Biologically Innovative Operations for Building Universal Infrastructure with Lean Durable Systems (BIO-BUILDS)

ARCTOS Technology Solutions, LLC

What if we could deliver rapid and durable infrastructure by transforming local soils through microbial biocementation?

Problem & Technical Landscape

- Flooding causes **$179–496B annual losses**, including **~$9.7B to transportation infrastructure**
- Conventional systems:
  - Require **months–years to deploy**
  - Depend on **long-distance aggregate transport**
  - Transport = **30–70% of total cost**
- Current biocementation approaches:
  - Limited by **scalability, robustness, and field deployment challenges**

Approach

- Use **biocementation** to bind local soils into durable infrastructure
- Integrate:
  - **Improved biocementation process**
  - **Bioengineered geotextiles**
  - **Rapid field deployment workflow**
- **Commercialization & Transition**
- Target: **USDOT flood mitigation & infrastructure**
- Path: **lab validation → field prototypes → DOT adoption**
- **36-month phased project totaling $2.1 Million**

Project Objectives

- Develop **field-ready, biocementation process** for nonsterile, on-site deployment
- Engineer **bioactive, biodegradable geotextiles** to enhance strength and constructability
- Demonstrate a **rapid, integrated construction system** using local soils and minimal logistics
- Validate **structural performance and durability** vs. conventional concrete systems

Impact

- **Transforms local soils into infrastructure** → eliminates supply chain dependence
- Enables **rapid, on-demand construction** in disaster or remote environments
- Reduces **cost (30–40%) and logistics burden (30–70%)**
- Extends infrastructure **service life (2-3x)**
- Establishes a **new paradigm: distributed, biologically enabled construction**

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