Drooid – modular nanodrone swarms for impossible jobs

Daniel Kalu and Fitz Doud · May 2025

2 | Problem

Real-world tasks nobody can do safely or cheaply today:

- Too dangerous: collapsed buildings, toxic gas sites
- Too remote: tight caves, flooded tunnels, underwater pipework
- Too complex: GPS-denied, dynamic, or unmapped geometry

Current robots are too big, brittle, and single-purpose. First responders and field scientists still rely on humans in harm's way.

Swarm systems provide resilience: if one bot fails, others can complete the mission. Centralized designs don't offer that.

3 | Solution

Swarms of palm-size drones & crawlers that team up like insects

- Fly · Crawl · Swim units mix & match per mission
- Rapid AI-to-Print pipeline → new design in days, not months
- Physics-checked missions = higher success, lower loss rate

4 | Why Now

- Battery energy density ↑ 2× in 8 years
- On-device AI chips < $100
- Newlab Michigan Central gives us $500k of prototyping gear for $0 cap-ex

Timing is perfect for field-ready swarms.

5 | Tech Stack (Core Components)

- **Swarm Hardware Prototypes** – lightweight, modular nano-bots
- **AI-to-Print Pipeline** – GPT-CAD → 3D print → bench in <72 h
- **Constructor-Theory Feasibility Engine** – filters impossible tasks
- **Hive Box** – backpack hub that offloads compute & comms
- **Book of Nature** – growing database of what tasks work where

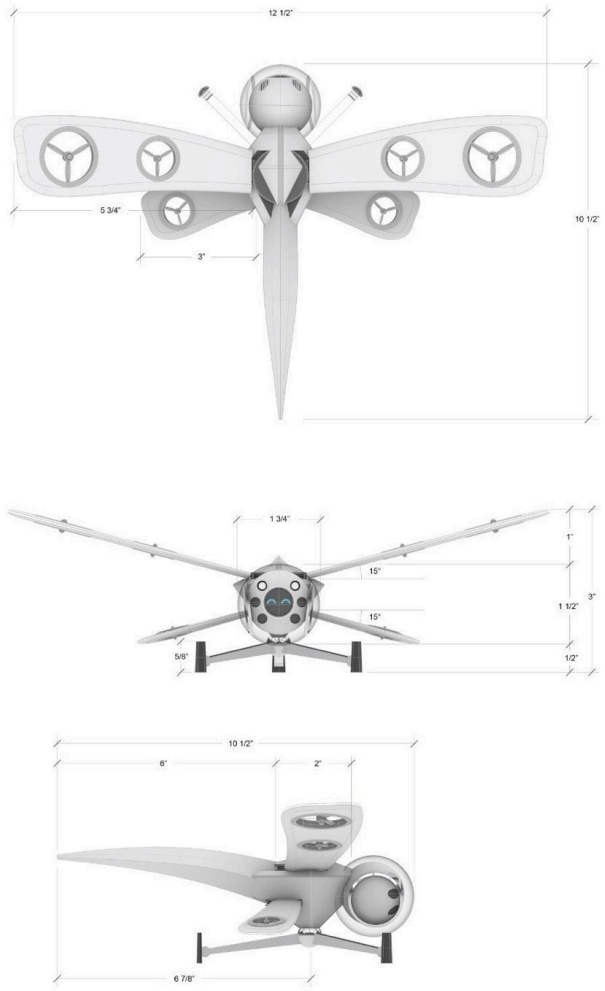
5.1 | Biomimetic Swarm Designs

Field-Ready Forms Inspired by Nature

"These designs are not theoretical art — they are reference points for real, buildable nano-robotic swarms."

- Bioinspired forms allow stealth, agility, and mission adaptability.
- Each unit is task-specific: fly, crawl, swim.
- Compact, field-deployable, and fit in backpack kits for real-world missions.
- Feasible today — prototyping can begin now with COTS parts and rapid fabrication.

