



FIRST MILE SOLUTIONS

Village Area Networks

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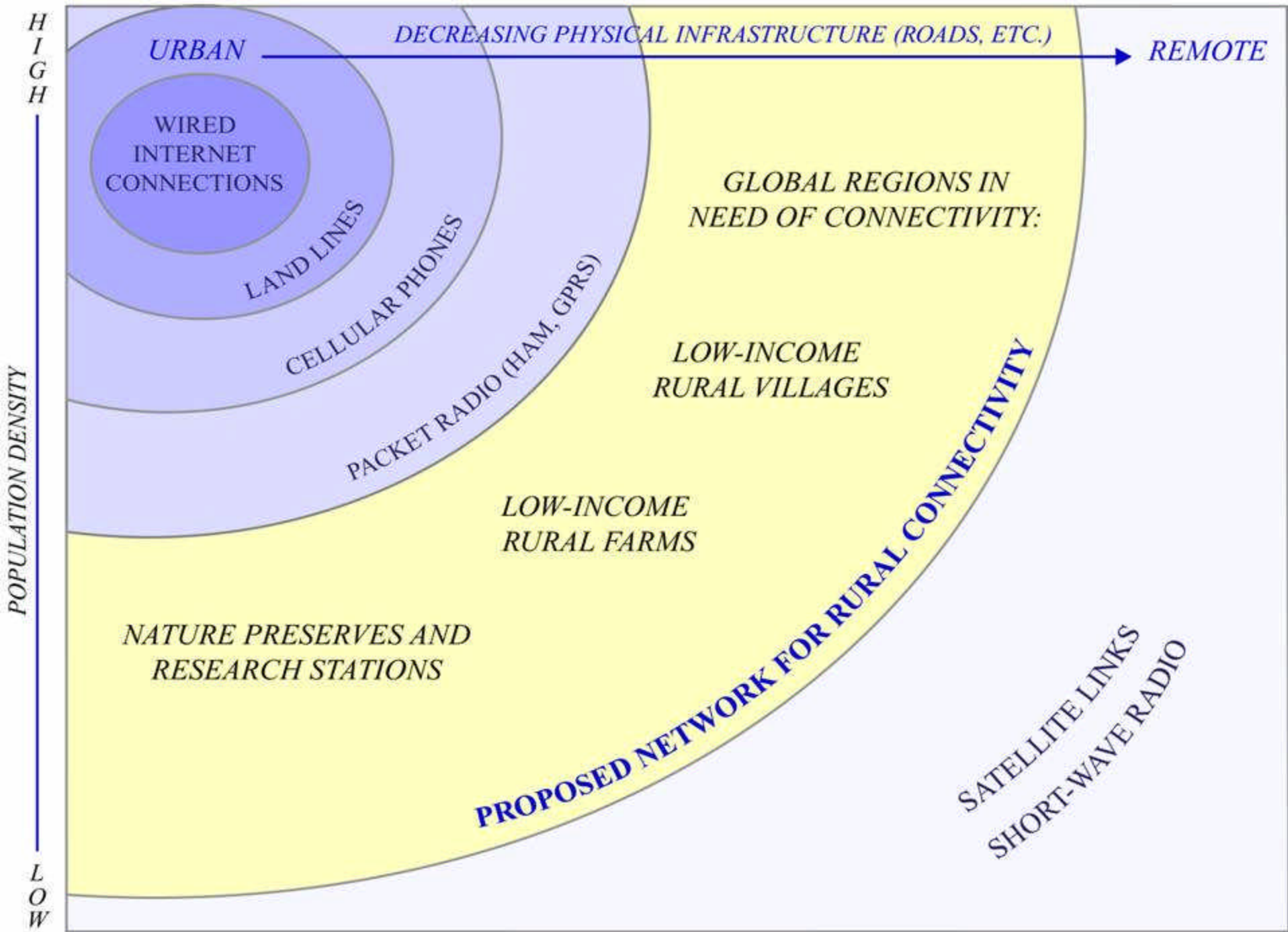
Driven by private investment and widespread entrepreneurial activity, the economies of developing regions grow vigorously, creating jobs and wealth and bringing hundreds of millions of new consumers into the global marketplace. China, India, Brazil, and, gradually, South Africa become new engines of global economic growth, promoting prosperity around the world. The resulting decrease in poverty produces a range of social benefits, helping to stabilize many developing regions and reduce civil and cross-border conflicts. The threat of terrorism and war recedes. Multinational companies expand rapidly in an era of intense innovation and competition.

