

Developing a competitive space industry

ESA's industrial policy to grow a European sustainable space economy

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THIS IS ESA

→ UNITED SPACE IN EUROPE, UNITED EUROPE IN SPACE

EUROPE'S GATEWAY TO SPACE

WHAT

22 Member States, 5000 staff and contractors

WHY

Exploration and use of space for exclusively peaceful purposes

WHERE

HQ in Paris, 7 sites across Europe and a spaceport in French Guiana

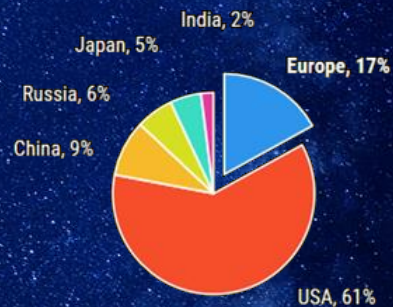
HOW MUCH

€5.72 billion = €12 per European per year



Investment in Space in 2018

Public



World
€58 billion



+3.5%
per year over 5 years



incl. Europe
€10 billion



+4.3%
per year over 5 years

Private



World
€2.7 billion



x 3
Step increase in 2015



incl. Europe
€220 million

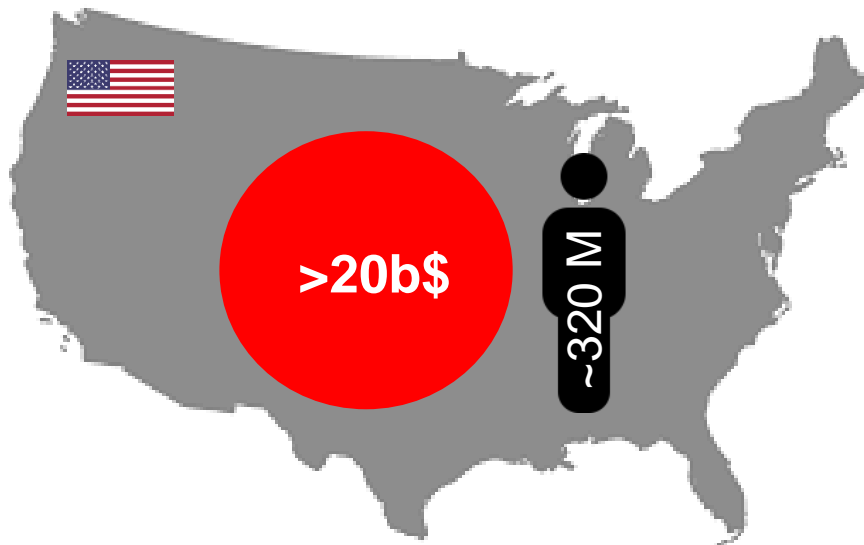


x 4
Step increase in 2017



Civil space budgets

esa



>62.5 \$/cit.



= 12 €/cit.



WHAT DOES ESA DO?



ALL OF THIS IS POSSIBLE THANKS TO THE COLLABORATION OF MEMBER STATES

ESA is active across **every area** of the **space sector**

World leader in **science** and **technology**

Over 80 satellites developed, tested, and operated **since 1975**

More than 220 launches from Europe's Spaceport in Kourou

Socio-economic impact: Earth Observation



- Every € spent in ESA EOEP → creation of 3.8 € in ESA Member States economy over 2013 – 2030 :
 - 1.9 € in GDP increase
 - 1.9 € in innovation spill-overs (2.9 for SMEs)
- More than 60% of the investment recovered in tax revenues
- For each new job in the space sector → about 1.3 additional jobs in the wider economy

Socio-economic impact: ISS

BETTER TOGETHER

1998: ESA meets International Space Station



strong partnership and international cooperation

- 15 international partners
- 230 individuals from 18 countries visited the ISS



PROFITABLE SPACE

each euro spent on the Space Station produces €1.8 added value to European economies



€7B
government revenues from ESA spending

90%
spent in ESA participating countries

every 100 jobs in the space sector linked to the Space Station creates 90 additional jobs



INSPIRATION

43K teachers trained per year



university lectures



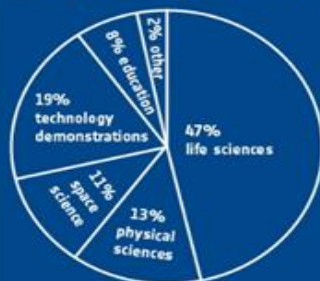
student nano-satellites and hands-on projects

