

COMMISSION A3

FUNDAMENTAL STANDARDS

STANDARDS FONDAMENTAUX

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COMMISSION A3 WORKING GROUPS

None at this time

TRIENNIAL REPORT 2018–2021

1. Background

IAU Division A Commission A3 (CA3): Fundamental Standards was inaugurated as part of the restructuring of the IAU at the 2015 General Assembly (GA).

The purpose of the Commission is to facilitate the development, implementation, and communication of IAU-endorsed standards for fundamental astronomy. Our objectives for 2021–2024 are:

- strengthen links between the IAU, the International Earth Rotation and Reference Systems Service (IERS), the International Association of Geodesy's (IAG) Global Geodetic Observing System (GGOS), the Consultative Committee for Time and Frequency (CCTF), the Consultative Committee for Units (CCU), and other standards groups;
- coordinate and promote the continued work of the IAU's Standards of Fundamental Astronomy (SOFA), the Working Group on Numerical Standards for Fundamental Astronomy (NSFA), and the Working Group on Cartographic Coordinates and Rotational Elements (CCRE);
- develop, implement, and disseminate new standards under consideration within Division A; e.g., provide a forum for discussion between the team which developed the International Celestial Reference Frame 3 (ICRF3) and the rest of Division A prior to its adoption;
- improve and update the web site for communicating and coordinating standards, and to ensure that concerns of users are heard.

2. Developments within the past triennium

2.1. *Standing up a new web site*

The Commission's primary method of communicating its work is through its web site. In the autumn of 2019 an event occurred that concerned the OC: the web site of the

Working Group on Numerical Standards for Fundamental Astronomy (NSFA) was taken offline as its host institution web site undergoes modernization. The Commission’s web site was then hosted by another institution with similar ongoing upgrades. The decision was taken to move the site to an institution-free host, GitLab. The revised web site is now available at <https://iau-a3.gitlab.io/>. The site includes a scrolling news window to alert Commission members to recent actions. The page of developing standards has been updated to prepare organizing committee members for discussion on current issues to be addressed in the near term. This move has the additional advantage of allowing easy transfer to a new web master whenever that activity is required.

The Commission has also incorporated the NSFA’s web site, with the permission of the WG’s chair. Changes to the NSFA pages include an update of the Best Estimates for the potential for the geoid as well as a reorganization of the constants into two lists:

- estimates and
- values fixed by convention

as suggested by the NSFA WG. The NSFA portion of the web site is available at <https://iau-a3.gitlab.io/NSFA/index.html>, and there is a link to it from the Commission’s portion of the site.

2.2. Assuming the duty of calling the Working Group on Numerical Standards for Fundamental Astronomy (NSFA) to action

As of the 2018 IAU General Assembly (GA), the uncertainties of the values of the best estimates of the fundamental constants have stabilized to the point that any changes to their values are likely to be small for the foreseeable future. Thus the NSFA found itself with little work to do. Those NSFA members attending the WG meeting at the GA approved a recommendation that the NSFA:

- (a) adopt a mechanism to deal with possible future updates to fundamental standards,
- (b) write a final report, and
- (c) recommend its dissolution.

The large overlap in the work of Commission A3 with that of the WG† suggested that A3 should act as the mechanism to prompt the NSFA to revise the fundamental standards when required. The Commission OC assented to the NSFA’s recommendation. The Commission had already begun hosting the NSFA’s web site. And the NSFA issued its final report in November 2020.

2.3. Interactions with other commissions and standards organizations

The Commission supported a proposed General Assembly symposium on “Reference systems and their interaction with the rotation of the Earth and other Solar System bodies” with a letter of support. Two of the four co-chairs of the proposed symposium’s SOC were members of the Commission and at least one other commission member has agreed to serve on the SOC.

We continue to maintain contact with other standard-setting organizations to ensure the consistency of standards. Robert Heinkelmann is our contact with the Global Geodetic Observing System (GGOS) Bureau of Products and Standards. We assisted Heinkelmann in presentations for the International Union of Geodesy and Geophysics (IUGG) general assembly in Montréal and Journées 2019 in Paris.

The Commission continues to coordinate with numerous bodies that set or propagate

† 85% of the WG members were also members of Commission A3.

standards of interest to fundamental astronomy. Among our membership are representatives of:

- Functional Working Group on Cartographic Coordinates and Rotational Elements (CCRE),
- Consultative Committee on Time and Frequency (CCTF),
- Consultative Committee on Units (CCU),
- International Earth Rotation and Reference Systems Service (IERS)
- Standards of Fundamental Astronomy (SOFA),

This list is not meant to be exhaustive.

3. Conclusion and future plans

During this triennium we have spent considerable time upgrading our web site and moving it to an institution-free location to assure its future availability. We have provided a new home for the functional Working Group on Numerical Standards for Fundamental Astronomy (NSFA)'s web site. The Commission has agreed in coordination with the NSFA to use the Commission's function of tracking current issues as a trigger to determine when to prompt the NSFA to explore new standards. Finally, we have continued our primary mission of coordinating with those other bodies which set or propagate standards of interest to fundamental astronomy.

During the next triennium, Commission A3 plans to develop and implement a plan for more robust and regular communication with IAU commission organizing committees and IAU members with regard to standards. The Commission also has a goal of more vigorous coordination with the International Earth Rotation and Reference Systems Service (IERS) and the Working Group on Cartographic Coordinates & Rotation Elements (WGCCRE). At the conclusion of the IAU General Assembly, Commission A3 anticipates an update of its web site for developing standards and possibly the NSFA standards page which they also now support.

James L. Hilton
President of the Commission