Densification of the International Celestial Reference Frame: Results of EVN+ Observations

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Outline

Current status of the ICRF

Overview of ICRF densification project
- source selection
- observations

Results
- astrometric precision
- comparison with VCS1 positions
The International Celestial Reference Frame (ICRF)

- Currently 717 sources
- 250 μas position accuracy at best
- Orientation of frame known to 20 μas/yr
Overview of densification project

- Concentrate on the northern sky
- Obtain a more uniform ICRF source distribution
- Select sources of high astrometric value (no or limited extended structure)

ICRF

Northern sky

392 sources

ICRF + 150 new sources

542 sources

1 source / 7°x 7° nearest source at 13° max

1 source / 6°x 6° nearest source at 6° max
Source selection strategy

- **Input:** JVAS catalog (2118 sources in the northern sky)

- **Strategy:** fill first the "empty" regions of the frame

- **Candidate sources** filtered out using VLBI images

**Typical targets**

50 new sources + 10 high-quality ICRF sources observed in each experiment.
Results

Astrometric precision

All 150 new sources successfully detected.

Coordinate uncertainties:
- < 1 mas for most sources
- larger in declination
Results
Comparison with VCS1 positions

129 sources part of the VLBA Calibrator Survey (VCS1) astrometric catalog.

Coordinate differences at the level of:
- < 1 mas in right ascension
- 1-2 mas in declination
Summary

- 150 new potential ICRF sources observed AND detected in three EVN+ experiments.
- Coordinate uncertainties < 1 mas for most sources.
- Agreement at the 1-2 mas level with the VCS1 astrometric positions.
- Further investigation of the VCS1-EVN+ differences necessary to search for possible systematic trends.