

Highlights 2016

INNO
space

MASTERS

Satellite 4.0 New ideas for the next space generation

The competition is embedded in DLR Space Administration's INNOspace® initiative,
which promotes innovation and new markets.

Operator



INNO
space

Partners



Organiser





INTRO

The aerospace industry currently finds itself in a transitional phase. The advancing digitalisation, great advances in microelectronics and software technology, complex and integrated production processes, and new players around the world from outside the space industry with innovative business ideas, which have an affinity for commercialising, have led the way. This provides major challenges for established aerospace manufacturers – particularly in the medium-sized supplier industry. The New Space Economy mainly offers additional opportunities and also has great potential to revolutionise technologies and processes along the value chain, as well as in connection with subsystems and components.

Under the theme “Satellite 4.0”, the first-ever INNOspace Masters competition embarked on a search for new ideas and concepts designed to address the aerospace industry’s current issues and offer potential innovative solutions. INNOspace Masters was a great success in its very first year. With both the quality of the project ideas and concepts

entered and the wide range of topics covered, the relevance of the competition is underscored. The Space Administration of the German Aerospace Center (DLR) is the operator of this competition. I am thrilled with this positive response and looking forward to advancing the ideas received along with the other INNOspace Masters partners.



I congratulate all of this year’s winners and finalists. At the same time, my sincere thanks go out to Airbus Defence and Space and Germany’s ESA Business Incubation Centres in Bavaria and Darmstadt for their support. Furthermore, I want to thank Anwendungszentrum GmbH Oberpfaffenhofen for doing such an excellent job of organising the first INNOspace Masters competition.

Dr Gerd Gruppe
Member of the DLR Executive Board
German Aerospace Center (DLR), Space Administration



INNOSPACE INITIATIVE



Space is an important driver of innovation for Germany and a key to open new markets. In order to use and exploit these transfer potentials more goal-oriented and efficiently, the Space Administration of the German Aerospace Center (DLR) has launched the INNOspace® initiative on behalf of the Federal Ministry for Economic Affairs and Energy (BMWi) in 2013.

INNOspace® is an initiative in the framework of BMWi's "National Programme for Space and Innovation" and part of the German government's new high-tech strategy since 2014. In close coordination with the Federal Ministry for Economic Affairs and Energy as well as with various federal states, INNOspace® comprises the following instruments:

- › Interdisciplinary symposia to initiate cooperation projects, expert and user workshops on "new markets"
- › Promoting innovation and transfer projects with funds from the National Programme
- › Ideas competition INNOspace Masters in cooperation with the German ESA BICs and Airbus Defence and Space
- › The mobile INNOspaceEXPO „ALL.täglich!“ for efficient public presentation of space applications in everyday life
- › Website www.dlr-innospace.de





PRIZE CATEGORIES

The INNOspace Masters awards innovative solutions for the optimisation of processes, components or subsystems involved in connected satellite manufacturing and future concepts for space (New Space Economy) of varying levels of innovation and maturity in three competition categories.

Overall winner



Space Administration

Pre-competition phase
Research, development, demonstrators

Companies (especially SMEs), universities, and non-university research institutions

Verifiable applications involving individual or joint proposals are eligible for funding from Germany's national space and innovation programme (up to 400,000 Euro in support per proposal)



Challenge supported by

Initial phase
Proof of market, near to market prototypes

Small and medium-sized enterprises (SMEs), start-ups, research teams, students

Support for the application for one of the two ESA BICs in Germany

In case of success 50,000 Euro in funding
Access to European-wide expert networks
Consulting services by OHB System AG to create a viable business plan



