

2 Ground Station

2.1 Overview

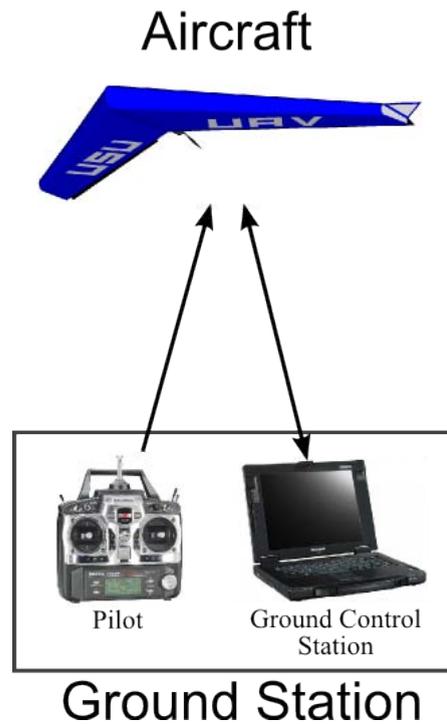


Figure 3: Ground Station Diagram

The ground station for AggieAir is comprised of two pieces: the pilot and the GCS (Figure 3). The pilot's job is to watch and manually fly the UAV whenever needed while in site. In addition, the pilot also inspects the UAV before each flight, makes any necessary repairs and launches the aircraft. The GCS operator programs the UAV with its flight plan, sets up the payload and monitors and controls the UAV from the GCS.

The ground station can be used in many different configurations (Figure 4). For example, multiple ground stations can be used to control and monitor the UAV. This is useful if the flight plan requires the UAV to fly out of range from the home ground station. Even though the UAV does not need the ground station to fly, another ground station could be set up at the end of the flight plan for additional safety. The only problem with this configuration is that the ground stations cannot have the RC transmitters on at the same time (if the transmitters are within range of each other). In addition to multiple ground stations controlling and monitoring one UAV, multiple UAVs can also be controlled and monitored with a single ground station. This is useful for applications which have an area of interest too big for one UAV to cover in one flight. Multiple ground stations could also be used to control and monitor multiple UAVs.

2.2 Paparazzi Ground Control Station

The Paparazzi GCS is used to monitor and control the UAV while in flight or while in simulation. Figure 5 shows the layout of the GCS.

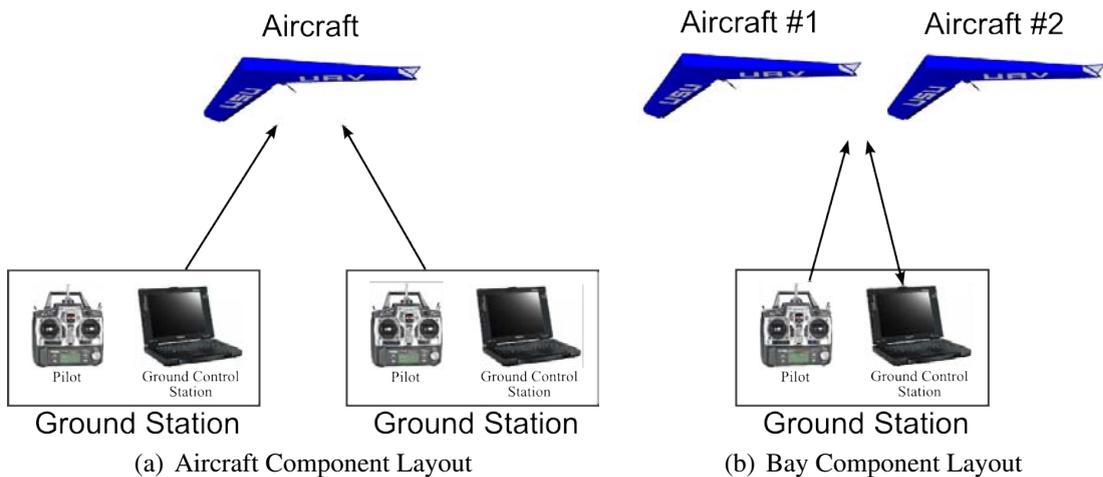


Figure 4: Different ground station configurations

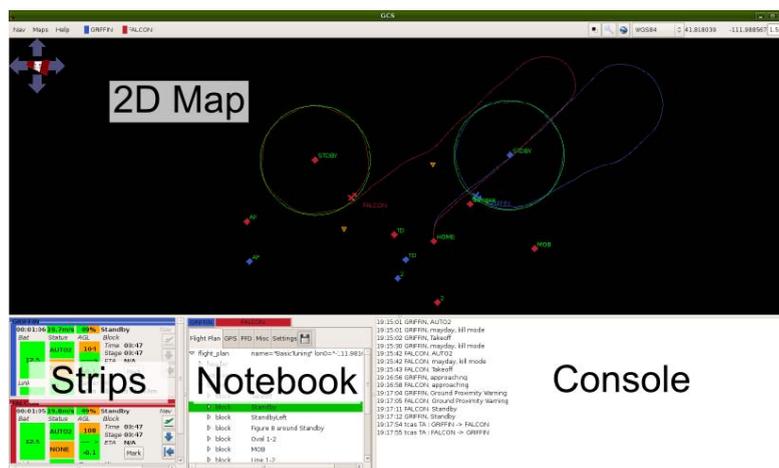


Figure 5: Paparazzi Ground Control Station

The 2D map gives the user an aerial perspective to help control and monitor the UAV. The UAV, the waypoints, the path of the UAV and the desired path of the UAV are all displayed on the 2D map. To help know where the UAV is, background images can be downloaded from Google maps under the Maps menu. The 2D map can be navigated using the mouse, the arrow keys or by using the menus and buttons above the map.

Each strip on the GCS displays important telemetry data and has buttons for common commands for the respective UAV. Each UAV visible to the GCS will have its own strip. Examples of the telemetry data displayed on each strip include battery voltage, speed, throttle, current altitude, target altitude, and the autonomous mode. In addition to common command buttons (e.g. launch, kill throttle, altitude and lateral shift), the user also has the option to add more buttons which represent different blocks in the flight plan.

Like the strips, the notebook frame contains a page for each running UAV. Each page has multiple subpages which contain tools for monitoring and controlling the UAV. The flight plan subpage is used to display all the elements in the flight plan. It also allows the user to change the current block being executed (highlighted in green). The GPS, PFD and Misc subpages all display information about the UAV. The GPS displays the number

of satellites and the position error of the GPS signal, the PFD displays the orientation of the aircraft, and the Misc subpage displays other information such as wind data. The settings subpage contains all the settings of the UAV which the user can change during the flight. These settings include the controller gains, the kill throttle and other flight parameters. Because of the access to the controller gains, the settings subpage is important for tuning the aircraft.

The console frame displays messages and alerts the user when the status of the aircraft has changed.