

HUMANITAS



# HIGHLY RESILIENT LOW-COST WIRELESS NETWORKS FOR SMALL ISLAND DEVELOPING STATES OF THE PACIFIC REGION

In Small Island Developing States (SIDS) of the Pacific region, wireless network coverage is not ideal, presenting several criticalities in terms of offered bandwidth, resilience and coverage uniformity. The issues tend naturally to grow when moving away from the main urban centers where the network infrastructure is more developed.

This fragile situation gets even more critical in post-disaster scenarios (a hurricane<sup>1,2</sup>, a tsunami<sup>3</sup>, etc.) when the low level of redundancy of the telecommunication infrastructure is very likely to cause severe service disruptions. This even prevents the emergency teams to communicate and coordinate operations in an efficient way.

Along the lines of some previous pilot projects under the patronage of the Emergency Telecommunication Cluster (ETC) and of the International Telecommunication Union (ITU)<sup>4</sup>, Halys and Humanitas Solutions propose to launch a new pilot projects to deploy low-cost and multi-technology wireless network for short range and long range communications in both normal and post-disaster conditions.

The **Halys-Humanitas (H<sup>2</sup>) Network** allows mobile devices (smartphone and tablets) to transmit information even when the traditional telecom infrastructure is not available or not working properly. Multiple communication technologies are integrated to offer the best performance and reliability, giving the user the feeling of being connected to a standard network. The **H<sup>2</sup> Network** does not just work as a stand-alone system but is natively designed to work as a seamless extender of traditional cellular, wifi and wired networks that give access to the Internet.

## RESILIENT COMMUNICATION AND GEO-LOCALIZATION IN A CONSTRAINED AREA

The **H<sup>2</sup> Network** can be quickly deployed to provide full communication capabilities to the personnel working in a constrained area, e.g., doctors, nurses in a field hospital, personnel in government buildings, workers of a building site.

## RESILIENT COMMUNICATIONS FOR MULTIPLE SITES

Humanitas long-range wireless technology can be leveraged to offer up high bandwidth connections between multiple sites/restricted constrained situated up to 100 km of distance, e.g., two emergency teams deployed in the field, a village and a hospital, two different islands, two government buildings.

## RESILIENT COMMUNICATIONS THROUGH UNMANNED SYSTEMS

The capability of the new **Halys-Humanitas (H<sup>2</sup>) Network** architecture of seamlessly interconnecting advanced communication equipment for ground-to-air, ground-to-space and air-to-space communications with mobile devices widely spread among the population brings two main advantages: First, part of the field operators may become part of the network by using an advanced mobile ecosystem on their mobile devices. Secondly, the mobile devices within a specific perimeter may be easily included in the network (with all the due authorizations and permissions required to preserve privacy and anonymity) to collect additional data, e.g., the location of civilians, that may improve the operator situational awareness.

## THE H<sup>2</sup> NETWORK PILOT PROJECT

We propose to implement a multi-site deployment of the **H<sup>2</sup> Network** able to:

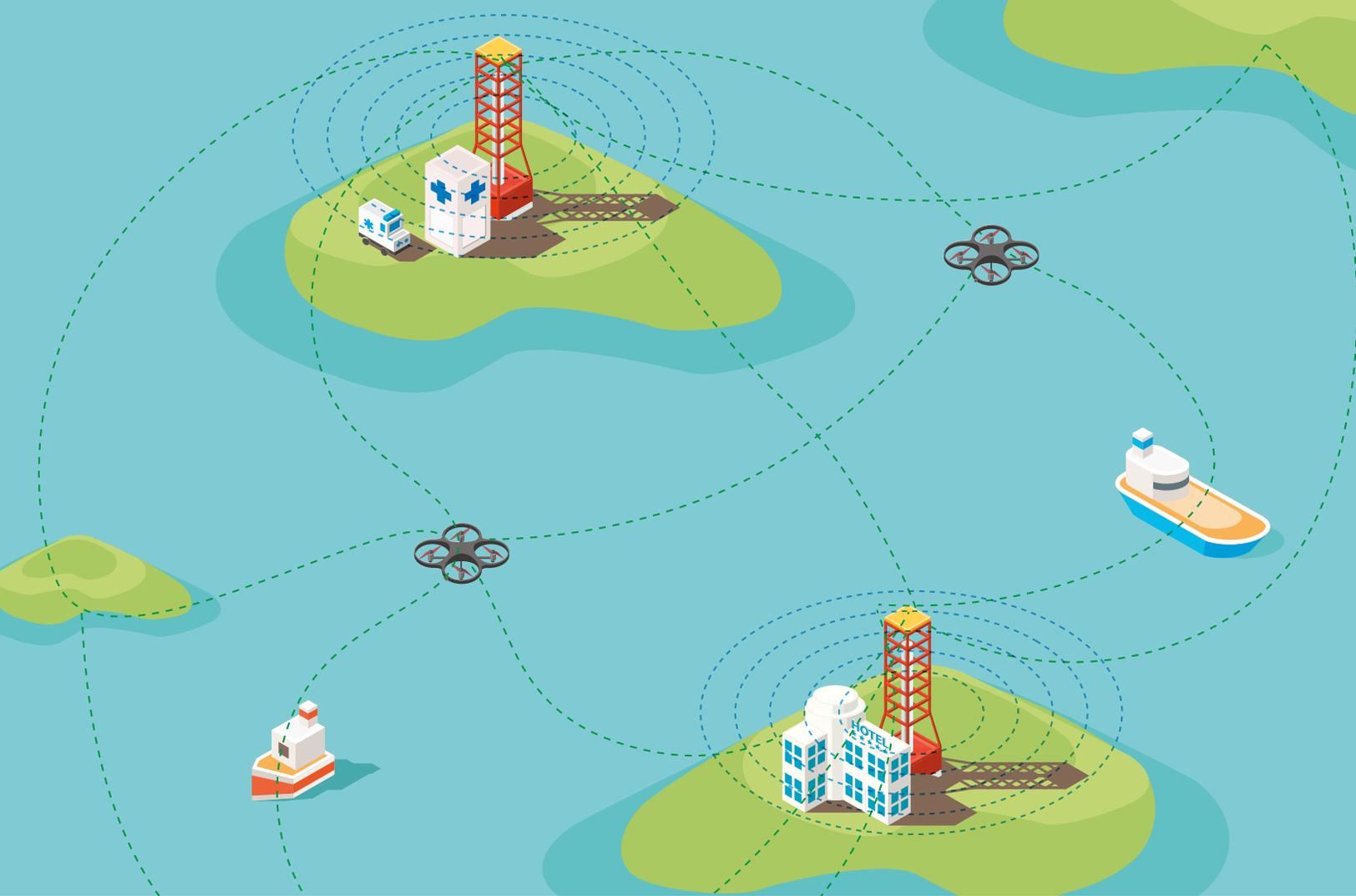
- ◆ Provide local connectivity to sites or teams with no actual internet coverage
- ◆ Interconnect multiple sites or teas with currently no Internet coverage
- ◆ Interconnection of multiple sites or teams to the Internet
- ◆ Provide a secondary telecommunication network easily deployable in post-disaster scenarios

1 [http://www.itu.int/net/pressoffice/press\\_releases/2015/07.aspx#.W7zMSmhKgWU](http://www.itu.int/net/pressoffice/press_releases/2015/07.aspx#.W7zMSmhKgWU)

2 <https://www.etcluster.org/countries/tonga>

3 Roeber et al (2010), Resonance and impact of the 2009 Samoa tsunami around Tutuila, American Samoa, Geophys. Res. Lett., 37, L21604, doi: 10.1029/2010GL044419.

4 <https://www.itu.int/net4/wsis/stocktaking/projects/Project/Details?projectId=1486967327>



The **H<sup>2</sup> Network** can be easily integrated within existing project or applied in new use cases:

- ◆ Along the lines of what done by the VITAL project in 2016 in Vanuatu, building a resilient and distributed electronic medical record (EMR) for mobile devices working over a multiple site-scenario. The system will improve intra-personnel communications as well as medical personnel-people interactions, even at distance.
- ◆ Provision of high-speed communications among multiple emergency teams and one or more command centers for real-time improved decision making and optimized situational awareness.
- ◆ Provide Internet connectivity to populations living in rural areas or remote islands currently not covered by traditional networks.

Sites may be located on different islands. Mobile devices, wearable devices and smart nodes running HS applications will be used to provide local communication services at each site over the **H<sup>2</sup> Network**.

Network devices may be installed over autonomous drones power by Humanitas drone engine to improve inter-site connectivity. The use of off-the-shelf mobile devices will favor portability, mobility, cost reduction, and ease of use.

## CANDIDATE COUNTRIES

- ◆ **Tonga (letter of support already provided),**
- ◆ Vanuatu,
- ◆ New Papua Guinea,
- ◆ Palau,
- ◆ Kiribati

### **About Humanitas Solutions Inc.**

Humanitas Solutions is a technological leader of innovative device-to-device communication technologies with the HyperXSpace ecosystem (HXS). The HXS allow any mobile devices and smart objects to transmit information even in absence of any telecommunication infrastructure, at both short and long distance. Moreover, Humanitas Solutions exploits low-cost unmanned aerial vehicles to autonomously extend the network coverage through aerial nodes. Last but not least, the HXS offers real-time geo-localization functionalities that can be naturally leveraged to deploy smart applications for human and physical resource management in critical scenarios.

### **About Halys Inc.**

Halys is a leader in adaptive cellular technologies (3G and 4G) that allow to quickly rebuild a fully functional cellular bubble ready to use, in a fully transparent manner, by the people in the surrounding area. Halys' solution for resilient communication fits in a suitcase and can be easily configured to support a different number of users (according to the needs).