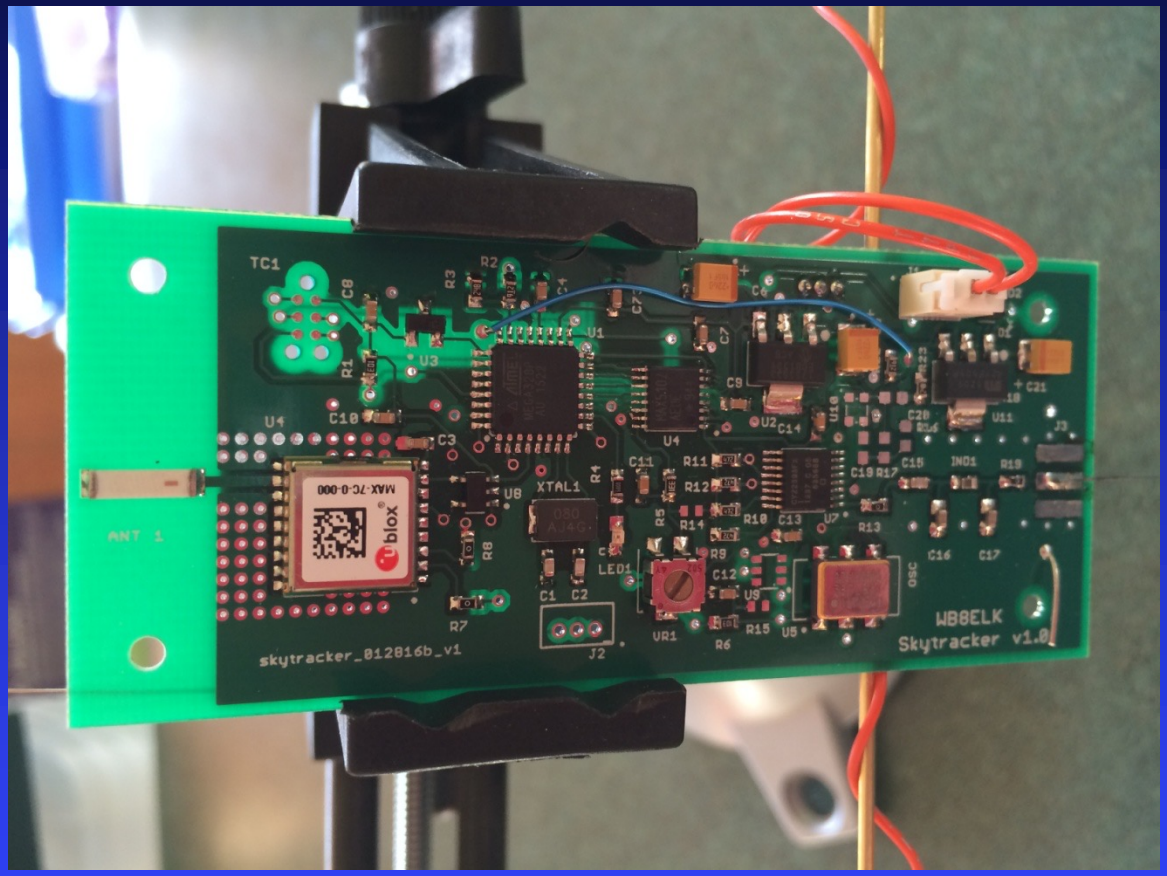
Around the World in 14 days

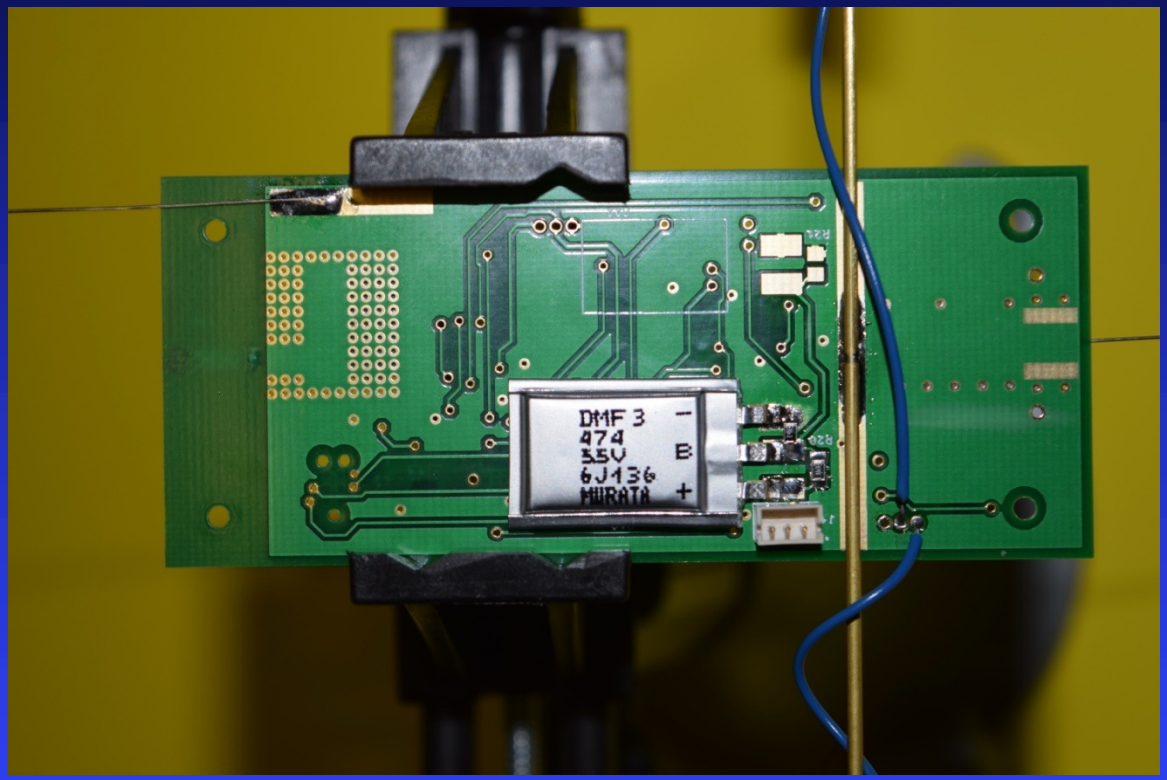
Send an amateur radio balloon around the World

Pico Balloons



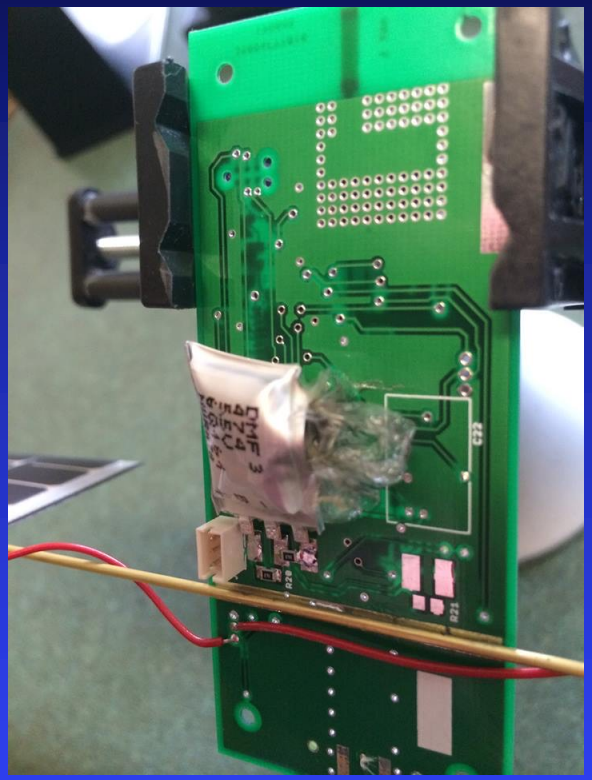
Designed a board called the Skytracker. Complete tracker with onboard GPS that can transmit on VHF or HF frequencies. APRS or WSPR modes.