5.2 | Dragonfly-Class (Aerial Recon Drone)



Use Cases:

- Indoor or outdoor search-and-rescue
- Gas leak scouting
- Rooftop or tunnel ventilation analysis
- Infrastructure inspection (bridges, fire zones, under-roof)

Mission Features:

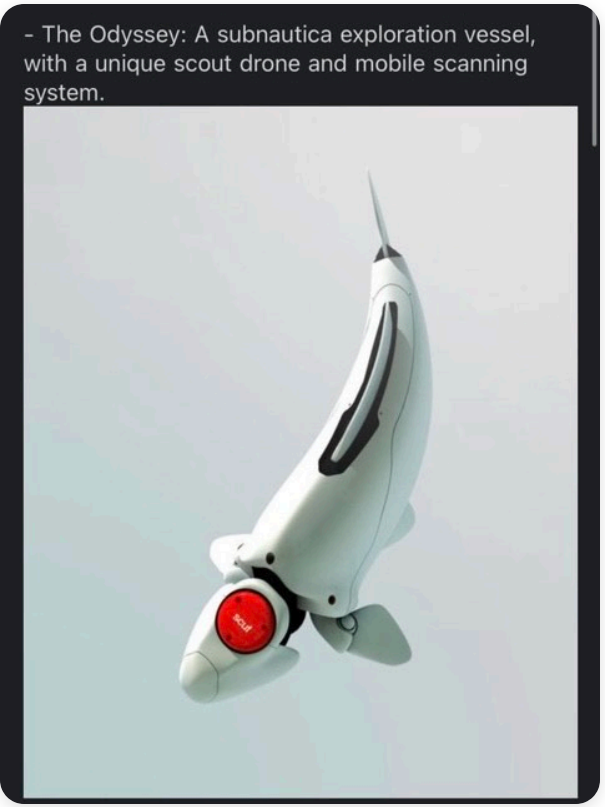
- Vertical Takeoff (VTOL) for tight spots
- Stable hover for high-res imaging
- Forward flight for perimeter sweeps
- Ducted fans for safety in indoor/confined spaces

Example Mission:

> *Map an unstable, GPS-denied building after an earthquake to find safe entry points and gas concentrations.*

Wings and body are designed for maximum lift and maneuverability in cluttered environments.

5.3 | Fish-Class (Aquatic Recon Drone)



Use Cases:

- Flooded tunnel inspection
- Urban storm drain mapping
- Nuclear cooling pool or marine site monitoring
- Environmental water testing

Mission Features:

- Silent aquatic motion using biomimetic flippers
- Sensor payloads for salinity, turbidity, pressure
- Can relay data back via surface drones or swarm beacons

Example Mission:

> *Swim through a collapsed sewer line to detect chemical spills and structural damage.*

Streamlined for low drag and equipped for tight underwater navigation.

5.4 | Orb-Class (Communication/Rescue Ball Drone)

Use Cases:

- Two-way communication with trapped victims
- Swarm node or repeater for underground swarms
- Deployed in disaster rubble by rolling or air-drop

Mission Features:

- Loudspeaker + mic for emergency teams
- Flashlight beacon for visibility
- Ruggedized outer shell for chaotic debris fields
- 150 ft voice range, hands-free operation for victims

Example Mission:

> *Drop into a collapsed mine shaft to establish comms with trapped workers and light the interior.*

Designed for maximum durability and clear audio in harsh environments.

5.5 | Why This Matters

- Each class does one job well.
- They operate in dangerous, unmapped, or GPS-denied zones.
- Together, they form a swarm that can map, measure, and communicate across terrain types.

6 | Unique Edge

Most robotics platforms rely on statistical guesswork. Drooid is vertically integrated from physical limits up:

- Swarm designs, fabrication, and deployment are rapid and tightly coupled—changes in the field inform redesigns overnight.
- Hardware, software, and operating logic co-evolve as one system, not siloed tools stitched together.
- Constructor-theoretic feasibility checks reject doomed tasks before they waste energy, crash, or fail silently.
- Vertical stack from mission to motor—we control task spec, part design, swarm logic, and field deployment.
- Rapid deployment capability—we can take a new mission concept and produce a deployable swarm in under a week.
- Every failed mission teaches the system—the Book of Nature captures feasibility data and improves task success over time.

This leads to: fewer crashes, faster iteration, and a clearer ROI for high-risk, high-value field deployments.

