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EUROPEAN SATELLITE NAVIGATION COMPETITION 2017

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The leading innovation network for satellite navigation

The Results, 2017
14th Edition

in cooperation with

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AZO business propulsion components

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AZO Space of Innovation

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INTROS

Fostering GNSS technologies

When we started the European Satellite Navigation Competition (ESNC) in 2004, we had a vision to spur the commercial use of satellite navigation signals and services in everyday life. I am proud to say that this vision is now a reality: The ESNC 2017 has once again demonstrated its potential to provide key solutions for Europe's Global Satellite Navigation Systems (E-GNSS). With about 6 billion devices in use around the world, GNSS has become an indispensable technology for all kinds of purposes – and this number is expected to grow to 8 billion by 2020. Due to the need for precise positioning and orientation, key technologies such as Augmented Reality, logistics management and civilian unmanned aerial vehicles (UAVs) constitute part of this great growth for the GNSS market. Exactly these key future developments hold great potential for young, innovative companies – a fact impressively reflected in this year's ESNC submissions.

With 321 innovative entries submitted and participants from over 50 countries in 2017, this adds to the success story of the ESNC and brings its total to 331 awarded winners with a prize pool worth 11 million EUR, with more than 4,000 submitted ideas, and 11,500 participants since 2004. This indicates that the ESNC is not only the prestigious competition for GNSS-related ideas but also serves as Europe-wide and effective support mechanism for entrepreneurs and startups.

I would like to take this opportunity to thank our 200 international experts, who took the time to evaluate the submissions and choose this year's winners. Special thanks also to the European Committee of the Regions (CoR) for taking over the patronage. I also welcome our new partner Estonia, where the Satellite Masters Conference & Horizon 2020 Space Info Day as part of the first European Space Week 2017 takes place.

I want to express my gratitude to our long-term partner regions and their dedicated support forming the backbone of the global ESNC network.

We are also very pleased to have the great support of our valuable partners such as the European GNSS Agency (GSA), the European Space Agency (ESA), the German Aerospace Center (DLR) and the German Federal Ministry of Transport and Digital Infrastructure (BMVI). Last but not least, I would like to thank all our participants and congratulate the winners for trusting in the potential of the ESNC and introducing their excellent services, products, and application ideas. I would be thrilled to see all participants obtain support from one of our more than 50 incubators in our network all across Europe.

I am already excited to start the 2018 edition of the ESNC, which is scheduled to run from April to June next year.

Thorsten Rudolph
Managing Director
AZO Anwendungszentrum GmbH
Oberpfaffenhofen

A special year for the EU, the GSA and Europe's space programmes

In 2017 Europe celebrates the 60th anniversary of the signing of the Treaty of Rome, which laid the foundation for building the EU. Since then, the EU's Member States have created something that no single nation could do on their own, thus strengthening and growing European integration in many important areas – including space.

The EU's influence in establishing space as a pillar of growth for innovation, business and entrepreneurship is especially strong. The sheer scale of these space programmes means many countries couldn't even consider attempting to go it alone. Today, the EU's flagship space programmes – Galileo, EGNOS and Copernicus – serve as emblematic examples of how European integration can bring real benefits to both individual EU countries and European citizens.

The GSA is at the forefront of linking Europe's space technology to user needs. As of 1 July, we are responsible for overseeing Galileo operations and service provision – a responsibility that includes ensuring a return on investment from Galileo in the form of across-the-board services and applications. Included in this responsibility is a commitment to boosting European market uptake, both directly and by supporting the efforts of the downstream market. With its excellent reputation for fostering innovative GNSS applications in Europe, the GSA has been a proud partner of the ESNC since 2008.

According to the latest GSA GNSS Market Report, there are currently 5.8 billion GNSS devices in the world. By 2020, this number is expected to grow to over 8 billion. Furthermore, with the global core GNSS downstream market forecasted to grow by more than 6% annually during this same period, the downstream market will produce over EUR 70 billion in revenue annually.

These numbers mean big opportunities for European business. I am confident that each of this year's winners will not only take full advantage of Europe's space programmes to capture a portion of this market, but will also go on to help lead Europe into the next 60 years.

I would like to wish all the 2017 ESNC winners much success in leveraging the full potential of EGNOS and Galileo.

Carlo des Dorides
Executive Director
European GNSS Agency (GSA)

INTROS

2017, doubling our efforts through the new Galileo Incubator programme

In pursuing space initiatives, the EU Member States and the Commission have set a perfect example of the value-added that can be generated at EU level. No single EU Member State could have done it alone given the financial burden and technical complexity. It is a historic step. Now Europe not only shares laws and the Internal Market, it also shares infrastructures providing advanced space services. This is a success story that could become a model to follow in other fields, thus strengthening European integration.

The EU's commitment to establishing space as an enabler for growth, innovation, entrepreneurship and commercial success is here and it is here to stay.

Entrepreneurship is at the heart of the European Satellite Navigation Competition and the Galileo Incubation programme. At the European Commission we see our role in creating the framework conditions that allow fostering entrepreneurship. Our two space programmes, Satellite Navigation (Galileo/EGNOS) and Earth Observation (Copernicus) are doing exactly that: Providing advanced technologies that would otherwise not be provided because of their complexity, size and budget requirements. These technologies then become widely available for entrepreneurs to create products and services based on them.

Beyond this fundamental role, we also developed a number of tools and funding opportunities for small and big, new and old entrepreneurs to exploit the potential of Galileo/EGNOS. The European Satellite Navigation Competition and the Galileo Incubation programmes, supported by the European Commission, are promoting the market uptake of satellite navigation. The aim is to support entrepreneurs and startups from Europe and neighbouring countries to move beyond the conception of ideas towards business incubation and to develop commercial ventures. We are creating multiple opportunities through the award of prizes and business incubations. In total up to 30 prizes are co-funded and 3 incubations are given out per year. The potential of space has not yet been fully exploited in Europe, and limits and frontiers have still to be explored. With the ESNC and the Galileo Incubation programme, we aim at helping entrepreneurs to venture into startups.

Elzbieta Bienkowska
Commisioner for Internal Market, Industry, Entrepreneurship and SMEs
European Commission (EC)

The innovative use of space technology and satellite data opens up new opportunities for Europe

From protecting our environment to supporting local industries and creating new jobs, pioneering regions and cities should now embrace new technologies to drive sustainable growth. This is why I am immensely proud to be the patron of the European Satellite Navigation Competition and call on participants from every region and city to have an active role in this competition – now and in the future. The local and regional dimension is essential in bringing the benefits of space closer to users. The adoption of the CoR opinion on a EU strategy for space figures highly on the CoR plenary session agenda in October 2017. The space strategy relies on strong support and interest from younger generations. Space should be a source of inspiration and motivation. It helps to change people's lives for the better. The benefits of space for society manifest themselves in a variety of ways: In communications technologies; the possibility of exchanging information in real time; continuous, high-resolution surveillance systems; a rapid response to natural disasters; support for agriculture, forestry, fisheries and maritime transport; stronger border and security controls; and many other applications. Cooperation is necessary between all institutions, as the space sector is characterised by long development cycles. Regarding the EU Space Strategy, the CoR has identified a few key priorities:

1. Promoting the establishment of new businesses (spin-offs and startups) and creating jobs in fields that use space technologies;
2. Supporting R&D and education programmes at all levels in the fields of ICT, science, mathematics, engineering and social sciences;
3. Investing in space, highlighting the role of investment funds, and the involvement of private investors;
4. Significantly improving the management of the space sector, both in the Member States and at European level, and promoting cooperation between the EU and the ESA with a focus on users.

The ESNC's network is an important asset for European regions and cities, ever since its initiation 14 years ago. It comprises Europe's most important space stakeholders, the most thriving startups and trendsetting entrepreneurs. Thereby, the network is dedicated to implement the commercial use of space applications through the regional dimension in a truly pan European manner.

This competition shows a new perspective for broader uptake of space-based solutions in serving an increasingly complex society.

Markku Markkula
1st Vice President
European Committee of the Regions (CoR)

SUCCESS STORIES

OVERALL & BAVARIA CHALLENGE WINNER 2013

KINEXON: Revolutionising data analytics in sports

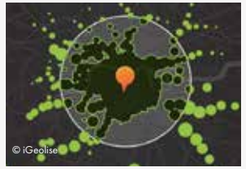
Many applications require tracking solutions that are precise, but at the same time affordable and small. The overall winner of the ESNC 2013 offers just such a solution: KINEXON sensors use the latest space technology to track positions with centimetre-level accuracy. The KINEXON app, a secure cloud-computing platform with a smart analytics component, transforms big sensor data into valuable information in real time. Before winning the ESNC and becoming an ESA BIC Bavaria incubatee, KINEXON's business had only just begun to succeed. The support the startup received from the ESA BIC partner network helped it build its first working prototype. This resulted in Kinexon winning not once, but twice in ESNC 2013. Media interest in the company increased, several pilot projects followed, and several endeavours have turned into great customer relationships. Today, with a team of 60 employees, KINEXON is one of the market leaders in precision localisation and motion-sensing solutions. The company has also widened its target market from the sports industry to the retail, medical, and manufacturing sectors. By also offering indoor products to renowned partners such as Intel and the European Handball Federation (EHF), KINEXON has become one of the companies currently powering the Internet of Things (IoT).

© Kinexon

UK CHALLENGE WINNER 2012

iGeolise: Turning miles into minutes on a global scale

The British startup iGeolise operates the online platform TravelTime, which makes life easier for travellers around the globe. TravelTime converts miles into minutes while considering all the transport facilities at hand. This enables users to identify the fastest way to get to their desired destination without having to check the apps or websites of all the public or private transport services available. Winning the UK Regional prize in 2012 jump-started iGeolise's business: Thanks to the huge media interest, the startup landed its first client, the UK property group Countrywide Estate Agents, and put its business on the path to success. Big consumer-facing websites now use the platform to enable their users to find locations based on their commute time and transport mode of choice. Other firms analyse their own data in terms of travel time, including for sales areas, store catchment areas, and office relocations. Today, with over 100 clients in 15 countries, the platform of the former ESA BIC Harwell incubatee ranks and sorts one billion locations a month and returns results within 0.7 seconds.


© iGeolise

GSA SPECIAL PRIZE & CATALONIA CHALLENGE WINNER 2011

CATUAV: Taking UAV technology to the next level

Catalonia is one of the main UAV hotspots around the globe thanks to one company: CATUAV. The ESNC GSA Special Prize winner from 2011 develops state-of-the-art UAV technology and runs the BCN Drone Center, one of only ten drone test sites in the world. It provides UAV training sessions and consultancy services in all sorts of scenarios and locations. Since the inauguration of the BCN Drone Center in 2014, teams and specialists from more than 60 countries have passed through its facilities, which include an internationally recognised 2,500 hectares of specific segregated airspace. In 2011, the team won the GSA Special Prize with a project involving a traffic avoidance system for mini UAVs. Participating in the ESNC enabled CATUAV to advance its technology and successfully enter the market. The company reached another milestone in 2015 by winning the Horizon 2020 project mapKITE. The project's vision is to create a whole new mapping paradigm by combining terrestrial mobile mapping (TMM) and unmanned aerial systems (UAS). Today, CATUAV is cooperating with the ESA BIC network by giving ESA BIC startups free access to its testing facilities. CATUAV has also teamed up with the ESNC to enable winners to turn their business ideas into promising UAV ventures.


