

PROJECT BRIEF



PREPARED

July 2026

AUTHOR

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Autonomous Equity Trading Engine

A fully autonomous, standing-armed algorithmic trading system that trades a live real-money equity sleeve unattended, with layered fail-closed risk controls and cross-host monitoring.

SIGNATURE CAPABILITY

Trades real money with zero daily human input — entry, rebalance, and trailing-stop passes run on their own, and every risk gate fails closed rather than open.

OVERVIEW

The engine runs a blended, backtest-validated long-only equity sleeve on a live brokerage account, executing entry, rebalance, and trailing-stop protection passes on scheduled jobs with no daily human step. Position sizing uses fractional Kelly, and a statistical circuit breaker sets a dynamic consecutive-loss threshold from the win rate via a binomial model rather than an arbitrary constant. Every gate fails closed: unknown or stale risk state, a missing protection heartbeat, or a two-source quote disagreement all block new orders and force paper mode. An independent dead-man's-heartbeat watcher runs on a separate host and emails alerts if the trading host goes silent, unprotected positions appear, or drawdown limits trip.

TECHNOLOGY

Python 3.10, pandas / numpy, robin_stocks (Robinhood API), fcntl file locking with atomic tempfile+os.replace writes, SQLite (WAL), systemd / launchd / cron schedulers, n8n webhook alerting, Tailscale/LAN cross-host sync, pytest.

HIGHLIGHTS

- ◆ Statistical circuit breaker derives its loss threshold from the **win rate using a binomial-probability model**, replacing arbitrary fixed-loss rules.

- ◆ Concurrency-safe shared state: all writes route through one atomic adapter using **fcntl LOCK_EX plus tempfile and os.replace**, with shared locks for readers.
- ◆ Strict-TDD build: from 663 execution tests at first baseline to **~2,765 unit tests**, with **core risk modules at 100% coverage**.
- ◆ Multi-agent alpha hunt (**36 agents**) with a placebo / fee-fragility / lookahead gate produced a de-correlated 3-edge blend: **out-of-sample Sharpe 1.58, ~20% CAGR, max drawdown -11.2% vs SPY -18.8%**.
- ◆ Adversarial review fixed **10 criticals pre-build and 2 P0 + 5 P1 at wiring**, including capital-lock enforcement and a no-silent-naked-position guarantee.
- ◆ Independent **cross-host dead-man's switch** with edge-triggered, deduplicated email alerts.

STATUS

Live and trading real money on a Robinhood agentic cash account (~\$1,000, ~20 fractional names); autonomy enabled, protection daemons run every 120s during market hours.