

Edison Brothers, LLC— AirCrete

Research Project Pitch

1. The Technology Innovation (3498 characters)

Edison Brothers is tackling a bold challenge: building affordable homes and tiny structures in rural America, specifically the Midwest, using poured aircrete reinforced with proven polyester fabric, adapted to traditional concrete slab foundations. Aircrete is lightweight and insulating, but integrating it with conventional slabs for load-bearing walls is untested, making this a high-risk project.¹ Our Phase I research will validate this adaptation, ensuring structural integrity, safety, and affordability at \$10-30 per square foot versus \$100-200 for traditional methods.¹ This includes single-pour forms for tiny structures. With minimal rural codes, we'll adhere to the International Building Code (IBC) for quality 3 Missouri Building Codes | UpCodes.

Here's what we're researching:

- **Slab Integration:** Anchoring fabric-reinforced aircrete to slabs is novel. We'll develop connection methods like embedded anchors, testing in our 4800 sq ft shop with foam generators and forms producing 36 12x12x4 inch blocks each ⁵ Aircrete 101 – Domegaia.
- **Climate Durability:** Aircrete on slabs must withstand Midwest climates (e.g., 20°F winters, 90°F summers, humidity). We'll test blocks and tiny structure prototypes for moisture and frost resistance, optimizing coatings.
- **Construction Scaling:** Scaling to homes and single-pour tiny structures requires new processes. We'll refine pouring with custom forms and train builders ⁵ Why Aircrete is Irresistible for DIYers - Domegaia.
- **Safety Compliance:** We'll test slab-anchored aircrete against IBC standards for load-bearing and seismic safety, ensuring scalability. This differs from wood/brick homes, which are costlier and less insulating ¹, and autoclaved aerated concrete (AAC), which is factory-made and less flexible ⁶ Aircrete Building System - Aircrete Europe. Our on-site aircrete enables custom shapes like domes and tiny structures, unlike rigid modular homes ⁶ Advantages of a Panel Based Building System - Aircrete Europe. It's better because it reduces costs, boosts energy efficiency, and suits rural Midwest needs. This could create a new market for affordable, green housing in rural America. It'll be adopted because:
- **Affordability:** Lower costs serve veterans, and low-income families, supported by grants ⁸ HUD USER Case Studies.
- **Sustainability:** Less cement and insulation align with eco-trends, like H+H's projects ¹⁰ H+H Case Studies.

- **Durability:** Fireproof and bug-proof, it's ideal for rural upkeep ¹ Aircrete - Steemit.
- **Social Impact:** Aligns with government/nonprofit goals, unlocking funding ⁸ Advantages of a Panel Based Building System - Aircrete Europe. We're proving fabric-reinforced aircrete works with slabs, building on online interest ¹² Designing a Home using poured AirCrete - Omegaia Community Forum. Success means rural America gets cheaper, greener, tougher homes and tiny structures.

2. The Technical Objectives and Challenges (3498 characters)

Edison Brothers aims to prove that poured aircrete, reinforced with polyester fabric, can be used for affordable housing and tiny structures on traditional concrete slab foundations in rural America, specifically the Midwest, at \$10-30 per square foot.¹ This leverages aircrete's lightweight, insulating properties but faces challenges in structural integration, climate durability, and construction scalability.¹ The research and development (R&D) will validate feasibility, ensuring safety and cost-effectiveness while adhering to the International Building Code (IBC) despite minimal rural codes ³ Missouri Building Codes | UpCodes.

Objective 1: Structural Integration with Concrete Slabs

Develop methods to anchor polyester fabric-reinforced aircrete walls to slabs, ensuring load-bearing capacity. This is innovative as aircrete is rarely used with conventional foundations ⁵ Aircrete 101 - Omegaia.

- **R&D Tasks:** Design wall-to-slab connections using embedded anchors or rebar ties, leveraging our 4800 sq ft shop's tools (CNC table, welders). Test prototypes for shear and tensile strength to meet IBC standards.
- **Challenges:** Aircrete's lower strength, ~50% of concrete, risks instability at the slab interface ⁵ Is Aircrete as Strong as Concrete? - BuilderSpace. Weak bonding could cause failure.
- **Management:** Partner with structural engineers to model load paths. Conduct iterative load tests in-shop, adjusting anchor types and fabric density. Use benders for custom rebar. **Objective 2: Climate-Specific Durability** Validate aircrete's performance in Midwest climates (e.g., 20°F winters, 90°F summers, humidity), ensuring resistance to moisture and frost on slabs.
- **R&D Tasks:** Produce test blocks and tiny structure prototypes with our foam generator and forms (36 12x12x4 inch blocks each). Apply waterproof coatings and test for moisture absorption, freeze-thaw cycles, and cracking under simulated weather.
- **Challenges:** Aircrete's porosity can lead to water ingress, causing cracks at slab junctions.¹
- **Management:** Collaborate with materials scientists to optimize coatings. Use shop-based climate chambers for testing, refining mix ratios. Reference H+H's sustainable builds ¹⁰ H+H Case Studies. **Objective 3: Scalable Construction Process** Develop a repeatable process for building aircrete homes and

single-pour tiny structures, scaling from batches to full structures.

