AZO
Space of Innovation

copernicus masters

www.copernicus-masters.com
The leading innovation platform for
commercial Earth observation applications

The Results 2019

9th Edition

upon the initiative of

partners

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AZO Business Propulsion Components

We offer visionary entrepreneurs the space of innovation they need to secure their competitive advantage.

Become a partner

You are looking for innovative solutions from all over the world that either make use of your company technologies or address a specific problem: Become a partner of the Copernicus Masters or set up your own competition.

- Innovation
- Promotion
- Networking

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AZO Space of Innovation

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COPERNICUS MASTERS INTRO 2019

In recent years, the Copernicus Masters innovation competition has given Earth observation (EO) in Europe a new, young face. Our innovation competitions have always been amongst the first to put forward topics such as big data, data analytics and processing, the evolution of business models and cloud computing, which are key for pioneering space applications. Since its launch, AZO has received nearly 3,700 applications from close to 100 countries, and these numbers continue to grow. Programmers, engineers, analysts, geoscientists and business scientists from universities, research institutes and companies are recognising EO as an endless source of data for applications that benefit our home planet. Inspiration and creativity are needed to derive new information and insights from this data to protect and help our society. Cloud computing, machine learning and artificial intelligence (AI) support the objective to efficiently and meaningfully process these large amounts of digital data.

Entrepreneurial talent, new business models and venture capital are needed to build up EO data into sustainable services for a wide variety of industries. The Copernicus Masters has managed to establish a new market for "big data from space" in Europe and trigger a startup boom with more than 100 young companies.

Through challenges in fields of application such as smart farming, digital transport, small satellites, and its search for both ideas and working prototypes, the competition attracts applications from various types of enterprise. The results from the past nine editions show that a majority of applicants in our competitions are startups, researchers, and small and midsize companies, but individuals and major companies have also submitted their visionary solutions.

Business and society are benefitting from these new solutions in agriculture and forestry, construction, transport and logistics, health, energy, environment, safety, maritime transport and aviation.

Together with the European Space Agency and our world-class partners, we are capable of attracting the most innovative products and services based on Copernicus data in a multitude of application fields each new year. My special thanks go to the European Space Agency, which has supported us from the very beginning and provided us with cutting-edge data from its Copernicus space programme.

My thanks also go to our dedicated partners who have hosted topic-specific challenges for the Copernicus Masters over recent years: The German Aerospace Center (DLR), CGI, Planet Inc., BayWa AG, Astrosat, Airbus, and the German Federal Ministry of Transport and Digital Infrastructure (BMVI).

I am also very thankful for our more than 70 international experts from industry, research, and politics who evaluated all submitted entries.

I am excited to see the Copernicus Masters participants and winners push the commercialisation of the EO sector forward with their business cases.

As you can tell: It certainly remains exciting. Stay tuned for the next Copernicus Masters operational phase from April till June 2020.

Thorsten Rudolph
Managing Director
AZO Anwendungszentrum GmbH
Oberpfaffenhofen

"This is where the Copernicus Masters comes into play. It functions as deal flow generator for Copernicus. The 2019 edition of the Copernicus Masters featured 8 challenges presented by first-class partners and 24 regional associates from all over the world. 432 participants, submitted 182 new EO business ideas from 52 different countries."

ESA INTRO

Today, we all have understood that space is a critical sector enabling the implementation of public policies and of European engagement worldwide. The capacity to access and use space is an indispensable condition for Europe to tackle global challenges, such as climate change, technology revolutions, shifts in geopolitical power or humanitarian crises, and to support economic growth, safety and security, quality of life and sustainable development.

From there it is not far to the Copernicus Masters, which has proven to be an excellent example for boosting economic growth and tackling global challenges for our planet. Over the past nine years, the Copernicus Masters has, indeed, evolved into an important tool that promotes the evolution of cutting-edge applications using EO data and continues to be a rich breeding-ground for successful entrepreneurship.

I have been following the Copernicus Masters since its inception and I am proud that this innovation competition is always one step ahead in addressing the latest state-of-the art topics, now focussing on artificial intelligence (AI) and other disruptive EO technologies of the future. Not surprisingly, we have introduced this year the extremely successful "Copernicus 4.0 Challenge", aiming to respond to the fundamental trends of EO that are currently evolving fast and furious.

As part of the challenge, we were inviting participants to demonstrate how new and disruptive trends in EO (SmallSats, NanoSats, HAPS – High Altitude Platform Stations – and drones) can work together with the traditional EO satellites to provide innovative solutions. I have been told that the submissions have been of outstanding quality, a proof that we did the right thing at the right time. You will discover more about this ESA Challenge in the present booklet.

With ESA being at the forefront of this new approach in EO, I am delighted that we also introduced Copernicus 4.0 in November to all Member States at Space 19+, the ESA Ministerial Conference, as part of "OperationalEO", amongst others aiming at the development of new Sentinel families that respond to emerging user needs making up the transformation of EO.

I am convinced that disruptive technology developments and space are, indeed, influencing each other and, with such a powerful tool as the Copernicus Masters and its forward-thinking participants, I believe that we have an excellent choice in our toolbox to address the challenges facing the European space sector and the European society as a whole. Together with the European Commission we will continue on this successful path, also by reinforcing synergies with the Galileo Masters.

Jan Wörner
Director General
European Space Agency (ESA)

My gratitude and congratulations go out to all participants and winners of the Copernicus Masters 2019.

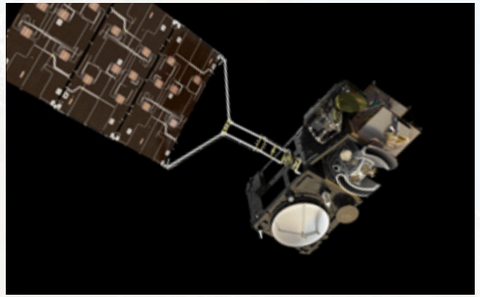
Special thanks also to the competition organisers at ESA and AZO Anwendungszentrum GmbH Oberpfaffenhofen, who have again underlined the enormous potential and power of ground-breaking and revolutionising solutions based on Earth observation.

"I am convinced that disruptive technology developments and space are, indeed, influencing each other and, with such a powerful tool as the Copernicus Masters and its forward-thinking participants, I believe that we have an excellent choice in our toolbox to address the challenges facing the European space sector and the European society as a whole."

ABOUT COPERNICUS

By rising to the global challenges of climate change and responding to the ever-growing and diverse stress factors placed on the environment and civil security, Europe's Copernicus programme is taking significant steps forward in the way we care for our planet. Copernicus is the most ambitious Earth observation programme to date and is an integral component of Europe's ambitious activities in space. It responds to the needs of its users and ultimately serves European citizens – both directly through its products and applications and indirectly through its social, economic and environmental benefits. The Copernicus programme is under the overall leadership of the European Commission, which acts on behalf of the European Union (EU) and is responsible for the programme's Services Component. The EU's main partner in this endeavour is the European Space Agency (ESA), who coordinates the Space Component, which is the heart of Copernicus. In addition, the European Environment Agency (EEA) gathers data from a network of various airborne sensors and ground stations.

