CEI Recent Developments

Darin McKinnis
Vice President, CEI Inc.

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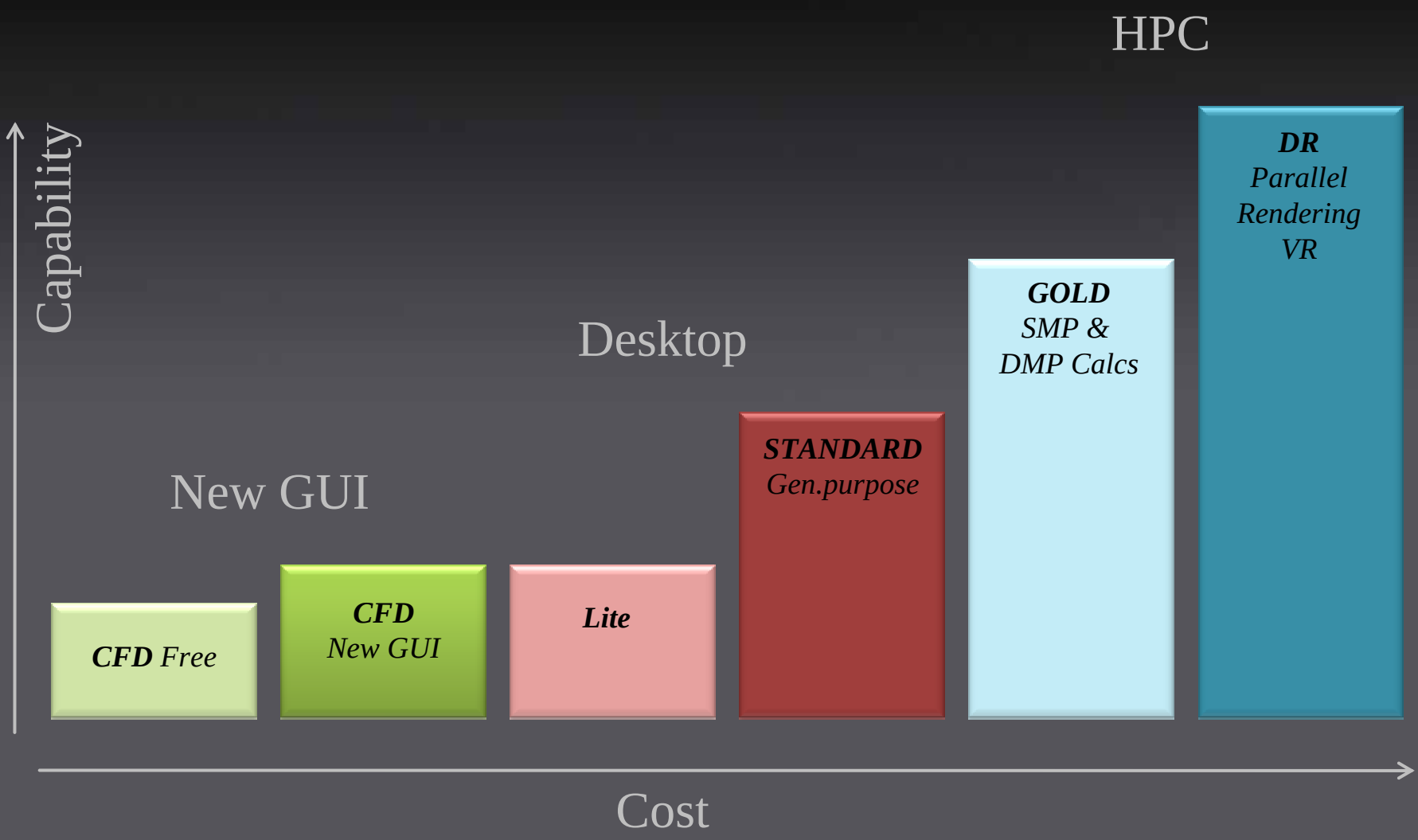
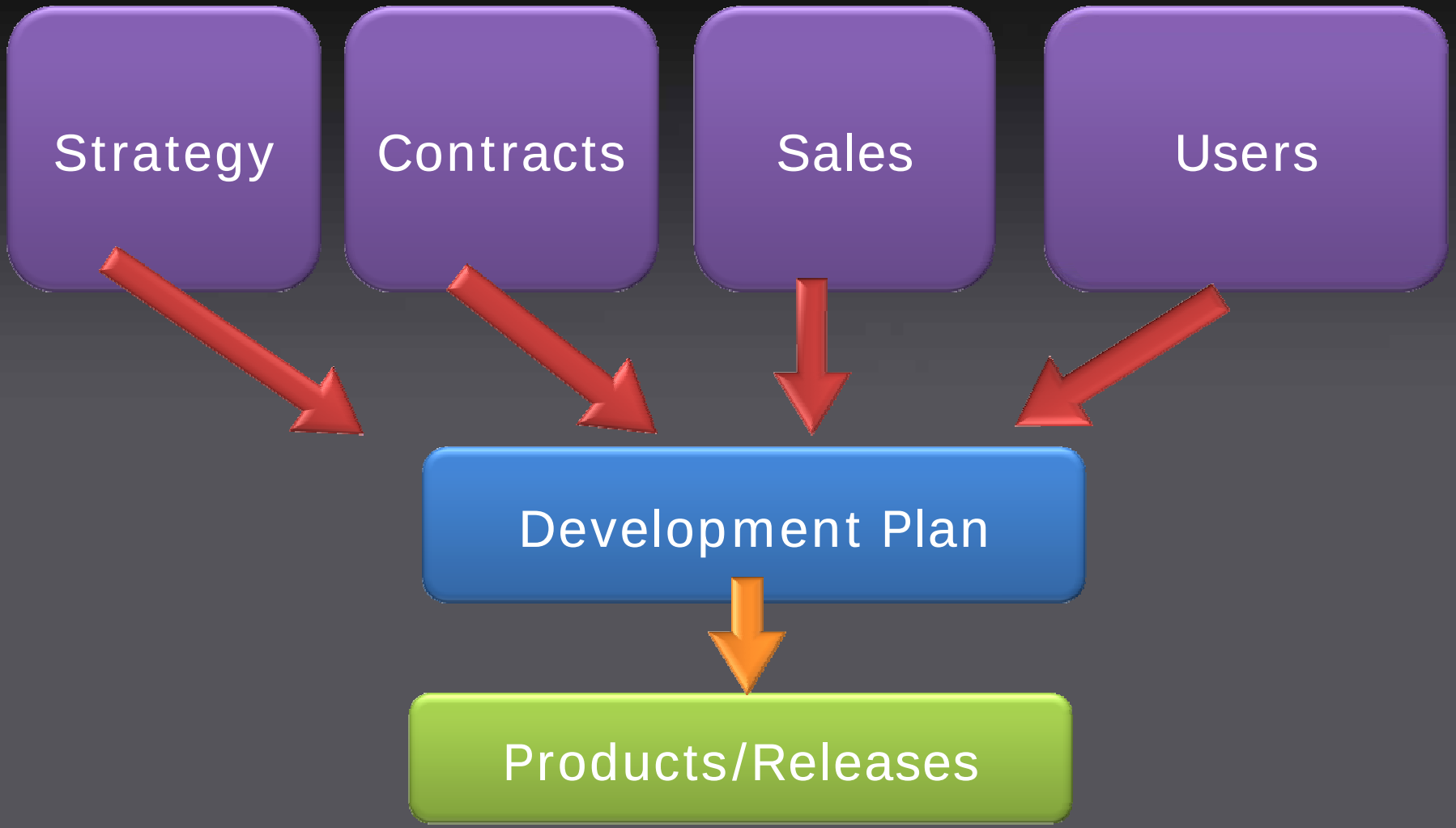
Agenda

- Introduction
- 9.1
- 9.2
- 10.0
- Python
- EnSight CFD and Alternative GUIs
- Q & A

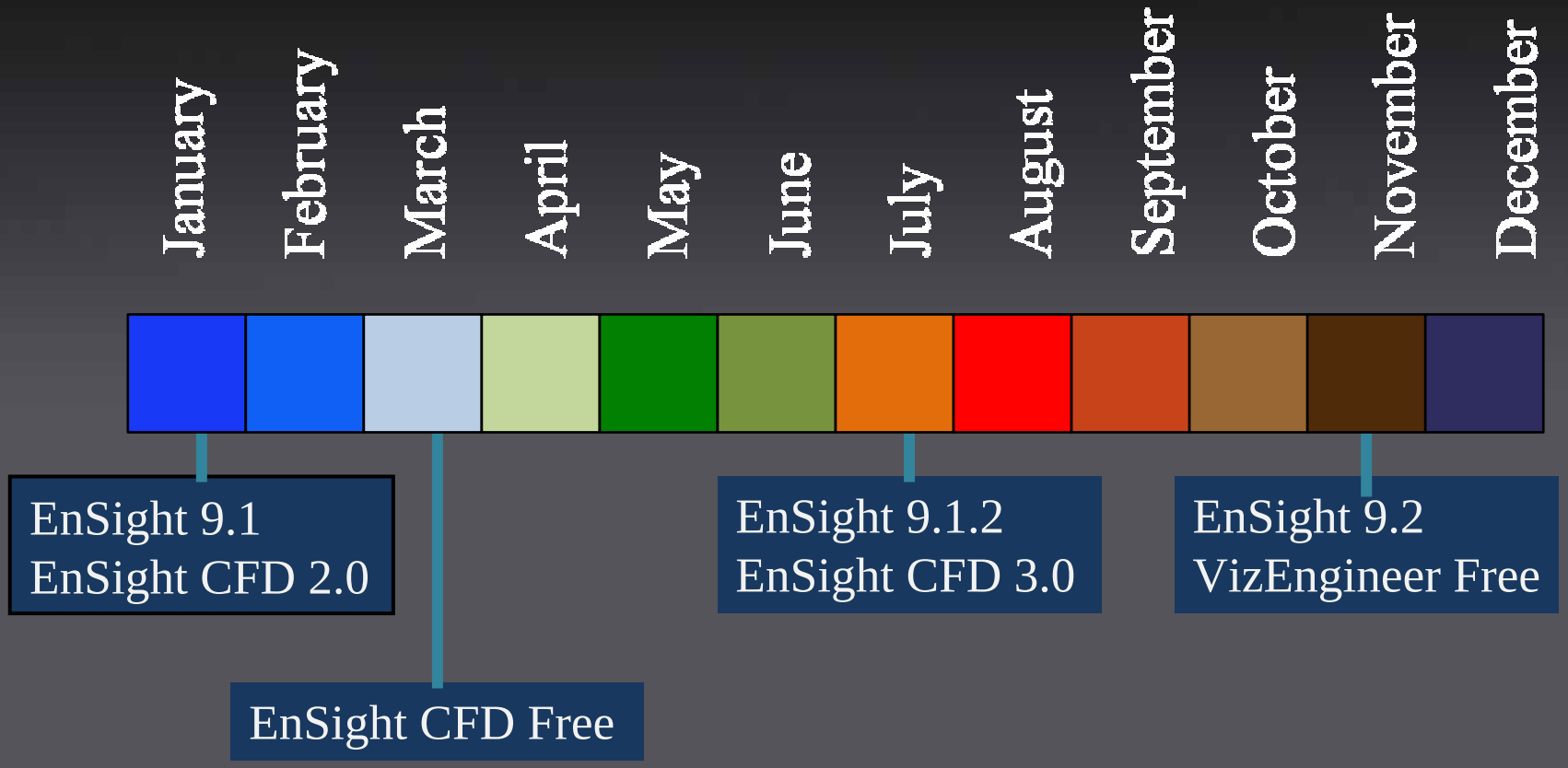
The EnSight Family



How New Releases are Defined



2010 Developments

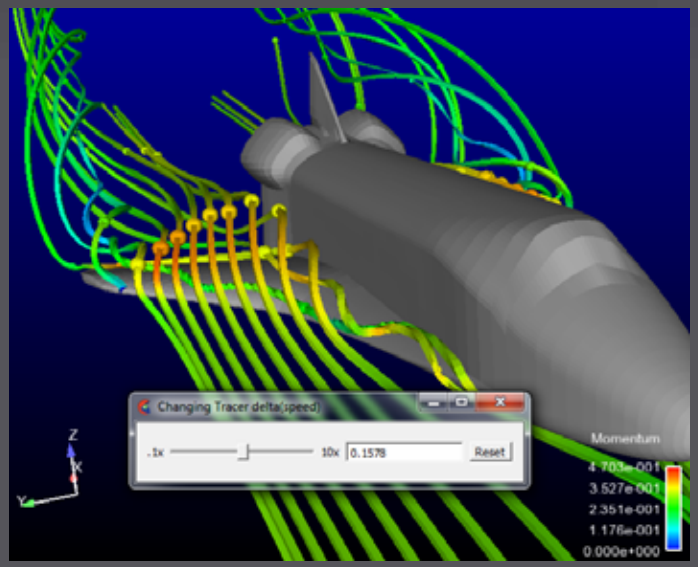


EnSight 9.1.x Highlights

- Usability
  - More right click
  - Part Highlighting
  - Views Dialog
- Performance
  - N-faced elements
  - Rigid body
- Data readers
- Capability
  - Volume Rendering
  - Continued Python Integration

