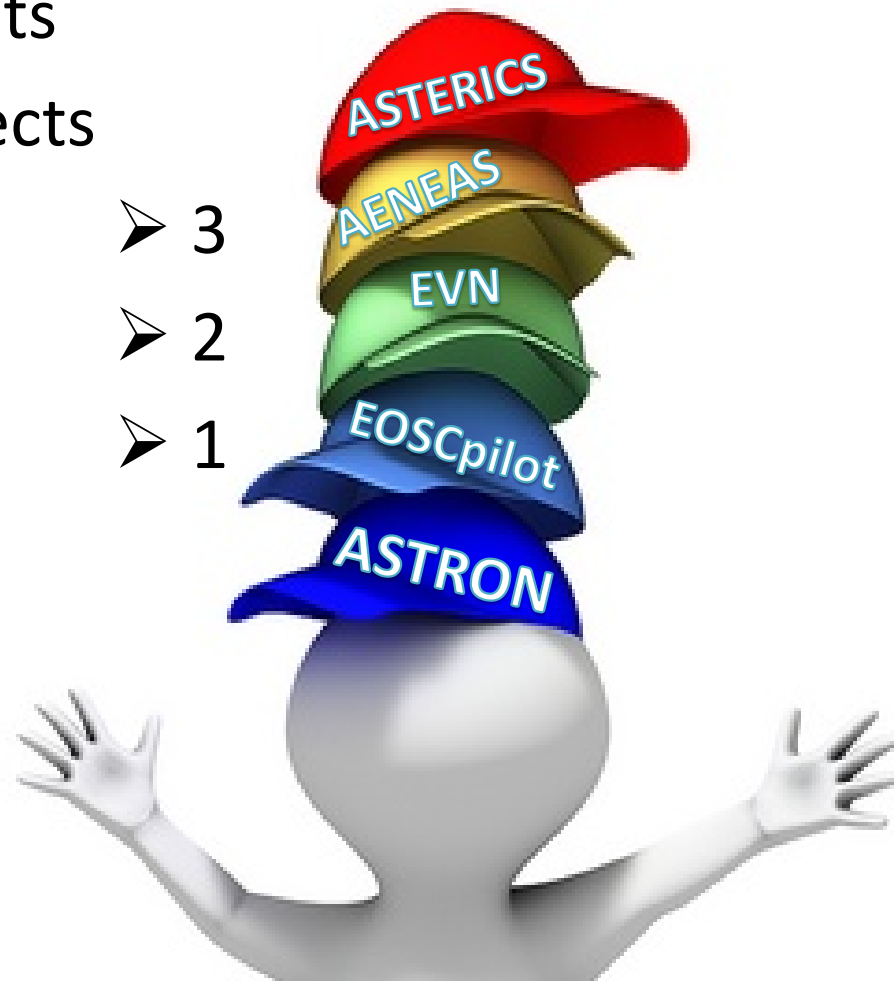


EOSCpilot Science Demonstrator LOFAR

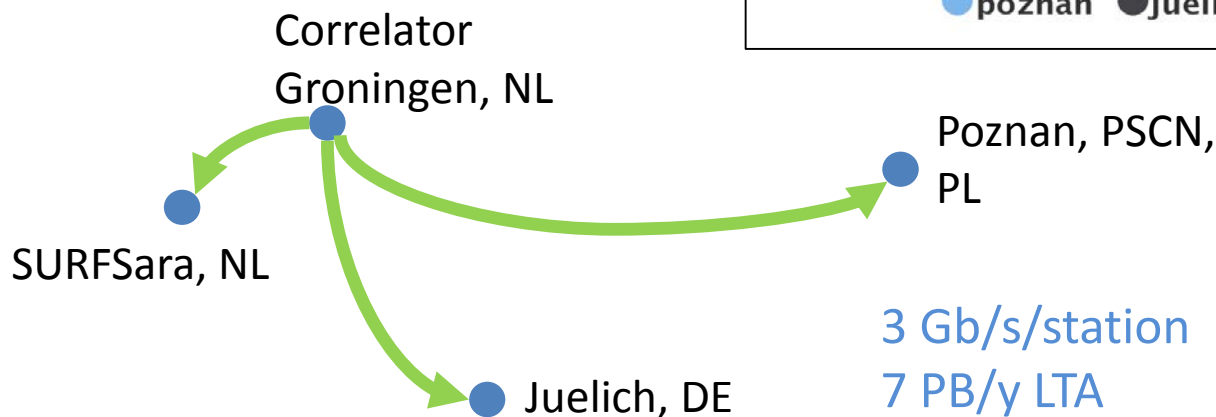
