

The future of European space

Driving #Space4.0

European Space Agency

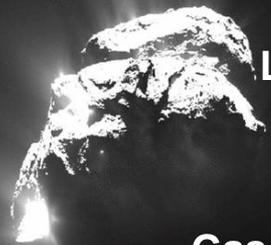
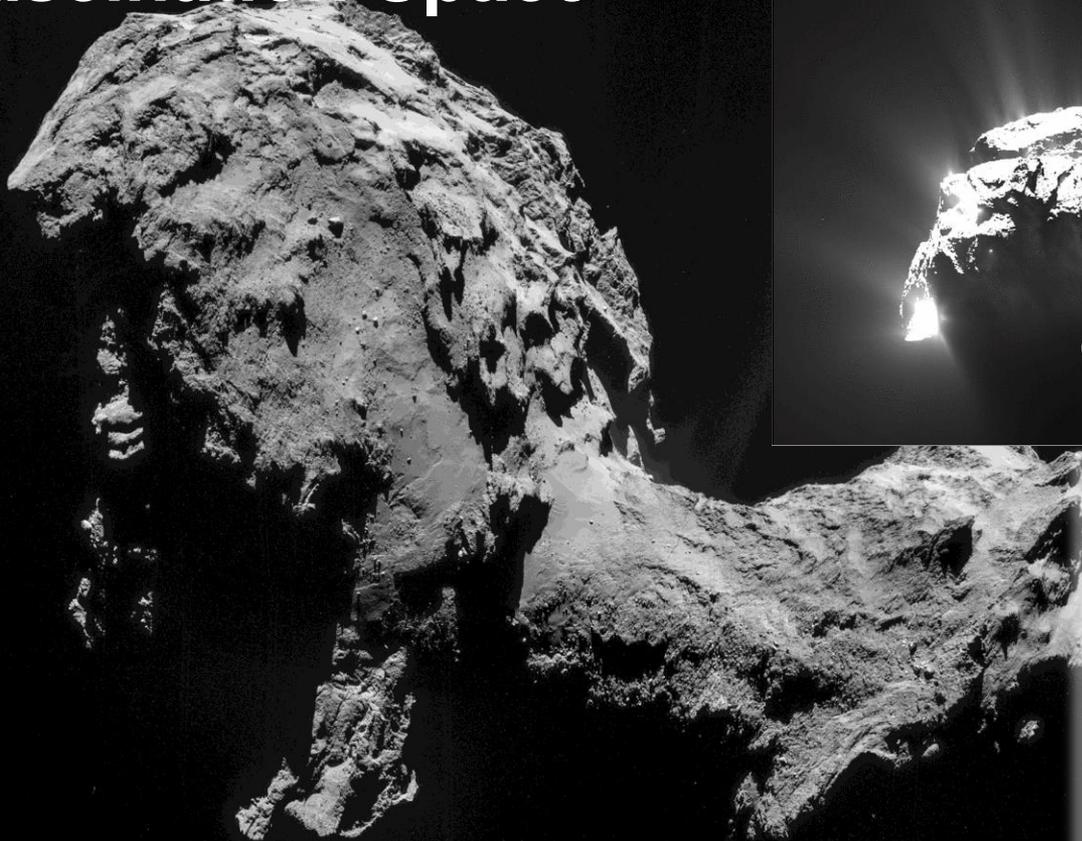
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Fascination Space

7.

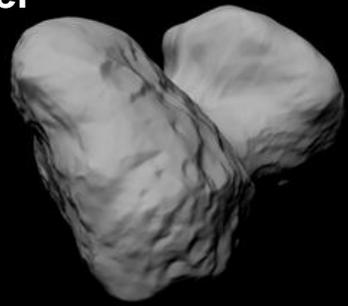


Lander *Philae*

Gas jets erupting



3D Model



View from Orbit by *Rosetta* Spacecraft (n km)



