Compliance sheet — star-sun

Everything a supplier qualification, a legal review or an export check usually asks about star-sun 0.1.0, in one document.

1. Identity

Document	STAR-PKG-STAR-SUN-EN · v2.3 · 2026-11-14
Package	star-sun
Version	0.1.0
Capability	star.orbit.sun
Maturity	Released & Verified (RELEASED)
Python	>=3.9
Source commit	dc09f61d
Source	https://github.com/Andrea07072000/S.T.A.R.-/tree/main/packages/star_sun

2. Licence and obligations

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3. What it needs at run time

Nothing beyond the Python standard library: it works offline.

4. Integrity

SHA-256 fingerprints of the files published on this website. Check a downloaded file with:

```
python -c "import
hashlib,sys;print(hashlib.sha256(open(sys.argv[1],'rb').read()).hexdigest())" star_sun-0.1.0-
py3-none-any.whl
```

FILE	SHA-256
star_sun-0.1.0-py3-none-any.whl	412ce030b074224320cc227db1ec855f45c1923a123a7c1e9674a93bdf6e7c8c
star_sun.py	9c1a0f1b89694b7cadd6d21fc0c13a2af1ef4533a24740c8eda6fc9fe461aaa7
star_sun-0.1.0-source.zip	b56bad88e725bd8614f4992bdaa5ce6836e66845661b219d7c112149eaeac931

5. What it does, and its limits

Low-precision geocentric Sun vector for 1950-2050 (measured within 0.0097 deg of JPL DE440 apparent), orbit beta angle and cylindrical shadow test; every function returns finite values or raises ValueError.

Not an ephemeris: 0.01 deg is about 36 arcseconds. No nutation (mean equator of date, about 0.7 deg from J2000 in 2050: rotate before mixing with J2000/GCRF vectors). The shadow is a cylinder: no penumbra, no oblateness, no atmosphere; near the shadow edge the answer can differ from a conical model by tens of seconds of orbit.

- `sun_vector_au(jd_day, jd_frac=0.0)` and `sun_ra_dec_deg`: geocentric Sun in AU, mean equator and equinox of date, for UT1 Julian dates from 1950-01-01 to 2050-01-01 (inclusive); outside, `ValueError`. Reproduces Vallado Example 5-1 within 1.2e-6 AU.
- Measured accuracy (402 dates): direction within 0.0097 deg of JPL DE440 *apparent* and of astropy, distance within 7e-5 AU. The series includes aberration: against *geometric* positions the difference reaches 0.014 deg.
- `beta_angle_deg(sun, inc_deg, raan_deg)`: angle between the Sun direction and the orbit plane, in [-90, 90], positive on the side of the angular momentum; only the direction of `sun` is used.
- `in_shadow(r_sat, sun, body_radius=6378.137)`: True when the satellite is behind the body and closer than one body radius to the Sun-body axis (cylinder, parallel rays, no penumbra); `r_sat` and `body_radius` in the same unit.
- Every function returns finite values or raises `ValueError`: non-numeric, boolean, NaN, infinite or |value| >= 1e300 input; a vector that is not three numbers; a zero Sun vector; a satellite inside the

body; a non-positive body radius; inclination outside [0, 180]; node outside [-360, 360]; a date outside 1950-2050.

6. Export, use and certification

The package is published and freely available. That usually takes software out of export-control lists, but not every use of it: read the page on space activities and export control before using it in a controlled programme. It is not certified or qualified for flight; the evidence describes what was tested and how.

7. Citation and bill of materials

```
@software{cavazzini_star_sun_0_1_0,
  author  = {Cavazzini, Andrea},
  title   = {{star-sun}: Sun direction, beta angle and eclipse test},
  version = {0.1.0},
  year    = {2026},
  url     = {https://andrea07072000.github.io/S.T.A.R.-/software/star_sun/},
  note    = {Apache-2.0. Source: https://github.com/Andrea07072000/S.T.A.R.-, commit dc09f61d}
}
```

CITATION.cff · BibTeX · SBOM CycloneDX 1.5 · SBOM SPDX 2.3

8. Warranty and liability

Provided "as is", without warranties or conditions of any kind (Apache License 2.0, sections 7 and 8), to the extent the law allows. This never excludes liability that the law does not allow to exclude.

Related: space activities and export control · acceptable use · evidence and limits · licence texts