

# Target Geolocation

**Objective:** Allow a user watching a video stream to click on a target of interest, and to enable the system to continuously track the target and accurately estimate its GPS coordinates.

**Principle Investigators:** Tim McLain, Randy Beard, Clark Taylor

**Sample Publication:** D. Blake Barber, Joshua D. Redding, Timothy W. McLain, Randal W. Beard, Clark N. Taylor, "Vision-based Target Geo-location using a Fixed-wing Miniature Air Vehicle," *Journal of Intelligent and Robotic Systems*, vol. 47, no. 4, December, 2006, p. 361-382.

**Funding Source:** AFOSR.

## Problem Summary

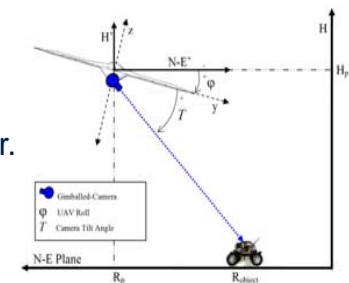
**Step 1.** User identifies target of interest in the video stream.

**Step 2.** Computer vision algorithm tracks the target in the video stream.

**Step 3.** UAV sensors are used to estimate the relative position of the target, and its GPS coordinate is estimated from the UAV's GPS sensor.

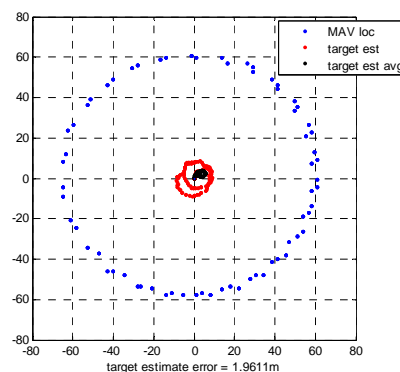
**Step 4.** Servo pan-tilt gimbal so that object is in center of image

**Step 5.** Modify flight path of UAV to orbit object



## Approach

1. Kalman filter raw data
2. On-board gimbal calibration
3. Optimal flight path selection
4. Wind estimation and compensation
5. Telemetry Synchronization
6. Range Estimation Using Digital Elevation Models



## Results

*Relative target estimation error less than 2 meters after one orbit*

First successful flight test in 2005.

Licensed to Procerus Technologies in 2006.

Commercial product: OnPoint

