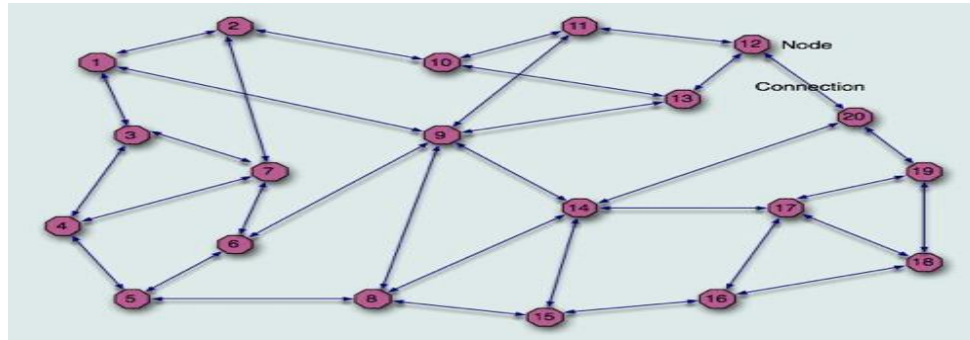


# Boosting Rhode Island's “Communications Resiliency” via *Low-cost, High-Impact Mesh Networking*

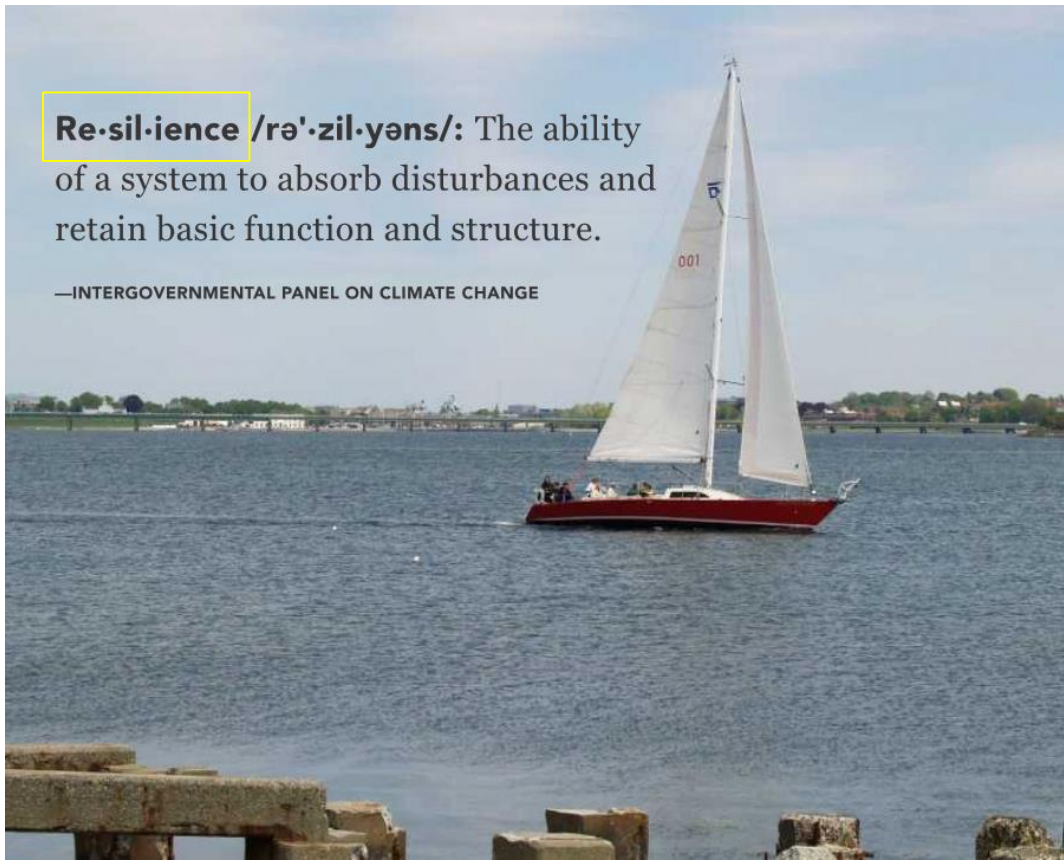


Michael “Mac” Cullen

Stone Soup Leadership Institute’s 15<sup>th</sup> Youth  
Leadership Summit for Sustainable Development  
June 22-28, 2019 • Newport, RI

