



# Building a Citizen Engaged Research Project

Case Study: Humanitarian OpenStreetMap Team

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ESA Earth Observation Summer School  
Frascati, Italy August 4, 2016

# About



Humanitarian  
OpenStreetMap  
Team



**OpenStreetMap**



**MISSING  
MAPS**

Free, up-to-date maps are a critical resource when relief organizations are responding to disasters or political crises. The Humanitarian OpenStreetMap Team (HOT) creates and provides those maps.

HOT provides community driven mapping, technical tools and training to support the use of OSM for humanitarian and economic development purposes.

Missing Maps is an open, collaborative project in which you can help to map areas where humanitarian organisations are trying to meet the needs of vulnerable people.

Partners include American Red Cross, British Red Cross, Medicine San Frontieres, CartoONG, Dutch Red Cross and HOT.



# Network

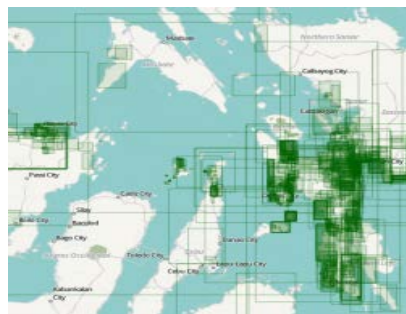
Digital Humanitarian Network



[www.DigitalHumanitarians.com](http://www.DigitalHumanitarians.com)



## Haiti Earthquake 2010



## Typhoon Haiyan Philippines 2013



## Indonesian Preparedness 2012 - 2015

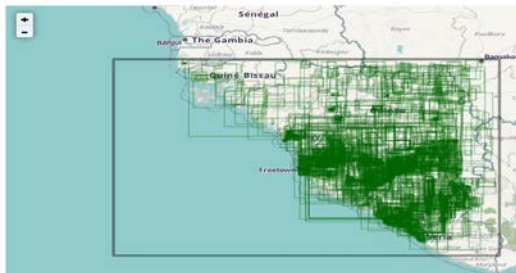
### OpenStreetMap Activities for Ebola Response (2014)

**General Information**  
Number of OSM Contributors: 2,170  
Number of Map Changes: 11,024,404  
(Total number of Changesets: 74,951)  
(Number of visualized Changesets:  
with >= 400 Map Changes: 2,151)

**If you want to help?**  
Go to the [OpenStreetMap Wiki page](#)  
[West Africa Ebola Response \(2014\)](#)  
Additional information can be found at  
[Humanitarian OSM Team \(HOT\)](#)  
[Mailbox List](#)

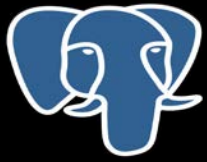
[Wiki Helpdesk!](#)  
[Blog Post](#) about this website

**Legend**  
 Analysis Extent  
 OSM Changesets



## West African Ebola Response 2014

# Learning and building over time



PostgreSQL



django



OpenStreetMap and HOT's tools are built with large open source tools, software and products.

# Data Collection

Welcome to Field Papers



**Make yourself an atlas**

Print out anywhere in the world.



**Take it into the field**

Make your notes and observations.



**Capture your notes**

Upload pages you've photographed.



**Mapillary**



**OpenAerialMap**

**OpenMapKit**







Nepal  
Earthquake:  
Kathmandu Living  
Labs and  
Humanitarian  
OpenStreetMap  
Team (HOT)

