Modular Open Source Shelter

THIOS + CO

Transforming 2 billion underutilized parking spaces into productive environments

Role: Founder & Lead Designer
Timeline: August 2024 - Present
Status: First product launched December 2025, generating revenue

Impact: Designed and launched an open-source modular shelter system that converts standard parking spaces into functional environments.

First product: The Whole Thiosphere Catalog. A “How to” guide, in the spirit of The Whole Earth Catalog, now selling, with complete CAD models, physical prototype validated, and the seeds of a community ecosystem established.

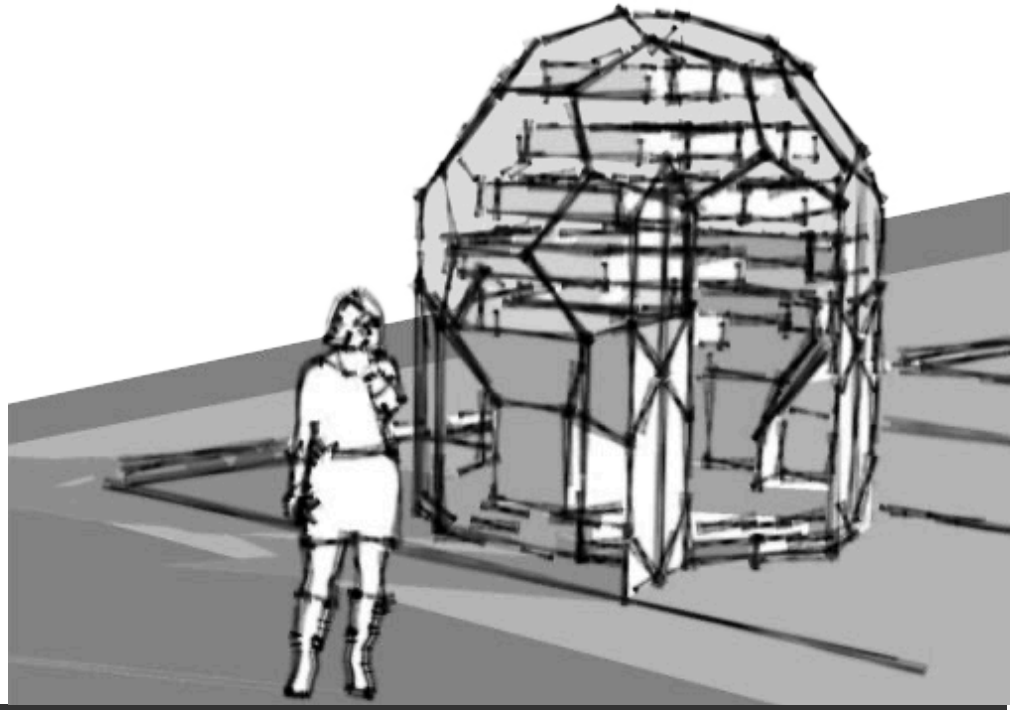
PROBLEM SPACE

North America has 8 parking spaces for every car

That's 2 billion spaces occupying 6,500 square miles

This massive infrastructure sits mostly empty whilst:

- **Remote work revolution**: Need for affordable, flexible workspace outside the home
- **Urban food security**: Limited space for local food production in dense cities
- **Wellness accessibility crisis**: Quality wellness spaces (saunas, cold plunge) remain expensive and exclusive
- **Climate change**: Construction produces 40% of global CO2; we need sustainable alternatives

