A Low-Cost, Rapid Response Communication Link During a State of Emergency Using WiFi Mesh Networks

Jain, Pooja (School: West Linn High School)

Hurricane Harvey catastrophically flooded Houston in August 2017, followed a month later by Hurricane Maria that devastated Puerto Rico. Cell phone service, telephone landlines, internet service along with the power grid required to run these vital communication links go down during these severe storms. Emergency readiness kits always include a portable battery powered radio for broadcast instructions from first responders. If a two-way communication link can be rapidly deployed in impacted areas during these times of emergency, then citizens can communicate with search and rescue to help prioritize resources more efficiently in the distribution of aid and manpower. Also neighbors and communities can help each other directly. The project is a solution that combines ham radio, mesh networking, WiFi, battery power and delivery mechanisms using off-the-shelf and low-cost items to rapidly deploy emergency communications for citizens to contact first responders and each other. Multiple WiFi routers are turned into ham radios and linked together as a mesh network to cover a wide area. These WiFi routers are powered by portable cell phone battery chargers and are deployed using drones or as backpacks dropped in strategic locations for maximum coverage. Citizens use the WiFi on their smartphones, tablets or laptops to communicate with the mesh network. To ensure there is enough WiFi bandwidth available for as many citizens as possible to communicate, a text only chat service is used to send messages to a base station monitored by search and rescue personnel.

Awards Won:

International Council on Systems Engineering - INCOSE: Certificate of Honorable Mention

Drexel University: Full tuition scholarship $250,000

Samvid Education Foundation: Agni Award of $1000 honoring the services of Dr. Abdul Kalam, former Hon. President of India