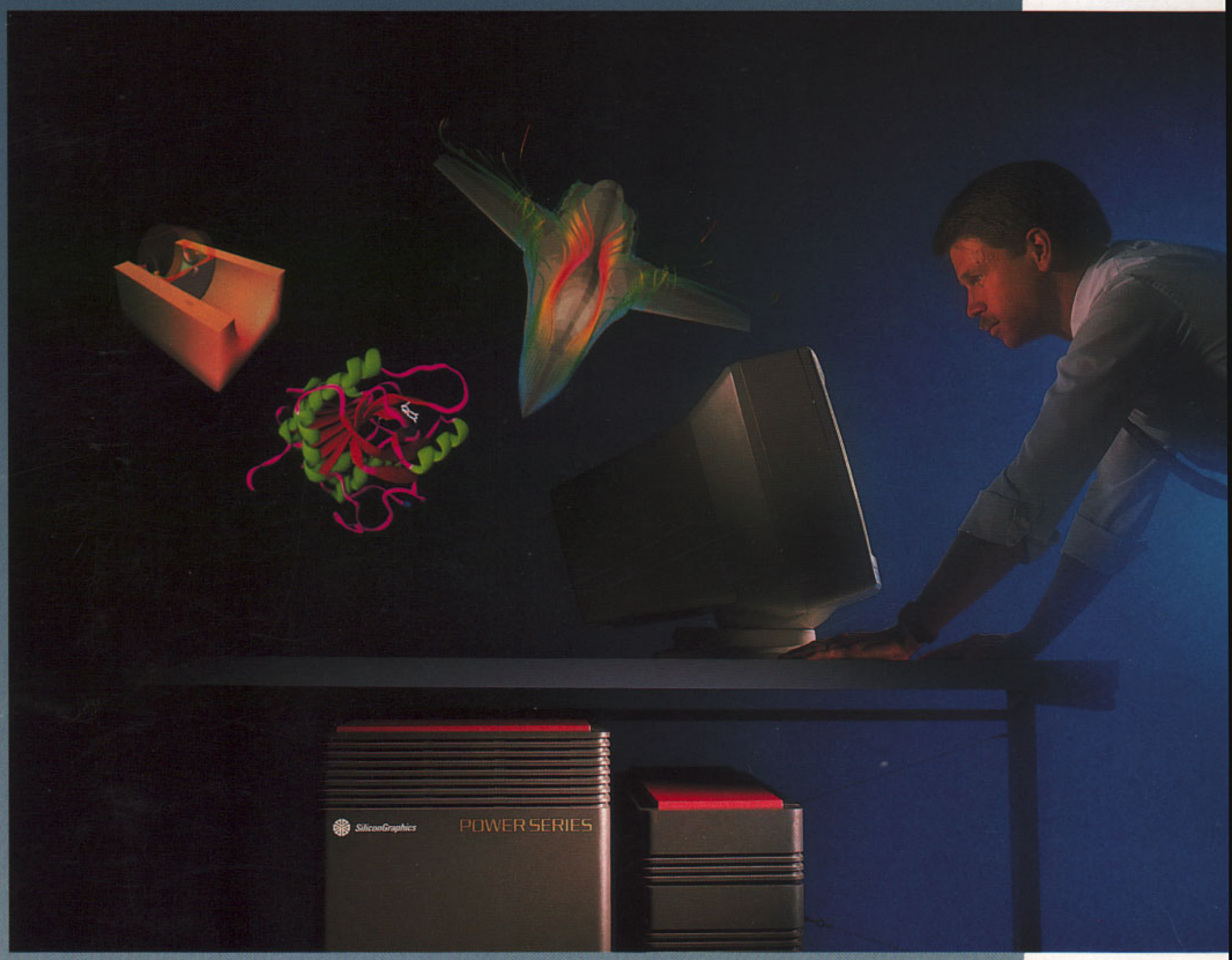
SiliconGraphics

POWER
SERIES



The 4D/210 GTX Graphics
Supercomputing Workstation

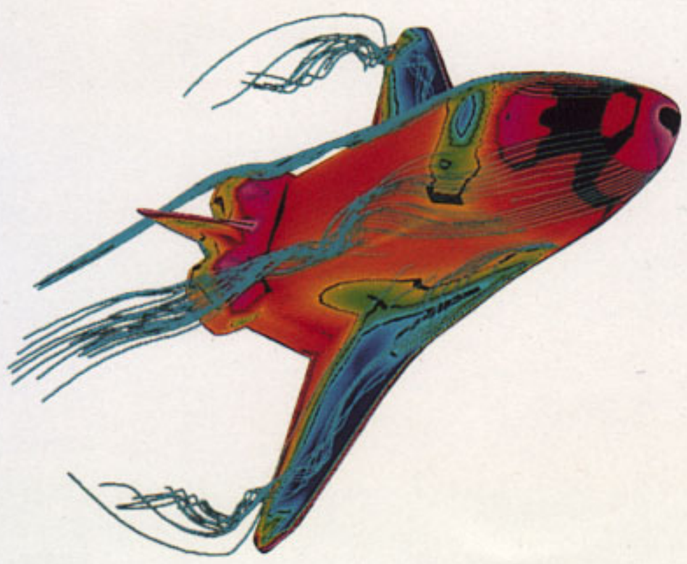
Serious computing and graphics power for serious technical applications.

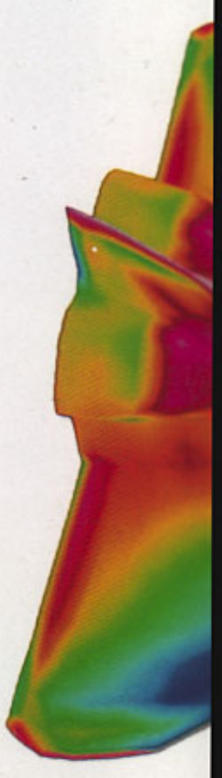
Just imagine visualizing the air flowing over the wing of an aircraft flying at 600 miles per hour. Or, imagine simulating the effect of cavitation caused by air bubbles flowing around a submarine propeller blade as it cuts through the water. Imagine seeing a cross section of a new car engine and being able to determine its efficiency through a series of simulated stress tests. Or, say you're a researcher trying to better understand visually how nerve cells grow three-dimensionally in real-time. Or a chemical engineer trying to visualize and query the complex nature of 3D molecular structures.

All of these things are now possible on your deskside supercomputing workstation from Silicon Graphics. Within hours after plugging it in, the 4D/210 GTX workstation can be at your side, giving you the power to visually interact with massive quantities of data. Our 4D/210 GTX combines the power of a fast RISC CPU and floating point coprocessor with the industry's fastest 3D graphics to get you down to serious business on your application. Fast.