Copernicus consists of a complex set of systems that collects information from multiple sources, including the aforementioned sensors and upwards of 30 Earth observation satellites. The Space Component comprises two types of satellite missions: The dedicated Sentinel missions, which were developed by ESA specifically to meet the Earth observation needs of Copernicus users

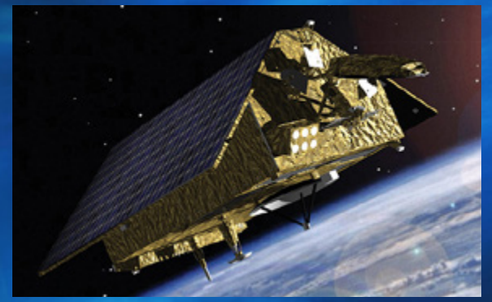


Sentinel-3, © ESA/ATG medialab

© contains modified Copernicus Sentinel data (2019), processed by ESA

and the Contributing Missions, which involve a number of existing and planned Earth observation satellites from other space agencies or organisations that also provide data to the programme. The Sentinels, each of which carries state-of-the art technology, provide a unique set of observations. The data generated is not only open to users worldwide, but also provided free of charge. This enables Copernicus to contribute to the development of a wide variety of innovative applications and services tailored to specific public or commercial needs. As a result, business opportunities are emerging in food security, urban planning, air-quality forecasting, flood management, drought detection, flight safety, oil spill detection and drift prediction, forest monitoring, marine pollution, crop health and disease detection, changes in land use, adventure tourism, and humanitarian aid – to name just a few.

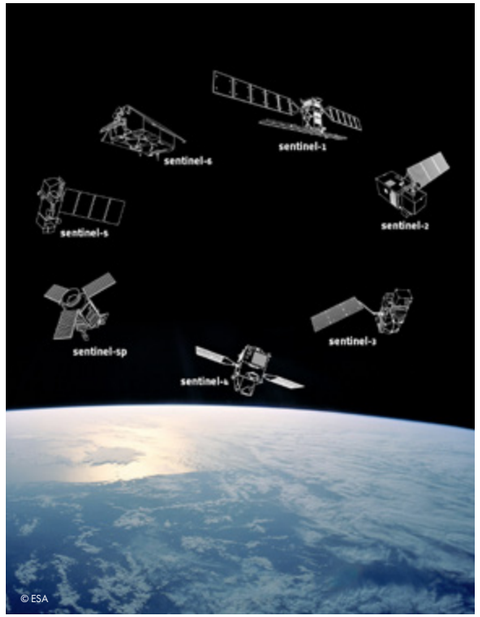
Source: ESA



Sentinel-6 carries a radar altimeter, © ESA 2015, Airbus Defence and Space

THE SPACE COMPONENT

The Space Component forms the heart of the Copernicus programme. This element delivers a wealth of data from six families of Sentinel satellites that are being developed by ESA specifically for Copernicus. Data from the Sentinels are then fed into six types of services – Marine, Land, Atmosphere, Emergency, Security and Climate Change – to benefit the environment and the way we live. This data is used in a wide variety of areas, including: Mapping land cover and tracking the way land is being used, improving agricultural practices and forest management, monitoring the oceans for maritime safety and efficiency, and tracking pollution in the air we breathe. The Sentinels also offer key information that supports rapid responses to natural disasters and promotes humanitarian efforts in times of crisis. Once the data is received on the ground, a network of corresponding archiving centres provides systematic data processing. All data products are archived and disseminated to users online. While the ground segment of each Sentinel mission includes specific components, all the related facilities are united to form the Copernicus Space Component Ground Segment. In particular, access to the Copernicus Space Component (CSC) data is coordinated through the CSC Data Access System.



There are currently six Sentinel families carrying a range of technologies that monitor land, ocean and atmosphere. Sentinel-1 is a polar-orbiting, all-weather, day-and-night radar imaging mission for land and ocean services. The first of these satellites, Sentinel-1A, was launched on a Soyuz rocket from Europe's Spaceport in French Guiana on 3 April 2014. Sentinel-1B was launched on 25 April 2016.

Sentinel-2 is a polar-orbiting, multispectral high-resolution imaging mission for land monitoring to provide, for example, imagery of vegetation, soil and water cover, inland waterways and coastal areas. Sentinel-2 can also deliver information for emergency services. Sentinel-2A was launched on 23 June 2015 and Sentinel-2B followed on 7 March 2017.

Sentinel-3 is a multi-instrument mission to measure sea-surface topography, sea- and land-surface temperature, ocean colour and land colour with high-end accuracy and reliability. The mission will support ocean forecasting systems, as well as environmental and climate monitoring. Sentinel-3A was launched on 16 February 2016. Sentinel-3B joined its twin in orbit on 25 April 2018.

Sentinel-4 is a payload devoted to atmospheric monitoring that will be embarked upon a Meteosat Third Generation-Sounder (MTG-S) satellite in geostationary orbit, and has a planned launch in 2021.

Sentinel-5 is a payload that will monitor the atmosphere from polar orbit aboard a MetOp Second Generation satellite. Sentinel-5 Precursor satellite mission is the forerunner of Sentinel-5 and provides timely data on a multitude of trace gases and aerosols affecting air quality and climate. This precursor mission was launched on 13 October 2017.

Sentinel-6 carries a radar altimeter to measure global sea-surface height, primarily for operational oceanography and for climate studies. Its launch is planned for the second half of 2020.

Source: ESA

SUCCESS STORIES FROM PAST WINNERS

Sinergise – EO Data Driver in the Cloud

The 2016 Copernicus Masters overall winner Sinergise won with a streamlined solution for the distribution of satellite imagery called Sentinel Hub. Through a simple API, it provides immediate access to the global archives of all the Sentinel missions, as well as those pertaining to Landsat, MODIS, and other satellite systems. Unprecedented access to petabytes of data, with several hundred terabytes being added every month, is enabling application developers around the world to translate space data into useful information by building EO-based applications. Things that took months in the past can now be done in just a few days. It is not a coincidence that Sentinel Hub now processes around three million requests every day for clients that range from multinationals and international organisations to numerous small and large companies around the world. Due to the general recognition among the EO community that Sentinel Hub is the most efficient way to access such data, four out of five DIASes (Data and Information Access Services) have partnered with Sinergise to make it available there as well. Discussions are also ongoing with several commercial satellite operators, which have the data but lack the platform to provide it to their customers.