Mapping  
Financial  
Inclusion in  
Uganda  
with HOT





## Remote Mapping - lines/points



# Data and Tools

## #1917 - Peace Corps Benin -- Sahoue Zougbonou

Description

Instructions

Contribute

Activity

Stats



Task #32



➔ Start mapping

Leave a comment

Comment

Unlocked

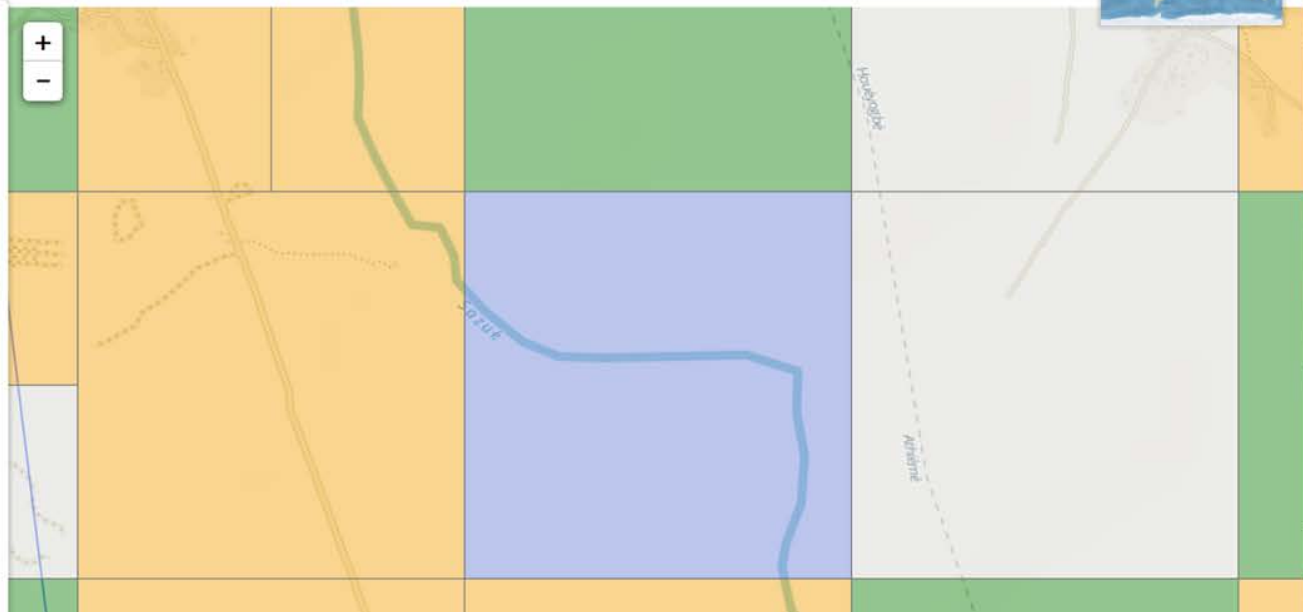
about 21 hours ago

🔒 Locked by [hax404](#)

