

CASE STUDY Arm tools enable software mission success at BAE Systems Advanced Technology Centre



CHALLENGE

The ATC development team needs to write efficient software, on time, to support the research efforts of their fast-moving company

PROBLEM

Meeting deadlines while providing quality, reliable software

SOLUTION

The Arm Forge debugger and profiler enable the team to react quickly and deliver high-quality fast software for their mission

RESULTS

The team is able to deliver on time, and aim high for future projects

The complex physics problems tackled every day by the software development team at BAE Systems Advanced Technology Centre (ATC) require intelligent tools to help find solutions, fast.

High Performance Computing is vitally important to the ATC who are responsible for identifying and developing technology for BAE Systems, Europe's largest defence, security and aerospace company. Cutting-edge software developed by the ATC helps it to produce competitive products for today and the future.

"Whether for modeling and simulation of computational fluid dynamics, electromagnetics or the other complex algorithms used in development of the company's maritime and air platforms, the coding is supported by Arm debugging and profiling products" says Pierre Moinier, Group Leader for Integrated Modeling Technologies at the ATC.

What's more, the group is set to increase their usage of Arm tools as they take aim at some harder challenges and deliver even more from their complex simulations. The development team is aiming at coding for larger clusters and GPGPU (General

Purpose Graphics Processing Unit) platforms.

HIGH PERFORMANCE COMPUTING DEVELOPMENT

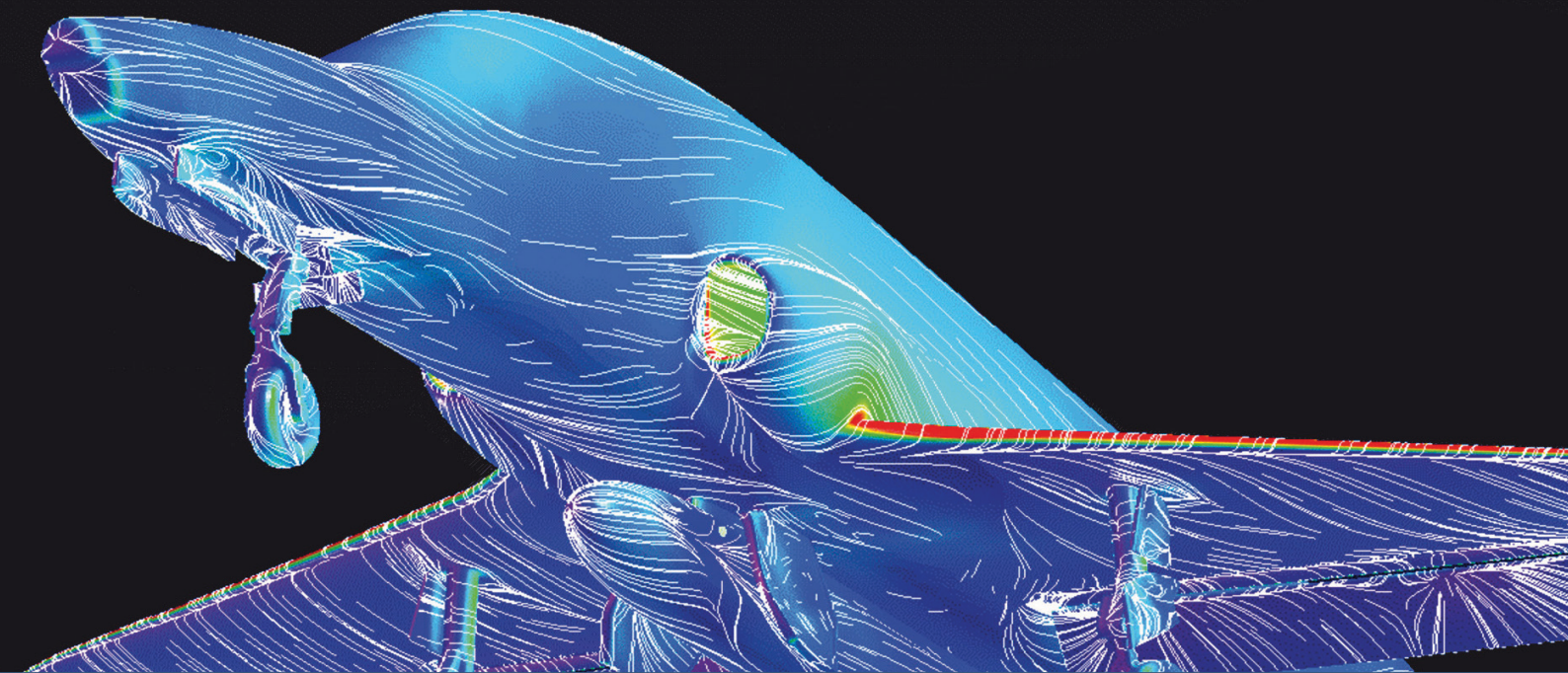
The ATC use the powerful debugger, Arm DDT, and performance profiler Arm MAP. The tools, part of the Arm Forge tool suite, are used for debugging and profiling software for the company's high performance computing clusters and for many smaller software problems, where they make life easier for developers with their intuitive interface and straightforward presentation of information.

