# A View from Above

## Balloon Mapping Bourj Al Shamali

Claudia Martinez Mansell, Mustapha Dakhloul, Firas Ismail

bourjalshamali.org

Lebanon currently houses 53 percent of a total of approximately 450,000 registered Palestinian refugees (UNRWA, 2016). Bourj Al Shamali is located three kilometers east of Tyre in the south of Lebanon; approximately 22,000 registered refugees live here. From the original 7,000 refugees who fled or were expelled from their homes in 1948, the majority of the population in the camp is currently formed by second and third-generation refugees. Like the other official refugee camps in Lebanon, Bourj Al Shamali suffers from serious problems: no proper infrastructure, overcrowding, unemployment and poverty. To add a further level of complexity, large numbers of Palestinian refugees from Syria have now moved into the camp. The arrival of these twice-over refugees has resulted in a deterioration of the already overcrowded living conditions.

The ancestors of Bourj Al Shamali's population lived in Tiberias and Safad in historic Palestine, now Israel, where they led an agricultural existence that has now been completely lost by camp residents, who have increasingly grown detached from the land (Martinez Mansell, 2016). With this in mind, Al Houla Association, one of the local NGOs working in the camp and the base for the local camp committee that is working to improve conditions in the camp, started exploring the possibility of launching an urban agriculture pilot project and the creation of a green space in the camp. Having worked at various times in the camp over the past decade and a half, I (Claudia Martinez Mansell) became involved in this project.

For this initiative, a map of the camp was needed to discuss potential locations and to visualize potential 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 complex politics of the region, the maps that do exist are withheld by international organizations that justify their discretion in the name of security and do not share them with the camp inhabitants or with the local camp committee. On online maps only the main street is marked, and on Google Earth the very low-resolution images of the area do not allow you to see the space clearly and to identify the narrow streets and buildings. On one Lebanese paper map of Beirut, for example, the refugee camps appear as grey blobs, providing no details about the interior of these spaces (Ghubril, 2010). 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.[1]

Therefore, in 2015 we decided to launch an initiative in cooperation with the local camp committee's leader, Mr. Mahmoud Al Joumma, 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 by and for the camp's refugee community. This turned out to be no simple task. Mapping refugee camps is politically sensitive, and refugee populations are understandably wary concerning the security implications and possible uses of such maps.[2] Aerial photography and mapping processes are permanently associated with military surveillance, having been used for everything from geographic exploration to secret spy missions. Looking for options, we learned about balloon mapping and decided to use this Do-It-Yourself (DIY) aerial photography tool that could allow us to take aerial images from the camp and use them to produce a map.

To dispel local concerns at Bourj Al Shamali, it was therefore crucial for us to work under the supervision of the local committee. 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 a DIY citizenship as a means of transformative political action (Ratto & Boler, 2014). Their tools are an example of the increasing use of new and creative ways to share data on environmental decisions (The Economist, 2008). Balloon mapping was first developed and tested by citizen activists on the Gulf Coast of the USA after the Deepwater Horizon oil spill of 2010. It was a reaction to concerns that the government and BP were not adequately informing citizens about the actual extent of environmental damage. Compared to other mapping platforms that have a more humanitarian focus, such as Humanitarian OpenStreetMap or Ground Truth and Map Kibera (see article page 228), Public Lab's tools take a lower technology, community-oriented approach.[3]

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, reusable Velcro for closing the balloon, some carabineers to attach things together, 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


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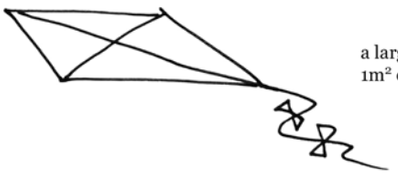
### Illustrations

*An Illustrated Guide to*

# *Grassroots Mapping with Balloons and Kites*

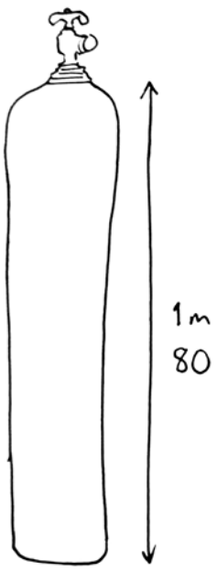
*To learn more, visit http://grassrootsmapping.org*