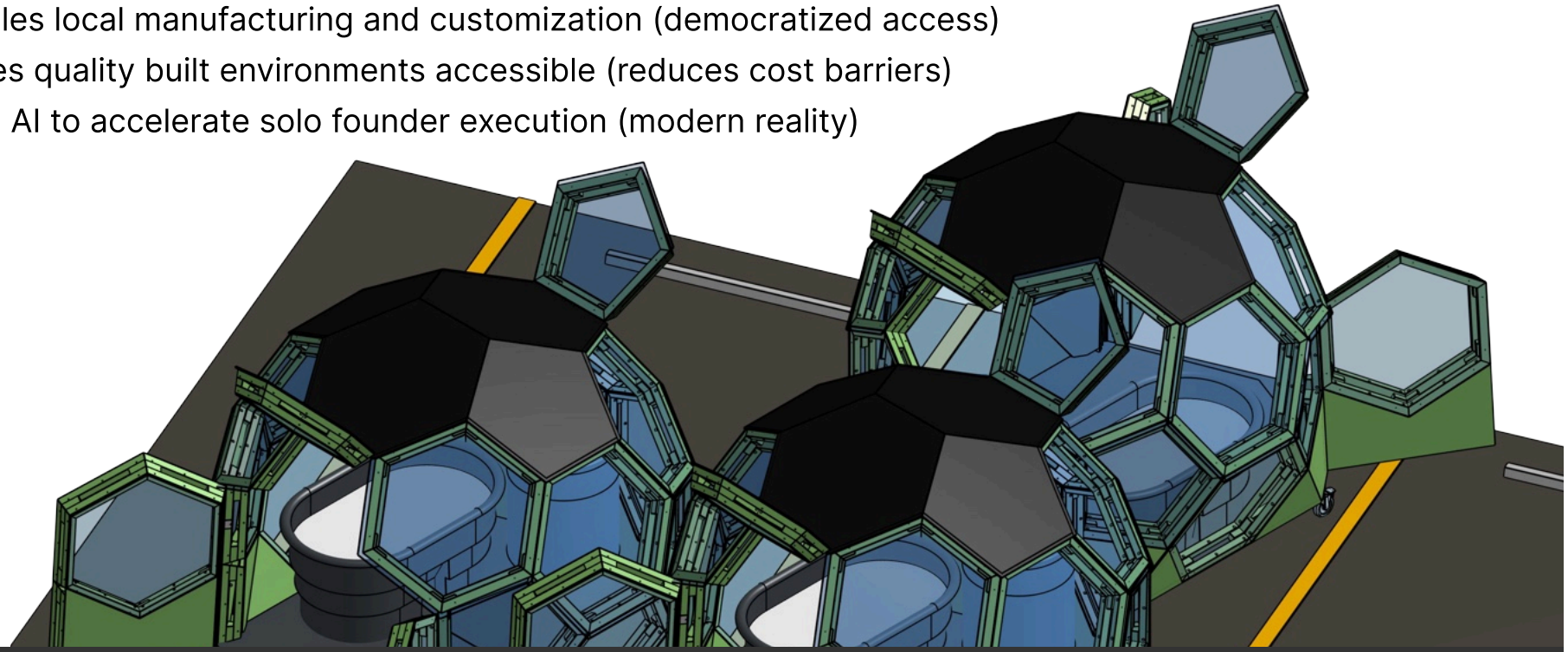


CORE INSIGHT:
We maybe as gods with modern tools, as Stewart Brand famously said, but have also formatted our world for cars

OPPORTUNITY

I set out to build an open-source modular shelter system that:

- Fits standard parking space dimensions (universal compatibility)
- Scales from simple storage to complex urban farms (progressive capability)
- Enables local manufacturing and customization (democratized access)
- Makes quality built environments accessible (reduces cost barriers)
- Uses AI to accelerate solo founder execution (modern reality)



TIMING
AI made now the time to try

APPROACH

Working Solo with AI as Co-Founder

Limited time while supporting my family meant I had to move impossibly fast. I used AI tools like Claude, Cursor, etc. as a force multiplier across every discipline:

Design & Engineering:

- Concept validation and systems architecture
- CAD modeling and design optimization
- Structural calculations and material specifications
- Technical documentation

Development:

- Web platform architecture
- E-commerce integration
- Technical documentation systems
- Marketing copy and storytelling

Business Strategy:

