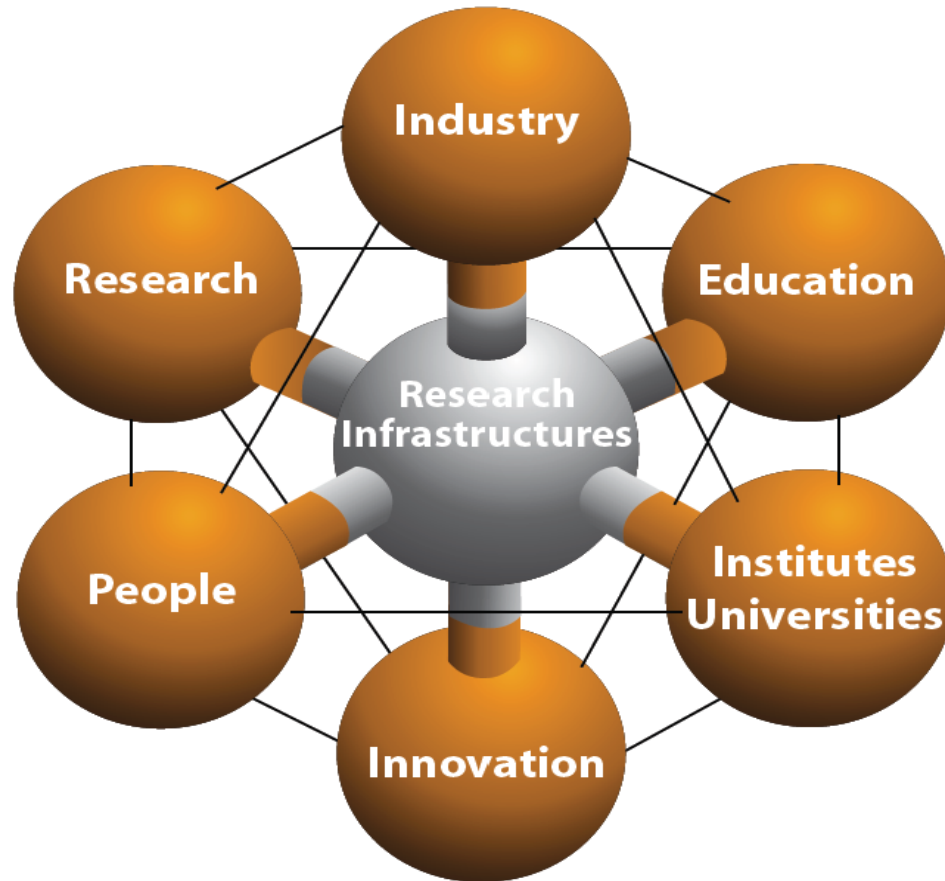


# Research Infrastructures: Characteristics and Implications

Wouter Los  
University of Amsterdam &  
LifeWatch research infrastructure



# 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”)

# Elettra Sincrotrone Trieste



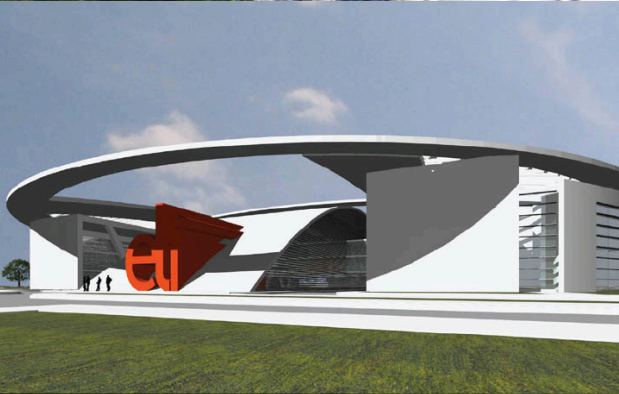
Linking existing FEL & SPS facilities in Europe closer together.