4M friends
Facebook

6M followers
Twitter

85M views
YouTube

KNOWLEDGE FOR SOCIETY



1850+ european researchers



800+
experiments



COMPETITIVE INDUSTRY

the partnership established Europe as a reliable international partner





European Space Agency

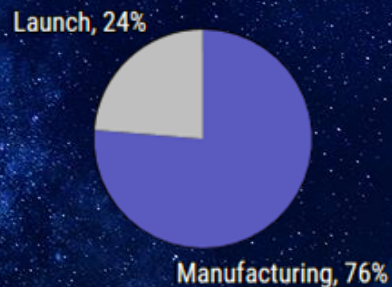
Source: PricewaterhouseCoopers, ESA

Space Economy: new roles and responsibilities


Upstream market value in 2018

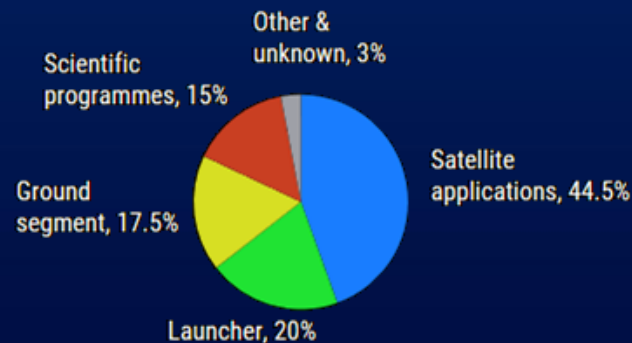
 World
€25.6 billion

 **+6.3%**
per year over 5 years

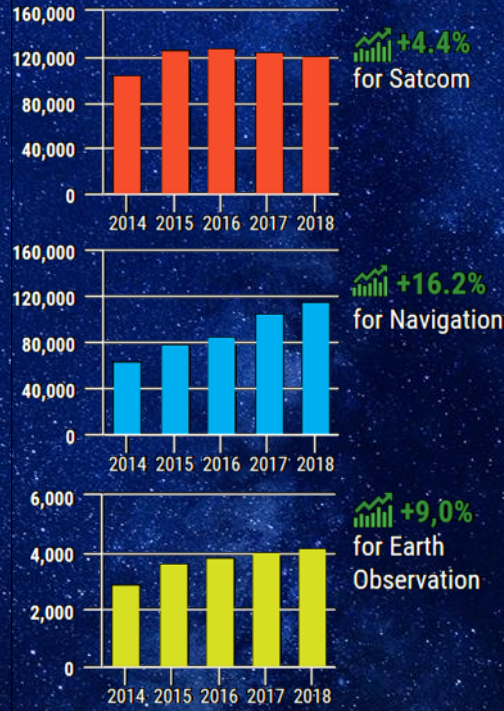


 *incl. Europe*
€8.5 billion

 **+4.3%**
per year over 5 years



Downstream market value in 2018



World
€242 billion



+9.2%
per year over 5 years

Earth Observation, 2%

Navigation,
48%



Satcom,
50%



incl. Europe
€58 billion
in 2018



for Satcom



for Navigation



for Earth Observation

The space industry: an high value added sector

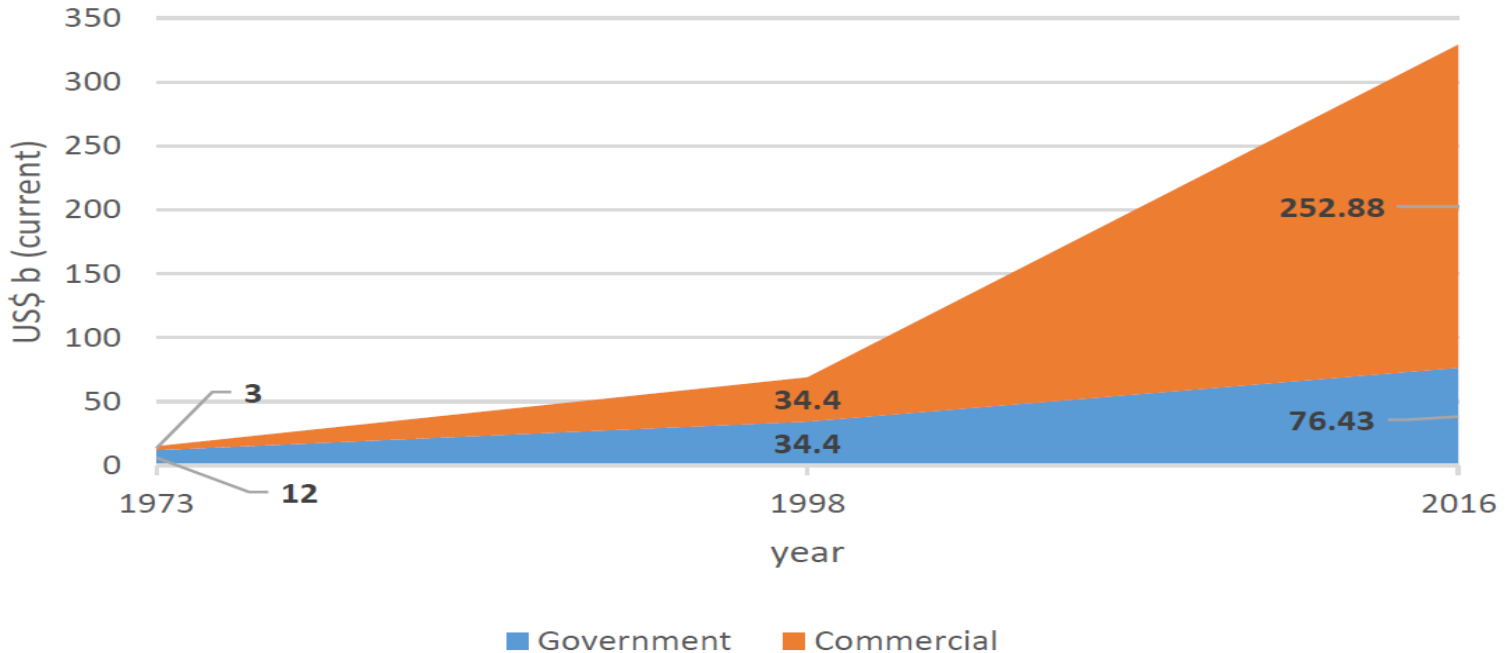


Ratio **x5** between the turnover generated by the **upstream segment (manufacturing)** and the turnover from the **downstream segment (applications and services)**

The diagram illustrates the space industry value chain. At the top, a satellite orbits in space. Below it, a large blue arrow points downwards towards a grey arrow pointing upwards, indicating a 5x ratio between upstream and downstream turnover. The upstream segment is represented by a large blue arrow pointing down, and the downstream segment is represented by a large grey arrow pointing up. The background features a globe with various icons representing different sectors: wind turbines, solar panels, a person, a car, a heart, a location pin, a leaf, a robot arm, and a group of people.

➤ Estimated European downstream turnover **€37.5 billion**

Government and commercial space economy turnover



Source: Euroconsult World Space Industry Survey 1999 and The Space Report 2017

A fast-evolving context for space



- Markets are changing
- Increased competitive pressure from new entrants:
globalisation of space is a reality
- Increasing concerns about export control issues (USA, China)
- Increasing variety of programmes – public, private, partnerships....
