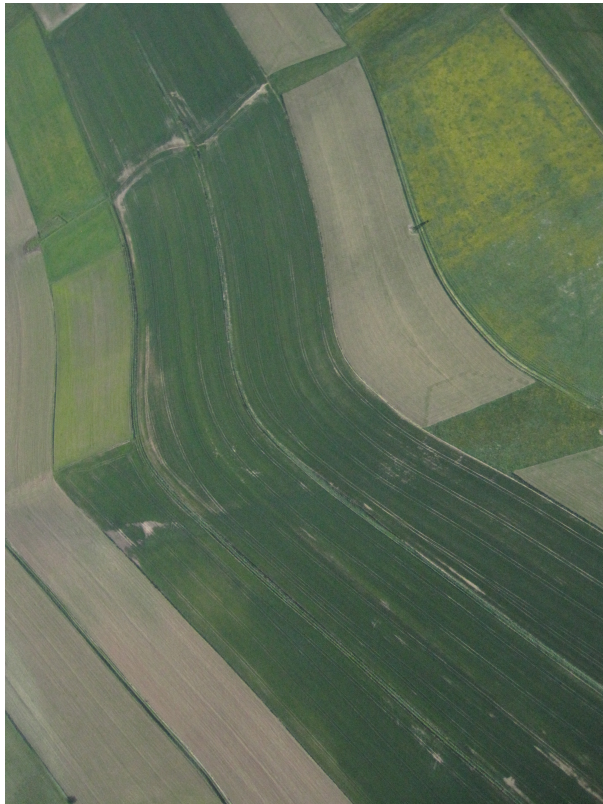


Amateur Aerial Surveying



Jul 16, 2011

State of the Map EU

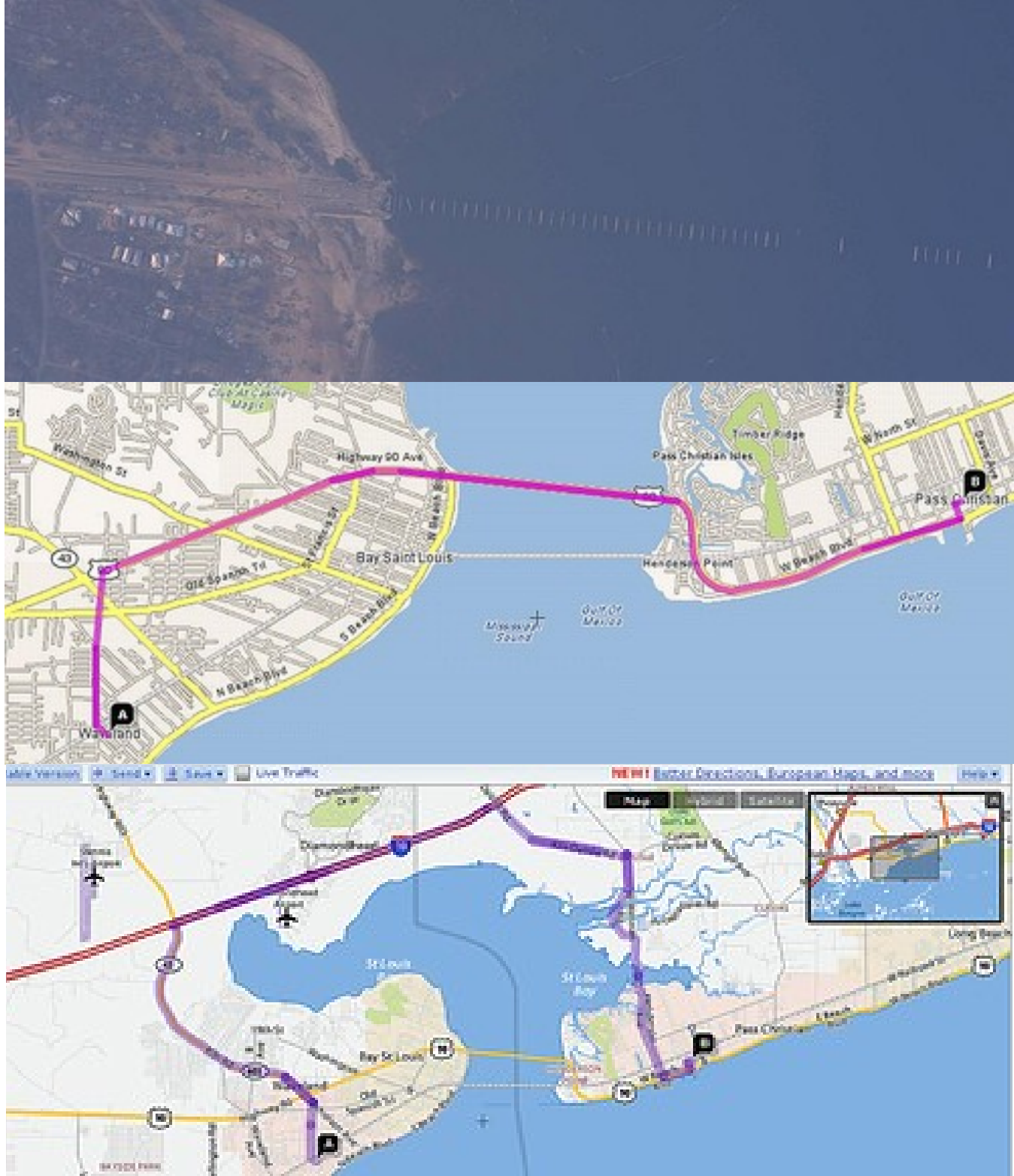
Andrzej Zaborowski @ Intel

Overhead imagery is useful

- adding coastlines with GPS?
- reference for OSM
- pretty background for the map
- non-OSM uses, automatic processing

