News from the European Wind tunnel Association NoE

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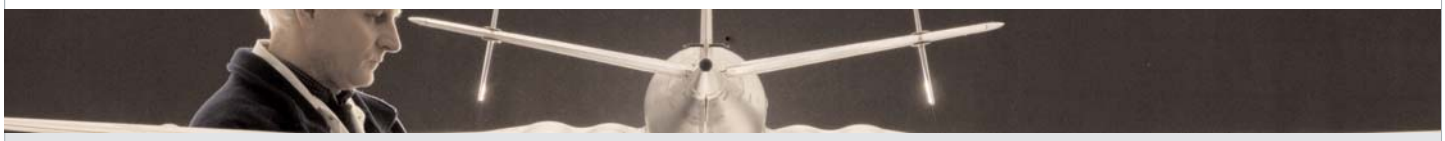

EWANEWS

Spotlight on BAE Systems
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EWA Stand

Munich, Germany 15-17 April 2008

EWA had an impressive and unique stand at the Aerospace 08 Testing-Design-Manufacturing Expo, to establish the EWA brand-name as an EU Network of Excellence (NoE) working to strengthen European Aerospace.

Members of the EWA Management Board attending the Aerospace Expo

The stand was very much a joint effort managed under WP1.2 Business Relations, and its success was due to the Partners pulling together to make it happen, together with the professionalism of the stand subcontractors.

The stand portrayed various EWA achievements: networking activities (balance calibration etc.); model and instrumentation demonstrators and test samples; benchmark tests (MDM, PSP, PIV and acoustic arrays); and spreading of excellence (workshops involving industry and lecture courses). EWA hardware was displayed from various Work Packages: the shared sting balance; an optical strain gauge demonstrator; a transonic aileron drive system demonstrator; a test-bed for optical (non-contact) measurements of control surface deflections; the mini-DAS breadboard; and an innovative pressure instrumented model, horizontal tail plane and elevator. Furthermore, we displayed and distributed EWA and Partner brochures on the stand. A 50-inch plasma screen continuously showed a compilation of Partner video clips to visitors.

An ETW 1/27th scale airliner model gave the EWA stand presence amongst all the others, as well as allowing us to highlight the use of advanced instrumentation techniques (PSP, MDM,etc) and to provide a convivial atmosphere on the stand, some excellent German wine was served to add a socializing element.

Aerospace 08 is the only focused aerospace testing expo in Europe in 2008, and therefore was an excellent opportunity for EWA partners to meet old and new customers, as well as to see what the worldwide aero testing community has new to offer.

The Expo actually started in 2003, and is now well established as an annual event, under new management. In fact, we met a number of interesting people at the stand, from companies and organizations we previously had no contact with. Some visitors were even interested in joining the EWA Trade Organization. An EWA sponsored Workshop was also held at Aerospace 08, which highlighted the various technical activities of EWA. This series of presentations covered instrumentation benchmarking and innovative model design, and was an excellent supporting activity to the theme of the EWA stand, by raising visitor awareness.

Overall, the stand provided a platform for us to demonstrate to the worldwide testing community that EWA exists, and is helping to make European Aerospace more capable for the future. The fact that the partners worked so well together during the Expo, is testimony to how far harmonization has come within EWA today.

http://www.eu-ewa.aero/

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Trade Association EWA (TA-EWA)

The European "Network of Excellence" was created under the 6th Framework program of the European Commission, to satisfy a perceived need to strengthen the European Research Area, through the creation of lasting integrated structures involving researchers from various member states and organisations.

Partners in the Network of Excellence (NoE-EWA) are those organisations operating wind tunnel facilities and also those organizations providing related advanced technologies and research. Within the NoE-EWA it was agreed that formation of a trade association (TA) would move forward the continuing integration of the member organisations, beyond the duration of the project support.

The objective of the TA is to promote and support the joint activities and interests of its members in the field of wind tunnel testing, including advanced techniques in instrumentation, model manufacturing, measuring technologies, benchmarking tests and experimental simulation technologies.

Following lengthy deliberations, the statutes were agreed, resulting in the Trade Association being duly established under Dutch law in the spring of 2008. The highest organ of the Trade Association is the General Assembly, comprising the representatives of its members.