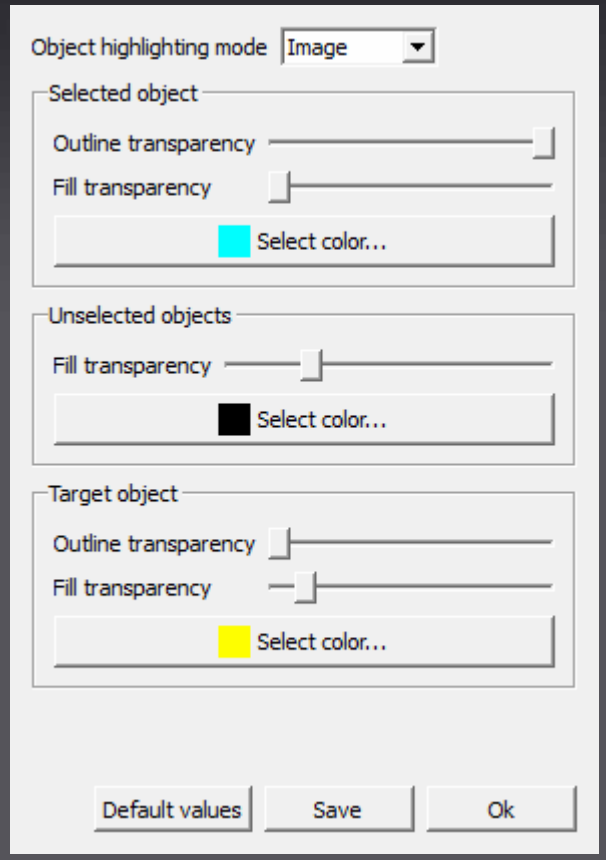
EnSight 9.1.x - Usability

- Right click
  - Continue “point and click” context sensitive modifications
  - Query markers
  - Modification of legend and plotter titles
  - Text annotation
  - Sliders
    - Transparency
    - Animated particle length and speed
    - Text annotation size



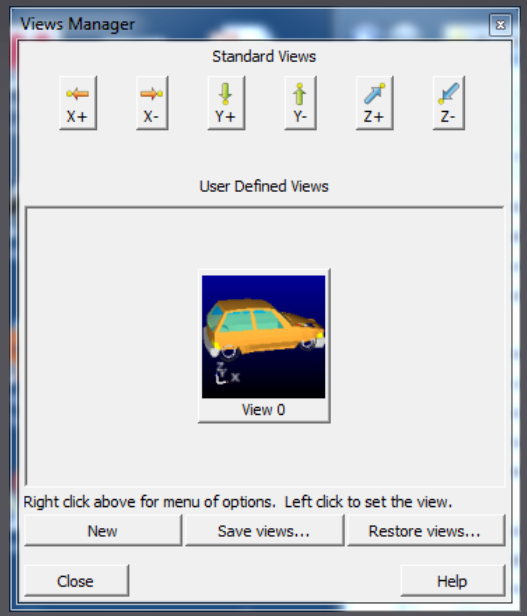
EnSight 9.1.x - Usability

- Part Highlighting
  - Now performed via a “shader”, i.e., all in hardware with no redraw necessary
    - Updates very fast
  - But only if hardware available
    - Old graphics cards
    - Using Software rendering
    - Remote display
  - User controllable
    - On/Off
    - Selected part outline and color
    - Unselected part color
    - Target part outline and color

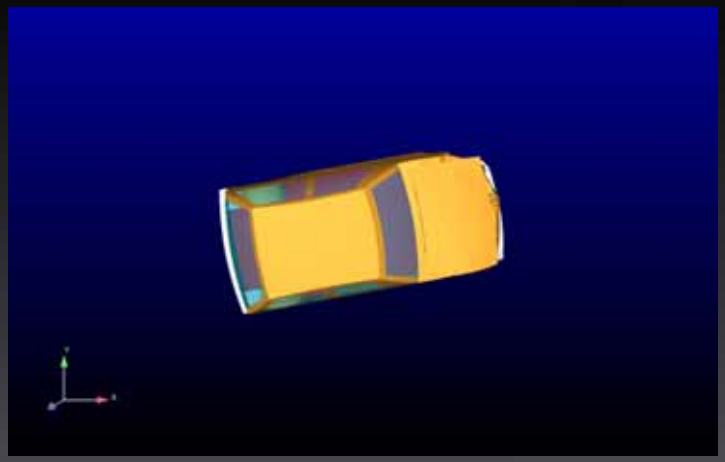


EnSight 9.1.x - Usability

- Views
  - Restored views can be “normalized”, i.e., a view saved from one geometry can be applied to a completely different geometry with good results
  - A saved view from a single viewport can be applied to a viewport in a multi-viewport scene



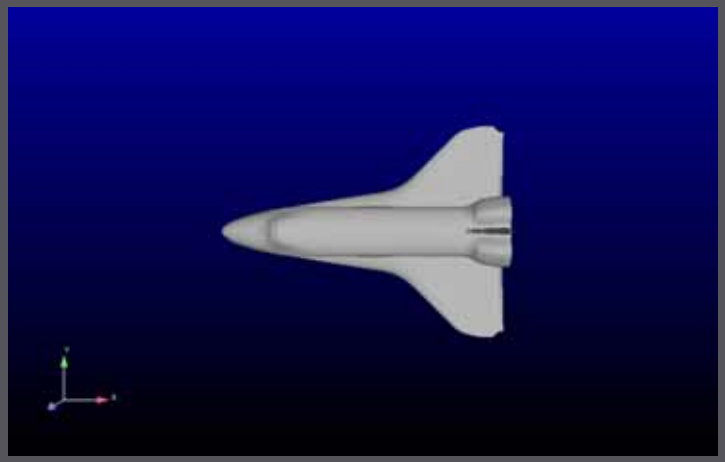
EnSight 9.1.x - Usability

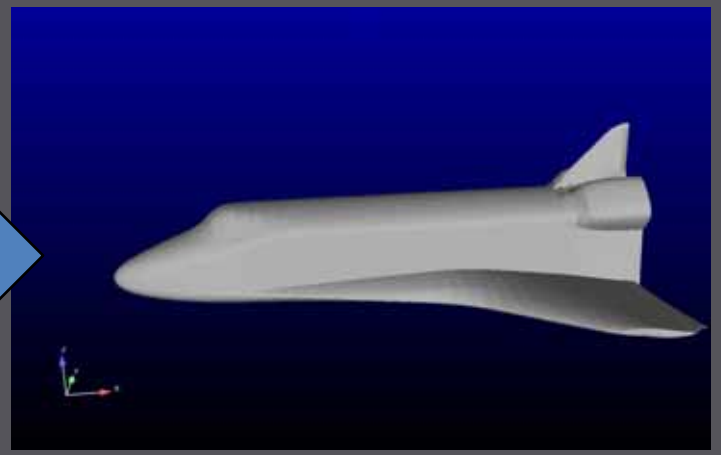


Original Views

Take this view and apply

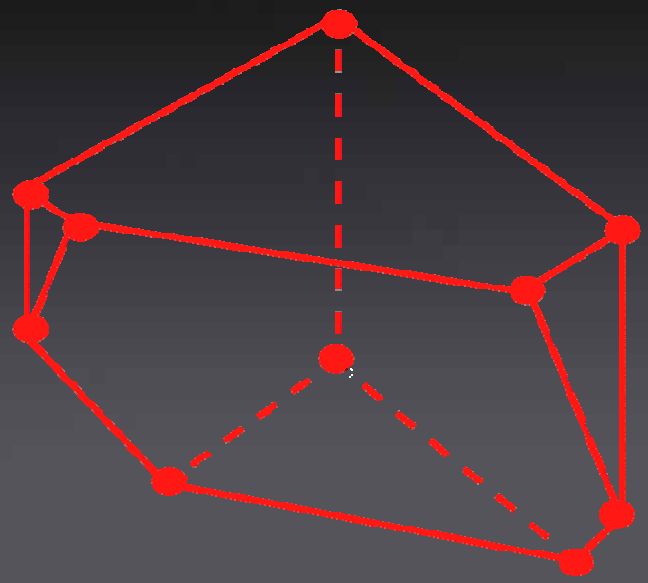
New Views





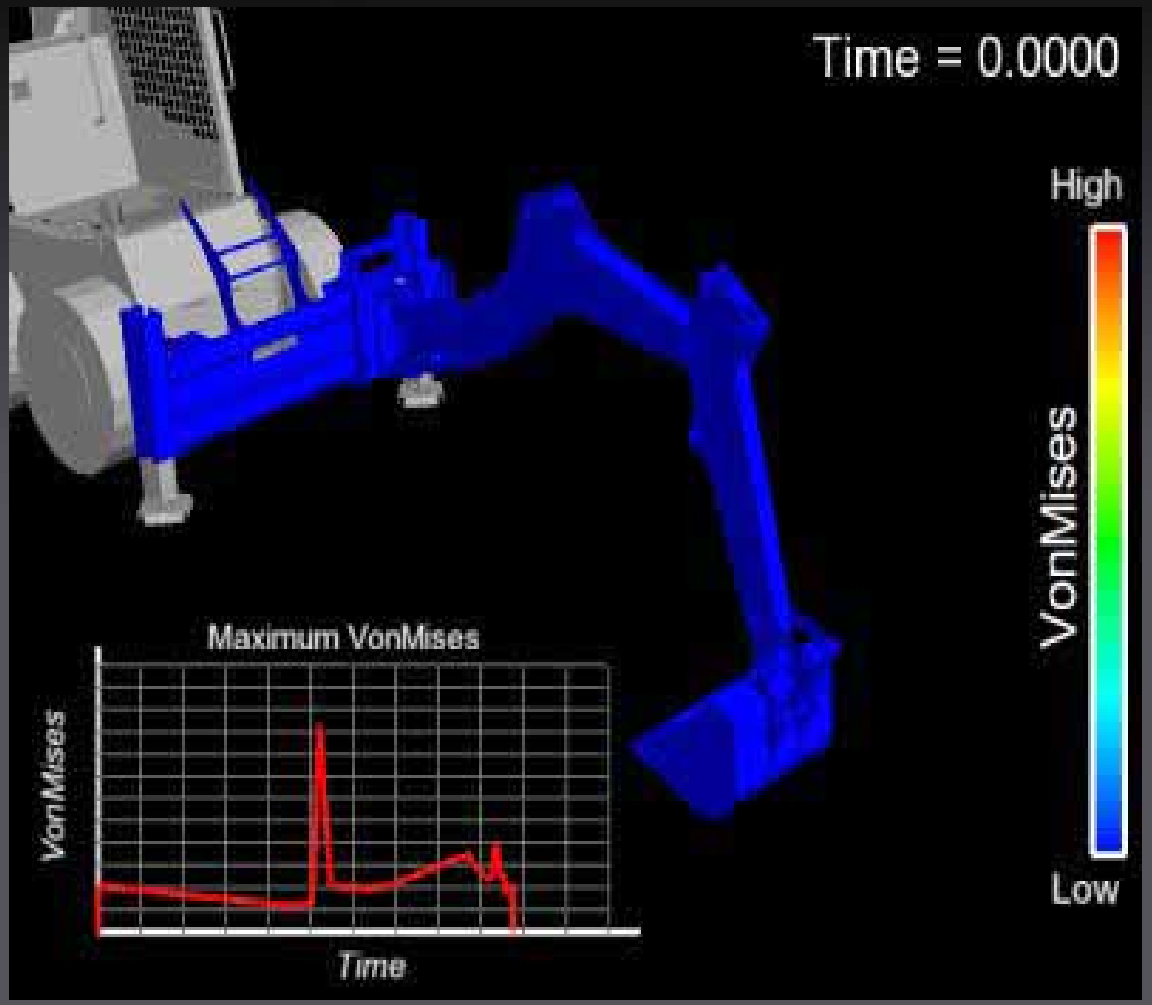
EnSight 9.1.x - Performance

- N-Faced Elements
  - 30 to 40% less memory usage compared to 9.0



EnSight 9.1.x - Performance

- Rigid Body
  - Frame rate and memory
    - Frame rate (Streaming)
      - 9.0: 3.1/sec
      - 9.1 of 38/sec
    - Flipbook load:
      - 9.0: 22GB
      - 9.1: 507 MB



