



# WORKING FOR SUSTAINABLE GROWTH IN EUROPE'S REGIONS

## THE VALUE OF PUBLIC-PRIVATE PARTNERSHIPS

A PARLIAMENT MAGAZINE SPECIAL SUPPLEMENT



INNOVATING TO CREATE A PROSPEROUS EUROPE

**T**he European Union set up a number of Public Private Partnerships (PPPs), also known as Joint Undertakings (JUs), in 2007-2008 to drive innovation in key industrial sectors. Since their launch, these pioneering partnerships have delivered results that are both scientifically excellent and have applications in areas that are vital to Europe's competitiveness.

Now, PPPs are starting to demonstrate clear socio-economic benefits. In this supplement, you will learn about how seven JUs, partly funded by the EU, are providing sustainable economic growth in the regions of Europe through major technological innovations.

Clean Sky projects are contribut-

ing to the significant reduction of pollution and noise in the aviation sector. The Single European Sky ATM Research (SESAR) JU is delivering a catalogue of solutions to modernise European air traffic management, ensuring the sustainability of European air travel and aviation.

When it comes to electronic components and systems, ECSEL's forerunners, ARTEMIS and ENIAC, are delivering results with significant impact. One award-winning project developed technology that reduces energy use by up to 40 per cent by manufacturing electronic devices on silicon wafers thinner than paper.

The Fuel Cells and Hydrogen JU has sparked investment across the fuel cells and hydrogen industry, resulting in significant financing for

a large number of organisations.

In the health sector, projects from the Innovative Medicines Initiative (IMI) are delivering tools to speed up drug development, particularly in challenging areas such as brain disorders, diabetes and antimicrobial resistance.

Building on the success of older initiatives are two new PPPs set up in 2014. The Bio-based Industries (BBI) JU is aiming to use renewable natural resources and innovative technologies for greener everyday products. Shift2Rail, meanwhile, brings together key stakeholders in the rail sector with the goal of doubling the capacity of the European rail system and increasing its reliability and service quality by 50 per cent, while halving lifecycle costs. ★



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EDITORIAL

**General editorial enquiries**  
Tel: +32 (0)2 741 8221  
newsdesk@dods.eu

**Managing Editor**  
Brian Johnson  
Tel: +32 (0)2 741 8221  
brian.johnson@dods.eu

**Commissioning Editor**  
Rajnish Singh  
Tel: +32 (0)2 741 8225  
rajnish.singh@dods.eu

**Newsdesk team**  
Julie Levy-Abegnoli  
Tel: +32 (0)2 741 8219  
julie.levy-abegnoli@dods.eu

Colin Mackay  
Tel: +32 (0)2 741 8220  
colin.mackay@dods.eu

7th Floor, Rue du Trône 60,  
Brussels 1050

PRODUCTION

**Head of production**  
John Levers  
Tel: +44 (0)20 7593 5705

**Design**  
Matt Tittley  
Max Dubiel

ADVERTISING AND SPONSORSHIP SALES

**Publishing Director**  
Grant Hewston  
Tel: +44 (0)20 7593 5547  
grant.hewston@theparliament.com

**Sales Manager**  
Sandra Fernandez  
Tel: +44 (0)20 7593 5545  
sandra.fernandez@dods.eu

**Sales**  
Monica Barbosa  
Tel: +44 (0)20 7593 5544  
monica.barbosa@dods.eu

Nick Rougier  
Tel: +44 (0)20 7593 5688  
nick.rougier@dods.eu

Roisin Lynch  
Tel: +44 (0) 20 7593 5573  
roisin.lynch@dods.eu

Ausrine Juskeviciute  
Tel: +44 (0)207 593 5643  
ausrine.juskeviciute@dods.eu

MANAGEMENT

**Managing Director, Media**  
Richard Vize

**Subscriptions**  
Tel: +44 (0)1778 395 035  
dodssubs@warnersgroup.co.uk  
Annual subscription price: €120

www.theparliamentmagazine.eu

MEDIA PARTNERSHIPS AND MARKETING

marketing@dods.co.uk



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# The power of public-private partnerships

