Award #1831547

University at Albany Research on Emergency Preparedness and Response

Mariya Zheleva (Principal Investigator)
Petko Bogdanov (Co-Principal Investigator)
Mila Gasco (Co-Principal Investigator)
Jose Ramon Gil-Garcia (Co-Principal Investigator)

College of Engineering and Applied Sciences
University at Albany State University of New York

CTG
University at Albany
State University of New York

The problem

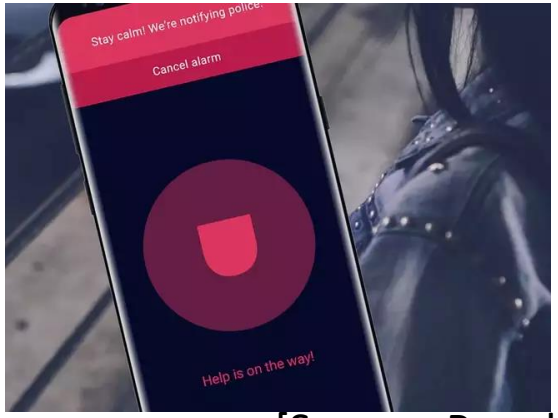
- Emergency preparedness and response increasingly rely on high-speed wireless connectivity for information exchange
  - Across agencies
  - Between agencies and residents

- FirstNET – nation-wide first responder network by the US government (NTIA)
  - Utilizes a slice from AT&T network for prioritized first responders access
  - Requires private partnership for full realization

- *The current first-responder broadband access is inherently biased towards urban areas.*

[Source: Critical Communications Review]

[Source: PowerDMS]



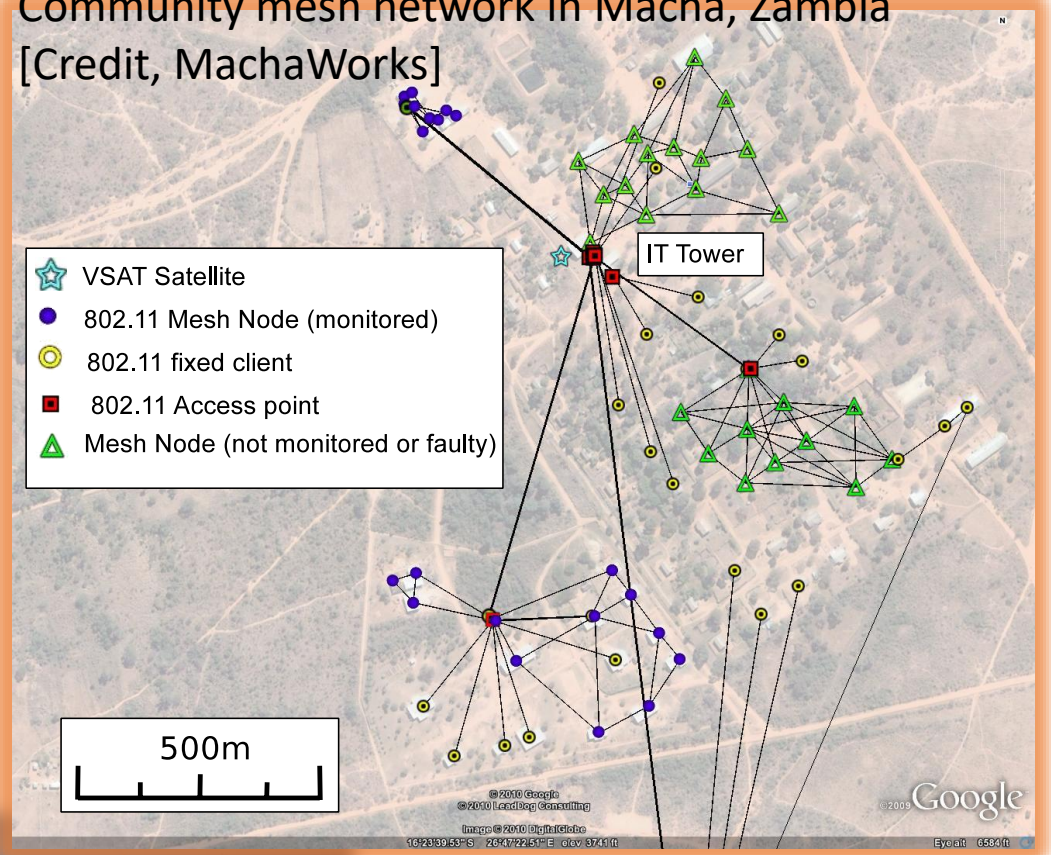
[Source: Popular Science]

