Big Data from Space

pier.giorgio.marchetti@esa.int

We are surrounded by BIG DATA

Textual information

(Google crawlers)

Sharing multimedia

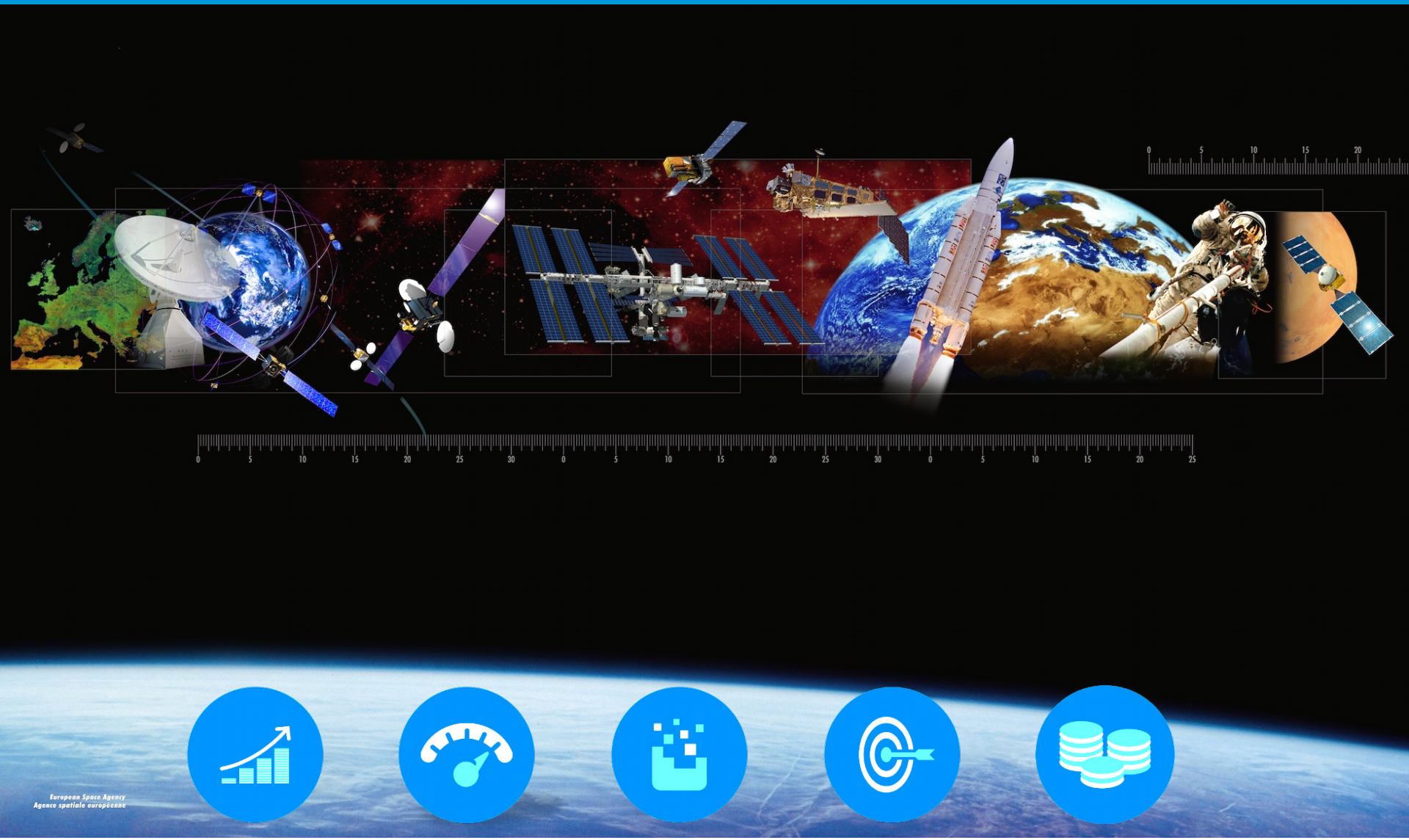
Geo-location

(Google Earth, Google Maps)

Social Networks

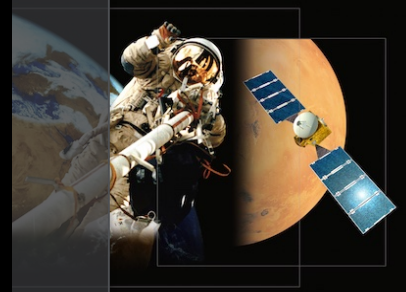
Credits: Psdblast.com

Big data from Space



Big data from Space: VOLUME

Sheer value of sensed data: archived data is currently reaching the exabytes scale.



