SPACEBRIDGE

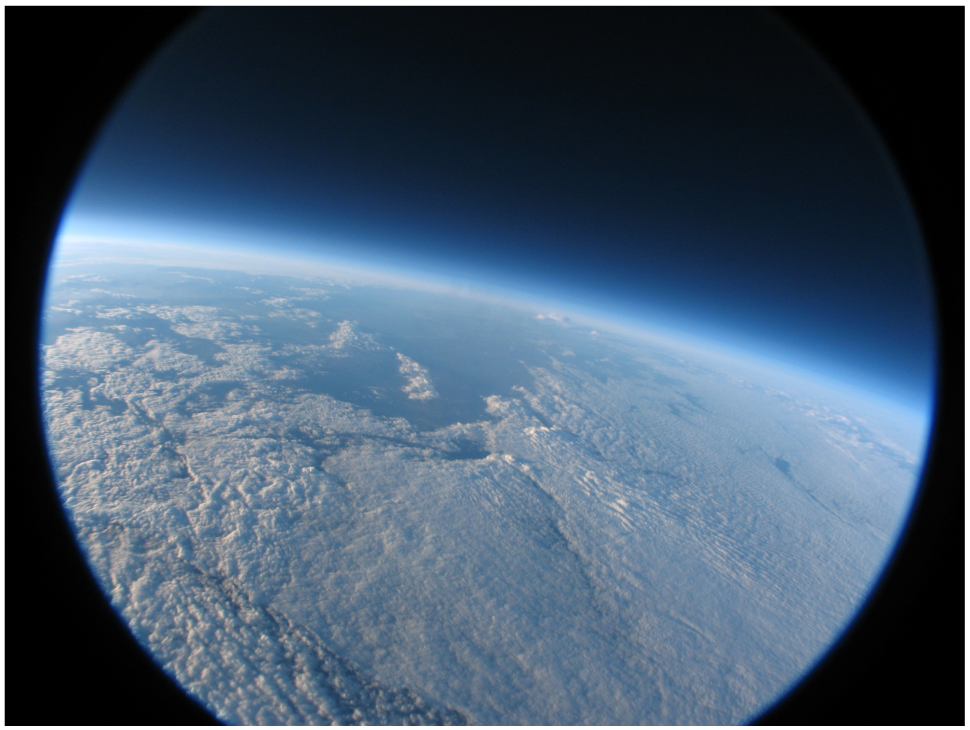
These are the voyages of the hackerspace Noisebridge, our ongoing mission to explore strange (yet economically priced) new ascent technologies; to seek out new parts and new partnerships; to boldly go where no non-government-or-massively-industrially-funded-group has gone before.

https://www.noisebridge.net/wiki/Spacebridge

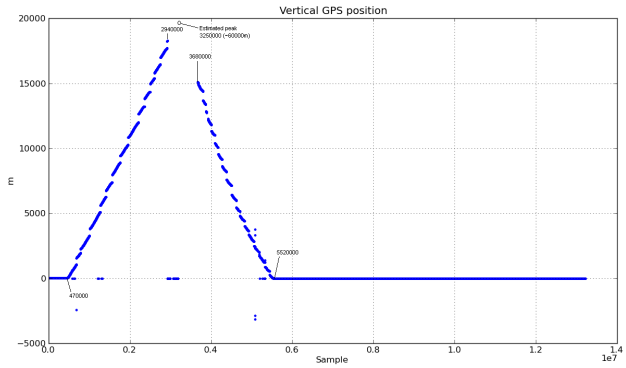
Alpha

The inaugural launch

Launch date:	7th February 2010
Outcome:	Success
Peak altitude:	~20km (66,000ft)
Payload:	Garmin GPS 18x LVC
	OpenTracker+
	Puxing PX-777 PLUS VHF Radio
	G1 Android smartphone
	Canon SD400 camera
	Canon A700 camera with fisheye lens adapter
Power:	9V Energizer lithium battery for OpenTracker+ and GPS
	All other components used internal Li-ion batteries
Bus:	Styrofoam cooler



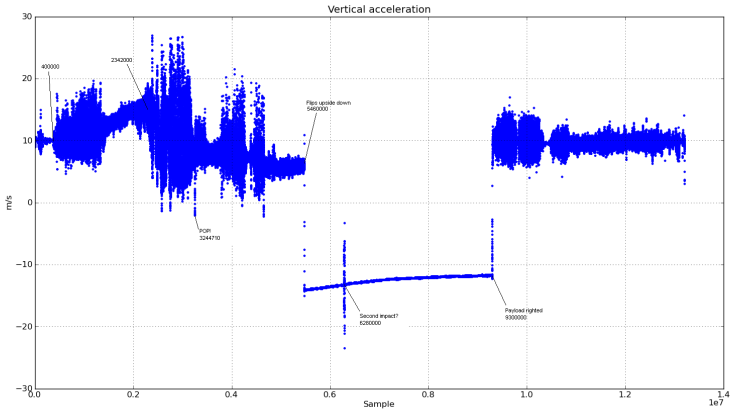
The following images show vertical acceleration (onboard sensor) and vertical position (via GPS) of the space vehicle (SV) as a function of sample. The Android sample rate varies but was generally around 80 samples per second. Sample numbers correspond from sensor to sensor.



The G1 only provides GPS data up to 60,000' so there is a large gap between samples 2940000 and 3680000 during which the balloon exceeded that altitude.

The strange discontinuous shape of the curves is an artifact of the GPS chipset, which does not cope well with high altitudes or large changes in altitude.

Descent began somewhere around sample 3250000 as estimated by curve-fitting the ascent and descent. Estimated maximum altitude is ~20,000m. Landing occurred at approximately sample 5520000.



