National Research Foundation

SARAO
South African Radio Astronomy Observatory

SARAO REPOSITORY INTERFACE HELP DESK

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The SARAO science repository interface (Dspace http://dspace.sdp.kat.ac.za:4000) allows users to view , search and request new Digital Object Identifiers (DOIs). This help guide describes how to use the repository interface and how to request new DOIs for data releases. The SARAO repository interface user help guide is available on http://dspace.sdp.kat.ac.za:4000/help. Direct all repository related queries to the SARAO Help Desk at https://skaafrica.atlassian.net/servicedesk/customer/portal/1/group/7.

Revision History

Version	Date	Editors
V1.0.0	May 2023	Sci-Ops Team

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SARAO Repository Interface Help Desk

1. Accessing the SARAO Repository

To access the SARAO science repository interface, go to the link http://dspace.sdp.kat.ac.za:4000. Registration or Authentication is not required.

The directed page will be the landing page as shown in Figure 1.1 :

Figure 1.1: Science repository landing page

If unable to see a landing page, raise a ticket on the SARAO Help Desk via https://skaafrica.atlassian.net/servicedesk/customer/portal/1/group/7

Make your email subject: **Landing page Error**

Add the following information to your email:

- Full name and email of the person trying to access the interface.
- **Copy of the error message** displayed.

2. Using the SARAO repository interface

Once the landing page is accessible, the user has access to the repository where all SARAO's DOIs are published. Figure 2.1 illustrates the different components of the interface.

Figure 2.1: An illustration of the Science repository components

2.1 General Buttons

Communities & Collections: The communities are the primary storage level in the repository's storage hierarchy that holds collections. Communities are the different telescopes that SARAO facilitates. Collections are a level within a community that holds Digital Object Identifiers (DOIs). The collections are the different data products within the different communities.
About Us: This button contains information about SARAO
Create Doi: This button leads to a link to request for a new DOI creation or update an existing DOI.
Help Guide: This document contains information about the repository and all its components.

Filter By Category: This button allows users to filter the DOIs using different categories such as issue date, author, title, and subject.
Statistics: This button shows the statistics of DOI visited and accessed.

2.2 Search Bars

Figure 2.2: An illustration of the Science repository components

Figure 2.3: An illustration of the Science repository components

There are two search bars within the interface. The first one is in the navigation bar as shown on **Figure 2.2** and the second one is in the center of the page as shown on **Figure 2.3**. Both work in the same way as follows:

- Text is entered where “ Search” is indicated with a search icon.
- The search is initiated by either pressing the Enter key or clicking on the magnifying glass on the right side.

3. Interaction with Communities, Collections and DOIs

Clicking on the **Communities & Collections** button. A list of the Communities will be displayed as shown in Figure 3.1.