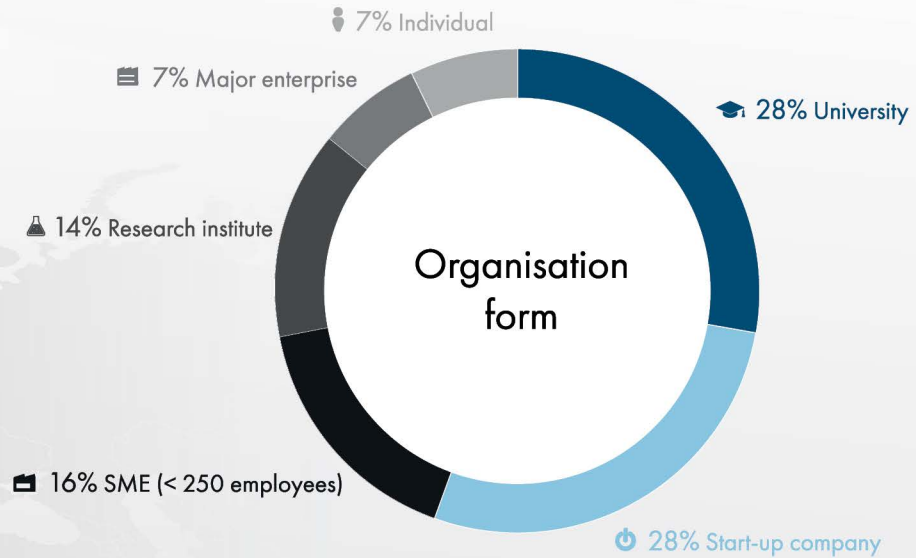
Operational and integration phase
Operational solutions as supplier for Airbus

Large-scale enterprises, small and medium-sized enterprises (SMEs), start-ups

Direct access to Airbus Defence and Space in-house expertise and expert networks, Support for the application for the BIZLab Accelerator and for the Airbus Venture Capital fund, as well as the opportunity to become an Airbus Defence and Space partner and supplier

STATISTICS

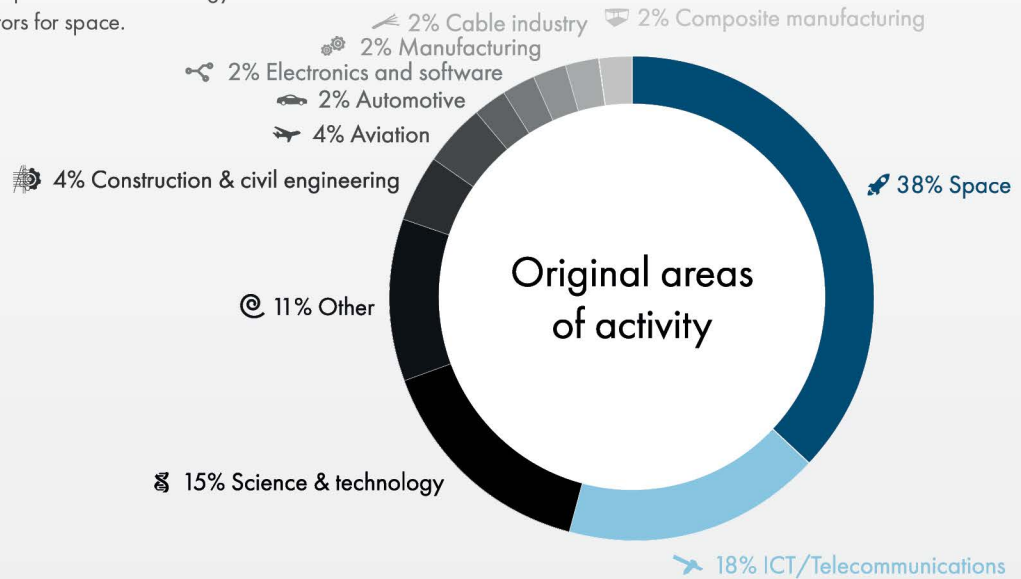
The first INNOspace Masters idea competition addressed European companies, start-ups, universities, or non-university research institutions that are all well-represented among the 50 participants from eight different countries.



8 participating countries

STATISTICS

The INNOspace Masters called for projects that involve forward-looking transfers of technologies and expertise from other industries to the space sector (“spin-ins”). Already in its first year, the INNOspace Masters has affirmed the growing importance of technology developments in other sectors for space.



„Satellite 4.0“ – Challenge by the DLR Space Administration

The aerospace sector finds itself in a transitional phase. New production and manufacturing processes, as well as the increasing digitalisation, offer new opportunities and possibilities, also for new business models.

CHALLENGE

The DLR Space Administration was looking for ideas and new concepts which offer innovative solutions to current issues in the aerospace sector, above all in the following subject areas:

Additive manufacturing, increased modularisation of production, utilisation of platform concepts, intelligent structural elements and components, as well as cyber-physical systems in complex, connected production- and logistics processes.

