Compliance sheet — star-coverage

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

1. Identity

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

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_coverage-
0.1.0-py3-none-any.whl
```

FILE	SHA-256
star_coverage-0.1.0-py3-none-any.whl	ea04b0895582ccb09d58deba5fa6144d0de83c88ecedf6f96c548b321d018768
star_coverage.py	b7bf0970d36692f5579c8462cc54e73ae389b2df0844b1fcc69157a30f3dcfad
star_coverage-0.1.0-source.zip	5a8d874f8c9f653bf163edb74cfaee7a09f8d13155c1158005c37d351e9980b6

5. What it does, and its limits

Earth-central angle, nadir angle, slant range, covered fraction, footprint area and elevation for a satellite at a given altitude and minimum elevation; agrees with pymap3d and PROJ on a sphere to 1e-13 and keeps precision from 1 mm of altitude to 1e12 km.

A sphere: on the real Earth the horizon distance changes by up to about 0.3 % with latitude. No refraction, terrain or antenna pattern; no constellation design (number of satellites, overlap, revisit).

- `central_angle_deg`, `nadir_angle_deg`, `slant_range`, `coverage_fraction`, `footprint_area` for an altitude and a minimum elevation; `elevation_deg(altitude, central_angle)` is the inverse relation (negative below the horizon). Default radius 6378.137 km; `radius=` for another body or unit. The three angles add up to 90 degrees.
- Reproduces the textbook geostationary figures (81.3 deg, 8.7 deg, 41 679 km, 42.4 % of the surface, 76.3 deg at 5 deg of elevation) and the 2294 km horizon of a 400 km orbit.
- Measured against pymap3d and PROJ on a sphere (400 cases, 200 km to 400 000 km): elevation within 8e-14 deg, slant range within 4e-15 relative, central angle within 3e-14 deg. The formulas are written to keep precision at both ends: 1 mm above the ground the slant range is right to 1e-14 (the textbook form loses seven digits there), and at 1e12 km the central angle stays below 90 degrees.
- Every function returns a finite float or raises `ValueError`: non-numeric, boolean, NaN or infinite input, altitude <= 0, radius <= 0, minimum elevation outside [0, 90], central angle outside [0, 180], an altitude so small or so large against the radius that the ratio is not representable.

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_coverage_0_1_0,
  author  = {Cavazzini, Andrea},
  title   = {{star-coverage}: What a satellite sees, and from where it is seen},
  version = {0.1.0},
  year    = {2026},
  url     = {https://andrea07072000.github.io/S.T.A.R.-/software/star_coverage/},
  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