EnSight 9.1.x – CFD Data

- CFD Data Readers
  - Fluent
    - N-faced support
    - Units
    - Multiple DAT files
    - IcePak and AirPak direct reader
  - Improved Flow3D
  - Improved Converge
  - New Polyflow
  - AcuSolve now part of distribution

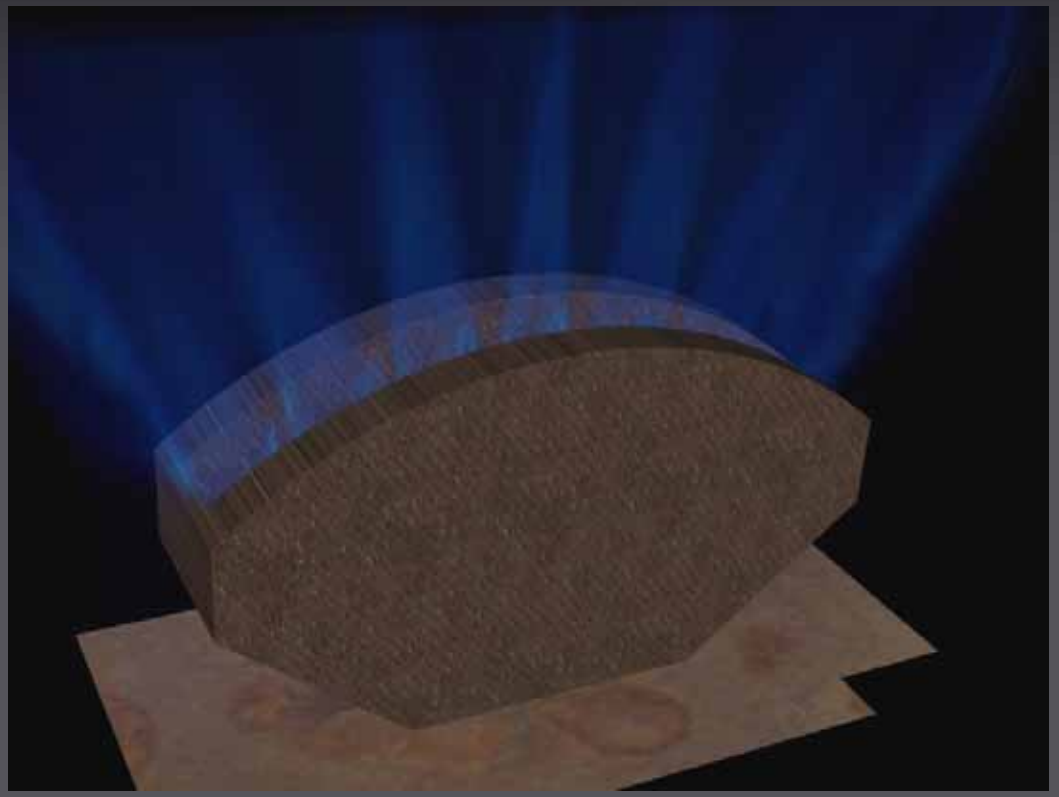
EnSight 9.1.x – FEA Data

- FEA Data Readers
  - New MSC Marc
  - Better MSC Dytran performance
  - ABAQUS performance
  - New SDRC

EnSight 9.1.x - Capability

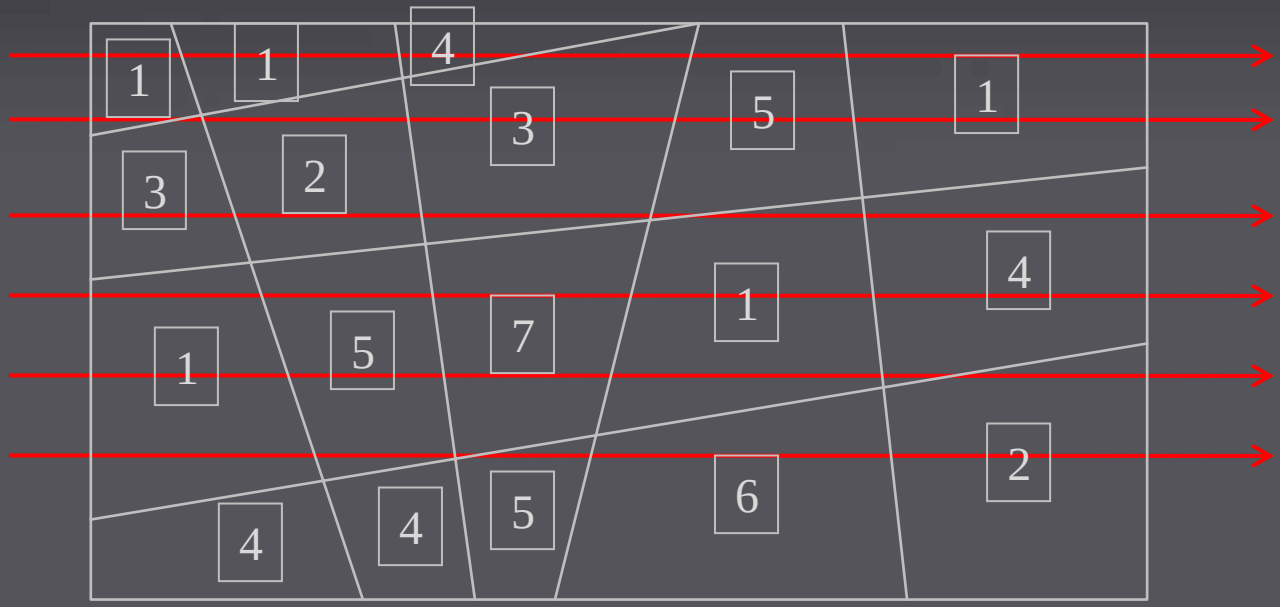
- Volume Rendering
  - Volume Rendering Explained….

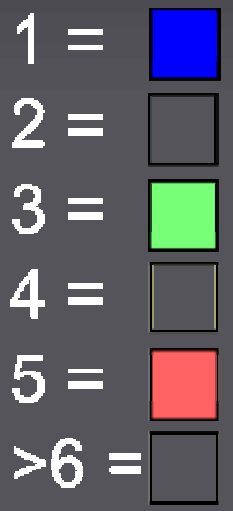
This is not a volume rendered image. But the effect is the same. Ten clip planes were created. Each clip was colored by a variable and each plane was assigned a transparency value – more opaque in the center.



EnSight 9.1.x - Capability

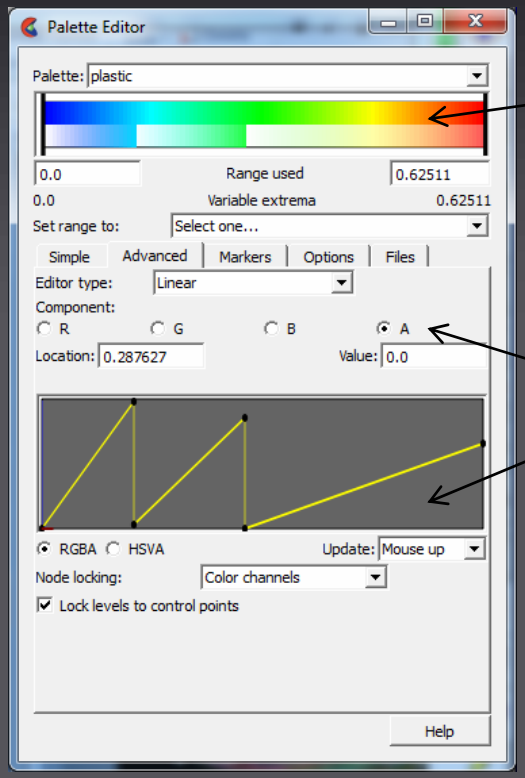
- Volume Rendering
  - Volume Rendering explained...
    - Cast rays through each pixel along line of sight
    - Integrate the opacity and color information along the ray
    - User sets different opacity for different values for the variable palette





EnSight 9.1.x - Capability

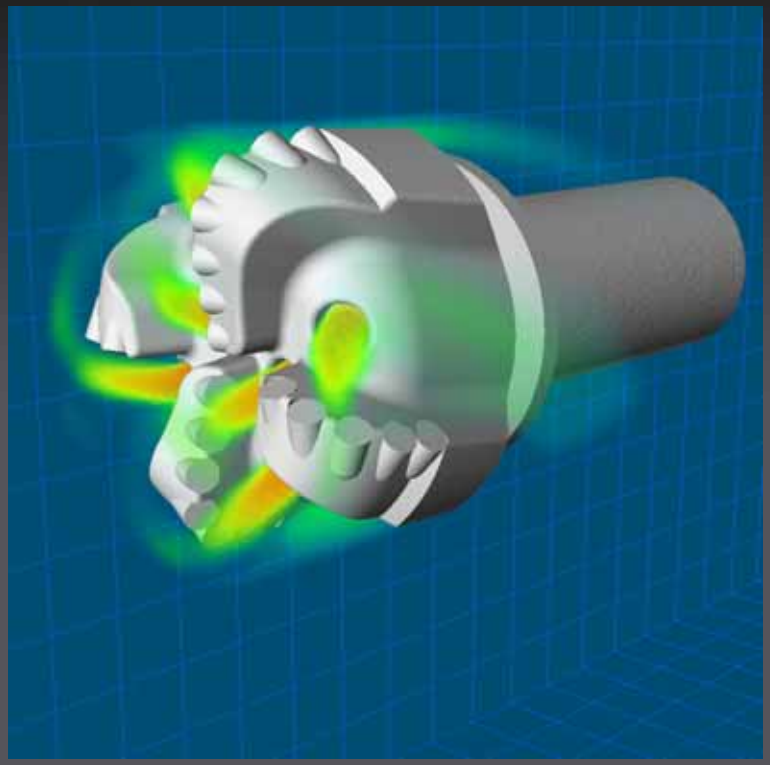
- Volume Rendering
  - New Color palette editor

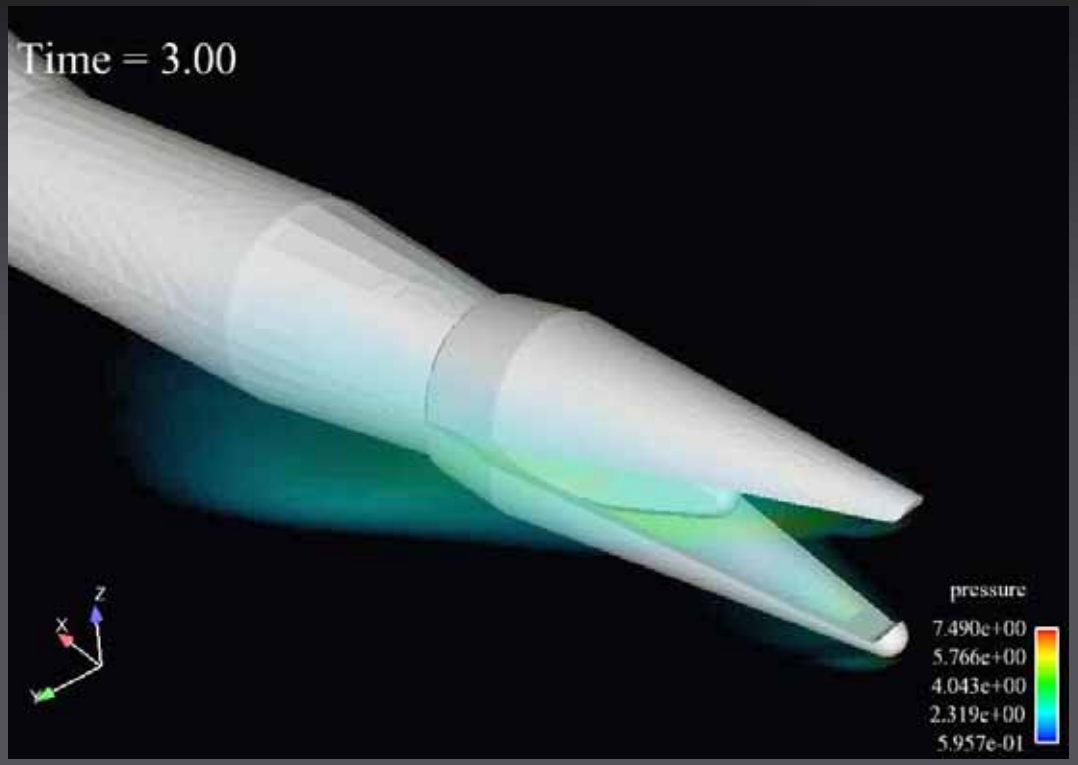


Color palette w. and wo. alpha

Manipulate color or Alpha

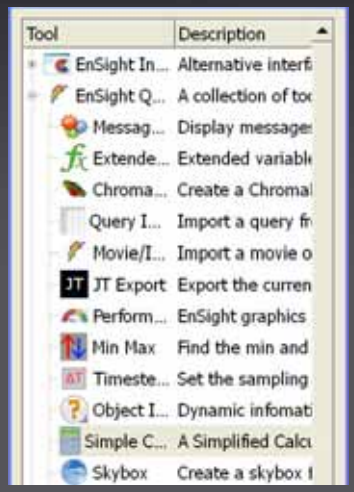
EnSight 9.1.x - Capability





EnSight 9.1.x - Capability

- Python API Enhancements
  - Command interface since 8.2 – 100% coverage
  - Object Interface introduced in 9.1 - ~50% coverage
    - Basis for EnSight CFD