Public-private partnerships are an essential tool to fill the EU's investment gap, says **Markku Markkula**



**Markku Markkula** is President of the Committee of the Regions

Investment in Europe's regions and cities is essential for future sustainable growth, competitiveness and employment. Investment levels in the EU have dropped 15 per cent on average in the last decade. Compared with pre-crisis levels, the investment gap in the EU is estimated at €430bn. In practice, this gap is even bigger due to the increased knowledge and innovation potential. This is a major factor holding Europe back, hindering both long-term competitiveness and the more immediate task of getting growth back on track and creating jobs for young people. Local and regional authorities are crucial for relaunching investment with public-private partnerships (PPPs) representing a very attractive option for them.

In a fiscal context which continues to be challenging, leveraging private-sector resources for public investment makes good sense, provided the projects are carefully prepared and managed. Leveraging is the underlying principle of the Investment Plan

for Europe and its key instrument, the European Fund for Strategic Investment. However, there is still considerable scope for wider use of the PPP model, including in cities and regions, given their ability to draw in additional private capital for public investment projects, contribute to new management and implementation competences, while making optimal use of resources and increasing the quality and efficiency of public services.

On the other hand, such processes can be complex, necessitating specific competences and capacities from public authorities in comparison to traditional forms of procurement. For example, rigorous systems are needed for assessing value for money and classifying, quantifying and allocating risk. This is especially the case for smaller authorities who

experience difficulties to assemble and maintain the necessary expertise when they have infrequent recourse to PPPs. Complexity also arises from the fact that a PPP project often entails not just the design, construction and operation of a capital asset, but also the ongoing delivery of a public service to the required standard. Ensuring compatibility with EU state aid rules can also be challenging – the rules need to be renewed to attract more research and innovation elements in investments.

In short, the absence of the required knowledge, competences and capacities in regional and local government can be a significant obstacle to investment; especially with regards to PPPs. Planning capacity for innovative multidimensional and more complex projects is missing. As a result, projects that could be very attractive for all partners, both public and private, are not being realised and the badly needed public

services are either not provided or not to the quality levels that citizens rightfully expect. This is why each individual project needs to be robustly evaluated and show clear value for money when compared to other approaches.

In our drive to relaunch investment in Europe, the Committee of the Regions is working to identify and tackle the key obstacles to investment at the level of cities and regions, especially with respect to access finance, administrative challenges and lack of competences, unnecessary or unduly burdensome administrative or regulatory requirements. These will be reviewed in an opinion entitled "Bridging the Investment Gap – How to tackle the challenges", for which I am the rapporteur.

The right administrative capacities and processes, including sound innovative procurement, must be put in place now so that regions and cities can deliver on Europe's badly-needed infrastructure and public services. ★

## PUBLIC PRIVATE PARTNERSHIP

**"A PPP project often entails not just the design, construction and operation of a capital asset, but also the ongoing delivery of a public service to the required standard"**





GREEN TRANSPORT

**COLLABORATION BETWEEN THE COMMISSION AND INDUSTRY CAN HELP SPEED UP THE TRANSITION TO A GREENER TRANSPORT SYSTEM, SAYS HENRIK HOLOLEI**

Combined with regulatory initiatives, standardisation and adequate funding, innovation is a great asset in achieving a truly safe, competitive and resource efficient transport system. But research and innovation should not be limited to incremental improvements; it should also, where necessary, be disruptive and produce a real step-change compared to today's technologies and behaviours.

Recent experi-

ences in Joint Undertakings such as SESAR and Shift2Rail have demonstrated that the active collaboration of the Commission with industrial partners, on coherent result-oriented research and innovation programmes, can achieve a faster and cheaper transition to a more efficient and sustainable European transport system. ★



**Henrik Hololei** is Director-General of the European Commission's DG Mobility and Transport



FUNDING INNOVATION

**JOINT UNDERTAKINGS HELP LEVERAGE FURTHER INVESTMENT TO ALLOW FOR GROUND-BREAKING INNOVATION, WRITES ROBERT JAN-SMITS**

Some of the challenges facing Europe require strategic long-term partnerships. This is why the European Commission has set up a number of public-private partnerships – Joint Undertakings (JUs) – in key areas where Europe's competitiveness is at stake.

