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XSKYMAP 2: A Multi-Catalog Visualization Facility

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Abstract. XSKYMAP is a widget-based IDL application for visualization of astronomical catalogs. Since then XSKYMAP has grown into a powerful sky catalog visualization tool.

1. Introduction

The version of XSKYMAP presented here supports the following catalogs:

ZGSC: a compressed version of the Guide Star Catalog version 1.1. ZGSC was created at the Institute of Astronomy (Smirnov & Malkov 1997). ZGSC employs a custom binary format and an adaptive compression algorithm to achieve 6:1 lossless compression of GSC 1.1 – down to about 200 MB (from 1.2 GB). ZGSC, like its uncompressed counterpart, contains roughly 20 million objects. The compressed size makes it entirely practical to keep the catalog on-line on a hard disk for a dramatic improvement in access times.

The PPM family of astrometric catalogs, namely the Catalog of Positions and Proper Motions, the Catalog of Positions and Proper Motions – South, the Bright Stars Supplement to the PPM and PPM South Catalog, Revised Edition, and the 90000 Stars Supplement to the PPM Star Catalog (Roeser & Bastian 1988; Roeser & Bastian 1993; Roeser, Bastian, & Kuzmin 1993) contain J2000 positions and proper motions of altogether 468861 stars. Their main purpose is to provide a convenient, dense, and accurate net of astrometric reference stars that represents the IAU coordinate system on the sky.

GSC's inherent depth of field is supplemented by extremely precise positions of relatively brighter stars from the PPM.

XSKYMAP provides a wide range of visualization tools for various applications. The current version has been integrated with the control software for the Galileo Italian National Telescope as an observation support tool (Pasian et al. 1998); the primary applications being generation of finder charts and preliminary telescope positioning.

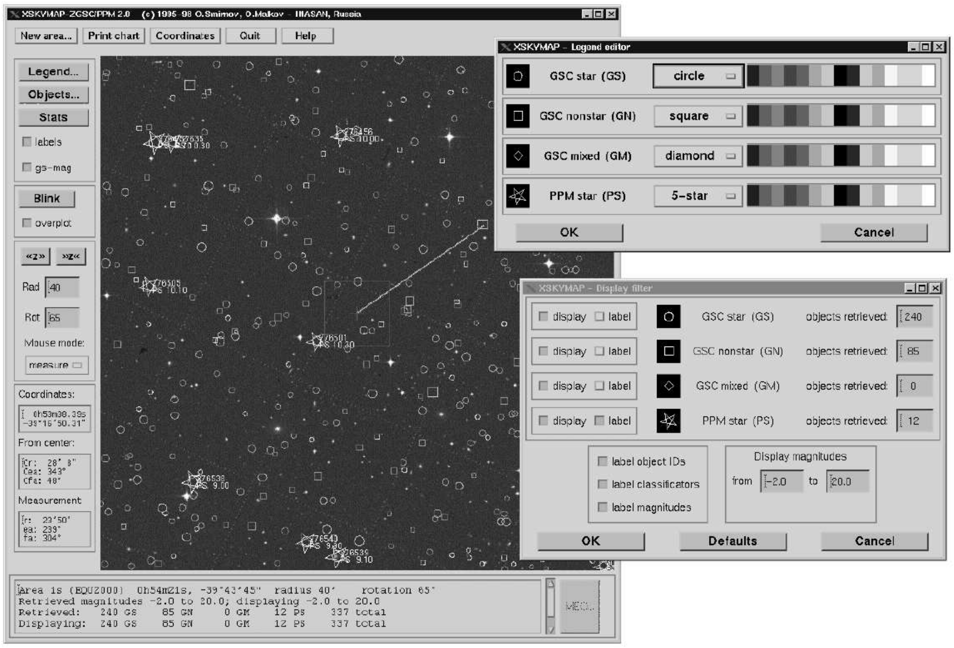

Figure 1. The XSKYMAP Interface.

2. XSKYMAP Features

XSKYMAP's primary screen, along with some additional dialogs, is presented in Fig. 1. The software has the following important features:

- On-the-fly data retrieval for a user-supplied region. XSKYMAP can work in four coordinate systems: equatorial and ecliptic (for any equinox), galactic and supergalactic.
- Uses a custom map projection routine, allowing for accurate plotting of rectangular areas even in polar regions (something the map projection routines of IDL[1] currently lack), and supporting arbitrary rotation of the map relative to North on the sky.
- Mouse-based catalog feedback: click on an object to obtain its full catalog entry or entries.
- Tracking of pointer coordinates when over the map, with dynamic display of sky coordinates and separation/positional angle relative to center of area. Click and drag to measure separation and positional angle between two points on the map.
- Mouse operations for zoom in/zoom out and moving to new map center.
- User can interactively change the of map legend (i.e., symbol and color used for each type of object), and selectively display and label objects of a particular type.

[1]IDL is the trademark of Research Systems, Inc.

- Move to a different coordinate system while preserving the current area (i.e., new coordinates are established, and the map is rotated to compensate for the orientation of North in different coordinate systems).
- Display 2D images (e.g., directly from an instrument) in greyscale under the map. Plot the instrument's field-of-view box over the map.
- Hard copy output in PostScript format, both in map-only mode, and in image+map mode.

3. Future plans

In the nearest future we plan to extend XSKYMAP to support the new USNO-A catalog (Monet 1996). We are also redeveloping the catalog access module of the program to make full use of the object-oriented capabilities of IDL version 5, so that support for additional catalogs may be added to the software by implementing a catalog query object according to predefined specifications. The authors can be contacted by e-mail at `oms@inasan.rssi.ru` and `omalkov@inasan.rssi.ru`.

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