

# “Big data: Development of value-added downstream services and applications”

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European Space Agency

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## **22 Member States:**

20 Member States of the EU  
plus Norway and Switzerland

## **Associated State**

Slovenia

## **Cooperating State**

Canada

## **Cooperation Agreements EU**

Bulgaria, Cyprus, Latvia, Lithuania,  
Malta, Slovakia, Croatia



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# Competition = driver



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Cooperation = enabler



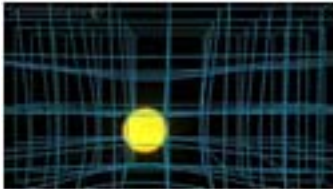
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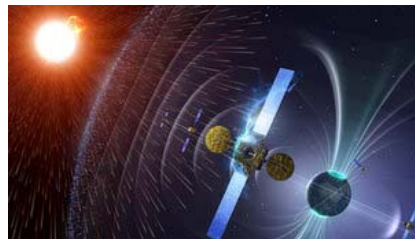
# 4 Main Programmatic Pillars



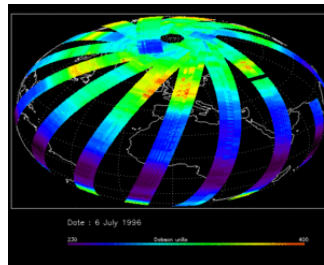
Science and  
Exploration



Safety and  
Security



Applications



Enabling and Support  
(transp., tech, & ops)



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# 4 Main Programmatic Pillars



Science and  
Exploration

Safety and  
Security

Applications

Enabling and Support  
(transp., tech, & ops)

Downstream Gateway

The diagram features a large blue arrow pointing downwards from the four pillars to a central box labeled 'Downstream Gateway'. Below this box is another large blue arrow pointing downwards to a final box labeled 'One Space to the Customer'. The background of the slide shows a network of green lines connecting various points, resembling a global communication or data network, with a satellite dish visible in the upper right.

“One Space to the Customer”