These partnerships bring a long-term commitment from the industry and as such leverage private funding. In addition, they trigger further investments to develop new technologies, products and services which will give European industry a leading position on world markets. The JUs have also proven to be effective addressing some of the

societal challenges Europe and the world are facing. An impressive example was the development of vaccines and medication under IMI (Innovative Medicines) during the Ebola outbreak. ★

**Robert Jan-Smits** is Director-General of the European Commission's DG Research and Innovation



HYDROGEN TECHNOLOGIES

**KEY PROJECTS COULD HELP SUPPORT THE ENERGY UNION SAYS DOMINIQUE RISTORI**

The Joint Undertakings are a means to support transnational cooperation in key areas where research and technological development can contribute to European competitiveness and quality of life.

DG Energy is directly involved and provides policy steering in line with the objectives of the energy union, whenever relevant in the area of energy efficiency, renewables and promotion of clean transport. One project in particular is the Fuel Cells and Hydrogen

Joint Undertaking (FCH JU), as hydrogen technologies are now becoming market ready and could therefore significantly contribute to a cost-efficient low-carbon energy system. Hydrogen technologies could integrate variable renewable power and capture synergies over several economic sectors, while supporting a global leadership of the European hydrogen industry.

Those partnerships can contribute towards economic growth, as they are expected to support competitiveness of sectors, open market opportunities for industry, deliver high quality jobs, develop closer synergies with national and regional programmes and encourage greater private investment in research and innovation. ★



**Dominique Ristori** is Director-General of the European Commission's DG Energy



NEXT GENERATION

**PUBLIC-PRIVATE PARTNERSHIPS HELP GENERATE THE NEXT GENERATION OF PRODUCTS TO BOOST EU COMPETITIVENESS, WRITES ROBERTO VIOLA**

The Digitising European Industry strategy reinforces the role of Public-Private Partnerships (PPPs) to focus on key technologies and their implementation through federated projects. Via the PPPs, the private sector has committed to mobilise investments three times greater than those coming from Horizon 2020, leading to a total investment of more than €20bn in digital technologies by 2020.

One of the key roles of the PPPs is to identify key research and innovation priorities in strategic areas like 5G, photonics, robotics, big data, high performance computing, manufacturing and electronics. These priorities serve as guidance to the Commission for the creation of the framework programmes, ensuring that they really fit stakeholders' needs.

This makes PPPs the centre of ecosystems for digital industrial innovation, capable of generating the next generation of digital-enhanced products and services needed to make EU competitive in a globalised digital economy. ★

**Roberto Viola** is Director-General of the European Commission's DG CONNECT



# Working with regions towards sustainable smart local growth

The Bio-based Industries Joint Undertaking provides a public-private partnership model for implementing the bio-based economy, particularly at local regional level, writes **Philippe Mengal**



**Philippe Mengal** is the Executive Director of the Bio-based Industries JU

**E**urope must transition towards a post-petroleum society, and the bioeconomy offers a viable alternative. The potential for green sustainable growth is enormous. The total European bioeconomy, including the food, feed, beverages and primary sectors in agriculture and forestry, is already worth €2.1 trillion in turnover and currently supports 18.3 million jobs.

There is no single bio-based industry sector, but bio-based industries, which means the non-food and beverage sectors excluding primary production, currently generate €600bn turnover for the European economy and provide 3.2 million jobs. However, the development of a coherent, commercially competitive European bio-based economy is at an early stage and represents a high-risk investment. No single sector, industry or company is capable of managing this phase of its development independently.

The Bio-based Industries Joint Undertaking (BBI) was created to tackle the gaps in the market and to de-risk investment in European bio-based industries. BBI's vision is to be the catalyst

for Europe to fast-forward to a more sustainable post-petroleum bio-economy. The €3.7bn public-private partnership between the Commission and the Bio-based Industries Consortium leverages €975m of public contributions against €2.73bn from industry. Its mission is to implement the industry-led strategic research and innovation agenda through competitive open calls for proposals.

