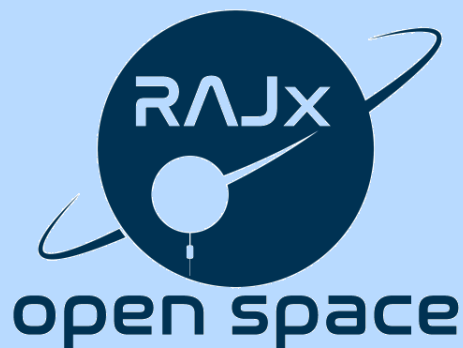




UP!

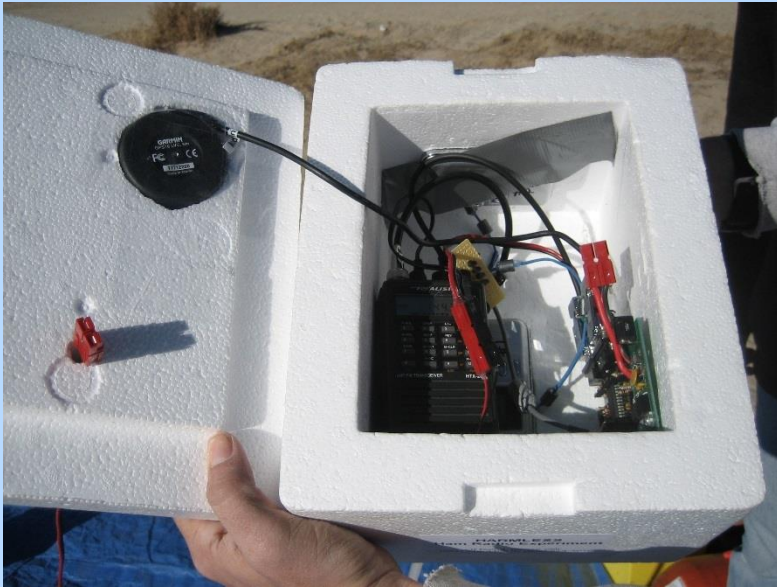
High Altitude Balloon



Michal Rybka
OK1WMR

EurOpen.CZ
50. Konference Myslovice
14.–17. 5. 2017

High Altitude

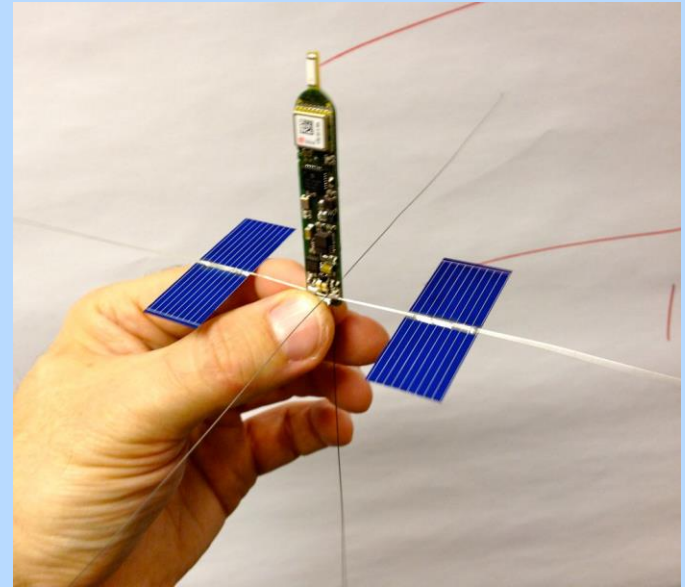


kg

cca 40 km

hours

Float Flight



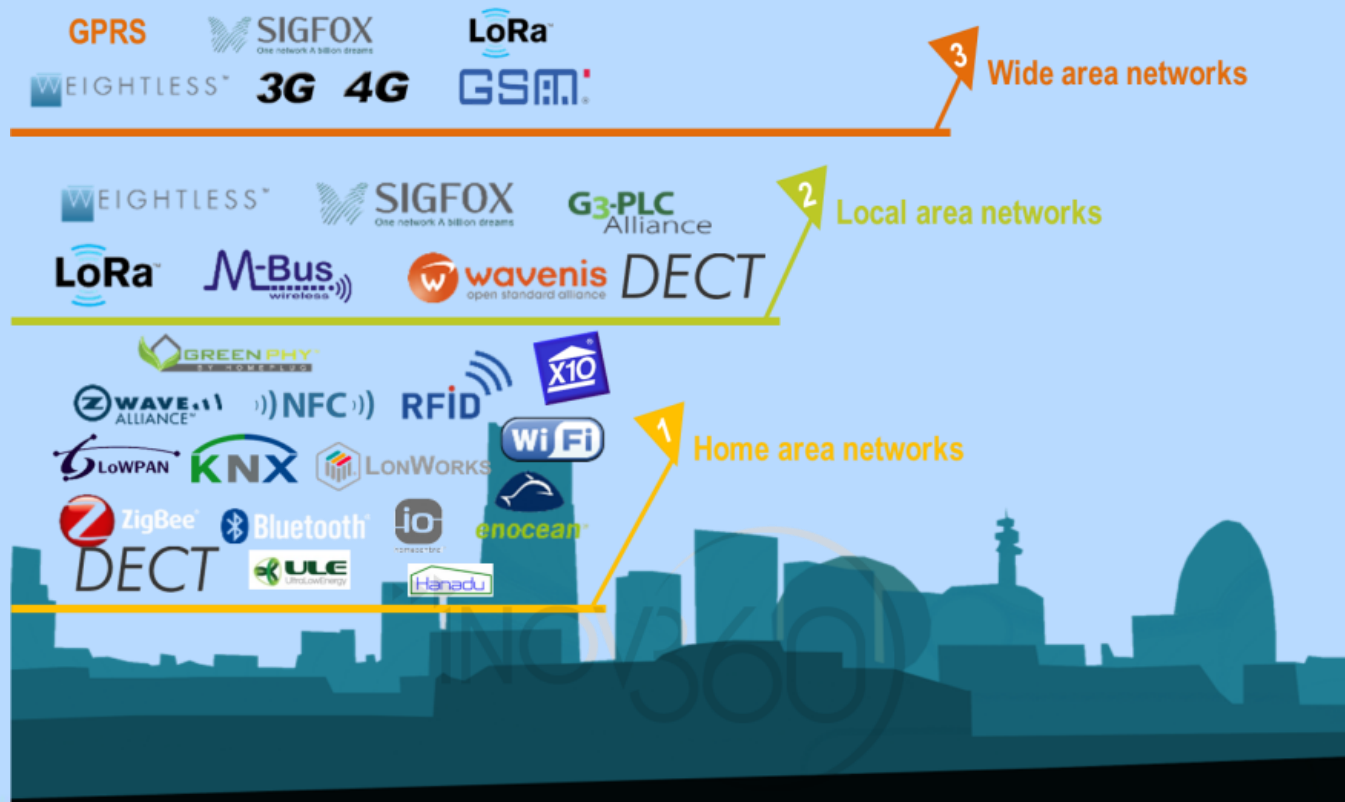
g

cca 10 km

weeks

Float HABs – hard live

- Extreme low temperature
- Navi. function above 4 000 m asl
- Clouds (storms) helium
- Long range global radio site (100 km+)



IoT site LoRa (868 MHz)



1000 bps – 90 km

100 bps – 280 km

RTTY modulation (432 MHz)