Pico Balloons



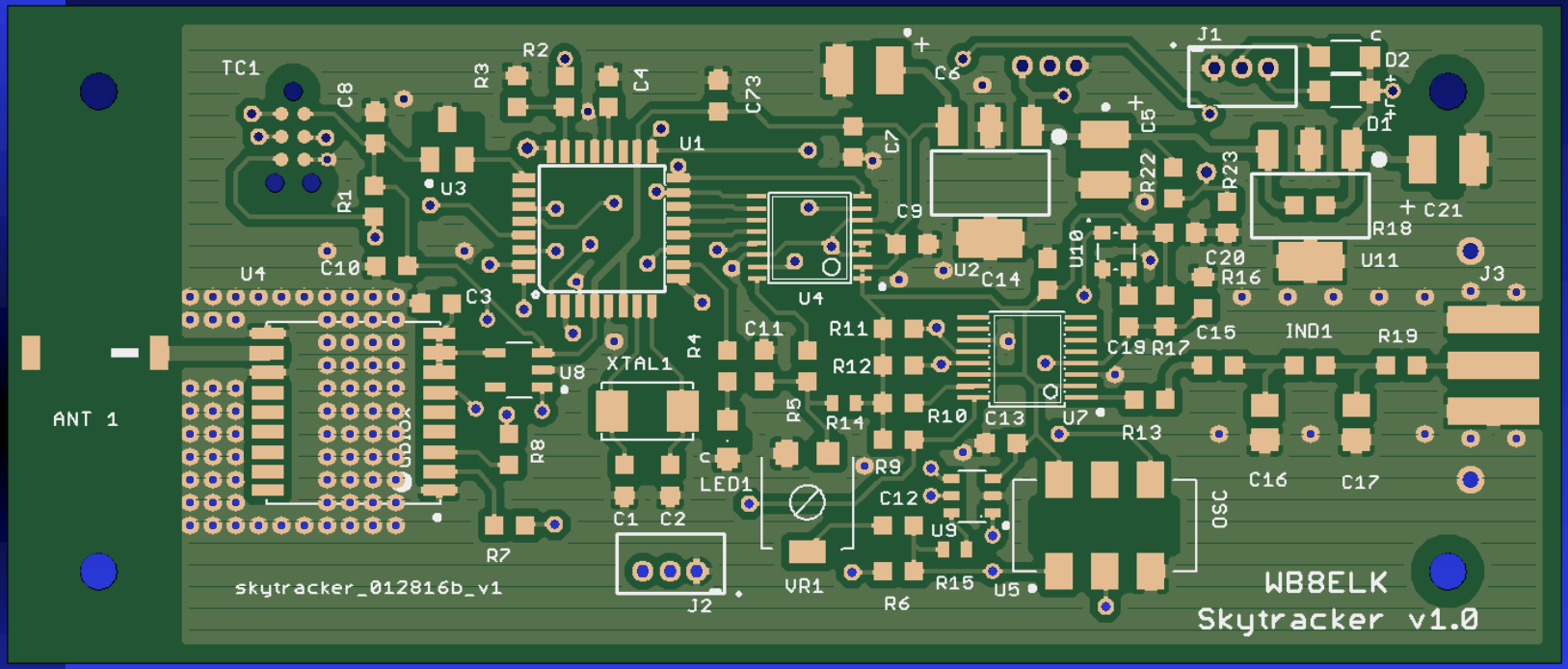
The 0.47 Farad Supercap on the back is very lightweight.

Pico Balloons



This is what happens if you put too much voltage on a Supercap - KABOOM.

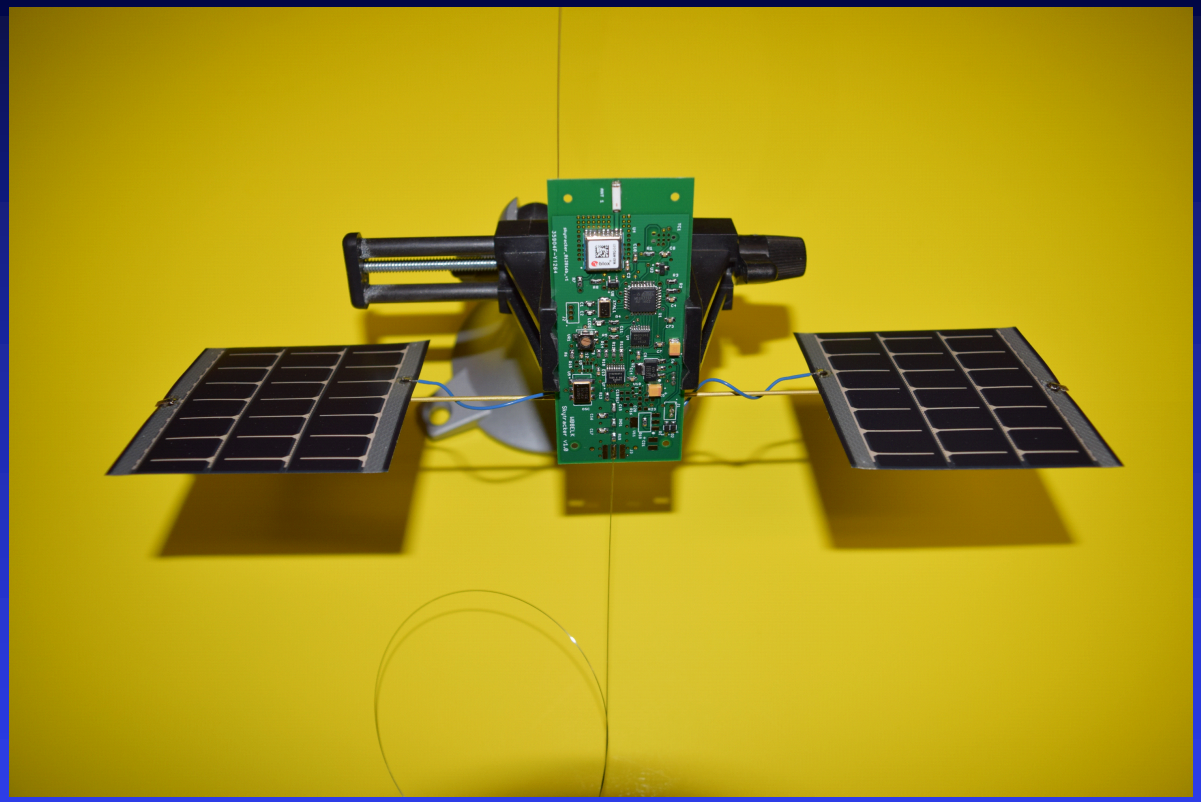
Pico Balloons



The goal is to make it as lightweight as humanly possible and then make it even lighter.