Fascination Space

Earth and Moon



~ 1400 million km



~ 77 million km



View from Saturn (Cassini)
900 million miles away

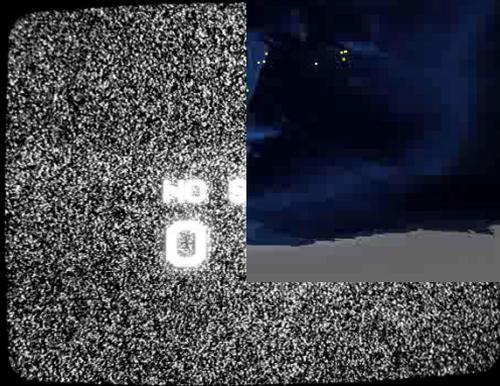
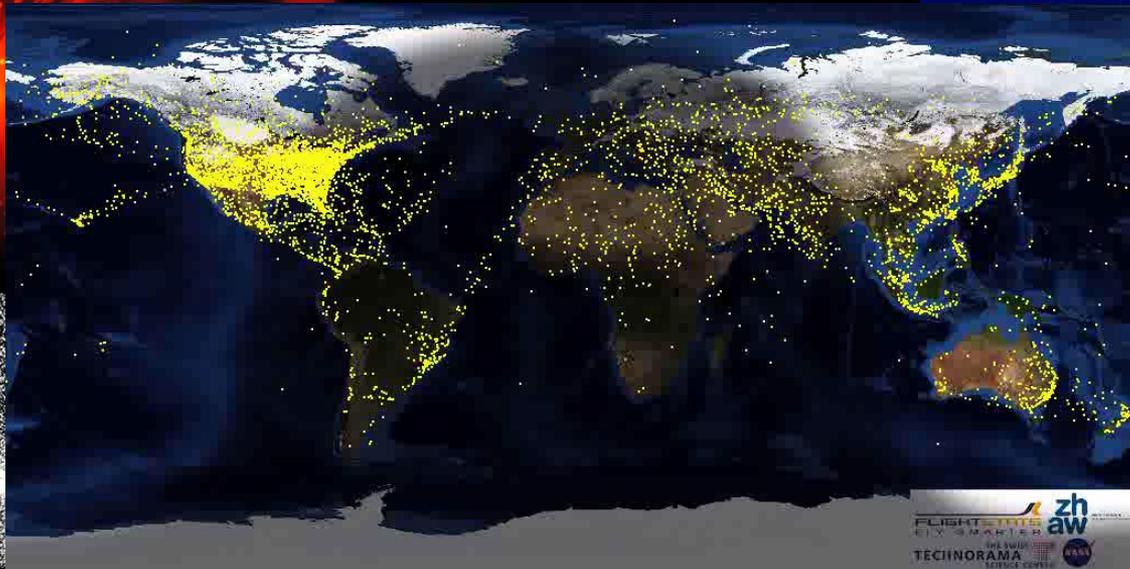
View from Mercury (MESSENGER)
61 million miles away

IMAGE: NASA/JPL-Caltech/Space Science Institute and NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington



European Space Agency

A day without Space

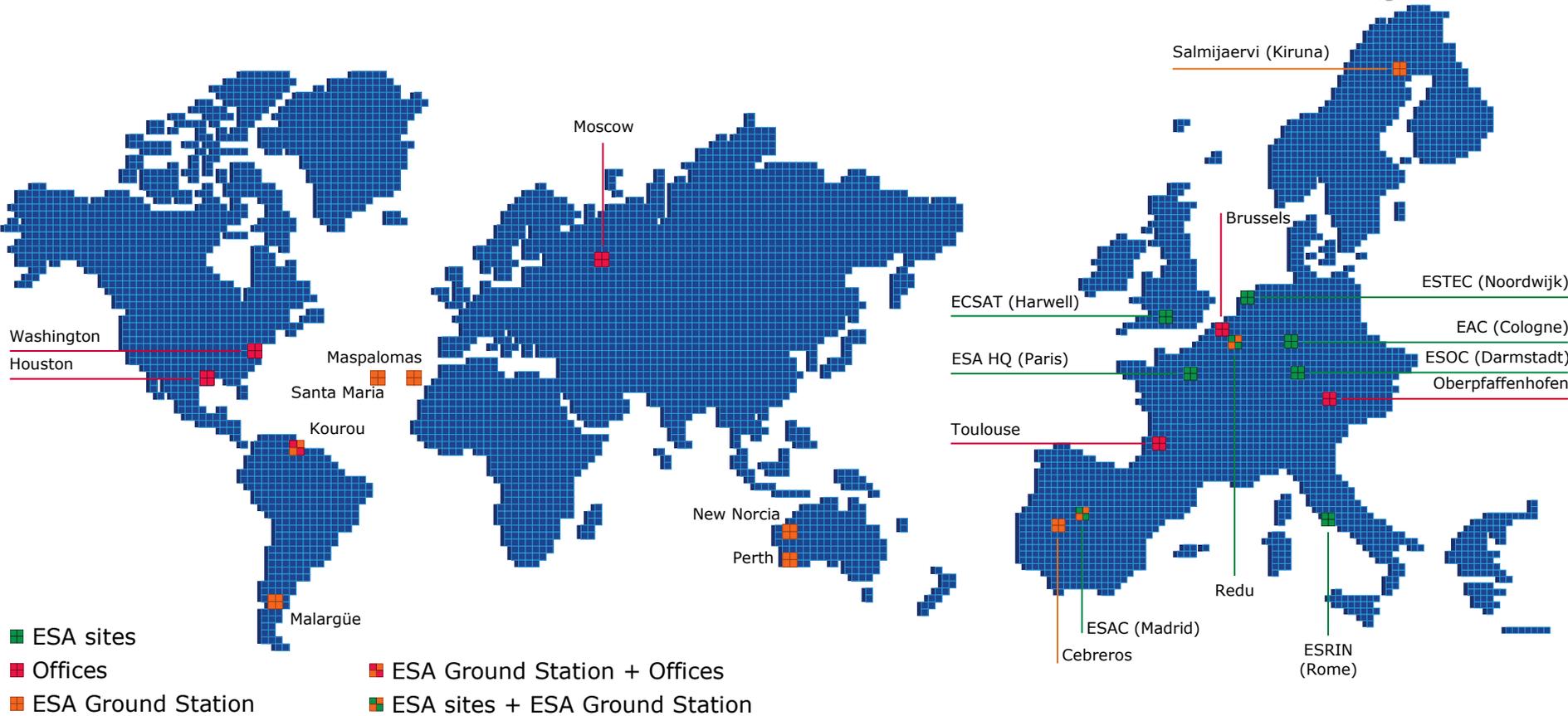


ESA Facts And Figures

- Over 50 years of experience
- 22 Member States
- Eight sites/facilities in Europe, about 2200 staff
- 4.4 billion Euro budget (2015)
- Over 80 satellites designed, tested and operated in flight
- Over 20 scientific satellites in operation
- Six types of launcher developed
- 200th launch of Ariane celebrated in February 2011



ESA's locations



Activities



space science



human spaceflight



exploration



earth observation



launchers



navigation



operations



technology



telecommunications

ESA is one of the few space agencies in the world to combine responsibility in nearly all areas of space activity.

* Space science is a Mandatory programme, all Member States contribute to it according to GNP. All other programmes are Optional, funded 'à la carte' by Participating States.

What is Space 4.0?

