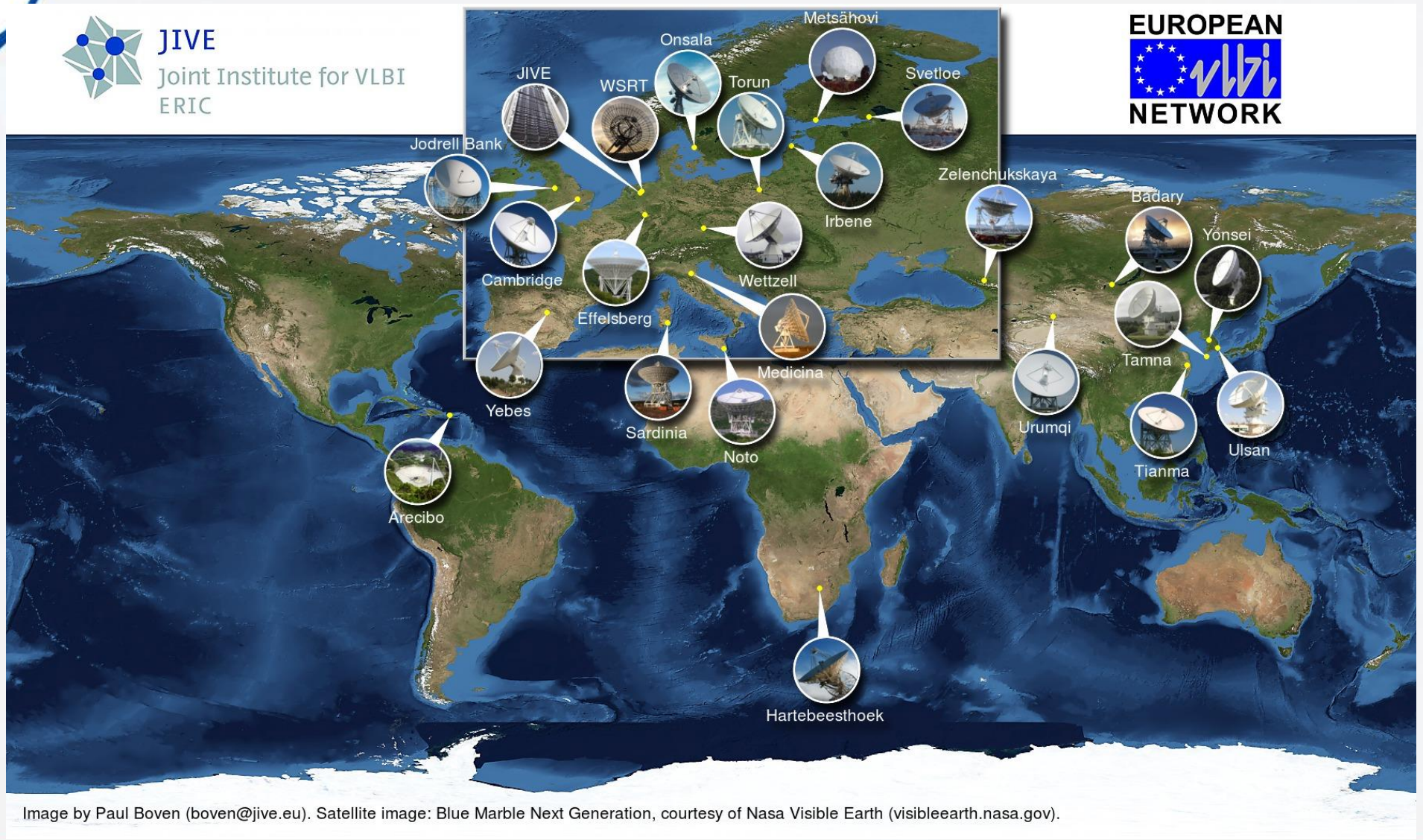
CASA improvements for VLBI

Des Small, JIVE

JIVE and the EVN



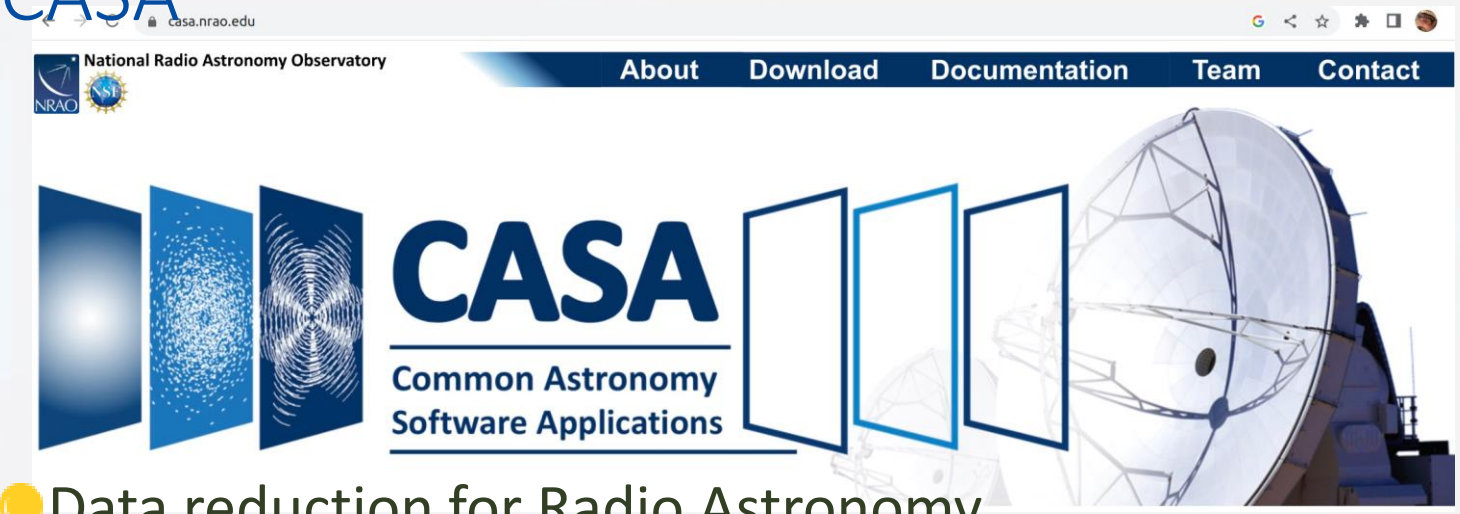
JIVE and the EVN

- JIVE is a European Research Infrastructure
- Works for EVN
- Correlates most EVN experiments
- Maintains software correlator (SFXC)
- Supports users in data reduction
  - Originally AIPS
  - Increasingly CASA

CASA

ESCAPE - The European Science Cluster of Astronomy & Particle Physics ESFRI Research Infrastructures has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 824064.

CASA



- Data reduction for Radio Astronomy
- Developed by NRAO, ESO, NAOJ & JIVE
  - C++ and Python
- Handles full data reduction