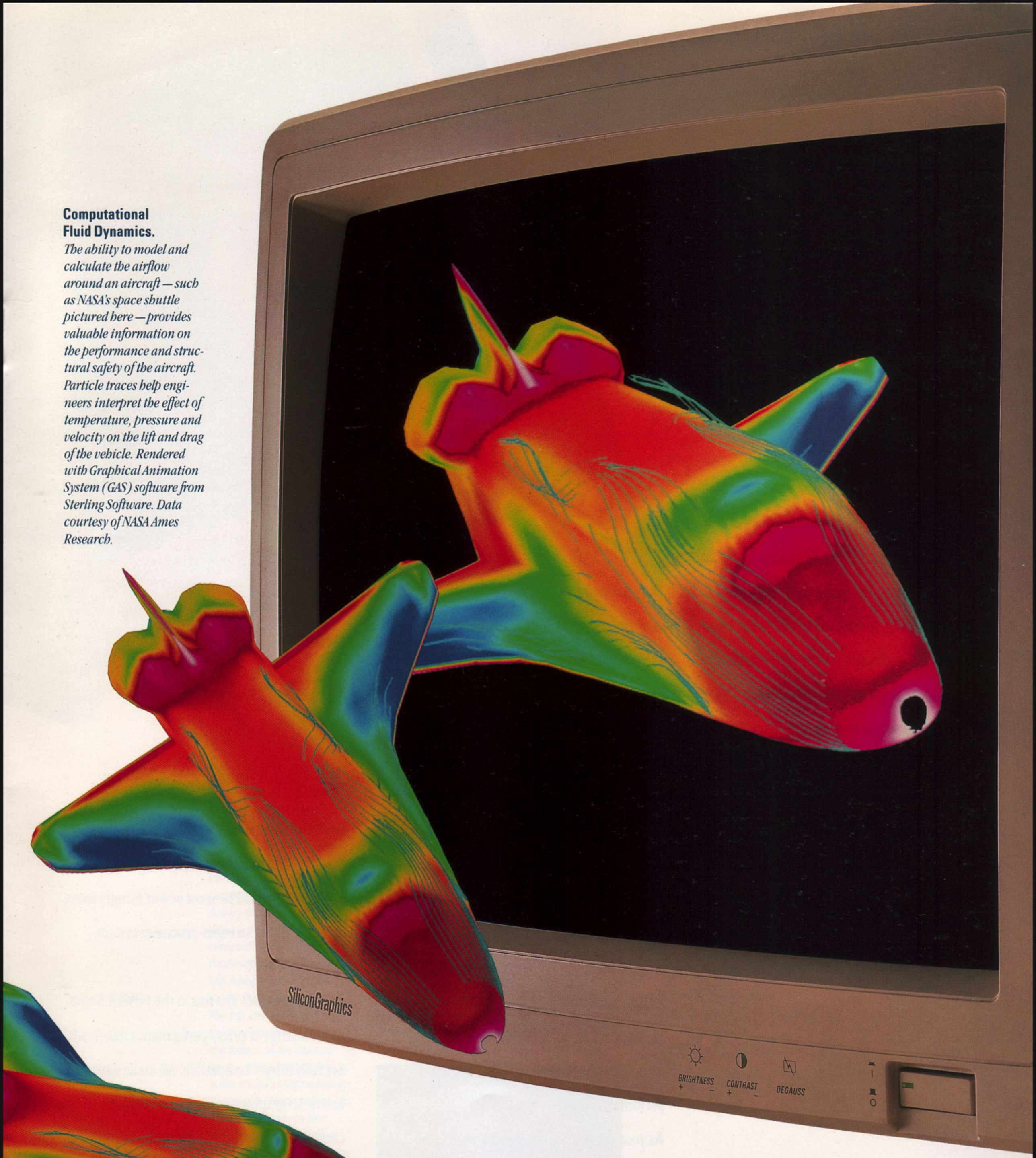
We designed the 4D/210 GTX for engineers, scientists, researchers and animators. It can be used for all kinds of technical applications including computational fluid dynamics, molecular design, finite element analysis, rendering, medical imaging, visual simulation and many more. These are floating-point intensive applications that require a powerful floating-point compute system as well as high-quality graphics capabilities. That's why we integrated the powerful compute performance with Silicon Graphics' legendary graphics capabilities.

Interacting with shaded, realistic images in real-time greatly improves productivity and shortens design cycles. Most likely, that means you'll say good-bye to expensive prototypes or mock-ups of designs. This is real-time graphics at its finest. Welcome to the world of real-time, 3D—the world of Silicon Graphics.





Computational Fluid Dynamics.
The ability to model and calculate the airflow around an aircraft—such as NASA's space shuttle pictured here—provides valuable information on the performance and structural safety of the aircraft. Particle traces help engineers interpret the effect of temperature, pressure and velocity on the lift and drag of the vehicle. Rendered with Graphical Animation System (GAS) software from Sterling Software. Data courtesy of NASA Ames Research.



