

COMMISSION 5: Documentation and Astronomical Data

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Abstract. The triennial report of Commission V *Documentation and Astronomical Data/Documentation et Données Astronomiques* covers 2002–2005 activities, and in particular the activities of the five Working Groups: Working Group Astronomical Data; Working Group Designations; Working Group Libraries; Working Group FITS; Working Group Virtual Observatories; and of Task Force for the Preservation and Digitization of Photographic Plates.

Keywords. Astronomical data bases: miscellaneous, standards, atlases, catalogs, surveys

1. Introduction

The main task of Commission 5 is to manage five Working Groups and one Task Group, and to maintain consistency between these activities:

- Working Group Astronomical Data (WGAD), chaired by R.P. Norris
- Working Group Designations, chaired by M. Schmitz
- Working Group FITS, chaired by W.D. Pence, vice-chair F. Ochsenbein
- Working Group Libraries, chaired by U. Grothkopf and F. Murtagh
- Working Group Virtual Observatories, contact person F. Genova
- Task Force on Preservation and Digitization of Photographic Plates, chaired by E. Griffin

Griffin

The triennium reports of the Working Groups and Task Force are given in the following Sections.

2. Working Group Astronomical Data

The Working Group on Astronomical Data (WGAD) has continued a number of vigorous discussions in 2003-2005. In addition the WGAD has actively functioned as a communication channel between the IAU and CODATA (ICSU Committee on Scientific Data). However, the most significant activity has been the planning of a data management framework for astronomy, as described in the paper in IAU Bulletin # 69. These and other issues are discussed in more detail below.

2.1. WIPO legislation

Our current freedom of access to public-domain astronomical databases was threatened in 2000–2002 by treaties and legislation proposed by WIPO (World Intellectual Property Organization), the European Union, and other bodies. At present, the threat appears to have diminished, thanks to quick and effective action by members of CODATA and other bodies, but we need to remain vigilant that the threat does not re-appear. A lesson learned from this is that the science community needs to ensure that its data needs are

better articulated and understood, which in turn underscores the need for an effective data management framework.

2.2. Moves Towards Open Access in Science

In October 2003, a conference took place in Berlin on “Open Access to Knowledge in the Sciences and Humanities”. This resulted in the “Berlin Declaration”, which was subsequently signed by many scientific institutions and organizations. The Declaration is well-aligned with the spirit of open access that prevails in astronomy, although the details are such that it was not felt appropriate at present for the IAU to be a signatory.

Furthermore, in January 2004 the OECD (Organization for Economic Co-operation and Development) made a “Declaration on Access to Research Data from Public Funding” which essentially states that the governments concerned (representing the bulk of IAU membership) will work towards making publicly-funded data openly accessible.

At the 2003 IAU General Assembly a resolution was proposed by the WGAD, and adopted by the Assembly, that broadly says that publicly-funded archive data should be made available to all astronomers. This is aligned with ICSU and OECD recommendations, and may be regarded as a first step towards articulating the principles by which the astronomical community would like to see its data managed.

2.3. ICSU Review on Scientific Data and Information

The International Council of Science (ICSU) has set up a panel of independent experts to perform a Priority Area Assessment (PAA) on Scientific Data and Information. The resulting report recommends that ICSU assume an international leadership role in identifying and addressing critical policy and management issues related to scientific data and information, and that it create a new global framework for data and information policy and management. The chair of the WGAD chaired a CODATA committee which enthusiastically welcomed the PAA report.

This importance of this for the IAU is that it provides an opportunity for sciences such as astronomy to gain recognition and legitimization of their values and methodologies in the area of data management, rather than being subject to the external commercially-driven or politically-driven pressures to adopt a particular model. However, for astronomy to be able to take advantage of this opportunity we must first reach a consensus about what represents good practice in astronomical data management. This is one aim of the ‘Data Management Framework’.

2.4. Towards a Strategic Framework for the Management of Astronomical Data

Several very vigorous and effective groups in astronomy (e.g. the VO and the data centers) are individually achieving ambitious goals in the area of data management and handling. However, between and outside these active groups are gaps in which data management is neglected or dealt with in an ad hoc way. Astronomy does not have any strategic data framework that links these activities together, provides policies or guidelines for astronomical data management, or is able to represent the interests of astronomical data management to external parties. As a result, we are vulnerable to external threats such as the WIPO legislation; we are unable to represent astronomical data requirements in a coordinated way to external groups, such as ICSU, funding agencies, or journal publishers; there is no uniform approach across astronomy to preservation and dissemination of data; while some groups in astronomy adopt a professional approach to data management, others treat it as an afterthought, or neglect it completely, so that astronomy as a whole loses value; there is poor coordination between astronomy and other disciplines, and poor recognition in other disciplines of the data needs and strengths of astronomy.

