Engagement Capability Statement

Contact Info

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Executive Summary

AI-powered Tactical Situational Awareness
[Mobility Platform: Hardware, SaaS, User's Protection]

Mission Statement

Our mission is to empower U.S. DoD, IC, and NATO agencies with the knowledge and tools needed to help stay ahead of evolving threats in defense and national security areas. Our goal is to foster a safer digital environment through education, innovation, and collaboration.

Vision

Military and security agents have super vision, super hearing, super respiratory and facial protection, a built-in drinking system, an omnichannel communication system, firing assistance, SIGINT and navigation tools, remote control for drones and robots, various digital assistants using Augmented Reality, Artificial Intelligence, Computer Vision, Computer Audition, voice control, hand tracking, and vitals body sensors.

Leadership

Basil Boluk, CEO & CTO
MechEng, EEE / Embedded, Optics, Physics, R&D,
Management, Strategy, Marketing

Tess Volkova, VP SW Dev
Software / Embedded Eng, AI/ML, Computer Vision, Sensors, Signal Processing

Core Competencies

Integration

o Battlefield Management System (BMS)
o Joint All-Domain Command and Control (JADC2)
o Multi-Domain Battle Management Team (MBMT) Mobility Platform
o C4ISR / C5ISR
o UAS (UxS)
o C-UAS (C-UxS)
o Casualty Tracking and Monitoring System (CTMS)
o Human Performance, Training and Education
o Cognitive Science for Human Machine Teaming
o Life-Synthetic Training Environment (L-STE)

Innovation

o Tactical Augmented Reality (TAR)
o Tactical AI
o Synthetic Day/Night Vision
o Next Generation Identification Awareness
o Artificial Intelligence/Machine Learning (AI/ML) Image Intelligence (IMINT)
o Highly-directional Antenna Options
o RF Surveillance
o Multiple Object Tracker or Multiple Target Tracking (MOT/MTT)
o Local Device AI/ML and CV/CA Processing

Areas of interest

Data collection and processing

 # Night Vision
 # Day Vision
 # Twilight Vision
 # Synthetic Vision
 # Smart Audition
 # RF Space ISR
 # Passive Radar ISR
 # Vitals Body Sensors
 # Highly-directional Antenna
 # Digital Beamforming

Soldier-as-Sensor Concept
Expanding the data collection and verification network, increasing the density of observation points per quadrant, diversifying observations from multiple locations simultaneously, improving data accuracy, reducing data processing time.

Multimodal data
HD / HDR / SWIR / LWIR images and videos (no IR illumination), stereo cam rangefinder (no laser), azimuth, elevation angle, speed and direction measurements, 20 ballistic parameters, sound wave characteristics (13-microphone dome array), RF spectrum characteristics (2 MHz - 8 GHz, up to 40 GHz) and localization (RDF) of signal sources, RF reflected signal characteristics in multistatic passive radar mode, per-shot and ammunition stockpile data, 8 groups of user health data, task and auto-task performance data for mission, training, or skill exercise.

Data collection with and without the user's action
AI triggered recording, control via voice assistant and quick button shortcuts, short and long timelines, preference modes for real-time filtering and searching of audiovisual information, auto frequency scanning, auto selection of passive radar RF probe signal.

Data processing
Frequency decomposition, channel gain, filters (noise, brightness, power, etc.), Histogram of Oriented Gradients (HOG), Support Vector Machine (SVM), Rectified Linear Unit (ReLU), Local Response Normalization (LRN), Very Deep Convolutional Neural Networks (CNN) for Large-Scale Image Recognition by the Visual Geometry Group (VGG-16), Track-Before-Detection (TBD), intra- and inter-frame detection, range-velocity ambiguity separation, Cumulative Value Function (CVF) based estimation criteria, false alarm exclusion based on polynomial coefficient variance statistics, edge refinement, other neural network algorithms and convolutional Deep Learning and self-learning networks Computer Vision and Computer Audition **on local device**, generation of Synthetic Vision and Audition (exclusion of solid boundaries and surfaces that create noise and hinder perception), detection and identification of RF sources, 3D RF carrier decomposition in multiplexing, identification of passive radar signatures, transcribing user voice into text, text voicing with user avatar voices, data encryption and decryption.

Data transmission and BLOS / LOS-communications
Raw and processed data transmission modes (important for reducing traffic, number and duration of communication sessions), connection via Highly-directional Antenna using hopping frequencies and dynamic power control Digital Beamforming.

Safe navigation

 # Identification Friend-or-Foe
 # Navigation Grid
 # Situational Awareness Grid
 # Gunfire Locator
 # Drone Detection
 # Radar Warning
 # Passive Radar
 # Ground-Based NavSys
 # Law Altitude NavSys
 # Map & Navigation
 # Route Tracking

Identification Friend-or-Foe (IFF), Situational Awareness Grid

The solution against friendly and crossfire, improved coordination and cross-domain interaction (CDI), multi-domain operations (MDO), and intelligent stealth modes (Force Recon, Scout Snipers, etc.).

Gunfire Locator (GFL)

Detection and recognition of counter-directional ballistic trajectories including the use of a silencer, identification and localization of the source of the shot.

Radio Frequency Drone Detection (RFDD)

RF carrier detection and recognition for drone and robot control and data transmission. It is used in addition to the visual and auditory modes of drone and robot detection by Computer Vision and Computer Audition methods (the main method that enables detection of fully autonomous flight missions).

Radar Warning Receiver Control (RWRC)

Detection and recognition of RF carrier reference beams of hostile and unidentified radars. Localization of all types of friendly and hostile radars when using illumination for passive radar.

Passive Covert Surveillance Radar (PCSR)

Passive multistatic radar using reference emissions from active friendly and hostile radars, as well as AM, FM, TV, HDTV bands. A pre-trained and self-learning model. Use of convolutional neural networks for processing signatures with low Signal-to-Noise Ratio.

