A View from Above
Balloon Mapping Bourj Al Shamali
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Leveraging the context of various international organizations and the complex politics of the region, mapping the refugee camps is a politically sensitive task. However, mapping the refugee settlement in Bourj Al Shamali is crucial for understanding the actual extent of environmental damage. To achieve this, we launched a mapping initiative and decided to use balloon mapping as a Do-It-Yourself (DIY) aerial photography tool. We aimed to democratize inexpensive and accessible DIY techniques to address environmental issues that affect people. At the same time, we tried to promote participatory mapping as a means of transformative political action.

For this initiative, we needed a map of the camp to discuss potential locations and visualize water sources. But it turns out that it is difficult to find a map of Bourj Al Shamali, even though it has been in existence for over 60 years (UNRWA, 2017). With the complexities of the region, the maps that do exist are withheld by international organizations that justify their discretion in the name of security. This lack of cartographic information stands in stark juxtaposition to the ever-present outlines of historical Palestine that are memorialized on walls and surfaces of Bourj Al Shamali and many other Palestinian refugee camps in Lebanon.

Therefore, in 2015 we decided to launch an initiative in cooperation with the local camp committee's leader, Mr. Mahmoud Al Joumaa, in order to map the refugee settlement ourselves. The budget was small, and we wanted and needed to have the whole community on board since this would be the first map produced for the camp. Key local committee members informed the community, the various factions within the camp, and the Lebanese army about the planned balloon flights. Our choice of tool would also prove to be crucial.

Balloon mapping was developed by Public Lab, an open network of community organizers, educators, technologists, and researchers that was founded in 2010 as an open-source, grassroots data-gathering and research initiative. Their aim is to democratize inexpensive and accessible DIY techniques in order to address environmental issues that affect people. At the same time, they try to promote participatory mapping as a means of transformative political action.

In Bourj Al Shamali, this low-tech approach proved key to solving the problem. At first, there was disappointment from the local committee and key team members at just how low-tech the equipment was: a 1.5-meter wide reusable latex/chloroprene balloon, a 300-meter long line, swivel clips for attaching the balloon and the camera, rubber bands for making a camera cradle, and a camera. However, this soon contributed to making our work with the community non-threatening and approachable, when compared to using drones. The simplicity of the process also allowed many people to participate. The digital camera needs to be one that can be set on an automated mode taking images every few seconds. It can be a smartphone or a basic point-and-shoot device set to continuous mode. It is placed in a plastic bottle for protection and secured to the balloon string. The process of launching the balloon is also simple. You tie it all up, you let the helium-filled balloon rise up in the air, and after a flight of 10-20 minutes you bring the balloon down again. For best quality images it is advisable to choose a bright day. It is also important to be on the lookout for obstacles, such as houses, power lines, and trees. The altitude of the balloons has an effect on the scale of the map as well as the resolutions of the images. In Bourj Al Shamali we took images at various altitudes in order to ensure high-quality images of rooftops but also good overviews of the camp.

When problems arose, many were able to chip in and help, as for example when a camp carpenter built us a box to protect the camera or when the high school physics teacher offered us ideas about...
how to stabilize our camera in the high winds which the balloon regularly encountered. Once our balloon was shot with a pellet gun by some idle youths and the local tire shop tried to patch the holes. We were also continually invited onto rooftops and into people’s homes to help us accomplish our work.

After waiting in the tire shop for a balloon replacement, someone suggested that we contact a photographer in the camp who was planning to start using drones to photograph weddings. Like anywhere else, drones have now become accessible and affordable in Lebanon and can more easily accomplish the same tasks as balloons. But as any military operator of drones can tell you, drones offer power while rendering the operator invulnerable; whereas it was precisely the vulnerability of the balloon that necessarily generated conversations around the camp and, with time, won us supporters. The history of drones is that of an eye turned into a weapon (Chamayou, 2015); our red balloon high above the camp was different. It was less threatening and more poetic, with the string tying us to it, acting as some kind of umbilical cord that required us to be present in the spaces we were mapping (if you closely look at the images we produced, you can see us in many of them). Our red balloon was visible from everywhere in the camp, and people often mentioned to us from where they had seen it. This visibility was a way of winning trust.