- Market research and competitive analysis
- Business model development
- Pricing strategy and go-to-market planning
- Web content and positioning

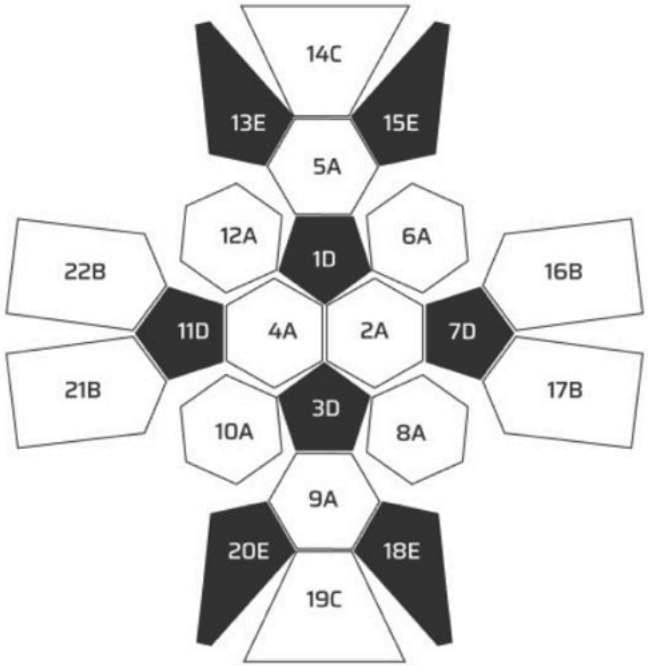
KEY LEARNING:
AI isn't replacing designers. It's a force multiplier. I maintained creative vision and decision-making while AI handled execution in areas I couldn't afford to hire for. **This is the future of lean product development.**

PROCESS

1. System Design: Building a Flexible Foundation

Goal: Create a modular platform that scales from simple to complex use cases

What I Did:
Designed the Thiosphere SDK, a universal base frame with standardized connection points. Established 10ft x 8ft footprint to fit standard parking spaces with clearance



Developed 4 initial variants to demonstrate range and possibility:

1. Saunosphere: Wood-fired portable sauna (wellness)
2. Ergosphere: Battery-powered workspace (remote work)
3. Immosphere: HV AC-equipped entertainment pod (leisure)
4. Agrosphere: Smart greenhouse with aeroponics (urban farming)

OUTCOME:
Modular system with 10ft x 8ft footprint, compatible components, clear upgrade paths

PROCESS

Design Decisions:

Radically simple materials: Every Thiosphere uses just 200 standard 2×4-8's and a bucket of screws and bolts. No exotic materials, no special orders, no waiting for custom parts. Available at any hardware store, anywhere.

Common tools only: Designed for circular saw, drill, and measuring tape. No CNC, no specialized jigs required for basic assembly.

Flat-packable architecture: Every module disassembles into flat components that stack efficiently for shipping and storage.

