

IAU Commission B2 Data Representation Working Group Triennial Report 2018-2021

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1. Background

The Data Representation Working Group was formed under IAU Commission B2 in 2018 to encompass forms of encoding digital astronomical data in addition to the standard FITS format. The IAU Working Group on FITS (Flexible Image Transport Format) was formed in 1988 and continued to actively maintain FITS as a standard for 27 years. In the age of larger and larger telescopes producing larger and larger amounts of data with more and more ways to describe that data, the developers of software to support those telescopes and their instruments were running up against the limitations of FITS and creating their own solutions.

Since its inception in 1991, the annual Astronomical Data Analysis Software and Systems (ADASS) Conference has hosted a FITS Birds of a Feather (BoF) session where the astronomical software community has kept track of changes in the FITS data standard and heard about the need for new format designs. In 2014, at the ADASS Conference in Calgary, Alberta, Canada, we put together a well-attended Birds of a Feather session called "The Past, Present, and Future of Astronomical Data Formats", which included presentations on several of the alternative formats then being developed. It resulted in a proceedings paper and the journal papers listed below, which were in the September 2015 issue of "Astronomy and Computing", the editor of which, Robert Mann, co-chaired the session with the now-chair of the Data Representation Working Group.

In 2016, at the ADASS meeting in Trieste, Italy, it seemed like a good time to extend the IAU's involvement beyond FITS to include other structured astronomical data formats by subsuming the FITS Working Group as a FITS Special Expert Group into an enlarged Astronomical Data Representation Working Group, which was authorized by the IAU in 2018.

2. Developments within the past triennium

Every year since 2016, the Working Group has facilitated Data Formats Birds of a Feather sessions at Annual ADASS conferences and published the discussions in the proceedings, as listed in the publications list. However, the various structured data formats have mostly gone their own ways. Though we've heard reports and discussed possible agreements at the annual ADASS meetings, progress toward cooperation has been gradual, and there has been little progress toward creating a new standard format. Another problem has been that those developing the new formats tend to be neither IAU members nor have as strong desire to join, so the Structured Data Format Special Expert Group remains unpopulated.

Improvements to FITS have been suggested to make data from the new formats more accessible to software not written by those who developed the new instruments. Some improvements along the lines of those desires are being considered for addition to the FITS standard, such as longer keywords and multiple-line keyword definitions in data headers. These changes will keep FITS in its original position as an "interchange" standard.

In our online conference in 2020 November, the ADASS community recognized the continued importance of the FITS data format when it gave its annual Software Award to Bill Pence, developer of the widely used CFITSIO data access software package and longtime FITS Working Group member. In our "New and Old Data Formats" BoF, Lucio Chiappetti, current FITS SEG chair, presented current proposals which could become changes in the standard to make FITS a better component in the new world of structured data formats, even though those formats are not ready for standardization themselves.

3. Conclusion and future plans

When the former FITS Working Group was renamed as a "FITS Special Expert Group" within the a newly created "WG Data Representation" under Commission B2, it was envisioned that other "Special Expert Groups" dealing with a broader range of issues with other astronomical data formats besides just FITS would be created under this new WG, but this never materialized. As a result, the WG Data Representation is now effectively just an empty shell organization whose only functions are to run the annual ADASS Data Formats sessions and house the 18-member FITS Special Expert Group. This administrative act of demoting the former WG FITS, which was one of the IAU's officially recognized scientific bodies, into an ex-official "Special Expert Group" has had the unfortunate effect of diminishing the international stature of the FITS support activities that this group continues to be perform and may even bring into question the IAU's ongoing commitment to the FITS format.

We wish to restore the visibility and stature of the IAU's important FITS support responsibilities by renaming the WG Data Representation back to WG FITS. In addition, given that the long-term scope of the FITS support activities described below are institutional and naturally extend beyond the IAU three-year cycle, we propose that this reinstated WG FITS be designated as a "functional" WG under either Commission B2 or under the parent Division B, which ever is deemed most appropriate.

Jessica Mink
DRWG Chair

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