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Space

Air

In situ

big data

Information

institutional



commercial



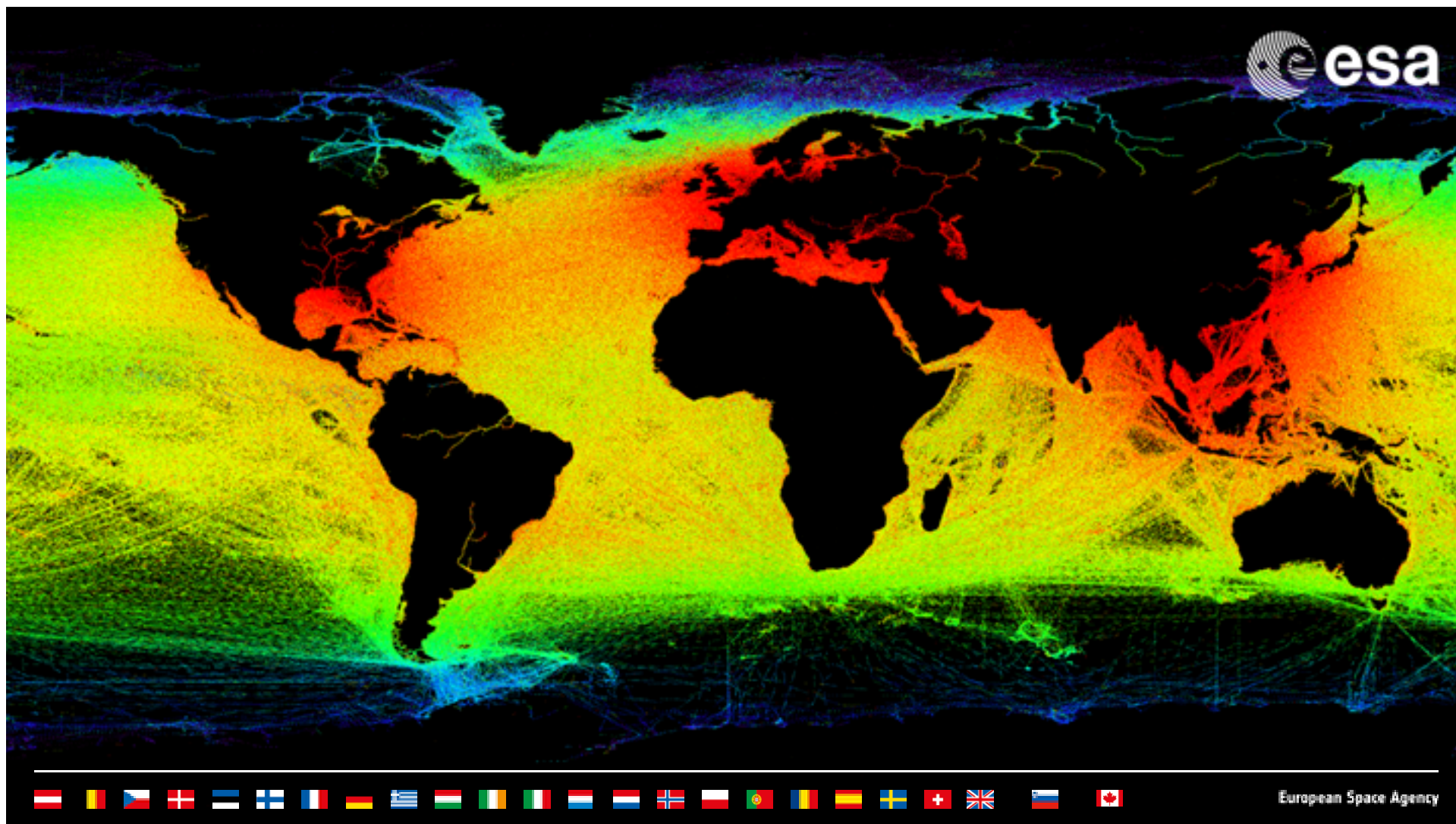
# Big Data

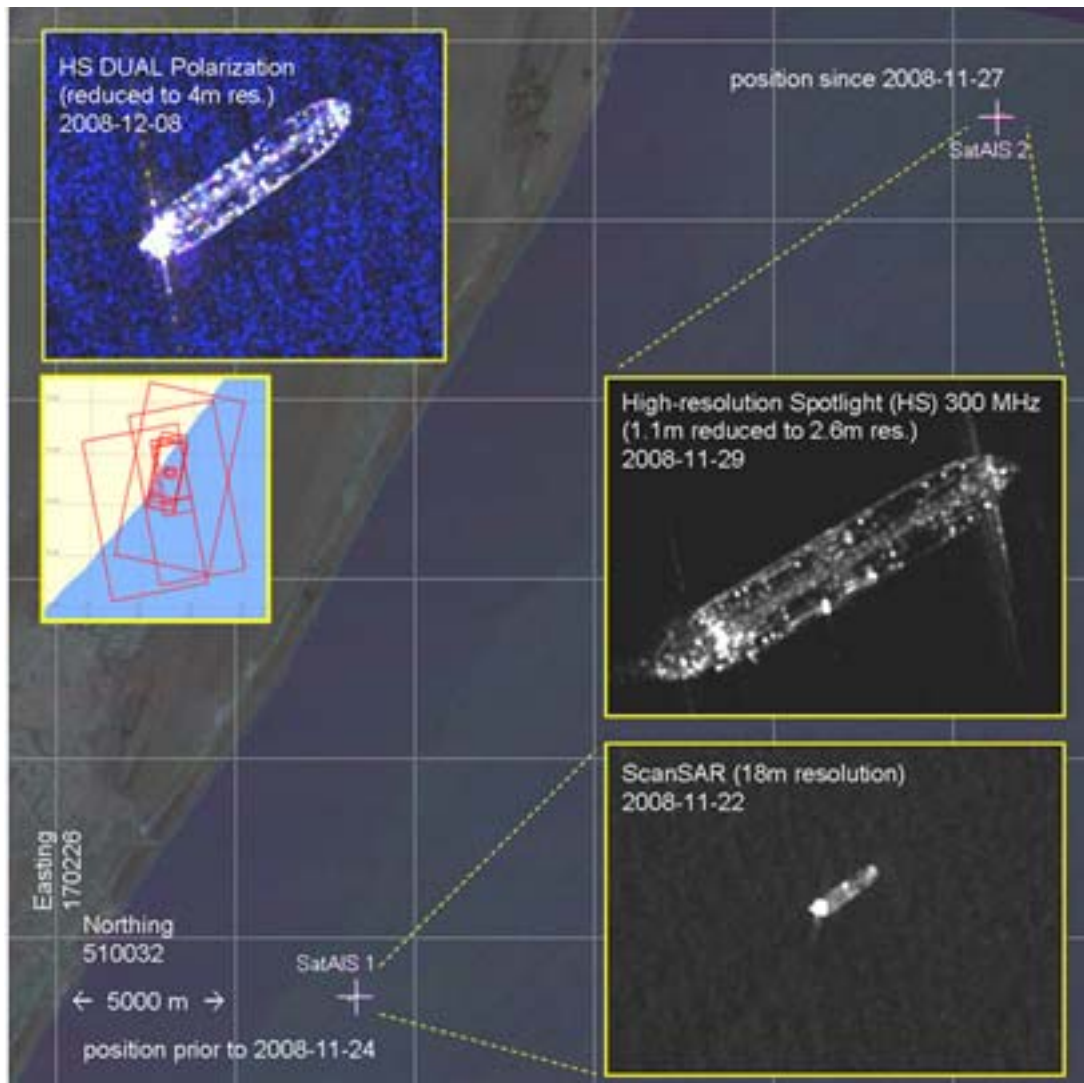
