

connecting those who need it most



**Workshop on Communication in Extreme Environments
for Science and Sustainable Development
ICTP Nov.2023 Robert Marsh**

Our mission is to get the tools of Information and Communications Technologies (ICTs) -- computing, Internet access, telephony -- to the people and organizations who need them most, in rural and under-served areas in the developing world



Inveneo at a Glance

- California-based non-profit social enterprise
- Founded in 2004, by Silicon Valley technologists
- Designs and deploys turnkey basic ICT infrastructure solutions for organizations in developing countries
- Building an ICT Entrepreneur partner & capacity-building program to 90 partners in 28 countries
- Delivering systems and projects, with partners, in 25+ countries



Bob Marsh, ICIP Training 2008 | Cameroon

ICT4D Case Study, Liberia 2015-2019

- **ERCI 1.0 past success, 2014-15**
(Ebola Response and Connectivity Initiative)
 - 100 sites connected during the Ebola emergency
 - 75 sites in Sierra Leone, partnered with Airtel
 - 25 sites in Liberia, partnered with Cellcom
 - Funded US\$1.25M by Facebook
- **ERCI 2.0, but renamed RECOVER.IT, 2016-2019**
 - Funded US\$1.5M; 50% by USAID, 50% by Orange Telecom
 - Originally up to 50 sites
 - Finally 46 organizations in 36 sites

ERCI 1.0 Liberia portion 2014-15

- **25 sites connected to free high speed enterprise quality Internet for 3 months**
- **NGO offices & Health Facilities in rural Voinjama, Sanniquellie and Gbarnga**
- **Longer Term, Lower Cost, Cheaper, Faster option than vSAT connections during Response**
- **No obligation to continue and pay, but, Prioritized for Sustainability:**
 - **Ability and willingness to continue to pay after 3 month free period**
 - **-ICT Needs & Dedicated ICT Staff**
 - **Impact**
 - **Strengthened existing service provider network**
- **48% still connected after 10 Months**

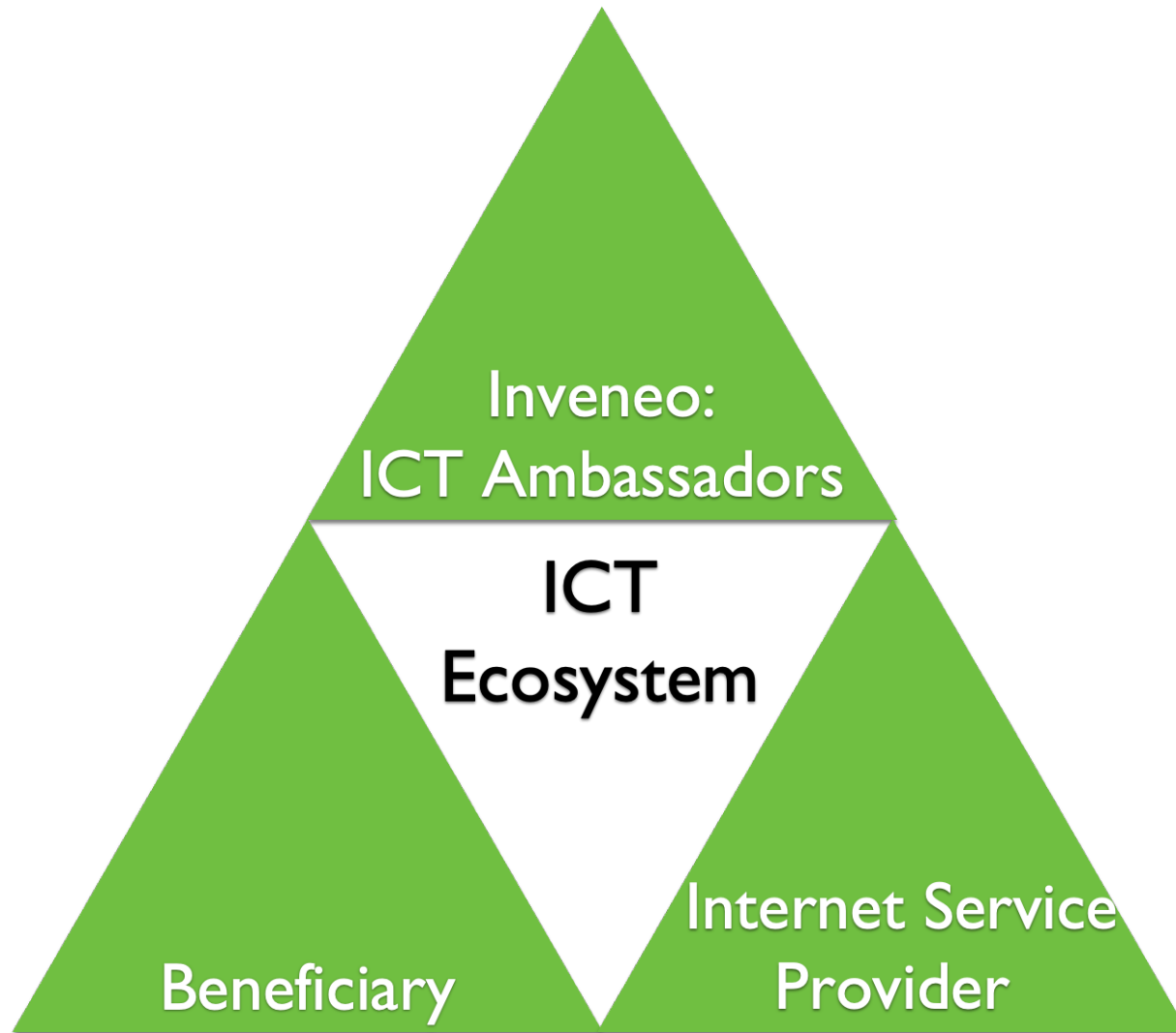
Goals for Beneficiaries, RECOVER.IT Liberia