The first General Assembly meeting took place in Munich on the 15th of April 2008. At this meeting many of the signed-up members of the TA (ARA, BAE, CIRA, DLR, DNW, ETW, NLR, QinetiQ and VZLU), formally accepted the Internal Regulations of the General Assembly and the Management Regulations of the TA.

The General Assembly also elected A. Dillmann (DLR), G. Eitelberg (DNW) and L. Vecchione (CIRA) to the Executive Board of the TA.

The aspiration to act as a single European body is a new and challenging development for the member organisations. In order to enhance the start of the necessary activities, the General Assembly resolved to meet in a workshop/seminar on the main issues confronting the newly established body. These are, among others, the harmonization, standardization and certification within the TA as well as interactions of the TA with external entities and bodies. This first workshop will engage the services of an external advisor experienced in the process of the Europeanization of activities of disparate organizations within a European trade association.

With the establishment of the TA-EWA, another step has been taken in the direction of enhancing the area of European Research.

LectureSeries

Determination of Dynamic Stability

Von Karman Institute, Belgium,
18th - 22nd February 2008

The VKI lecture series was organised, in partnership with EWA, to bring together engineers and scientists working in the field of dynamic stability. The stability of aerial vehicles has always been one of the most important topics studied for a safe and smooth flight.

An aerial vehicle should have the tendency to return back to a stable position, when it is disturbed from its original path. Dynamic stability is usually thought as the vehicle's response over time when disturbed from a given angle of attack, slip or bank.

The advent of flight at high angles of attack has revived our interest in the dynamic stability of aircrafts and missiles. One of the biggest problems in studying dynamic stability is the accurate determination of dynamic stability parameters, in other words, the damping coefficients.

During the lecture series, experts from all around the world presented. These included the fundamentals of dynamic stability testing, post processing methodologies, and advances in experimental tools. The series also provided a review of experimental dynamic stability tools and a state-of-the-art survey of analytical, wind-tunnel and flight test techniques. A total of eighteen lectures were given by the fifteen assembled experts, covering a wide range of associated topics. The presentations were well received by the eighteen participants, mainly from Europe, but also some from North America.

The lecture series achieved its aim of providing valuable training and information to engineers and scientists wishing to enter the field. It also provided a focal point for technical discussions and the opportunity to exchange views and ideas amongst experts, engineers and scientists who already work in the field.

EWA Workshop

Advanced Measurement Techniques

Delft University of Technology,
the Netherlands,
31st March - 1st April 2008.

The two day workshop was organised by TU Delft on behalf of EWA, bringing together a group of 40 engineers and scientists involved with advanced measurement techniques in aerodynamics.

The two day workshop focused primarily on non-intrusive flow diagnostic techniques such as particle image Velocimetry (PIV) and pressure sensitive paint (PSP). Emphasis was placed on the requirement for industrialised techniques, with many presentations demonstrating practical applications. In addition, there were also many informative presentations on the current advances taking place within academia.

The opening session began with a key note address by G.E. Eitelberg where, amongst other observations, he emphasised the requirement for advanced techniques to become commercially available, off the shelf systems.

This was followed by presentations from experts, detailing practical uses of the advanced techniques in both scaled model and full scale aircraft environments. The afternoon sessions covered PIV techniques in high speed flows, concluding with presentations on PIV algorithms and data post-processing. The morning sessions of the second day concentrated on describing the advances and applications of extended PIV methods. These were primarily concerned with tomographic three dimensional PIV analyses and high speed time resolved applications. The final session concluded with presentations on loads and pressure determination with applications from the PSP and PIV fields.

The workshop generated much debate during the presentations and concluded with round table discussions between the assembled engineers and scientists.

Concluding Workshop

Aero-Acoustic Benchmark Tests

Southampton University, UK,
4th June 2008

This concluding one day workshop was held at Southampton University and brought together the participants of the aero-acoustic benchmarking activity, along with other interested parties.

The morning session began with an overview of the instrumentation and tests that were carried out in the closed section Airbus Bremen wind tunnel facility, including a summary of the conventional beam forming results from the five participants. This was followed by individual presentations from each participant detailing their advanced post processing techniques and results.