- Built for connected element arrays
- Used by VLA and ALMA pipelines
- Development process well defined

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CASA development

- Each feature is a JIRA ticket and git branch
- Scope of the issue defined
- Implementation, verification, validation
  - Verification requires unit tests and regression tests
  - Validation done by someone else
  - Centralised package building/testing on commit (can be turned on)
- Software engineering best practices!
- (We *really* don't want to break ALMA pipelines!)

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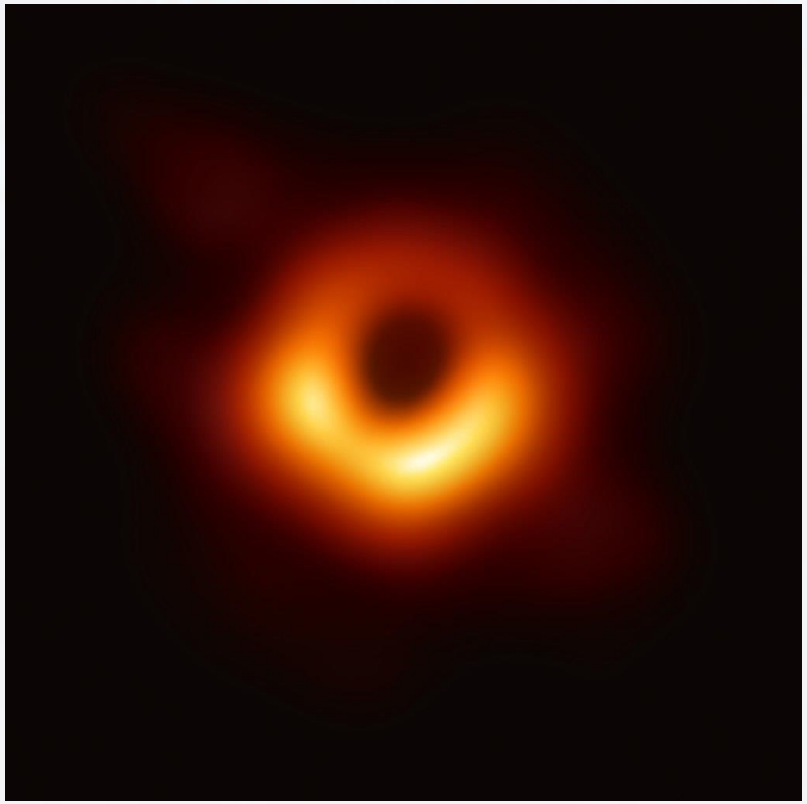
CASA, VLBI and JIVE