a large kite - 1m² or more

*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!*

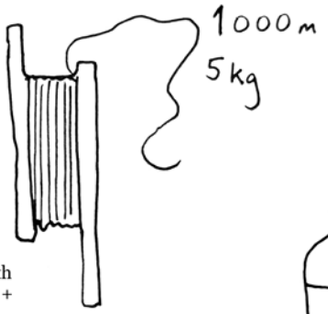


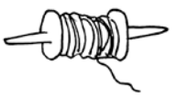

80 cubic feet or 1.5 cu. meters of helium

One 2 meter-wide weather balloon

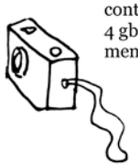
or 2 mylar sleeping bags

1000m 5kg nylon string for balloons



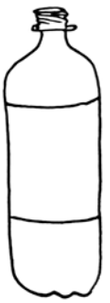
30kg+ strength nylon string for kites



~200g

digital camera with continuous mode + 4 gb or larger memory

heavy work gloves



2L plastic soda bottle

scissors

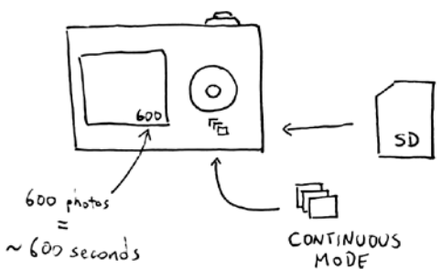
rubber bands

duct tape, gaffe tape is best



## Choose and prepare your camera

Any digital camera around 2-300 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.

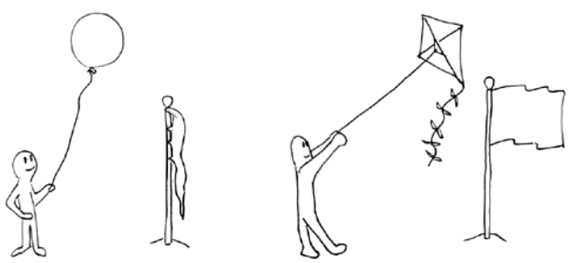



To fly longer, you may need a newer battery, a larger memory card, or you can set your camera to a lower resolution. A 4 GB card fills up in about 35 minutes.

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.

## Balloons or kites?

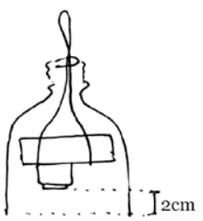
Decide whether to use a balloon or kite based on local wind conditions. While kites are cheaper, they're harder to fly, and you may have to prepare for both:



Balloons in <10kph wind; kites in more than that. Look at flags to decide.

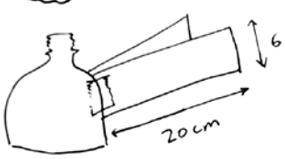
## Build a camera capsule

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

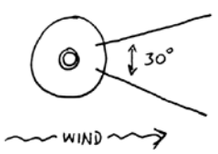



Cut a soda bottle in half and put the camera inside the top with the loop through the bottle neck.

Be sure the camera lens is protected even when it's extended!



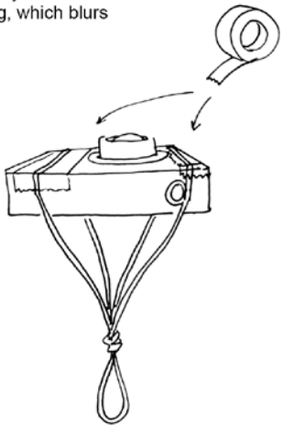

Use the rest of the bottle to make 'wings' to stabilize it in the wind. Cut strips and crease them to keep them straight.




This will keep your camera from spinning, which blurs the photos.

Fold a 1 meter loop of string and tape it firmly onto your camera. Be sure the tape doesn't stop the lens from extending.

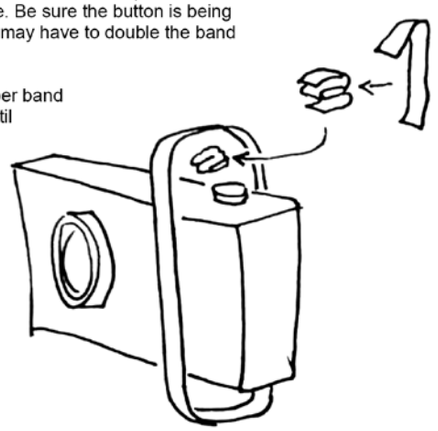

Press the tape down hard - its the only thing keeping your camera from slipping out of the string at 500 meters high!