© CATUAV

ESNC winners and participants foster the development of GNSS innovations and the Galileo/EGNOS market uptake. Find out more about these three pioneering companies and discover even more ESNC success stories at: www.space-of-innovation.com!

THE GLOBAL INNOVATION NETWORK FOR GALILEO

Special Prize Partners

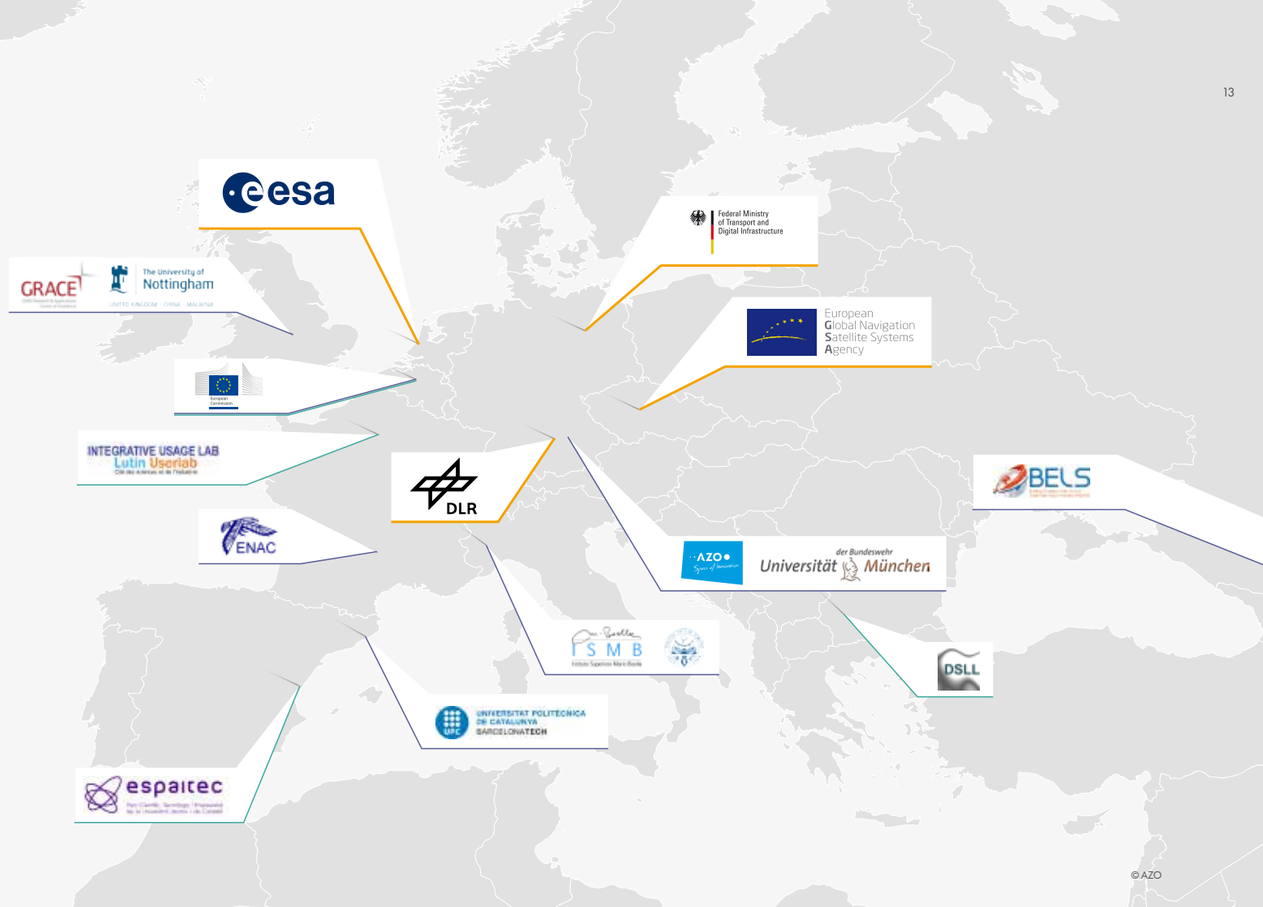
Boosting path-breaking commercial GNSS applications

The ESNC – the world's largest innovation network for satellite navigation applications – is firmly supported by the most relevant and future-oriented GNSS stakeholders in Europe. They are united in their goal to systematically support emerging visionaries and to achieve the integral promotion of space-based innovation and entrepreneurship for the benefit of the European economy and its citizens.

ESNC 2017
SPECIAL PRIZE PARTNERS

ESNC 2017
UNIVERSITY CHALLENGE

ESNC 2017
GNSS LIVING LAB PRIZE



© AZO

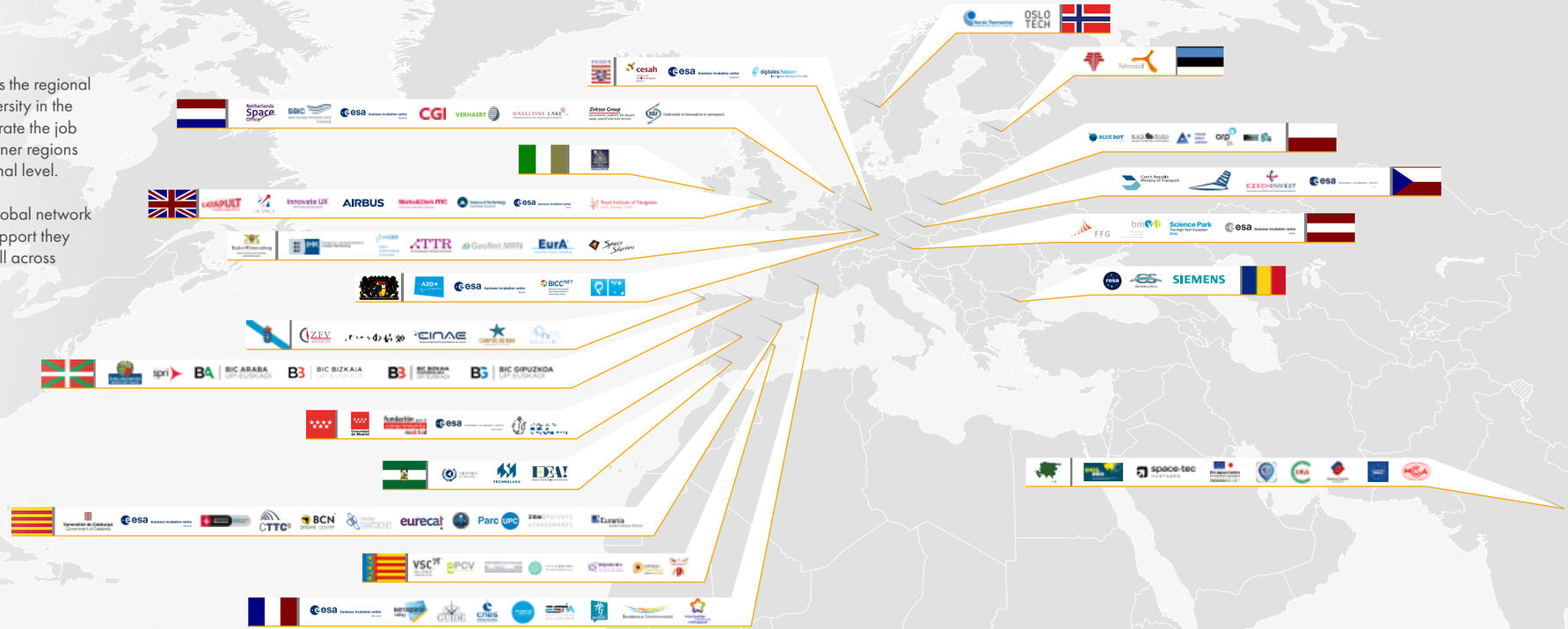
THE GLOBAL INNOVATION NETWORK FOR GALILEO

Regional Partners

Strong regional support

The ESNC's unique cross-regional network puts the regional dimension into the limelight to ensure high diversity in the European community and ultimately to accelerate the job growth potential it holds. The currently 20 partner regions comprise about 140 stakeholders at the regional level.

They form the backbone of the competition's global network and ensure that participants can access the support they need at any stage to launch their businesses all across Europe and beyond.



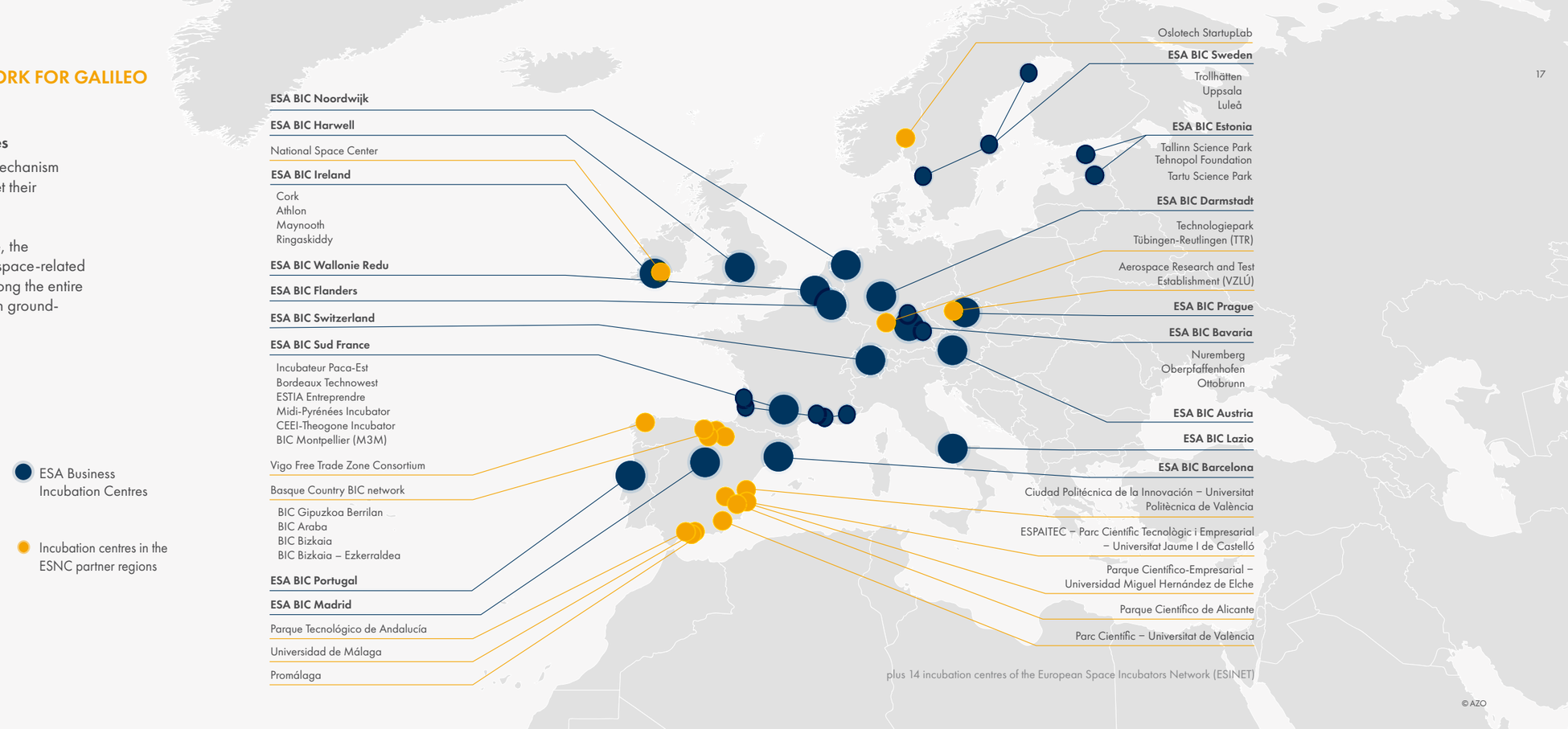
THE GLOBAL INNOVATION NETWORK FOR GALILEO

Incubation Network

Encouraging the creation of new businesses

The ESNC provides a Europe-wide support mechanism for entrepreneurs and startups who want to get their space-based business off the ground.