C.K. Prahalad, Allen Hammond, "Serving the World's Poor, Profitably", Harvard Business Review, R0209C, September 2002



4 Billion Rural People Remain Unconnected

- **Chicken and egg problem:**
 - Egg: Affordable, scalable last-mile communications infrastructure
 - Chicken: Market for last-mile communications
- **What is needed: a low-cost, low-risk means of providing widespread connectivity so as to:**
 - Overcome infrastructure cost barriers
 - Establish scalable “seed” infrastructure that can scale with demand
 - Test out digital rural applications/services
 - Stimulate the rural development dynamic
 - Create incentives for deregulation and delicensing





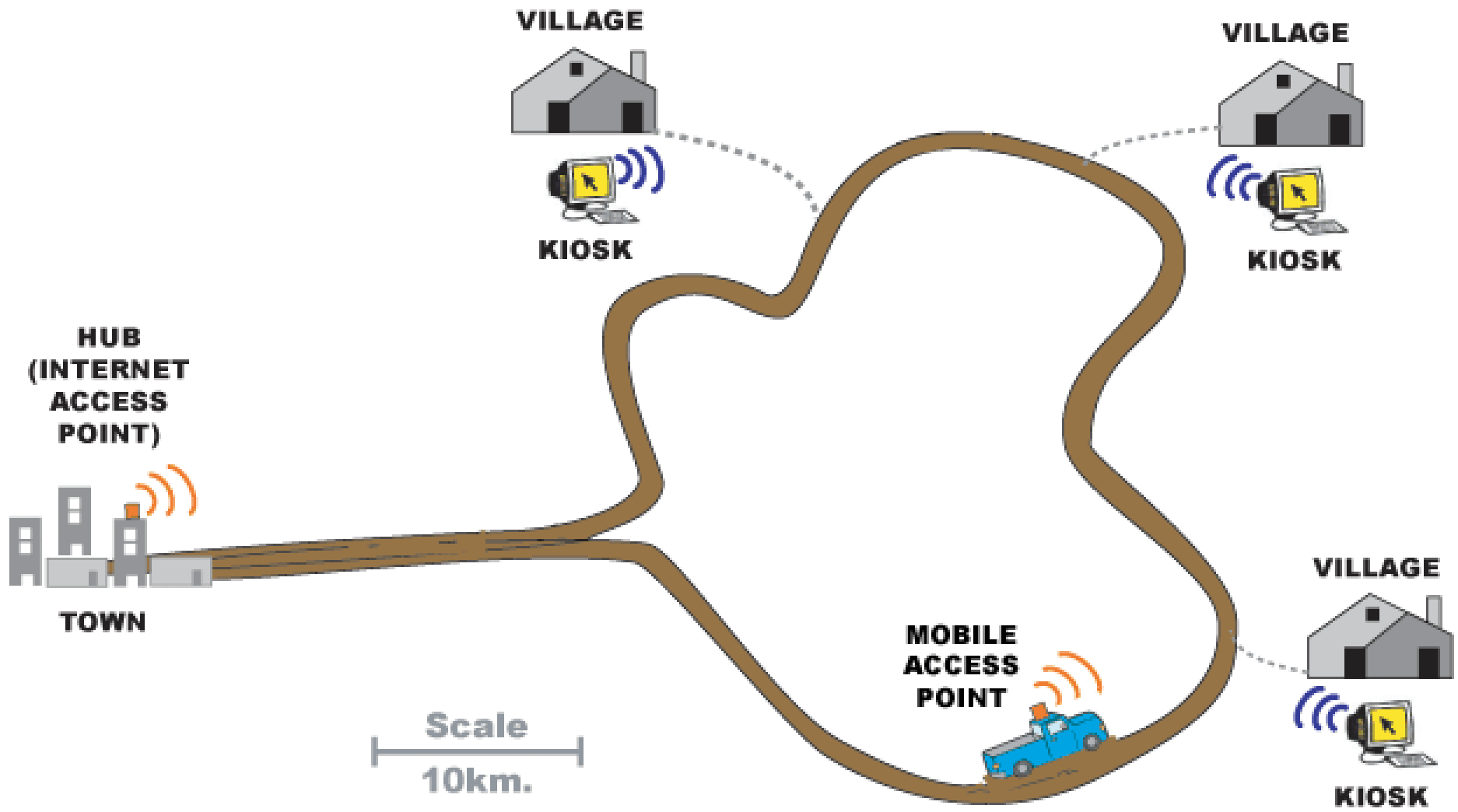