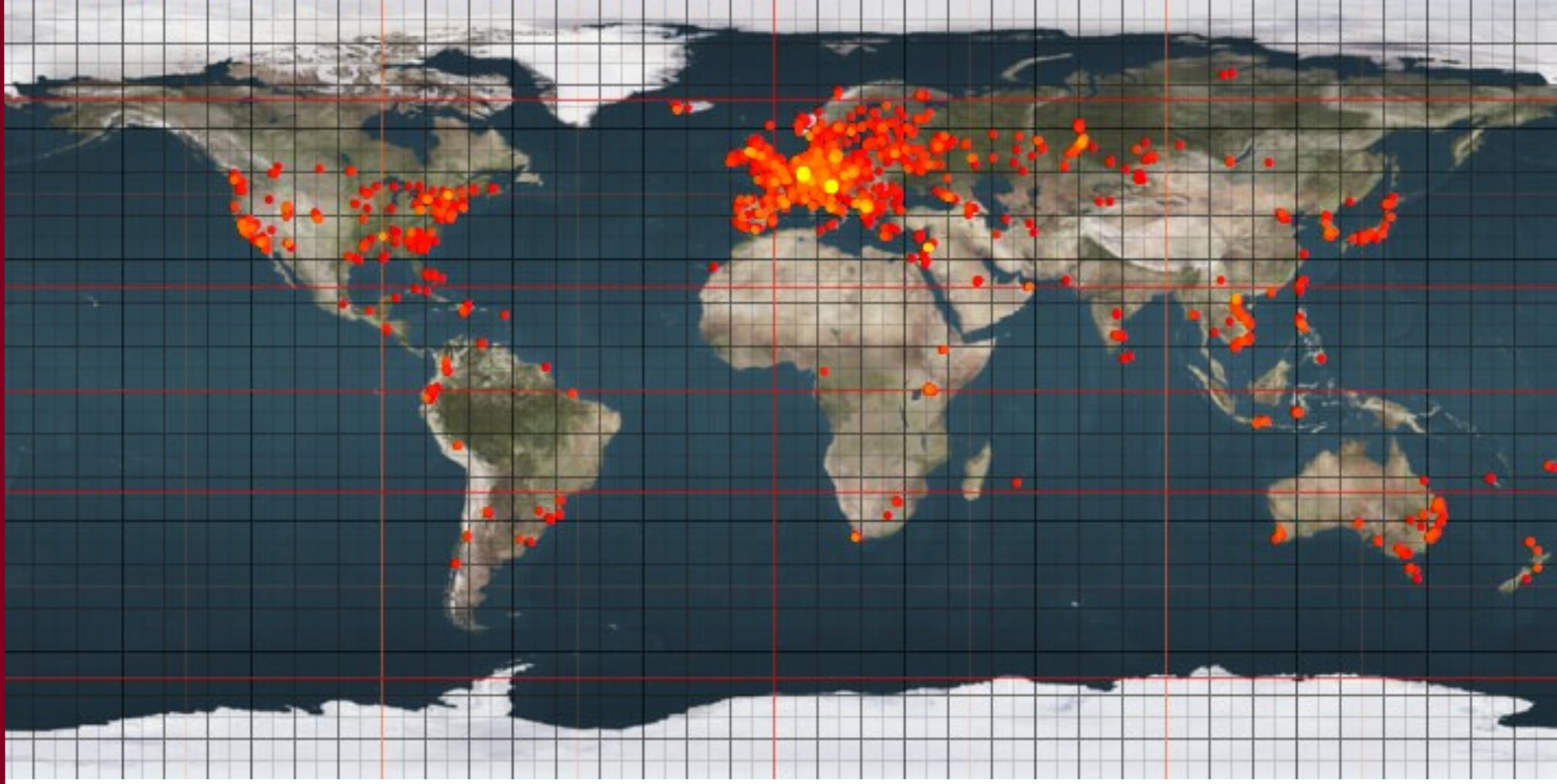
- poor availability outside select areas, expensive
- usually out of date
- outside of US non-free – not free enough for OAM anyway, Ms, Y!: custom license, Space Chapter NC
- Ms: \$20/km², very long term
- satellite imagery strictly controlled, lower resolution, no oblique images