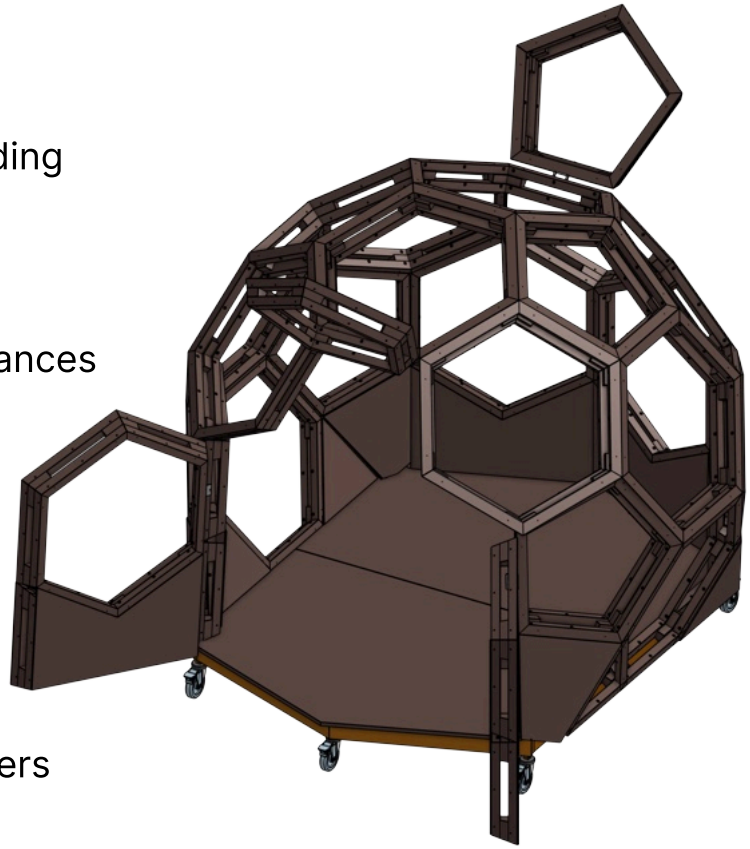
A complete Thiosphere fits in a standard semi trailer

Chose wood frame construction for accessibility (familiar techniques, forgiving material)
Created upgrade paths so users start simple and add complexity over time
Prioritized weather resistance and structural integrity for outdoor installation

PROCESS

2. CAD Development:
Production-Ready Models

Goal: Create manufacturing-ready documentation that enables building



What I Did:
- Built complete 3D models in OnShape for all 5 variants
- Generated technical drawings with precise dimensions and tolerances
- Created assembly sequences and exploded views for builders
- Designed jigs and templates to ensure repeatability
- Documented full bill of materials (BOM) for each configuration

Technical Specifications:
- 14 detailed CAD views per variant
- Downloadable models for modification and customization
- Manufacturing-ready specifications for lumber, hardware, fasteners
- Tolerance planning for real-world material variations

Outcome:
Complete technical package ready for makers, manufacturers, and DIY builders. Anyone with basic woodworking skills can now build a Thiosphere.

PROCESS

3. Physical Prototyping:
Validating the Design

Goal: Prove the concept works in the real world, not just CAD

What I Built:

- Full-scale working prototype in my home workshop
- Tested structural integrity under load and weather conditions
- Refined joinery methods and connection details
- Validated that standard lumber dimensions work (2×4-8)
- Documented entire build process with photography

PROCESS

3. Physical Prototyping:
Validating the Design

What I Learned:

- CAD doesn't know how heavy a 10ft beam is to lift solo
  (design needed adjustment for single-person assembly)
- Weather sealing is harder than it looks
  (added drainage details)
- Standard lumber isn't actually standard
  (dimensional variance requires design flexibility)
- Assembly sequence matters enormously
  (redesigned to reduce awkward angles)

Disassembly taught me as much as assembly.
Taking the prototype apart revealed how the structure wanted to come together, which joints were stressed, and where the design fought against itself. You see your design completely differently when reversing it.

PROCESS

Critical Design Changes from Prototype:

- Added temporary bracing points for solo assembly
- Simplified corner joints to reduce cutting precision requirements
- Changed panel attachment method after discovering waterproofing issues
- Redesigned base connection for better ground contact

Outcome:

Functional prototype that validated core concept while revealing real-world constraints that improved the final design. This physical testing was invaluable. It exposed problems no amount of CAD work would have caught.

PROCESS

4. Business Model & Launch:
Sustainable Open Source

Goal: Generate revenue while keeping designs free and accessible

What I Did:
Developed a tiered value ladder that respects open-source principles:

Tier 1: Digital Plans ($25)
For makers and DIYers who want to build from scratch. Complete CAD files, assembly instructions, BOM.

Tier 2: Templates & Jigs ($50-200)
For repeat builders who value time over money. Precision-cut templates ensure accuracy.

Tier 3: Flat-Pack Kits ($2,000-8,000)
Pre-cut lumber, hardware pack, assembly guide. Like IKEA but for parking space shelters.

