

Interactive Visual Analysis Tools – SimVis –

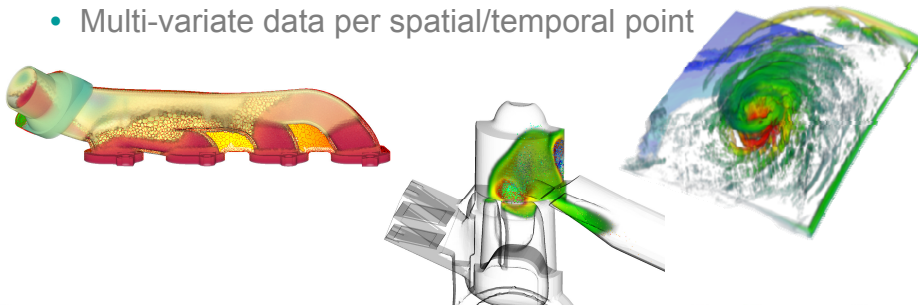
Tutorial: Interactive Visual Analysis of Scientific Data

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What is SimVis?

- General purpose IVA Framework developed since 2000 in Vienna, Austria
 - VRVis Research Center, SimVis GmbH
- Using multiple, linked views (2D, 3D, nD)
- Allowing interactive visual analysis of real-world data sets
 - Physical 3D (4D) grids
 - Multi-variate data per spatial/temporal point



SimVis – Input

- Many different data converters are available
- Data needs to be converted prior to loading into SimVis
 - CGNS
 - NETCDF
 - GRIB
 - Fluent
 - Star-CCM+
 - AVL Fire
 - OpenFOAM
 - Enight Gold
 - Many raw formats
 - ...
- SimVis can handle completely arbitrary unstructured grids

SimVis – Views

- 3D View(s)
- Scatterplot
- Histogram
- Parallel Coordinates
- Time Curves View
- DOI View
- TF Panel, Time Control Panel, Derived Data Panels

Live Demo

SimVis – Advanced Possibilities

- 3D:
 - Isosurfaces
 - Streamlines, Pathlines
 - Cut planes
 - Particles
 - Vector Display (Arrows)
- Derived Data Calculator
- Transfer Function Panel
- Time Control Panel
- DOI View

SimVis – Results

- Capture Images and Videos
 - With / without UI
 - Single views / full setup
- Save and reload sessions
 - Reapply analysis on similar data / cases
 - Save session state into image description
 - Save analysis step by step
- Report generation
 - Automatically produce HTML Report
 - Including data description / characteristics
 - All views, with descriptions of selections
 - Time-dependent widget
- Export selected data

SimVis – Limitations

- No data mapping for data on time-dependent geometries
 - Some techniques work only for data with steady geometry
 - Pathlines
 - Curve view
 - Some derived data
- Data needs to be converted into internal readable format
- Parallelized, but not distributed so far
- Volume rendering only on NVidia cards

SimVis – Current Status

- Unfortunately, SimVis GmbH had to go out of business in August
- Therefore, SimVis is not further distributed/sold/supported currently
- We are trying to find a solution for the future
- Nevertheless, the presented Tool shows the capabilities of such a technology

Summary and further Considerations

- Showcases are just examples, methodology is generally applicable in engineering disciplines
- IVA is new to application engineers, you have to educate potential future users
- New powerful tool for in-depth analysis in complex problems
 - Analyze multivariate behavior
 - Find out unexpected behavior
 - Explore complex spatial, temporal and attribution-based correlations
- Visualization community has to be aware of limitations of existing workflow (no full data access on client, limited hardware, complex geometries and data structures, ...)

SimVis – Contact

- <http://www.simvis.at/>
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- Thank you!