

## ***Control Station System Description-OHARNG UAS Feb08***

TM 1-1550-695-13&P 0063 00

### **SUPPORTING INFORMATION**

**SMALL UNMANNED AIRCRAFT SYSTEM (RQ-11B)**

**NSN 1550-01-538-9256 EIC: 1CB**

### **RECONNAISSANCE, SURVEILLANCE, AND TARGET ACQUISITION (RSTA) KIT**

#### **Overview**

The Reconnaissance, Surveillance, and Target Acquisition (RSTA) kit is intended to facilitate mission planning, monitoring of mission progress, and observing, recording, and processing of video and still images derived from the Small Unmanned Aircraft System (SUAS). The RSTA kit is fielded to units on the same basis as the SUAS. The RSTA kit is employed by the SUAS operator as an optional element of their normal mission.



Figure 1. RSTA Components.

The primary component of the kit is a ruggedized laptop. The RSTA Computer can be in a stand-alone mode to plan and review missions, or it can connect with the GCS in operational mode or with the simulator. When in stand-alone mode, no external hardware is needed. When used with the GCS, the Ethernet cable (provided with the GCS) is used to connect the GCS Mission Operator Port and the Ethernet port of the computer. Additional RSTA components include a USB CD-RW/DVD-ROM drive, an 80 GB external hard drive, cables and adapters.

## **Components**

The components of the RSTA kit are shown in Figure 1. The components are carried in a hard-sided, molded case that may be locked with user provided locks for security. The components are organized and secured within foam compartments.

1. Storage Hard Case
2. Laptop computer
3. LIND Power Cable
4. AC Adapter and Cord
5. CD-RW/DVD-ROM Drive
6. High Speed USB Cable (2 ea)
7. USB Power Sharing Cable (2 ea)
8. AC External Power Supply Cable
9. 80 GB External Hard Drive
10. World Scenery Disks (Set of 3)

## **NOTE**

- The USB Power Sharing Cables and AC cables are not required when connecting to a laptop with USB 2.0 ports.
- For USB 1.0 operations, the operator will be required to use both USB and USB Power Sharing Cables or USB Cable and AC External Power Supply Cable depending on the number of available parts.
- The CD/DVD and Hard Drive Power Cables are interchangeable.

## **GCS/RVT FUNCTIONAL DESCRIPTION**

The GCS provides command and control of the AV, and displays video from the AV's payload cameras. AGCS with the transmitter turned off can be used as a Remote Video Transceiver (RVT). RVT functionality allows remote viewing of video sensor data and metadata coming from the AV, screen capture, replay and range and bearing function. The GCS is composed of four major functional units. The major functional units are the Hub Unit, Hand Controller, RF Unit, and Antenna Mast. A block diagram of the GCS components is shown in Figure 2. The four functional units are described below:

**1. Hub Unit** — The Hub Unit is the main functional element of the GCS that ties all the other elements together. It includes interfaces for the Hand Controller, RF Unit, Batteries, video and data out to external interfaces. Main battery power for the GCS is connected at the Hub Unit. Power is conditioned and directed to other elements of the GCS. The Hub Unit has a central processing unit which runs software that controls other devices within the GCS. Communications, video and data signals are passed between other GCS components and external interfaces through the Hub Unit.

**2. Hand Controller**—The Hand Controller is the primary human interface to the system. It provides the user a means of input and output to the system. Buttons and switches are provided for the user to enter commands and manipulate data. An LCD display screen is provided for the user to see video imagery and data displayed as text. The Hand Controller is powered by the Hub Unit. A central processing unit in the Hand Controller runs software that controls the display and communication of video and data on the screen and to the Hub Unit.

**3. RF Unit** — The RF Unit contains the uplink transmitter and downlink receiver. The RF Unit receives data from the Hub Unit and transmits it to the AV. The RF Unit receives video and data signals from the AV and sends them to the Hub Unit.

**4. Antenna Mast** — The antenna mast is a structural element used to position the RF Unit above the ground for better RF line-of-sight to the AV.

