

## COMMISSION B2

## DATA AND DOCUMENTATION

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## TRIENNIAL REPORT 2015-2018

### 1. The Era of Data Intensive Astronomy

As a discipline, astronomy has always been driven by the acquisition of new data. With the rapid increase in the scale and complexity of data generated by modern facilities over the past two decades, however, astronomy has become more data-driven than ever before. The rise of large-scale astronomical archives has clearly demonstrated that persistent, well-documented data collections can dramatically increase the total scientific output of a given observatory (e.g. SDSS, HST, Chandra, Spitzer, etc.). With the advent of new facilities such as ALMA, the JVLA, LOFAR, CTA, Pan-STARRS, JWST, and the ELT, the challenges facing large-scale and long-term astronomical data management have increased. At the same time, the power of the computational and algorithmic tools necessary to extract science from that data have grown at a commensurate rate. Future facilities such as the LSST and SKA have the potential to increase the scale of these challenges, management and analysis, by orders of magnitudes.

Maintaining the system of standards and protocols required to describe and manage these large data collections, as well as the computational and analysis systems to interpret them, has been and will continue to be a priority in the coming years if we are to fully exploit the scientific potential of the current and future generation of astronomical facilities. Recognizing the importance of these efforts, an IAU Commission with a specific focus on the many aspects of documenting, managing, archiving, sharing, and exploiting astronomical data has been part of the IAU portfolio for decades. The current Commission B2 represents a direct continuation of the efforts of the previous Commission 5 formed during the recent restructuring of the IAU's scientific bodies and at the time of writing has 199 members. It consists of several working groups organized around a variety of related topics including nomenclature and designations, data standards (including FITS), data preservation and curation (especially heritage photographic data), and data-driven education and public outreach. We briefly summarize some of the Commission's activities in these various areas over the triennium below.

### 2. Nomenclature and Designations

Consistency and accuracy of nomenclature is fundamental to clarity and communication in astronomy and astrophysics. The Commission B2 WG on Nomenclature and Designations, chaired by Dr. Marion Schmitz, has continued to clarify existing astronomical nomenclature over the triennium to help astronomers avoid potential problems when

designating their sources. As part of that function, the WG oversees the IAU Registry for Acronyms hosted by the Centre de Données Astronomiques de Strasbourg (CDS). The WG screens submissions of new designations from the community for accuracy and conformity to the IAU Recommendations for Nomenclature. Over the triennium, 49 new acronyms were submitted for review by the WG. Of these, 43 were approved and are now registered in the IAU Dictionary of Nomenclature of Celestial Objects. More information about the Registry and how to submit new designations can be found online.†

### 3. Data Representation

The Data Representation WG (DRWG) is the successor of the former FITS Working Group (FWG) with a term of reference “to manage a careful and minimally disruptive transition from FITS to more modern and capable data representations”. It is currently chaired by Dr. Lucio Chiappetti. The perspective arrangement of the DRWG is planned to include targeted “Special Expert Groups”, namely a FITS SEG to continue the activities of the FWG about the FITS standard, and a Structured Data Expert Group (SDEG). These plans were presented and discussed with the community at two *Birds of Feather* (BoF) sessions organized at successive Astronomical Data Analysis Software and Systems (ADASS) meetings in 2016 and 2017. At the time of reporting, the organization of the proposed SDEG team is still being finalized.

Concerning FITS-related activities, these have continued under the old IAU FWG up to July 2016 when a Version 4.0 of the FITS Standard was approved with a formal vote. Version 4.0 fully includes the Standard 8 former conventions (including time WCS, FITS compression, long string keyword values, CHECKSUM, etc.) Although the content of this Standard is valid and has been ratified, the description document is currently marked “draft” and is undergoing final editorial revision before approval. A new membership for the FITS SEG has also been established. Following the editorial review, the current SEG membership will vote to approve the definitive release of FITS Version 4.0, and thereafter to continue on to other FITS issues such as binary tables with more than 999 columns, or keyword names longer than 8 char, to name a few.

### 4. Inter-Commission Working Groups

Over the triennium, Commission B2 has undertaken several organizational activities in support of its core mission. In collaboration with Commissions C1 and C2, the inter-commission working group on Data Driven Astronomy Education and Public Outreach (DAEPO) has been established is currently chaired by Dr. Chenzhou Cui. The DAEPO WG has the potential to be an important new direction for astronomy education and public outreach, and can provide a valuable additional resource for existing astronomy education communities.

Members of the working group have been very active since its inception attending a range of meetings and engaging with the community. These meetings include the International Virtual Observatory Alliance (IVOA) Interoperability Meeting in Shanghai in May 2017, the first International Symposium on Education in Astronomy and Astrobiology (ISE2A) in Utrecht, NL in July 2017, and the recent ADASS and IVOA Interoperability meeting in Santiago, Chile in October 2017. At these meetings, Dr. Cui and members of

† <http://cdsarc.u-strasbg.fr/viz-bin/Dic>  
<http://cdsweb.u-strasbg.fr/Dic/how.html>  
<http://cdsweb.u-strasbg.fr/Dic/iau-spec.htx>  
<http://cdsarc.u-strasbg.fr/viz-bin/DicForm>

the DAEPO WG gave a range of presentations on DAEPO and related activities from the Chinese Virtual Observatory (China-VO). These include examples of a citizen science project called Popular Supernova Project (PSP) and interactive digital planetarium powered by World Wide Telescope (WWT).

Future plans for the DAEPO WG include establishing a standing website for the group as well as sharing resources with existing scientific bodies including EPO bodies, professional astronomers and technical (VO, ADASS, Astroinformatics, etc.) bodies. A number of specific collaboration projects between DAEPO and the IAU Office of Astronomy for Development (OAD) are also envisioned including the design and construction of a planetarium in central China. More details on the activities and plans for this WG are described in the DAEPO triennial report.

Finally, in addition to the formation of the DAEPO working group, Commission B2 has contributed to the creation of a new working group under the auspices of inter-division Commission J1 on a standardized sample of galaxy SEDs data and models and interfaces to SED databases. Commission B2 organizing committee member Dr. Anja Schroeder is currently co-chair of the working group From Databases to Spectral Energy Distributions (DB2SED). The activities of this inter-commission WG are described in a separate DB2SED report.

## 5. Meetings

Members of Commission B2 have been instrumental in the organization of the IAU Symposia for 2017 on Time-Domain Astronomy which was held in Stellenbosch, South Africa in November 2017. Like its predecessor, IAU S285, this meeting focused on the relationships between types of variability and the knowledge which can be derived from and through them. Commission B2 organizing committee members, Dr. R. Elizabeth M. Griffin and Dr. Rob Seaman, have been some of the prime organizers for this symposium through their participation in the new working group on Time-Domain Astronomy, now a Division WG.

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