



AMAZING-6G

**Next-generation connectivity powering
efficient wind operations**

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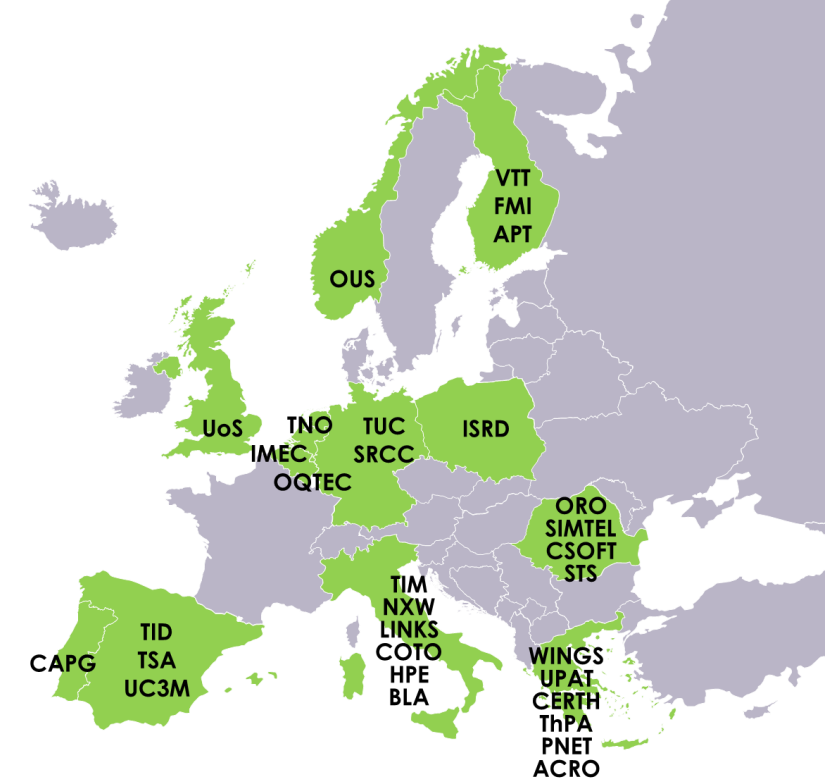
Project Overview

Background

- **Demonstrate** 6G connectivity and advanced enablers (e.g., edge computing, AI)
- **To** improve resilience, and performance in several critical infrastructures
- Why? Connected devices and remote/critical infrastructures demand reliable, low-latency, and sustainable communication networks.
- 31 partners from 13 countries; with case studies in Health, Public Safety, Energy, and Transport

Activities

1. For the Wind Energy system: How can 6G and other connectivity solutions enable faster and reliable inspections?
2. For other use cases (Health, Rescue missions etc...) enhance operations using novel network capabilities