- **Expand affordable, reliable, and sustainable Internet in 5 rural Liberian Counties, Lofa, Bong, Nimba, Margibi, and Montserrado counties, chosen by USAID**
- **Improve or connect up to 50 site locations with expanded and strengthened digital infrastructure**
- **Build the ICT human capacity of beneficiary organizations, Liberian ICT entrepreneurs and students**
- **Improve ICT technical support from the point of the router to the intranet of the beneficiary**

ICT Challenges in Liberia, 2017

- **Access to reliable, high speed ICT infrastructure, including reliable power**
- **Cost of access to the Internet !!!**
- **Lack of well trained ICT support staff in the rural counties**
- **Speed & efficiency of support services in rural counties**
- **Lack of knowledge of ICT benefits by many residents**
- **Perceived lack of ROI in ICT investment**
- **Usual environmental challenges: heat, humidity, dust**

Proposed Solution Structure



Implementation Methodology

- 1. Discussion with local authorities & knowledge sources**
- 2. Select local tech support partners**
- 3. Site Surveys**
- 4. Sourcing appropriate equipment**
 - local sources preferred, with some imported
- 5. Wait until all equipment is through customs**
- 6. Install equipment & configure**
- 7. Measurement & Evaluation**
 - collect data & monitor
 - survey participants
 - analyze results and report

Inveneo ICT Partners, Liberia

- 1. Established ICT Business (ICIPs)**
 - 2. Established individual who is an ICT expert (ITSEs)**
 - 3. ICT Employee of a beneficiary**
 - 4. Cellcom/Orange employee**
 - 5. Other appropriate persons (Interns)**
- Partnerships are formed through innovative certification and training programs that empower local ICT entrepreneurs with increased visibility, knowledge sharing, resource acquisition, and high-value job creation.**
 - Increased ICT competition which drives UP quality and drives DOWN price**
 - Increased access to reliable, quick response for ICT infrastructure support**

Project Beneficiaries, Liberia

Hospitals: 4

Community Health Team clinics: 5

District Health Team offices: 5

County Service Center offices: 5

Jr. Colleges: 3

Private University: 2

MoE local office computer labs for teachers: 3

Misc. Training Centers & Labs: 6

Recover.IT Liberia Implementation

- Certified ICT partners: 8 staff from 3 ICIP companies
- Local technicians: 13 ICT Envoys
- MACs: 8 staff from MIA, MoE, MoH & NPHIL
- 46 Beneficiary organizations at 31 sites



Example: Envoy in Nimba County

Recover.IT Liberia Capacity Building

ICIPs + MACs: 5 days classroom instruction & hands-on workshop, plus

ICIPs + MACs + Envoys: 5 more days joint instruction & workshop



ICIP = Inveneo Certified ICT Partner
ICT Envoy = local rural small IT business
MAC = Ministry Agency or Commission

Recover.IT Liberia Capacity Building

ICIPs + Envoys: 1 day business practices training



@Boulevard Palace Hotel conference room

Recover.IT Liberia Capacity Building

ICIPs + MACs + Envoys:

- 5 days on-site
- Activities:
 - hands-on installation
 - equipment configuration
 - network provisioning
 - training of local admin users (ICTCs)