- Vertical integration of Industry along the value chain
- Development of NewSpace, worldwide and in Europe +
Increased role played by private investors → new role for
Agencies?

Shift of paradigms!

- change of motivations
- change of actors
- change of contents
- change of roles
- change of technologies

→ **ESA SPACE 4.0 = ASA Space 2.0 !**



SPACE 4.0:

- Commercialisation
- Participation
- Information
- Innovation
- Interaction
- Inspiration
- Cooperation
- Jobs & growth
- Digitalisation

society

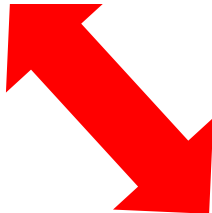
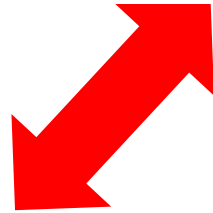
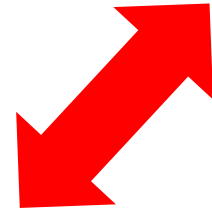
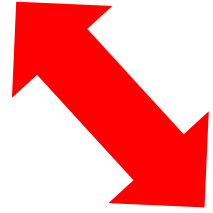
politics



SPACE 4.0



esa



science

industry

ESA's industrial policy must evolve and adapt



- ESA Industrial Policy objectives were written **40 years ago**, focusing on science, R&T and enabling infrastructures.
- **Two new additional objectives are needed.**
 - ✓ creation of **value** for society
 - ✓ integration of space activities in **economy**.

IP evolution can accompany existing and **new Agency's roles:**

- **R&D sponsor** to improve competitiveness and non-dependence, with the objective to achieve unrestricted and affordable access to space technologies and systems
- **Regulatory** (together with the EU), in order to improve the level-playing field
- **Advisory (NEW!)**:
 - ✓ To Member States
 - ✓ To Industry
 - ✓ To Investors



Examples of tools to spur the development of a robust space economy

Lake Amadeus, Sentinel-2A



Introduction: traditional tools



- **spinning-in**, spinning out, spin together: commercially exploit space technologies in non-space markets such as automotive, biomedical devices, telecommunications and the wider aerospace sector...and vice versa (e.g. the case of INNALABS in Ireland)
- **B2B Industry days** in Member States where local industry, LSI and ESA programs meet and exchange information and contacts
- Measures to allow and encourage the **cooperation of LSI** with local industry
- **One on one sessions** with local industry in New Member States at each industrial briefing (typically once per year)
- **Training** on how to do business in space: bid, PA/QA, business plan, etc..