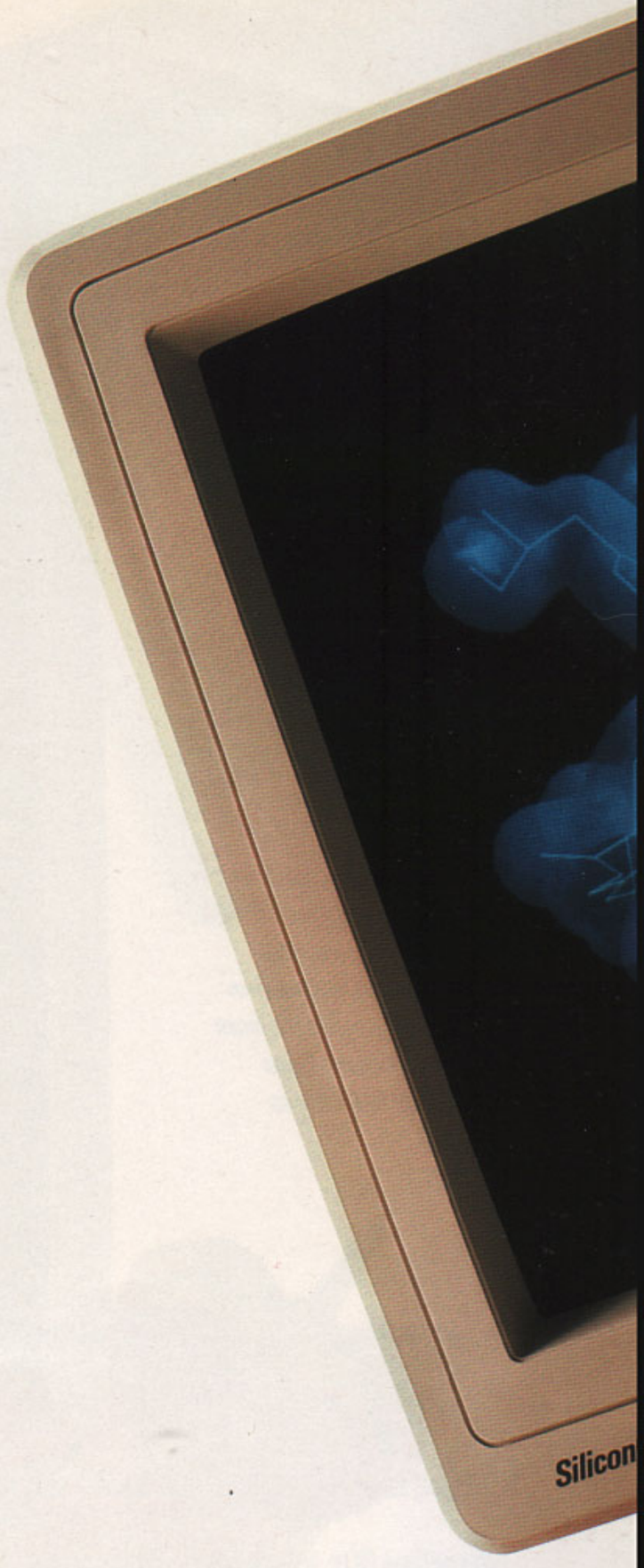
Meet the 4D/210 GTX workhorse–out of the ordinary performance for everyday technical needs.

Delivering sustained performance of 20 MIPS and 3.3 double-precision MFLOPS, the 4D/210 GTX is a powerful, single processor RISC-based graphics supercomputing workstation. It uses the industry's most powerful 32-bit RISC CPU (MIPS R3000) and a tightly coupled 25 megahertz floating-point coprocessor (MIPS R3010).

The result: our workhorse ranks as the fastest in its class. Yet despite this techical brawn, the 4D/210 GTX is accessible to the results-oriented scientist and engineer. That's the beauty of it. You don't have to be concerned with programming to the specific nuances of specific architectures.

The 4D/210 GTX comes with 64 KBytes of instruction cache, 64 KBytes of data cache, and 8 MBytes of main memory expandable up to 160 MBytes. We also include a high-speed disk subsystem that may be expanded to 9.6 GBytes.

Molecular Modeling.
Pictured here is the active site of a molecule—showing scientists visually where bonding with other molecules takes place. This makes it possible for scientists to study thousands of possible shapes of molecules interactively—saving them hundreds of man-hours each year. Courtesy of the Computer Graphics Lab at the University of California at San Francisco and the UCSF Howard Hughes Medical Institute.



Your gateway to the POWER Series.

Like the rest of the POWER Series™ graphics supercomputing systems, the 4D/210 GTX gives you deskside technical computing power comparable to that of a networked supercomputer configuration—but tightly coupled to a graphics subsystem. That means we're able to deliver a combination of both graphics power and compute performance that is second to none—without sacrificing one for the other.

When your application grows, or your needs change, you can upgrade to the only true parallel RISC architecture in the industry. Our POWER Series systems can deliver up to 160 MIPS and 28 double-precision MFLOPS of sustained performance.