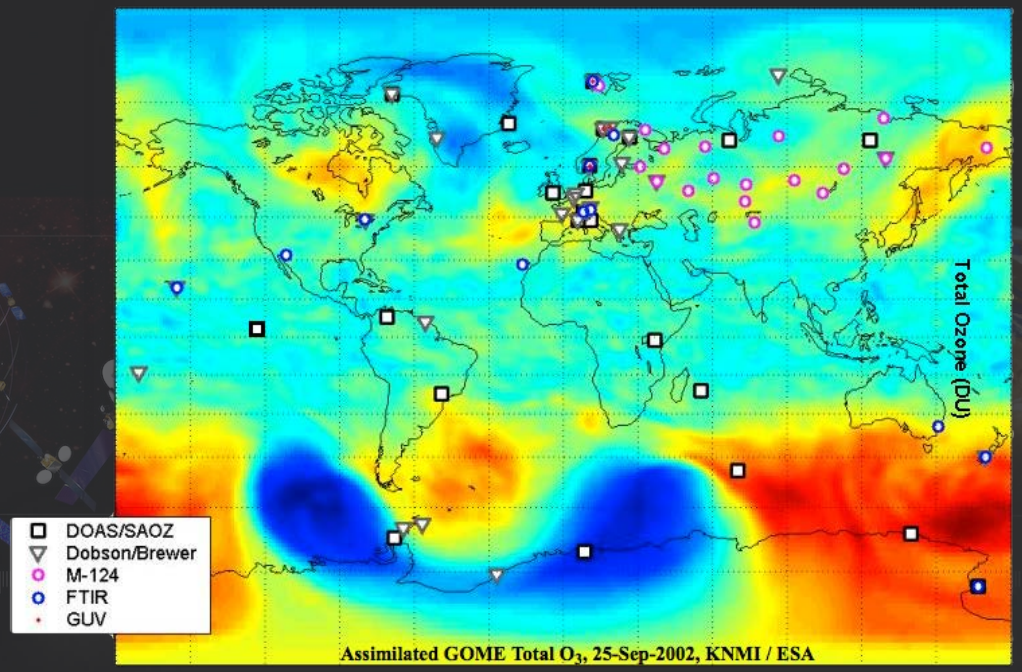
Big data from Space: VELOCITY

New data is acquired almost on a continuous basis and with an increasing rate

Big data from Space: VARIETY

Data is delivered by sensors acting over various frequencies of the electromagnetic spectrum in passive and active modes

Big data from Space: VERACITY



Sensed data is always associated with uncertainty and accuracy measurements

Big data from Space: VALUE

Our capacity to extract information and meaning from data

Big data from Space: focus on USERS

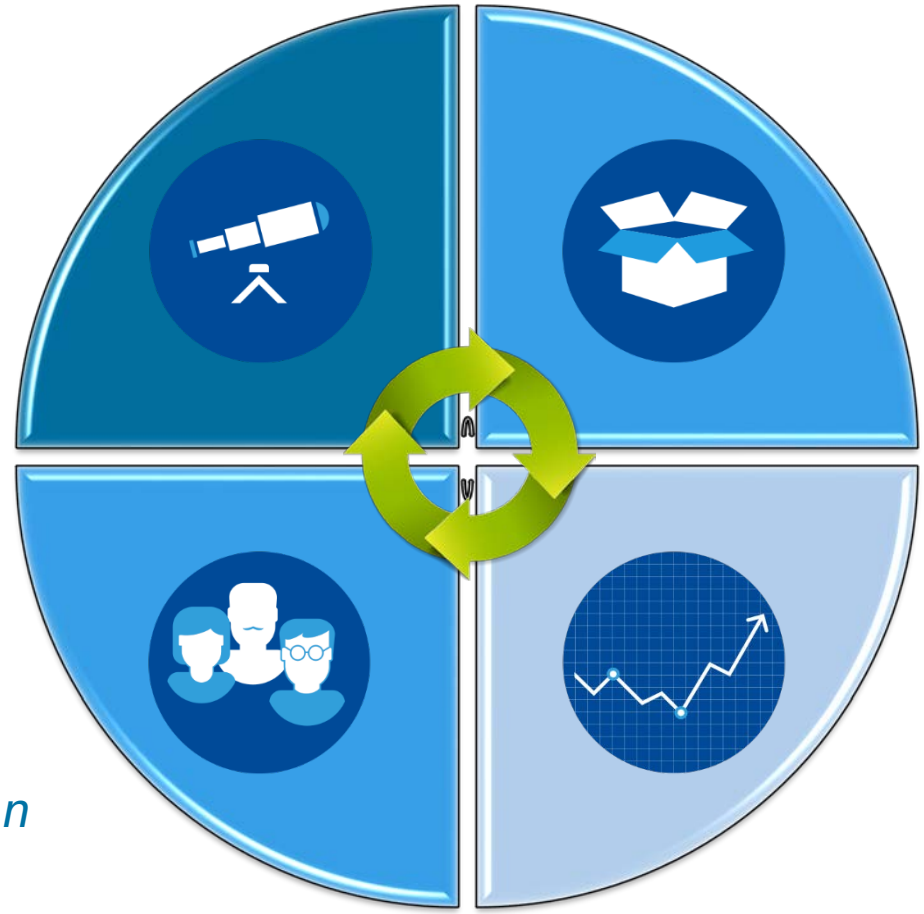
Credits: ESA - Luca della Valle

Various space-related "***domains***" are concerned: Earth Observation, Space Science, Solar System Objects, Space Situational Awareness, Secure Societies, etc.