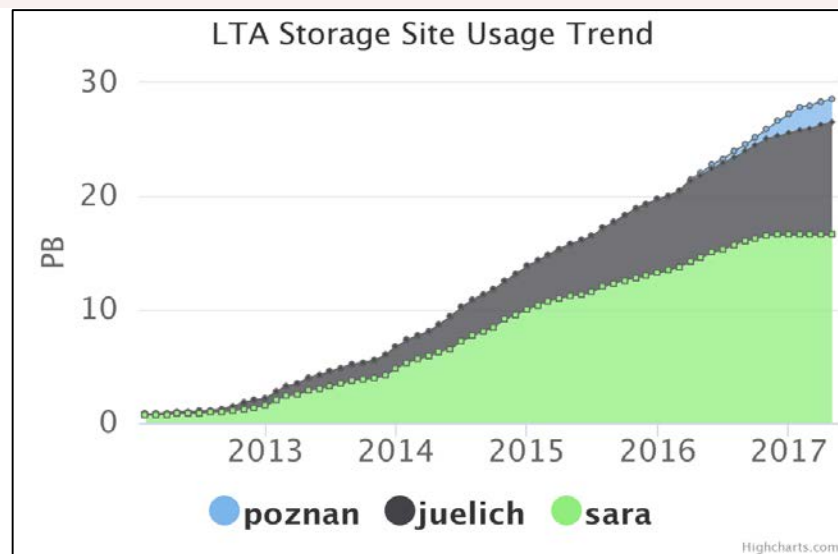
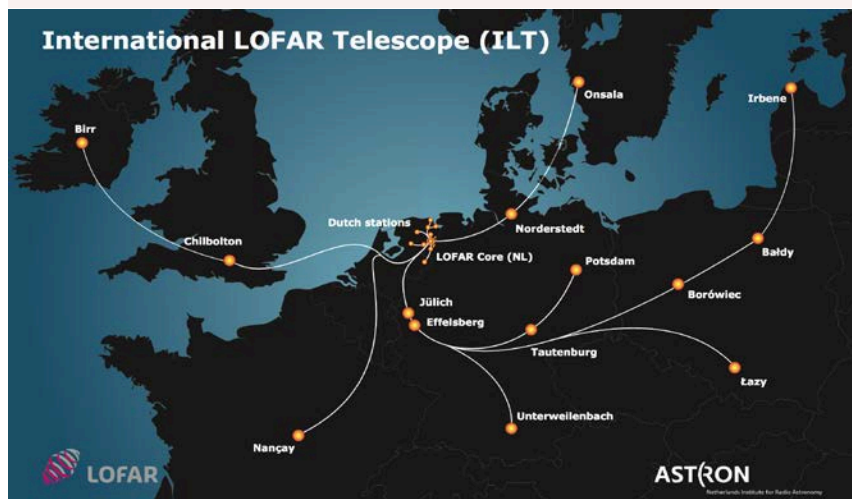
Rob van der Meer - ASTRON
Arpad Szomoru - JIVE