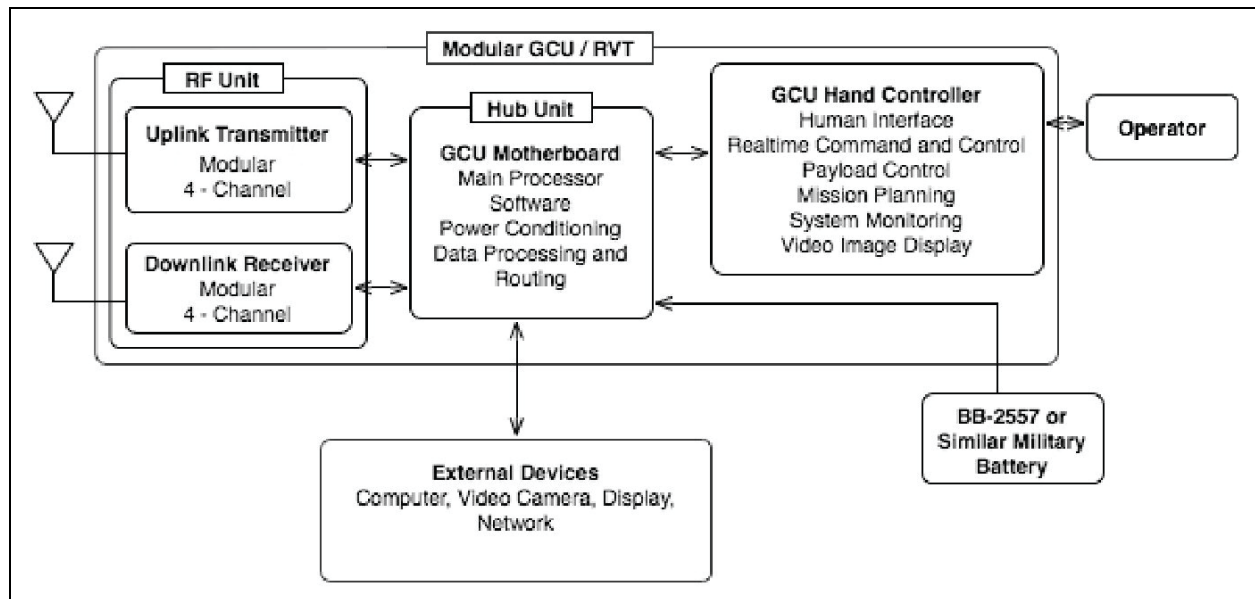


Figure 2. GCS Block Diagram.

### SYSTEM RF SIGNAL ELEMENTS

Figure 3 is a block diagram of the primary system components. The main Radio Frequency (RF) signal elements are shown. The system has three independent RF signal elements, which are described below:

1. Uplink—The RF uplink transfers command and control information from the GCS to the AV. All aircraft commands and information generated in the GCS, including mission data, are transmitted to the aircraft over this link.
2. Downlink—The RF downlink transfers payload video signal and data generated in the AV from the AV to the GCS. Downlink data includes flight systems data and navigation sensor data.
3. GPS Signal—The GPS signal is transmitted from multiple GPS satellites to the GPS receiver onboard the AV. The signals are used by the GPS receiver to generate AV position for the avionics system.

Each of the RF signals functions and operates independently of each other as long as power is applied to the GCS and the AV. Failure or interference in one of the RF signals does not cause a failure in one of the other signals. All RF signal elements are limited by line-of-sight and thus may be obscured by buildings, mountains, vehicles and trees.

