# Grassroots Mapping: a toolkit for participatory and politically engaged cartography

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# Chapter 1

# Introduction

## 1.1  Overview

## 1.2  Defining Grassroots Mapping: Toolkit, Practices, or Community?

Exactly what makes up the Grassroots Mapping project? Is it a body of code, available under an MIT license at http://github.com/jywarren/cartagen? Is it a set of mapping practices, or tools, which have been employed in Lima, Peru, or Rio de Janiero? Or is it a community of practitioners and the web site, wiki, and mailing list which tie them together?

The core of the Grassroots Mapping project is the **application** of a novel combination of technology to a specific cultural need. Without

### 1.2.1  Software

**Interfaces for participatory cartography**

**The Cartagen framework**

**Rendering architecture**

### 1.2.2  Practice, Community, Support structure

**GrassrootsMapping.org**

**The Grassroots Mapping Wiki**

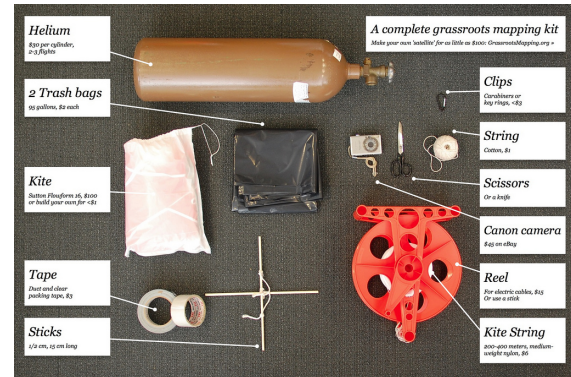Documentation, case studies, Grassroots Map Collection

The Grassroots Mapping community and mailing list

## 1.3 Novel Contributions

### 1.3.1 Novel application of low-cost tools to well-established need for raster imagery

### 1.3.2 Novel approaches to map rendering

### 1.3.3 Central merit: technology or culture?



*Helium*
*$20 per cylinder, 2-3 flights*

*A complete grassroots mapping kit*
*Make your own 'satellite' for as little as $100: GrassrootsMapping.org »*

*2 Trash bags*
*95 gallons, $2 each*

*Clips*
*Carabiners or key rings, <$5*

*String*
*Cotton, $1*

*Kite*
*Sutton Flowform 16, $100 or build your own for <$1*

*Scissors*
*Or a knife*

*Canon camera*
*$45 on eBay*

*Tape*
*Duct and clear packing tape, $3*

*Reel*
*For electric cables, $15 Or use a stick*

*Sticks*
*1/2 cm, 15 cm long*

*Kite String*
*200-400 meters, medium-weight nylon, $6*

# Chapter 2

# Subjectivity in Mapping

# Chapter 3

# The Need for Geospatial Data

## 3.1 Two worlds of mapping

### 3.1.1 Urban slums, informal settlements

### 3.1.2 Tenure mapping

**The invasion of Lima, Peru**

## 3.2 Environmental assessment

### 3.2.1 Asset allocation mapping and carbon cowboys

## 3.3 Open geodata and crisis mapping

### 3.3.1 Crisis mapping and Ushahidi

# Chapter 4

# State of the Art

## 4.1   PGIS: Participatory Geographic Information Systems

Traditional GIS technology has been used since the XX's to support communities in developing contexts for purposes such as making tenure claims, environmental defense against petroleum and other extraction industries, as well as for planning purposes. This has become known as PGIS, or Participatory GIS, and typically...

