# Compliance sheet — star-geodesic

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

## 1. Identity

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

## 2. Licence and obligations

Apache License 2.0. You may use, copy, modify and distribute it, also commercially, and you receive a patent licence from the contributors. When you redistribute it: keep the LICENSE file and the copyright notices (and a NOTICE file, if a future version adds one), and state in modified files that you changed them. You may not use the S.T.A.R. name to endorse your product.

## 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_geodesic-
0.1.0-py3-none-any.whl
```

| FILE | SHA-256 |
|---|---|
| star_geodesic-0.1.0-py3-none-any.whl | bab23ff165623de1b2eec4669b077ec721 51ab4cc7ba53a57c5e63aa9045fb9e |
| star_geodesic.py | f5aff1696713eba4ebc9d19c6b5e55e9fb 85b64cfe185090a200c283dec8f661 |
| star_geodesic-0.1.0-source.zip | d14c46f8ce2a03ad4c8646b45f60f4ff27 55995bd2587ae9020c376c8b6ea26c |

# 5. What it does, and its limits

Inverse and direct geodesic problems on WGS-84 with bounded iterations: measured within 0.08 mm of PROJ, GeographicLib and PyGeodesy; nearly antipodal points are refused, an unconverged value is never returned.

Vincenty's method, not Karney's: points closer than about half a degree to the antipode are refused, not solved (the 40 pairs within 2 degrees of the antipode in the corpus all converged). No geoid, no height: lines on the ellipsoid.

- `inverse(lat1, lon1, lat2, lon2)`: geodesic length in metres and its azimuth at both ends in the direction of travel (degrees from North towards East, in [0, 360)). Reproduces the published line Flinders Peak - Buninyong (54972.271 m) within 0.2 mm and 0.004 arcsec.
- `direct(lat1, lon1, azimuth1_deg, distance_m)`: latitude, longitude in [-180, 180) and azimuth at the point reached, for distances from 0 to 20 000 km.
- Measured against PROJ, GeographicLib and PyGeodesy (exact) on 840 problems: distance within 0.08 mm at any length, 2 nm below 1 km; azimuth within 0.0003 arcsec; direct position within 0.07 mm. Two iterations are run after the 1e-12 rad tolerance is met: without them a 0.7 m line was 2.7 micrometres off.
- Every call returns three finite floats or raises: `ValueError` for non-numeric, boolean, NaN, infinite input, latitude outside [-90, 90], longitude or azimuth outside [-360, 360], distance outside [0, 20 000 km]; `RuntimeError` for antipodal points (the geodesic is not unique) and when the iteration does not converge within 200 steps (nearly antipodal points). An unconverged value is never returned. Coincident points give (0, 0, 0).

# 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_geodesic_0_1_0,
  author  = {Cavazzini, Andrea},
  title   = {{star-geodesic}: Distance and azimuth on the WGS-84 ellipsoid},
  version = {0.1.0},
  year    = {2026},
  url     = {https://andrea07072000.github.io/S.T.A.R.-/software/star_geodesic/},
  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