



Aerospace Solutions

Visual Numerics Delivers Powerful Data Analysis and Visualization Tools for the Aerospace Industry

The Aerospace Data Challenge

The Aerospace industry faces many difficult data challenges. Whether you are an airframe manufacturer, a space or satellite systems developer, or are Aerospace contractor or software vendor, the PV-WAVE Family of products has the power to solve your complex data problems.

Typical Aerospace projects such as flight-testing, avionics, structural dynamics, defect analysis, aerodynamics, ground control, and space systems, require sophisticated data analysis and visualization. In order to tackle these problems, scientists and engineers are required to deal with all types of data from simple to big, complicated datasets that come from varied sources, often in proprietary formats, including ASCII and binary files as well as commercial databases. And, the code and platform requirements frequently change from project to project creating the need for engineers to easily change with them. Mastering large amounts of complex data requires high performance, extensible and flexible tools, which the PV-WAVE Family is built to deliver.

Solution: Flexible, Extensible, Powerful, Reliable

The PV-WAVE Family of products by Visual Numerics — PV-WAVE, TS-WAVE, and JWAVE — delivers aerospace engineers the tools to efficiently and accurately meet their data challenges, no matter what form or complexity they come in. The PV-WAVE development solutions allow you to rapidly import, manipulate, analyze and visualize your data. And, PV-WAVE Advantage has the added benefit of a sophisticated set of analysis routines based on the IMSL libraries.

In addition to the broad functionality of PV-WAVE, TS-WAVE delivers unprecedented power to the Aerospace industry by providing an extensible COTS solution that allows for custom interactive time-series data analysis and the ability to read almost any data format. And, JWAVE is PV-WAVE's web-enabled version that allows teams to collaborate across the enterprise and quickly access data from anywhere, at anytime.

Whether you need an interactive **desktop solution** to explore data and create one-off solutions, a **custom application** to perform analysis and generate plots, an **off-the-shelf solution** that is extensible and easily imports complex data, or a **web-based solution** to share information with people outside of your group, the PV-WAVE Family delivers. It has the functionality you need in a flexible, open systems environment that easily adapts to your data needs.

Value Proposition

Visual Numerics provides Aerospace companies an all-in-one solution for data analysis and visualization to help solve the industry's unique and complex data problems. PV-WAVE combined with the industry standard IMSL libraries is an open system environment that is easy to use, highly flexible and extensible, and is built for maximum performance on any system and with any dataset.

Key Benefits

Visual Numerics, with its PV-WAVE and IMSL product families, has been delivering complex data solutions to the Aerospace industry for over a decade. Some of the key benefits of its solutions are:

- Open systems environment
- Multi-platform support
- Rapid prototyping
- Large dataset support
- Filtering and analysis
- Custom, 2D/3D, OpenGL, and interactive graphics
- Image processing
- Ability to call C and FORTRAN code
- Web-enabled applications
- COTS solution

ROI Impact

The PV-WAVE Family of products provides significant ROI in many ways.

- **It is fast** – quickly import, process, and analyze data, and rapidly switch between projects for maximum efficiency.
- **It is easy to use** – easily import large datasets from multiple sources and formats and efficiently render complex charts, plots and reports.
- **It is an all-in-one solution** – learn and use only one tool for all of your data needs.
- **It is cost effective** – save valuable engineering time and application development dollars.

"Using PV-WAVE has saved us hundreds of hours during the course of our application development."

Jeff Hawkins
Meteorologist
Naval Research
Laboratory



PV-WAVE®

HELPING CUSTOMERS **Solve** COMPLEX PROBLEMS

IMSL®

Trusted For Over **30** Years

World Class Products, Services and Support

For over 30 years, Visual Numerics, with its PV-WAVE and IMSL product families, has provided trusted visualization and numerical analysis tools to thousands of users in the Aerospace field.

The PV-WAVE Family has all of the functionality you need in one tool. It provides an open software environment allowing for integration with other technologies, including the IMSL Library which delivers over 370 mathematical and statistical routines, creating the most powerful data analysis and visualization solution available.

Visual Numerics partners with its customers to provide world-class products, services and support. We have unparalleled technical support that can answer the hard questions fast, and responsive consultants that can provide in-depth expertise and fast delivery of time-critical solutions.

"PV-WAVE provides significant value not only because of its powerful visualization tools, but also the strong data analysis capabilities offered through IMSL Numerical Libraries, which are included in PV-WAVE. This is an area that clearly separates Visual Numerics from its competition."

Brian Smith
Senior Systems Analyst
Coleman Research Corporation

Proven Results

Visual Numerics has been solving complex data problems for high profile Aerospace customers for over a decade. Some of the Aerospace data challenges we can share include:

- **European Space Research Center** – Developed a multipurpose data analysis software package for use in all phases of satellite systems from pre-launch testing through full commissioning. This project used both satellite telemetry data and ground station processed data, including synthetic aperture radar image data, thus both time series and image data were involved.
- **Integral Systems** – Developed an off-line analysis module for a satellite ground command and control system. Analyzed archived satellite data to track satellite performance and investigate problems. Large, complex datasets, analysis and charting, automated report generation, and multi-platform support were all requirements.
- **NASA Glenn Advanced Research Center** – Researched the performance of arc jet thrusters used to stabilize satellites using fluorescence image data. The parameters calculated include temperature, types of particles, energy conversion, and pattern of ionization. PV-WAVE was also used in material defect analysis using multiple lasers.



Unparalleled PV-WAVE Functionality

- **Data Access** – PV-WAVE can easily import proprietary and custom data formats and provide support for a wide range of standard image formats. PV-WAVE can access data directly from commercial databases and easily manage large datasets.
- **Data Reduction and Filtering** – Use PV-WAVE's powerful array-based language to easily write code to subset, filter, and transform data.
- **Data Analysis** – PV-WAVE Advantage delivers powerful data analysis capabilities, which include the industry standard IMSL libraries of over 370 mathematical and statistical routines.
- **Charting** – With PV-WAVE, creating highly customized and interactive charts is easy. Time series charts with date/time axes, multiple axes, overlaid charts, and custom mouse interactions are all possible. Image processing, contour charts, 3D charts and even interactive 3D visualizations rendered using OpenGL provide an unparalleled depth of functionality.
- **Platform Support** – PV-WAVE runs on all platforms, including Windows, Linux, UNIX, and OpenVMS. Code created using PV-WAVE is platform neutral, so it can run on any system.
- **Legacy Code** – Call your legacy C or FORTRAN code from PV-WAVE, or call PV-WAVE directly from your own C or FORTRAN application.
- **Open System Platform** – Support for communication between processes using operating system calls, pipes, remote procedure calls (RPCs), and sockets make it easy to develop client/server applications or communicate between PV-WAVE and other in-house or third party applications. Web-enabled applications are available with JWAVE.
- **User Interface Development** – Create simple to complex, platform-independent user interfaces with ease.
- **Time Series Application** – Flight test engineers use TS-WAVE, the leading COTS solution.
- **All-in-one Solution** – meet all of your varied data needs with one solution, now... and in the future.

Visual Numerics®

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