Imagery is useful



Would be cool to crowdsrc

Open Street Map Live View in Realtime



- always current when needed
- not directly business-decided coverage
- free to upload to a single global repository like OAM (soon to be)
- community building
- available ahead of a disaster

What methods are there?

- Traditional: manned airships, Now: unmanned
- kites
- drones: RC copters, planes
- balloons, blimps
- many more: slingshot cameras, water rockets, nanosats, small sats



There are more methods



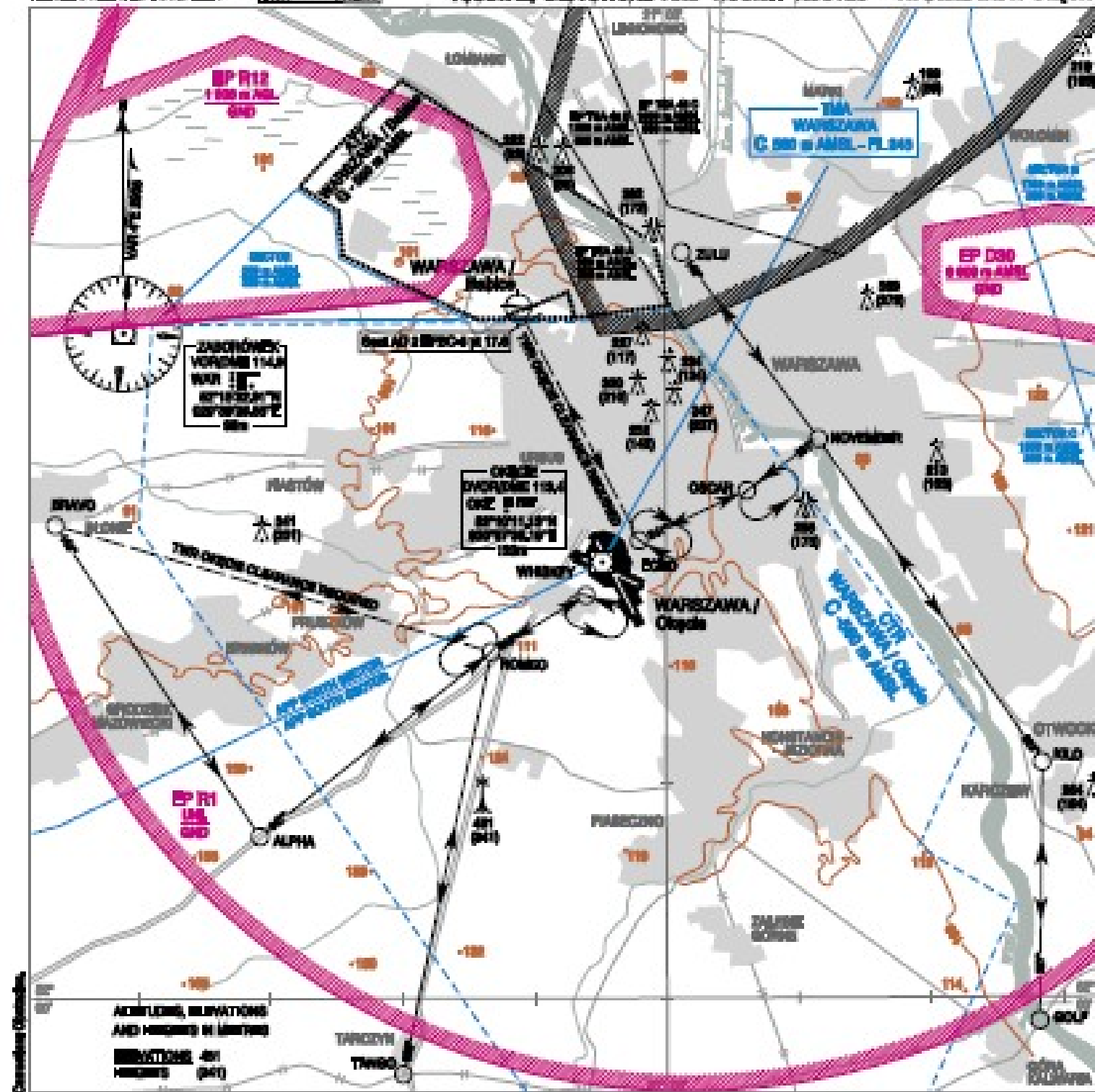
75g, 1903!

