The Bordeaux VLBI Image Database

(Version 2)

Arnaud Collioud, Patrick Charlot

Laboratoire d’Astrophysique de Bordeaux, Université de Bordeaux / CNRS

24th EVGA Meeting, Gran Canaria, Spain – March 17-19, 2019
Context

Observing sources with VLBI

- Sources are not point-like at VLBI scales
- Structure can (rapidly) evolve with time
→ Necessity to **monitor source structure**

Observations of (ICRF) sources in the framework of the IVS

Sessions adapted to the imaging, i.e. RDV (R & D with the VLBA) sessions.

Main products:
  1. *High-resolution images*
  2. *Astrometric information* (Structure Index)

→ Make it accessible to everyone through a **database/web interface**
The Bordeaux VLBI Image Database (BVID)

Available products

- **VLBI Images**
- **Structure Correction maps / Structure indices**
- **Visibility maps / Compactness values**

User interface until now

Available since 2008...
The Bordeaux VLBI Image Database (BVID) is developed at the Laboratoire d’Astrophysique de Bordeaux (LAb) as part of its activities for the maintenance and improvement of the International Celestial Reference Frame (ICRF) in the framework of the International VLBI Service for Geodesy and Astrometry (IVS).

The BVID provides products and tools to better understand radio sources:

- **VLBI Images** at multiple frequencies
- **Structure correction maps** & **Structure indices**
- **Visibility maps** & **Source compactness**

**Sources:** 1344

**Sessions:** 77

**VLBI Maps:** 6116

**Structure correction maps:** 12891

---

**Official opening**: The Bordeaux VLBI Image Database (BVID) is officially opened to the scientific community.

**Presentation of the BVID**: The BVID will be presented during the 4th meeting of the European VLBI group for Geodesy and Astronomy (EVGA), which is held in Las Palmas de Gran Canaria, Spain from 17 to 19 March, 2019.

---

http://bvid.astrophy.u-bordeaux.fr
What’s new?

New interface
  dynamic, modern, adaptative

New tools
  - Sky map
  - Multi-criteria query form *
  - Interactive plots & tables
  - Export data (images, tables, plots) *

New data
  - Images in FITS format *
  - Source models (CLEAN components) *
  - (u,v)-plots, amplitude vs. (u,v)-radius plots *

*: Access to some functionalities or data requires creating an account on the BVID website.
Use Case 1... Queries

Ex: Query by « Source name » (0014+813)
Use Case 2... Time series

Flux time series for source 0552+398

Compactness time series for source 0552+398

Source 0552+398
ICRF3 Def. source
38 sessions from 1994 to 2015

S-band
X-band

NB: Images not to scale
Use Case 3... Sky map

Median flux at X-band

Whole range from 0.02 to 18.02 Jy

1285 sources
Use Case 3... Sky map

Median flux at X-band

Filtered range: \( \geq 1 \text{ Jy} \)

168 sources
Use Case 3... Sky map

Median flux at X-band

**Filtered** range: 
≥ 1 Jy 
&
More than 10 sessions

72 sources
Use Case 3... Sky map

Median flux at X-band

Filtered range: \( \geq 1 \text{ Jy} \)

&

More than 10 sessions

→ possibility to look at individual sources

72 sources
Global statistics

4 frequency bands
- S: 2.3 GHz
- X: 8.6 GHz
- K: 24 GHz
- Q: 43 GHz

59 RDV sessions
(34 analysed at Bordeaux)

On average, 4 to 5 sessions per source
(at X- and S-band)

ICRF3 Categories
- 246 Def.
- 1053 Not Def.
- 45 not in ICRF3

+ 6775 links to images of the “Radio Reference Frame Image Database” (RRFID)

The same number of:
- Structure index
- Visibility maps
- Compactness values

Time span: 22 years
Statistics: BVID and ICRF3

ICRF3 Def.

Median Flux

ICRF3 Not Def.

S-band

X-band

Median flux: 0.50 Jy (243 sources)

Median flux: 0.52 Jy (244 sources)

Median flux: 0.26 Jy (1003 sources)

Median flux: 0.22 Jy (1000 sources)
Statistics: BVID and ICRF3

ICRF3 Def.

Median Structure index

Median SI: 1.64 (243 sources)

S-band

ICRF3 Not Def.

Median SI: 2.16 (1003 sources)

Median SI: 3.21 (1000 sources)

X-band
Perspectives

“Release Candidate” version

- Ready for intensive testing
- Possible bugs
  → Please contact us if you find one

- Data missing (especially for the “oldest” sessions)

Available to host images...

- You produced VLBI images...
- ...but you do not know how to disseminate them

→ Make them available to the community through the BVID with full credits to you and your co-author(s)

Please come to see me if you are interested!
Thank you!

http://bvid.astrophy.u-bordeaux.fr

@ Contact: arnaud.collioud@u-bordeaux.fr