5G / IoT Real Use Cases for Sustainable Development

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5G offers high bandwidth, low latency and capability to support high number of connected devices. These features will help enable digital services across verticals.

	Human to Human	Human to Machine	Machine to Machine
Extreme Mobile Broadband	Virtual Reality/Augmented Reality Video Calling	Fixed Wireless UHD Video	Video Monitoring Mobile Cloud Computing
Massive Scale Communication	Wearable devices Social network	Smart Home/Smart City Healthcare Monitoring	Traffic Monitoring Industrial Automation
Ultra-Reliable Low Latency	Public Safety	Remote Surgery	Vehicle to Vehicle

NHS and BT utilized 5G technology on connected ambulance which allows paramedics to perform on more difficult tasks such as ultrasound scans.

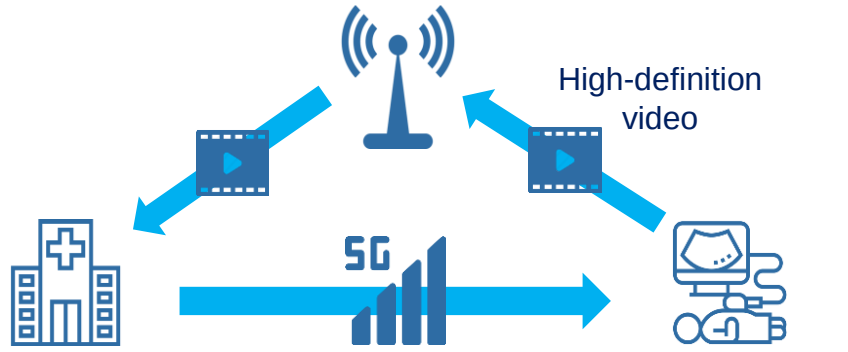
Smart Healthcare: Connected Ambulance And Remote-Controlled Ultrasound Scan

NHS University Hospitals Birmingham NHS Foundation Trust

BT

WM 5G

- NHS and BT demonstrated connected ambulance and **remote-controlled ultrasound scan over a public 5G network.**
- West Midlands 5G (WM5G) testbed was set up to trail new 5G applications and services.



- **Live images** of an ultrasound scan being sent from an ambulance straight to a screen at the hospital.
- 5G allows the person carrying out the ultrasound to wear a robotic glove which is **controlled remotely from the hospital by a specialist**

Front-line paramedics diagnose patients **better and faster.**

SUSTAINABLE DEVELOPMENT GOALS

3 GOOD HEALTH AND WELL-BEING

Goal 3: Ensure healthy lives and promote well-being.

- Improve medical services
- Increasing chance to save lives of patient

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5G provides high speed and low-latency channel for accuracy data exchange from sensors and drones. This help improve yield, efficiency, and profitability for farmers

Smart Farming: RuralFirst Project

Hands-Free Hectare

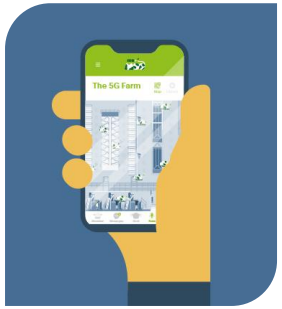
Precision Decisions · Harper Adams University · AGRIEPICENTRE

The Hands-Free Hectare project has successfully grown the world's first crop of wheat **without human entering the field** by using drones, autonomous machines, IoT sensors

- **5G powered drone** providing high definition image analysis of crop and soil which help monitor barley growth
- **Autonomous tractor**
- **Autonomous combine harvester** (drilling miss only 0.35%)

- Improving wheat yield
- Produce higher-quality wheat

Connected Cows



Cisco launched **Me+Moo** which is **5G Connected Cows Smartphone Application**

- The cows wear **IoT collars and leg sensors** transmitting **real-time data** such as cows' health and behavior to application **via 5G network**
- **Autonomous feeding system**
- **Autonomous milking systems**

- Increasing herd survival
- Increasing in milk yield

CISCO Hand-Free Hectare and connected cow are the projects in **5G RuralFirst** led by Cisco and partners that aim to exploit 5G benefits for rural communities and industries like agriculture.

