

# **TwinCam-Lite/Aeropod Operating Procedures**

June 15, 2010 – Revised May 14, 2012

Flight operations require a minimum of three qualified participants.

**IMPORTANT: All actions shall be verbally announced and acknowledged.**

## 1) PREFLIGHT PLANNING SESSION

- Review mission objectives, flight profile, and contingency plans
- Review flight hardware and status
- GO/NO GO Criteria (wind limits, etc.)
- Determine personnel roles and responsibilities (*Flyer, Launcher, Spotters, etc.*)

## 2) TRANSPORT TO FLYING SITE

- Verify safe flight area (people, property, obstructions, etc.)
- Re-evaluate GO/NO GO conditions and record (wind, weather, etc.)
- Re-evaluate flight plan with regards to local conditions (wind, sun, etc.)

**If conditions are GO, proceed to step 3**

## 3) AEROPOD PREPARATION

- Attach *TwinCam-Lite* payload to *Aeropod* boom using supplied screws
- Install SD cards in each camera (512 MB minimum) in camera (do not use SD HC cards)
- Install 2 AA batteries in each camera and secure door (tape is advised)
- Slide two #32 rubber bands over aft end of 1/4" x 24" boom (~10")
- Seat a 4" x 12" fin to bottom of boom in the forward (horizontal) location
- Stretch the #32 rubber bands over aft end of boom, securing fin
- Slide two #32 rubber bands over aft end of 1/4" x 24" boom (~4")
- Seat a 4" x 12" fin to side of boom in the aft (vertical) location
- Stretch the #32 rubber bands over aft end of boom, securing fin
- Attach a leader (15 feet) to the *TwinCam-Lite/AeroPod* pylon attach point
- Suspend assembled *TwinCam-Lite/AeroPod* by leader and observe orientation
- Pylon attach point may be moved fore/aft to level boom/pitch axis
- Pylon attach point and/or vertical fin may be flipped left/right to level roll axis

TO AID IN ACHIEVING A TRUE NADIR VIEW, IT IS RECOMMENDED TO BALANCE THE AEROPOD ASSEMBLY TO HANG WITH A SLIGHTLY NOSE-UP ATTITUDE TO COMPENSATE FOR TILT DUE TO WIND DRAG.

#### 4) CAMERA PREPARATION

- Check each lens for obstruction
- To format cards, press and hold MODE button to turn each camera on if necessary
- Press MODE to select still camera mode if necessary
- Press and hold MODE until FOR message is displayed
- Press shutter button to format SD card – “0” displayed (THIS ERASES ALL DATA ON CARD, SO BE SURE YOU HAVE COPIED PREVIOUS FLIGHT DATA ONTO YOUR COMPUTER!)
- Set camera aside taking care not to press buttons

#### 5) KITE ASSEMBLY AND LAUNCH

- Verify that operating area is clear of non-participants and other hazards
- Operators shall don protective gloves to prevent injury
- Assemble kite following manufacturer’s instructions
- Attach 225 ft leader assembly to kite bridle/attachment point
- Install attachment ring on leader lower swivel
- Attach flying line to leader via ball bearing swivel
- Launch kite and ascend to end of 225 ft leader
- Record kite launch time

#### 6) PAYLOAD INSTALLATION

- Turn on each camera by pressing and holding MODE button
- Press MODE again to select MOVIE MODE, H RES
- Simultaneously, press both shutter buttons to start cameras
- Verify operation by observing time counters
- Record camera start time

#### CAMERAS WILL RECORD FOR 17 MINUTES (999 SECS) MAXIMUM

- Attach 15 ft *TwinCam-Lite/AeroPod* leader to attachment ring
- Smoothly release kite line until *TwinCam-Lite/AeroPod* is safely airborne
- Record *TwinCam-Lite/AeroPod* launch time
- Release line until desired altitude and location are achieved
- Maintain steady flight for best imagery

IT IS RECOMMENDED TO FLY THE FULL 17 MINUTES TO PRECLUDE THE POSSIBILITY OF DATA INTERRUPTION DURING RECOVERY

## 7) RECOVERY

- After desired data is collected move to recovery site
- Recover kite until *TwinCam-Lite/Aeropod* is near the ground
- Gently “catch” the *TwinCam-Lite/Aeropod* and detach from attachment ring
- Press the shutter button to stop camera (if camera is still running)
- Record *TwinCam-Lite/Aeropod* recovery time
- Complete kite recovery
- Record kite recovery time
- Remove batteries from camera to prevent discharge

## 8) CAMERA DATA RECOVERY

NOTE: DRIVERS/CODEC FOR THE AIPTEK PENCAM SD MUST BE INSTALLED ON THE COMPUTER USED FOR DATA PROCESSING BEFORE IMAGERY CAN BE VIEWED.