Arm DDT reduces the time to debug codes which makes the team more efficient and able to focus on its development tasks, rather than struggling to debug code.

STEPPING UP TO FUTURE CHALLENGES

"We've often been able to debug our codes on modest core counts





“We have access to the whole suite of tools to help us to achieve our mission and can rely on them when we need them most.”

– typically up to 32 cores – but that’s changing,” he says.

“Until now, it’s been enough to just debug problems in the software on smaller machines and we haven’t tended to run a whole debug on a full scale problem. But we’re reaching a stage where we’re going to have to start doing that and we know that the tools will be able to handle it.”

SPEEDING UP OPERATIONS

“We have been using GPU technology to improve the performance of our simulations since 2008 and developed one of the first CFD codes in the world capable of harnessing the full power of multi-core processors and accelerator boards. We are at the cutting edge of High Performance Computing and use it in areas such as image processing, real time data analysis and simulation whilst using very large data sets to support the design of air, land and sea based platforms. It allows BAE Systems to move from physical testing to virtual testing, where engineers can focus on new

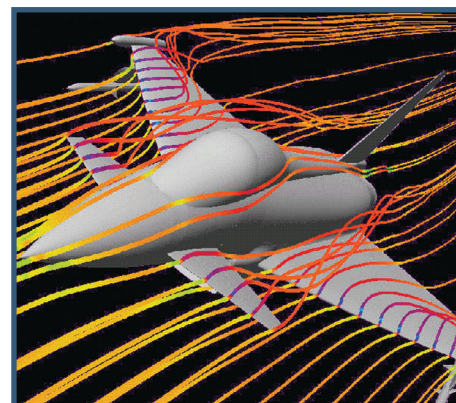
designs and innovation. Advanced computer simulation technology gives us early indications of the features of a design before even prototypes exist and a means to improve performance of the platform.”

ATC developers are implementing codes to run on GPUs for the faster operation that the parallel architecture can offer. Arm MAP helps the team to understand the performance of their applications and where GPUs could deliver improvements. It shares the same interface and look and feel as Arm DDT, so the developers are productive with the tool immediately. Arm MAP makes parallel performance problems clear and shows where software should be optimized.

“Our developers are really good at what they do but the speed and throughput of simulations is becoming more important, meaning we need a good profiler that can work with our production and research codes and help us to optimize that performance.”

The ATC has ambitions to run far larger supercomputers for more accurate and detailed simulations. Arm tools will suit the team no matter the scale of its debugging and profiling needs, so the team can be comfortable in using the tools for the long term.

According to Pierre “Arm is a good company to work with - quick to respond, knowledgeable and always helpful. It really is intuitive software, very easy to use even on complex problems and we know this will become even more important as our usage of high performance computing increases.”



arm

Arm Limited, Fulbourn Road, Cambridge, CB1 9NJ
Learn more at <https://www.arm.com/hpc-tools>