Overview

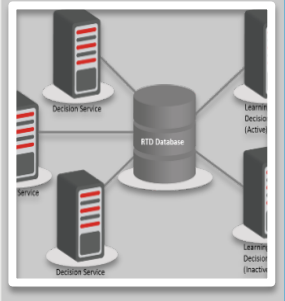
- Data Lifecycle
- Infrastructures and Services for Big Data
- Big Data from Space Scenarios
- Objectives and Activities

Big Data Lifecycle



Big Data Lifecycle: Supporting Resources

SUPPORTING RESOURCES AND INFRASTRUCTURES



Architectures

Data selection & pre-processing

Data & Software Frameworks

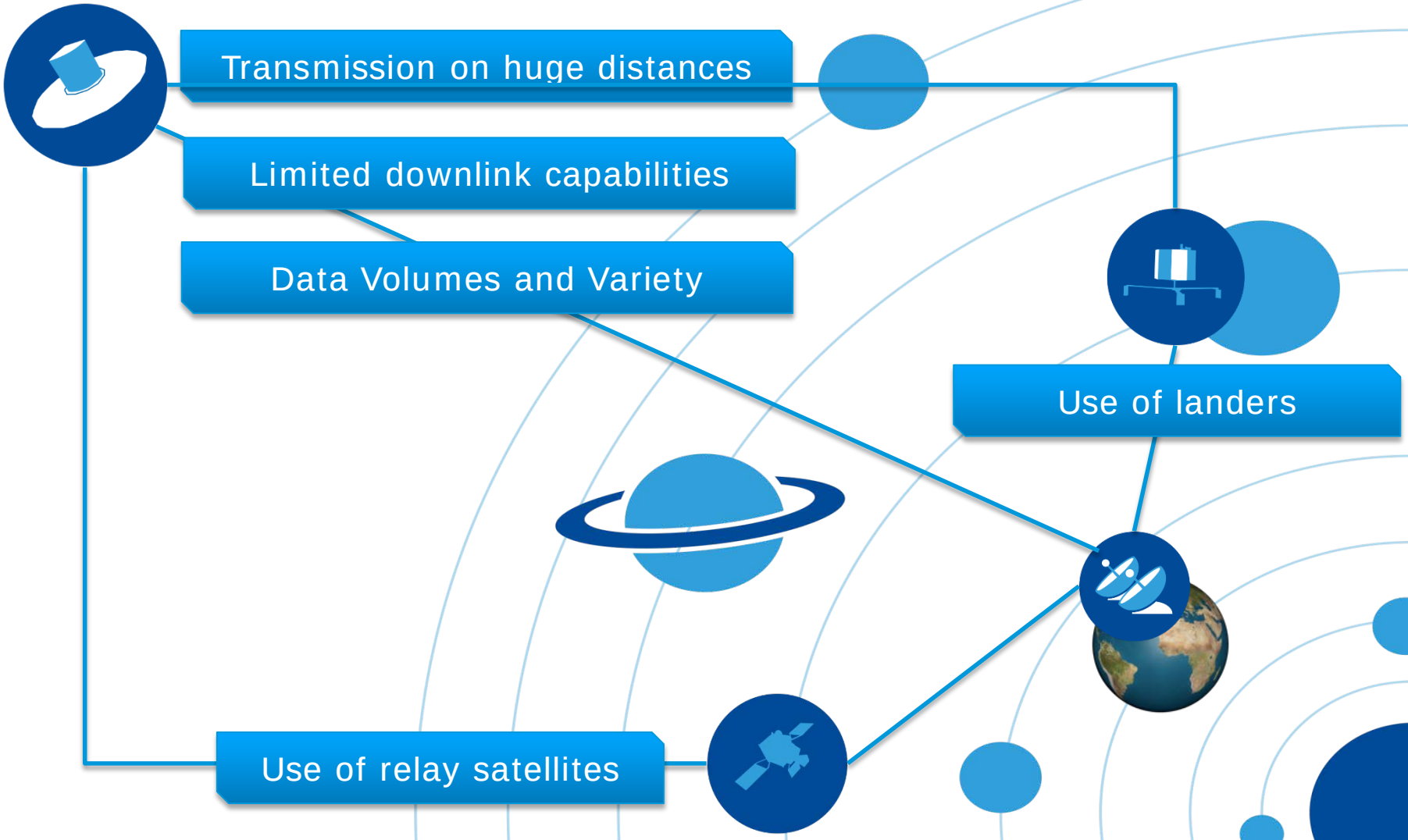
Processing Algorithms

Provenance & Security

Big Data from Space: Technology Themes

Examples
Data Lifecycle
Processing and Analysis
Visualization and Visual Analytics
Multi-temporal Analysis
Onboard Computing, Compression and Transmission
Quality, Provenance and Trust
Infrastructures and Services for Big Data
Storage and computing platforms
Interoperability and Standards
Heterogeneous Data Sources (incl. auxiliary and collateral data)
Linked Data and Semantics
Data Openness, Privacy and Security
Software defined Networking

