



VESTIGE DEFENSE

Subterranean and Urban Autonomy

Drop the swarm. Walk away. Surveillance runs for months.



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Founder Cade Dalton in a Hamas tunnel · Gaza border, hosted by Yahalom

01 - THE PROBLEM

Denied space is no longer the exception.

Tunnel exploration and clearance is one of the highest-risk missions in modern warfare.

Today the mission runs on continuous human presence: soldiers, dogs, and robots with an operator in the loop.

No persistent, unattended capability exists. When the team leaves, the tunnel goes dark.

Vestige builds the third option: surveillance that stays after operators leave.

01 - THE PROBLEM · QUANTIFIED

The subterranean threat is named and dated. Five representative theaters. One unsolved domain.

GAZA

1,000_{km}

Hamas tunnel network under a 41 km strip. Multi-level - electrical, ventilation, command. IDF Operation Iron Swords (since Oct 2023). Estimate given by IDF December 2025.

LEBANON

6_{+ tunnels}

Hezbollah cross-border attack tunnels into northern Israel. Operation Northern Shield 2018. More suspected post-Oct 2023. Israel actively clearing and destroying these tunnels.

SW BORDER

200_{+ tunnels}

CBP-discovered cross-border smuggling tunnels since 1990. The 1,313 m San Diego-Tijuana tunnel had rail and ventilation.

PRC

5,000_{+ km}

PLA Rocket Force "Underground Great Wall" - hardened tunnel infrastructure housing nuclear + strategic assets. (Karber, 2011)

IRAN

100_{m+ depth}

IRGC-disclosed subterranean missile bases (2020-2025), reportedly under 100m+ of rock per Iranian state media and Alma Research Center satellite-imagery analysis.

US and allied force casualties in the manned clearance of these networks are unacceptable. **The mission is still run by humans and dogs. The cost is measured in deaths.**



Hamas Tunnel Entrance · Israel/Gaza Border

01 - THE PROBLEM · WHY NO ONE SOLVED IT

What exists does not solve persistence.

Three approaches exist today. Each one leaves the area unwatched.

Manned clearance

IDF Yahalom and US combat engineers clear tunnels on foot, putting soldiers inside the most ambush-favorable terrain in warfare. Clearing runs days per kilometer. When the unit leaves, surveillance and reconnaissance leave with it.

Surface sensor mesh

Anduril's Sentry towers and Lattice mesh watch the surface, and stop there. Soil and layered concrete block the radio links these networks depend on (40-80 dB of attenuation), and GPS does not exist underground. A billion-dollar surface network can stand directly on top of a tunnel and see nothing.

Tethered robots

Ghost V60, Spot, and Shield AI all need an operator nearby or a line-of-sight radio link. That works for a raid measured in hours, not surveillance measured in months. DARPA's Subterranean Challenge ended at mapping: explore and exit, not stay and watch.

03 - THE ANSWER

Drop. Leave. Uplink.

Operator deploys V-Suite during a primary SOF mission. Surveillance runs unattended for 90-180 days. Operator is remote, not absent.

01

DROP

Deposit at depth

SOF operator carries V-Hex Operator - a recoverable hexapod - into a tunnel during a primary mission. Robot deposits autonomous V-Node sensors at chokepoints, junctions, chambers. Team exfils with or without the hexapod. Sensors stay.

02

LEAVE

Run unattended

Mesh of V-Nodes networked over 2.4 GHz ESP-NOW (Rev3 migrates to sub-GHz US-origin). Each node: 24 GHz mmWave HUMAN-class radar + 6-axis IMU with hardware ML core (on-node gait classification roadmapped). Radar presence fused with footstep cadence or sustained-dwell signatures. HMAC-SHA256 message authentication + anti-replay shipping today; AES-128-CCM radio encryption and cryptographically-derived FHSS (provisional claim #63/999,948) roadmapped for Rev3.

03

UPLINK

SATCOM to ATAK

Detection mesh-routes to V-Gateway at the entrance. Iridium Certus or Starlink Mini burst-uplinks alerts to ATAK on the operator's laptop - anywhere. Unmanned presence inside denied space.

