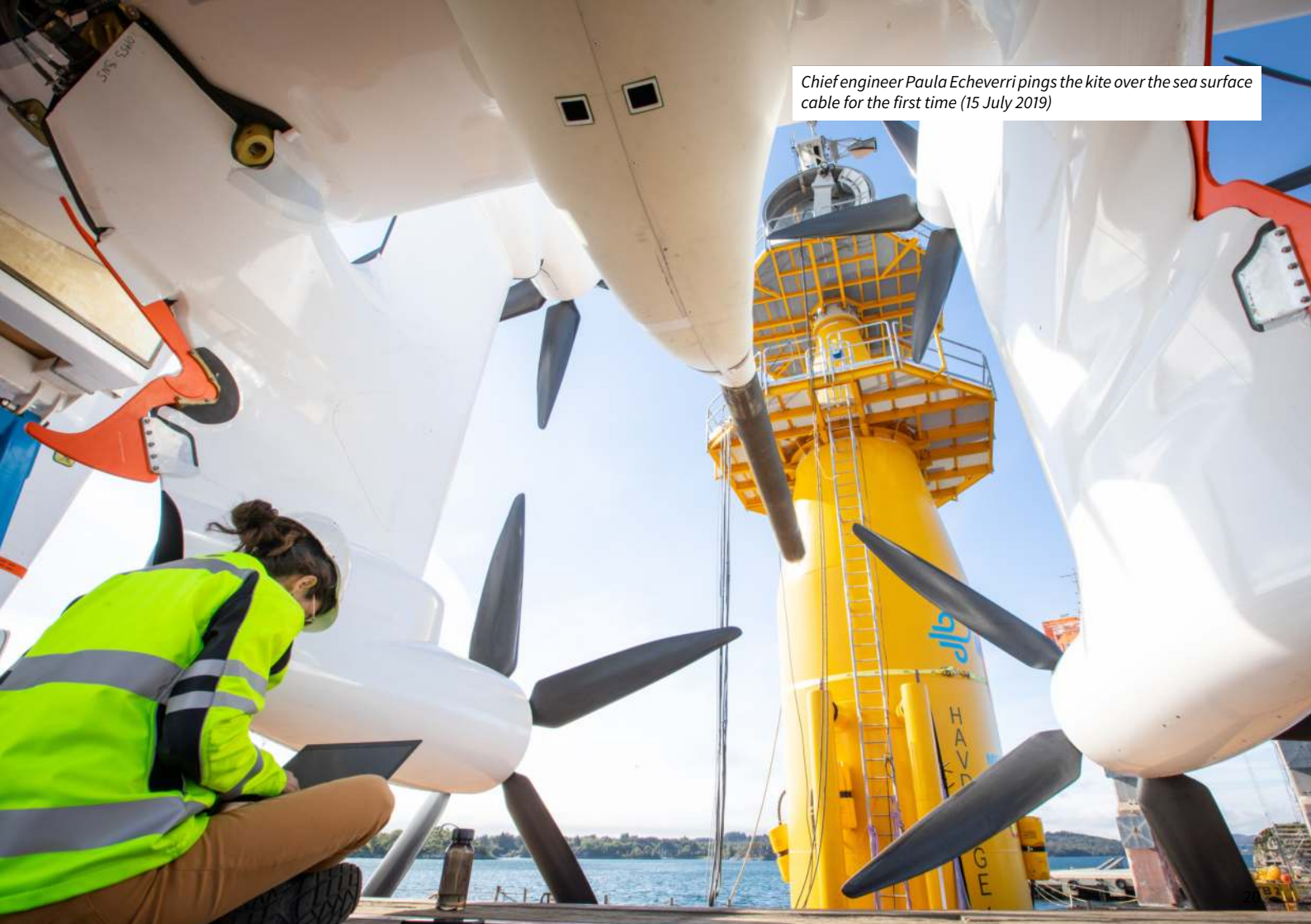


Chief engineer Paula Echeverri pings the kite over the sea surface cable for the first time (15 July 2019)



Hardware engineer Crystal Allen applies the Viking compass the team chose to "provide guidance and protection" for the first offshore test of the kite (28 July 2019)



Makani's kite is lifted onto its perch using a commonly available mobile boom crane (28 July 2019)





Makani's kite and floating platform were towed offshore by two coastal tugboats (31 July 2019)



Makani's kite and floating platform being towed offshore in Karmøy, Norway (31 July 2019)



Makani's kite was installed at a depth of 220 m for its first ever flight offshore (1 August 2019)



*Makani's kite was installed at a depth of 220 m
off the coast of Karmøy Norway (1 August 2019)*



For the purpose of this test Makani's command center was installed on a barge and held in position by a tugboat with dynamic positioning capabilities (7 August 2019)



Makani's energy kite launches from a floating platform in the North Sea off the coast of Norway (8 August 2019)



Makani's energy kite is tethered to a floating platform over the North Sea (8 August 2019)





Flight engineers Robbie, Tobin and Simon in the test flight command center on a barge in the North Sea off the coast of Norway (8 August 2019)

Makani's energy kite flies over the North Sea (8 August 2019)





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MAKANI

Lessons Learned from Testing Makani's Energy Kite Offshore

Doug Mcleod, Charlie Nordstrom

Makani

In August 2019 Makani operated its M600 energy kite prototype from a floating platform in the North Sea. The project advanced from a “Go” decision to a successful offshore flight test campaign in 20 months. This presentation offers an overview of our transition offshore and explores some of the ways we accelerated real-world learning while managing risk.

Makani made the decision to transition offshore to move quickly towards testing our system in the place where energy kites can have the greatest impact. Hundreds of millions of people live within 25 miles of a coastline where winds are strong and steady, but there are currently no options to economically harness this wind resource. Conventional floating offshore wind turbines rely on large platforms anchored to the seabed by multiple lines, and installing them requires specialized equipment, making deployment impractical and expensive. In contrast, to transition Makani's airborne wind power system offshore we utilized a simple floating platform design and leveraged existing supply chains and commonly available infrastructure.

Makani's first offshore flight campaign demonstrated that our simple floating platform design works, and emphasized that Makani is solving the right technical problems by continuing to specialize in creating kites that efficiently harness energy from the wind.



The Makani energy kite rests on its base station atop a floating platform during Makani's first offshore test campaign. August 2019.