

**Annual Report, 2009**  
**Working Group on Astronomical Software**

**Robert J. Hanisch, Chair**  
**Space Telescope Science Institute**

**Arnold Rots, WGAS FITS Committee Chair**  
**Smithsonian Astrophysical Observatory/Chandra X-Ray Center**

**April 3, 2009**

The primary role of the AAS Working Group on Astronomical Software is to function as the body that serves the North American community in formulating, reviewing, and endorsing modifications to the FITS data format standard. The WGAS FITS Committee (WFC) serves as one of four regional FITS standards committees, operating under the IAU FITS Working Group. Arnold Rots (SAO/CXC) chairs the WFC.

There were no changes in membership this year. The committee has 16 voting members.

WGAS members were active in the review and discussion of the revised FITS Standard (prepared the previous year by a special committee chaired by Bill Pence, NASA/GSFC, and chair of the IAU FITS Working Group). The IAU FITS WG officially accepted the new version in July 2008.

WGAS members also participated in the review of four FITS conventions that have been added to the registry of conventions maintained by the IAU FITS WG.

- Spatial Region File convention defines a spatial region of a 2-dimensional image.
- TNX World Coordinate System is a non-standard coordinate system for evaluating celestial coordinates from the image pixel coordinates.
- Simple Imaging Polynomial convention provides a convenient means of representing non-linear geometric distortion of the coordinate system as polynomials in FITS header keywords.
- Substring Array Convention for Binary Tables may be used to specify that a character array field (TFORMn = 'rA') consists of an array of either fixed-length or variable-length substrings within the field.

A. Rots is the lead author on a draft paper, "Representations of Time Coordinates in FITS" (April 2009). This constitutes the final component of FITS coordinate definitions, with celestial coordinate systems and spectral coordinate system having been defined previously. Providing proper metadata for time domain measurements is increasingly important, and will be essential for the correct understanding of the many transient events and variability measurements that will come from survey facilities like PanSTARRS and LSST. Time

scale definitions are complex and subtle, and it is fair to say, not understood by many in the astronomy community. Thus, clear definitions and rules for syntax and semantics in the FITS framework are essential. The co-authors of this paper are P. Bunclark (IoA, Cambridge), M. Calabretta and R. Manchester (ATNF), and S. Allen (UCSC/Lick). We regret that Peter Bunclark, who was instrumental in the preparation of this paper, died before seeing these efforts come to completion. He was a tremendous contributor to astronomical software in general and the FITS standards efforts in particular.

Don Wells (NRAO, retired) reminded the FITS community that on March 28, 2009, the FITS standard has been in use for 30 years!