WGAD therefore proposes to develop a strategic framework for data management in astronomy, with recommendations to guide and assist individual observatories and organizations, and encouraging principles of open access as far as possible. It will do so in close liaison with the IVOA, which can provide the tools and infrastructure for facilitating this process. Recognizing that the ICSU is also engaging in a similar activity across all sciences, the IAU will be proactive in working with the ICSU, both to participate in the ICSU framework, and to bring that experience to the development of an astronomical framework. Elements of achieving this goal include: active participation by IAU in ICSU and CODATA discussions; an electronic discussion to reach broad agreement on the way forward; close collaboration with the IVOA on developing requirements for implementing these strategies within the VO; a Special Session at the Prague IAU GA in 2006, at which a draft framework will be debated; a resolution to be proposed at the IAU GA in 2006 for the IAU to adopt and develop the data management framework.

As an outcome of these measures, we expect that the next few years will see a vigorous growth in the availability and inter-operability of astronomical data, resulting in even more cross-fertilization and idea generation in astronomy.

Links

Working Group Astronomical Data Web page:

<http://www.atnf.csiro.au/people/rnorris/WGAD/>

Berlin declaration: <http://www.zim.mpg.de/openaccess-berlin/berlindeclaration.html>

Electronic discussion Web site: <http://www.ivoa.net/twiki/bin/view/Astrodata/>

3. Working Group Designations

At the 2003 Sydney IAU meeting, Marion Schmitz (Caltech, USA) took over the Presidency of the Commission 5 Working Group Designations succeeding Helene Dickel.

The Working Group Designations of IAU Commission 5 clarifies existing astronomical nomenclature and helps astronomers avoid potential problems when designating their sources.

The most important function of WG Designations during the period 2003-2005 was overseeing the IAU REGISTRY FOR ACRONYMS (for newly discovered astronomical sources of radiation) which is sponsored by the WG and operated by the Centre de Données Astronomiques de Strasbourg (CDS). The Clearing House, a subgroup of the WG, screens the submissions for accuracy and conformity to the IAU Recommendations for Nomenclature. From its beginning in 1997 through September 2005, there have been 118 submissions and 95 acceptances. Attempts to register asterisms, common star names, and suspected variable stars were rejected.

In the three years prior to the General Assembly in Manchester, the designation of the components of binary stars became an important topic for the WG Designations. After the multi-commission meeting at that General Assembly, further developments were turned over to the multi-star community (mainly Commissions 26 and 30). A Special Session (#3) was held at the General Assembly in Sydney on "A New Classification Scheme for Double Stars" organized by Division IV and Commissions 5, 8, 26, 30, 40, 42 and 45. This Special Session resulted in a Type C resolution on the designation of components of binary/multiple star systems, adopted by Commission 5 and 26, and later ratified by Commissions 8, 42 and 45, and the Working Group on Interferometry.

Assistance was provided for inquiries about nomenclature for planet-candidates discovered through micro-lensing events; a short history of naming stars, which has been posted on the Commission 5 Web site and is referred to in the IAU Frequently Asked Question page; and designations of Cosmic Microwave Background structures.

Links

Form for registering a new acronym: <http://cdsweb.u-strasbg.fr/cgi-bin/DicForm>

Recommendations for Nomenclature: <http://cdsweb.u-strasbg.fr/iau-spec.html>

Resolutions resulting from Special Session 3 held at Sydney General Assembly:
<http://ad.usno.navy.mil/wds/newwds.html>

Short history of naming stars: <http://cdsweb.u-strasbg.fr/IAU/starnames.html>

4. Working Group FITS

The IAU FITS Working Group held its triannual business meeting at the Sydney GA in July 2003. New officers were elected, with Dr William Pence (NASA/GSFC) chairman and Dr Francois Ochsenbein (CDS, Strasbourg) vice-chairman.

As the first order of business, the membership of the WG was reassessed, and 12 new members were installed (some replacing other long-time members) in order to provide broad representation across the major subfields in astronomy, and from many of the major astronomical data centers. The size of the WG was increased from 15 to 22 members. An Executive Committee was also created to help define policy and set priorities. The Executive Committee is made up of the present and past officers, a representative of the VO Working Group, and the chairmen of each of the regional FITS committees.