First Mile Solutions Overview

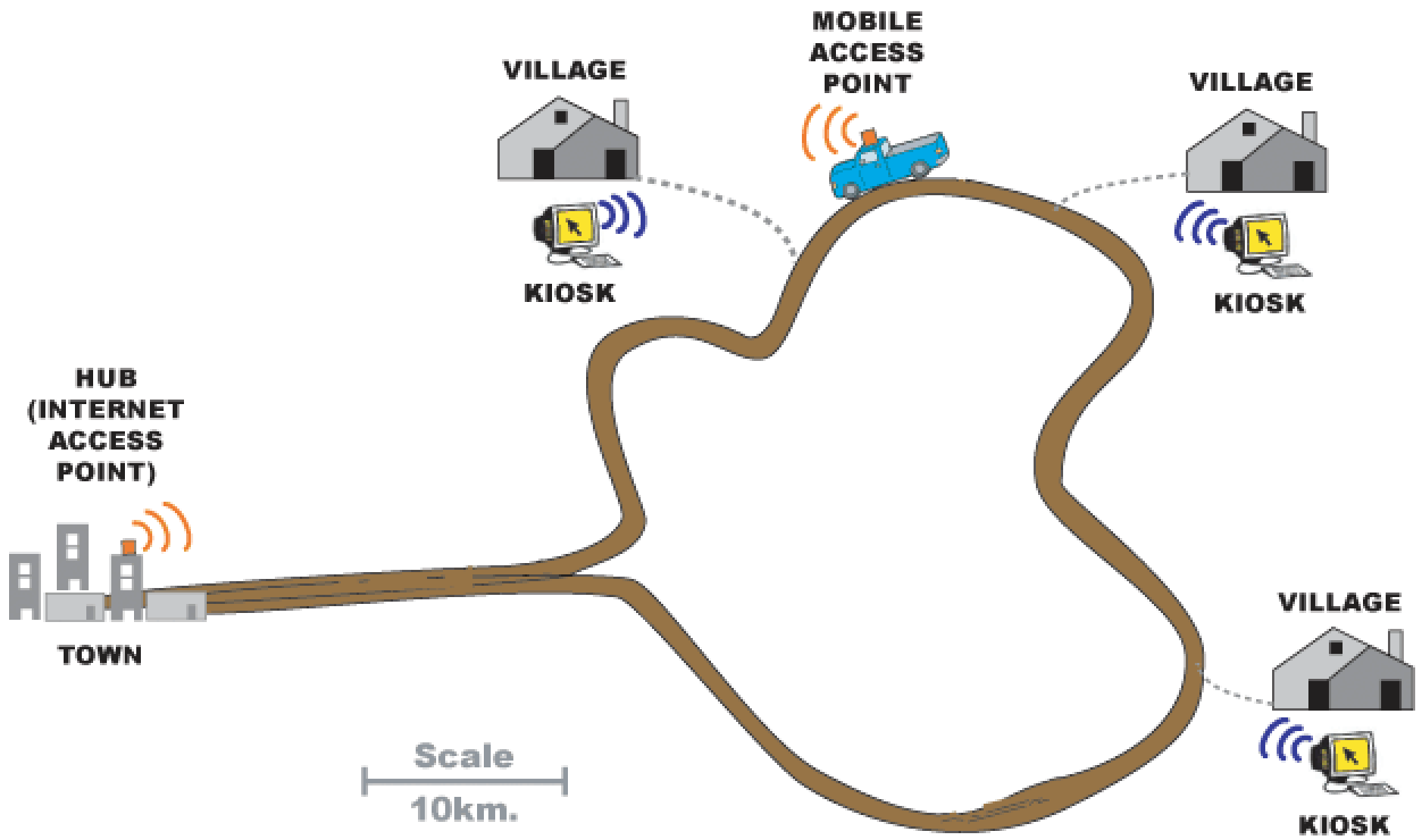
- Mission: to help public and private organizations in developing nations bridge the digital divide by providing affordable, scalable communications infrastructure and by building internal capacity in wireless networking.
- Leverages two major trends that are rapidly driving costs down: WiFi (802.11x wireless) and digital storage
- *Cached wireless network intelligence*
- Network products designed for affordable rural access
 - Globally-exportable, turn-key rural access point available in March 2004
- Who do we work with?
 - Telcos/ISPs
 - NGOs/Academia
 - Governments/ Multilateral Institutions