- costs: < \$300 a basic kit
- altitudes: avg 400-500m, in good conditions 800-900m, record 8+km (FL250+)
- no horizontal control
- takes about 1h to set up, fly and pack
- “kit” can be as little as 1kg, easily fits in a backpack
- weather conditions some 1-2 days in a week (bp figure) avg for Poland

Kites, how to start

- wiki.grassrootsmapping.org!
- kites and line in EU: kapshop.nl or local makers
- ALWAYS WEAR GLOVES
- know local airspace law, not completely uniform across EU



WARSZAWA / Olsztyn

Kites, problems

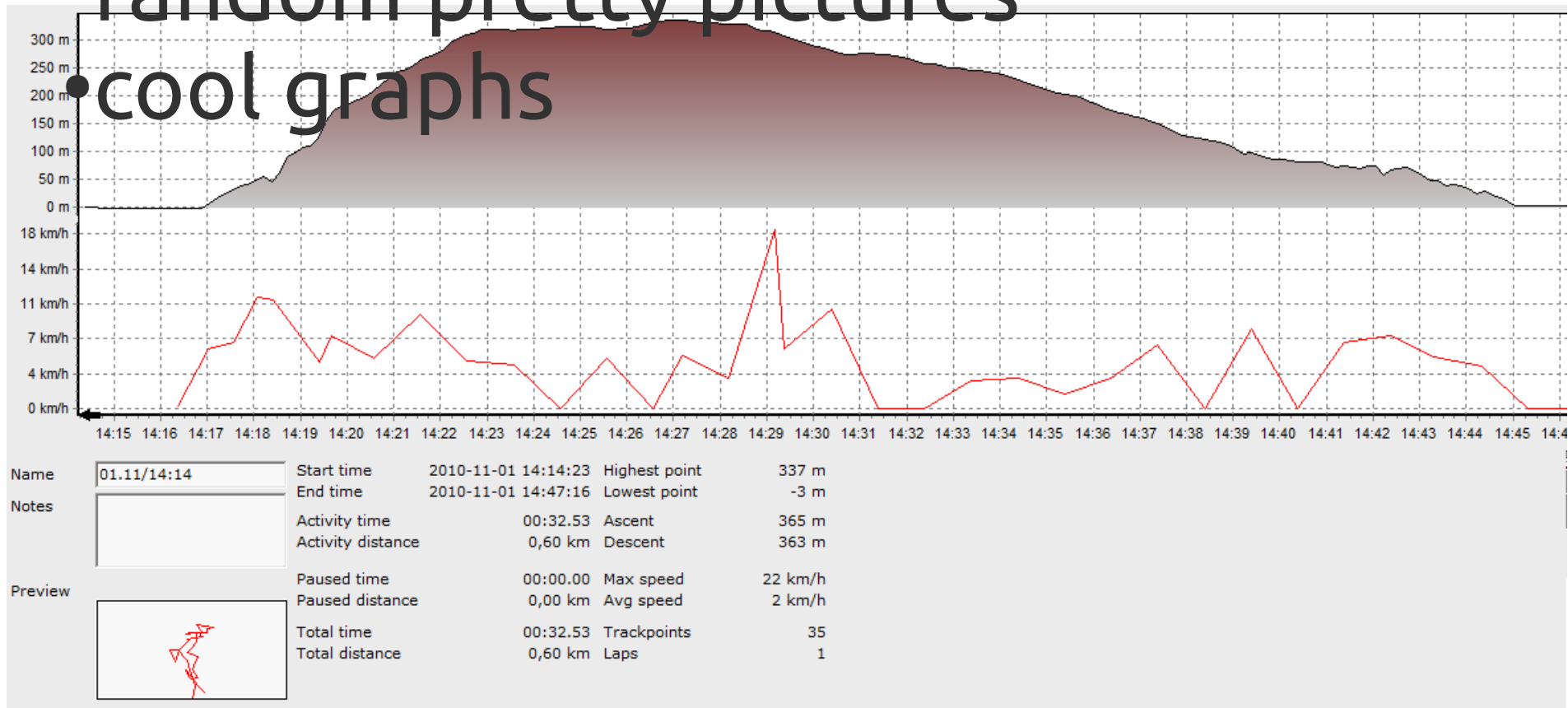
- legal
- technical
- screw-ups



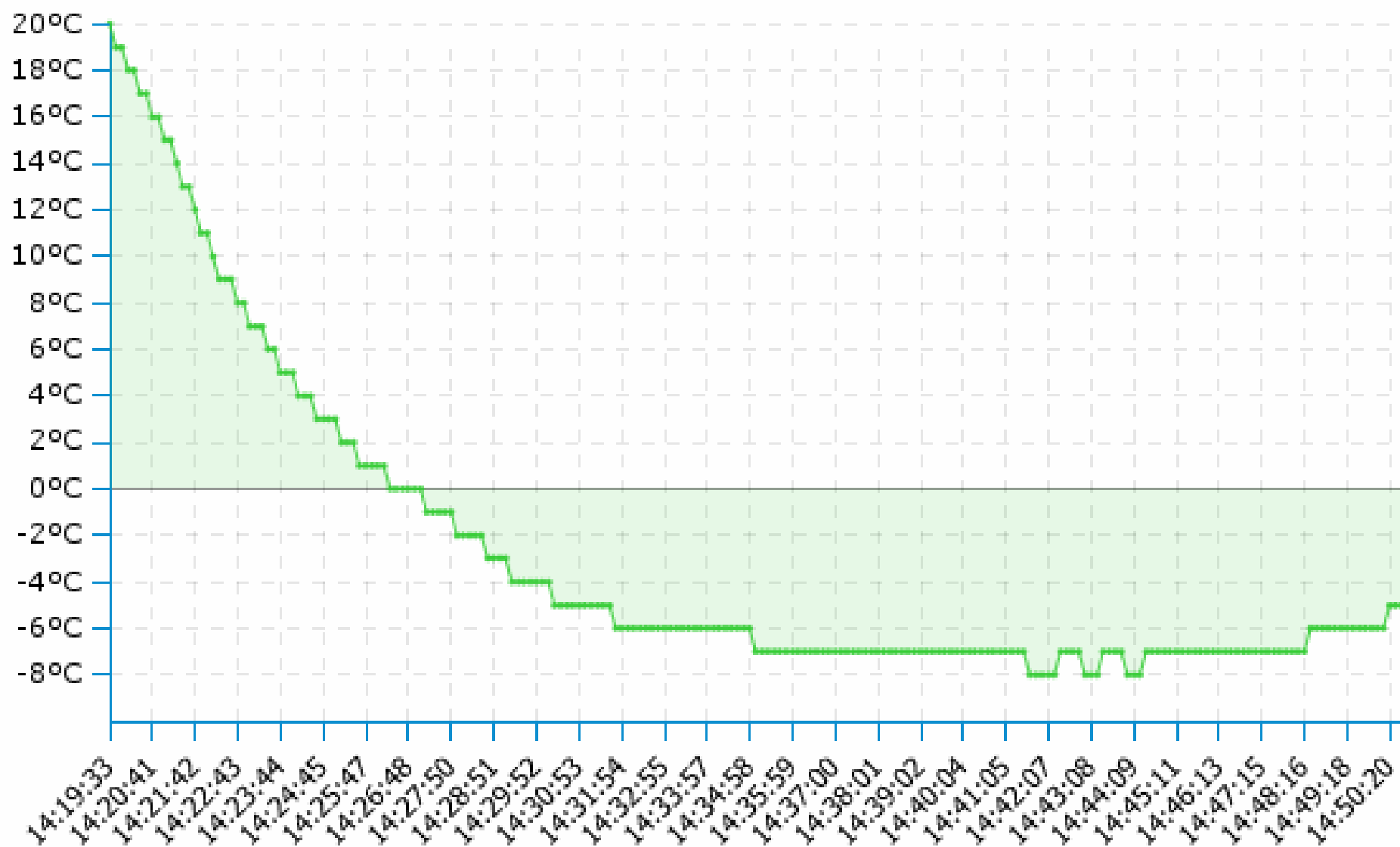
- lots of talk
- cost per km² handwaving
 - area covered: avg 5km² max 15km² at Yahoo/Bing resolution or better, ignoring the tilt
 - 1-2 people necessary
 - 45-60min
- what are the results
- sustainable? IMO yes, or close to be