## Hawaii-Mauna Kea



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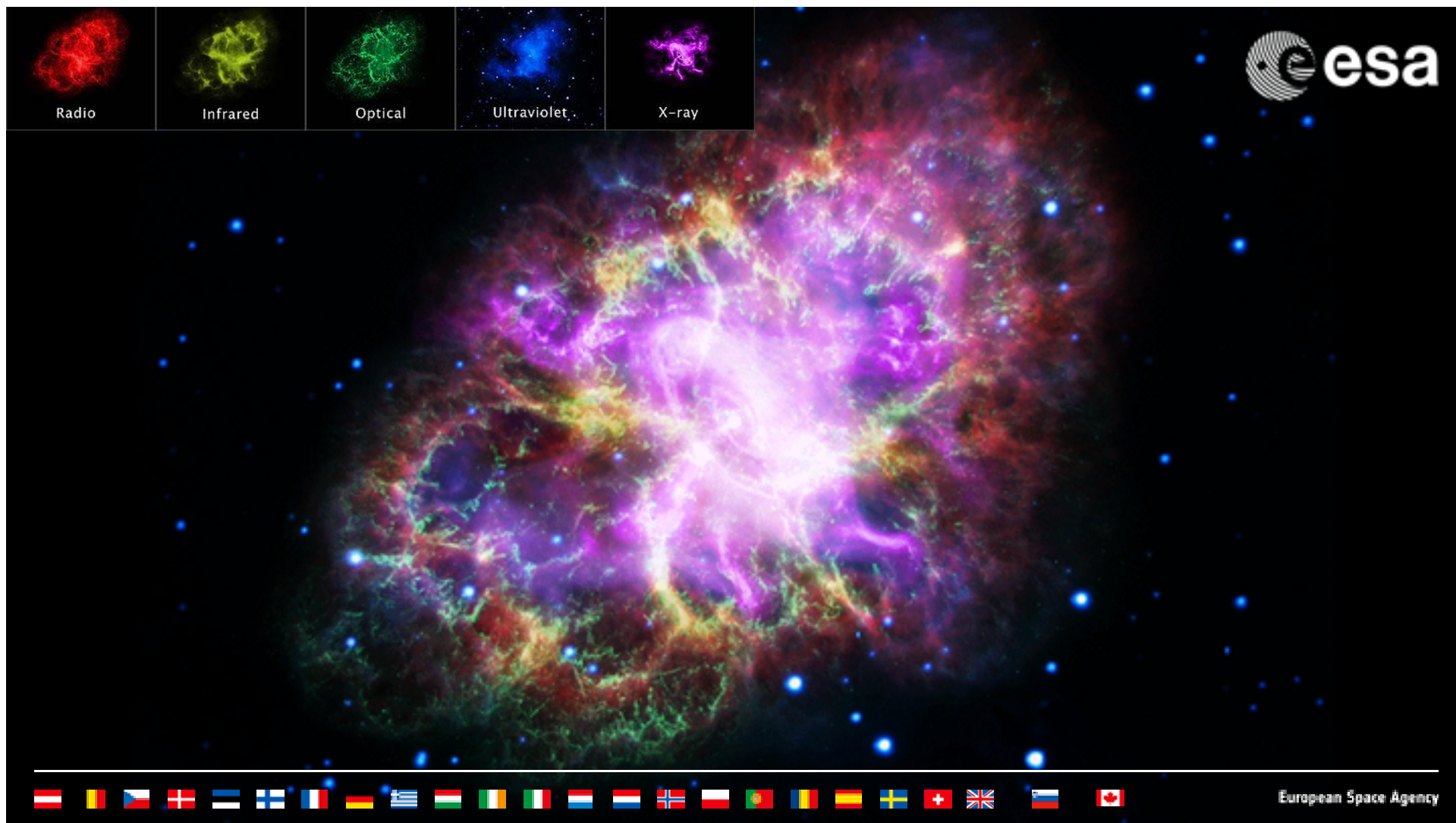




detection of a hijacked ship  
(Sirius Star) with satellite radar  
(TerraSar X) and AIS  
(Automatic Identification  
System)







“Bringing sound to the cosmic movies”