Dutch (TNO) use cases

Health (H1-H2) Trial Location: TNO

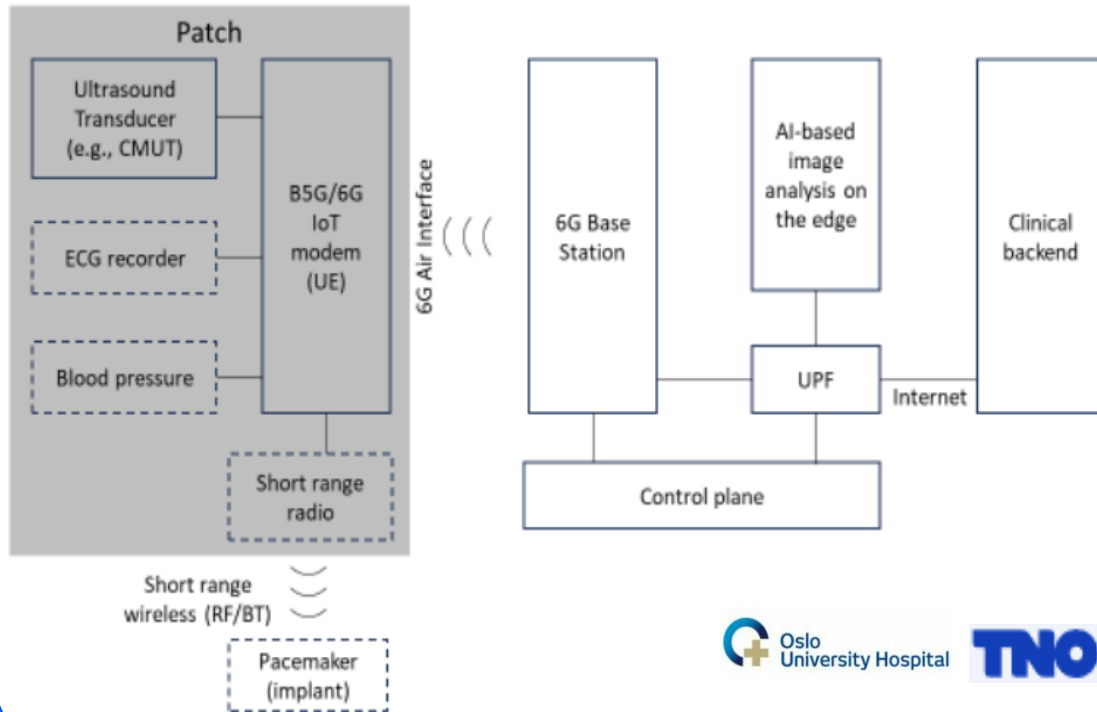
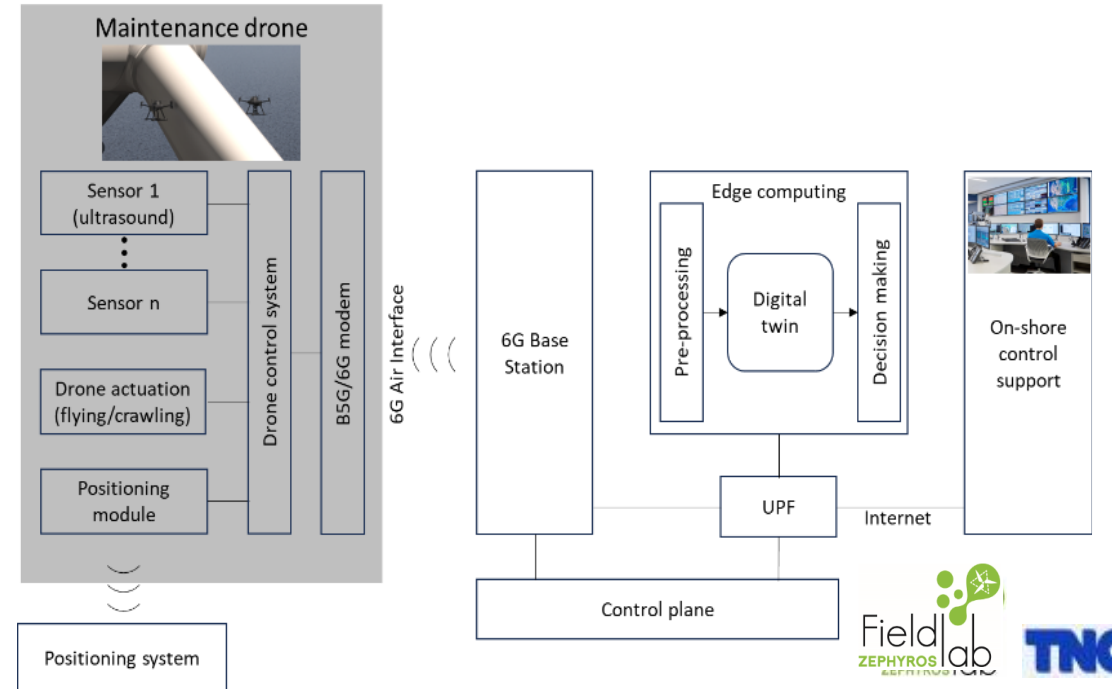
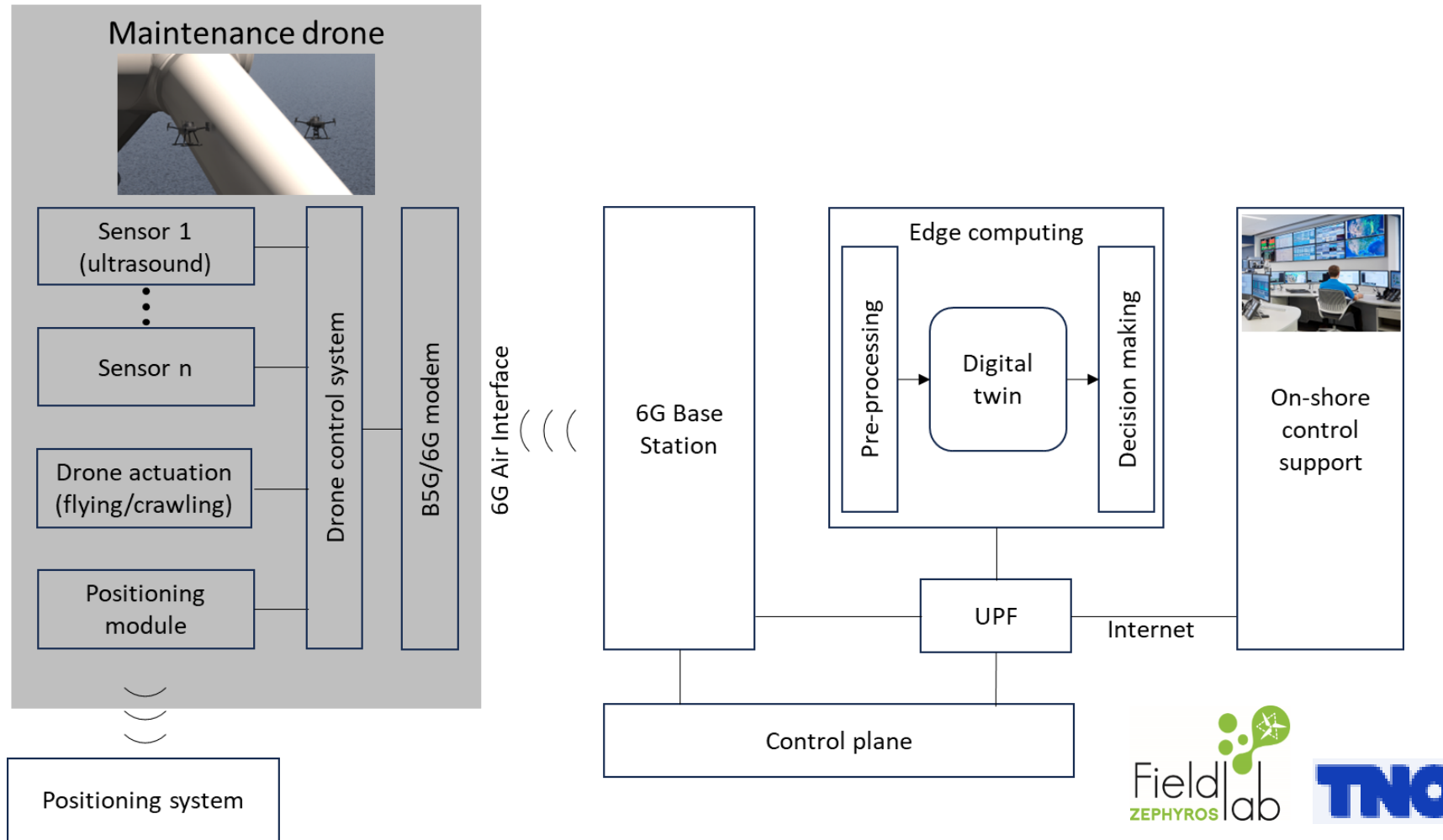