20tree.ai – Detecting Forest Threats with Artificial Intelligence

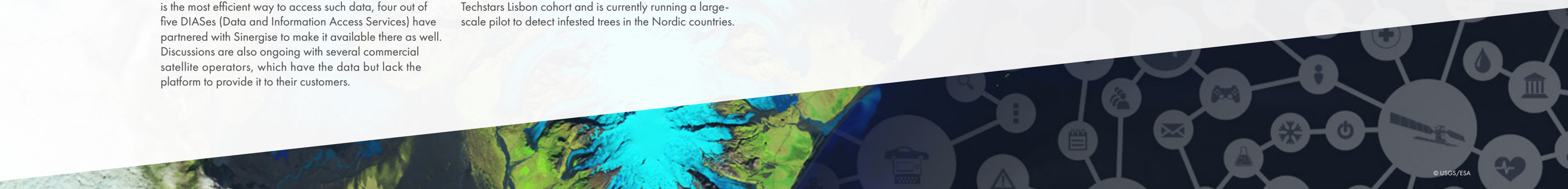
As the winner of the 2018 Copernicus Masters Planet Daily Change Challenge, the company 20tree.ai combines artificial intelligence (AI) and satellite imagery to monitor forest health and to detect forest threats. The company uses a range of different machine learning models that are trained on different resolutions and frequencies. For use cases that require a very detailed view from the sky, 20tree.ai uses optical imagery with up to 30 cm resolution from leading imagery providers such as Maxar and Airbus and high-resolution SAR data. Looking at forests at scale with very high resolution is not common and can be costly. However, when used to the fullest, it provides stakeholders with highly accurate and actionable insights to improve decision-making. Since winning the Copernicus Masters competition, 20tree.ai was selected out of more than 600 startups to join the first Techstars Lisbon cohort and is currently running a large-scale pilot to detect infested trees in the Nordic countries.

CyanoLakes – Cyanobacteria Public Info Service

Monitoring large, remote bodies of water is logistically challenging, time consuming and expensive. Responding quickly to events that pose a risk to human health has been almost impossible, given the size of some lakes and seas. Based on satellite remote sensing, CyanoLakes monitors toxin-producing cyanobacteria blooms in Earth's waterbodies from satellite remote sensing. The online service also enables water utilities with limited resources to become more efficient and responsive by supplementing their monitoring programmes. In 2014, CyanoLakes won the Copernicus Masters Ideas Challenge. In 2015, after being awarded with a research grant by the Water Research Commission, CyanoLakes began working on a prototype for South Africa. In January 2017, the prototype began providing near-real-time updates and, with the launch of Sentinel-3B in 2018, the service now provides up to six updates per week for all waterbodies on Earth.

FSSCat – Tandem Satellite Mission for Sea Ice and Soil Moisture Monitoring

The 2017 Copernicus Masters overall winner FSSCat was proposed by Spain's Universitat Politècnica de Catalunya and developed by a consortium of European companies and institutes. In addition to its remote sensing objectives, the soon to be launched FSSCat mission will demonstrate the world's first reliable optical intersatellite between two 6U CubeSats flying in low Earth orbit (LEO). The solution enables real-time sharing of Copernicus data in orbit for the development of novel applications – machine learning in space, for example, or other applications that would benefit from the rapid use of Copernicus data in space. Once in orbit, the mission will also demonstrate how onboard artificial intelligence can improve the efficiency of sending Earth observation data back to Earth. This not only ensures better quality data but also makes the delivery much more efficient.



© ESA

ESA Copernicus 4.0 Challenge

PRIZE

EUR 10,000 cash prize

Possibility to access EUR 10,000 worth of commercial Satellite datasets from the Copernicus Contributing Missions in the Copernicus Data Warehouse (financial support by EC)

PARTNER

The European Space Agency (ESA) is Europe's gateway to space.

Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world.

While the Copernicus programme is politically led by the European Union (EU), ESA is the overall coordinator of the Copernicus Space Component. Among other duties, it ensures the uninterrupted delivery of data from the Copernicus Sentinel satellites and from a number of important Copernicus Contributing Missions at national, European, and global level.

Dr Thomas Beer, European Space Agency (ESA-ESRIN)
thomas.beer@esa.int
www.esa.int

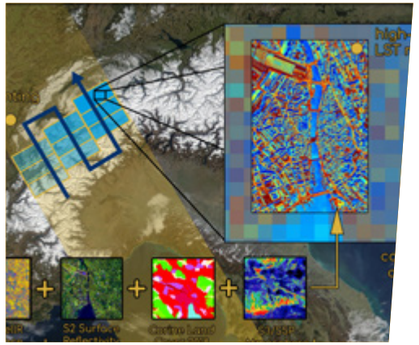
WINNER

ConstellR – Taking Our Planet's Temperature During Climate Change

This high-resolution temperature monitoring service from space will answer the market's need for granular land surface temperature data. It will also enable a massive reduction in greenhouse gas emissions and drastically improve humankind's capability to respond quickly to environmental threats in the age of climate change.

For atmospheric corrections, ConstellR uses aerosol and cloud cover data from Sentinel-5P and water vapour products from Sentinel-3.

In response monitoring, ConstellR data will enable global irrigation optimisation at the single-field level. Main benefits are the massive potential to conserve water which will take pressure off farmers, secure food production and mitigate CO_2 emissions.



© ConstellR

ConstellR, a spin-off from Fraunhofer EMI
Max Gulde
max.gulde@emi.fraunhofer.de
www.emi.fraunhofer.de/en.html

ConstellR

EXPERTISE

"ConstellR provides an intriguing opportunity to benefit our stressed-out biosphere: The idea does not only propose cutting-edge sensor technology to be installed in orbit, it also provides for the CubeSat to carry it and for the launch to make all that happen within a short time frame. This package is a unique feature, and it has convinced me to vote for it."

Dr Thomas Beer
Copenicus Policy Coordinator
European Space Agency (ESA-ESRIN)

© ESA

PRIZE

EUR 5,000 cash prize

Possibility to access EUR 10,000 worth of commercial datasets from the Copernicus Contributing Missions in the Copernicus Data Warehouse (financial support by EC)

PARTNER

The Earth Observation Center (EOC) of the German Aerospace Center (DLR) works in all fields related to the development of algorithms and data analysis systems, as well as in the practical implementation of Earth observation (EO) applications and services – from satellite data reception and near-real-time services to disaster monitoring and environmental mapping.

As such, the EOC is involved in many aspects of Copernicus design, operations, and applications. In determining the focal points of its research, DLR is to a large extent guided by the demand for innovative products and services in planning, resource management, and civil security.

Doris Klein, German Aerospace Center (DLR)
Doris.Klein@dlr.de
www.dlr.de/eoc

WINNER

ajuma UV-Bodyguard – Take Sun Protection to the Next Level

Sunburns are painful, but skin cancer is dangerous and has been rising on a global scale. To promote individual healthcare and offer a planning tool for sunny days, ajuma has developed the UV-Bodyguard. This is a wearable that connects to smartphones and continuously measures UV exposure, issues warnings, and provides a UV forecast based on Copernicus products. ajuma will apply near-real-time information on the state of the atmosphere derived from Copernicus (Sentinel-3 and -5P for ozone and aerosols) in order to provide accurate location-based UV forecasts. Users get real-time information on current UV and UV exposure, forecasts of when they should come in from the sun, and active warnings to protect them from sunburn and an increased risk of skin cancer. In the winter, it will also ascertain vitamin D deficiencies that stem from a lack of UV exposure.