Space 1.0

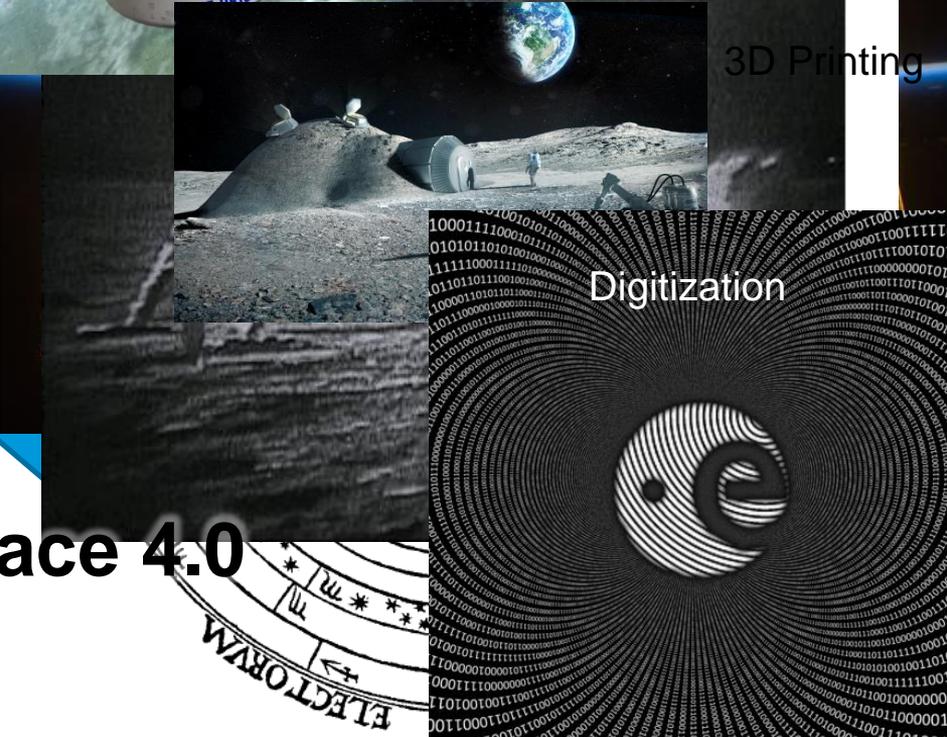
Space 2.0

Space 4.0



3D Printing

Digitization



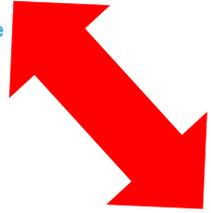
Term and concept developed by ESA Director General Jan Woerner



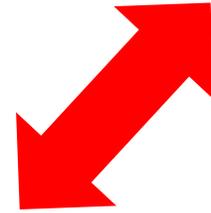


Citizens' debate
on Space for Europe

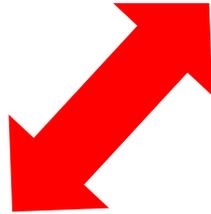
society



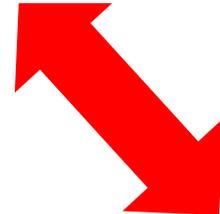
politics



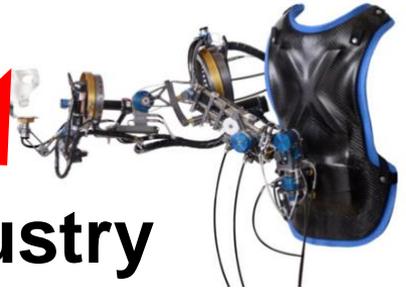
esa



science



industry



Space in Europe

Stakeholders



Member States
European States



- competition in Europe with geo-return
- industrial policy
- driven by Member States

- open competition
- best prices
- driven by EU-parliament?

Lisbon Art. 4.3
„parallel competence“

Space Council

Lisbon Art.189

„appropriate relations“



European Space Agency



European Commission



European identity, spirit and cohesion



Maximise the integration of space into European society and economy

Foster a globally competitive European space sector

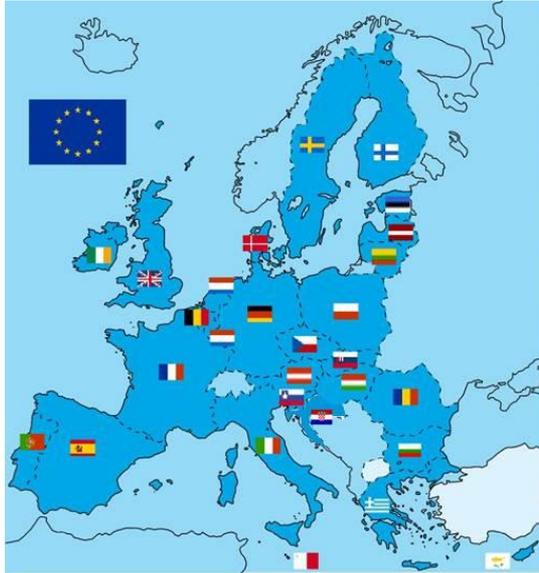
Ensure European autonomy in accessing and using space in a safe and secure environment



Excellence in space science and technology



European Union



United States of Europe



United Space in Europe!