Ground-Based Navigation System (GBNS) and Law Altitude Navigation System (LANS)

Integration with ground-based, aerostat, and drone-based navigation solutions in challenging GNSS satellite signal suppression and distortion environments.

Navigation and Route Tracking (NAV & PATH)

Navigational mapping (similar to ATAK-MIL) to dynamically alter routes and section speeds in response to changes in the environment, including enemy movements, threat evasion maneuvers, weather conditions, experience of other units in given sections, synchronization with the movement of other friendly units within the mission, and to avoid congestion in narrow sections of the route.

Why right now?

There are 4 reasons for that:
1. Military innovation request became detailed and has a budget;
2. C2 and C4ISR platforms are ready to deploy;
3. Electronic components and sensors came fit on the size and performance;
4. We found the unique ideas for features and apps.

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Deck highlights

Pitch Deck (PDF link)

Data Room (Wiki link)

Calculations (XLSX file)

Main user's pains

Fog of war, Friendly fire, BLOS comms for everyone, Fire contact range, Drones & Robots, RF space, All Threats Detection, Night Vision, One shot - One hit, Soldier-as-Sensor. *See details.*

User groups

Fire teams, light armored, mortar & artillery crew, Force Recon, scout snipers, SOF, LAAD / SHORAD, helicopter crew, RPA / UxS ops, combat engineers & EOD, flight deck crew, SIGINT & EW crew, CASEVAC / MEDEVAC, combat logistic, USN / USAF / USA maintenance units, USN hull units, Coast Guards, CBP, USSS, FBI ops, SWAT, police, EMS physicians, surgeries, firefighters, rescuers.

Market

TAM $52B, 14.7M+ users	LTV ave $18,767
SAM $31B, 8.7M+ users	Annual charge-offs $3,519 / user
SOM $20B, 5.7+ users	

Business model

ODM / OEM: 79x scaling within 7 years, affordable price
SaaS: 30+ Apps (R&D roadmap for 7 years), Open Source, high ARPU
Go-to-Market: co-distribution (top-50 defense industry)

Product line

Model One, Model 2 (+4 add-ons), Model 3 (+7 add-ons)

Team

Pre-Seed: 15.2 fulltime equivalents (up to 11 full-time + part-time)
- Design Development & Algorithm Architecture: Ada Lovelace Team
- Mechanical Engineering: Stephanie Kwolek Team
- Optical Engineering: Katharine Blodgett Team
- Electronics Engineering: Ida Hyde Team
- Software Development: Hedy Lamarr Team
- Software Development: Grace Hopper Team
- Software Development: Evelyn Berezin Team
- Software Development: Barbara Askins Team
- Networking: Margaret Hamilton Team
- Customer & Business Development: Barbara Liskov Team

R&D milestones

- Pre-Seed –> for MVP Alpha, Q2'2025
- Seed –> for MVP Beta + experimental production, Q2'2026
- Round A –> for MMP Gamma + proving ground testing + pilot programs (USMC, US Army, Bundeswehr), Q1'2028
- Round A –> for MMP Delta + production robotic line launch (Germany) + add-ons, Q4'2029
- Round B –> for 2nd production factory launch (U.S.), Q4'2029

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IP

We plan to finalize documentation and submit applications for provisional patents during 2025.

We don't work in stealth mode from the beginning. We have quite a lot of information in the public domain.

However, we are very clear about the level of detail we need now and in the future for public content, for partners and investors, and for the team.

Without these details, it is practically difficult and impractical to replicate our innovations.

- **Adaptive identification friend-or-foe for tactical situational awareness system**
  incl. multi-level ID: transponder, mesh nets, p2p nets, Computer Vision

- **Methods and ontology for tactical situational awareness system**
  incl. navigation grid, digital compass and indicators, marks, threats, AI for pre-emptive, signal and decision-making ontology

- **Tactical messenger for Cross-Domain and Multi-Domain Operations**

- **EO and SWIR multi-sensor with optical zoom**

- **Method and optical system for noncontact coordinate measurement**

- **Computer Audition methods and system for tactical operations**

- **Gunfire locator methods and system for mobility platform**

- **Visor screen design with variable separate area transparency and one-way limited light transmission with low reflectance in the visible and IR range**

- **Multifunctional Software Defined Antenna (Phased Array Antenna) for mobility platform**
  2 MHz - 8 GHz (up to 40 GHz) with dynamically variable power and beamwidth, 3-element dome with 17 or more independent digital beamforming arrays in each element

- **Micro-vibrator manufacturing technology for Software Defined Antenna (Phased Array Antenna)**

- **Methods and algorithms for Radio Direction Finding using Software Defined Antenna (Phased Array Antenna)**

- **Methods and algorithms for passive radar using Software Defined Antenna (Phased Array Antenna)**

- **EOD detector using Software Defined Antenna (Phased Array Antenna)**

- **Active noise reduction and hearing protection against concussion damage**

- **Built-in drinking system with intelligent hydration control system**

- **Ultra-low breathing resistance powered air-purifying respiratory (PAPR / RPD) system with integrated intelligent CPAP / DPAP system and non-invasive resuscitation on the move**

- **Multilevel intelligent system for stopping acute bleeding in the extremities and non-invasive control of vital signs of the body**