about 21 hours ago

Unlocked

2 days ago



# OSM Analytics

OpenStreetMap Analytics *beta*

Analysis Map

About

rome



or

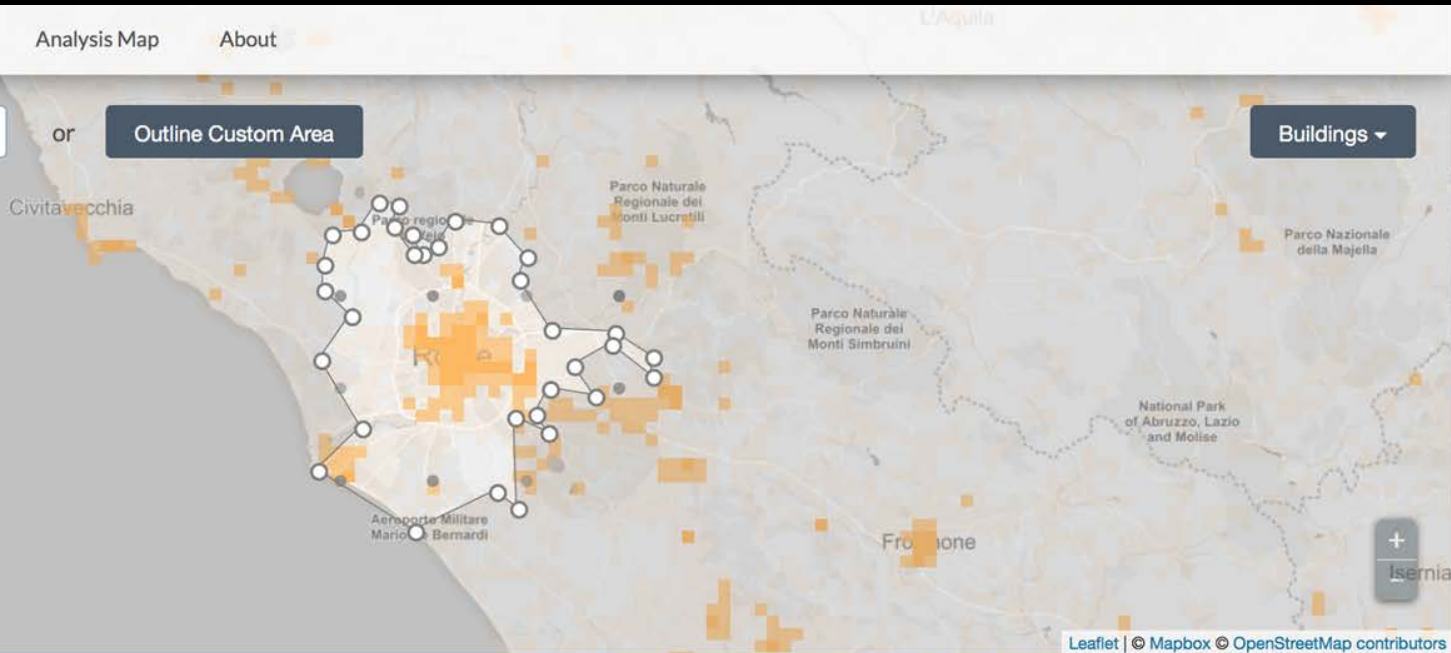
Outline Custom Area

Buildings ▾

## Map Legend

- High density of buildings
- Medium density of buildings
- Low density of buildings
- Area with mostly highlighted buildings

Last Data Update: 18 hours ago



Recency of Edits ▾

62,193 0

Buildings

HOT Projects ▾

many

Contributors

Compare Time Periods



# OSM Export Tool



Humanitarian  
OpenStreetMap  
Team

[Bahasa Indonesia](#) | [Deutsch](#) | [English](#) | [Español](#) | [Français](#) | [日本語](#)

## OSM Export Tool

[Create](#) [Exports](#) [Presets](#) [Help](#) [About](#) [TylerOSM](#)

**Describe Export**

[File Formats](#)

[Tree Tag](#)

[Preset File](#)

[Export Details](#)

Name

Description

Project

Coordinates

**+** **Select Export Area** **Zoom To Selection** **Reset Map**

**Q** Search for a place or enter xmin,ymin,xmax,ymax

A world map showing several countries and regions outlined in red, indicating they are selected for export. The highlighted areas include parts of South America (Brazil and Argentina), Africa (a large central region), and Southeast Asia (Indonesia). The map also shows labels for 'United States of America', 'KAZAKHSTAN', 'RUSSIA', and 'INDONESIA'. A scale bar at the bottom left indicates 2000 km and 1000 mi. The copyright notice '© OpenStreetMap contributors.' is at the bottom right.



## OSM Export Tool

Describe Export File Formats **Tree Tag** Preset File Export Details

### Select from either the HDM or OSM data models

Features can only be selected from one tree, either from the HDM or the OSM data model. Feature tags can not be mixed between the two. Deselect the HDM Tree to enable the OSM Tree.

