

Chapter 10

Conclusions and future work

10.1 Ongoing uses of Grassroots Mapping tools

10.1.1 Activist mapping with Coal River Mountain Watch

A variety of new projects have been initiated both with and without my prompting or intervention, in order to apply Grassroots Mapping tools towards different goals. One which I had the pleasure of collaborating on directly was a mapmaking pilot project with the Coal River Mountain Watch (CRMW) community, an activist and advocacy organization based in Rock Creek, West Virginia. CRMW works to educate and disseminate information about mountaintop removal mining (MTR) practices in Appalachia, in which companies such as Massey Energy remove entire mountaintops to access coal seams, depositing the ‘waste’ rock in nearby valleys. What results is extreme environmental degradation and a variety of health hazards from water table contamination, landslides, and particulate air pollution. CRMW was interested in using balloons, kites, and remote controlled airplanes.



Figure 10.1: A balloon photograph of a mountaintop removal mining site at Cherry Pond Mountain, West Virginia, captured from over 4000 ft above ground level.

In collaboration with Stewart Long of GonzoEarth, I joined photographer Chris Eichler in attending the Mountain Justice conference at Wiley’s Last Resort, in Kentucky. There and subsequently in Marsh Fork, West Virginia, we created a series of maps of mining-related sites. Our first depicts the bright green of a reclamation site, where a mining company has attempted to replant a former MTR site. Rob Goodwin of CRMW and other activists who performed the mapping pointed out that the green color is due to a thin layer of invasive weed which is sprayed over reclamation sites from airplanes. The coverage is thin and

there is little or no topsoil over what is essentially a pile of broken-up rock. Aerial imagery shows the contrast between this kind of so-called replanting and the natural forest surrounding the site. It also depicts several contaminated ponds and highlights the tendency of mining companies to plant bushes and shrubs mainly along roadways.

At the Marsh Fork Elementary school near CRMW headquarters, we launched a balloon to over 4000 feet above ground level, breaking all our previous records for altitude, and captured photos of a runoff pond and an active mining site above the school. By using an electric power drill to reel in the tether, we reduced deployment time, though in that case we ran out of battery for the drill and were forced to revert to hand-reeling. The potential to do power-assisted reeling makes such high-altitude flights more reasonable in a limited time frame, allowing for shorter intervals between flights. With enough power to run a drill, over 1000 feet can be reeled in every 2 minutes.

An additional advantage to balloon imagery is that it can be captured inconspicuously from public roads upwind of target sites. These tools provide groups such as CRMW access to time-sensitive information about the progressive degradation of the environment, and CRMW hopes to use the data in court cases to prevent mining operations.

10.1.2 A Grassroots Mapping collaboration in Georgia

In early 2010, Jeff Haack of JumpStart International, the nonprofit group which implemented the Free Map Palestine project with Mikel Maron in 2008-9, expressed interest in applying Grassroots Mapping tools and ideas to a nation-wide mapping project in the country of Georgia. With educational projects in 9 cities across the country, this was to be the first large-scale explicitly educational application of the Grassroots Mapping concept. In Georgia, JumpStart had focused on creating a locally-operated nonprofit called OpenMapsCaucasus ([OMC](#)) to direct mapping efforts. Beginning in June 2010 and lasting 6 weeks, the collaborative program consisted of a series of workshops and trainings with [OMC](#)-affiliated educators and activists using balloons and kites.

The creation of [OMC](#), a fully Georgian organization, reflects JumpStart's interest in building long-term technical expertise and interest in open-source, civil society centered projects in Georgia. Haack elaborated on this aspect of the project in a comment on Mikel Maron's blog in the spring of 2010:

The NGO structure JumpStart has built in Georgia is, in my opinion, an apt and sustainable way forward. After our experience in Palestine it became clear that impact requires a lasting effort in a community and the encouragement of local skills and ownership. Its not merely about mapping a country, but about understanding where that, conceptually, meets societal needs, and building value therein. Sustainability for [OMC](#) comes by understanding the convergence of digital technologies with community mapping, social fabric, governance, and civil society, and filling a need within that sphere. Were not expecting [OMC](#)'s community mapping focus to last forever, but that concept, at the very heart of it is meaningful and sustainable, because accessing the tools for extracting and considering not oil or timber, but information, strengthens a society and can make it more prone to long term development.