Towards a solution

- Rural communities take charge of their technological progress.
  - Examples include some from our prior work – cellular networks over community Wi-Fi mesh in rural Zambia.
  - Adoption and use in Europe vs. Latin America
  - Digital divide studies in Mexico, U.S. and Italy
  - IT in emergency situations

- Town of Thurman TV White Space a brilliant example of a community in charge.

Community mesh network in Macha, Zambia
[Credit, MachaWorks]



[Cellular network deployment in Macha, Zambia]

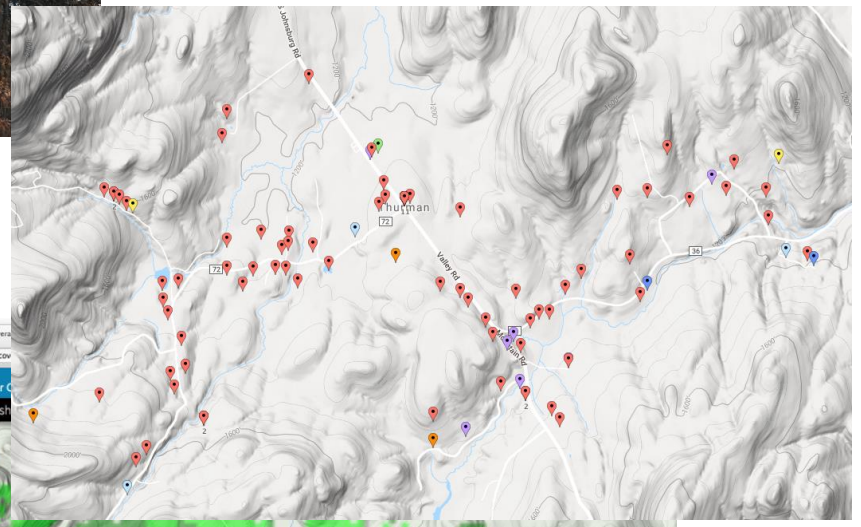
Why a collaboration with Thurman

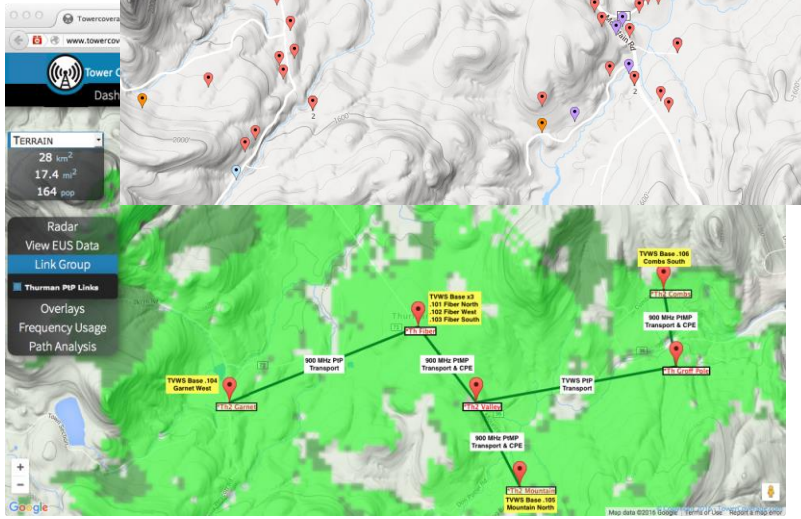
Community

- Classical example of a rural disconnected community
- In charge of your technological progress
- Receptive to new ideas
- Wide-area blanked coverage through your TV White Space network