Location:
the Orkney islands, Somerset and Shropshire, UK

SUSTAINABLE DEVELOPMENT GOALS

2 ZERO HUNGER

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

- **Reduce food loss** which help us meet the increasing demand for food production
- **optimize agricultural processes** such as water management

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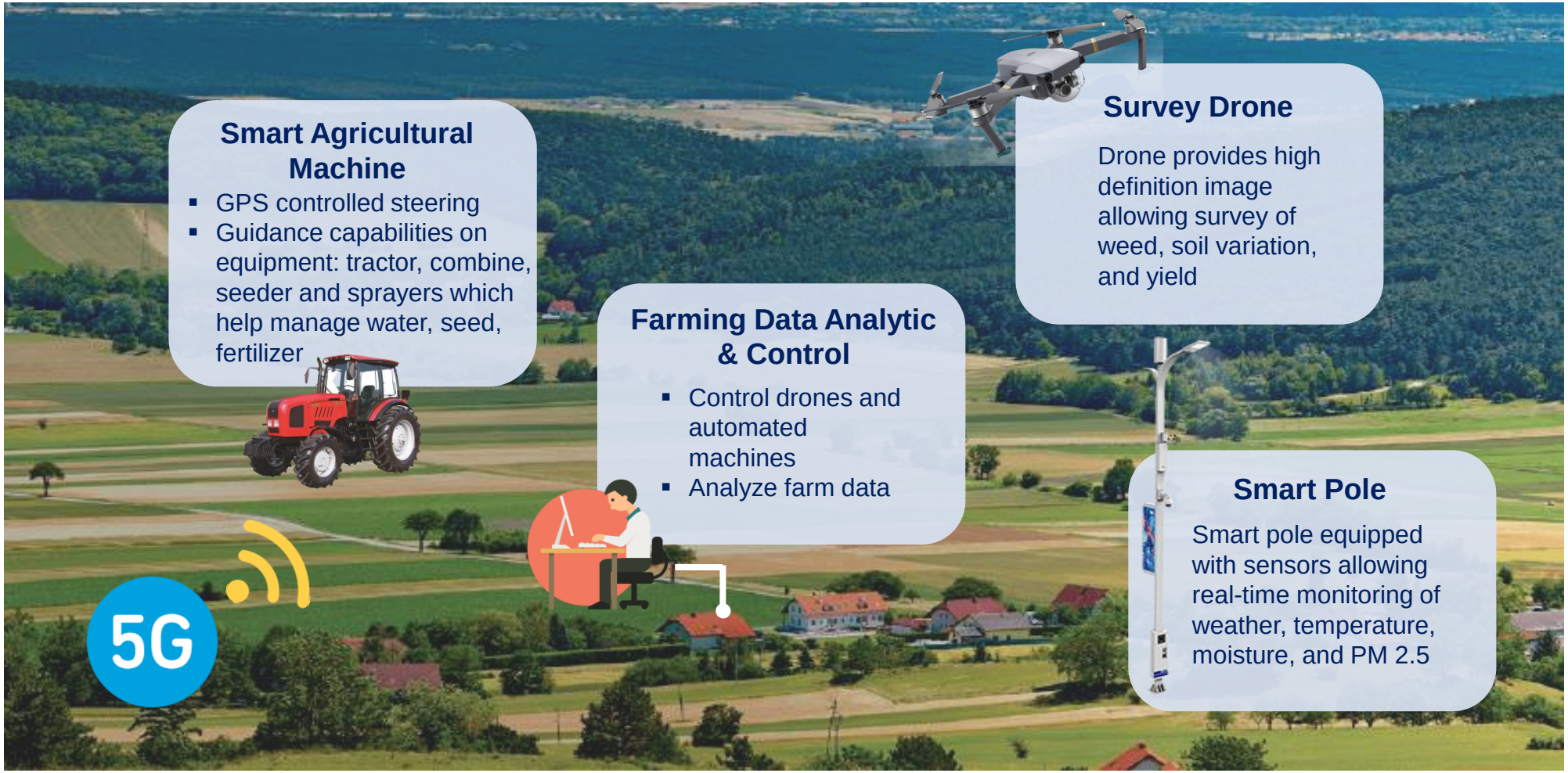
In Thailand we are planning to do a trial on 5G Bio Hub in EEC area to demonstrate Smart Precision Farming.

