

A photograph of a person in a red shirt and yellow shorts climbing a tall, metal lattice tower. The person is secured with a safety harness and ropes. The tower has various antennas and equipment at the top. The background is a clear, bright blue sky.

The Village Base Station Project: **Connecting Communities Through Mobile Networks**

Joshua Aaron Dalmacio

University of the Philippines - Diliman

pcari.vbts@gmail.com





Access to communication services is now considered an essential human need.

But as of 2018, the Philippines' **subscriber penetration is only at 64%** of the population.*

*GSMA. The Mobile Economy Asia Pacific 2019.
<https://www.gsma.com/r/mobileeconomy/asiapacific/>



To become truly inclusive, services must be able to **reach the underserved** in the Philippine countryside.

Community cellular networking provides an alternative approach to bringing mobile connectivity to these underserved populations.

Research Objectives

1

Study the feasibility of deploying CCNs in the Philippines, geared towards sustainability.



2

Study alternative technologies to solve spectrum usage problems and high CAPEX/OPEX.



3

Impact evaluation study of communities with first-time access to cellular communications





System Features



12 concurrent calls



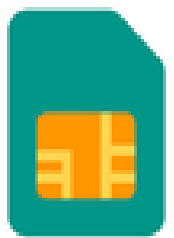
180 text messages/min



120 authenticated registrations/min



SMS-based reporting hotline



VBTS SIM card



Prepaid system, E-loading service



3-days autonomous operation*



Up to 5km radius coverage**

* tested from full battery charge
**terrain dependent



Deployments

3 municipalities, 7 community sites
2K++ subscribers
2 years of operation
10k+ voice mins, 20k+ SMS ave monthly traffic

SEP 2017

OCT 2017

FEB 2018

MAY 2018

AUG 2018

OCT 2018

JAN 2019



Site1 Sabang-Limbok

Site2 Dikapinisan

Site3 Dibut

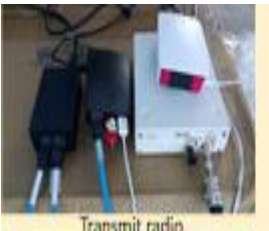
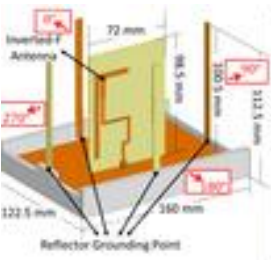
Site4 Diatorin

Site5 Bacong-Market

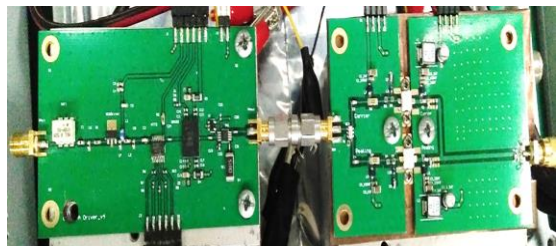
Site6 Dianao

Site7 Dipasaleng

Development of a Pattern and Frequency Reconfigurable Antenna
 Development of a Power Amplifier
 Ocean relays as backhaul option



Transmit radio



VBTS.Driver

VBTS.DPA



Transmit antenna



Actual setup



Measures received signal strength



Measures link performance



1

Relief from anxiety: easier & more convenient mobile communication



2

Social capital formation and efficiencies in economic transactions



3

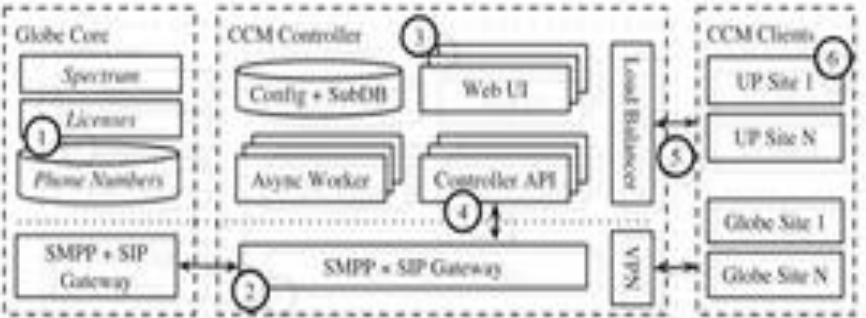
Improved local governance communications, access to basic social services



4

Training opportunities for community and local SUCs



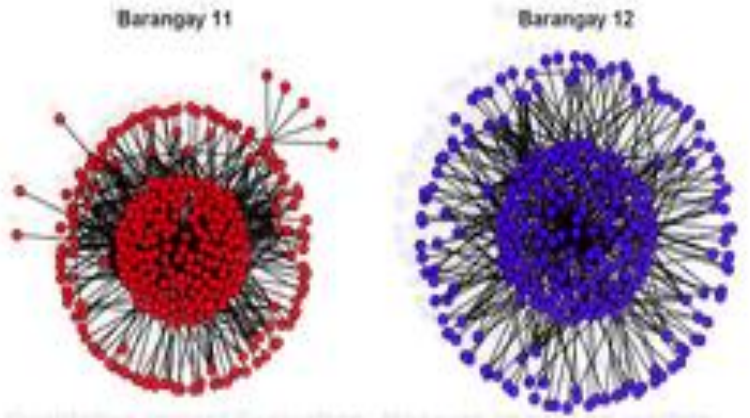


Community Cellular Networks for last-mile access
 A novel IP-based approach to cellular networks, allowing community networks to operate at the fraction of the cost of traditional networks.

Social Infrastructure Building: Engaging with stakeholders
 Forming partnerships agreements with telco, LGUs and cooperatives; Also research and capacity building for local SUCs



Providing communications services in last-mile areas
 We have provided cellular coverage to one of the most remote areas of the Philippines where incumbent telecoms are unable to profitably serve



Qualitative Impact Evaluation: Measure Impact on welfare
 How does access to a local cellular network help previously isolated community members connect to the outside world?

In the Philippines, there is an estimated 10,000 out of the 42,000 barangays that still do not have cellular coverage. These communities lack access to basic communication services.

To address this, the VBTS-CoCoMoNets Project (Village Base Station-Connecting Communities through Mobile Networks) aims to deliver basic mobile telephony, through Community Cellular Networks (CCNs) to small number of remote barangays in Aurora.

The project is concerned on the how the technological intervention affects the ways the community build and maintain their social networks given their first exposure on communication grid.

Through detailed qualitative studies, the project have made societal impact such as easier communication, improved local governance, livelihood improvements, Information dissemination, etc,

Please describe the output or outcome of your proposed method (idea) from the following points of view:

1. Scientific, e.g. new technologies, new applications, etc.
2. Societal, e.g. data set for public use, documents provided to standards organizations, or technologies which will be transferred to companies, etc.
3. Collaborative, e.g. new partners, new colleagues, etc.
4. etc.

Please summarize your presentation from the following points of view.

1. Targets
2. Method (idea)
3. Scientific and societal impact
4. etc.