- Remove SD card from camera
- Insert SD card into an SD card reader (on an active PC)
- Open the DCIM folder on the SD card (USB removable disk)
- Copy the indicated IMG\_0001.AVI file in the DCIM\100MEDIA folder to a folder that you create and name on the hard drive (example: 03232010TestPlot).
- Find the file on the hard drive and rename it with a title designating date, location, flight number, near-infrared data, etc. (example: 03232010TestPlotFlt1nir.AVI) to prevent overwriting by future data files.

## NOTES

The files may now be viewed and used for analysis. Utilize image-processing procedures found in the ICCARS eCollaboratory at:

<https://sites.google.com/site/iccarsproject/resources/remote-sensing-resources/learning>

Document the flight (flight time, anomalies, observations, etc.) using the **ICCARS Field Data Collector App** for iPad/iPhone, available free from the iTunes store. You may also use a flight logbook or similar to record the mission information. An example of a Flight Log is appended to this procedure.

TKM 06/15/10/ rev. PAH 03/12/12

### AEROKATS Mission/Flight Log (Modified for ICCARS)

|                     |           |
|---------------------|-----------|
| Date:               | Location: |
| Mission/Flight#:    | Pilot:    |
| Aeropod Handler(s): |           |
| Other Personnel:    |           |
| Mission Objective:  |           |

#### Atmospheric Conditions

|                 |                      |
|-----------------|----------------------|
| Wind Speed/Dir: | Temperature:         |
| Humidity:       | Barometric Pressure: |
| Cloud Cover:    |                      |

#### Site Details

|                    |               |
|--------------------|---------------|
| Latitude:          | Longitude:    |
| Altitude (at site) |               |
| GCP 1 – Lat:       | GCP 1 – Long: |
| GCP 2 – Lat:       | GCP 2 - Long  |
| GCP 3 – Lat:       | GCP 3 – Long: |
| GCP 4– Lat:        | GCP 4 - Long  |

|                             |                                |
|-----------------------------|--------------------------------|
| Launch Time (Kite)          | Launch Time (Aeropod)          |
| Landing Time (Aeropod)      | Landing Time (Kite)            |
| Total Flight Duration       |                                |
| Max line-out length:        | Azimuth $\angle$ to sensor     |
| $\angle$ to sensor at peak: | $\angle$ to apex of line drag: |

|                                 |  |
|---------------------------------|--|
| Mission Result:<br>Successful?  |  |
| Problems?                       |  |
| Kite/Payload Post Flight Status |  |

## AEROKATS Mission Field Equipment Checklist

|                          | Description  | Qty | Notes |
|--------------------------|--|-----|-------|
| <input type="checkbox"/> | Aeropod(s) and Sensor(s)   |     |       |
|                          | <input type="radio"/> MonoCam-B<br><input type="radio"/> TwinCam-Lite<br><input type="radio"/> Air Column Profiler-B |     |       |
| <input type="checkbox"/> | Hoop(s) with line  |     |       |
| <input type="checkbox"/> | 225 ft leader(s)   |     |       |
| <input type="checkbox"/> | 15 ft pod leader(s)  |     |       |
| <input type="checkbox"/> | Carabiner(s)   |     |       |
| <input type="checkbox"/> | Rubber Bands   |     |       |
| <input type="checkbox"/> | Gloves   |     |       |
| <input type="checkbox"/> | Log Book/Pens  |     |       |
| <input type="checkbox"/> | iPad / iPods   |     |       |
| <input type="checkbox"/> | Wireless hub (if available)  |     |       |
| <input type="checkbox"/> | Kestrel/Weather vane   |     |       |
| <input type="checkbox"/> | Tripod   |     |       |
| <input type="checkbox"/> | GPS  |     |       |
| <input type="checkbox"/> | Camera   |     |       |
| <input type="checkbox"/> | Phillips screwdriver (small)   |     |       |
| <input type="checkbox"/> | Multipurpose tool  |     |       |
| <input type="checkbox"/> | Gaffers Tape (or comparable)   |     |       |
| <input type="checkbox"/> | Extra Rubber Bands (size 12)   |     |       |
| <input type="checkbox"/> | Extra batteries (AA), (AAA)  |     |       |
| <input type="checkbox"/> | Extra Kite(s)  |     |       |
| <input type="checkbox"/> | Extra line and hoop  |     |       |
| <input type="checkbox"/> | Extra Leader   |     |       |
| <input type="checkbox"/> | Extra Swivels  |     |       |
| <input type="checkbox"/> |  |     |       |
| <input type="checkbox"/> |  |     |       |
| <input type="checkbox"/> |  |     |       |
| <input type="checkbox"/> |  |     |       |