<http://brainoff.com/weblog/2010/04/28/1556>

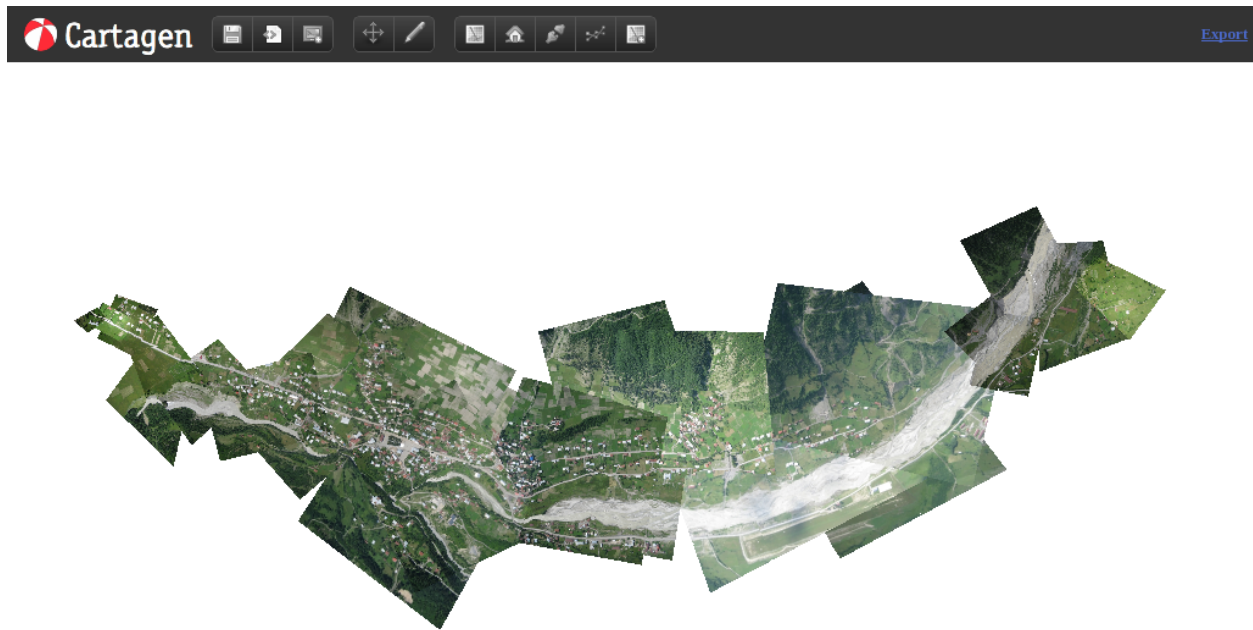


Figure 10.2: A map of Mestia, in the Svaneti region of Georgia. The map spans 5.5 kilometers, and was captured in just 3 days of balloon and kite mapping with local OpenMapsCaucasus staff and participating students.

The trip also afforded me an opportunity to push the techniques to their limits. With a small but dedicated team of mappers in Mestia, in the far northern region of Svaneti, we set out to create the largest and most complete map of an entire city to date. Our end result, captured over three days of kite and balloon flights, and reaching altitudes of over 1.4 kilometers, covered most of the city of Mestia, and spanned over 5.5 kilometers in length. Using the new [TMS](#) export feature of the Cartagen Knitter, this dataset will allow [OMC](#) mappers to trace buildings, pastures, roads, and other features in [JOSM](#) faster and more efficiently than ever before.

10.2 Outreach

There has been a great deal of interest from both technology enthusiasts (kite, RC airplane, and geo-programmers alike) and organizations working in local communities to implement Grassroots Mapping tools and techniques. Part of the ongoing development of this community will be the brokering of relationships between these two communities, and the matchmaking of those with technical know-how with those in need of geospatial information and training. The Grassroots Mapping mailing list incorporates representatives of both of these groups, and as such will continue to be the central organization point for such collaborations. I plan to organize meetup sessions in key areas to bring these communities together in a hands-on, workshop setting, where personal connections and professional relationships can evolve.

10.3 Illustrated Guides

Originally suggested in early 2010 by Grassroots Mapping community member Pat Coyle, the idea of an illustrated guide to provide a rich and cross-language instruction set has received some attention in the intervening months. Storyboarding, outlining, and initial sketches were begun in the spring of 2010 by Pat Coyle and Nathan Cooke of MIT's D-Lab, based on requests by other mailing list members for a simple guide which spelled out how to produce balloon maps step by step. Published in May 2010, the 4-page guide (reprinted in Appendix C) developed for the Louisiana Bucket Brigade was a quick attempt to provide such instructions, but was primarily intended to serve as an organizational guide and checklist, with tips and reminders, rather than a complete start-to-finish guide.

Ultimately I published a more complete 5-page illustrated guide (reprinted in Appendix B) for the Georgian mapping project of July 2010, rendered in black and white for easy photocopying. A translation in Georgian was produced by OMC and distributed amongst interested mappers across the country. This guide attempts to capture and simply convey many of the small details which make the balloon mapping techniques successful, such as tips for a more stable camera mounting using rubber bands, and instructions on how to make inexpensive balloons from trash bags. While there is no replacement for face-to-face instruction, I hope that the guides will be a compact and clear means to convey Grassroots Mapping techniques to a wider audience, and more translations are planned, including Spanish and Arabic.

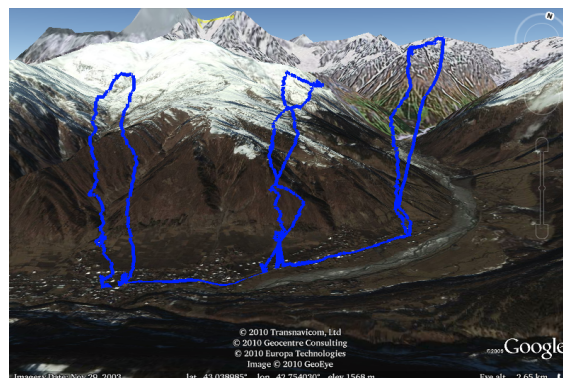


Figure 10.3: Flight paths of several balloon mapping flights in Mestia, Georgia, during a 3-day project to map the entire city. The pictured flights reached 1.4 kilometers above ground level.

10.4 Conclusions

The large number of continuing efforts and high interest in further mapping work of this kind in places such as the Philippines, Belize, Sumatra, Palestine, Nigeria, and elsewhere indicate that the central mission of the project has resonated with a wide audience. However, the work thus far represents only the groundwork for a broader effort to promote a more inclusive cartography. Future work may include the development of semi-automated techniques for stitching imagery, the development of yet less expensive means to lift cameras, perhaps employing solar heating, and further refinement of the instructional materials which accompany the Grassroots Mapping Kit. Other directions include the generation of digital elevations models from balloon imagery, and expanding sensory equipment to far-infrared, air quality, and other sensors.

It is my hope that such new directions, along with the continued publication of new and exciting map imagery from Grassroots Mappers around the world will inspire individuals and communities

to challenge existing forms of cartography. Such explorations will not only advance the the abilities of would-be cartographers, but promote the belief that maps and mapmaking can effect positive change in the world.