ICTC = Information, Communication and Technology Coordinator (at beneficiary org)



@Kakata, Margibi County

Recover.IT Liberia Capacity Building

Envoys + local ICTCs: hands-on maintenance & usage training in all 5 Counties



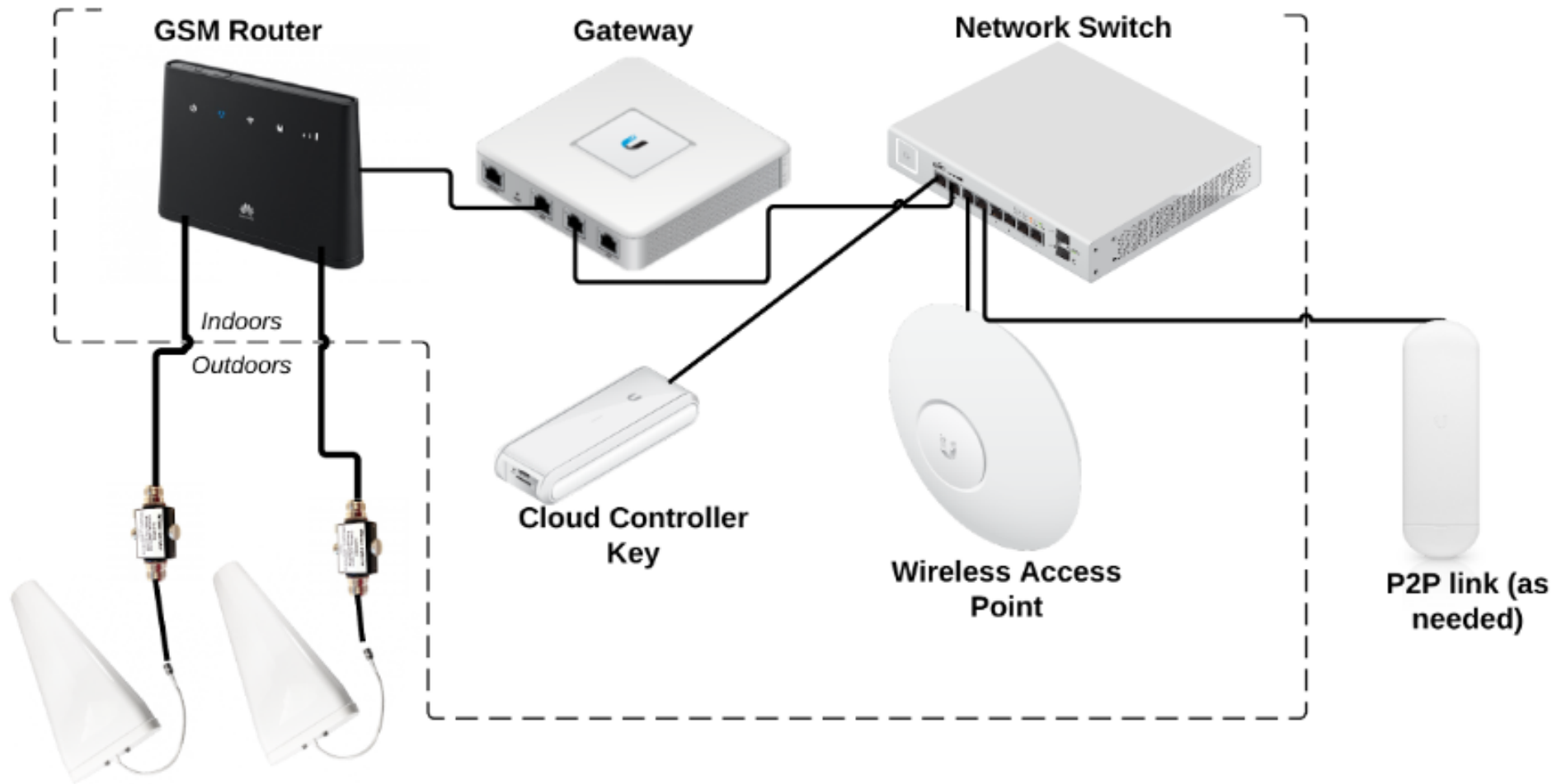
@Ganta Leprosy Hospital, Nimba County

Recover.IT Liberia Follow up & Verification

- Inveneo staff visited all 46 Beneficiary organizations
- All equipment & networks re-tested, verified, and updated (if needed)
- Local ICTCs present & participating
- M&E surveys & data collected from beneficiary staff (some data collected by Envoys)



