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Research Infrastructures: Characteristics and Implications

Wouter Los
University of Amsterdam &
LifeWatch research infrastructure

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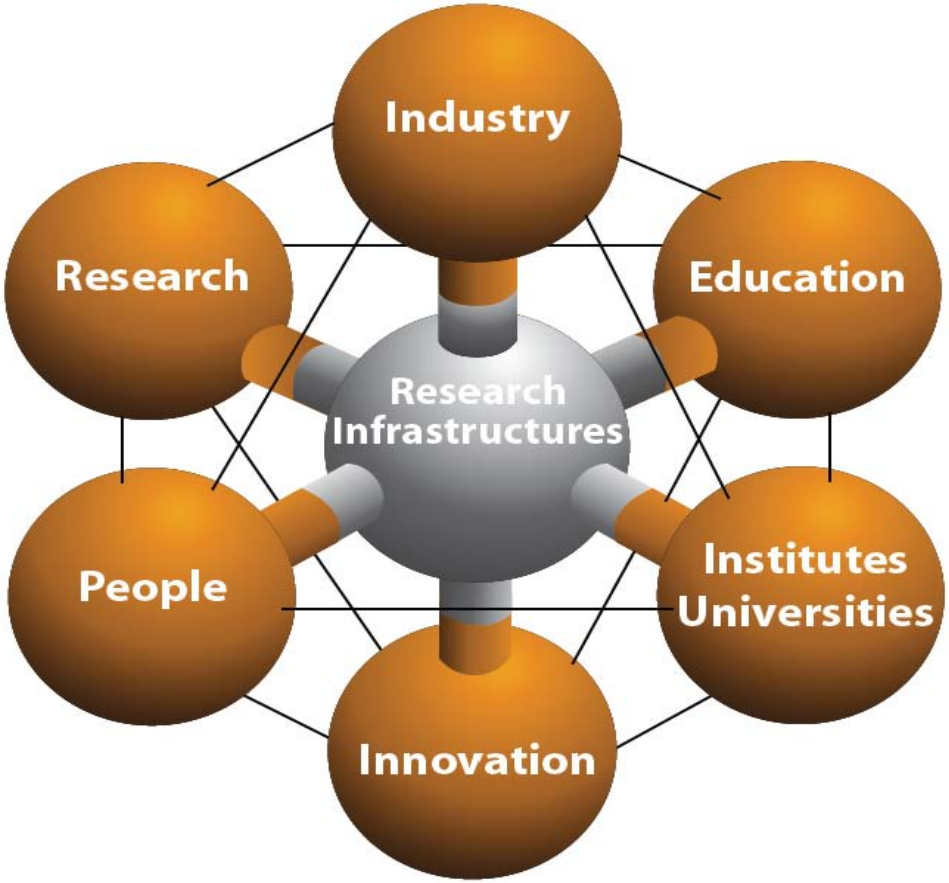
Industry
Research
Education
Research Infrastructures
People
Institutes Universities
Innovation

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Scientific and technological drivers for infrastructure development

- New scientific areas requiring new instrumentation
- Expected breakthroughs
- Higher resolutions in instrument outputs
- Faster data generation and processing
- Opportunities to operate data or instruments remotely (e-infrastructures)

✓Researchers are asking for new facilities (“market pull”)

✓New technologies offer new capabilities (“technology push”)

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Elettra Sincrotone Trieste

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EMFL

European Magnetic Field Laboratory

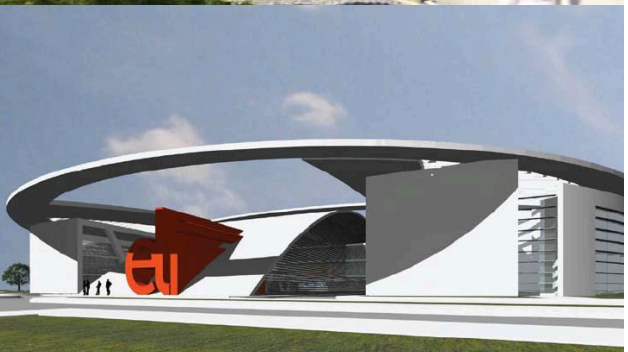
Linking existing high magnetic field laboratories in Europe closer together.