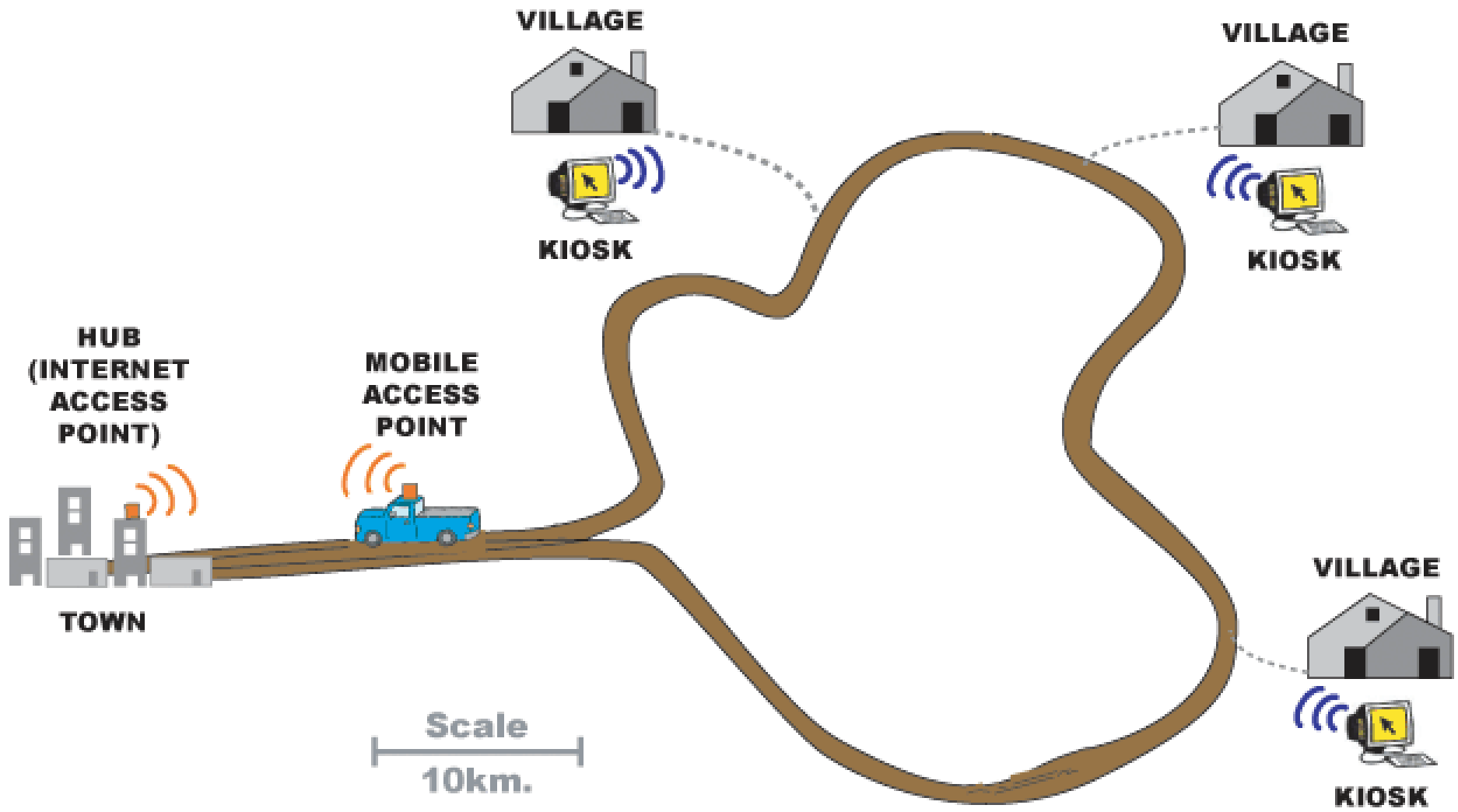


First Mile Solutions Approach

- Rural ICTs typically start as a shared resource
- This has serious drawbacks for real-time infrastructures:
 - High level of adoption required to achieve cost recovery
 - Both parties have to be on-line at same time to leverage full value of real-time infrastructure
 - Asynchronous communications correlate with shared access
- Rural design constraints
 - Low-Power (availability and regulatory)
 - Robustness
- Insights
 - *Asynchronous is sufficient*
 - *Transportation infrastructure can be used to create a network*