- **R&D Tasks:** Standardize mixing and pouring using adjustable and custom single-pour forms. Create training manuals, testing workflows. Build a prototype home and tiny structure ⁵ Why Aircrete is Irresistible for DIYers - Domagaia.
- **Challenges:** Inconsistent mixes weaken structures; single-pour forms are complex. Training unskilled builders risks quality.
- **Management:** Document mix ratios and pouring in-shop, using our woodworking station for forms. Pilot training with local builders, iterating feedback. Leverage DIY insights. **Objective 4: Cost Validation** Prove aircrete's cost savings versus \$100-200 per square foot for traditional builds while maintaining integrity on slabs.
- **R&D Tasks:** Compare material, labor, and energy costs of prototypes versus traditional builds. Quantify savings from reduced cement and insulation, using shop data.¹
- **Challenges:** Initial form costs could offset savings. Market acceptance needs proven affordability.
- **Management:** Use existing tools to minimize costs. Conduct cost-benefit analyses, engaging nonprofits to validate demand. Benchmark against affordable housing case studies ⁸ HUD USER Case Studies. Innovation: Adapting proven fabric-reinforced aircrete to traditional slabs enables conventional housing with lower costs and better insulation than wood/brick, and more flexibility than AAC. R&D ensures feasibility through testing, partnerships, and process optimization.

3. The Market Opportunity (1748 characters)

Edison Brothers' aircrete innovation delivers affordable, sustainable housing and tiny structures in rural America, specifically the Midwest, addressing high construction costs. By integrating polyester fabric-reinforced aircrete with concrete slabs, it achieves lower costs than \$100-200 per square foot for traditional methods, using less material and labor, and boosts energy efficiency with superior insulation, reducing bills.¹ Its durability (fireproof, bug-proof) suits rural needs, offering long-term savings.¹

- **Value and Uses:** The technology enables low-cost homes and tiny structures for veterans, single mothers, low-income families, and eco-conscious buyers. It supports single-family homes, tiny house communities, and emergency housing, with applications in rural development and nonprofit projects.⁸
- **Beneficiaries:** Primary customers are low-income households and veterans, leveraging housing grants. Secondary customers include eco-conscious rural buyers and developers for affordable housing projects. Nonprofits and government agencies benefit by addressing housing shortages.
- **Competitive Landscape:** Aircrete competes with wood/brick homes, which are

costlier and less insulating, and modular homes, which lack customization.¹ AAC is factory-made, expensive to ship, and less flexible for rural use.⁶ Aircrete's edge lies in its DIY scalability, on-site mixing, and slab compatibility, enabling custom designs like domes and tiny structures.

- **Potential to Compete:** The innovation's affordability and sustainability align with rising material costs and green building trends, as seen in H+H's projects.¹⁰ Its focus on underserved communities taps into grant funding, enhancing market entry. Rural suitability and online interest in aircrete signal strong adoption potential, creating a niche for scalable, eco-friendly housing.¹²

4. The Company and Team (1746 characters)

Edison Brothers, a Midwest startup led by retired Air Force veteran Jason Chavies (awaiting SDVOSB certification), is primed to execute this aircrete housing project. Operating from a 4800 sq ft shop with a foam generator, adjustable forms (36 12x12x4 inch blocks each), CNC table, welders, and woodworking station, we've produced multiple aircrete batches, proving hands-on expertise.⁵ Our mission to serve veterans, and low-income families drives our R&D, leveraging Chavies' veteran status for trust and funding eligibility.⁸

- **Team Composition:**
 - Jason Chavies, CEO: Veteran with leadership experience, steering strategy and community outreach.
 - Nathan Chavies, Operations Manager: Manages shop workflows and construction, optimizing processes.
 - Scott Abney, Chief Engineer: Oversees structural design and slab integration, ensuring technical rigor.
- **Suitability:** Our team's aircrete experience, backed by advanced shop tools, enables rapid prototyping and testing.⁵ Jason's leadership fosters community ties, while Abney's engineering expertise ensures safe, slab-compatible designs. Nathan streamlines production, supporting scalable construction for homes and tiny structures.⁵ Our shop's capabilities (form fabrication, single-pour form development) align with rural housing needs.
- **Addressing Gaps:** Gaps in materials science and large-scale construction will be bridged through partnerships with the University of Missouri for testing and trade groups for builder training. Nonprofits focused on veterans and low-income housing will provide market insights, ensuring alignment with community needs.⁸ This positions us to deliver affordable, sustainable homes and tiny structures across rural America.

Key Citations

Aircrete 101: The Ultimate Guide to How to Make Aircrete and Tools – Domegaia:

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<https://forum.domegaia.com/topic/361/designing-a-home-using-poured-aircrete-for-the-walls>
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