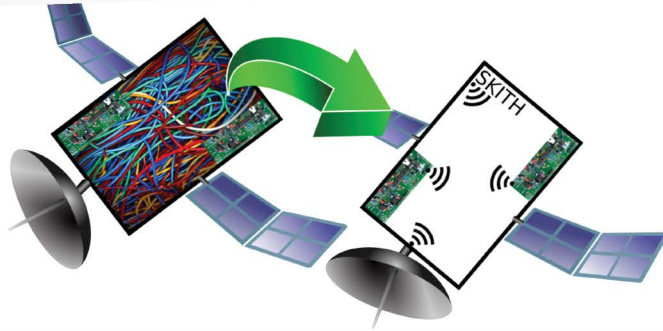


DLR

Space Administration

PRIZE

- › In case of successful application, receipt of a grant from the “National Programme for Space and Innovation” as an individual or joint project for the three finalists
- › Up to 400,000 Euro in funding for each project



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Technology



Skith: Skip the Harness (Harnessless Satellite)

The harness for satellites has been necessary so far but also costly, heavy and a major risk factor. Skith aims to create the first wireless satellite, by using short range, high speed real time miniature radio communication links.

By combining modular and fault-tolerant software with ultra-wideband technology from industry 4.0, a robust and adaptable system will be created.

Skith is aiming at:

- › Reducing the costs of integration and launches of satellites
- › Increasing the dependability of machines, especially of satellites and aircrafts
- › Increasing the flexibility of control systems
- › Making the board computer independent from input/output (IO) devices

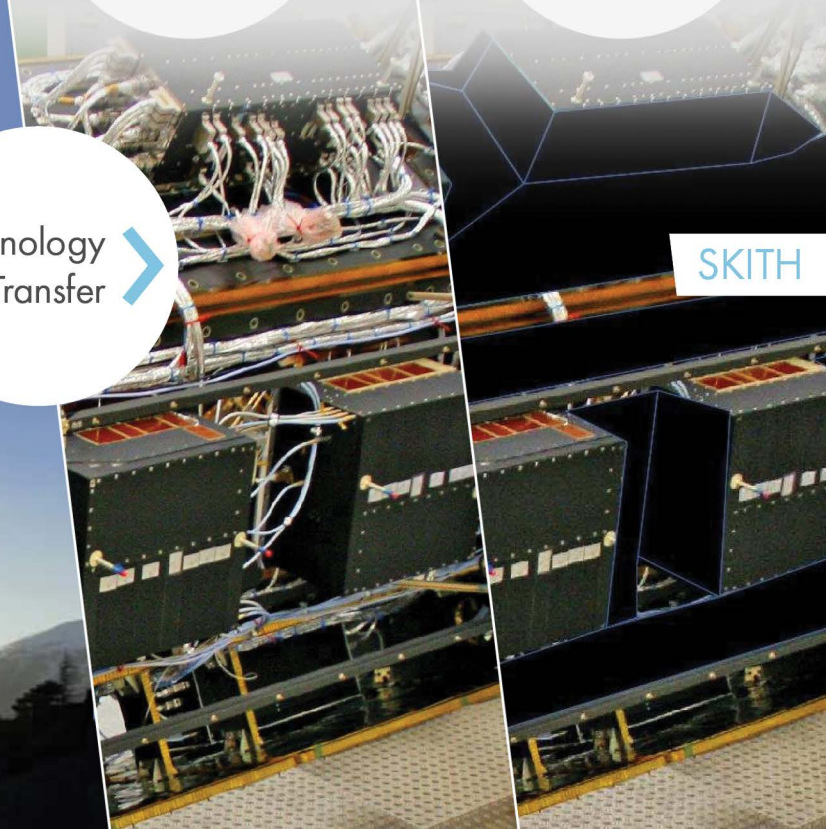
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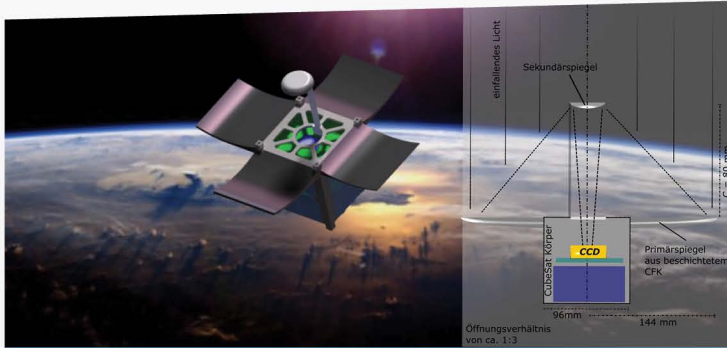
Today