These presentations can be found on the EWA web site, deliverable D1.79a. After lunch there was a panel discussion during which a wide range of topics were discussed, including the industrial requirements of aero-acoustic testing. The broad exchange of information proved to be of great benefit to all present. The Workshop concluded with a demonstration in a university low-speed wind tunnel facility together with a tour of relevant aero-acoustic facilities at the university.

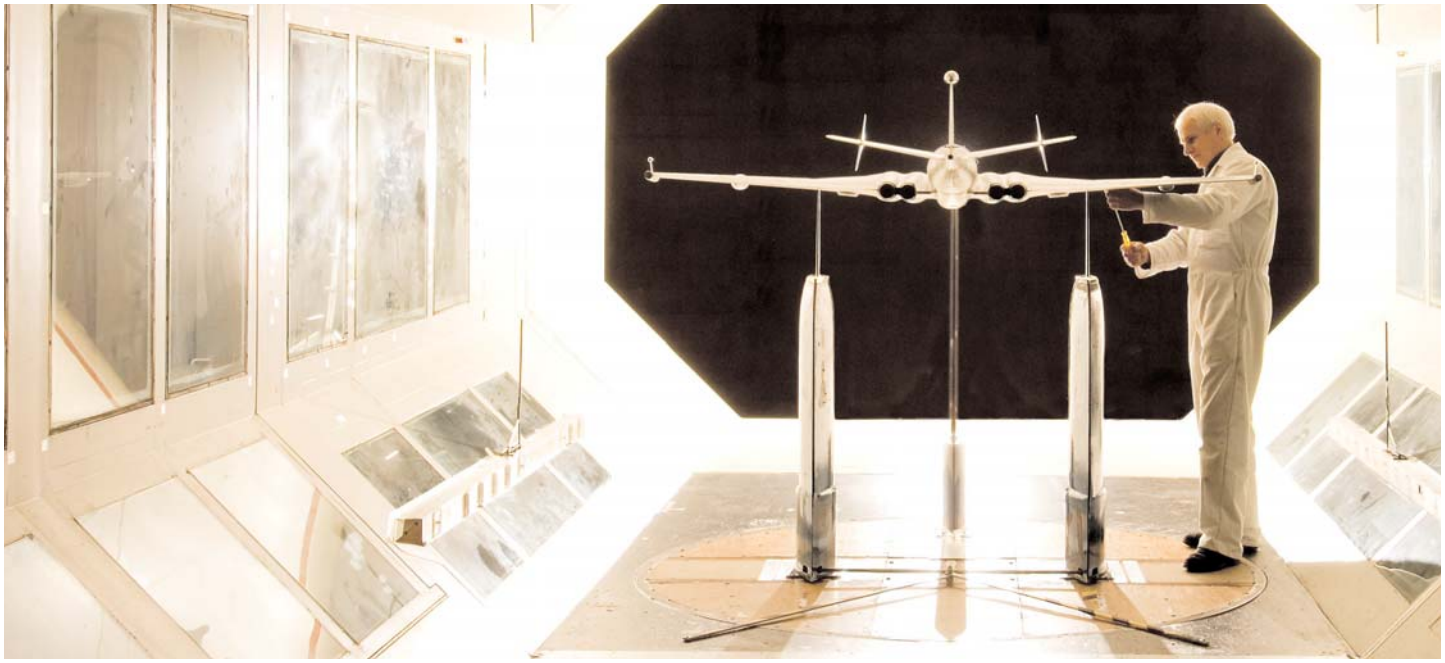
The presentations and subsequent discussions were well received by the 21 participants and clearly demonstrated that EWA has a high level of capability in aero-acoustic measurement and processing techniques. They also provided the opportunity for the development groups involved to work closely together which should promote collaborative work in the future and improve capability more quickly.

http://www.eu-ewa.aero/

Spotlight on BAE Systems

BAE SYSTEMS

BAE Systems Wind Tunnel department consists of 6 major test facilities with the ability to characterise and develop vehicle performance from Hover to Mach 6.



4.0m Low Speed Wind Tunnel

BAE Systems Wind Tunnels have contributed to the aerodynamic development of all of the companies manufactured aircraft since the Canberra bomber, including Harrier, Tornado, Typhoon, JSF and more recently UAV's. BAE Systems also carry out work for several external customers.

Specialist test activities include model Design and Manufacture, Low Speed testing, High Speed testing, Ground Erosion studies, Hot Gas ingestion and high temperature nozzle flow investigation.