Once the membership had been updated, the WG then documented the formal rules and procedures for conducting business and for approving any changes to the definition of the FITS format. These previously unwritten rules are now documented on the WG web site. These rules clarified the role of the external regional FITS committee and their relationship to the WG. The regional committees generally play an advisory role by voting on any proposed change to FITS before the WG considers the proposal. The WG generally follows the recommendations of the regional committees, but the WG retains the final authority to make any changes to the definition of FITS.

Three regional FITS committees covering North America, Europe, and Japan have been in existence for many years. In August 2004 the WG approved the formation of a fourth regional FITS committee to represent astronomical institutions in Australia and New Zealand.

Once the membership and rules were established, the WG began considering a number of proposals related to FITS. In August 2004 the WG endorsed a proposal to create two new Internet MIME types for use in describing the types of data files when transmitting them over the Internet. The 2 MIME types (`image/fits` and `application/fits`) were subsequently officially approved by the governing Internet regulatory committee and were released as RFC 4047 in April 2005.

In a follow up to the approval of binary table extensions in FITS back in 1994, the WG in April 2005 formally approved two important conventions that are often used in conjunction with binary tables. These conventions define how the TDIMn keyword should be used to define the dimensionality of arrays in tables, and how to specify variable length arrays in tables. These two conventions were previously only defined in an unofficial appendix to the FITS Standard document. Shortly afterwards, the WG released a new updated version (v2.1) of the FITS Standard to reflect these changes.

In August 2005, the third in a series of papers that define how world coordinates should be specified in FITS files was officially approved by the WG. This paper defines standards for specifying spectral coordinates. This follows the approval of the first two papers by the WG in December 2002. A fourth paper on how to represent distortions from an idealized coordinate system is in preparation.

Currently, the WG is actively considering modifying the FITS Standard to add support for images and table columns containing 64-bit integers. Discussions on a final agreement are still underway, but it seems likely that some changes to the FITS Standard will be approved within the next few months. The last time a new numerical data type was introduced into FITS was when floating point numbers were added in 1990.

A number of other FITS issues are likely to be considered by the WG before the next GA. One of the most important of these will be to set up a central repository where useful conventions that have been developed within the FITS user community can be documented, for possible reuse by others.

Links

WG FITS Web page: <http://fits.gsfc.nasa.gov/iaufwg/>

FITS Support Office at NASA/GSFC: <http://fits.gsfc.nasa.gov/>

5. Working Group Libraries

In the era of Virtual Observatories, institutional repositories and open access to scholarly literature, astronomy libraries and librarians are facing severe paradigm shifts. The role of small, specialized libraries has to be redefined in this context. Our general mission is still the same, namely to fulfill the information needs of our users by selecting, collecting, preserving, and providing access to relevant resources. This mission, however, has to be interpreted in light of the changed settings.

In order to investigate the current situation of astronomy libraries and explore possible ways into the future, the 5th LISA (Libraries and Information Services in Astronomy) conference is being planned. It will take place in June 2006 in Cambridge, MA, USA, co-hosted by the Harvard-Smithsonian Center for Astrophysics (CfA) and the Massachusetts Institute of Technology (MIT).

Shortly afterwards, in August 2006, the XXVIth IAU General Assembly will take place for which the WG on Libraries is currently planning a joint event with the WG on Publishing.

Two long-time and enthusiastic members of the Working Group retired during the current triennium. Marlene Cummins, from the University of Toronto Astronomy Library, took early retirement in 2004 and Brenda Corbin, librarian of the US Naval Observatory Library for 32 years and one of the 'founding mothers' of this Working Group and instrumental in shaping its work, retired at the end of September 2005. We thank them cordially for their numerous contributions and initiatives and look forward to Brenda's continued advice even after retirement. At the same time, we are happy to welcome two new members: Laurence Bobis, Observatoire de Paris, France, and Halima Naimova from Osservatorio Astronomico de Lisboa, Portugal.

Links

WG Libraries Web Site: <http://www.eso.org/gen-fac/libraries/IAU-WGLib/>

LISA V Conference: <http://www.cfa.harvard.edu/library/lisa/>

6. Working Group Virtual Observatories

The International Virtual Observatory (IVO) is one of the rare truly global endeavors of astronomy. Many projects, each with its own goals, have been set up around the world to develop the IVO. The *International Virtual Observatory Alliance* (IVOA) is an alliance of the VO projects, formed in 2002 to

facilitate the international coordination and collaboration necessary for the development and deployment of the tools, systems and organizational structures necessary to enable the international utilization of astronomical archives as an integrated and inter-operating virtual observatory.

Each VO project keeps its own objectives and constraints (for instance, several projects are funded by Information Technology or e-science funds). IVOA manages communication between VO projects, defines a common road map, and coordinates in particular propositions for the definition of the VO Interoperability standards, for which it has set several Working Groups and Interest Groups which work by email discussions and meet twice a year in the *IVOA Interoperability meetings*.