Member States



Inspiring and motivating



Challenges to the European space sector



- More space faring nations, more institutional players, more commercial players
- Hidden subventions and diverse regulatory environment
- Changing role of agencies and government
- High risk averseness in Europe
- Increasing reliance of economy on space, its applications and value chains
- Invigorating a “Smart Europe”
- New manufacturing production lines
- New technologies and applications
- Big data and digitalisation available anytime, anywhere



A tool for the economy

Energy

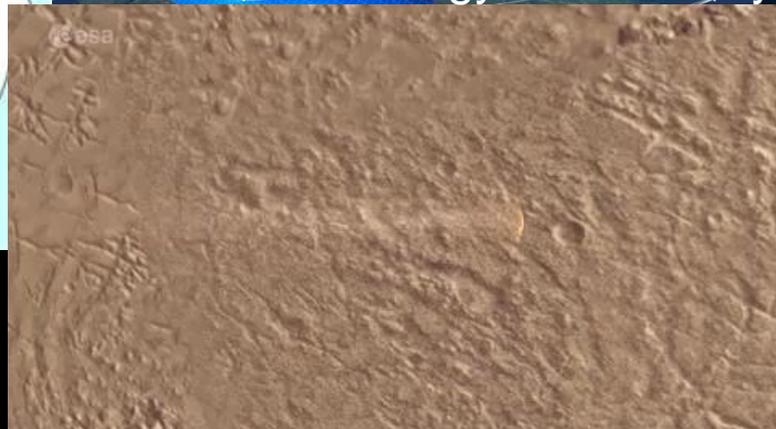
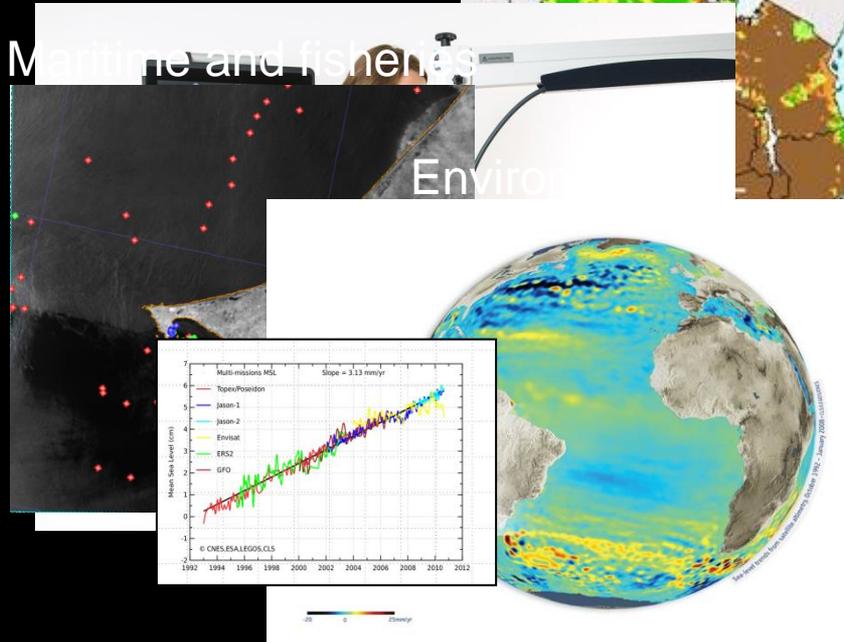
Regional development