© ajuma GmbH

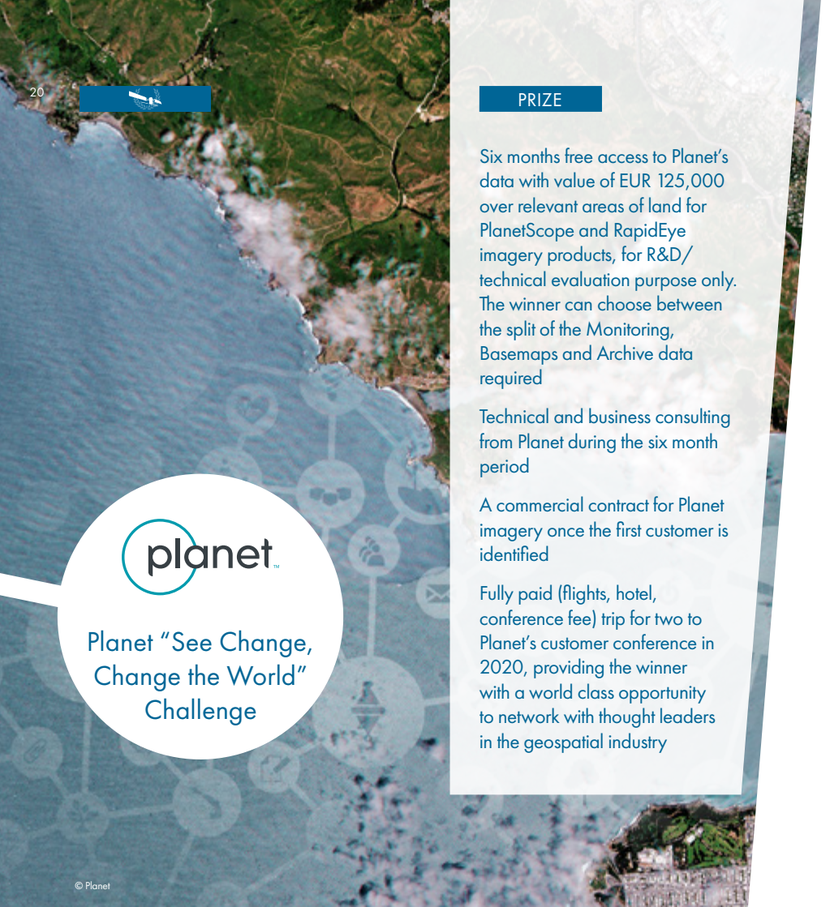
ajuma GmbH
Julian Meyer-Arnek
julian.meyer-arnek@ajuma.eu
www.ajuma.eu

ajuma UV-Bodyguard

EXPERTISE

"UV Bodyguard is an application of the Copernicus Atmospheric Services that enables healthy management of our outdoor behaviour. It can be used in a way that makes it hard to even tell that it's satellite-based. This is an important step in getting everybody – all of us as individuals – involved in using Copernicus."

Gunter Schreier, Deputy Director
German Remote Sensing Data Center
German Aerospace Center (DLR)



Planet "See Change, Change the World" Challenge

© Planet

PRIZE

Six months free access to Planet's data with value of EUR 125,000 over relevant areas of land for PlanetScope and RapidEye imagery products, for R&D/ technical evaluation purpose only. The winner can choose between the split of the Monitoring, Basemaps and Archive data required

Technical and business consulting from Planet during the six month period

A commercial contract for Planet imagery once the first customer is identified

Fully paid (flights, hotel, conference fee) trip for two to Planet's customer conference in 2020, providing the winner with a world class opportunity to network with thought leaders in the geospatial industry

PARTNER

Founded in 2010 by a team of ex-NASA scientists, Planet is driven by a mission to image the entire Earth every day and make changes visible, accessible, and actionable.

Planet started in a garage with a small team of physicists and aerospace and mechanical engineers who used the CubeSat form factor to inform the first designs of the Dove satellite.

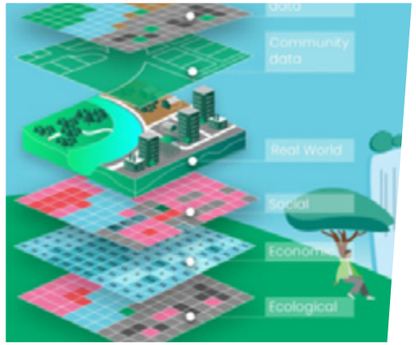
Just three years after their first satellite entered space, Planet now operates the largest constellation of Earth-imaging satellites ever.

Athiye Jawad, Planet
planet@azo-space.com
www.planet.com

WINNER

Green City Watch – Measure the Quality of Urban Nature

The mission of Green City Watch is to radically change the way nature and biodiversity is valued, to bring transparency to local government, and to regenerate cities. The technology combines ecological science, emerging data sources (high-resolution satellite data), and innovative technologies (machine learning and AI) to measure the quality of urban nature. Green City Watch's products have endless applications for municipalities, foresters, and planners in conducting inspections faster and more efficiently than ever before. Green City Watch relies on Sentinel-2 MSI (MultiSpectral Instrument) for vegetation analytics, Sentinel-1 SAR imagery to assess urban flood risks, Planet's SkySat, RapidEye, and ±2x daily revisit times to map illegal tree removal and much more.
Together with cities, Green City Watch is attacking green space management head-on, sketching out concepts, and reducing the turnaround time required to get ideas implemented. The technology is faster than manual assessments, operates in near-real time, and is temporally and spatially scalable.



Green City Watch
Nadinè Galle
nadine@greencitywatch.com
www.greencitywatch.com

GREEN CITY WATCH

EXPERTISE

"At Planet, we love helping businesses disrupt their industries through the use of daily data, and we're proud to be working with Green City Watch. Their mission is to revolutionise the way we value nature, bring transparency to local government, and regenerate our cities. This speaks to Planet's values and we can't wait to see what will come out of our collaboration."

Agnieszka Lukaszczyk
Senior Director Governmental Affairs
Planet

AZO Space of Innovation
Copernicus masters
Overall Winner 2019

BayWa
Smart Farming
Challenge

© BayWa, Sentinel-2

PRIZE

EUR 5,000 cash prize

Mentoring package from BayWa, FarmFacts and Vista, including support with scientific and commercial expertise, developing a go-to-market strategy, and identifying sales channels

Access to BayWa sales platforms and customers through NEXT Farming

Access to BayWa agri-business and agri-organsation networks

Access to field trails in multiple countries (if eligible)

Possibility to access EUR 10,000 worth of commercial datasets from the Copernicus Contributing Missions in the Copernicus Data Warehouse (financial support by EC)

PARTNER

BayWa is a group with worldwide operations in the core areas of trade, logistics, and supplementary services. It has three operating segments: Agriculture, Energy, and Building Materials, along with its Innovation & Digitalisation development segment. As a shareholder of Vista GmbH, BayWa offers attractive satellite and model-based solutions for agricultural purposes.

Together with the subsidiary FarmFacts and its high degree of acceptance and experience as a systems service provider, BayWa can already offer a wide range of innovative services today. Its international activities focus on Europe, as well as on the United States and New Zealand.

Dr Elisabeth Becker, BayWa AG
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www.baywa.de

WINNER

Audili – Remote Soil Analysis

Fertilizer misuse causes significant environmental damage. At the same time, fertilizers play a significant role in feeding an ever-growing population. To achieve this with minimal harm to the environment, data that facilitates efficient use is necessary.

