









#SPACE4.0

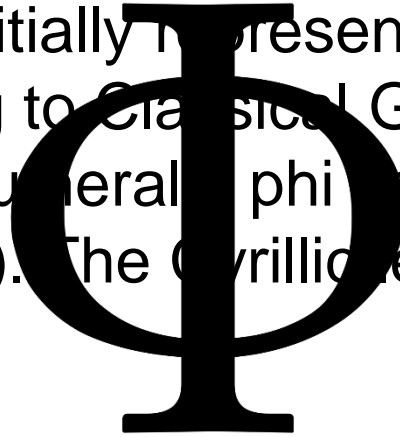
Jan Wörner
European Space Agency

Space19 

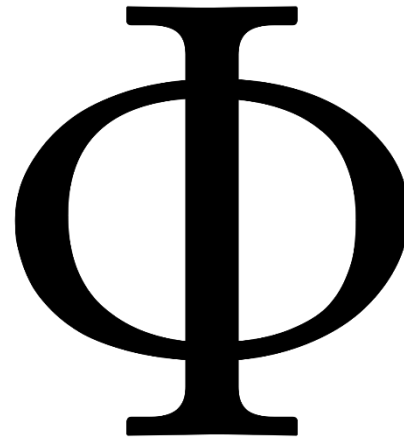


European Space Agency

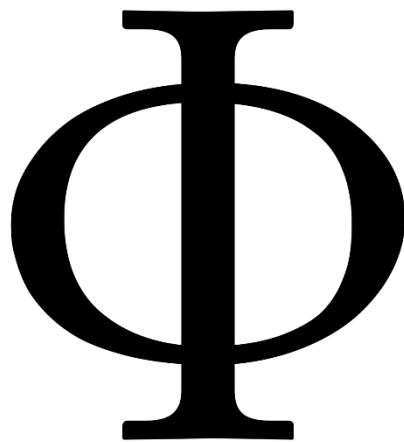
usual romanization as "ph". In modern Greek, it represents a voiceless labiodental fricative ([f]) and is correspondingly romanized as "f". Its origin is uncertain but it may be that phi originated as the letter qoppa and initially represented the sound /k^{wh}/ before shifting to Classical Greek [p^h].[2] In traditional Greek numeral phi has a value of 500 (ϕ') or 500,000 (ϕ). The Cyrillic letter Ef (Ф, ф) descends from phi.



Phi is also used as a symbol for the golden ratio and on other occasions in math and science.



Phi is also used as a symbol for the golden ratio and on other occasions in math and science.



Phi is also used as a symbol for the golden ratio
and on other occasions in math and science and
now as well in SPACE!





2019 Citizens' debate on Space for Europe

#CDOS19

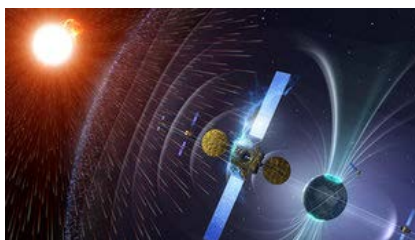


4 Main Programmatic Pillars

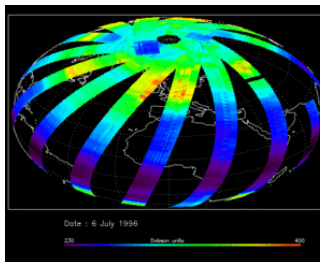
Science and Exploration



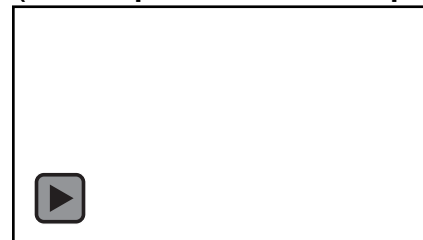
Safety and Security



Applications



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



Diversity of instruments

Traditional projects

open concepts

Shareholder projects

Turn key projects

ppp projects

Crowd funding

SPACE 4.0

→ Diversity of roles



**22 August 2018
Aeolus**



**NEOSAT
Next Generation
Platform**



**In Orbit Servicing
Debris removal**

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



Suppliers



LSI

Industrial Policy

- political will and climate
- sound industrial configuration
- variety of instruments
- fair (start-up) loans
- acceptance of failure
- access to competition
- access to information
- access to infrastructure
- networking & partnerships
- fair competition



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)

The diagram shows a large blue arrow pointing downwards from the four pillars. Inside this arrow is a smaller blue arrow pointing upwards, creating a double-headed arrow effect. This central arrow points to a box labeled 'Downstream Gateway'.