As your gateway to the POWER Series, the 4D/210 GTX can be upgraded to a two or four-processor system (the 4D/220 GTX or the 4D/240 GTX) simply by replacing the existing processor board. The most power hungry users can upgrade to an eight-processor system, the 4D/280 GTX.

The five graphics systems in the POWER Series cover a range of price/performance needs. All are fully binary compatible. All make interactive 3D graphics possible. And all CPU configurations are available without graphics boards as high performance servers. That should say something about our dedication to outstanding compute horsepower *and* graphics performance.

What makes the 4D/210 GTX such an applications workhorse.

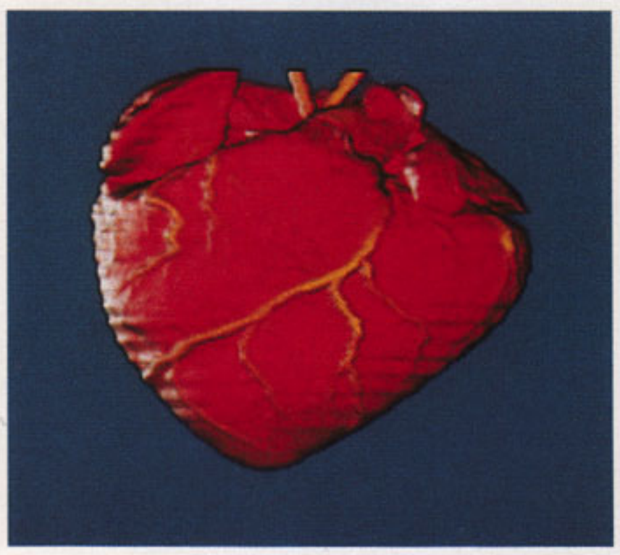
Fast, single RISC CPU

The MIPS R3000 RISC CPU, the heart of our workstation, is the fastest RISC architecture available today.

Balanced CPU and graphics system

Our innovative POWERpath™ architecture gives you simultaneous performance in both technical computing and graphics processing. That's performance that defies any standard benchmark tests. Specialized graphics processors offload graphics tasks from the general-purpose CPU subsystem so that both computational and graphics tasks proceed simultaneously at full speed. This combination of powerful analysis and graphics performance in one system allows you to visually interact with your applications—in real time. You don't have to wait for data from an external computer running a batch-mode application.

Medical Imaging.
Researchers and scientists can now perform non-invasive exploratory surgery, thanks to technology made possible with Silicon Graphics' supercomputing workstations. Pictured here is a 3D image of a living heart captured by the Cine CT scanner. The top image depicts the exterior surface of the heart chambers. In the bottom image, the exterior surface is electrically stripped away to reveal a cross-section of the arterial tree. In the future, volume rendering methods such as these may provide invaluable information for the diagnosis of heart disease. Rendered with VoxelView by Vital Images, Inc. Data courtesy of the University of Iowa Image Analysis Facility.



GTX Graphics subsystem

The graphics subsystem in the 4D/210 GTX contains a pipeline of custom graphics processors that feeds a bank of parallel rendering processors. The dedicated graphics hardware ensures full-speed rendering independent of CPU activity.

The resulting graphics performance specifications:

- 400,000 vectors per second (10 pixel, connected, 24-bit color double-buffered, arbitrary orientation with perspective).
- 100,000 polygons per second (100 pixel, independent, 24-bit color double-buffered, lighted, Gouraud-shaded, Z-buffered, arbitrary orientation with perspective).
- 135,000 triangles per second (50 pixel, meshed, 24-bit color double-buffered, lighted, Gouraud-shaded, Z-buffered, arbitrary orientation with perspective).