1. AV.
2. GPS Signal.
3. GCS.

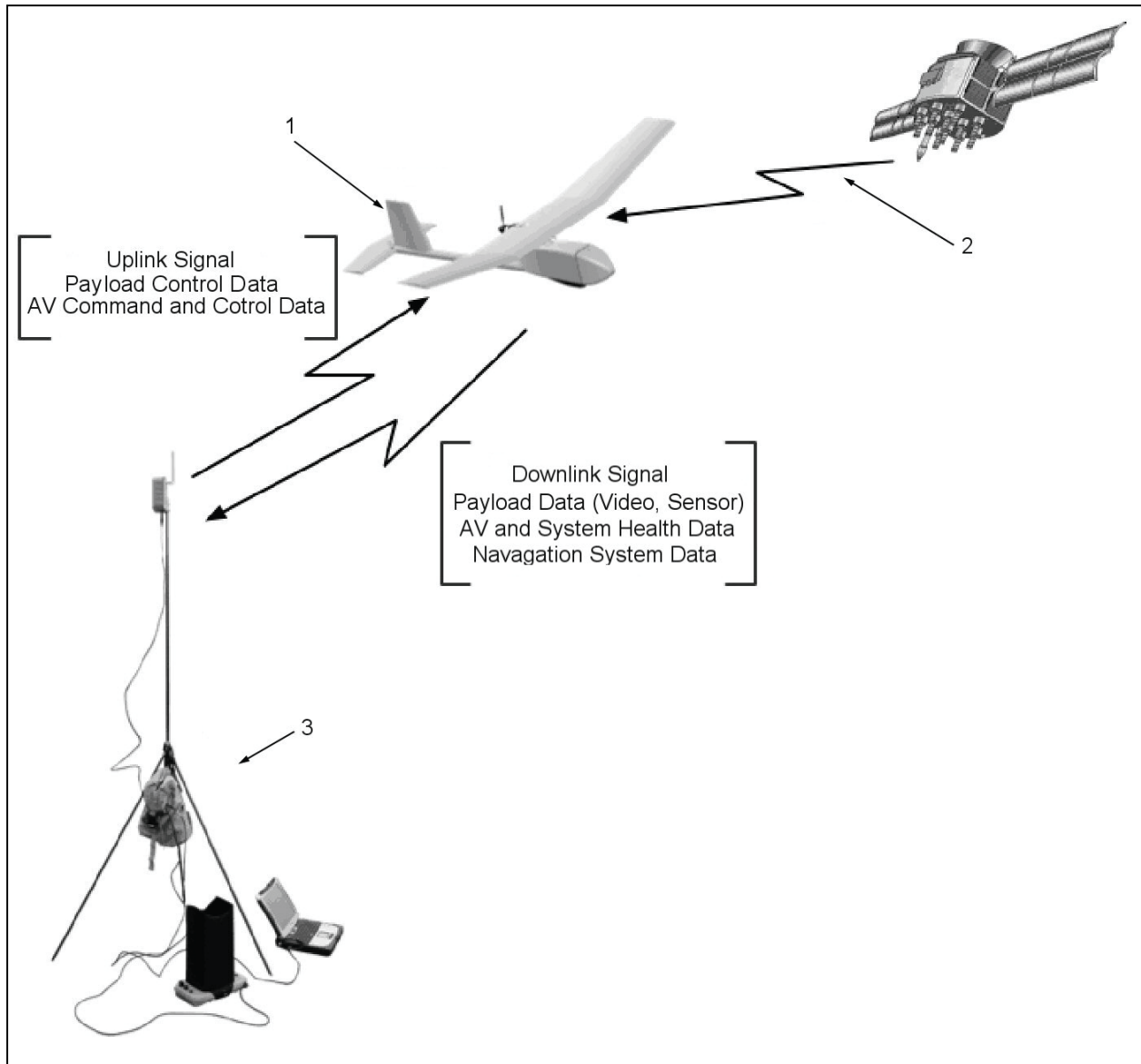
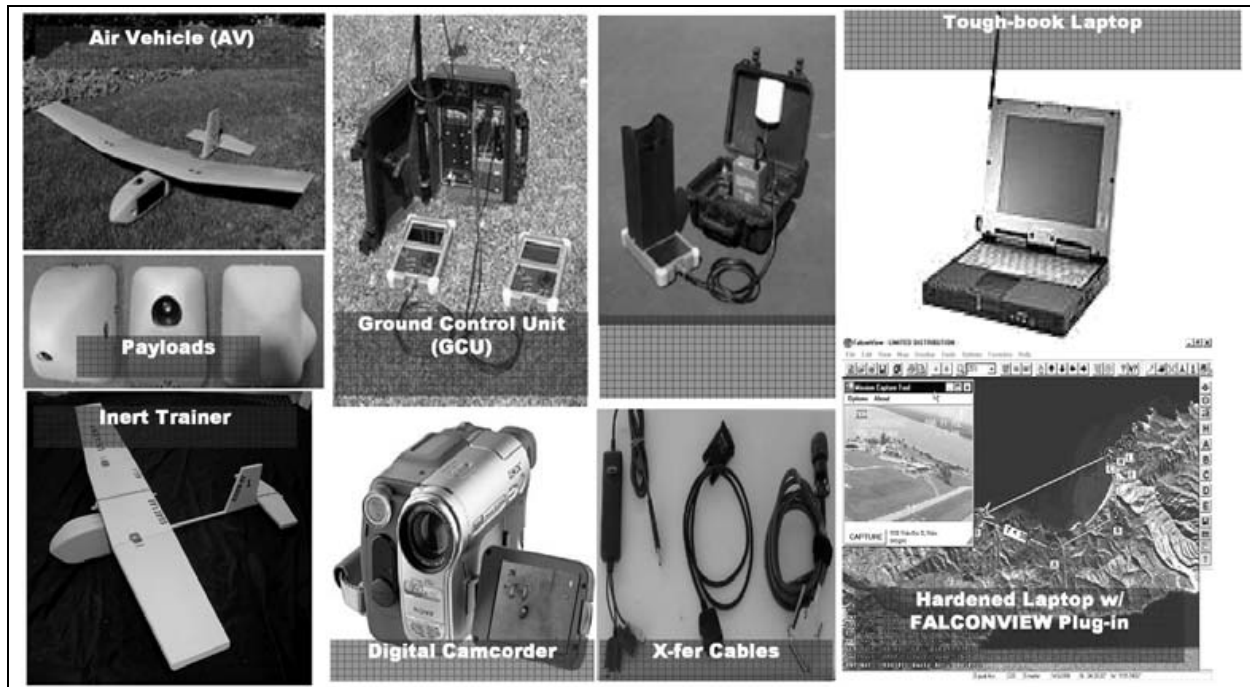


