of research and may be recognised as such by their peers, other stakeholders in the helix may not be aware of their existence or commercial potential. While some established participants may have a good understanding and appreciation of the advancement of photonics in space technologies, there is a lack of engagement from businesses which have not entered

## QUADRUPLE HELIX

### Needs

- Getting the policy influencers and primes to discuss and consider the sector
- More funding from government to help establish the sector for more companies, end users and researchers
- Need to raise the profile of available funds as not enough new businesses or researchers applying
- Raising the profile of photonics activity in relation to space.
- Improve processes for spin out/technology transfer for universities

### Barriers

- End users not engaged very much at any point in research and development, product development or funding
- Lack of desire from government, industry or research to engage end users in the sector
- Business focussed on 'the now' as they need a product/service which will generate cash in the short term
- R & D risky in the sector as large financial and knowledge resource required with a long wait time for income generation

or explored opportunities in the space sector. The poor connection between primes and smaller players can also be improved to maximise the adoption of the state of the art.

- Understanding of the funding routes and availability, particularly by businesses that are not traditionally in the space sector but have capabilities and R&D which can be capitalised in the sector.
- Better understanding of the availability of workforce across the value chain to take maximise the potential of commercialising photonics in the space sector.
- New instrumentation fabrication using advanced manufacturing techniques (AMT). This will help to solve existing engineering and manufacturing challenges (limitations) as well as opening up new avenues and techniques for innovation.

## FUNDING SCHEMES

### Strengths

- Universities are a strong resource to support R & D
- Many funds are very specific to the industry which means there is a strong chance of successful bids
- Knowledge Transfer Network are there to support in engaging companies with funds
- The region has 5 universities to support business and provide the workforce of the future and the entrepreneurs of the future

### Weaknesses

- Most funds are not specific to the industry and therefore small chance of winning bids
- There is lack of unity across investment in the sector – very disjointed
- Businesses struggle to cashflow R & D as it takes large volume of cash and a very slow return
- Universities have knowledge but in silos, which leads to multiple single points of failure

The ideas proposed within the regional vision help to address these limitations, and will be refined as the project progresses with the sharing of knowledge and best practice amongst the project partners.

### YOUR CONTACT IN DURHAM

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## A Centre of Excellence in optics for space systems in Liège

CSL, a Research Center owned by University of Liège, is focused on space systems for payloads and associated technologies.

CSL delivers a customized service from design to integration and calibration (on ground or in-flight). CSL elaborates solutions providing a unique expertise in system engineering, optics and thermal regulation.

CSL was the first Test Centre agreed by ESA for space harsh environment tests (cryogenics, vacuum, vibrations) in an ultraclean environment. The CSL technologies are also used in Collaborative Research projects, in partnership with space and non-space (e.g. medical) industries, in various technological fields as optical design and metrology (e.g. straylight management), surface engineering (e.g. optical coatings for sensors, SPR, ...), electronics solutions for

## QUADRUPLE HELIX

### Needs

The development of the Space and Photonics domains in Wallonia is in connection with different policies :

- Via a specific support of the Belgian government to ESA :
  - To industrial players in technological niches
  - For the promotion of scientific expertise
- Walloon Region : via Skywin, the aerospace Cluster in good intelligence and coordination with the federal space industry policy. The Photonics Cluster is now integrated in the services offered by AGORIA, the Belgian Technology Industry Federation.

### Barriers

- Necessity for coordinating between many actors

## FUNDING SCHEMES

### Strengths

- Strong dynamism regarding the collaboration between industrials, universities and research centers.
- At the Regional level, the policy objectives are pursuing the reindustrialisation of Wallonia; the budget is 2,9 billion EUR (2015-2019).
- The Competitiveness Clusters act to support the development of granted projects in a "R&D, training and investment triangle" context.
- Experience in transregional initiative : ERA-STAR Regions (ERANet project for Space networking)

### Weaknesses

- Different policies (from federal and regional levels)
- Different "support initiatives" dedicated to particular technologies (space / photonics)

harsh environment (radiation), Additive Manufacturing techniques, radar image processing for geomatics industry. In aeronautics, CSL is specialized in Non Destructive Testing techniques based on laser applications, shearography, thermography, laser ultrasounds methods.


## The Regional Vision in Wallonia

The Stephanie project also involves the Competitiveness Clustering Policy of the Walloon Region, without forgetting that the policy for Space remains the competency of the Belgium State. In that frame, the contacts are organised mainly with SKYWIN, the aerospace Competitiveness Cluster and more specifically its Space segment Wallonie Espace.

## YOUR CONTACT IN WALLONIA

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# Get! involved.

If YOU **represent** a

- Regional /Local authority
- Technology network, Business cluster and/or Support structure
- Company / Enterprise
- R&D centre
- Industry association
- Chamber of commerce
- Banking and finance institution
- Venture capital company and/or Private equity fund
- Technology user

interested or engaging in space technology and photonics – then become an active part of the STEPHANIE project and help shape the future of Europe's high-tech infrastructure with your experience and expertise!

Join today, share your experience to progress future innovation strategies. Find your regional project partner here:  
**[www.InterregEurope.eu/stephanie](http://www.InterregEurope.eu/stephanie)**

## The Interreg Programme

- Also known as European Territorial Cooperation (ETC), represents one of the two goals of European cohesion policy.
- Funded by the European Commission through the European Regional Development Fund (ERDF).
- Provides a framework for the implementation of joint actions and policy.
- Exchanges experiences between national, regional and local actors from different member states.
- The overall objective is to promote a harmonious economic, social and territorial development of the European Union as a whole.
- Three strands of cooperation:
  - Cross-border (Interreg A)
  - Transnational (Interreg B)
  - Interregional (Interreg C)

## Interreg Europe

- Covers the 28 EU Member States plus Switzerland and Norway.
- Provides a framework for exchanging experience and good practice between regional and local bodies in different countries.
- ERDF contribution: EUR 359 million.