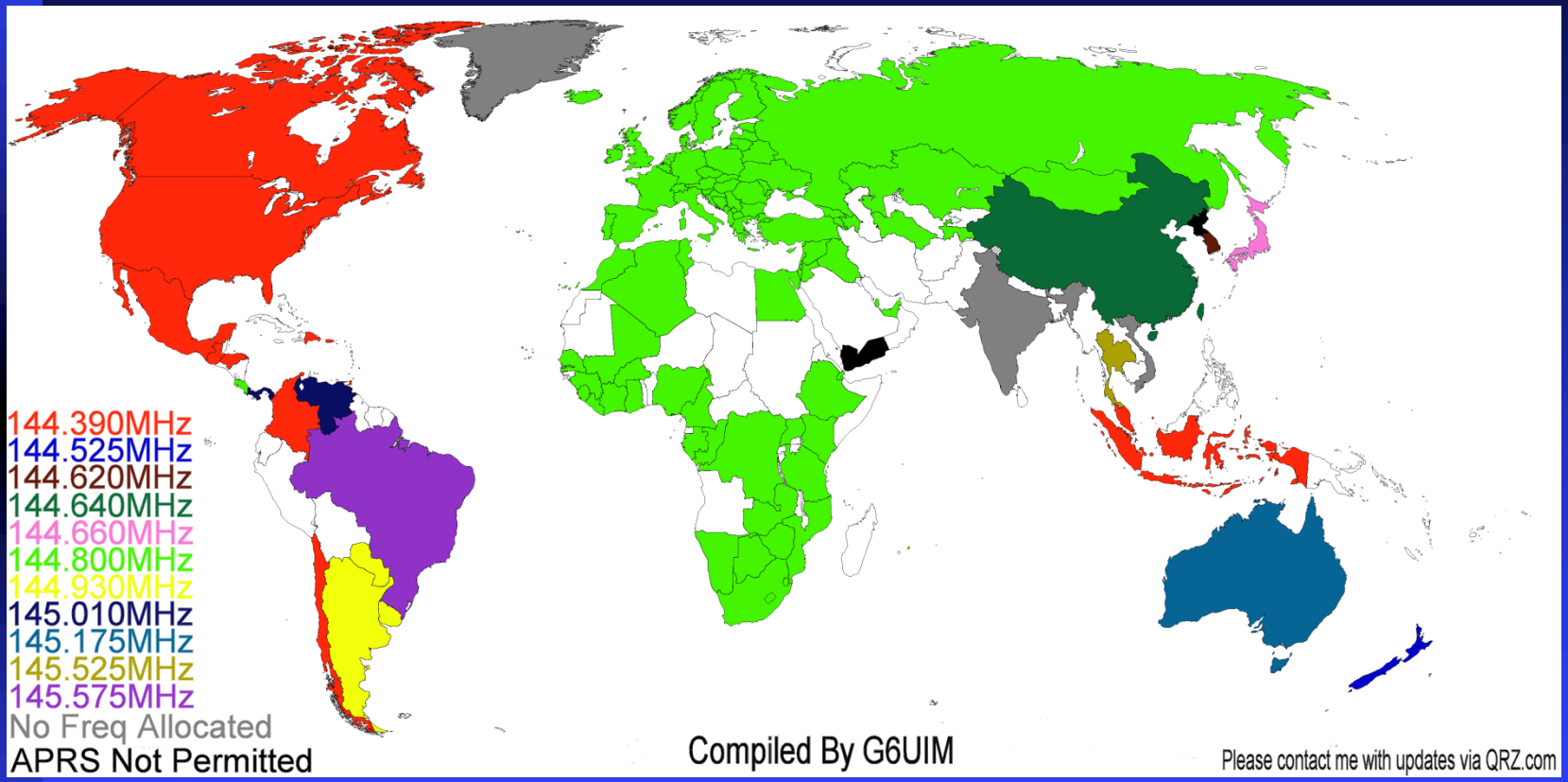
Boards are less than 1/3 the normal thickness and made in China by JLCPCB.

Skytracker



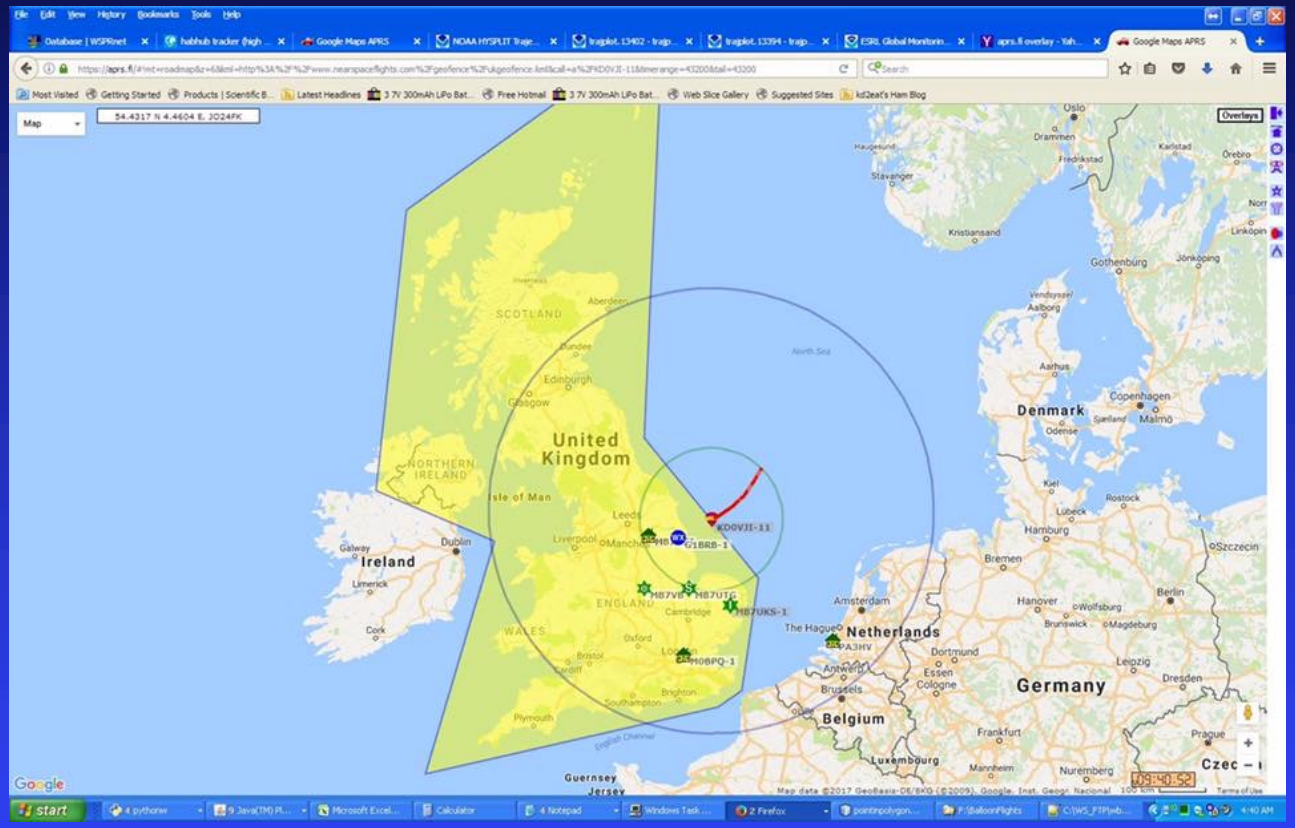
Totally solar-powered using very lightweight thin-film flexible solar cells by PowerFilmSolar. Guitar string antenna wires. Magnet wire for WSPR version.
Total flight weight is around 12 grams. wb8elk@gmail.com for more info on the Skytracker.

Pico Balloons



For an APRS tracker you have to automatically switch frequencies based on your location in the World.

Pico Balloons



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 geofencing point-in-poly routine was written by KD2EAT and W7QO.

Small 40 cubic foot tank of helium can be obtained at low cost

Easy to transport – can inflate 20 flights or more
Can also use BalloonTime helium (Walmart, Dollar General)
But only 80 percent helium so will fly about 2000 feet lower