Health

Maritime and fisheries

Environment

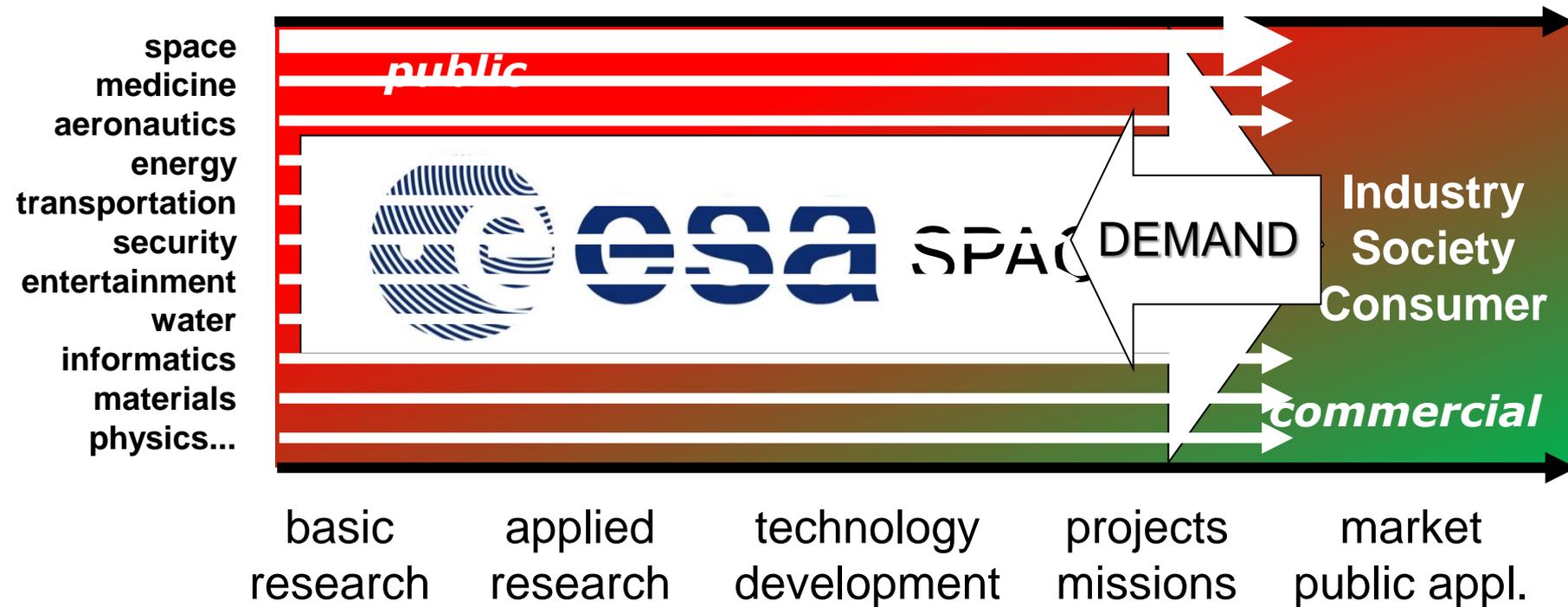
Research, technology and industry



Seamless Chain of Innovation



Invention → Missions → Innovation



Business Incubation Centers



Technology Transfer



energy

tourism

HydroLogic

media & broadcasting

resources

ThruVision Systems

People Screening Safe Technology Our Products

agriculture & forestry

report on ThruVision Systems' capabilities

Click here to learn about the T4000...