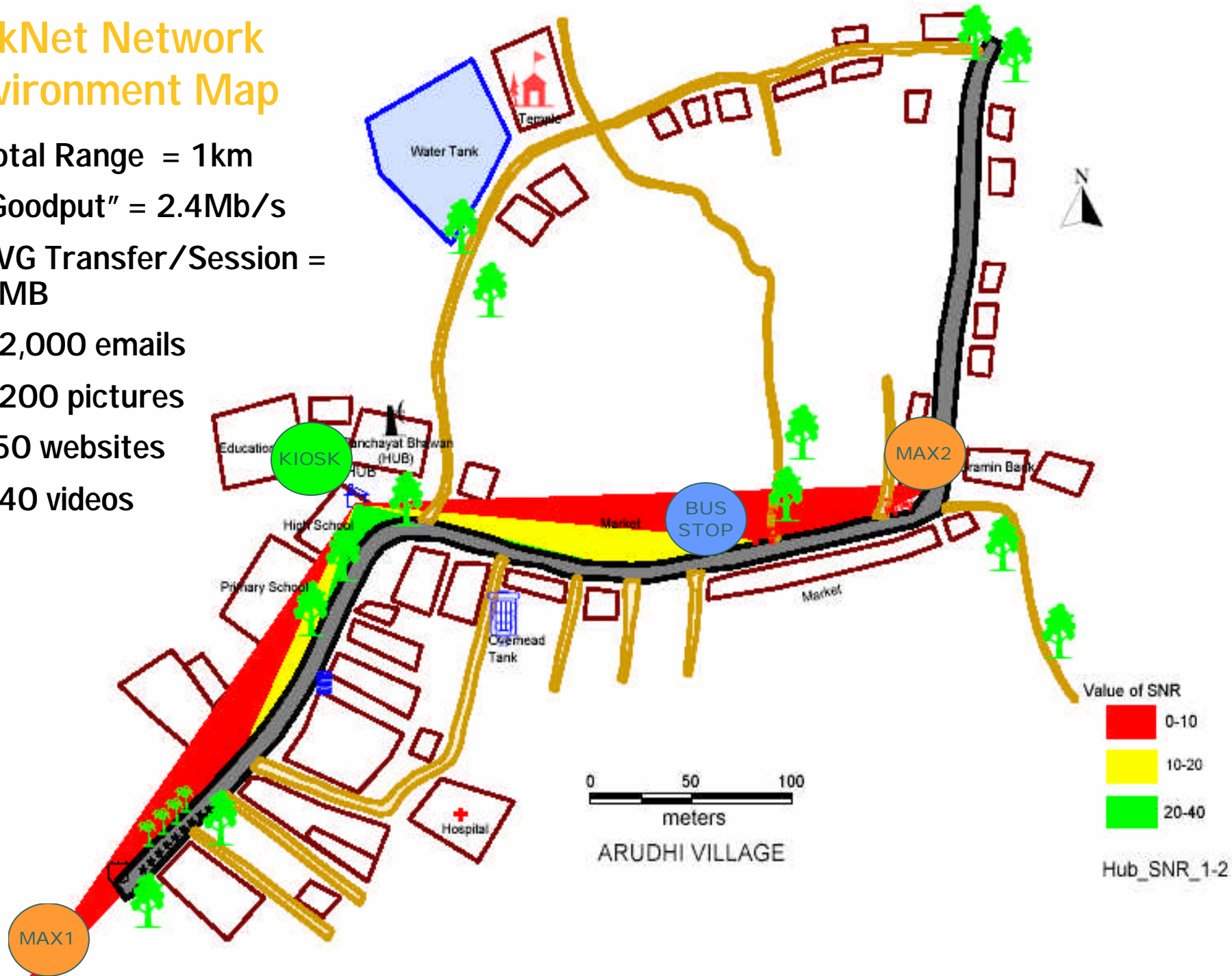







DakNet Network Environment Map

- Total Range = 1km
- "Goodput" = 2.4Mb/s
- AVG Transfer/Session = 40MB
- 2,000 emails
- 200 pictures
- 50 websites
- 40 videos





