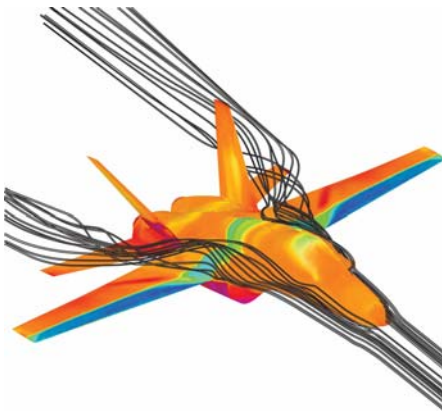




Supercomputing for Aerodynamic modelling

The [Computational Science and Engineering department](#) at Daresbury and RAL have been involved in providing intelligent code design and running advanced computational fluid dynamics (CFD) on their HPCx supercomputer. The next generation, BlueGeneP will be available soon.



Modelling airflow over aircraft



HPCx Supercomputer

The [Computational Science and Engineering department](#) allows the ability to perform computer simulations that were previously not achievable. For example whole aircraft simulations can now be performed in a fraction of the time taken previously allowing design improvements leading to product optimisation and significant savings in both time and money.

The aerospace industry makes extensive use of computational fluid dynamics (CFD) simulations in the design of new aircraft. BAESYSTEMS have an in-house CFD code which they use to model the aerodynamics of military aeroplanes. Accurate prediction of the airflows around the whole aircraft is important in determining the heat and noise characteristics in operation both of which impact on running costs. However, whole aircraft simulations were impossible to achieve using single processor hardware. The challenge for BAESYSTEMS was to convert the in-house code to operate in parallel mode in order to enable accurate whole aircraft simulations to be performed in acceptable timescales. Using a 128 processor distributed memory architecture this approach succeeded in delivering whole aircraft simulation involving over half a million nodes and, in addition, the solution was achieved 80 times faster than it would have been on a single processor of equivalent capacity.



The [Computational Science and Engineering department](#) is also involved in modelling for the **aerospace industry** in the following areas:

- Airflow around rotating helicopter blades;
- Microfluidics;
- Combustion;
- Catalysts and surfaces.

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