Slide 21



European Space Agency

Global Space Economic Forum (GSEW)

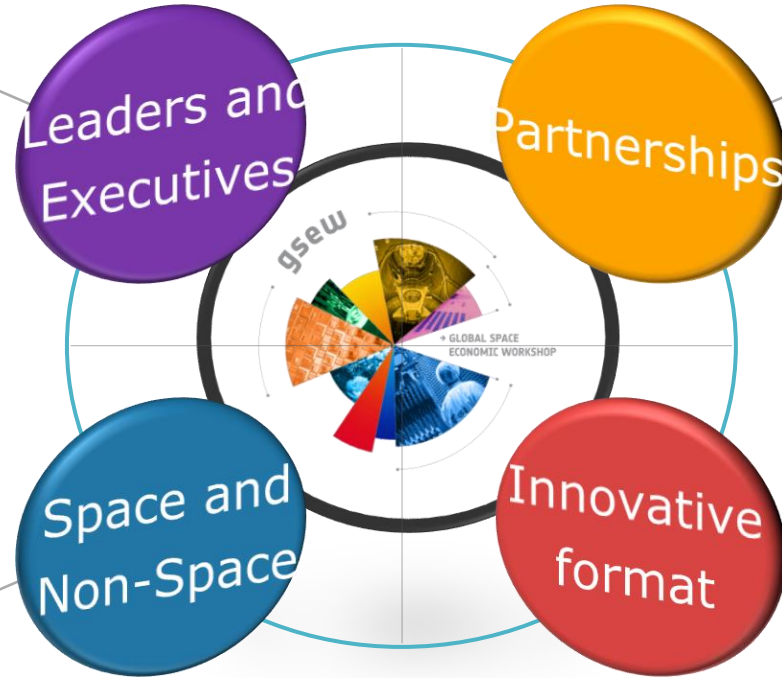
Engaging with wider economy and non-space industrial verticals



What is a GSEW event?

It is a high-level meeting:
e.g. CEOs,
Presidents,
VPs, Directors
etc.

Cross-fertilization is
the cornerstone
of the event:
Spin-in/Spin-off



Participants
discuss together
about how they
can engage and
develop potential
industrial activities
together

Industrial Panel
Discussions,
Inspiring TED-
like talks,
Working Tables

Some GSEW participants



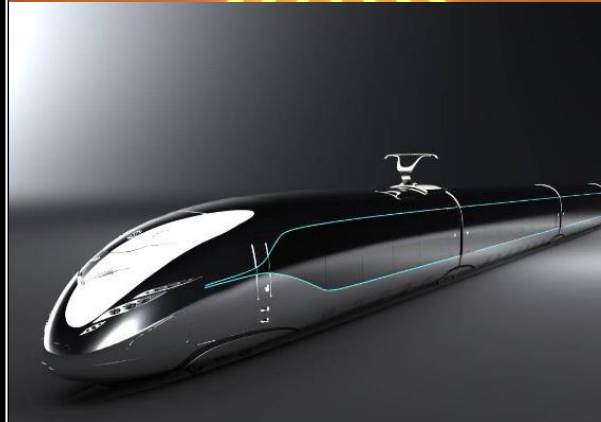
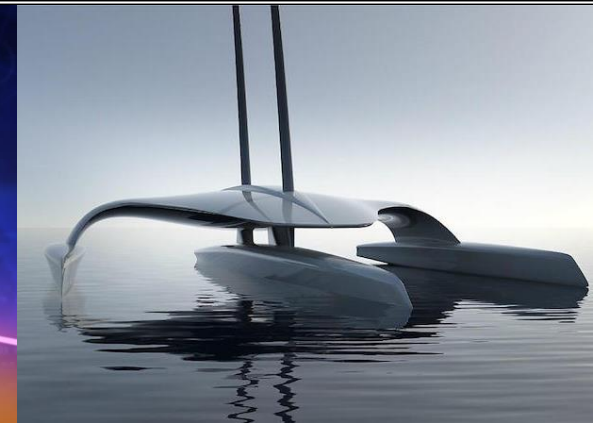
Past events

Global Space Economic Workshop @ Italy 24th May 2018

Highlights

- Organised by Distretto Tecnologico Aerospaziale
- Ostuni, Brindisi, Apulia Region
- + 150 participants, two industrial projects launched
- Theme: Space Cybersecurity for Mobility (Maritime, Aviation, Railway, Automotive)
- Supported by ASI, Italian Ministry of Defence, Italian Ministry of Transports

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Past events



Global Space Economic Workshop @ UK18th July 2018

Highlights

- Organised by Metalysis
- ESA/ECSAT
- + 80 high-level participants
- Theme: New Materials \ and Energy



