

# West Mercia Rural 5G

*Transforming Rural  
Healthcare...*

*...Trialing Rural 5G  
Deployment Models*

WEST MERCIA RURAL  
**5G** PROJECT



West Mercia Rural 5G Project is a partnership between:



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**5G PROJECT**

# Network Overview



- Network will be a combination of:
  - 5G SA in Tenbury Wells. **Airband Mast** (20m), Nokia N77
  - 5G NSA at **Malvern Hills Science Park** indoor cells and Mast (25m existing, Ericsson N78)
  - EE Commercial 4G coverage will be used across the project area where service is available.

The above mix gives an opportunity to compare technologies and report on real world results.

# Innovative use of XR to support remote monitoring of patients for Rehabilitation

- **Use Case Partner:** Virtual Reality Simulation Systems **VRSS** (<https://vrss.co.uk/>). VRSS use simulations and extended reality to deliver productivity gains.
- **Health XR** - Innovative use of Extended Reality (XR) to support remote monitoring of patients for Rehabilitation. This use case will use a real-time XR Telemedicine platform for remote patients monitoring initially using our patent pending censored clothing and platform. Augmented view of a patient can be used in any place that human motion is desired to be studied, such as in the study and analysis of physical therapy, Parkinson's Disease or in the study of athletes in sports performance contexts. Doctors / Clinicians / Therapists will be able to view Augmented view of patient's biomechanical capability (range of motion, gait, etc.) and monitor patients progress without the need to meet them regularly in person.
- **Problem statement:**
  - Telehealth and telemedicine are currently restricted to using tablets and phone with software such as Video Calls. These solutions do not give the doctor or clinician ability to visualise precise data regarding the patient.
  - With isolation and social distancing, the medical profession is unable to meet patients on a regular basis including general health checks, use of physiotherapy or rehabilitation
  - Covid19 has highlighted the need for (among other things) remote physical therapy monitoring for patients mitigating the health concerns associated with in-patient rehabilitation.

# Innovative use of XR to support remote monitoring of patients for Rehabilitation

- **Solution proposition:**

- Augmented view of a patient can be used in any place that human motion is desired to be studied, such as in the study and analysis of physical therapy, Parkinson's Disease or in the study of athletes in sports performance contexts.
- In addition to the in-office platform, VRSS would like to create a remote mobile component to the platform and send smart phones home with patients to use the internal RGB camera to remotely track patients progress throughout the trial

