

# JOURNÉES 2008

## Numerical Standards in *The Astronomical Almanac*

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*The Astronomical Almanac* (AsA), a joint publication of Her Majesty's Nautical Almanac Office (HMNAO) and the Nautical Almanac Office of the U.S. Naval Observatory (USNAO), is a worldwide reference standard for astronomy. As such, the offices strive to adhere to the standards set forth by the larger astronomical community.

However, sometimes the astronomical community is not clear as to what standards should be followed. There are standards that are promulgated formally, such as via IAU resolutions, some are informal but generally recognized as customary and common practice, while others seem to be adopted only within a particular field.

This paper looks at various ephemerides, constants, parameters and models used in the AsA and the decision-making process that determines how they are selected for inclusion in the book.

## COMMENTS

**Formal Standards:** HMNAO and USNAO typically follow formal standards where they exist. There should **not** be "competing" formal standards

- IAU and IAG standards via resolutions, working groups, etc
- IERS Technical Notes
- *Examples:* ICRS & ICRS-based catalogs, precession, nutation, time scales, photometric standards, rotational elements for planets, IAU-SOFA software

**Informal, but Widely Recognized Standards:** Many data sources and computational techniques are not formalized within resolutions, but are world-recognized; most have been documented in refereed journals. Choosing between "competing" standards is done via numerical comparisons, usability, origin, and wider astronomical community acceptance

- *Examples:* JPL ephemerides, satellite orbital parameters, magnitude coefficients, Carrington's solar reference system

**Informally Recognized Practices:** Often there are similar data sources and computational methods that have scientific justification. Other times new, formally recognized techniques have not been fully accepted by users. Selection of which to use and maintain is made by customary practices within HMNAO and USNAO, or a clearly-defined user need to maintain past datasets

- *Examples:* Rise/set times, equinox-based positions, refraction models, Carrington's solar reference system

**Consistent Approach:** Two different, conflicting, examples

- Using the JPL ephemeris: units compatible with TDB and JPL definition of the astronomical unit
- Eclipses: where old IAU values are still the standard (see Section A)