With more than 50 incubators all over Europe, the competition encompasses the world's largest space-related incubation network. By supporting startups along the entire value chain, this network provides society with ground-breaking technological novelties.



European GNSS Agency (GSA)

The GSA, a European community agency, works with the European Commission on a range of activities aimed at helping European entrepreneurs and businesses – especially high-tech SMEs, business incubators and related networks – commercially exploit EGNOS and Galileo.
These marketing, promotional and R&D activities help to ensure that European industry maintains a competitive edge in the global satellite navigation market.
EGNOS is Europe's first venture into satellite navigation and is available free of charge.
It augments GPS and makes it suitable for safety-critical applications. It is followed by Galileo, a full-fledged global navigation system. www.gsa.esnc.eu

presented by

Carmen Aguilera
+42 (0)23 4766607
gsa@azo-space.com
www.gsa.europa.eu

60 YEARS OF EU: THE MOST INNOVATIVE APPLICATION FOSTERING EUROPEAN INTEGRATION – PRESENTED BY GSA

SPECIAL PRIZE WINNER
SAFETY & SECURITY

CENTRIP – ChildrEN TRIp Protector

For many European countries, security is an important topic nowadays. The market needs a solution that can help ensure the wellbeing of children – which is where CENTRIP comes into play. CENTRIP is a student management system for school trips that protects and monitors children during outdoor activities. It helps educators or other responsible individuals keep control and reduce the risk of incidents whilst allowing children to discover the world outside kindergartens and schools. CENTRIP combines GNSS and ZigBee technologies in an innovative way to ensure a group's safety. Devices for teachers and students independently compute their absolute positions, exchange this information, and simultaneously calculate relative positions to measure the distances between them. If a receiver exceeds the maximum allowed distance, an alarm signal is sent to the student and teacher devices in question to allow for quick and appropriate action. The ZigBee module provides connectivity even when underground (in subway stations, for instance). With CENTRIP's support, teachers and the parents of young kids can make sure that children are exploring the world safely.

Ewa Kadziolka, Deimos Space UK, Dr Philip Muller, Tampere University of Technology, Yahao Cheng, Technical University of Munich, Dr Terri Richardson
Kadziolka.ewa@gmail.com

CENTRIP

3RD PLACE

ESA SPACE SOLUTIONS® PRIZE

SPECIAL PRIZE WINNER
CONSTRUCTION

Attestis – No More Late Objections to New Buildings

Attestis is a startup company that is using Galileo to develop digital proof services for the construction industry. Attestis targets building project owners (including consumers and businesses), which represent a market of more than 2 million construction projects every year. In several countries (such as France, Italy, Portugal, Finland, and Belgium), when a building permit is granted, planning regulations mandate that the owner displays a notice sign on the property to inform their neighbours, who then have a limited time to file an objection. To avoid late objections, litigation, and the destruction of ongoing or finished works, owners need proof that they have indeed displayed the mandatory sign. To this end, Attestis is developing a range of digital proof services based on a web platform, mobile applications, and a geolocation device embedded in the notice sign itself (patent pending). Compared to traditional documentation methods (i.e. an affidavit from a notary), Attestis provides better legal security at a much cheaper price. GNSS services are key to Attestis's methods of rendering proof. The unique features of Galileo's services also provide an essential advantage (high precision, signal authentication, position certification).

Guilhem Ensuque, Olivier Tosello, Attestis
contact@attestis.com
attestis.com

ATTESTIS

European Space Agency (ESA)

ESA's mission is to shape the development of space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. ESA designs and implements the European space programme, including the development of technologies and infrastructure for satellite navigation, telecommunications and EO, the promotion of industries, and the endeavour to find out more about the universe. The ESA space solutions® network compiles a variety of expertise from Europe's space programmes to give any business a tailored solution, based on space systems, technologies and know-how. Through ESA's Business Incubation Centres, Technology Transfer Brokers and partners, Europe benefits from its space industry and increased global competitiveness. www.esa.esnc.eu

organised by

Dr Thomas Bouvet
+31 (0)71 5656592
esa@azo-space.com
www.esa.int

German Aerospace Center (DLR)

The German Aerospace Center (DLR) is Germany's national research centre for aeronautics and space. Its extensive research and development work is integrated into national and international cooperative ventures. As German Space Administration, the German federal government has tasked DLR with the forward planning and implementation of the German space programme, as well as with the international representation of Germany's space interests. Furthermore, Germany's largest project-management agency is also part of DLR. DLR is highly guided by industry's demand for innovative products and services. It also invests in promising technologies and offers its R&D capacities to customers. Numerous products have been successfully brought to market in co-operation with innovative enterprises.

www.dlr.esnc.eu

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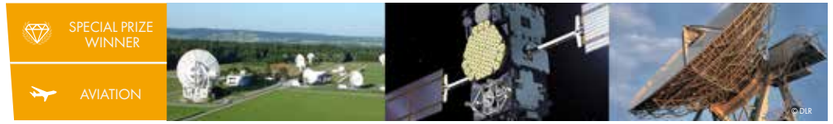
Robert Klarner
+49 (0)8153 281782
dlr@azo-space.com
www.dlr.de

ROBUST MEANS TRUST – GALILEO FOR RELIABLE POSITIONING



Making ADS-B Systems More Robust and Resistant to Spoofing and Jamming

TCAS (Traffic Collision Avoidance Systems) and ADS-B (Automatic Dependent Surveillance – Broadcast) systems are key components of flight safety. Designed for air traffic control and the prevention of aircraft collisions, these systems are susceptible to hacking. Spoofing and jamming ADS-B signals requires relatively little effort and no expensive equipment at all. To address ADS-B security issues, the team proposes a solution for authenticating received signals through amplitude/phase analysis using the directional antenna systems of aircraft. In addition to improved security, the verification hardware and additional sensors involved make it possible to maintain ADS-B functionality without any space (i.e. GNSS) or ground infrastructure, which would be useful in worst-case scenarios (i.e. during extremely large coronal mass ejections). This idea thus provides the following benefits and improvements to ADS-B:

- Resistance to spoofing
- Resistance to jamming
- Functionality in worst-case scenarios (i.e. when no GNSS or other ground or space infrastructure is available)
- Potential to detect more planes
- No air drag on the additional antenna

Overall, these benefits can lead to marked improvements in flight safety.


© Saulius Rudys

Dr Saulius Rudys, Jurgis Aleksandravicius, Vilnius University
rudys@elmika.com
rfk.ff.vu.lt/index_eng.htm

PRS APPLICATIONS – RELIABLE SERVICES FOR A SECURE DIGITAL SOCIETY

SORUS – Spoofing-Resistant UAVs

The main purpose of SORUS is to store short sequences of PRS PRN (pseudo-random noise) code chips on user receivers prior to missions. These PRS PRN code chips enable a user receiver to calculate a Galileo PRS position at predefined points in time. All the advantages of PRS are maintained in the process, including its robustness against jamming and spoofing and the access it provides to a secure navigation solution for authorised users. At the same time, SORUS circumvents all the drawbacks of conventional PRS receivers and server-based techniques: No need for a PRS security module on the user receiver; no size, weight, or power (SWaP) problems; no keying issues; no handling of controlled items on the user side; no need for a communication link that would lead to the availability and radio silence issues; and no security issues thanks to the short PRS PRN code chip sequences, which are only valid for the limited duration and area of a given mission. SORUS enables PRS navigation for a wide range of users while considerably reducing security requirements and Galileo PRS costs per user device. Police, special forces, and other authorised Galileo PRS users could use this method to equip their UAVs with a secure, trustable, and unspoofable positioning solution.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Alexander Rügamer, Fraunhofer IIS
Dr Jan Wendel, Airbus Defence and Space
alexander.ruegamer@iis.fraunhofer.de
www.iis.fraunhofer.de

German Federal Ministry of Transport and Digital Infrastructure (BMVI)

The German space industry plays a key role in the Galileo system, with OHB and Astrium constructing 32 Galileo satellites and one of its two main control centres being operated in Oberpfaffenhofen. The BMVI supports high-quality economic growth by ensuring a sophisticated infrastructure for smart mobility and development. The Galileo Public Regulated Service (PRS) is the first encrypted navigation signal under civilian control. While its use by governments, security authorities, emergency and rescue services is evident, the signal's full potential in today's digital society is yet to be explored. Therefore, the BMVI is strongly committed to driving innovative PRS applications. www.bmvi.esnc.eu

organised by

Kai Herrmann
+49 (0)30 183006233
Lukas Schmid
+49 (0)30 183006234
bmvi@azo-space.com
www.bmvi.de

AZO & GRACE

Carried out by AZO Anwendungszentrum GmbH Oberpfaffenhofen and the GNSS Research & Applications Centre of Excellence (GRACE), the University Challenge connects innovative thinkers with the business community to pave the way from university to entrepreneurship. GRACE is part of the Geospatial Institute (NGI) at the University of Nottingham, an internationally recognised centre of excellence in surveying, positioning, and navigation technologies. By providing business support, consultancy services, training, and testing for the exploitation of new ideas and the creation of new business opportunities GRACE serves as a hub for the GNSS community and beyond.

www.uni.esnc.eu

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ESNC UNIVERSITY CHALLENGE
Andreas Dippelhofer
+49 (0)8105 7727716
uc@azo-space.com
www.space-of-innovation.com

UNIVERSITY CHALLENGE – FROM THE LECTURE HALL TO THE BOARD ROOM

2ND PLACE

SPECIAL PRIZE WINNER

SAFETY & SECURITY

J911 Prototype: Crowdsourced GNSS Jammer Detection

The right response to jamming? Instead of using valuable human resources to field and operate expensive jamming detectors, why not use existing hardware and infrastructure, and let a computer watch for jammers as a preemptive action? The Colorado Center for Astrodynamics Research has been working towards this goal. Based on both previous and current research, the centre's team has implemented the first J911 prototype. In this system, regular smartphones or cheap sensors report GNSS signal conditions to a central server that can then depict these measurements and provide for fast, easy jamming detection. The J911 system could be built on top of the Enhanced 9-1-1 or Advanced Mobile Location infrastructure, which are used for location reporting as a part of emergency calls in the USA and Europe. Since this infrastructure is already in place, J911 is implemented mostly in software, which allows for easy deployment, testing, and upgrades. This in turn significantly reduces the costs of development and operation compared to existing solutions, which all require fielding and dedicated devices. J911 enables governments to keep up with technology and provide the next level of public service and protection.