CustDev results

National Geospatial-Intelligence Agency (NGA) *[Link to pitch "Gunfire Locator and Radio Direction Finding"](#)* *[Watch this demo on YouTube](#)*	Thank you very much for taking the time to meet with us and for your pitch on the conference. We very much enjoyed learning more about your company and the capabilities of its solutions. Thank you so much for sharing the materials and links. We sent them on to our NGA Colleagues in GEOINT Futures, Warfighter Support, and Data and Digital Innovation. We also sent them to our POC at Anduril, as you requested. We will let you know of their responses and we can take things from there.
USA AFC – PEO Soldier, CTR USARMY CDID MNVR (USA)	Your submission the IVAS Next: AI-Powered Tactical Situational Awareness will be reviewed for the next SEP meeting, currently scheduled for April 2025. Your submission will be sent to the Proponent and Program Manager that is responsible for your ideas' capability. In the meantime, we would like to gather as much information about your submission as possible, so that the Proponent and Program Manager evaluating it can make an informed decision.
USA Col. Mario Alvarado, *USSOCOM 5ᵗʰ SFG* *Fort Campbell, KY* *Intelligence Analytics Center*	This is an amazing project leveraging AI and being able to have a wide spectrum of information available at real time. What sensors and for whom would this be geared towards? My concerns would be an overload of information and what specific data points are you trying to deliver?
USA AFC - PEO IEW&S	Pending…
Jörgen Lundberg, Director Business Development at Teledyne FLIR	I'm impressed with what you're doing at Furtherium. Can you please send me an email with some info for me to look at?
Shane Karp, Sr. Director, Marketing and Communications at Epirus	Hi Basil - can you send me a company overview or more about your vision on how we'd collaborate? I can make sure you're connected to the right people if there's interest on our side.
Jennifer Swanson, Deputy Assistant Secretary of the Army (Data, Engineering & Software) – DASA(DES) ASA(ALT)	Hi Basil. Thanks for sending. It looks very interesting. How does the SaaS work if disconnected? Or is it only meant to be a training aid? It sounds like you're already connected with the right folks especially Soldier and STRI. Impressive to see something built at no cost to the Army. The US Army has initiated a pilot program to explore the use of generative AI in #ArmyAcquisition. The program is called #CalibrateAI. #CalibrateAI will leverage an advanced generative AI tool, developed in collaboration with the Army's industry partners, at no expense to the Army. This innovative technology harnesses the power of data analytics, machine learning, and natural language processing, ensuring we stay at the forefront of technological advancements.
DoD Chief Digital and Artificial Intelligence Office (CDAO)	Thank you for reaching out. Your tech looks interesting. How close are you to an actual prototype?

OUSD(R&E)	Pending…
USN CAPT Mark Harris (ret.), Palantir	Hello, Basil. I'm intrigued and interested. I'll have a look at the pitch deck and collect my thoughts. Thanks for considering me and I'll be in touch shortly.
USN VADM Michael LeFever (ret.), National Security at Concentric	Happy to chat
Col. Angel Segundo Gómez González, NATO Communications and Information Agency (NCI Agency)	I've worked nearly 25 years in Intel & ISR. Currently I am focused on Space Based ISR and not so much in building the integrated multidomain COP, but of course I'm interested in it as AI-enabled edge processing and tipping/cueing, will soon open new opportunities also in the space domain. I'll follow your works.
Col. Charles Seaberry, Director, DEVCOM FWD Elem. Atlantic	Seems to be great tech. Thanks for sharing.
Young Bang, Principal Deputy at ASA(ALT) U.S. Army	Hi Basil. It's great. I'm interested. Reach out to PEO Soldier and the IVAS program. Please keep in touch.
Col. Stuart Nassé, Head of DACOS Rapid Acquisition Team, British Army	Really interesting, and I will make time to read your pitch deck. It sounds like you are focused on the soldier - I will pass your details on to the British Army "SoldierWorks" team, who are the design authority for all soldier system integration. Hope to speak soon.
Group Captain Edward Whitechurch, Royal Air Force	Basil, I am connecting you with Group Lead who sits in the "futures" area of the RAF - in copy. Good luck.
Col. Justin Herbermann, Director, Army Capability - Sustainment Mission Cmd at US Army (CASCOM AFC)	It will boost American defensetech. Thank you for sharing. Keep me in touch.
Huey Stephens, Project Convergence Branch Chief, G5 Plans at Army Futures Command, U.S. Army	I really enjoyed our conversation and thank you so much for the kind words. Looking forward to hearing expert opinions from our colleagues.
Col. Nadine Nally, Director, Army Capabilities Manager for Cyber	Thanks for reaching out. I'd like to learn more. Some comments on how this technology covers the following functions for C-UAS and UAS.
Bart Russell, Ph.D., Deputy Director, DARPA Defense Sciences Office (DSO)	I'd be happy to set up a meeting to hear more about your capabilities. I've cc'd Brandy to help us find a time to talk next month, if that works for you. Thank you for your presentation today. Your vision is impressive. I will share your slides with a TTO PM and he will reach out if he is interested. Thank you for sending them. Thank you for the meeting. Definitely interesting. Let's keep in touch.