300 bps – 300 km

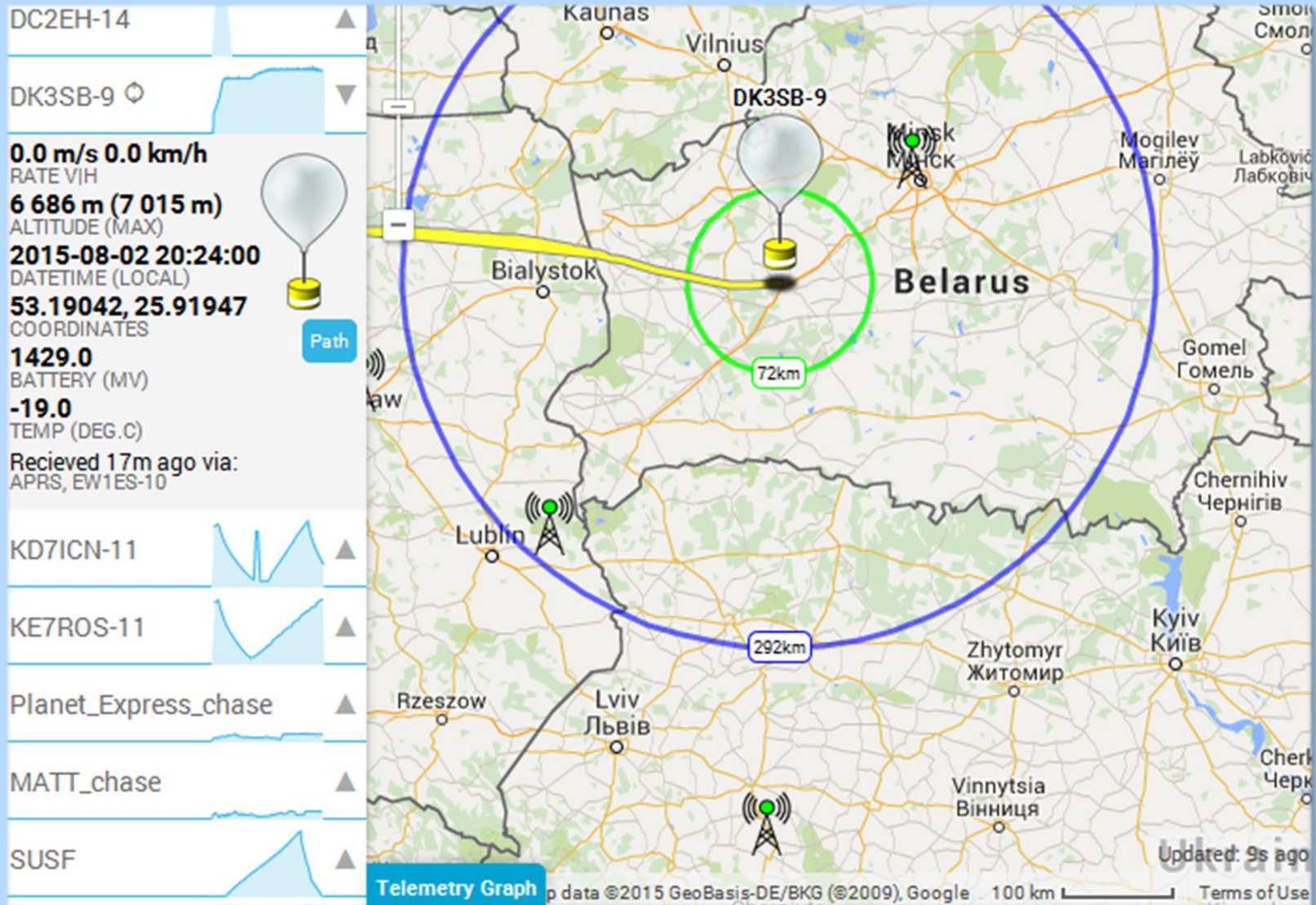
50 bps – 650 km

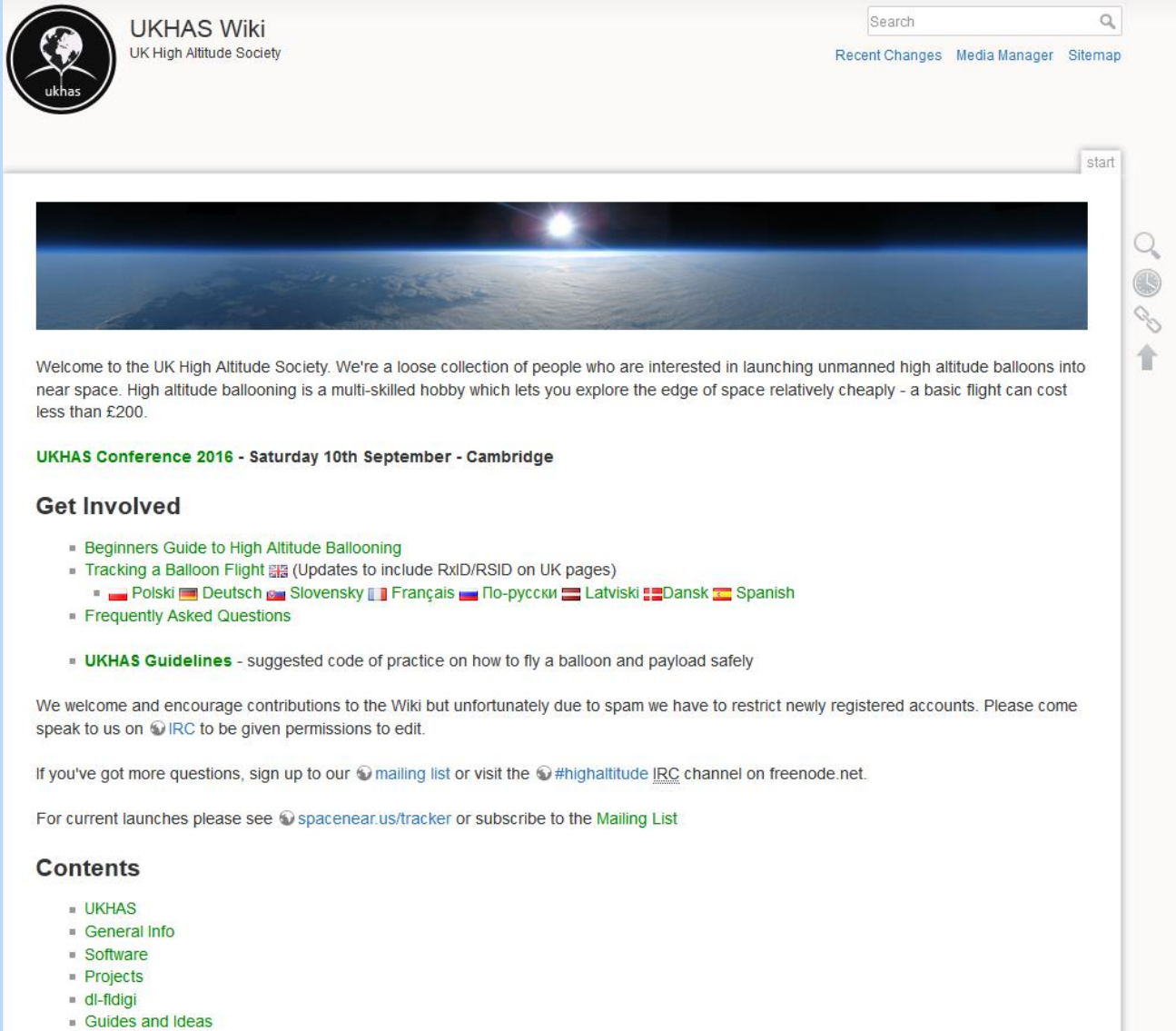
APRS (144 MHz)

Automatic Packet Reporting System

1200 bps – 300 km

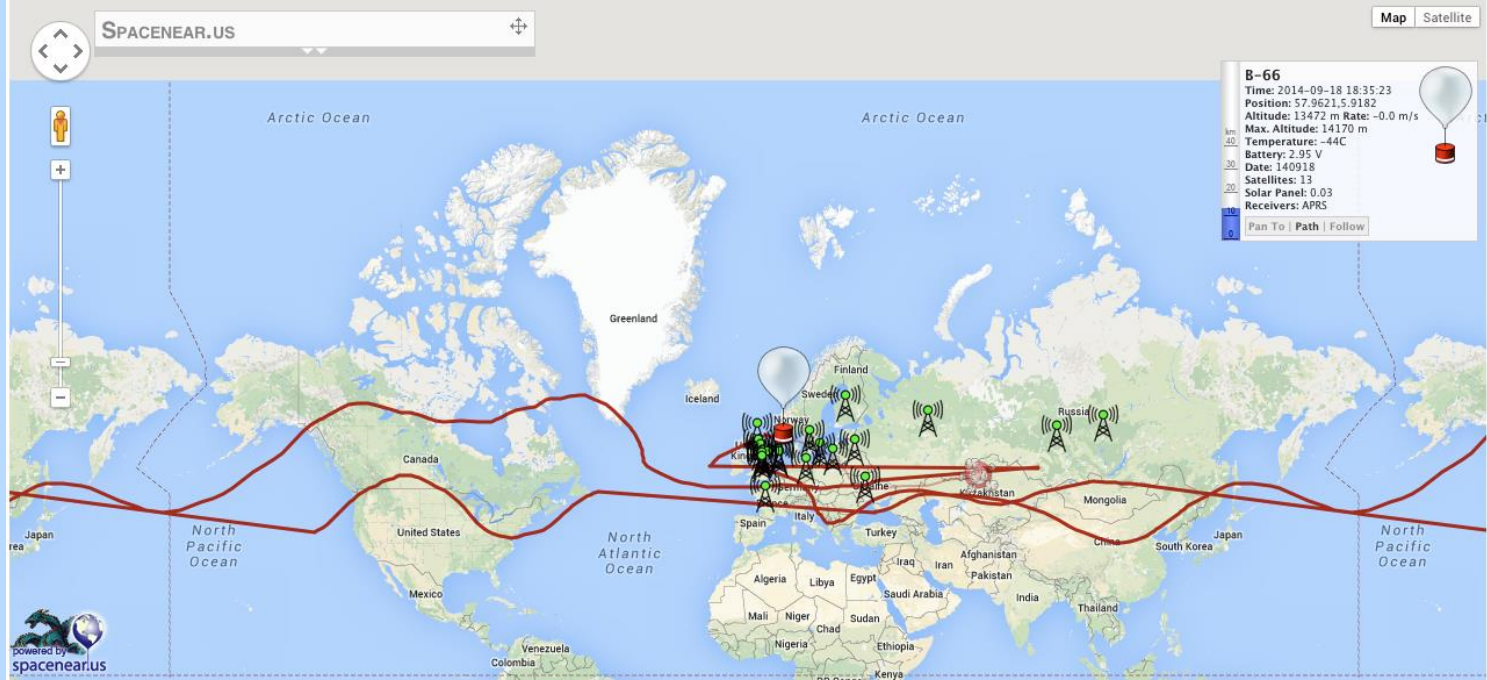
tracker.habhub.org





The screenshot shows the UKHAS Wiki homepage. At the top left is the UKHAS logo, a globe with the text 'ukhas' below it. To its right is the text 'UKHAS Wiki' and 'UK High Altitude Society'. On the top right, there is a search bar and navigation links for 'Recent Changes', 'Media Manager', and 'Sitemap'. Below the header is a large banner image of Earth from space. Underneath the banner is a welcome message: 'Welcome to the UK High Altitude Society. We're a loose collection of people who are interested in launching unmanned high altitude balloons into near space. High altitude ballooning is a multi-skilled hobby which lets you explore the edge of space relatively cheaply - a basic flight can cost less than £200.' This is followed by a green heading: 'UKHAS Conference 2016 - Saturday 10th September - Cambridge'. Below that is a section titled 'Get Involved' with a list of links: 'Beginners Guide to High Altitude Ballooning', 'Tracking a Balloon Flight' (with a note about updates to include RxD/RSID on UK pages), 'Frequently Asked Questions', and 'UKHAS Guidelines' (described as a suggested code of practice on how to fly a balloon and payload safely). A paragraph follows: 'We welcome and encourage contributions to the Wiki but unfortunately due to spam we have to restrict newly registered accounts. Please come speak to us on IRC to be given permissions to edit.' Below this is another paragraph: 'If you've got more questions, sign up to our mailing list or visit the #highaltitude IRC channel on freenode.net.' The next paragraph says: 'For current launches please see spacenear.us/tracker or subscribe to the Mailing List'. At the bottom is a 'Contents' section with a list of links: 'UKHAS', 'General Info', 'Software', 'Projects', 'dl-fidgi', and 'Guides and Ideas'. On the right side of the page, there is a vertical sidebar with icons for search, a clock, a link, and an upward arrow, and a 'start' button at the top.

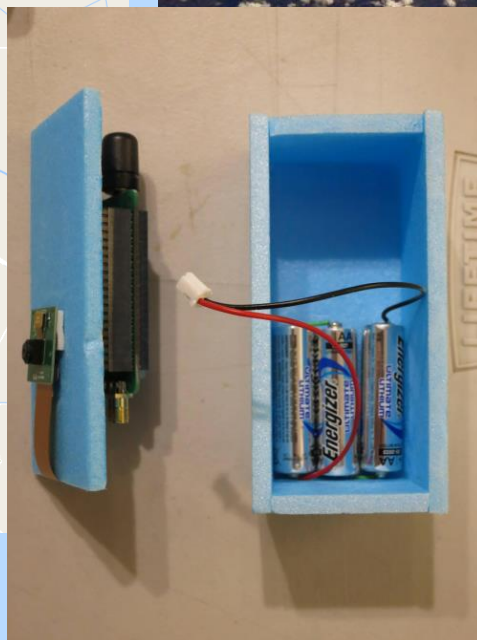
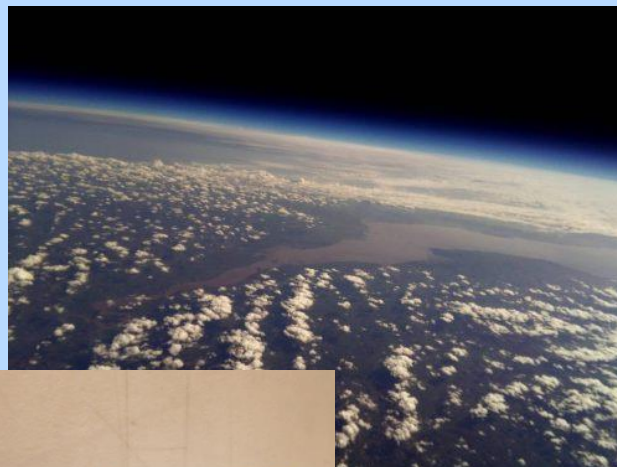
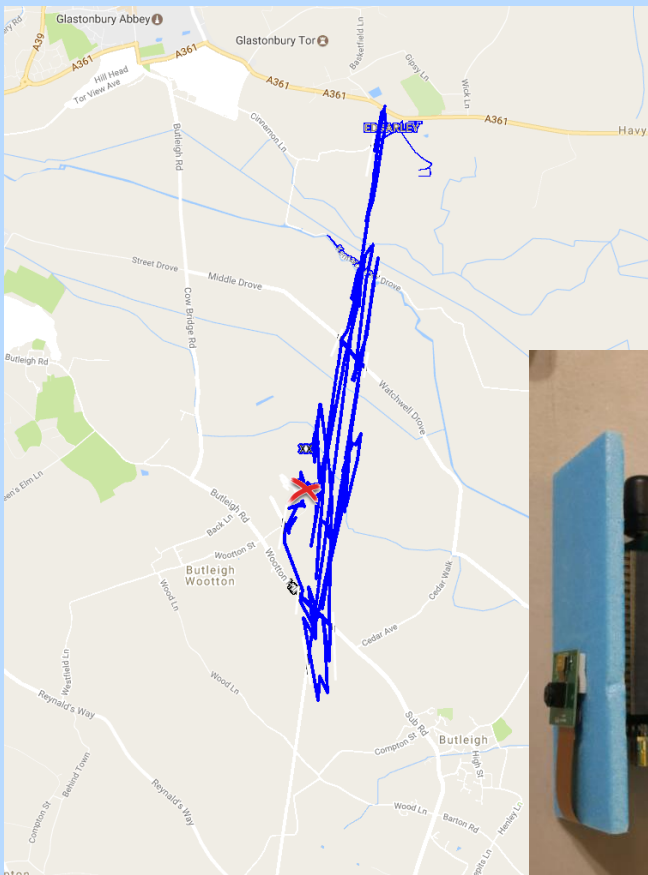
B-66