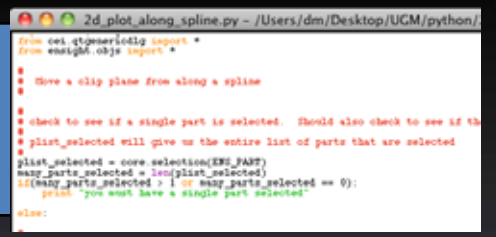
  - User Defined Tools
    - Add to the interface or play as command file
    - Use ours or write/add your own
  - Right Mouse Button events
    - Use ours or write/add your own
  - New User Interfaces
    - Use ours or write/add your own

<u>To enhance, extend, and customize the capabilities</u>

EnSight 9.1.x – Capability Python

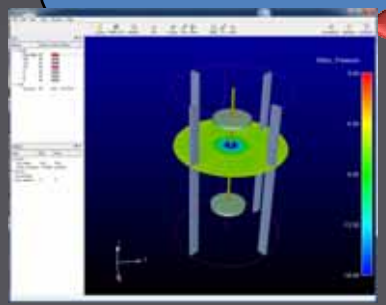
Commands
.cmd > .py

Scripts

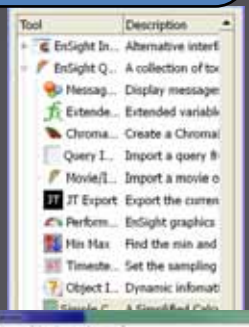


EnSight

GUIs



Tools



Key
Macros

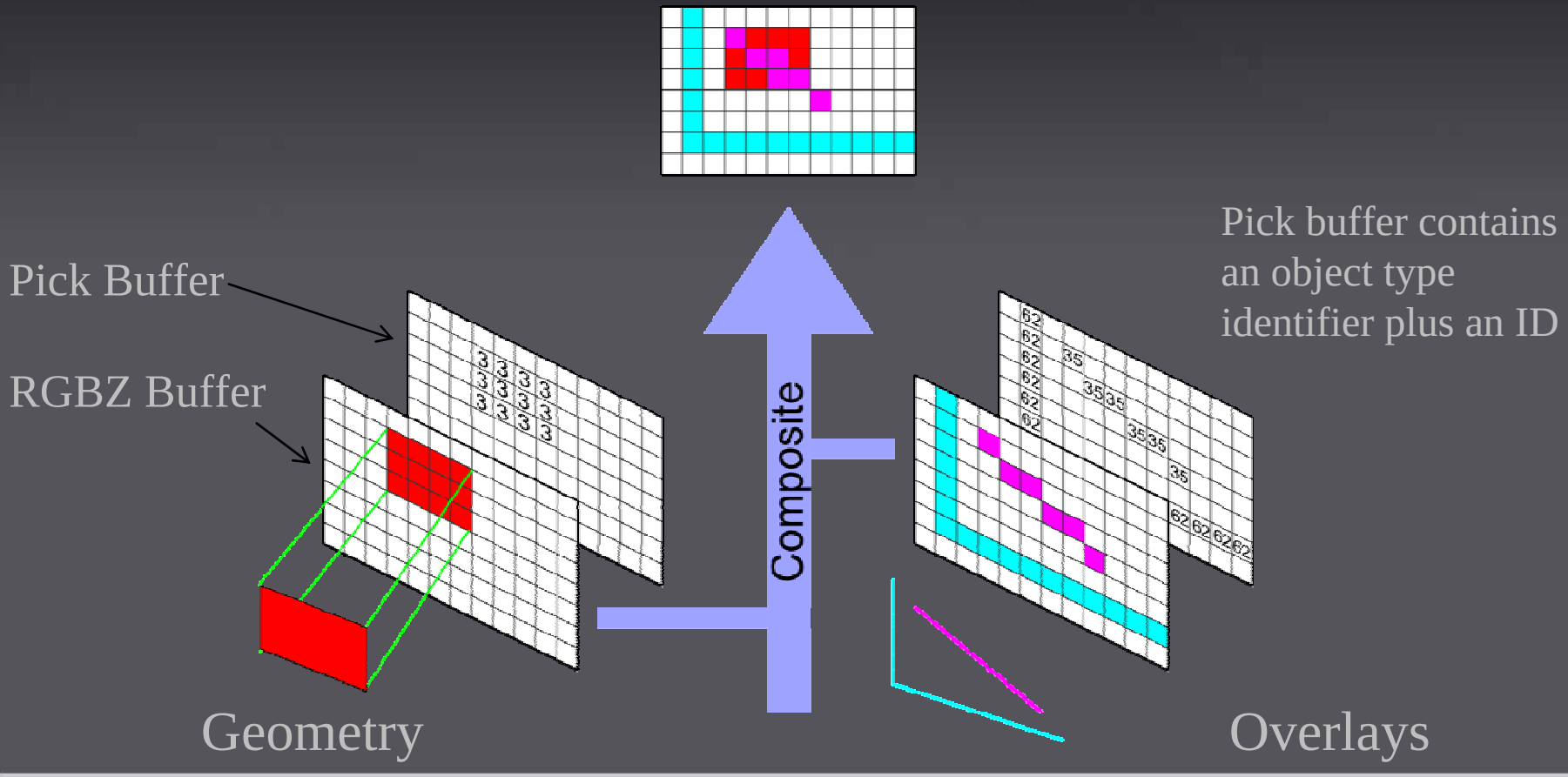
Right
Mouse
Menus

What's New in 9.1 - Summary

- Part Highlighting
- More Interactive Click-n-go
- Volume Rendering
- Faster Rigid-Body
- Data Readers
- Views Dialog
- Python Object API
- Less Memory Polyhedrals

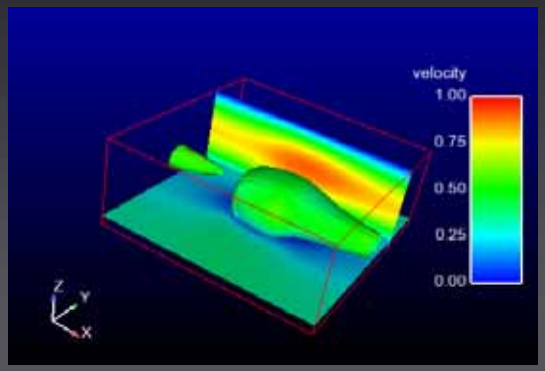
What's New in 9.2?

- Compositing of geometry with annotations
  - Can manipulate annotations, legends, and plots at high frame rates independent of EnSight mode – redraw annotation plane then composite with geometry buffer

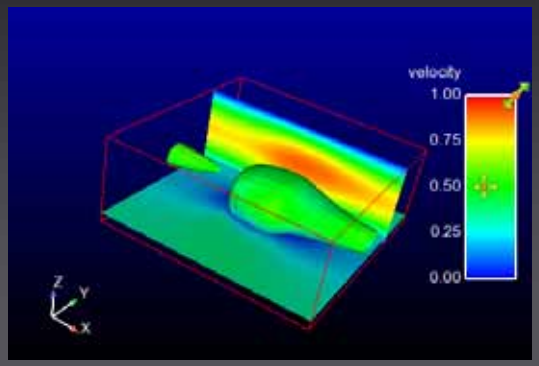


What's New in 9.2?

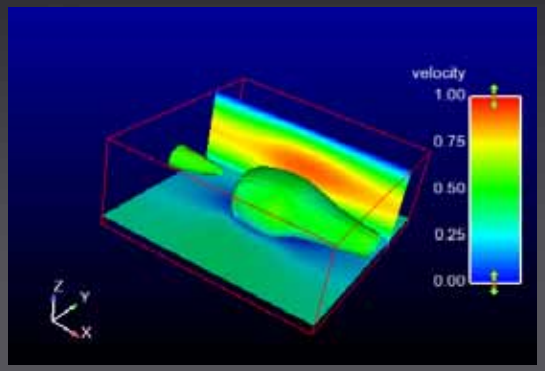
- Touch-n-go
  - Click-n-go requires user to know the object can be clicked
  - And sometimes can be clicked twice!



Click on legend



Can now click on handle again

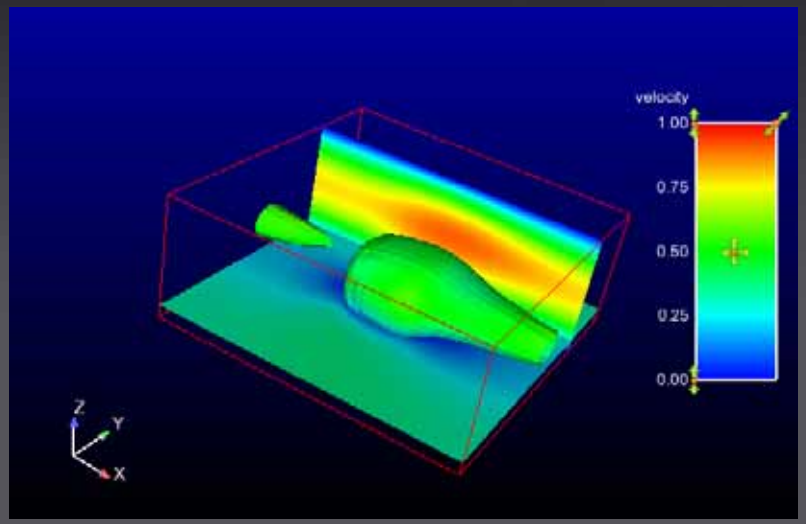


To get palette min/max handles

- Handle display required a redraw of the scene
- Manipulation of the handles required a redraw of the scene

What's New in 9.2?

- Touch-n-go enhancements to Click-n-go
  - Touch-n-go - simply move the mouse on top of objects
    - Handles (all of them) will appear



Move mouse to object – handles appear

- Handle display required **no** redraw of scene (just a overlay redraw + composite)
- Manipulation of the handles required **no** redraw of scene
- Parts do not have touch-n-go handles – still need click-n-go
- Preferences exist to turn on/off touch-n-go for various object types

What's New in 9.2?

- Client-Server Launcher
  - Easy
  - Faster
  - No memorization
  - Random ports
  - Switch from Standalone
  - Future?
    - SOS? DR?
    - PowerWalls?

What's New in 9.2?

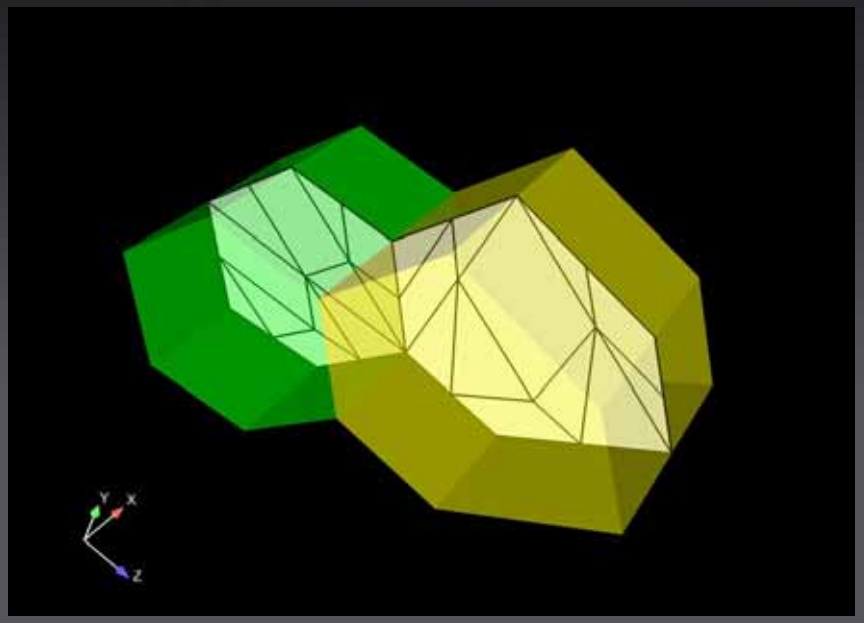
Survey:

How do you use EnSight?