Audili eliminates the expensive and time-consuming process of soil probing by analysing spectral satellite imagery to provide topsoil nutrient insights from space. Farmers, scientists and national agencies can therefore access historical and more recent soil insights from all over the world. Sentinel-1, Sentinel-2, Sentinel-3, LANDSAT 7, LANDSAT 8 as well as records of past soil probing results are used.

© contains modified Copernicus Sentinel data (2018), processed by ESA

Audili OG
Armin Schöpf
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audili

EXPERTISE

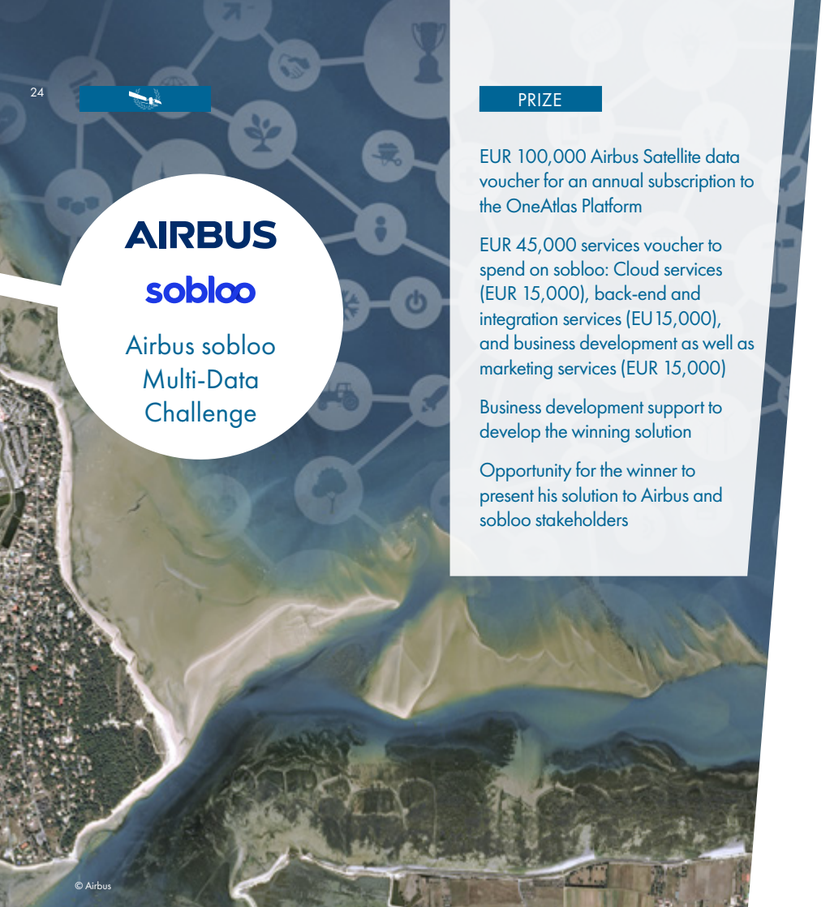
"Audili is developing a totally new approach to measuring top soil nutrients by satellite in an easy and cost efficient way. Measuring soil nutrients is a time-consuming and costly process that is required by law on agricultural land. Therefore, Audili has great potential to revolutionise soil sampling."

Jörg Migende, Head of Agricultural Distribution & Head of Digital Farming
BayWa AG

AIRBUS

sobloo

Airbus sobloo Multi-Data Challenge



© Airbus

PRIZE

EUR 100,000 Airbus Satellite data voucher for an annual subscription to the OneAtlas Platform

EUR 45,000 services voucher to spend on sobloo: Cloud services (EUR 15,000), back-end and integration services (EU15,000), and business development as well as marketing services (EUR 15,000)

Business development support to develop the winning solution

Opportunity for the winner to present his solution to Airbus and sobloo stakeholders

PARTNER

Based upon exclusive commercial access to the most comprehensive satellite constellation, Airbus delivers an extensive portfolio spanning the entire geo-information value chain.

OneAtlas
OneAtlas is a unique collaborative environment to easily access premium imagery, perform large-scale image processing, extract industry-specific insights and benefit from Airbus assets for solution development.

sobloo
sobloo platform provides a broad access to Copernicus data as well as complementary data collections ranging from commercial Earth observation imagery to mobile and IoT databases.

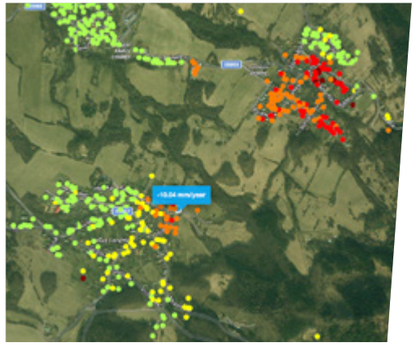
Robin Expert, Airbus Defence and Space
robin.expert@airbus.com
www.intelligence-airbusds.com

WINNER

remotIO-X – Retrieval of Motion and Potential Deformation Threats

remotIO-X monitors millimetre-level changes in man-made objects from space. These are analysed to identify potentially hazardous zones by pinpointing anomalous behaviour. remotIO-X provides easy web access to early warning and higher-level InSAR products, which are updated several hours after new satellite acquisitions are made.

remotIO-X's unique data-mining algorithm is based on satellite radar interferometry (InSAR) technology that leverages regular acquisitions of Sentinel-1 and TerraSAR-X (remotio-X). This solution reduces the cost of monitoring structures and provides more detailed and frequent surveillance, which will result in better safety conditions. The results are also easier to interpret, and communicating them to non-expert customers takes less time when a rapid response is required.



© insar.sk Ltd.

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remotio[X]

EXPERTISE

"Our team of experts chose the Insar solution to be this year's Airbus sobloo Multi-Data Access Challenge winner for a number of reasons. First of all, its maturity and ability to use Airbus and Copernicus data were clearly demonstrated. In terms of business credibility, Insar is also able to provide automatic on-time updates to decision makers regardless of their location in the world. Last but not least, we believe that the Insar solution has real market potential and we are looking forward to working with them in the very near future."

Robin Expert
Airbus Defense and Space

PRIZE

EUR 5,000 cash prize

Access to cloud computing facilities and Copernicus data via the "Copernicus Data and Exploitation Platform – Deutschland" (CODE-DE)

Attendance and presentation at a transport related event of the German Aerospace Center (DLR) (if eligible)

Possibility to access EUR 10,000 worth of commercial datasets from the Copernicus Contributing Missions in the Copernicus Data Warehouse (financial support by EC)

PARTNER

This challenge has been issued by the German Federal Ministry of Transport and Digital Infrastructure (BMVI) with support from the DLR Space Administration.

Together with its executive agencies, the BMVI addresses issues related to transport and mobility, digital matters, and spatial development in Germany.

It is also responsible for Germany's participation in the Copernicus programme's design along with the European Commission and other European players. The BMVI consolidates the country's interests and coordinates accompanying national measures.

