Press Release

30 September 2014

European Strategic Windtunnels Improved Research Potential

Access to the World's Leading Advanced Wind Tunnels Matters for Science

The ESWIRP project has been funded by the European Framework Programme 7 to support the integration of and access to research infrastructure of pan-European interest. It has significantly enhanced the interoperability of 3 key world-class aeronautical wind tunnels, and harmonised, improved and optimised the scientific access conditions thereto: DNW-LLF, ETW and ONERA S1MA, which are recognised e.g. by ACARE (Advisory Council for Aviation Research and Innovation in Europe) as strategic infrastructures critical for the competitiveness of the European aeronautical research and industry. The coordinated ESWIRP approach amongst the operators now provides a sound basis for accelerating the transfer from science into innovations in Europe towards resource efficient aviation that respects the environment. The project ended on 30 September 2014, and a strong indicator of its success is already visible in terms of the scientific impact it is generating.

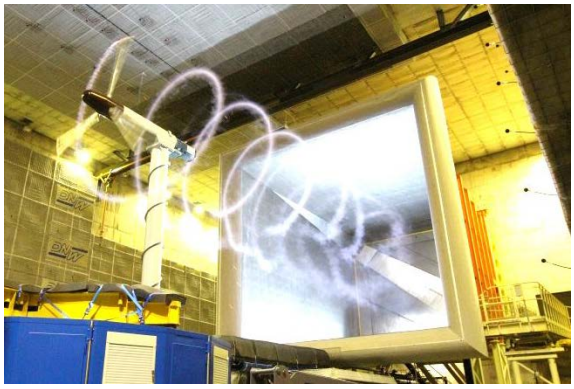
A central element of the project, besides networking and joint research activities, has been the transnational access (TNA), which has been provided to 4 consortia with a total of more than 100 scientists from 17 different nations including 1 associated and 3 international cooperation partner countries as well as USA and Japan: The DNW-LLF access covered the topics of advanced rotor simulation both for aircraft propulsion as well as energy production. The TNA entry at ETW gave further insight in the development and downstream propagation of wing wakes featuring separated flow as well as their resulting effects on the empennage. Such tests at realistic flight conditions are of high interest to the worldwide aircraft industry due to the heavy unsteadiness of separated wing flow at the limits of the flight regime that can cause severe excitation of the empennage. At ONERA-S1MA, advantage was taken of the huge dimensions of the facility to provide experimental turbulence data with a spatial and temporal resolution as well as accuracy in terms of statistical convergence quality, which are both unprecedented: A grid with a diameter of 10 m was used to generate the turbulence. Its characteristics were measured downstream in the test section, and the data enable scientists to validate numerical simulation methods and enhance computational models.

So far the TNA tests attracted 7 doctorate theses, and more are expected. Besides graduates, students also had the opportunity to join these international research tests: a call was sent to European universities inviting students to attend the TNA test entries. More students assisted in the evaluation of the testing results, of which a substantial number of the TNA test results were and will be used for bachelor and master theses.

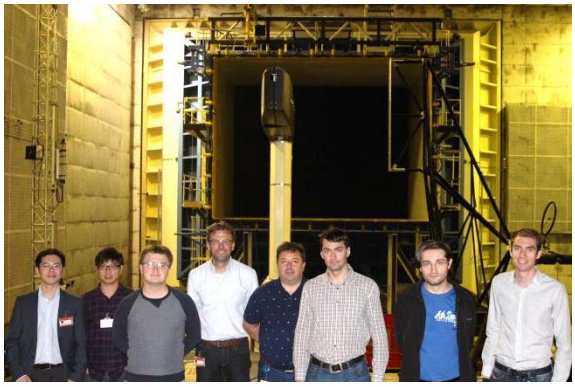
The official conclusion of the ESWIRP project in September 2014 does not mean that the induced international cooperation will come to an end. The ESWIRP consortium and associated scientific TNA consortia will further exploit and disseminate their results, e.g. at international symposia such as the AIAA SciTech 2015 (USA) or the CEAS Air & Space Conference 2015 (Netherlands). Based on the papers at the CEAS conference, the CEAS Aeronautical Journal will release a special issue on the ESWIRP advancements at DNW-LLF, ETW and ONERA S1MA, and the scientific progress resulting thereof. The ongoing dissemination efforts are expected to attract further interest and to result in new insights in the respective fields of expertise.

