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European Training Network AWESCO Launched

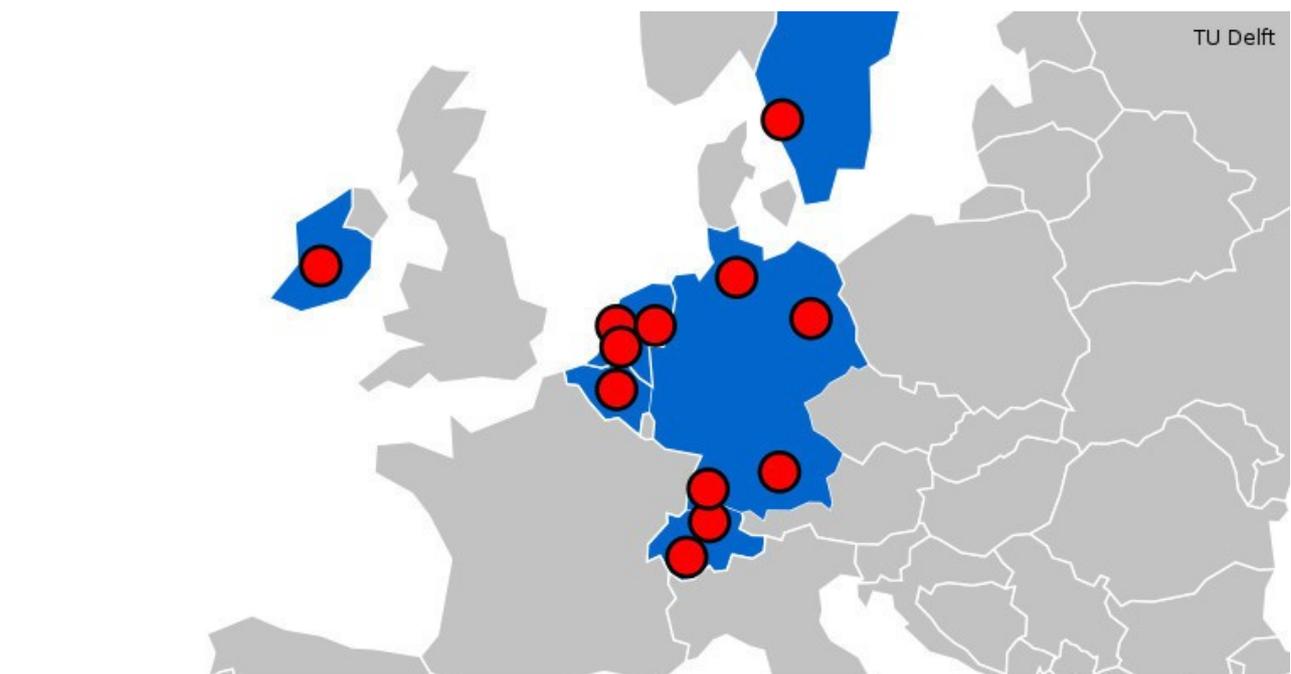
The potential contribution of Airborne Wind Energy to the transition towards a renewable energy economy is supported by an increasing number of [scientific studies](#) and operational prototypes. Makani Power, since 2013 a Google subsidiary, is testing a [600 kW energy kite](#) and European research groups and system developers have taken up the race for commercialising the innovative technology. The technology status is documented by 56 recorded presentations and 17 posters that are available online on the website of the [Airborne Wind Energy Conference 2015](#), which was held in Delft, the Netherlands.

From 29 February to 4 March 2016 fourteen PhD researchers and their supervisors from academia and industry [gathered at the University of Freiburg](#), Germany, to launch the doctoral training network [AWESCO](#). The acronym stands for "Airborne Wind Energy System Modelling, Control and Optimisation" and it is the declared objective of this network to collaboratively solve the scientific and technical challenges

