

# HIBAL FLIGHT PREPARATORY CHECKLIST

## PREFLIGHT PLANNING

### **THREE WEEKS PRIOR**

- Determine Launch Captain
- Payload(s) Weight Estimate
- Balloon and Spare of Required Size on Hand
- Required Helium volume calculated
- Helium Tank Quantity Sufficient (two fills single launch, three fills for double launch)???????
- Gas Cylinder Transport Arranged

### **TWO WEEKS PRIOR**

- Flight Computer Program tested for proper functioning. Check flight prediction software by running site selection and flight path (most current) to make sure flight paths and landing sites match.
- APRS Programmed and Tested
- DTMF-8 Programmed and Tested
- Launch Team & Chase Team Personnel Totals
- Check flight prediction software: run site selection and flight path (most current) to make sure flight paths and landing sites match

# HIBAL FLIGHT PREPARATORY CHECKLIST

**WEEK OF**

- \_\_\_ Completed Payload(s) weighed Payload and parachute weight: \_\_\_\_\_ lbs
- \_\_\_ Calculate Helium Volume Needed Desired lift:  $1.2 * (\#1 + m_{balloon}) - m_{balloon}$  = \_\_\_\_\_ lbs
- \_\_\_ Determine & Mark Helium Cylinders Needed for Mission Fill
- \_\_\_ Possible Launch Site(s) Confirmed
- \_\_\_ Launch Team & Chase Team Personnel Totals & vehicle arrangements
- \_\_\_ Gas Cylinder Transport Arrangements Confirmed
- \_\_\_ All Batteries Charged / Sufficient Disposable Batteries on Hand
- \_\_\_ Airport Contacted (on Thursday) (if launch site is an airport)
- \_\_\_ Ground Test All Systems (conduct ground flight)

- |                               |  |
|-------------------------------|--|
| <b><u>Flight Computer</u></b> | <ul style="list-style-type: none"> <li>___ Flight Computer Operating as Intended</li> <li>___ Altitude Triggers Operate Properly</li> </ul>  |
| <b><u>Gas Fill Team</u></b>   | <ul style="list-style-type: none"> <li>___ Balloon Available</li> <li>___ Fill Valve Ready</li> <li>___ Equipment Ready</li> </ul>   |
| <b><u>Imaging/Cameras</u></b> | <ul style="list-style-type: none"> <li>___ Camera(s) Functioning</li> <li>___ Memory Available</li> <li>___ Batteries Charged</li> <li>___ Flight Crew Available</li> </ul>  |
| <b><u>Communications</u></b>  | <ul style="list-style-type: none"> <li>___ Air to Ground Communications Operate Properly</li> <li>___ Radios &amp; GPS Functioning</li> <li>___ APRS Programmed Correctly &amp; Operating Properly</li> <li>___ Audio Beacon Functioning</li> <li>___ Fox Hunting Beacon Functioning</li> <li>___ DTMF Systems Operate Properly</li> <li>___ Laptop Functioning &amp; Power System Ready</li> <li>___ Batteries Charged</li> </ul> |
| <b><u>Payload</u></b>         | <ul style="list-style-type: none"> <li>___ All Flight Boxes in Good Condition</li> <li>___ Experiment in Working Order</li> <li>___ Experiment Data Collection Working</li> <li>___ Experiment Controls Operation as Intended</li> </ul>   |

**WITHIN 24 HOURS OF LAUNCH**

- \_\_\_ Weather Checks Completed
- \_\_\_ Flight Prediction Okay
- \_\_\_ Airport Approval Confirmed (if launch site is an airport)
- \_\_\_ NOTAM faxed to FAA ATC Facility (Dayton Approach). Call to make sure fax was received. Initial fax must be sent at least 6 hours before launch. On fax sheet, change Rowdy Raider and the cell phone number and the landing location. (fax from Flight Prediction Package)

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\_\_\_ Call FAA ATC Facility to Confirm Receipt of NOTAM Fax

## **Launch Day**

\_\_\_ Run flight path again in morning. If path has changed, send a new fax to (NOTAM) to FAA ATC Facility (Dayton Approach). Call to make sure fax was received.

\_\_\_ Call Dayton Approach when balloon is released.

\_\_\_ Call Dayton Approach when balloon is recovered.

