Visualization and Analysis Software Solutions for industrial inspection and R&D

For industrial tomography and other 2D/3D acquisition techniques
From ready-to-use software for engineers and scientists to 3D toolkits for application developers

Solutions for:
NDT equipment manufacturers
NDT service providers
Software developers
Industry
Research

Across a wide range of fields:
Aeronautics
Automotive & transports
Plastics & composites
Metals and casting
Porous materials
Electronics
Construction

Materials and products R&D
Avizo® Fire software provides powerful tools for visualizing, exploring, and analyzing multi-modal data sets. It is used in many aspects of the design and development phases of a material/product:
• Materials characterization
• Materials/product test and analysis
• Rapid prototyping
• Reverse engineering

Assembly, production and maintenance inspection
Avizo® Fire 2D/3D image review software tools and workflow offer high-performance capabilities to NDE specialists for:
• Defect/flare detection and analysis
• Fast pre-production sample testing
• In-line inspection automation
• Individual small-sized to large scale parts/components inspection
• Performance and process evaluation
Avizo® Fire 3D visualization and quantification software for materials and products R&D

Avizo® Fire software provides advanced 3D visualization and state-of-the-art quantification capabilities to scientists and engineers who require great insight into complex materials and products structures data sets, at any scale, during design and development phases.

**Multi-modal data processing**
- Industrial tomography
- Nano- and micro-tomography
- Radiography
- Ultrasonics
- MRI
- Microscopy
- More 2D/3D acquisition techniques

**Measurement and analysis**
- Properties extraction from experimental or simulated data, image voxel or geometry data
- Extensive measurements: counts, distributions, areas, volumes, thickness, orientation, shape factor, and more
- Advanced query, plotting and export capabilities through the built-in spreadsheet tool or MS Excel®
- Bridge with Matlab®, LabView, COMSOL

**Porous and multiphase media analysis**
- Analysis of porous materials and multiphase systems at any scale
- Morphometry, stereology measures
- Skeletonization and network characterization features for dentritic and fracture networks

**3D Image-based meshing for CFD and FEA**
- From 3D imaging modalities (CT, micro-CT, MRI, and more)
- High quality surface and volume meshes generation
- Export to FEA and CFD solvers for simulation
- Advanced post-processing for simulation analysis

**High-performance processing and visualization for very large data sets**
- Seamless integration with advanced CPU/GPU computing techniques for interactive image processing
- Automatic and interactive segmentation
- Interactive visualization and navigation even when data sets exceed tens of gigabytes (larger than main memory)
- Interactive visualization even for remotely accessed data

**Tuned for optimal performance**
- Automatically takes advantage of the latest graphics features
- Optimized hardware resources consumption

**Presentation and communication**
- Mix images, geometric models, measurements and simulations
- Annotations, measures legends, histograms, and curves plots
- Advanced key frame and object animation
- Export spreadsheets, 3D models, images, and movies
- Tools for immersive and collaborative environments, shared and remote sessions
Avizo® Fire-based applications for high-volume inspection workflows

Avizo® Fire open framework enables the implementation of custom applications for the automation of specific tasks in the inspection process. Typical solutions provide users with dedicated assistants at all steps of the inspection process. In this example, each processing operation has been automated using the Avizo Fire framework in order to provide NDE operators with a straightforward workflow from image server to inspection scenarios and automated test report generation, for a highly efficient quality control cycle.

**Inspection Data Service**
The “Inspection Data Service” tool is a Windows® service. It retrieves stacks of images, registers them against a reference model, and stores them for further review.

**Designer**
The “Designer” tool allows NDE specialists in charge of defining inspection procedures to create custom inspection scenario vs. a reference model. The NDE operator (level III) is guided through the steps to define test regions, views to be depicted and analyzed during the inspection, quality criteria for each test region, and quality tests for each view or region.

**Inspector**
The “Inspector” tool executes the appropriate workflow script showing each view, 3D region and associated test results to the NDE operator (level II) during the inspection process of a part. “Inspector” can be launched as a batch application so that tests are run automatically and results saved for later review.

**Inspection Reviewer**
This tool allows the NDE operator to review detailed test results as ambiguous cases are detected.
Avizo, the ideal open framework

Customize Avizo® by expanding it
Avizo’s expandability makes it an ideal open framework for organizations that need rapid software customization to address their specific 2D/3D data visualization and analysis needs. Use the XPand extension to create new custom components for Avizo, such as file readers and writers. Integrate custom computation modules, and even new visualization modules.

Avizo® Wind for post-processing simulation data
Avizo Wind edition is a high-end extensible software that provides advanced post-processing visualization and analysis tools for simulation data, ranging from flow to thermal, and stress data:
- From CFD/FEA output to visual analysis
- Advanced analysis, visualization and feature extraction tool
- From 3D imaging data to simulation
- Easy-to-use navigation and 3D manipulation tools
- High-performance processing and visualization for very large data sets
- High quality presentation and communication tools
- Advanced support for collaborative and immersive environments

Solution for 3D application developers
For application developers that require powerful and rapid integration of a 3D visualization engine for advanced NDT software tools, we provide Open Inventor® by VSG. Open Inventor® is an object-oriented, cross platform 3D graphics toolkit for the development of industrial strength interactive applications using C++, .NET or Java. It provides the power and functionality of OpenGL at an object-oriented level. Its easy-to-use API, extensible architecture, and large set of advanced components provide developers with a high-level platform for rapid prototyping and development of 2D/3D graphic applications. Moreover, Open Inventor extensions provide high-level additional components: state-of-the-art volume rendering, high-end mesh visualization and post-processing, very Large Data Management, ultimate scalability, remote application, photo-realistic ray-tracing, and more.

Professional services
Our Professional Services team is available to increase your efficiency through training, expertise or custom development covering the whole life cycle of your project: software and hardware requirements, specifications, prototyping, migration assistance, code expertise and optimization, custom component development, specific product extensions, support for system deployment, and even cooperative research and development.

About VSG
VSG - Visualization Sciences Group is the worldwide leading provider of high-performance 3D visualization software tools, applications and services for engineers, scientists, and developers.

We bring more than 20 years of innovation to the highly complex visualization challenges of key players in engineering, materials science, oil & gas, geosciences, and medical industries.

We are dedicated to providing ultimate visualization technologies to our customers through robust yet easy-to-use tools and applications. We serve our clients all over the world through offices in the United States, United Kingdom, France, Germany, and through distributors worldwide. Visit www.vsg3d.com for a complete listing of our locations.

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