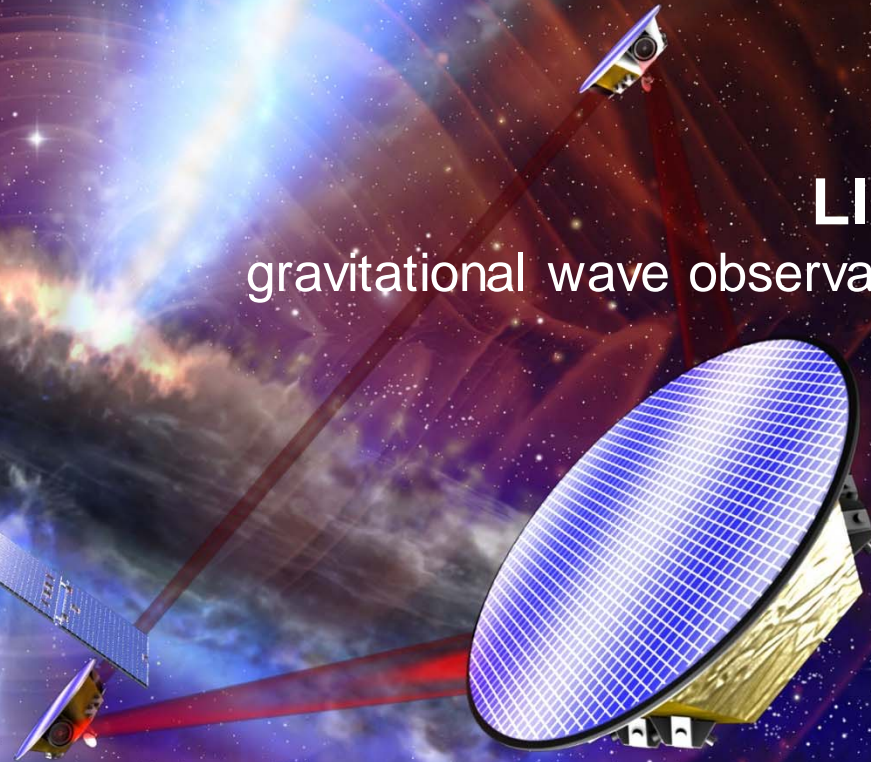
**Athena**

hot gas structures  
supermassive black holes



**LISA**

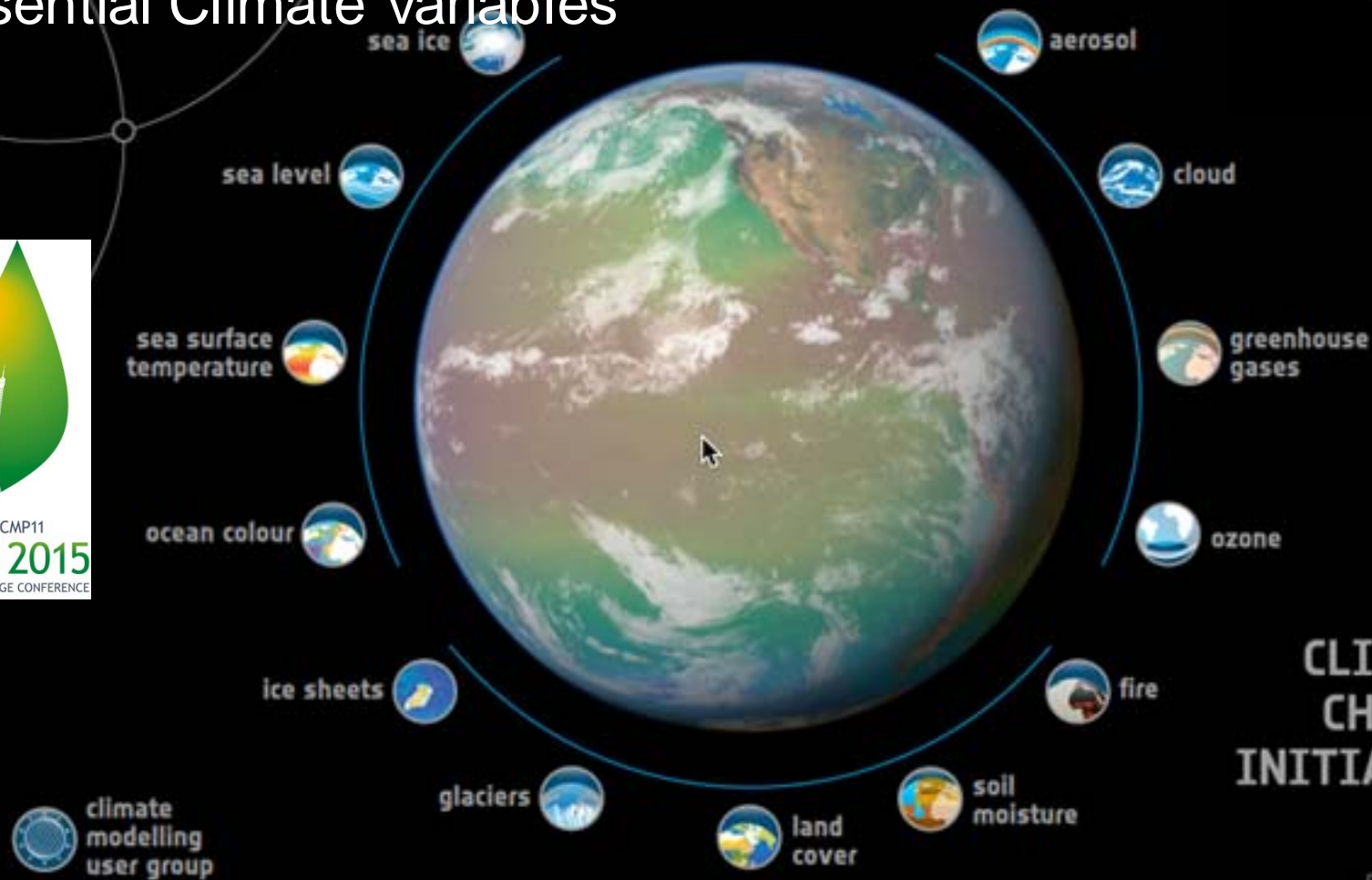
gravitational wave observation



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# Essential Climate Variables