03 - THE ANSWER

90–180 days

of persistent subterranean surveillance and reconnaissance.

No operator on site.

03 - THE ANSWER · PLATFORM FAMILY

One family. US-origin. Section 889 / 1260H clean.

Pre-seed builds the top row. Phase II or Series A builds the rest.

PRE-SEED / V0 DELIVERABLES

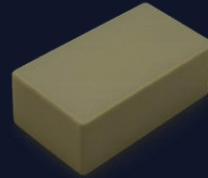


V-Hex Operator

Recoverable hexapod

\$13K BOM, V1 \$16-22K at qty 100-1000

2 prototypes for V0



V-Node

Dual sensor + mesh relay

\$23 BOM at qty 100K

25 Rev2 delivered and live



V-Gateway

Mesh root + satcom uplink

Iridium Certus / Starlink Mini

PoC integration during pre-seed

PHASE II / V1 EXPANSION



V-Mapper

Tracked mothership



V-Hex Scout

Expendable swarm



V-Drop

Micro aerial — vertical shaft

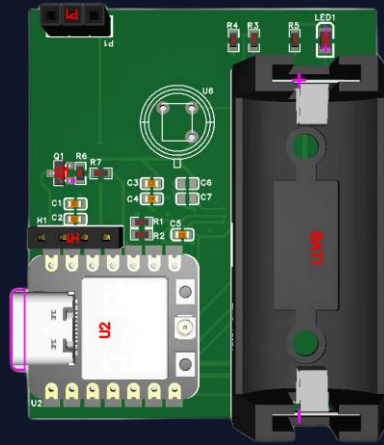


V-Station

Autonomous Charging FOB

We are not pitching slides.

Two platforms running today. V-Hex Operator V0 builds during the round and inherits the autonomy stack developed and proven on JetHexa.



V-Node Rev2

25 Rev2 units delivered and live

Low-power MCU + 6-axis IMU with onboard ML core + 24 GHz mmWave HUMAN-class radar + 2.4 GHz mesh. Vestige-designed, contract-manufactured.

Rev3 migrates to US-origin MCU + mmWave silicon — Section 889 / 1260H clean.



JetHexa autonomy stack

Mesh-to-ATAK alerts live · detect-to-dispatch loop in integration · ports to V0

Gmapping SLAM, frontier exploration, return-to-home, stuck detection, ATAK CoT bridge

V-Hex Operator V0 inherits this stack (\$13K prototype BOM; V1 targets \$16-22K at qty 100-1000)



Hezbollah Style Tunnel · Yahalom Training Facility

04 - THE EVIDENCE · ISRAEL

End-user validation. In country.

Hosted by the SOF unit that fights this mission.

Hosted by the IDF Special Operations Engineering Corps

The unit responsible for subterranean warfare against Hamas tunnel networks. Ground-side and air-side access. Introduction via GSOF.

Direct testing access at the unit's training facility

Hosts invited Vestige to bring autonomous subterranean systems for evaluation at the training facility once US export licensing is in place. No technical data exchanged in country; invitation is forward-looking and license-gated.

Ground-truth on three tunnel types

Captured Hamas tunnel, purpose-built training architecture, northern-border tunnel-threat terrain.

What pre-seed unlocks: DDTC registration and export licensing pathway, V0 hardware to a tunnel that matters, end-user validation before Series A.

Signed. Filed. Submitted. Manufactured. Validated.

ADVISOR · SIGNED 2026-04-18

MAJ (Ret.) John Spencer

Chair of War Studies, Madison Policy Forum. Author of Connected Soldiers and Understanding Urban Warfare. Letter of support attached to DARPA DSO ES.

ADVISOR · SIGNED 2026-04-27

CSM (Ret.) Joe Vega

Former Senior Operational Advisor to the Asymmetric Warfare Group. Principal author of Army Training Publication 3-21.51 Subterranean Operations (2019). Active in IWTSD, SOF tunnel-circuit, CBP CUAS-adjacent.