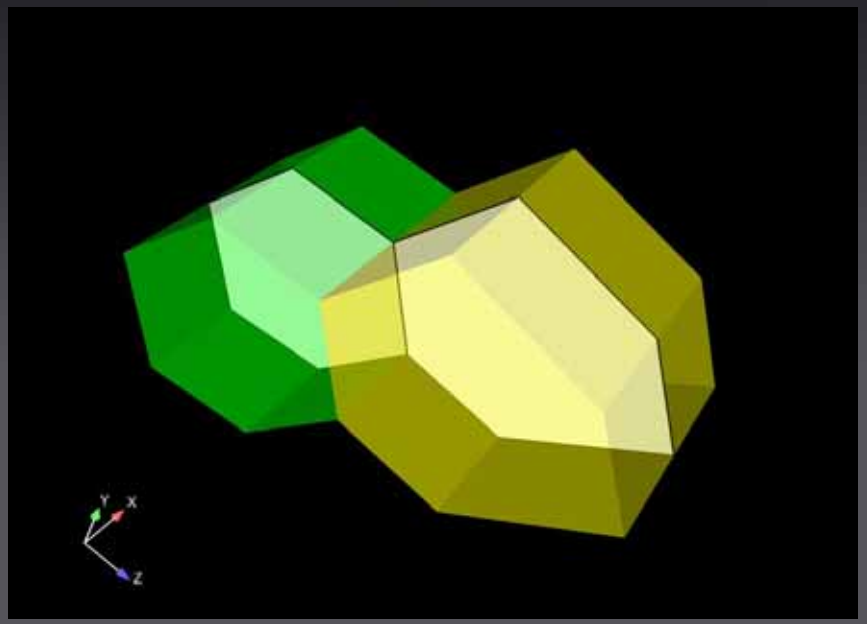
1. Standalone (my data is on my PC)
2. Client – server (EnSight client – EnSight Server)
3. Export Display (X11 server, Hummingbird, VNC, etc)
4. SOS, Client – Server of Servers (SOS)

What's New in 9.2?

- Clips of n-faced elements



9.1



9.2

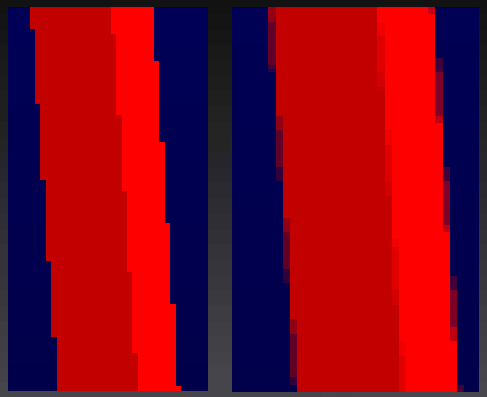
What's New in 9.2?

- Launching in HPC environments
  - Users shouldn't have to set `$CEI_HOME` or modify their `$PATH` environment variables
  - Better support for running EnSight components in network environments
  - Better support for batch queuing systems
  - Site customized launch configuration, ssh, port forwarding, etc.

  - Don't bother most users
  - Make significantly better for users that need it

What's New in 9.2?

- Anti-aliasing filters
  - Many new features prevented multi-sampled visuals
    - "jaggies" are back in 9.0-9.1
  - 9.2 adds multi-sampled visuals via "shaders"
    - done in the graphics hardware
    - smooth out the images during interactive
  - Does not effect batch rendering or saving images
    - these are already anti-aliased
- Variables for vortex identification
  - Gamma 1 and 2 scalars on clip planes
  - PSA



9.0-9.1 9.2

What's New in 9.2?

- OpenFOAM Reader
  - Serial
  - Parallel jobs using reconstruct
  - Currently in testing
  - Test files gladly accepted

What's New in 9.2? Reminder

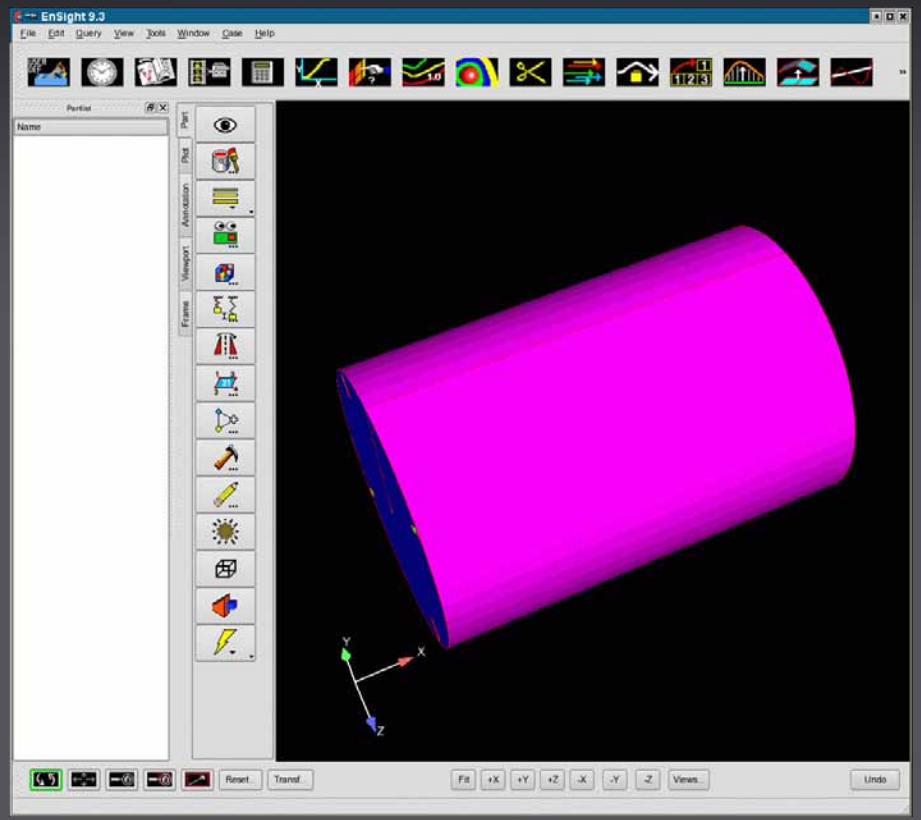
- More Interactive Touch-n-go
- More Interactive Click-n-go
- Faster Rendering
- No Jaggies
- Client-Server Launch
- HPC Launch
- OpenFOAM Reader
- Vortex Variable
- Polyhedral Cell Clip Planes

EnSight 10, 10+

- Modern look and feel
  - Consolidation of Win, Mac, and Linux
  - Use of Drag and Drop
  - Native File Open dialog (when running stand-alone)
- Continued expansion of Direct Interaction
  - Right click on objects in graphics window
  - Right click on GUI items
- Consolidation of QIA with FDE
- Elimination of “Enter” confusion in GUI fields
- User Defined Tools as a first class feature

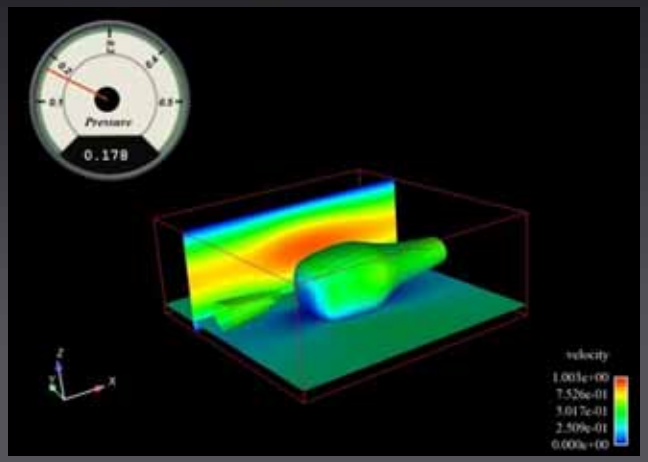
EnSight 10, 10+

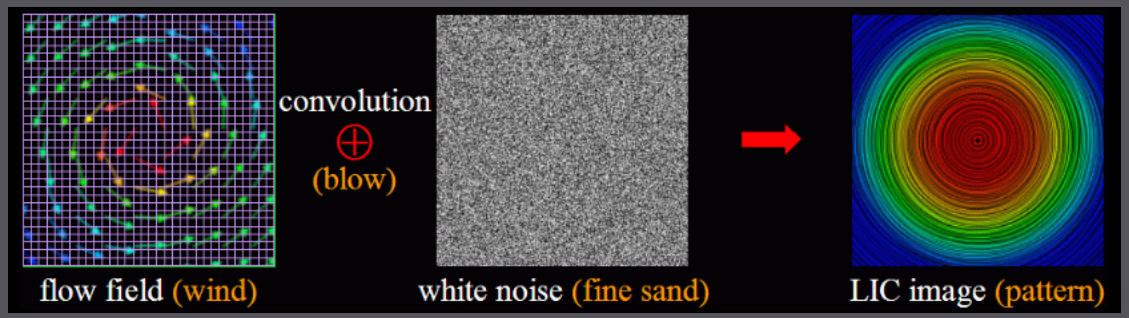
- Dock, resize, and move GUI panels
- Part list from EnSight CFD with additional enhancements
  - Sorting
  - Hierarchical views
- Existing users will find experience very familiar
  - Require zero training
- Fully compatible with existing command language and python scripts
- Top Icon list will include user defined tools



EnSight 10

- April 2011 Target Date!
- With not-yet-determined feature enhancements
  - Report Generation
  - Plotting Enhancements
  - Volume Rendering options
  - N-faced element memory and performance
  - Instruments
  - Units
  - Selection by arbitrary polygon
  - LIC (Line Integral Convolution)