Global Space Economic Workshop
@ Tallin, Estonia on 1st December
2018

Highlights

- Organised by Robotex
- Theme: Generation R
- + 80 high-level participants



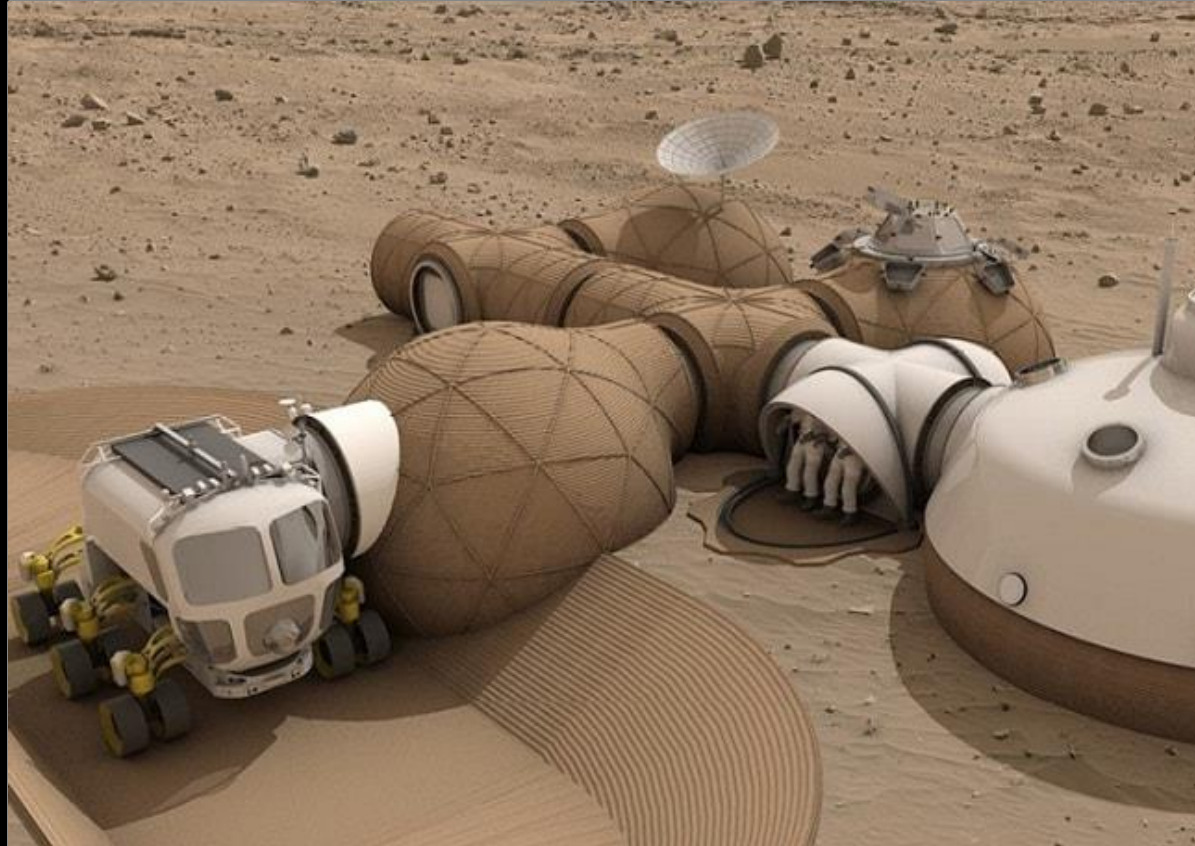
Past event

Global Space Economic Workshop @ France 31st May 2018 and 13th May 2019

Highlights

- Organised by Kedge Business and Design School in cooperation with CNES and ESA
- Marseille, Kedge Business Accelerator
- + 50 participants
- Theme: Future Urban Settlements on the Moon and Mars

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Global Space Economic Workshop @ Italy 29th May 2019

Highlights

- Organised by Distretto Tecnologico Aerospaziale
- Ostuni, Brindisi, Apulia Region
- + 180 participants + industrial project launched
- Theme: Space Cybersecurity for Smart Cities
- Supported by ASI and Italian Ministry of Defence





ESA grand challenge

Creativity, innovation and start-up



WHAT IS AN ESA GRAND CHALLENGE?

- ▶ The Grand Challenge is a competition that proposes inspiring goals far from market reach.
- ▶ The Grand Challenge attracts wide communities of thinkers and problem solvers to address your specific challenge with unconventional and disruptive approaches.
- ▶ This may also trigger development and exploitation of unforeseen spin-off businesses.