Luka Strizic, Prof Dennis M. Akos,
University of Colorado Boulder; Colorado Center for Astrodynamics Research
luka.strizic@hotmail.com
ccar.colorado.edu/gnss

CCAR

SPECIAL PRIZE WINNER

SAFETY & SECURITY

Safety on Trucks and Heavy Goods Vehicles

In several terror attacks over the past few years, heavy goods vehicles have been driven into large crowds to inflict maximum damage. In order to address this threat, Callwise Ltd. has developed an application which integrates satellite tracking technology with vehicles' electronic management systems. This has enabled the company not only to track vehicles, but also to restrict access to specific locations. It does so by comparing a vehicle's Galileo GNSS location data with a route that was previously set on the Callwise app. If the location of the vehicle deviates from the predefined route, a fault code is sent to the vehicle's electronic management system, which will then gradually slow the vehicle down to a maximum speed of 8 km/h (engine limp mode). One main benefit of the application is that implementing this turnkey solution will make public outdoor areas much safer.

It also offers multiple commercial advantages:

- Optimisation of routes with multiple delivery points
- Increased fuel efficiency
- Real-time monitoring of locations, cargo doors, cargo temperatures, fuel cap locks, speed, etc.

Dr. Roland Weesie, Nia Weesie, Sarah Weesie, Callwise Ltd.
Roland.weesie@gmail.com
www.callwise.eu

AZO

The GNSS Living Lab Prize is being continued by AZO and three living lab partners after having been initiated as part of the FP7 project GAINS (Galileo Advanced INnovation Services). The GNSS Living Lab Prize seeks to facilitate the emergence of user-driven, open innovation demand for services and GNSS applications. Living Labs – Public-Private-People Partnerships (PPPP) of firms, public agencies, universities, institutes, and users – in Bulgaria (Digital Spaces Living Lab), France (Integrative Usage Lab), and Spain (espaitec Living Lab) are now prepared to conduct a reality check trial with the winning application and up to four finalists. www.livinglabs.esnc.eu

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Andreas Dippelhofer
+49 (0)8105 7727716
livinglab@azo-space.com
www.space-of-innovation.com

University of Malaga, Promálaga & Parque Tecnológico de Andalucía

The regional partners comprise three organisers: University of Malaga (UMA) is a public institution responsible for higher education with more than 2,300 teachers and 39,000 students. It has a long history of international collaboration with major technological companies. Promálaga is a development and business promotion agency dedicated to job, wealth and welfare creation in the city of Málaga. It's guided by the promotion of entrepreneurial spirit, business drive and investment in technology. With advanced services and infrastructures, Parque Tecnológico de Andalucía (PTA) is a high-quality location to set up businesses that are innovative, respectful of the environment and geared towards manufacturing and R&D. www.andalucia.esnc.eu

organised by

Raquel Barco Moreno
+34 952131064
andalucia@azo-space.com
www.uma.es/smart-campus/cms/menu/esnc

ANDALUCIA / SPAIN

REGIONAL WINNER

SMART MOVING

Platform for GNSS/PNT/Intelligent Vehicle Systems

Infinite Dimensions Integration S.L. is creating an intelligent navigation system package for buses supporting current and future technologies and regulations. The company's technology implements all existing GNSS data and operates in GPS-denied environments using alternative navigation sensors and systems. Combined with a development kit and execution environment for intelligent network-based systems, the package will facilitate the cost-effective assembly and sale of bus automation systems. Capabilities can be adapted to technologies and regulatory environments as they evolve into a fully autonomous future, opening the door to greater efficiency in areas such as:

- Fuel consumption (estimated reductions of up to 40%)
- Safety and security
- Quality of life

The company's approach to vehicle automation provides greater accuracy and precision. By focusing on this market segment, it can pursue the optimisation of technology and product packaging and the expansion of infrastructure (i.e. signals to support wide-area real-time kinematics (RTK), cloud monitoring and control) in support of more advanced vehicle-automation methods.

Angelica Valdivia, Dr Jeffrey Wallace, Dr Sara Kambouris,
Infinite Dimensions Integration S.L.
Dr Lukasz Bonenberg, University of Nottingham
Markus Löning, Löning Consulting
jeff@id-inc.eu, www.id-inc.eu

ASIA

REGIONAL WINNER

ENERGY

City Street Lighting Audits via Aerial Drone Imagery

The number of streetlights in the world is expected to grow to 352 million by 2025. LED and smart street lighting today represents a $63.5 billion market opportunity for providers. The ability to audit this infrastructure will thus be key in winning projects. Lighting audits are costly and time consuming: They require workers to collect GPS locations manually and identify the light types. This data is rarely complete, and obtaining it from municipalities is difficult. Using a drone-based platform, Skymetrix is developing a solution that will autonomously audit cities' street lighting infrastructure. Imagery collected via drone-based sensors will be processed to instantly extract data on lighting infrastructure (GPS, lighting types). The data can then be used through a map-based interface providing analytical tools for evaluating project scenarios and generating business cases. The solution offers these benefits:

- Faster, less expensive lighting audits
- Optimised identification, prioritisation, and pursuit of business opportunities for lighting providers
- Map-based interface for evaluating business cases in the lighting sector

Skymetrix will thus revolutionise the auditing of city street lighting thanks to a combination of the latest UAV technology and a user-friendly interface.

Shadi El Abdallah, Michelle Abboud, Skymetrix Drone Solutions
shadi@skymetrixdrones.com
www.Skymetrixdrones.com

GNSS.asia

The Asia-Pacific rim is a hotspot for satellite signal reception and is likely to be at the forefront of multi-constellation usage increasing accuracy, availability, and reliability for a fast-growing population of GNSS users. Asia is also the manufacturing hub of GNSS downstream equipment, chipsets, and receivers and home to highly innovative technology companies. Many Asian companies are taking key positions along the GNSS value chain, and several countries produce significant amounts of locally developed innovations. GNSS.asia provides a comprehensive range of hands-on support services to industries in Europe and the Asia-Pacific region to aid the sector in establishing commercial activities and industrial collaborations. www.asia.esnc.eu

organised by

Rainer Horn
+49 (0)89 45160980
asia@azo-space.com
www.spacetecpartners.eu
www.gnss.asia

Austrian Research Promotion Agency (FFG)

The national funding institution for applied research and development in Austria offers a comprehensive range of services for enterprises, research institutions and researchers. Its Aeronautics and Space Agency connects such entities with the international aerospace world, implements Austria's aerospace policy, and represents the country at international aerospace committees – incl. ESA. Austria's ASAP programme, meanwhile, funds research on space science, technology, and applications. Finally, the agency acts as the central interface between Austrian interests and European programmes, FFG's Galileo contact point supports Austria's competencies in the field of satellite navigation and interacts with the GNSS community.

www.austria.esnc.eu

organised by

Dr Matthias Schreitl
+43 (0)577 553306
austria@azo-space.com
www.ffg.at/en

LimeCam – Mobile Illumination Measurement System

LimeCam is a lightweight, vehicle-mounted, multi-sensor system for measuring road illumination and generating key information for planning, verification, and quality control in related projects. LimeCam performs measurements at up to 80 km/h without the need to close off streets. Its measurement performance can also achieve as many as 200 light points per hour – many times faster than manual methods. LimeCam's measurement results are presented to the customer in the form of a database with details on each light point (including geo-referenced positions, mounting heights, and local light distribution), as a graphical map, and as formatted text-based reports. The system uses Galileo GNSS and EGNOS for geo-referencing. Potential users of LimeCam include energy suppliers, urban service providers, engineering companies, light planners, and communities. They all can benefit from its key features:

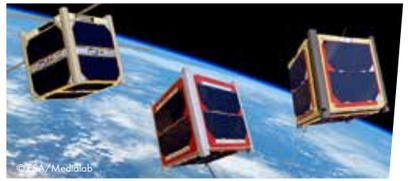
- Practicable: A single instrument platform that mounts on any vehicle, no need to close off traffic, automatic data processing
- Fast: Vehicle speeds up to 80 km/h, up to 200 light points/h
- Safe: Protects operators in vehicles
- Data quality: Light point database, incl. maps and reports

Luzian Wolf, Klemens Wolf, Wolf Technologie
Luzian.wolf@object-tracker.com
www.object-tracker.com

LimeCam

Distributed Ground Station Network (DGSN)

Mini-satellites, laptop satellites, cubesats and other concepts reflect a new type of satellite: Cheap, easy to realise and easy to launch – but easily lost in space in some cases. The Distributed Ground Station Network (DGSN) is a solution that matches this new approach to satellites. DGSN is a network of small ground stations, each of which will receive a wide spectrum of radio frequencies. Each received signal will be time-correlated with an on-board GNSS system. When at least five ground stations receive the same signal, an algorithm can position the signal and track it via multilateration. The resulting data will be transmitted via the internet to a central server. In summary, DGSN provides communication links to small-scale missions, facilitates tracking of small satellites,



and offers important raw and positioning data to satellite owners. With the DGSN, tracking cubesats could hardly be easier thanks to the following characteristics:

- Faster than services currently on the market
- Global in scope
- Open-source
- Reasonably priced

Thanks to DGSN, no mission will be lost in space.

Andreas Hornig, Sebastian Kühn, Alexandros Kazantzidis
Jay Krishna, Timm Eversmeyer, AerospaceResearch.net
contact@aerospaceresearch.net
www.aerospaceresearch.net

IHK Reutlingen

Baden-Württemberg, the federal state in the South West of Germany and home to 11 million inhabitants, is famous for its tourist highlights, such as the Black Forest and Lake Constance, its universities in Heidelberg, Freiburg, Karlsruhe, Constance, Stuttgart, Ulm, and Tübingen; as well as the companies Daimler, Porsche, SAP and Bosch. The state is known for its great writers like Friedrich Schiller and its people are known as „Tüftler", a term indicating a great enthusiasm for technical problems and their solution. Thanks to its open-minded spirit, Baden-Württemberg is ideally positioned to participate in the ESNC. The twelve Chambers of Commerce and Industry represent the interests of around 607,000 companies and provide services to the region's economy. www.bw.esnc.eu

organised by

Dr Stefan Engelhard
+49 (0)71 21201119
bw@azo-space.com
www.reutlingen.ihk.de
www.galileo-masters-bw.de

Department of Economic Development and Infrastructures of the Basque Government

The organiser boosts the participation of Basque projects in the ESNC. With the help of the SPRI agency and BIC Gipuzkoa, the Information Society Division manages the competition in Euskadi and sets a regional prize. The Ministry for Economic Development and Competitiveness of the Basque Government coordinates the design and implementation of the Basque R&D&I Policy. That policy is widely known for its strong regional compromise with knowledge and industrial development. Manufacturing plays a major role in the Basque industry and the Government is committed to support its industrial base by promoting higher value added production through R&D&I.

www.basque.esnc.eu

organised by

Pablo Martínez Muñoz
+34 943 000999
basquecountry@azo-space.com
www.esnc-basquecountry.eus

BASQUE COUNTRY / SPAIN

REGIONAL WINNER

SPORTS

KinetiKom

Sport tracking products are being used more and more nowadays. Having revolutionised the tracker concept, KinetiKom is launching a multidisciplinary service for sport lovers of all levels.
Even though current sport trackers are usually specific to a single discipline, KinetiKom offers an entire monitoring and analysis system that adapts to multiple sports. It consists of a platform, an application, and a data collecting device equipped with high-precision sensors. As with any sport tracker, geopositioning is a crucial feature. Thanks to the arrival of GNSS constellations like Galileo, the system will be able to offer much more accurate statistics. On the one hand, the availability of Galileo data is essential to obtaining uninterrupted data and computing higher-order statistics. On the other hand, athletes and their coaches need high-precision tracking data in order to accurately analyse an athlete's movement.
Benefits provided by KinetiKom's solution:

- Ideal for professional athletes thanks to highly accurate statistics
- Multidisciplinary service makes it easier for amateurs to start a new sport
- Ability to stream live statistics

Alex Aranburu, Eneko Echeverria, Unai Gorostegi, Kepa Otxoa, Amets Txurruka, KinetiKom
contact@kinetikom.com
www.kinetikom.com

KinetiKom

Overall Winner 2017

BAVARIA / GERMANY

REGIONAL WINNER

UAV

SORUS – Spoofing-Resistant UAVs

The main purpose of SORUS is to store short sequences of PRS PRN (pseudo-random noise) code chips on user receivers prior to missions. These PRS PRN code chips enable a user receiver to calculate a Galileo PRS position at predefined points in time. All the advantages of PRS are maintained in the process, including its robustness against jamming and spoofing and the access it provides to a secure navigation solution for authorised users. At the same time, SORUS circumvents all the drawbacks of conventional PRS receivers and server-based techniques: No need for a PRS security module on the user receiver; no size, weight, or power (SWaP) problems; no keying issues; no handling of controlled items on the user side; no need for a communication link that would lead to the availability and radio silence issues; and no security issues thanks to the short PRS PRN code chip sequences, which are only valid for the limited duration and area of a given mission. SORUS enables PRS navigation for a wide range of users while considerably reducing security requirements and Galileo PRS costs per user device. Police, special forces, and other authorised Galileo PRS users could use this method to equip their UAVs with a secure, trustable, and unspoofable positioning solution.

Alexander Rügamer, Fraunhofer IIS
Dr Jan Wendel, Airbus Defence and Space
alexander.ruegamer@iis.fraunhofer.de
www.iis.fraunhofer.de

AIRBUS Fraunhofer IIS SORUS

AZO

AZO is an international networking and branding company for the European space programs, supporting entrepreneurship with more than 500 companies founded in Europe to date. Over the last 15 years, AZO has established the leading European space cluster innovation network for the satellite downstream market, while providing the necessary marketing and promotion platform, incubation and expert network, as well as regional funding programmes with the objective to increase the uptake of business cases. AZO with its ESA BIC Bavaria, has supported 130 company foundations in Bavaria. AZO organises the most important space-related innovation Masters competitions such as ESNC, Copernicus Masters, INNOspace Masters and Space Exploration Masters. azo-space.com

organised by

Stefanie Biermeier
+49 (0)8105 7727734
bavaria@azo-space.com
www.space-of-innovation.com

Government of Catalonia

The Government of Catalonia conducts policy, manages the Government's Administration and holds executive and regulatory powers.
The Government of Catalonia is developing SmartCATalonia, the strategy that is designed to make Catalonia an international smart region benchmark. It aims to take advantage of the digital technology and information, in order to encourage innovation in public services, foster economic growth and promote a more intelligent, sustainable and integrative society. These strategy goals are to improve the services provided to citizens, by means of a more efficient and intelligent use of available information in real-time. www.catalonia.esnc.eu

organised by

Generalitat de Catalunya
Government of Catalonia

Armengol Torres
+34 600 485 486
catalonia@azo-space.com
www.barcelonactiva.cat

REGIONAL WINNER

DISASTER MANAGEMENT

DANTE

Wildfires can have a devastating impact on a country's population, economy, and environment. DANTE is an integrated low-cost solution for the early detection of forest fires that features advanced methods of reporting and managing fires. Its high-performance image processor is embedded into a low-cost hardware platform and integrated into a smart connectivity network. It provides an alarm system evaluating the risk of a fire, maps burnt areas, and guides firefighting operations in real time. The system can be integrated and managed remotely from emergency control rooms or from a smartphone. It then provides maps of active fires and precise geo-referenced coordinates of their sources. UAVs offer huge potential for monitoring and extinguishing operations in wildfire management. DANTE's algorithm optimises the use of GNSS in drones with the following benefits:

- Better performance compared to current state-of-the-art technology
- Two to 15 times cheaper than alternative solutions on the market
- Suitable for both small and large territories
- Substantial potential savings in firefighting and reconstruction budgets

DANTE aims to be the first smart and interactive UAV navigator capable of automatically guiding drones in real time during firefighting and fire management operations.

Luis Crespo, Antonio Alcayde, Simone Azzalin, Virginia Alcayde, Vicente Ferrer, AD TELECOM S.L.
Luiscrespo@adtelecom.es
www.adtelecom.es

REGIONAL WINNER

UAV

Protecting Wild Animals During Harvesting with Galileo-Enabled UAVs

The pressure on agriculture is high nowadays with regard to efficient and precise farming. Harvesting is carried out by large and fast agricultural machines. The disadvantage is the large number of wild animals, especially deer being killed by these harvesting methods. In the Czech Republic, the estimated number of deer killed by harvesting machines has risen to about 60,000 per year, and other animals are also affected. The winners aim to address this Europe-wide problem with GNSS and especially Galileo data. Upvision's online application enables farmers to submit their harvest dates and order a drone monitoring service just before they begin. Unmanned aerial vehicles using thermal imaging systems and GNSS signals then start monitoring the field.

This produces a thermal image of the field, which offers the following advantages:

- Real-time animal identification and rescue
- Expanded use of modern technologies in terms of precision farming and the environment
- Protection of harvesting machines

In addition to protecting animals, farmers can thus expand the use of new technologies in their harvesting methods thanks to Galileo signals.

Jakub Karas, Upvision, Antonín Machálek, Research Institute of Agricultural Engineering (VÚZT), Petr Marada, Mendel University
jakub.karas@upvision.cz
www.upvision.cz

Czech Republic

Space exploration and research have a long tradition in the country: Intercosmos 1, launched in 1969, was the first satellite that carried instruments developed in the former Czechoslovakia. Dozens of Czech instruments and systems have been deployed over the past 20 years of space activities, including both terrestrial environment explorations and planetary missions. The Czech Ministry of Transport has a mandate given by the Czech Government to coordinate all national space activities. It is responsible for Czech membership in the European Space Agency, EU space policy, satellite navigation development, space applications and partnership with the European GNSS Agency (GSA). www.cz.esnc.eu

organised by

Czech Republic Ministry of Transport

Josef Sobra
+42 (0)225 131657
czechrepublic@azo-space.com
www.czechspaceportal.cz

Tartu Science Park & Tallinn Science Park Tehnopol Foundation

Tartu Science Park (TSP) is the oldest science park in the Baltics. For almost 25 years it has provided the infrastructure, business consulting, technology transfer, and networking services local enterprises need to raise their competitiveness on the global market. TSP also cooperates closely with the University of Tartu and Tartu Observatory. Founded in 2003, Tehnopol is a science and business campus that aims to advance technology-based entrepreneurship and bring scientists and entrepreneurs together. It is currently home to 200 companies. To foster the growth of businesses capable of generating significant added value, Tehnopol offers startup incubation and business development services tailored to companies in ICT, green technology, and healthcare technology.

www.estonia.esnc.eu

organised by

Andrus Kurvits
+372 (0)512 6584
estonia@azo-space.com
www.teaduspark.ee
www.tehnopol.ee

ESTONIA

REGIONAL WINNER

SMART CITY

City Infrastructure Management

Residents who move around in their neighbourhoods easily discover various problematic areas of their cities. Right now, however, it is rather difficult for them to inform their local government – not only in Estonia, but in many other countries as well – due to different roadblocks: Opening hours, not knowing whom to contact, difficulty in describing the exact location, and so on.

City Infrastructure Management (CIM) consists of a user-friendly smartphone app and a cloud-based management platform that solves all these problems. Residents will be able to use CIM to notify their local government about issues such as road conditions, street lighting, garbage disposal, graffiti, snow, floods, stray animals, and fallen trees. To improve their local environment, CIM users will only need a smartphone with internet and GNSS connectivity. They then can identify the exact location of the problem, take a picture or describe it in words, and send it to the government office responsible. The local government then can review the messages on the cloud platform, prioritise tasks, and act accordingly to improve the area in question. CIM will thus facilitate greater interaction between citizens and their governments.

Jana Subitidze, CIM
subitidze@gmail.com

C:M

3RD PLACE

FRANCE

REGIONAL WINNER

CONSTRUCTION

Attestis – No More Late Objections to New Buildings

Attestis is a startup company that is using Galileo to develop digital proof services for the construction industry. Attestis targets building project owners (including consumers and businesses), which represent a market of more than 2 million construction projects every year. In several countries (such as France, Italy, Portugal, Finland, and Belgium), when a building permit is granted, planning regulations mandate that the owner displays a notice sign on the property to inform their neighbours, who then have a limited time to file an objection. To avoid late objections, litigation, and the destruction of ongoing or finished works, owners need proof that they have indeed displayed the mandatory sign. To this end, Attestis is developing a range of digital proof services based

on a web platform, mobile applications, and a geolocation device embedded in the notice sign itself (patent pending). Compared to traditional documentation methods (i.e. an affidavit from a notary), Attestis provides better legal security at a much cheaper price. GNSS services are key to Attestis's methods of rendering proof. The unique features of Galileo's services also provide an essential advantage (high precision, signal authentication, position certification).

Guilhem Ensuque, Olivier Tosello, Attestis
contact@attestis.com
attestis.com

ATTESTIS

ESA BIC Sud France

The ESA BIC Sud France promotes entrepreneurship based on technology transfer from space to other domains and the development of services and applications from space technologies. Created in 2013, it is managed by Aerospace Valley in close cooperation with SAFE Cluster and the French Space Agency in Toulouse. It is run by structures that support the creation of innovative companies in Aquitaine, Midi-Pyrénées, Languedoc-Roussillon and Provence-Alpes-Côte d'Azur, including GUIDE, Paca-Est Incubator, ESTIA Entreprendre, CEEI Théogone, Bordeaux Technowest and the BIC Montpellier Mediterranée Métropole. ESA BIC Sud France encourages entrepreneurs to promote and exploit existing space-related patents. www.france.esnc.eu

organised by

Dr Aude Nzeh Ndong
+33 561 145802
france@azo-space.com
www.esabic.fr

GALICIA / SPAIN

REGIONAL WINNER

DISASTER MANAGEMENT

Vigo Free Trade Zone Consortium

Galicia, one of Spain's 17 autonomous regions, has an area of 29,500 square kilometres and more than 2.5 million inhabitants. The region is a hotbed of education and innovation. It is home to three universities and a large number of nationally acclaimed R&D centres for Forestry, Marine, Automotive, Shipbuilding, Mining, Wind, Hydroelectric Energy, Food and Agriculture. The Vigo Free Trade Consortium is a public institution encouraging international trade and economic development in Galicia since 1947. As an economic development agency, it serves as the main developer of business parks in its area and provides companies with many services. In 2010, the network of parks in Vigo's free trade zone generated >25% each of the total wealth of the Vigo Metropolitan Area and of its employment. www.galicia.esnc.eu

organised by

ZFV CONSORCIO ZONA FRANCA DE VIGO

Francisco J. Diaz-Otero
+34 986 818671
galicia@azo-space.com
www.uvigo.es/uvigo_en

ALIVETOR: Alive Victims Detector Onboard of an UAV

After earthquakes, terrorist attacks and other disasters, thousands of people can be trapped inside collapsed houses, factories or public buildings. Using radar technology that penetrates various materials, ALIVETOR is able find buried victims near the surface of rubble. Its radar sensor is mounted onto a UAV, allowing the solution to cover vast areas in a reasonable time.

