



Maritime telemedicine evolves



Keeping crew and passengers healthy and safe at sea is no simple task. When an emergency or complex illness takes place at sea, medical experts are miles away, making treatment a challenging task. Telemedicine has been practiced in one form or another for many years, but it is only relatively recently that satellite solutions have become more popular for delivering medical services at sea. Ghani Behloul, CMO at Marlink, outlines the complexities of delivering high quality medical services at sea, and explains how Marlink's new Xchange Telemed service can bring medical treatment to the next level.

According to an article published in *International Maritime Health*^[1], the average direct and indirect cost of a staff member evacuation due to a medical emergency is approximately US\$180,000. But through the use of satcom telemedicine technology, unnecessary helicopter evacuations or diversions could be avoided by treating crew illnesses and injuries on board with frequent follow-up by a remote doctor. In fact, it's estimated that as many as one in two vessel evacuations or re-routings could be avoided with better medical data.

While the need to re-route a ship due to a medical emergency is relatively rare, the costs should it happen unnecessarily are somewhat prohibitive. This is especially relevant considering today's challenging maritime business climate, which is born out of the crisis in the energy markets and low freight rates in the merchant markets.

It's interesting to note, that at least on the satcom side, there continues to be significant investment by the global shipping business even in the face of challenging times. This is in part driven by satcom's potential to enable operational efficiencies through the smart use of new technology and digitalisation. Additionally, and despite the current financial situation, smart shipping companies continue to be committed to the welfare and sustainability of their most precious resource – their people.

While satcom has long played the role of the seafarer's link to friends and family on shore, today it is also being used to ensure the health of crew members on board. Of course, the use of telemedicine at sea is not completely new, or indeed totally altruistic on the part of shipping companies, considering the cost of a vessel re-routing or downtime of crew members. However, it can help to improve comfort for a sick or injured person on board, so it is a significant benefit to persuade trained and professional crew members to either join a company or stay with it.

Another key driver for the further development and uptake of maritime telemedicine is helping shipping companies to meet the recent Manila Amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) by IMO and the Maritime Labour Convention (MLC) by ILO. The latter states that employers "*must ensure that seafarers are given health protection and medical care as comparable as possible to that which is generally available to workers ashore, including prompt access to the necessary medicines, medical equipment and facilities for diagnosis and treatment and to medical information and expertise.*" It is widely expected that flag states and other regulatory bodies will soon enact legislation mandating telemedicine explicitly.



New approach to telemedicine

Without telemedicine, the standard process when a person falls ill on board is for the Health Officer to call either an in-house or external Medical Assistance Center (e.g. public service TMAS like CIRM or private providers). The doctor would ask for medical information to establish a diagnosis and advise a treatment based on limited information. To transfer relevant medical data on the patient, the Health Officer would have two options:

- 1) Dictate the medical readings and describe the observations vocally, which can be imprecise and lead to misunderstandings considering the potential for limited medical vocabulary and the accents of non-native English speakers; and
- 2) Send an email with the data as an attachment – which is common practice today although not legally permitted, as it does not secure patient data. Moreover, this option might not be available as most medical devices on board might not be digital or could be unable to export medical files to be transferred.

In the case of emergencies, doctors would be asked to advise upon single observations and non-medical descriptions provided by officers with only basic medical training. Hence doctors may easily recommend evacuation, which might turn out unnecessary in hindsight. In this respect, providing the ability for doctors to see live video of the patient, receive live data from medical instruments and have direct access to secure medical records is a strong argument for the use of telemedicine at sea.