potential space applications

cost effective approach

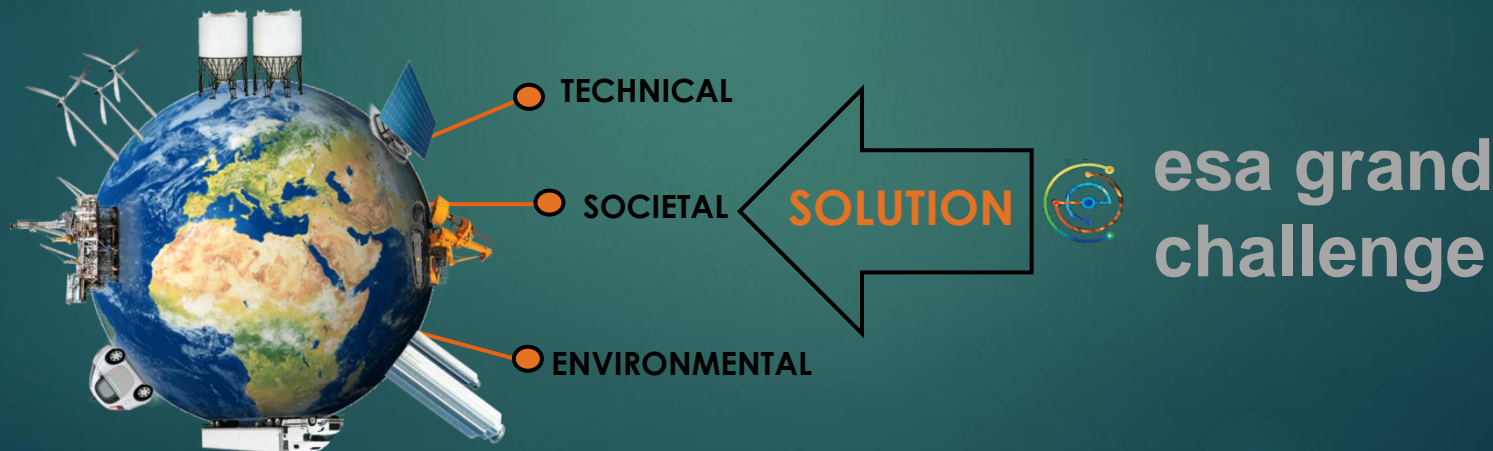
global industry business lines



GLOBAL INDUSTRIES FACING CHALLENGES

YOUR IDEA TO SHAPE THE FUTURE

You propose the challenge that interests your business. The European Space Agency promotes your challenge with the space community of problem solvers. You obtain disruptive solutions and have a chance to influence the space exploration agenda for the next decades



METALYSIS-ESA Grand Challenge



create metals from resources found on other planets



reduce crew dependence on cargo



allow sustainable operations of long term settlements

**IN SITU RESOURCES
UTILIZATION**

- ▶ The Challenge invites competitors to devise process-monitoring systems that can slot into Metalysis' **electrochemical cells on Earth, and accompany the technology into space.**

TIMELINE

- ▶ 1 MILESTONE GATE 50K€ PRIZE/500 keuro total
- ▶ 3 YEARS TIME

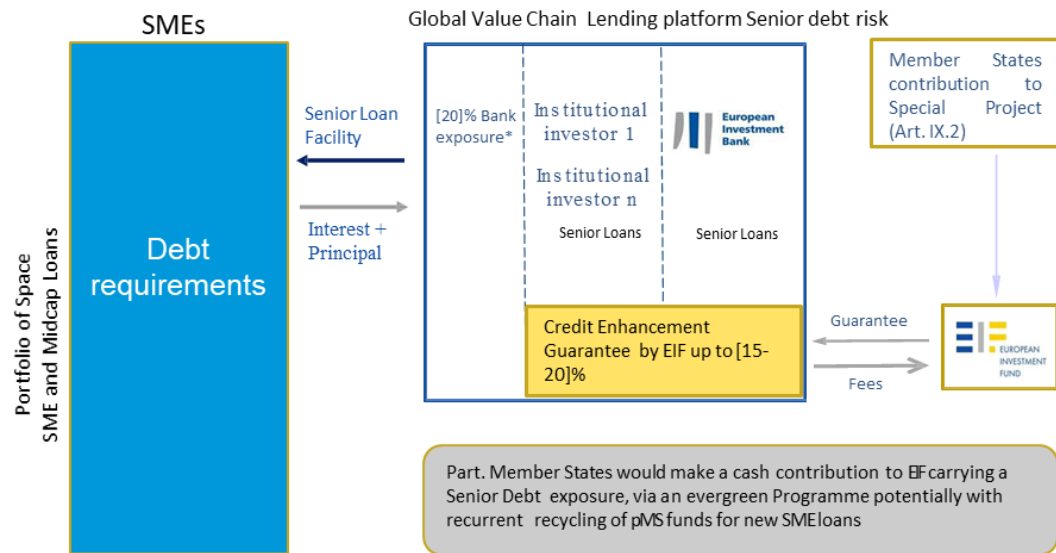
Access to finance

A lending platform for SME

- Article VII.1.b of ESA Convention: *"foster the world-wide competitiveness of European industry"*.
- European investment landscape is suboptimal due to **lack of understanding** and perceived maturity of the space market
- **Loans from commercial banks presenting tenors, prices and collaterals adequate to SME capacities are nearly inaccessible for SME**
 - Financing working capital (liquidity)
 - Co-funded activities (e.g. with ESA GSTP, ARTES, etc.)
 - Growth/ scale up investments (including M&A - not eligible financing use for EIB)