FIELD VALIDATION · ISRAEL · MAY 2026

Yahalom testing access secured

May 14-20 trip — end-user validation in operational Hamas tunnel + Yahalom training facility. Testing logistics activate on State Dept licensing.

INTELLECTUAL PROPERTY

Provisional filed 2026-03-08

App #63/999,948 — 18 claims, 12 figures. Amsel IP Law (Docket VEST-001P). Non-provisional window through 2027-03-08.

GOVERNMENT CONTRACTING

SAM / CAGE active

SAM.gov active, UEI G7BWHD49HNM5. CAGE 1A1J8. NAICS 334511 / 541715. PSC 5895. CMMC L1 self-attested. Pursuing DARPA + SOCOM pipeline (DSO, STO, CD&I, SOFWERX).

HARDWARE · REV2

25 V-Nodes delivered

~\$49 landed per unit at qty 25. \$23 BOM target at qty 100K. Boards delivered May 27. Firmware coded. Active lab testing; field protocol next.

The DoD is buying this by name. Contract Pipelines.

Procurement signals inside the last four months and expected contracts. Each tied to a specific named program.

IN FLIGHT · UNDER REVIEW	LIVE · ACTIVE PURSUIT	EXPECTED · Q3-Q4 2026	EXPECTED · 2027
<p>IN FLIGHT · AWAITING RESPONSE</p> <p>DARPA DSO Office-Wide BAA</p> <p><i>HR001125S0013 · Submitted 2026-06-02</i></p> <p>ES submitted at deadline. Title: "Emergent Global State in Sparse, Lossy, Subterranean Sensor Swarms." Spencer LoS attached. Response expected Jul-Aug 2026.</p>	<p>LIVE · INVITED TO PRESENT</p> <p>SOFWERX Tech Tuesday (USSOCOM)</p> <p><i>Sep 29, 2026 · USSOCOM innovation hub</i></p> <p>Invited to present the V-Suite to USSOCOM's innovation ecosystem, direct SOF end-user, and program-office visibility. On-ramp to SOFWERX-channeled assessment + prototyping calls.</p>	<p>LIVE · OUT-OF-EMPHASIS PATH</p> <p>DTRA C-WMD FRCWMD</p> <p><i>HDTRA1-25-S-0001 · Rolling through 2034</i></p> <p>TRL 1-4 fit. Current call emphasizes chem-bio. Vestige Counter-UGF angle pursued as out-of-emphasis or future thrust.</p>	<p>EXPECTED · FY27 REOPEN</p> <p>DARPA DSO FY27 Successor</p> <p><i>Expected republish ~Jul-Aug 2026</i></p> <p>FY26 DSO BAA (HR001125S0013) closed 2026-06-02. Successor typically reposts within 30-60 days.</p>
<p>IN FLIGHT · RSVP SUBMITTED</p> <p>USSOCOM JATF Proving Ground</p> <p><i>Jul 15 Stennis · WP window Aug 18 – Sep 18</i></p> <p>Topic 3 (unmanned systems lab) + Topic 1 (multidomain ranges) direct fits.</p>	<p>LIVE · REGISTERED</p> <p>SO/LIC Industry Day + CD&I</p> <p><i>Registered · same-day awards ~\$25-75K</i></p> <p>First challenge-based SO/LIC Industry Day. Same-day award authority, SOCOM + CENTCOM leadership in the room. Successor channel to IWTSD (now CD&I).</p>	<p>EXPECTED · COMING SOON</p> <p>AFWERX SBIR Open Topic 26.2</p> <p><i>26.1 closed Mar 2026 · 26.2 NOO pending</i></p> <p>SBIR reauthorized through FY2031; solicitations resumed May 2026; 26.2 Open Topic cycle anticipated</p>	<p>EXPECTED · ~MAY 2027</p> <p>BIRD HLS 2027 Cycle</p> <p><i>2026 cycle closed May 14 · annual</i></p> <p>Best Israeli-joint mission fit (counter-terror, border, critical infra). Up to \$1M conditional grant. Israeli co-PI sourcing in parallel.</p>
<p>EXPECTED · Q4 2026 SUBMIT</p> <p>DARPA STO Office-Wide ISO</p> <p><i>DARPA-PS-26-09 · Closes 2026-12-18</i></p> <p>Strategic Technology Office. Persistent battlespace presence + sensor mesh + networked battle management, close V-Suite fit.</p>	<p>EXPECTED · Q4 2026 SUBMIT</p> <p>DHS S&T LRBA + BIRD General</p> <p><i>LRBA Q4 draft · BIRD ES Nov 19 2026</i></p> <p>DHS Tunnel Detection LRBA (\$500K-\$5M, complements CBP ERDC \$17.8M program). BIRD General needs Israeli co-PI via Yahalom or BG network.</p>	<p>EXPECTED · DEC 2026 CYCLE</p> <p>xTech Edge Strike: Ground FY27</p> <p><i>FY26 concluded Mar 2026 (Grafenwöhr)</i></p> <p>Army xTech competition for ground autonomy in distributed maneuver. FY27 cycle launch expected ~December 2026.</p>	

