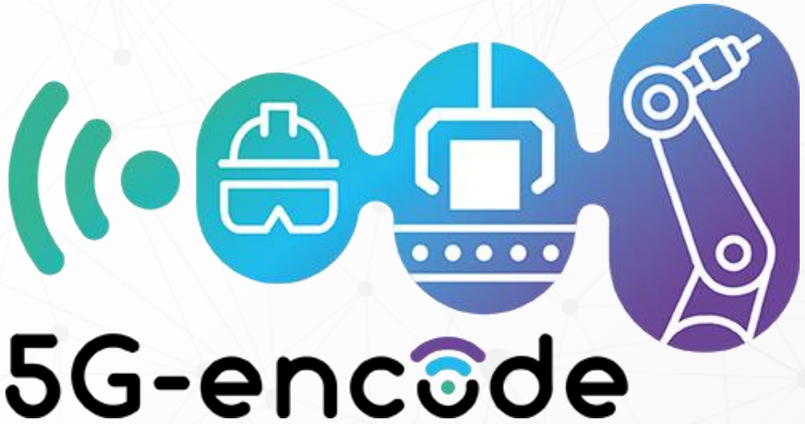


The 5G-ENCODE project

ENabling COnnectivity for Digital Engineering

5G-ENCODE Project Overview

- **£9m** Project funded partly by DCMS' "Industrial 5G Testbeds and Trial: Manufacturing and Logistics" Programme
- Aims to develop **clear business cases and value propositions for 5G application** in manufacturing industry
- Also to deliver a private 5G Testbed within the National Composites Centre (NCC)
  - New business models
  - New 5G technologies: Network slicing and splicing
- Three manufacturing use cases:
  - AR/VR to support design, manufacturing and training
  - Monitoring and tracking of time sensitive assets
  - Wireless real-time in-process monitoring and analytics
- Lead Partner: **Zeetta Networks**

Department for Digital, Culture, Media & Sport

NATIONAL COMPOSITES CENTRE

Zeetta NETWORKS

5G-encode

Project Partners

Zeetta NETWORKS

NATIONAL COMPOSITES CENTRE

Telefónica

SIEMENS

University of BRISTOL

TOSHIBA

SOLVAY

PLATAINE®

mativision

5G-encode

Role of Each Partner

Partner	Category	Role
Zeetta Networks	Small SME	Project leader and technology provider (NetOS® SDN Controller and Orchestrator, NetOS Rapide deployable network, Multi-domain Orchestrator (MDO))
Cytec+ Solvay	Large enterprise	Work closely with NCC of asset tracking and providing composite materials as a contribution to the project
Plataine	Small SME	Provision of IOT software licenses and consultancy (in-kind support). No funding requested
Telefonica	Telco	Assist with spectrum T&D licenses and join the neutral hosted solution when deployed by the project. Also assist in network design and evaluate technology vendors.
Toshiba	Large enterprise	Technology provider: Provide very-low latency private 4G/5G system using programmable hardware and COTS devices. The 4.5G system is available immediately, 5GNR early in 2020.
Mativision	Small SME	Bring proven real-time AR/VR technology from past 5G test bed programmes (Smart Tourism) to meet the needs of the industrial use cases
NCC	RTO	Demonstration factory facility, providing all data and infrastructure for the test bed. Leader of WP2 to coordinate the industrial use cases and install, setup and run any equipment required
University of Bristol	University	Advise and assist in the network design architecture and manage the testbed during the project. Also integration with Millennium Square 5G testbed and dissemination of results
Siemens	Large enterprise	Provision of PLM, IOT and Analytics software licenses and consultancy (in-kind support). No funding requested

5G-encode

5G-ENCODE Project – Use Cases

In-factory and in-transit asset tracking

NATIONAL COMPOSITES CENTRE · SOLVAY · PLASTAINE · SIEMENS

Business Objective: Improve productivity and reduce costs by providing accurate and live location and condition information of tracked assets

TARGET: 5% productivity improvement (£0.9m/annum)