- Laboratoire National des Champs Magnétiques Intense (Grenoble & Toulouse)
- Hochfeld-Magnetlabor (Dresden)
- High Field Magnet Laboratory (Nijmegen)

The Extreme Light Infrastructure
European Project

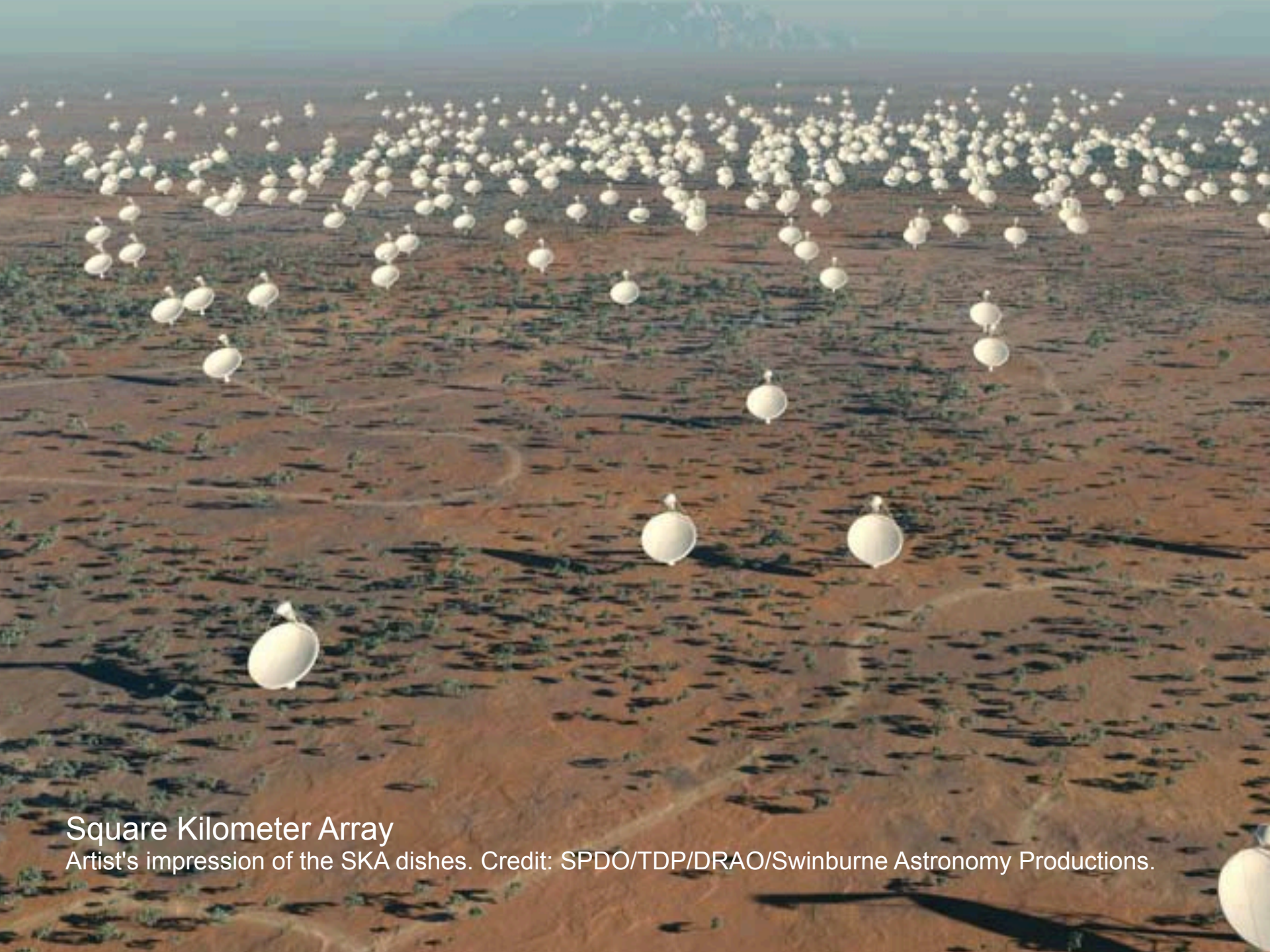
Distributed new research infrastructures in a single organisation

ELI-Beamlines Facility
in the Czech Republic



ELI-Attosecond Facility
in Hungary

ELI-Nuclear Physics Facility
in Romania



Square Kilometer Array

Artist's impression of the SKA dishes. Credit: SPDO/TDP/DRAO/Swinburne Astronomy Productions.