Points of today

- Multiple hats
- Three subjects



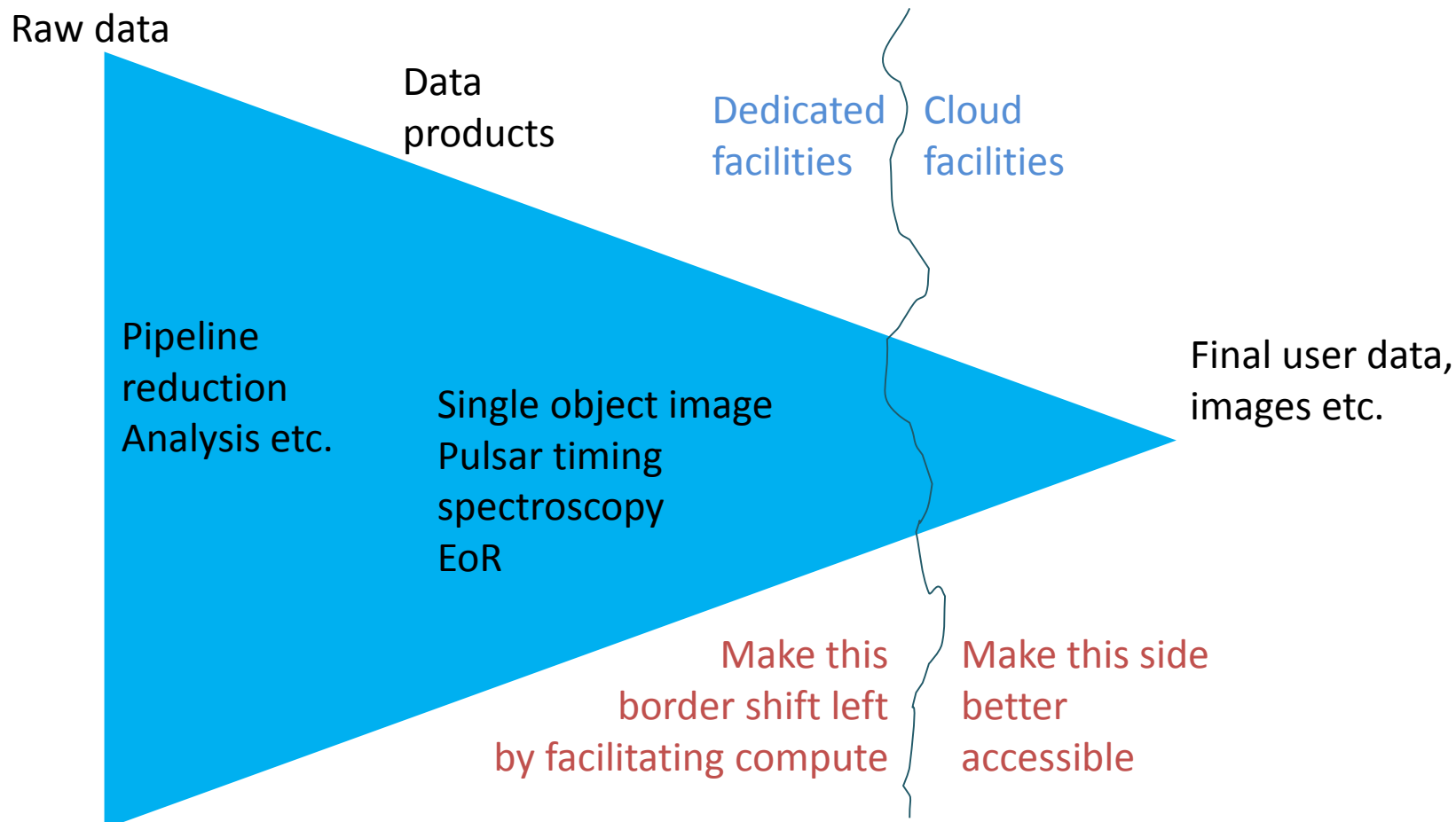
International LOFAR Telescope



High level use-case:

-
- The diagram illustrates the LOFAR system architecture, showing the interaction between a user and the system components. The system is divided into two main sections by a horizontal line. Above the line is the user, represented by a stick figure. Below the line is the system, which includes a box labeled "LOFAR" in the top left corner. The system components are: "Online storage" (a cylinder), "Cold storage" (a 3D box), "Control" (an oval), and "Meta-data" (a cylinder). The interactions are numbered 1 through 5:
- 1. Ingest:** A curved arrow from the user to "Online storage".
 - 2. Store:** A curved arrow from "Online storage" to "Cold storage".
 - 3. Query:** A curved arrow from the user to "Meta-data".
 - 4. Retrieve:** A curved arrow from "Meta-data" to the user.
 - 5. Monitoring & Control:** A straight arrow from "Control" to the user.
- Additionally, there are dotted lines connecting "Online storage" to "Control" and "Cold storage" to "Control".