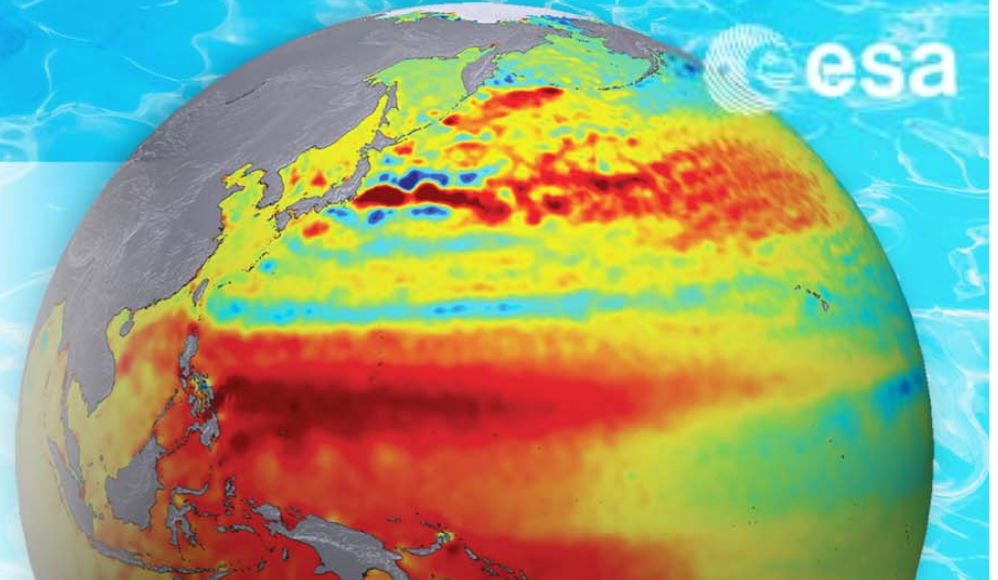


CLIMATE  
CHANGE  
INITIATIVE

CREDITS 

# Sea level rise

## GLOBAL MEAN SEA LEVEL



**“Now, I know there are still a few who insist that climate change is one big hoax, even a political conspiracy. My friends, these people are so out of touch with science that they believe rising sea levels don’t matter, because, in their view, the extra water is just going to spill out over the sides of a flat Earth.” – John Kerry, December 9, 2015, Paris.**



# Seamless Chain of Innovation



Invention → Missions → Innovation



basic  
research

applied  
research

technology  
development

projects  
missions

market  
public appl.



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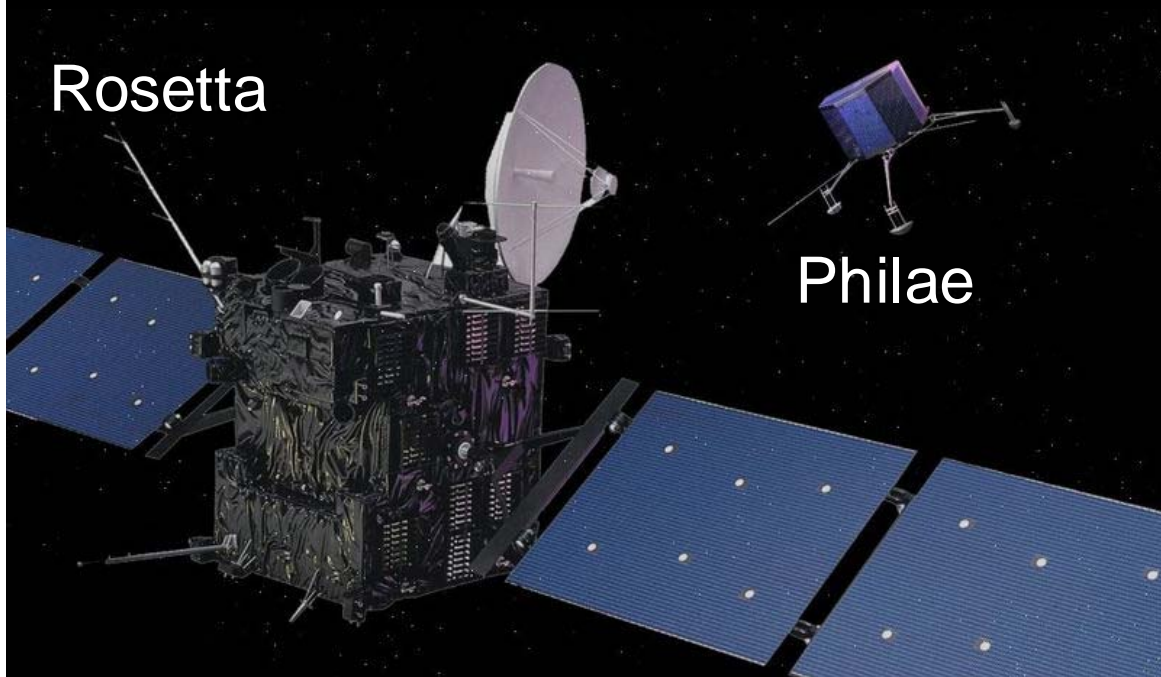
# From Space to Environmental Protection