Christiane Hohmeister
German Federal Ministry of Transport and Digital Infrastructure
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www.bmvi.de/en

WINNER

ERMES – Extensive Road Monitoring Early-Warning System

The ERMES (Extensive Road Monitoring Early-Warning System) project aims to develop a solution for large-scale highway infrastructure monitoring through satellite data. The proposed solution will rely on data obtained from Earth observation (EO) satellites to monitor slope stability and ground subsidence throughout highway and road networks. The ERMES project is primarily based on the processing and analysis of SAR data obtained from EO satellites. The source of this data will essentially be the Sentinel-1 satellite constellation.

This remote monitoring system offers various advantages as it quickly monitors large areas and provides precise information much more frequently than the current solutions. It thus minimises the logistical challenges and costs involved in on-site ground surveys.

THEIA
Ricardo Cabral
ricardo@theia.pt
www.theia.pt

EXPERTISE

"The winner of this year's BMVI Challenge is an idea for an Extensive Road Monitoring Early-Warning System, or ERMES. This innovative transport application simplifies and accelerates the analysis of large-scale highway infrastructure using Sentinel SAR data. ERMES provides precise information frequently and minimises the logistical challenges and costs of ground surveys. The application stands out thanks to its different features: Apart from wide-area monitoring and hotspot analysis, it consists of an early-warning system for critical ground subsidence."

Christiane Hohmeister, Policy Officer
German Federal Ministry of Transport and Digital Infrastructure (BMVI)

ASTROSAT

Astrosat Thermal Impact & Energy Challenge

PRIZE

Business and technical support worth EUR 8,000 to take the solution to market

Integration into Astrosat's ThermCERT dashboard, including showcasing the solution to existing and potential customers at worldwide exhibitions

Possibility to access EUR 10,000 worth of commercial datasets from the Copernicus Contributing Missions in the Copernicus Data Warehouse (financial support by EC)

PARTNER

Astrosat is a private sector, commercial, satellite applications company based in Edinburgh, Scotland.

Astrosat's clients are spread internationally from South East Asia to Central America and consume products as diverse as deforestation monitoring to energy efficiency in the urban environment as well as disaster response management.

Melanie Shields, Astrosat
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www.astrosat.space

CHALLENGE

Astrosat Thermal Impact & Energy Challenge

Energy companies and local authorities require a comprehensive understanding of total energy use in order to better allocate resources and implement cost-saving measures for consumers. Copernicus data, together with in situ-data or socio-demographic data, has the potential to support the sector with this goal.

Submissions can focus on one specific aspect of the energy sector or can address multiple related aspects such as urban living or impact of pollution on health in urban areas. Likewise, solutions can be designed to support more than just energy companies and local authorities, instead targeting specific groups of end users and tying in platforms that are already available such as smart wearables. Submissions must do more than simply aggregate and present a visualisation of data on a map.

Astrosat was looking for new solutions that use Copernicus data to clearly identify the overconsumption of energy in urban areas.

For this year it was determined that no winner will be announced.

Social Entrepreneurship Challenge

PRIZE

EUR 1,000 cash prize

Consulting package to develop your idea into a valid business case

Business opportunity to join one of the 20 ESA Business Incubation Centers (BIC) worth up to EUR 50,000

Possibility to access EUR 10,000 worth of commercial datasets from the Copernicus Contributing Missions in the Copernicus Data Warehouse (financial support by EC)

CHALLENGE

The Copernicus Masters Social Entrepreneurship Challenge looked for students and research associates to compete for the chance to transform their bright ideas into successful commercial ventures.

Relevant application fields included (but were not limited) to:

Cultural heritage: Monitor and protection of cultural landscapes, historic buildings, ancient monuments, city centres or archaeological sites

Environmental protection: Enabling sustainable environmental practises, such as urban planning, deforestation

Renewable energies: Management and further development of natural resources for energy production

Public health: Identification and monitoring of environmental factors that have an effect on public health

Education: Provision of Earth observation solutions to educate either the younger generations, or the general public about important issues facing society

Ines Kühnert, AZO
ines.kuehnert@azo-space.com
www.space-of-innovation.com

WINNER

Zuri – An AI-Enabled Platform for Monitoring and Regulating Farm Fires in India

Every year, millions of tonnes of crop waste are burnt to clear agricultural fields in India, which releases significant pollution and GHG (greenhouse gas) emissions. The huge smoke cloud that results then moves across the North Indian plains, inflicting irreversible health damage on 300 million Indians who breathe the hazardous air. Zuri is an artificial intelligence (AI) enabled platform that uses satellite data for improved monitoring, supply chain and pricing analysis, and alternative allocation of crop waste to other industries as raw material.

Abhilasha Purwar
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blueskyhq.in

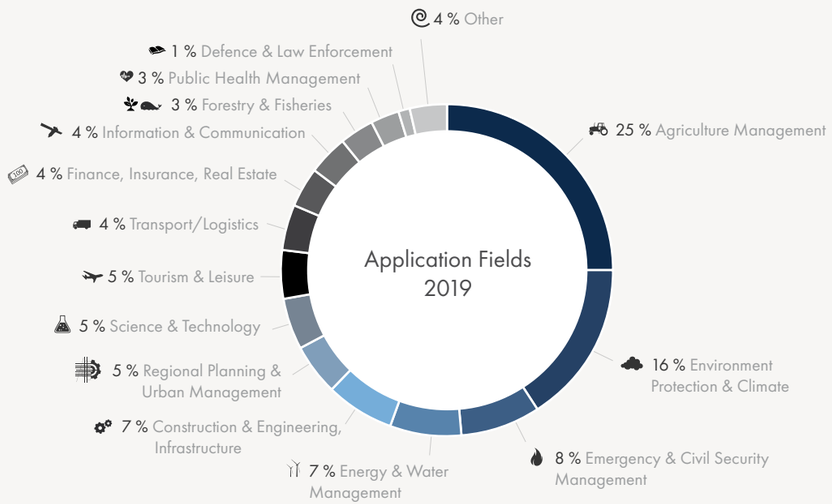
EXPERTISE

"What impressed the jury most about Zuri is the proposed technology and the excellent team behind it. With Zuri's closed system it will be possible to find the stubble and allow energy companies to buy it and use it. That is immense - solves the carbon challenge and creates clean(er) energy and income for farmers. We believe that this idea really can make a difference but also make a solid sustainable business."

Steve Lee
CEO
Astrosat

APPLICATION FIELDS

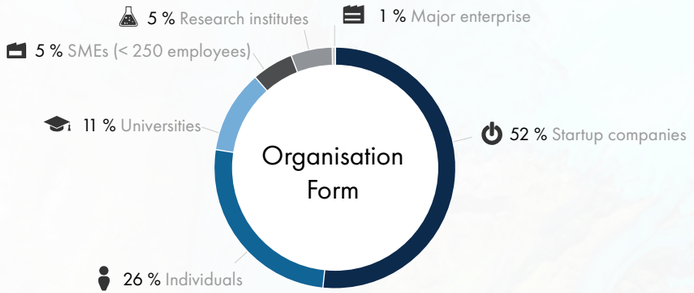
Earth observation offers tremendous opportunities for creating pioneering applications and solutions. Enabled by the Copernicus programme, a wide variety of industries and fields of major European public interest can benefit from these innovations.