6.1 | Vertical Integration Advantage

"Vertical integration is an under-explored modality of technological progress." — Peter Thiel

- **Drooid owns the full stack**: hardware, AI design, feasibility OS, and swarm data.
- **Atoms + Bits under one roof** at Newlab: design, print, test, and deploy in a single loop.
- **No middle layers**: Hive Box and Book of Nature keep intelligence local.
- **Hard to copy**: our vertically integrated pipeline is like a Tesla gigafactory for swarm robotics.

6.2 | Project-First Philosophy

"Let it be a project before it's a company." — Sam Altman

- This is not a $500k pitch to finish an idea.
- It's a $500k sprint to prove a new class of robotics is real, field-ready, and scalable.

Pre-seed = Proof of Feasibility

- Fund 3-bot swarm demo + cost curve BOM
- Validate physics, unit economics, and demand before scale
- Spin into full product company only after technical signal is clear

Investors aren't buying hype. They're backing the search for scalable reality.

7 | Business Model

Hardware + "Swarm-as-a-Service"

- Starter kit (10 bots + Hive Box): $25k COGS $8k
- Software & maintenance: $1k / mo / swarm
- Beachhead = fire & rescue → expand to mining, energy, env-monitoring

7.1 | Market Focus—Jobs We Solve

Instead of slicing the market by customer type, Drooid targets *critical jobs that no existing tool completes well.*

Job to Get Done	Current Pain	Drooid Swarm Advantage
Map a collapsed or smoke-filled structure in <5 min	Manual entry is lethal and slow; ground robots fail on rubble	Air-hover nano-bots create a real-time 3-D map plus toxic-gas overlay in a single flight
Inspect a flooded tunnel without draining it	Divers and ROVs are bulky, costly, risky	Fish-class swimmer navigates tight bends and streams HD video live
Relay comms deep underground	Radio blackouts stall rescue operations	Orb-class relay bot forms an instant mesh network that follows the team
Sense methane leaks across sprawling well pads	Helicopters are expensive; fixed sensors miss moving plumes	Dragonfly flyers sweep grids autonomously and cut per-acre cost by an order of magnitude

Why this matters

When customers face these jobs, Drooid is the obvious hire: precise, fast, and safer than humans or legacy machines.

Each job anchors pricing, product specs, and go-to-market—keeping R&D and sales laser-aligned on real value.

8 | Summer Build Plan (June–August)

We're building Drooid's first working swarm this summer. Hardware, AI, swarm logic, and control systems—everything built and tested by end of August.

Bi-Weekly Plan (Part 1)

Date Range	Focus	Outcome
May 27–Jun 2	Order parts, set up Jetson + ROS	Tools ready, test board boots
Jun 3–16	Print first bots, build swarm base	First bots fly, basic swarm script
Jun 17–30	Finish 3-bot swarm, run formations	Indoor swarm flight tested
Jul 1–14	Build fish drone, test air-water	Cross-medium handoff works

8.1 | Summer Build Plan (June–August) (cont'd)

Bi-Weekly Plan (Part 2)

Date Range	Focus	Outcome
Jul 15–28	Run full demo, prep for outdoor	Mission runs start to finish
Jul 29–Aug 11	Outdoor mapping + leak detection	Swarm detects and logs field tasks
Aug 12–25	Final fixes, polish swarm control	Stable, reliable swarm system
Aug 26–31	Demo + pitch prep	System ready for seed raise

Goal:

Have a 5-bot swarm system completing real-world tasks by end of August.

Use it to start seed fundraising and pilot outreach in September.

9 | Use of Funds

Ask: $500k SAFE, post-money cap $6M

Category	Amount	Purpose
Builder Stipends (4 builders)	$120k	$2.5k/month avg to live and build full-time
Prototyping + BOM Materials	$100k	Covers parts for ~20 swarm bots, sensors, Hive Box rebuilds
Field Testing + Pilot Support	$60k	Permits, insurance, facilities, field logistics
Strategic Hires	$40k	Short-term CAD, AI, or swarm contractors
Travel + Demo Missions	$40k	VC meetings, pilot site visits, government demos
Legal & Ops	$20k	SAFE paperwork, IP, incorporation
Runway Buffer	$120k	5–6 month buffer in case grants delayed

This is not a $500k pitch to finish an idea.

