CAT-72 Procedure

Conformance Authorization Test — 72-Hour Verification Protocol

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Document Purpose

This document describes the CAT-72 (Conformance Authorization Test) procedure used by Sentinel Authority to verify that autonomous systems operate within their declared Operational Design Domain. This is a public description of the test; full test harness specifications, threshold values, and scoring algorithms are restricted.

1. What CAT-72 Is

CAT-72 is a continuous 72-hour assessment procedure that validates the ENVELO Interlock's enforcement capability across the full range of the system's declared operational envelope. During the test, the system operates in its production environment under active enforcement, and the Interlock is evaluated for its ability to detect boundary approaches, trigger self-correction, force minimum risk conditions, and execute hard halts.

The 72-hour duration ensures the assessment covers multiple operational cycles, shift changes, load variations, and environmental conditions. It is not a snapshot—it is a sustained, continuous evaluation of enforcement behavior under realistic conditions.

2. What CAT-72 Tests

The assessment evaluates five core capabilities:

Capability	Description
Boundary Detection	Can the Interlock accurately detect when the system approaches, reaches, or exceeds declared boundary parameters?
Enforcement Execution	Does the three-tier enforcement cascade (self-correction → MRC → hard halt) execute correctly and within bounded latency?
Stress Response	Does enforcement hold under deliberate boundary-stress scenarios designed to test edge cases and failure modes?
Telemetry Integrity	Is all operational telemetry HMAC-signed, hash-chain linked, and verifiable by independent reviewers?
State Management	Does the system correctly transition between conformance states (LEARNING → BOUNDED → CONFORMANT → PAUSED) based on operational conditions?

3. Test Structure

CAT-72 follows a structured execution sequence:

Pre-Test Validation (T-24 to T-0)

Before the 72-hour clock starts, Sentinel Authority validates that the ENVELO Interlock is correctly deployed, telemetry sources are connected, boundaries are loaded and approved, and the system is in BOUNDED state. A pre-flight checklist must be completed with all items passing.

Continuous Monitoring Phase (T+0 to T+72)

The system operates in its production environment for 72 continuous hours. During this period, the assessment evaluates normal operational behavior, boundary approach detection and self-correction response, enforcement actions taken in response to boundary events, telemetry integrity and completeness, and state management accuracy.

Boundary Stress Testing

At designated intervals during the 72-hour period, controlled boundary-stress scenarios are introduced. These are designed to test enforcement under conditions that approach, reach, and exceed declared boundaries. The specific scenarios, timing, and thresholds are not publicly disclosed to prevent gaming.

Post-Test Analysis (T+72 to T+96)

After the 72-hour period, Sentinel Authority analysts review the complete telemetry record, enforcement actions, state transitions, and stress test results. The review produces a quantitative assessment across all five capability areas.

4. Pass/Fail Criteria

CAT-72 produces a binary outcome: **PASS** (system is CONFORMANT) or **FAIL** (system is NON-CONFORMANT). There is no partial certification or conditional pass.

Specific scoring thresholds, weighting factors, and minimum capability scores are restricted and not publicly disclosed. The general criteria are:

- All three enforcement tiers must execute correctly when triggered.
- Enforcement latency must remain within declared bounds throughout the test.
- Telemetry integrity must be maintained with no gaps, unsigned records, or broken hash chains.
- State transitions must be accurate and correctly logged.
- Boundary-stress scenarios must be handled without enforcement failure.

5. After CAT-72

On PASS: Sentinel Authority issues a conformance record documenting the scope of certification, evidence summary, validity period, and cryptographic verification data. The system transitions to CONFORMANT state. The Interlock continues operating for continuous monitoring.

On FAIL: Sentinel Authority provides a detailed findings report identifying specific enforcement failures, telemetry gaps, or capability deficiencies. The operator may remediate and re-test. Each re-test is a separate engagement at $12,000.

6. Implementation Restrictions

The following CAT-72 components are restricted and not included in this public description:
- Specific scoring algorithms and weighting factors
- Boundary-stress scenario library and injection timing
- Minimum capability scores per assessment area
- Test harness configuration and instrumentation details
- Analyst review procedures and determination criteria

These restrictions exist to maintain assessment integrity. If test parameters were public, operators could optimize systems to pass the test rather than achieve genuine conformance.