© GRADIANT

The solution works by capturing and positioning a victim's movements or, if the victim is unconscious or resting, by detecting the minimal displacements caused by respiration.
The advantages of ALIVETOR:

- Detection of live victims, which is the primary concern during post-disaster scenarios
- UAV covers vast areas more quickly than common existing methods
- Sensors use GNSS signals to achieve robust, accurate coverage of multiple locations

In post-disaster scenarios, victims don't have access to food or drink and can be severely injured. This makes ALIVETOR's fast response time vitally important. In such scenarios, the UAV follows a three-step procedure: Fly, land, and detect. By providing first responders with quick, reliable and detailed descriptions of damaged areas, ALIVETOR helps them save lives.

Pablo González Fernández,
Jorge Munir El Malek Vázquez, Gradiant
pgonzalez@gradiant.org
www.gradiant.org

gradiant

HESSE / GERMANY

HESSEN

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REGIONAL WINNER

HIGH PRECISION

PPP-WizLite: Precise Positioning Using a Smartphone

Last year, Android 7 was released, enabling users to access raw GNSS measurements using a smartphone. This new possibility is key to the success of the Precise Point Positioning (PPP) WizLite application, as its innovative algorithms now allow users to fixate positions within one metre with a compatible smartphone. At the moment, this application is the only one on the Google Store capable of achieving this accuracy using GPS raw measurement corrections and ephemeris in real time. Meanwhile, PPP-WizLite already offers the option to use EGNOS data. Its next version will not only provide access to default casters, but also use GALILEO, GLONASS and BEIDOU

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for even more precise localisation. Last but not least, new multi-frequency chipsets and a new method of carrier phase measurement will soon make centimetre-level accuracy possible. This improved GNSS application for precision positioning could be used in various industries and public and/or military applications thanks to PPP-Wizard algorithms (which were developed by France's CNES).

Aude Privat, Matthieu Pascaud, Arnaud Ginestet,
Nicolas Frouvelle, CS Systèmes d'Information
nicolas.frouvelle@c-s.fr
uk.c-s.fr

Centre for Satellite Navigation Hesse (cesah)

The ESA Business Incubation Centre (BIC) Darmstadt is managed by cesah, a competence, information and incubation centre for satellite navigation. It is supported by its shareholders, the Region of Hesse, the City of Darmstadt, and renowned scientific and industrial partners. Located in the vicinity of the European Space Operations Centre (ESOC), cesah supports the development and marketing of business ideas and startups in the satellite navigation domain. cesah is supported by digitales.hessen, a programme of the Hessian Ministry of Economic Affairs that supports the Hessian ICT sector in its market development, as well as SMEs in their efficient and creative use of ICT. www.hesse.esnc.eu

organised by

cesah Centrum für Satellitennavigation Hessen

Dr Frank Zimmermann
+49 (0)6151 39215612
hesse@azo-space.com
www.cesah.com

National Space Centre

Supported by a highly skilled workforce, Ireland's knowledge-based economy and strong technology sector have given the country the highest concentration of ICT activity and employment in the OECD. Ireland's ICT sector also attracts global investment, with 7 of the world's top 10 companies now operating from the country. ICT also accounts for EUR 50 billion in Irish exports. The National Space Centre, located in the South of Ireland, is Ireland's only teleport. It is involved in a number of emerging satellite technology projects, including the development of Satellite Automated Information Systems (SAIS) and marine mapping feeds with ESA and has provided technical support services for the European Galileo satellite navigation programme. www.ireland.esnc.eu

organised by

Carla Brown
+353 (0)21 6010744
ireland@azo-space.com
www.nationalspacecentre.eu

IRELAND

REGIONAL WINNER

UAV

DroneSAR: Transforming Drones for Search & Rescue

DroneSAR makes it possible to use affordable, "off-the-shelf" drone technology to expedite successful outcomes during emergency response incidents. It does so by delivering the right data to the right people at the right time when agencies are faced with time and resource constraints. DroneSAR aims to assist search and rescue (SAR) missions by enabling drone operators to plan and carry out waypoint and grid search missions based on altitude, field-of-view, battery life, probability of detection, and other variables.

The vast amounts of drone data retrieved during SAR missions need to be collected, processed and transferred with speed, accuracy and quality. DroneSAR's live tracking interface provides search managers with live streams of end-to-end, low-latency, first-person-view (FPV) video. The accuracy and reliability of its GNSS positioning information also facilitates navigational services that enable remote coordinators to track and view multiple drone flight missions simultaneously. This ultimately allows for quicker, more effective responses and mitigates the risks faced by responding personnel.

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Oisin Mc Grath, Leo Murray, Matthew Kelly, Gearoid O' Briain, DroneSAR
oisin@dronesarpilot.com
dronesarpilot.com

DRONE SAR
SEARCH AND RESCUE

MADRID / SPAIN

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REGIONAL WINNER

AUGMENTED REALITY AR

Underground Visualisation for Utility Management

The LARA system promises to provide field workers with the ability to "see underground". It combines GNSS, 3D GIS and geospatial databases, and Augmented Reality in order to render complex 3D models of underground water, gas, sewage and electricity grids. LARA is equipped with a high-precision, low-power, highly autonomous GNSS receiver module capable of achieving centimetre-level accuracy. Consisting of a GNSS module and an IMU module, this receiver is compatible with multiple constellations (including Galileo and EGNOS), but Galileo is key to improving its accuracy, availability, and integrity. The LARA system will enable utility companies to localise their key underground assets thanks to these benefits:

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- Facilitates far more precise maintenance operations on underground infrastructure without affecting adjacent underground grids
- Precise interventions also reduce overall maintenance costs
- Minimises economic and social implications of lengthy surface works

The LARA system is ideal for utility companies; engineering, construction and maintenance firms; and grid owners and operators.

Dr Stratos Stylianidis, GeoImaging Ltd.
stratos@geoimaging.com.cy
www.geoimaging.com.cy

madri+d Foundation

The Madrid region represents the primary hub of Spanish industry, research, and education in the aerospace sector. It accounts for around 92% of the country's aerospace activity, both in terms of direct employment and turnover. The Madrid region is also home to a large number of public and private universities and boosts Spain's highest level of investment in R&D. The madri+d Foundation supports the creation and early consolidation of new technology-based firms. Since 2002, it has supported 460 startups generating > EUR 150 million in total turnover and > 2,800 jobs. madri+d works closely with its network of universities, incubation centres, research and entrepreneurial institutions.

www.madrid.esnc.eu

organised by

Eduardo Díaz Sánchez
+34 91 7816570
madrid@azo-space.com
www.madrimasd.org

The Netherlands Space Office (NSO)

The Netherlands Space Office (NSO) was established by the Dutch government to develop and implement its country's long-term space programme. In addition to serving as the Dutch space industry's representative in international space organisations like ESA and NASA, NSO forms the central point of contact for the space community within the Netherlands. Moreover, NSO also seeks to educate the general public – and specifically students and teachers – about space (science, applications, and exploration) in an open and innovative manner. Finally, NSO invests in programmes that foster the commercial market for applications based on the utilisation of space data. www.nl.esnc.eu

organised by

Bert Meijvogel
+31 88 6024529
netherlands@azo-space.com
www.spaceoffice.nl

THE NETHERLANDS

REGIONAL WINNER

UAV

Drones for Work – Industrial Offshore Drones

Drones for Work is a startup that aims to create safe, simple and cost-effective inspection and maintenance solutions by applying state-of-the-art control methodology to custom-designed drones. Maintenance drones require an extraordinary level of control that minimises path deflection due to gusts. A 70 km/h gust will push a current-generation drone off its path by a few metres, if it remains controllable at all. The technology behind Drones for Work uses both position and velocity data from GNSS to reduce this deflection to around 10 cm. To improve drone stability, the startup applies a model-based control methodology that was originally developed for space applications and extended to be especially useful in unpredictable environments. Currently, Drones for Work is developing a drone platform that can carry a wide range of payloads up to 10 kg. The first application will be short-range offshore package delivery. This is a solution for offshore construction companies, which face costly delays due to missing tools. In the future, a wide range of payloads can be developed with applications ranging from ultrasonic inspection to maintaining the leading edges of wind turbine blades.

Robert Crone, Jim Rojer, Maurice Bos, Drones for Work
r.crone@dronesforwork.nl
Dronesforwork.nl

NORWAY

REGIONAL WINNER

HEALTH

Smartwatch for Alzheimer's/Dementia Patients

Dementia/Alzheimer's cases are increasing worldwide. One of the main concerns of relatives and caregivers is that patients are not only oblivious, but can fall unexpectedly due to a loss of bodily control. Illuminox seeks to address this problem with a smartwatch including an airbag feature for fall detection and a connected application for caregivers. The embedded LoRa geolocation solution supports in- and outdoor tracking, which makes life easier for patients and caregivers alike. The device offers the following benefits:

- SOS/medical emergency calls
- Emergency call function for caregivers
- Heartbeat monitoring
- Guides patients back to a set home address
- Real-time geotracking of patients in a predefined area

- Sends alerts to caregivers if patients leave a predefined area
- Airbag inflates as soon as device detects a patient's fall

The solution is highly accurate thanks to its use of deep learning algorithms for ignoring false alarms. The data is processed by servers based on Fog Computing for Robotics and Industrial Automation. The main goal of Illuminox is to save more lives of Alzheimer's and dementia patients.

Ashish Rauniyar, University of Oslo (UiO)
Siva Leela Krishna Chand GUDI, The Magic Lab, University of Technology Sydney
ashishr@ifi.uio.no
www.illuminox.org

Norwegian Space Centre

The Norwegian Space Centre (NSC) is a government agency under the Ministry of Trade and Industry. Its mission is to ensure that Norway benefits as much as possible from its space activities. NSC's areas of focus include activities in which Norway can compete in the global market for space-related goods and services, and which to a great degree are based on national qualifications and needs. In addition to promoting the development, coordination, and evaluation of the country's space activities, NSC supports Norwegian interests through the European Space Agency (ESA). Norway's participation in the EGNOS and Galileo programmes is also actively managed by NSC.

www.norway.esnc.eu

organised by

Erik Uribarri
+47 (0)22 511804
norway@azo-space.com
www.romsenter.no

Blue Dot Solutions

Poland is one of the biggest markets for IT, mobile, transport, and entertainment products and services in the EU. It has a vibrant investment scene with an increasing interest in funding new applications and technological solutions. Having joined the EU in 2004 and become an ESA member-state in late 2012, Poland is now in a position to realise, fund, or co-fund several space-related programmes. Blue Dot Solutions (BDS) Ltd. is a Polish SME providing a broad range of engineering, B2B, and consulting services to the Polish space sector. The services are mostly related to projects conducted for ESA, the European Investment Bank (EIB), and the European Commission (EC). BDS owns the biggest Polish website dedicated to space news, named Kosmonauta.net. www.poland.esnc.eu

organised by

Krzysztof Kanawka
+48 58 520 16 34
poland@azo-space.com
www.bluedotsolutions.eu

POLAND

REGIONAL WINNER

AGRICULTURE

Zukbot – The Autonomous Agricultural Robot

The purpose of Zukbot, the autonomous agricultural robot, is to meet the growing need for automation in agriculture. Here, the contributing factors include the increasing price of human labour, the development of agricultural technologies, and the growing demand for food worldwide. Zukbot's smart spraying machine (which features a precise tool for soil diagnostics) is designed to help the modern farmer produce food more effectively and profitably thanks to technologies such as satellite guidance, laser distance measurement and weed detection. In particular, Zukbot offers farmers the following advantages:

- Precise information on plant and soil conditions
- Weed detection
- Reduced use of chemicals
- Increased crop yields
- Reduced harvesting costs

In addition to enabling farmers to make optimal use of all their available resources, Zukbot's advanced technology will help protect the environment by requiring fewer chemicals.