- In July 2018 ESA and the European Investment Bank Group (EIB) signed a Joint Statement :
 - To raise private investor awareness of the potential of the space sector
 - To identify and assess the potential to support space companies with promising growth perspectives
 - To improve access to finance, including by pooling in capital from third parties; setting up joint financing instruments
- Ongoing discussions concerning various options addressing
 - ✓ established, bankable companies
 - ✓ pre-bankable/early-stage companies

Description of the lending platform



Example for five year pilot case:

- pMS Risk guarantee ~6M€/year (30M€ in total) could generate a 150M€ portfolio (50/50 EIBG/Investors)
- For ~300 SME loans with average loan size of 400k€
- Interest rates ~5% (instead of 7-10%)
- Duration: up to 8 years, allowing max. 12 years

- Lending platform (no equity) for SME/Midcaps working with ESA
- Portfolio budget financed through EIB, commercial investors and pMS
- Managed by EIB Group and ESA and operated through Private Financial Institution (PFI)
- pMS contribution to EIB Group (20% of portfolio) as risk guarantee ("first loss piece", capped to the extent of the contribution) acts as de-risking and multiplying factor and
- pMS contribution kept aside of the portfolio
- the ESA procurement and contractor selection process is valued as a credit enhancement by de-risking the technological risk



Support space SME scale-up on export market leveraging defense offset

Great Barrier Reef, Sentinel-2A



European Space Agency

- 60 countries worldwide (among which all ESA MS) foresee compensations in their public procurements.
- Obligors – companies with offset obligations, are desperately looking for new avenues to explore including local R&D and supply chain
- **Potentially, a unique value proposition for space SME to leverage offset investments to develop in new markets**

- Inward investment including loans or equity for new Joint Ventures
- Subcontracting and Work Packages - Purchasing Components & Materials from local companies.
- Technology Transfer (e.g. Training & Technical Assistance, Co-Development.)
- Business Development and Marketing Support re-export of locally developed products.
- IP Development and commercialization. Share of IP rights
- Research and Development
- Training and Education
- Internships

- Raise awareness in European national offset authorities (often MoDs)
- Raise awareness in space SME community
- Jointly identify and propose concrete opportunities to LSIs for offsets involving space SME



Business Incubation Centre

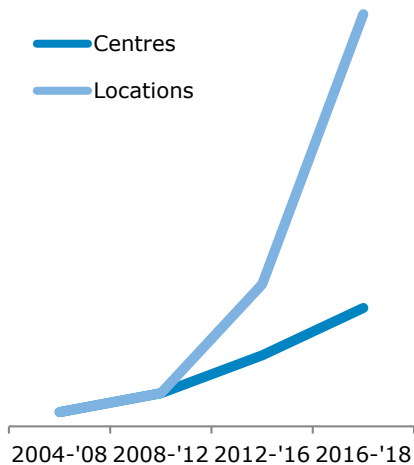
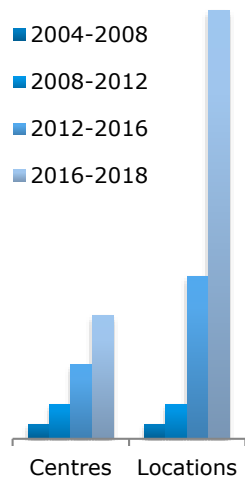
Lake McKay, Sentinel-2B