**Re-sil-i-ence** /rə'zil-yəns/: The ability of a system to absorb disturbances and retain basic function and structure.

—INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

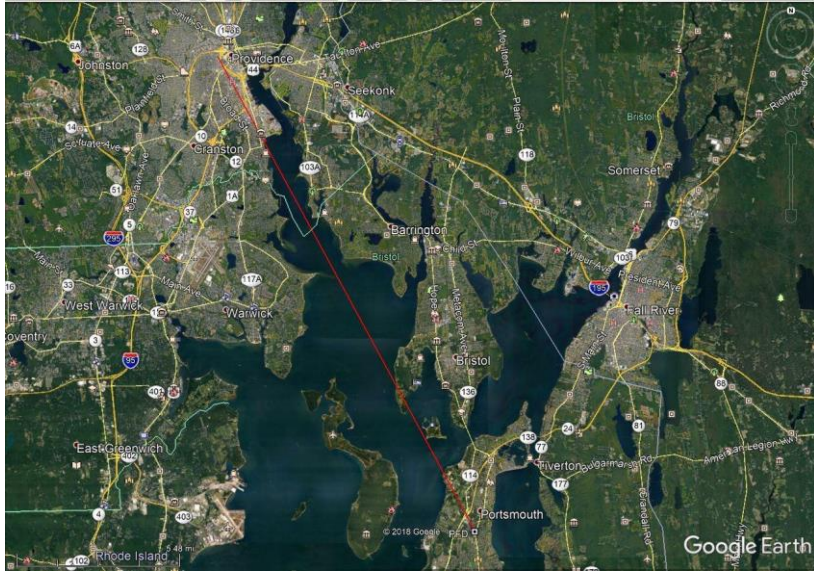


# Resilience

Aquidneck Island Resilience Strategy Summary - 2017, written and published by University of Rhode Island Coastal Resource Center and Rhode Island Sea Grant.

# Boosting RI's "Communications Resiliency"

## My Summer 2018 Scout Project



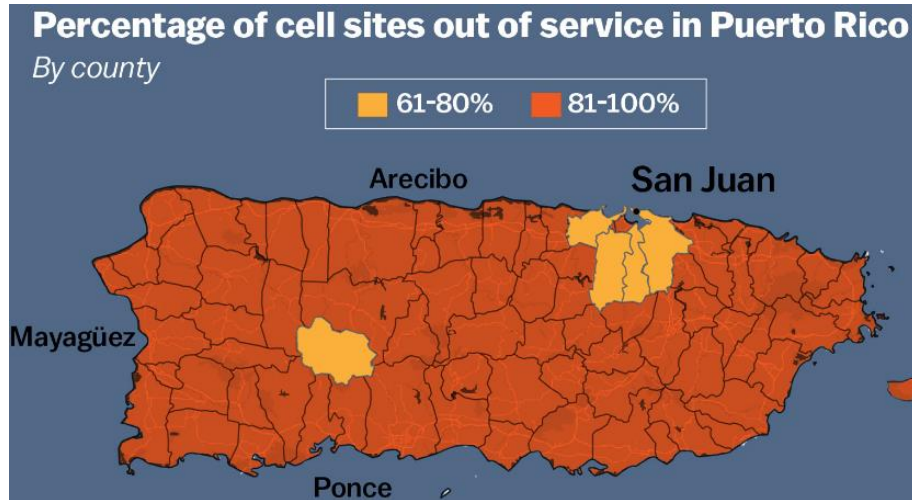
**Goal: Connect Portsmouth to Providence**



**100 Atwells Ave, Providence**

# Without “Communications Resiliency”

Following Hurricane Maria, there was a loss of communications that lasted months.



# Mesh: A Resiliency, Sustainability Idea

1. Plan for disasters
2. Leverage low-cost, mesh technology
3. Find tall buildings (church towers, hospitals)
4. Use solar power & batteries
5. Organize your community partners + towns



“Industrial” mesh



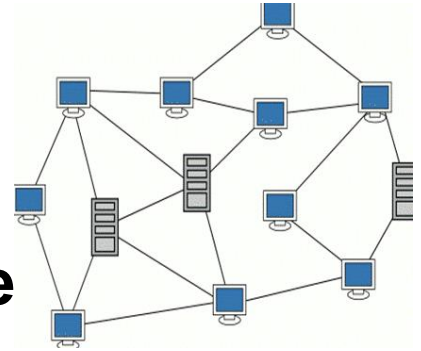
“Consumer” mesh



# Boosting RI's "Communications Resiliency"

## What is Mesh?

- Mesh is “ad hoc” networking
  - It’s self-discovering, self-configuring, self-advertising, and self-healing
  - There’s no choke point
  - It uses “smart” routing of bits & bytes