European regions and cities will play an increasingly important role in implementing the bioeconomy as they come to understand the opportunities for developing a local bioeconomy. When regions support initiatives with a strong

regional bioeconomy policy, they enable innovation to occur by bringing industry and research institutions together. Regions can foster the necessary support and infrastructure needed to capitalise on local natural resources, regional strength and capabilities.

BBI has just signed its first Letter of Intent to cooperate and support activities with several regions in Poland. The collaboration will identify common priorities, strategies and areas of potential synergies and support development of new partnerships between their regions and bio-based industries. These regions will consider developing their local bioeconomy strategies to reflect possible synergies with BBI's strategic innovation and research agenda.

The potential for success though engaging regional expertise and involvement in developing concrete bio-economy strategies is one

of the pre-cursors for successful, local sustainable regeneration and growth. Regional innovation networks, such as those in North Rhine and bio-based Delta partnership, are examples where government can work with various sectors to coordinate projects, funding and knowledge transfer. Where regional differences of strengths are identified, there is an important opportunity for inter-regional collaboration.

The BBI programme is designed to allow applicants to exploit possible synergies with national and regional funding and financing for the bio-economy. Regions can encourage bio-based industrial investment through coherent smart specialisation strategies which will leverage structural funds. The attractiveness of large-scale and long-term private investments will leverage further industry investments. The preliminary figures identified by the industry founding member show that their members' estimated pipeline investments across EU regions was €2.16bn by January 2015, rising to €4bn by January 2016.

BBI will help to accelerate this process, by working with regions as a bridge between Horizon2020 and EU structural funds and by finding synergies with other programmes, like SPIRE. Combining Horizon 2020 funding with relevant structural funds is good for investing in innovation-drivers, infrastructure development, logistics and take-up. Exploiting these opportunities available in each region will lead towards a localised, well-distributed innovative, sustainable and competitive bio-economy. ★



Picture: European Commission JR C96713

# Tackling unmet health needs through collaboration



Innovative Medicines Initiative projects are already having an impact on the way medicines are developed for the benefit of patients in Europe and beyond, writes **Pierre Meulien**



**Pierre Meulien** is Executive Director of the Innovative Medicines Initiative

**A**lthough medical research has saved countless lives, many diseases remain without a cure. Very often, these ailments are so complex that only a major collaborative effort can hope to make progress. As the world's biggest public-private partnership in health research, the Innovative Medicines Initiative (IMI) is well placed to bring together many diverse stakeholders needed to tackle this challenge.

Our projects represent a community of more than 9000 researchers from academic teams, pharmaceutical companies, SMEs, patient groups and regulators from across Europe. By creating a very active community, IMI is raising the profile and reputation of both the European medical research base and the pharmaceutical sector, and building valuable long-lasting collaborative networks.

This approach has proven highly successful. The first IMI projects are now drawing to a close and are delivering excellent science that is

already having a real impact on the way medicines are developed. Our projects are adding to our understanding of the underlying causes of diseases and delivering novel tools and resources that allow researchers to study diseases in more detail, while reducing the use of animals in research. As one example, IMI cancer project PREDECT has designed complex, three-dimensional models of tumours that behave more like cancers in the body than simpler, two-dimensional models.

Our projects are also identifying potential new medicines, and developing techniques to rapidly assess how safe and effective they are. For example, scientists in the eTOX project have developed a computer model to test whether potential medicines could damage the heart.

Moreover, IMI projects are generating biological markers that

could be used to assess how well medicines work, diagnose patients more accurately, and track the progress of the disease. As an example, our SAFE-T project has evaluated more than 150 potential biological markers for drug-induced injury of the kidney, liver and vascular system. The project is now working to obtain regulatory acceptance for the most

promising among those biomarkers so they can be used in drug development.

