



# Low-Cost, Off-the-Shelf Components for Stratospheric Ballooning (Part 1)

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# Sensors

- Neulog Modules
- HOBO Data Loggers
- PocketLab Weather

# Niches

- Low-Cost
- Off-the-Shelf

# Neulog Modules



## Features

Individual sensor modules - up to 5 in one “chain” - must have a battery module in every chain too (the USB module is for communication with laptop, not for flight)

## Modules

Examples: Battery (\$45), USB (\$50), Pressure (\$83), Wide-range Temperature (\$64), Voltage (\$50), Light (\$55), UVA (\$106), UVB (\$101), and many more

Pros: Wide variety of sensors, ease of use

Cons: Poor battery management system, no real-time clock, size (a full module case for each sensor - bigger than necessary)

# HOBO Data Loggers

Devices: Pendant G (3-axis accel), U12-013 4-Channel Data Logger (built in thermometer and humidity sensor, two plug in sensors, can plug in thermometers and raw voltage cables)

Costs: \$140 U12-013 device, \$35 Temp Sensor, \$83 Pendant G, \$70 Optical Cable (required for Pendant G)

Pros: Very reliable, real-time clock, delayed start feature, quality sensors, compact

Cons: Software sold separately, optical cable sold separately, limited sensor selection (e.g. no pressure sensor)



# PocketLab Weather

## Features

Bluetooth 4.0 Connectivity

## Functions

Temperature, Humidity, Barometric Pressure, Light intensity

Cost: \$98.00

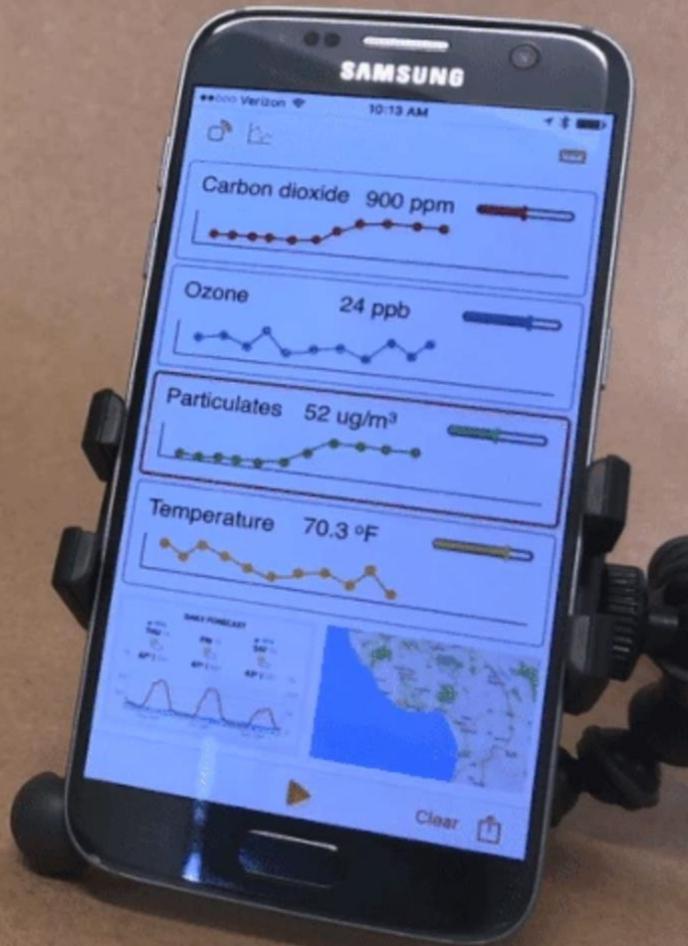
Pros: Compact, convenience, user friendly, portability

Cons: Accuracy, limited range on some sensors

\*See also PocketLab One, PocketLab Voyager, and PocketLab Air (coming soon)



	PocketLab One	PocketLab Weather	PocketLab Voyager
Acceleration	●		●
Angular Velocity	●		●
Magnetic Field	●		●
Rangefinder			●
Altitude	●	●	●
Pressure	●	●	●
Ambient Temperature	●	●	●
Temp. Probe (Optional)		●	●
Humidity		●	●
Light		●	●
Dew Point		●	●
Heat Index		●	●
Bluetooth	●	●	●
On-Board Memory		●	●



# Cameras

- GoPro Session
- Lightdow 4000 1080P HD “Sports Action” Camera
- Mobius Actioncam (including IR version)

# GoPro Session

- Cost: \$150
- Pros: small size, battery life
- Cons: requires heating



# Lightdow 4000

- \$40 range
- Pros: cost, video duration
- Cons: resolution, possible shock sensitivity



# Mobius Actioncam (including IR version)

- Cost: \$80
- Pros: size, weight
- Cons: battery life



IR Conversion: <https://publiclab.org/notes/classic/04-22-2014/mobius-ii-conversion>

# Trackers

- Stratotrack
- Big Red Bee
- SPOT Finder
- PocketFinder

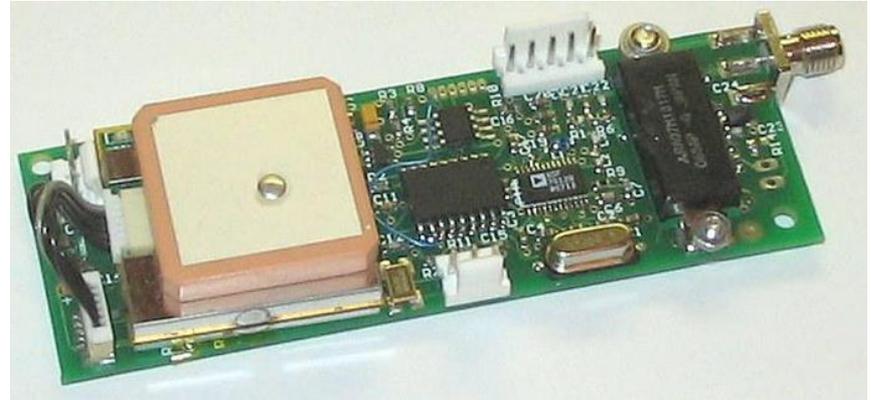
# Stratotrack

- APRS HAM Radio GPS Tracker
- Cost: \$225
- Pros: size, weight, “very very small,” temperature robust (using Li batteries), Internet tracking, reports temperature and battery voltage
- Cons: HAM license required, internet tracking, occasionally mis-reports GPS data



# Big Red Bee\*

- APRS Unit
- Cost: ~\$300
- Pros: Ruggedness\*\*, Reliability,
- Cons: Size, Weight



\*There is a special high-altitude ballooning package

# SPOT Gen3 Satellite GPS “Finder”

- Satellite GPS tracking device
- Cost: \$140 per unit, \$150 per year for the basic service plan
- Pros: Rugged, Temperature Tolerant, Use Lithium Batteries, updates to about 80,000 feet - reconnects during descent
- Cons: no altitude, updates only once every ten minutes

\*Attach to apex of parachute for best results



# PocketFinder

- Cost: \$130/device, \$13/month service plan
- Pros: small size
- Cons: updates only to about 20,000 feet, often struggles to re-establish gps lock during descent (and sometimes won't reconnect even after landing)

\*uses cell-tower network