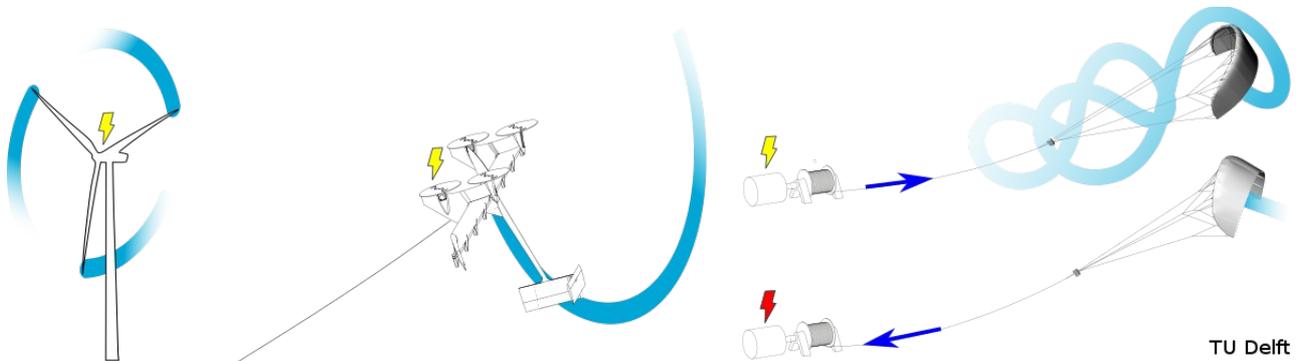
of wind energy harvesting by means of tethered wings. The Marie-Skłodowska-Curie action is funded by the European Union within [Horizon 2020](#) and by the [Swiss Federal Government](#) and has a total budget of €3.4 million.



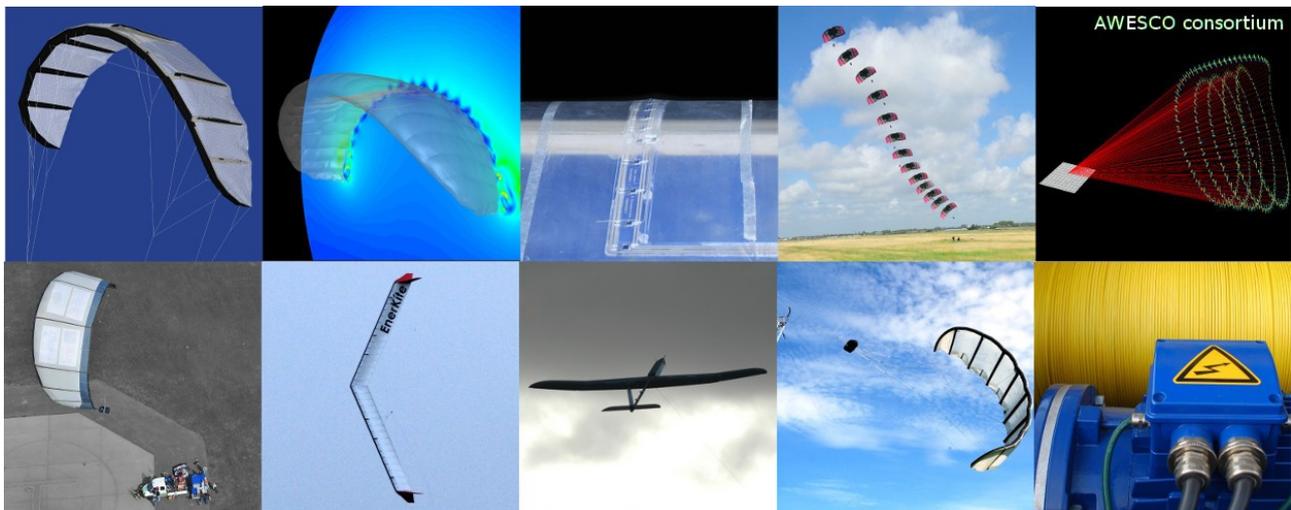
Having a shared mission objective, the AWESCO PhD researchers represent a new generation of specialist trained academics who can provide an important contribution to the technology development. The AWESCO network is coordinated by Delft University of Technology and the consortium includes University of Freiburg, Chalmers University of Technology, University of Leuven, Technical University of Munich, University of Limerick, ETH Zurich, EPFL, Ampyx Power, Skysails, Xsens and Enerkíte.



The interdisciplinary research of the fourteen PhD researchers is clustered into four work packages: (1) Modelling and Simulation, (2) System Design and Optimisation, (3) Sensors and Estimation and (4) Control Systems and the application focus is on traction power generation in pumping cycles (right illustration below), which is the concept of choice for most European teams with operational prototypes.