- DESY and HZB (Germany)
- Elettra and INFN (Italy)
- Max-lab (Sweden),
- STFC (UK)
- PSI (Switzerland)
  
- SOLEIL (France)
- IPJ (Poland)

## Distributed new research infrastructures in a single organisation



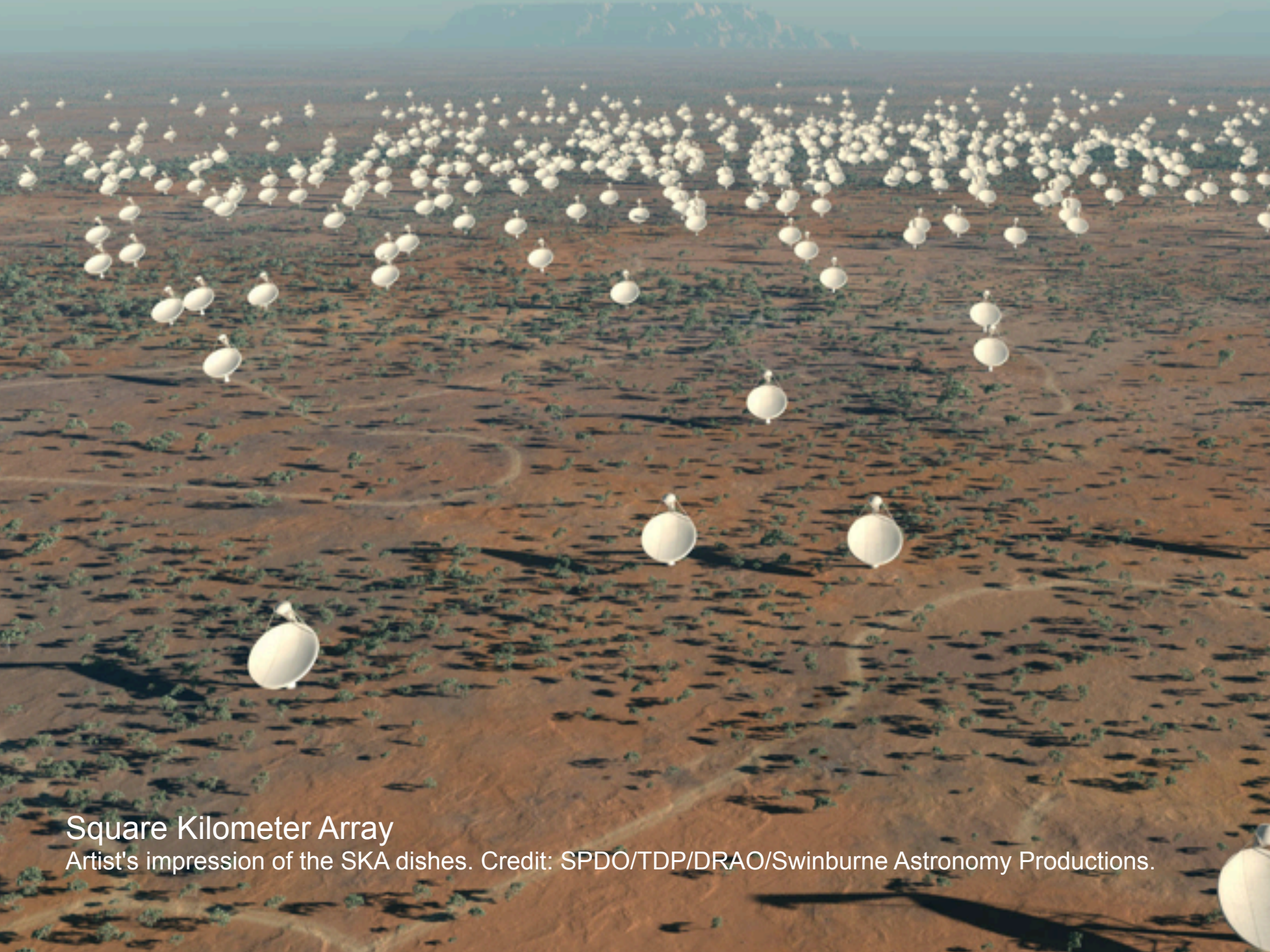
ELI-Beamlines Facility  
in the Czech Republic



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.

