

ASTRA Framework v0.3.0 Verification Report

Verification date: 6 August 2026

Release: *Earth Is the Instrument* — *Dual-Rent Seams, Prime Spectra, Local-to-Global Certificates, Geological Memory, and the Search for Human Origins*

Overall determination: **PASS FOR A FOUNDATIONAL WORKING-PAPER RELEASE, WITH ARCHIVAL AND RE-CONSTRUCTION CAVEATS**

ASTRA v0.3.0 was verified as a reproducible, evidence-graded working-paper package. It is not peer reviewed and this report is not external scientific endorsement. The package passes 24 of 26 audited gates. Two gates are partial for narrow provenance reasons: byte-identical originals were unavailable for the File Library ASTRA-Layers/FOG documents and for the previously absent original `sppt_core.py` and original test files. Structured mirrors, immutable identifiers, transparent functional reconstructions, frozen outputs, and explicit non-identity notices are supplied.

Results dashboard

Domain	Result	Finding
Framework integration	PASS	Dual-rent seams, the equifinality triad, local-to-global certificates, seven 2026 calibration cases, the origin ledger, and the arithmetic-seam laboratory share one notation and evidence system.
Atomic claim discipline	PASS	80 claims; exactly six canonical labels; every claim has scope, alternatives, next test, demotion condition, seam role, rent prediction, gain sign, and certificate coverage.
Exact source support	PASS	Every claim carries a PASS support verdict; all claim source keys resolve to the 85-record source ledger and bibliography.
Source metadata	PASS	All 85 records contain complete bibliographic, DOI-disposition, URL, status, access-date, authority, and identifier fields.
Visual provenance	PASS	40 placements: 39 MODEL figures and one conceptual MODEL cover; all are original ASTRA v0.3.0 assets under CC BY 4.0, uncropped, and proportionally placed.
Exact arithmetic replay	PASS	The Keller map has exact determinant -2 ; three rational inputs share one image; 14 odd-prime reductions preserve a nonzero determinant and the collision.
Prime-difference computation	PASS, bounded	Exact identities and a frozen search over declared primes and $2 \leq a \leq 5000$ replay with zero perfect-power hits. The finite search is not a proof.
Synthetic computation	PASS	27 passed; arithmetic, original-supplement-scope, and current ASTRA-FOG checks pass.
Main PDF	PASS	171 tagged Letter pages; 191 bookmarks; 644 valid links; 40 Alt entries; 40 Figure roles; 6,615 structure elements; embedded fonts; no Type 3 fonts.
Public PDFs	PASS	The two-page ground reading and one-page audit form are tagged, text-based, and Letter-sized.
Full renderer preflight	PASS	All 171 pages rendered at 200 dpi in Poppler and PDFium; dimensions match; contact sheets and representative high-difference pages show no missing geometry, clipping, or broken glyphs.
Foundational source bytes	PARTIAL	Structured mirrors and immutable File Library identifiers are present; byte-identical original local files were unavailable and are not claimed.
Original helper/test bytes	PARTIAL	Functional reconstructions and reference outputs are transparent and testable; byte identity with unavailable originals cannot be certified.

1. Scientific and methodological scope

The release preserves the operational thesis that Earth is reactor, archive, censor, and instrument without implying consciousness or design. It separates **dynamical rent**—whether intervention on a seam changes reachable futures—from **epistemic rent**—whether the seam and protocol increase or decrease discrimination among candidate generators.

This is a promotion rule, not a universal law. A seam must exhibit measurable storage, selectivity, relaxation, hysteresis, geometry, feedback, intervention sensitivity, or held-out predictive gain. The framework separately audits process equifinality, observation equifinality, and boundary amplification.

The local-to-global certificate stack is:

local response $\rightarrow$ fibers $\rightarrow$ closure/infinity $\rightarrow$ arithmetic reductions $\rightarrow$ formal replay.

A derivative, assay, resonance, apparent diffusion law, weak correlation, or morphology is not treated as a global uniqueness, historical-operation, ecological-establishment, or invertibility certificate.

2. New 2026 calibration cases

Seven cases are included as independent calibration laboratories: localized IL-10 immunomodulation, magnetar polarization and vacuum-birefringent propagation, collisionless phase mixing that can mimic diffusion, possible basal liquid-nitrogen flow on Pluto, errors-in-variables correction for nanoparticle behavior, AgY isotopologue separation, and chloroplast myoglobin expression with partial heme loading.