04 - THE EVIDENCE · MARKET

\$11.5B addressable today. \$20B by 2030.

Six adjacent markets, one platform. Subterranean autonomy is the entry wedge. Urban clearing, perimeter, commercial security, and infrastructure are the same hardware running different mission profiles.

TAM

\$11.5B

Defense-core ~\$8B + nearest dual-use. ~15% blended CAGR to ~\$20B by 2030.

SAM

\$2-6B

US + Five Eyes core, widening to tier-1 NATO. PRC supply chain structurally excluded.

SOM 24-36 MONTHS

\$15-40M

DARPA Phase I/II + SOFWERX/SO-LIC awards + SOF & federal LE pilots + first dual-use pilot.

SEGMENT BREAKDOWN · SIX MARKETS · \$11.5B TODAY, \$20B+ BY 2030

SUBTERRANEAN · SOF TUNNEL OPS

\$1.6B

Counter-tunnel detection: the uncontested entry wedge · Hamas / Hezbollah / DPRK networks · IDF Yahalom path

PERIMETER & FORCE PROTECTION

\$2.8B

Rapidly-deployable defense slice of PIDS · FBI HRT · BORTAC · DoD installation security

CRITICAL INFRASTRUCTURE

\$3.0B

Physical-security sensing · federal facilities · pipelines · GPS-denied utility tunnels

COMMERCIAL SECURITY

\$2.5B

Guard-replacement economics · data centers · logistics hubs · energy sites

TACTICAL MESH

\$0.8B

Low-cost expendable node tier · sub-GHz · GPS-denied mesh comms

MINING · Underground

\$0.8B

Hard-rock & longwall safety · atmospheric + presence monitoring

Subterranean is the wedge. Dual-use is the hedge.

The V-Suite is platform-portable. Same V-Hex Operator chassis, same V-Node mesh, same autonomy stack — runs defense tunnel ops, federal LE clearing, and commercial security. Software-defined mission profile, not three different robots.

PRIMARY WEDGE

DEFENSE

SOF tunnel ops, border tunnel detection, allied SOF testing

CUSTOMERS

- US SOCOM (JSOC, ARSOF)
- CBP / BORTAC border tunnels
- DARPA pipeline (DSO / STO / SOFWERX)
- IDF Yahalom (testing access)
- FBI HRT (slower wave)

ADDRESSABLE MARKET (2026)

\$3.5B

DUAL-USE · CONFIGURATION 1

URBAN

Building clearing, room entry, federal and state law enforcement

CUSTOMERS

- FBI HRT, BORTAC
- State / major-city SWAT
- DoD urban CQB training facilities
- Allied tier-1 LE (UK SCO19, AUS TAG-E)
- DHS protective details

ADDRESSABLE MARKET (2026)

\$3.0B

DUAL-USE · CONFIGURATION 2

COMMERCIAL

Critical infrastructure, data centers, mining, utility tunnels

CUSTOMERS

- Hyperscale data center security
- Pipeline / utility tunnel inspection
- Hard-rock mining safety monitoring
- Logistics hubs, energy sites
- Port / maritime perimeter

ADDRESSABLE MARKET (2026)

\$5.0B

PLATFORM PORTABILITY · ONE HARDWARE FAMILY

Same V-Hex Operator chassis. Same V-Node mesh. Same autonomy stack. Software-defined mission profile, not three different robots.