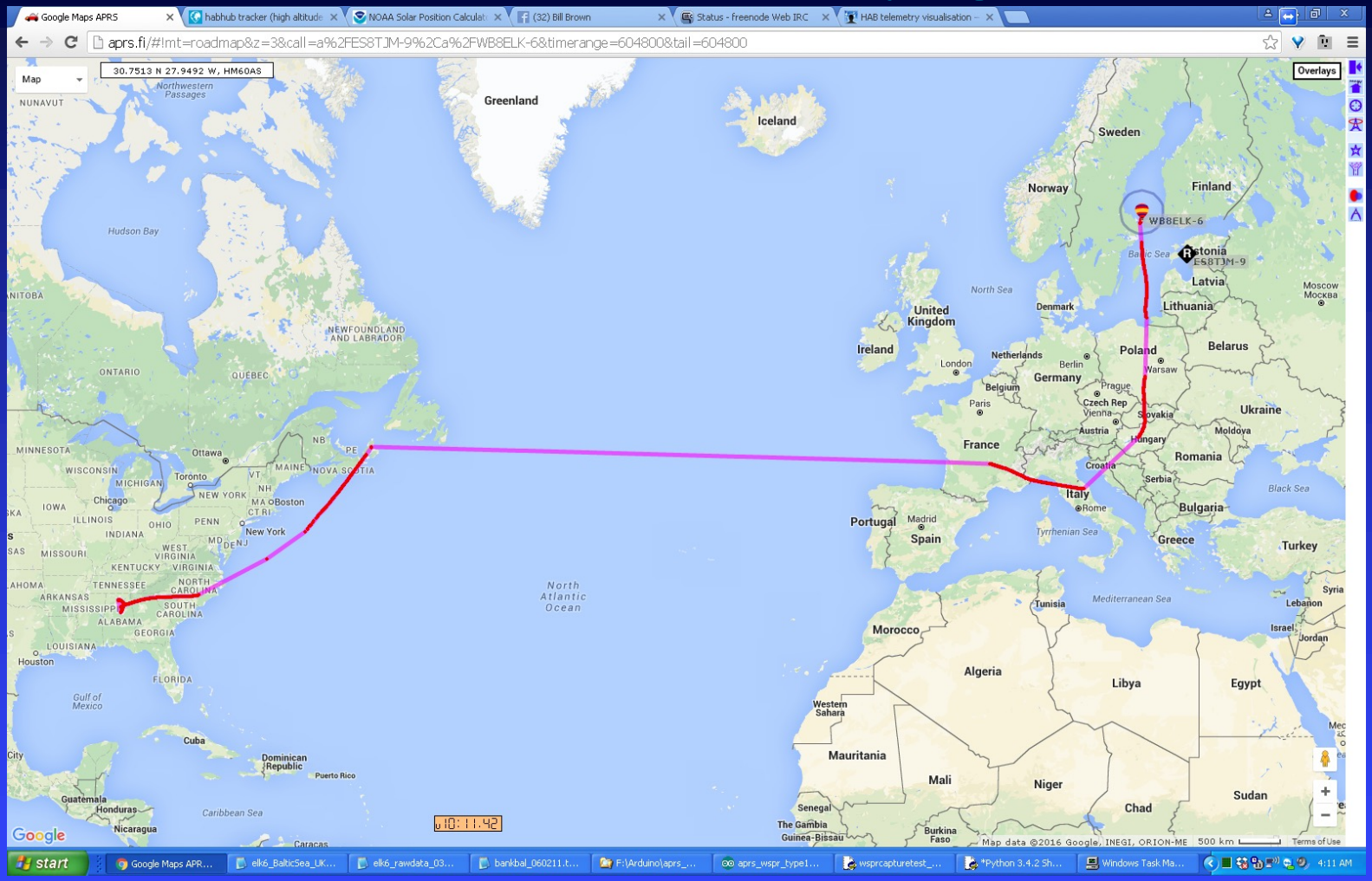
Pico Balloons

Small size makes this an ideal STEM student experiment.

Pico Balloons

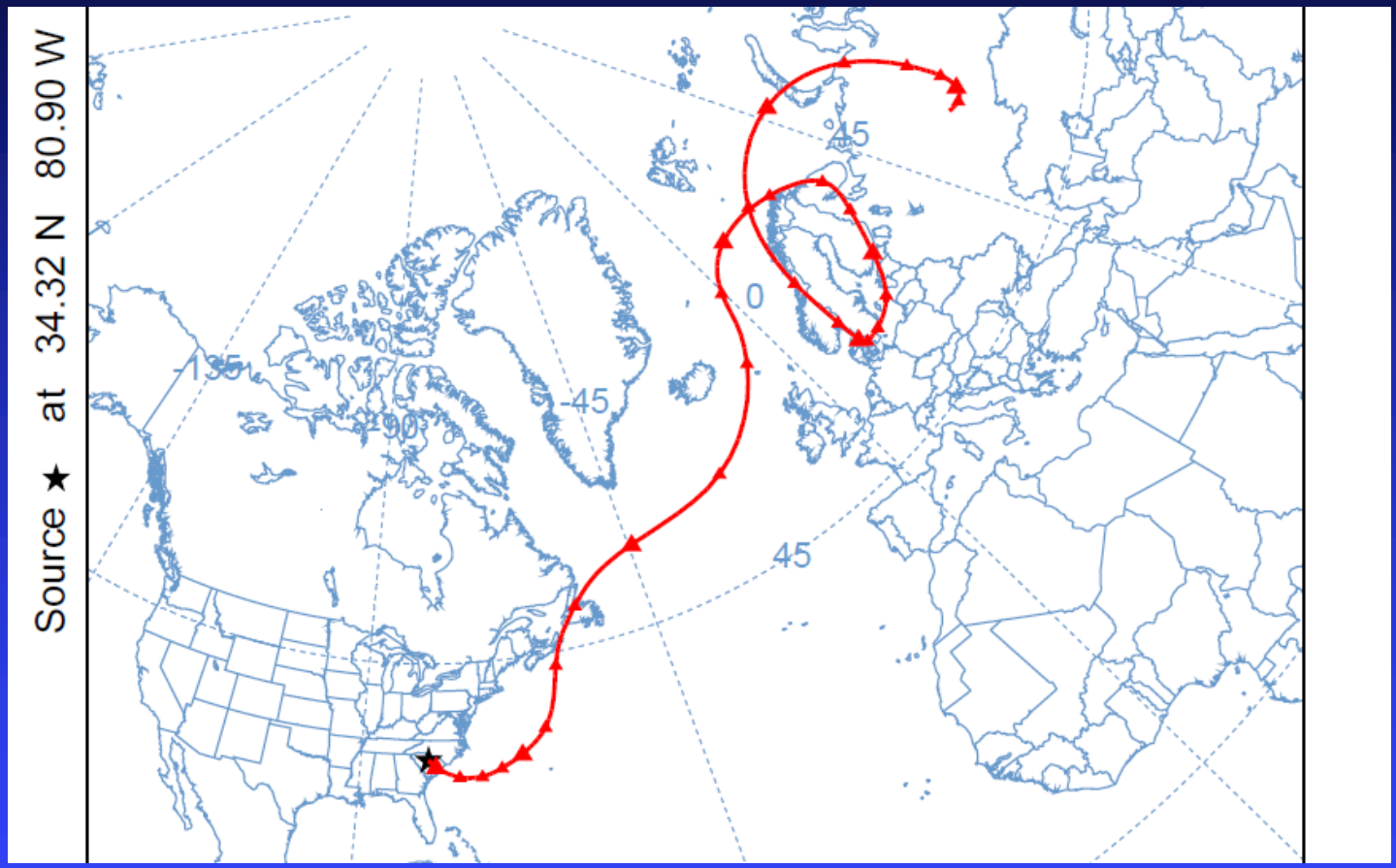
Easily launched by one person in a moderate wind.

How far can they go?