Tier 4: Complete Units ($5,000-15,000)
Turnkey solution. We build it, you install it (or we do).

PROCESS

Launch Strategy:
Created Whole Thiosphere Handbook (200+ pages of technical documentation)
Built e-commerce platform at beta.thios.co
Launched with pre-order offer for first 2,000 customers (lifetime updates included)
Positioned as premium but accessible

Outcome:
First product launched December 2024, generating early revenue and validating market demand.
The handbook acts as lead generation for higher-tier products while providing immediate value to early adopters.

PROCESS

5. Open Source Strategy:
Community-Driven Innovation

Goal: Enable global innovation while building sustainable business

What I Did:

- Released designs under CERN OHL v2 (strongly reciprocal license)
- Created vision for WTFosphere marketplace (global component ecosystem)
- Documented APIs for independent suppliers to create compatible modules
- Established quality assurance framework for third-party components

PROCESS

The WTFosphere Vision:
Imagine designing your perfect space by combining:

- Finnish sauna expertise
- Japanese minimalist aesthetics
- German engineering precision
- Brazilian tropical climate adaptations
- Local artisan customization
-

All compatible, quality-assured, globally shippable. The marketplace enables specialists to create modules while maintaining system compatibility.

Why Reciprocal License?
Prevents large companies from taking designs and undercutting. If you improve the design, you must share improvements. This creates a commons that grows stronger over time.

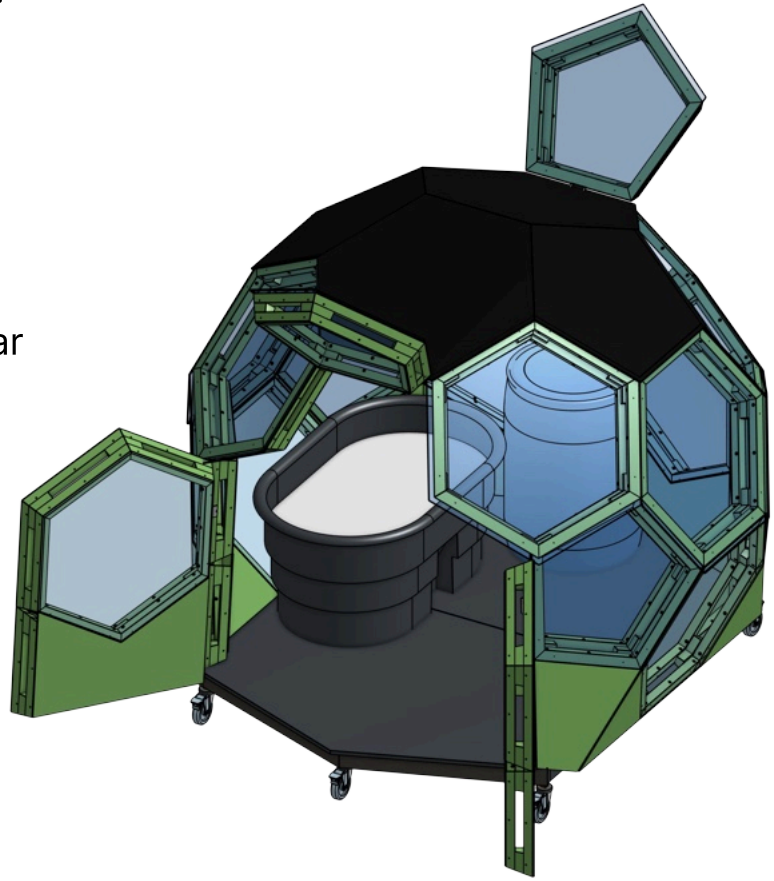
Outcome:
Open-source foundation with share-alike requirements, ready for community-driven innovation.
Early interest from makers, sustainability communities, and potential manufacturing partners.

