

Runbook — Deployment & Ops

- 1) Pin policy and schemas in repo; content-addressed ids.
- 2) Configure shell schedule and stop thresholds by environment (dev vs prod).
- 3) Emit OpenTelemetry spans for stage/lane/accept/reject.
- 4) Sign artifacts (ED25519/Sigstore) when keys are available; include signer in handshake entries.

CI/QA

- Canon determinism (hash stable under reorder).
- Codes orthogonality (Hamming/Golay $\mathbf{G}\mathbf{H}^T=0$).
- Lane permutation row-space invariance.
- Monotone acceptance property tests; Midpoint parity strictness.
- Out-of-shell gating; schema validation; presence of policy/metrics/overlay_store.
- Weyl invariance smoke for Φ_{geom} ; Sigstore attestation in CI.

Troubleshooting

High delta_increase: geometry over-binding; widen shell or reduce α .

Many out_of_shell: shell too small; expand factors.

Parity_fail on Midpoint: adapter or noise; verify syndrome calc and lane whitelist.

Zero accepts: operator starvation; check Alena enablement and policy strictness.