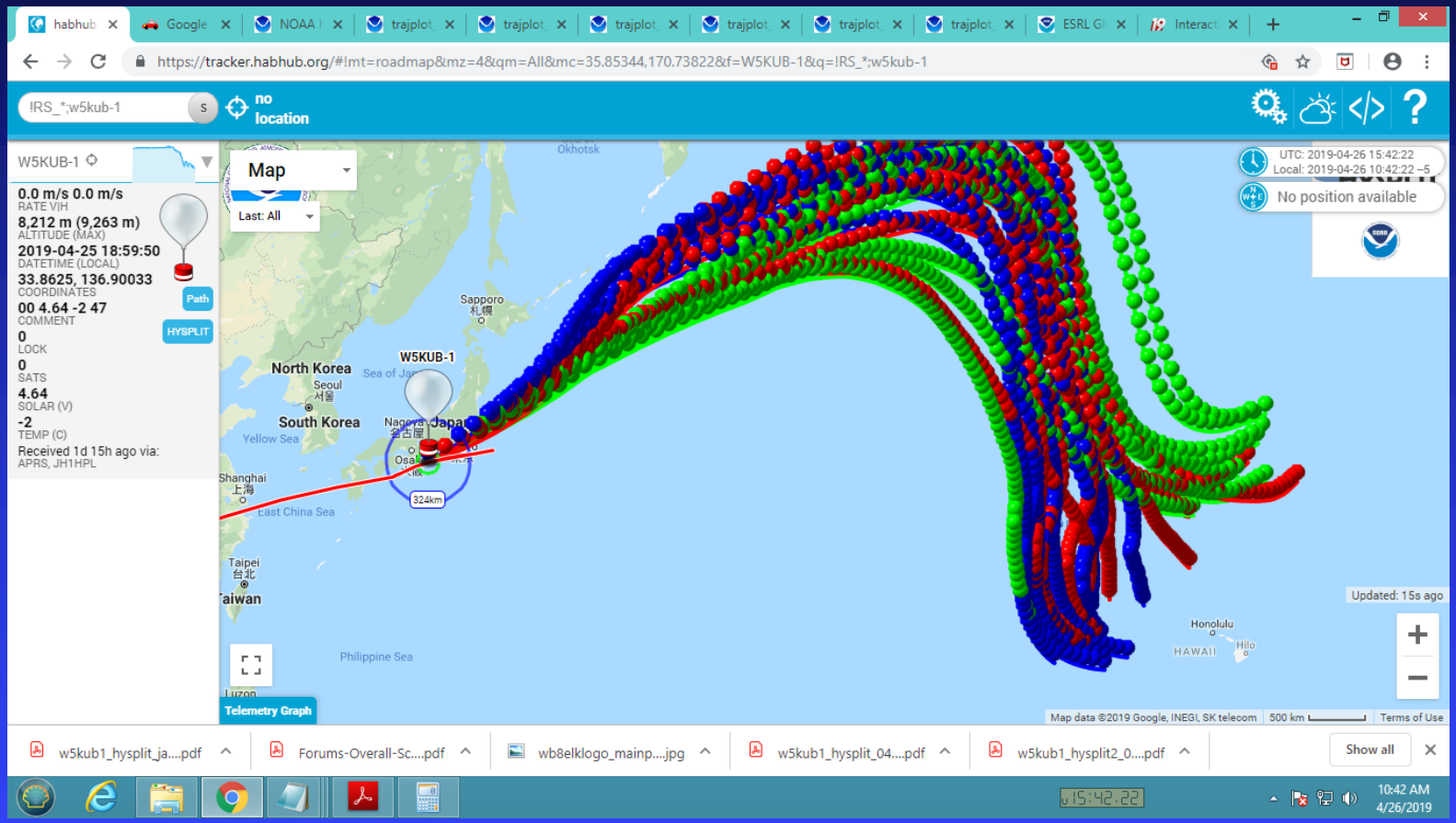
After six days floating at 27,000 feet my little party balloon ended up off the coast of Sweden having crossed the Atlantic Ocean in 32 hours.

Flight Path Prediction



NOAA READY HYSPLIT site can predict flight path
For a week in advance.

How far can they go?



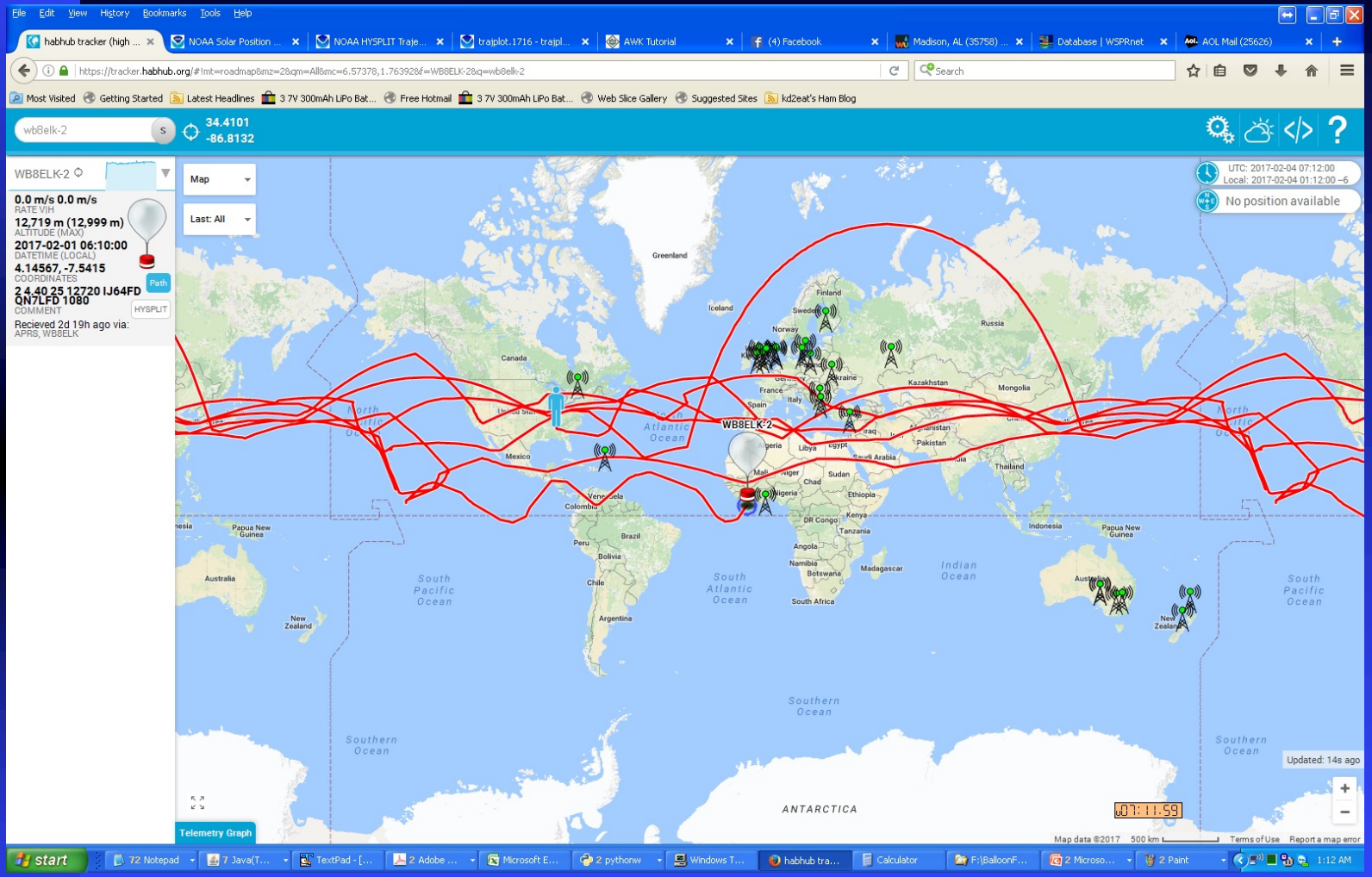
13 Days after launching from Memphis TN, W5KUB-1 Arrived in Japan. Predicted flight path shown.

SBS-13 balloon

Larger superpressure balloon from Scientific Balloon Solutions floats around 40 to 43k feet to avoid storms.