# COPAL

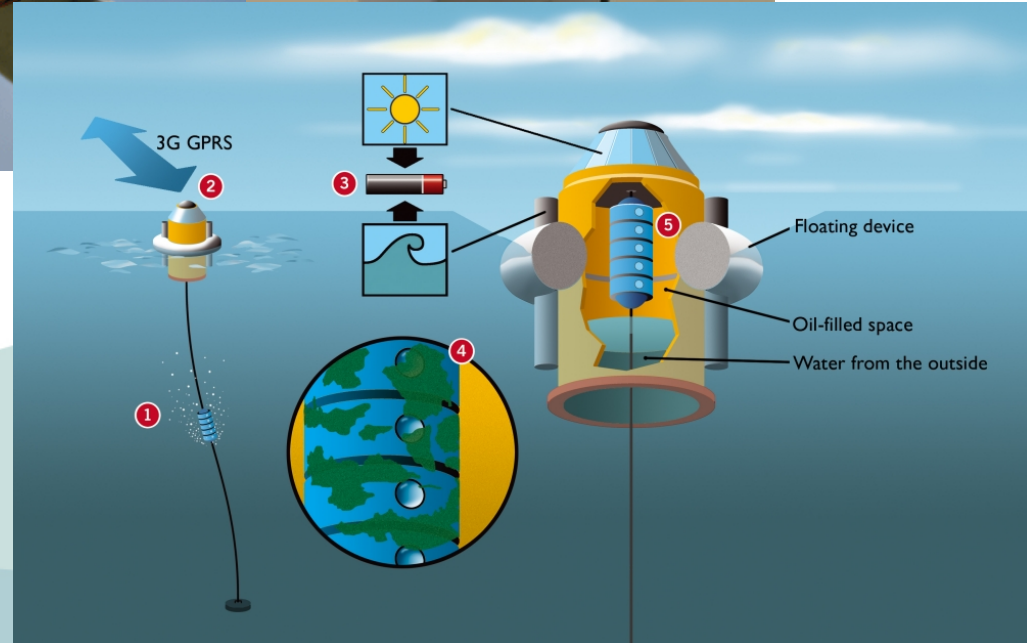
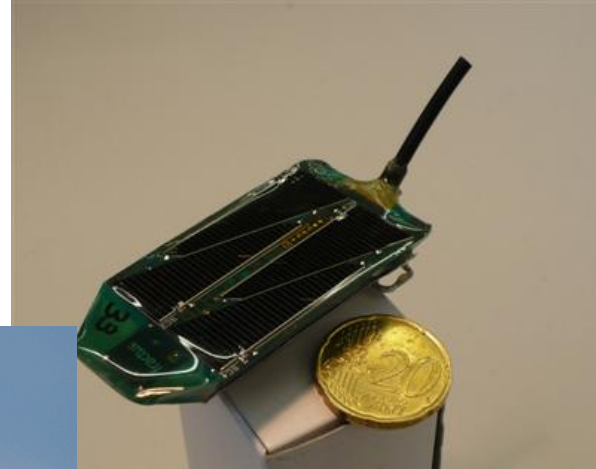
Airborne measurements for multidisciplinary experiments