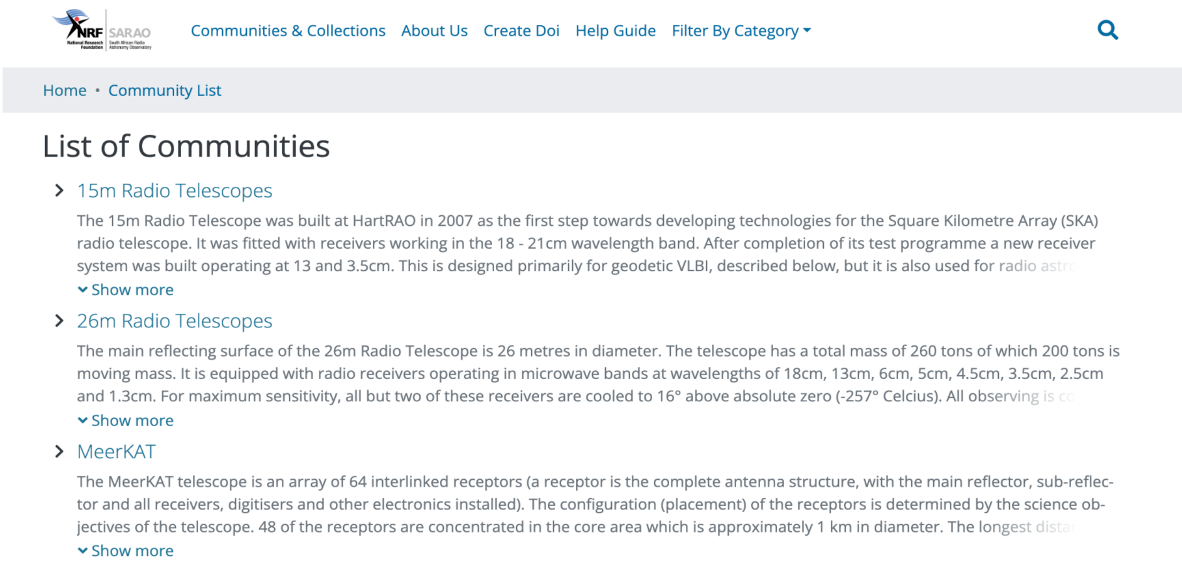


Figure 3.1: A list of all the Communities within the repository

SARAO repository facilitates two telescopes. MeerKAT, the 15m- and -26m Radio telescopes of HartRAO. The South African MeerKAT radio telescope, situated 90 km outside the small Northern Cape town of Carnarvon, is a precursor to the Square Kilometer Array (SKA) telescope and will be integrated into the mid-frequency component of SKA Phase 1. More information can be obtained here (https://www.sarao.ac.za/science/meerkat/about-meerkat/).

The main reflecting surface of the 26m Radio telescope is 26 meters in diameter. The telescope has a total mass of 260 tons of which 200 tons is moving mass. It is equipped with radio receivers operating in microwave bands at wavelengths of 18cm, 13cm, 6cm, 5cm, 4.5cm, 3.5cm, 2.5cm and 1.3cm. For maximum sensitivity, all but two of these receivers are cooled to 16° above absolute zero (-257° Celsius). All observing is controlled by computer.

The 15m radio telescope was built at HartRAO in 2007 as the first step towards developing technologies for the Square Kilometer Array (SKA) radio telescope. It was fitted with receivers working in the 18 - 21 cm wavelength band. After completion of its test programme a new receiver system was built operating at 13 and 3.5cm. This is designed primarily for geodetic VLBI, described below, but it is also used for radio astronomy research. More information can be obtained here (http://www.hartrao.ac.za/summary/sumeng.html).

3.1 MeerKAT Collections

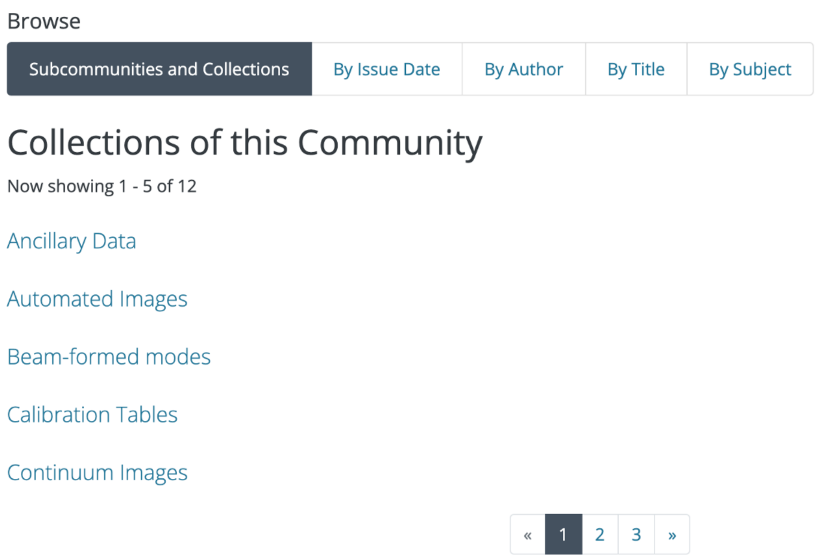


Figure 3.2: A list of all the collections within the MeerKAT community

- Ancillary Data
- Automated Images
- Beam-formed modes
- Calibration Tables
- Continuum Images
- Pulsar Timing Data
- Rapid Timing Transients
- Reports on Image Quality
- Sensor Data
- Serendipitous Discovery Data
- Spectral Line Cubes
- Visibility Data

3.2 The 15m- and -26m Radio telescopes of HartRAO Collections

The data products under these two telescopes are as shown on Figure

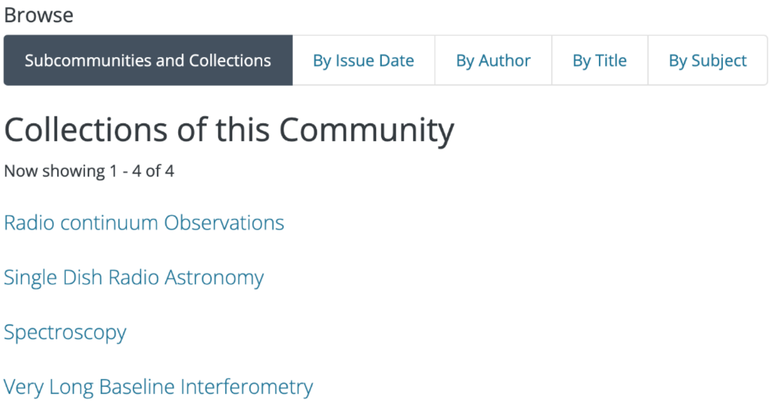


Figure 3.3: A list of all the collections within the 15m- and -26m Radio telescopes of HartRAO

- Radio continuum Observations

  Radio continuum emission is the broadband radiation emitted in the radio part of the spectrum by celestial objects. Its intensity (brightness temperature) typically varies relatively slowly as a function of wavelength (or frequency). This is in contrast to the narrow emission lines produced at characteristic frequencies by atoms and molecules. Continuum observations can be made with all installed receivers at HartRAO.