5G for Smart Precision Farm: Bio Hub of Asia



Bio Hub of Asia

Location: **EEC** area, Chachoengsao

Scale: 3500 Rai (560 Hectare)

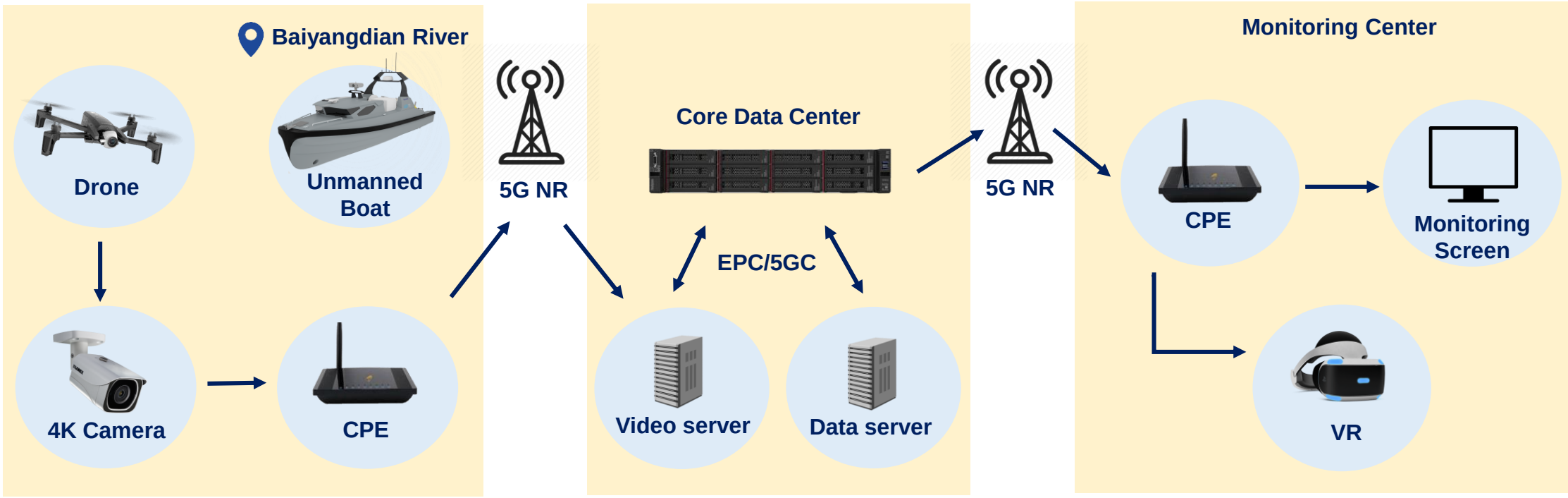
New S-Curve: biological industry :Bio Energy & Bio Refinery

Some of partnerships:

CAT, dtac, HUAWEI, ERICSSON, BIOMATLINK, Kubota, GISTDA, INET, OliZac TECHNOLOGIES

China Unicom and Huawei created 5G based Environmental Monitoring system which provides accuracy water quality monitoring in Baiyangdian river in Xiongan, China.

5G All in one Environmental Monitoring System



- Using **UAV, CPE, 4K Camera, and Unmanned Boat** equipped with water quality sensor allowing monitoring of environment data
- The data will send back to core data center for analytic

5G network slicing enables better emergency response to unexpected incidents and improve safety management in Bristol.

Smart City: 5G Smart tourism project in Bristol

Bristol's **City Operation Centre** provide integrated monitoring and management of services:

- Sensors that help monitor pollution level, water level, and weather
- **A traffic management system** which collects real-time data from street to optimize the flow of traffic
- **High bandwidth CCTV**
- Using **thermal cameras** designed to help citizens and visitors from drowning

The use of IoT and 5G could help a city to achieves their **Smart Safety and Smart Tourism plan**

5G thermal Camera

- **5G-enabled thermal cameras** beam a virtual line across the edge of habour which serve as barrier lines on the harbour wall and can detect change in water temperature
- Council's operations centre will be **automatically alerted** through 5G if someone falls into the habour

5G **provide access to hard-to-reach places**, performance with **low latency,** and support **real-time analytics** to keep people safe

SUSTAINABLE DEVELOPMENT GOALS

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

- Improving **safety**
- Improving **transportation**