## FireWatch → Early Forest Fire Detection

Rosetta

Philae



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# Seamless Grid of Innovation



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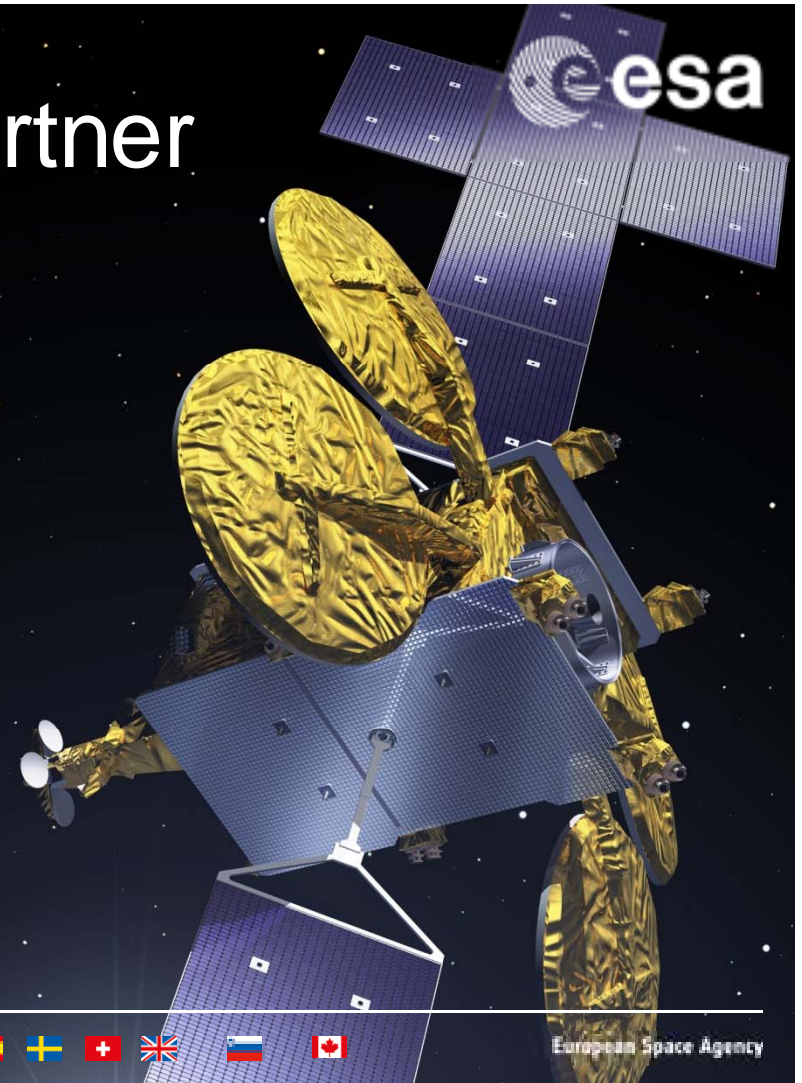


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# esa + industrial Partner

- developing world class competitiveness
- enabling technological leaps
- sharing investments
- sharing risks

**Telecommunication**  
**Earth observation**  
**Launcher**  
**Downstream Application**  
**Exploration**  
**Safety and Security**