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Humanitarian Data Model <input checked="" type="checkbox"/> | <input type="checkbox"/> OSM Data Model <input type="checkbox"/>  |
| <input checked="" type="checkbox"/> Buildings <input checked="" type="checkbox"/>               | <input type="checkbox"/> Water <input type="checkbox"/>           |
| <input checked="" type="checkbox"/> Transportation <input checked="" type="checkbox"/>          | <input type="checkbox"/> Relations <input type="checkbox"/>       |
| <input checked="" type="checkbox"/> Barriers <input checked="" type="checkbox"/>                | <input type="checkbox"/> Sports <input type="checkbox"/>          |
| <input checked="" type="checkbox"/> Transportation means <input checked="" type="checkbox"/>    | <input type="checkbox"/> Highways <input type="checkbox"/>        |
| <input checked="" type="checkbox"/> Other road objects <input checked="" type="checkbox"/>      | <input type="checkbox"/> Facilities <input type="checkbox"/>      |
| <input type="checkbox"/> Obstacles <input checked="" type="checkbox"/>                          | <input type="checkbox"/> Shops <input type="checkbox"/>           |
| <input checked="" type="checkbox"/> Roads <input checked="" type="checkbox"/>                   | <input type="checkbox"/> Man Made <input type="checkbox"/>        |
| <input checked="" type="checkbox"/> Places <input checked="" type="checkbox"/>                  | <input type="checkbox"/> Bridges <input type="checkbox"/>         |
| <input checked="" type="checkbox"/> Hazards <input checked="" type="checkbox"/>                 | <input type="checkbox"/> Man Made <input type="checkbox"/>        |
| <input checked="" type="checkbox"/> Public services <input checked="" type="checkbox"/>         | <input type="checkbox"/> Power <input type="checkbox"/>           |
| <input checked="" type="checkbox"/> Commercial and Economic <input checked="" type="checkbox"/> | <input type="checkbox"/> Historic Places <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Physical environment <input checked="" type="checkbox"/>    | <input type="checkbox"/> Annotation <input type="checkbox"/>      |
| <input checked="" type="checkbox"/> Utilities <input checked="" type="checkbox"/>               | <input type="checkbox"/> Transport <input type="checkbox"/>       |

+
-

Select Export Area
Zoom To Selection
Reset Map

✓

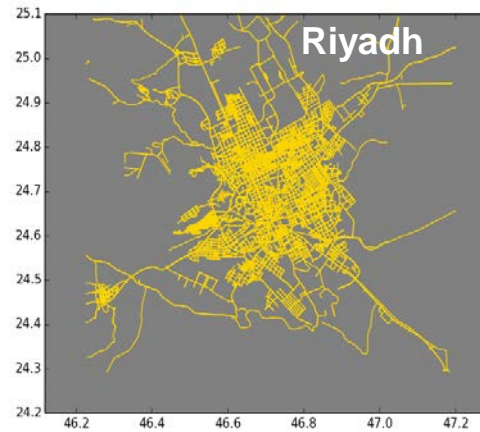
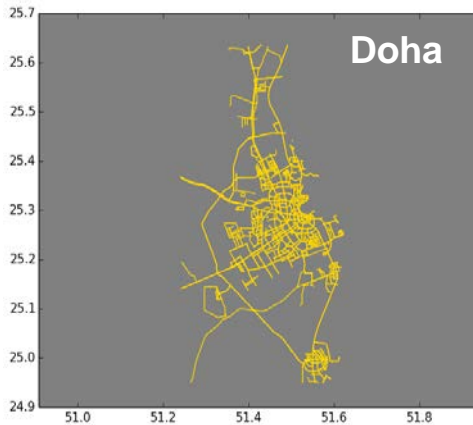
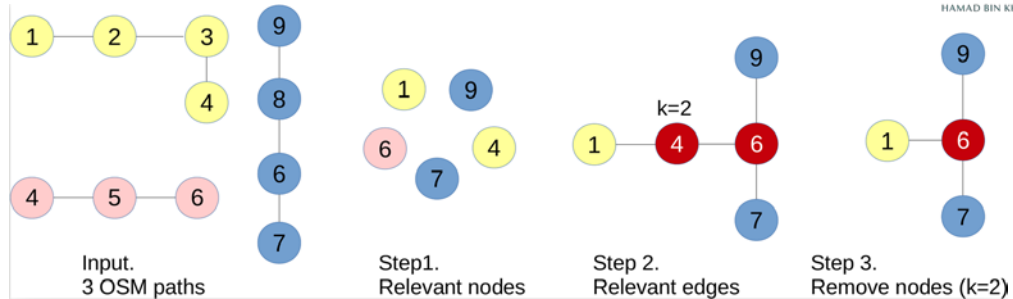




HOT and Missing Maps are not  
“research” projects. Research is welcome.