Scenario 1: Space Science



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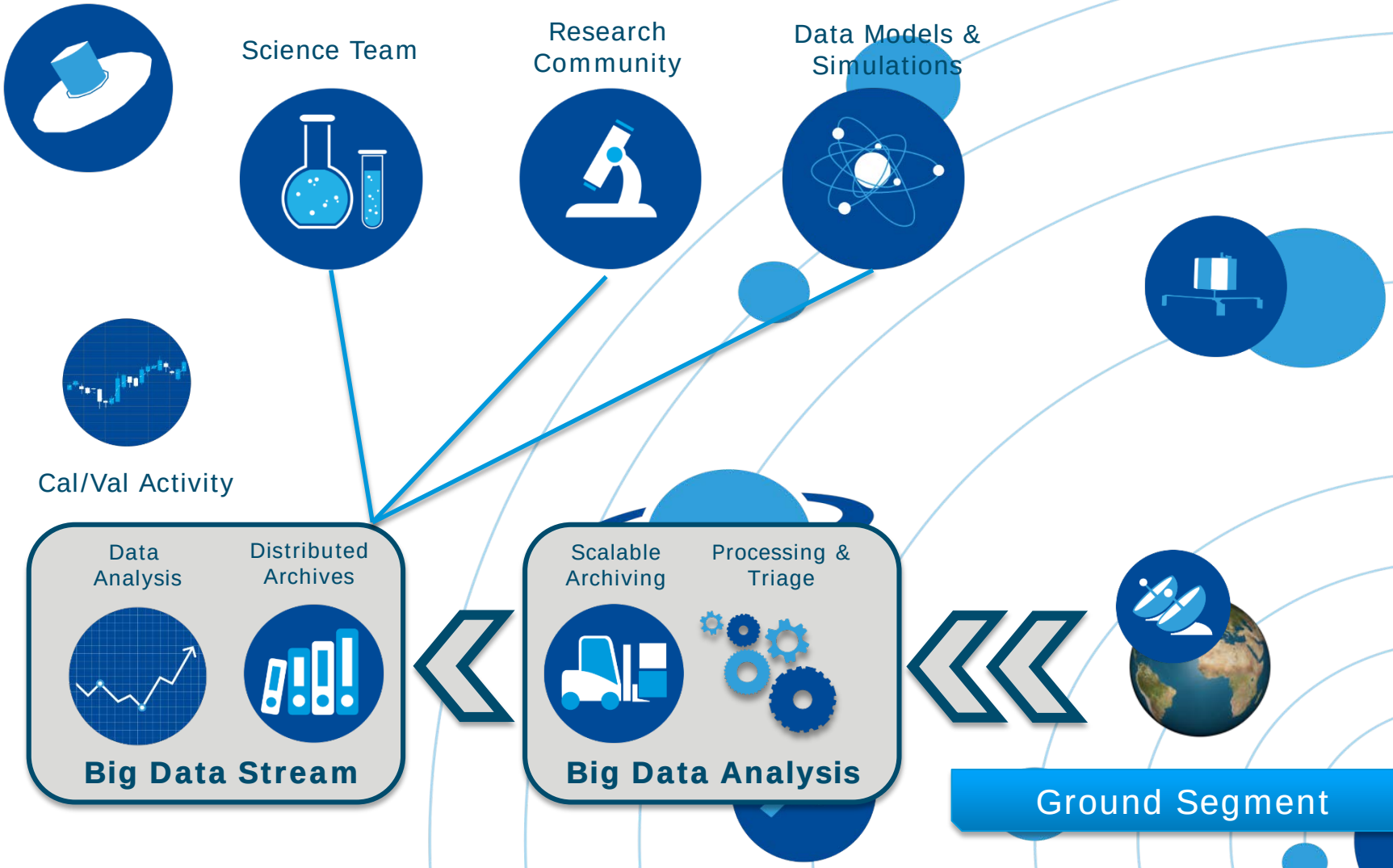
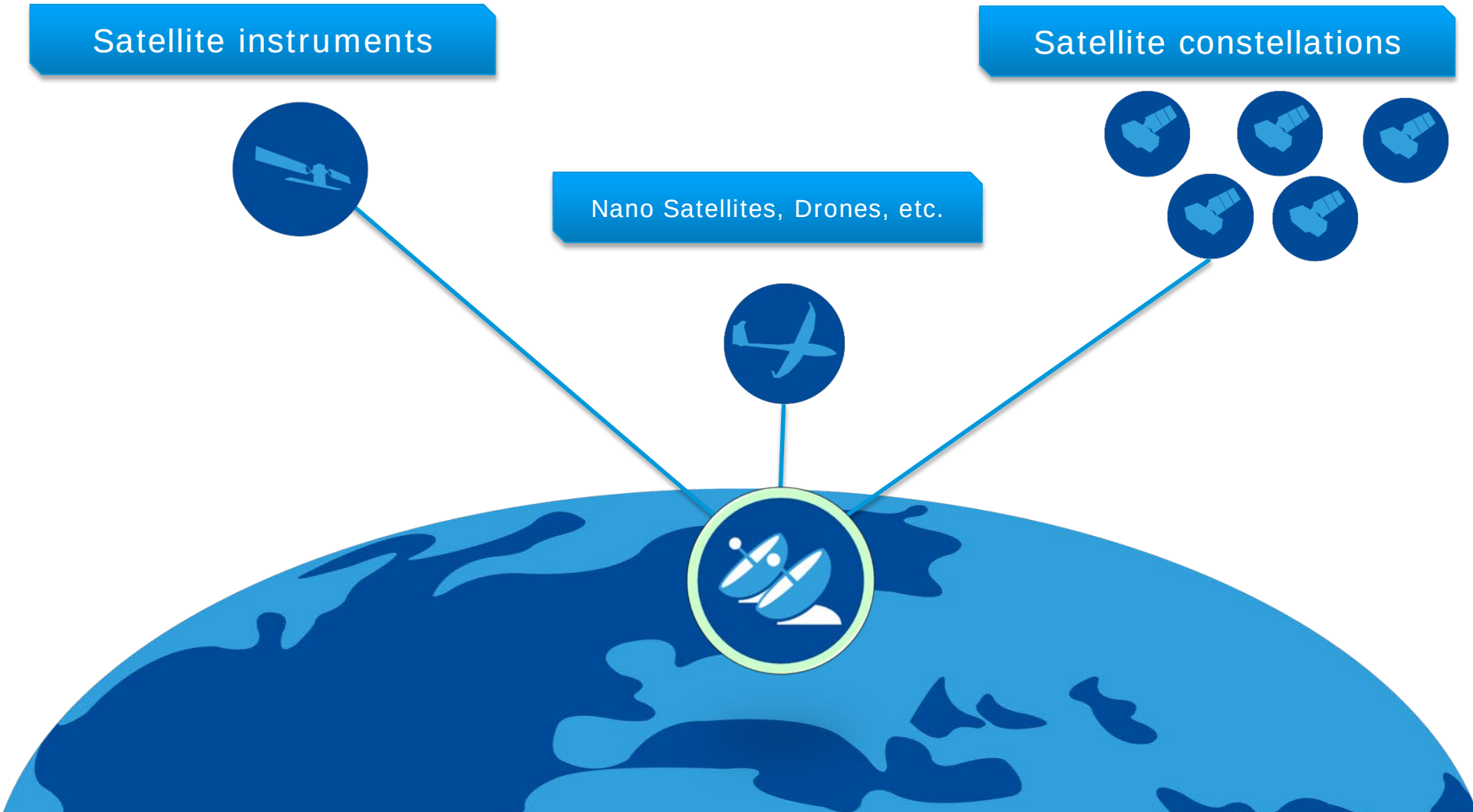