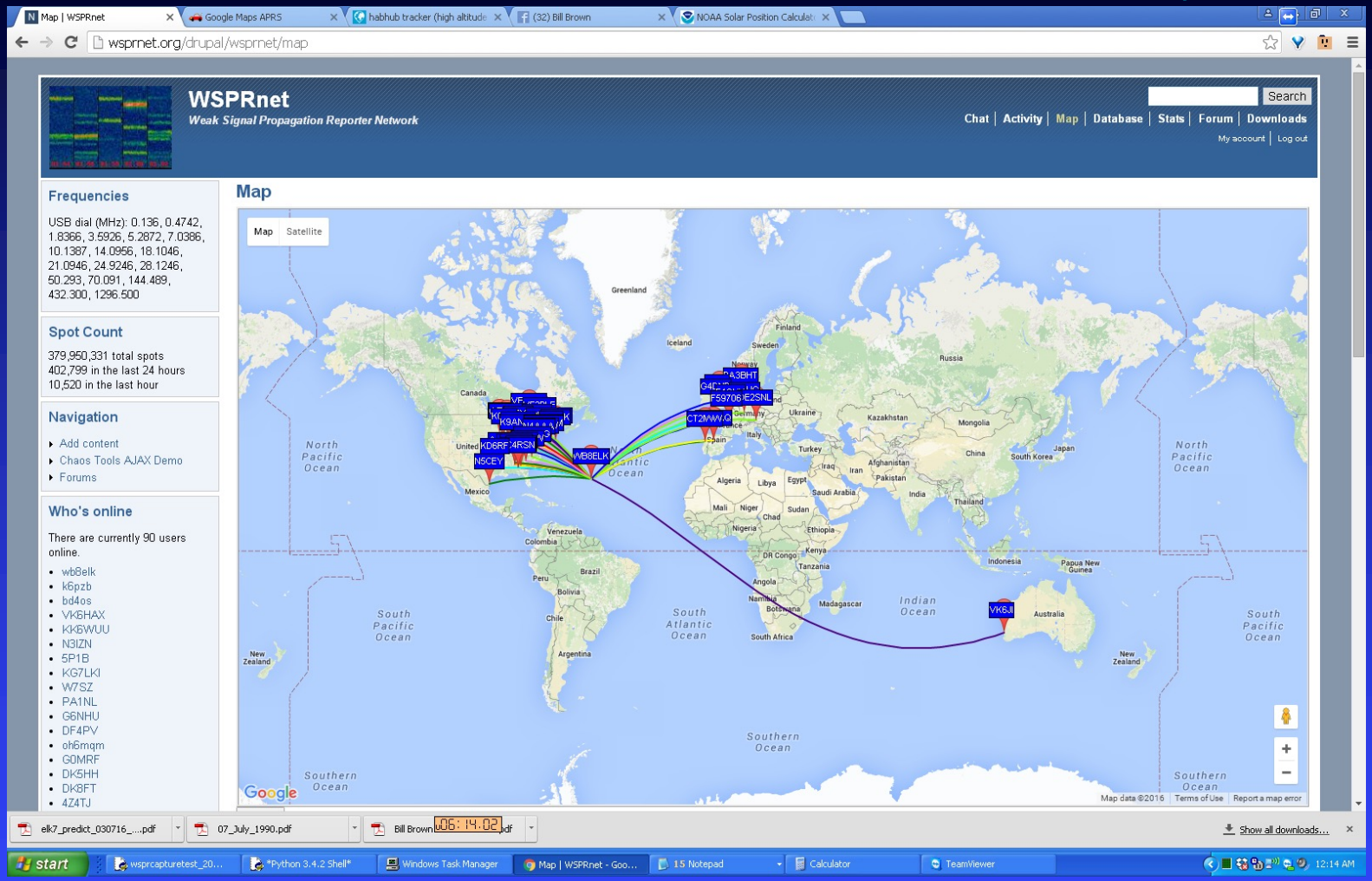
WB8ELK-6 on its way to attempt a circumnavigation of the World.

Around the World



WB8ELK-6 WSPR Skytracker 20m WSPR flight went around the World over 6 times after flying at 40,000 feet for 75 days.

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 20 milliwatt HF transmitter.

Over the Horizon telemetry

	See Note 1			*5th & 6th*			
Chan#	**Temp/Sats**	**Chan#**	**Solar**	*grids*		**Alt(coarse)**	**Alt(fine)**
Call 1	Call 2	Call 3	Call 4	Call 5 & 6	**dBm level**	*Altitude in Meters*	
0	-30	0	3.3	A	0	0	0
Q	-25	1	3.4	B	3	1000	60
1	-20	2	3.5	C	7	2000	120
	-15	3	3.6	D	10	3000	180
	-10	4	3.7	E	13	4000	240
	-5	5	3.8	F	17	5000	300
	0	6	3.9	G	20	6000	360
	5	7	4	H	23	7000	420
	10	8	4.1	I	27	8000	480
	15	9	4.2	J	30	9000	540
	20		4.3	K	33	10000	600
	25		4.4	L	37	11000	660
			4.5	M	40	12000	720
	0		4.6	N	43	13000	780
	1		4.7	O	47	14000	840
	2		4.8	P	50	15000	900
			4.9	Q	53	16000	960
			5	R	57	17000	0
			5.1	S	60	18000	0
			5.2	T			

Callsign	**WB8ELK**		
Grid Square	EM64OJ		
Solar	4.4		
Temp	25		
Sat status	2	0,1 or 2	
Altitude	13180		0 = 4 and 5, 1 = 6 to 8 sats, 2 = > 8 s
Channel#	17		

Telemetry Callsign:

Q	Z	7	L	O	J

1st WSPR transmission:

WB8ELK	EM64OJ	43

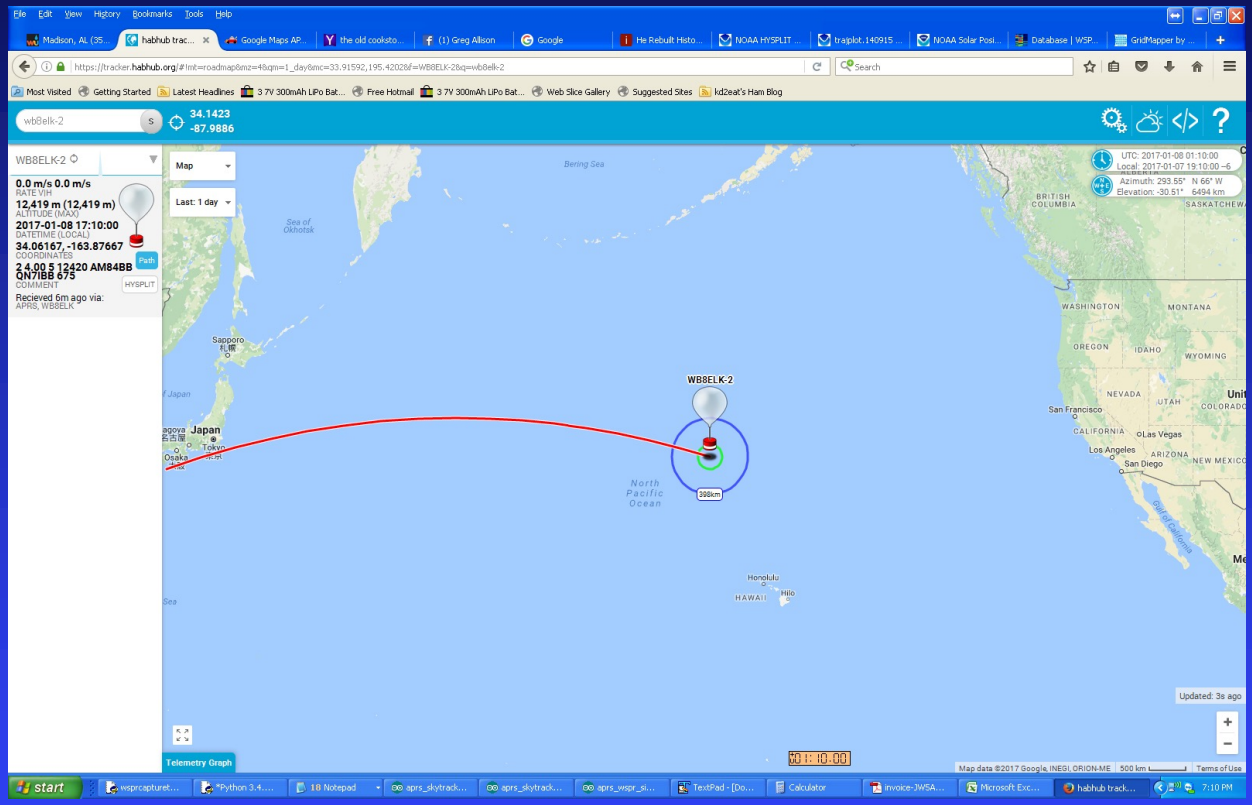
2nd WSPR transmission:

QZ7LOJ	EM64OJ	10

10

Wrote a Python script to skim WSPR data from WSPRnet.org, decode the telemetry and post the report to APRS servers. Second WSPR transmission encodes telemetry into the callsign and power fields.