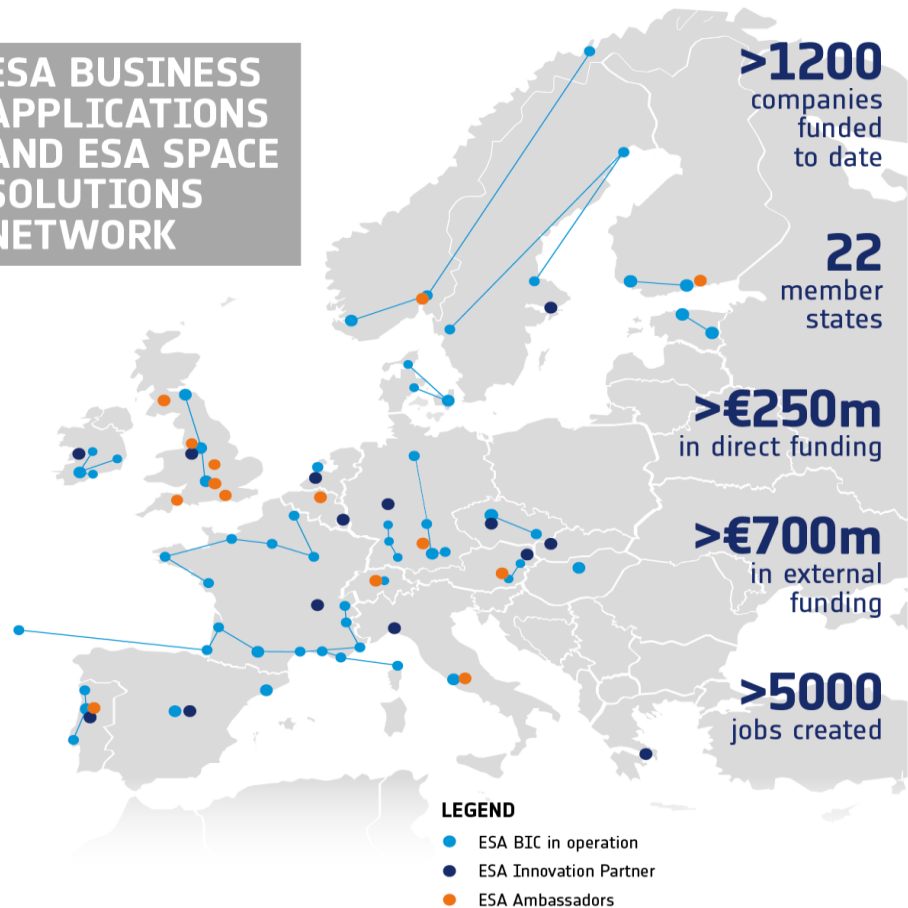
European Space Agency

ESA Space Solutions Network

- Innovation Partner Network: 16 Brokers
- Ambassador Platform: 9+⁵ Ambassadors
- Exponential growth ESA BICs: 20 ESA BICs
60 Locations



→ ESA BUSINESS APPLICATIONS AND ESA SPACE SOLUTIONS NETWORK



Space Solutions Centers - OUR OFFER - WHAT'S IN IT FOR YOU?

Business Incubation

- Network of 20 ESA BICs in 60 locations;
- 2 years of business incubation support;
- Technical Support up to 80 hours;
- Access to €50k incentive funding for product & IP development;
- Business support through workshops, trainings and coaches;
- Exclusive access to international events
- Access to the international ESA BIC entrepreneurial community;
- Preferred access to office facilities, technical expertise, suppliers, buyers and investment capital.

Technology Transfer

- Network of Technology Brokers that help identify technologies from across the European space industry that have a high potential for product and service applications in other industries;
- Demand driven support to non-space companies to explore how space technology can provide them with new competitive advantages;
- Act as a connector, facilitator, and mediator between space and non-space companies;
- Provide access to feasibility studies and market research;
- Support companies in applying for funding calls – both ESA and external.

Business Application

- Network of Application Ambassadors that help identify opportunities to use space infrastructures for new business applications on other markets;
- Get in touch with ESA technical officers, each specialized in a specific domain that integrates space data into your business;
- Provide access to feasibility studies and market research;
- Support companies in applying for ESA Business Application funding calls.



International Relations

Partnerships for worldwide competitiveness

Uluru/Ayers Rock, Sentinel-2A



European Space Agency

ESA and its international partners



Strong ties all over the world



Partnership: one of ESA's key words

As a European research and development organisation, ESA is a programmatically driven organisation, i.e. the international cooperation is driven by programmatic needs and rationale more than a general “foreign policy” as is the case for Sovereign States.

- **Strategic partnerships** with USA, Russia and China
- **Long-standing cooperation** with Japan, India, Australia, Argentina, Brazil, Israel, South Korea, and many more...
- **EU Members, but not ESA Member States:** enhanced cooperation and joint activities. Associate member: Slovenia. European Cooperating States (ECS): Bulgaria, Cyprus, Latvia, Lithuania and Slovakia. Cooperating States: Malta. Discussions are on-going with Croatia.



ASA and ESA today



- A Joint statement of intent between ESA and the Australian Space Agency on the expansion of bilateral cooperation was signed mid-August 2019 by Prof. Jan Worner, DG of ESA and Dr. Megan Clark, Head of the Australian Space Agency. This statement of intent calls for the identification of concrete joint projects in a number of areas that are currently being identified and for the formalisation of the ensuing reinforced bilateral cooperation.
- Since that signature, teams from both agencies are working now to explore opportunities of cooperation in accordance to what is identified as a priority sector in the Australian Civil Space Strategy and in particular on the 4 following domains:
 - **Telecommunications (optical laser, cf. "HydRON - High Throughput Optical Network" aiming for "Fibre in the Sky" optical technologies at Terabit capacity and "SAGA - Secure and cryptographic mission" aiming for Quantum Communication and Key Distribution services).**
 - **SSA (passive radar, defence)**
 - **Earth observation (sensor technology, on-board processing, AI, data analytics and mission support)**
 - **Remote operations and robotics, IRSU (cf ESA METERON project)**

Are you ready to discover more?



www.esa.int

http://www.esa.int/About_Us/Business_with_ESA/GSEF

<https://twitter.com/ESASpaceEconomy>

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