- Payload weight - **11 grams.**
- Downlink mode - 434.500 MHz USB Contestia 64/1000 and APRS on regional frequencies. 10mW transmitter.
- Start time: 15th July 2014 14:17 UTC
- Last known position: 18th September 2014 18:35 UTC
- Flight duration: **65 days** (1564 hours)
- Minimum track distance: **69 583 km** (projected onto geoid, missing sections replaced by shortest path)

Dave Akerman

www.daveakerman.com

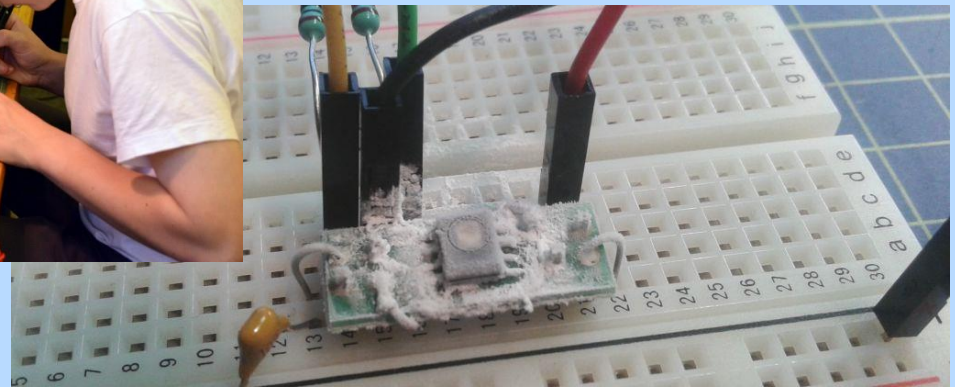
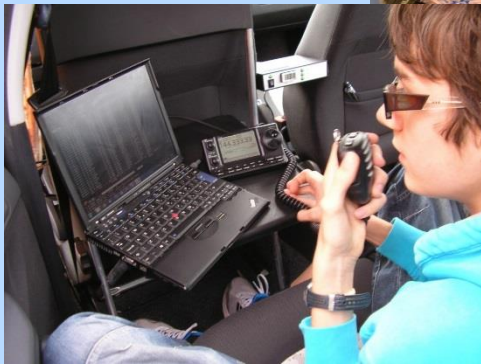
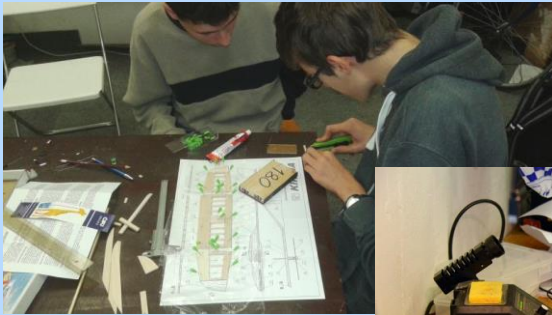


