



DIGITAL TRANSFORMATION FOR DISASTER RESPONSE WITH WAVE PTX

LEVERAGING PUSH-TO-TALK/MULTIMEDIA COMMUNICATIONS AND HIGH SPEED AND CAPACITY NETWORKS FOR MISSION-CRITICAL INCIDENT GROUND COMMUNICATIONS

Technology advancements are not only improving people's lives, but are also making work easier in many industries. As companies embrace digital transformation to thrive in this ever-changing world, medical organizations can turn to digitalization to enable easier access to healthcare, improve efficiency and decrease operational costs.

Besides providing mission-critical medical services during the emergencies of weather disasters, earthquakes and viral pandemics, such as the novel coronavirus that are becoming more frequent and severe every year, the medical industry is also enhancing operational capabilities with digital transformation for the future of healthcare to ensure healthy, prosperous lives for all.

However, the complexity of the universal health system and the medical fee structure in Japan have caused the efforts for digitalization to be slow and challenging.

To support the healthcare organizations in their digital transformation journey, the Wave PTX Broadband push-to-talk network service from Motorola Solutions provides a unified ecosystem combining voice, software, video and services designed to improve communications and response. This rich multimedia system coupled with high speed and high capacity networks can truly transform the medical field.



We reproduce the insightful discussions between Nobuyuki Koike, Director of Mobile Hospital International, and Dr. Syuji Kitahara, Specially Appointed Associate Professor of Tokyo Women's Medical University, on the possibilities for the future of medicine.

Mobile Hospital International, Inc.

Mobile Hospital International was established in 2010 as a general incorporated association with the aim of establishing a "rescue network based on hospital ships," which is essential for disaster medical care in Japan, a maritime country. In 2011, it became a public interest incorporated association, and has been conducting lobbying activities such as policy proposals in order to own the first hospital ship in Japan after World War II. In recent years, it has been involved in a number of activities, including the port call of the U.S. Navy hospital ship Mercy to Japan and cooperation with the Tokyo 2020 Olympic and Paralympic Games.

NEW PUSH-TO-TALK MULTIMEDIA COMMUNICATION THAT REQUIRES NO LICENSE AND IS READY TO INSTALL



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Koike: Thank you very much for taking the time out of your busy schedule to talk with us today. Digitalization in medicine is one of the key trends of my research, so I have been looking forward to talking with you.

Kitahara: It is my pleasure to meet you. As a member of the board, Mobile Hospital International's mission is to introduce hospital ships to support medical care in the disaster-prone areas near the sea when a disaster occurs.

Koike: Yes, we were preparing an emergency boat for volunteers to transport heatstroke victims, who would be watching the games that were being held on the coast, safely to a hospital in Toyosu. However, we did not implement the project as the event was eventually held without spectators. While an ambulance would take almost an hour to reach the hospital depending on the congestion of the roads, a boat has the advantage of being able to transport the patient within 10 minutes. Although we were not able to make a mark at the Tokyo 2020 Olympic and Paralympic Games, we remain hopeful of this opportunity to build a momentum for the introduction of hospital ships.

Kitahara: I heard that you were planning to conduct a demonstration test of a broadband push-to-talk communication system on the emergency boat. Could you elaborate more on this system?

Koike: It is the WAVE PTX multimedia communications from Motorola Solutions which can capture video and transmit it in real time. The purpose of this system is to capture the status of the patient being transported and share the information with the emergency

boat, hospital and fire department. Currently, the ambulance and the fire department are connected by the radio network, but the hospital does not have radio devices and uses a smartphone network. With the WAVE PTX multimedia communication, we can centralize the information transmission and instantly share audio and video files at the push of a button.

Kitahara: It is noteworthy that we can share multimedia information now. At the present moment, ambulance personnel can only verbally provide information to the hospital, such as the patient's vital signs and level of consciousness. If the doctors at the hospital can remotely monitor the patient's condition in the ambulance, the probability of saving the patient's life drastically increases. Even if they receive only one image from the ambulance's ultrasound machine, they are enabled to take the appropriate measures. Do I need a special device to use WAVE PTX?

