USNO Analysis Center for Source Structure Report

Alan L. Fey, David A. Boboltz, Ralph A. Gaume, Kerry A. Kingham

Abstract

This report summarizes the activities of the United States Naval Observatory Analysis Center for Source Structure for calendar year 2011 and the activities planned for the year 2012.

1. Analysis Center Operation

The Analysis Center for Source Structure is supported and operated by the United States Naval Observatory (USNO). The charter of the Analysis Center is to provide products directly related to the IVS determination of the "definition and maintenance of the celestial reference frame". These include, primarily, radio frequency images of International Celestial Reference Frame (ICRF) sources, intrinsic structure models derived from the radio images, and an assessment of the astrometric quality of the ICRF sources based on their intrinsic structure.

The Web server for the Analysis Center is hosted by the USNO and can be accessed by pointing your browser to

`http://rorf.usno.navy.mil/ivs_saac/`

The primary service of the Analysis Center is the Radio Reference Frame Image Database (RRFID), a Web accessible database of radio frequency images of ICRF sources. The RRFID contains 7,279 Very Long Baseline Array (VLBA) images of 782 sources at radio frequencies of 2.3 GHz and 8.4 GHz. Additionally, the RRFID contains 1,706 images of 282 sources at frequencies of 24 GHz and 43 GHz. The RRFID can be accessed from the Analysis Center Web page or directly at

`http://rorf.usno.navy.mil/rrfid.shtml`

The RRFID also contains 74 images of 69 Southern Hemisphere ICRF sources using the Australian Long Baseline Array (LBA) at a radio frequency of 8.4 GHz.

Images of ICRF sources can also be obtained from the Bordeaux VLBI Image Database (BVID) at

`http://www.obs.u-bordeaux1.fr/m2a/BVID/`

2. Current Activities

Maintaining the Radio Reference Frame Image Database (RRFID) as a Web accessible database of radio frequency images of ICRF sources.

3. Staff

The staff of the Analysis Center is drawn from individuals who work at the USNO. The staff are: Alan L. Fey, David A. Boboltz, Ralph A. Gaume, and Kerry A. Kingham.

4. Future Activities

The Analysis Center currently has a program of active research investigating the effects of intrinsic source structure on astrometric position determination. Results from this program are published in the scientific literature.

The following activities for 2012 are planned:

- Continue imaging and analysis of VLBA 2.3/8.4/24/43 GHz experiments.
- Maintain the Radio Reference Frame Image Database (RRFID) as a Web accessible database of radio frequency images of ICRF sources.

5. Relevant Publications

Publications of relevance to Analysis Center activities:

- "TANAMI: tracking active galactic nuclei with austral milliarcsecond interferometry. I. First-epoch 8.4 GHz images," Ojha, R., Kadler, M., Böck, M., Booth, R., Dutka, M. S., Edwards, P. G., Fey, A. L., Fuhrmann, L., Gaume, R. A., Hase, H., Horiuchi, S., Jauncey, D. L., Johnston, K. J., Katz, U., Lister, M., Lovell, J. E. J., Müller, C., Plötz, C., Quick, J. F. H., Ros, E., Taylor, G. B., Thompson, D. J., Tingay, S. J., Tosti, G., Tzioumis, A. K., Wilms, J. and Zensus, J. A. 2010, A&A, 519, 45
- "The Celestial Reference Frame at 24 and 43 GHz. I. Astrometry," Lanyi, G. E., Boboltz, D. A., Charlot, P., Fey, A. L., Fomalont, E. B., Geldzahler, B. J., Gordon, D., Jacobs, C. S., Ma, C., Naudet, C. J., Romney, J. D., Sovers, O. J. and Zhang, L. D. 2010, AJ, 139, 1695
- "The Celestial Reference Frame at 24 and 43 GHz. II. Imaging," Charlot, P., Boboltz, D. A., Fey, A. L., Fomalont, E. B., Geldzahler, B. J., Gordon, D., Jacobs, C. S., Lanyi, G. E., Ma, C., Naudet, C. J., Romney, J. D., Sovers, O. J. and Zhang, L. D. 2010, AJ, 139, 1713