FEDERAL CAPABILITY STATEMENT // DUAL-USE R&D & AIR-GAPPED ENCLAVE SOFTWARE

AstroDynamix Research Cipher LLC

DBA **AstroDynamiX** — Offline Scientific & Telemetry Software Studio · Est. August 20, 2026 · U.S. Provisional Patents Pending

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1. EXECUTIVE SUMMARY

AstroDynamix Research Cipher LLC is a founder-led Maryland software studio developing self-contained Pure-Rust binaries built without HTTP/TLS client crates for air-gapped customer enclaves. Operating two completely separate codebases and separate U.S. provisional patent families, our portfolio spans **Biophysics & Grid (Division 01)** for macromolecular variant triage & infrastructure screening (Linux/macOS CLI on arm64/x86_64) and **Compression & Edge (Division 02)** for searchable lossless sensor compression & low-RAM edge inference (Pure-Rust core with C/C++, Rust, Go, and Python host bindings & 5-target C-ABI: runtime-tested on macOS arm64/x86_64 & Linux aarch64; Linux/Windows x86_64 cross-compiled & symbol-audited).

2. CORE COMPETENCIES ACROSS TWO CODEBASE-ISOLATED ENGINEERING DIVISIONS

DIVISION 01 · BIOPHYSICS (RUO) & GRID RESILIENCE

- **PRISM 3D Variant & Countermeasure Triage:** Self-reported studio benchmark completes a 10-variant PDB complex, 3-scaffold, and 50-frame relaxation triage batch in under 15 min on 8-core arm64 (~0.2–0.6 s single-chain [Reference Model; NDA eval pack]; Research Use Only).
- **UMMO Space-Weather & Reduced-Grid Screening:** L1-to-ground geomagnetic GIC storm discrimination and millisecond linearized DC rank-k screening of N-1/N-2/N-3 outages on reference topologies.

DIVISION 02 · SEARCHABLE COMPRESSION & EDGE CORE

- **Quantoji Lossless Compression & Indexed SDK:** CLI & 20-function panic-guarded 5-target C-ABI library for numerical/sensor packing, compressed-header range queries without full decode, and optional systematic erasure recovery.
- **AstroDyX Edge Runtime & SENTRY Sync:** Integer sequence core achieving 257.81× latency speedup & 1,048× state-RAM reduction vs. dense f32 quadratic attention on arm64 [Synthetic scaling only, no task-accuracy claim; 710ad5cf...], plus GPS-free clock sync [Synthetic; NDA eval pack].

3. DIFFERENTIATORS & MEASURED BENCHMARK MILESTONES (SELF-RUN)

- **Air-Gapped Enclave Pre-Filter:** Built with zero HTTP/TLS client crates for firewall-isolated DoD/lab AlphaFold, Rosetta, SPR, and telemetry workflows using Rust cores & thin catch_unwind C-ABI boundaries [ff0c6108...].
- **Human Genomics [Observational]:** Single-channel & core-abundance |ρ| = 0.20–0.43 across 48,628 MaveDB variants in 8 genes (+pocket partial |ρ| = 0.165–0.317; +3,143 PTEN calibration; all 11 CSVs hashed; spec cb367d60..., log 7aa8359d...).
- **OMNI2 [Observational] & 5 Reduced Grids [Reference]:** 0.9525 AUC on 2005–2014 backward intense-storm/quiet holdout (n=60; fc2ddb7a...); 9,668,081 N-1/2/3 contingencies (9,592,097 N-3) across 5 reduced grids (230B/461L) in 56 ms (d1404f89...).
- **Compression, Extract & Heal:** 4.004× single Silesia mr file [Observational; input 68637ed5...] & 57.792× 3D f32 grid [Synthetic; **5.14×** vs. standalone XZ-6; 98f91024...]; 12.3× selective extract & systematic GF(2^8) erasure recovery (+m/k over k data blocks heals m of k+m total; 36.11 ms) [Synthetic; 0dd9ec5f...].

4. CORPORATE DATA & PAST PERFORMANCE STATUS

Entity & State	Domestic MD LLC (Est. 2026-08-20)
Socioeconomic	Self-Cert SDB · Disabled-Owned (Self-Reported; Counsel Review)
NTDC & OTA Auth	10 U.S.C. § 3014 · § 4022(d)(1)(A)/(B)/(D) · § 3710a
SAM.gov	Submitted Nov 2026 (UEI/CAGE Unassigned; Self-Reported)
MD MBE & DOBE	TEDCO T031331962611 · Intakes in Prep (Uncertified)
NAICS / UNSPSC	541715, 541511, 541714 · 43232605
Past Performance	No prior prime/CRADA; NDA binary pilot ready
Background IP Title	100% Founder-Originated · U.S. PPAs Pending

5. STATUTORY SOCIOECONOMIC & MARYLAND CORRIDOR ALIGNMENT

AstroDynamiX is a 100% Disabled-Owned (self-reported) enterprise and **Non-Traditional Defense Contractor (NTDC, 10 U.S.C. § 3014)**: under 10 U.S.C. § 4022(d)(1), a Prototype OTA satisfies statutory authority without the one-third non-Federal cost-share of § 4022(d)(1)(C) when any condition of § 4022(d)(1) is met—including (A) *"there is at least one nontraditional defense contractor or nonprofit research institution participating to a significant extent in the prototype project"*, (B) all non-Federal significant participants are small businesses or nontraditional defense contractors, or (D) a written exceptional-circumstances determination by the senior procurement executive. Founder **SDB self-certification** (federal SDB goaling context: 15 U.S.C. § 644(g); eligibility/representation criteria: 13 C.F.R. §§ 124.103(c), 124.104 & 124.1002 & applicable FAR rules; ADA disability documentation under 42 U.S.C. § 12102; biomedical R&D grant-diversity context per NIH Notice NOT-OD-20-031 [grant-policy context only, not an SBA/DoD contracting authority]) is a self-reported representation subject to SBA/FAR solicitation rules, contracting-officer review, and legal counsel verification, alongside 35 U.S.C. § 123 USPTO Micro-Entity status and MD MBE (Md. Code Ann., State Fin. & Proc. § 14-301) & Disability:IN DOBE intake applications in preparation (self-reported; certifications not yet issued) near Fort Detrick, WRAIR, APG, and NIST.

Statement Current as of: November 18, 2026 (Rev 24)

Data Key: Observational (public files) · Reference Model (PDB/reduced grid) · Synthetic (benchmark/fault-injection).