Virtual 360 video training

NATIONAL COMPOSITES CENTRE · mativision

Business Objective: Improve efficiency and trainee satisfaction of in-house training using immersive and interactive VR 360° platform over a 5G mobile network

TARGET: 20% costs reduction (£1.0m/annum)

Closed loop manufacturing in Liquid Resin Infusion (LRI)

NATIONAL COMPOSITES CENTRE · PLASTAINE

Business Objective: Improve efficiency and productivity in LRI composite manufacturing using 5G and digital technologies

TARGET: 40% better yield (£1.5m/annum)

5G-encode

Contact Us

If you have any further queries regarding the 5G-ENCODE Project, please get in touch.

5G-ENCODE Project (c/o Zeetta Networks)
1 Friary, Temple Quay, Bristol, BS1 6EA, U.K.

info@5g-encode.com

www.5g-encode.com

Twitter.com/encode5G

Linkedin.com/company/5g-encode

5G-encode

5G-encode

NATIONAL COMPOSITES CENTRE

Closed-loop manufacturing in Liquid Resin Infusion (LRI)

NATIONAL COMPOSITES CENTRE

CATAPULT
High Value Manufacturing

5G-encode

NCC Overview

Sectors:

- Aerospace & Defense
- Space
- Energy
- Construction
- Infrastructure
- Automotive
- Medical devices
- Marine
- Rail
- Leisure and sports

Vision

Be the world-leading authority on composites, bringing together and developing the best minds and the best technologies, to solve the world's most complex engineering challenges.

Purpose

Through innovation and collaboration, accelerate the commercial adoption of high impact, sustainable engineering solutions in composites by being the catalyst to enhance UK capabilities and stimulate global growth.

2011
officially opened

£200m
invested in capabilities

10
New technologies tailor-made going live in 2020

21,500m²
facility at NCC HQ

350
engineers

725
organisations engaged

5G-encode

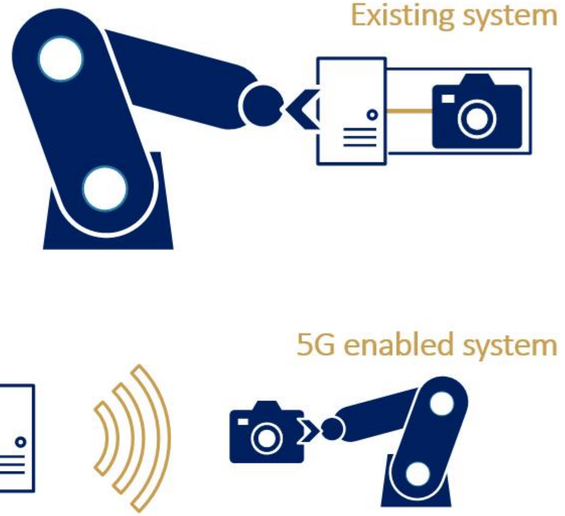
5G Aims & Benefits Closed Loop Manufacture

The NCC's digital capability is being applied across two initiatives DETI and 5G Encode.

These use cases demonstrate aspects of both initiatives.

Use Case: Automated Preforming Cell

- Robotic verification sensor end effector
- Large end effector, **1m x 1m x .6m, ≈120kg**
- Up to **1Gigabits/s** data sent from sensor
- **Aim: To decouple sensor from data processing unit**
- **Benefits: Reduce infrastructure costs of Closed Loop Manufacture**



Use Case: Liquid Resin infusion

- Sensor system to track and adjust the infusion process
- Harsh environment sensing
- Extensive cabling requirements
- **Aim: Create a wireless network of sensors to replace existing wired solution**
- **Benefits: Increase flexibility of Closed Loop Manufacture**

5G-encode

mativision

Virtual 360° Video Training

Mativision: Immersive Media Partner

Mativision is the most experienced specialist in the fields of immersive video and interactive content.

With a field-proven end-to-end workflow, a highly experienced team with an unmatched skillset and market leading 360° video platform and distribution technologies, we have VR-live streamed major events to global audiences of millions and have produced and delivered award-wining immersive projects for a long list of international clients across industry sectors.

