



Innovation Challenge 1

Automating and accelerating the coating process for large composite structures

Background

The OWiX initiative is supporting an innovation challenge owner in the offshore wind industry to identify transferable solutions to its innovation needs.

Currently wind turbine blades must be contained within a large environmentally controlled tunnel for manual coating (painting and protective matting) and curing while in the factory. Solutions are required to automate and accelerate this process.

Whilst not limiting the technologies from solution providers, it is expected that solutions would consider innovations from some of the following areas:

- Camera and imaging systems
- Sensor systems
- Aerospace
- Marine
- Rail
- Chemicals
- Piping technologies
- Construction and bridges
- Shipping
- Robotics
- Artificial intelligence
- Drones
- Crawlers
- Autonomous vehicles

To meet the desired timescale and risks, it is preferred that the proposed solution (or the key part(s) of the solution) has been demonstrated in an industrial environment. The solution should be in line with health and safety requirements and regulations.

Solution Requirements

Functional

Requirements

- *Surfaces to be painted are on a 3-dimensional, large and complex composite structure*
- *Coating must be applied to 3-dimensional structure and pass over blended profiles*
- *Solutions must be deployed within a single flow factory environment and preferably have minimum human intervention*
- *Coating must be undertaken with the target structure in-situ, without the need to rotate the composite structure*
- *Solutions must automatically coat and cure a structure in a moveable or stationary controlled environment*

	<ul style="list-style-type: none"> • Polyurethane (PU) coating (primer and paint) must be applied and cured within a controlled environment • Structure may need sensor or tracking system because there is no existing positioning system for this coating • Solution would preferably not require its own independent building
Technical Characteristics	<ul style="list-style-type: none"> • Solution must be able to apply a coating system (PU or Epoxy + PU) with function to protect against UV radiation and erosion (impact of rain, sand, hail and salt spray). The coating is designed to optimise energy production over the 20-year lifetime of the blade. • Solutions must be able to apply a protective material to protect the leading edge of the blade from erosion due to high velocity rain and solid particle impacts • Automated solution must be capable of coating a structure greater than 100m in length and greater than 5m in depth/width at its largest cross section. • Solution coating system must be able to automatically coat and cure the entire structure in under 12 hours • Solution must be able to provide an accelerated curing time that beats the current time of 6 hours • 'Lights out' – minimal human intervention
Deployment Timescale	<ul style="list-style-type: none"> • Commercial implementation: by Q3 2018
Operating Conditions	<ul style="list-style-type: none"> • Solutions must be able to be operated safely and reliably in the following conditions: <ul style="list-style-type: none"> ○ Ambient temperature $20 < \text{temp } [^{\circ}\text{C}] < 30^{\circ}\text{C}$ ○ Humidity $50 < \text{RH } [\%] < 80$
Market opportunity	<ul style="list-style-type: none"> • Improving the tact time for production of a single structure is where the market opportunity lies • A successful solution will have the opportunity to sell 4-6 devices globally to the challenge owner. It will also have opportunities in other sectors
IP and Potential Commercial Route	<ul style="list-style-type: none"> • Existing background IP associated with a potential solution will remain with Solution Provider(s). Where any new IP generation is envisaged, it will be subject to the mutual IP agreement of the Solution Provider(s) and Innovation Challenge Owner. • Any commercial deployment of transferred solution or newly developed solution, through licensing, joint venture, partnership or direct investment, will be subject to the commercial agreement between the Solution Provider(s) and Innovation Challenge Owner • Where necessary, a non-disclosure agreement (NDA) may be signed to uphold confidentiality in the engagement between the Solution Provider(s) and Innovation Challenge Owner • Innovate UK and KTN do not take any share of IP ownership or enter into commercial venture through the OWiX programme