Around the World in 14 days

Send an amateur radio balloon around the World
Pico Balloons

Advantage: Inexpensive foil party balloons that can fly around the World
Challenge: Total payload weight must be well under an ounce.
A handful of hams around the World are developing trackers that weigh less than an ounce.
For an APRS tracker you have to automatically switch frequencies based on your location in the World.
There are several Do Not Transmit zones in the World: The UK, Yemen and North Korea are three of the most critical ones. An integer-based point-in-poly routine was written by KD2EAT and W7QO.
Pico Balloons

Designed a board called the Skytracker. Complete tracker with onboard GPS that can transmit on VHF or HF frequencies. APRS or WSPR modes.
Pico Balloons

The 0.47 Farad Supercap on the back is very lightweight.
Pico Balloons

This is what happens if you put too much voltage on a Supercap - KABOOM.
The goal is to make it as lightweight as humanly possible and then make it even lighter.

Boards are less than half the normal thickness and made in China by Hackvana.com.
Skytracker

Totally solar-powered using very lightweight thin-film flexible solar cells by PowerFilmSolar.
Pico Balloons

Small size makes this an ideal STEM student experiment.
Pico Balloons

Easily launched by one person in a moderate wind.
How far can they go?

After six days floating at 27,000 feet, my little party balloon ended up off the coast of Sweden having crossed the Atlantic Ocean in 32 hours.
Over the Horizon telemetry

Wrote a Python script to skim WSPR data from WSPRnet.org which reformats it to post to the vehicle tracker websites. Data received as far as Australia from the tiny HF wireless transmitter.
Decoding software used by hundreds of ground stations worldwide uploads reception reports to a central database.
Skimming data with Python

Python script skims the database of the raw position reports coming in from remote ground stations and sends it to a vehicle-tracking website for a position map display.
Balloon Tracking web map

Final result of reformatted raw WSPR data as displayed on the TRACKING.HABHUB.ORG map. Also shows up on APRS.FI
SBS-13 balloon

A new balloon by Scientific Balloon Solutions flies above 12 km to avoid most storm systems and can stay aloft long enough to circle the World.
First attempt snagged the tree behind my barn. Second flight had a hole in the balloon and we DFed the WSPR signal. Third time was a charm.
SBS-13 balloon

On its way to attempt a circumnavigation of the World.
Around the World

My Skytracker 20m WSPR flight went around the World over 6 times after flying at 40,000 feet for 75 days.
Around the World

Students at Forestview Middle School in Baxter MN flew the very first middle school balloon to circumnavigate the World. KD0VJI-11
UC San Diego students have flown their KK6PNN-5 balloon around the World 6 times and has been flying for 3 months.
Dave VE3KCL launches his S-24 20/30mWSPR payload from a boat with two Mylar balloons taped together.
Around the World

UC San Diego balloon KK6PNN-5 and CG3KCL S-24 launched from Canada meet up over Japan.
Alan W7QO’s HiRFW-6 has been aloft for 1 year is about to complete 22 laps around the World.
GPSL 2015

WB8ELK, KD4STH and KD0QCA balloon photographed by Jeff Ducklow N0NQN at 53,000 feet.
Great Plains Superlaunch 2016

9 Latex weather balloons launched. 3 Mylar Pico balloons.
Great Plains Superlaunch

7 balloons in the air at once during group launch.
Great Plains Superlaunch

3 Pico Mylar party balloons launched. (l to r): WB8ELK, AB5SS and KD2EAT.
Great Plains Superlaunch

A busy tracking map with 12 balloons in the air at the same time.
Dayton Pico Balloon Race

Three Pico balloons launched from Dayton Hamvention 2017.
Great Plains Superlaunch

Great Pico Balloon Race at GPSL 2017 in Hutchinson Kansas.
The GPSL 2017 Great Pico Balloon Race lasted 22 days.
Great Plains Superlaunch

After 14 days of flight WB4ELK-4 flew directly over my work and house here in the Huntsville area.
Boy Scout Jamboree launches

Live streaming of two Pico balloons flown from National Jamboree.
Eclipse 2017
Over 100 amateur radio balloons flew during the solar eclipse.
Three Pico Skytracker balloons were flown from Clarksville TN.
Solar Eclipse Balloons

Three solar eclipse Skytracker balloons flew through the eclipse path.
Eclipse 2017

The Three Skytracker eclipse balloons stayed up for 4 days.
The Future of Amateur Radio Ballooning?.
Very Angry Bird