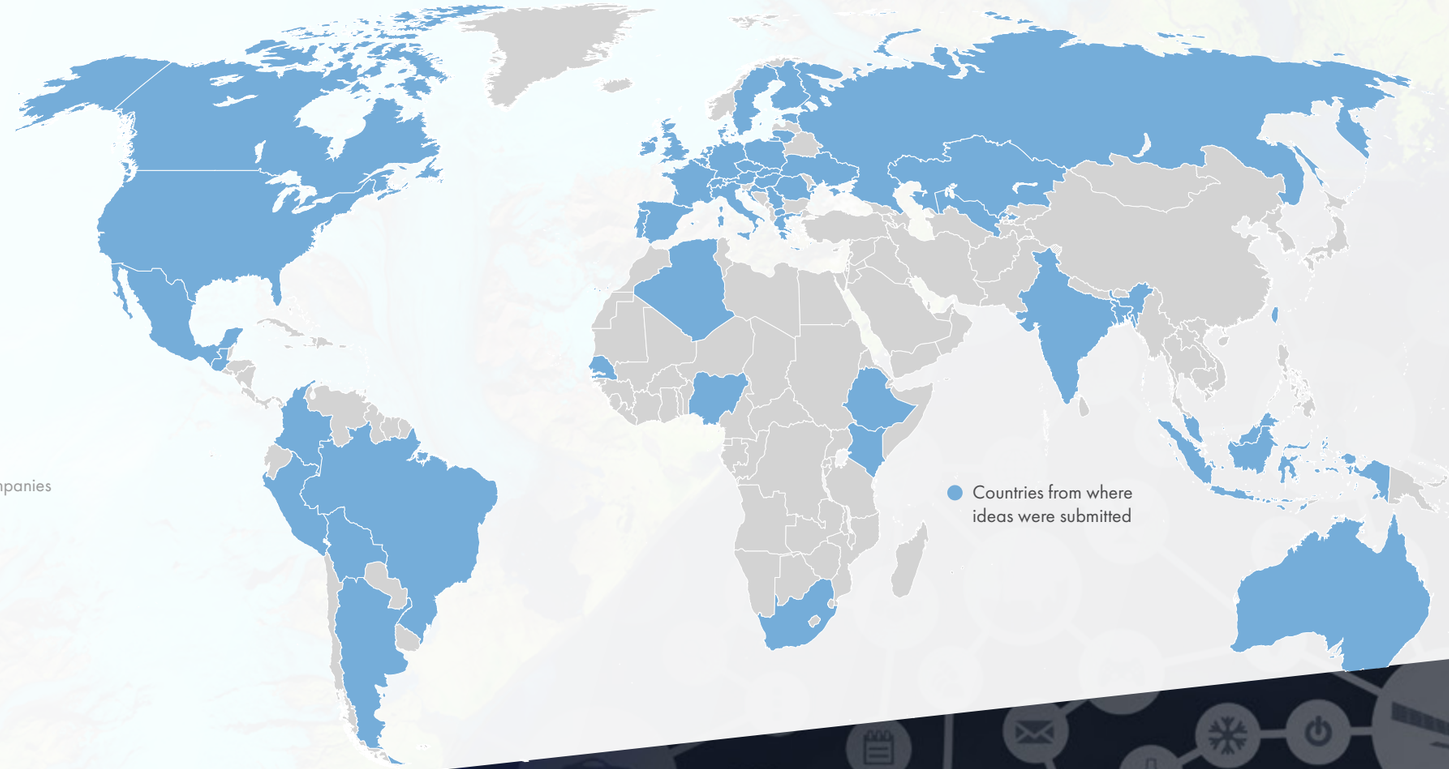


The data generated are not only open to users worldwide, but also provided free of charge. This enables Copernicus to contribute to the development of a wide variety of innovative applications and services tailored to specific public or commercial needs.

STATISTICS

The Copernicus Masters emphasises the huge potential for Earth observation in all areas and aspects of life. More than 1,400 completed ideas from over 100 countries all around the world have been showcasing the exciting future of EO solutions and applications. Have a look where the 2019 edition winners are from and how their organisations are formed.





THE EXPERTS

ESA Copernicus 4.0 Challenge

Dr Thomas Beer
Copernicus Policy Coordinator, ESA-ESRIN

Franz Haslbeck
Independent Consultant

Micaela de Lorentiis
Head of the Corporate Applications Service Section, ESA

Pierre-Philippe Mathieu
EO Data Scientist, ESA-ESRIN

Robert Meisner
Communication Officer, ESA-ESRIN

Bruno Naulais
Technology Transfer Office , ESA-ESTEC

Thomas Obst
Head of Apple Product Management, Deutsche Telekom

DLR Environment, Energy and Health Challenge

Dr Rolf-Dieter Fischer
Head of Technology Marketing, German Aerospace Center (DLR)

Dr Jutta Graf
Head Scientific Information, German Aerospace Center (DLR)

Dr Stephen Illerhaus
Director, Portfolio Management and Energy Trading, Stadtwerke München (swm)

Carl-Jan Keuck
Program Directorate Space, German Aerospace Center (DLR)

Robert Klarner
Technology Marketing Oberpfaffenhofen, German Aerospace Center (DLR)

Dr Doris Klein
Science Advisor, German Remote Sensing Data Center, German Aerospace Center (DLR)

Katrin Molch
Programme Officer, Directorate General for Internal Market, Industry, Entrepreneurship and SMEs, DG GROW, European Commission

Dr Wolfgang Rathgeber
Head, Programme Planning & Coordination, Earth Observation Programmes Directorate, ESA-ESRIN

Gunter Schreier
Business Development & Copernicus, Deputy Director German Remote Sensing Data Center, German Aerospace Center (DLR)

BMVI Digital Transport Challenge

Roman Beck
Head of LuFV- and Asset Data Management, DB Netz AG

Alexandra Förster
Copernicus PR, Event Manager, German Aerospace Center (DLR)

Christiane Hohmeister
Policy Officer, Federal Ministry of Transport and Digital Infrastructure (BMVI)

Vanessa Keuck
Deputy Head Programme Strategy Space R&D, German Aerospace Center (DLR)

Christina Prien
Head of Global LLP Services and Solutions, DHL

Planet “See Change, Change the World” Challenge

Rodrigo Almeida
Pre-Sales Engineer, Planet

Paulina Brozek
Technical Support Engineer, Planet

Maria Cierpinski
Satellite Tasking Engineer, Planet

Timothy Gituma
Senior Account Manager, Planet

Athiye Jawad
Account Executive, Planet

Agnieszka Lukaszczyk
Senior Director Governmental Affairs, Planet

Michaela Mikalauski
EMEA Sales Coordination, Planet

BayWa Smart Farming Challenge

Dr Wolfgang Angermair
Managing Director, FarmFacts

Florian Appel
Team Leader Hydrological Applications BayWa AG – represented by Vista

Dr Heike Bach
Managing Director, Vista

Josef Bauer
Head of Crop Consulting, BayWa AG

Dr Elisabeth Becker
Senior Project Manager Digital Farming, BayWa AG

Josef Bosch
Product Manager NEXT Farming, FarmFacts

Stefan Burgstaller
Team Leader Desktop Development, FarmFacts

Jörg Migende
Head of Agricultural Distribution, Head of Digital Farming, BayWa AG