- CASA didn’t have VLBI features
- NRAO always wanted them
- JIVE added them
- Continued work on new features



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New CASA papers for added FAIRness!

Cornell University

arXiv > astro-ph > arXiv:2210.02276

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Astrophysics > Instrumentation and Methods for Astrophysics

[Submitted on 5 Oct 2022]

CASA, the Common Astronomy Software Applications for Radio Astronomy

THE CASA TEAM, Ben Bean (1), Sanjay Bhatnagar (2), Sandra Castro (3), Jennifer Donovan Mever (4), Bjorn Emonts (4), Enrique Garcia (3), Rober Garwood (4), Kumar Golap (2), Justo Gonzalez Villalba (3), Pamela Harris (2), Yohei Hay Jagannathan (2), Wataru Kawasaki (5), Aard Keimpema (6), Mark Kettenis (6), Jorge Lop McNichols (4), David Mehringer (4), Renaud Miel (5), George Moellenbrock (2), Federico Petry (3), Martin Pokorny (2), Ryan Raba (4), Urvashi Rau (2), Darrell Schiebel (4), Neal (5), Des Small (6), Jan-Willem Steeb (4), Kanako Sugimoto (5), Ville Suoranta (4), Takah (6), Akeem Wells (4), Wei Xiong (1), Arpad Szomoru (6), Morgan Griffith (4), Brian Glend Socorro, (3) ESO, (4) NRAO Charlottesville, (5) NAOJ, (6) JIVE, (7) IDIA)

CASA, the Common Astronomy Software Applications, is the primary data processing software for th Karl G. Jansky Very Large Array (VLA), and is frequently used also for other radio telescopes. The C synthesis, and Very Long Baseline Interferometery (VLBI) telescopes. One of its core functionalities i VLA Sky Survey (VLASS), and the Nobeyama 45m telescope. This paper presents a high-level overv procedures for calibrating and imaging astronomical radio data in CASA. CASA is being developed b based at the National Radio Astronomical Observatory (NRAO), the European Southern Observatory and the Joint Institute for VLBI European Research Infrastructure Consortium (JIV-ERIC), under the

zenodo

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October 3, 2022 Software Open Access

Jupyter-CASA

Aard Keimpema; Mark Kettenis; Des Small; Ilse van Bemmel

A Jupyter kernel for CASA, a popular data processing suite for radio astronomy. The software is packaged together with CASA as a Docker container.

Preview

Files (3.1 GB)

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codemeta.json	2.0 kB	Preview Download
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jupyter-casa-docker-6.5.1.tar.gz	3.1 GB	Download
md5:88b6b8bc2d3d2c455ebc853662704ea0		

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Publication date: October 3, 2022

DOI: DOI 10.5072/zenodo.1111745

Keyword(s): JIVE Astronomy jupyter-notebook

Grants: European Commission:
- ESCAPE - European Science Cluster of Astronomy & Particle physics ESFRI research infrastructures (824064)

Related identifiers: References
https://arxiv.org/abs/2210.02275 (Preprint)
https://arxiv.org/abs/2210.02276 (Preprint)

Cornell University

arXiv > astro-ph > arXiv:2210.02275

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Astrophysics > Instrumentation and Methods for Astrophysics

[Submitted on 5 Oct 2022]