Acceleration starts out at 10m/s due to gravity. Jerk begins at sample 400000 due to payload handling, lining up nicely with the launch at 470000 shown by GPS. The SV continued to ascend until sample 3244710, which appears to indicate a pop. After this sample, the acceleration trends less than 10m/s and slowing, indicating a controlled fall. At sample 5460000, the sensor becomes inverted, as the impact of landing flips the payload (or at least the phone). This corresponds closely with the GPS recorded SV landing at sample 5520000. There was a very large spike at 6280000 from unknown causes. Finally, the payload was righted at 9300000.

Spacebridge Alpha blog posts:

http://dichro.blogspot.com/2010/02/declaring-weeks-advance-notice-of.html

http://spaceballoonproject.blogspot.com/2010/02/noisebridge-successfully-launches-and.html

Photographs:

http://picasaweb.google.com/syncretin/SpacebridgeAlpha02

Beta

New bus, more cameras, more sensors

Launch date:	27th March 2010
Outcome:	Failure
Cause:	Insufficient helium
Payload:	Garmin GPS 18x LVC OpenTracker+ Puxing PX-777 PLUS VHF Radio G1 Android smartphone Package Tracker Canon A700 camera with fisheye lens adapter Canon SD1100 IS camera Casio EX-S600 camera Miniature digital camcorder
Power:	9V Energizer lithium battery for OpenTracker+ and GPS 4 AA batteries for Package Tracker All other components used internal Li-ion batteries
Bus:	Solid block of styrofoam with internal spaces carved to accommodate individual components; stabilizer struts and a large radio antenna

We discovered during our launch preparations that the helium tank was only half full. We never did find out why: perhaps there was a leak, or perhaps someone used some of the helium for something else, or perhaps we had the wrong tank. Although we cut the skirt from the balloon and removed everything from the payload except the G1, radio and a camera, we still didn't have enough lift to clear the nearby trees...

Spacebridge Beta blog posts:

http://dichro.blogspot.com/2010/03/10am-designated-meeting-time.html

http://spaceballoonproject.blogspot.com/2010/03/spacebridge-beta-launch-results.html

Gamma

New bus, upwards-facing camera

Launch date:	1st May 2010
Outcome:	Failure
Cause:	High winds
Payload:	Garmin GPS 18x LVC OpenTracker+ Puxing PX-777 PLUS VHF Radio G1 Android smartphone Canon A700 camera with fisheye lens adapter Canon SD1100 IS camera
Power:	9V Energizer lithium battery for OpenTracker+ and GPS All other components used internal Li-ion batteries
Bus:	Solid block of styrofoam with a single internal space for all components, cameras attached to faceplate; stabilizer struts and a large radio antenna

It was a very windy day and we under-filled the balloon: when it was released it smashed into a barbed-wire fence.

Spacebridge Gamma blog post:

http://spaceballoonproject.blogspot.com/2010/05/spacebridge-gamma-result.html

Delta

New launch procedure

Launch date:	5th June 2010
Outcome:	Success
Peak altitude:	~22km (72,000ft)
Payload:	Garmin GPS 18x LVC OpenTracker+ Puxing PX-777 PLUS VHF Radio G1 Android smartphone Canon A700 camera with fisheye lens adapter Canon SD1100 IS camera
Power:	9V Energizer lithium battery for OpenTracker+ and GPS All other components used internal Li-ion batteries
Bus:	Solid block of styrofoam with a single internal space for all components, cameras attached to faceplate; stabilizer struts and a large radio antenna

As expected, most of the photos from the upwards-facing camera were of uninteresting blue sky. However, we did get valuable EXIF data, which was the purpose of the experiment (as well as some more nice photos from the horizontal camera).

Spacebridge Delta blog post:

http://spaceballoonproject.blogspot.com/2010/06/spacebridge-delta-success.html

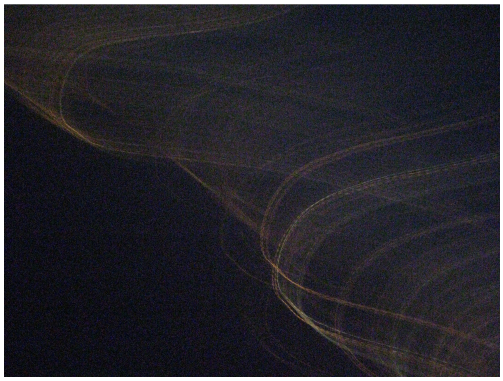
Photographs:

http://www.flickr.com/photos/25405306@N05/sets/72157624240127078

http://www.flickr.com/photos/schjlatah/sets/72157624104984989

Epsilon

Night launch



Launch date:	26th June 2010
Outcome:	Success
Peak altitude:	~28km (93,000ft)
Payload:	Garmin GPS 18x LVC OpenTracker+ Puxing PX-777 PLUS VHF Radio G1 Android smartphone Canon A700 camera with fisheye lens adapter Canon SD1100 IS camera
Power:	9V Energizer lithium battery for OpenTracker+ and GPS All other components used internal Li-ion batteries
Bus:	Solid block of styrofoam with a single internal space for all components, cameras attached to faceplate; stabilizer struts and a large radio antenna

The cameras both automatically set their ISO level to 1600 and the exposure to 1 second. All the photos are grainy streaks of light, if they aren't completely black. Night balloon photography is tricky. But, as with Gamma, we got the EXIF data. Far more exciting was the recovery: see the blog for tales of mountain climbing and desert rescues...

Spacebridge Epsilon blog post:

http://spaceballoonproject.blogspot.com/2010/07/spacebridge-epsilon-night-launch.html

Photographs:

http://www.flickr.com/photos/schjlatah/sets/72157624410744292