Mesh Technology:
A New Shining Star in Wireless Communication Field

--- Interview with Michael Agam, Operation VP, Maxtech Nnetwork

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Photo: Michael Agam in the interview, taken by Zheng Xiao Chun, ST Daily Journalist

Highlight Today

When the earthquake, tsunami, or hurricane happens, the available effective communication really means something significant for the accurate detection of the damages incurred, their rescue and recovery. However, although today, the era when the communication technologies are rapidly developed, the wireless and fix-line communication networks cover almost all the areas where the human-being resides, even the most advanced communication networks can't do anything at all if all the communication infrastructures are destroyed and flattened by the disaster

in the disaster zone. Therefore, we need a kind of user-friendly, infrastructure-free, and portable communication-tool at this moment.

When I heard that a new equipment, developed by Maxtech Network Inc. Israel, has all the features mentioned above, I especially made an appointment and visited Michael Agam, Operation VP of this company.

After I explained the purpose of the interview, Mr. Agam introduced and said: Maxtech is a Hi-Tech company dedicated to R&D of Meshed-Networking communication technologies. In fact, their developed product is one kind of wireless Walky-Talky, based on Meshed Networking. Nevertheless, it is different from the regular Walky-Talky in the aspect: while the coverage of the regular walkie-talkie is limited to the maximum distance by which one terminal can reach another ; Maxtech's walkie-talkie signal can reach farer with more powerful functions. Maxtech can make it because of the secret that the signal is transmitted via Meshed Networking.

Wireless Meshed-Networking is a totally different communication network from the traditional one. In the traditional wireless network, the communication sessions between the users must be established via a fixed access-point, they can't communicate with each other directly. In the meshed-network, each terminal(that is, communication equipment) functions as an access-point and receive/transmit from/to each other. The data communication doesn't rely on few access-points, but all the communication equipments in the network. The signal-transmission is done by hopping from one node to another. Therefore, meshed network is called muti-hops network as well.

To present the points more intuitively, he turned on his notebook, and started to show the journalist a simulation software about the mechanism/principle of meshed-networking. I saw over 10 white points moving all around the computer-monitor, and in which one blue-line connects several white points. He explained the white points on the monitor represent the walky-talky users and blue-line symbolizes the transmission-path. When white point A wants to talk to white point B which is beyond the distance the signal between 2 individual terminals can reach, the signal is looking for a walky-talky C, which is closest to point A, takes it as a relay, and via which the signal is transmitted to the next walky-talky. When C steps far away from C, the system would re-search another node closest to A, and with this mechanism, the signal would eventually reach the target it would like to communicate with.

He explained: in Meshed Networking, the signal is transmitted in point-to-point way, therefore, the more nodes there are in the network, the more coverage area

there is and the better the quality of the communication session is. Compared with the traditional network, the advantages of this networking are very obvious:

1. The cost is low and the realization of the network is simple. Mesh networking doesn't rely on the infrastructure anymore. The users in the network turn on the communication-equipments and a wireless communication network, with a specific coverage area, is implemented immediately. The implementation of the network is low-cost and so simple that it's very applicable to the places where there's no infrastructure, the infrastructure is destroyed, the fast deployment is required, or non-permanent installations like the rescue for the disasters, activities in the remote wild, security and the communication for the important sites, big activities and events.

2. The transmission distance is very far. In Mesh Network, each communication equipment is a communication tool, and a relay as well. When the distance between 2 terminals is beyond what 2 individual terminals can reach, the system automatically search the closest equipment and take it as a relay. The signal is eventually forwarded one relay after another to the final destination, therefore the coverage distance is extended significantly.

3. High reliability. The signal in the traditional wireless network is transmitted via the fixed access points. Once if they are out of order, the part of the network may be paralyzed. In Mesh Networking, each communication equipment is an access-point. If the closest node malfunctions or is interfered, the signal would be automatically re-directed to another path and the operation of the whole network is not influenced. Besides, Mesh Networking has the features like high bandwidth and flexibility of the structure etc. Therefore, more and more people pay attention to it.

Currently, their developed products are applied to the military, professional and general civilian fields. The maximum distance 2 individual terminals can reach: 3 Km in the open space without the obstacles, 300-500 meters in the urban city with more buildings, 100-150 meters in the buildings; With the guaranteed quality of the voice, the maximum number of the relays is 10; In the environment of the city, the maximum distance a signal can be forwarded to is 5000 meters.

When setting up a network in a site or high building, and considering the movement and non-average distribution of the user walky-talky in the applications, they(Maxtech) have a kind of drop-node, which can be put in a specific interval, in order to make sure the coverage area is enough even if the distribution of the terminal is in the extreme case. Foe example, the fireman extinguish fire in a building with over 10 stories, and one drop-node is put every 1-2 stories, in order to make sure the communication between the fireman and the commander vehicle is working in any case. Therefore even if all the fireman go to the highest story, the

communication with the commanding system on the ground is still guaranteed. After the mission is completed, the drop-node can be gathered and kept for use later on.

In order to adapt the different requirements of different customers, the design of the walky-talky is open-style. Based on the requirements of the users, the operation frequency, encryption and the case can be specified. The communication modes are point-to-point, multi-points and broadcasting. In point-to-point mode, you just dial the entry stored in the phone-book and it's similar to the cellular phone. This walky-talky can communicate in their own network, and communicate with the external networks via Satellite, GSM, WiFi, Wimax, VHF/UHF, TETRA gateways etc. Then the cross-networks communication is realized.

Mr. Agam said the wireless Mesh Networking is a kind of very promising wireless communication technology. Its related research is just emerging and growing. It's believed that the new star: Wireless Meshed Networking, in the wireless communication field, would be even more shining when its research and development are more mature.

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