It's a $500k sprint to prove a new class of robotics is ready for the field—and ready for scale.

10 | Leverage Non-Dilutive Cash

- NSF SBIR Phase I: $275k (submitted)
- AFWERX Tactical Funding: $75k (LOI in draft)
- Michigan SPARK Prototype Grant: $100k match

Grants stretch investor money +9 months.

11 | Early-Investor Value Proposition (June 1 kickoff)

Your job-to-be-done as a pre-prototype investor:

- **De-risk core physics + manufacturing loop** — fund the sprint that proves 3-bot swarm can go design-to-flight in <30 days
- **Secure seat in complex monopoly** — vertical stack = long-term moat
- **Shape the platform** — direct input into BOM, vendors, and first use case
- **Price advantage** — $6M cap SAFE now vs $15M cap post-revenue

Milestone your check enables by Aug 31:

10-minute autonomous gas-mapping demo with 3 nano-drones in Detroit FD tower.

12 | The Ask

Invest $500k via SAFE @ $6M cap

Funding gets us to swarm demo + paid pilot inside 12 months.

Let's build the swarm that keeps people out of danger.

Team & Newlab Advantage

- Fitz Doud – robotics platform engineer, ex-open-source maintainer
- Daniel Kalu – CS grad from Minerva, AI/ML & swarm control
- Newlab @ Michigan Central – SLA/SLS printers, drone cage, motion-capture lab

Thank You

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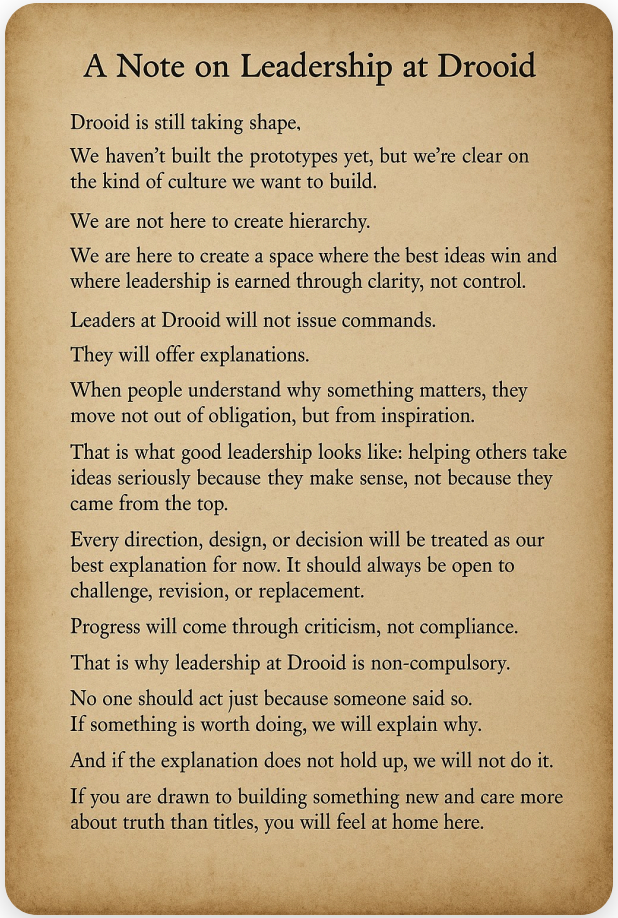
Join us in building the future of rescue robotics.

Drooid Leadership



A Note on Leadership at Drooid

Drooid is still taking shape.

We haven't built the prototypes yet, but we're clear on the kind of culture we want to build.

We are not here to create hierarchy.

We are here to create a space where the best ideas win and where leadership is earned through clarity, not control.

Leaders at Drooid will not issue commands.

They will offer explanations.

When people understand why something matters, they move not out of obligation, but from inspiration.

That is what good leadership looks like: helping others take ideas seriously because they make sense, not because they came from the top.

Every direction, design, or decision will be treated as our best explanation for now. It should always be open to challenge, revision, or replacement.

Progress will come through criticism, not compliance.

That is why leadership at Drooid is non-compulsory.

No one should act just because someone said so.
If something is worth doing, we will explain why.

And if the explanation does not hold up, we will not do it.

If you are drawn to building something new and care more about truth than titles, you will feel at home here.