Persistent autonomy in denied areas is overlooked.

We are filling the skipped quadrant. Architected for US-origin Section 889 / 1260H compliance, persistent, expendable, robot-deposited, below grade.



ADJACENT PLATFORMS

Anduril · US10506436B1 "Lattice mesh" (Dec 2019)

Broad mesh-networking prior art; Vestige's novelty is the integrated robot-deposited subterranean system. Anduril-aware FTO budgeted.

Ghost V60 / Spot

Hours-scale endurance; persistence requires facility-powered docks; no infrastructure-free 90+ day operation; no organic mesh emplacement.

Shield AI / V-BAT

Focused on aerial. Same operational gap as surface mesh.

Vestige · App #63/999,948 (Mar 2026)

Subterranean specificity. Sub-GHz mesh + 24 GHz mmWave HUMAN classification. Robot-deposited, operator-recoverable. Multi-month operational life. FHSS anti-jam scheme is patent-pending (#63/999,948); security stack is AES-128-CCM + HMAC-SHA256 + anti-replay in Rev3.

Solo founder. A bench operators recognize.

FOUNDER


Cade Dalton

Founder & CEO

Designed and built the V-Suite end-to-end: firmware, hardware, autonomy stack, operator software. Dual B.A. in Finance and Economics with CS minor, University of Miami. Prior work experience in investment banking and asset management. Self-taught the full embedded + SLAM + sensor-mesh + ROS stack. Took Vestige from concept to shipped Rev2 hardware in five months. Hosted by IDF Yahalom on a unit briefing, tour, and tunnel embed.

ADVISOR


MAJ (Ret.) John Spencer

Chair of War Studies, Madison Policy Forum

25+ years US Army Infantry: 75th Ranger Regiment, 173rd Airborne, 4th Infantry Division. Chair of War Studies, Madison Policy Forum. Executive Director of the Urban Warfare Institute. Founding member, International Working Group on Subterranean Warfare. Author of Connected Soldiers (2022) and Understanding Urban Warfare (2022). Widely considered the world's leading expert on urban and subterranean warfare.

ADVISOR


CSM (Ret.) Joe Vega

Former 1st SFOD-D (Delta)

30+ years warfighter: Ranger → Green Beret → 1st SFOD-D (Delta) Operator (Master Breacher / Heavy Breacher). Detachment Lead of the Army's Asymmetric Warfare Group's (AWG) Subterranean Operations Cell. One of the principal authors of Army Training Publication 3-21.51 Subterranean Operations (2019). Currently Deputy Director, National Center for Urban Operations (Fort Hamilton NY) and Vice President, US Armor Group.

06 - THE ASK

Raising a Pre-Seed.

MFN. Y Combinator post-money SAFE. 18-24 month runway.

USE OF PROCEEDS · 18-24 MONTHS

Engineering & Tactical Development

Core robotics engineering, autonomy software, mesh networking, perception, and field integration. Funds development of the V-Suite architecture from prototype to deployable demonstration systems.

Manufacturing & Hardware

V-Hex Operator V0 builds, V-Node Rev3 production batch, V-Gateway development, sensor integration, manufacturing tooling, and hardware iteration through operational testing cycles.

Operations & Customer Development

Government engagement, pilot programs, compliance, IP protection, field exercises, customer discovery, cloud infrastructure, and business operations supporting transition to Phase I contracts.

Traction Validation

Two A-tier advisors signed

Spencer + Vega + provisional IP + DARPA DSO ES on file + hardware delivered + mesh live + Yahalom engagement.

Invited to present at SOFWERX (USSOCOM)

Selected for a SOFWERX Tech Tuesday virtual presentation at USSOCOM's innovation hub (Sept 2026) with direct SOF end-user engagement.

Live CTO pipeline under NDA

Advanced, NDA-protected conversations with a senior field-robotics leader (past DARPA experience) to source CTO candidates and review technical stack.