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



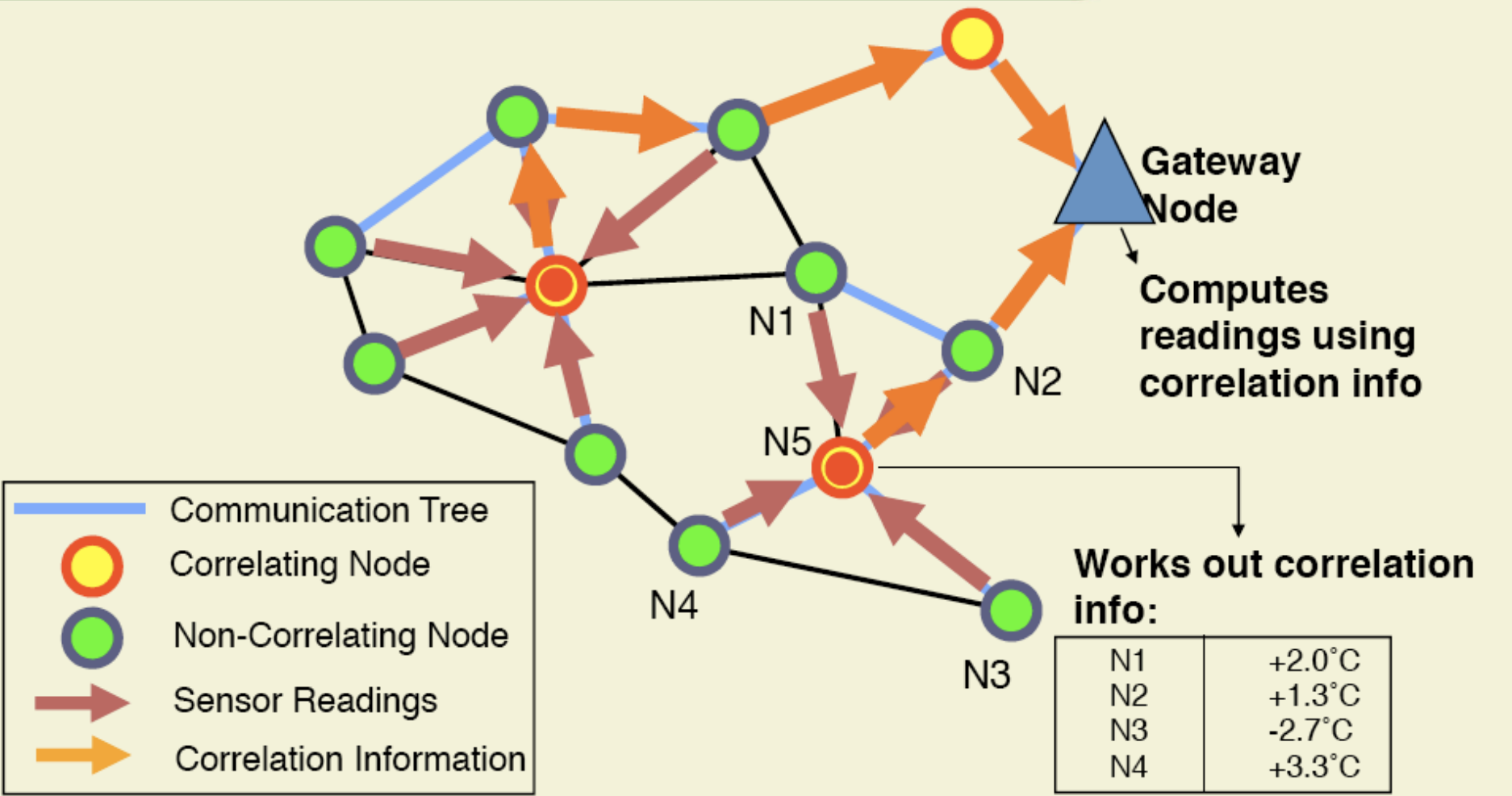


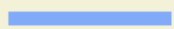




# Instruments for biodiversity research infrastructures



# Spatial correlation

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

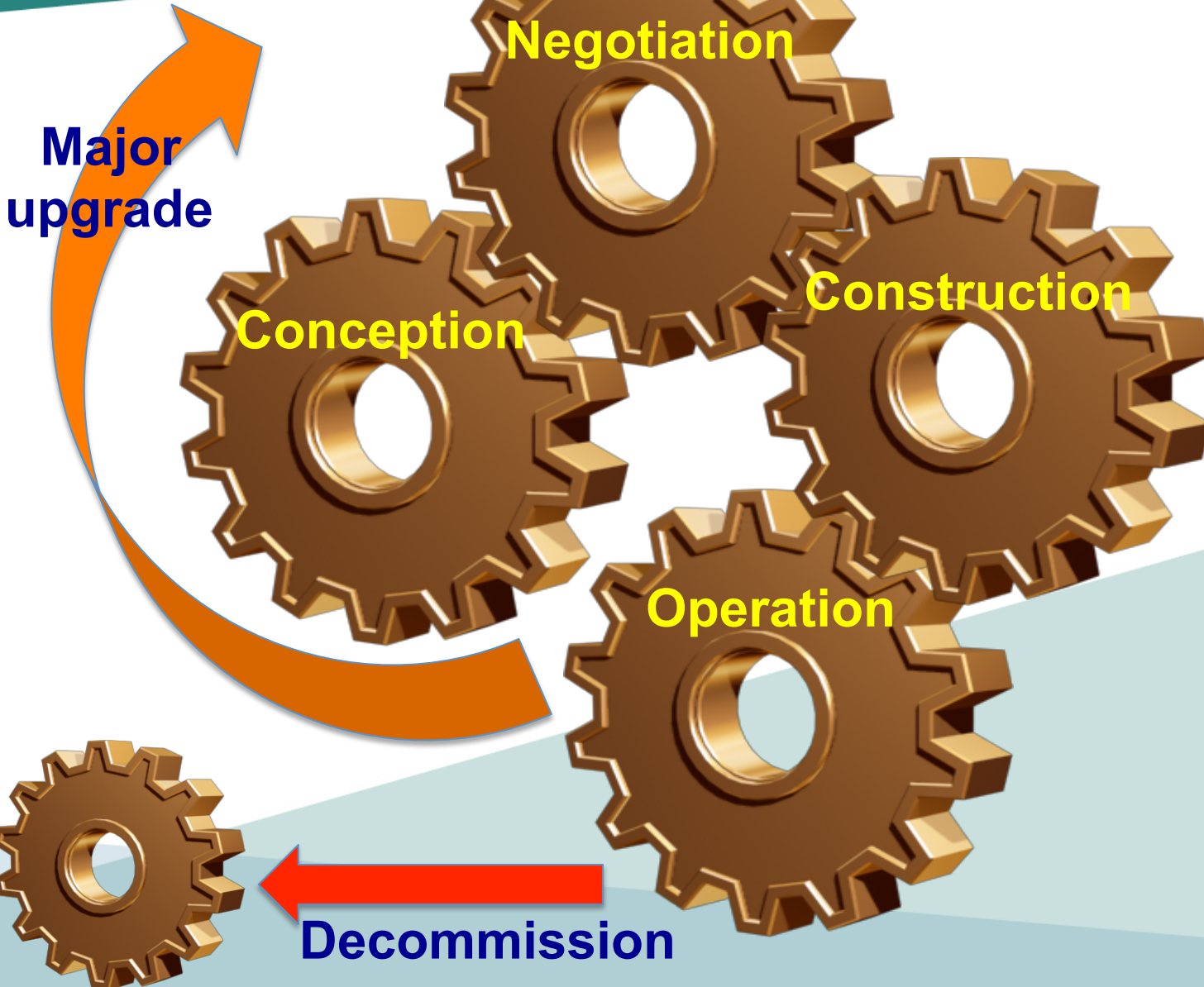


-  Communication Tree
-  Correlating Node
-  Non-Correlating Node
-  Sensor Readings
-  Correlation Information



CLARIN

Virtual Language  
Observatory



# 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
- **Politicians**
  - Consider research infrastructures expensive
  - Often state: “priority for domestic researchers; the foreign user pays”
  - Expect benefits or negative effects for the country, region, city

# 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

# 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