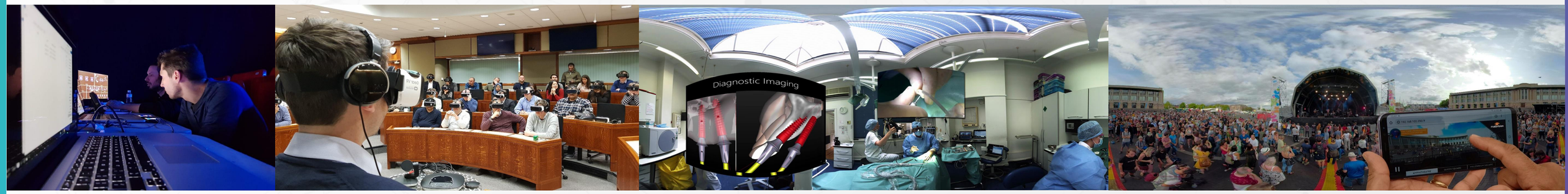
We are valued partners of governments and corporates on R&D innovation and commercial projects, using our mature proprietary platform to demonstrate 5G next generation capabilities.

Leveraging more than 10 years solid field experience worldwide, Mativision is the trusted immersive media partner

Mativision in 5G-Encode

Mativision will be involved in the first use case of project 5G ENCODE, aiming to improve training and maintenance in composite manufacture using interactive augmented reality (AR).

Mativision was selected as a partner in the 5G-ENCODE on the strength of its world-class experience, technology and skillset in immersive applications (AR/VR/XR) as well as its prior successful work in combining the company’s proprietary immersive content delivery platform with 5G Networks.



Mativision in 5G-Encode

01 WP 3.1.1 VR / AR classroom

Develop and pilot VR / AR enabled distributed training system for composites manufacturing – delivering classroom-based training into remote areas and across a distributed supply chain saves training costs, time and delivers composite knowledge into a wider community in a more immersive and effective fashion

02 WP 3.1.2 AR Expert Guidance

Establish AR enabled distributed expert assist systems for inspection, concession logging and / or problem resolution scenarios - The ability to get expert advice while in the field in real time “phone an Expert“, enable more effective and efficient solution to processing issues or defect rework. Records of what has happened can be used to assist in product assurance, compliance and potential redesign of solutions.

03 WP 3.1.3: AR enabled Instructions

Enable AR digital work instructions, defect visualization and the overlay of simulated scenarios – presenting more detailed, accurate and immersive techniques to performing manual operations improves product first time and compliance.

04 WP3.1.4 VR Controlled Robotics

Develop and pilot VR solutions for Human to robotic control solution over a distributed network including tactile internet – the ability to remotely steer robotic systems which operate in harsh environments supports use cases such as nuclear decommissioning.

5G-encode

SOLVAY

In-factory and In-transit Asset Tracking

Solvay

A chemical company aligned to powerful megatrends

Electrification

Lightweigthing

Resource efficiency

Healthcare

Eco-friendly based solutions

IoT/Digitalization

5G-encode

Composite materials GBU
“At a glance”