All of these needs have driven the development of a new type of telemedicine solution from maritime satcom service provider Marlink. The company is already established as the largest global maritime VSAT provider^[2] but its work extends into the development of solutions to support all areas of vessel operations and life on board, including crew welfare. Marlink's XChange Telemed service was launched at 2016's biggest international maritime exhibition, SMM 2016. It is a fully integrated solution that integrates on-board medical equipment, the communications carrier, secure patient data storage and a flexible web portal to be used with the medical experts chosen by the customer. The system consists of the following elements:

- 1) On-board Telemedical Station with fully connected CE certified medical equipment, intuitive touch-screen user interface and an HD camera. Equipment provided includes electro cardiograph, blood pressure monitor, pulse oximeter and one or several of the following options: Otoscope, dermascope, stethoscope, ultrasound, eye

analyser, dental examination camera, glucometer and thermometer. All medical devices are fully connected with automatic data transfer. Marlink has established a long-term partnership with a European CE Medical certified Telemedicine equipment manufacturer to create a product specifically for the Maritime market. For example, rather than using ECG lead stickers which are common in hospitals, considering the humid climate on board ships, ECG clips are used instead. Other criteria were the resistance to the vessel environment (vibrations, power cuts) and the avoidance of consumables.

- 2) Marlink Satellite and Service Management: Marlink has optimised the efficiency and security of the patient data transfer and live video conference over broadband VSAT satellite. Video is the key improvement for remote consultation at sea. In order to replicate a face-to-face meeting with the doctor, the live video consultation feature is very easy to access via the provided tablet computer. Managed through the XChange service delivery platform, the Telemed service is configured to take precedence over other applications, to ensure high availability. Moreover, XChange Telemed is supported by Marlink's 24/7 Customer Care and Global Logistics organisation.
- 3) Shore Medical Portal: Via the full secure web portal, doctors access the patient medical data transferred from the vessel and participate in the live video conferences. The portal includes a patient file management system, which can include information from pre-boarding interviews (e.g. allergies, family history) and medical backgrounds. All patient medical data is stored according to the strictest European medical authority standards. The doctor responding to an urgent call can view both the current medical data as well as the patient file including previous examinations on one central platform. The Medical Portal can be associated to the Medical Assistance Center chosen by the customer; for instance, a compatible public Telemedical Maritime Assistance Service (TMAS) centre, or an appointed doctor or a private medical organisation ship owners may already have a long medical relationship with. The service is also fully flexible should the Customer wish to change medical assistance provider at a later stage.

Meeting maritime requirements

With XChange Telemed, the Health Officer would first use the on-board station to establish medical measurements. All medical data is then automatically synchronised to the Web Portal and associated to the patient file. By the time the Health Officer has called the Medical Assistance Centre, the doctor would have already looked at both the transmitted data and the patient file, including medical history. The doctor may be





able to advise a treatment right away or ask pertinent questions in order to establish a diagnosis quickly. Additionally, the doctor can establish at any time a live video consultation with the vessel to see the patient first hand. The video connection can also be used to guide the Health Officer in his examination for instance, if he needs help to operate one of the instruments.

The benefits of telemedicine at sea are quite clear. With live video, medical professionals can act and advise almost as if they were on board, ultimately securing the health and safety of sick and injured crew members or passengers. However, the maritime industry faces its own unique challenges.

In regards to the economics of telemedicine at sea, Marlink has developed a business model tailored to the preferences of the maritime community. There is no upfront investment on XChange Telemed and the monthly subscription fee includes all components: On-board equipment leasing, maintenance, 24/7 customer care support, patient data hosting, web portal access for the onshore doctors and the live video consultation platform.

During 2016, XChange Telemed was beta tested on several vessels of different types, operating in different regions, with a public medical centre. The overall feedback from the doctors and vessel crew was very positive and has allowed Marlink to understand how the service would benefit its customers and meet their business requirements. The XChange Telemed service launching now includes adaptations and evolutions which were directly inspired by Marlink's customers' and doctors' feedback. ■



[1] "The Business Case for Telemedicine"; *Int Marit Health* 2013; 64, 3: 129–135; C.Henny, K. Hartington, S.Scott, A.Tveiten, L.Canals

[2] Marlink has been rated the No.1 in maritime VSAT revenue market share in the COMSYS Maritime VSAT Report.



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