

# Sky Survey Source Catalogs

This table summarizes the more recent astronomical survey catalogs used to construct updates to GSC-1, GSC-2 and GSC-3. Additional information on the fields used is provided in the [GSC releases](#).

| Original Catalog                       | Coverage (sq. deg)               | Number of Objects | Description                                                                                                                                                                                                                       | Passbands                         | Notes                                                                                              |
|----------------------------------------|----------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------|
| 2MASS                                  | All-Sky                          | 496,911,362       | 2MASS Point Source catalog<br><a href="https://irsa.ipac.caltech.edu/Missions/2mass.html">https://irsa.ipac.caltech.edu/Missions/2mass.html</a>                                                                                   | J, H, Ks                          | Added in GSC 2.3.4 (new sources, photometry)                                                       |
| APASS dr9                              | All-Sky                          | 61,176,401        | AAVSO Photometric All Sky Survey<br><a href="https://www.aavso.org/apass">https://www.aavso.org/apass</a>                                                                                                                         | B, V, g, r, i                     | added in GSC 2.4.1 (additional photometry)                                                         |
| ATLAS refcat2                          | All-Sky                          | 992,637,834       | Asteroid Terrestrial-Impact Last Alert System (ATLAS)<br>(GAIA dr2 + PanSTARRS dr1 + SkyMapper dr1 + APASS + Tycho2 + Yale Bright Star Catalog<br><a href="https://arxiv.org/abs/1809.09157">https://arxiv.org/abs/1809.09157</a> | G, Grp, Gbp, g, r, i, z, J, H, Ks | Added in GSC 3.0                                                                                   |
| GAIA dr1                               | All-Sky                          | 1,142,679,769     | GAIA<br><a href="https://www.cosmos.esa.int/web/gaia/data-release-1">https://www.cosmos.esa.int/web/gaia/data-release-1</a>                                                                                                       | G                                 | added in GSC 2.4.1 (new sources, updated astrometry, photometry)                                   |
| GAIA dr2                               | All-Sky                          | 1,692,919,135     | GAIA<br><a href="https://www.cosmos.esa.int/web/gaia/data-release-2">https://www.cosmos.esa.int/web/gaia/data-release-2</a>                                                                                                       | G, Grp, Gbp                       | added in GSC 2.4.2 (new sources, updated astrometry, photometry)                                   |
| GAIA edr3                              | All-Sky                          | 1,811,709,771     | GAIA<br><a href="https://www.cosmos.esa.int/web/gaia/early-data-release-3">https://www.cosmos.esa.int/web/gaia/early-data-release-3</a>                                                                                           | G, Grp, Gbp, Grvs                 | added in GSC 2.4.3 (new sources, updated astrometry, photometry)                                   |
| GAIA dr3                               | All-Sky                          | 1,811,709,771     | GAIA<br><a href="https://www.cosmos.esa.int/web/gaia/data-release-3">https://www.cosmos.esa.int/web/gaia/data-release-3</a>                                                                                                       | G, Grp, Gbp, Grvs                 | added in GSC 3.0 (sources, astrometry, photometry)                                                 |
| Galactic Nucleus Survey                | Galactic center<br>(~0.3.sq.deg) | 3,277,922         | <a href="https://www.eso.org/sci/publications/announcements/sciann17403.html">https://www.eso.org/sci/publications/announcements/sciann17403.html</a>                                                                             | J, H, Ks                          | added in GSC 3.0 (new sources, astrometry, photometry)                                             |
| GALEX                                  | All-Sky                          | 82,992,086        | GALEX All-Sky Imaging Survey (AIS)<br><a href="https://galex.stsci.edu/GR6/">https://galex.stsci.edu/GR6/</a><br><a href="https://arxiv.org/abs/1704.05903">https://arxiv.org/abs/1704.05903</a>                                  | fuv, nuv                          | added in GSC 2.4.2 (new sources, photometry)                                                       |
| NOIRlab Source Catalog dr2             | ~35,000                          | 3,932,838,064     | <a href="https://datalab.noirlab.edu/nscdr2/index.php">https://datalab.noirlab.edu/nscdr2/index.php</a>                                                                                                                           | u, g, r, i, z, Y, VR              |                                                                                                    |
| PanSTARRS dr1                          | ~30,000                          | 1,919,106,885     | PanSTARRS<br><a href="https://confluence.stsci.edu/display/PANSTARRS/PanSTARRS1+data+archive+home+page">https://confluence.stsci.edu/display/PANSTARRS/PanSTARRS1+data+archive+home+page</a>                                      | g, r, i, z, y, w                  | 'best' catalog with ndetections>2<br>added in GSC 2.4.2 (new sources, photometry, classifications) |
| PanSTARRS dr1 recalibrated to GAIA dr3 | ~30,000                          | 1,484,273,377     | PanSTARRS<br><a href="https://ui.adsabs.harvard.edu/abs/2022AJ....164...73W/abstract">https://ui.adsabs.harvard.edu/abs/2022AJ....164...73W/abstract</a>                                                                          | g, r, i, z, y, w                  | 'best' catalog with ndetections>2<br>added in GSC 3.0 (new sources, photometry, classifications)   |
| Tycho-2                                | All-Sky                          | 2,539,913         | TYCHO<br><a href="https://www.cosmos.esa.int/web/hipparcos/tycho-2">https://www.cosmos.esa.int/web/hipparcos/tycho-2</a>                                                                                                          | Bt, Vt                            | Added in GSC 2.3 (new sources, astrometry, photometry)                                             |
| SDSS dr13                              | ~14,555                          | 469,050,976       | Sloan Digital Sky Survey<br><a href="http://www.sdss.org/dr13/">http://www.sdss.org/dr13/</a>                                                                                                                                     | u, g, r, i, z                     | added in GSC 2.4.1 (new sources, photometry, classifications)                                      |
| Sky2000 v1                             | All-Sky                          | 299,485           | NASA Master Catalog Stellar Database<br><a href="https://cdsarc.cds.unistra.fr/viz-bin/cat/V/95">https://cdsarc.cds.unistra.fr/viz-bin/cat/V/95</a>                                                                               | U, B, V                           | Added in GSC 1.1                                                                                   |
| Sky2000 v5                             | All-Sky                          | 299,460           | NASA Master Catalog Stellar Database<br><a href="https://cdsarc.cds.unistra.fr/viz-bin/cat/V/145">https://cdsarc.cds.unistra.fr/viz-bin/cat/V/145</a>                                                                             | U, B, V                           |                                                                                                    |
| SMSS dr1                               | ~17,200                          | 285,159,194       | SkyMapper Southern Sky Survey<br><a href="http://skymapper.anu.edu.au/">http://skymapper.anu.edu.au/</a>                                                                                                                          | u, v, g, r, i, z                  | added in GSC 2.4.2 (new sources, astrometry, photometry, classifications)                          |