Cyber Innovation Hub der Bundeswehr	**Active mentorship since Jul 2023 – Jan Philipp Krahn.**
Peter Muermans, Oberstleutnant i.G. u. Stv. Referatsleiter I (7) Planungsamt der Bundeswehr, Abteilung I	I would like to take this opportunity to thank you once again for your presentation. We are happy to take on board the assessments and presentations of technical developments from the company's point of view. You will be aware that your AR projects are more or less in line with the trend. For various reasons (e.g., confidentiality), however, we are limited in terms of feedback. Please keep us informed of your progress.
USMC Col. William "Mac" McHenry II, Director Defense Engagement and Senior Service Lead, Defense Innovation Unit, Office of Secretary of Defense	Thank you for connecting with us. I reviewed your materials and it seems as if you and your team are doing exciting work. I have added Ray the lead for our Commercial Engagement Team. He and his teammates educate and help companies such as yours, partner with DIU and connect to DOD customers. Semper Fi and Respectfully Submitted
U.S. Army xTechSearch 7	Company-identified gaps are plausible correct targets for this technology. Systematically conveys ultimate product's purpose and value. A fully deployed, mature solution could impact an Army element. Partially demonstrates attributes superior to other solutions. Demonstrates product has a path to commercial profitability. The Army might benefit from this technology. We may want to invest more time to learn more.
U.S. Army xTechSearch 6	Currently fielded solutions deliver mostly unsatisfactory Army outcomes. If successful, significant improvement vs. existing technological approaches. Credible scientific basis for presented approach. Requires proven technologies. Adequately refutes alternatives. Identifies stage- appropriate next contract goal. Credible plan for near-term execution. The Army would benefit greatly from this technology. I might use or recommend this solution. Since constant upgrades and new innovations/ideas are constantly required for the Heads-up display helmet system, I believe you have both a good concept and are knowledgeable about the task(s) at hand.
[Defense Innovation Requests](#)	We regularly participate in innovation requests and competitions from US, UK and EU defense agencies and defense companies. In addition to the opportunity to win, we seek the following: o To gain expert insight into the current and future needs of defense agencies; o To test whether our ideas are aligned with and ahead of the military's needs; o Obtain feedback from military experts for our project; o Expand networking;

Collaboration

We don't yet have formalized relationships with defense agencies and the intelligence community. After participating in the NGA conference on October 8, 2024, we expect to begin cooperation.

Link to pitch "Gunfire Locator and Radio Direction Finding"

Watch this demo on YouTube

See Traction & Roadmap

R&D
- Joining efforts to exchange expertise and hypotheses
- Dataset exchange for training ML, LM, CV, and CA models
- Training pipeline engineering
- Proving ground testing
- Pilots (USMC, U.S. Army, Bundeswehr)

Integration
- Integration of different products with common goals
- Creation of joint projects

Distribution
- Joining efforts for promotion and contracts

Fundraising
- Venture Investing
- Grants
- Warm intro to decision-makers in the industry

We are interested in collaborating with defense agencies and military-technical companies in the areas of Battlefield Management Systems, Tactical AI, Battlefield Awareness, Multiple Object Tracker or Multiple Target Tracking Systems, Warfighter Health Protection, Casualty Tracking and Monitoring Systems, Live-Synthetic Training Environment, Military Drones and Robots, Surveillance and Reconnaissance (ISR) Platforms, Multi-Domain Battle Management Team (MBMT) Mobility Platform, Tactical Map and Navigation Systems, Highly-directional Antenna, Digital Beamforming, Automated Imagery Analysis, Neuromorphic Computing and in related fields where we could join forces, share our hypotheses and experiences.

We are ready to offer to participate in a private Community (https://community.furtherium.com/**), where it is convenient to hold time-distributed intellectual discussions.**

Exchange Expertise	**Big Data System Integration**	**UAS, C-UAS, Radar**
NGA	Palantir	Anduril
DASA(DES) ASA(ALT)	Maven Smart System (NGA)	Epirus
CDAO	Convergence (AFC U.S. Army)	Shield AI
OUSD(R&E)	Overmatch (ONR U.S. Navy)	Skydio
USA ASC PEO Soldier	TITAN (DCGS-A - PEO IEW&S)	Elbit Systems
USA AFC PEO IEW&S	Northrop Grumman	Northrop Grumman
USA AFC PEO STRI	Raytheon / Collins Aerospace	Raytheon
USA AFC PEO CS&CSS	General Dynamics	Lockheed Martin
USA AFC PEO C3N	Scale AI	Bell Textron
AFC CDIDs and CFTs: CCOE Cyber CoE / STE CFT / CCDC Soldier Center / ARL	Leidos	General Atomics
USA Applications Lab (AAL)	Helsing	Hermeus
NSA M&CS/CSS	ManTech	CX2
DARPA I2O / DSO	Rebellion Defense	HENSOLDT / ESG
NSA AISC / NSA CCC	Vannevar Labs	Quantum Systems
MITRE	ATOS	Chaos Industries
USA DHA	Rafael	MBDA
	Leonardo	Kodiak Robotics
	Thales	D-fend Solutions

MVP

MVP$_\alpha$ (TRL-7) Q2'2025

See Traction & Roadmap

(TRL-7) Prototype near, or at, planned operational system. Algorithms run on processor of the operational environment integrated with actual external entities. SW support structure in place. SW releases are in distinct versions. Frequency and severity of SW deficiency reports do not significantly degrade functionality or performance. Verification, Validation and Accreditation (VV&A) completed:

o *Design Dev & Algorithm Architecture: Ada Lovelace Team:*
- Engineering design in MVP – TRL-7
- Graphical User Interface (GUI) in MVP – TRL-7
- Voice User Interface (VUI) in MVP – TRL-7
- Sw Architecture in MVP – TRL-7

o *Mechanical Engineering: Stephanie Kwolek Team:*
- Enclosure in MVP – TRL-7

o *Optical Engineering: Katharine Blodgett Team:*
- Optical system in MVP – TRL-7

o *Electronics Engineering: Ida Hyde Team:*
- Motherboard, I/O and power in MVP – TRL-7
- HUD in MVP – TRL-7
- Multimedia in MVP – TRL-7
- SDR and SDA in prototype – TRL-6

o *Sw Dev: Hedy Lamarr Team:*
- Situational Awareness (IFF) in MVP – TRL-7
- Networks (NET) in prototype – TRL-6
- RF systems (RDF, RFDD, RWRC, SDRS, RPAC, ANTC) – TRL-4

o *Sw Dev: Grace Hopper Team:*
- Visual system (CAM, DISP, FPAD) in MVP – TRL-7
- Input / output (HT, INP, STT, VOVR) in prototype – TRL-4..6

o *Sw Dev: Evelyn Berezin Team:*
- Messenger (CHAT) in MVP – TRL-7
- Notifications (IMSG, NOTS) in prototype – TRL-6
- Encryption system (CRPT) in prototype – TRL-4

o *Sw Dev: Barbara Askins Team:*
- Small language model (TESS) in training phase – TRL-7
- Computer Vision (CVC) locally functioning – TRL-6
- Firing Assistance (FA) subsystem in prototype – TRL-4
- Computer Audition (CAC) subsystem in prototype – TRL-3

o *Networking: Margaret Hamilton Team:*
- Mentorship
- Updates, PR
- Demo (physical prototype, GUI, VUI, apps)

o *Customer & Business Development: Barbara Liskov Team:*
- DoD program research
- Collaboration research

