



Innovation Challenge 3

A solution for the transfer and replacement of very heavy and complex large components, at height, in dynamic offshore weather conditions.

Background

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

The proposed solutions for this challenge must be deployable without requiring changes to existing manufacturing and design of offshore wind turbines. Whilst not limiting the technologies from solution providers, it is expected that solutions would consider innovations from some of the following areas:

- Self-lifting and heavy-lifting technology
- Robotics and mechatronics
- Naval architecture
- Aerospace engineering and manufacturing
- Heavy engineering and manufacturing
- Smart autonomous systems
- High accuracy positioning systems
- Large air carriers
- Unmanned aerial vehicles (UAVs)
- Artificial intelligence

To meet the desired timescale and risks, it is preferred that the proposed solution, or the key part(s) of the solution, has been commercially proven in other sectors.

Solution Requirements

- Functional Requirements**
- Solutions should be capable of replacing large and heavy components including the main bearing, generators, blades and other components of this scale.
 - Ideally a single solution would be capable of replacing components of different sizes and weights.
 - Solutions should be deployed in dynamic weather conditions offshore, up to a distance of 50km from shore and in water depths up to 50m.
 - Solutions must be deployed safely and ideally with reduced human intervention.
 - Solutions must align to offshore/marine operational, health and safety statutory standards.

- Technical Characteristics**
- Solutions must be capable of lifting objects:
 - With a mass of 40-150 tonnes
 - To a height of 90-140m above sea level
 - 6-8m in diameter
 - Up to 75m in length

Deployment Timescale	<ul style="list-style-type: none"> • Validation of solution: within 1.5 year • Field trials: within 3 years • Commercial implementation: within 3-5 years
Operating Conditions	<ul style="list-style-type: none"> • Solutions must be able to be operated safely and reliably in offshore conditions with: <ul style="list-style-type: none"> ○ Up to 12m/s wind speeds ○ 1-2m wave heights ○ An ambient temperature 0-40°C • Solutions must allow safe tolerances from main structure during the lift of various parts in changing operational conditions.
Cost Requirement	<ul style="list-style-type: none"> • New solutions must offer a lower cost of component replacement than currently achieved by industry. A cost of £100,000 per day or less is required, with the capability of replacing components 24/7 is desired. • The current estimated component replacement market in the UK for a successful solution is estimated to be in the region of £49m-£60m in 2017, growing to £53m-£85m by 2030, with a significant additional export market.
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.