DakNet v0.1: Technology & Lessons Learned

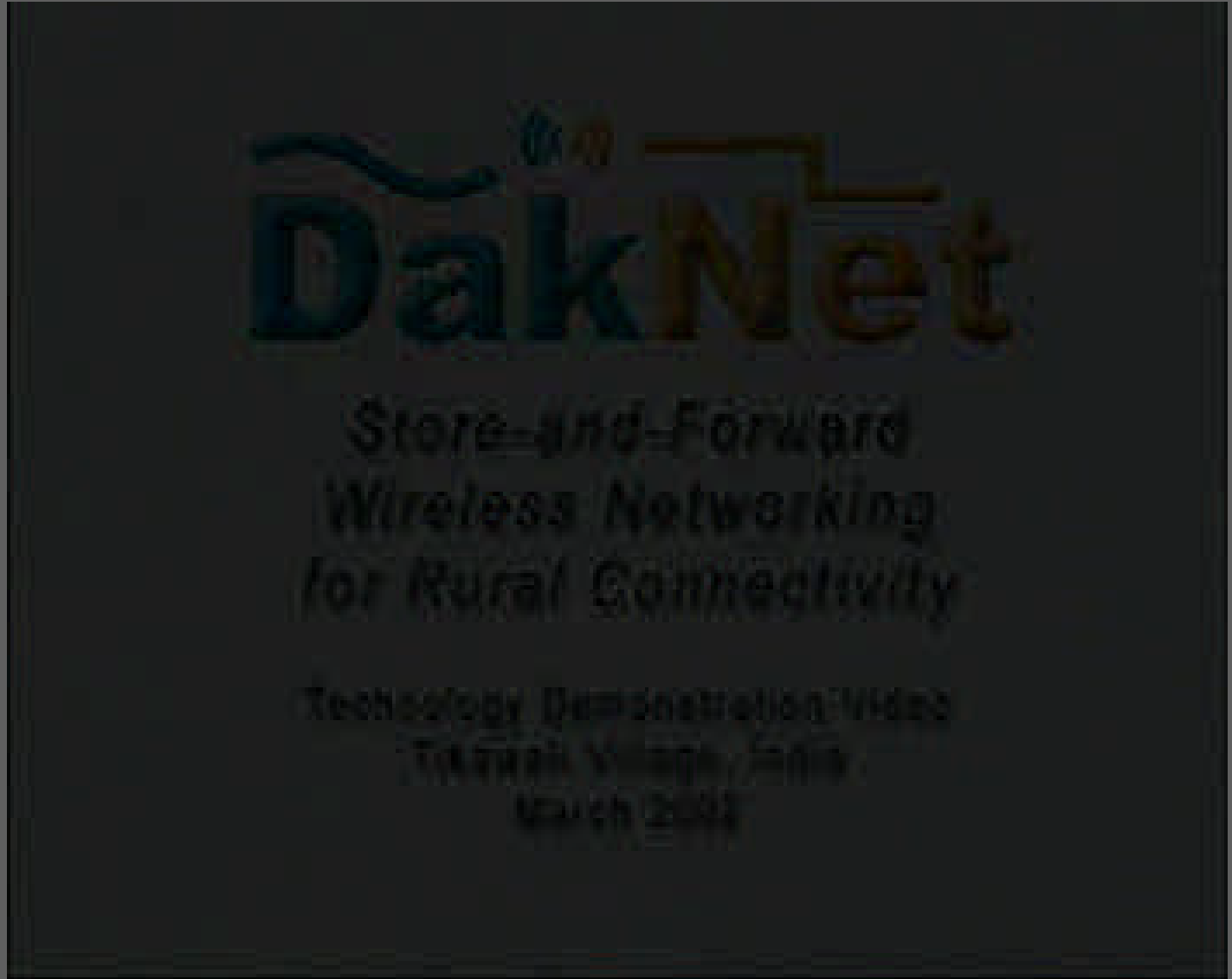
○ Technology


- Laptops with WiFi cards, no external antennas
- Custom JAVA-based server and interface
- No dynamic Internet routing

○ Lessons Learned

- Need more affordable, rugged, and ugly devices
- Connection-dropping
- Standardized protocol to integrate apps, including Internet

DakNet Technology Demonstration





DakNet v0.4: Technology & Lessons Learned

- **Technology**

- Low-cost, rugged access point
- Resume functionality
- Expanded range and capacity