First responders

- First responder agency with an outlook towards technological progress and innovation





What is this project about

Emergency Preparedness and Response – EPR

Goal

- *Analyze the feasibility of EPR information dissemination in disconnected rural areas using TV White Space community networks, human and first responder mobility.*

Objectives:

- Smartphone application to maximize the reach of EPR information to responders and residents.
  - Using a mix of Cellular, TV White Spaces, Wi-Fi, resident-to-resident and resident-to-responder
- Methods for efficient information dissemination via mixed networks
  - What is the best way to use networks and human mobility to get information across?
- First responders online through community networks
  - Technology to allow first responders vehicles to remain connected when traveling through community networks
- Working with community members to understand adoption and use

What is this project NOT about

- Residential Internet Access
  - We maximize the reach of EPR (not just any) information
  - Where Internet access is available, we use it for information access
  - Where Internet access is not available, we extend with resident-resident or responder-resident data passing
- Management, financing or oversight of Thurman's TV White Space network. Funds from our project cover:
  - The development of the smartphone application EApp
  - The study of Thurman's TV White Space network for mobile use
  - The development of a mobile TV White Space client for first responders
  - The deployment of these research prototypes with residents and first responders
  - The continuous evaluation of adoption and use

How do we operate?

- We identify fundamental issues that have not been explored in prior research or the industry
  - Can we use wide-area wireless networks (like TVWS) and human mobility for better emergency preparedness and response?
    - How? → develop research technology
  - Would residents and first responders find our solutions useful?
    - Engage with community to study use and adoption
- Using our expertise from previous research we develop prototype technological and policy solutions. We evaluate their benefits and drawbacks
- We are testing these ideas
  - Not looking to commercialize
  - Not looking to maintain network or become a provider of any network or tech services
- Our progress is continuously followed and evaluated by the funding agency (National Science Foundation)