MVP$_\beta$ (TRL-8) Q4'2025

(TRL-8) Technology and SW has been proven and demonstrated to work in its final form and under expected conditions. In almost all cases, TRL represents the end of true system development. Examples include developmental test and evaluation (T&E) of the system in its intended weapon system to determine if it meets design specifications:

- *Design Dev & Algorithm Architecture: Ada Lovelace Team:*
  - Engineering design in MVP – TRL-8
  - Graphical User Interface (GUI) in MVP – TRL-8
  - Voice User Interface (VUI) in MVP – TRL-8
  - Sw Architecture in MVP – TRL-8
- *Mechanical Engineering: Stephanie Kwolek Team:*
  - Enclosure in MVP – TRL-8
- *Optical Engineering: Katharine Blodgett Team:*
  - Optical system in MVP – TRL-8
- *Electronics Engineering: Ida Hyde Team:*
  - Motherboard, I/O and power in MVP – TRL-8
  - HUD in MVP – TRL-8
  - Multimedia in MVP – TRL-8
  - SDR and SDA in MVP – TRL-8
  - Add-ons in prototype – TRL-4..5
- *Sw Dev: Hedy Lamarr Team:*
  - Situational Awareness (IFF) in MVP – TRL-8
  - Networks (NET) in MVP – TRL-7..8
  - RF sys (RDF, RFDD, RWRC, SDRS, RPAC, ANTC) – TRL-7..8
  - Radar & RC (EODD, PCSR, FTRC, RBRC, APAR) – TRL-4..7
- *Sw Dev: Grace Hopper Team:*
  - Visual system (CAM, DISP, FPAD) in MVP – TRL-8
  - Input / output (HT, INP, STT, VOVR) in MVP – TRL-8
  - Navigation (MAP, NAV, PATH) in prototype – TRL-4..6
  - Integration (SYS, ADM, DVC, VBS) in prototype – TRL-4..6
- *Sw Dev: Evelyn Berezin Team:*
  - Messenger (CHAT) in MVP – TRL-8
  - Notifications (IMSG, NOTS) in MVP – TRL-8
  - Encryption system (CRPT) in MVP – TRL-8
  - Task management (TSK) in MVP – TRL-7
  - Multi-Domain ops (WGR) in MVP – TRL-7
  - Mission management (PLAN, ANLS) in prototype – TRL-5
- *Sw Dev: Barbara Askins Team:*
  - Small language model (TESS) in training phase – TRL-8
  - Computer Vision (CVC) in MVP – TRL-8
  - Firing Assistance (FA) subsystem in MVP – TRL-7
  - Computer Audition (CAC) subsystem in MVP – TRL-7
  - Virtual Mentor (VM) subsystem in prototype – TRL-6
- *Networking: Margaret Hamilton Team:*
  - Mentorship
  - Updates, PR, demo (device, GUI, VUI, apps)
- *Customer & Business Development: Barbara Liskov Team:*
  - DoD program and collaboration research
  - Agreements to initiate proving ground testing

MMP$_\delta$ (TRL-9) Q3'2026

(TRL-9) In almost all cases, this is the end of the last "bugfixing" aspects of system development. Examples include using the system under operational mission conditions. SW releases are production versions and configuration controlled. Frequency and severity of SW deficiencies are at a minimum:
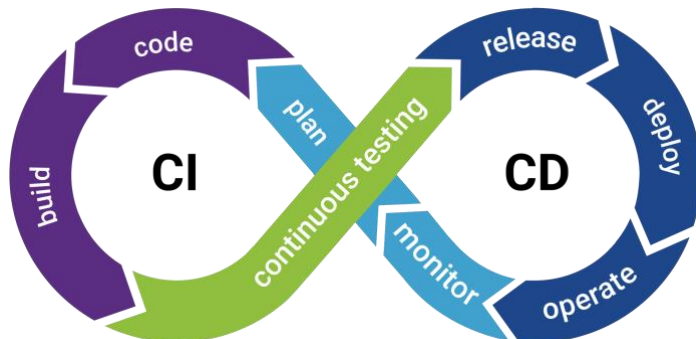
- *Design Dev & Algorithm Architecture: Ada Lovelace Team:*
  - Engineering design in MMP – TRL-9
  - Graphical User Interface (GUI) in MMP – TRL-9
  - Voice User Interface (VUI) in MMP – TRL-9
  - Sw Architecture in MMP – TRL-9
- *Mechanical Engineering: Stephanie Kwolek Team:*
  - Enclosure in MMP – TRL-9
- *Optical Engineering: Katharine Blodgett Team:*
  - Optical system in MMP – TRL-9
- *Electronics Engineering: Ida Hyde Team:*
  - Motherboard, I/O and power in MMP – TRL-9
  - HUD in MMP – TRL-9
  - Multimedia in MMP – TRL-9
  - SDR and SDA in MMP – TRL-9
  - Add-ons in MMP – TRL-9
- *Sw Dev: Hedy Lamarr Team:*
  - Situational Awareness (IFF) in MMP – TRL-9
  - Networks (NET) in MMP – TRL-9
  - RF sys (RDF, RFDD, RWRC, SDRS, RPAC, ANTC) – TRL-9
  - Radar & RC (EODD, PCSR, FTRC, RBRC, APAR) – TRL-7
- *Sw Dev: Grace Hopper Team:*
  - Visual system (CAM, DISP, FPAD) in MMP – TRL-9
  - Input / output (HT, INP, STT, VOVR) in MMP – TRL-9
  - Navigation (MAP, NAV, PATH) in MVP – TRL-7
  - Integration (SYS, ADM, DVC, VBS) in MVP – TRL-7
- *Sw Dev: Evelyn Berezin Team:*
  - Messenger (CHAT) in MMP – TRL-9
  - Notifications (IMSG, NOTS) in MMP – TRL-9
  - Encryption system (CRPT) in MMP – TRL-9
  - Task management (TSK) in MMP – TRL-9
  - Multi-Domain ops (WGR) in MMP – TRL-9
  - Mission management (PLAN, ANLS) in MMP – TRL-9
- *Sw Dev: Barbara Askins Team:*
  - Small language model (TESS) in MMP – TRL-9
  - Computer Vision (CVC) in MMP – TRL-9
  - Firing Assistance (FA) subsystem in MMP – TRL-9
  - Computer Audition (CAC) subsystem in MMP – TRL-9
  - Virtual Mentor (VM) subsystem in MVP – TRL-8
- *Networking: Margaret Hamilton Team:*
  - Mentorship
  - Updates, PR, demo (device, GUI, VUI, apps)
- *Customer & Business Development: Barbara Liskov Team:*
  - DoD program and collaboration research
  - Active phase (1/4, 6+ months) proving ground testing
  - Agreements to initiate pilots