Mateusz Olszewski, Robotics Association Skalp
mateusz.olszewski@skalppg.pl
skalppg.pl

ROMANIA

REGIONAL WINNER

HEALTH

PharGO: Pharmacy on the GO!

The purpose of the mobile application PharGO is to connect pharmacies with their end users by making it easier for consumers to purchase medicine.
The location-based application allows users to make a list of the pharmaceutical goods they need. Based on the user's location, PharGO then shows the best purchase offer in terms of local proximity, price, availability and pick-up time. The application uses GNSS signals to provide directions to the target pharmacy, enabling consumers to simply pay for and pick up orders at their preferred time. Consumers can thus avoid queues and time spent searching for available stock or rare medicines. Pharmacies also benefit from PharGO thanks to location-based advertising, which helps them increase their sales performance.

Teodor-Alexandru Sararu, Andra Mihaela Oancea
Team MayDay
alex.sararu@outlook.com

Romanian Space Agency

Established in 1991 and reorganised in 1995 as a public institution within the Ministry of National Education, the Romanian Space Agency (ROSA) develops the National Space Programme and coordinates its implementation through research projects and space applications. It also establishes its own R&D centres. ROSA serves as the lead organisation of the Programme for Research, Development and Innovation STAR (Space Technology and Advanced Research) and represents the Romanian Government in international cooperation programs such as ESA, UN and the NATO. Led by president Dr Piso since 2004, the agency carries out its own R&D projects through the ROSA Research Centre. www.romania.esnc.eu

organised by

Dr Vlad Olteanu
+40 (0)726 194283
romania@azo-space.com
www.rosa.ro/index.php/en

The Satellite Applications Catapult

The SA Catapult is an independent innovation and technology company, created to foster growth across the economy through the exploitation of space. Catapult helps organisations to exploit satellite technologies and brings together multi-disciplinary teams to generate ideas and solutions in an open innovation environment. Their world-class facilities and expertise enable the best businesses, researchers and end-users to work together to develop new satellite-based products, services and applications, translating ideas from concept to market. Catapult allows the UK to boost the business support provided to all entrants, and vastly expand on the range of available programmes such as for a for investor readiness, ideas accelerators and business breakfast clubs. www.uk.esnc.eu

organised by

Kirsten Robinson
+44 (0)1235 567999
uk@azo-space.com
sa.catapult.org.uk

UNITED KINGDOM

REGIONAL WINNER

LOGISTICS

DriverNet: The Smart Logistics Network

DriverNet is a logistics network and mobile app that connects any driver to any site by sharing information among drivers, driver management systems and customers. This results in lower emissions, better driver and customer experiences, and improved all-round performance. The DriverNet app bridges the service gap that has led 5 million commercial vehicle drivers in the UK to fall back on navigation services designed for cars and consumers. Due to the cost of specialist HGV satnav services, many drivers use Google Maps or Apple Maps on smartphones, or TomTom or Garmin devices. These services fail to do three major things: Provide the advance delivery information drivers need, guide them to the correct "goods-in" delivery point, and notify customers before they arrive. The DriverNet app is a plug-and-play service that provides all these services in one solution, along with additional advantages:

- Connects any driver to any customer or site in real time across a national logistics network
- Easy access through the web or mobile devices
- Quick and easy registration of users

After registering, users only have to upload their site profiles to get immediate access to a customer-facing app, which then connects them to any delivery in real time.

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Anthony Chisnall, Emma McNally, Arturs Karlovics, Jordan Docherty, Sam Gileeney, Jack Gooden, DriverNet
ant.chisnall@driver-net.com
www.driver-net.com

VALENCIAN COMMUNITY / SPAIN

REGIONAL WINNER

UAV

Stratolloon: A Reusable High-Altitude Laboratory

The main purpose of Stratolloon is to launch payloads into low Earth orbit with a stratospheric balloon and recover it safely. Stratolloon is designed to land on the user's exact GNSS position, thus avoiding parachute issues and crashes with the ground, planes, and other objects. Stratolloon consists of a reusable container (bus) that can slow its free-falling velocity, place payloads in the desired location, and avoid all types of damage once it is released from the balloon. This is possible thanks to four foldable arms with multi-copter engines that work together with Stratolloon's automated landing system and a ground station application. The solution also provides real-time mission data, including altitude and position based on GNSS, IMUs, barometers and ultrasound systems. Stratolloon is capable of flight times up to several weeks, during which it collects data in cruise mode and for more than 30 minutes in landing mode. This enables it to land in locations far from the point of release. The first version can recover up to 5 kg of payload from an altitude of 33 km, making Stratolloon the first system in the world that ensures the security of payloads from the ground to low Earth orbit and back again while also providing abort capabilities.

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Jorge Sancho Muñoz, Technical University of Valencia
info@stratolloon.com
www.stratolloon.com

Val Space Consortium

Boasting an excellent communications network, modern infrastructure, quality industrial land, and skilled entrepreneurs, the 3 provinces of Valencia, Castellon, and Alicante offer an ideal place for companies to settle and grow. Val Space Consortium was created in 2010 to combine Valencia's efforts in the space sector and increase their impact and international competitiveness. Composed of Generalitat Valenciana, the city administration of Valencia, Universitat Politècnica de València, and Universitat de València Estudi General, it performs scientific research and renders technological development services in space-related fields. Through collaborations with ESA and other institutions, the consortium facilitates European space development.

www.valencia.esnc.eu

organised by

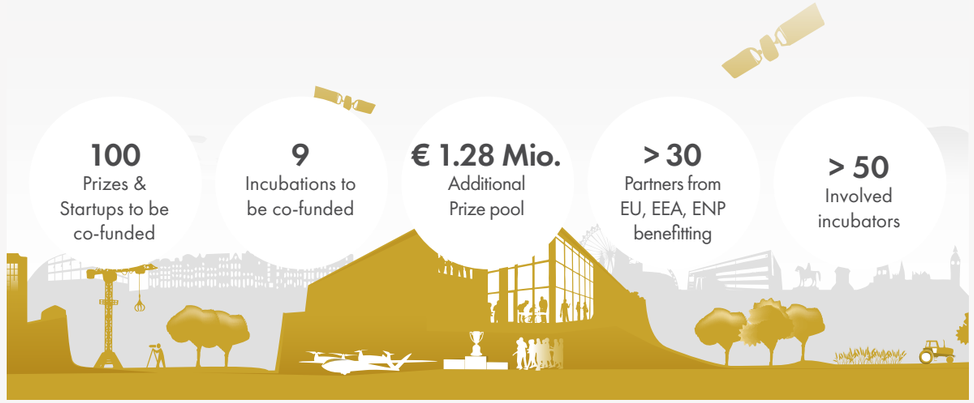
David Argilés
+34 96 2051405
valencia@azo-space.com
www.val-space.com

E-GNSS ACCELERATOR

Boost Your Region with High-Tech Innovation

Since 2004, the ESNC serves as accelerating instrument for startups and entrepreneurs with the most forward-thinking applications based on satellite navigation. Until today, the competition remains to set benchmark levels of space-related innovations for Europe.

From 2017 until 2019, this success story will be further strengthened thanks to the new E-GNSS Accelerator. Funded by the European Commission, it is the first Accelerator for the European Galileo programme enabling partners and participants to foster the Galileo/EGNOS market uptake on a broad scale.



Benefit as ESNC Partner Region

- Co-financing of EUR 10,000 for your regional prize
- Additional EUR 43,000 for further services if your winner is among the top 3 ESNC startups
- More attractive prizes to be offered within your challenge
- Retrieval of innovative satellite navigation data business ideas for daily use & corresponding development into real commercial ventures
- Key position for your country in the implementation of Europe's new Space Strategy
- Access to 140 GNSS stakeholders such as EC, GSA, ESA, DLR, BMVI and many more
- Driver of innovation of Europe's first E-GNSS Accelerator

Who's Eligible?

The E-GNSS Accelerator creates multiple benefits for ESNC Regional Prize partners from EU28, the European Economic Area (EEA) and European Neighbourhood Policy (ENP) countries.

Get Involved

Find out more about the largest E-GNSS Accelerator for satellite navigation at www.esnc.eu/accelerator

Do you want to boost your region with high-tech innovation? Then please contact us!

Kathrin Lenvain
Head of Competitions and Events
kathrin.lenvain@azo-space.com

Luisa Wagner
Project Officer
luisa.wagner@azo-space.com

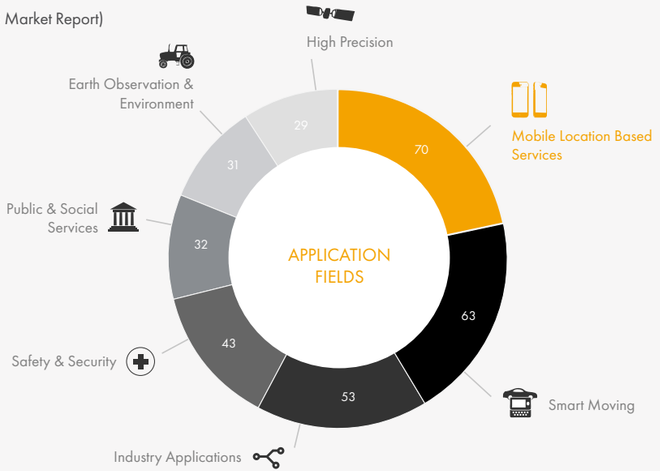
Ulrike Daniels
Business Development
ulrike.daniels@azo-space.com

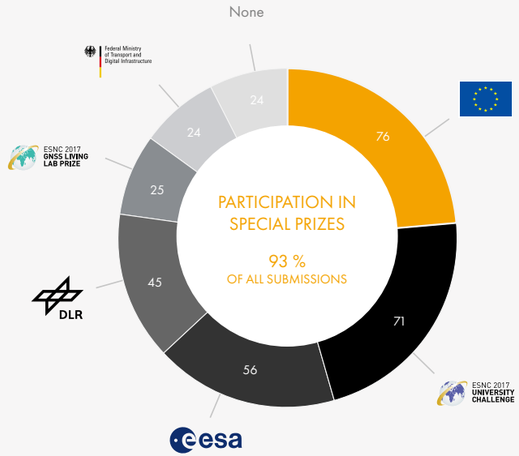
STATISTICS

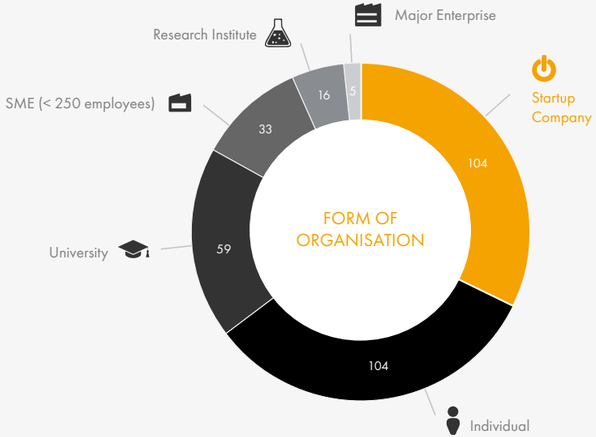
Scouting the latest GNSS trends around the globe

This year's edition of the ESNC recorded another great result of 321 entries and reached entrepreneurs from over 50 different countries. More than 11,500 participants have submitted 4,077 business cases since 2004. This contribution has helped to foster the growing market which is expected to produce over EUR 70 billion in revenue annually in 2025.* When the revenue created by added-value services is included, this number could more than double.