### 4.1.1   PPGIS

Definition: http://www.ppgis.net/ppgis.htm Bibliography: http://dusk2.geo.orst.edu/gis/student_bibs/slurie.htm

### 4.1.2   Participatory GIS for Development

### 4.1.3   Shortcomings of traditional PGIS practice

## 4.2   OpenStreetMap

### 4.2.1   Humanitarian OSM Team

**Free Map Gaza**

**Followup projects**

**Challenges**

**Emphasis on local infrastructure**

# Chapter 5

# Grassroots Mapping as an alternative means of participatory cartography

## 5.1 Cartagen: an alternative architecture

# Chapter 6

# Related works

## 6.1    Beyond symbolic mapping: Data-driven approaches to participatory mapping

# Chapter 7

# Evaluation criteria

## 7.1 Participants vs. collaborators

**Triangulation**

**Construct validity**

how theory was affected by data

**Face validity**

how research was received by participants

**Catalytic Validity**

how participation transforms the situation (self-awareness/reflexivity)

### 7.1.1 Interviews with local partners

Wiki, mailing list, blog, media coverage ( Face validity)

# Chapter 8

# The Grassroots Mapping tool chain

## 8.1   Balloon/kite Aerial Mapping (BAM/KAM)

## 8.2   Digital maps: reconceptualizing mapping interaction

### 8.2.1   Beyond raster mapping/Tile politics

### 8.2.2   Cartagen dynamic rendering

### 8.2.3   An iterative toolchain development process

# Chapter 9

# Case Study: Grassroots Mapping in Lima, Peru

## 9.1 Introduction

In the interest of basing tool development and design on real-world applications, and due to an ongoing conversation with Carla del Carpio of Lima-based Manzanita "A",
   traveled to Lima, Peru in January 2010 to conduct field research and to collaborate on the Grassroots Mapping tool set with those who would be likely to use it.

### 9.1.1 Designing with, not for

Needs assessment
   Potential beneficiaries/collborators: Hector, Carla/Manzanita A, CEDRO, Escuelab, Shuawa

### 9.1.2 The Other Path: Lima's history of informal settlement

### 9.1.3 Valuation and 'grey' economies

### 9.1.4 Limits of state-sanctioned mapping efforts

### 9.1.5 A Grassroots Mapping curriculum

### 9.1.6 Mapping with Juan Pablo II

- Introduction to mapping - discussion: literal mapping difficult due to different mental models - tape-measure technique – bodystorming - introduction to Google imagery not relevant

**First flights in Juan Pablo II**

**Situating mapping practice**

**Stitching maps with Juan Pablo II**

- Stitching exercises - with kids - 'rubber sheets' - with teachers (secondary audience) - Map Warper, discussion of difficulties (see ahead)

### 9.1.7    Mapping with San Ignacio Loyola

- Manzanita "A" - usage of Photoshop primarily; fast mapping; 2-3 hrs flight, 1-2 hrs stitching - Hector: ideal user: - lives in an informal settlement - teacher, interested in using this in curriculum - community leader - interest in tech, willing to try map warping - difficulty in trackpad/menu usage, took notes - engaged despite workload - sees applicability for mapping tools in settlements

### 9.1.8    Mapping with Cantagallo

- Escuelab - technology, art, society - engaged with a creative group, Shuawa

#### The Shipibo in Lima

- narrative of 10 year stay, claim to land, contested claims, and riverbank site - Escuelab sought political neutrality, but obviously interested in political situations: ex: shipibo language - Drawing exercises - 'amazon' home vs current home - non-literal mapping - related to issues of veracity re: Wherecamp sugg. of children mapping with stickers

#### Flying balloons with Cantagallo

- fastest yet - total images - usage of hugin/SIFT/Photoshop

#### Lower Cantagallo and local geographic dispute

- Escuelab and Sara/CEDRO - two cantagallos (three?) - Sr. Ricardo - possible political engagement/entanglement - entry into SETAME site; playfulness seen as neutrality? Or just no resistance at low levels to mapping activity? - not perceived as claim-related?