Gabriel von Mitschke-Collande
Head of Business Development, BayWa AG

Hannes Schallermayer
Product Management, FarmFacts

THE EXPERTS

Airbus sobloo Multi-Data Challenge

Salomé Charpignon
Sobloo Marketing Manager, Airbus

Robin Expert
Open Innovation Manager, Airbus

Jürgen Janoth
Head of Innovation & Product Management / SAR Applications, Airbus

Patryk Jaskula
Business Development Manager, Airbus

Christophe Sauvage
Business Development Manager, Airbus

Social Entrepreneurship Challenge

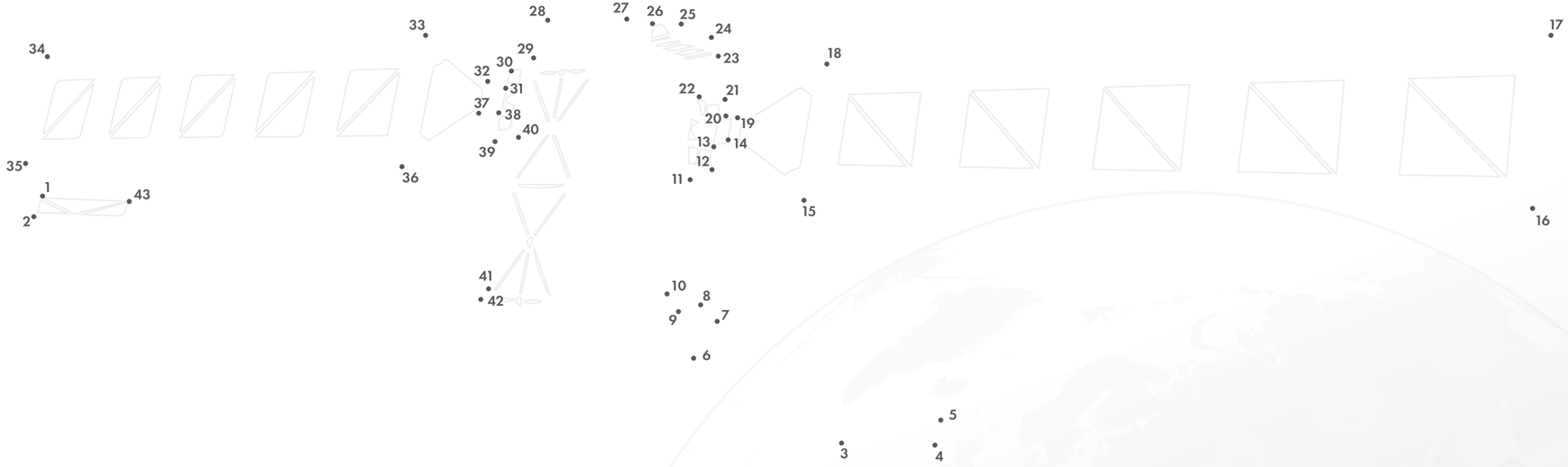
Dr Thomas Beer
Copernicus Policy Coordinator, ESA-ESRIN

Steve Lee
CEO, Astrosat

Thorsten Rudolph
CEO, AZO Anwendungszentrum GmbH Oberpfaffenhofen

Peter Seige
Seige Consultant

PAINT BY NUMBERS



MEDIA PARTNERS

The Copernicus Masters in the Limelight

We want to express our appreciation to the Earth observation (EO) magazines and stakeholders active in space-related fields who support the Copernicus Masters as media partners. They are an essential part of spreading the word about the unique opportunities available to entrepreneurs and startups all across the world.

We offer the following benefits:

- Be the first to receive our latest news
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  - 140 space-related stakeholders
  - Global innovation network outreach

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Regine Heue
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www.space-of-innovation.com

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Become a sponsoring partner and discover innovative space-based solutions from all over the world. Benefit from pioneering Earth observation (EO) applications that leverage your technologies.

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Meet forward-thinking business partners from renowned EO stakeholders, obtain extensive promotion within the worldwide space community and get access to a unique international network of innovation and expertise.

Get in touch:

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ines.kuehnert@azo-space.com

Monika Mayr
Project Officer
monika.mayr@azo-space.com

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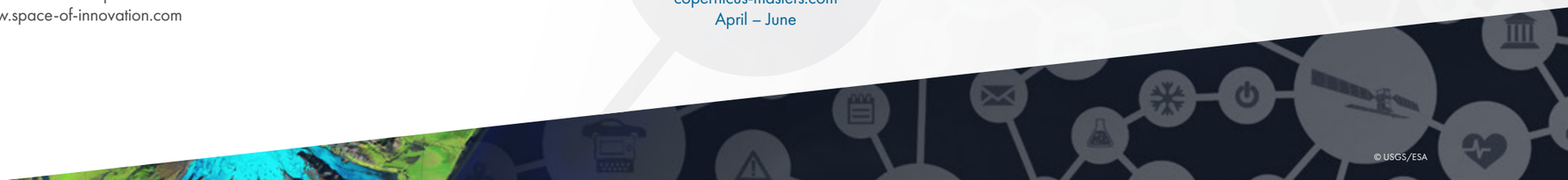
Join in and introduce yourself to the world's leading Earth observation network.

Register at:
copernicus-masters.com
April – June

Become a partner now!
copernicus-masters.com/partners



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esa business incubation centre

Bavaria

Financial support

- EUR 50,000 cash, zero equity
- Loan of up to EUR 50,000 from local supporting bank

Network support

- Meet with high-level contacts from industry, research, business angels and investors
- Become part of the unique European-wide ESA BIC network
- Discover numerous networking and promotion opportunities to accelerate your business

Technical support

German Aerospace Center (DLR): 48 institutes with expertise in Galileo, remote sensing, robotics & mechatronics, simulation, optical systems

Fraunhofer IIS: High precision localisation systems, sensor networks, RFID, WLAN applications, energy harvesting

Airbus: Communication, electronics, space systems, security, manufacturing

partners

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Contact us!

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

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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 Galileo Masters, the Copernicus Masters, the INNOspace Masters, as well as the Copernicus Hackathons. From 2004 – 2019, there have been 14,600 participants from more than 100 countries, 512 prizes awarded, EUR 24.5 million prize pool available, with 300 top experts.

Become part of our global space innovation network comprising more than 160 world class space stakeholders! With Europe's largest acceleration programmes for Galileo, AZO makes ideas reality!

Create your solutions with AZO and discover new horizons!

AZO supports you and your business cases through the best international innovation ecosystem in various high-tech domains: Satellite Navigation, Earth observation, and the new space economy. Upstream and downstream. Through the best expertise from product innovations to company foundation. With more than 6,600 business cases and 700 company foundations in 15 years.

Copernicus masters

Annually from April – June
copernicus-masters.com

Galileo Masters

Annually from April – June
galileo-masters.eu

INNOspace Masters

Annually from November – February
innospace-masters.com

Copernicus hackathons

Last Copernicus Hackathons mid 2020
hackathons.copernicus.eu

E-GNSS Accelerator

galileo-masters.eu/accelerator

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