the move

security

development

retail & finance

maritime

health

Non Edible Parts of Higher Plants

CREW

Wastes

Fibre degradation

COMPARTMENT I

Thermophilic Anaerobic Bacteria

COMPARTMENT II

Photosynthetic Bacteria Rhodospirillum rubrum

COMPARTMENT III

Nitrifying Bacteria Nitrosomonas Nitrobacter

NT IVA

Photosynthetic Bacteria Arthrospira platensis

Water

O₂

CO₂

CO

NO₂

NO₃

Food

Volatiles Fatty Acids Minerals

NH₄⁺

Minerals

#SpaceInside





SUSTAINABLE DEVELOPMENT GOALS

3

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

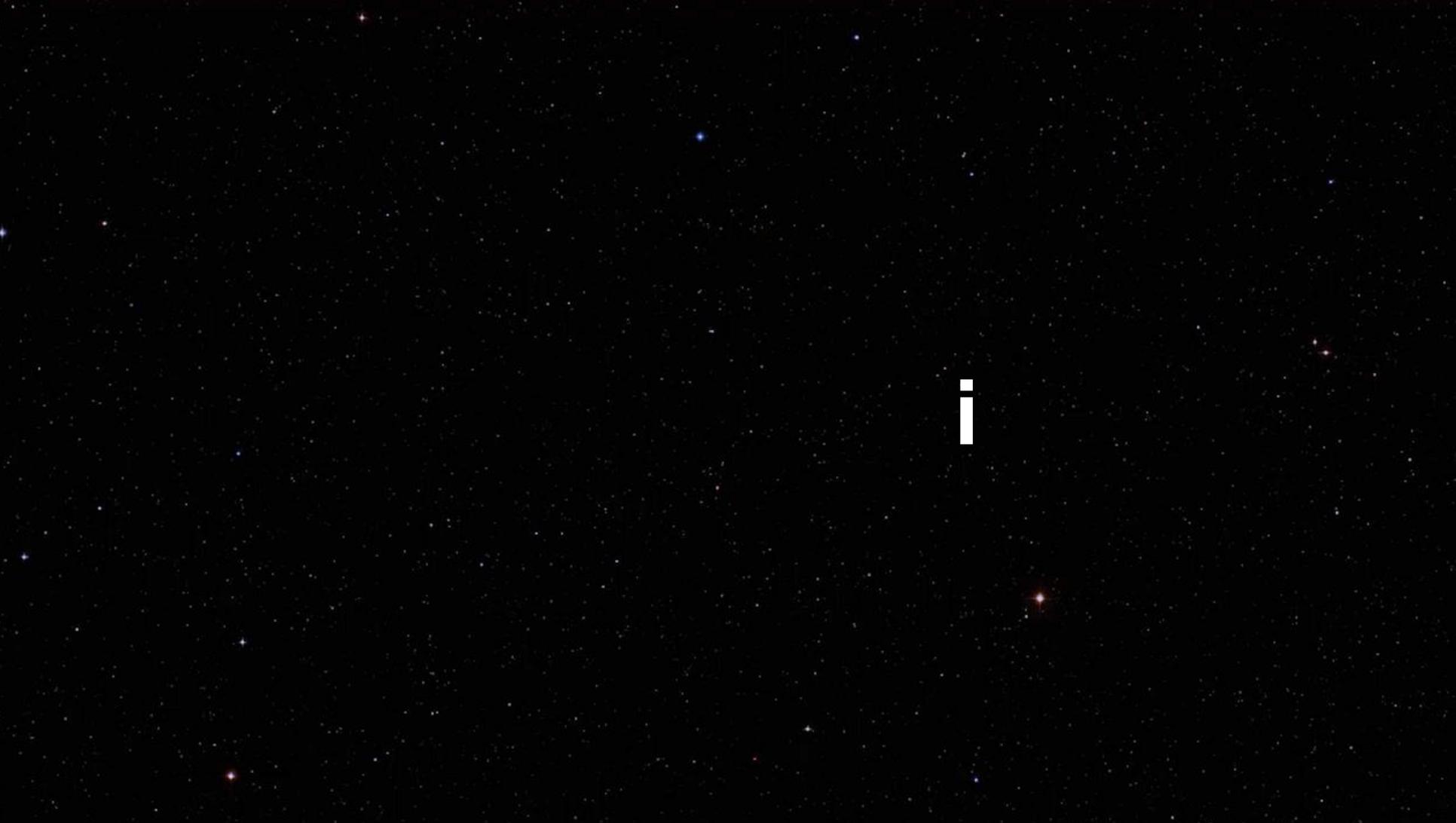
17 PARTNERSHIPS FOR THE GOALS

SUSTAINABLE DEVELOPMENT GOALS



MoonVillage







European Space Agency