

IAU Standards of Fundamental Astronomy (SOFA)

Annual Report 2019

SOFA Board/Working Group Members

John Bangert	United States Naval Observatory, retired
Steven Bell	HM Nautical Almanac Office, UKHO (Webmaster)
Nicole Capitaine	Paris Observatory
Mickaël Gastineau	Paris Observatory, IMCCE
Catherine Hohenkerk	HM Nautical Almanac Office, retired (Chair)
Li Jinling	Shanghai Astronomical Observatory
Brian Luzum	US Naval Observatory
Zinovy Malkin	Pulkovo Observatory, St Petersburg
Jeffrey Percival	University of Wisconsin
Wendy Puatua	United States Naval Observatory
Scott Ransom	National Radio Astronomy Observatory
Nicholas Stamatikos	US Naval Observatory (IERS Conventions)
Toni Wilmot	HM Nautical Almanac Office (Trainee)
Patrick Wallace	RAL Space, retired

SOFA is a Functional Working Group of Division A. The IAU SOFA service continues its task of establishing and maintaining an accessible and authoritative set of algorithms and procedures that implement standard models used in fundamental astronomy. This is achieved via the expertise of Board members and the SOFA website (www.iausofa.org).

Currently SOFA is in a “maintenance” mode. Technical queries from users still occur, which were answered by Patrick Wallace, and there has been one release since the end of January 2018. Release 15, dated 2019 July 22, was a major release which, in summary, implements four new routines in the Star Catalog Conversion section, corrects a sign in one ANSI C routine, and enhances 17 routines to minimise rounding errors.

The four new routines that were added deal with the transformation between the FK4 and FK5 reference systems. These routines were included partly for completeness, but mainly so that positions in publications pre-1984 can be properly handled, and they cover conversions between B1950.0 FK4 and J2000.0 FK5, with and without proper motion. Following input from the Astropy group, enhancements were made to routines that compare the two components of the given date/time arguments to minimize rounding errors, so that optimum results are achieved even when one of the arguments is negative. SOFA is particularly grateful to the Astropy group and to all users for their comments and suggestions. The addition of new routines required updates to the *Astrometry Tools Cookbook*, the test program and the other supporting files. Many miscellaneous typographical corrections and improvements to various other documents were also made.

Since 2019 March it has been impossible to report the numbers of users studying the source code via our website, or the numbers of times the SOFA library (Fortran and/or ANSI C) has been downloaded, due to system changes at SOFA’s host organisation. There are also many users of the SOFA software via various other implementations; Java from Jodrell Bank Centre for Astrophysics and C# available from the World Wide Astronomy library, and the thousands of users via the Essential Routines for Fundamental Astronomy (ERFA) version that is bundled with Astropy in Python. We encourage all our users to acknowledge their use of SOFA.

Considering the people on the SOFA Board, a new Chair is needed to take SOFA forward. To help both the current Chair and the Webmaster, Toni Wilmot from HM Nautical Almanac Office joins the board as a “trainee” member. Also joining the Board from 2019 November is Nicholas Stamatikos from the US Naval Observatory and the International Earth Rotation and Reference Systems Service (IERS) Conventions.

Finally, we acknowledge and thank the members of the Board and their institutes. The Board thanks the United Kingdom Hydrographic Office for hosting the SOFA website. We also thank our users; in particular for pointing out issues and making suggestions.

Catherine Hohenkerk
Chair IAU SOFA Board
2020 April 5