IMI can also have an important role in boosting the competitiveness of regional life science clusters. After two research sites closed down due to the consolidation of the pharmaceutical

industry, one in Scotland and one in the Dutch region of Noord Brabant, both regional governments decided to step in and revitalise the sites as

incubators for health research. Both Pivot Park in Noord Brabant, and BioCity in Scotland opened in 2012.

Encouraged by the pharmaceutical industry's new collaborative model for innovation, IMI's European Lead Factory (ELF) brought the two sites together under a common project. In Scotland, ELF has created a collection of some 450,000 compounds from both private and public sources, and in Noord Brabant has set up a state-of-the-art screening centre. Since 2013, research groups can apply to access this resource to hunt for compounds that will be useful in their own drug development programmes.

Participation in ELF not only allowed both sites to establish themselves as international life sciences hubs, but it also contributed to creating an ecosystem in which open innovation can flourish.

It is an excellent example of how synergies between public-private partnerships such as IMI and regional smart specialisation strategies can strengthen the competitiveness of Europe's regions, leading to much-needed improvements in healthcare for the benefit of patients. ★

**“Our projects represent a community of more than 9000 researchers from academic teams, pharmaceutical companies, SMEs, patient groups and regulators from across Europe”**

# Fuel Cells and Hydrogen: benefitting cities and regions

With support from the regions, Fuel Cells and Hydrogen can help decarbonise the EU's transport sector, writes **Bart Biebuyck**



**Bart Biebuyck** is the Executive Director of the Fuel Cells and Hydrogen JU

**A**ddressing European decarbonisation targets requires technologies that reduce energy consumption and emissions, while fully harnessing the potential of renewable energies. Fuel Cells and Hydrogen (FCH) will play an important role in contributing to the EU's energy, environmental and competitiveness agenda. They can facilitate the shift to renewables by providing an option for large scale energy storage, and in decarbonising the transport and industrial sectors.

As these technologies are ready for the market, a last push from public and private partners is necessary to enable their mass deployment. These joint efforts mainly occur on the platform created by the Fuel Cells and Hydrogen Joint Undertaking (FCH JU). By fostering partnerships and supporting research and demonstration projects in the field of transport and energy, the FCH JU is accelerating the market introduction of these technologies.

Hydrogen is an energy carrier and fuel cells are an efficient and non-polluting energy-conversion technology for transforming the hydrogen into electricity. When pro-

ducing electricity with a fuel cell, the only by-product is water: zero emissions. It offers the means to provide clean fuel, a challenge which most deeply affects the transport sector.

Inside cities, the deployment of hydrogen-powered buses for urban public transport is becoming widespread. Cities such as Aberdeen, Antwerp, Cologne, London, Oslo

grams of hydrogen. The upshot of these projects alone is that around 14,200 tonnes of CO<sub>2</sub> emissions have been avoided, assuming half of the hydrogen fuel was generated using renewable energy.

Fuel cells also present a great potential for domestic solutions. Compared to a state-of-the-art internal combustion engine with condensing boiler and grid electricity supply, fuel-cell micro CHP (combined heat and power) units can slash CO<sub>2</sub> emissions by at least 30 per cent and in some

Regions can help us to identify the level of demand for specific hydrogen and fuel cell products, develop hydrogen communities where several applications can be showcased simultaneously, from hydrogen production to its use in different market segments or even leverage our funding with other sources, thus enabling projects 'impact to go forward where otherwise they might not be able to.

This in turn offers regions the possibility to identify those hydrogen and fuel cell applications



and Rome are all gaining fleets of fuel cell buses thanks to FCH JU-backed bus projects (such as CHIC, High V.LO-City, HyTransit and 3Emotion). These and earlier projects are proving the practicality, reliability and safety of hydrogen-powered vehicles: around 60 buses and 100 cars used in EU-funded trials have already travelled more than 9.6 million kilometres and refuelled more than 1.1 million kilo-

cases by up to 80 per cent.

Regions are key partners for implementing sustainable solutions to environmental challenges. As they align with EU and national strategic policies, they typically have the scale to implement larger projects that would otherwise be difficult for cities alone to take on.