- Single Dish Radio Astronomy

  For single-dish observing with the 26m telescope, multiple receivers are available. Their technical characteristics are summarized in http://www.hartrao.ac.za/factsfile.html.

- Spectroscopy

  Atoms and molecules in space can produce radio emission at characteristic frequencies. This emission is studied using a spectrometer. For example, newly formed massive stars excite intense beams of radio waves, called masers, from molecules such as water (H_2O), hydroxyl (OH) and methanol (CH_3OH) in the clouds of gas surrounding the new stars. Many methanol masers in the southern Milky Way were discovered using the 26m telescope.

- Very Long Baseline Interferometry

  Quasars are so distant from the Earth that they appear fixed in space. By observing them with a VLBI network, we can measure the distances between the radio telescopes in the network to an accuracy of one centimeter. This lets us measure, for instance, the slow drift of the continents over the surface of the Earth and the continuously changing tilt and rate of rotation of the Earth. The 26m telescope was used to establish the absolute reference point for the country's National Survey system. This is known as the Hartebeesthoek94 Datum. The 26m and 15m radio telescopes at HartRAO participate in geodetic VLBI experiments as part of the International VLBI Service for Geodesy and Astrometry (IVS). Progress with geodetic VLBI observations can be watched at IVS Live. The results from these experiments can be found at the IVS Analysis Coordinator.

3.3 Digital Object Identifiers (DOIs)

DOIs are stored under differing collections or data products. This is an example of a DOI under the Beam-formed modes data products.

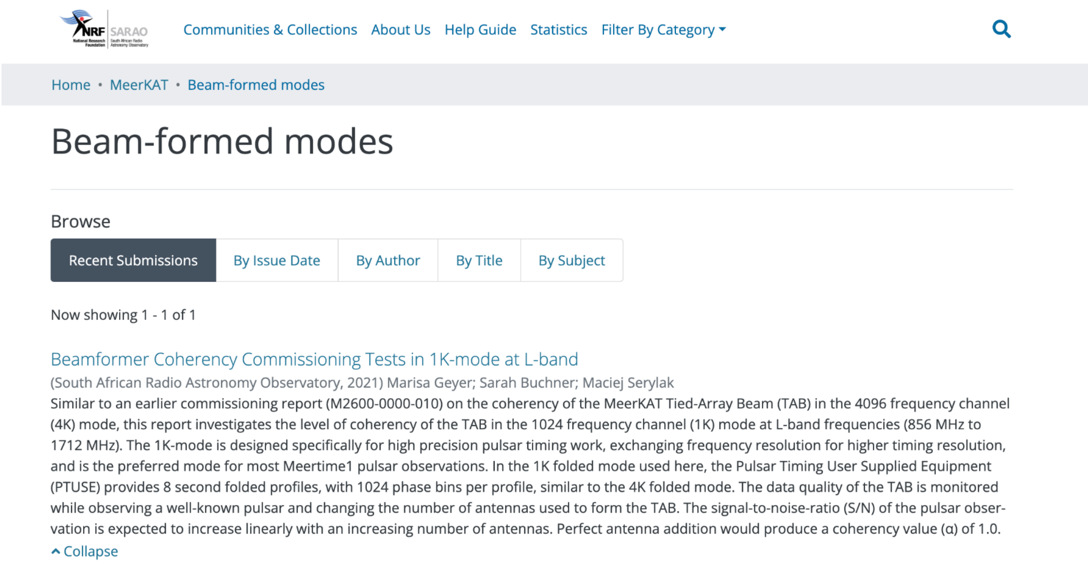
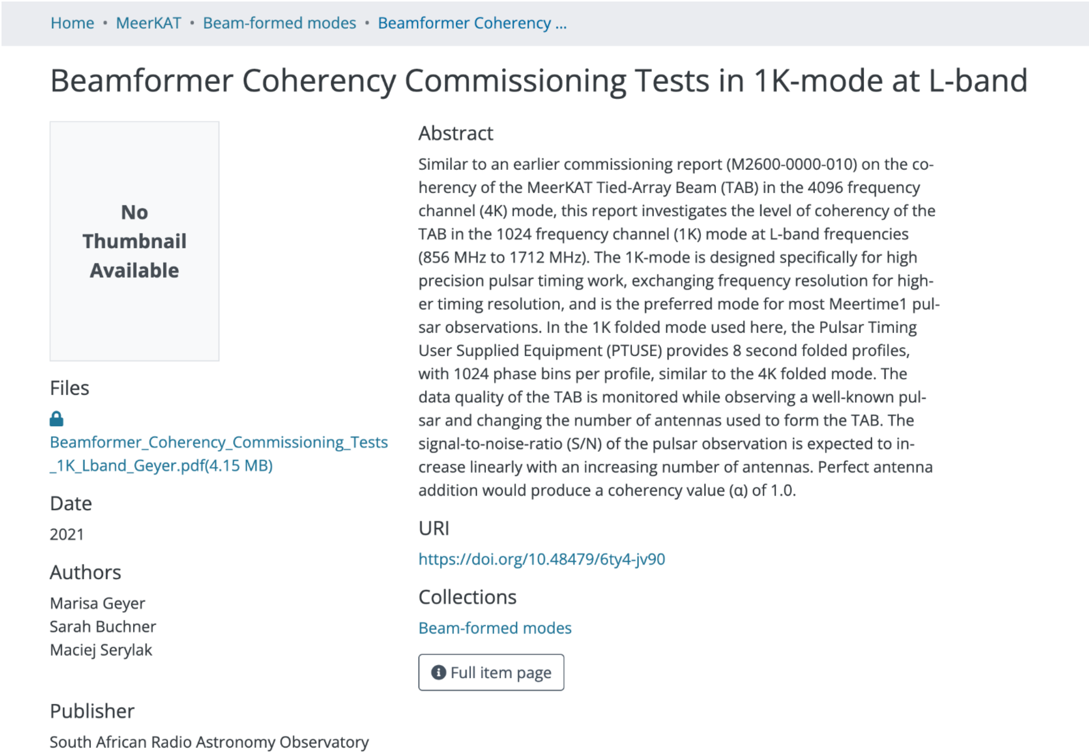