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**SPACE 4.0**



**22 August 2018  
Aeolus**



**NEOSAT  
Next Generation  
Platform**



**RFI  
In Orbit Servicing  
Debris removal**

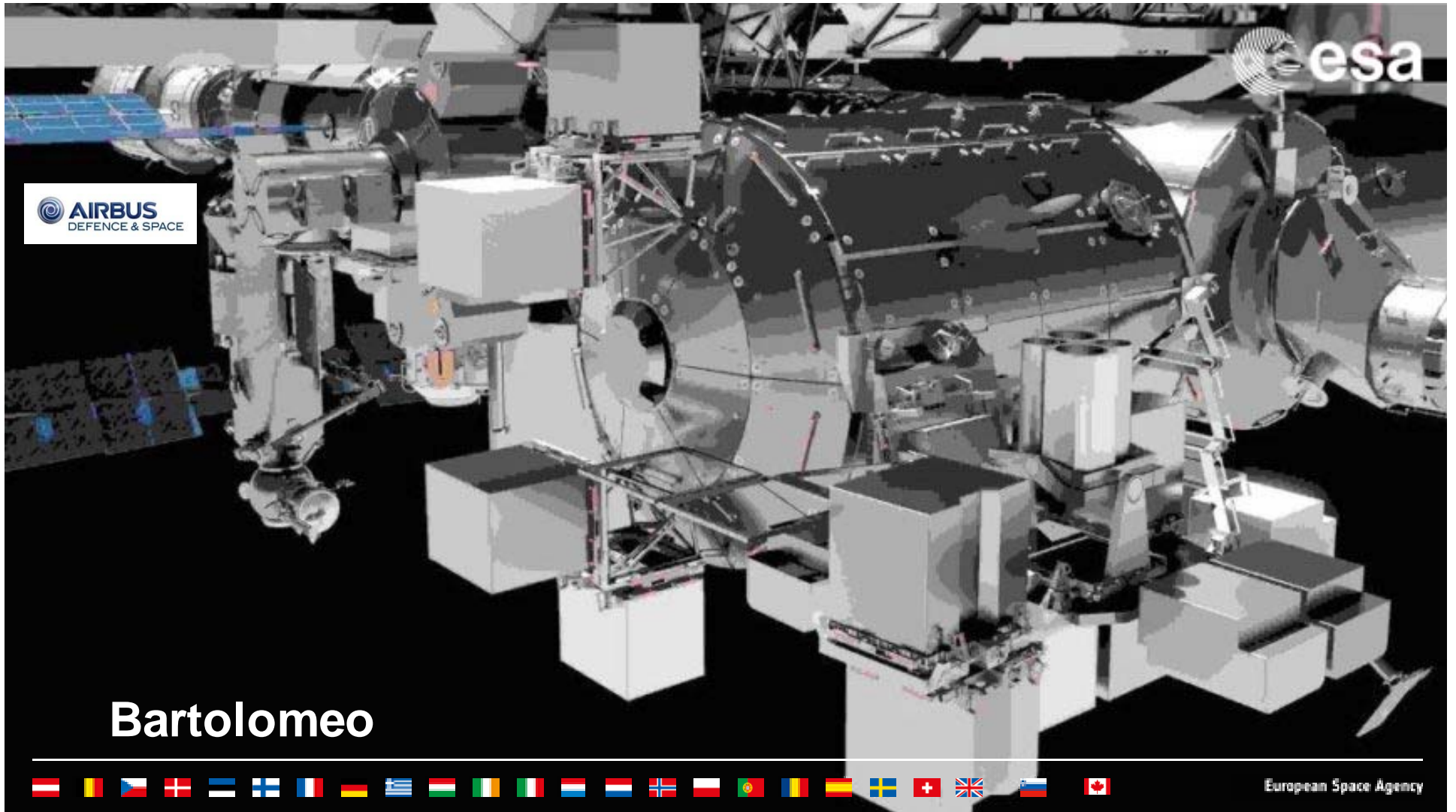
**ESA: Agency and  
partner, broker, mediator, facilitator and enabler**



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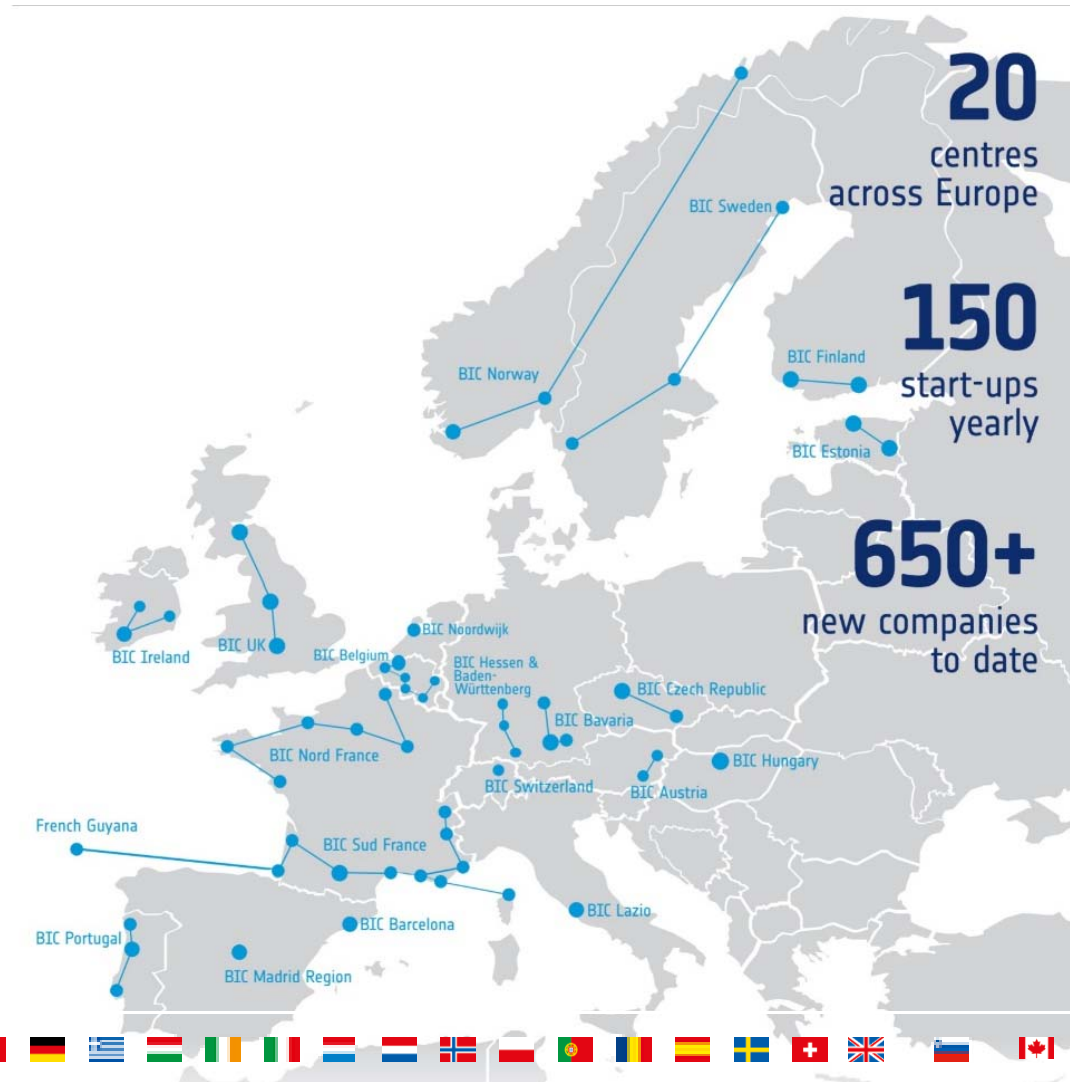