History

In 1954 the expansion of Warton's research and development facilities was initiated. The first tunnel to be constructed was an 18" x 18" wind tunnel which was commissioned on the south side of the Warton airfield, powered by two Rolls Royce Nene jet engines. Two high speed wind tunnels were built during the period 1956-60.

One tunnel had a four foot working section able to test aircraft at speeds up to Mach 3.7, with a companion 18" tunnel for guided weapons research at speeds up to Mach 6.

These facilities were supplemented with the construction of a wind tunnel for Short Take Off and Vertical Landing (STOVL) research in 1962-63 and the transfer of the Vickers Armstrong 13' x 9' (4.0m x 2.7m) Wind Tunnel from Weybridge in 1992.

These facilities today make Warton one of the most advanced research facilities in the world.

4.0m Low Speed Wind Tunnel

The 4.0m Low Speed Wind Tunnel is a closed return tunnel with a maximum test speed of 105 m/s. The working section is nominally 4m wide x 2.7m high x 7.3m long. Flow conditioning and a large 10.6:1 contraction ratio combine to give excellent flow quality.

Models can either be sting mounted on an internal strain gauge balance or strut mounted on the under floor virtual centre mechanical balance.

5.5m Low Speed Wind Tunnel

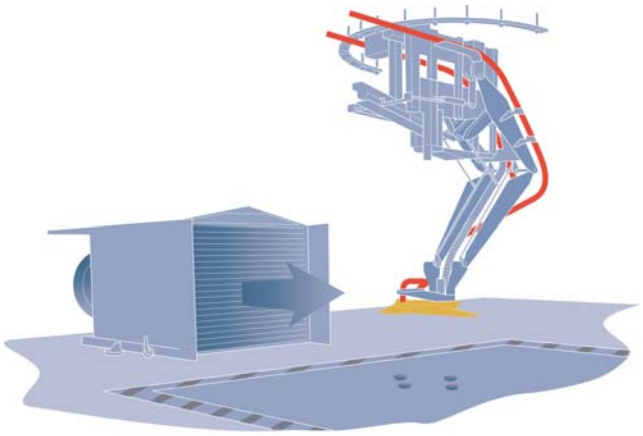
The 5.5m Low Speed Wind Tunnel was designed specifically for the investigation of powered lift configurations, but because of the large test section it has since proved to be eminently suitable for high incidence and rotary derivative testing. Models are typically sting mounted on an internal strain gauge balance. In recent times the tunnel has been extensively used to develop STOVL configurations.

1.2m High Speed Wind Tunnel

This is an intermittent trisonic blowdown type, operating from a storage pressure of 4200 kPa and exhausting to atmosphere. The tunnel is capable of variable Reynolds number testing over a Mach number range 0.4 to 3.7.

The tunnel has been utilised extensively to support Typhoon development, including specialised intake, afterbody and live store testing.The facility also has the capability to simultaneously pitch and roll missile models, delivering high levels of productivity.

1.2m High Speed Wind Tunnel



The Ground Effects Rig

The blower has good axial and cross axis visibility and can be used for store ejection / deployment, flare firing, pilot equipment air blast testing, parachute deployment tests and general load and pressure measurement studies.

Hot Gas Laboratory

The Hot Gas Laboratory (HGL) tests large scale models at full scale pressures and temperatures.

It is used primarily for Ground Erosion Characterisation studies and also for structural, environmental and infra-red signature testing.

The HGL contains a heavily modified combustion chamber mounted on a support frame allowing exhaust gas temperatures up to 1100°C at pressures of up to 5 atmospheres.

Advanced Gas Facility

The Advanced Gas Facility consists of the Ground Effects Rig (GER) and the Reaction Control System (RCS). The GER is designed to investigate ground effect jet flows on STOVL configurations.

These include the evaluation of hot gas ingestion and jet induced loads. The RCS development cell has been utilised in the development and qualification of the Harrier reaction control system.

The facility is able to provide high temperature and pressure gas flows to a variety of nozzle and valve configurations.