Downstream Gateway

The diagram shows a large blue arrow pointing downwards from the 'Downstream Gateway' box. Inside this arrow is a smaller blue arrow pointing upwards, creating a double-headed arrow effect. This central arrow points to a box labeled 'One Space to the Customer'.

“One Space to the Customer”

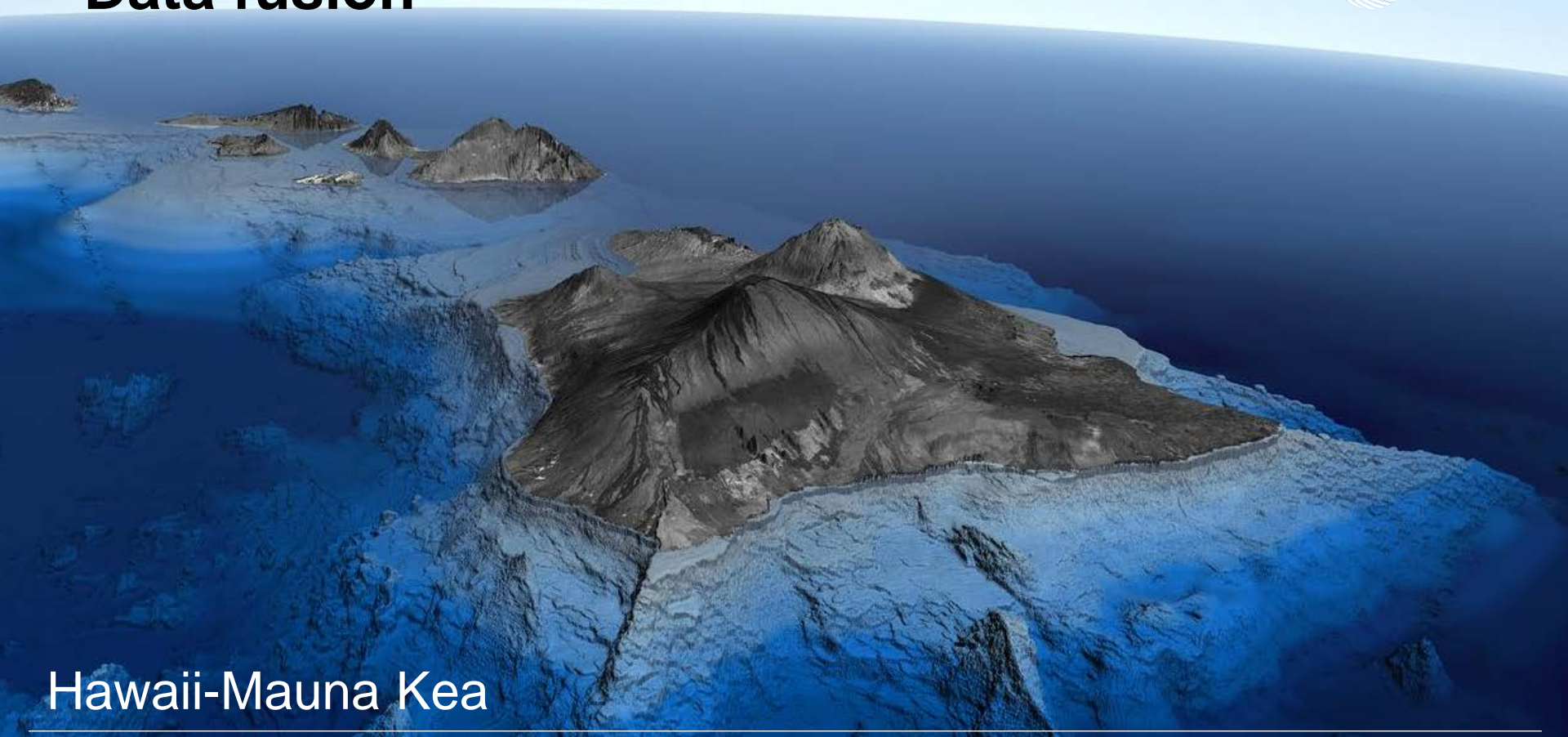




1. Type of card
2. Number
3. Cardholder
4. Expiration date
5. Security code



Data fusion



Hawaii-Mauna Kea



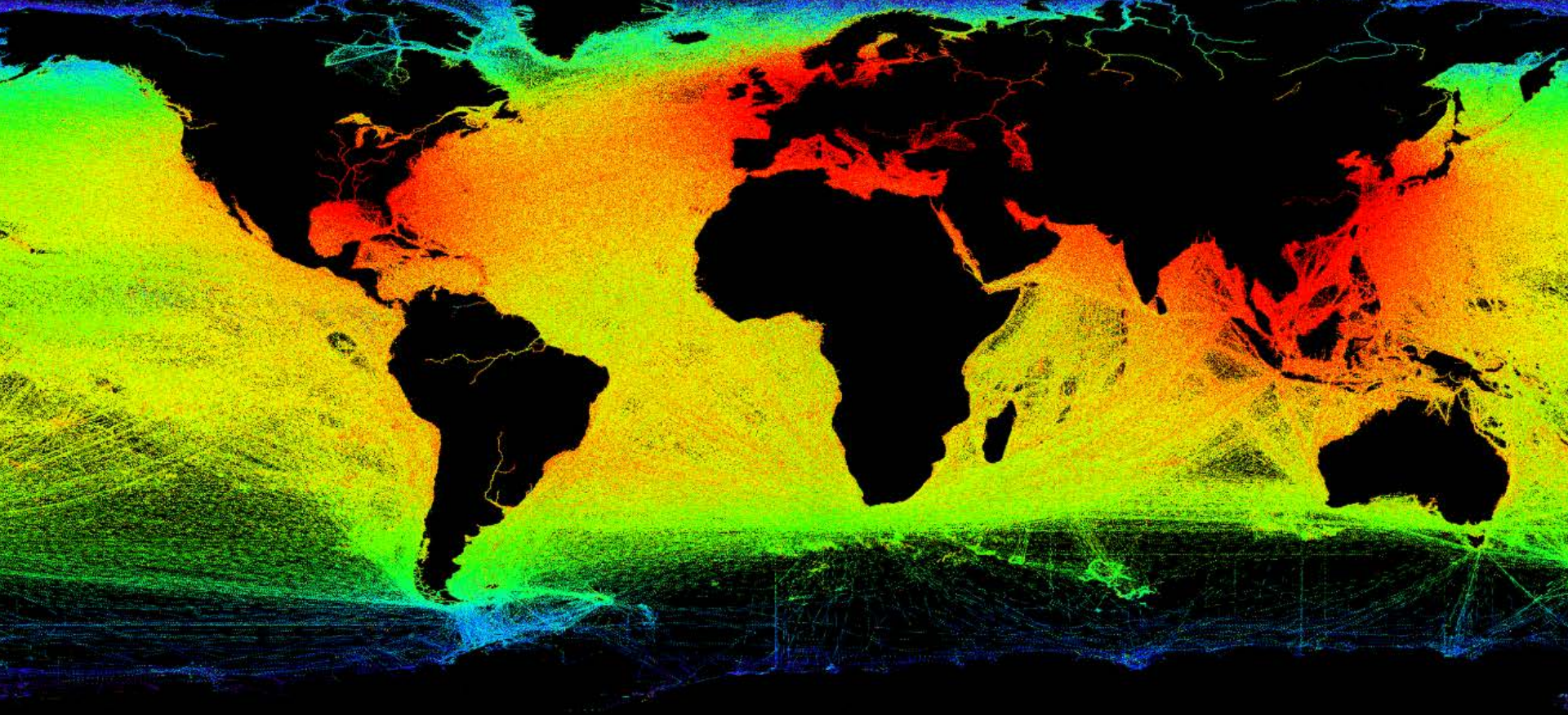


“Health check: feeling the pulse”