# HIBAL FLIGHT PREPARATORY CHECKLIST

## PARTS CHECKLIST

- Ground cloth/tarp and stakes
- Balloon enclosure and Velcro break-away strap
- Lead shot weights for balloon enclosure (4 big and 4 small)
- Weights for ground cloth (water jugs)
- Table
- Handling gloves (latex gloves)
- Helium (in secure transport structure)
  - o Take 3 tanks for 1500 gram balloon
  - o Take 4 tanks for 3000 gram balloon
- Helium regulator
- Balloon hose and filler assembly
- Filler assembly hose clamp
- Quick clamp (for balloon filling)
- Flow meter
- Scientific scale (not fish scale)
- Fish scale/counterweight
- Bucket to fill with sand
- Balloons (this means more than 1!)
- Party balloons
- Aluminum foil (for party balloons)
- Servo
- Servo tester
- Foam enclosure for servo
- Gauge 32 nichrome wire
- Nichrome wire circuit
- Parachute
- Kite string cut to length??????????
- Yellow cord
- Orange nylon cord
- Red cord for ascent control
- Payload harness
- Water bottle with soapy water
- Carabineers
- Barnes Balloon Attachment Connector/Ring
- Radar reflector
- Handheld GPS tracker
- Notebook and pen
- Mobile HAM (with car battery)
- directional antennae
- ham radios used with directional antennae
- AA batteries for directional antenna radios
- Cigarette lighter plug
- FRS Walkie-Talkies (for foxhunting)
- AAA batteries for walkie-talkies
- Smoke dectector
- Cigarette lighter plug
- Spreader Ring
- Swivels (at least 3)
- Quick link connectors (at least 4)
- 4 black shock absorbing bands
- Fishing leaders
- Extra snaps
- Extra springs
- Extra jones plugs
- Extra split rings
- Extra welded rings
- Balloon connection

# HIBAL FLIGHT PREPARATORY CHECKLIST

- Laptop**
  - Power cable
  - Floppy drive
  - CD-ROM drive
  - Drive cable
  - HAM→PC cable
  - USB flash drive
  
- Communication module**
  - GPS receiver
  - GPS antenna
  - Battery pack (for GPS)
  - Handheld HAM radio with battery pack
  - HAM antenna
  - Screamer circuit
  - 9V battery for screamer
  - “SOS” foxhunting beacon
  - Camera
  - Box lid
  - Nylon bag
  - Bag label card – harmless radio device; contact info
  - hand warmers
  - carabineers to attach to bottom of command module
  
- Experiment module**
  - \_Data logger power cord\_\_\_\_\_
  - \_DVR remote\_\_\_\_\_
  - \_DVR batteries\_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  
- Tool kit**
  - Multimeter
  - Screwdrivers
  - Pliers
  - Wire cutters
  - Wire
  - Electrical tape
  - Duct tape (black)
  - Gorilla tape
  - 2 large adjustable crescent wrenches
  - Measuring tape
  - Soldering iron
  - Solder
  - Solder wick
  - Spare AA batteries

# HIBAL FLIGHT PREPARATORY CHECKLIST

- Battery charger????????????
- Spare 9V batteries
- Zip ties
- Kite string
- Pocketknife
- Scissors
- Extra batter terminal leads
- Stop watch
- Tackle box
- Allen Wrenches
- Extra carabineers

## Documents

- Tax exempt form
- Phone numbers (launch cite and area approaches)
- Directions to launch site (enough for all drivers)
- Directions from launch site to landing site (enough for all drivers)

## In-Box

- Thermal load
- Servo unit
- Camera
- APRS
- Basic stamp
- DVR \*\*
- Beacon/Screamer \*\*
- Data logger \*\*