ADVANCED MATERIALS
COMPOSITE MATERIALS

€ 1.3 bn
Revenue
2019

~ 2600
Global
employees

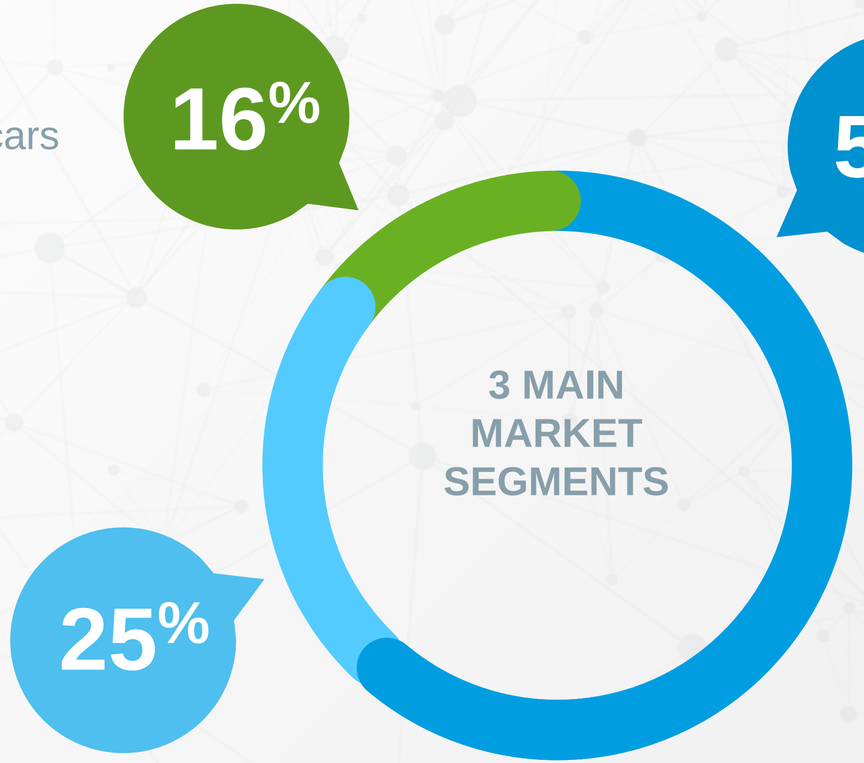
18
Industrial
sites
“A global foot print”

