BleedIO Tech — Technology Thesis

Why the Architecture Wins. Why Now.

Date: March 2026 | **Confidential — Investor Use Only**

The Core Insight

Every real-time IoT system in use today has a hidden dependency: it requires infrastructure to exist before the network can operate. Wi-Fi requires access points. Cellular requires towers. LoRaWAN requires gateways. Zigbee requires a coordinator. When that infrastructure fails — in a fire, in a contested environment, in an oil refinery with no connectivity backbone — the network dies.

BleedIO's DRAW Mesh eliminates that dependency entirely.

Every node in a BleedIO network is simultaneously a sensor, a relay, and a router. There is no hub. There is no gateway. There is no single point of failure. The network forms, heals, and routes around damage automatically — in under 3 seconds. It moves with the people and assets it tracks. It works where nothing else works.

This is not an incremental improvement on existing IoT. It is a different architecture, built on a different open standard (DRAW Mesh / BLE 5.0+), producing capabilities that no competing system can deliver.

The Technology Stack

Layer	What BleedIO Built	Why It Matters
DRAW Mesh Protocol	Hubless BLE mesh on open standard	No vendor lock-in; no infrastructure dependency
Edge Orchestration	On-device provisioning, routing, OTA management	Zero-touch deployment; works offline
"Network in Advance"	Pre-provisioned mesh deployed before entry	Fire, defense, emergency: network is live the moment teams arrive
Edge AI	On-device anomaly detection, zone logic, telemetry filtering	Intelligence without cloud latency or connectivity
RTLS Engine	Sub-2m real-time location via BLE signal processing	Worker safety, asset tracking, firefighter accountability
Multi-Tenant SaaS	Cloud management layer for enterprise fleet oversight	Recurring revenue; enterprise-grade governance

BLE 6.0 Channel Sounding — The Next Technical Horizon

The current RTLS engine delivers sub-2m accuracy using BLE RSSI and multi-anchor triangulation. **BLE 6.0 Channel Sounding (CS)** — entering production with Nordic nRF54LM20A chipsets in 2026 — will extend this to **10–50cm accuracy** using phase-based ranging across 80 MHz of frequency diversity.

This unlocks three new market categories that RSSI-based systems cannot serve:

1. **Tool-level asset tracking** — distinguishing which tool is in which drawer in a manufacturing cell (not just which room)
2. **Surgical-grade personnel accountability** — zone-level accuracy for operating theater tracking
3. **Defense positioning in GPS-denied environments** — precise drone and operator positioning without satellites

BleedIO's architecture is designed to upgrade to BLE CS via OTA firmware push — no hardware replacement required for customers using BLE 5.3+ chipsets. Competitors built on proprietary hardware cannot make this transition.

The Defense Angle — netMESH

The same hardware that runs locMESH for commercial RTLS can be reconfigured as **netMESH** — a tactical DRAW Mesh radio for contested environments.

This matters for three reasons:

1. Market timing. The U.S. DoD's Drone Dominance program targets $5K per drone (dropping to $2.3K). Existing tactical mesh radios — Silvus StreamCaster ($5–15K), Persistent Systems MPU5 (~$30K) — cost more than the drone. The military needs sub-$100, sub-50g mesh networking. BleedIO is the only commercially available architecture that fits those economics.

2. Government contracts de-risk the business. SBIR Phase I ($250K) → Phase II ($2M) → OTA/IDIQ pathway. CAGE/SAM/UEI registrations are complete. SBIR pipeline reopens upon Presidential signature of S.3971 (passed both chambers, March 2026). First SBIR application ready to file.

3. Dual-use creates a land-and-expand flywheel. Commercial revenue (locMESH) funds the company. Defense contracts (netMESH) validate the technology at the highest standard of reliability. Defense validation creates a reference that no commercial RTLS competitor can match.

Why This Architecture Is Difficult to Copy

Barrier	Detail
3–5 years of engineering	No-hub mesh orchestration with <3s self-healing requires ground-up architecture — not an add-on to existing systems
Field data	3+ months of production telemetry at Chevron (steel/metal refinery), fire departments (active burn environments), maritime — irreproducible without equivalent deployments
IP	"Network in Advance" patent pending (#63/804,380, May 2025); 2nd provisional Oct 2025; 8 invention disclosures; copyright on gateway stack
Open standard moat	Built on DRAW Mesh / BLE 5.0+ — not a proprietary protocol. BLE CS upgrade is firmware-only for existing hardware
Ecosystem integration	Snap-on OEM, Lufthansa IS reseller, 100+ integrators on waitlist — embedded in distribution channels that competitors cannot easily displace

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Comparable Technology Exits

Company	Acquirer	Value	Why Comparable
Silvus Technologies	Motorola Solutions	$4.4B (15–20× rev)	Mesh radio networking for defense — same market ceiling
Cradlepoint	Ericsson	$1.1B (~8.5× ARR)	Always-on wireless edge for enterprise — same recurring model
Nozomi Networks	Mitsubishi Electric	~$1B (8–12× ARR)	Mission-critical OT/IoT infrastructure — same industrial positioning
Edge Impulse	Qualcomm	Strategic	Edge AI for IoT — BleedIO's AI layer analog

BleedIO's convergence of DRAW Mesh + edge AI + RTLS + defense applicability represents a combined exit surface larger than any single comparable.

Current Technical Validation

Evidence	What It Proves
Chevron (live, 3+ months)	Mesh reliability in hostile RF (metal-dense refinery); real-time telemetry without cloud
Snap-on Tools (paid pilot)	OEM firmware integration into enterprise manufacturing tooling
Oracle Red Bull Racing (paid events)	High-density, high-mobility environment; equipment logistics and crew accountability
2 Fire Departments (active)	Network deploys and operates with zero infrastructure in active fire environments
Carbon Reform (signed)	Industrial sensor network for environmental compliance
Lufthansa Industry Solutions (channel)	Enterprise distribution validation across maritime and aviation verticals

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The Roadmap

Phase	Timeline	Milestone
Current	2026	$245K ARR target; SBIR Phase I; Ignite Conference (48 fire depts); BLE CS chipsets entering market
Scale	2027	Series A at $1M ARR; SOC 2 Type I; Cloud AI analytics layer; 3–5 defense contracts
Platform	2028	AI Ops Copilot; ambient sensing; Villanova math model validation; 10+ OEM integrations
Exit	2028–2030	Strategic acquisition by industrial conglomerate, defense prime, or cloud platform (Motorola, Siemens, Cisco, AWS)

Why Now

Three forces converge in 2026:

1. **BLE 6.0 Channel Sounding** enters production — extending BleedIO's accuracy from 2m to 10cm without hardware replacement
2. **SBIR reauthorization** (S.3971) reopens the government funding pipeline — BleedIO is application-ready on day one
3. **Defense attritable economics** force the DoD to find sub-$100 mesh solutions — the market now requires what BleedIO already built

Investors who enter at the $6M Seed cap are buying the inflection point, not the outcome.

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