

## DAY 1 (or morning if its a 1 day workshop)

I. What is balloon mapping? It is using a balloon and an inexpensive camera to capture aerial image data. It is basically a low flying satellite.

II. What are some real life applications and examples?

A. Ask for student input...

B. When members of a community are faced with a problem, generally they need evidence. Most people rely on labs to produce these studies. Through using balloons and kites to produce aerial image data, citizens can increase the amount of power they have. Using a balloon is inexpensive and accessible, which helps members of the community engage in their civic communities. The more they know, the more they can do.

1. occupy wall street protests

a) <http://grassrootsmapping.org/2011/10/occupywallstreet-aerial-mapping/>

2. protests official maps in Lima, Peru

a) <http://grassrootsmapping.org/tag/lima/>

b) <http://publiclab.org/wiki/en/cedro-grassroots-mapping-curriculum>

### 3. Deepwater Horizon Oil Spill/BP Oil Spill

a) Ask students what they know about it

b) Basic Information

(1) April 20th, 2010

(2) largest accidental oil spill

(a) what is an accidental spill?

(b) accidental: result of mechanical failure

(c) intentional: result of oil companies cutting corners (spending less than they need to)

i) i.e. not replacing overused/old parts, not maintaining facilities, not following safety protocols, etc.

(3) approx. 4.9 million barrels of oil spilt

(a) what does a million look like

i) [http://www.vendian.org/envelope/dir2/lots\\_of\\_dots/million\\_dots.html](http://www.vendian.org/envelope/dir2/lots_of_dots/million_dots.html)

(4) explosion and sinking of Deepwater Horizon Oil Rig led the rig to flow for 87 days (capped on July 15th, 2010)

(5) officially declared sealed on September 10th, 2010

(6) offshore deepwater drilling

(a) pros

i) self reliance: don't have to rely on middle east for worlds oil needs

(b) cons

i) environmental: possibilities of spills

c) DEMO (lego oil rig, rubber ducks, olive oil and food dye)

(1) supplies

(a) rubber ducks

(b) lego oil rig

(c) food dye

(d) cooking oil

(e) dishwashing soap

(f) mason jar/clear bottle with resealable lid

d) BP had a history

e) why is oil so important?

(1) what it is used for

(a) [http://www.eia.gov/KIDS/energy.cfm?page=oil\\_home-basics-k.cfm](http://www.eia.gov/KIDS/energy.cfm?page=oil_home-basics-k.cfm)

(b) common uses

i) gasoline (46%)

(1) cars

(2) motor boats

- (3) lawnmower
      - (4) leaf blower
    - ii) heating oil/diesel fuel (20%)
    - iii) jet fuel (8%)
    - iv) propane/propylene (7%)
    - v) NGL and LRG (6%)
    - vi) still gas (4%)
    - vii) petrochemical feedstocks (2%)
    - viii) petroleum coke (2%)
    - ix) residual/heavy fuel oil (2%)
    - x) asphalt and road oil (2%)
    - xi) lubricants (1%)
    - xii) miscellaneous products/special naphthas (.4%)
    - xiii) other liquids (.1%)
    - xiv) aviation gasoline (.1%)
    - xv) waxes (.04%)
    - xvi) kerosene (.02%)
  - (2) the price
    - (a) supply and demand
    - (b) 2/3 of cost is determined by crude oil cost
    - (c) 1/3 is dependent on taxes, refining, distribution and marketing
- f) Aftermath
  - (1) Clean up
    - (a) skimmer ships
    - (b) floating booms
    - (c) controlled burns
    - (d) **oil dispersants** (1.84 million gallons)
      - i) document (for instructor)
        - (1) oildemo.pdf
      - ii) what are they
        - (1) mixture of surfactants (lower surface tension/bubbling and foaming) and solvents
        - (2) breaks oil into small droplets
      - iii) pro (2)
        - (1) lessens exposure of marine life on surface
        - (2) reduces amount of oil that reaches the shore
      - iv) con (4)
        - (1) increases exposure to underwater marine life
        - (2) allows for faster, deeper penetration of oil into costal terrain (more difficult to biodegrade)
        - (3) study showed that it made oil 52x more toxic than the oil alone
        - (4) increased toxicity of ecosystem and made oil spill worse
  - (2) consequences
    - (a) health
      - i) hospitals reported 143 spill exposure cases in LA
      - ii) 35 from residents
      - iii) caused by oil and dispersants
    - (b) environment
      - i) damage of wildlife habitats and marine life
      - ii) 2013: 4.6 million pounds of oily materials cleaned up from beaches
      - iii) marine life died at 6x the normal rate
      - iv) oil and dispersant found in sand
      - v) deformaties to organs in tuna and amberjack