Radio club OK1RAJ - Prague

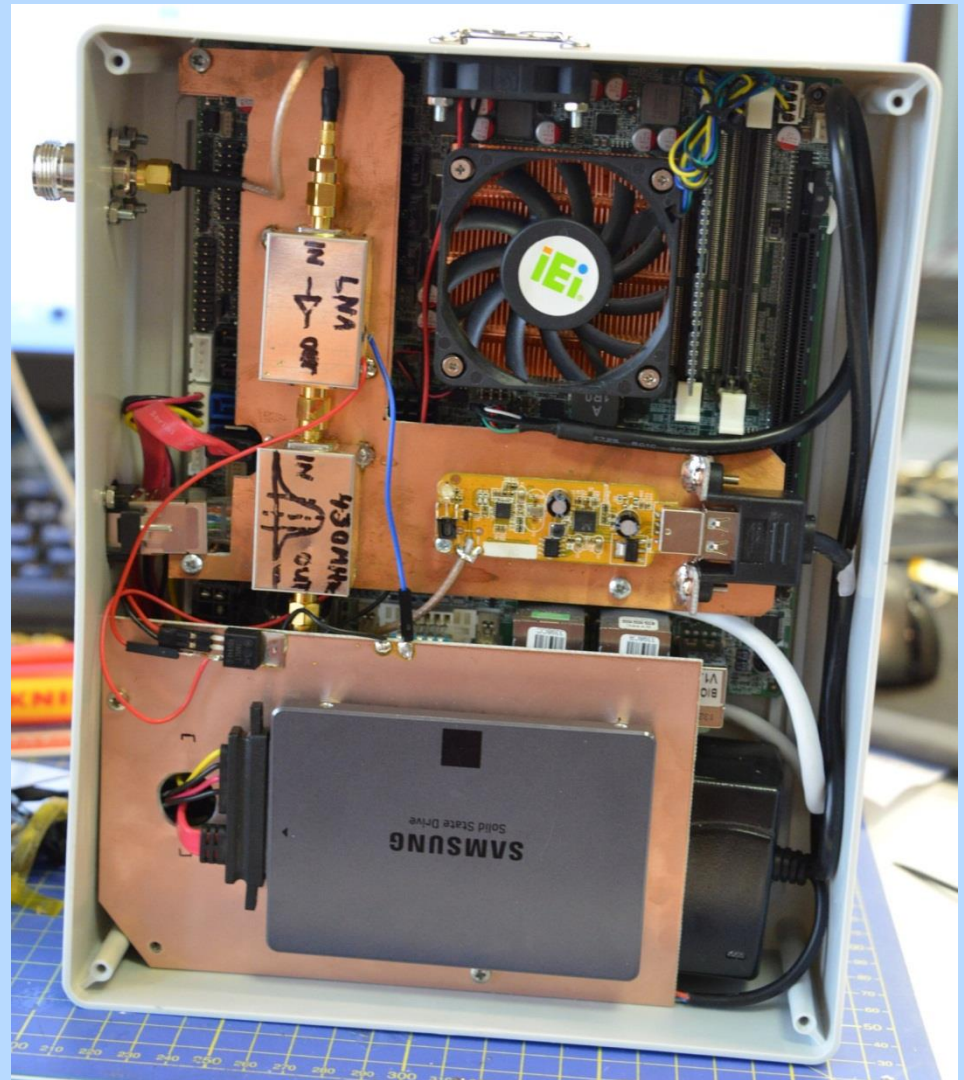
radioklub.dvojka.cz



- Projects
- Experiments
- Fun
- Open know-how



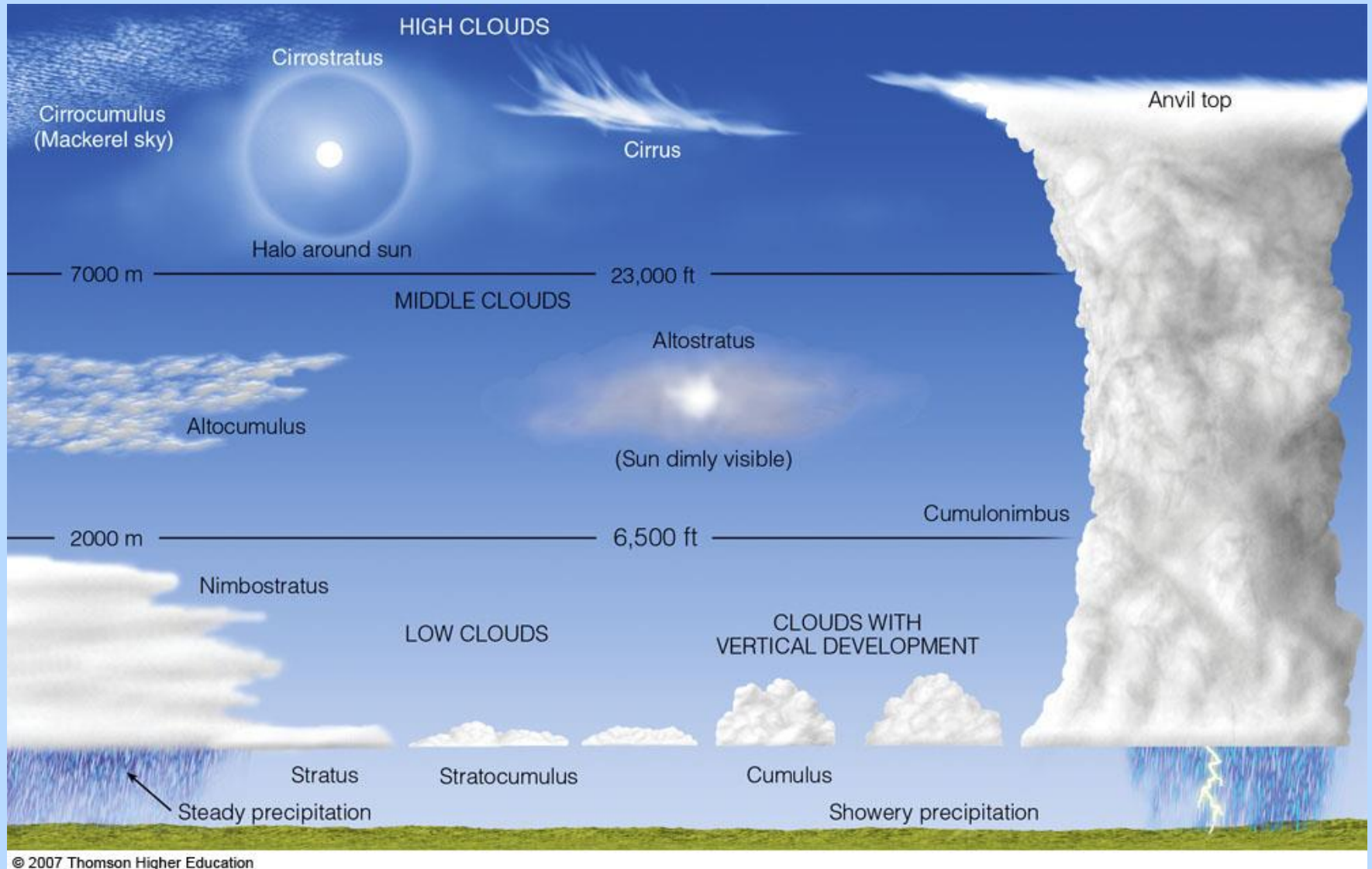
Přijímací stanice OK1RAJ-1



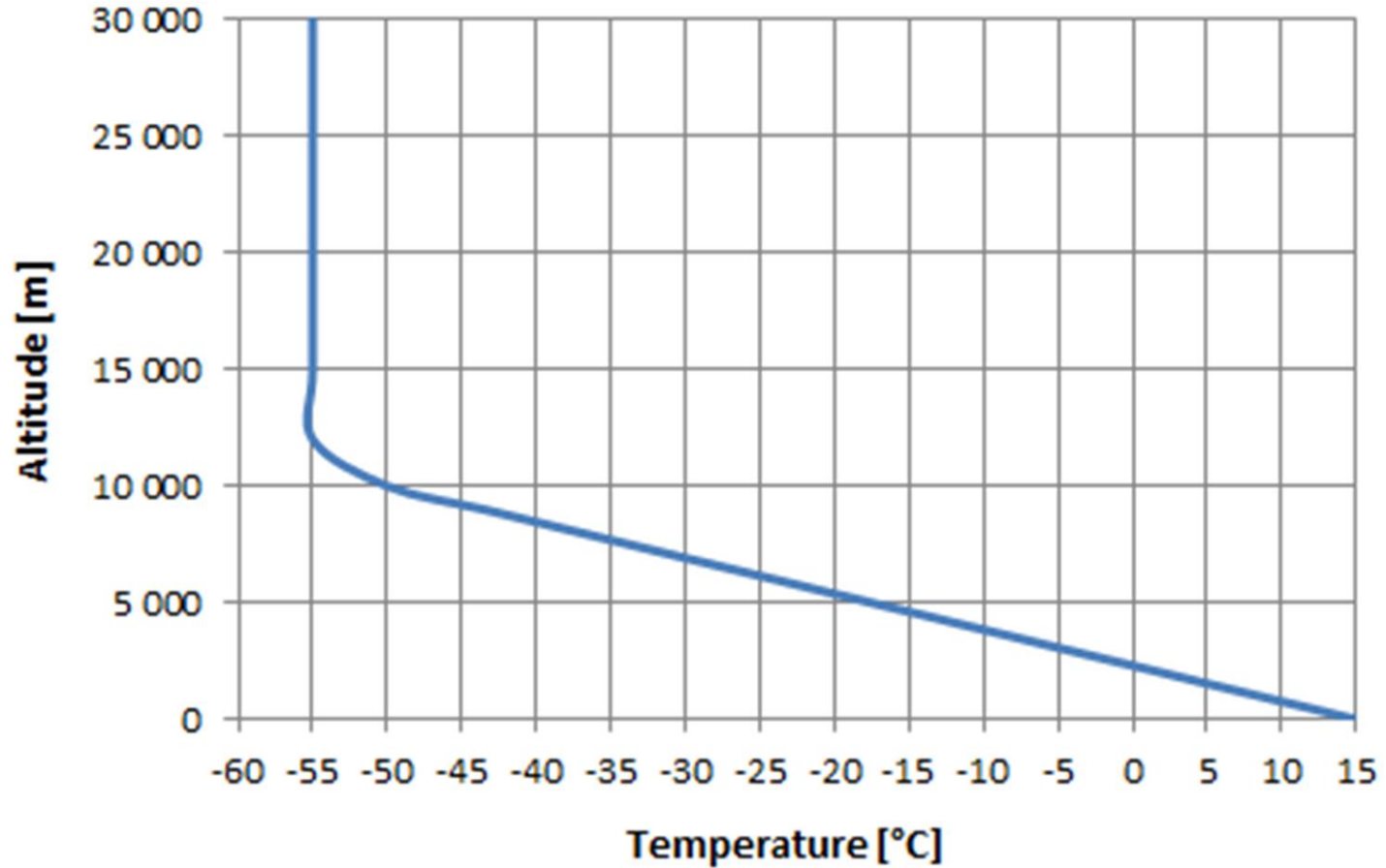
SW Fl-digi + SDR sharp

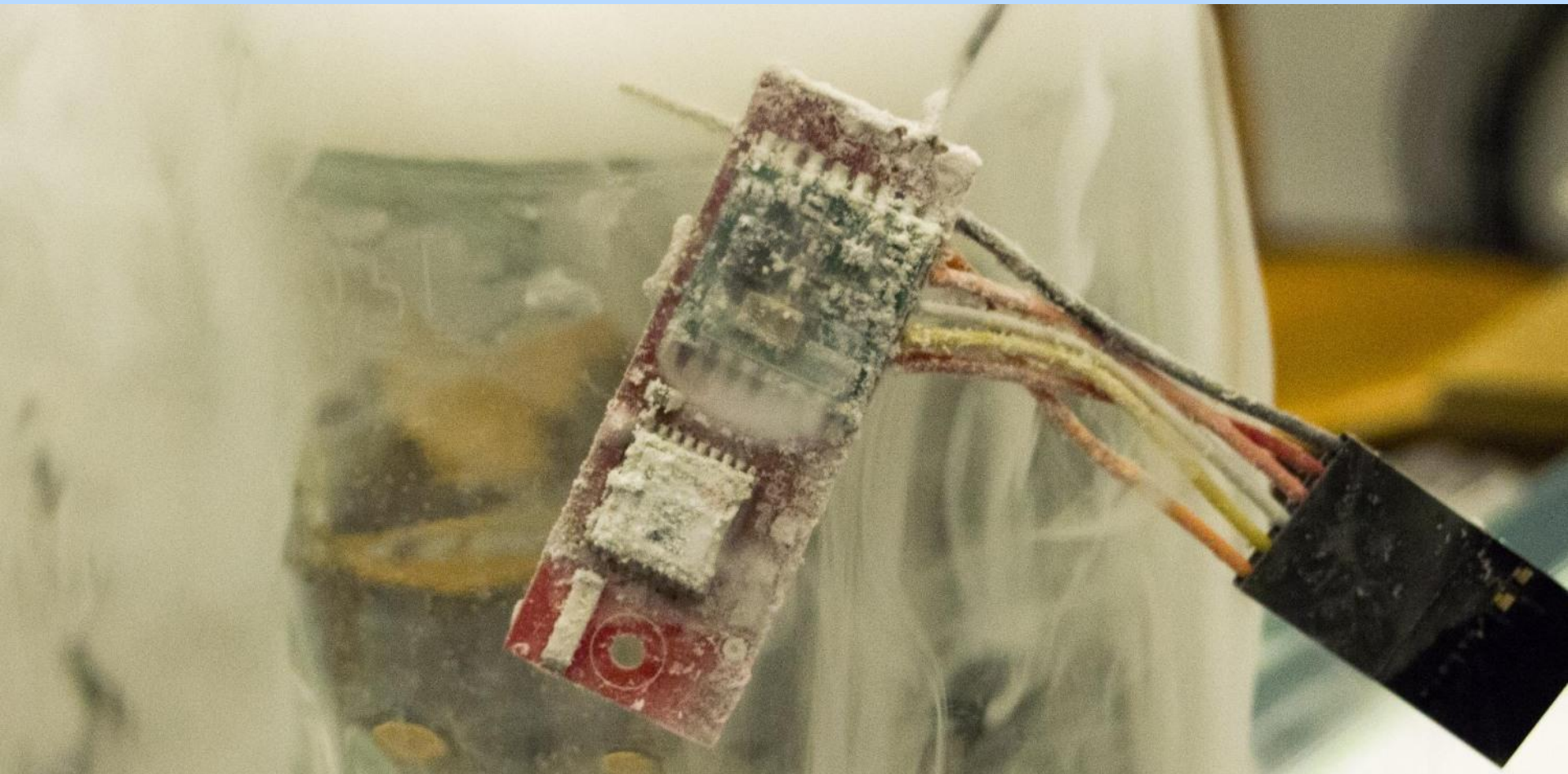
The image shows two overlapping software windows. The top window is 'dl-fldigi - dl-fldigi for High Altitude Balloon Tracking'. It features a menu bar (File, Op Mode, Configure, View, Help, DL Client) and several control panels. The 'Flight' panel includes fields for 'PYSY-12: PYSY', 'Callsign', 'Time', 'Latitude', 'Longitude', 'Altitude', 'Checksum', and 'Bear'. The 'Payload' panel shows 'PYSYrfm (PYSY)' and '1: RTTY 50'. The 'Multi mode' panel has 'Auto-configure' and 'Auto-mode-switch' buttons. A status bar at the bottom of this window displays '0.000' and a red error message: '\$\$2^^Zu?c^^?[[[kg_^F'. Below the controls is a large text area containing a block of Base64-encoded data. The bottom section of the window is a frequency spectrum plot with a scale from 500 to 3500 kHz. The bottom window is 'SDR# v1.0.0.1347 - IQ Imbalance: Gain = 0,994 Phase = -0,115°'. It has a frequency display of '000.434.625.000' and various control sliders for 'Latency (ms)', 'AGC', 'Threshold (dB)', 'Decay (ms)', and 'Slope (dB)'. The main display area shows a waterfall plot with a frequency range from 434,6235M to 434,6289M. The Windows taskbar at the bottom shows the system time as 21:34 on 2.8.2015.