Industrial

High-performance cars
Motorsport
Oil and Gas
Wind Energy
Marine

Military & Space

Fighter Jets
Transports
Rotorcraft
Unmanned Vehicles
Launch Vehicles, Missiles



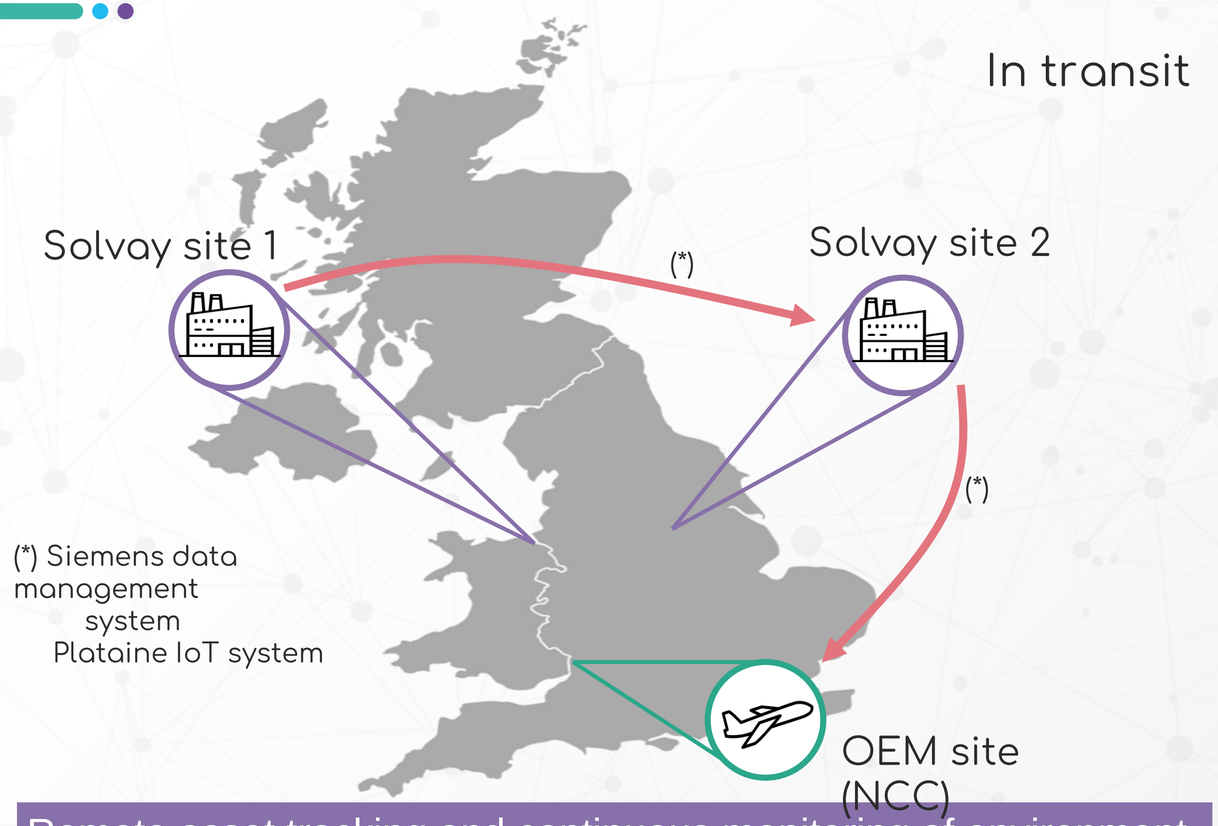
Civil Aircraft

Large Commercial Transport
Business Jets
Regional Jets
Turboprops
Rotorcraft

Asset tracking

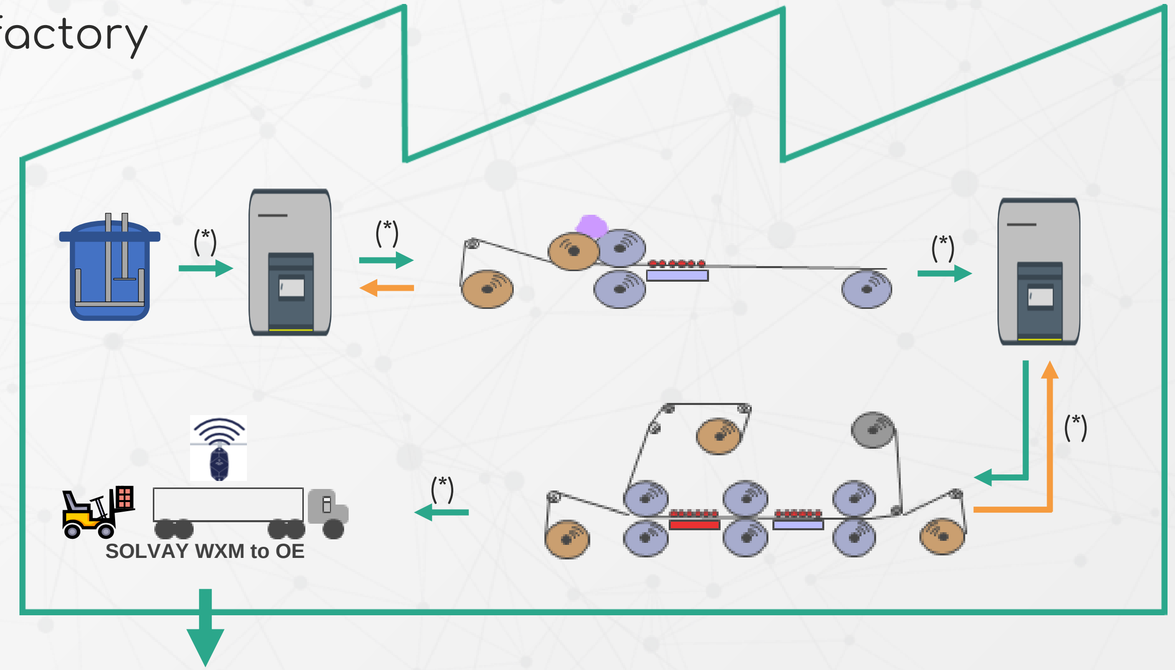
To answer logistic and production challenges

In transit



Remote asset tracking and continuous monitoring of environment (temperature, humidity & impact)

In factory



In factory asset tracking and communication between assets

ENABLING

Total visibility **Perfecting prediction** **True vertical integration of supply chain**

Continuous information **Continuous monitoring** **Autonomous production system**