

Calibration of astrometric positions

ALBiUS kickoff meeting, Dwingeloo, 2-3 March 2009

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Participants:

- Bordeaux (leading institution): 21 months (12+9)
- JIVE: 3 months
- Manchester: 3 months

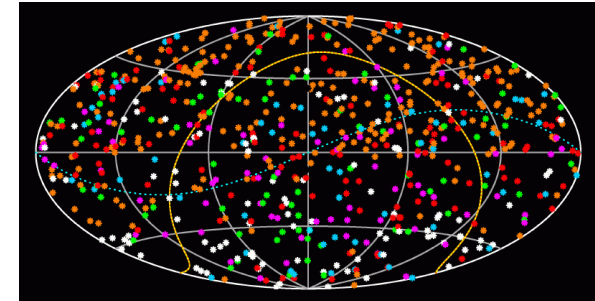
- Expression of interest from NRAO

Starting time: 09/2009

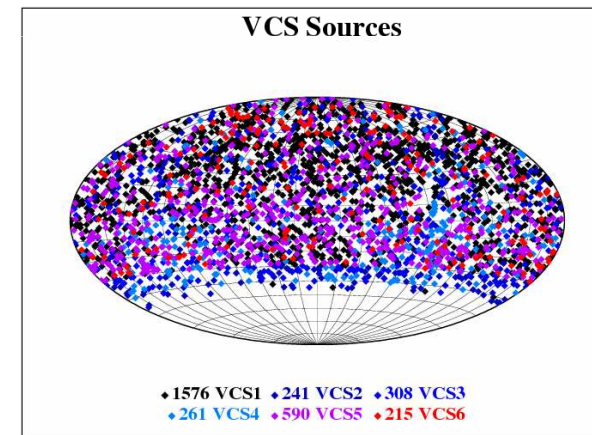
Main goal: develop observing strategy/algorithms to combine wide-angle (global) VLBI astrometry with narrow-angle (local) VLBI astrometry

- Based on VLBI group delays
- Observe sources widely-separated on the sky during each (24-hour) experiment
- Optimize sky coverage above each telescope
- Requires full geometric/atmospheric modeling
- Accuracy: 0.25 mas (better with forthcoming ICRF-2)
- Limitation: targets must be detected with $\text{SNR} > 7$ on each (few minute long) scan

ICRF



VCS Sources



- Based on relative phase measurements with respect to a nearby calibrator (a few degrees away at most)
- Calibrator position fixed to ICRF or VCS catalogs

Advantages

- Can observe much weaker sources (no need for actual detection over each few-minute long scan)
- Potentially much higher accuracy (10 μ as)

But limited to small areas on the sky...

- Define observing strategies and analysis schemes that combine the two approaches (group delays and phases)
- Applicable to produce an improved, denser and unified reference frame comprising all sources (whether observed with wide-angle or narrow-angle VLBI astrometry)
- Focus on algorithms/observing strategies than software development
- Issues:
 - Are there data that are available to test the method?
 - Which software package?

- Astrometry from wide-band observing (e.g. 4 GHz, 2-15 GHz band):
 - What do group delays from such wide-band observations mean?
 - What is the impact of the frequency-varying structure?
- Astrometry from multi-beaming observations
 - Observe simultaneously several sources at each site
 - Applicable to
 - IVS future VLBI2010 network (2 sources)
 - SKA (many sources)