Maximizing the reach of information to residents

Phone-to-phone exchange of information

Townhall meeting

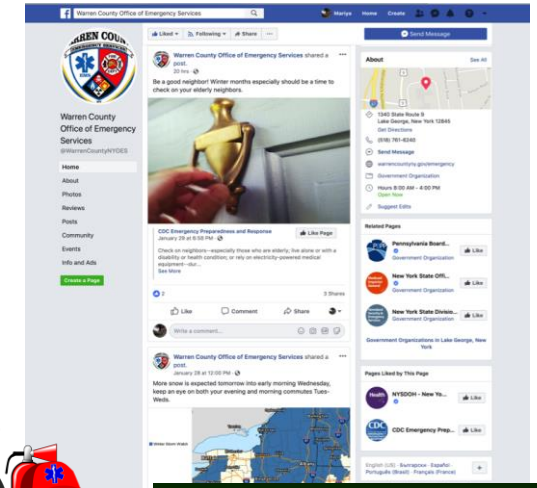
Diner

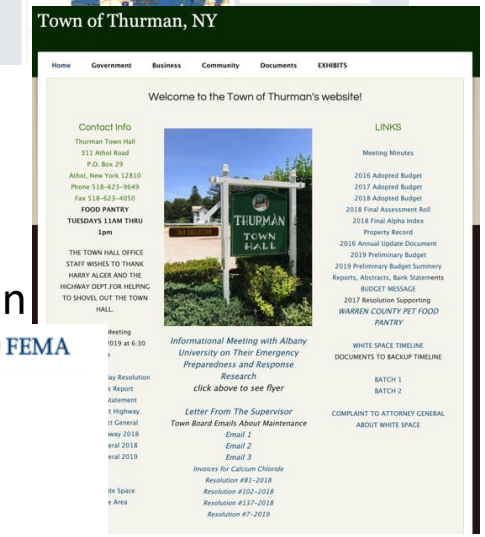
social

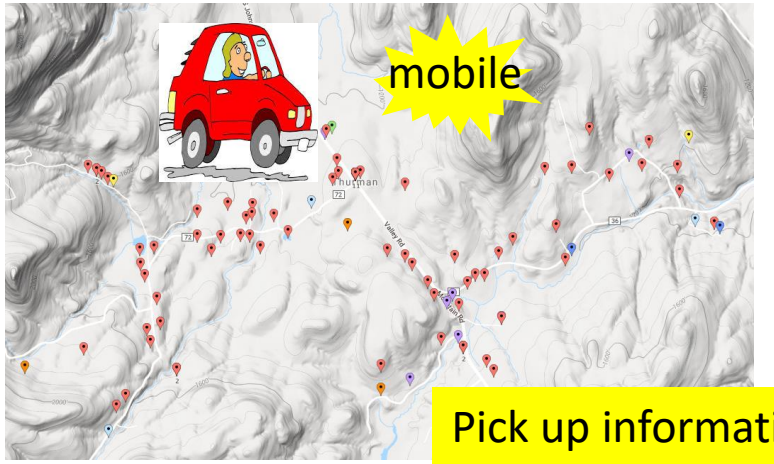
Bob; ~~offline~~

Digital divide

First responders with emergency preparedness/response information

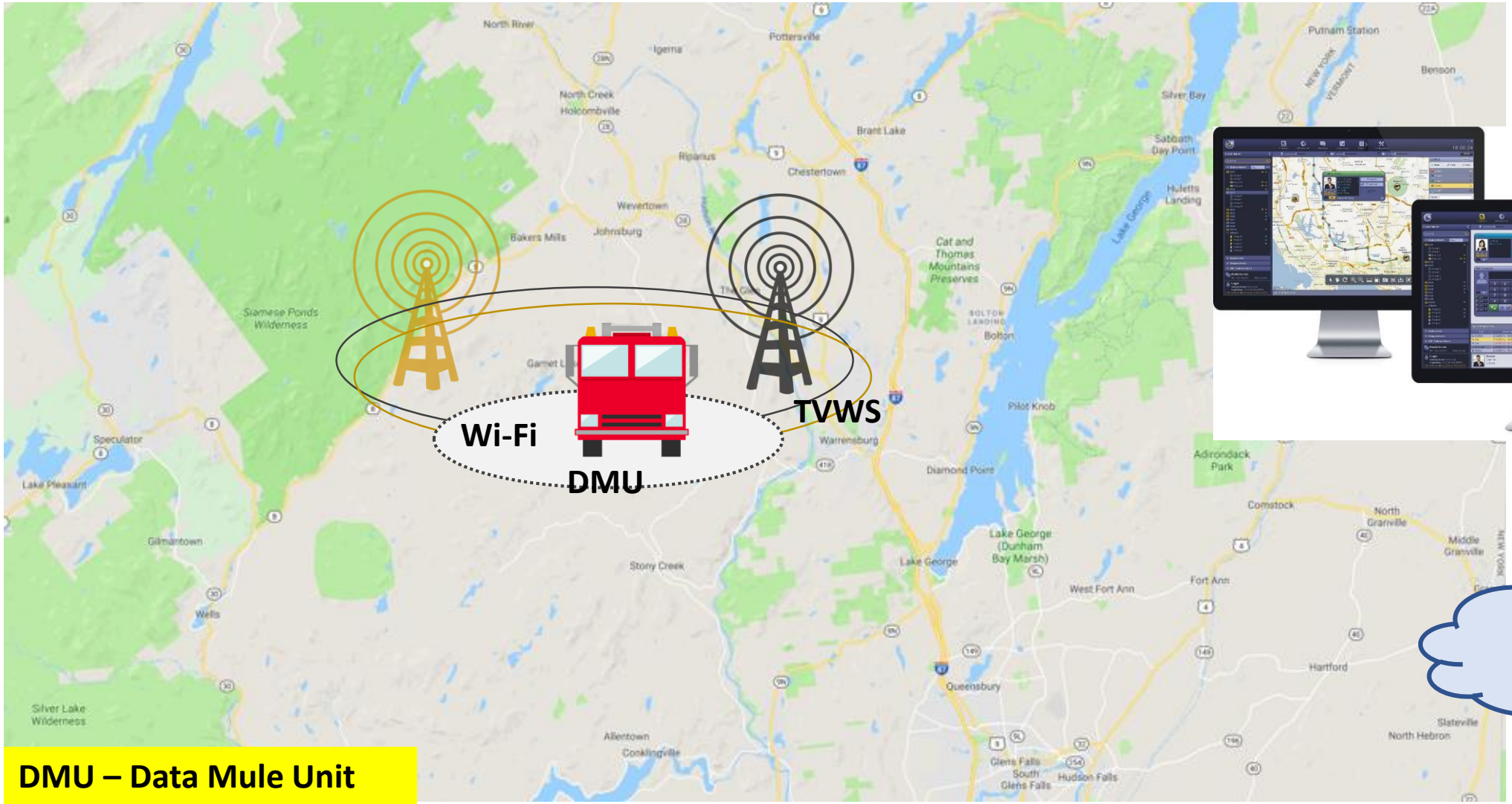




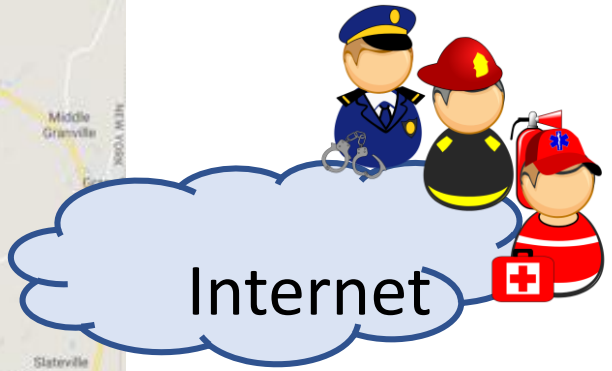


Pick up information as you travel

Maximizing the reach of information to responders



[Source: Hytera]



DMU – Data Mule Unit

Community engagement with technology

- Smartphone app version alpha
  - Mid Spring 2019
  - 10 users; ready to test and get involved in ironing out functionality.

- Smartphone app version beta
  - Early-mid Fall 2019
  - Additional 40-50 users
  - Selection process to be refined

- First responders connectivity
  - First tests from the Ualbany team in Y2 (2020)
  - Early deployment with first responders in Y3 (2021)

Community engagement on adoption and use

Needs assessment for technology adoption and acceptance in the community (February-April, 2019):

- In-depth interviews with government officials and first responders
- Focus groups with residents
- Application to participate

EApp co-production process (February-March, 2019):

- Ex ante focus groups
- Ex post focus groups: testing the app

Evaluation of adoption and use throughout the project (2020-2021):

- In-depth interviews with government officials and first responders
- Focus groups with residents

How to engage with us

- Fill out an online application form by March 5th
  - https://goo.gl/forms/PxhHx7bkaIXhoQmc2
- Complete printed forms now