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COPAL

Airborne measurements for multidisciplinary experiments

Heavy-payload (> 10 tons) and long endurance (> 10 hours) aircrafts with capabilities for European scientists

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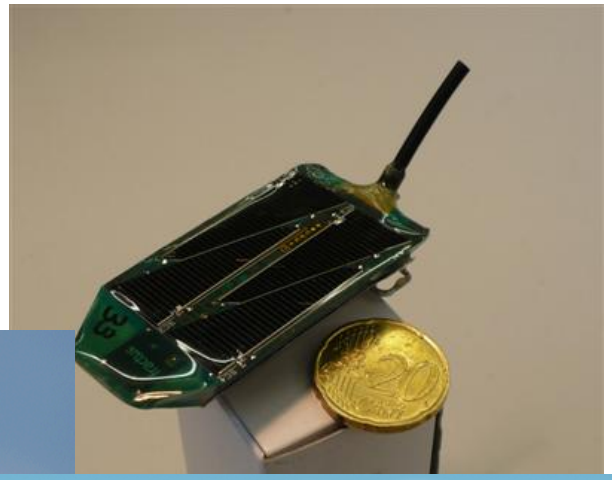
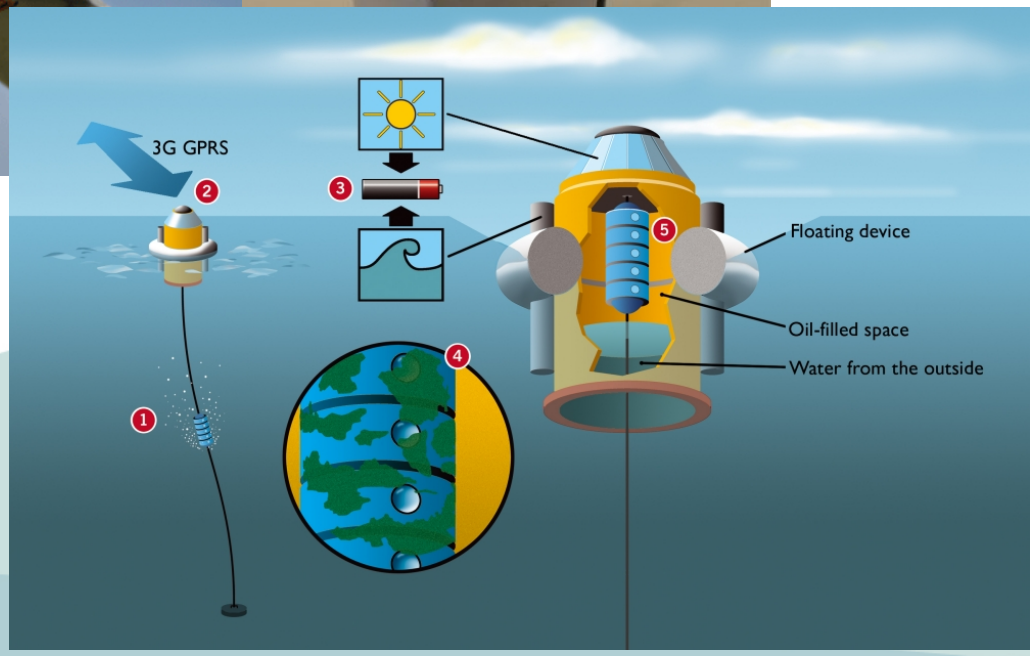
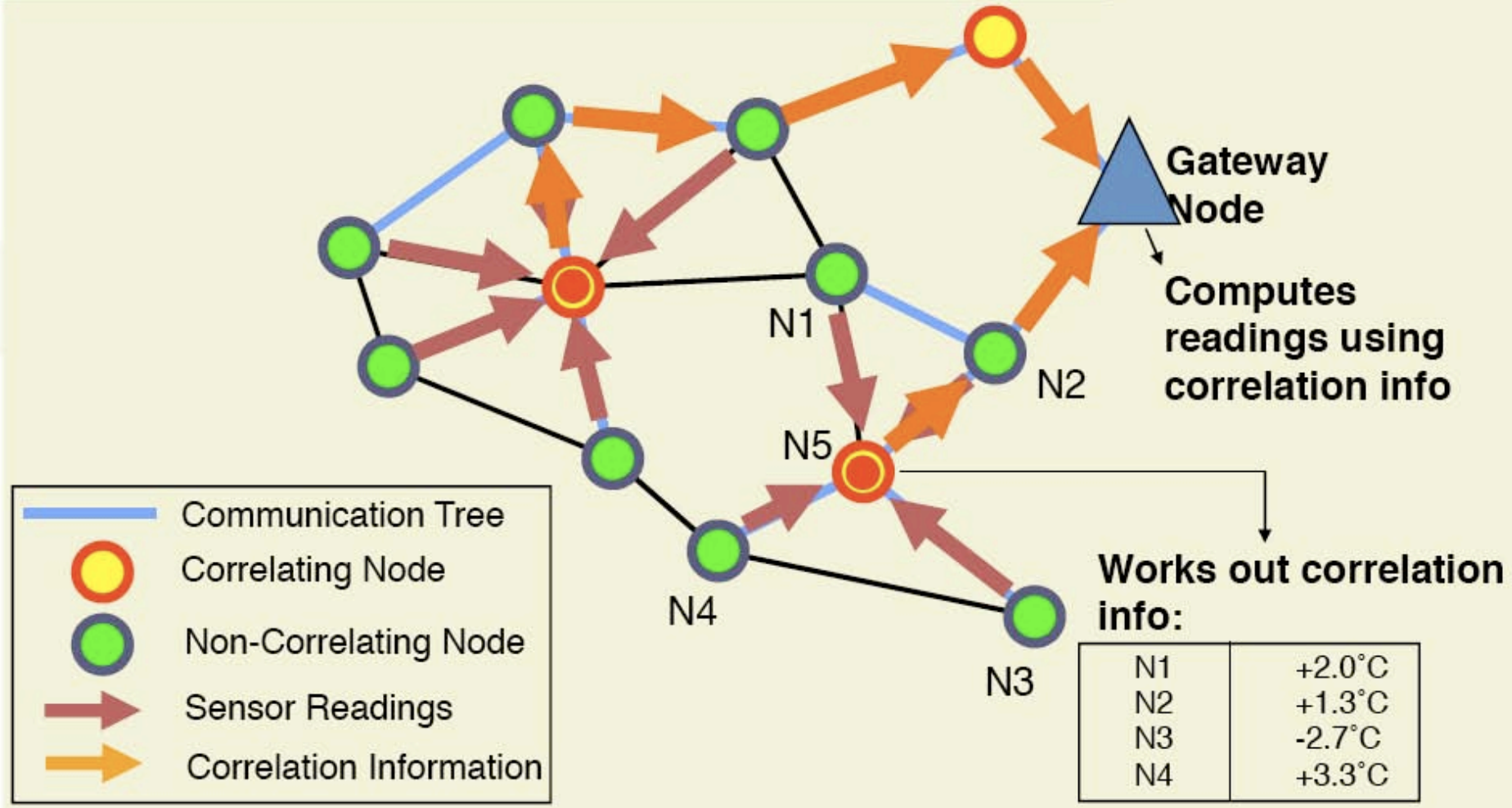
Instruments for biodiversity research infrastructures