- vi) 10x more than normal dead baby dolphins showed up on shore during the mating season after the spill
  - (1) 650 dead bottle nose dolphins from spill -> 2013
  - (2) BP said increased dolphin death rates started before the spill
- (c) bluefin tuna: irregular heartbeats -> cardiac arrest
- (d) tar balls
- (e) economic
  - i) detrimental to tourism, fishing and offshore drilling
    - (1) cost \$2.5 billion for fishing
    - (2) \$23 billion for tourism
    - (3) 36% of federal waters in the Gulf of Mexico were closed
- g) Members of communities around the spill used balloon mapping as evidence for legal and environmental cases.
  - (1) <https://www.flickr.com/photos/tags/gulfoilmapping/>

### III. Enabling our communities to find the data ourselves and be proactive.

- A. collecting footage using a helicopter (like weather channels do) can cost anywhere between \$600,000 to \$1 million
- B. balloon mapping can cost less than \$200
- C. proactive
- D. what about google maps?
  - 1. the footage is not recent
  - 2. subpar visibility
  - 3. through doing it yourself, you can specify an area of particular interest

### IV. Preparation

- A. hand out packet
- B. Materials
  - 1. 2 liter soda bottle
  - 2. scissors
  - 3. strong, resealable tape (clear and duct)
  - 4. hot glue (not 100% necessary but helpful)
  - 5. 20 #64 latex free rubber bands
  - 6. rubber gloves
  - 7. 3 mighty-mini snap swivels
  - 8. 1 or 2 carabiner
  - 9. 1000+ feet of line
  - 10. x-acto blade
  - 11. 8" or 9" hoop winder
  - 12. 1.25" steel wing
  - 13. cable ties
  - 14. 1 weather balloon
- C. Camera
  - 1. GENERAL
    - a) <http://geojournalism.oeco.org.br/2013/08/balloon-mapping-how-to-make-your-own-low-flying-satellite/>
  - 2. Housing (most time consuming part)
    - a) <http://publiclab.org/wiki/pet-bottle-rubber-band-rig>
  - 3. Trigger
    - a) <http://publiclab.org/notes/mathew/1-29-2012/using-knot-trigger-cameras>
- D. Cables
  - 1. clove hitch knot
    - a) [http://www.netknots.com/rope\\_knots/clove-hitch/](http://www.netknots.com/rope_knots/clove-hitch/)
  - 2. have a 10 foot space between the balloon and the top of the camera's connecting string
  - 3. the length of the camera's connecting string should be 5-10 feet

## DAY 2 (or afternoon if its a 1 day workshop)

### V. Taking footage

- A. settings
  - 1. continuous shooting
  - 2. infinity
- B. bring extra batteries! (2 extra sets)
- C. make sure the memory card is empty

### VI. Mapping ([mapknitter.org](http://mapknitter.org))

- A. make sure to align with reference image (the map) and not other images that may overlap
- B. don't lock image until certain it fits properly
- C. when stitching the image on the software, only the low resolution version is shown
- D. the full resolution version is displayed after the completed map is exported
- E. export
  - 1. open layer: low resolution, good for web viewing
  - 2. GeoTIFF: high resolution

### VII. helpful links (all the links used above compiled)

- A. clove hitch knot
  - 1. [http://www.netknots.com/rope\\_knots/clove-hitch/](http://www.netknots.com/rope_knots/clove-hitch/)
- B. preflight checklist
  - 1. <http://publiclab.org/sites/default/files/balloon-mapping-preflight-checklist.pdf>
- C. before you go checklist
  - 1. <http://grassrootsmapping.org/wp-content/uploads/2010/05/oil-mapping-guide3.pdf>
- D. camera housing
  - 1. <http://publiclab.org/wiki/pet-bottle-rubber-band-rig>
- E. knot trigger for camera
  - 1. <http://publiclab.org/notes/mathew/1-29-2012/using-knot-trigger-cameras>
- F. How to overview (very helpful)
  - 1. <http://geojournalism.oeco.org.br/2013/08/balloon-mapping-how-to-make-your-own-low-flying-satellite/>
- G. guides
  - 1. <http://publiclab.org/guides>