

Bonner County Amateur Radio Club  
Pico-Ballon Project  
Update  
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&

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# Project Initiation

- Proposed to the BCARC over year ago and approved
- Original plan was to work with Forest Bird Charter School Radio Club
  - Teach some classes and then do a launch
  - Unfortunately, could not quite pull this together
- Presentation by Joanne Michael, KW6BWB
  - Good overview of ballooning
  - [BCARC August Soaring the Radio Skies on a Bed of Helium-JM 2023.pptx - Google Slides](#)
- Decision to proceed with the project anyway

# High Altitude vs. Pico Balloon

## High Altitude Balloon

- Rapid ascent to 100,000 feet +/-
- Payload usually a camera
- Get picture(s) at altitude
- Balloon burst
- Payload recovery

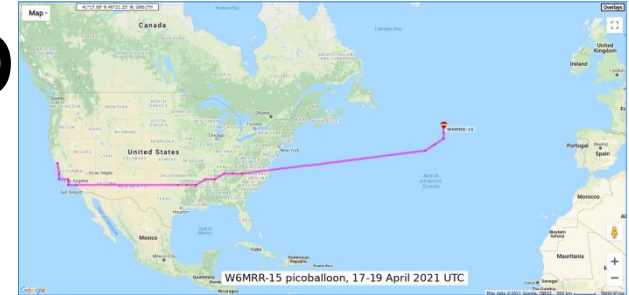


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## Pico Balloon

- Neutral Buoyancy @ 40,000 feet (Jetstream)
- Payload is a tracking device
- Balloon does *not* burst by design
- Rather, trip(s) around the world 🙌
- Payload usually lost



# Why BCARC Pico Ballon Project?

- Good first attempt project
- APRS (2m) versus WSPR (20m)
  - Equipment preassembled
  - Antenna is shorter on 2m than 20m
  - Launch requirements less demanding
    - Easier to clear a 38-inch antenna (2m)
    - 20m dipole is 31.2 feet (20m)
- We have a complete APRS kit
- We also have a 20m WSPR tracker but Tx only
  - “Some assembly required”



# APRS vs WSPR



## APRS

- Automated Packet Reporting System (aprs.org)
- Bob Bruninga (WB4APR) (SK)
- Frequency in US 144.390 MHz
- Milliwatt signals
- Location, altitude, speed, callsign
- Needs a 2m receiver and Internet for maximum effectiveness

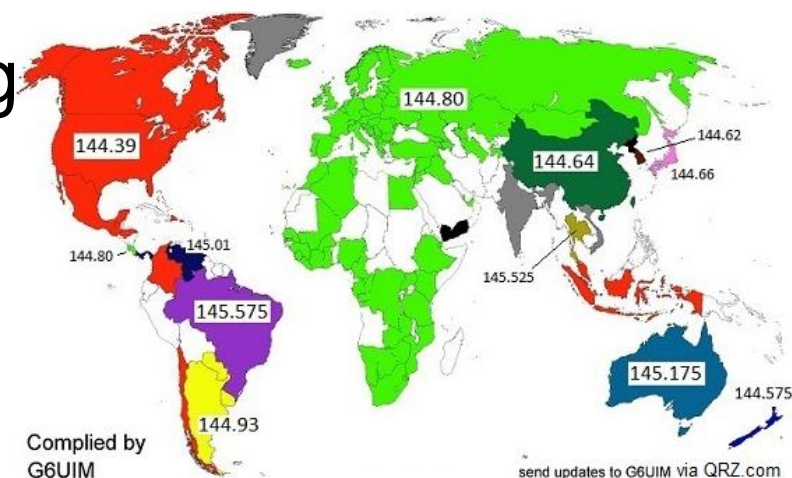


## WSPR

- Weak Signal Propagation Reporter
- Joe Taylor (K1JT)
- WSPRnet (collects and reports signals from all over the world)
- Milliwatt signals
- Configured to report location, altitude and callsign

# BCARC Choice ARPS

- Easy to track
  - Aprs.fi
  - We are K7JEP-11
- -11? (SSID)
  - 0 or blank: home fixed station
  - -7: HT's
  - -9: mobile
  - -11: balloon, aircraft, etc
  - [aprs.org/aprs11/SSIDs.txt](http://aprs.org/aprs11/SSIDs.txt)
- Rx stations not everywhere
  - Northern Canada
  - Oceans area problem
- Different frequencies different parts of the world
- Geofencing



