



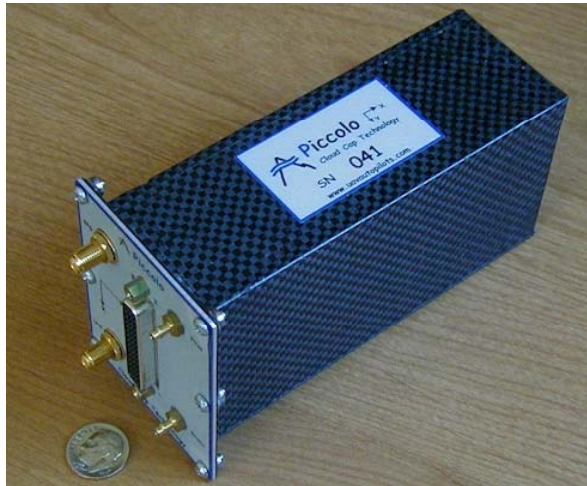
Control Station Description

- ▶ Each UAS autopilot unit is monitored and controlled by its operator using laptop computers which are part of the ground control station. Each UAS has its own operator. During autonomous flight, the operator has full knowledge of the state of the autopilot unit including data such as the GPS location and flight path of the vehicle. The operator can also reconfigure flight plans in real time to suit a change in mission.
- ▶ Through the ground control station, the external pilot can assert manual control of any one of the UAS using an R/C style handset. This feature is used for takeoff and landing.





Avionics and Control Hardware



Piccolo Avionics (One per UAS)



Piccolo Ground Station



Laptops w/ Control Software (One per UAS)





UAV Control Interface - Piccolo

The screenshot displays the Piccolo UAV Control Interface, which consists of several windows showing real-time data and control options for different UAVs.

Piccolo 147, [174025] 18:40:12; 11 December, 2003

- Telemetry:** GPS data (Latitude: 37.867852 [deg], Longitude: -122.267211 [deg], Height: 20.76 [m]), Air data (True Air Speed: 8.10 [m/s], Altitude: 1.44 [m], Air Temperature: 29 [°C]), System (T[°C]: 43.00, RSSI: -71, lin: 0.31, Vin: 13.39), Wind (m/s) (South: 0.00, West: 0.00, Error: 0.00, Time: 0.0), Gyro (deg/s) (Roll: -0.06, Pitch: 19.42, Yaw: -25.32), Accel (m/s/s) (X: -4.57, Y: -1.78, Z: -9.58), RPM (Left: 0, Right: 0).
- Commands:** UHF radio settings (Channel: [], Power [W]: [], Req: [], Send: []), Firmware (Version 1.1.7, Jul 7, 2003 Released, Request: []), Deadman status: OFF, GPS, Comm.
- Map:** A map view showing the UAV's position and flight path.

Piccolo 138, [174025] 12:02:55; 01 January, 2002

- Telemetry:** GPS data (Latitude: 37.867852 [deg], Longitude: -122.267211 [deg], Height: 20.76 [m]), Air data (True Air Speed: 8.10 [m/s], Altitude: 1.44 [m], Air Temperature: 29 [°C]), System (T[°C]: 43.00, RSSI: -71, lin: 0.31, Vin: 13.39), Wind (m/s) (South: 0.00, West: 0.00, Error: 0.00, Time: 0.0), Gyro (deg/s) (Roll: -0.06, Pitch: 19.42, Yaw: -25.32), Accel (m/s/s) (X: -4.57, Y: -1.78, Z: -9.58), RPM (Left: 0, Right: 0).
- Commands:** UHF radio settings (Channel: [], Power [W]: [], Req: [], Send: []), Firmware (Version 1.1.7, Jul 7, 2003 Released, Request: []), Deadman status: OFF, GPS, Comm.
- Map:** A map view showing the UAV's position and flight path.

Piccolo 144

- Telemetry:** GPS data (Latitude: 37.867852 [deg], Longitude: -122.267211 [deg], Height: 20.76 [m]), Air data (True Air Speed: 8.10 [m/s], Altitude: 1.44 [m], Air Temperature: 29 [°C]), System (T[°C]: 43.00, RSSI: -71, lin: 0.31, Vin: 13.39), Wind (m/s) (South: 0.00, West: 0.00, Error: 0.00, Time: 0.0), Gyro (deg/s) (Roll: -0.06, Pitch: 19.42, Yaw: -25.32), Accel (m/s/s) (X: -4.57, Y: -1.78, Z: -9.58), RPM (Left: 0, Right: 0).
- Commands:** UHF radio settings (Channel: [], Power [W]: [], Req: [], Send: []), Firmware (Version 1.1.7, Jul 7, 2003 Released, Request: []), Deadman status: OFF, GPS, Comm.
- Map:** A map view showing the UAV's position and flight path.

Ground Station...

- File:** Add Address, Remove Address, Remove All, Pilot Address, Pilot [144], Request.
- Units:** GPS, System (T[°C]: 41, RSSI: -71, lin: 0.27, Vin: 13.45), Firmware (Version 1.1.7, Jul 7, 2003 Release, Request).
- UHF radio settings:** Channel [], Power [W] [], Req [], Request Spectrum.