MMP$_\gamma$ (MRL-8, IRL-8) Q1'27

Manufacturing Readiness Level (MRL)

(MRL-8) Detailed system design essentially complete and sufficiently stable to enter low rate production. All materials are available to meet planned low rate production schedule. Manufacturing and quality processes and procedures proven in a pilot line environment, under control and ready for low rate production. Known producibility risks pose no significant risk for low rate production. Engineering cost model driven by detailed design and validated. Supply chain established and stable. Industrial Capabilities Assessment for Milestone C completed.

(IRL-8) System is fully integrated in an operational environment. All testing and safety qualifications are completed for all technologies and interfaces. Form, fit, and function are verified.

- *Design Dev & Algorithm Architecture: Ada Lovelace Team:*
  - All Design & Dev in deployment (CI/CD)
- *Mechanical Engineering: Stephanie Kwolek Team:*
  - Enclosure in pre-production
- *Optical Engineering: Katharine Blodgett Team:*
  - Optical system in pre-production
- *Electronics Engineering: Ida Hyde Team:*
  - All modules (motherboard, I/O, power, HUD, multimedia, SDR, SDA, add-ons set 1 and 2) in pre-production
- *Sw Dev: Hedy Lamarr Team:*
  - All systems (IFF, NET, RDF, RFDD, RWRC, SDRS, RPAC, ANTC, P2P, SDR2, EODD, PCSR, FTRC, RBRC, UVRC, APAR) in deployment (CI/CD)
- *Sw Dev: Grace Hopper Team:*
  - All systems (CAM, DISP, FPAD, HT, INP, STT, VOVR, MMC, PTTH, SPOT, SRV, MAP, NAV, PATH, GNSS, SYS, ADM, ACC, FILE, DVC, REC, PLAY, SEC, STM, TRSL, VBS) in deployment (CI/CD)
- *Sw Dev: Evelyn Berezin Team:*
  - All systems (CHAT, IMSG, NOTS, CRPT, TSK, WGR, PLAN, ANLS, WIKI, MAIL, CAL) in deployment (CI/CD)
- *Sw Dev: Barbara Askins Team:*
  - All systems (TESS, CVC, FA, CAC, VM) in deployment (CI/CD)
- *Networking: Margaret Hamilton Team:*
  - Updates, PR, demo (tests, pilots)
- *Customer & Business Development: Barbara Liskov Team:*
  - DoD program and collaboration research
  - Active phase (6+ months) pilots in USMC, USA, Bw
  - Agreements to co-distribution and delivery

TRL current status

(TRL-4) Basic technological components are integrated to establish that they will work together. System SW architecture development initiated to include interoperability, reliability, maintainability, extensibility, scalability and security issues.

(TRL-5) The basic technological HW/SW components are integrated with reasonably realistic supporting elements so that they can be tested in a simulated environment.

- *Design Dev & Algorithm Architecture: Ada Lovelace Team:*
  - Engineering design – TRL-5
  - Graphical User Interface (GUI) – TRL-5
  - Voice User Interface (VUI) – TRL-4
  - Sw Architecture – TRL-5
- *Mechanical Engineering: Stephanie Kwolek Team:*
  - Enclosure in MVP – TRL-5
- *Optical Engineering: Katharine Blodgett Team:*
  - Optical system – TRL-4
- *Electronics Engineering: Ida Hyde Team:*
  - Motherboard, I/O and power – TRL-5
  - HUD – TRL-5
  - Multimedia – TRL-5
  - SDR and SDA – TRL-3
- *Sw Dev: Hedy Lamarr Team:*
  - Situational Awareness (IFF) – TRL-5
  - Networks (NET) – TRL-4
  - RF systems (RDF, RFDD, RWRC, SDRS, RPAC, ANTC) – TRL-4
- *Sw Dev: Grace Hopper Team:*
  - Visual system (CAM, DISP, FPAD) – TRL-4
  - Input / output (HT, INP, STT, VOVR) – TRL-4
- *Sw Dev: Evelyn Berezin Team:*
  - Messenger (CHAT) – TRL-4
  - Notifications (IMSG, NOTS) – TRL-4
  - Encryption system (CRPT) – TRL-4
- *Sw Dev: Barbara Askins Team:*
  - Small language model (TESS) – TRL-4
  - Computer Vision (CVC) – TRL-4
  - Firing Assistance (FA) – TRL-4
  - Computer Audition (CAC) – TRL-3
- *Networking: Margaret Hamilton Team:*
  - Mentorship
  - Updates, PR
  - Demo (virtual prototype, GUI)
- *Customer & Business Development: Barbara Liskov Team:*
  - DoD program research
  - Collaboration research

