Guide Star Catalog (GSC)

These pages are a consolidated guide to the Guide Star Catalog; each sub-chapter contains information about the structure and formatting of data, how to access it, and other information you may find useful. We're in the process of migrating catalog documentation; more will be added to the list below as they become available.

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GSC Overview

The Guide Star Catalog (GSC) was originally constructed to support the pointing and target acquisition for the Hubble Space Telescope (HST). It has since been adopted for numerous other purposes; for example, observation planning, the preparation of finding charts, and the operation of ground-based telescopes, as well as space telescopes like the James Webb Space Telescope (JWST) and Roman Space Telescope (RST).
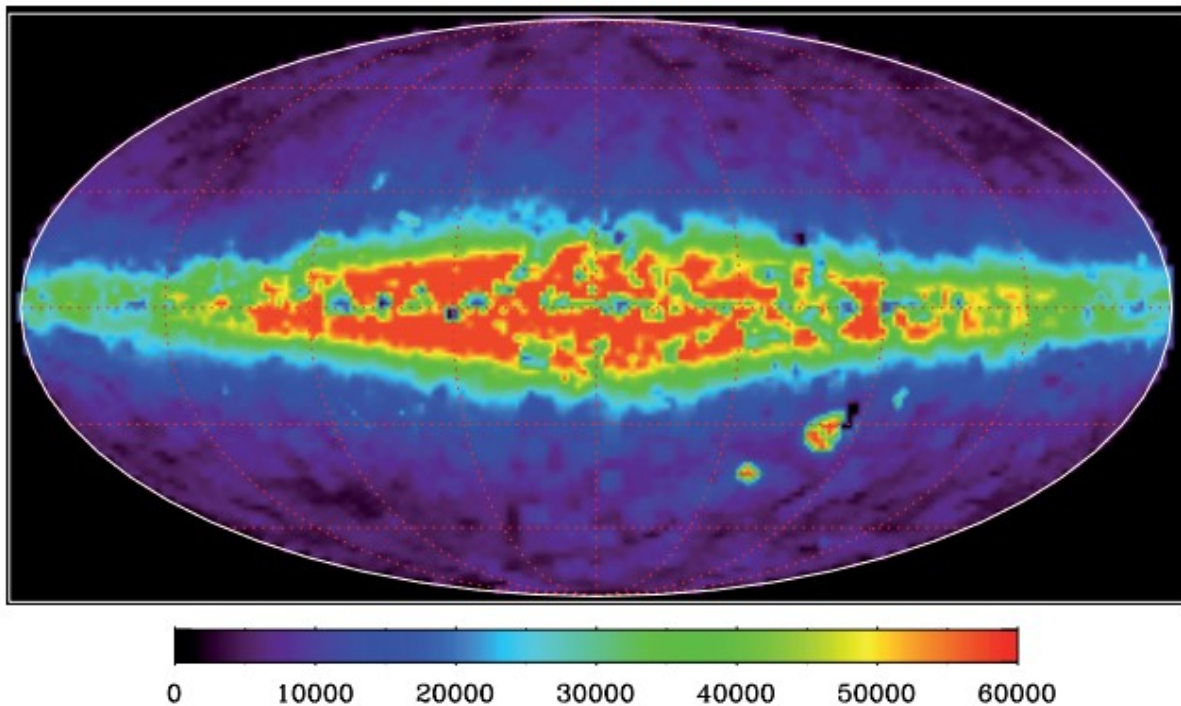

Figure 1 — GSC 2.3 all-sky map. Cumulative counts in galactic coordinates, including both stellar and extended objects. The color scale indicates the GSC 2.3 density ranging from 0 to 60,000 objects per square degree.

Image from front cover of *The Astronomical Journal, Vol. 136, 2008*

Major Versions

The original version of the Guide Star Catalog (GSC-I) was an all-sky catalog of positions and magnitudes for approximately 25 million stars and other objects in the sixth to fifteenth magnitude range. The GSC-I was primarily based on an all-sky, single-epoch collection of Schmidt plates (DSS-I). For centers at +6° and north, a 1982 epoch "Quick V" survey was obtained from the Palomar Observatory, while for southern fields, materials from the UK SERC J survey (epoch = 1975) and its equatorial extension (epoch = 1982) were used.

The Guide Star Catalog II (GSC-II) was an all-sky optical catalog based on a second generation of photographic Sky Survey plates, giving us two epochs and three bandpasses, from the Palomar and UK Schmidt telescopes (DSS-II). This all-sky catalog contains positions, proper motions, classifications, and magnitudes in multiple bandpasses for almost a billion objects down to approximately Jpg=21, Fpg=20. See the article Sky Surveys for more information on the plates.

The most recent versions of GSC 2.4 have been updated to provide improved astrometric positions from the ESA GAIA satellite in addition to providing better photometry and classifications from ground-based CCD survey telescopes such as PanSTARRS, SDSS, SkyMapper and VISTA.

For full details on all releases, see the Releases page.

Catalog Access

It is possible to query all of the versions of the Guide Star Catalog using either a web-based form or more generally using an API. These methods are described in the catalog access section.