### 9.1.9    Computing literacy challenges with orthorectification

- map warper - designed for printed maps - large loop of interaction - overcorrection easy, no immediate feedback upon assigning GCPs - difficulty in explaining GCPs, and necessity of javascript hack for areas without base data - amazing for intended use, even note application in Mumbai - Photoshop better, but barely - stuart long uses photoshop, maybe bruce owen (see emails)

### 9.1.10    Evaluation

- based on criteria - Interviews!!!!!!!! transcribe them - Applications of maps we made - legal role - import to OSM? - World Bank mandate to map every home? do we support that goal? - education, urban planning, NGO planning support, demonstration project

### 9.1.11    Needs (Re)assessment

- Goals for a true 'pilot' that goes beyond information gathering and use of existing State of the art tools - planning of new, easier interfaces and techniques - Map Warper difficulties, speed - discussion and 'designing with' leading to Cartagen Knitter (see later discussion) - needs assessment - user-centric design, appropriate design - Possibility of mapping a fast-changing community History/future assignments make explicit the value of mapping as an activity

# Chapter 10

# Field trials in India

## 10.1 Goals

# Chapter 11

# Project sustainability and ongoing work

## 11.1 Wiki, blog and mailing list

Incorporation of new needs through dialogue (see Evaluation Criteria .. Face validity/Construct validity) Examples of community-based reformulation/innovation Crispen's suggestion of lat/lon rectification points (mentioned above) Pat Coyle's videos, bungee-cable design, and camera shutdown research

## 11.2 Illustrated Guide

Nathan Cooke, Pat Coyle Workshops/flights Community building, matchmaking (mentioned in strategies section above)



Figure 11.1: The Toucan

# Chapter 12

# ReadingList

**Related readings**

A collection of readings on kids, playful exploration, and grassroots mapping

**Jeff:**

New information technologies in the old political economy : an exploration of community-based GIS for improving basic services for the poor in New Delhi, India - 2005 MIT DUSP dissertation by Claudia Canepa

PARTICIPATORY SPATIAL INFORMATION MANAGEMENT AND COMMUNICATION IN DEVELOPING COUNTRIES - Giacomo Rambaldi, Peter A Kwaku Kyem, Mike \McCall, Daniel Weiner, EJISDC, 2006

The child's creation of a pictorial world, Claire Golomb

Curriculum on "Children as Community Researchers" - UNICEF, authored by Children's Environment Research Group

Participatory GIS - A Paradigm Shift in Development? - Jen Osha and Daniel Weiner, 2006

Mapping for Change - 2005 International Conference on Participatory Spatial Information Management and Communication

Weiner, D. and T. Harris, 2003. "Community-Integrated GIS for Land Reform in South Africa." URISA Journal. 15(2): 61-73.

PPGIS on MapTogether.net

Bilingualism and identity: Spanish at the crossroads with other languages - Geographic dispute in Canta Gallo, in Lima, Chapter 7

Intervention: Mapping is critical! - This intervention targets the much heralded demise of the map in geography and the recently proposed rethinking of maps. It comprises contributions from two political geographers, a military geographer, a political scientist, and two activist cartographers and argues that there is not so much a need to rethink maps, but to re-engage with the material practices of mapping, and above all to re-make maps.

Mapping in a Shoebox - A Grassroots Approach for Developing the Geospatial Literacy of Elementary Children - 24th International Cartographic Conference - Jaqueline M. Anderson, Sally Hermansen, Lorraine Innes, 2009

Lots of work by Proboscis: Social Tapestries/Urban Tapestries, 2002-7 - Urban Tapestries investigated how, by combining mobile and internet technologies with geographic information systems, people could 'author' the environment around them; a kind of Mass Observation for the 21st Century. Like the founders of Mass Observation in the 1930s, we were interested creating opportunities

for an "anthropology of ourselves" adopting and adapting new and emerging technologies for creating and sharing everyday knowledge and experience; building up organic, collective memories that trace and embellish different kinds of relationships across places, time and communities.

BEST PRACTICES FOR SHARING SENSITIVE ENVIRONMENTAL GEOSPATIAL DATA - for GeoConnections by AMEC Earth & Environmental, 2010

**Kate:**

BBC article - train station hires a Director of Fun!

Place-Logging - MIT thesis

Tube iphone app - augmented reality