Aircraft System

The Aeryon Scout is produced and manufactured by Aeryon Labs Inc. located in ON, Canada. The system is comprised of five main components:

1. The Aerial Body (vehicle core), also consists of:
    a. Vehicle core
    b. Scout Arms (propellers)
    c. Scout Landing Gear
2. Base Station with Antenna
3. Command Station
4. Battery
5. Payloads

Characteristic	Measurement
Dimensions	80 cm x 80 cm x 20 cm
Operational Weight	Approx. 2.5 lb
Operational Range	3 km
Operational Duration	20 min
Maximum Altitude	500 m

Materials

The body of the flyer, its legs, and the battery casing are made of injection molded plastic. The flyer internals are FR4 fiberglass circuit boards and various electronic components. Four aluminum heatsinks are bonded in to the flyer body to keep the internal electrical components within safe thermal operating parameters. Battery internals include FR4 fiberglass circuit boards, assorted regulation components, and lithium polymer cells. The prop arm mounting mechanism is composed of a steel spring clip held in by an aluminum plate. The flyer body, battery enclosure, and prop arm mounting mechanisms are held together with stainless steel screws. Prop arms are made of unidirectional carbon fiber bonded to injection molded bulkhead connectors on the flyer end and injection molded motor baskets on the propeller end. The propellers themselves are made of bidirectional carbon fiber and are mated to out-runner brushless electric motors which are mounted into the motor baskets via rubber isolators and an aluminum heat sink plate.

Aerial Vehicle

The Scout sUAS is controlled via a commercial off the shelf (COTS) U-blox GPS. The operator provides GPS waypoints for a mission plan in the Flight Planning mode, and then waypoints are performed during the Waypoint Flight mode. Operator can manually operate the Scout during the Manual Flight mode by clicking and holding on the desired destination on the command station (specifically the map area of the command station).

The Aerial Body contains all the sensors, motor controllers, communications links and high speed processors for managing all operations are contained here. Its main job is to stabilize flight, navigate, point the camera and monitor for unsafe operating conditions. The duties of the core are to stabilize flight, navigate, point the camera and monitor for unsafe operating conditions. It takes 1-2 minutes to warm up the core before flight operation can be attempted. The Scout Arms or propeller arms are assembled to the core by snapping them in place and are controlled by a three phase brushless type. There are two styles of propeller arms, red and white stripped. It is important to note that the red tipped arms must line up with the battery ends and be opposite of each other. Since the propeller arms are the most fragile it is recommended to visually examine and/or run your finger over the trailing edge to check for cracks before each assembly and after hard landings. The Landing Gear is designed to absorb energy on a landing and is specifically designed on hard landings to break in order to protect the vehicle core and camera. One of the four landing gear legs contains the communications antenna for the aerial vehicle. It is vital that this particular leg be installed in the correct location. The landing gear snaps in and out for installation/packing.

The SMART Battery is used on the base station and the aerial vehicle. It takes approximately 60 minutes to recharge each battery and there is a power level button on the front used to check the power left in the battery. Battery technology used is lithium polymer and if severely damaged could result in high thermal emittance.

Command Station for the Scout contains the Mission control Software (MCS). The user controls the aerial vehicle and camera direction using the map based interface. Battery life for the Command Station is 2-3 hours. It communicates via WiFi to the Base Station.

The Base Station provides a long distance communication link between the command station and aerial vehicle and uses the same battery as the flyer and powers for up to 8 hours. The base station should be mounted at an elevated level.

There are three payloads available that are interchangeable depending upon which images are desired. All the payloads are assembly by inserting two pegs into their slots and laying the body down onto the payload bay. All three payloads have the option for Autosnap which will be explained later in this analysis. The first payload is the daylight still with video preview camera. This camera is a 5 mega pixel camera that has both the option of taking snapshots and video. Through the video tab, settings can be changed while the vehicle is in the air. The second camera is the video zoom 10X color camera payload which allows a high quality and close-up snapshot. The third and final camera is the FLIR camera payload. This forward looking infrared (FLIR) camera has the option for both snapshots and video imaging. The video tab allows for the selection of the quality and resolution of the video that will be recorded on the vehicle.