# City Robustness: Road networks

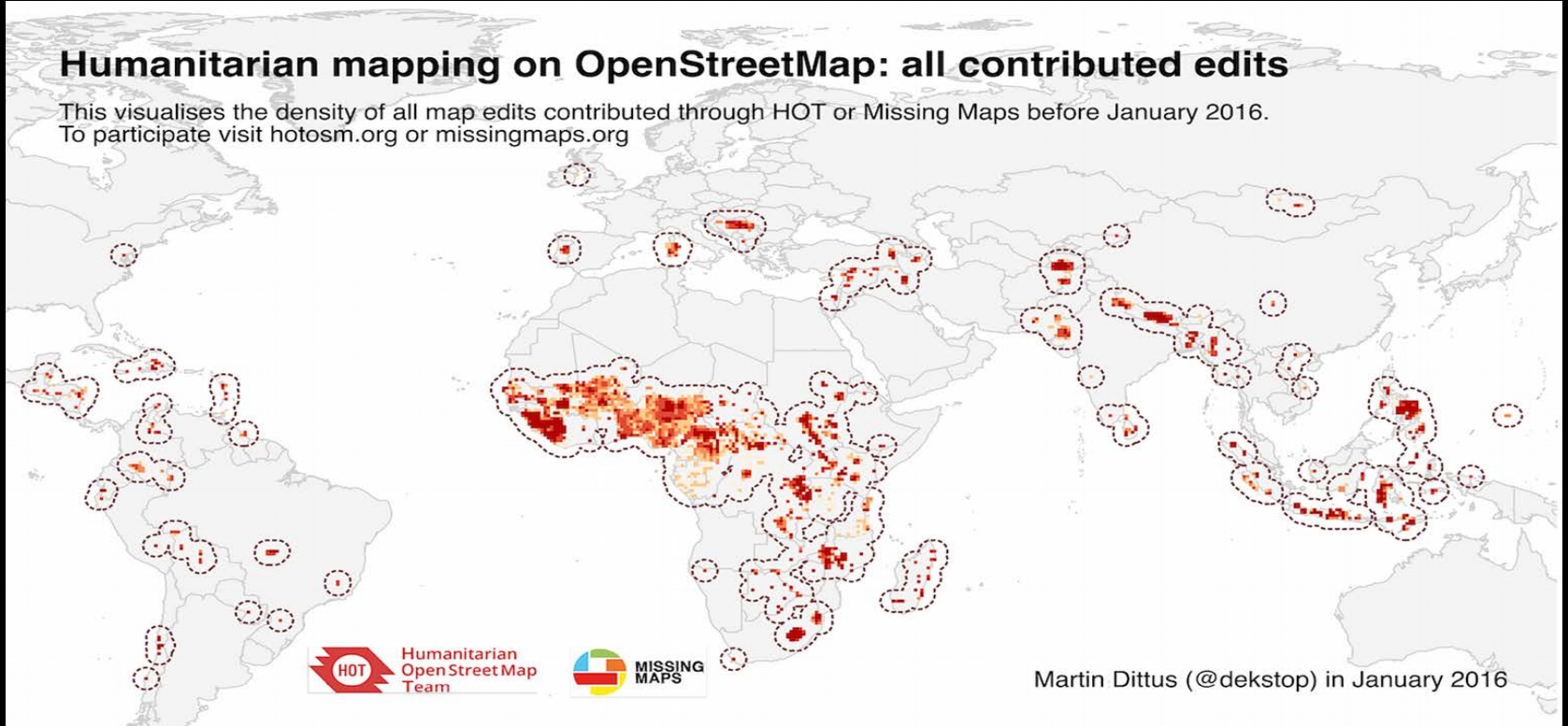
Build road networks from OSM shapefiles



City	V	E	Length (KM)	K	Mesh	Org
los-angeles	525246	678652	113504.437	2.584	0.146	0.924
paris	369244	503320	54713.641	2.726	0.182	0.915
london	343081	451855	37954.920	2.634	0.159	0.900
dallas	313147	398649	80613.803	2.546	0.137	0.950
chicago	300479	403366	70911.445	2.685	0.171	0.938
melbourne	285671	382855	48425.705	2.680	0.170	0.936
new-york	280797	378542	60445.977	2.696	0.174	0.925
denver-boulder	224441	296232	44696.132	2.640	0.160	0.920
bangkok	205062	251387	64109.417	2.452	0.113	0.966
rotterdam	197785	280381	24081.916	2.835	0.209	<b>0.867</b>
mexico-city	184568	246154	36659.346	2.667	0.167	0.944
milan	177746	242894	22686.829	2.733	0.183	0.911
pittsburgh	169723	211419	42600.967	2.491	0.123	0.950
saint-louis	167058	203376	44989.002	2.435	0.109	0.953
rio-de-janeiro	145383	193222	28436.101	2.658	0.165	0.943
lisbon	136740	184803	24091.563	2.703	0.176	0.944
athens	136338	188655	25389.023	2.767	0.192	0.907
sydney	131581	174639	22508.013	2.654	0.164	0.948
montreal	124373	172043	39126.493	2.767	0.192	0.908
rome	111259	147794	17878.176	2.657	0.164	0.920
riyadh	107445	156448	24023.621	<b>2.912</b>	<b>0.228</b>	<b>0.980</b>
santiago	107027	146604	17690.681	2.740	0.185	0.946
san-francisco	99491	134451	17644.981	2.703	0.176	0.898
glasgow	93235	118877	11350.264	2.550	0.138	0.953