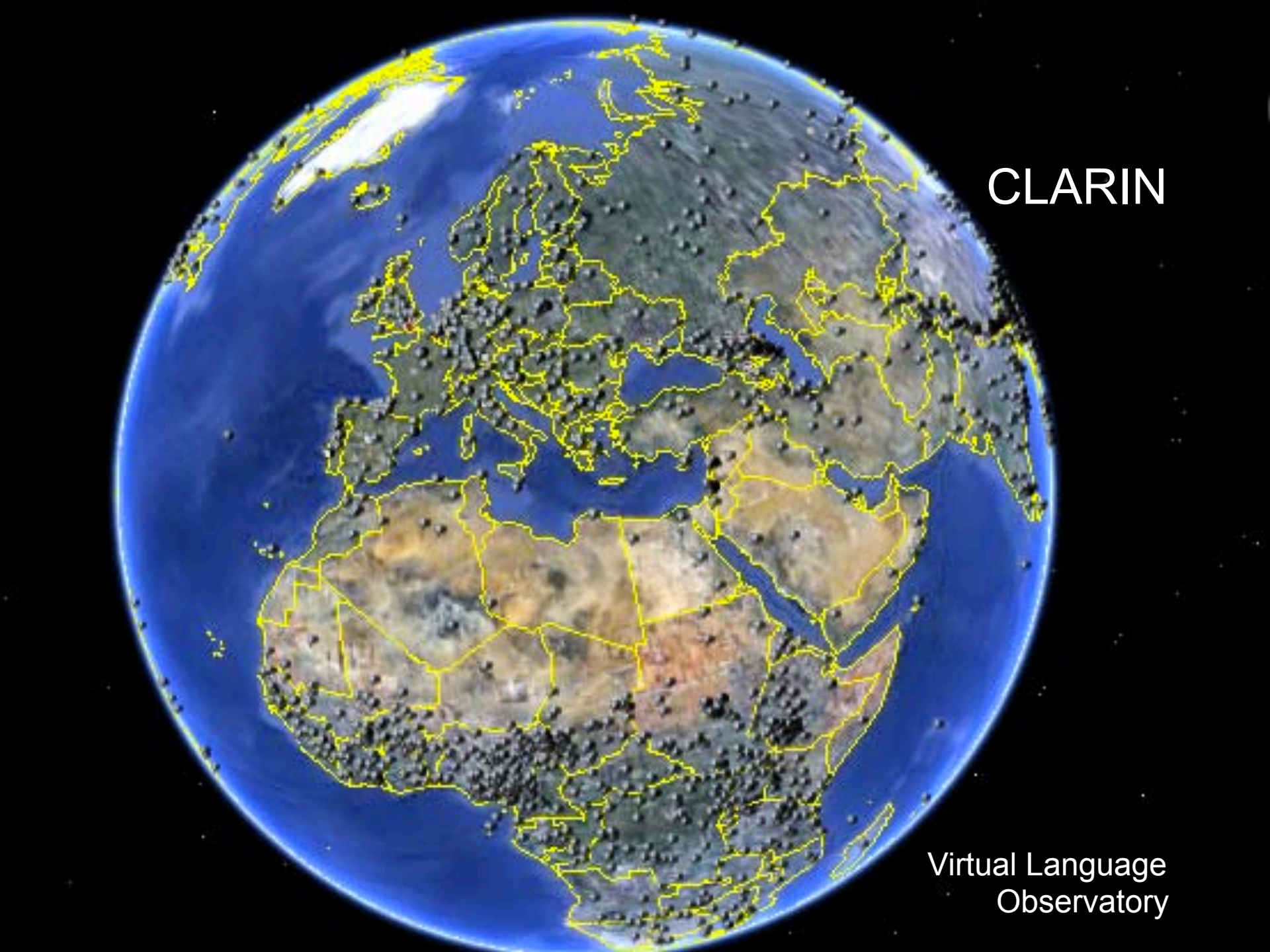




Spatial correlation

DOSA: Distributed and Self-Organizing Scheduling Algorithm for Data Aggregation




CLARIN
Virtual Language
Observatory

Infrastructure life cycle

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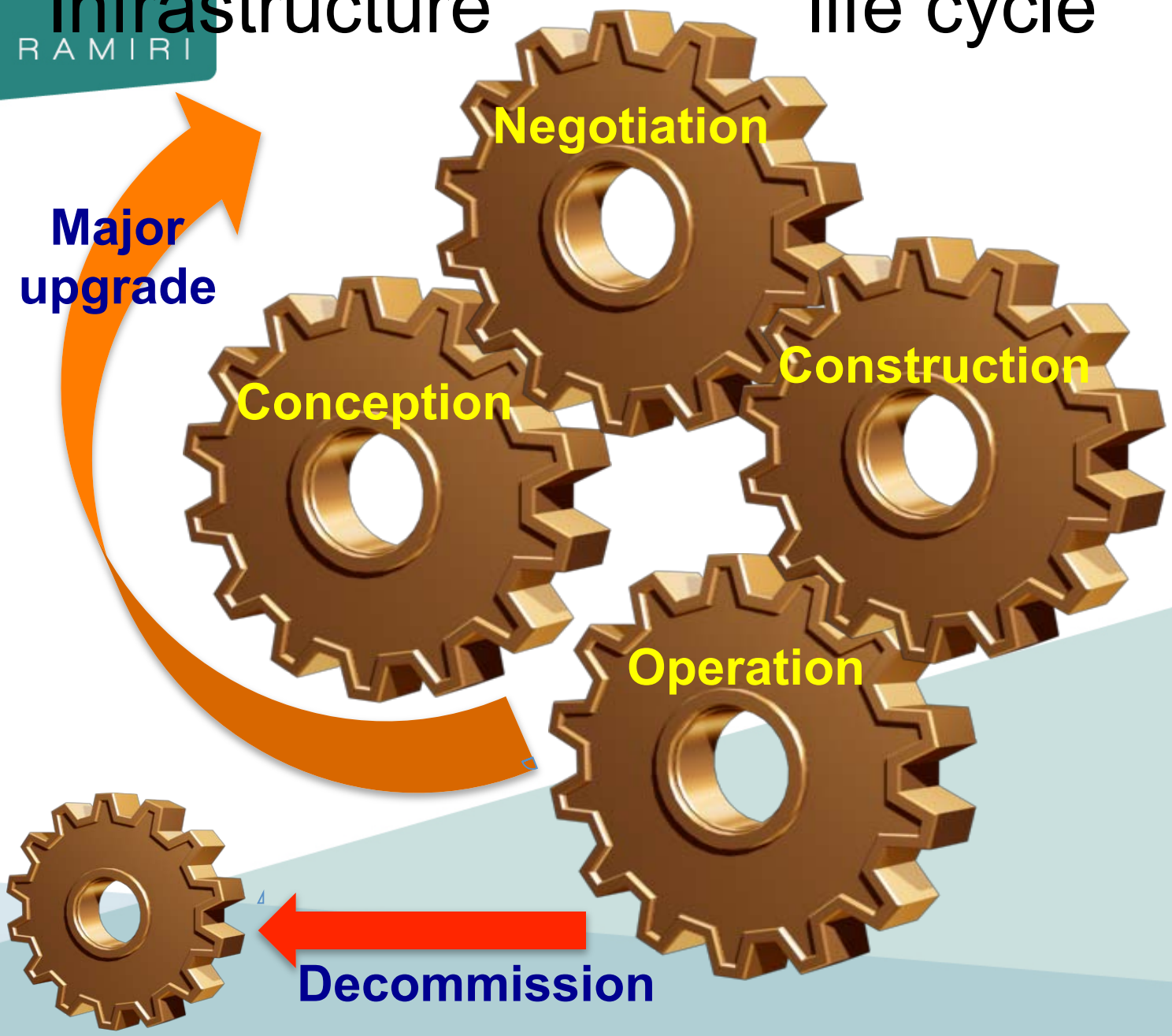

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Perspectives of stakeholders

- Researchers
  - Asking for free access
  - Requiring funding to benefit from the facilities
- Universities
  - Expected to train new generations for using new infrastructures
  - Want to be close to research infrastructures
- Industry
  - Depends on innovation to compete
  - Industries and infrastructures not always aware of opportunities and obstacles
- Policy makers
  - Consider research infrastructures expensive
  - Often state: “priority for domestic researchers; the foreign user pays”
  - Expect benefits or negative effects for the country, region, city

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The infrastructure perspective;
mission and expectations

- Commit to excellence and new knowledge
- Serve users; provide free and open access
- Operate at the scientific and technological forefront
- Promote innovation

But also

- Operate with often not secured (long-term) funding
- Keep all stakeholders as a friend
- Have to commit to non core objectives

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Present day challenges

- Operating at the European/international scale
- Increasingly interconnected research infrastructures
- Offering remote access -> relation with e-infrastructures

- Appropriate governance & management
- Legal structures
- Financial engineering