\*\* Power on as close to launch as possible

# HIBAL FLIGHT PREPARATORY CHECKLIST

## Launch Preparation Procedure

### 1. AT LAUNCH SITE

- a. Spread ground cloth with no sharp objects located underneath (weight down corners)
- b. Attach regulator to cylinder #1
- c. Make sure regulator output closed
- d. Note Initial pressure of cylinder #1: \_\_\_\_\_psi
- e. Put on handling gloves
- f. Place balloon on ground cloth, inspect for damages
- g. Tape lift gauge loop to filler assembly
- h. Place balloon nozzle over filler assembly
- i. Clamp or tape balloon nozzle onto filler assembly
- j. One person should be holding the balloon nozzle, one person operating the regulator, others guarding the balloon with “big hands”
- k. Begin inflation (use regulator to begin slowly and increase fill rate as balloon takes shape)
- l. When appropriate, connect fish scale to loop
- m. Attach lift gauge to weight on the ground (to prevent accidental release)
- n. When cylinder #1 reaches ~100 psi close regulator output
- o. Record cylinder #1 pressure: \_\_\_\_\_ psi
- p. Shut off in-line valve
- q. Shut off cylinder #1 valve
- r. Move regulator to cylinder #2
- s. Open cylinder #2 valve
- t. Record cylinder #2 initial pressure: \_\_\_\_\_ psi
- u. Open regulator
- v. Open in-line valve, continue inflation
- w. Carefully let go of balloon nozzle while someone holds fish scale
- x. Take several readings and roughly average in your head
- y. When desired lift achieved, close in-line valve and regulator
- z. Record final pressure of cylinder #2: \_\_\_\_\_ psi
- aa. Close cylinder

# HIBAL FLIGHT PREPARATORY CHECKLIST

- bb. Pinch off balloon nozzle
- cc. Twist balloon nozzle
- dd. Tie balloon nozzle with kite string (**CAUTION: not too tight or it will tear through**) at the top of the nozzle, make this string have an extra 2-3feet in length to attach to the weight on the ground
- ee. Wrap tape around the tied section
- ff. Tape and tie load loop on balloon nozzle about mid length down the nozzle by wrapping and tying the string and then wrapping that with a small piece of tape; this string should have an extra 4 – 5 feet in length that will attach to the parachute; wrap this section with tape
- gg. Fold nozzle material at the load loop section
- hh. Tie again
- ii. Duct tape balloon nozzle

## 2. CHECK CONNECTIONS

- a. Flight GPS antenna to GPS unit (**before power-up**)
- b. Flight GPS to flight HAM radio ([Kenwood TH-D7](#))
- c. Batteries to GPS unit
- d. Flight HAM radio to HAM antenna
- e. HAM radio battery pack
- f. Camera batteries
- g. Camera timer circuit
- h. Camera timer circuit switch
- i. Screamer speaker
- j. Screamer circuit
- k. Screamer battery
- l. Screamer switch
- m. HOBO thermocouple

## 3. PREPARE LAPTOP/MOBILE HAM RADIO

- a. Power on laptop
- b. Power on HAM radio
- c. Connect to mobile HAM radio
- d. Set HAM frequency to 144.390 MHz

# HIBAL FLIGHT PREPARATORY CHECKLIST

- e. Check TNC mode
  - f. Check APRS mode
  - g. Load Xastir
4. CHECK SETTINGS
- a. Power on HAM radio
  - b. Set frequency to 144.390 MHz
  - c. Check TNC mode
  - d. Check Beacon mode
  - e. Lock keypad (hold F for >1s)
  - f. Confirm receiving signals in Xastir
  - g. Move communication module around, checking that Xastir updates location
5. HOBO LAUNCH
- a. Close Xastir (serial port is needed to launch HOBO)
  - b. Connect HOBO cable
  - c. Launch HOBO logger
  - d. Delete log file in Xastir log folder
  - e. Reopen Xastir
  - f. Reconfirm data reception
  - g. Start trace on call sign
  - h. Confirm that coordinates are reasonable by comparing with handheld GPS
6. CHECK EXPERIMENT MODULE OPERATION
- a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_
  - f. \_\_\_\_\_
7. CAMERA
- a. Turn on camera
  - b. Turn on timer
  - c. Confirm pictures are being taken
  - d. Make sure the display is off

# HIBAL FLIGHT PREPARATORY CHECKLIST

8. Switch on screamer circuit
9. Final check of APRS packet reception
10. Begin APRS packet logging
11. Connect Radar reflector to hoop
12. Connect parachute to balloon (redundant strings)
13. Connect parachute to hoop
14. Connect hoop to communications module
15. Connect communications module to experiment module
- 16. LAUNCH**
17. Call ATC to confirm launch
18. Recovery Team Heads for Predicted Landing site.

## CONTACT SHEET AND DIRECTIONS

**Contact Names and Phone Numbers:**