EpiSci

Capabilities for HAYSTAC

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March 2022

EpiSci At A Glance

Powered by an exclusive portfolio of DoD & NASA sponsored technology, EpiSci develops and deploys **trustable**, **modular**, and **explainable** autonomous systems equipped with **Tactical AI** for commercial and defense applications.

Highlights

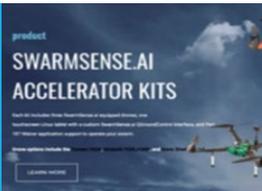**30+** SBIR/STTR Projects
- - 8 Phase 2 / 1 Phase 3

$32M+ Cumulative booking
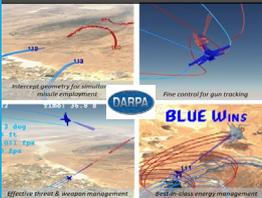R&D, RIF, & IDIQ contracts

30+ Employees

10+ Customers

8 Patents

Non-R&D Sources of Revenues

$800K+ SwarmSense.ai sales, licensing, and service contracts as of Dec 2021

$1M+/year Tactical AI Virtual Pilot licensing revenue for USAF via Red 6 partnership

$46B Eglin Wide Agile Acquisition ID/IQ Contract

Select Customer and Program Highlights

From sUAS to F-16s, EpiSci builds high-performance, trust-first collaborative, multiagent, autonomous systems.

CRANE AISUM Prize Challenge 2021

- **Objective**: Develop complex indoor navigation algorithms to enhance the maneuver and reconnaissance capabilities of autonomous drones within defined scenarios and deploy onto Government Furnished Property (GFP) drones, sensors, and onboard processing.

- **Outcome**: 1st place out of 20+ companies and government labs.

- **Highlighted Capability**: Tactical AI **sim-to-real** demonstration < 3 mo.

Naval Surface Warfare Center, Crane Division

DARPA Air Combat Evolution 2020-2024

- **Objective:** Design highly capable multi-agent AI pilots to increase trust in combat autonomy by using human-machine collaborative dogfighting as its challenge problem and demonstrate combat autonomy for 2 vs X within-visual-range air combat maneuvering.

- **Outcome:** Lead the field in all multiagent categories.

- **Highlighted Capability:** Tactical AI pilots rated the **most trustworthy** by human pilots.

Defense Advanced Research Projects Agency

USAF Golden Horde Vanguard 2021-2022

- **Objective**: Design and deliver robust, trustable, and verifiable combat algorithms for networked collaborative autonomy while providing a scalable system architecture and development suite, enabling rapid development, integration, testing, and deployment of emerging autonomous capabilities.

- **Outcome:** 1st place out of 8+ companies and government agents.

- **Highlighted Capability:** Tactical AI is a **mission-ready** technology.

EpiSci

Human Mobility Simulator (EpiSci SW Tool)
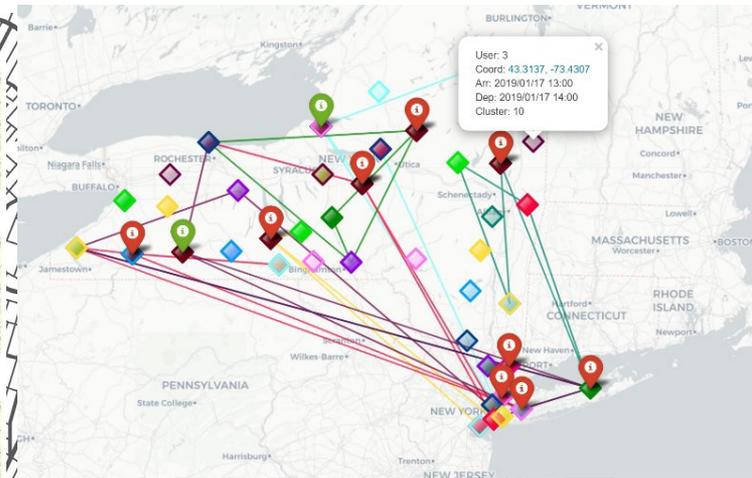
- Simplified Location Profile (LP)
- Discretize Map into grids
  - Equal grids L x L
  - Non-equal grids
    - Same Wi-Fi network, building, vicinity, etc.
- Prediction over next T time slots (T hours)
- LP is binary 3-D matrix
  - At each time t, matrix of L x L has single 1 for the predicted grid

Simplified Raw Location Profile X_A,
If map is in $L \times L$ grids, 3D profile of $L \times L \times T$
T is number of time slots (e.g. hours) for future visit predictions
Example: $X_A(i, j, t)$ is binary prediction of visiting grid (i, j) in $t \in \mathbb{Z}$ hours from now.

Simplified Raw 3-D Location Profile
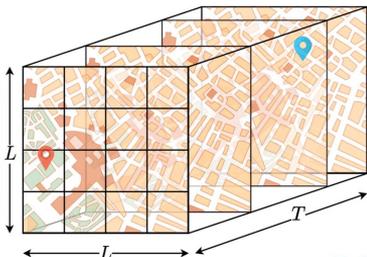
Movement Profile vs. Movement Prediction
(probabilistic) LP

Predict if and when a person will be deviating
from normal routes with what confidence …