Clouds

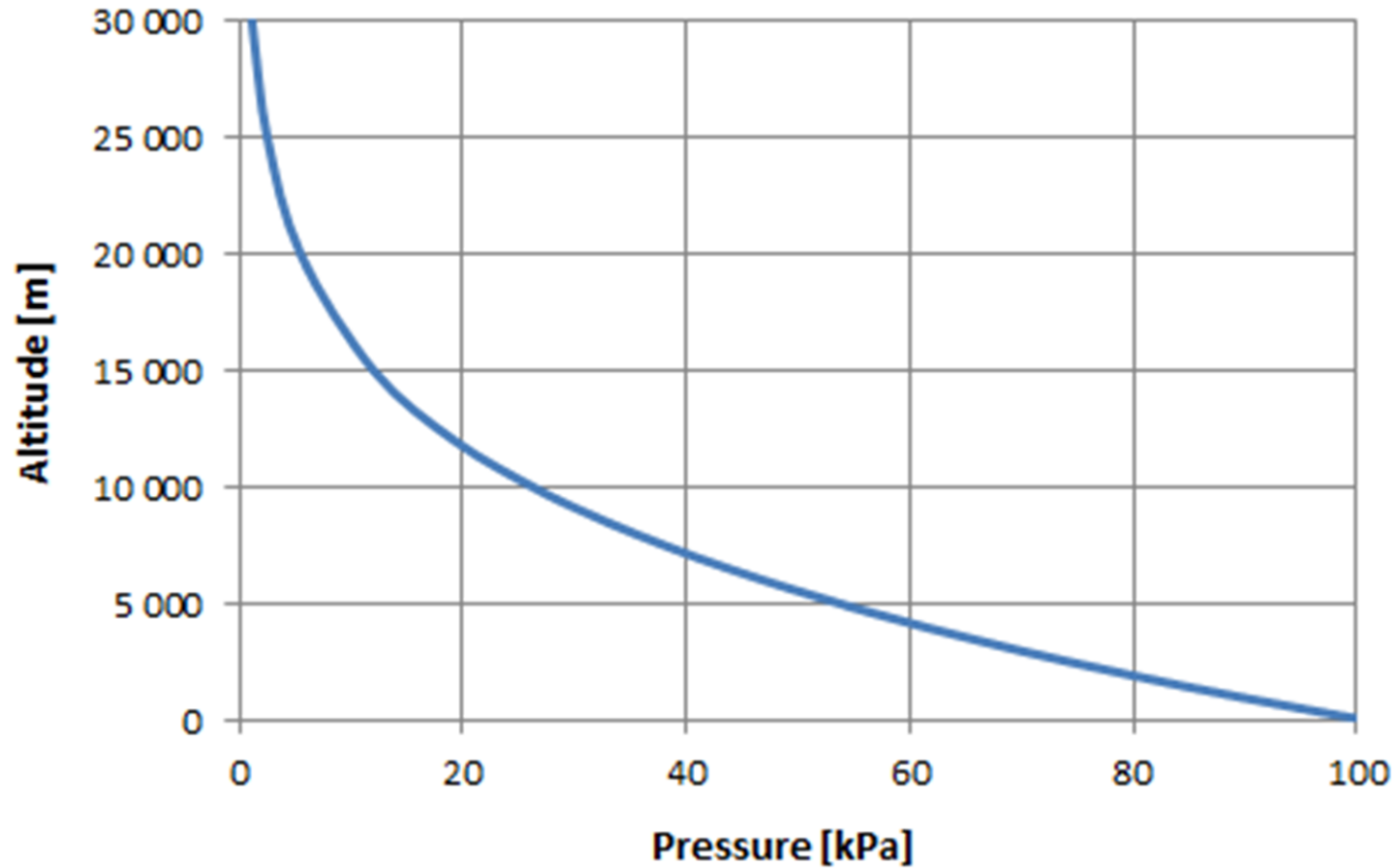


Temperature





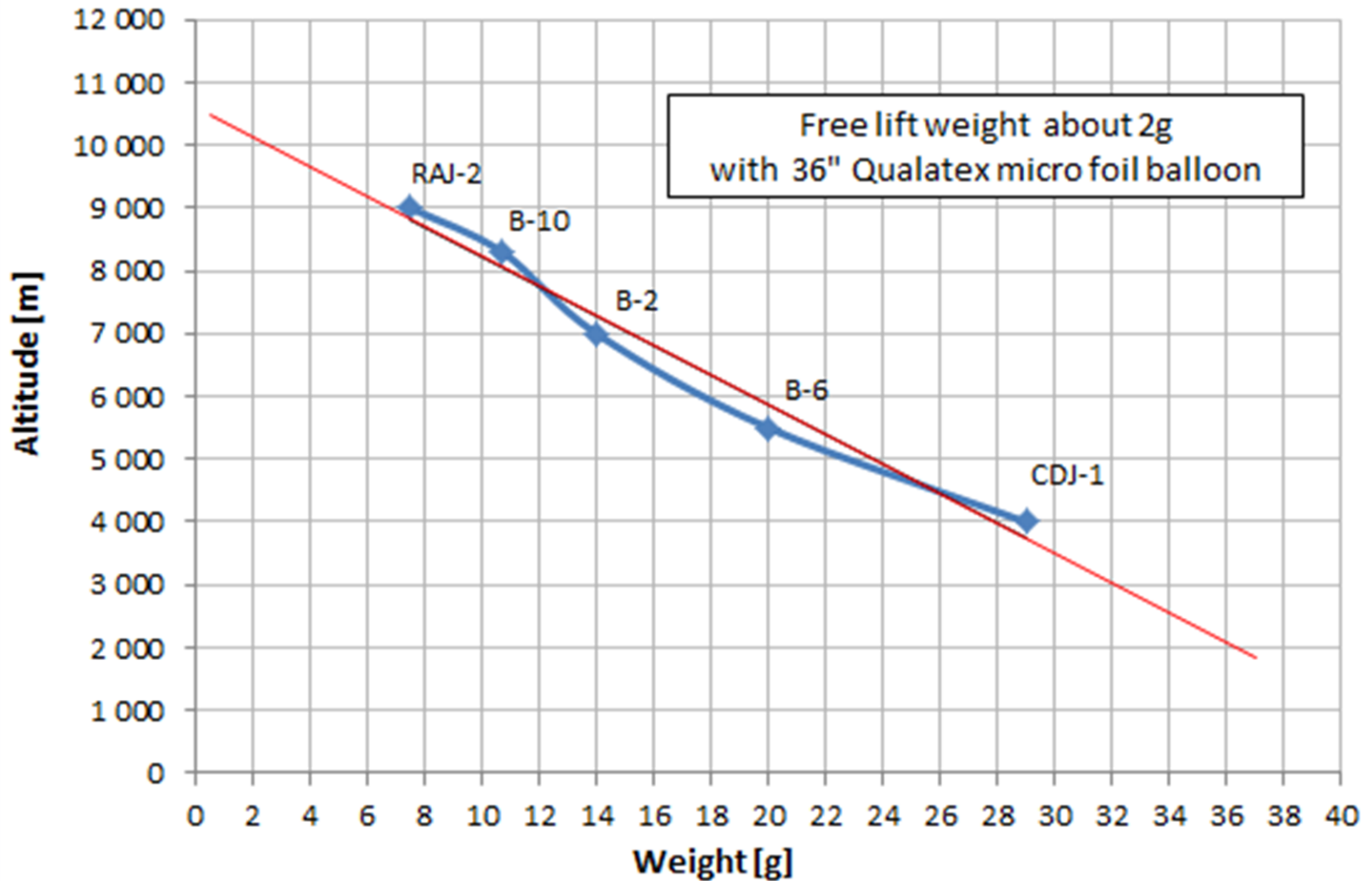
Pressure



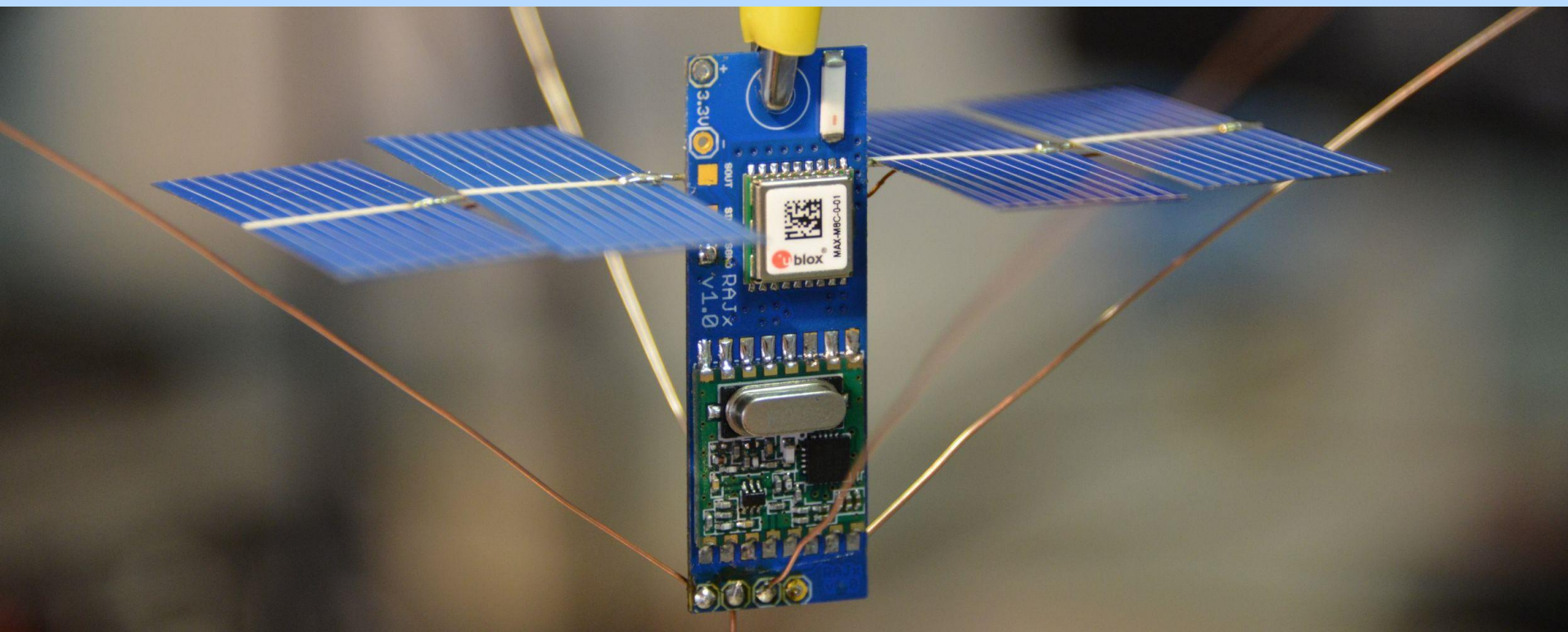
Qualatex Micro Foil +helium



Payload weight



Project solar powered radio sonde RAJx



GPS, Radio 434 MHz, uP ATMEGA328
1st generation

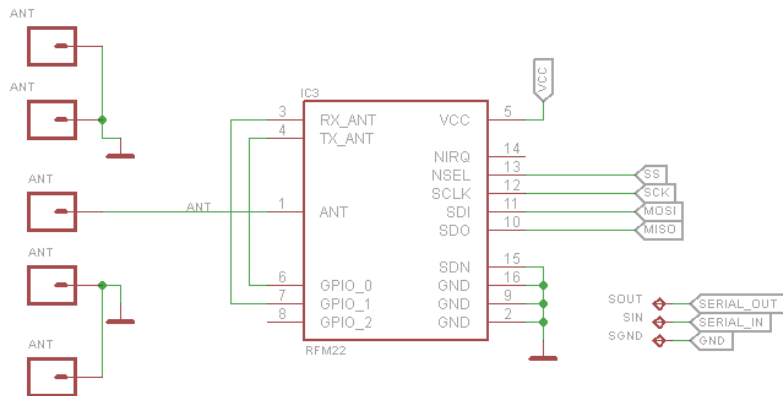
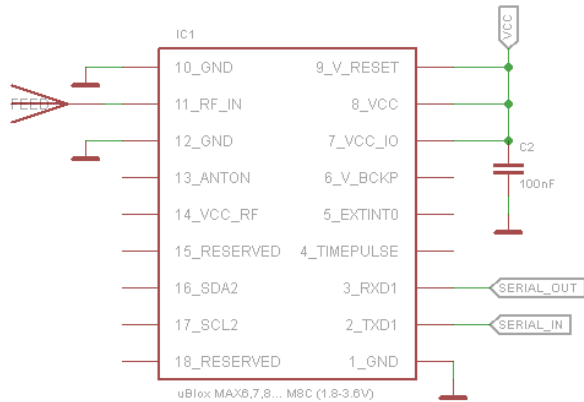
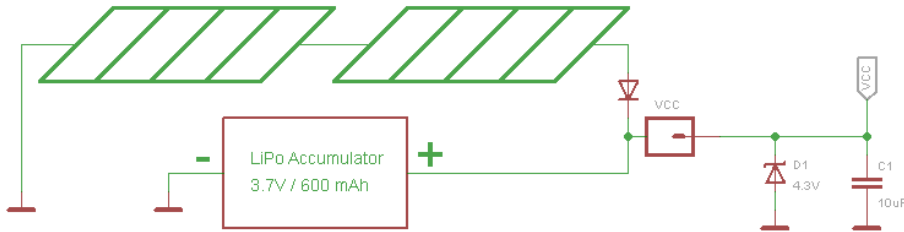
Project solar powered radio sonde RAJx



