BUSTER Guidance & Control Station (GCS)

Pictured below is the entire BUSTER GCS package displayed on the custom (Pelican) carrying case. The ruggedized Panasonic notebook computer (center) provides system and mission information and the interface between operator and vehicle. Also shown are the GCS antenna and UAV starter battery (left) and the sensor package/payload auxiliary video display and antenna (right).

The GCS can be set up and made ready for use in minutes using no tools. Map displays, UAV location, caution panel, launch steps and GCS controls are all displayed on the notebook computer screen. Mission profiles can be created in advance and edited during flight by touch screen entry.

Missions are typically planned in advance and saved as electronic files on the computer internal memory with backup on an external digital drive. A pre-planned mission contains all airspeed, altitude and terrain data as well as all waypoints to include an initial point (IP) and communication failure (CF) point. Prior to launch with the UAV powered up on the launcher, the operator will typically transfer (by comm. Link) the mission data to the UAV and confirm data

transfer as part of the pre-launch checklist. The UAV will not accept mission data that does not include IP and CF waypoints.

Prior to launch with the UAV engine running, the operator verifies (by comm. Link) proper operation of gyros, GPS receiver, INS, autopilot, engine and sensor package and directs the launcher operator to launch the UAV. The BUSTER UAV is manually launched from the mechanical launcher by the launcher operator, not by GCS command. After launch, the UAV will climb straight ahead for 5 seconds and then turn to orbit the IP at the pre-planned altitude & airspeed. For test and training missions the GCS position is normally set as the IP to allow the operator to visually check the UAV and perform in-flight system checks prior to entering the route.

The operator then sends a command for the UAV to depart the IP for the next waypoint. From then on the UAV will continue the entire route as programmed unless the operator manually overrides the flight plan and flies the UAV. Manual control does not mean control of UAV pitch and bank (as in flying a radio-control model airplane) but manual input of airspeed altitude and next waypoint. The autopilot continues to control pitch and roll during "manual" flight of the BUSTER UAS.

During manual or automatic flight the operator has a continuous display of system status, UAV position displayed on a terrain map and sensor/payload imagery if applicable. In automatic mode, the UAV will proceed to the final waypoint and orbit until fuel exhaustion and deploy the recovery chute with no input from the GCS. The final waypoint is typically the launch position and is also the designated communication failure (CF) waypoint. If at any time in flight (manual or automatic) the link between the GCS and UAV is lost, the UAV will proceed to the CF waypoint at a designated airspeed and altitude (see separate attachment).

The UAS operator has full operational control of the UAV during flight to include monitoring all systems, following UAV position on the map display and directing manual or automatic progress of the mission. The operator can direct the UAV to repeat or reverse the route at any time and can kill the engine and deploy the recovery chute immediately with a single command.