Scenario 2: Earth Observation



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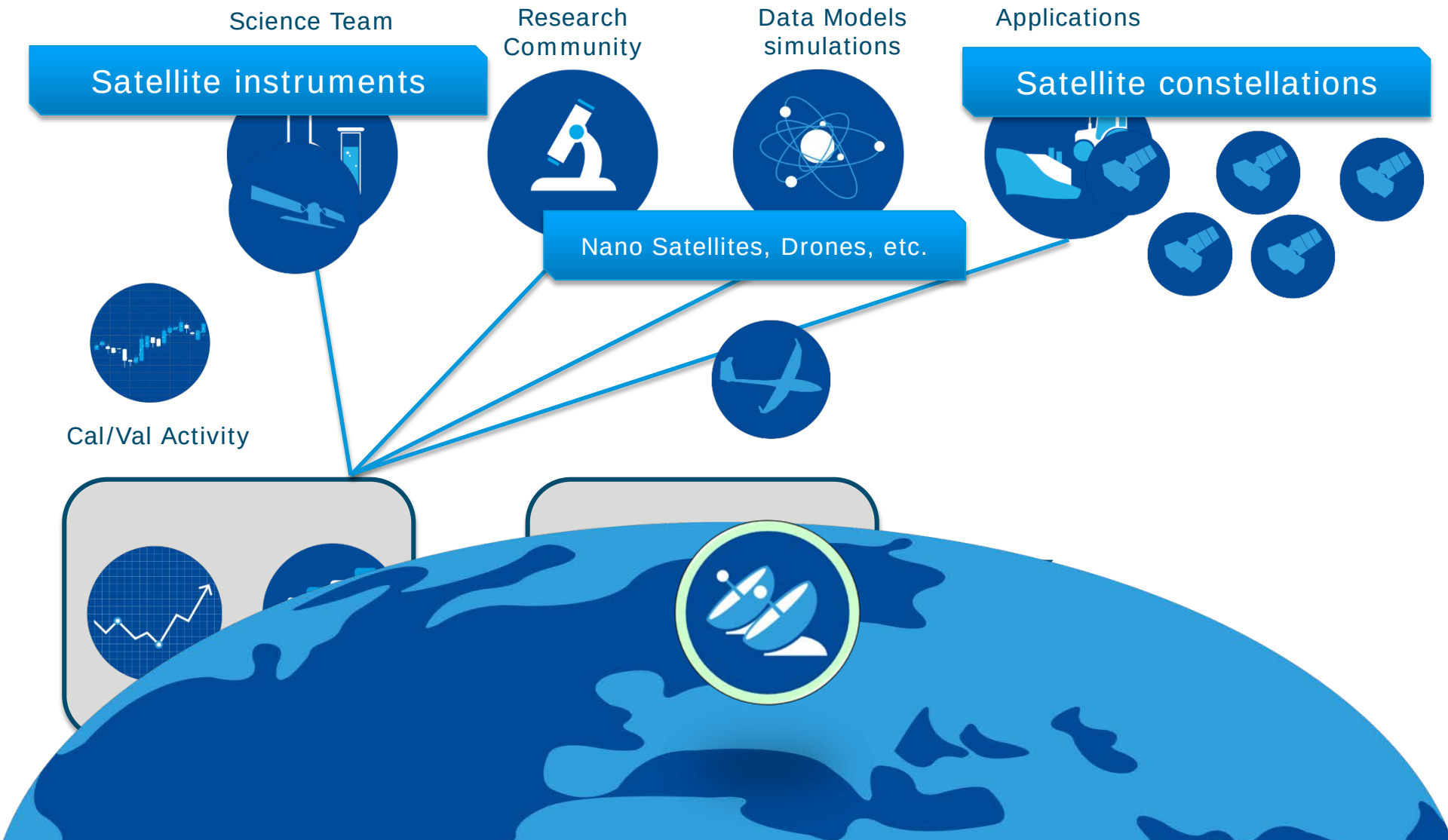
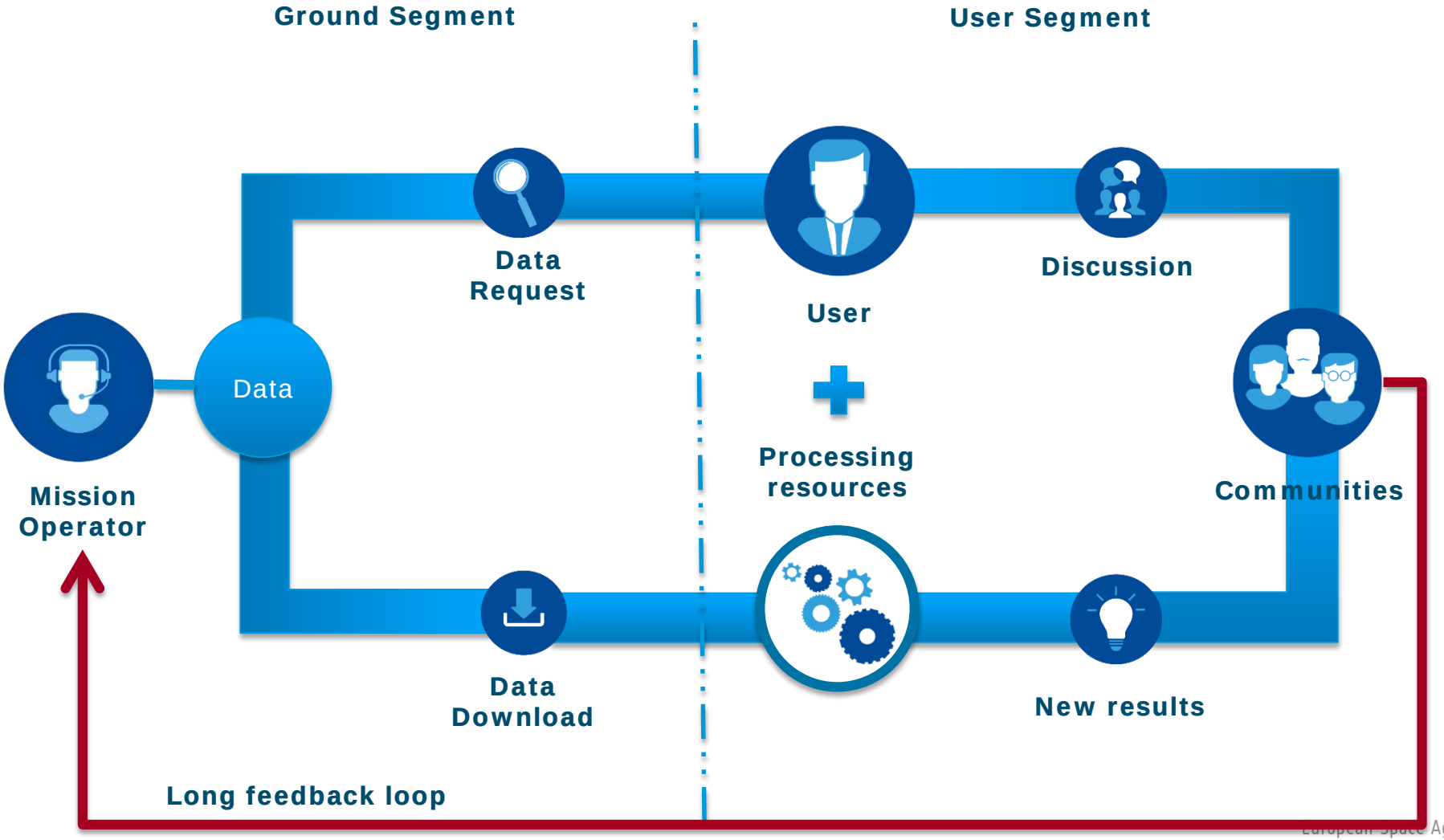
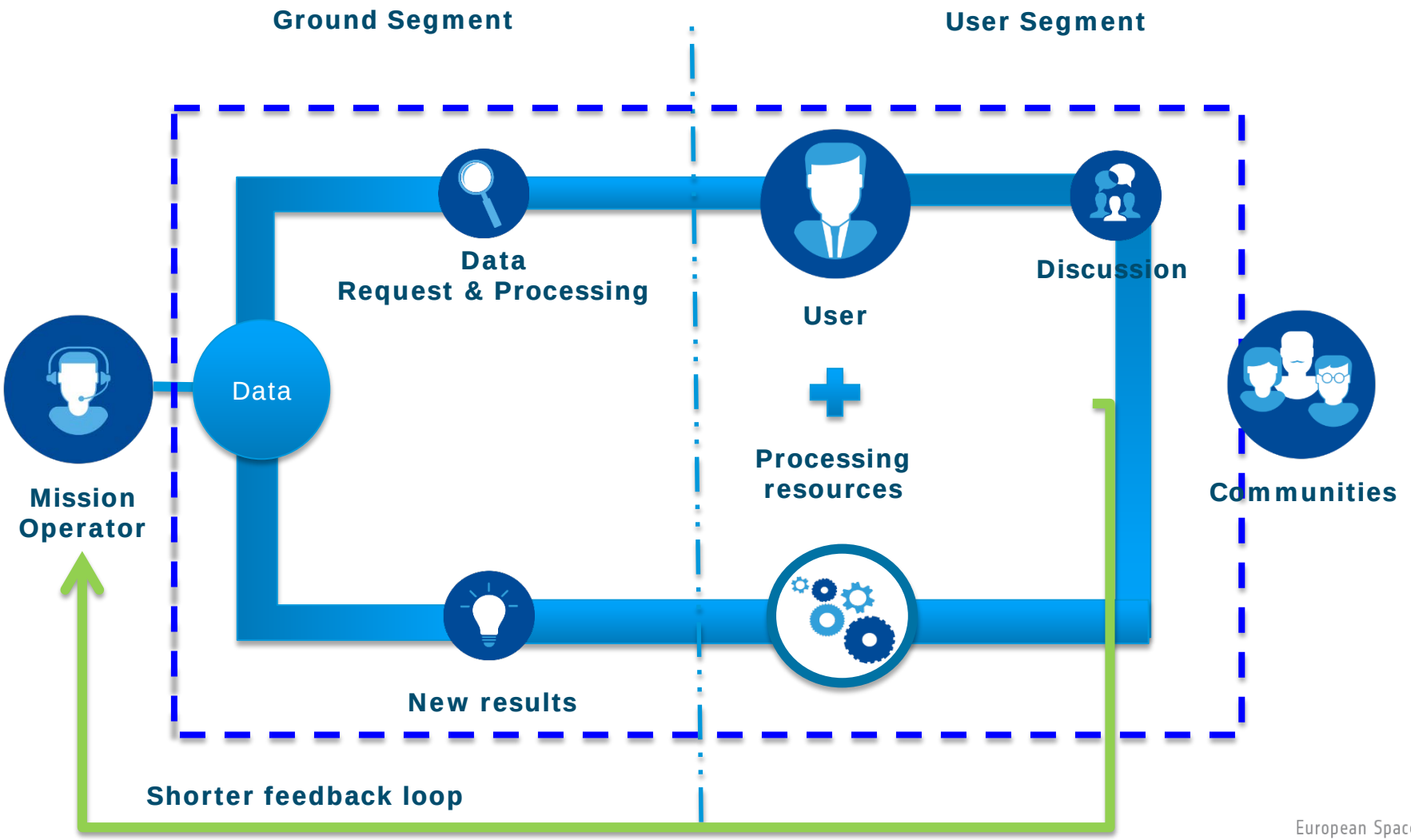