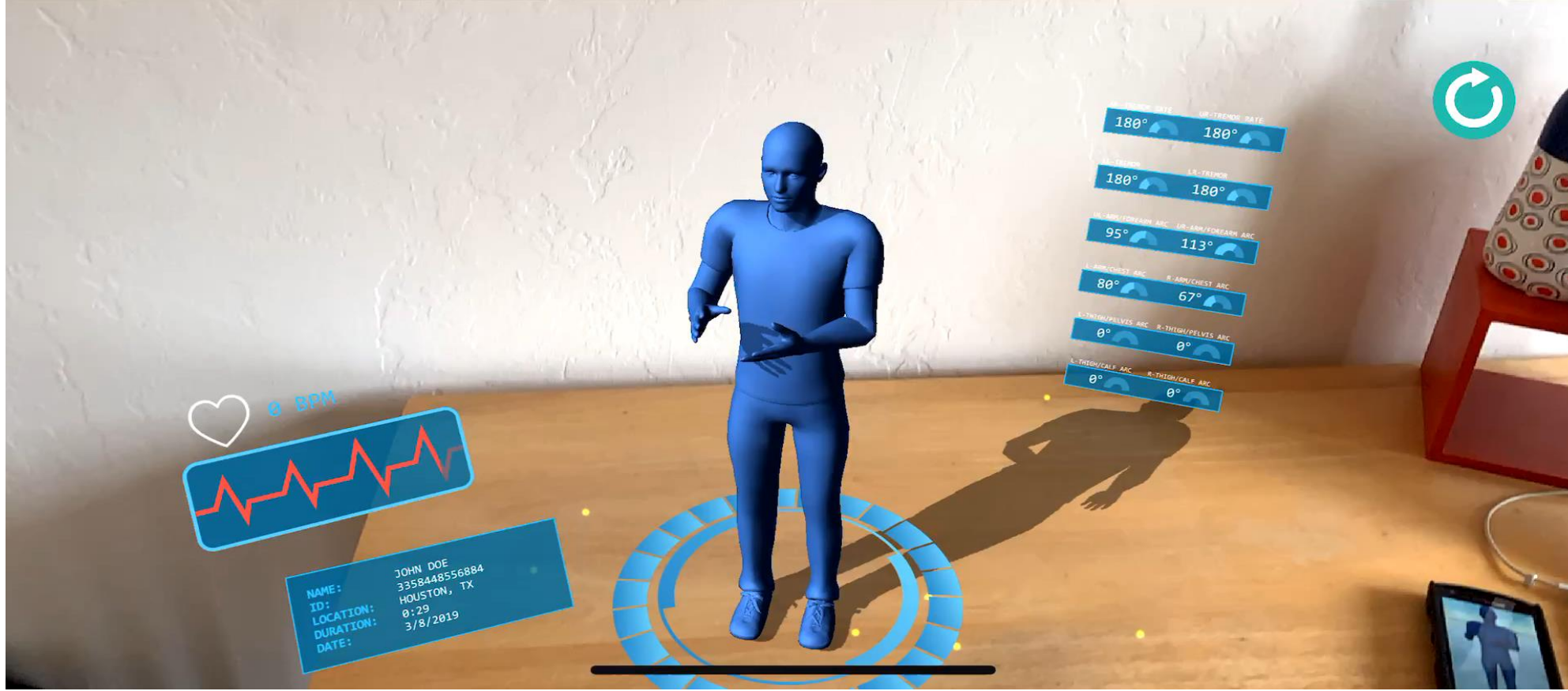
- **Technical consideration:**

- Augment the view of the patient using biometric data coming from them, specifically, in this case, the angles between lower limbs in order to assess gait and ambulation. This possible in real time using Wi-Fi, but not possible through 4G cellular capabilities. VRSS believe 5G would offer this capability.
- Health XR use AR headsets to capture image and depth data, which then use that information to build a body model on the server, in real time, using GPU-based deep neural networks.
- This data would then be used to overlay around a person with body model information and biostatistics gathered from analysis of that body model.



# Innovative use of XR to support remote monitoring of patients for Rehabilitation

View of patient moving in VR lab



# Use Case 1 .... Innovative use of XR to support remote monitoring of patients

- Example Scenarios:
  1. Remote MKS Clinics
    - a. Patient joining the clinic from home and clinician at central location. IOT sensors to be used by patients together with a 5G/4G device is sent to the patient and patient is expected to keep them during the trial period
    - b. Patient visiting a closer to home central location such as Tenbury Hospital (with IoT sensors, 5G devices in situ) instead of visiting to the location where the clinician is. Clinician is at their usual central location such as RJAH.
  2. Remote Physio Sessions by community Physiotherapists
    - a. Patient joining the session from home and clinician at central location. IOT sensors to be used by patients together with a 5G/4G device is sent to the patient and patient is expected to keep them during the trial period
    - b. Patient visiting a closer to home central location such as Tenbury Hospital (with IoT sensors, 5G devices in situ) instead of visiting to the location where the clinician is. Clinician is at their usual central location.

# Connected Worker - Wearable Video & Mobile Telemedicine

**Connected Worker** is a web-based real-time video communications service delivery platform which connects a medical expert with a remote medical situation via video. Head-mounted camera provide “see what I see” capability to field based care workers. Allows real time connectivity back to site of clinical expertise

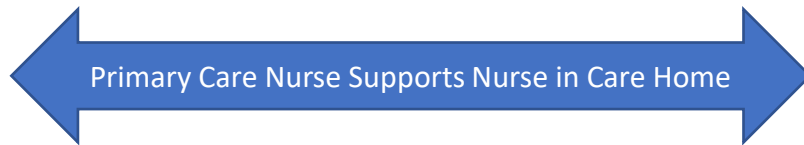
## Technical Consideration: Scenario 2 - 5G Wearable Video for Rural Community Nurse

- Background
  - Frail/Elderly patient cohort, in most cases, do not receive adequate medical support in Care Homes.
  - Medical treatment that is derived, in certain cases, is delivered by transporting patient to hospital at high cost.
  - 5G combined with wearable video can potentially resolve this.

Primary Care Centre



Primary Care Nurse



Nurse in Care Home



Elderly and Frail



Care Home



# Connected Worker - Wearable Video & Mobile Telemedicine

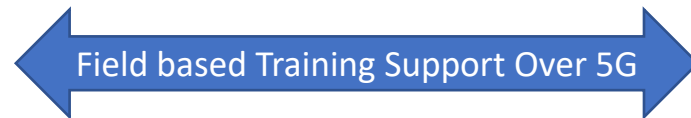
## Technical Consideration: Scenario 3 - 5G Wearable Video for training support

- Background

- Junior field based medical personnel in acute situations may require external senior medical support during training situations
- 5G combined with wearable video can potentially resolve this.



**Senior Doctor  
(Training Expert)**



**Junior Doctor,  
Nurse, or  
Paramedic With  
Patient**

# Connected Worker - Wearable Video & Mobile Telemedicine

## Technical Consideration: Scenario 4 - 5G Wearable Video for Domiciliary Care Provision

- Most *out of hospital* care takes place in the home and domiciliary care plays a key role in supporting independent living. Domiciliary care workers are often best placed to identify issues at an early stage and if properly supported can initiate steps which reduce risk and prevent escalation of health care issues.
- 5G combined with wearable video could potentially link domiciliary care workers to a range of practitioners who are able to advise, guide, and support.

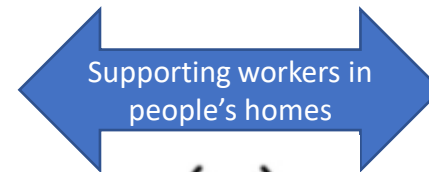
### Domiciliary Care Provider Operations Hub

- Support, advise, train, and channel urgent issues
- Helps to address retention problem



### Minor Works, Aids and Adaptations

- Prevent falls and other risks in the home.
- On the spot assessment with rapid turn around of repairs and minor works .



### Domiciliary Care Worker

- Helping people to live independent lives in their homes.
- Often the first to identify issues requiring attention.

### Health Care Professionals

- Remote physical and mental health care assessments.
- Advice on simple “non-medical” interventions which can prevent deterioration of health and wellbeing.



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