For more information on the facilities, please visit www.dnw.aero/llf, www.etw.aero, and windtunnel.onera.fr/s1ma-continuous-flow-wind-tunnel-atmospheric-mach-005-mach-1.

This project has received funding from the European Union's FP7/2007-2013 under grant agreement no 227816.

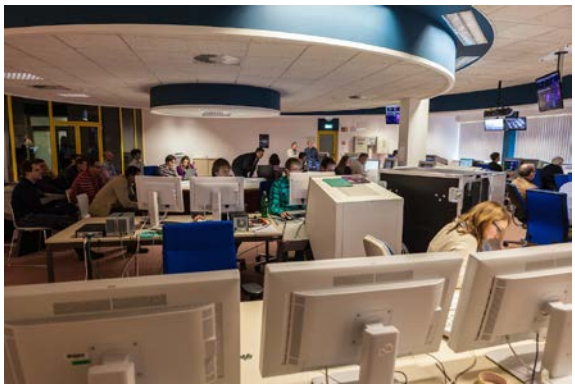


The “New-Mexico” wind turbine TNA test at the DNW-LLF test section. Photo: DNW.

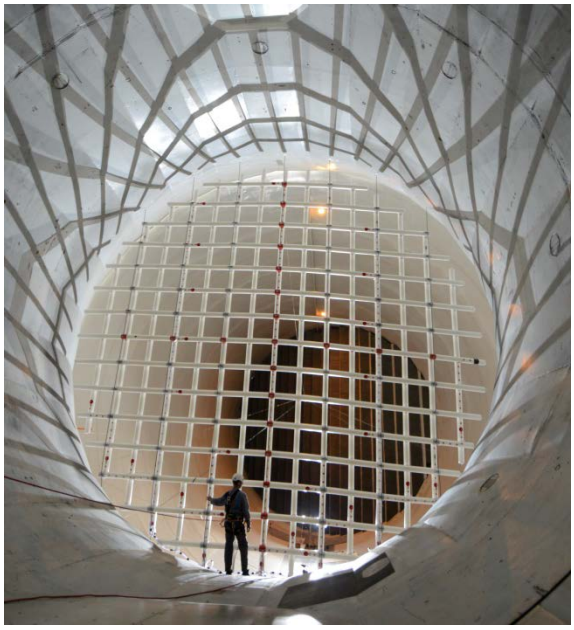


One of the two ESWIRP TNA testing teams at DNW-LLF. Photo: DNW.

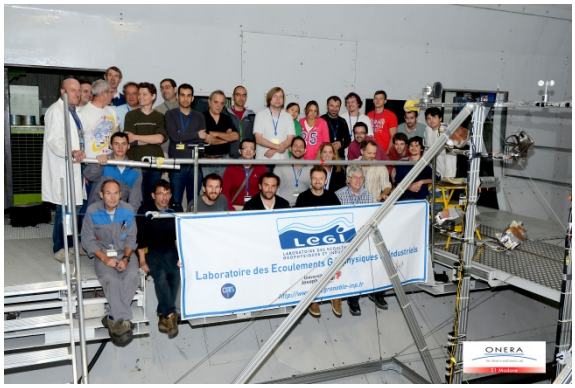
Adjusting PIV (Particle Image Velocimetry) for testing the NASA CRM during the ETW TNA. Photo: DLR.



The busy ETW Control Room during the ESWIRP TNA test. Photo: DLR.



A 10 m diameter grid was used as a turbulence generator in the ONERA-S1MA. Photo: ONERA.



The entire ESWIRP TNA team in ONERA wind tunnel S1MA test section after the TNA test. Photo: ONERA

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