

IAU Commission A3 - Fundamental Standards
Annual Report 2022 (activities from 1 April 2022 – 31 Mar 2023)

Commission A3 Organizing Committee (CA3 OC)

Susan G. Stewart, President, US Naval Observatory, USA

Jose Manuel Ferrándiz, Vice President, Universidad de Alicante, Spain

Steven A. Bell, HM Nautical Almanac Office, UK

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IAU Division A Commission A3 (CA3) continues to fill an important and necessary role in the IAU and wider astronomical research community by identifying, researching, coordinating and communicating fundamental astronomical standards. The Commission currently has 103 members and 7 members on the CA3 organizing committee who began their tenure in 2021.

The success of the Commission relies on communication. Our primary method of communication to the community is through an actively maintained CA3 website: <https://iau-a3.gitlab.io/> (Susan Stewart, webmaster). The CA3 also established a twitter account @IAU_CA3 (approved by the IAU media liaison) and commission email address iauca3standards@gmail.com this past year to facilitate communication.

The CA3 previously took over responsibility for the upkeep of the Numerical Standards for Fundamental Astronomy (NSFA), hosted on the CA3 website. The following items were added to the CA3 website, identifying them as developing standards for discussion and possible future updates on the NSFA list:

- Mass of Ceres
- Mass of Sun / Mercury
- Mass of Sun / Mars
- Mass of Sun / Jupiter
- Mass of Sun / Saturn

The CA3 presented an update during the Division A Division Days portion of the August 2022 General Assembly in Busan, South Korea. The CA3 also held a business meeting during which focused on the need for further discussion and possibly the formation of Commission Working Groups in collaboration with other standards partners:

- Lunar standards
- Implications of upcoming continuous UT1-UTC
- Updates to the IAU 2009 constants
- Updates and addition to IAU 2006 Nomenclature

Several Organizing Committee and Division members will be present at the September 2023 Journées meeting in Nice, France and plan to have extended conversations in these areas, with the possibility of the formation of working groups prior to the meeting.

Commission A3 maintains strong ties and enhanced communication with our standards partner organizations. Our representative in the International Association of Geodesy is Robert Heinkelmann (GFZ Potsdam, Germany) who interfaces with the Global Geodetic Observing System Bureau of Products and Standards (GGOS BPS) committee. He reported the CA3 A3 activities to their annual meeting. In 2021-2022, CA3 OC was in frequent communication with Dennis McCarthy (USNO, retired), who is the IAU representative to the Consultative Committee on Time and Frequency (CCTF) and the Bureau International des Poids et Mesures (BIPM) to use his expertise in connecting with our time standard partners. The CA3 OC assisted him in developing a pamphlet for the BIPM which described the practical impact on astronomy with regard of the future adoption of a constant UT1-UTC. CA3 OC member Steve Bell joined the IAU Division A WG for Time and Metrology. The IAU also has representatives to the Consultative Committee for Units (CCU) and the International Earth Rotation and Reference Systems Service (IERS) who are apprised of our activities. In addition, CA3 A3 fostered coordination with the Working Group on Cartographic Coordinates and Rotational Elements (WGCCRE) on several occasions this past year. Several CA3 members participated on the lunar reference system WG on which WGCCRE members also served.

Members of the CA3, including those on the CA3 OC, served on the interoperability of cislunar Working Group between ESA and NASA this past year with representatives from BIPM and other international standards bodies. This working group discussed lunar standards for time, reference frame(s) and coordinate systems. The recommendations from this group will be available in the upcoming year and would be the basis for possible IAU recommendations.

4 Apr 2023

Susan G Stewart

President, Commission A3