Basic Installation Diagram, Liberia



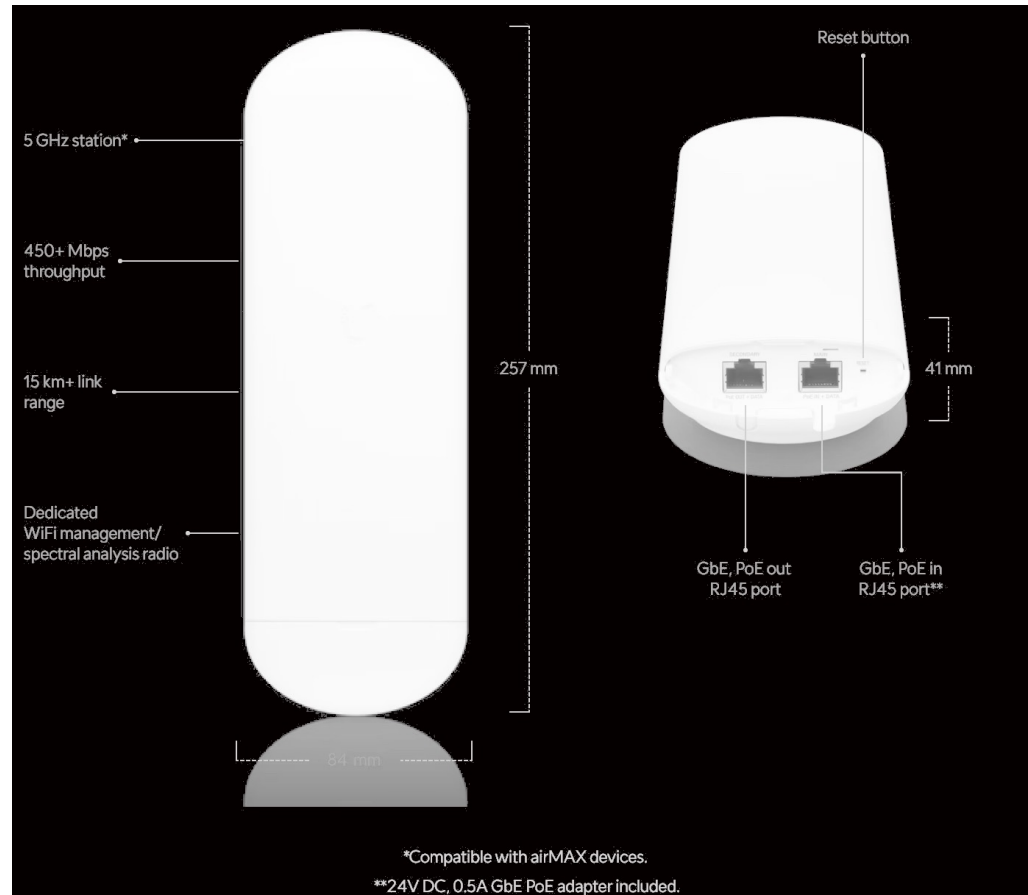
Some sites used existing 2Mbps(?) P2P link from MTN Liberia
One other used new 1Mbps P2P wifi link from Orange tower

Last Mile Link Equipment



**Needs 7W max @ 24VDC, antenna gain 29dBi, Tx power 25dBm
Cost in USA \$179**

Last Mile Link Equipment



Needs 9W max @ 24VDC, antenna gain 16dBi, Tx power 25dBm
Cost in USA \$49 to \$129

Other Important Equipment

- Cabling, CAT5, both indoor and outdoor
- Cabling, RF low loss (esp. for 5GHz systems)
- Lightning protection, esp. for outdoor antennas
- Grounding hardware
- Power Supply conditioning
 - Surge protector
 - Voltage Stabilizer
 - UPS (optional, but usually needed on grid power)
- Power Tools!! (Generally not available in LDC country's rural areas)

Final Results, Liberia RECOVER.IT

Connected Sites: 32

Connected Organizations: 46

Number of ICIP companies trained and certified: 3

Number of ICTC contacts initiated: 43

Number of IT Envoys trained and certified: 13

Site Installation Details, Liberia

Type	Description	# of Sites	Install Duration, estimated days
Standard <i>No or small LAN</i>	Single Floor Building, 1-2 APs	6	1.5
	Multi Floor Building, 3+ APs	7	2
	2 Buildings, 4+ APs	6	3
Complex <i>Existing LAN</i>	Existing LAN, 3+ Buildings	7	4
	Existing Internet Provider, 2+ Buildings	6	3.5



Grazie molto

Questions please ...