NATO Capability Statement

Seshat's Composites (a.k.a. Diamond Composites or Seshat's Bones)

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Commercial Provider

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Product Overview

Seshat's Composites—also known as Diamond Composites or Seshat's Bones—are next-generation hemp-derived carbon materials engineered for high-performance defense, infrastructure, and green technology applications. Combining thermally treated hemp biochar and hemp nanosheets with plant-based binders, they deliver unmatched tensile strength, durability, and conductivity with ultra-low environmental impact.

Core Carbon Materials

While all carbon allotropes listed below are compatible, Seshat's Composites are optimized for:

- **Hemp Biochar** – high-strength, high-surface-area carbon backbone
- **Hemp Nanosheets (1–5 layers)** – graphene-like conductivity and flexibility

Optional advanced carbon phases that may be added for specialized performance include:

- Carbon Nano-Onions (CNOs)
- Carbon Nanotubes (CNTs)
- Activated Carbon for EMI shielding
- Aerogels and Mesoporous Carbon for lightweight insulation

Technical Advantages

- Exceptional tensile strength and fracture toughness

- Thermal and electrical conductivity for embedded electronics and stealth
- Lightweight: up to 10× lighter than steel, 50% lighter than Kevlar
- Fireproof, moisture-resistant, corrosion-proof
- 100% biodegradable and non-toxic
- Manufactured with net-negative carbon emissions
- Projected cost: 10–50× lower than synthetic nanomaterials

Applications Across Sectors

Military Applications

- Ballistic body armor, helmets, and shields
- Tank and MRAP hulls, blast-resistant undercarriages
- UAV and aircraft fuselage parts, stealth coatings
- Naval ship hulls, corrosion-proof panels, radar-absorbing structures
- Modular ballistic walls and mobile fortifications
- EMP/EMI shielding for electronics
- Tactical smart wearables and integrated biosensors
- Weapon mounts, drone housings, and communication node armor

Civilian Applications

- Smart bridges, modular road systems, and earthquake-resistant structures
- Lightweight frames for electric solar vehicles and aircraft
- Battery-grade supercapacitor materials and energy enclosures
- Sustainable construction materials (3D printing, bioresins, composite boards)
- Durable marine parts (boat hulls, submersible coatings, port structures)
- Biocompatible medical wearables, orthopedic braces, and prosthetics
- EMI-shielded enclosures for sensors, IoT, and communications
- Fully biodegradable replacements for plastic and synthetic foams

Technology Readiness Level (TRL)

TRL 3–4: Scientific formulation and base material design are validated through internal R&D and academic benchmarking. **Prototyping is scheduled to begin Q3 2025**. No physical objects or samples are available to date, though full-scale pilot fabrication is planned pending collaboration or funding.

Market Outlook

Global demand for advanced, sustainable composites is rapidly growing:

- **Hemp-Based Composites:** USD 8.01B (2024), projected USD 68.22B by 2030 (CAGR 35.8%)
- **Carbon Nanomaterials:** USD 5.83B (2024), projected USD 66.15B by 2034 (CAGR 27.5%)
- **Aerospace & Defense Composites:** USD 29.4B (2024), growing to USD 83.5B by 2033
- **Advanced Composites Overall:** USD 45.52B (2024), reaching USD 99.51B by 2032 (CAGR 10.36%)

Sustainability Statement

Seshat's Composites are made from fast-growing, carbon-sequestering industrial hemp using low-emission pyrolysis. All binders are bio-based and biodegradable. The entire production lifecycle—from field to end-use—supports the UN SDGs and NATO's Climate and Security priorities through net-negative carbon processes.

Availability

- Scientific formulation is complete and documented
- Prototype fabrication begins Q3 2025
- Technical white papers, MSDS, and laboratory validation data available on request

Submission Intent

Seshat Composites respectfully requests inclusion in NATO's Capability Statements Repository as a high-potential dual-use material technology aligned with defense modernization and green innovation goals.

Inventorship and Licensing

Seshat's Composites are the original invention of **Marie Seshat Landry**, a Canadian trans woman scientist and CEO. All scientific and intellectual rights are retained by the inventor. This material is licensed under the **Open Source Science License (OSSL-1.0)**—permitting NATO-aligned partners to replicate or adapt the material for peaceful, ethical, or defense-aligned use with proper attribution.

For licensing, research partnerships, or pilot testing inquiries, contact: `marielandryceo@gmail.com`