CASA on the fringe -- Development of VLBI processing capabilities for CASA

chael Janssen, George A. Moellenbrock, Dirk Petry, Ciriaco Goddi, Justin D. Linford, Kazi L.J. Rygl dina, Neal Schweigart, Marjolein Verkouter, Aard Keimpema, Arpad Szomoru, Huib Jan van

rometry (VLBI) data has been implemented in the CASA package. This includes two new tasks to handle fringe sting tasks have been adjusted to handle VLBI visibility data and calibration meta-data properly. With these and spectral line observations in CASA. This article describes the development and implementation, and uropean VLBI Network or Very Long Baseline Array data in CASA. Though the CASA VLBI functionality has rizon Telescope data processing, in this paper we compare results for the same dataset processed in CASA s and conclude that CASA in some cases performs better, though it cannot match AIPS for single-core for easy development of pipelines or Jupyter notebooks, and thus contributes to raising VLBI data processing to and reusability.

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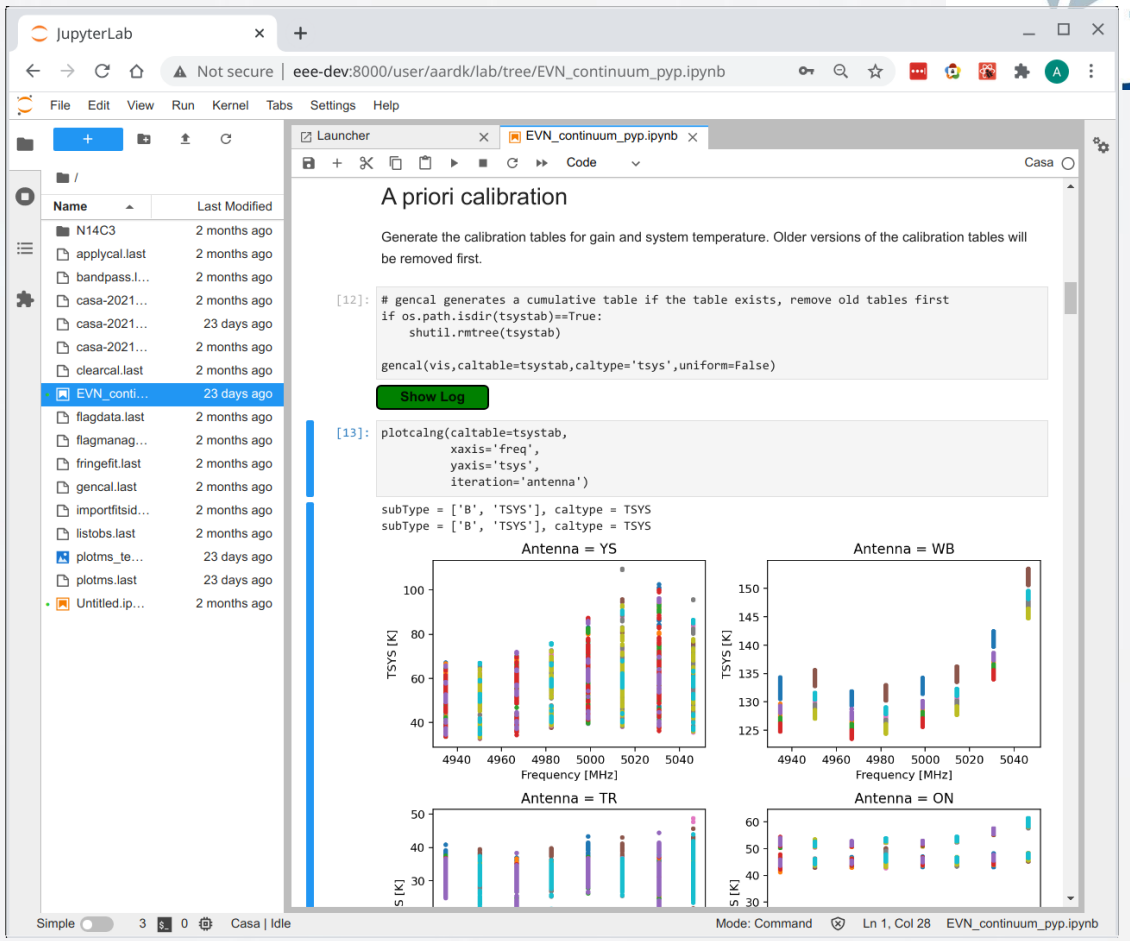
Our OSSR contribution

- Wrapped CASA in Jupyter notebooks
- We can offer “CASA in the cloud”
- Trial run at ERIS 2022
- Will be covered by A Keimpema



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Thanks!