FCH JU makes special effort to engage with regions recognising the benefits for both sides.

that are of most interest to them, create high value added jobs and ultimately contributes to their goals regarding the environment or reduction of greenhouse gas emissions. The FCH JU is currently working on a Memorandum of Understanding with regions. A signing ceremony will take place in the frame of the FCH JU annual Stakeholder Forum in Brussels on the 23 November 2016. ★

# Building partnerships with regions to boost innovation and growth in aeronautics

Helping regions work together will boost growth and innovation, says **Eric Dautriat**



**Eric Dautriat** is Executive Director of the Clean Sky Joint Undertaking

**T**his year will deliver the first results of Clean Sky's pilot phase on building synergies with ESIF, launched in 2015. Our work is based around two strategic pillars. The first pillar is political: cooperating with the Regions. This cooperation is acknowledged through memoranda of understanding, a necessary framework to build mutual trust and knowledge, and effective exchange of information.

The second pillar is at content level. We propose to the Regions concrete synergies scenarios for

cooperation and work closely with our partners and members to promote projects that contribute to Clean Sky's overall objectives

There are several pilot projects worth mentioning, among those the first, supported by the Catalan innovation agency, is looking into affordable ways to produce components for regional aircrafts based on the results of a Clean Sky project. The second based in the Swedish region of Västergötland is a lab infrastructure investment for 3D metal print that will be used to manufacture and test engine components which received approximately €1.7m infunding plus significant private contributions .

Clean Sky shows that JTIs are well placed to develop synergies, thanks to their sectorial framework,

which is consistent with well-defined research and innovation priorities in RIS3. Aeronautics is one of Europe's main industrial sectors and a key competitiveness and growth driver. Industrial leadership by Airbus, Finmeccanica, Safran, Rolls-Royce and others is setting a research and innovation and priorities linked to the market. This, coupled with product development, is essential. It is important to better integrate regional and European programmes, especially in regions that require support on better investing in research and innovation.

The JTI dimension, and the role played by our members, is essential to keep the synergy activity within the programme objectives and ensure market uptake. We are pleased with the official recognition of our work by the European Parliament and European innovation Commissioner Carlos Moedas. During a parliamentary

debate in July, Clean Sky was cited as a model for other JTIs. We must ensure this is taken into account when discussing the future FP9.

The JU must keep the momentum from the pilot phase going, sharing best practices and figuring out how to expand regional partnerships. Our strategic regional mapping found 25 to 30 possible regional partners, but we must proceed with caution and be well prepared, considering our limited staff and resources.

The JU has de facto also created a network of regions in aeronautics on which to build up now a thematic platform to better network. Some partner regions have already expressed an interest in supporting such an initiative for sharing best practices. This may lead to significant steps forward also on regional policy development and reinforce the interregional collaboration in the planning of ESIF expenditure. ★

**“We work closely with our members and partners to achieve Clean Sky’s overall objectives, CO2 and noise reduction, together with growth and the competitiveness of European aeronautics”**







# Smartening Europe's future

The ECSEL Joint Undertaking is helping Europe maintain its position as a global leader in research and innovation, says **Bert De Colvenaer**



**Bert De Colvenaer** is Executive Director of the ECSEL Joint Undertaking

**T**he ECSEL Joint Undertaking (ECSEL JU) manages a research and innovation programme for the development of a strong and globally competitive electronics components and systems industry in the European Union. It has a total budget of about €5bn. It is a public-private partnership set up between the EU (through the Commission), member states and countries associated with Horizon 2020 on a voluntary basis, as well as three, private-member industry associations (EPoSs, AENEAS and ARTEMIS-IA).

Electronics and ICT are crucial to innovation for any business and everywhere in society: they have an important impact on the daily life of all Europeans. ECSEL JU supports innovation in key sectors (e.g. smart

solutions for mobility, health, environment, energy, digital society and overall competitive manufacturing) and provides a reliable, affordable and credible platform which unifies European public-sector, industrial and academic actors around a compelling technical programme.

The private members ensure the direct industrial and research relevance of the programme's activities, and federate the RD&I actors into coherent projects clustered around key topics, amplifying their impact. At the same time, this facilitates alignment with European, national and regional strategic priorities.