# APRS Symbol Chart



# Aprs.fi – basic setup for tracking

Enter K7JEP-11

Change to 7 days

Track callsign: [Clear](#)  
 [Search ?](#)

Address, city or Locator: [Clear](#)  
 [Search ?](#)

Show last:  
 [Show all](#)

Track tail length:

Wx: 43°F 85% 1009 mbar 1.7 MP

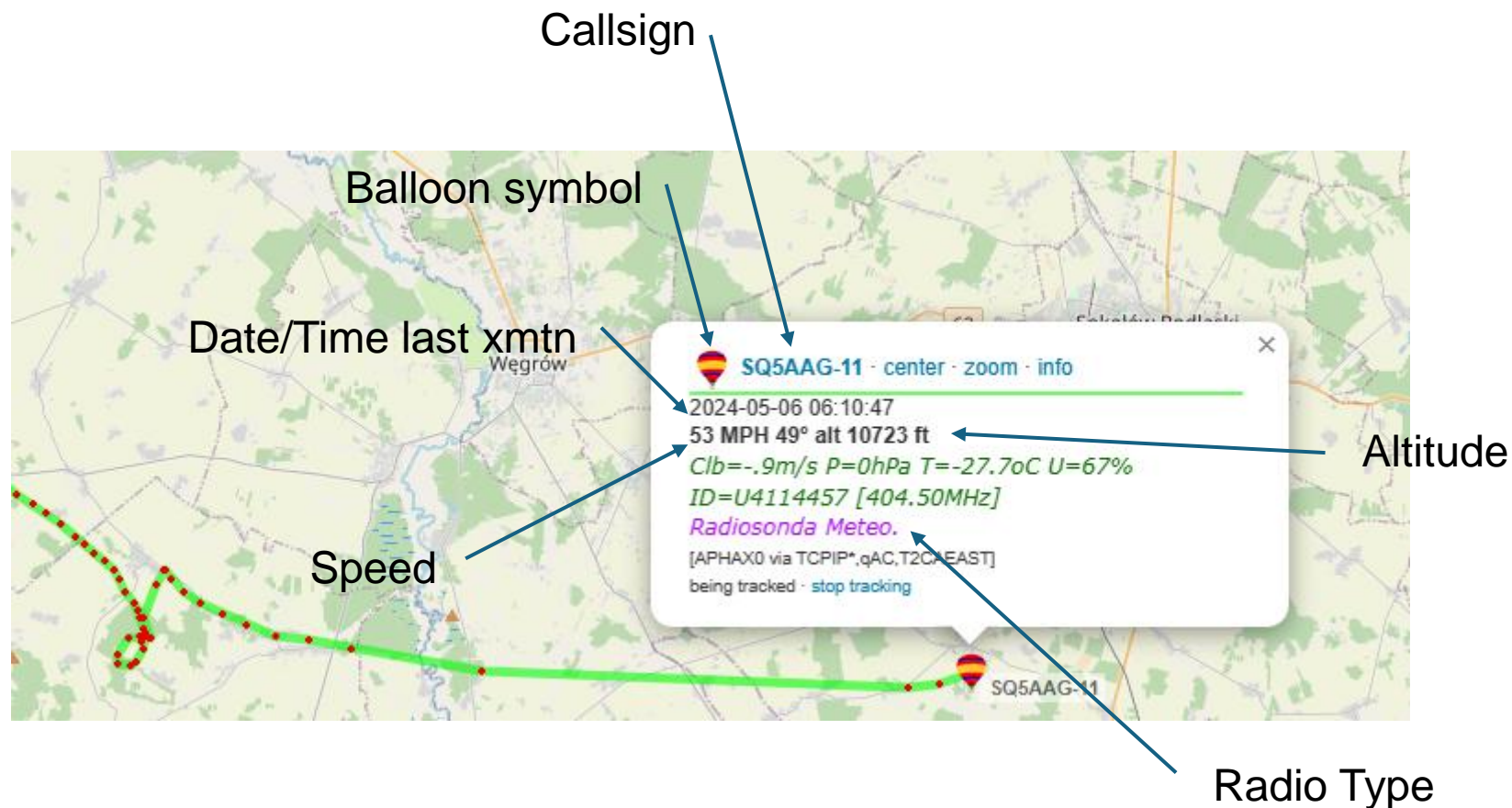
**Other views:**

- [Station info](#)
- [Raw packets](#)
- [Status packets](#) - [Beacon packets](#)
- [APRS/CWOP weather](#) - [Telemetry](#)
- [Messages](#) - [Bulletin board](#)
- [Prefix browsing](#)
- [Google Earth KML ?](#)
- [Data export tool](#)
- [Preferences](#) - [My account](#)