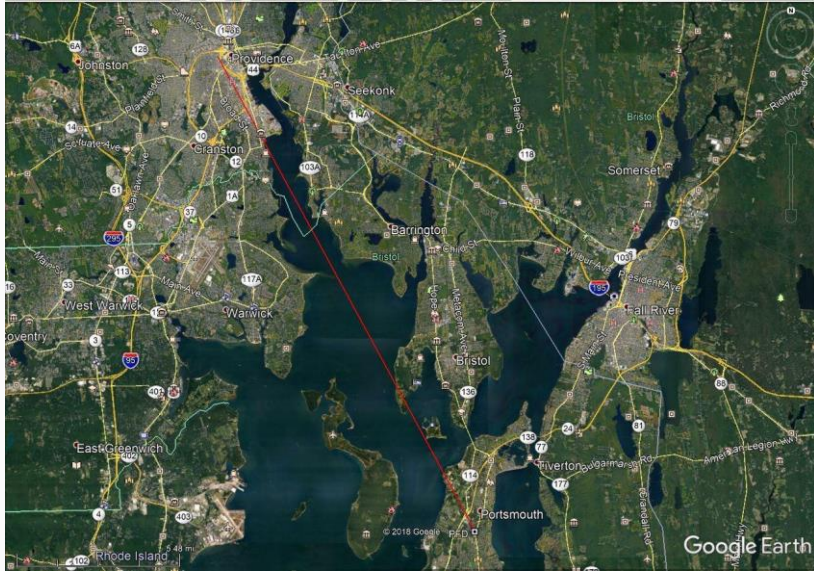
# **Boosting RI's "Communications Resiliency"**

## **What can Mesh do for Communities?**

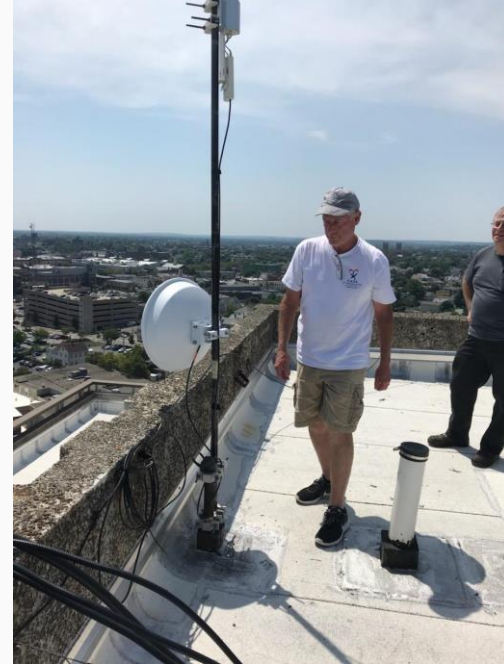
- **Backup, high-speed, private Intranet**
  - **Text messaging**
  - **Limited video and telephone communication**
  - **File-sharing**
  - **IP Cameras**

# Boosting RI's "Communications Resiliency"

## My Summer 2018 Scout Project



**Goal: Connect Portsmouth to Providence**



**100 Atwells Ave, Providence**



# Boosting RI's "Communications Resiliency"

## What's the Equipment Look Like?



- Commercial grade quality
- Low-cost, high-performance



# Boosting RI's "Communications Resiliency"

## Extending Mesh south of Portsmouth

Verizon 5:46 PM 63%

localnode

**AREDN**  
ADVANCED RESILIENT EXTENDED RANGE NETWORK

!!!! THIS DEVICE IS STILL BEING TESTED !!!!

### K6MAC-POR-5A mesh status

Refresh Auto Quit

Local Hosts	Services	Current Neighbors	LQ	NLQ	TxMbps	Services
K6MAC-POR-5A.local.mesh		K6MAC-POR-OMNI.local.mesh (dst) 100% 100%				
		K6MAC-PVD-SB.local.mesh 100% 100%			7.2	

Remote Nodes	ETX	Services	Previous Neighbors	When
11HA-RIMN.local.mesh	1.10	Sony	none	
Sony.local.mesh				
11HA-PVD-ATW.local.mesh	2.22			
11HA-PVD-WI-HOSP.local.mesh	3.28			
11HA-PVD-WI-HOSP2.local.mesh	4.53			
11HA-PVD-COM-TW.local.mesh	5.91			
11HA-PVD-WI-OPF.local.mesh	6.76			
11HA-PVD-PS-Comm.local.mesh	6.91			
11HA-PVD-FEMA.local.mesh	10.12			

Part of the AREDN™ Project. For more details please [see here](#)



Works great from Portsmouth HS



Middletown's Gaudet MS needs more work

# Boosting RI's "Communications Resiliency"

## Where is RI Mesh Headed?

- **Install more mesh devices**
  - **In Providence, Cranston, Warwick**
  - **In Newport County**
    - **Portsmouth Middle School**
    - **To help the regional Red Cross shelter at Gaudet Middle School**



# Boosting RI's "Communications Resiliency"

## Mesh at the Neighborhood Level

- goTenna mesh device - \$80
- Uses a smartphone app
- Functions:
  - private messaging
  - secure encryption
  - emergency beacon



Yes, we can make our communities, our neighborhoods much more resilient