Figure 3.4: An example of a DOI under the Beam-formed modes data products

Clicking on the title of the DOI, the actual DOI is shown as shown in **Figure 3.5** below:



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Beamformer Coherency Commissioning Tests in 1K-mode at L-band

No Thumbnail Available

Files

Beamformer_Coherency_Commissioning_Tests_1K_Lband_Geyer.pdf(4.15 MB)

Date

2021

Authors

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Publisher

South African Radio Astronomy Observatory

Abstract

Similar to an earlier commissioning report (M2600-0000-010) on the coherency of the MeerKAT Tied-Array Beam (TAB) in the 4096 frequency channel (4K) mode, this report investigates the level of coherency of the TAB in the 1024 frequency channel (1K) mode at L-band frequencies (856 MHz to 1712 MHz). The 1K-mode is designed specifically for high precision pulsar timing work, exchanging frequency resolution for higher timing resolution, and is the preferred mode for most Meertime1 pulsar observations. In the 1K folded mode used here, the Pulsar Timing User Supplied Equipment (PTUSE) provides 8 second folded profiles, with 1024 phase bins per profile, similar to the 4K folded mode. The data quality of the TAB is monitored while observing a well-known pulsar and changing the number of antennas used to form the TAB. The signal-to-noise-ratio (S/N) of the pulsar observation is expected to increase linearly with an increasing number of antennas. Perfect antenna addition would produce a coherency value (α) of 1.0.

URI

https://doi.org/10.48479/6ty4-jv90

Collections

Beam-formed modes

Full item page

Figure 3.5: An expansion of a DOI under the Beam-formed modes data products.

This DOI page has authors, publishers, date ,abstract and a DOI URL of the webpage that hosts the data to be released.

4. FAQs

Please see https://skaafrica.atlassian.net/wiki/spaces/ESDKB/pages/1452441609/Frequently+asked+question

SARAO, a Business Unit of the National Research Foundation.

The South African Radio Astronomy Observatory (SARAO) spearheads South Africa's activities in the Square Kilometre Array Radio Telescope, commonly known as the SKA, in engineering, science and construction. SARAO is a National Facility managed by the National Research Foundation and incorporates radio astronomy instruments and programmes such as the MeerKAT and KAT-7 telescopes in the Karoo, the Hartebeesthoek Radio Astronomy Observatory (HartRAO) in Gauteng, the African Very Long Baseline Interferometry (AVN) programme in nine African countries as well as the associated human capital development and commercialisation endeavours.