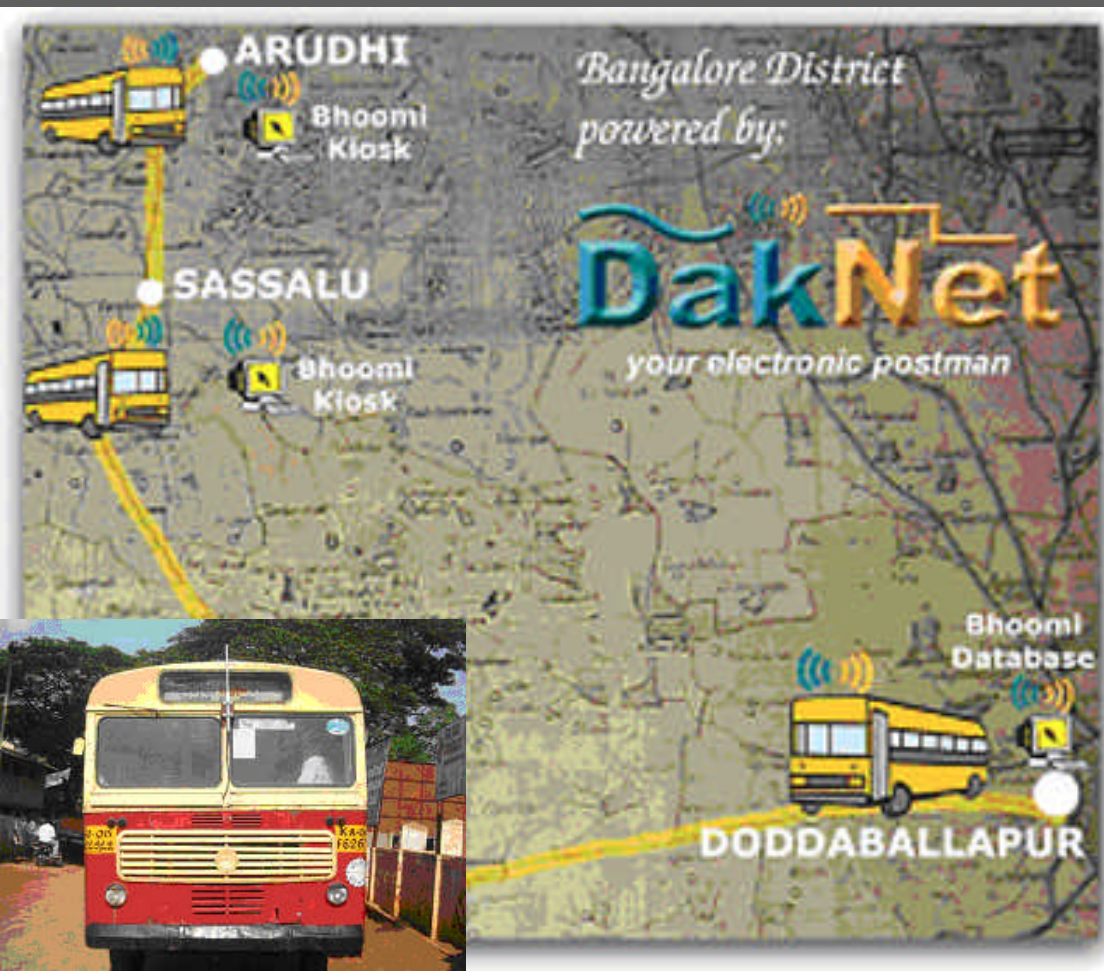
- **Lessons Learned**

- Power not always on in villages
- Wireless hardware compatibility
- Need additional value-added services for sustainability

DakNet Bhoomi Implementation

DakNet-Bhoomi Pilot
Rough Cut

Rural Karnataka, India



- Computerization of all land records in state of Karnataka -- Manual land records illegal
- Some 500,000 land record transactions/month
- Seeking means of decentralizing its database using wireless technology

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SOLUTIONS

DakNet v0.9: Technology & Lessons Learned



- Technology
 - Fixed and Mobile Access Points
 - Mesh capabilities
 - Email and Cached Web browsing
- Lessons Learned
 - Protect against viruses and spam
 - Need remote administration tools support and more local capacity building
 - Need user-friendly network interface and more user-friendly installation package