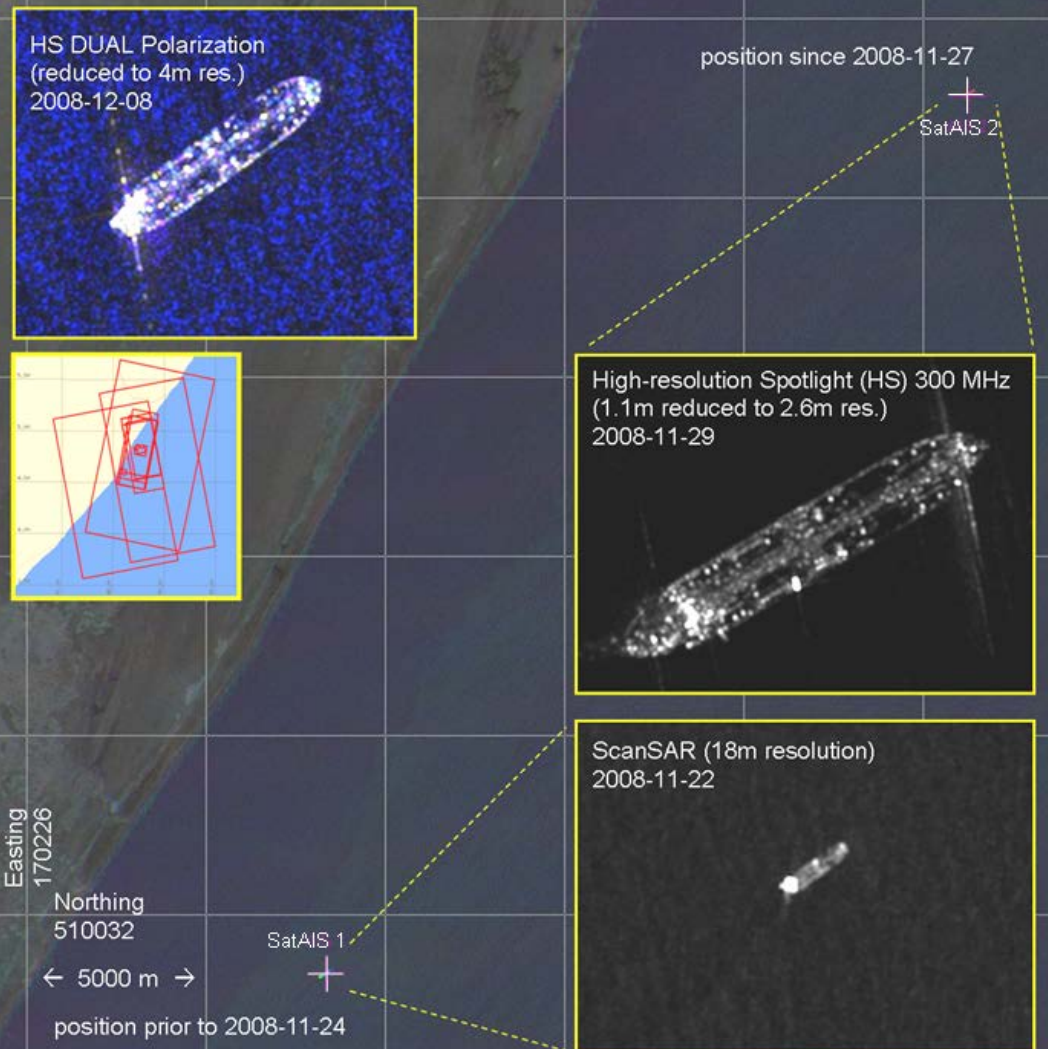
Ser
Esse



AIS (Automatic Identification System)



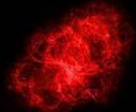
detection of a hijacked ship (Sirius Star) with satellite radar and AIS (Automatic Identification System)



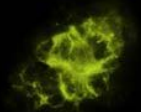
Space Safety and Security

exclusively peaceful purposes

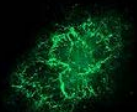




Radio



Infrared



Optical



Ultraviolet



X-ray



Big Data in Science



“Raising awareness”



Samantha Cristoforetti



European Space Agency

“Enable the visions”



New Technologies
Digitalisation
Internet of Things
Blockchain
Cyber Security
Artificial Intelligence

...



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“Enable the visions”



- **legal basis for industrial activities**
- **partnership instruments**
 - improving competitiveness
 - facilitating technological leaps
 - sharing investments
 - sharing risks

Telecommunication

Earth observation

Launcher

Business applications

Exploration

Safety and Security



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“Enable the visionaries”



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