Some 50 locations

- kites are fun!
- spur people's interests
 - mapping with the scouts
 - a good time to give out leaflets
- random pretty pictures
- cool graphs



Camera sensor temperature

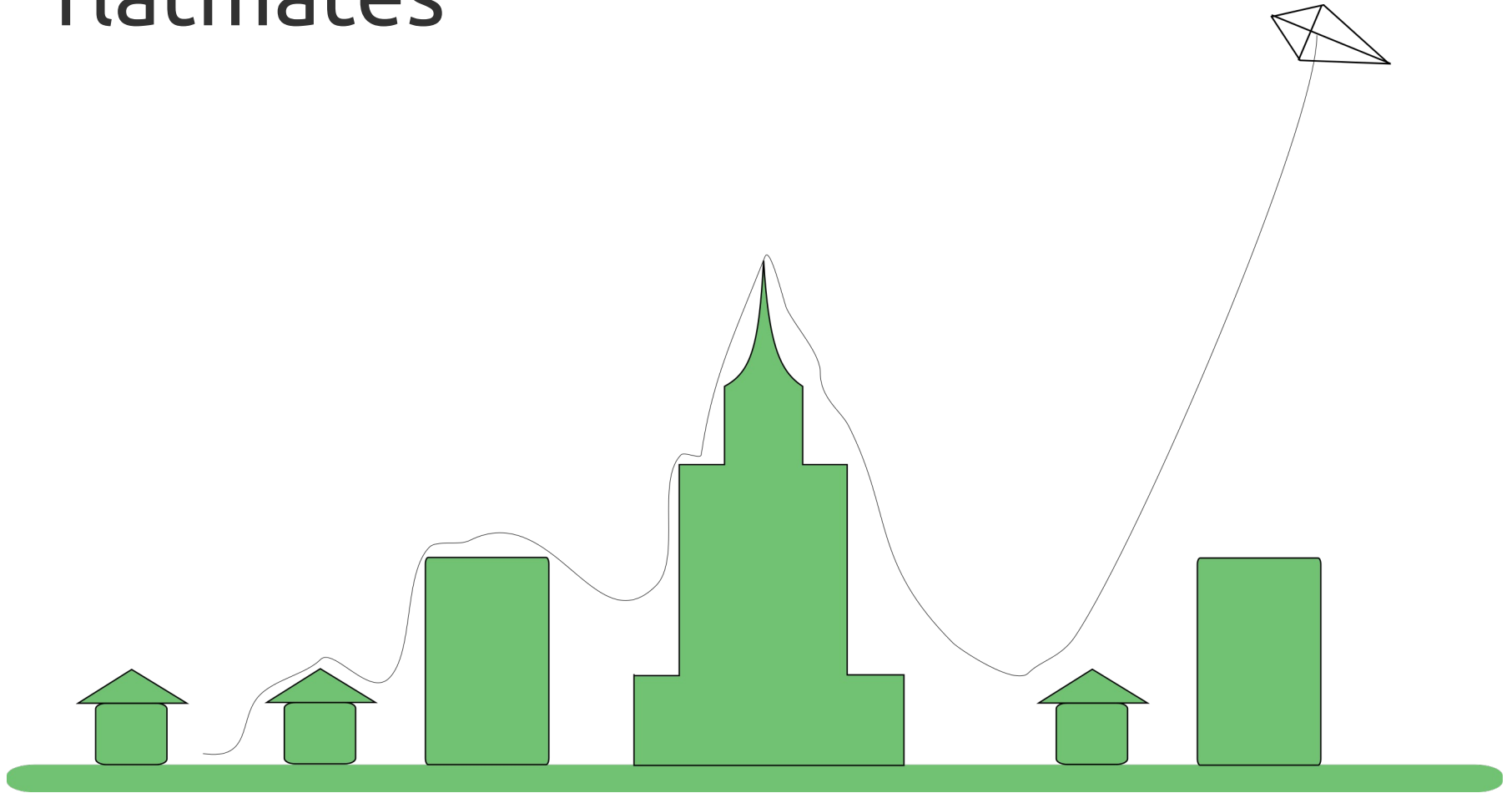






- GrassrootsMapping & Public Laboratory
 - IR images, NRG & NDVI (sp?)
 - social impact
 - documentation
 - use Google Maps imagery as reference for most things :-)

- Multicopters, planes, nano satellites, drag kites, water rockets and more.
- Hydrogen & CNT: problem with flatmates