|           |         |               |                                                                                                                                                                                                                                                                                         |                  |                                                                           |
|-----------|---------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------|
| SMSS dr2  | ~17,200 | 505,176,667   | SkyMapper Southern Sky Survey<br><a href="http://skymapper.anu.edu.au/">http://skymapper.anu.edu.au/</a>                                                                                                                                                                                | u, v, g, r, i, z | added in GSC 2.4.3 (new sources, astrometry, photometry, classifications) |
| SMSS dr4  | ~26,000 |               | SkyMapper Southern Sky Survey<br><a href="http://skymapper.anu.edu.au/">http://skymapper.anu.edu.au/</a>                                                                                                                                                                                | u, v, g, r, i, z | added in GSC 3.1 (new sources, astrometry, photometry, classifications)   |
| UCAC5     | All-Sky | 107,758,513   | USNO CCD Astrograph catalog<br><a href="https://iopscience.iop.org/article/10.3847/1538-3881/aa6196">https://iopscience.iop.org/article/10.3847/1538-3881/aa6196</a>                                                                                                                    | G, Fpg, J, H, Ks | all are GAIA dr1 sources; provides additional proper motion data          |
| VHS dr5   | ~20,000 | 1,373,400,198 | VISTA Hemisphere Survey<br><a href="http://www.vista-vhs.org">http://www.vista-vhs.org</a>                                                                                                                                                                                              | Z, Y, J, H, Ks   | added in GSC 2.4.3 (new sources, astrometry, photometry, classifications) |
| VVV dr3   | ~520    | 590,682,953   | Vista Variables in Via Lactea<br><a href="https://www.eso.org/rm/api/v1/public/releaseDescriptions/161">https://www.eso.org/rm/api/v1/public/releaseDescriptions/161</a>                                                                                                                | J, H, Ks         | added in GSC 3.1 (new sources, astrometry, photometry)                    |
| VIRAC dr1 | ~520    | 312,587,642   | VVV Infrared Astrometric Catalog<br>(subset of VVV)<br><a href="https://www.eso.org/rm/api/v1/public/releaseDescriptions/138">https://www.eso.org/rm/api/v1/public/releaseDescriptions/138</a>                                                                                          | J, H, Ks         | added in GSC 3.1 (proper motions only)                                    |
| WISE      | All-Sky | 747,634,026   | Wide-Field Infrared Survey Explorer<br><a href="https://wise2.ipac.caltech.edu/docs/release/allsky/">https://wise2.ipac.caltech.edu/docs/release/allsky/</a><br><a href="https://wise2.ipac.caltech.edu/docs/release/allwise/">https://wise2.ipac.caltech.edu/docs/release/allwise/</a> | w1, w2, w3, w4   | added in GSC 2.4.2 (new sources, photometry)                              |