Balloon Tracking web map



Final result of reformatted raw WSPR data as displayed on the TRACKER. HABHUB.ORG map. Also shows up on APRS.FI

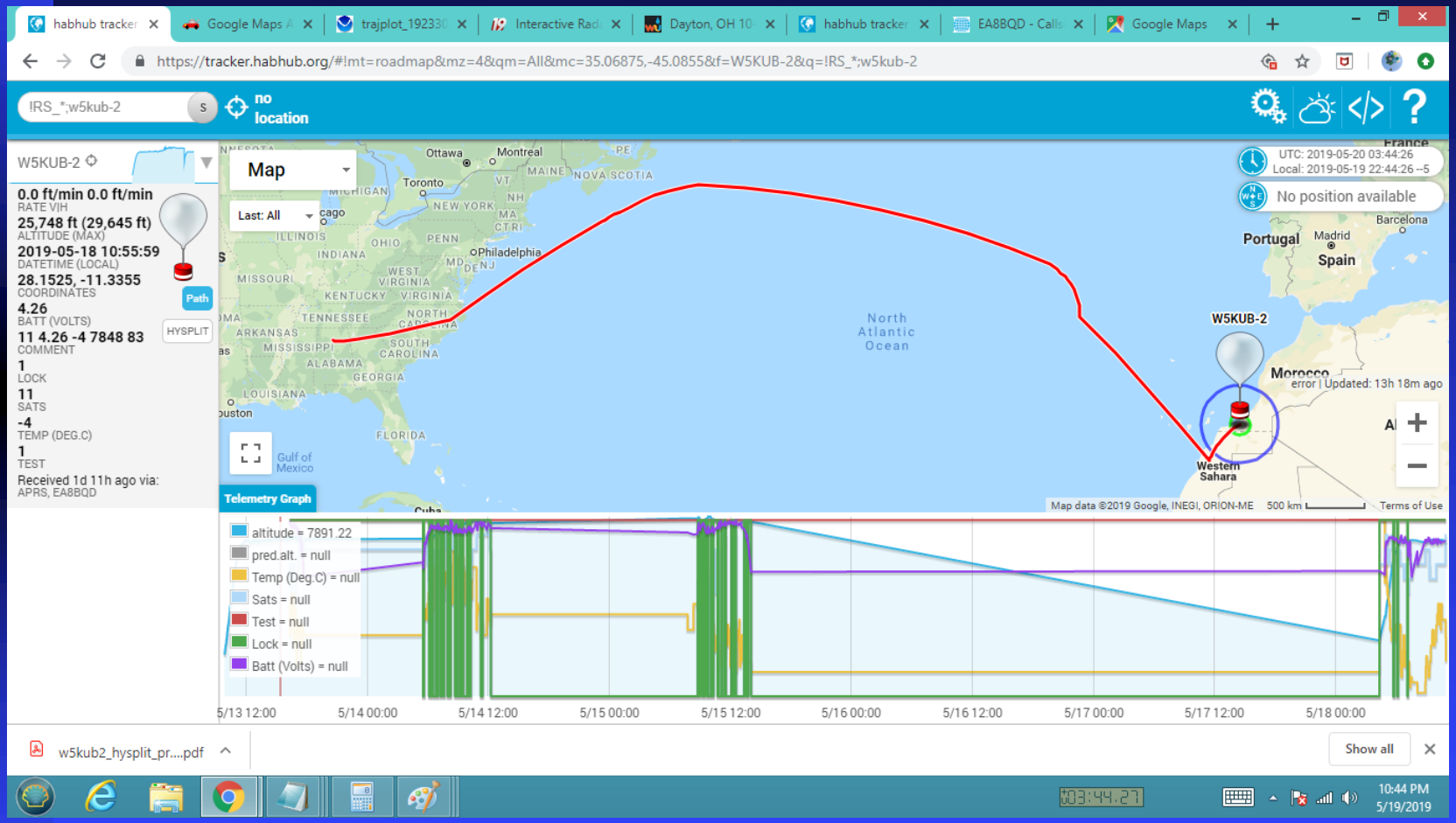
Bev WB4ELK prepares a pico balloon for liftoff

West Point Middle school pico launch – Cullman AL

West Point Middle school pico balloon launch

West Point Middle school pico launch – Cullman AL

West Point Middle School – Mylar party balloon to Morocco

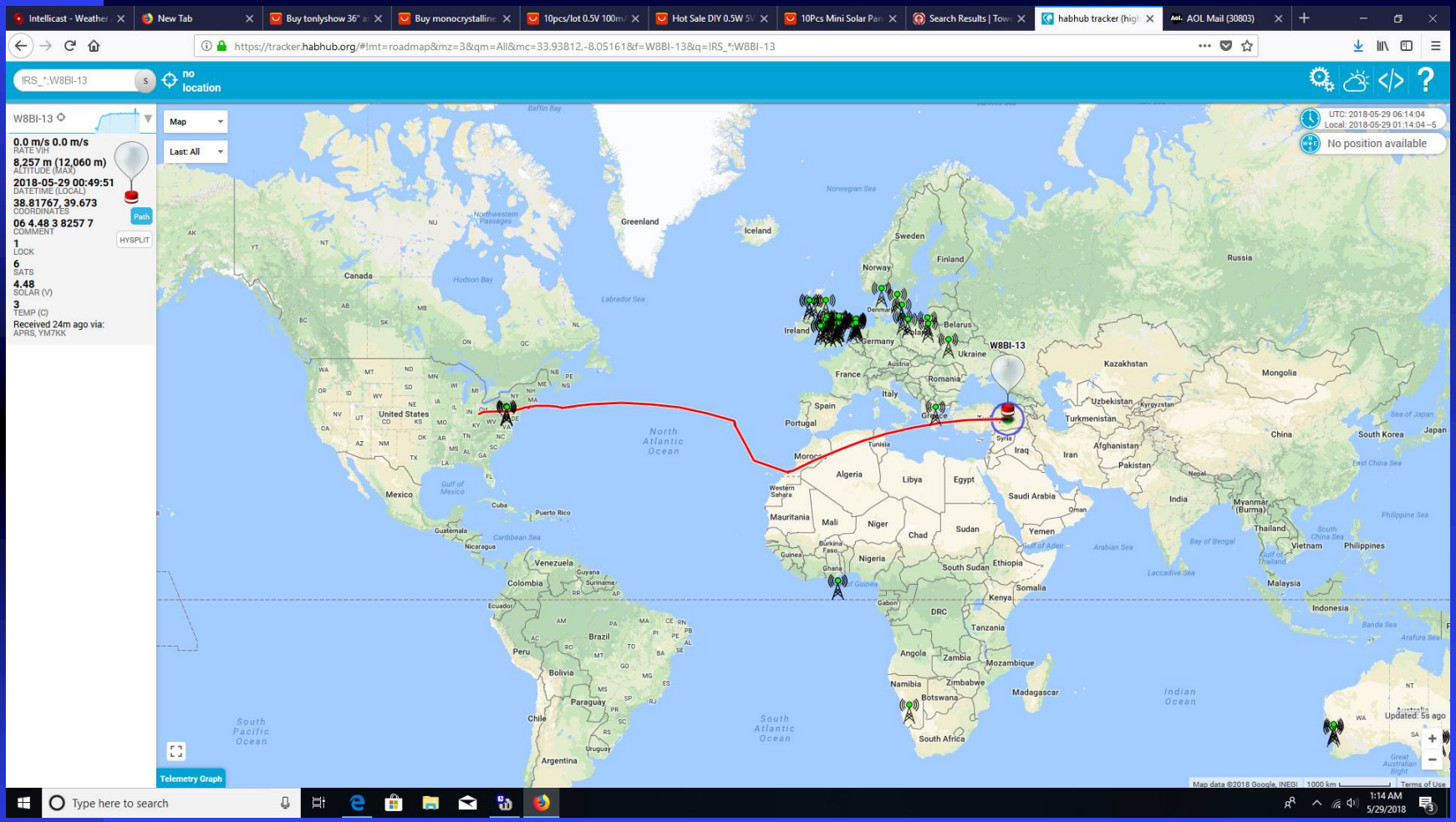


Dayton Hamvention 2018 Pico balloon flight

Dayton Hamvention 2018 Pico balloon flight

The Hamvention Hexbeam snags the W8BI-13 pico balloon

Dayton Hamvention 2018 Pico balloon flight



Fell off the Hexbeam, hit a power line, then went on for an 11 - day flight from Dayton Hamvention to Turkey