bengaluru	88037	114748	14457.036	2.607	0.152	0.959
porto-alegre	79148	108282	23416.511	2.736	0.184	0.918
new-orleans	76438	94395	22442.663	2.470	0.117	0.948
chennai	72277	92720	11950.411	2.566	0.141	0.958
singapore	65333	87039	13641.570	2.664	0.166	0.931
dubai	64462	92849	12127.150	2.881	0.220	0.907
san-juan	61883	72247	9027.872	<b>2.335</b>	<b>0.084</b>	0.963
barcelona	59165	84178	10104.779	2.846	0.211	0.899
amman	57123	76775	10675.922	2.688	0.172	0.954
el-paso	44326	60167	11000.284	2.715	0.179	0.949
quito	43051	56301	10406.483	2.616	0.154	0.944
durban	42171	53345	8424.425	2.530	0.133	0.942
boston	40375	55573	5656.712	2.753	0.188	0.899
dakar	38640	54164	4208.776	2.804	0.201	0.949
abudhabi	38401	55724	8006.597	2.902	0.226	0.880
doha	34743	48544	7106.840	2.794	0.199	0.968
juarez	33663	46313	7401.811	2.752	0.188	0.949
belgrade	32936	41780	5840.179	2.537	0.134	0.937
wellington	27135	32651	7811.626	2.407	0.102	0.967
manama	26781	37143	3891.066	2.774	0.193	0.957
medellin	24410	33397	5049.379	2.736	0.184	0.902
christchurch	20368	26220	5667.041	2.575	0.144	0.939
cali	20001	28930	3549.279	2.893	0.223	0.923
accra	19838	26079	4070.770	2.629	0.157	0.974
phnom-penh	17283	22296	4075.526	2.580	0.145	0.959
mandalay	7190	9584	1706.192	2.666	0.167	0.944
da-nang	6872	9777	1565.853	2.845	0.212	0.930
kigali	6622	9006	2511.172	2.720	0.180	0.945
surat	<b>2639</b>	<b>3569</b>	<b>1040.696</b>	2.705	0.177	0.958

