

## IAU Adopts ICRF2 as New Celestial Reference Frame

The Second Realization of the International Celestial Reference Frame (ICRF2) was adopted at the XXVII General Assembly of the International Astronomical Union (IAU) in Rio de Janeiro, Brazil as Resolution B3. The ICRF2 replaced the previously used first realization (ICRF) effective 1 January 2010. The International Earth Rotation and Reference Systems Service (IERS) published ([http://www.iers.org/nm\\_11216/IERS/EN/Publications/TechnicalNotes/tn35.html](http://www.iers.org/nm_11216/IERS/EN/Publications/TechnicalNotes/tn35.html)) Technical Note #35 about the computation of the ICRF2. The ICRF2 was an effort of a joint IERS/IVS working group and was overseen by an IAU working group. ICRF2 contains precise positions of 3,414 compact extragalactic radio sources, more than five times the number in the ICRF. Further, the ICRF2 is found to have a noise floor of  $\sim 40$  microarcseconds, some 5–6 times better than ICRF, and an axis stability of  $\sim 10$  microarcseconds, nearly twice as stable as ICRF. Alignment of ICRF2 with the International Celestial Reference System (ICRS) was made using 138 stable sources common to both ICRF2 and ICRF-Ext2. We reproduce here the full wording of the original resolution.

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### IAU 2009 Resolution B3

on the

#### Second Realization of the International Celestial Reference Frame

The International Astronomical Union XXVII General Assembly,

**noting**

1. that Resolution B2 of the XXIII General Assembly (1997) resolved “That, as from 1 January 1998, the IAU celestial reference system shall be the International Celestial Reference System (ICRS)”,
2. that Resolution B2 of the XXIII General Assembly (1997) resolved that the “fundamental reference frame shall be the International Celestial Reference Frame (ICRF) constructed by the IAU Working Group on Reference Frames”,
3. that Resolution B2 of the XXIII General Assembly (1997) resolved “That IERS should take appropriate measures, in conjunction with the IAU Working Group on reference frames, to maintain the ICRF and its ties to the reference frames at other wavelengths”,
4. that Resolution B7 of the XXIII General Assembly (1997) recommended “that high-precision astronomical observing programs be organized in such a way that astronomical reference systems can be maintained at the highest possible accuracy for both northern and southern hemispheres”,
5. that Resolution B1.1 of the XXIV General Assembly (2000) recognized “the importance of continuing operational observations made with Very Long Baseline Interferometry (VLBI) to maintain the ICRF”,

**recognizing**

1. that since the establishment of the ICRF, continued VLBI observations of ICRF sources have more than tripled the number of source observations,
2. that since the establishment of the ICRF, continued VLBI observations of extragalactic sources have significantly increased the number of sources whose positions are known with a high degree of accuracy,
3. that since the establishment of the ICRF, improved instrumentation, observation strategies, and application of state-of-the-art astrophysical and geophysical models have significantly improved both the data quality and analysis of the entire relevant astrometric and geodetic VLBI data set,
4. that a working group on the ICRF formed by the International Earth Rotation and Reference Systems Service (IERS) and the International VLBI Service for Geodesy and Astrometry (IVS), in conjunction with the IAU Division I Working Group on the Second Realization of the International Celestial Reference Frame has finalized a prospective second realization of the ICRF in a coordinate frame aligned to that of the ICRF to within the tolerance of the errors in the latter (see note 1),
5. that the prospective second realization of the ICRF as presented by the IAU Working Group on the Second Realization of the International Celestial Reference Frame represents a significant improvement in terms of source selection, coordinate accuracy, and total number of sources, and thus represents a significant improvement in the fundamental reference frame realization of the ICRS beyond the ICRF adopted by the XXIII General Assembly (1997),

**resolves**

1. that from 01 January 2010 the fundamental astrometric realization of the International Celestial Reference System (ICRS) shall be the Second Realization of the International Celestial Reference Frame (ICRF2) as constructed by the IERS/IVS working group on the ICRF in conjunction with the IAU Division I Working Group on the Second Realization of the International Celestial Reference Frame (see note 1),
2. that the organizations responsible for astrometric and geodetic VLBI observing programs (e.g. IERS, IVS) take appropriate measures to continue existing and develop improved VLBI observing and analysis programs to both maintain and improve ICRF2,
3. that the IERS, together with other relevant organizations continue efforts to improve and densify high accuracy reference frames defined at other wavelengths and continue to improve ties between these reference frames and ICRF2.

*Note 1: The Second Realization of the International Celestial Reference Frame by Very Long Baseline Interferometry, Presented on behalf of the IERS / IVS Working Group, Alan Fey and David Gordon (eds.). (IERS Technical Note ; 35) Frankfurt am Main: Verlag des Bundesamts für Kartographie und Geodäsie, 2009. See <[www.iers.org/MainDisp.csl?pid=46-25772](http://www.iers.org/MainDisp.csl?pid=46-25772)> or <[hpiers.obspm.fr/icrs-pc/](http://hpiers.obspm.fr/icrs-pc/)>.*