With this unique, tri-partite funding model, ECSEL JU has been able to support major collaborative projects of significant scale and impact. Here are just two examples. First, 'CRITICAL sYSTEM engineering Acceleration' (CRYSTAL) reconfirms European leadership in safety-critical electronics systems for automotive

and other transport domains, as well as healthcare, establishing a European standard. It provides ready-to-use tools for developing electronic and software systems that meet the most demanding safety requirements. With a budget of €82m, it supports 71 partners in 10 countries, maintaining European companies at the forefront in these markets.

Second, 'Enabling Power technologies on 300mm wafers' (EPT300) developed a best-in-class technology to reduce energy waste by up to 40 per cent in energy generation,

**“Technology progress in electronics and ICT is no longer measured in decades but in years, or even months”**

distribution and use. It was selected by the European Commission as a 'multiKET Pilot Line' demonstrator, and received the Austrian Ministry of Economy, Family and Youth's State Prize for Innovation in 2013.

Between 2008 and 2015, 119 projects have been selected for funding, receiving roughly €630m in EU support, leveraging €912m in

national contributions. Taking into account contributions from private participants, around €4bn have been leveraged in total investment in research and innovation projects. Each euro paid by the EU has resulted in €6.40 for research and innovation activity in Europe. Moreover, more than 3000 positions have been filled on average every year by researchers working in the projects supported by the programme.

Technology progress in electronics and ICT is no longer measured in decades but in years, or even months; projects and programmes should therefore act and react at the same pace or quicker. The required investments are no longer counted in millions, but in billions; so co-funding opportunities should be facilitated to the widest extent. That is the

added value and indeed the vision of ECSEL JU. By joining knowledge, engineering know-how and market requirements, the European ECSEL JU community works to understand and pre-empt the future needs of society, to forge a coherent, long-term strategy that will benefit European citizens, making life easier, longer and safer. ★

# Supporting regional aviation and air transport

As citizens' and businesses' demand for mobility increases, SESAR has a crucial role to play in making sure Europe prospers, writes **Florian Guillermet**



**Florian Guillermet** is Executive Director of the SESAR Joint Undertaking

**A**ir transport and the aviation industry are important contributors to Europe's economic prosperity and are vital for keeping regions connected. The growth of low-cost airlines and the expansion of smaller regional airports across Europe are clear signs of citizens' and businesses' demand for greater mobility. Proximity to an airport is still among international companies' top five considerations when deciding whether or not to invest in a region.

For European regions to remain well connected and for their business to prosper, it is imperative that the efficiency and operational cost-effectiveness of airlines, airports and air traffic control services are improved. This is where SESAR can help, offering innovative and smart air traffic management solutions to regions and which are leading to real savings in fuel, fewer delays for airlines as well as a more efficient management of traffic across the whole European network.

Launched in 2004, the Single European Sky ATM Research project (SESAR) is a major cross-industry initiative on air traffic management (ATM). It brings together stakeholders from across the air transport

and aviation industry to define, develop and deploy new technologies and procedures that will improve the way Europe's airspace is managed. In 2007, the SESAR Joint Undertaking (SESAR JU) was established as a public-private partnership to run, validate and demonstrate the research and innovation activities of SESAR, working notably with airlines and airports, large and small, as well as the manufacturing industry, public authorities, and European research centres

and universities. In other words, SESAR has facilitated the growth of an unprecedented network of excellence in aviation research and innovation stretching across Europe. With more than 3,000 experts, the partnership has invested €2.1bn into European R&D, conducting more than 350 tests and 30,000 flight trials at real system test beds across Europe's regions to deliver over 90 industrial prototypes and 60 new or improved ATM solutions.