EOSC pilot tasks



Challenge & Use cases

Challenges

- Data provenance
- Federated Identity
- Compute to data
- Multiple LTA sites
- Where → what is my data

Facilitate

- easy access for power user.
Free/sandbox compute with own algorithm, parameters, on small local data set.
 - Then scale up to larger data set on remote cluster
- Make LOFAR LTA accessible to non power users
 - Standard pipeline and GUI for ~10 free parameters.

Plan of attack

1. Define “perfect” environment

2. Existing tools and resources
immediately start building

3. from there define new projects
for improving the working system



Use this demonstration to show both possibilities and limitations of current software and e-Infrastructure.

Project plan

- SURFsara → connectivity to others
- Standardize existing pipelines → CWL
- Investigate notebooks
- Build web frontend → User settings
- Existing viewer for resulting workflow
- Use Zenodo/B2Share + Research Object → persistent storage with DOI

Resource & interoperability requirements

- ✓ Access to data in the LOFAR LTA @ SURFsara
- ✓ Access to compute facilities @ SURFsara
- ✓ Access to data in the LOFAR LTA @ Juelich
- ✓ Transport of data between LTA sites
- Contact with GÉANT
- ✓ Access to compute facilities at other sites

Succes criteria

Demonstration that a complete system can be constructed from existing tools.