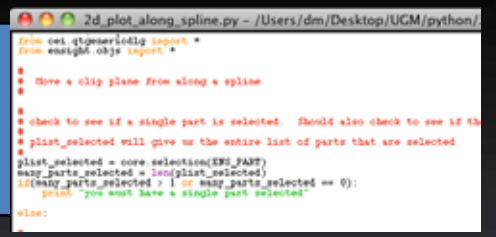




EnSight 9.1.x – Capability Python

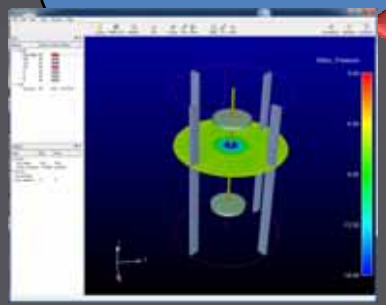
Commands
.cmd > .py

Scripts

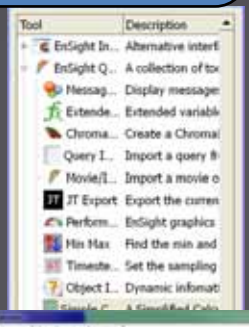


EnSight

GUIs



Tools



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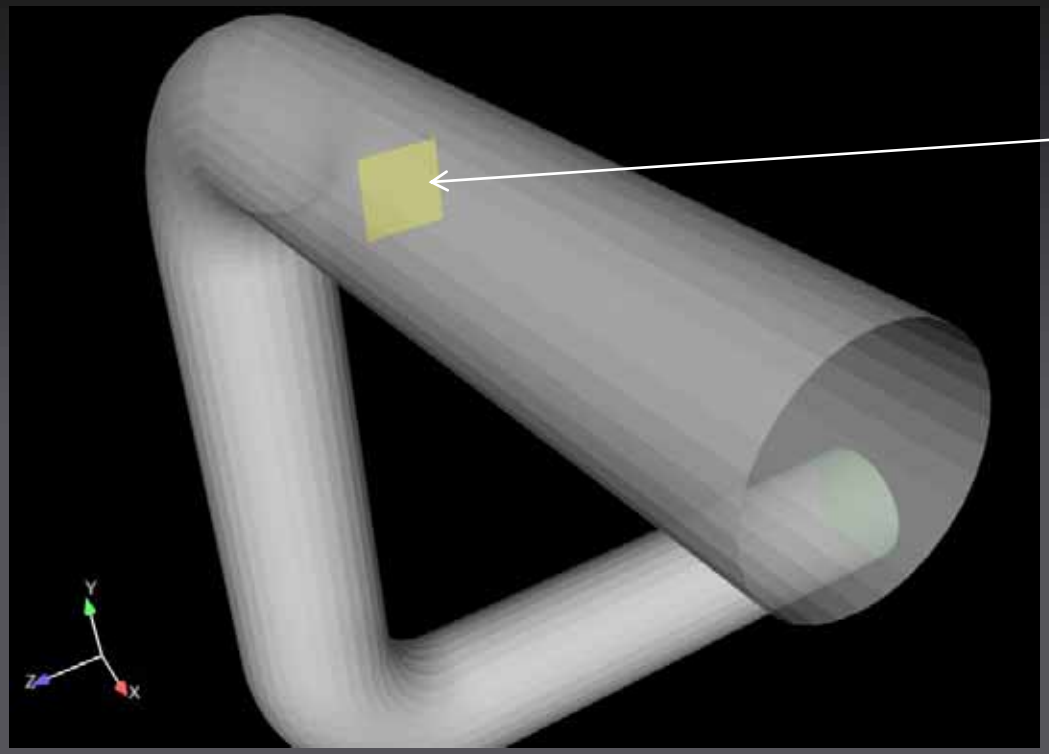
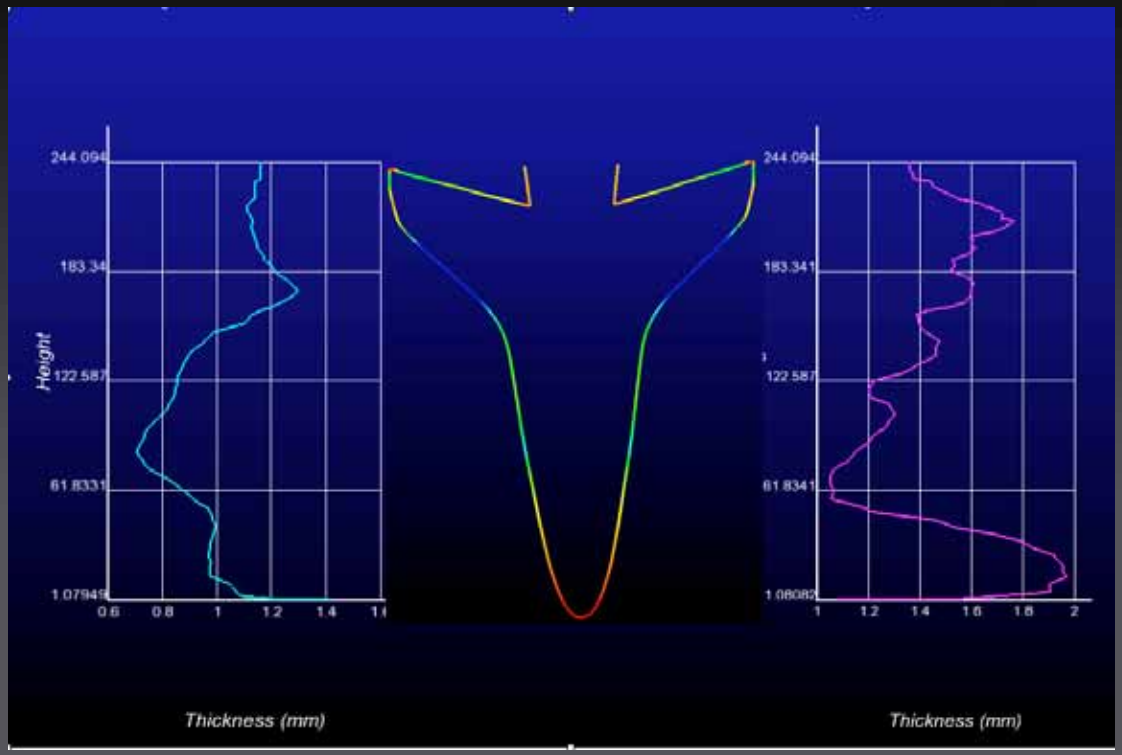
Python Example – Sensor Location



Good location for a sensor???

Python Example – Bottle Thickness



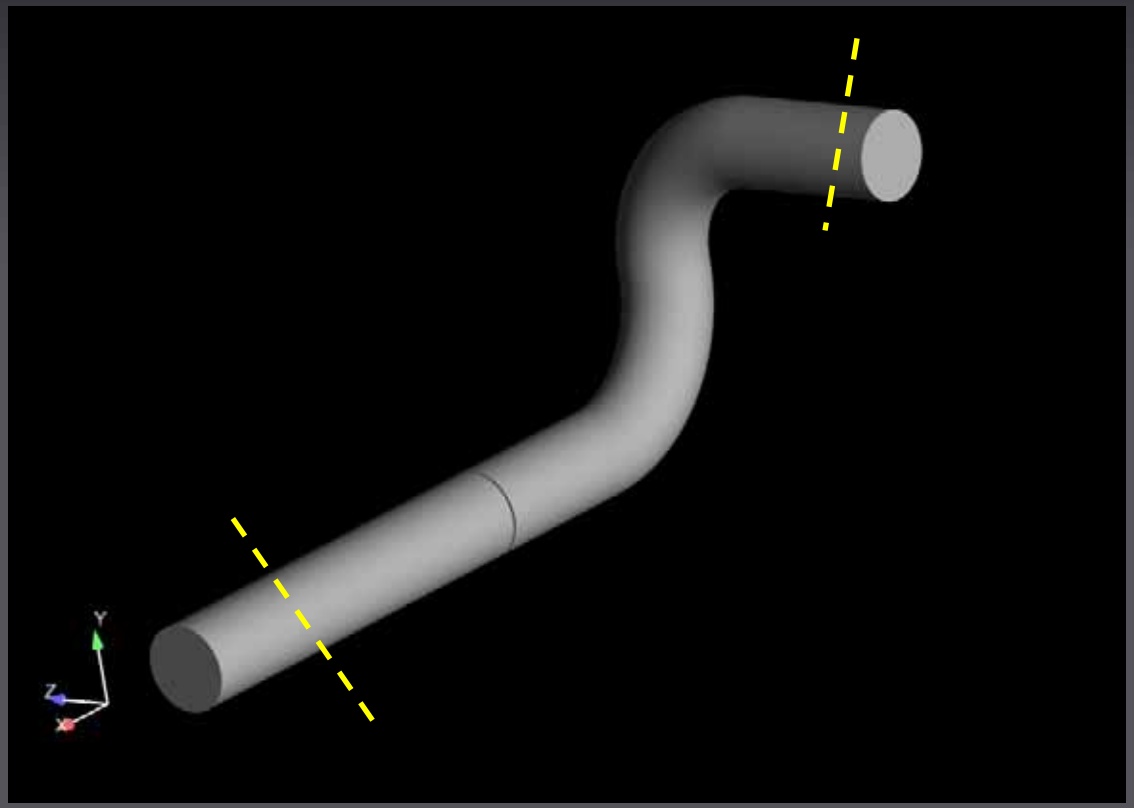
Given a cross section of a bottle (replaced in this image with a dummy geometry to protect the customer data). Want to query/plot the bottle thickness at a cross section.