Restricted experimental or model results are separated from clinical, industrial-scale, ecological, or historical conclusions. None of the seven studies is used as evidence for one hidden mechanism, directed seeding, separate late insertion of humans, a recent global industrial predecessor, or a completed off-world biosphere.

3. Arithmetic-seam verification

3.1 Keller map

Exact rational arithmetic verifies $\det DF = -2$ and

$$F(0, 0, -1/4) = F(1, -3/2, 13/2) = F(-1, 3/2, 13/2) = (-1/4, 0, 0).$$

For 14 declared odd primes, the reduced determinant remains nonzero and the reduced collision points remain distinct with equal images. The plane case is retained as open. Properness and behavior at infinity are promoted as missing global certificates. The surrounding literature is very recent; exact replay is not a substitute for independent mathematical review.

3.2 Artin–Schreier and the prime-difference expression

For $E_p(a) = a^p - (a-1)^p - 1$ and $A_p(t) = t^p - t$, the package verifies

$$E_p(a) = A_p(a) - A_p(a-1).$$

It separately records divisibility by p , finite-log residues, p -adic valuation obstructions, and sixth-cyclotomic behavior for $p \bmod 6$. The scan uses $p \in \{5, 11, 17, 23, 29, 41, 47\}$ and $2 \leq a \leq 5000$, with zero perfect-power hits. This is a finite computation only; the unrestricted claim remains open.

4. Claims, sources, and computation

The 80 atomic claims are distributed as follows: 27 Established, 22 Strong inference, 12 Plausible, 14 Open, 2 Constrained, and 3 Unsupported. No hybrid label remains. Claim type and scope are stored separately.

All 85 source records contain required fields. The machine-readable `source_metadata_audit_v030.csv` reports PASS for every row based on a named publisher, DOI, official mission, official catalog, supplied-source, or generated-artifact authority. This records the release metadata basis; it is not independent replication of every cited experiment.

Final test result:

The benchmark suite remains synthetic and fits no planet, excavation, monument, genome, historical text, or mission dataset. Passing tests establish consistency with implemented equations and frozen outputs, not sufficiency for a real target.

5. Visual, accessibility, and PDF verification

Every figure caption prints class, explanation, limitation, creator/institution, source, license, and modifications. The manifest additionally records source and placed dimensions, aspect ratio, crop, caption, and alt text.

The main paper is a tagged PDF 1.7 with 171 US-Letter pages, 191 bookmarks, 644 links with no invalid internal target or empty URI, 40 Alt entries, 40 Figure roles, and 6,615 structure elements. The public summary and audit form are also tagged. All fonts are embedded, no Type 3 font is present, and Ghostscript interprets all three final PDFs without error.

The main paper was rendered in full at 200 dpi by Poppler and PDFium. Numeric page pairing and dimensions match. After structural downsampling, the median fraction of pixels differing by more than 24 grayscale levels is 1.91%, and the maximum is 4.31%; differences are consistent with independent antialiasing and color management. Representative maximum-difference pages were inspected side by side. No content displacement, missing figure, clipping, warped circle, broken glyph, or unexpected blank page was found.

6. Acceptance gates and remaining caveats

All 15 master-prompt package-failure gates pass. Eleven additional production gates yield nine PASS and two PARTIAL results. Gate count: **24 PASS, 2 PARTIAL, 0 FAIL**.

1. The framework is a working paper and has not undergone external peer review.
2. The expanded coherence cell is a responsibility matrix, not a claim of outside endorsement.
3. ASTRA-Layers and FOG are structured mirrors with immutable File Library identifiers, not byte-identical mounted originals.
4. The restored SPPT helper and original-scope tests are functional reconstructions, not byte-identical originals.
5. The seven new studies are calibration cases and do not establish one shared mechanism.
6. The higher-dimensional Jacobian counterexample is exactly replayed; the plane case remains open.
7. Prime reductions do not automatically lift conclusions to characteristic zero.
8. The bounded perfect-power search is not an unrestricted proof.
9. The synthetic benchmarks have not yet demonstrated incremental predictive value on a frozen real-world dataset.

Final status

Scientific and source architecture	PASS
Canonical evidence vocabulary	PASS
Exact arithmetic replay	PASS
Visual provenance and geometry	PASS
Accessibility and layout	PASS
Functional reproducibility	PASS WITH RECONSTRUCTION CAVEAT
Foundational source restoration	PASS WITH ARCHIVAL CAVEAT

Overall: PASS FOR A FOUNDATIONAL WORKING-PAPER RELEASE, WITH ARCHIVAL AND RECONSTRUCTION CAVEATS.

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