R&D results

Problem research

We're taking a close look at user issues during 2020-2024. How do we do this?
- We rely on recent warfighter publications for the U.S. Marine Corps ([link](#)) as our base of operations
- We subscribe to a large number of YouTube channels that publish documentary videos of U.S. military training and combat operations
- We research innovative requests from defense agencies
- We read conference proceedings on topics of future threats and perspectives on military tactics
- We research news from defense companies and startups, their new products and concepts

Technology research

During our professional careers in engineering and development, we keep in touch with updates:
- Trends and new concepts
- New components and experience of other researchers
- Patents
- New production technologies and equipment
- Examples of algorithms and models from different fields
- Successes and failures of technology startups and companies
- User experiences

Competition research

The experience of competitors is a very important element of research:
- Where they are headed and what they have accomplished
- Attention to detail and components of their products
- Conclusions about what is holding them back and where they are falling behind
- Opinions on where they have made progress and what experiences are valuable to us
- White spots (gaps) that most people don't notice

Mentorship

We have 5 mentors today who are supporting us in the following:

We are constantly looking to expand the number of mentors and advisors to improve our expertise.

Jan Philipp Krahn (Cyber Innovation Hub der Bundeswehr)
- Military Intelligence, signal and data analysis
- Applications for military users (Bundeswehr)
- Verification, validation, implementation and test procedures
- Networking

James Monroe (USMC Veteran)
- EOD best practices and tactics, threats and trends
- Applications for military users (USMC)
- High fidelity additive technologies
- Networking

Lex Herrera (USMC Veteran)
- Military network applications
- Military user applications (USMC)
- Cyber threats and cyber security

Anton Donets (RF & Embedded Engineering)
- RF technologies
- Integrated circuits, chips, sensors, components
- Embedded systems, code development, testing
- New manufacturing and assembly technologies
- Design, digital twins, algorithms

Prof. Dr. Tobias Strobl
- Go-to-Market strategies
- Strategies for Dual-Use Market
- Venture investments
- Launch and marketing
- Networking

Hardware and software architecture & development

To date, we have the following results, processes launched and planned.

See Traction & Roadmap

Electronics (TRL-5)
- Module topology, performance evaluation and analysis
- Schematics and SPICE simulation models
- Data accumulation and exchange schemes and diagrams, interfaces
- Sensor, component, MCU, FPGA, CPU, IC datasheets
- Cooling problem in hermetically sealed design
- Airflow, temperature and heat transfer in IC packages, PCBs, electronic assemblies/enclosures, cooling simulation
- RF, microwave and digital filter design, synthesis and optimization
- RF filter design for defense, telecom, radar applications
- High-capacity EM modeling for high-speed RF and digital SOCs
- Electromagnetic modeling (EMI/EMC/EMP) and simulation
- Shielding effectiveness analysis
- EMI crosstalk between cables, cable signal integrity
- Radiated emissions simulation, radiated immunity tests
- 3D electromagnetic simulation, simulating high-frequency electronic products such as antennas, components, interconnects, connectors, ICs and PCBs
- Real-time, dynamic electromagnetic wave simulation
- Physics-accurate wireless network and radar modeling
- Multiphysics parasitic extraction and analysis
- Parasitic extraction sign-off for IC design
- IC layout parasitics analysis and debugging
- Electrostatic discharge (ESD) simulation
- Digital power integrity signoff to detect and correct dynamic voltage drop
- Electrical, thermal, and mechanical coupling interactions of 2.5D/3DIC structures, chip power model (CPM) generation
- Transistor-level power noise and reliability analysis for analog mixed-signal IP and full custom design
- Signal integrity, power integrity, and EMI analysis for PCB design, impedance and crosstalk scanning
- Inductor and transformer design
- Protection against ionized and microwave radiation
- Fatigue, robust reliability and stress analysis

- o Analyze, profile and reduce register transfer level (RTL) power
- o Upgrade options and integration with other devices
- o Project documentation and whitepaper for the team

Embedded (TRL-4)
- o Model-based system and software architecture design for highly dependable embedded products, incl. SysML
- o Modeling and simulation human-machine interface for HUD
- o Model-Based Systems Engineering (MBSE) development
- o Variability-aware SoC clock jitter analysis
- o Acoustic analysis and sound design
- o Test, verify and validate (V&V) embedded software
- o Model and code coverage analysis
- o Test execution on target
- o System-in-the-Loop testing
- o Create and deploy digital twin model
- o Safety and security analysis for electronic systems (HAZOP, HARA, FHA, FTA, FME(C)A, FMEDA methods, MIL-STD-882E)
- o Cybersecurity threat analysis and risk assessment (TOE modelling, Attack Trees, Threat Analysis and Risk Assessment (TARA), Vulnerability Analysis)
- o Key safety analysis methods at various levels of a chip, ranging from IP Design of integrated components, up to SoCs and electronic boards

Software (TRL-5)
- o Description of application functions and interactions
- o Apps functions and topology
- o System and application event-driven architecture (EDA)
- o List of requirements and constraints
- o Set of prioritized AI algorithms and models
- o Set of methods
- o High-fidelity wireless channel modeling, dynamic RF system performance analysis
- o Simulation process and data management (SPDM)
- o Project documentation and whitepaper for the team
- o UI / UX interface prototype