Technology Transfer



SKITH



Technische Universität Braunschweig
Institut für
Raumfahrtssysteme



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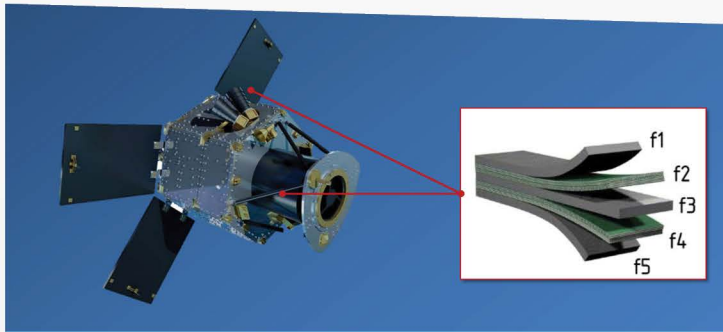
Dr. Andreas Dietz, andreas.dietz@ist.fraunhofer.de
Fraunhofer IST



OCULUS – Optical Coatings for Ultra Lightweight Robust Spacecraft Structures

Low weight as well as high durability and accuracy for mirrors of space telescopes? New material solutions have great potential to make it happen! The objective is to combine innovative production processes of carbon-fiber-reinforced plastic (CFRP) structures and reflective coatings. By this means, lightweight optical mirrors can be developed for aerospace applications (e.g. remote sensing and astronomy) that exhibit versatile advantages over conventional mirrors:

- › Thermal stability (no cooling necessary)
- › 80% to 90% weight reduction
- › Modularisation in production (large quantities using one tool)
- › Smart coatings enable multifunctional surfaces
- › Process transferable to mechanical engineering industry



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Multifunctional lightweight structures for satellites

Conventional satellite design separately considers functional, structural and protective requirements. Subsystems are not integrated into the primary structure, but applied at a later production stage.

- › Project aim: disruptive innovation in satellite design
- › Integration of functions into load-carrying structural parts (communication, thermal management, vibration control, diagnosis)
- › Concurrent optimisation of structural and functional properties with respect to mass and production processes
- › Validation by a demonstrator

Airbus Defence and Space Challenge

Global economies are at the onset of a fourth industrial revolution. The ongoing process of digitalisation means a radical change for traditional value chains and the opportunity of new products, services and business models along a new supply chain of the commercial space industry.

CHALLENGE

Airbus Defence & Space was seeking innovative ideas along its complete satellite value chain, using existing industrial standards & processes. Thereby, the focus was on innovative business models and new industrial applications.



PRIZE

The winner receives a tailored package of advisory and support services:

- › Direct access to the Airbus DS in-house expertise (technical and business support based on NDA)
- › Support with the application for the Airbus Group accelerator BIZLab
- › Support with the application for Airbus Seed funding
- › The possibility of becoming a supplier and partner of Airbus Defence and Space



Laser Communication for Future LEO Constellations

ViaLight develops Laser Communication Terminals for future low Earth orbiting (LEO) constellations and Earth observation missions requiring the transmission of large data volumes at rates of up to 10 Gbps over thousands of kilometers.

- › Leader in laser communication systems for stratospheric platforms and ground stations – chosen supplier for large international commercial customers
- › ViaLight's product evolution: aviation > stratosphere > space (inter-satellite, satellite-to-ground)
- › Serial production keeps costs low while ensuring the highest quality product
- › Solutions for: telecommunications, navigation and Earth observation data, ISR applications, Internet of Things, Big Data
- › Fully operational space system on the ISS in 2 years



Airborne

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Realising affordable satellite structures

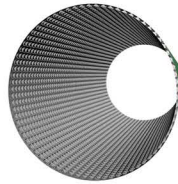
New Space requires drastic cost reduction in spacecraft manufacturing and unprecedented production volume.

Airborne will redefine the process for satellite panel manufacture to cut down to a fraction of today's cost. Applying disruptive process technologies on highly automated production lines will assure stable quality at high throughput.

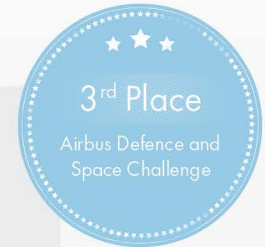
Airborne's smart approach to automation has the following advantages:

- > Low capex
- > Flexible
- > Scalable
- > Transferable

innovation in structural PANEL TECHNOLOGY



Antonio Valente
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PLY Technologies GmbH



OSS4SPACE – Open Sandwich Structures for Space

Open Sandwich Structures (OSS) are a new type of free form and full design oriented structural panel technology for the construction of low Earth orbiting (LEO) satellites (mega constellations).