**Information:**  
[Stations currently moving](#) · [User guide](#) · [FAQ](#)  
· [Blog](#) · [Discussion group](#) · [Linking to aprs.fi](#) · [AIS sites](#) · [Service status](#) · [Database](#)

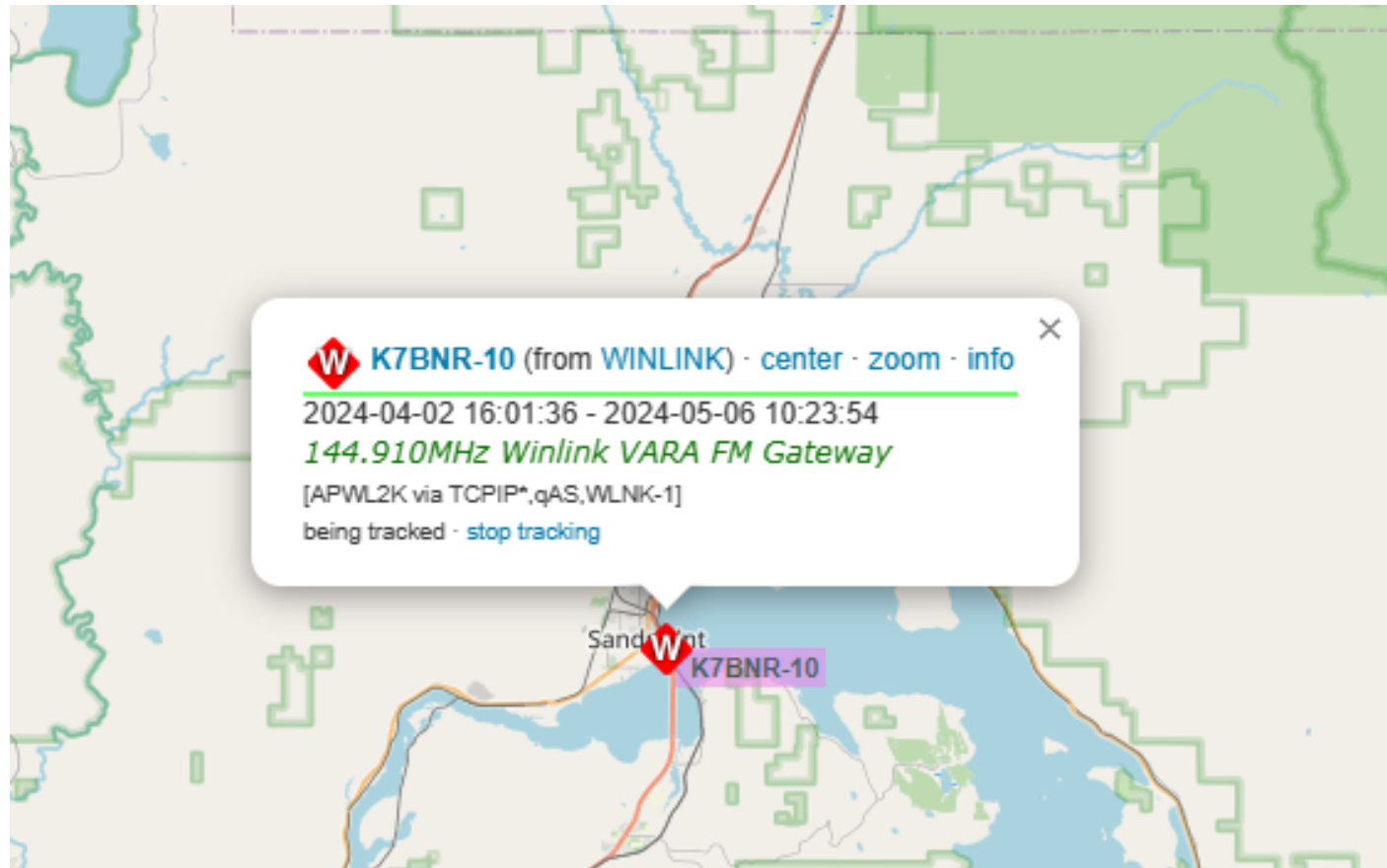


# Object Details



\* SQ5AAG – Jacek Domanski, Warszawa, Poland

# Maybe a little closer to home.....

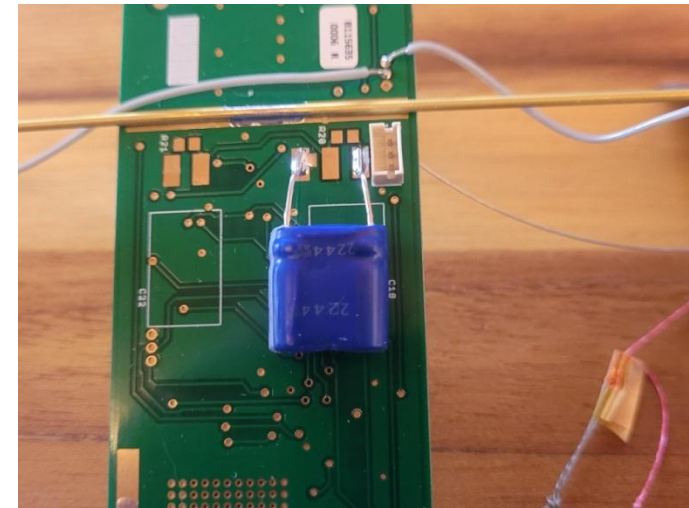


# APRS Payload

- Tracker
  - GPS & GPS antenna
  - APRS transmitter
  - APRS antenna
  - Power supply
    - Solar panels
    - Super Capacitor (charge for 2 minutes, then 1-2 second xmission, recharge)
- Balloon – 36” Mylar
- Total weight ~ 14 grams

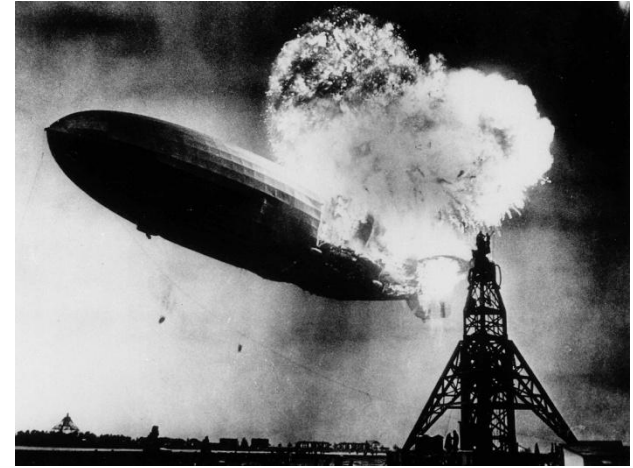
# What is a “supercapacitor”?

A **supercapacitor (SC)**, also called an **ultracapacitor**, is a high-capacity [capacitor](#), with a [capacitance](#) value much higher than solid-state capacitors but with lower [voltage](#) limits. It bridges the gap between [electrolytic capacitors](#) and [rechargeable batteries](#). It typically stores 10 to 100 times more [energy per unit volume or mass](#) than electrolytic capacitors, can accept and deliver charge much faster than batteries, and tolerates many more [charge and discharge cycles](#) than [rechargeable batteries](#).<sup>[2]</sup>



# BCARC Launch

- First – no FAA reporting requirements
  - So small – sucked in and spit out!
- Filling balloon
  - He – Helium safer but leaks faster and not quite as much lift
  - Diatomic H – Hydrogen explosion hazard (think Hindenburg!) but slower leaking
  - Just enough free lift but not so much balloon pops at altitude
- Weather
  - Clear day with little or no wind (<5mph)
    - Need a large area – BCARC has selected
    - Goes up slowly as only partially filled at lower levels
  - Winds aloft ([ventusky.com](http://ventusky.com))





# BCARC balloon launch site

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# Major Milestones – Managing Expectations

- The balloon is airborne!
- Receive first airborne transmission
- Make it to altitude – 30,000 to 40,000 feet
- Lives through the first night
- Cross the Atlantic or Pacific first time
  - Winds aloft generally West to East
  - Atlantic for K7JEP-11
- Finally, circumnavigation(s)



# Day of Activity

- Waiting for favorable winds and weather (no rain – adds weight!)
- Hoping for Spring/Summer 2024 timeframe
- Go-NoGo via groups.io
  - Exact date
  - Exact time
- Welcome to attend but notice will be short
- If launch is successful, notice on groups.io
- Track on aprs.fi K7JEP-11