End of EOSC pilot



EVN as cloud version

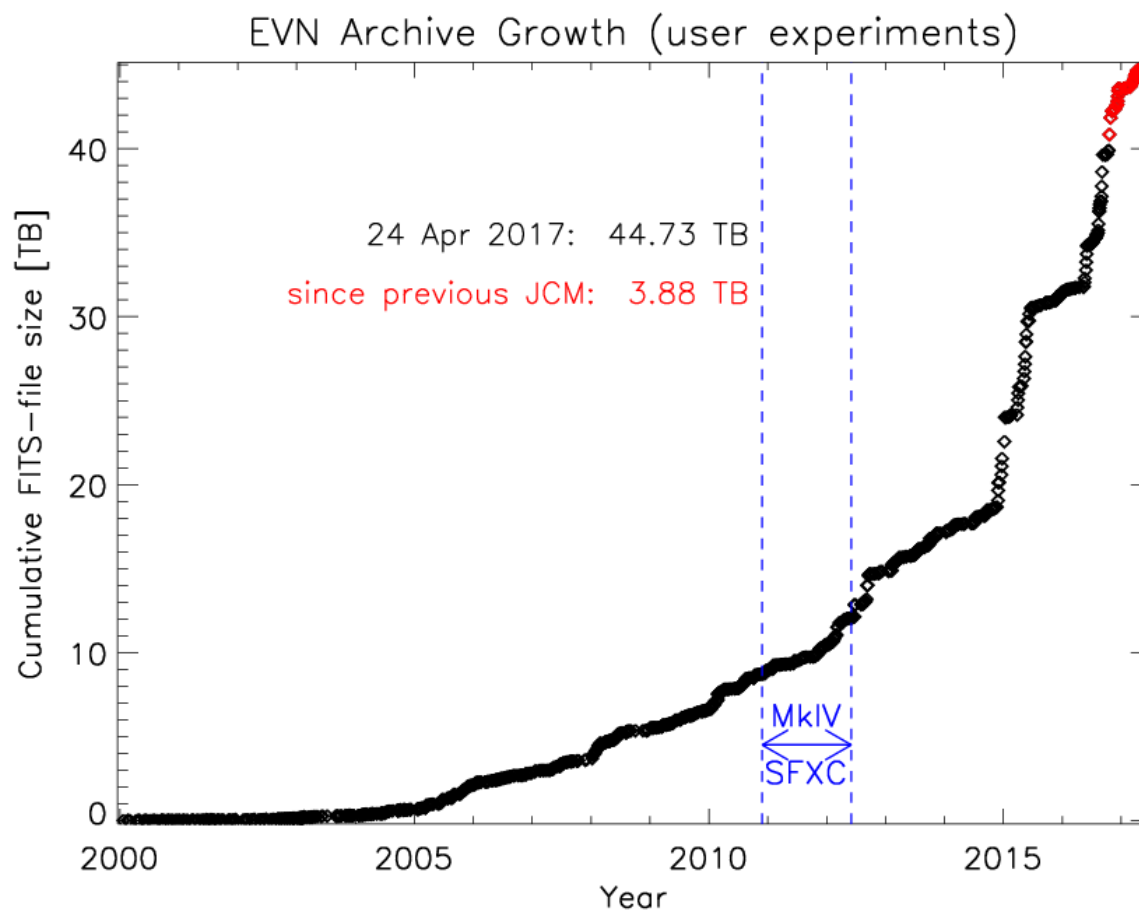


JIVE
Joint Institute for VLBI
ERIC



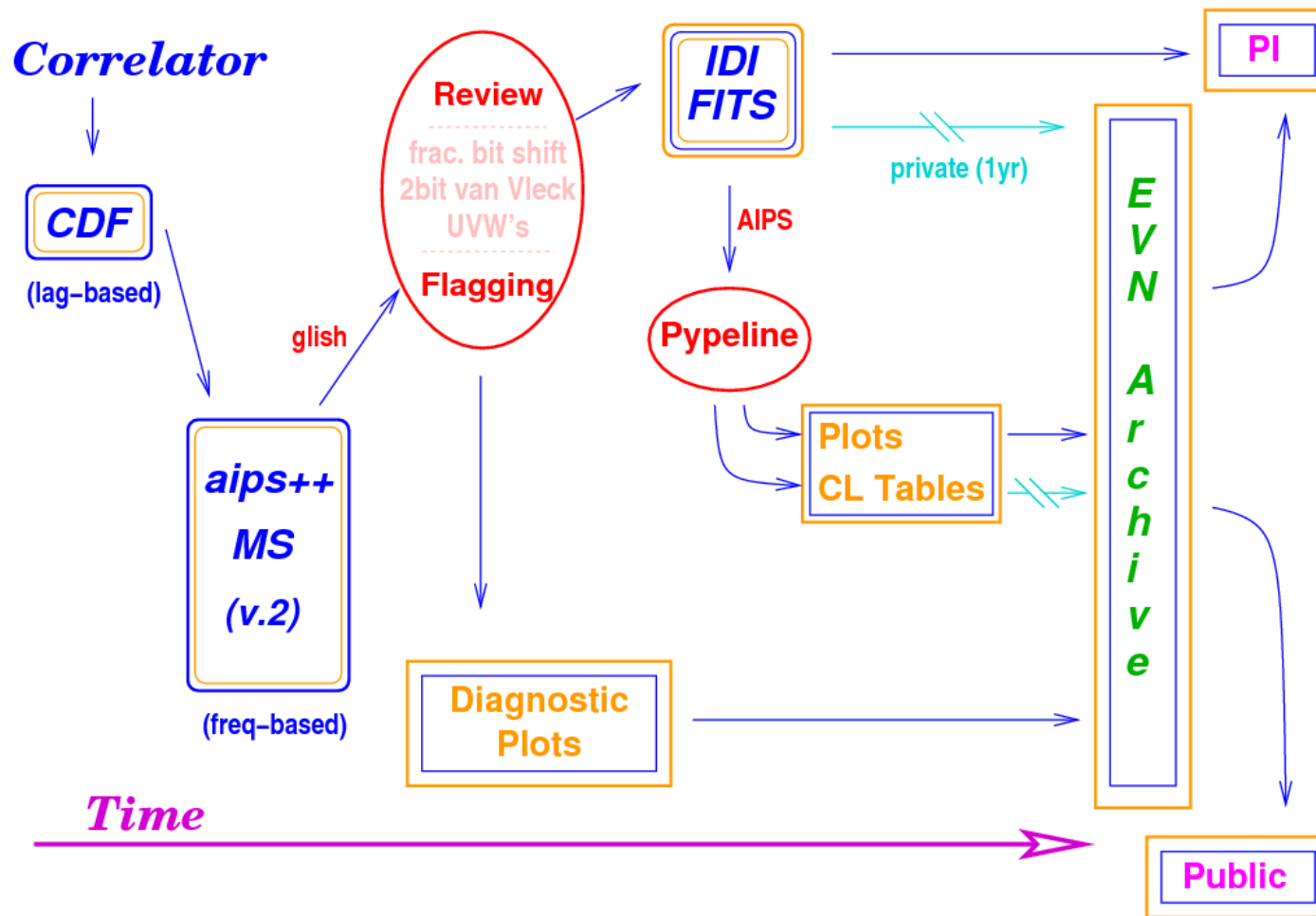
Image by Paul Boven (boven@jive.eu). Satellite image: Blue Marble Next Generation, courtesy of Nasa Visible Earth (visibleearth.nasa.gov).