# Bartolomeo



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# ESA BICs



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# Conditions for Start-ups and Entrepreneurship

- political will and climate
- acceptance of failure
- variety of instruments
- fair start-up loans
- flexible use of facilities
- access to competition
- access to information
- access to infrastructure
- networking & partnerships
- fair competition



→ new technology to create metals from resources found on other planets



**The first ESA Grand Challenger**



# Seamless Grid of Innovation



Invention → Missions → Innovation



basic  
research

applied  
research

technology  
development

projects  
missions

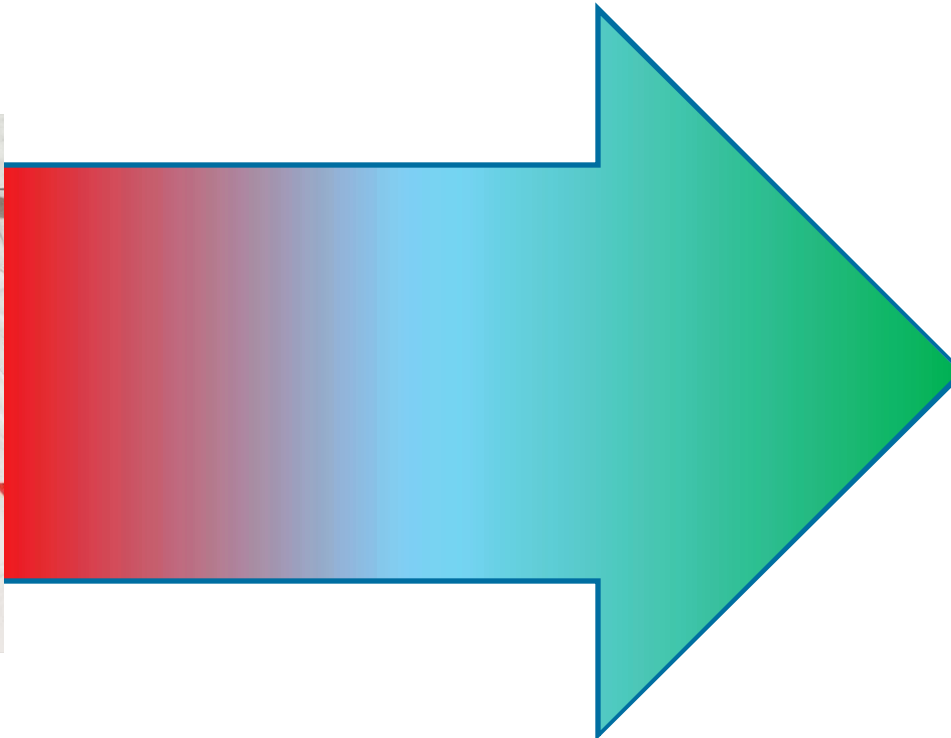
market  
public appl.



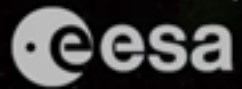
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**SPACE 4.0**

## Chain of Motivation



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ISS



**ESA: THE European Space Agency**