KEY DESIGN DECISIONS

Why Parking Space Dimensions?
The Constraint Became the FeatureStandardization enables scale. Every parking space is roughly the same size globally.

This seemingly arbitrary constraint created massive advantages:

- Instant compatibility: Fits existing infrastructure everywhere
- Familiar footprint: People understand the size intuitively
- Built-in access: Parking spaces are already flat, accessible, near utilities
- Regulatory simplicity: Often classified as "temporary structure"
- Transport efficiency: Fits on standard truck beds and trailers (especially when flat-packed)



The 10ft x 8ft footprint isn't random.
It's optimized for the world's existing infrastructure. And because every Thiosphere uses just 200 standard 2×4-8's and common hardware, you can source materials locally anywhere in North America, eliminating the exotic supply chain dependencies that plague most modular

KEY DESIGN DECISIONS

Why Open Source?

Democratize Access, Accelerate Innovation

Keeping designs free creates network effects impossible with closed systems:

- Local manufacturing: Lower transport costs, reduced carbon footprint
- Cultural adaptation: Communities customize for climate and culture
- Knowledge sharing: Workshop meetups, skill development, community building
- Rapid iteration: Global collaboration improves designs faster than any single company could
- The Paradox: Making designs free creates more business opportunity, not less. We compete on execution,
- quality, and service, not artificial scarcity.

KEY DESIGN DECISIONS

Why Modular System Architecture?
Start Simple, Grow Complex (And Ship Anywhere)

The modular system delivers three critical advantages:

1. Progressive Investment

Users can begin with a basic shelter and progressively add:
1. Basic frame (shelter only)
2. Plus power system (lights, charging)
3. Plus HV AC (climate control)
4. Plus specialized systems (sauna heater, hydroponics, etc.)

This reduces entry barrier (start for $2K instead of $15K) while creating clear upgrade path (existing users buy more modules). Each module builds on the last, so there's no wasted investment.

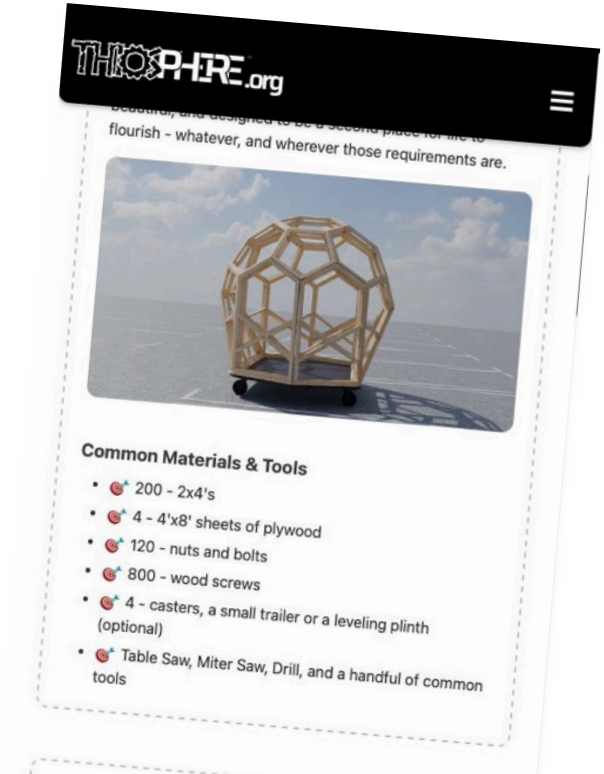
KEY DESIGN DECISIONS

2. Interchangeable Components

Every module uses the same connection system. A wall panel from a Saunosphere works in an Ergosphere. HV AC units swap between variants. Battery systems are universal.