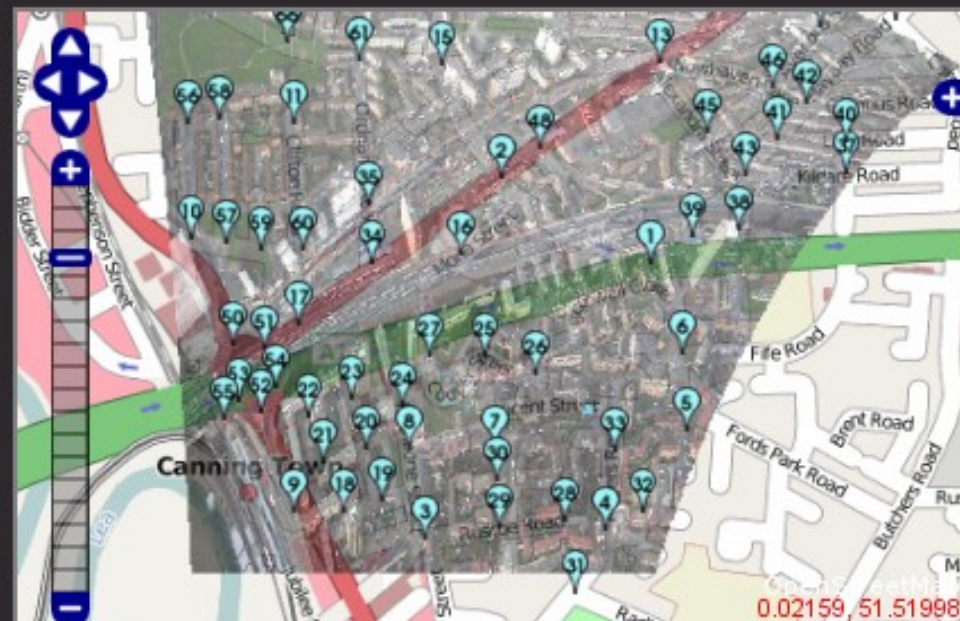
- Currently quite hard using open source
- “brute force” method: a lot of GCPs
- correct projective mapping with GCPs:
 - Cartagen Knitter:
maps.cartagen.org, try it!
 - GrassGIS
 - ILWIS
 - Since recently: qGIS
- Intelligent:
 - Hugin: wiki.openstreetmap.org/wiki/User:Balrog/Aerial_Imagery/Rectification
 - pix4d.com and friends



Canning Town | warp it

"Canning Town" by elbisreverri on flickr CC-BY-NC-SA <http://flickr.com/photos/elbisreverri/445202836/>
73 gcps. Added about 1 month ago