Figure 3. RF Link Block Diagram.



<p><u>System Components:</u></p> <ul style="list-style-type: none"> <li>• 3 air vehicles per system</li> <li>• 3 payloads</li> <li>• One (1) ground control unit</li> <li>• Remote video terminal (RVT)</li> <li>• Batteries: rechargeable</li> <li>• Carry / protective cases</li> <li>• Battery charger / power supply</li> <li>• Field maintenance kit</li> </ul>	<p><u>Characteristics / Description:</u></p> <ul style="list-style-type: none"> <li>• Power: rechargeable lithium ion battery</li> <li>• Wing span: 4.5 feet</li> <li>• Weight: 4.2 lbs (w/ carrying case, 12 lbs)</li> <li>• GCU weight: 17 lbs</li> <li>• Range: 5-12 + km</li> <li>• Endurance (mins): 60-90 (lithium ion)</li> <li>• Speed: 27-70 mph, cruise 30 mph</li> <li>• Payload(s): high resolution, day / night camera and thermal imagery</li> <li>• Crew / Manpower: 2 Soldiers</li> </ul>
<p><u>Mission:</u></p> <p>Army tactical-level reconnaissance, surveillance, target acquisition, and battle damage assessment</p>	<p><u>Capabilities:</u></p> <ul style="list-style-type: none"> <li>• Hand-launched / Auto-Land recovery</li> <li>• Military P(y) - Code GPS</li> <li>• Auto-navigation</li> <li>• Quick assembly (&lt; 3 min)</li> <li>• Man portable / back-packable</li> <li>• Quiet</li> <li>• Reusable</li> <li>• Typical operational altitude 150-500 ft AGL</li> <li>• Climb to operational altitude in 1-2 minutes</li> </ul>