EVN Archive growth

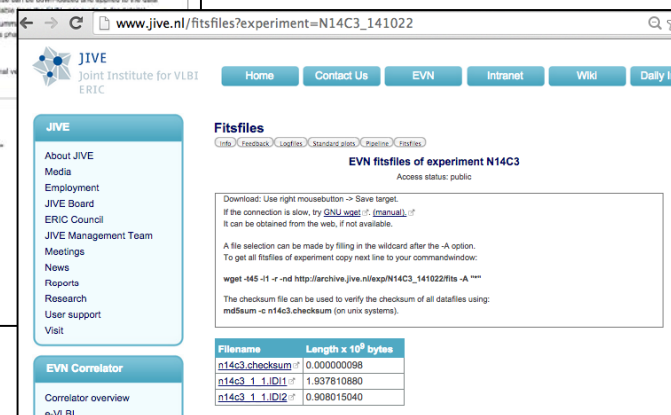
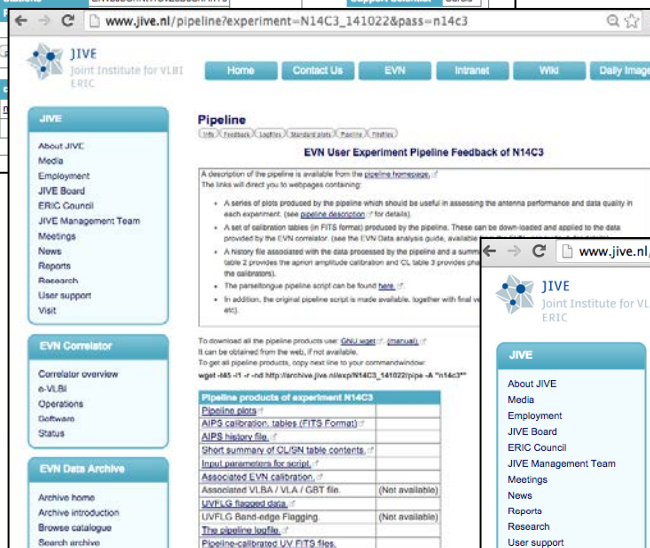




Processes



User Interface





Searching the EVN archive

Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://archive.jive.nl...ts/avofitsfinder.php

archive.jive.nl/scripts/avofitsfinder.php

Google

Fits Archive EVN Correlator at JIVE

Fitsfinder permits users to find data on the basis of selection criteria including sourcename and position.

Show fields		Select value's		Sort fields	
P. Investigator	<input checked="" type="checkbox"/>	Frequency	<input checked="" type="checkbox"/>	P. Investigator	<input type="checkbox"/>
Experiment	<input checked="" type="checkbox"/>	Channel width	<input type="checkbox"/>	Experiment	<input type="checkbox"/>
Source name	<input checked="" type="checkbox"/>	Freq. channels	<input type="checkbox"/>	Source name	<input checked="" type="checkbox"/>
RA	<input checked="" type="checkbox"/>	Nr bands	<input type="checkbox"/>	RA	<input type="checkbox"/>
DEC	<input checked="" type="checkbox"/>	Bandwidth / IF	<input type="checkbox"/>	DEC	<input type="checkbox"/>
Equinox	<input checked="" type="checkbox"/>	Total Width	<input type="checkbox"/>	Observ. date	<input checked="" type="checkbox"/>
File name	<input type="checkbox"/>	Stations	<input type="checkbox"/>	Frequency	<input checked="" type="checkbox"/>
File length	<input type="checkbox"/>	Polarization	<input type="checkbox"/>	Total Width	<input type="checkbox"/>
File startdate	<input type="checkbox"/>	Integr. time	<input type="checkbox"/>	Freq. channels	<input type="checkbox"/>
File starttime	<input type="checkbox"/>	Total time	<input type="checkbox"/>	Integr. time	<input type="checkbox"/>
File enddate	<input type="checkbox"/>	Observ. date	<input checked="" type="checkbox"/>	Total time	<input type="checkbox"/>
File endtime	<input type="checkbox"/>			Polarization	<input type="checkbox"/>

