

# Complete CFD Visualization

Tecplot 360 gets you answers faster. It enables you to quickly plot and animate all your data exactly the way you want. Using just one tool, you can analyze complex data, arrange multiple layouts, and communicate your results with professional images and animations. Save time and effort by automating routine tasks. Of all the CFD visualization tools available, Tecplot 360 is easiest to use and offers the most visually powerful output.

## Results Inspector

- Assess your grid quality with 28 grid quality functions including aspect ratios, skewness, orthogonality, and stretch factors.
- Easily load your data with support for 32 CFD, FEA, structural analysis and industry-standard data formats.
- Estimate the order of accuracy of your numerical solutions with Richardson extrapolation analysis.
- Interactively explore and sweep through the flow field to check that flow features align with the grid.

## Design Validator

- Gain full understanding with XY, Polar, 2D and 3D capabilities in one unified environment.
- Animate and step through transient solutions with DVD control options like forward, backward, loop, bounce, and throttle control.
- Gain insights with interactive slice, iso-surface, and streamtrace tools.
- Extract vortex cores, shock surfaces, and other key flow features.
- Compare numerical models with test data in the same window.

## Get Recognized

- Copy and paste images and animations directly into Microsoft Office applications.
- Export professional, presentation-quality vector and raster formats.
- Present multiple, time-linked views of your plots with Tecplot 360's unique multi-frame layout workspace.
- Make optimized animations for PowerPoint, the web, and Framer.
- Export data in formats compatible with Tecplot 360 2008 and 2006.

## Automator

- Instantly re-create an old plot, or apply the same style attributes and layouts to a different set of data with layout and style files.
- Analyze and automate your work with the power of Python.
- Create macros by recording or writing scripts.

## Mega Million Models on Desktop

- Handle large data sets on your desktop or laptop.
- Enjoy a faster time to first image by loading just the data you are actively using.
- Compare multiple models simultaneously, including fluid-structure interaction (FSI) visualization.

"We have seen a major reduction in CFD post-processing time. This means that more resources can be devoted to running CFD simulations and analysis rather than struggling with data plotting issues."

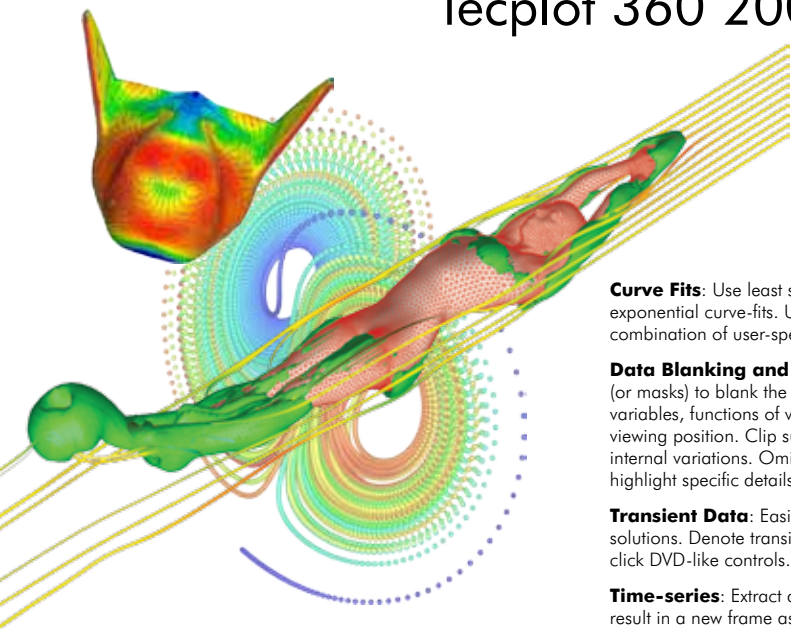
- Mehul P. Patel, Orbital Research Inc.

"We're looking for separated flow and vortex shedding, and you can only really see that with good visualization in 3D...I don't know what else I would do if I didn't have Tecplot 360 to visualize this data."

- Michael Colonno, SpaceX

Free, No-Hassle Trial Versions of  
Tecplot 360 are available at:  
[www.tecplot.com/trial](http://www.tecplot.com/trial)

# Tecplot 360 2009 R2 Feature Set



## Analysis

**CFD Analyzer:** Examine grid quality, perform spatial integrations, generate particle trajectories, extract flow features, and estimate numerical errors.

**Function Calculator:** Calculate over 90 grid and flow field functions. Perform data normalization.

**Integrations:** Integrate over lines, surfaces and volumes. Calculate volumes, areas, flow rates, forces and moments. Apply weighting options to calculate total pressure.

**Particle Paths:** Integrate particle trajectories in steady and unsteady flows. Calculate paths of particles with mass and drag effects.

**Feature Extractions:** Detect and extract shock surfaces, vortex cores, flow separation and reattachment lines.

**Error Analysis:** Estimate the order of accuracy of your numerical solutions using Richardson extrapolation analysis. Fluid-structure Interaction (FSI): Load structural analysis and CFD solutions simultaneously to see material deformation and fluid flow changes in one plot.

**Finite Element Analysis (FEA):** Derive Von Mises Stress/Strain, Principal Stresses/Strains, and Vector Magnitude. Plot the geometry with deformations and exaggerated deformations applied. Animate displacements.

**Create, Alter and Transform Data:** Alter your data or create new data using mathematical expressions. Store mathematical expressions for reuse. Create mirror images of existing data. Create new data as a subset of existing data.

**Interpolate and Triangulate:** Choose from linear, inverse-distance, and kriging interpolation. Create sets of triangles from data points defined in a 2D plane.