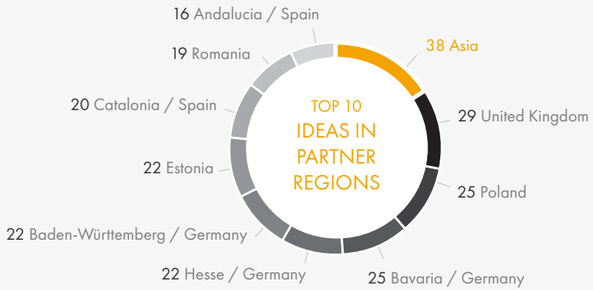
* (European GNSS Agency 2017 – GNSS Market Report)

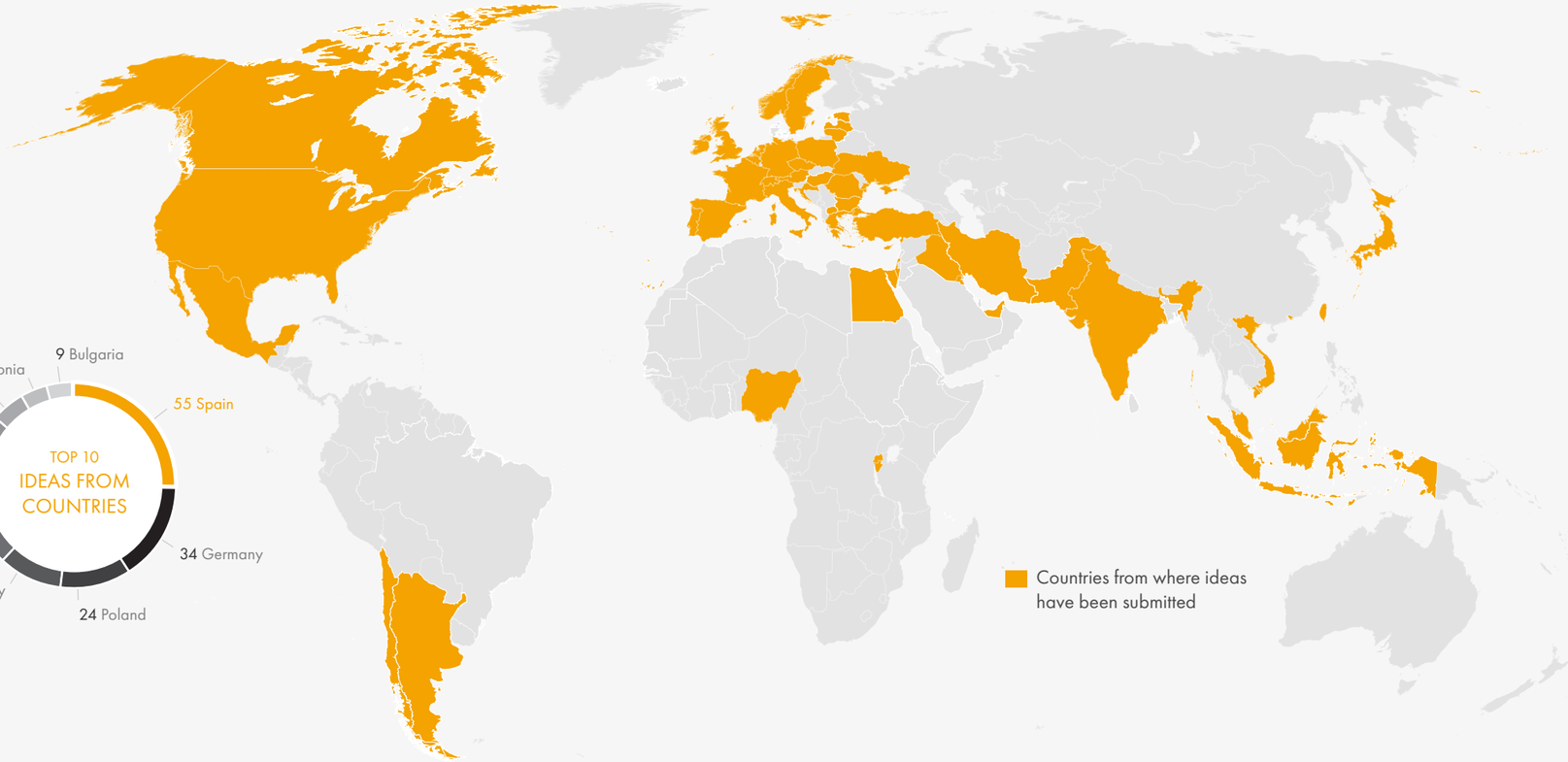






CROSS-REGIONAL IMPACT





EXPERTS

United expert knowledge for future-oriented entrepreneurs

Within the past 14 years, the ESNC has grown into a unique network of space innovation and expertise. 200 international experts from the realms of industry, research and politics contribute to this huge knowledge pool. Their most important task is to evaluate the ideas submitted and detect new key future technology trends.

European GNSS Agency (GSA)	
Ms Dafni Dimoudi	European GNSS Agency (GSA)
Mr Vojtech Fort	European GNSS Agency (GSA)
Ms Marta Krywanis-Brzostowska	European GNSS Agency (GSA)

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Mr Miroslav Kuridza	Bundeswehr Technical Centre (WTD) 81
Mr Hendrik Osenberg	German Aerospace Center (DLR)
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Dr Jaume Sanz Subirana	Technical University of Catalonia (UPC)
Mr Andreas Schütz	Universität der Bundeswehr München
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Dr Stavri Nikolov	Digital Spaces Living Lab (DSLL)
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Mr Rafael Godoy Rubio	University of Málaga (UMA)
Mr Pedro Lázaro Legaz	University of Málaga (UMA)
Prof Dr Teresa M. M. Guerrero	University of Málaga (UMA)
Mr Mariano Morán Prados	Promálaga
Ms Natalia Pérez Pérez	Andalucia Technology Park (PTA)
Mr Pedro Pablo Sanchez	AERTEC Solutions
Dr Rafael Ventura Fernández	University of Málaga (UMA)

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Mr Varadarajan Krish	European Business Group India (EBGI)
Mr Yasushi Sakurai	Satellite Positioning Research and Applications Center (SPAC)
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Ms Rosa Eguizábal	Vigo Free Trade Zone Consortium
Mr Carlos Groba-Presa	Marine Instruments
Dr Roberto Prieto-Cerdeira	European Space Agency (ESA)
Dr Javier Ventura-Traveset	European Space Agency (ESA)

EXPERTS

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Mr Hendrik Terstiege	HA Hessian Agency GmbH
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Mr Niels Eldering	European Space Agency (ESA)
Mr Bert Meijvogel	Netherlands Space Office (NSO)
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Ms Danuta Kostenecka	Pomorska Specjalna Strefa Ekonomiczna
Mr Wojciech Drewczyński	Space3ac accelerator
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Dr Jakub Ryzenko	Space Research Centre

Romania

Mr Ovidiu-Gabriel Dan	Siemens Convergence Creators SRL
Dr Sorin Nicola	CS ROMANIA SA
Dr Vlad Olteanu	Romanian Space Agency
Ms Alina Radutu	Romanian Space Agency

United Kingdom

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Mr Tim Just	Innovate UK
Mr John Pottle	Royal Institute of Navigation
Mr Andy Proctor	Innovate UK
Mr Mark Stevens	Airbus Defence and Space
Dr Tim Watkin	Marks & Clerk LLP

Valencian Community / Spain

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Mr Juan Antonio Bertolin	ESPAITEC
Mr Francisco Javier Casas Lucas	University of Alicante
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Ms Antonia Salinas	Parque Científico y Empresarial de la Universidad Miguel Hernández de Elche
Dr Javier Ventura-Traveset	European Space Agency (ESA)
Prof Dr Ana Vidal-Pantaleoni	Technical University of Valencia

MEDIA PARTNERS

The ESNC in the limelight

We want to express our appreciation to the GNSS magazines and stakeholders active in space-related fields who support the ESNC as media partners. They are essential parts of spreading the word about the unique opportunities to entrepreneurs and startups all across the world.

Join the ESNC media partner network

Be the first to receive stories and news about the latest innovations, opportunities and successes of the largest satellite navigation network! Our aim is to join forces and deliver latest news about exceptional chances for entrepreneurs and startups all across the world.

We offer the following benefits:

- Be the first to receive our latest news
- Get exclusive stories for your own media channels
- Profit from our current outreach:
- Over 11,500 ESNC participants since 2004
- Geographical outreach to more than 80 countries
- 140 space-related stakeholders

To learn more and to become a media partner in 2018, contact:

Regine Heue
Head of Marketing & Communications
+49 (0)8105 77277–33
regine.heue@azo-space.com
www.space-of-innovation.com

GET INVOLVED & PRE-REGISTER FOR 2018

Since 2004, the ESNC provides Europe with path-breaking satellite navigation novelties. The team behind the competition has always been scouting the most forward-thinking applications and offers a unique European space cluster innovation network, including access to over 50 incubators and 200 experts.

By providing participants with the necessary marketing and promotion platform, the competition and its team are key in increasing the Galileo user uptake and an overall awareness of GNSS applications in everyday life.

The ESNC Team

Andreas Dippelhofer
Senior Project Manager

Luisa Wagner
Project Officer

Christina Wlochowitz
Project Officer

Become a partner for 2018!

Become a prize sponsor for the leading innovation network for satellite navigation!

Please get in touch with
andreas.dippelhofer@azo-space.com

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We are happy to support you, get in touch with us via email

esa-bic@azo-space.com

or call us:

Thomas Ballatré
+49 (0)8105 77277–15

Cornelia Gebath
+49 (0)8105 77277–20

Christoph Müller
+49 (0)8105 77277–35

AZO Space of Innovation

AZO – Your Partner in Competition & Innovation

AZO is the international networking and branding company for European space programmes. AZO organises its "**Innovation Masters Series**", the most important space-related innovation competitions with the European Satellite Navigation Competition, the Copernicus Masters, the INNOspace Masters, the Space Exploration Masters and the START UP WORLD. Become part of our global space innovation network comprising more than 200 world class space stakeholders! With Europe's largest acceleration programmes for Galileo and Copernicus, we'll make ideas reality.

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European Satellite Navigation Competition

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www.esnc.eu

Copernicus masters

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www.copernicus-masters.com

INNOspace MASTERS

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Daniela Dobreva-Nielsen
Business Development
daniela.dobreva-nielsen@azo-space.com

Kathrin Lenvain
Head of Competitions and Events
kathrin.lenvain@azo-space.com