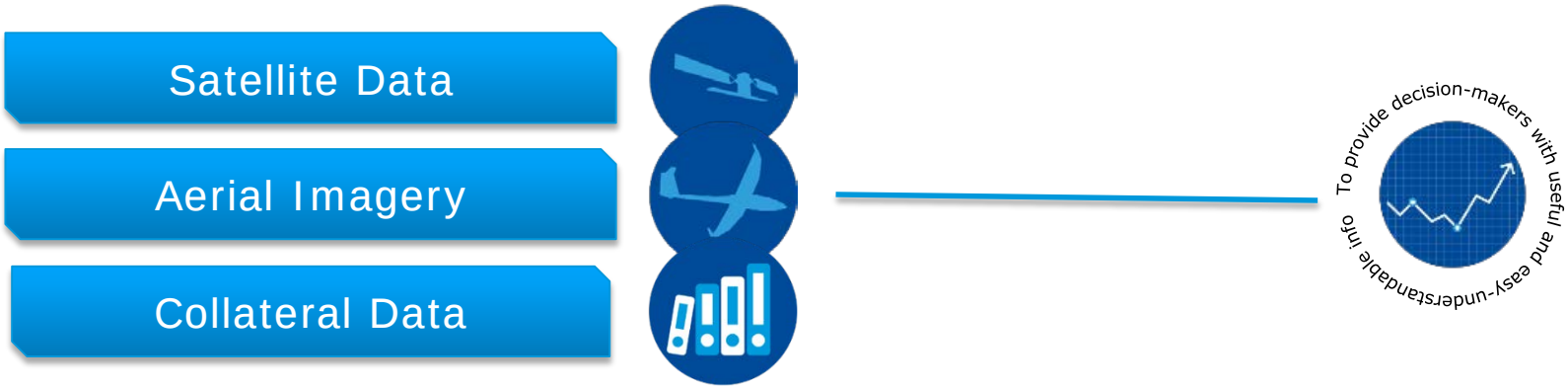
Scenario 3 : Big Data Exploitation
Current: *"bring data to users"*



Scenario 3 : Big Data Exploitation
Future: *"bring users to data"*



Scenario 4: Space and Security



1. Enhancing resilience against natural and man-made disasters
2. To sustain the Common Foreign and Security Policy
3. To improve Border and Maritime Surveillance as well as to support the EU External Action

Big Data from Space: Objectives

1. Identification of priorities and implementation of a plan for research, technology development and innovation

2. Widening competences and expertise of universities, research institutes, labs, SMEs and industrial actors in the field

3. Foster networking of experts and users towards better access and sharing of data, tools and resources

4. Leverage innovation, spin-in / spin-off of technologies and business development arising from research and industry progress

5. Increase and promote the value stemming from the huge quantity of data made available nowadays (and in the future)

6. Contribute to the EO innovation for Europe, as one of the main pillars for the Ground Segment evolution strategy

European Commission

SatCen

esa

→ 2014 CONFERENCE ON BIG DATA FROM SPACE (BiDS'14)

Research, Technology and Innovation (RT&I)

12–14 November 2014
ESA-ESRIN | Frascati (Rome), Italy

OGC® Making location count.