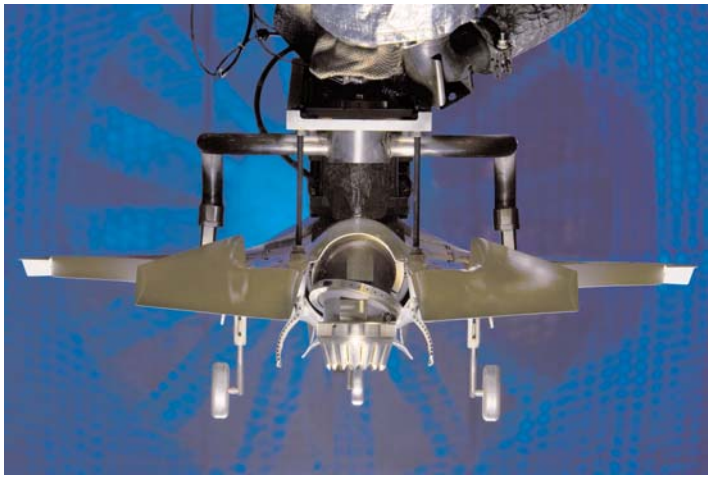
For more information visit:
http://www.baesystems.com/ProductsServices/bae_prod_mas_wind_tunnel.html

Guided Weapons Wind Tunnel with High Speed Blower Facility

The 0.45m Guided Weapons Wind Tunnel is a blow down type operating from a storage pressure of 4200 kPa and exhausting to atmosphere. The tunnel provides variable Reynolds number testing over a Mach number range 1.7 to 6.0. Models are mounted on a model cart that simultaneously pitches and rolls the model whilst measuring loads on an internal strain gauge balance. This delivers productivity that is comparable to a continuous running facility.

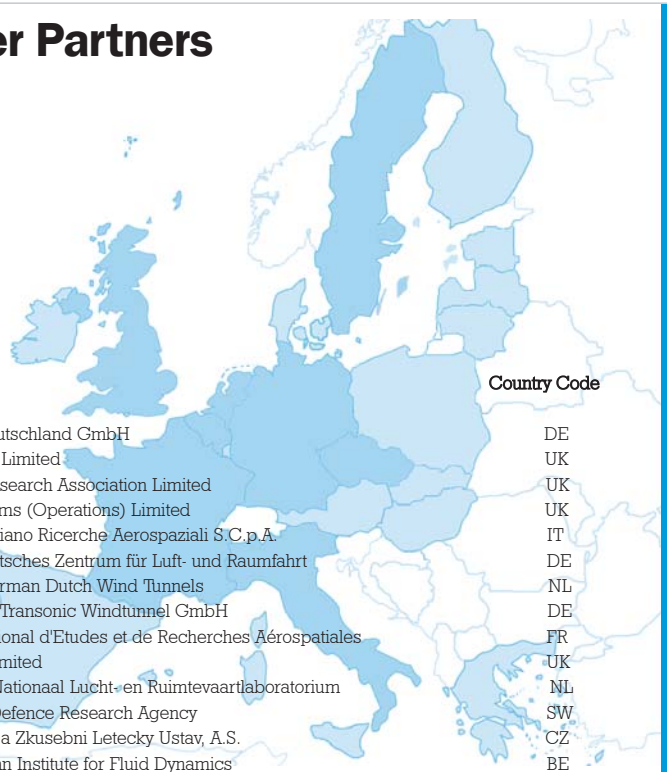
The tunnel also drives a High Speed Blower Facility (HSBF). The HSBF provides an open test environment up to Mach 1.8 in various nozzle configurations up to 1m in diameter.

High Speed Blower



Model on the Ground Effects Rig

Other Partners



Name	Country Code
Airbus Deutschland GmbH	DE
Airbus UK Limited	UK
Aircraft Research Association Limited	UK
BAE Systems (Operations) Limited	UK
Centro Italiano Ricerche Aerospaziali S.C.p.A.	IT
DLR - Deutsches Zentrum für Luft- und Raumfahrt	DE
DNW - German Dutch Wind Tunnels	NL
European Transonic Windtunnel GmbH	DE
Office National d'Etudes et de Recherches Aérospatiales	FR
QinetiQ Limited	UK
Stichting Nationaal Lucht- en Ruimtevaartlaboratorium	NL
Swedish Defence Research Agency	SW
Vyzkumny a Zkusebni Letecky Ustav, A.S.	CZ
Von Karman Institute for Fluid Dynamics	BE

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