Monitoring Atmospheric Composition with SkyWisp

Fall 2012

Figure 1, Jim Moryl of SwRI leads training of SkyWisp UAS on a tethered balloon at NCAR's Marshall Field. Credit: NOAA

The NOAA Unmanned Aircraft Systems (UAS) Program Office has funded a pilot study to collect atmospheric samples and data from altitudes as high as 100,000 ft using a balloon tethered UAS glider, SkyWisp, and returning the glider to a prearranged location on the ground using onboard computer and GPS that controls the glider's rudder and elevator.

SkyWisp is a 6 ft wingspan glider built by Southwest Research Institute (SwRI) in San Antonio, Texas. NOAA owns three of the gliders and two ground stations. A weather balloon (Figure 1) is used to launch the glider to a predetermined altitude, then the glider is released from the balloon by commands from ground computer sent via radio signals. A controlled descent to a predetermined waypoint location on the ground using this UAS technology allows quick recovery of the air sampled for analysis in a nearby laboratory.

Training conducted by SwRI occurred in late October 2012. Two instruments will be developed and deployed on SkyWisp, including a combined radiosonde and ozonesonde for sending ozone and meteorological data down via radio signals, and an AirCore that collects a vertical profile of trace gases on its way down for analysis in a laboratory. The goal of this project is to obtain vertical profiles of meteorological parameters (temperature, pressure, and relative humidity) and a number of trace gases involved in climate change and stratospheric ozone depletion. The SkyWisp UAS weighs 2.5 lbs. and can carry a payload of 3.5 lbs in order to operate under Part 101 Subpart A.

Figure 3, Recovery of SkyWisp by Dr. James Elkins. Credit: NOAA

Figure 2, SkyWisp's Descent in front of Long's Peak, Colorado. Credit: NOAA