

Press releases 2008

C²A²S²E - Aircraft from the computer

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Real-time simulation on a high-performance computer

High-performance computer for aeronautics research brought into use at DLR

At the C²A²S²E simulation centre (**C**enter for **C**omputer **A**pplications in **A**ero**S**pace **S**cience and **E**ngineering) in Braunschweig, a high-performance computer for aeronautics research has been brought into use by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) today. This computer is the core of the simulation centre and it is Europe's fastest high-performance computer for aeronautics research. After a lead time of just seven months, this marks the start of research activities in one of the most exacting projects of aeronautics research.

One of the objectives of this 30 million euro project, which is funded by Airbus, the German federal state of Lower Saxony, and DLR, is to develop processes, methods and numerical techniques which will enable a high-precision simulation of an aircraft, covering the entire flight envelope. T-Systems is the IT partner in the project. The C²A²S²E centre is envisaged to be operational for at least 15 years.

"C²A²S²E follows naturally from DLR's endeavours to give basic research a user-oriented direction as well", says Professor Dr Johann-Dietrich Wörner, Chairman of the DLR Executive Board. "The way in which the project links the large-scale research conducted at DLR on the one hand with Airbus as industrial user on the other, as well as the support provided by the federal state of Lower Saxony, set an example for the whole German research landscape."



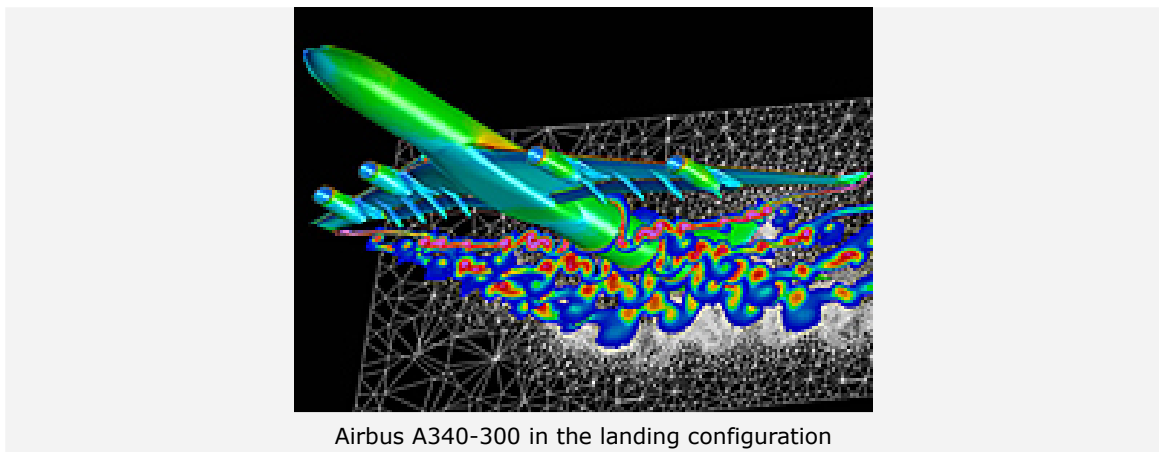
Europe's fastest computer for aeronautics research

Demands of the future

The political objectives aimed at enhancing the ecological balance of global air traffic cannot be achieved through continuous improvement of conventional technology alone. They require technological leaps forward, such as new flow control technologies or completely new configurations for aircraft development. In this context, numerical simulation as a tool for aeronautics research has in recent years become a key technology.

According to Professor Dr Joachim Szodruch, the DLR Executive Board member responsible for aeronautics, "The scientific use of the C²A²S²E centre allows the technological, economic, and ecological risks of future aircraft, for instance with regard to noise and pollutant emissions, to be decisively influenced even in the design stage. This provides scientists and engineers with a unique research platform for the air transport of the future."

C²A²S²E has been set up as a goal-oriented research environment, enabling direct integration of research, development, and industrial application. Special focus is on real-time simulation of aircraft in flight, calculation of aerodynamic loads across the flight envelope, numerical prediction of aircraft performance and handling qualities prior to first flight, as well as certification prior to aircraft production based on numerical data. In addition to the technical performance of C²A²S²E, its immediate availability is also a big advantage for scientists. Fifteen highly-qualified scientific positions have already been created for the centre. The science campus associated with C²A²S²E has already been used by scientists of NASA and of the US Air Force Academy.



Airbus A340-300 in the landing configuration

Sheer computational power

In order to meet the continually growing demand of applied research and the aeronautical industry, professional management and operation of high-performance computer and visualisation hardware is required. The C²A²S²E centre's IT infrastructure is conceived, built, and operated by T-Systems. The cluster computing configuration designed for C²A²S²E is making its world premiere; it achieves about 46.6 floating point operations per second. A high-performance communication network enables parallel processing of multiple highly complex simulations. In order to keep up to speed with the latest technical standards, an update of the computing cluster is already being planned for 2010.

C²A²S²E is an interdisciplinary centre of excellence for numerical aircraft flight physics simulation. This simulation centre is an innovative partnership between Airbus, the federal state of Lower Saxony, and DLR. At the core of the simulation centre is Europe's fastest high-performance computer for aeronautics research. The computer is designed, built and operated by T-Systems.

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