This means:

- Users can reconfigure their space seasonally (sauna in winter, workspace in summer)
- Components have resale value (used module marketplace potential)
- Repairs are simple (swap the damaged panel, not the whole structure)



KEY DESIGN DECISIONS

3. Flat-Pack Logistics

Unlike traditional prefab structures that ship as large, awkward boxes, every Thiosphere disassembles into flat components:

- Complete structure fits in standard truck bed (8ft length)
- Efficient stacking reduces shipping costs dramatically
- Easy storage when not in use (winter storage, moving, seasonal setups)
- Enables economical global shipping (container optimization)

This wasn't just convenient. It was essential for making the business model work. Shipping costs kill most hardware startups. Flat-pack architecture made affordable distribution possible.

KEY DESIGN DECISIONS

Why AI as Co-Founder?

Move Fast Without Compromising Quality. Solo founders face impossible tradeoffs: great design OR fast execution. AI collapsed this tradeoff.

I used AI to:

- Maintain quality across disciplines I'm not expert in (structural engineering, business strategy)
- Iterate rapidly on complex problems (100+ design variations explored)
- Generate comprehensive documentation (200+ page handbook in weeks, not months)
- Execute go-to-market without hiring marketing team

What AI Did Well:

- Technical calculations and specifications
- Content generation and documentation
- Competitive research and synthesis
- Code generation for web platform

KEY DESIGN DECISIONS

What AI Couldn't Do:

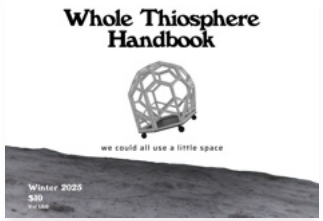
- Make strategic decisions (which variant to build first?)
- Understand physical constraints (how heavy is a 2×6?)
- Judge aesthetic quality (does this look good?)
- Navigate human relationships (early customer conversations)

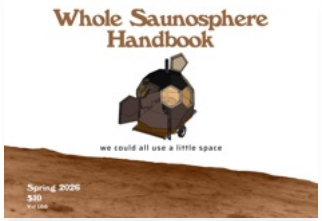
I stayed in creative control. AI was the execution engine.

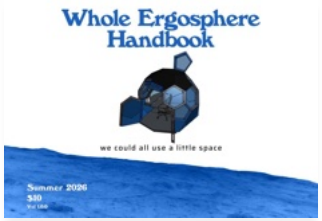
RESULT

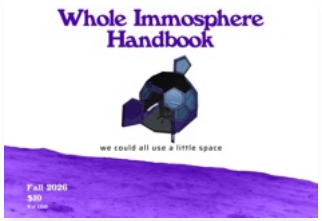
Product Launch

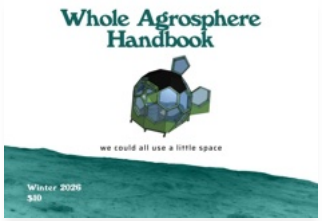
- First product shipped: Whole Thiosphere Handbook available for purchase
- Complete ecosystem designed: 5 variants with full CAD models and documentation
- Physical prototype validated: Built and tested in real-world conditions
- Web platform live: E-commerce, docs, community resources at beta.thios.co
- Open-source release: CERN OHL v2 license enabling community contributions











RESULT

Business Metrics

Current Status (as of January 2025):

- Handbook sales generating revenue with lifetime update commitment
- Pre-order campaign active for first 2,000 customers
- Organic engagement from maker communities, sustainability groups, tiny home enthusiasts
- Media interest in housing crisis, climate solutions, and AI-augmented design stories

Revenue Model Validated:

- Price tiers from $25 (digital plans) to $15K+ (complete units)
- Multiple entry points create accessible pathway for different budgets
- Recurring revenue potential through templates, jigs, upgrade modules

Community Traction:

- Early adopter feedback shaping product roadmap
- Interest from potential manufacturing partners
- Requests for custom variants and regional adaptations

RESULT

Personal Learnings

AI-Augmented Product Development is Transformative
I've lived the future of solo entrepreneurship. One person can now execute what previously required a full team while maintaining quality and creative vision. This isn't about AI replacing designers. It's about radical leverage for independent creators.