Europe-wide deployment of these solutions is now underway, which will continue to support connectivity across all regions of Europe and offer business opportunities for regional partners. This is clearly the case with SESAR

remote tower services (RTS), a solution for places in Europe where it is too expensive to build, maintain and staff conventional air traffic control tower facilities and services, or at airports where such services are currently unavailable. Sensors like high definition video and infrared cameras give controllers full surveillance and a 360 degree view of the airport, allowing the possibility of remote provision of air traffic control and aeronautical flight information services in real time. In 2014, the world's first RTS opened for business in Sundsvall, serving Örnsköldsvik airport over 150 km away. Further demonstrations of RTS are well underway in Ireland, Germany, Hungary, Italy and Spain with a view to further implementation of remote tower solutions.

The remote tower services are just one example of the many solutions developed by SESAR to support the sustainability and competitiveness of regional businesses and air transport. Deployment of SESAR solutions has started across Europe, promising approximately €12.1bn worth of performance gains for the aviation industry alone. Looking beyond to 2035, the SESAR project could potentially generate for aviation annual recurring benefits ranging from €8bn to €15bn per year.

The SESAR success story is not over yet. With its budget of €1.6bn, SESAR 2020, the next wave of research and innovation activities, will continue to further strengthen Europe's regional research infrastructure to support a more high-performing and intelligent transport system for all Europe's regions, cities and citizens. ★



**“SESAR has facilitated the growth of an unprecedented network of excellence in aviation research and innovation stretching across Europe”**



# Driving innovation in rail

Tackling the EU's climate challenges will require considerable changes in the rail sector, and Shift2Rail is ready to step up to the plate, writes **Carlo Borghini**



**Carlo Borghini** is executive director of the Shift2Rail Joint Undertaking

**T**he Shift2Rail Joint Undertaking (S2R JU) is a public-private partnership that provides a platform for the key actors of the European rail system to work together. Its goal is to drive innovation in the coming years, by implementing a comprehensive and coordinated research and innovation strategy. S2R JU aims to promote the competitiveness of the European rail industry and meet the challenge of changing EU transport needs.

Rising traffic demand, congestion, security of energy supply and climate change are some of the major issues that the EU and the wider world are facing. Tackling these challenges will require the railway sector to take on a larger share of the transport demand in the next few decades.

EU research and innovation must ensure that rail plays a new, broader role in global transport markets, both by addressing pressing short-term problems that drain rail business operations and resources, and by helping the sector achieve a stronger market position, in particular by supporting the creation of a single European railway area.

The European rail traffic management system (ERTMS) is a prime example of how the European rail sector can drive innovation and support the creation of a unified,

harmonised railway area and improve efficiency, while opening up significant business opportunities for the European rail industry, both within and outside of the EU. Shift2Rail is Europe's most ambitious research programme in the rail sector and is vital to ensuring the long-term competitiveness of the industry and delivering sustainable transport in Europe. The enhanced synergies of a public-private partnership are motors for innovation and the prospects are very exciting. Shift2Rail is jointly owned by the EU and Industry. This programme is vital at a European level and the Innovation Programmes (IP's) identified in Shift2Rail's Master Plan, anticipates the European Union's 4th railway package. This legislation will reform the EU's rail sector by encouraging competition and innovation in domestic passenger markets. It will also implement structural and technical reforms. The end result being higher levels of safety, interoperability and reliability in the European rail network. Importantly, it will make rail more attractive for passengers and businesses.

The Shift2Rail programme has three ambitious key targets which are to cut life-cycle cost of railway transport by as much as 50 per cent, double railway capacity and increase reliability and punctuality by as much as 50 per cent.

In December 2015, following the adoption of the Shift2Rail Multi-Annual Action Plan (MAAP) and Annual Work Plans 2015 & 2016, the Joint Undertaking published its first calls for proposals to its members and third parties

to realise research and innovation activities estimated at €170m in the next three years, co-financed up to €90m by EU contributions.

S2R projects cover a variety of topics, such as developing the next generation of traction systems, new concepts and architectures for train control and monitoring and advanced brakes. Other projects focus on rail signalling technological and operational advancement

for on-board automation systems, high-capacity radio communications systems, safe train separation systems, cyber security systems and innovative testing processes.

Other projects will be looking at passenger-centric IT solutions for interoperable framework developments and 'one-stop shop' sale and use of tickets and travel disruption assistance applications across multiple modes. ★

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