

EMRTS & Tactical Wireless collaborate on telemedicine product development: The transmission of foetal and paediatric cardiac ultrasound.

Tactical Wireless Ltd and the Emergency Medical Retrieval and Transfer Service (EMRTS) Cymru were awarded a grant, by the UK Space Agency (UKSA), at the end of September 2019, to carry out a project - **Bonded Satellite and Cellular Communications to support Health and Social Care in Rural Wales**

The EMRTS project lead was Dr David Rawlinson, Clinical Informatics & Research Manager, and the clinical lead was Professor Orhan Uzun, Consultant Paediatric and Foetal Cardiologist, Consultant Paediatric Cardiac Electrophysiologist, University Hospital of Wales.

The project was successfully concluded at the end of March 2020 and the final report was issued to UKSA - National Space Technology Programme (NSTP) & Space for Smarter Government Programme (SSGP) – in April 2020.

Since then, EMRTS and TWL have agreed to collaborate on the development of telemedicine products and, to date, 2 new products have been introduced, with more being planned. This collaboration has formed the basis of an agreement between TWL and the Welsh Air Ambulance Charity.

On Friday the 29th January 2021, Cardiff & Vale Health Charity issued the attached press release concerning **Hypertrophic cardiomyopathy echo screening in neonates**. This utilises one of the 2 products, referred to above, and has been the result of close cooperation between industry and the NHS – TWL, Dr Rawlinson of EMRTS and Professor Uzun.

Dr Rawlinson said “The key to the success of this collaboration has been the hands-on approach by TWL in understanding the user requirements and providing bespoke on site and remote support. It is already making a difference to patient care, and the use cases, whilst the most technically demanding, are only the tip of the iceberg considering the context of the pandemic and new ways of working “

The system for hospital use provides a kit of parts that allows any ultrasound machine in NHS Wales to be connected via a video streaming device to any tele-conference package. Most of the work to date has used the Microsoft Teams conferencing App but the system has been tested on numerous other tele-conferencing Apps. The remote cardiologist uses a high specification laptop, to enable the full quality of the ultrasound machine image to be viewed, usually at a higher quality than the image on the ultrasound monitor. Given the fact that a foetal heart can be the size of an adult thumbnail and that blood vessels are around 1mm, this is a very demanding application. EMRTS and TWL provide an inclusive support package for calibration, training and online support.

To date, the system for hospital use has been used for a total of 28 ultrasound transmissions and all were of diagnostic quality, without any loss of image resolution. The success of the project is best read in the attached paper and the upcoming white paper from Professor Uzun.

A system has also been developed for mobile use, incorporating TWL’s Omni-Route range that integrates hybrid routing (3G, 4G, 5G and satellite systems (L-band (BGAN) and KA-band). This system is being further developed under a collaboration agreement between TWL and Heriot Watt University, which will be the subject of a further announcement, in due course.

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Remote Heart Rhythm Monitoring and Emergency Tele-echocardiography Services, Launched across Wales

A remote heart rhythm monitoring and emergency tele-echocardiography service has been launched across Wales, which has proved invaluable during the current COVID19 pandemic.

Professor Orhan Uzun developed a new streaming device in collaboration with EMRTS-Welsh Air Ambulance for Children and Tactical Wireless, through UK Space Agency Funding at a 1/30th cost of the existing and ailing equipment. Mrs Claire Logan, the specialist cardiac liaison nurse, who is working alongside Professor Uzun as the nominated lead nurse within the team to maintain standards of this service from the clinical governance standpoint. The project also received financial support from Martha's Dancing Heart Campaign, which supports, Cardiff & Vale Health Charity's Neonatal and Paediatric Cardiology Investigation services and the Leon Montanari Heart Fund Charity, who also support, Paediatric Cardiology services across Wales.

Modern telemedicine equipment was acquired to start a pilot project across Wales. The equipment has saved many lives by allowing paediatricians and neonatologists in district general hospitals to obtain instant specialist opinion on live heart scan images in sick children, who cannot be transferred immediately, with severe heart problems.

Professor Uzun says "After successful trials in real emergencies, it has shown efficacy of the model in clinical use. The first in its kind to demonstrate true utilisation of telemedicine beyond its basic teleconferencing modality not only for improving patient's lives, but also allowing huge cost savings for the NHS.

"24 hour Holter and other ambulatory heart rhythm monitoring devices could also not be given to children suffering from arrhythmias during the pandemic. This could have led to serious consequences in the diagnosis and management of rhythm problems in children.





Therefore, funding was again given to purchase and donate over 22 wireless wearable ECG watches and ECG plates to be used for tele-arrhythmia service development and care delivery.

“Likewise, tele-echocardiography, we are in the process of spreading and scaling the tele-arrhythmia service to all Welsh district general hospitals to obviate the need for children to travel to Cardiff to receive the equipment. Glangwili, Nevill Hall, Singleton and Princess of Wales Hospitals have been provided with similar equipment and heart doctors, nurses and physiologists in each health board are being nominated. Again, both fundraisers are acquiring further devices for this purpose.

“Such effective, unique and stellar emergency telemedicine services are the first in its kind in the Wales and possibly in the UK. As a result, heart specialists, neonatologists and paediatricians in Wales now have a seamless tele-echocardiography and arrhythmia monitoring provision which were made available to them with true patient-medical professional engagement activity and an exemplary model of public and NHS collaboration. We are truly grateful for the generosity and tireless efforts of these selfless individuals and their charities.”

Professor Uzun, Michelle Graham and Julie Montanari have been pivotal in acting rapidly to close the gap in children’s arrhythmia service provision by demonstrating true citizen and NHS partnership. As a result, the Children’s Heart Unit for Wales have been provided with these pieces of equipment for the use of children with heart problems throughout the pandemic without any interruption of the service.

To read more of Michelle Graham’s story, please visit:
<https://www.justgiving.com/fundraising/marthasdancingheart>

To read more of Julie Montanari’s story please visit: <http://www.theleonheartfund.org/>

Pictured; Mrs Michelle Graham, Claire Logan, Specialist Cardiac Liaison Nurse, Professor Orhan Uzun.