Want the plots to match up vertically with the bottle

And do it for any size and shaped bottle

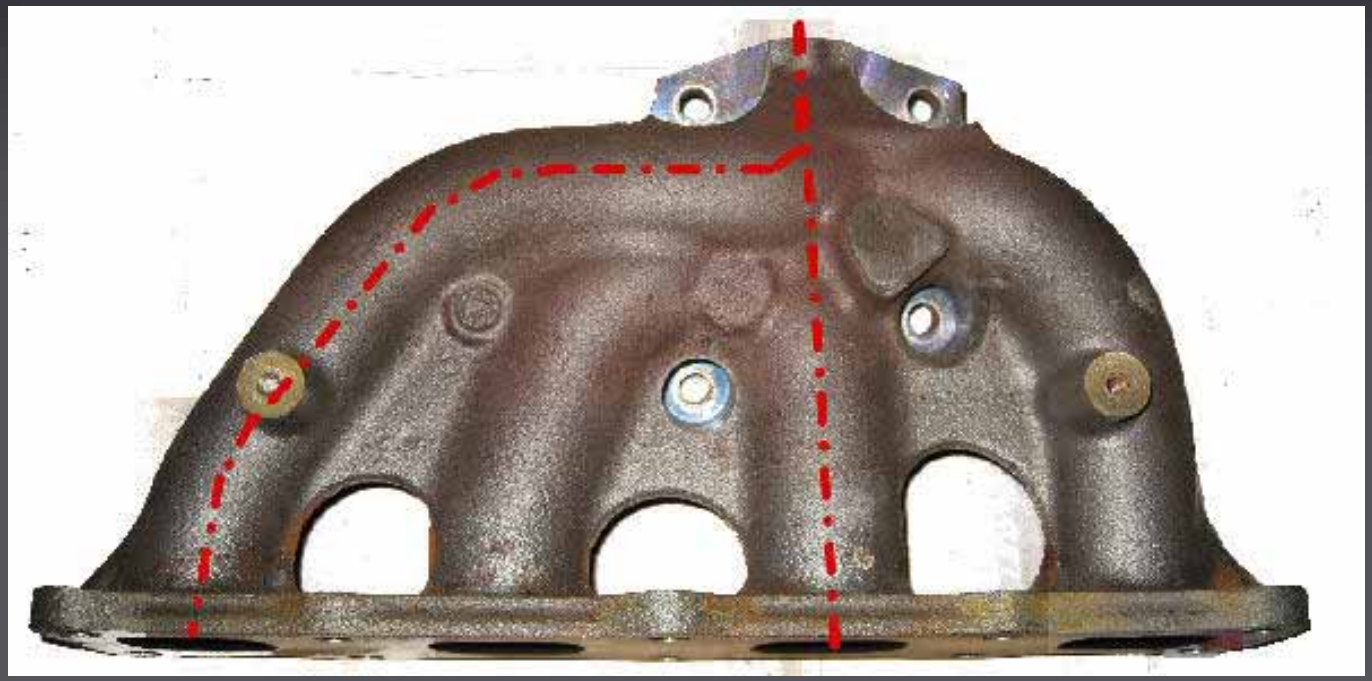
From batch

Python Example – Median Clips



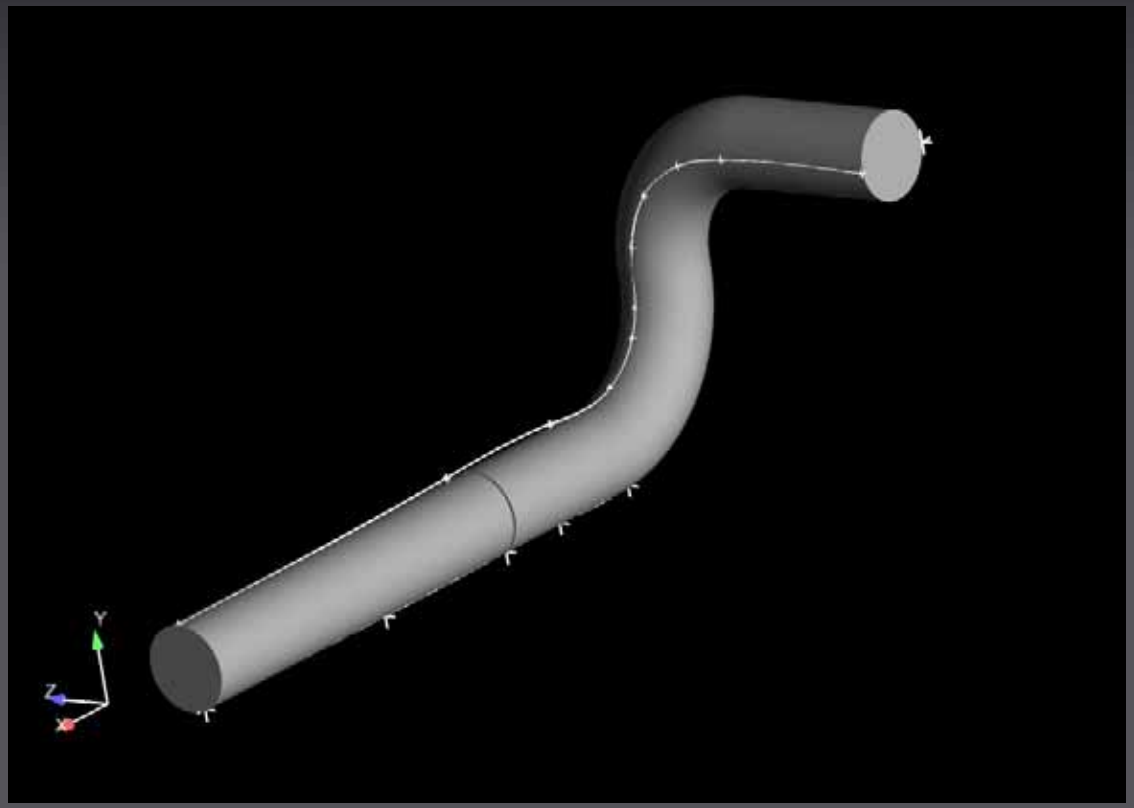
Cross sections are easy

Python Example – Median Clips



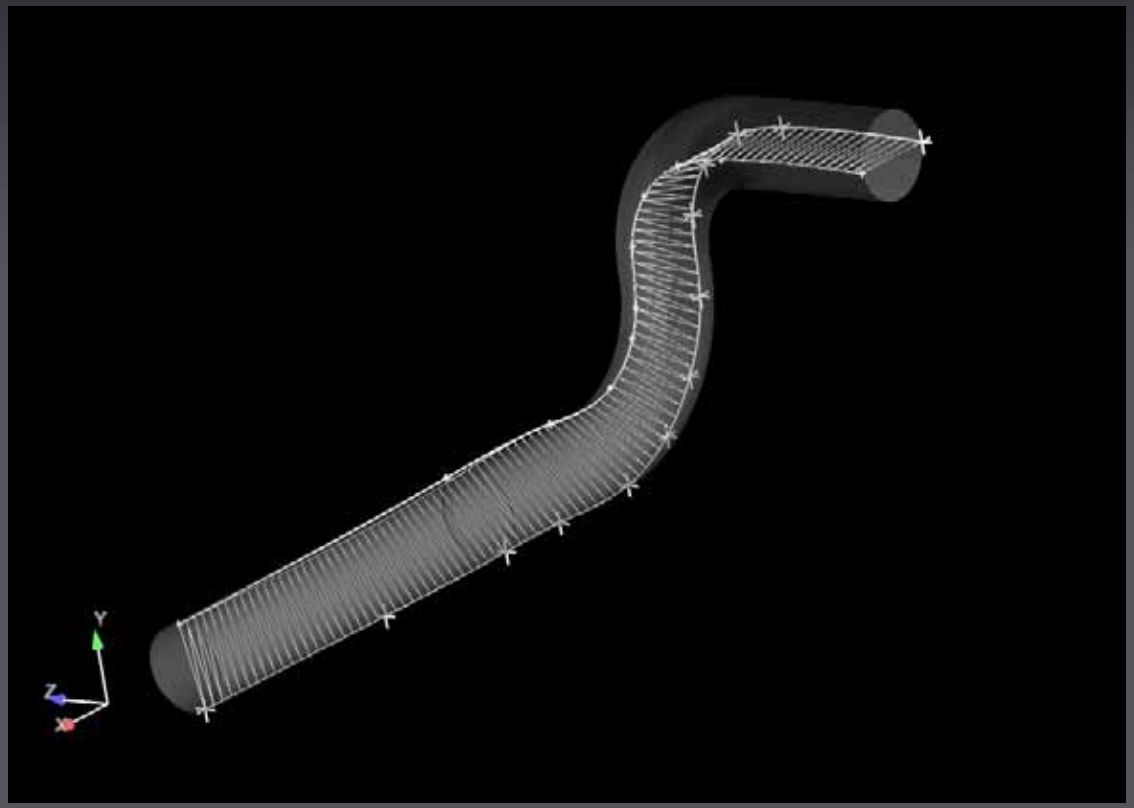
What if want a median slice?

Python Example – Median Clips



Draw a spline on top and bottom

Python Example – Median Clips

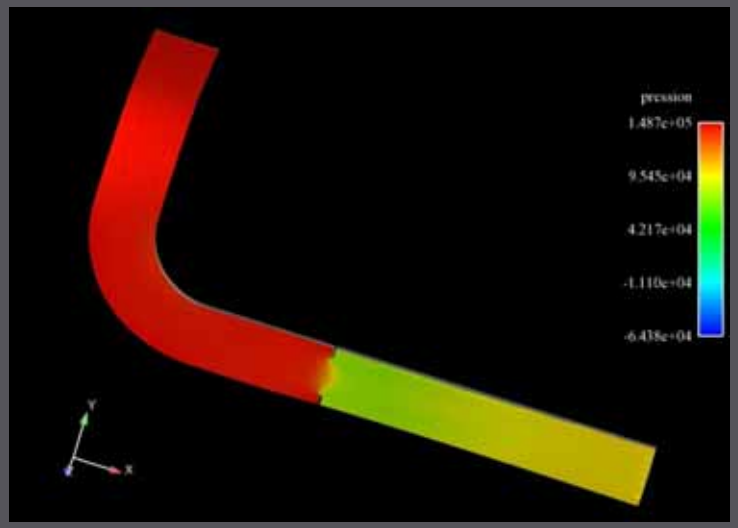


Python: interpolate the splines – create a point part.

Change it's representation to a triangle mesh.

Create a Dist2PartElem scalar field

Python Example – Median Clips



Cut and discard half of the pipe.

Or view median clip.

Can wrap all this up in a python script and possibly add it as a **user defined tool**.

Python

- Fascinating… but I'm an Engineer/Scientist….
  - Most users will not be creating python scripts
  - So who will?
    - CEI
    - Some Distributors
    - 3rd parties
    - And sometimes the support staff at user sites
  - How will they become available to me?

Python

Coming soon, i.e., not yet implemented

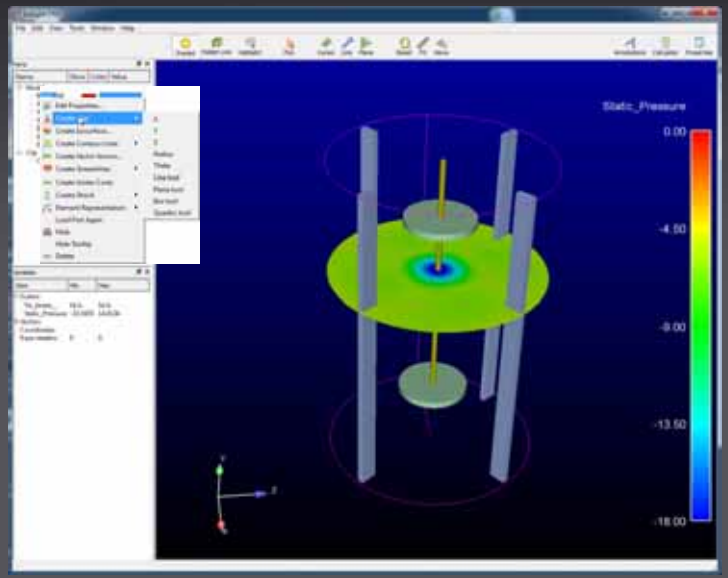
Python Exchange

Upload and Download Service

Production	Rough	Fragments	For Fee
•Polished •Documented •GUI •Could plug in as User Def Tool •Error Checking •…	"works for me"	Code fragments	Customer and 3rd party use Category not initially implemented

EnSight CFD

- Purpose?
  - Desktop tool
  - Most of the capabilities you need most of the time
  - Entry level product
  - Emerging markets
  - Simpler because:
    - It targets a specific audience
    - More direct interaction
    - Fewer options thus less interface
  - No training and little documentation

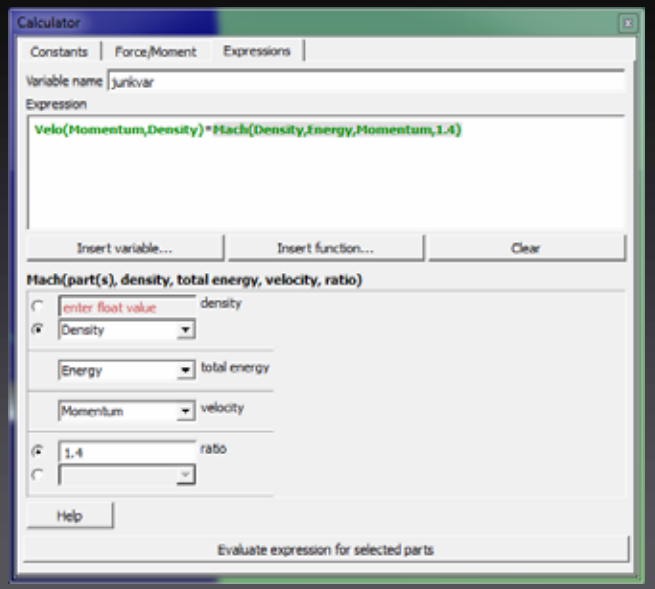


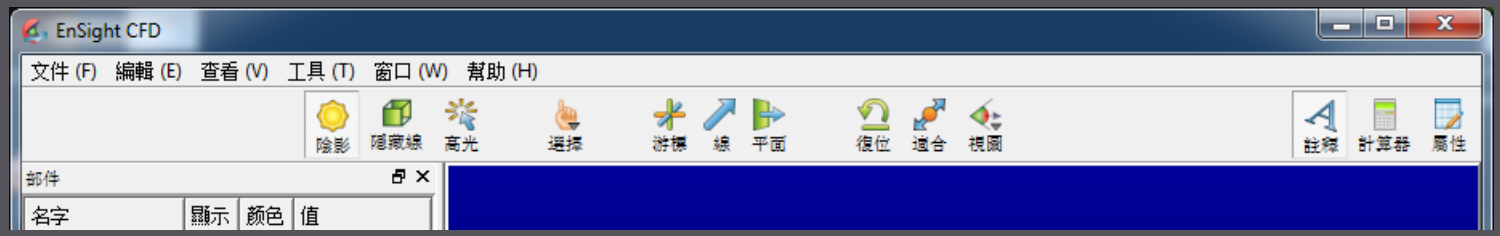
  - Also a “sandbox” for CEI for new and innovative user interface designs

  - ~800 downloads of EnSight CFD since March 2010

EnSight CFD

- Version 2 and 3
  - Full Feature calculator
    - Multi-token
    - Wizard layout
  - Structured part loader
  - Units
    - Depending on reader
  - Multi-language support



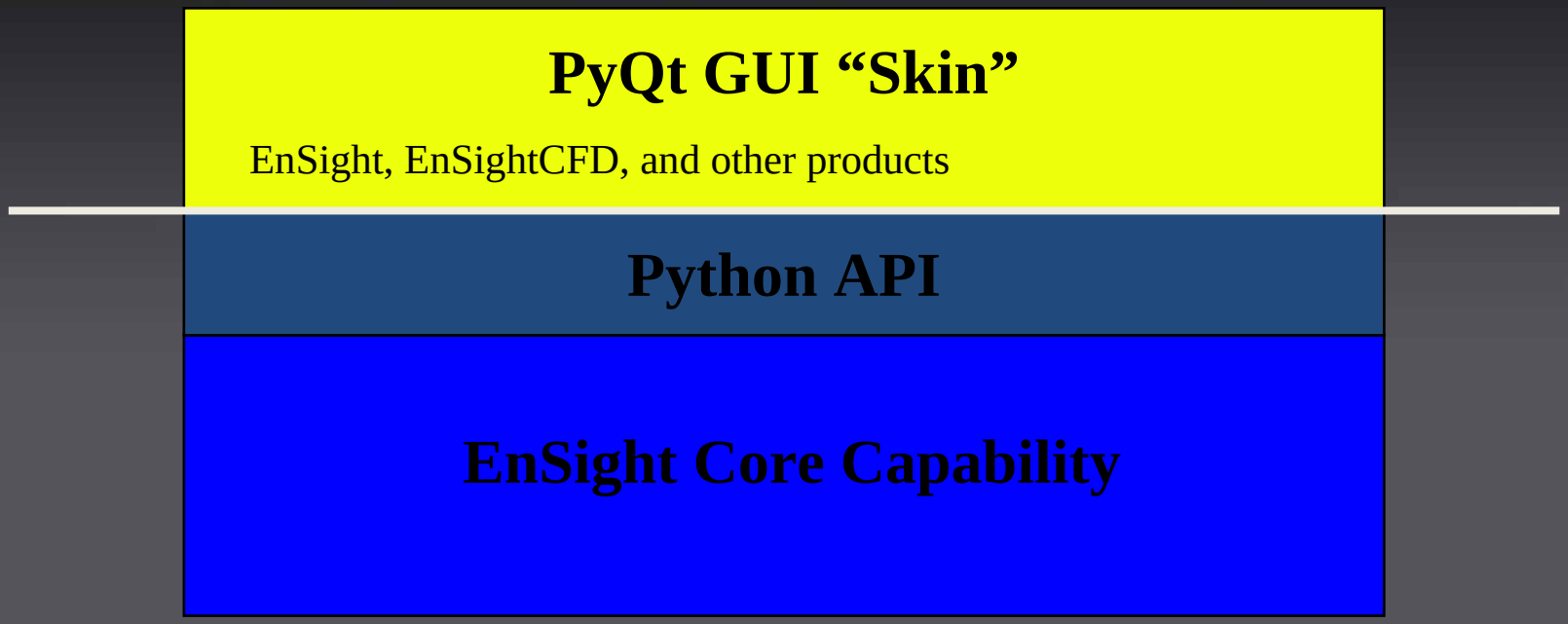


  - All Right click and click-n-go from EnSight
  - Native Apple support

EnSight CFD

- Free version
  - Limited data readers
  - Limited problem size
  - Watermark
  - Fewer fonts and animation output options (eliminated royalty components)
  - Full Featured