## Exploration

**Slicing Tool:** Interactively slice 3D data displaying mesh, contours, and vectors on the slice plane. Define and use up to eight different slice groups.

**Iso-surface Tool:** Change iso-surface values interactively. Define and use up to eight different iso-surface groups.

**Streamtrace Tool:** Interactively seed rakes of streamlines, streamrods, and streamribbons in 2D and 3D. Specify lines to terminate streamlines. Display markers along streamlines spaced by vector magnitude. Place streamline rakes.

**Contour Tool:** Interactively add/delete contour lines or levels.

**Extraction Tools:** Interactively define sets of points or polylines to which 2D and 3D surface data is interpolated and extracted for display as a separate plot.

**Curve Fits:** Use least squares linear, polynomial, power, and exponential curve-fits. Use least squares curve-fit of linear combination of user-specified functions.

**Data Blanking and Clipping:** Set multiple constraints (or masks) to blank the display of data based on local field variables, functions of variables, grid indices, or depth from viewing position. Clip surfaces of 3D volume data to reveal internal variations. Omit zones or peel away surfaces to highlight specific details.

**Transient Data:** Easily load and explore time-dependent solutions. Denote transient data as a time/date value. Use one-click DVD-like controls. Show multiple views of data over time.

**Time-series:** Extract a single point over time and plot the result in a new frame as an XY line plot.

**Extract Objects Over Time:** Extract slices, iso-surfaces, streamtraces, and points from polyline geometries in transient data. Resulting zones are then assembled into a new strand with proper solution times set for each zone.

## Automation

**Configuration and Batch Files:** Set defaults and perform initialization with configuration files and start-up batch files.

**Macros and Python Scripting:** Use macros and Python scripting to perform multiple, repetitive changes. Use Python's SciPy and NumPy libraries to perform additional calculations including FFTs.

**Layout Files:** Return to plots exactly as you created them by saving a layout file recording the frames, plotting attributes, and the data. Apply layout styles to the same dataset or different datasets.

**ADK:** Add your own specialized functions, analyses, and data input/output to Tecplot 360 using the included Add-on Developer's Kit (ADK). Use C, C++, and FORTRAN.

## Collaboration

**Cross-Platform Capability:** Run Tecplot 360 on Windows 7, Vista, and XP; Mac OS X; Linux; and UNIX platforms. Interchange Tecplot 360 macro files, layout files, stylesheets, color map files, and data files among all platforms.

**Expanded Data and File Sharing:** Export data in formats compatible with 2008 and 2006 versions of Tecplot 360.

## Work with Large Datasets

**Parallel Processing (shared memory):** Leverage up to 64 CPUs/Cores for faster computing-intensive operations, such as streamtraces, slices, and iso-surfaces.

**Multiple Data Sets:** Create and display plots from up to 128 different sets of data simultaneously.

**Multiple Zones & Variables:** Include up to 1 million segments/zones per data set, up to 1 million variables (X, Y, Z, U, V, etc.) per data point.

**Page Layout:** Create up to 2,048 plots per page.

## Plot Annotation

**Text:** Place text interactively on plot. Set text color, angle, size, font, background color, and justification. Choose from Greek letters, mathematical symbols, superscripts, and subscripts.

**Geometries:** Interactively create polylines, rectangular boxes, circles, and ellipses. Duplicate, reposition, resize geometries. Modify the geometries interactively and read from a file.

**Images:** Import JPEG, BMP, and PNG files into plots.

## Output Formats

### Vector-based and Raster Plot Files:

Export vector-based files in encapsulated PostScript (EPS), PostScript, and Windows Metafile formats. Export raster files in BMP, PNG, JPEG, TIFF, PostScript bitmap, X-Window bitmap, and X3d formats. Configure image resolution independent of screen resolution.

**Animations:** Export Flash (SWF) and PowerPoint-compatible AVIs.

## Data Input

**CFD Formats:** CGNS; FLOW-3D; FLUENT .cas and .dat format and polyhedral; PLOT3D; STAR-CCM+ and polyhedral; Tecplot and polyhedral.

**Data Formats:** HDF, HDF5, Excel (Windows only), comma- or space-delimited ASCII, EnSight 6, EnSight Gold.

**FEA Formats:** ABAQUS, ANSYS results files, ESJ/PAM-CRASH DAISY files, FIDAP Neutral file, LSTC/DYNA input file, LSTC/DYNA Taurus state databases, MSC/NASTRAN bulk data input file, MSC/NASTRAN OUTPUT2 output file, MSC/Patran neutral files, PTC/Mechanical design study, SDRC/IDEAS universal file, 3D Systems/STL.

## Line, 2D, 3D, and Polar Plotting

**Time and Dates:** Display time and date on any axis.

**XY Features:** Create scatter plots, line plots, bar charts, semi-log plots, log-log plots, error bar plots, splines, curve-fits, and more. Configure tick marks, symbols, legends and more. Work with multiple horizontal and vertical axes.

**Mesh Plots:** Display 1D, 2D, and 3D grids. Color mesh lines by variable, and remove hidden lines.

**Contour Plots:** Display contour lines, color flood between contour levels, and color fill cells (or elements). Use multiple contour variables to view and analyze interrelationships among several variables simultaneously.

**Vector Plots:** Display 2D and 3D vectors on planes, 3D surfaces, and in volumes. Display 3D vector components tangent to 3D surface. Specify length, color, line type, and head style. Color by variable.

**Polar Plot Features:** Create polar line plots (r, theta). Configure angles in radians, degrees or arbitrary units. Select between linear or logarithmic radius.