Dayton Hamvention 2019 Pico balloon race

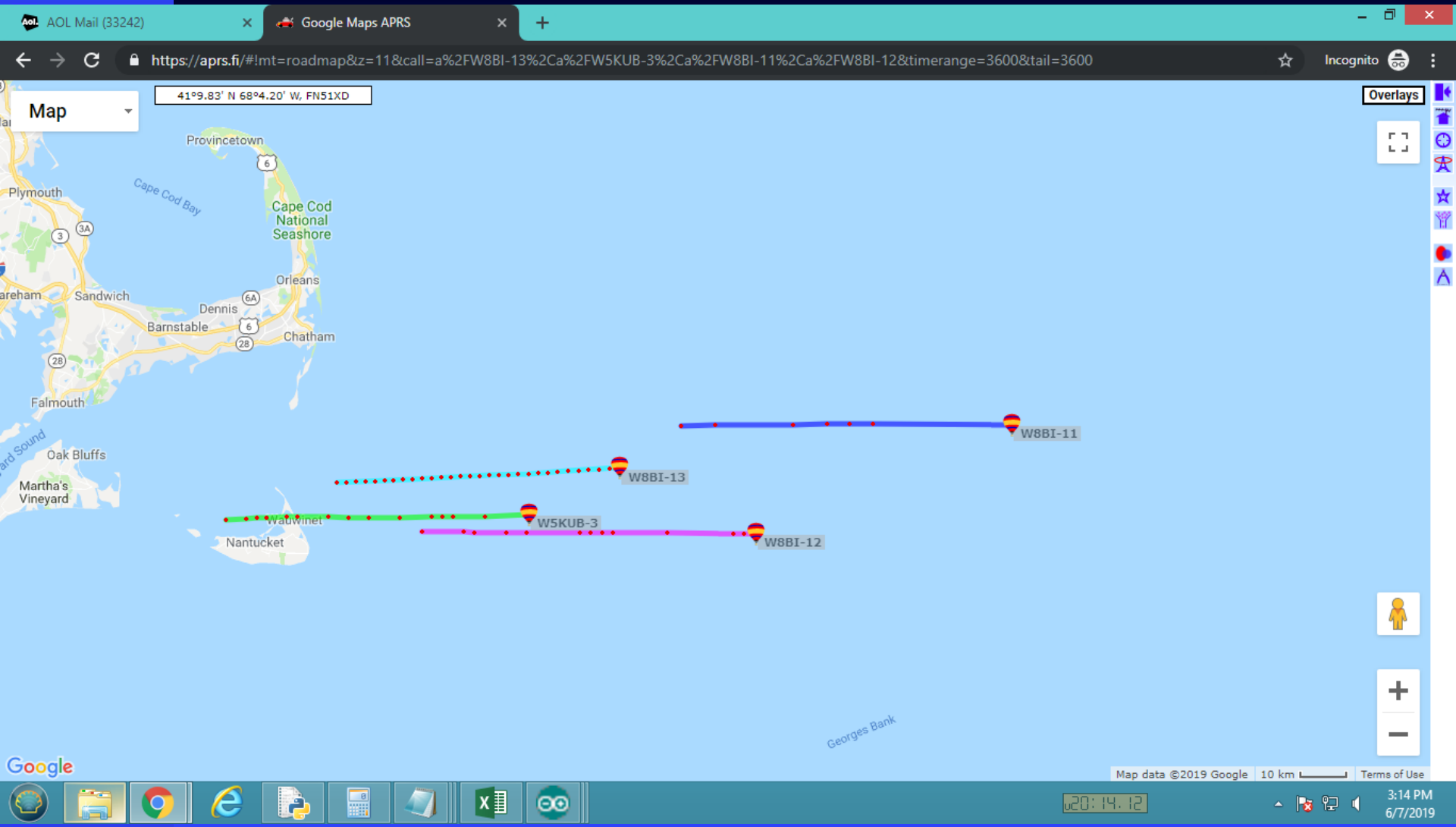
Four pico balloons in the Hamvention Pico Race

Dayton Hamvention 2019 Pico balloon race

Astronaut Doug Wheelock KF5BOC launches a pico balloon

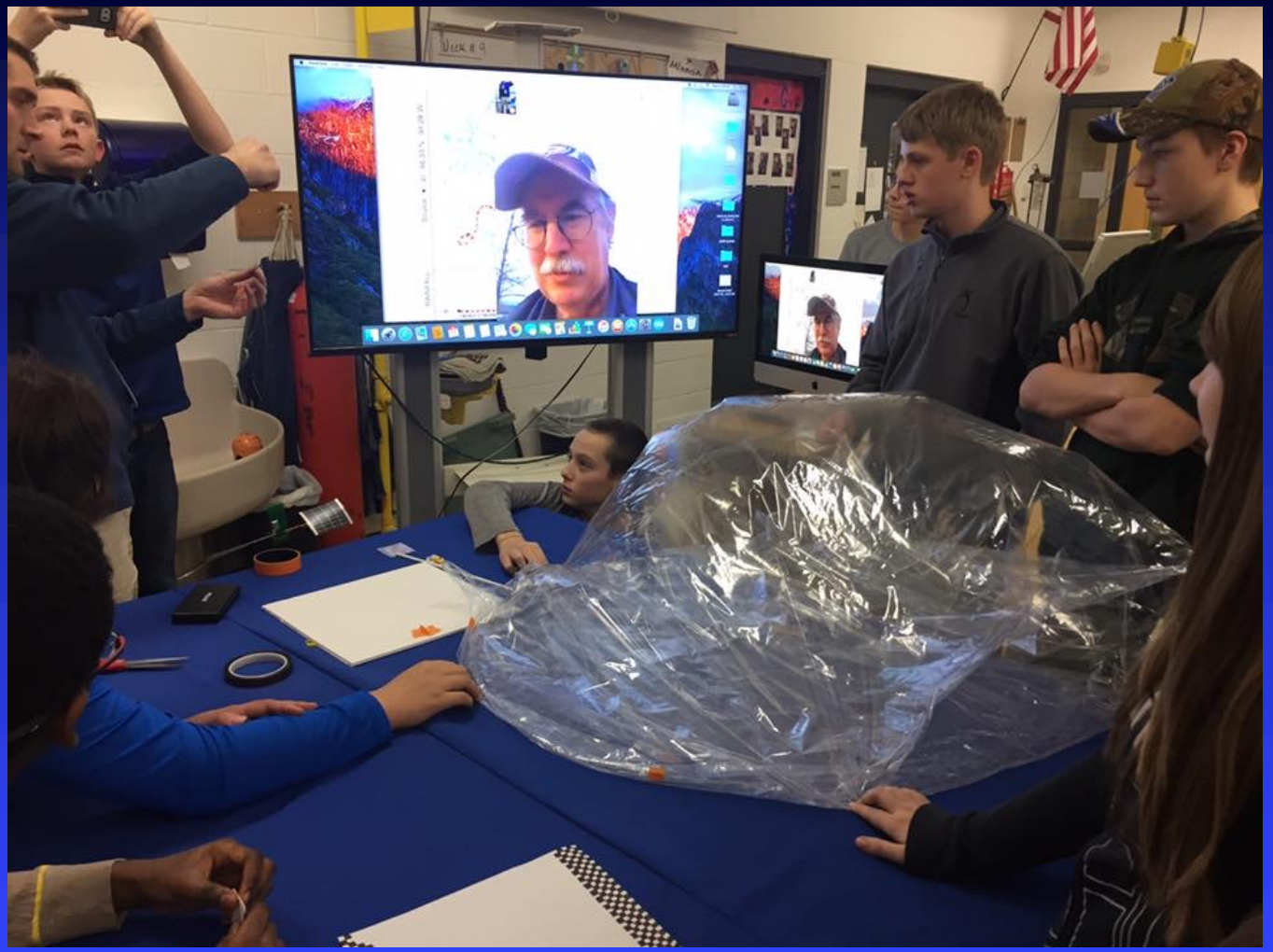
https://www.youtube.com/watch?v=cNzckpCtZfI

Dayton Hamvention 2019 Pico balloon race



Results of the Pico Balloon Race at end of day 2. W8BI-11 launched by AK0SK was the Winner.

Around the World



Students at Forestview Middle School in Baxter MN flew the very first middle school balloon to circumnavigate the World. KD0VJI-11

Around the World

UC San Diego students have flown their KK6PNN-5 balloon around the World 6 times and has been flying for 3 months.

The Future of Amateur Radio Ballooning?.

For more info contact:
WB8ELK@gmail.com

Very Angry Bird !!