Koike: Of course. While there are dedicated easy-to-use devices which you can deploy, you can also download the app on your smartphone or tablet and use your own device as a WAVE PTX terminal. Another major advantage of the WAVE PTX is that it is easy to install and has a low setup cost. The system allows hundreds of users to communicate and map their locations using GPS. There is no need to obtain a radio license, so anyone can use it right away. Our initial plan was to conduct a demonstration test on the emergency boats for the Tokyo 2020 Olympic and Paralympic Games, in anticipation of the introduction of the system on the hospital ships, which we are promoting.



A STABLE AND RELIABLE SYSTEM CAPABLE OF INSTANT COMMUNICATION DURING A LARGE-SCALE DISASTER

Kitahara: The cost of introducing the Wave PTX service is low, and anyone can use it easily, which is a big advantage. One of the reasons why the shift to digital transformation (DX) in medicine is slow is due to the financial burden of high installation costs. Large hospitals that are able to invest in the latest equipment are actively working on DX, but the smaller the hospital, the more difficult it is to digitalize because the budget available is limited. Smaller clinics cannot handle this high cost unlike when they were digitalizing their medical records. It would be difficult to change the analog operation of healthcare unless we promote DX not only in large hospitals but also in the clinics that patients visit on a daily basis. We need to stop sending and receiving important information via facsimile which has poor readability. A system such as WAVE PTX, which can share patient data such as video files and images with the ambulances and other clinics at the cost of a small investment, can be further introduced to private clinics as the next step for healthcare DX. It seems

to be a highly reliable communication system since it has been tested in emergency transportation.

Koike: Some people think that a smartphone suffice if all you want to do is send voice notes and images, which in this case you do not need to use WAVE PTX. However, in the event of a large-scale disaster, there is a high possibility that base stations get damaged or power being cut off, and as a result the cellular network and smartphones cease to operate. With WAVE PTX, stable communication can be ensured since it won't be affected by the risk of communication failures that may occur during such disasters.

Kitahara: Smartphones are certainly a convenient tool, but it is risky to solely rely on them for all communication in the healthcare operation. We cannot put patients at risk in case there is a carrier communication failure during an emergency.

Koike: You are absolutely right, and the WAVE PTX has been highly evaluated by an increasing number of companies and local governments which have introduced this push-to-talk multimedia communication system that combines the convenience of smartphones with the robustness of radio push-to-talk communication. This is also the reason why we are thinking of introducing it to the hospital ships.



LEX L11,
a Wave PTX
communication
device

ENHANCING SAFETY AND IMPROVING EFFICIENCY AS THE DRIVING FORCE FOR HEALTHCARE DIGITALIZATION

Koike: Motorola Solutions is working on expanding more functions and developing peripheral technologies to support the medical field with the WAVE PTX. At Mobile Hospital International, we have also made various proposals for the disaster medical services to improve situational awareness that result in faster, more accurate communication in the moments that matter. Please share your opinion on how it can be used not only for the current medical services but also as a roadmap for the future of healthcare.

Kitahara: First, I think this system can be used to support telemedicine. The number of elderly people who need to see a doctor more frequently is increasing, but there will be several cases where they cannot access the medical specialty institutions or reach their personnel due to difficulties in transportation or if they are living in remote areas. With the WAVE PTX, the medical team can share the necessary information and support diagnosis without being constrained by the location or time. I believe that WAVE PTX is an effective means of efficiently allocating limited medical resources. In addition, I see a great potential in the collection and accumulation of vital patient data using WAVE PTX for the healthcare digitalization.

Koike: Does this mean that the information collected at individual clinics will be compiled into a database?

Kitahara: Yes, in the smart operating room called "SCOT" at Tokyo Women's Medical University, the patients undergoing surgery are monitored and measured by the equipment, and their information is integrated, organized, and visualized so that it can be shared instantly with the surgical team. We are attempting to improve the standard of medical care by accumulating this information along with the video footage of the operation. If an unexpected situation arises in the operating room, we can instantly search the past cases for answers quickly. This process will better support the healthcare personnel and provide peace of mind for the patients. In the same way, if we use WAVE PTX system to record and collect data when doctors are examining patients at the clinics, I think we can build a valuable database to better support medical care.

Koike: So, you are saying that we will be able to focus not only on real-time communication but also on accumulating valuable information?