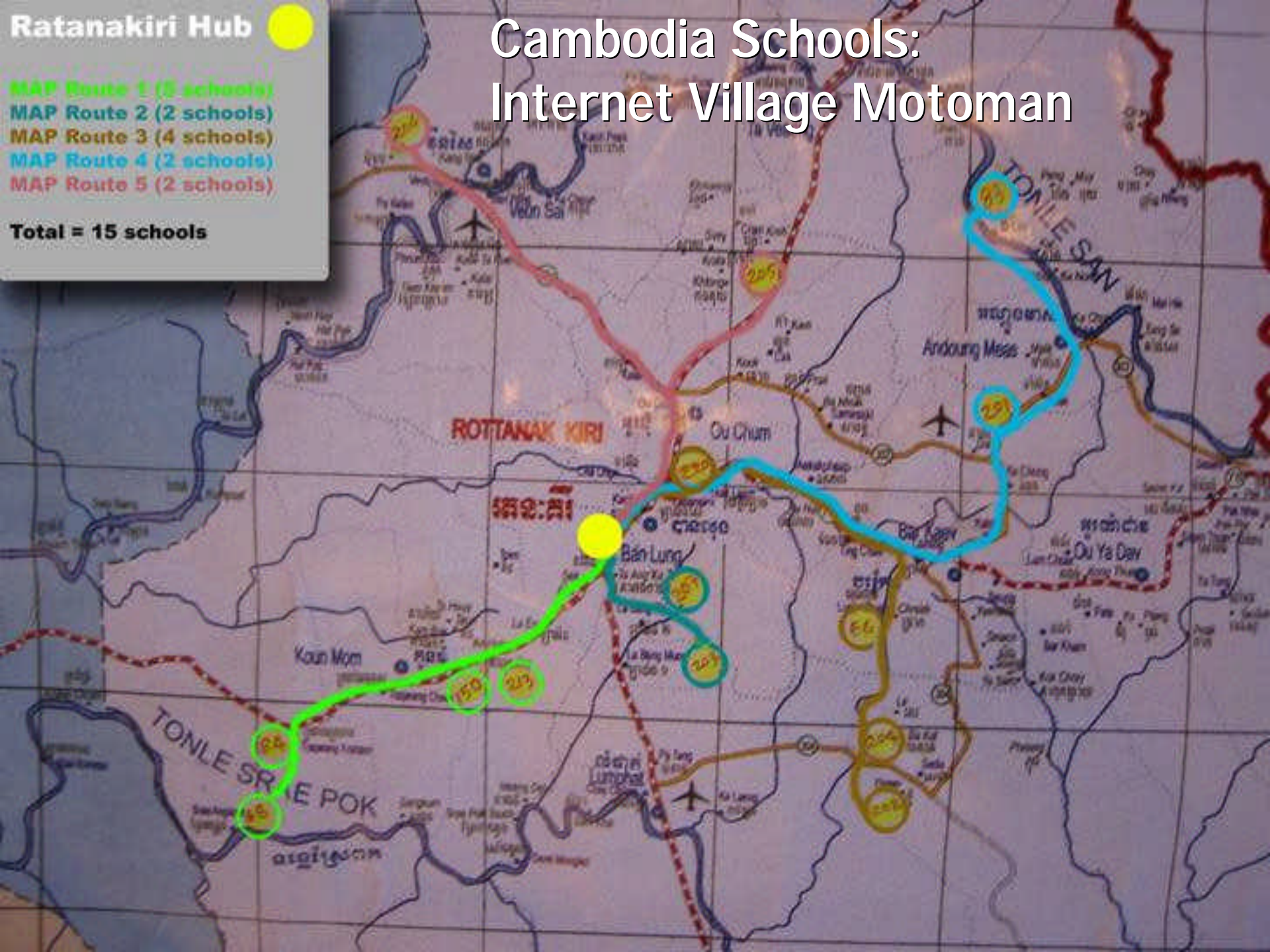
Ratanakiri Hub



- MAP Route 1 (5 schools)
- MAP Route 2 (2 schools)
- MAP Route 3 (4 schools)
- MAP Route 4 (2 schools)
- MAP Route 5 (2 schools)

Total = 15 schools

Cambodia Schools: Internet Village Motoman



Internet Hub With Satellite & WiFi Antennas



"Internet Village Motomen"



"OxNet"



Mounting WiFi Antenna On School



School 66: Sending First Email



Welcome to

Ratanakiri



Home
About
Marketplace
Projects
News
Contact us
Visit us

Projects >> Rural Schools



School #68

The World Mate School Number Eight
Phum Village 1, Sre Ankrong Commune, Kon
Mom district.

Distance from Hub: 72km

Meet the Teacher



Name: Moeun Boreirath

Age: 20

Gender: Male

Occupation: English and computer teacher

From: I am from Phnom Penh, I lived in
Future Light Orphanage (FLO)

In my future: In the future I want to do
English and computer teacher

Send the school a message!

Email the teachers
and students at this
school at

postman@school68.kh.daknet.net

E-mail is sent via the
[Internet Village](#)
[Motoman](#) network!

Behind the Scenes








Enjoy behind the
scenes photos from
the building and
launch of the Internet
Village Motoman
network!

Ratanakiri Discussion Group

See what all the
schools are talking
about on [the](#)
[discussion group](#).

Village Area Network

Legend

-  FMS VAN-APX Networking Kit
-  WiFi Data Transmission
-  WiFi Local Area Network (wLAN) and ISP
-  WiFi Wide Area Network (wWAN)
-  Village Area Network (Store-and-Forward)

VAN-APX Networking Kit



Turn-Key Access Point for wLANs, wWANs, and Village Area Networks including V-to-V Mesh Capabilities

Easy to set up, maintain, and expand

Designed for rugged, outdoor use in low-power environments

We provide initial on-site training

Affordable, scalable rural communications infrastructure!



Specifications

- IEEE 802.11b/g interface at 2.4Ghz
- 2 10/100 Mb Ethernet ports
- 1 Serial Port
- 64MB SDRAM
- 256-512MB CF-based Memory
- Accepts 8-14v DC Power Supply
- Operating Temperature 0-60 °C
- wLAN/wWAN supports VOIP apps
- VAN specific features:**
- Avg drive-by "goodput" = 2.47Mb/s
- Supports up to 3-Tier P2P Mesh Network
- Audio and Visual Feedback
- Includes Windows/Linux Compatible client software
- SMTP client platform supports email, cached web browsing, voice mail, and integration with several end-user applications

Satellite Internet Uplink and wLAN



Access Point Router for wWAN



Mobile Access Point for VAN



Village Kiosk and Fixed Access Point for VAN



Available March 2004 from:



www.firstmilesolutions.com



Applications?

- Email
- Cached Web browsing
- Village Voice Mail
- Distribution of Aggregated Web Caches
- Village Commerce (vCommerce)
- Telemedicine
- Remote Learning
- ?
- ?

Thank You!



www.firstmilesolutions.com

Photo: Betsy Heathington



"Motoman" After 16km Ride Through Swamp

Purchasing Power
Parity in U.S. dollars

Population in millions

