

Proven subsea electrical connector solutions for marine energy

Gavin McPherson, Nova Innovation Head of Policy and Research ETIP Ocean 2021, Connecting Your Kit: Quick and Reliable Connections

INNOVATION

Spot the power station?

Bluemull Sound, Shetland, home of the world's first offshore tidal array

Clean

Predictable / N

No visual / impact

No navigational hazard Protected from storms

Environmentally friendly

Nova's 100kW plug & play tidal power station

Nova M100

- 3 turbines powering the grid since 2016
- 5years+ operation
- Geared drivetrain
- Dry-mate connector

Nova M100-D

- Next generation device
 installed in Autumn 2020
- 99%+ availability
- Direct drive
- Wet-mate connector



 Proven technology 36,000 generating hours and counting

ΙΝΝΟΥΔΤΙΟΝ

- Rapid, low-cost deployment using local vessels with no heavy port infrastructure
- Scalable from a single 100 kW device up to multi- megawatt arrays
- Reliable no pitch or yaw mechanism; 2 year+ service interval
- Blue Energy solution integrated battery storage; EV charger; supporting the island grid and economy



Full water to wire project delivery experience





The problem

- Connectors have been our most troublesome component by far
- We've tried expensive turnkey complete connector systems from major suppliers all failed within months or minutes
- Nearly all leading marine energy developers have had a similar experience. Why?
 - Existing solutions are not designed or suitable for the highly energetic, bioactive marine energy environment
 - Our environment and operating profile are very different from typical subsea applications, particularly during the product demonstration phase
 - Loads experienced and working conditions during vessel operations and loads during in-sea operation are very difficult to predict – there is no substitute for in-sea operational experience

The solution

• NovaCAN – a subsea connector designed for marine energy

The NovaCAN subsea connector



- Power, auxiliary and comms connection solution for marine energy
- Comes in three parts, demonstrated in the Horizon 2020 EnFAIT project:
 - NovaCAN cable termination
 - NovaCAN dry-mate
 - NovaCAN wet-mate
- Designed and demonstrated for tidal energy with broad application to wave and tidal energy devices
- Can be integrated into a device, coupled with a mooring connector or a stand-alone connector (cable to cable)
- Features
 - Scalable power and voltage, copper or fibre for comms
 - Robust cable termination
 - Reliable, cost-effective, off-shelf components
 - Quick, safe and simple offshore connection

NovaCAN cable termination

- Interface between the cable and the connector
- Provides highly robust mechanical strain and water blocking
- Design informed by years of real-world operational experience of marine energy ops and device operation
- Deployed on all four turbines in the Shetland Tidal Array
- Proven to be 100% reliable over multiple retrieval and deployment operations and years of successful device operation
- Highly transferable to other marine energy applications





NovaCAN dry-mate

- Device-side pair of the NovaCAN cable termination
- Reliable, cost-effective, off-shelf components
- Quick, safe and simple offshore connection
- Successfully deployed on all 3 Nova M100 turbines with years of 100% reliable operating experience
- Suitable for a variety of MEC applications
- <u>But</u> dry-mates are troublesome: cable recovery and management is difficult, time consuming, expensive and risky
- Therefore ...







NovaCAN wet-mate

- Device-side pair of the NovaCAN cable termination
- Reliable, cost-effective, off-shelf components
- Quick, safe and simple offshore connection
- Successfully deployed on the T4 Nova M100D turbines
- Suitable for a variety of MEC applications
- Developing a next-generation model under the WES Quick Connection System programme







Summary



- Subsea electrical and comms connection of marine energy devices is challenging
- Nova Innovation has developed dry and wet-mate solutions drawing on years of in-sea operational experience
- The NovaCAN system has proven to be 100% reliable over multiple mate/de-mate operations and years of operational experience
- Nova are keen to share this experience for mutual benefit
- If you are interested, please get in touch!



Thank you

Contact us for more information

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Winner 2018: Outstanding Project Award



Finalist 2020: Innovation Category