Kitahara: That's right. We can store patients' medical records, but we cannot replace the doctors' experience. If the accumulated data can be used as a reference for medical residents to learn new things like palpation and auscultation procedures, and on what to focus during visual examinations, their skills will improve in a short period of time, and their

medical practices will be optimized. Although the results cannot be achieved in one or two years, I believe that it will be absolutely necessary when we think about advancing medicine in the 10 or 20-year time frame. This important data can be used not only by medical professionals but also by researchers and companies. In the United States (U.S), there are examples of such data being used to study the correlation between anti-smoking ordinances and cigarette price hikes and health conditions. I would like to discuss how DX can contribute to the medical policy, and not just about reducing medical costs. By accumulating vital data, it will be possible to narrow down the types of diseases that are suspected based on the recollections of patients who respond to medical interviews. If this happens, we will be one step closer to Artificial Intelligence (AI) diagnosis.

Koike: We are currently developing an engine for AI analysis of WAVE PTX data, and we hope that it will soon be put to practical use. It will also be able to search for video files, so if there are any unusual movements of personnel during surgery, it will be possible to track them.

Kitahara: That's great, please update us when you implement this autonomous learning through AI.





DEVELOPMENT OF WEARABLE DEVICES FOR THE EVOLUTION OF MEDICAL CARE

Koike: What functions must the WAVE PTX serve in the digitalization of healthcare operation?

Kitahara: Whether the system functions as a remote support or as a database, quality color reproduction is important to improve the accuracy of visual diagnosis, so it is desirable that WAVE PTX can take high-definition images, preferably in the 8K class, and transmit them without a time lag. Images from diagnostic equipment are also in 3D which make the data size larger. Therefore, the speed of the network is also an important factor, so I think it will be difficult to solve this problem with the performance of the WAVE PTX alone.

Koike: I heard from a representative of Motorola Solutions that they are developing a 10K camera that can be used for imaging during surgery. They are also pursuing technology that can compress and transmit large quantities of image files without compromising the image quality. The current network speed limit is 5G, but I believe that in the future, higher speeds such as 6G and optical communications will solve many problems.

Kitahara: Front-line medical workers could be working longer hours during an emergency. Can this dedicated terminal last for an extended shift of continuous operation?

Koike: Definitely. With its high-capacity battery, LEX L11 can be used continuously for 20 hours. It is also enclosed in a tough casing that meets the demanding specifications of the U.S. military, hence it won't break even if it is dropped. We are also requesting for the development of a wearable, dedicated terminal of lighter weight, so that medical personnel can have both hands free to perform medical procedures during an emergency. This new device would also display vital information on the screen in sync with the patient's image, thus making it easy to be implemented in ambulances, hospital ships and hospitals to form an efficient ecosystem of medical services.

Kitahara: I have high hopes for this new development. It could advance medical services and support the local government initiatives in healthcare. I am also interested in hospital ships, so I would like to learn more about them soon.

Koike: Thank you very much for your informative sharing today. Accelerating the digitalization of hospital ships, which is our goal, is essential in emergency response planning, as well as contributing to the medical advancements in Japan, a maritime nation. I look forward to working with you again in the future.



Instant communication using a Wave PTX device and mobile phone

Information sharing and control through multimedia such as audio and video cameras

WAVE PTX RADIOS AND WIRELESS SERVICES

Get the benefit of WAVE PTX with a rugged two way radio on a nationwide network

- **Nationwide push-to-talk**

Increase productivity with a nationwide push-to-talk network that the quickest push-to-talk set-up and call times.

- **Easy to use and manage**

Communicate instantly and manage your business effortlessly by handling talkgroups and subscriptions in real time.

- **Built for the job**

Get the job done with a rugged two-way radio that is built for business with location tracking and Wi-Fi calling



WAVE PTX MOBILE APP

Turn your phone into a PTT handset and get instant communication at the touch of a button

- **One application and two modes**

PTT radio for the experience of conventional radio and standard for device-based management of contacts and talkgroups.

- **Multimedia messaging**

Increase the speed and clarity of information via text, photo, video or file attachment.

- **Location and mapping**

Track your team on a map, share your location, find an address or set a meeting place.



PTT Radio

Standard

WAVE PTX WEB DISPATCH

Centralize communication anywhere

- **Web-based dispatching**

Login from any PC and get the latest features with no software to install or maintain.

- **Multimedia Communication**

Share details with an individual or your entire team via text, photo and video or file attachment.

- **Location and mapping**

Track your mobile teams on a map and efficiently dispatch based on real-time location.



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