WMS Original Download Warped Metadata



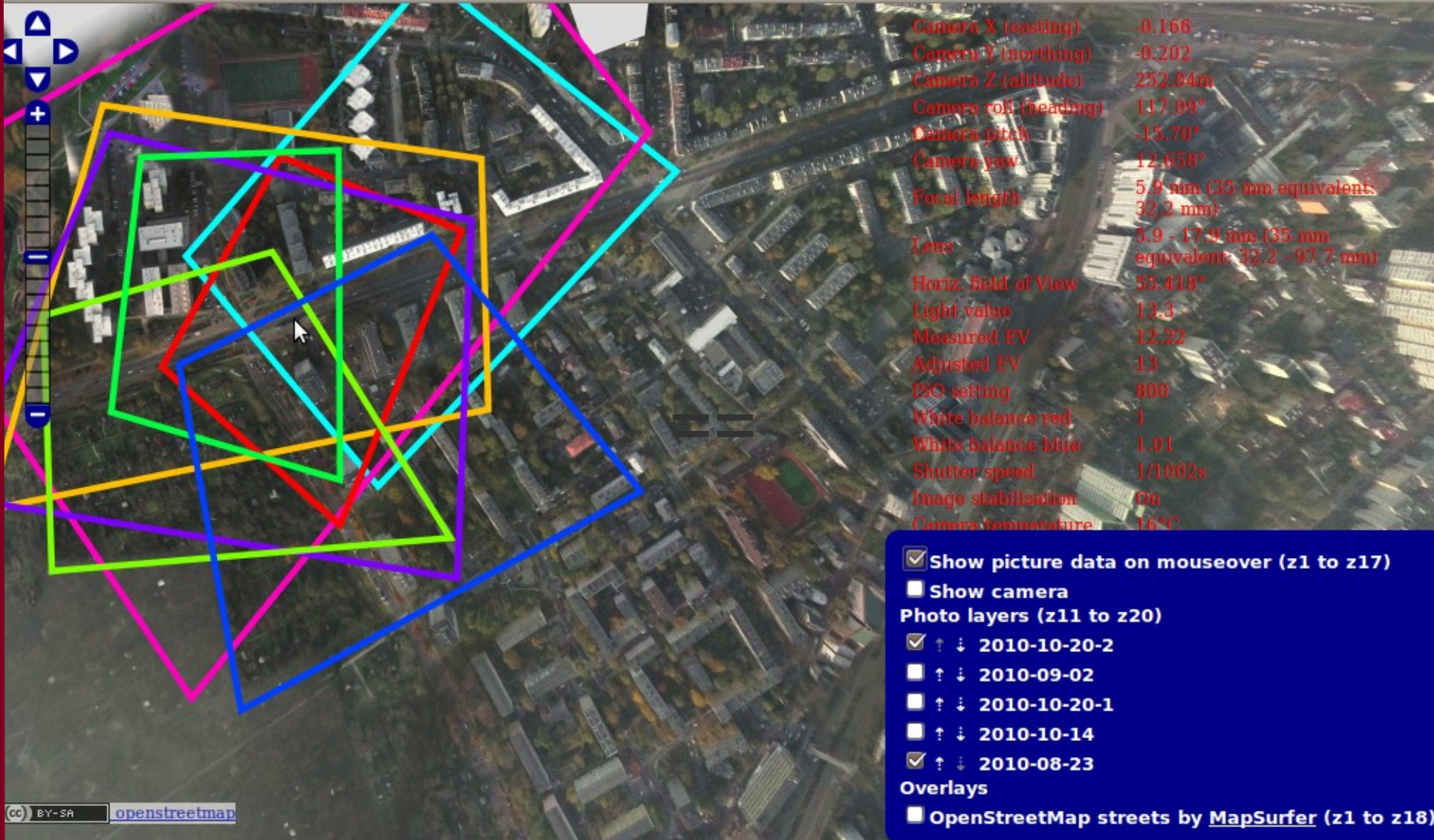
Double-Click on the scanned map, and the reference map, then click **Add Control Point**. Do this for at least 3 points.

Ground Control Points

1	788	256	0.016597509	51.51700282	Delete
2	520	224	0.013443231	51.51814446	Delete
3	535	719	0.011855363	51.51343082	Delete
4	925	606	0.015653371	51.51356436	Delete
5	974	426	0.017327070	51.51484630	Delete
6	895	338	0.017219781	51.51586114	Delete

- <http://ooc.openstreetmap.pl/kap-warsaw.xhtml>

Processing results so far



The image shows an aerial view of a city area, likely Warsaw, with several overlapping colored polygons (red, green, blue, yellow, magenta, cyan) representing different processing results or camera fields of view. A mouse cursor is visible over one of the polygons. The interface includes a navigation control on the left and a data overlay on the right.

Camera data:

- Camera X (easting) -0.166
- Camera Y (northing) -0.202
- Camera Z (altitude) 252.04m
- Camera roll (heading) 117.09°
- Camera pitch -15.70°
- Camera yaw 12.658°
- Focal length 5.9 mm (35 mm equivalent: 32.2 mm)
- Lens 5.9 - 17.9 mm (35 mm equivalent: 32.2 - 97.7 mm)
- Horiz. field of View 55.418°
- Light value 13.3
- Measured EV 12.22
- Adjusted EV 13
- ISO setting 800
- White balance red 1
- White balance blue 1.01
- Shutter speed 1/1002s
- Image stabilisation On
- Camera temperature 16°C

Photo layers (z11 to z20):

- ☒ 2010-10-20-2
- ☐ 2010-09-02
- ☐ 2010-10-20-1
- ☐ 2010-10-14
- ☒ 2010-08-23

Overlays:

- ☐ OpenStreetMap streets by MapSurfer (z1 to z18)

Navigation controls:

- Directional arrows (up, down, left, right)
- Zoom in (+) and zoom out (-) buttons
- Reset button (circular arrow)

OpenStreetMap logo: CC BY-SA openstreetmap

- SLAM: Simultaneous Location and Mapping
- 3D models extraction: Ms Bundler and the University of Washington work, go to Vladimir Elistratov's talk later today (16:20?), also pix4d.com
- Crowdsourced word-wide point cloud??

- Crowdsourced word-wide point cloud
 - “competition” isn't there yet
 - automatically gives us:
orthoimagery, bird eye, street view, trailview, streetside view, whatever view, OpenDEM and more
 - openspace routing or aid in OSM-based routing
 - building outlines can be automatically extracted, input to OSM

Thank you