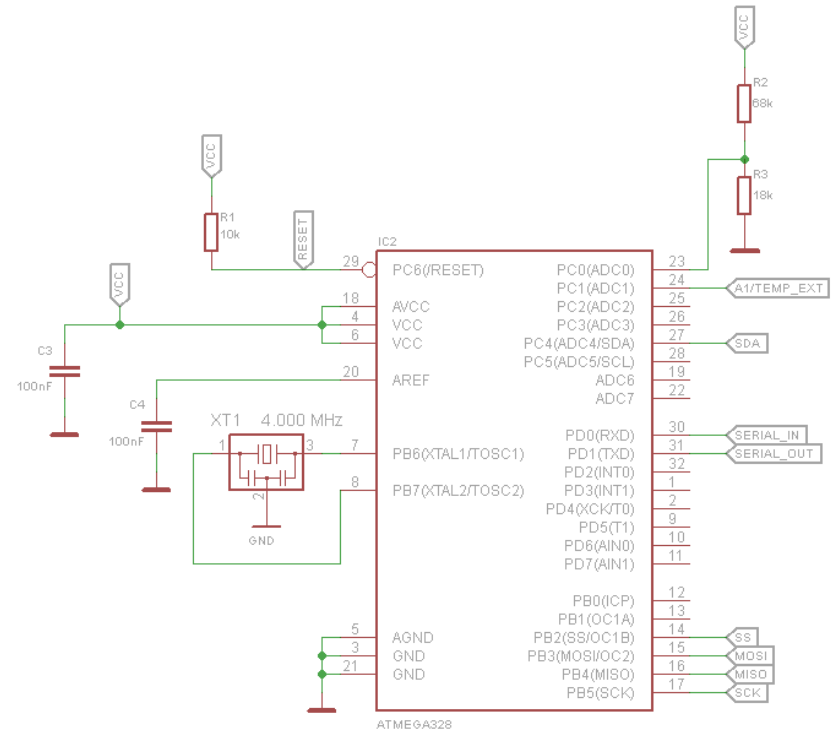
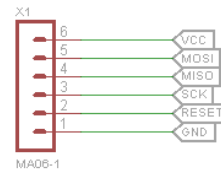
GPS, Radio 434 MHz, uP ATMEGA328
1st generation

RAJ-0 PICO tracker payload electronics

8pcs 52x19 mm solar cells (MAX 4.5V - 250mA)