Compatible with the entire product line

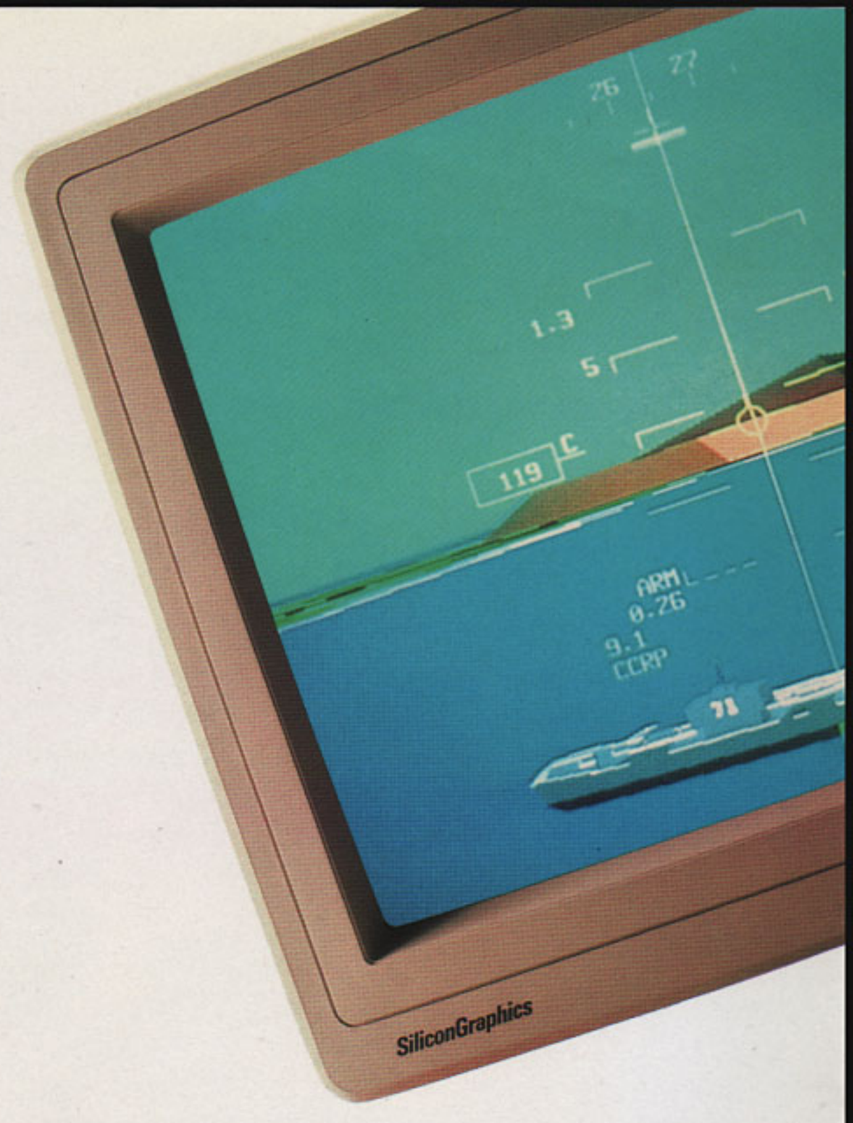
We preserve your hardware and software investments with true binary-code compatibility across our entire product line. We use the same instruction set on all our computers—therefore we can ensure compatibility up and down our product line.

Communication options that integrate the 4D/210 GTX into your networks.

To help you get more compute and graphics power out of the 4D/210 GTX, we offer a variety of networking and software development tools. Ethernet is included on all machines. Optional networking products include specific provisions for DECnet,™ IBM 5080/3270 emulation, and Hyperchannel™ interface to Cray computers.

Optional optimizing compilers include C, FORTRAN, Pascal, Ada and other languages that can help you take full advantage of the POWER Series' compute power. We also offer a parallelizing compiler that can help optimize FORTRAN code for the POWER Series multiprocessing systems.

As part of the 4D/210 GTX you receive the IRIS Graphics Library, a graphical debugger called IRIS *Edge,* AT&T's UNIX System V.3 and many Berkeley BSD 4.3 UNIX features. Optional programs include the EMACS debugger, an IBM-PC compatible emulator and the Documentor's Workbench.



Visual Simulation.
In the flight simulator's stationary cockpit, crews of spacecraft and commercial airliners are experiencing the sensation of actual flight, including take-offs, landing and flying through just about any occurrence—thunderstorms, engine malfunctions and more. Computer graphics simulations such as these are vital not only for training but for testing concepts and designs that—up until now—engineers have only dreamed about. Rendered with the Generic Visual System software from Gemini Technology Corp.

Tap into the world's largest 3D software library.

Through our Third Party Geometry Partners Program, we provide more than 400 software packages specifically written for 3D applications. More than 150 software developers from around the world support these comprehensive packages. Join the group or simply take advantage of what's already written.