Figure 2 24-7 Heart function – wearable based ultrasound application overview.

Wind Energy (E2) Trial Location: FieldLab Zephyros



Wind Turbine inspection: Connected inspections



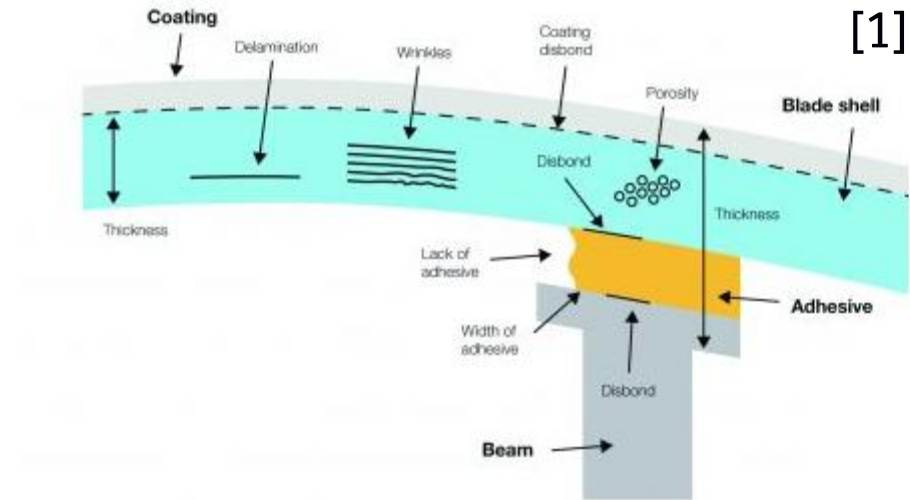
Wind Turbine inspection: Connected inspections

Objectives:

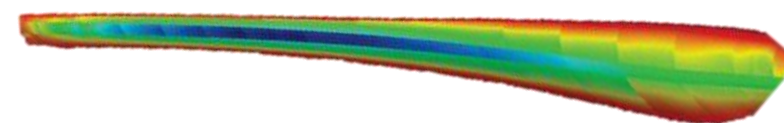
- 1) speed up information transfer to enable during-inspection decision making.
- 2) Improve edge computing for decision making capabilities.



Drone embarked sensors (UltraSound)



Damage detection



Estimation of hotspots for inspection through numerical simulations (FEM-ML)

Wind Turbine inspection: Connected inspections

- The E2 use case will demonstrate how 6G connectivity can improve wind turbine inspection, operation and maintenance.
- High data rate and low latency allow real-time transfer of drone sensor data
- High availability for almost always available network connection
- Use case enablers include:
 - Digital twin: data-driven decision-making tool
 - Network slicing: QoS guarantee for drone traffic
 - Public-private network integration at offshore location
 - Hybrid localisation with GNSS+RTK and B5G-based approach
- TNO will install a B5G small cell (RAN) and Edge server at Zephyros Lab
 - Connected to Open5GS core network at TNO Den Haag
 - VPN connection for remote configuration



Closing words

Developments

- 1) Processing UltraSound data for data transfer pipeline
- 2) Testing drone localization methodologies (GPS+RTK)
- 3) Preparing Edge computing framework for numerical simulations

Strong interests in Airtub-ROMI

- 1) Hardware importance: Drone, sensor.
- 2) Correlated objectives -> Learn from successes and failures in sensor data transfer!

Excited to find further future “connections”!

Thank you!

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