Optics (TRL-4)
- o Virtual prototype (engineering model, digital twin) of elements
- o Models of photonic components, processes, and materials
- o Waveguide and coupler designs
- o Photonics component simulation encompassing optical, thermal, electrical, and quantum wells
- o Photonic integrated circuit simulation
- o Model library development for photonic PDKs
- o Optical system (lenses, prisms, mirrors, waveguides, HUD, multilayered coatings) design, ray tracing, structural and thermal analysis, tolerance analysis, optimization, interoperability, multiphysics simulation
- o Design & validation of optical systems

Mechanical design (TRL-5)
- Digital prototype (engineering model, digital twin) of all elements
- Material analysis (additive manufacturing, test data management, minimize risk of restricted substances, increased modeling accuracy, comprehensive material data)
- Analysis for explosion/penetration, failure, drop testing of all shapes, impact, product misuse/serious loads, product failure/fragmentation
- Model-Based Systems Engineering (MBSE) for simulations
- Process integration and design optimization
- Physical prototype of the device (in progress)

Manufacturing (TRL-3)
- Process chain, zoning
- Business and process flowchart
- Space and productivity requirements
- Readiness for robotic technology

Working tools

We have the following tools and lab at our disposal.

Electronics
- KiCAD EDA
- NI Multisim
- Ansys EMC Plus
- Ansys HFSS
- Ansys Icepak
- Ansys Nuhertz FilterSolutions
- Ansys Perceive EM
- Ansys Q3D Extractor
- Ansys SIwave
- Ansys SynMatrix Filter
- Ansys Sherlock
- Ansys Exalto: EM-aware
- Ansys ParagonX
- Ansys PathFinder-SC
- Ansys PowerArtist
- Ansys RaptorH
- Ansys RedHawk-SC and RedHawk-SC Electrothermal
- Ansys Totem and Totem-SC
- Ansys VeloceRF

Embedded
- HDL (Hardware Description Language): LabView, VHDL, Verilog
- Ansys SCADE Architect
- Ansys SCADE Display
- Ansys SCADE Suite / One
- Ansys Clock FX
- Ansys Sound
- Ansys SCADE Test
- Ansys Twin Builder
- Ansys Medini Analyze and Medini Analyze for Cybersecurity
- Ansys Medini Analyze for Semiconductors

Software
- GUI (Graphical User Interface): Figma, Qt
- IDE (Integrated Development Environment): Visual Studio Code (C/C++), GDB Compiler, Qt Creator, STM32CubeIDE, MPLAB XCV
- SCV: Git
- Frameworks for C/C++
- MathWorks MATLAB and Simulink
- Ansys RF Channel Modeler
- Ansys Minerva
- AWS Cloud Tools and GPU-acceleration
- Test Automation: Qase, Zephyr Squad
- CI / CD, Deploy: Jenkins, Docker
- Scrum, Bug tracker: Jira Software

Optics
- Ansys Lumerical FDTD / MODE / Multiphysics
- Ansys Lumerical INTERCONNECT / CML Compiler
- Ansys Zemax OpticStudio
- Ansys Speos
- Ansys OpticsBuilder

Mechanical Design
- SolidWorks
- PTC Creo
- Ansys Granta MI Enterprise / Granta Selector
- Ansys Granta Materials Data for Simulation
- Ansys LS-DYNA / ModelCenter / optiSLang

Lab Equipment
- In-house production of multilayer printed circuit boards for prototyping (all stages, microtechnology, CNC, UV laser)
- PCB assembly (surface, manual) and assembly e-testing, component inventory
- Electronic equipment for programming, circuit analysis, digital signals, testing and debugging
- Additive (FDM, SLA) and vacuum technology for high-precision polymer molding
- Optical and mechanical production of components and testing of physical parameters
- In-house production of necessary tooling and laboratory equipment (high-power CNC laser, CNC milling machine, manual machining)
- Surface machining and finish coatings

Lab Software
- FDM/SLA 3D print: CURA, Chitubox
- Laser: LightBurn
- CNC Milling: LaserGRBL, Open CNC Pilot, Universal GCode Sender (UGS)
- Thermo & Vacuum Processing: Moldex3D Pro
- Inspection: Saleae Logic, Digital Scope, Celsius Thermal Solver

Funding Ask

What is the spend plan for the $1.75M ask?

Data Room (Wiki link)

Calculations (XLSX file)

Data Room includes: Market, Milestones, Product Line, Cash Flow, Fundraising, Legal

Team & Operations
- o $1,631,000: Personnel budget
- o $59,000: Operating costs budget

Product & Technology
- o $30,000: Rental and leasing budget (cloud computing*)
- o $30,000: Equipment budget (variable costs, tools, equipment)

Customer Development
- o $0

Cash Runway: 18 months
Burn Rate: $80-120k/m

* AWS credits packages for early-stage startups (up to $100k and $300k for AI)

** Materials budget for proving ground test is reimbursable from sample provision fee.

Do you already have any committed investors?

- o Currently, we are discussing details of negotiations with 5 VCs with a focus on defense and national security projects (4 in the US, 1 in the Netherlands)
- o 4 more defense startups whose founders are interested in investing in us (all in the US)
- o term sheet not yet received
- o we are still looking for new contacts (cold outreach)
- o we don't contact investors and angels who do not have experience investing in defense startups and are not located in the U.S., UK, EU (in NATO countries)
- o we rely on the active role of partners and advisors of the investor company in the project (we have an idea for an easy and convenient format for intellectual discussions)
- o we prefer SAFE or MFN agreement for Pre-Seed
- o we aim for one agreement with one investor at this round ($1.75M)

Project References

YouTube Demo

Pitch Deck

Traction & Roadmap (Wiki)

Product Details (Wiki)

Apps Details (Wiki)

HackerNoon Article