Community Engagement - FAQs

- **How much time is required to be involved in this research?**
  - Co-production: 2 stages; 2 hours per stage; 4 hours time commitment per participant.
  - Needs assessment: 1 stage; 2 hours time commitment per resident; 1.5 hours time commitment per responder
  - EApp engagement: focus groups with residents (2 hours/resident) and interviews with first responders (1.5 hours/responder) every 6 months over the next three years. 12 hours per resident and 9 hours/responder over 3 years.
- **What will I have to do to participate in the research?**
  - Willingness to participate and answer questions to the best of your ability.
- **Do I need to have technical skills?**
  - Participants testing the EApp will need to be prepared to use smart phone technology.
- **Do I need to have Internet access or cell service**

  -- No, you can still participate in our study even if you don't have these

Community Engagement - FAQs

- **Will I have to come to meetings and, if so, how often?**
  - Meetings will take place for the needs assessment, co-production and the initiation of EApp testing.
  - Researchers will reconnect once every 6 months with those carrying phones and testing the EApp to get feedback, evaluate the application and refine it accordingly.
- **Will the researchers need to come to my home?**
  - No, researchers will be conducting any meetings in a public space (such as the Thurman Town Hall).
- **Will the researchers need to call my phone?**
  - The researchers may need to contact you by phone when coordinating focus groups and interviews related to the needs assessment and co-production focus groups.

Questions?

Mariya Zheleva

mzheleva@albany.edu