IEEE GRSS Geoscience and Remote Sensing Society

Recommendations

The Big Data from Space initiative shall:

1. Foster and coordinate the European Research & Development activities to address forthcoming Big Data challenges

2. Define and implement technology development programmes supporting cross-cutting enabling technologies in the Big Data field

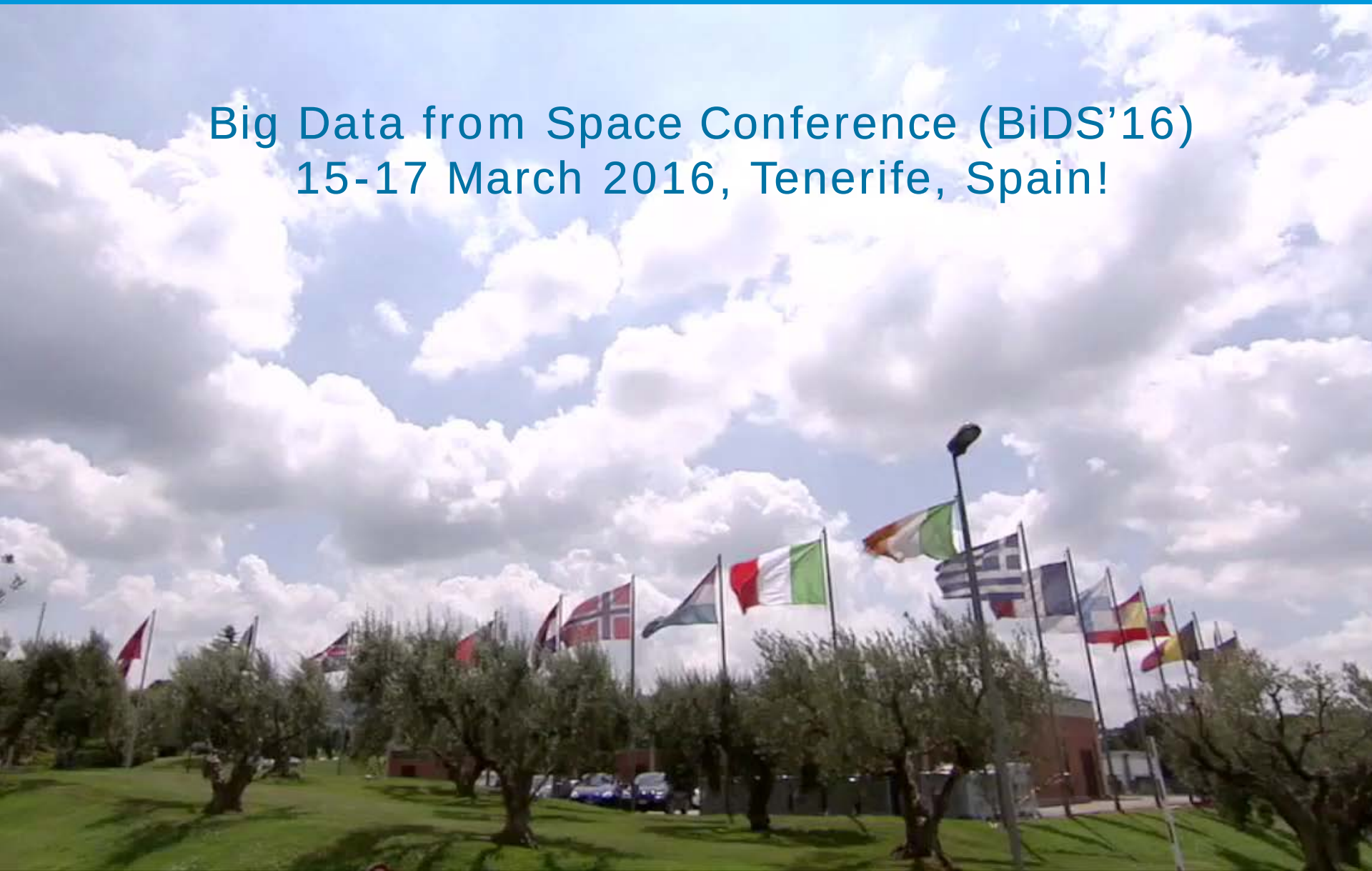
3. Establish and promote a close and permanent dialogue with key industry and SMEs actors

4. Contribute to the exploration and implementation of “partnership models” for the actual exploitation of future Big Data flows

5. Contribute to the EO innovation for Europe, as one of the main pillars for the Ground Segment evolution strategy

6. Support academic activities to build a new figure: the data scientist

Big Data from Space



Acknowledgements

BiDS'16 Organising Committee:

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