Design at Intersections Creates Moats
Physical plus digital plus business plus community isn't just "full stack." It's understanding how systems connect and reinforce each other. The magic happens at the boundaries between disciplines, not within them.

Open Source Plus Commercial Works (But Requires Nuance)
The tension between free access and sustainable business creates interesting constraints that lead to better solutions. You can't just "be open source." You need a thoughtful model that rewards contribution while enabling business sustainability.

WHAT'S NEXT

Near Term (Q1 2025)

- Scale handbook sales and gather builder feedback
- Release detailed build videos and step-by-step documentation
- Develop physical templates and jigs for purchase
- Test flat-pack kit logistics (sourcing, packing, shipping)
- Document first customer builds as case studies

Medium Term (2025)

- Launch Saunosphere as second standalone product
- Establish pilot manufacturing partnerships for flat-pack kits
- Build community showcase gallery of completed Thiospheres
- Develop certification program for professional builders
- Expand to regional climate adaptations (extreme cold, tropical, arid)

WHAT'S NEXT

Long Term Vision

WTFosphere Marketplace Launch:

Global platform connecting independent suppliers creating specialized modules. Anyone can design and sell compatible components:

- Solar panel kits optimized for Thiosphere mounting
- HV AC systems designed for 80 sq ft spaces
- Interior fit-outs for specific uses (recording studio, therapy office, pottery workshop)
- Regional climate packages (insulation, ventilation, heating)
- Custom aesthetic finishes and materials

Quality assurance ensures compatibility. Open protocols enable innovation. Global network creates resilience.

This is Lego for parking spaces. Endless recombination, global collaboration, local manufacturing.

REFLECTION

What Worked

AI as Force Multiplier
Accelerated development 10x across disciplines I couldn't afford to hire. Changed the economics of hardware startups.

Modular Thinking
Starting with flexible foundation enabled rapid variant development. One base system led to five products, which opens up infinite future possibilities.

Open Source Plus Business Model
The apparent contradiction created a better solution than pure commercial or pure open.

Constraints breed creativity.
Physical Prototype in software.

REFLECTION

What I'd Do Differently

Start with Smaller MVP
I built 5 variants when 1 would have validated the core concept faster. Scope creep is real, even when you're excited.

Engage Community Earlier
Should have gathered makers and builders during design phase, not after launch. Their feedback would have improved the product and created early champions.

Document with Video from Day One
I have photos but wish I'd filmed the entire prototype build. Video content is 10x more valuable for teaching and marketing.

Pre-Sales Before Full Build
Could have tested demand with concept and rendering before building complete ecosystem. Validate willingness to pay earlier.

REFLECTION

What This Taught Me About Enterprise Design

Speed Without Sacrificing Quality is Possible
AI lets small teams move like startups while maintaining enterprise-level polish. The future of product development is solo founders with AI leverage, not massive teams.

Systems Thinking Scales Across Contexts
The modular approach applies to design systems, platform architecture, organizational structure, and business strategy. Learn to think in composable systems.

Open Approaches Accelerate Innovation
Enterprise instinctively protects IP, but open-source models create network effects impossible with closed systems. The value shifts from ownership to orchestration.

Solo Execution Validates What Matters
Being forced to do everything yourself reveals what actually drives value versus nice-to-haves. Constraints clarify priorities ruthlessly.

CAPABILITIES DEMONSTRATED

- **0 to 1 Product Development:**
  Concept through launched, revenue-generating product
- **AI-Augmented Workflows:**
  Practical integration of AI across disciplines
- **Physical Plus Digital Design:**
  Hardware/software hybrid thinking
- **CAD/3D Modeling:**
  Production-ready technical documentation
- **Business Model Innovation:**
  Open-source plus commercial hybrid economics
- **Systems Architecture:**
  Modular platforms that scale and evolve
- **Go-to-Market Strategy:**
  Multi-tier products, pricing, positioning
- **Community Building:**
  Open-source engagement and contribution models
- **Strategic Constraint Application:**
  Turning limitations into competitive advantages