Up, Up and Away! NASA's Super Pressure Balloon is Hoping to Break Records

Residents in the Southern Hemisphere's mid-latitudes, such as Argentina and South Africa, may catch a glimpse of a large NASA heavy-lift scientific balloon as it travels around the globe on a potentially record-breaking flight.

NASA is scheduled to launch a heavy-lift super pressure balloon (SPB) as early as March 15 from Wanaka, New Zealand, with the goal of exceeding the current SPB record of 54 days. SPBs have the potential to stay afloat for up to 100 days under the right conditions.

NASA balloons are one of the best-kept secrets in the science community. They provide invaluable science at relatively low cost, and they offer scientists an opportunity to test groundbreaking instruments before they're considered for free-flying spacecraft.

Standard NASA balloons are very large structures, comprised of 10 to 50 acres or more of film that can carry several-ton payloads above 99.5 % of Earth's atmosphere, above 130,000 feet. Balloon film resembles sandwich bags, but it is of higher quality. Filled with helium and vented to the Atmosphere, these large zero-pressure balloons rise and fall with atmospheric pressure, which changes drastically with the day-night cycle.

The pumpkin-shaped SPB to be tested is made from some 22 acres of material reinforced with load-carrying tendons, and it completely sealed and not vented to the Atmosphere. When fully inflated the balloon's volume is 92 times greater than that of a typical blimp. Put another way, an entire football stadium could fit inside the balloon.

"The super pressure balloon is a game changer," said Debbie Fairbrother, chief of NASA's Balloon Program Office at Wallops Flight Facility in Virginia and principal investigator for the SPB. "Long duration, mid-latitude balloon flights at stable altitudes will expand the envelope for science and research, spark new technologies, and enable new discoveries."

While long duration is an important objective for this mission, engineers are more keenly focused on the challenge of maintaining a constant altitude during the flight. Most standard heavy-lift zero pressure balloons can vary in altitudes as great as 45,000 feet due to the alternating warming and cooling of the day and night cycle. In response, flight operators typically release excess weight in the form of ballast to maintain altitude. However, the SPB is designed to maintain a positive internal pressure in relationship to its environment, which keeps the balloon at a constant float altitude. In much the same way a car tire maintains its pressure despite changes in the environment around it, so does the SPB.

The science and engineering communities have previously identified long-duration balloon flights at stable altitudes as playing an important role in providing inexpensive access to the near-space environment for science and technology. This March test is set to validate the SPB technology, which has been under development by NASA for 15 years, according to Fairbrother.

Drifting eastward at a stable float altitude of 110,000 feet carrying a 5,000 pound payload consisting of tracking and communication instruments, NASA expects the SPB to circumnavigate the globe once every one to three weeks, depending on wind speeds in the stratosphere.

As the balloon travels around the Earth, it may be visible from the ground, particularly at sunrise and sunset, to those who live in the southern hemisphere's mid-latitudes. Anyone may track the progress of the flight, which includes a map showing the balloon's real-time location, at:

http://www.csbf.nasa.gov/newzealand/wanaka.htm

NASA's scientific balloons offer low-cost, near-space access for scientific payloads weighing up to 8,000 pounds for conducting scientific investigations in fields such as astrophysics, heliophysics and atmospheric research.

NASA's Wallops Flight Facility manages the agency's scientific balloon program with 10 to 15 flights each year from launch sites worldwide.

For more information on the Balloon Program, see:

http://sites.wff.nasa.gov/code820/index.html