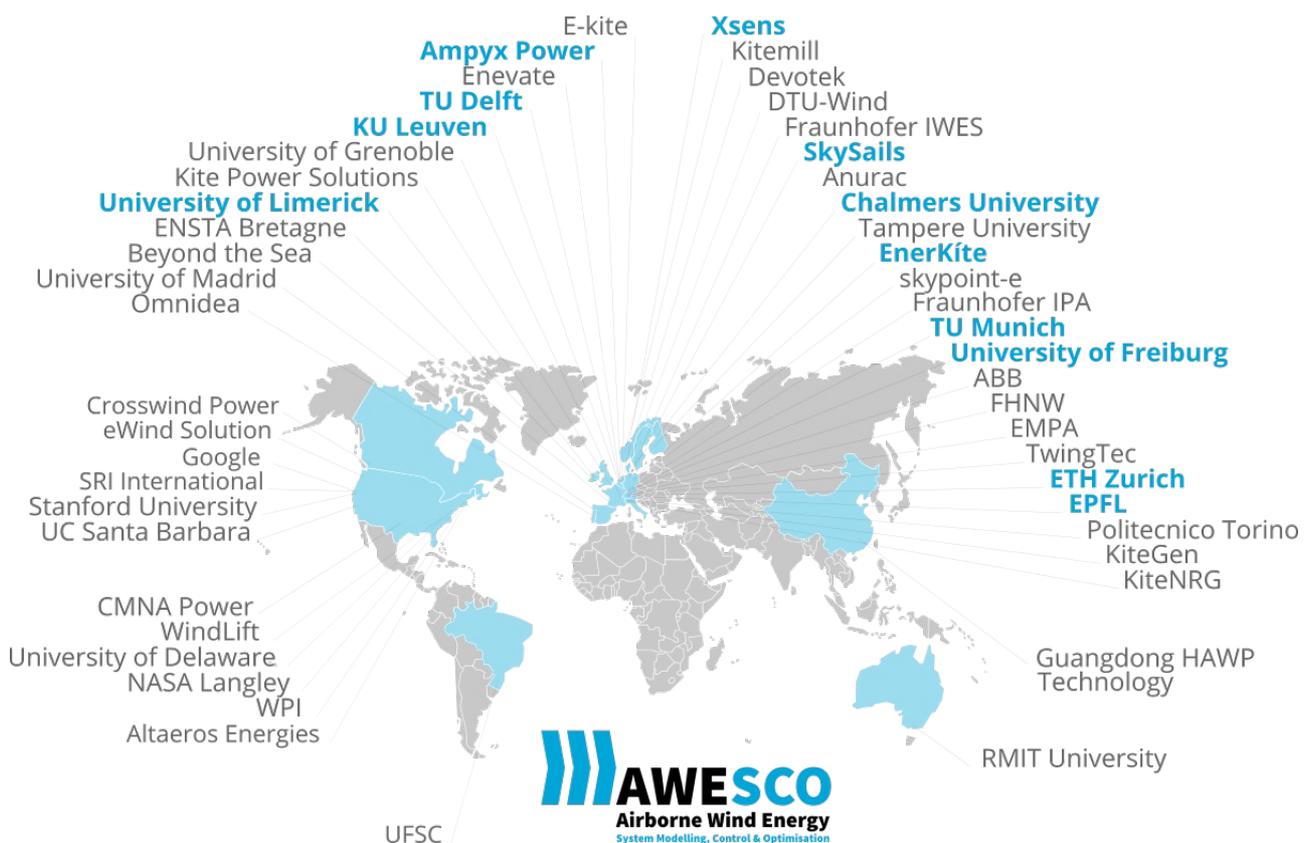
The individual research projects address complex physical processes such as the coupled structural dynamics, aerodynamics and flight dynamics of flexible tethered wings, precise in situ measurement of flight state and aerodynamic wing loading, reliable and robust flight path control and optimization, launching and landing, power conversion using electrical machines and finally also the interaction with the electricity network.



But eventually, AWESCO is only one of several larger projects that were recently funded by the European Union and by European national governments and that are dedicated exclusively on Airborne Wind Energy. [REACH](#) is a Horizon 2020 "Fast Track to Innovation" project coordinated by Delft University of Technology and involving Dutch startup Enevate BV and three other industry partners. [AMPYXAP3](#) is a Horizon

2020 SME Instrument Phase 2 project awarded to Dutch company Ampyx Power. The German Federal Ministry for Economic Affairs and Energy (BMWi) is funding the [ZIM-network HWN500](#) which is not only initiating R&D projects on Airborne Wind Energy with industry focus, but is also aiming at unifying the European approach for certification and regulation of the innovative technology. In Switzerland the Commission for Technology and Innovation (CTI) has awarded funding for [TwingTec AG](#) and in the UK an engineering consortium led by [Kite Power Solutions Ltd](#) has secured a £1.0 million grant from the government's innovation agency InnovateUK.

These developments clearly show that the pioneering phase of Airborne Wind Energy is over and that [private investors](#) and governmental funding agencies are now seriously supporting the renewable energy technology because of its potential to substantially decrease the cost of energy and -by design- the material consumption. In this context the doctoral training network AWESCO provides an unprecedented opportunity for collaborative research and development.



The Executive Board of AWESCO is composed of Roland Schmehl, who is Associate Professor at the Faculty of Aerospace Engineering of Delft University of Technology, and Moritz Diehl (right), who is Professor at the Systems Control and Optimization Laboratory of University of Freiburg.



Photo: Per Rutquist