P. Investigator: Any
Experiment: Any
Source name: Any
Polarization: Any

Select stations:
Any
Ar
Br
Cm
Eb
Ef
Fd

Find sources in Circle ☐ Box ☐

RA (hh:mm:ss): 12:00:00
DEC (dd:mm:ss): 00:00:00
Radius (degr): 180
Offset degr RA,DEC: 180 90

Find sources in frequency range:
Any band
P-band 90,49 cm
L-band 21,18 cm
S-band 13 cm
C-band 6,5 cm
X-band 2 cm
K-band 1 cm

Min. frequency: 320 MHz
Max. frequency: 50000 MHz

Show list Plot list Typed Input Info Defaults Reset

Square Kilometer Array

- 
- Australia
 - Canada
 - China
 - India
 - Italy
 - Netherlands
 - New Zealand
 - South Africa
 - Sweden
 - UK

Potential new members:

- Spain, Portugal,
- Germany, France, others...



The AENEAS Project

Design and specification of a distributed, European Science Data Centre (ESDC) to support the pan-European astronomical community in achieving the scientific goals of the SKA

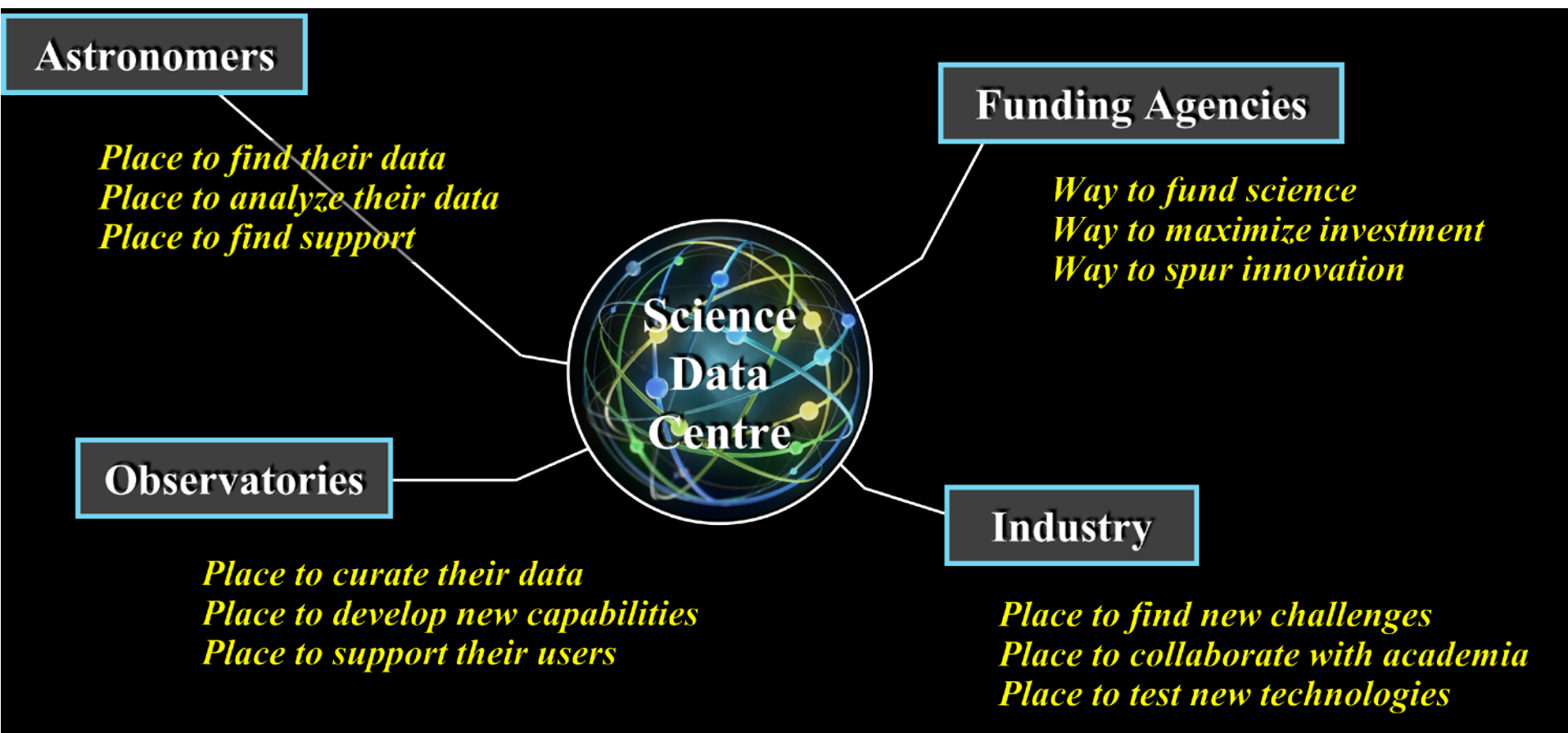
EC H2020, 28 partners, three years (2017-2019)