ISP programming

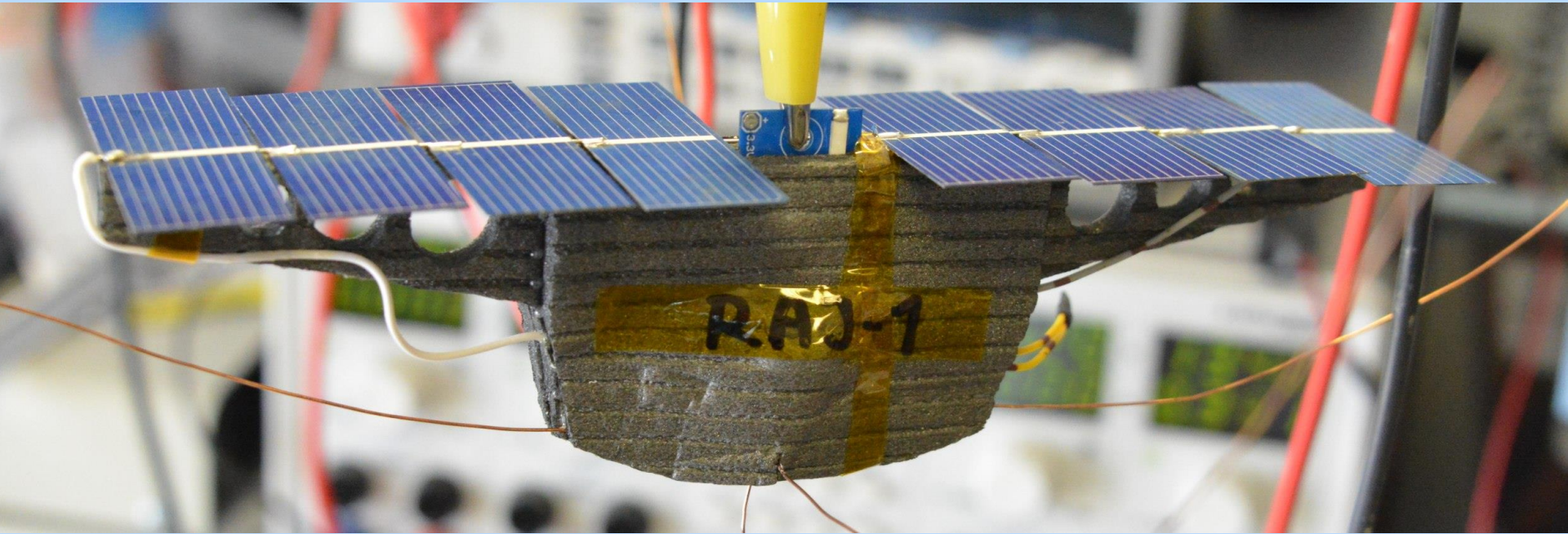


based on <https://github.com/ok1cdj/Picotracker> by OK1CDJ

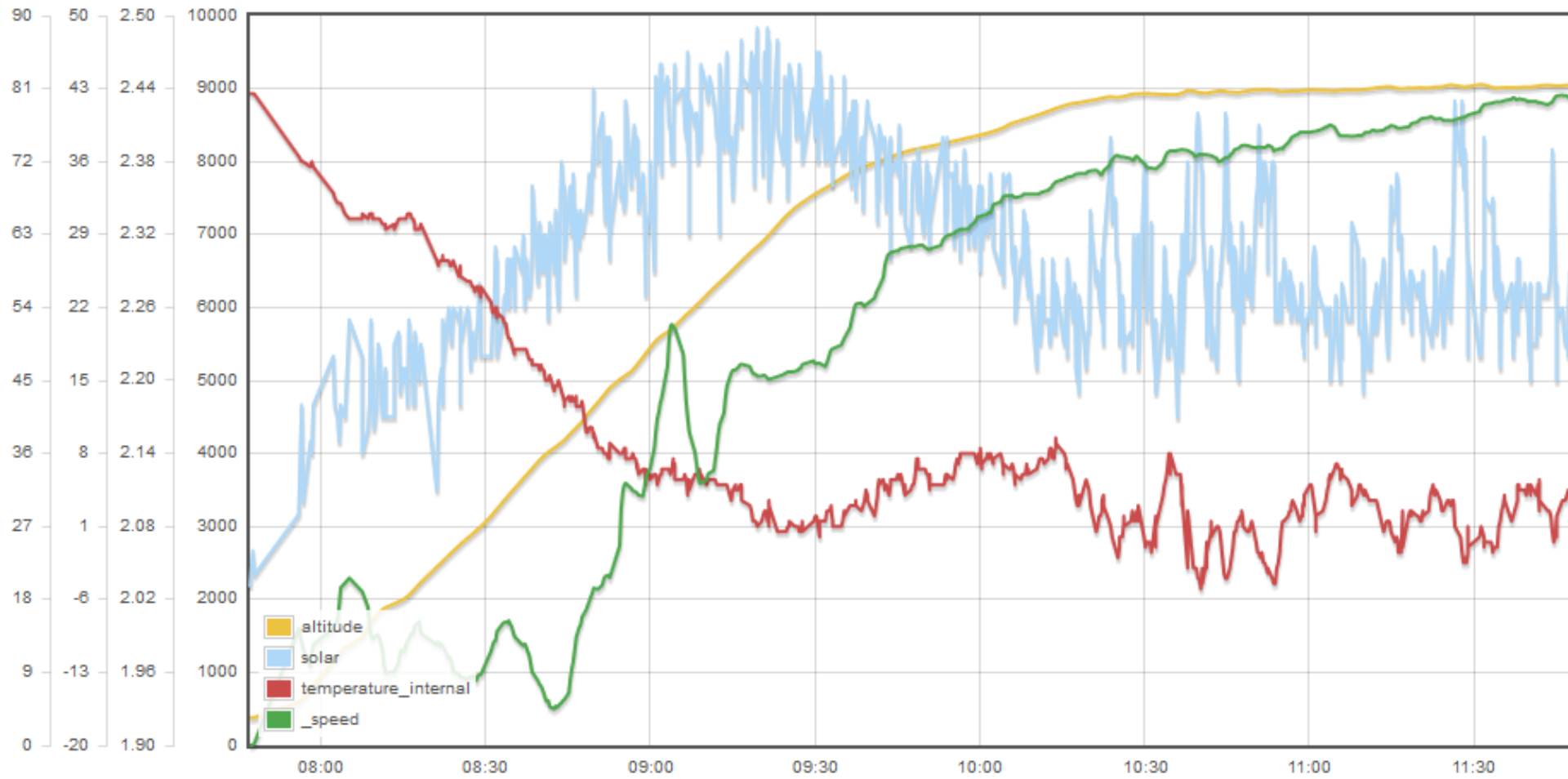
RAJ v1.0 HAB 2015

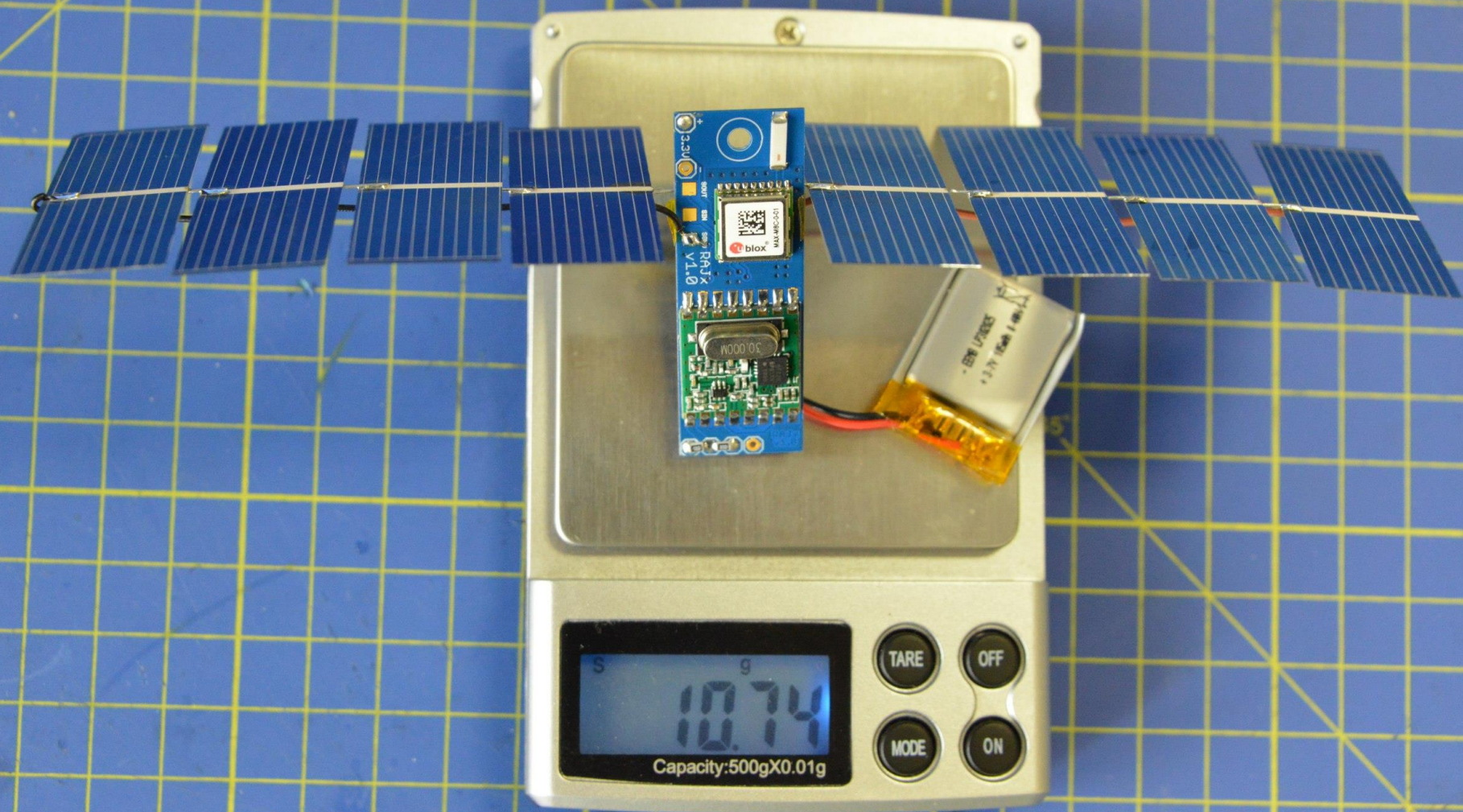
TITLE: raj-0		REV: b
Document Number:		
Date: 31.5.2015 10:59:59	Sheet: 1/1	

RAJ-1

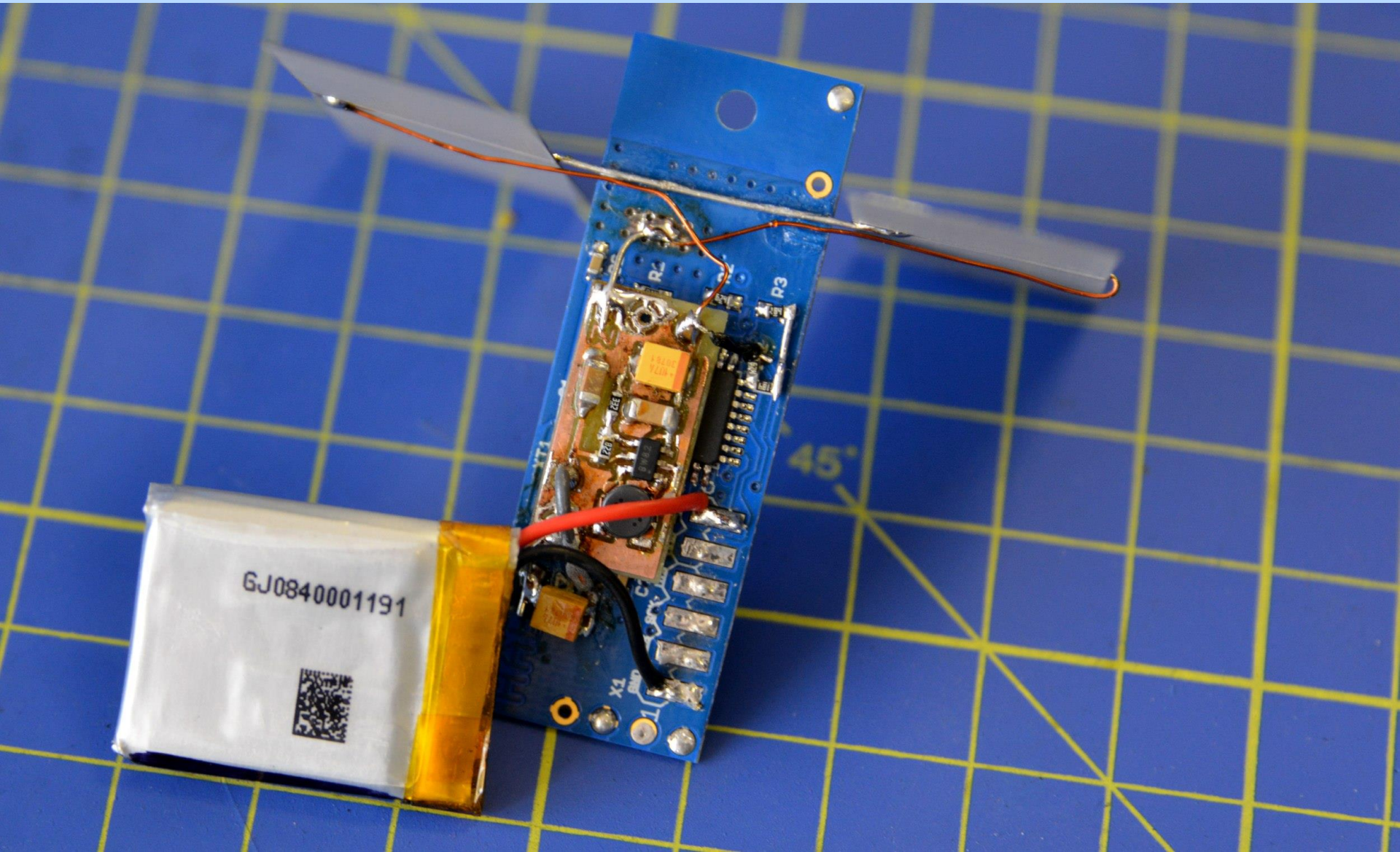


RAJ-3



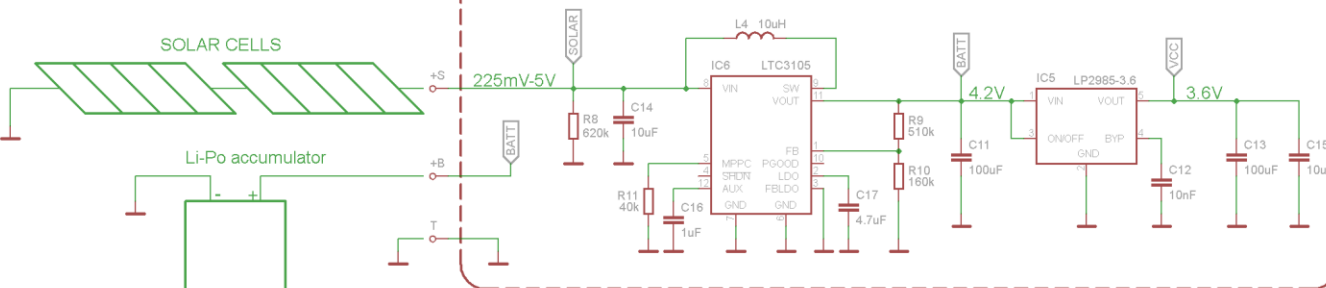




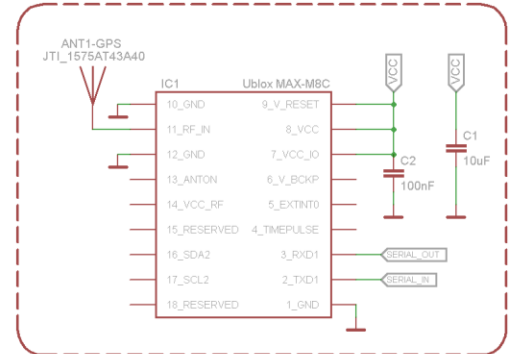


ultraPico High Altitude Balloon Tracker

POWER HARVEST&SUPPLY

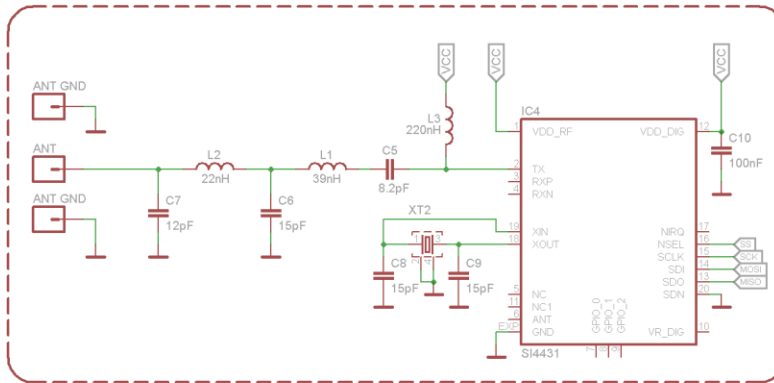
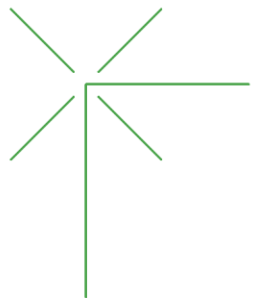