## 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.

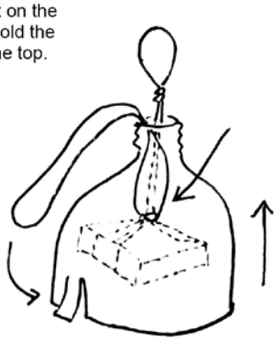
Move the rubber band to one side until you're ready to start.



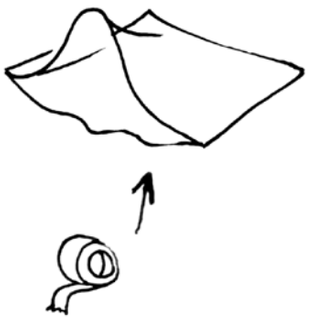
You can add a second loop or a rubber band and hook it on the bottom of the bottle to hold the camera firmly against the top.

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

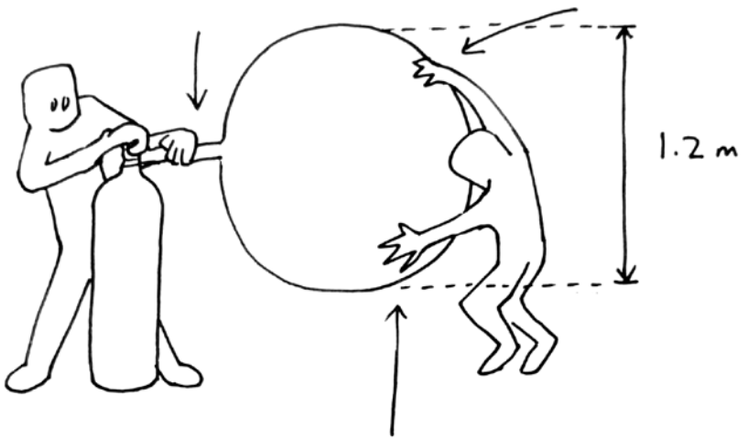


1.5 meter wide weather balloons work best, but if you can't get one, you can make one from plastic. You can use several giant trash bags, but they won't stay inflated for more than an hour -- mylar or PET plastic is far more airtight.

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.

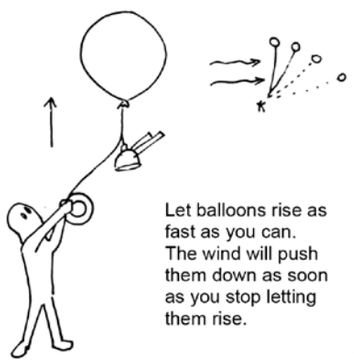
Test your valve first by letting some helium out with nothing attached. Then put your balloon on and slowly inflate it.

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.


Wind the string carefully - don't let it tangle! If it's bad enough you'll have to throw it out.

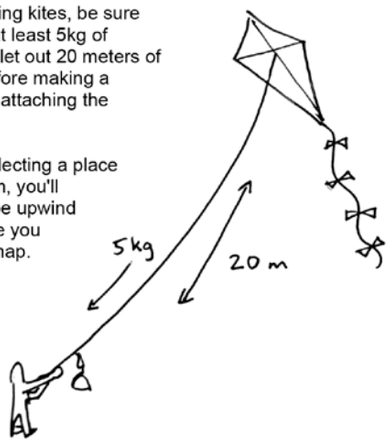
A second person just to wind the string can be very helpful.

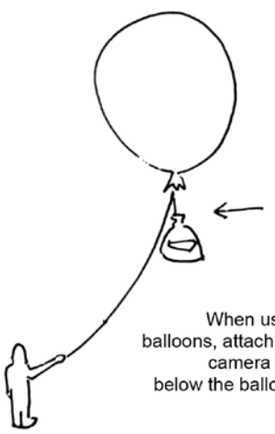
Always wear heavy gloves to prevent string burns!

Don't fly near power lines or in thunderstorms.

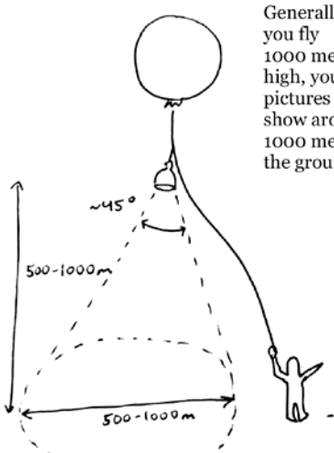
When using kites, be sure there is at least 5kg of pull, and let out 20 meters of string before making a loop and attaching the camera.

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



When using balloons, attach the camera just below the balloon.




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

Once the balloon is 500-1500 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.