

### ***Attachment 3: Launch & Recovery***

*Reference: FAA AIR-160 UAPO Guidance Document 08-01*

Launching of fixed wing UAV is accomplished either by manual takeoff from INL's dedicated runway, or by pneumatic launch for the Arcturus T15/T16 airframes (See Attachment 1 for an airframe discussion).

#### **INL UA Runway**

The INL has a dedicated 1000 ft by 100 ft asphalt runway for UA operations. The runway is at elevation 4891 ft, latitude 43° 35' 45.75" longitude -112° 54' 30.97", on the Idaho Falls VOR (IDA) 258° radial at 36.8 nm, and near the center of the INL reservation. The nearest inhabited structure not associated with the runway environment is several miles away. A fully equipped INL fire station is approximately five miles from the runway.

#### **Launch**

Most manual takeoff flights, but not all, begin and end at the runway. Manual takeoffs can be either rolling with a nose / landing gear or hand launched for fixed wing with no landing gear. Auto takeoff is possible for the Arcturus airframes using a pneumatic launcher, see Photos 1 and 2.



*Photo 1: Pneumatic Launcher for T15/T16*



*Photo 2: Auto Launch*

The following illustrates the safety and operational checklist for use of the auto launch and is characteristic of the checklists the INL uses for all flight procedures:

The pilot/operator will follow this checklist for all rail-launched takeoffs:

- Always wear safety glasses.
- Verify the preflight for the aircraft is complete, including aircraft; avionics, navigation, and payload are operating.
- Verify the carriage is de-energized.
- Inspect the carriage, for any damage which may have occurred from prior launches, if damage is found, replace or repair any damaged parts prior to proceeding.
- Partially open the bleed valve and the butterfly valve on the accumulator tank
- Attach gas cylinder regulator on the pressurized cylinder
- Insert carbon launch tube into cylinder
- Close bleed valve
- Close butterfly valve
- Place UAV on launch pad with wing supports just below wings
- Install alignment band between UAV tail and launch pad pin
- Clear the area forward of the main wing of the aircraft.
- Start UAV engine and complete normal pre-flight activities preparatory for take-off
- Ensure the regulator is closed and attach hose from pressure cylinder to accumulator tank
- Ensure butterfly valve is closed on accumulator tank
- Open the bleed valve on the accumulator tank
- Partially open the regulator on the pressurized cylinder
- Open the pressurized cylinder valve
- Verify pressurized air enters accumulator tank
- Adjust regulator valve as necessary to fill the accumulator tank while monitoring the pressure gage on the accumulator tank
- When the desired pressure is reached close the bleed valve on the accumulator tank. *Note: Desired pressure will vary with UAV weight and desired take-off velocity; typically 90 to 150 PSI*

- Pilot and GCS operator verify UAV ready for launch
- Upon signal from pilot, quickly open the butterfly valve on the accumulator tank to launch UAV

### **Recovery**

Most UA recoveries occur at the INL UA runway. Both auto-land using differential GPS and manual landing are used.