See the workhorse in action.

Whether you're manipulating enzymes in the hopes of discovering new drugs, or analyzing the structural stresses on a wing traveling at 600 miles per hour, you have to see it for yourself. The 4D/210 GTX is an application machine that gets you down to the task at hand fast.

Call your sales representative today to set up a demo. You've got to see it to believe it.

Finite Element Analysis.
With the capability to perform finite element analysis on-screen, engineers can simulate various stresses or pressures and gain vast insight into the efficiency of their designs. Increasingly sophisticated finite element analysis techniques allow engineers to precisely design complex parts without the need to increase expensive prototypes. Rendered with ANSYS software by Swanson Analysis Systems, Inc.

Specifications

System Specifications

Compute Processor	25 MHz 32-bit RISC CPU (MIPS R3000). 25 MHz floating-point coprocessor (MIPS R3010). May upgrade to higher performance system by swapping the processor board.
Memory	64 KBytes Icache, 64 KBytes Dcache 8 MB dynamic RAM standard Expandable to 160 MB 0-32 MB: all memory on CPU board 32-64 MB: all memory on one memory board 64-128 MB: all memory on two memory boards 128-160 MB: fully populate two memory boards. Remainder on CPU board.
Standard Image Memory	48 1280x1024 image bit planes (8 bits for red, green, and blue; double-buffered) 16 1280x1024 image bit-planes for double-buffered alpha (the Power Series may be ordered with or without alpha) 24-bit 1280x1024 Z-buffer for hidden surface removal Four 1280x1024 overlay or underlay bit planes Four 1280x1024 window ID bit-planes (not accessible to the user)
Color Range	Color map mode (12-bits, double-buffered): 4096 colors displayable RGB Mode (24-bits, double-buffered): 16.7 million colors displayable
Standard Peripherals	Two RS-232C ports for serial communications in addition to ports used for keyboard/mouse 170 MB SCSI disk drive 101 key up-down encoded keyboard with soft key functions 19" 60 Hz non-interlaced color monitor with tilt and swivel 3-button optical mouse
Video Interface	RGB and Alpha levels 0.7 Vp-p into 75 ohms 60 Hz refresh rates available: 30 Hz 1280 x 1024 30 Hz 636 x 485 (NTSC) 30 Hz 768 x 575 (PAL)
Standard Software	UNIX System V.3 operating system with Berkeley 4.3 and Silicon Graphics enhancements C compiler and development environment IRIS edge visual debugger development environment IRIS Graphics Library 4Sight window manager

Options

Hardware Options	Add-on memory in 8 MB increments (up to 160 MB) Genlock with NTSC or PAL color encoding Live Video Digitizer (LVD) at 15 frames/sec or 30 frames/sec
Peripheral Options	170, 380, and 780 MB SCSI disk drives 380 and 780 MB ESDI disk drives 1.2 GB SMD disk drives 60 MB and 150 MB ¼" cartridge tape drives ½" tape drives 11" x 11" digitizer tablet "Spaceball" 6-axis input device Dials and buttons box Programming terminal
Communication Options	Six RS-232C ports for serial communications (up to 19.2K baud) Parallel controller IEEE-488 interface IBM coax 3270 emulation IBM 5080 emulation IBM PC emulation DECnet connectivity Hyperchannel connectivity
Optional Software	FORTRAN compiler POWER FORTRAN accelerator (automatic parallelizing compiler) Network File System (NFS) Documenter's Workbench EMACS text editor

Physical and Environmental Specifications

Power Requirements	AC voltage: nominal 115V (87-132). International and domestic 220V models available upon request AC frequency 47-63 Hz NEMA 5-20 amp outlet Chassis: 1840 VA, 1310 W, 4470 BTU/hr 19" monitor: 225 VA, 15 W, 512 BTU/hr
Size and Weight	19" monitor: 18.5"H x 20"W x 21.5"D (51 x 48 x 54 cm), 84 lb (38 Kg) Chassis: 26"H x 24"W x 27"D (65 x 61 x 69 cm), 185 lbs. (84 Kg)
Environment	Operating 50-104F (10-40C), 10-80% relative humidity, no condensation Shipping/storage: -40-140F (-40-60C), 10-90% relative humidity, no condensation

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