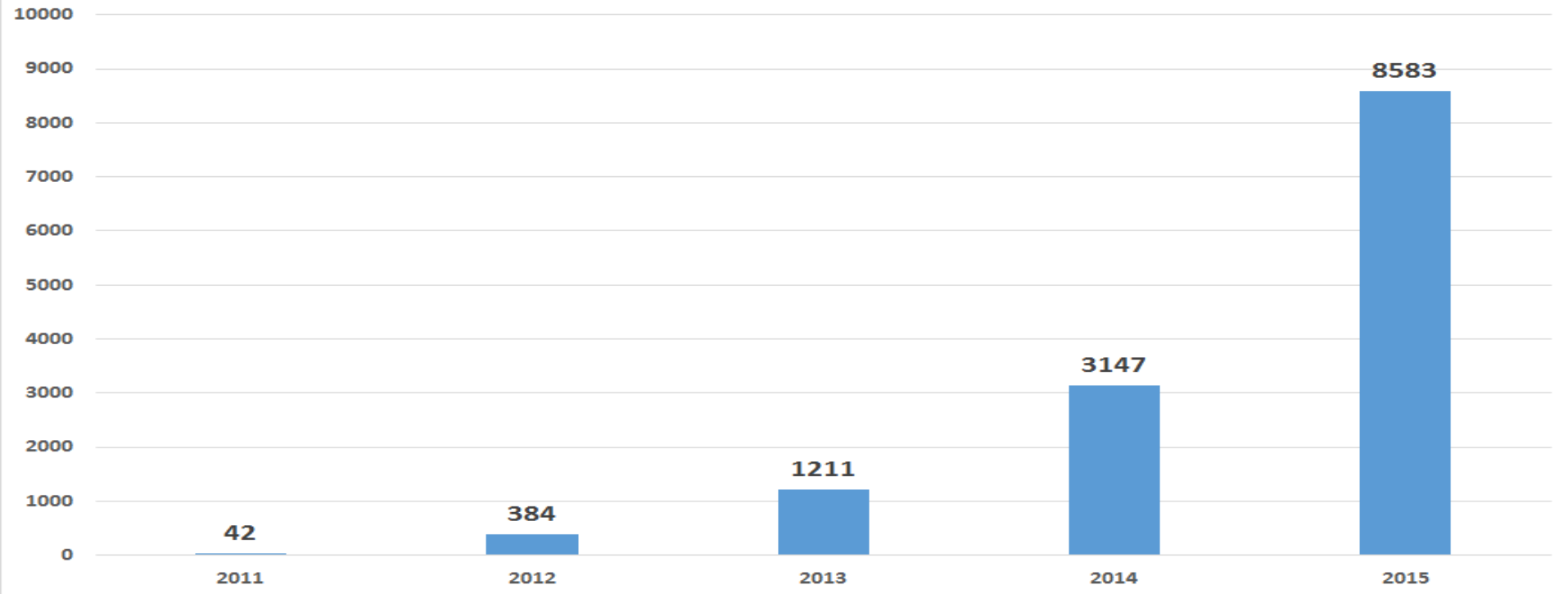
## Humanitarian mapping on OpenStreetMap: all contributed edits

This visualises the density of all map edits contributed through HOT or Missing Maps before January 2016.  
To participate visit [hotosm.org](http://hotosm.org) or [missingmaps.org](http://missingmaps.org)



120M map edits | 20,000 contributors | 1,000 projects

## Unique Active HOT Mappers Per Year



**Getting from 8,500 to 85,000 to 850,000**





# Data with the Community: Tanzania





# Mapping Dar es Salaam



# Research Paper

## The Praxis of Community Mapping in Developing Countries - Mark Iliffe

- Research done in collaboration with the local communities, HOT and the World Bank.
- The programme was not a result of the research but it informed the work.
- Mark has been advocating for more research in HOT and is setting an example for methodology and community development.