It was proposed in 2003 to set up a Working Group Virtual Observatories, to be the standard-bearer of the International Virtual Observatory at IAU, and the primary point of contact between the IVO and the IAU. The objective of WG VO is to provide an interface between IVOA activities, in particular IVOA standards and recommendations, and other IAU standards, policies, and recommendations. In particular, it raises VO-related topics (e.g. symposia, GA sessions, ...) that should be handled by the IAU (Commission 5, Division XII and executive level). It is responsible for approving the standards proposed by IVOA, after checking that there has been a process of consultancy according to the IVOA procedures, and that the proposed standards are consistent with other IAU approved standards (e.g., FITS, coordinate standards, etc.). The IAU WG VO brings to the attention of the IVOA Executive any topics it considers to be important for the IVO. It can be consulted by the IVOA Executive on any topic relevant to the international development of the VO.

The VO development has been evolving very rapidly since the beginning of the first VO projects in 2001, and the IAU WG VO has a major role to play in its long term sustainability, since it has the role to endorse standards recommended by IVOA. It appeared wise to delay a bit the WG constitution, to allow some time for assessing the standard definition process following the procedures defined by IVOA. The procedure works well and the composition foreseen in 2003 for the WG - members of IVO projects together with personalities bringing an external view on the long term vision of the VO and other stakeholders - is well adapted.

Several members of Commission 5 SOC also belong to the IVOA Executive Board, and close liaison has been maintained between IVOA and IAU since 2002. In particular, a Symposium proposal entitled "The Virtual Observatory in Action: New Science, New Technologies and Next Generation Facilities", submitted to the IAU for the Prague General Assembly, has been accepted as a three-day Special Session (Special Session #3).

Links:

IVOA Web Site: <http://www.ivoa.net>

IVOA Document standards Version 1.0, by the IVOA Executive Committee (Eds.: R.J. Hanisch, T. Line): <http://www.ivoa.net/Documents/latest/DocStd.html>

7. Task Force on Preservation and Digitization of Photographic Plates

The objectives of the PDPP are to examine and pursue the appropriate preservation of astronomy's widely-distributed archives of some 3 million photographic observations, and to encourage efforts to digitize archives, or selections, of plates where suitable equipment is made available.

In order to share and circulate general information on matters associated with those objectives, we commenced an annual newsletter (SCAN-IT) in 2002, and have now issued volume 2 (early 2004) and volume 3 (early 2005). Plans for the contents of volume 4 are now moving ahead.

The PDPP Task Force continues to grow as more astronomers become aware, and supportive, of what we are seeking to achieve. Several members of the community have e-mailed us after the publication of a Newsletter. We are now facing the somewhat daunting task of planning for the safe return of many hordes of plates currently held - and no longer required - in private collections. Very few archives have personnel to receive returned plates and replace them correctly, so the timing is delicate. The designated plate archive center (PARI, in North Carolina, USA) is still without enough funding to ensure a permanent endowment; however, several PDPP members met at the Atlanta AAS meeting in January 2004 where they held a workshop on issues to do with plates, and confirmed plans to support applications made by PARI for funding to pursue archival and plate preservation work.

Various members of the PDPP have been involved in workshop meetings, or in their own plate-preservation activities; e.g. an NSF-funded rapid scanner is being built in the Harvard plate store, and "first light" was reported in 2005 August. The details of such meetings and activities are too numerous to list here, but may be found in the various SCAN-IT Newsletters.

Links

SCAN-IT Newsletters: <http://www.lizardhollow.net/PDPP.htm>

8. Commission V activities until the next General Assembly

Several important activities will take place to prepare the next General Assembly:

- **Organizing Committee:** The Organizing Committee membership will be revised, to comply to the IAU bye-laws and terms of references adopted in 2003.

- **Working Groups:** It is expected that Commission 5 will propose to Division XII to maintain all the current Working Groups for the next triennium. As shown above, the first four Working Groups have been very active and fulfill important roles for the Union and the astronomical community. In addition, the organization of the *International Virtual Observatory Alliance* and the management of VO standard approval are now well settled, and the Working Group Virtual Observatories role has been consolidated: it is in particular in charge of approving incrementally the standards proposed by IVOA. The future status of the Task Force on Preservation and Digitization of Photographic plates will be discussed before and at the Prague General Assembly.

- **Consultants:** Consultants play a very important role in Commission 5 Working Groups, to the benefit of the Union and of the astronomical community, and it is expected that Commission 5 will propose several of them for full IAU membership before the Prague General Assembly.