Resilient Education Information Infrastructure for the New Normal

PHILIP A. MARTINEZ
Senior Science Research Specialist, DOST – Advanced Science and Technology Institute, Philippines
Technical Lead, Project REIINN
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Project Overview
Shift to remote and/or online learning

The COVID-19 pandemic has forced the Philippine educational system to shift from traditional to remote and/or online learning paradigm.
Key barriers to online learning

The lack of quality, reliable, sustainable, and resilient ICT infrastructure remains as the top challenge in the implementation of remote learning in the Philippines.
Problem

Difficulties in educational content transmission in remote learning due to the unreliable internet connection in the Philippines
Challenge

Develop innovative solutions utilizing UHF TV channels to provide internet connectivity to support remote education in the Philippines
The focus of the project is to develop innovative solutions utilizing UHF TV channels to support remote education and to provide internet connectivity since face-to-face classes still limited in the Philippines.
Why UHF TV Frequencies?

- The Philippines has yet to fully shift from Analog to Digital TV (2023)
- Opportunity to champion for alternative use of to-be vacated spectrum,
  - 600 MHz for both LTE/NR Band 71, Community Networks
  - ISDB-T Datacasting Test Broadcast
- National ICT Household Survey (2019): TV and Smartphones are almost ubiquitous in the Philippines
  - 78.9% of households have TV, 40.9% within reach of Digital TV
  - 82.64% primarily access the internet through smartphones
REIINN Technology Demonstrators

LokaLTE

Develop a low-cost, small-scale LTE base station that aims to address the lack of internet access in remote and unserved areas in the country.

RuralCasting

Utilize the datacasting feature of the Integrated Services Digital Broadcasting-Terrestrial (ISDB-T) to deliver educational digital content.
LokaLTE:
Goal
Local development and deployment of community LTE Networks in the Philippines
LokaLTE: System Overview

User Access
- Educational materials
- Cached content
- Local portal

Computing Storage and Equipment
- LTE network monitoring and control
- Subscriber management
- Radio components (SDR, front-end, antennas)

External Network
- Link to the outside world
RuralCasting: Goal

Utilizing datacasting technology to supplement the educational experience of the students
RuralCasting: System Overview

Web App
- Content Creator:
  - Modules/Quizzes
  - Videos
  - Others

Transmitter
- Setups:
  - TV Station
  - Mini-Transmitter

Set-Top Box
- User Access:
  - Wi-Fi
  - Stand-Alone
- Return Channel:
  - Long Range TX
  - ISP

Educational Content:
- Edukastv (LMS)
- Mathplus
- BSP Fin Ed
- Starbooks
Social Impacts

1. Better Connectivity
2. Access to Information
3. Health Literacy
4. Better Learning
Economic Impacts

1. Additional Revenue
2. Eliminate Market Barriers
3. Maximize Market Yields
4. Attract Investors
5. Breed Innovation
6. Educated Workforce
Pilot Sites
Pilot Sites Criteria

- Absence of commercial mobile phone service/signal
- School is not more than 500 meters away from a community with at least 50 households
- School officials and members of the community are willing to participate and cooperate in the project
- No ongoing armed conflict
Pilot Sites Criteria

• Availability of passable roads
• Preferably with stable and reliable electric power from the local utility
• Has an open space area to host our LokaLTE cell site (either of the following):
  • Ground space of at least 8m x 8m, preferably away from other infrastructures
  • Building rooftop space
San Andres, Tanay, Rizal

- Surrounded by dense residential area (population of 1,454 in 2020)
- Has an available land for the LTE tower
- Has accessible location for setting up transmitters
Madilay-dilay, Tanay, Rizal

- Surrounded by dense residential area (population of 2,806 in 2020)
- Pilot site for RuralCasting
Looc, Castillejos, Zambales

• Surrounded by dense residential area (population of 1,967 in 2020)
• Has an rooftop for the LTE tower
• Has accessible location for setting up transmitters
Pilot Sites
Crowdsourcing

- Target of six (6) pilot communities, nomination through data crowdsourcing
Conduct of Spectrum Measurement in Brgy. Kalawakan, DRT, Bulacan, and Dike Elementary School, Norzagaray, Bulacan
Setting up of Prototype LTE Base Station in San Andres Elementary School, Tanay, Rizal (left) and Bayabas, DRT, Bulacan (right)
Demonstration of REIINN Technology to the teachers and residents of Bayabas, DRT, Bulacan (left) and San Andres, Tanay, Rizal (right)
Conduct of Technology Demonstration in San Andres, Tanay, Rizal and Looc, Castillejos, Zambales
Groundbreaking Activity in San Andres, Tanay, Rizal and Looc, Castillejos, Zambales
Tower Construction in San Andres, Tanay, Rizal and Looc, Castillejos, Zambales
Implementation Challenges

• Currently in talks with regulator for limited permits in the select pilot areas
  • Policy for Government Entities performing quasi-telco functions.
• Restricted ability to import LTE Band 71 COTS Radios and End-user devices.
• Apparent Redundancy with Free Wi-Fi for All – Public Internet Access Program
  • Sustainable Operational Model for Community Buy-in / Participative Networks vs. Free/Subsidized.