# Data with the Community: Nepal



Kathmandu Living Labs

## A champion of Open Data and Civic Technology

that creates open data, open maps and open source applications leveraging emerging web and mobile technologies

## A community

where technical specialists work with domain experts to deliver solutions for the nation's everyday problems

## A connector

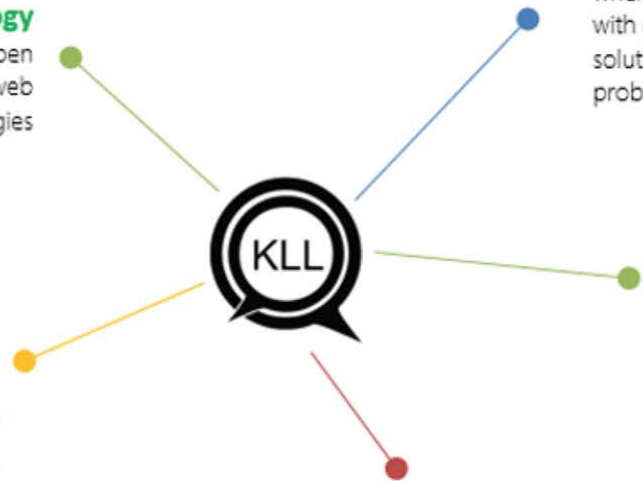
that fosters new partnerships from our diverse global network of innovative thinkers and doers

## An incubator

that supports tech entrepreneurs and civic leaders with training, mentorship and space for collaboration

## A physical location

providing space and logistical support for workshops, trainings and meetups with fun environment







# Research Papers

Community as curriculum youth community informatics curriculum  
integrating inquiry and social action with technology – Nama Budhathoki

Infrastructure in the wild: What mapping in Post-Earthquake Nepal Reveals  
about infrastructural emergence – Robert Soden, Leysia Palen



## Partnerships and Coordination



# Potential HOT Research Topics

## New Tools

- Satellite quality, Algorithms, Computer Vision
- Help and Local guides

## Contributor Experiences

Evaluating/understanding community

Impact of UX on mapping activities

Quality control / Validation

Impact of the map on the lives of affected communities

Diversity in the community



# Ask a Researcher!

What is the timeline of the research?

Tell me more about your background and your institution

How much time will a survey /interview take?

Do you have an IRB (Institutional Review Board) process?

Will this call or email be recorded?

Did you user test the survey before sharing?

Who else are you speaking with from the digital community?

Will we (digital community) be cited or just the individual?

Are there anonymization issues that require attention (E.g. the value of your product may be sensitive for first responders and humanitarian workers in the field)?

What other information products/ papers will you produce?

Can I review the work before you publish it?

Can you please confirm that [insert org] will be credited in the notes as a contributor?



# HOT Academic Partnerships

1. Get to know us
2. Be clear from the start on your purpose
3. Let us help
4. Need research ideas? We've got research ideas
5. There are other ways to collaborate with HOT
6. Let us know about your findings












# Empower with the Community: Mapfugees

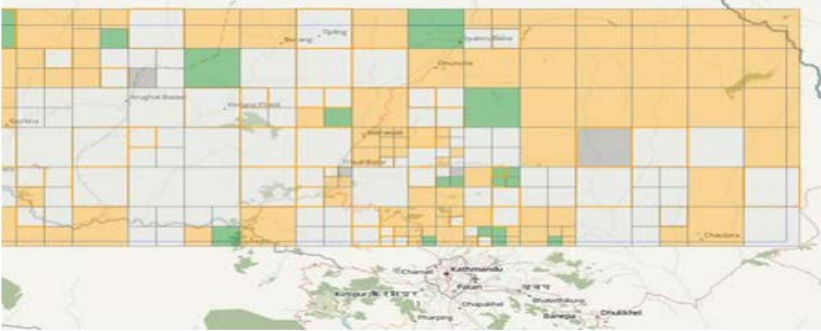




 **Bill Gates**   
@BillGates  **Following**


Citizen cartographers are helping earthquake efforts by mapping roads & open spaces: [b-gat.es/1lbMilH](http://b-gat.es/1lbMilH)



RETWEETS: **610** FAVORITES: **644**

1:35 AM - 5 May 2015

 Reply to @BillGates

**Thank you**



**Join us  
September 22,  
2016  
Brussels**

@heatherleson [Heather.leson@hotosm.org](mailto:Heather.leson@hotosm.org)  
[Hot.openstreetmap.org](http://Hot.openstreetmap.org)