Offshore Wind Accelerator Access Competition - shortlisted designs

The Carbon Trust Offshore Wind Accelerator Access Competition aimed to identify and develop new access systems to dramatically improve the availability of turbines and the safety of people during the transfer to turbines.

The competition has shortlisted the following designs in three categories:

- **Vessels** - Vessels for transporting personnel and equipment from bases or mother ships to turbines, incorporating a transfer system.
- **Transfer systems** - To transfer personnel and equipment from vessel to turbine, potentially with motion-compensation
- **Launch and recovery systems** - Systems fitted to the permanent bases or mother ships for launching and recovering daughter craft from the sea.

Since the competition in 2010, technical experts from the 8 OWA partners, DNV and the Carbon Trust have been working with these innovators to de-risk and commercialise their designs.

**Vessels**

Vessels for transporting personnel and equipment from permanent bases or mother ships to turbines, incorporating a transfer system.

**TranSPAR**

http://www.extremeocean.ca

The TranSPAR Craft is a radically different type of craft when compared to current access vessel design. An extremely small water plane area, coupled with a fin keel arrangement similar to that found on high performance sailing yachts, has resulted in a very stable transfer vessel especially well-suited for operations in high sea states. While it may not be the fastest vessel in the group, the TranSPAR Craft’s speed has been optimized for service operations staged from a central hub to meet the in-field service requirements of tomorrow’s Round 3 offshore wind farms. Anticipated to be cost-effective from both a manufacturing and operations perspective, the TranSPAR Craft could dramatically change the approach to offshore personnel transfer and wind farm service strategies. For the latest videos please see here and here.
Windserver
http://www.fjellstrand.no/

The Fjellstrand WindServer innovative hull design allows very fuel-efficient travel within the wind farm, but unlike other fuel-efficient vessels, it is actually very stable when stationary which is ideal for transferring engineers to turbines. The slender waterlines and unique bow ensures minimised motion at high speeds as well as during low speed manoeuvring in the wind farm. The generous deck space made possible by the hull’s ample load capacity can accommodate practically any transfer system.

Nauti-Craft
http://www.nauti-craft.com/

The Nauti-Craft is a radical new vessel design unlike anything else in the maritime engineering industry. The vessel’s hulls are separated from the deck and superstructure via a ‘passive reactive’ hydraulic suspension system. This technology draws on the Nauti-Craft team's experience in the development of interconnected suspension systems used by winning Dakar and WRC rally cars as well as many production motor vehicles including McLaren's new road car. The Nauti-Craft system allows the hulls to conform to the ocean's surface while providing improved stability and safety of the deck for crew transfers. The suspension also reduces structural loadings whilst increasing passenger comfort and fuel efficiency, permitting greater speed to the work location.

For the latest videos please visit their website.

Pivoting Deck Vessel
http://www.northsealogistics.co.uk/

North Sea Logistics is one of the leading offshore wind operation and maintenance (O&M) vessel suppliers and operators. The Pivoting Deck Vessel concept incorporates a deck into the vessel, which links with the turbine foundation and reduces motion significantly during transfers. It also allows heavier equipment to be transferred compared to many competing systems, which means that the vessel can be used for more O&M operations.

You can find them here on YouTube.
SolidSea Transfer

Robert MacDonald, a student from the University of Strathclyde, is developing a concept for an innovative access vessel for offshore wind turbines. This novel vessel configuration aims to fulfil two distinctly different services; firstly, to provide fast and comfortable transit for personnel and equipment to and from wind farm sites; and secondly, to provide a safe, stable and static transfer platform on arrival at the turbine base in sea-states above that tolerated by present vessels. The vessel’s design means the configuration can be changed at sea to accommodate these two different circumstances allowing maximum potential to be provided in both situations. The concept is at an early stage in the design process and this feasibility study will investigate the vessel configuration and confirm its application in the onerous conditions encountered by the offshore wind industry.

Surface Effect Ship

http://www.um.no/

This design has been adapted from vessels used by the Royal Norwegian Navy as Mine Counter Measure Vessels and Littoral Combat Crafts. Using an air-cushion, like a hovercraft, means that it is extremely fast so it can reach a turbine in a shorter weather window than would be possible with other vessels. When stationary, the air-cushion can be used to stabilise the motions of the vessel. The air cushion provides 80% of the lift with 20% coming from buoyancy. With a limited area of the hull in the water and the air cushion, the impact of waves on vessel motions is significantly reduced.

Transfer systems

To transfer personnel and equipment from vessel to turbine, potentially with motion-compensation.
Autobrow
http://www.otso.org.uk/Otso/Autobrow.html

Designed by leading marine design company (Ad Hoc and Otso Ltd) and offshore windfarm support vessel supplier (South Boats), the Autobrow is an elegant and simple modular transfer system (i.e. light weight, reliable and flexible) that can be retrofitted to existing vessels, and provides a significant, cost effective, improvement in transfer safety and operating window.

BMT & Houlder Turbine Access System (TAS) Mark II

This transfer system is a development of the award-winning TAS® system, developed by Houlder with BMT Nigel Gee, for which sea trials are planned this autumn. The elegant and light design can be fitted to smaller vessels to deliver a more cost effective solution than that achieved by larger dynamically positioned boats carrying complex transfer platforms.

You can find them here on YouTube.

MOTS (Momac Offshore Transfer System)
www.momac.de

This innovative robot arm uses sensors to measure the motions of the vessel and compensates by adjusting the position of the arm to keep the transfer platform stable. The design is currently undergoing prototype testing. The concept has significant potential to be used for a variety of operation and maintenance activities.

Wind Bridge
www.knudehansen.com/

Wind Bridge is a pneumatic-based boarding bridge for access to boat landings on offshore wind turbines from a service vessel featuring an impact absorbing boarding system and dynamic heave compensation. Once contact is made, an automated retention clamp system is activated forming a safe access. The Wind Bridge will be clamped to the boat landing of the wind turbines foundation resulting in a rigidly connected embarkation point which greatly improves operability in higher sea states.
Launch and recovery systems

Systems fitted to the permanent bases or mother ships for launching and recovering daughter craft from the sea.

Divex LARS
http://www.divexglobal.com/

Adapting principles from the diving industry, Divex have designed a launch and recovery system (LARS) that uses a semi-submersible cradle that can be lowered from the stern of the mother ship to launch and retrieve daughter craft. The inclination of the cradle is automatically adjusted so that it acts like a ramp when retrieving the daughter craft, significantly reducing the complexity and risk compared to existing launch and recovery systems. The design allows launch and recovery in rougher seas with both a stationary and moving mother ship as the cradle synchronises with the wave motion.

Offshore Kinetics L&R system

Offshore Kinetics is developing a complete maintenance system for offshore wind parks, consisting of mother ship, service vessels and personnel facilities. As a part of this concept, Offshore Kinetics has designed a lift system to launch and recover daughter crafts from the mother ship, and to move the daughter crafts around the deck so that a number of vessels can be operated from a single mother vessel.

Z Port
http://www.ztechnologies.nl

The Z Port is a mother ship that remains permanently at sea in the wind farm, accommodating the crew and operation and maintenance technicians and deploying a number of in-field daughter craft. Z Port creates a sheltered harbour area of 85 by 15 metres to protect daughter craft from the waves, which means vessels can be launched and recovered in high sea states.