Tecplot 10:
A versatile plotting package for engineers and scientists

Mike Peery, President
Amtec Engineering, Inc.
Bellevue, Washington, USA
Tecplot 10

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Where Is Amtec?

Headquarters:
13920 SE Eastgate Way, #220
Bellevue, Washington

Branch Office in Houston, Texas
A Few of Our Customers

• **Earth Sciences**
  – Army Corps of Engrs.
  – ChevronTexaco
  – USGS
  – Unocal
  – Woods Hole

• **Aerospace**
  – Boeing
  – Cessna
  – General Electric
  – Jet Propulsion Lab
  – Lockheed Martin
  – NASA Research Ctrs.
  – Northrop Grumman
  – ONERA
  – Pratt & Whitney
  – Raytheon
  – Rolls Royce
  – Solar Turbines

• **Manufacturing**
  – 3M
  – Applied Materials
  – Caterpillar
  – Ford Motor Company
  – Intel
  – John Deer
  – Monsanto

• **Dept of Defense & US Gov.**
  – Electric Boat
  – Edwards AFB
  – Naval Research Lab
  – Naval Surface Warfare Center
  – NIH
  – NIST
  – US ARL
  – US Food & Drug Admin.
  – Wright Patterson AFB

• **Academic Institutions**
  – Berkeley
  – CalTech
  – Georgia Tech
  – MIT
  – Purdue
  – Princeton
  – Stanford
  – Univ. of Illinois UC
  – Univ. of Michigan

• **National Labs**
  – Argonne
  – Knolls Atomic Power
  – Los Alamos
  – Lawrence Livermore
  – Lawrence Berkeley
  – Oak Ridge
  – Pacific Northwest
  – Sandia
Steps in Numerical Simulation
(CFD - Computational Fluid Dynamics)

Pre Processing

Problem Def.
Geometry Def.
Grid Generation

Problem: air flow around a cylinder

grid generation

At each node all you know is the grid location (X, Y)

Numerical Model

Solver
(CFD Code)

Numerical model generates solution for physical properties at each grid node (Temperature, Pressure, Density, Velocity)

Post Processing

Visualization

Plot results (Temperature Contour)
Tecplot Product Family

- **Tecplot** (flagship product)
  - CFD Analyzer Add-on
- **Tecplot Edge** (for application developers)
- **Tecplot RS** (for oil & gas reservoir simulation)
- **Tecplot Solution Services**
  - Application development services
  - Consulting and applications
  - Training
  - Technical support
What is Tecplot?

- Tecplot is plotting software with extensive XY, 2-D and 3-D capabilities.
- A “One-Stop Shop” for engineering/scientific data visualization
Who is Tecplot For?

- Engineers/scientists
- Need to analyze, explore and plot numerical simulation and/or experimental data
- Want convenient point & click plotting
- Want one program for making wide range of charts, graphs, plots for publication and presentations
- Want an affordable program for entire department
What Does Tecplot Do?

Tecplot helps you:

• Plot \textit{(integrated XY, 2-D, 3-D)}
• Explore \textit{(slice, iso-surface, streamlines, …)}
• Manipulate \textit{(Fortran-like operations)}
• Automate \textit{(macros, Quick Macro Panel)}
• Communicate \textit{(high-quality output)}
• Collaborate \textit{(read/write to URL, publish to html)}
• Customize \textit{(Add-on Developers Kit)}
What Do You Get From Tecplot?

• Control of your plots
• High-quality plots and animations
• Satisfaction from seeing your work in *its best light*; and sharing it with others

Visualizing the Dynamics of the Sun
Evolution of Coronal Loops

October 2002 PLOT OF THE MONTH
What’s New in Tecplot 10?

• Data management
• New Plotting Tools
• Interface Improvements
New Plotting Tools

• **Multiple Contour Variables**
  – Zones can have different contour variables
  – Separate variables for isosurfaces and contours
New Plotting Tools

- **3D Scatter Symbols**
  - Spheres, cubes & octahedrons
  - Size scaled by a field variable
New Plotting Tools

- Specular Highlights

Add realism for presentation impact.
New Plotting Tools

- **Image Import**
  - Logos
  - Bitmapped photos (images) incorporated with plot.
New Plotting Tools

- Super Sampling for High-quality Output
  - Remove “jaggies” with anti-aliasing

**Re=10 Channel Flow With Time Dependent Inlet Jets**

**No Super Sampling**

**Super Sampling**

Lattice Boltzmann Method (Flow Field) With Convection-Diffusion Equation (Passive Tracer)
New Plotting Tools

• Frame Linking Capabilities
  – Between frames
  – Within frames
New Plotting Tools

- **RGB Color Flooding**
  - Red, Green, and Blue proportional to values of up to three variables
  - General pseudo-coloring capability
  - Multi-phase and multi-component flows
New Plotting Tools

- **Polar Line Plots**: \( r = f(\theta) \)

Important engineering plot, especially for electrical engineers.
New Plotting Tools

- **Export images as JPEG**
  - Standard format for compressing and displaying images in HTML documents on the Web
  - Control lossy compression (quality) with Quality slider bar
Data Management

- **Variable & Node Map Sharing**
  - Reduce memory usage by sharing variables between zones (data blocks)
  - Time-dependent or iterative solutions only need one grid

Another important way to manage large data files and conserve disk and RAM.
Data Management

- Data Journaling
  - Save data alteration equations & operations in Layout File
  - Keep original data intact
  - No need to save modified data file

This is important for very large data files.
Data Management

• **Auxiliary Data**
  – Name/value pairs attached to Datasets, Frames and Zones
  – Read from data file, or set by Macro or Add-on

**Example:**

A Plot3D file having Mach Number and Reynolds Number defined.
Data Management

- **Cell-Centered Grid Structures**
  - Read and display cell-centered data
  - Mixed node and cell-centered data

Numerical simulation results have complex grid structures (FEM, finite-difference). Variables are stored in different places on each element. Important for other data types.
Data Management

• 64-bit on Selected Platforms (SGI, ...)*
  – Larger address space (larger data files)
  – Faster on some computers

(*May be post release.)
Interface Improvements

- **Undo**
  - View changes
  - Style changes
  - Data operations
Interface Improvements

- **Resizable Map/Zone Style Dialog**
  - Resize Map/Zone dialog to work with a large number of Maps/Zones

- **Improved Data Loaders**
  - Plot3D, CGNS, Fluent, ...
Tecplot’s Road Map (vers.11,12)

- Handle ever larger data sets
  - Faster file loading
  - Files >> local memory
  - Remote data files
  - Time-dependent data conveniences
- More plot types
- Programmability/math analysis capabilities
- Continue to make easier and more convenient
Tecplot 10: Show ‘n Tell