

## VISUAL SURVEILLANCE/DETECTION CAPABILITY

**Summary:** This describes the Visual Surveillance plan used for the Quarter-Scale Piper Cub UAS flight.

### **Location and Role of Observers:**

In addition to the Pilot-in-Command (PIC), the Quarter-Scale Piper Cub flight will employ a minimum of three additional spotters. One spotter will accompany the PIC, monitoring the radio and recording flight data, in addition to assisting the PIC and acting as observer and spotter.

The second and third spotters will be placed downrange approximately 0.2 miles from the launch/recovery area. In this way, they will keep the UAS in sight as it reaches the furthest point from the PIC and other spotter. This second and third spotters will be in line with the PIC, and all members of the team will be positioned in a line that dissects the center of the flight path. This provides continuous observation of the UAS to the left and to the right. Another one or two spotters may be added at opposite corners of the AO if needed.

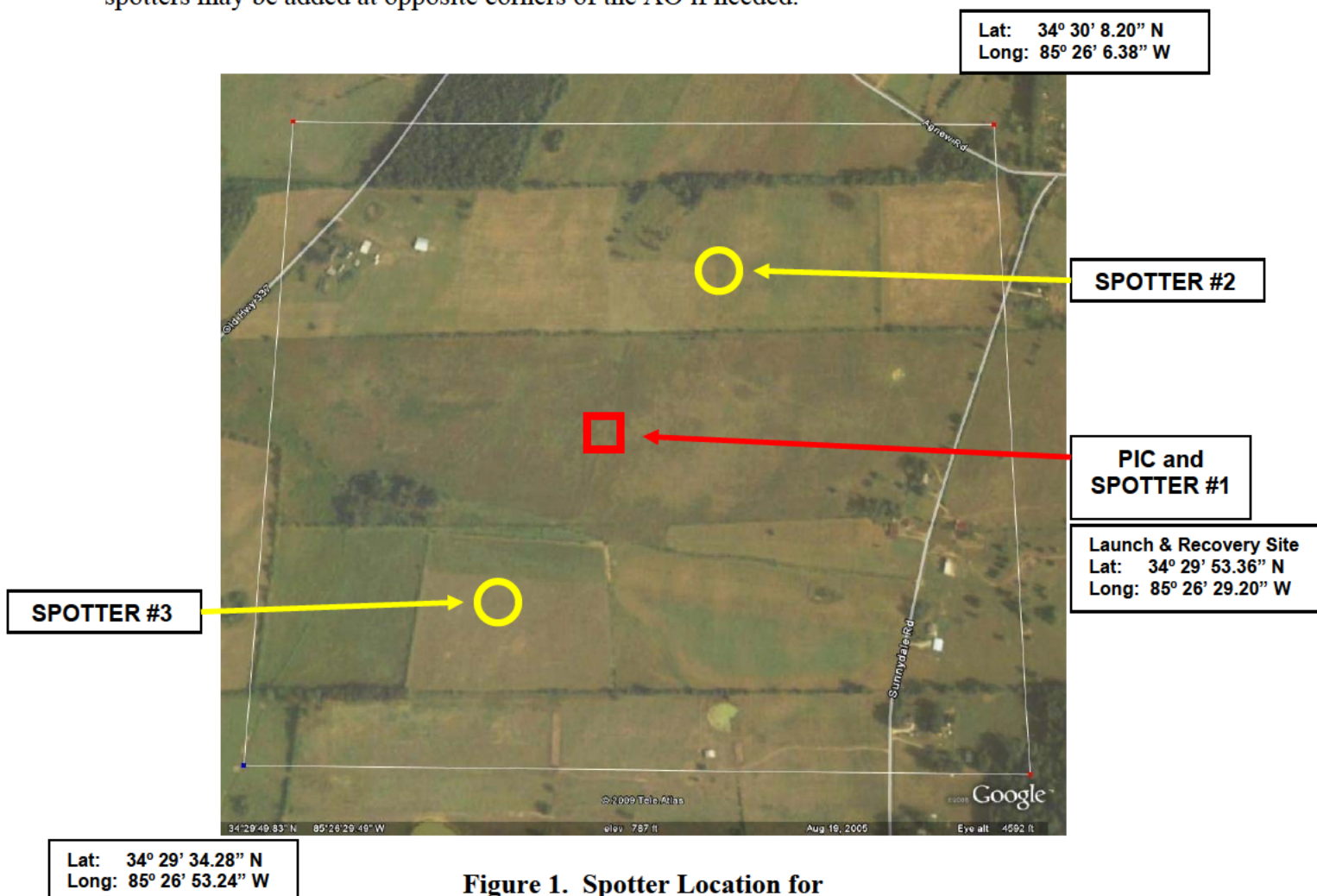


Figure 1. shows an example of the locations planned for PIC and two additional downrange spotters. Note that the downrange spotters can observe the UAS on both left and

right. The map is approximately 0.5 sq. mi. area. The spotters are placed at the optimum point for keeping the aircraft under continuous observation. As mentioned, additional spotters may be added at the NW and SE corners of the AO. This will be done if the flight path warrants it.

Latitude and longitude of the NE and SW corners of the map are labeled on the map image.

### **Detection Capability**

The Quarter-Scale Piper Cub UAS possesses NO onboard detection capability due to its limited size. Detection will be done by the use of spotters. Previous experience has shown that this bright yellow-colored aircraft will be clearly visible to a spotter at distances up to 2,000 ft. Full-size aircraft are visible at much greater distances. Thus, spotters can see full-size aircraft if they approach the UAS operating area and take measures to avoid being in the path of the other aircraft.

The aircraft will have two video cameras installed beneath the fuselage, looking forward and slightly down. The video from these cameras will be transmitted to the ground and monitored by an assistant/observer. These cameras will provide a view of the ground and of the sky ahead of the UAS. Although not intended to replace any of the spotters, the cameras could give early warning of an approaching aircraft in front of the UAS.

GTRI is working to develop a “sense and avoid” system for small and micro-UAVs but this is not yet operational.

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