But mapping with the balloon was not an easy task. There were many false starts, and at times we wondered if we were going to succeed. Mahmoud Al Jomma’s wise reflections on our doubts were reassuring: For him, irrespective of what final result we obtained, the balloon had gotten people thinking and talking about mapping and spatial awareness, and this process was already a result. For the youth from Bourj Al Shamali who worked on the project, there was great appeal in knowing that they were bypassing governmental and corporate control over geo-spatial information. In a society where young people encounter so many obstacles in their efforts to contribute to their community, they were happy to be helping with producing something useful for the community and to be given space to solve problems by themselves through experimenting. They were also very excited to be changing the community’s as well as their own perceptions of being helpless and ineffectual and to see themselves not as beneficiaries of an innovation but as partners and co-creators of the solutions to their problems.

Endnotes
1. For more information on the use of the map of Israel / Palestine as a celebrated symbol by both Israelis and Palestinians see Wallach (2011).
2. The report by UNOCHA, Humanitarianism in the Network Age, includes thought-provoking questions on the possible security implications of satellite imagery produced in Sudan.
3. For a discussion of these approaches see the World Bank report, “Interactive Community Mapping: Between Empowerment and Effectiveness” from 2014.

References
UNRWA. Burj Shemali Camp. unrwa.org/where-we-work/lebanon/burj-shemali-camp, 13 January 2018.
UNRWA. Where We Work. unrwa.org/where-we-work/Lebanon, 14 January 2018.

Illustrations
Guide by Grassroots Mapping with Balloons and Kites (publiclab.org), licensed under a Creative Commons Attribution ShareAlike 3.0 License (CC BY-SA 3.0).
Do you want to make maps? Do you need satellite images but can't afford them? Do you want to see your home from above?

Follow these instructions and you can, for as little as $100!

Choose and prepare your camera

Any digital camera around 2-500 grams that has a 'continuous mode' can work. You can also use a Canon camera with the CHDK to trigger a photo every 5 seconds.

In 'Continuous Mode' a camera takes a picture every 1 second if the trigger is held down. Your display will show how many pictures you can take on your card.

Build a camera capsule

This simple protective cover stops your lens from hitting the ground, and protects your camera from hitting walls and trees.

Balloons or kites?

Decide whether to use a balloon or kite based on local wind conditions. While kites are cheaper, they're harder to fly, and you may have to prepare for both:

Balloons in <10mph wind; kites in more than that. Look at flags to decide.
Set up your camera to auto-trigger

Set your camera on continuous mode. Wad up a bit of card paper or use a pencil eraser to hold down the camera trigger. Use a rubber band to hold it in place and apply pressure. Be sure the button is being pressed - you may have to double the band up.

Move the rubber band to one side until you're ready to start.

You can add a second loop or a rubber band and hook it on the bottom of the bottle to hold the camera firmly against the top.

Even better, put the cap on over the string when the camera is snugly in place, trapping the string.

Bounce the camera on a mattress and be sure it doesn't scrape the ground or fall out.

Prepare and fill your balloon

1.5 meter wide weather balloons work best, but if you can't get one, you can make one from plastic. You can use several giant trash bags, but they won't stay inflated for more than an hour - mylar or PET plastic is far more airtight.

Where available, mylar sleeping bags can be taped shut and will stay filled for several days, unlike weather balloons. Two of these are enough to lift a typical camera.

Test your valve first by letting some helium out with nothing attached. Then put your balloon on and slowly inflate it.

Someone should be in charge of not letting the balloon touch trees, bushes, or the ground.

Flying your balloon or kite

The highest wind is usually around 2pm, and the lowest is at dawn. Bring water and sunscreen if it's hot out, and charge your camera batteries the night before.

Let balloons rise as fast as you can. The wind will push them down as soon as you stop letting them rise.

When using kites, be sure there is at least 5kg of pull, and let out 20 meters of string before making a loop and attaching the camera.

When selecting a place to fly from, you'll have to be upwind of the site you want to map.

Generally, if you fly 1000 meters high, your pictures will show around 1000 meters on the ground.

Once the balloon is 560-1500 meters high, try walking around to take pictures of a greater area.

A small map usually takes around 2 hours to make.

Bring a GPS if you have one, and write down the latitude and longitude, or record a track.

Even a drawing of your site, or a photo of an existing map is helpful.

Wind the string carefully - don't let it tangle!

If it's bad enough you'll have to throw it out.

A second person just to wind the string can be very helpful.

Always wear heavy gloves to prevent string burns!

Don't fly near power lines or in thunderstorms.