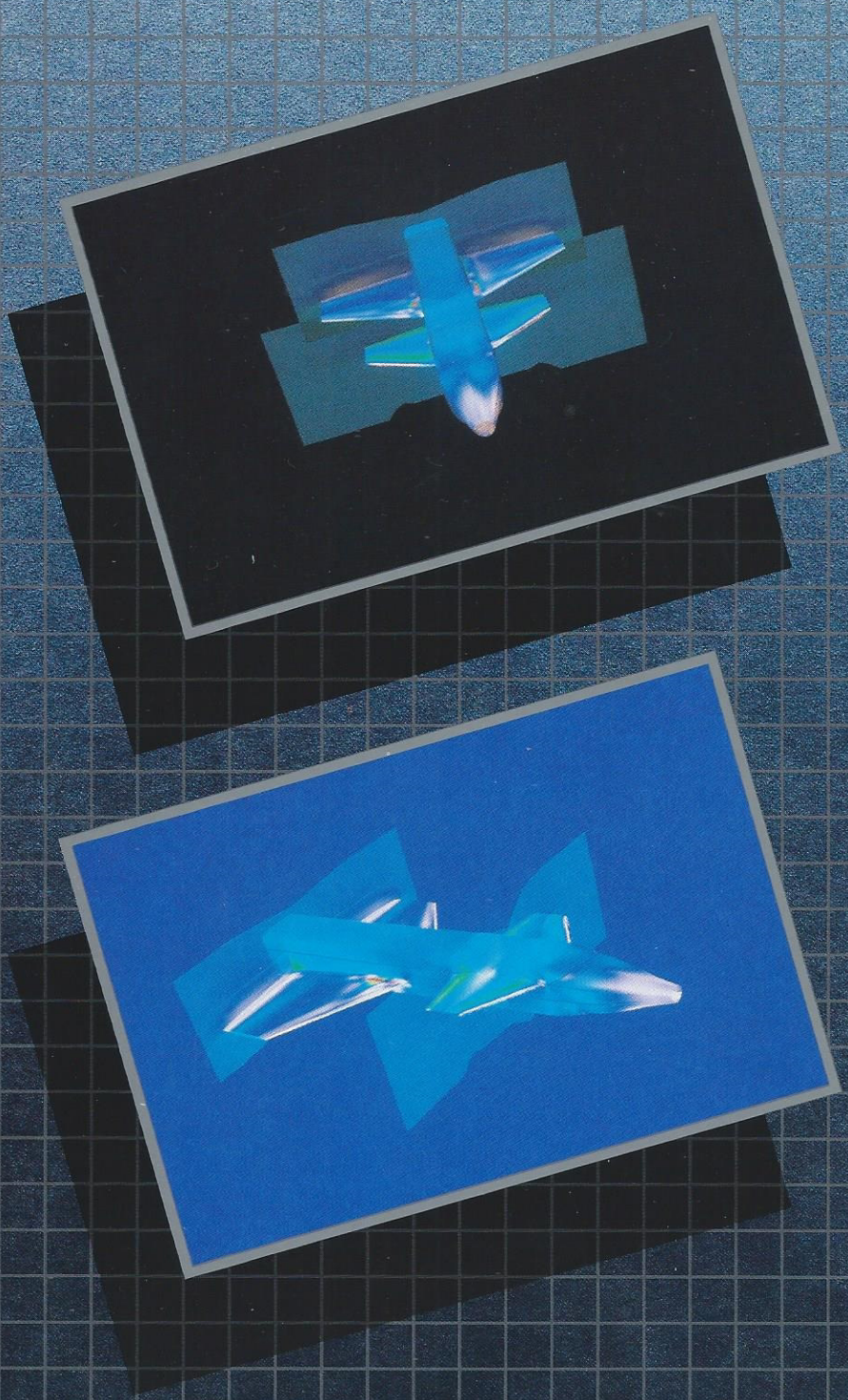
The Imagined Becomes a Reality ...



Full aircraft fluid dynamics

Computational Fluid Dynamics (CFD), the computer simulation of the motion of fluids, is of increasing importance to the aerospace, automotive, and power generation industries, to name a few. Advanced CFD requires high processing rates, large memories and large I/O bandwith. It's a natural for CRAY supercomputers. CRAY systems are used extensively by CFD researchers and commercial and military aircraft designers to complement expensive wind tunnel testing. This approach results in the most efficient aircraft at the lowest design cost.

The examples shown are of the air flow around an experimental fighter aircraft. Here, the pressure variation on the surface of the aircraft, yawed and pitched relative to its flight path, appears as variation in color. Using the graphic software package MOVIE.BYU interactively on the CRAY, not only could the surface pressure variation on the aircraft's surface be shown, but also on transparent computational planes intersecting the aircraft.

The flow was computed using TEAM, a three dimensional Euler method being developed by the Lockheed-California Company for the U.S. Air Force. This particular computation was performed on a CRAY X-MP/48 and required 3.75 MWords of main memory for 225000 mesh points. Detailed full aircraft computational fluid dynamics and visualization have become a reality using CRAY computers.

Figures:
Top - Static pressure variation on aircraft's surface
Bottom - Static pressure on a transverse plane showing flow around the aircraft.

Making the Imagined a Reality ...

Making the imagined a reality has become commonplace using CRAY computers. Previously insoluble problems in the aerospace, petroleum and automotive industries, in science, engineering, and graphics are being solved today using the power and flexibility of CRAY computer systems. In each of these disciplines, the CRAY is used to simulate a real-world process with a computational model in less time and at less cost.

To support these applications, a wide range of graphic software systems is offered for CRAY computers. Device-independent line drawing systems like DI-3000 from Precision Visuals, Inc., TEMPLATE from Megatek, Inc., and DISSPLA from ISSCO, Inc., are being used now on many CRAY computers.

Systems for CAD/CAM and pre- and post-processing like PATRAN from PDA Engineering and MOVIE.BYU from Brigham Young University support a variety of engineering design activities. In those cases where photographic quality scene generation is the objective, the designers, artists, scientists, and movie-makers are turning to CRAY systems to do what could not otherwise be done.

If your application or graphics task requires extraordinary computer power . . . if the problems you ***can*** do are much smaller than the problems you ***would like*** to do . . . if you need a general purpose powerhouse to run a variety of simulation, engineering or scientific codes . . . you need a CRAY!

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