Unlike the three constituent (sheet/core/sheet) type of sandwich panels, OSS encompasses a panel structure made of only two material sheets without any addition of core material. Compared to current closed cell panel technology, that leads to reduced material costs, a much simpler production process and a higher productivity for space structures.

ESA BIC Start-up Challenge

The space sector creates innovations, but has also begun to profit from technical advancements achieved "on the ground" in a variety of industries.

CHALLENGE

The European Space Agency's two business incubators in Germany (ESA BIC Darmstadt and ESA BIC Bavaria) – with support from OHB System AG – were searching for new business ideas and models optimising processes, components or subsystems – involved in connected satellite manufacturing and also improving the efficiency and customer orientation of the aerospace industry at large.



**business
incubation
centre**

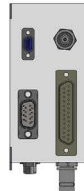
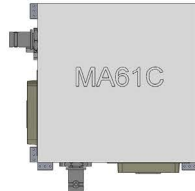
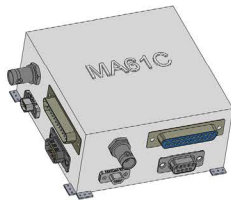
Challenge supported by



PRIZE

The winner receives a tailor-made package of advisory and support services:

- › Support by the OHB System AG in turning the innovative business idea into a commercially sound, viable business concept
- › Support in preparing an application for either one of Germany's ESA BICs with the opportunity of 50,000 Euro in funding
- › Access to a Europe-wide network of technological and business-related expertise



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Wirtschaft Foerderung Bremen GmbH



Multipurpose Aapter Generic Interface Conector MA61C

MA61C is a universal adapter that connects any subsystem to any spacecraft platform, reducing costs and time of satellite manufacturing. Once MA61C is connected with the satellite subsystem and the on-board computer, it powers up and integrates them.

The advantages are:

- › Integration of subsystems without programming (plug & play)
- › Compatibility with most used subsystems
- › Design based on requirements and specifics from its customers
- › Reuse of off-the-shelf subsystems

Reaktor Space

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Reaktor Space Lab Oy



Satellite development as cyber-physical systems

Innovative development framework for small satellite industry, utilising advanced complexity handling techniques adapted for use in both cyber and physical domains.

The advantages:

- › Providing higher reliability end products with lower costs
- › Cloud-based framework, integrating wide range of tools
- › Agile and model-based/-driven development approaches
- › Automated consistency checks, overall validation and verification support
- › Reuse and easy adaptation of system modules



TVC - 3



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MPBUS – Modular Power BUS for Space Vehicles

MPBUS is a decentralised power distribution architecture for spacecrafts, capable to transmit data over the same two power wires, allowing both weight reduction and cost reduction, due to harness design, assembly and integration tasks simplification.

- › Two front ends, for power sources and for consuming energy devices
- › No Power Distribution Unit (PDU), each device has its own power/load management
- › Smart Battery Management: on-board computer can decide which of the distributed batteries is active
- › MPBUS branches can be jettisoned (launchers stages)
- › Up to 3 Mbps per data comms



EXPERTS

Challenge by the DLR Space Administration

Dr Thomas Driebe

Microgravity Research department, Head of Physical Sciences Programme
DLR Space Administration

Prof Dr Roger Förstner

Head of Institute for Space Technology and Space Applications
University of Armed Forces Munich

Dr Klaus Hermanns

Referee for Innovation & new markets
DLR Space Administration

Dr Anke Pagels-Kerp

Research associate, Satellite Communications
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Dr Klaus Ruf

Former DLR employee, Consultant

Peter Seige

Consultant for space
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Managing Director & Chairman of the Executive Board
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Promotion of Space Science

Dr Peter Vits

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Dr Alexander Weiß

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Head of Innovation & new markets
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Airbus Defence and Space Challenge

Goetz Anspach von Broecker

Key Account Manager German Space Research Institutions and
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ESA BIC Start-up Challenge (supported by OHB)

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GET READY FOR THE NEXT CHALLENGE

The INNOspace Masters 2017
will call for ideas
from 1 October 2016 to 31 January 2017 at
www.innospace-masters.com

SAVE THE DATE

Kick-off event
INNOspace Masters 2017: 6 October 2016
In line with the
INNOspace symposium in Bavaria