- ☐ Governance Structure and Business Models
- ☐ Computing and Processing Requirements
- ☐ Data Transport and Optimal European Storage Topologies
- ☐ User Data Access and Knowledge Creation

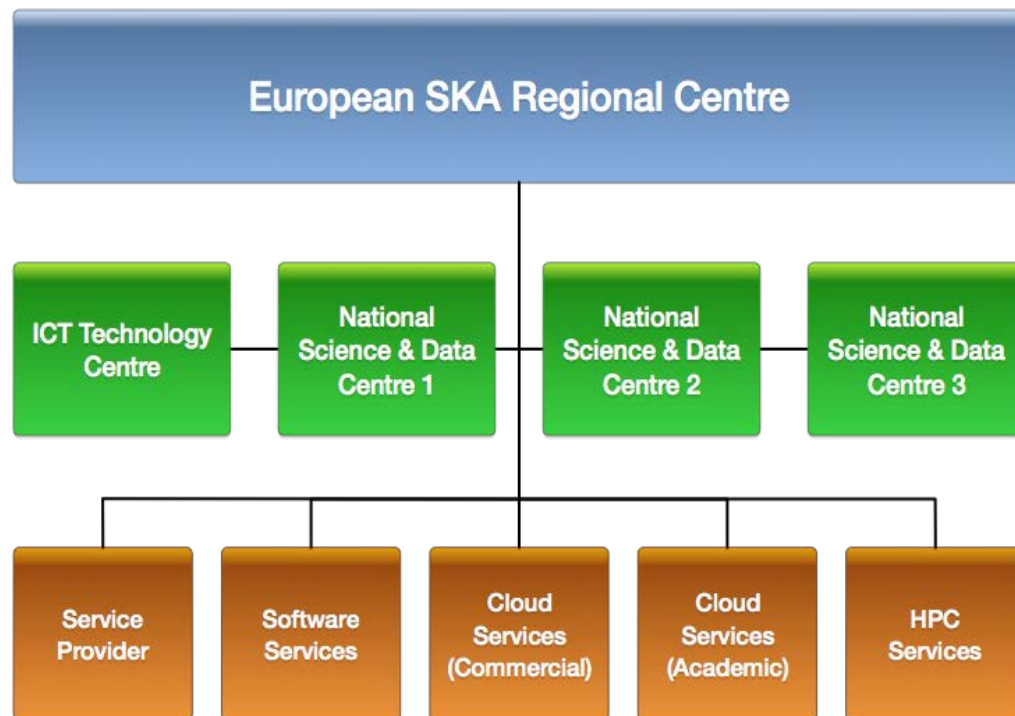
***Global network
of SD centers***

What is a Science Data Centre?



European SKA Regional Centre

- Create a European-scale, federated Regional Centre for the SKA
- Provide resources for SKA science extraction to users
- Coordination with ICT communities, industry, and service providers
- Facilitate shared development, interoperability, and innovation
- European counterpart for engagement with other SRCs internationally



AENEAS & EOSC

- Building on the existing infrastructure
- using knowledge and requirements of current large archives and compute facilities
- scale increase of one to two orders of magnitude will stretch the capacity of any cloud or existing infrastructure to the limit.
- It is therefore very important that the design of the ESDC for SKA runs parallel to the emergence of the EOSC and learning from each other.

Open Questions

- How do we build and sustain large-scale research infrastructures that can support multiple domains?
- How do we deploy science as a service to researchers and maintain the cycle of discovery and innovation?
- How do we commodify public private partnerships?