



PreVAIL™

# Predictive Vehicle Activity for Identification & Location



PreVAIL is an AI/ML framework that enables the state-of-the-art for satellite-based tracking capabilities using a novel approach to automated target detection and recognition (ATD/ATR). PreVAIL leverages commercial and military assets using sensor-agnostic algorithms to maintain custody of targets, even in periods of intermittent coverage, increasing GI-ISR mission effectiveness.

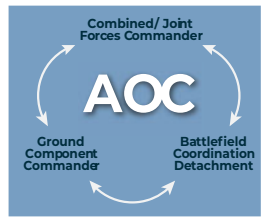
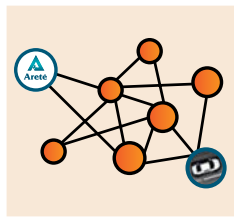
## Key Features

- Accurately predicts the vehicle location, orientation, and appearance before the target is acquired by the sensor.
- Reveal subtle, anomalous vehicle behavior across multiple sensors, times, and locations.
- Leads to faster target engagement with fewer false alarms.
- More flexibility by leveraging commercial and opportunistic surveillance assets.
- Sensor-agnostic capabilities save time and allows for optimized use of ISR assets.



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CAOC Leadership / MAAP / Target Cell Decide to Pursue Target

Intel Analyst Tasked to Find Target

Analyst Pulls Imagery from Downlink or Repository

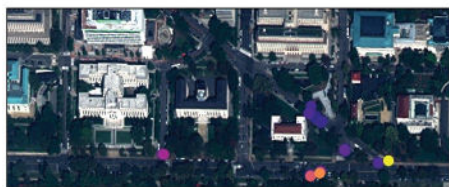
Analyst Applies GQN Application to Find Target

Analyst Compares Results with Other Intel Sources

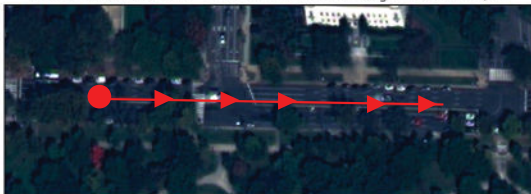
Target Engaged by Ops

## How PreVAIL Works

- PreVAIL algorithms use machine learning and road networks to predict the appearance and orientation of target vehicles in future imagery.
- PreVAIL integrates traffic data and driving characteristics to determine the most probable search area for a given timepoint.
- PreVAIL requires minimal information about previous detections and vehicle type to make accurate predictions of the future vehicle position.



$\Delta t = 22.50 \text{ sec}$  :  $D = 188.48 \text{ meters}$  :  $V_{avg} = 18.74 \text{ mph}$



## ROADMAP

**Phase 1** - AFRL Air Force  
Explore Proof of Concept Completed  
2nd Qtr 2022



**Phase 2** - Advanced Algorithm Development  
Basic UI/UX  
3rd Qtr 2022 - 3rd Qtr 2024



**Initial PreVAIL Prototype**  
Enhanced UI/UX  
IOC Architecture Integration



**Prototype Demonstration in Exercise**



**End Goal:**  
IOC as a Program of Record