GPS module

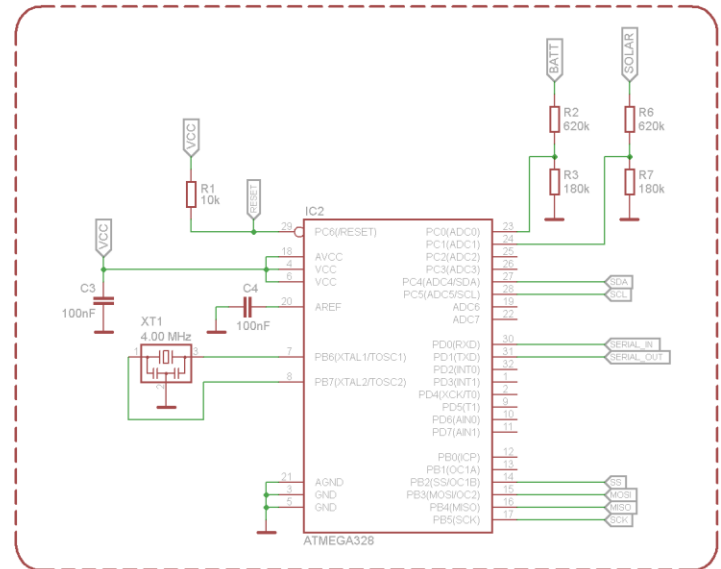


Radio unit

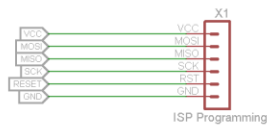
434.7 MHz ANT INV GP



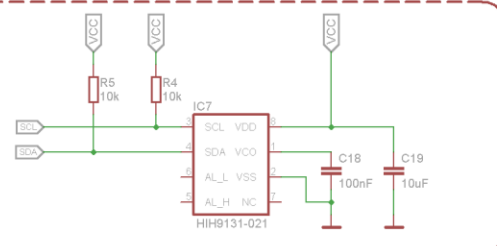
Microprocessor unit



Data input/output



External temperature and humidity meter



uRAJ-X v0.3

TITLE: urajx_v0.3

Document Number:

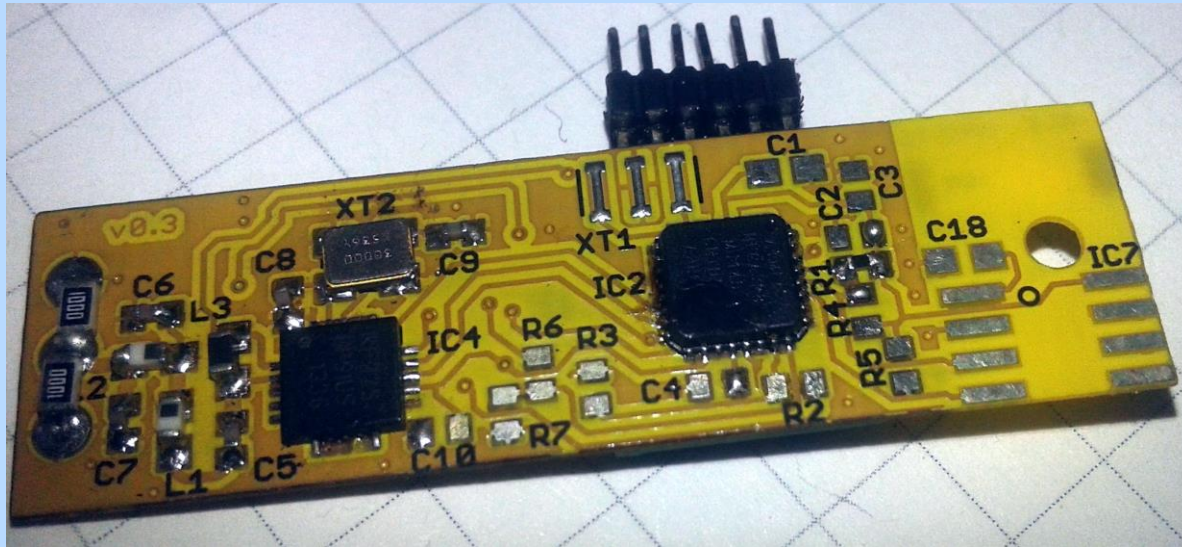
REV:

Date: 21.7.2015 23:34:51

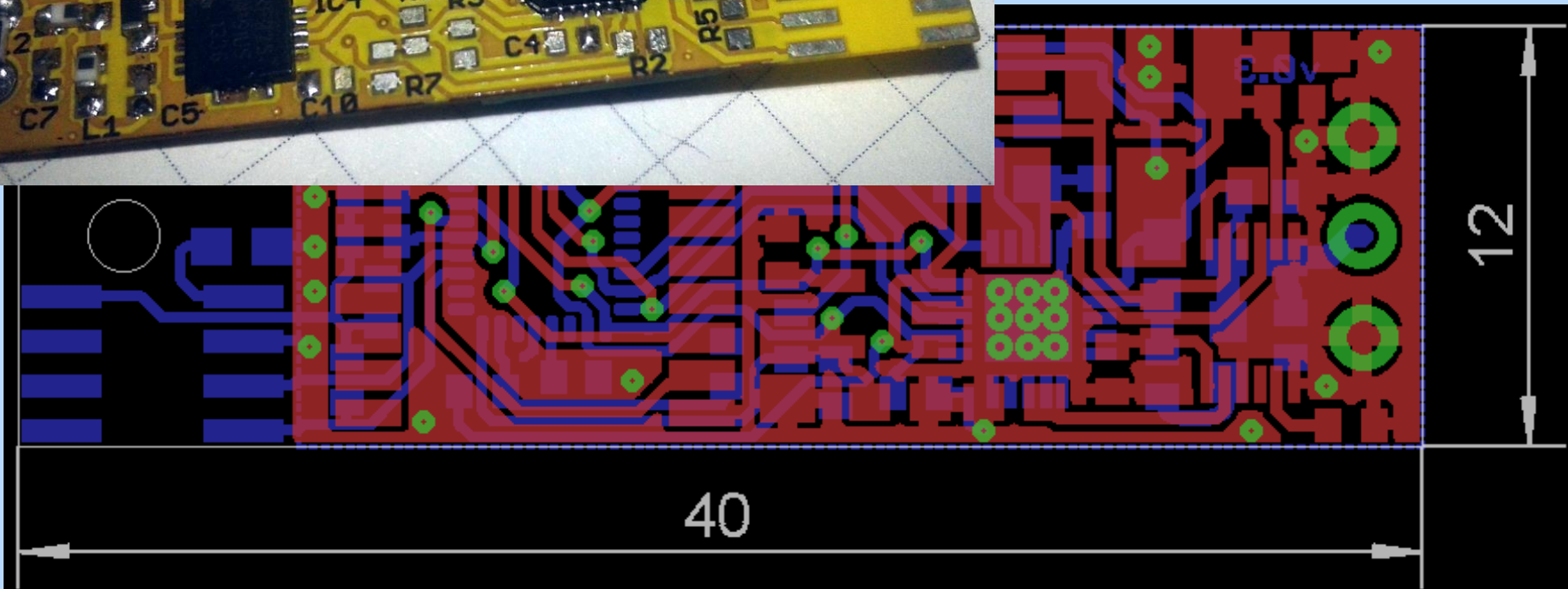
Sheet: 1/1

PCB v3 – 2nd generation

ISM band 433 MHz RTTY modulation

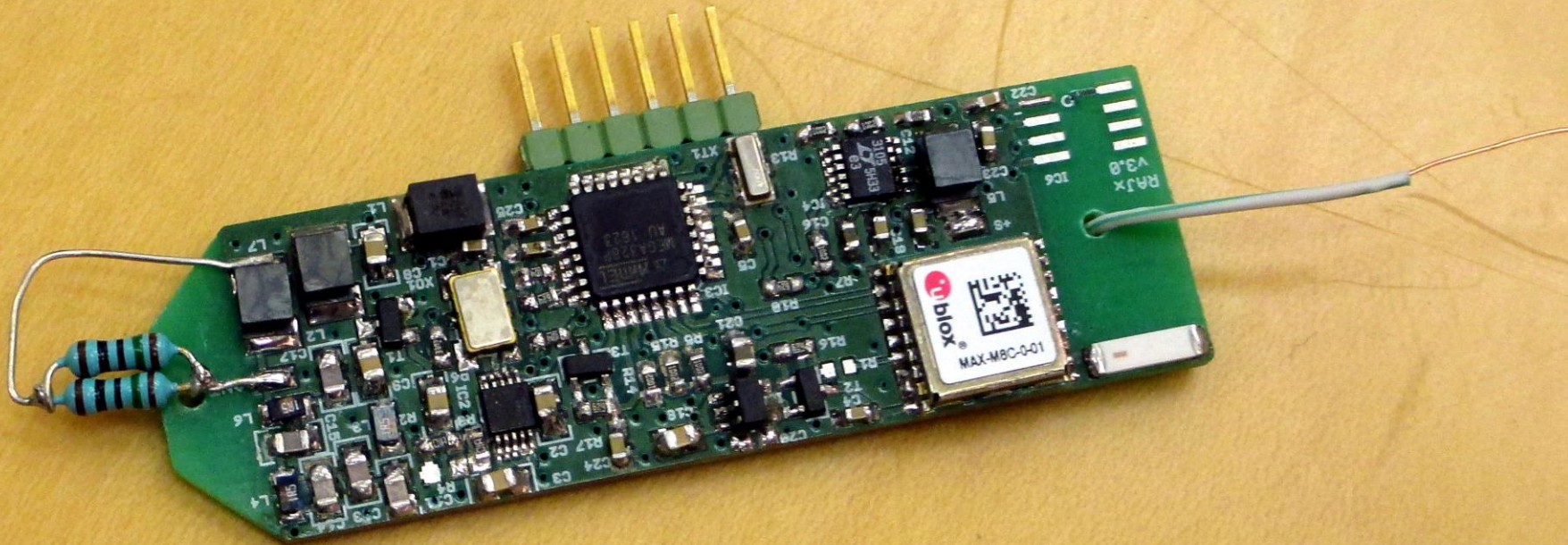
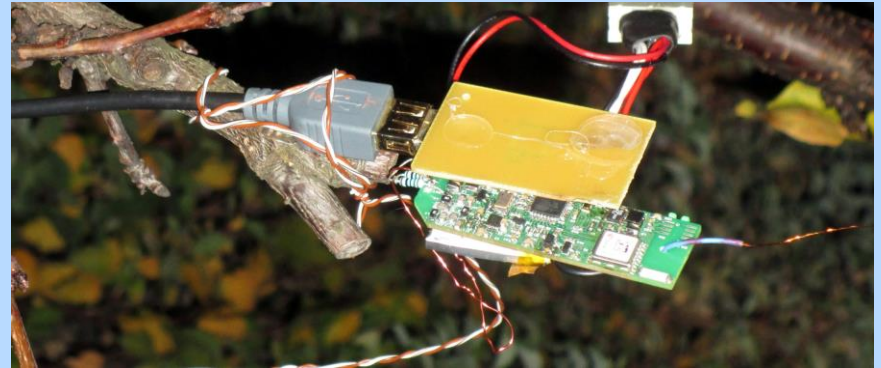


- Thickness 0.3 mm
- 4g payload
- Humidity $\pm 1\%$

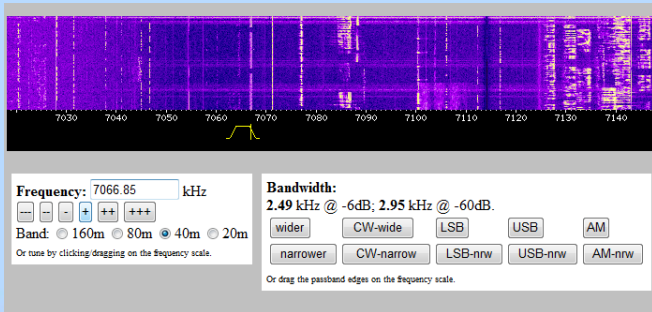


3rd generation

- HF band (14 MHz)
- PSK-31 modulation
- TCXO
- Solar powered



webSDR.org online site





UP!