Emerging Architecture



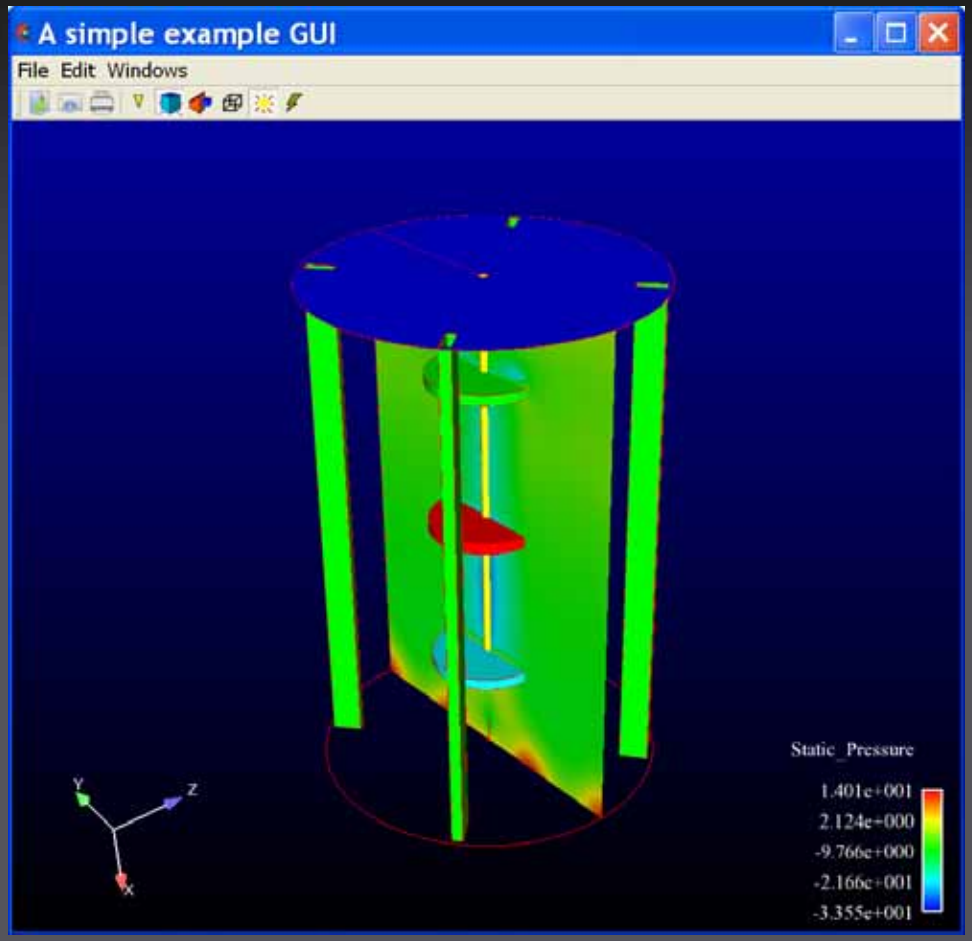
New User Interfaces

PyQt GUI "Skin"

EnSight, EnSightCFD, and other products

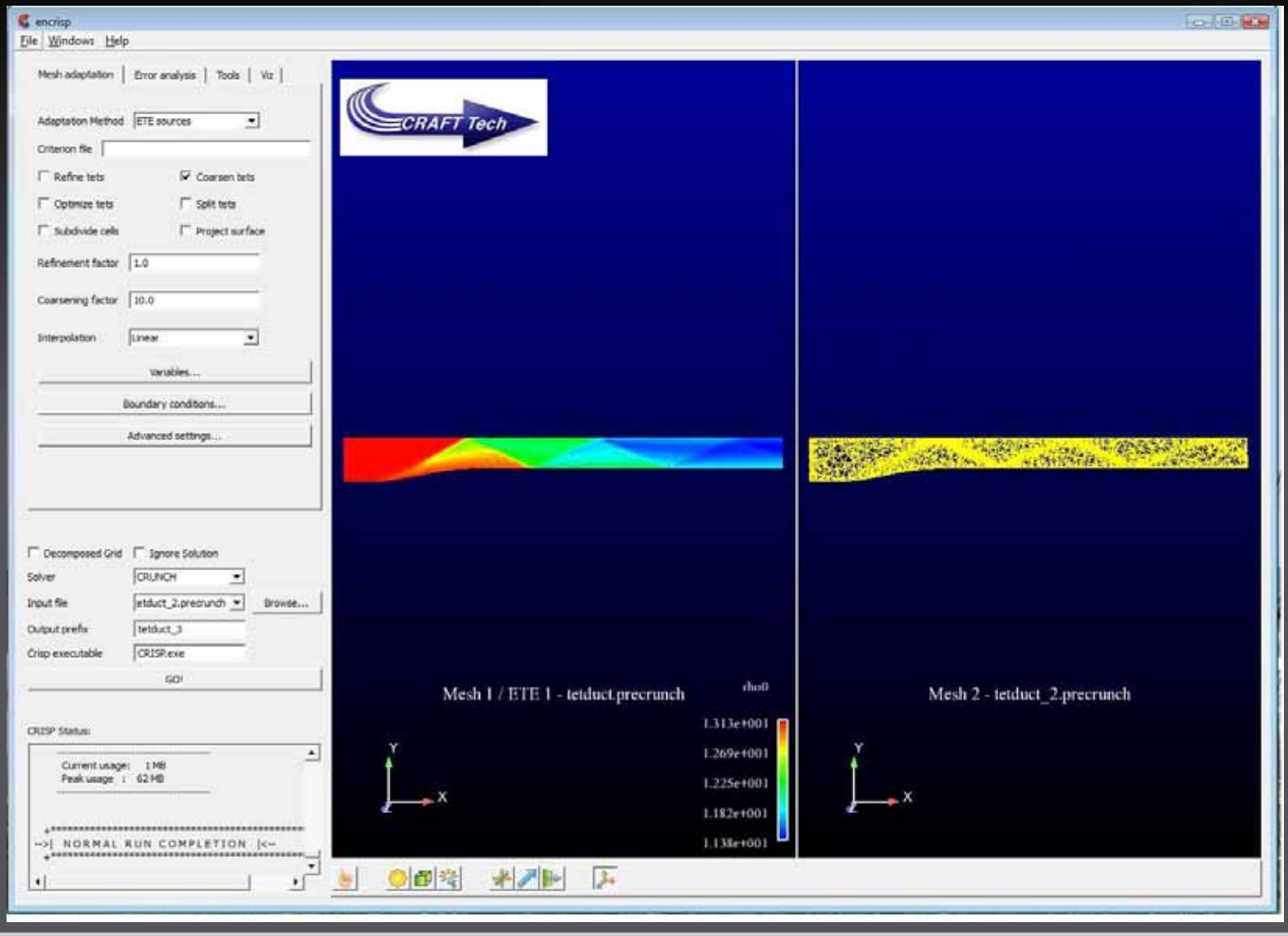
- Various interfaces are possible on top of a very large feature/capability base
- Why?
  - Special purpose interfaces
  - Embed in existing infrastructures
  - Simpler to use
- Developed by?
  - CEI
  - 3rd parties including CEI distributors
  - Customers

New User Interfaces - Simple

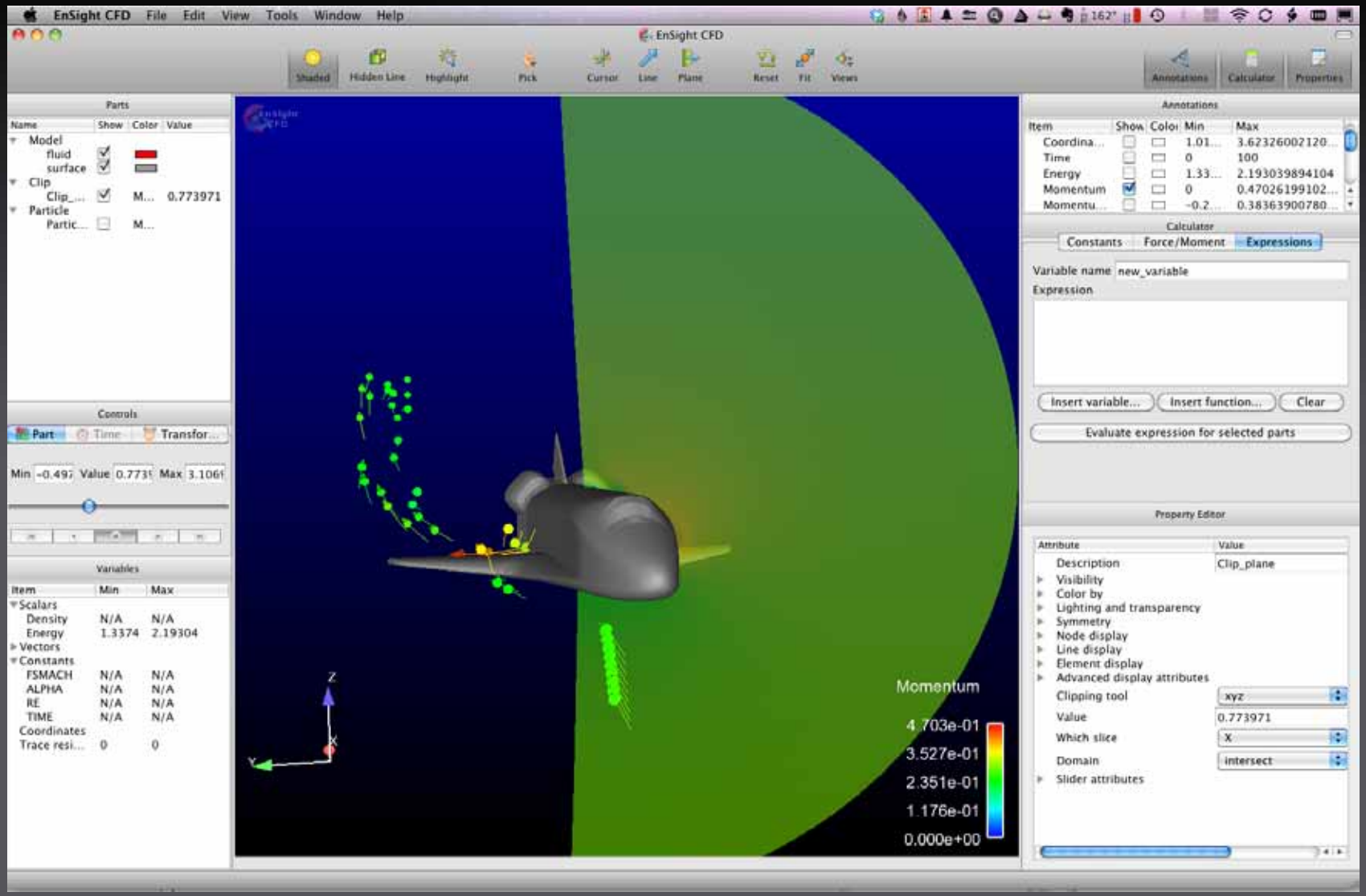


Load data, color by a variable, play through time, and record.

New User Interfaces-Mesh Adapt



New User Interfaces – EnSight CFD

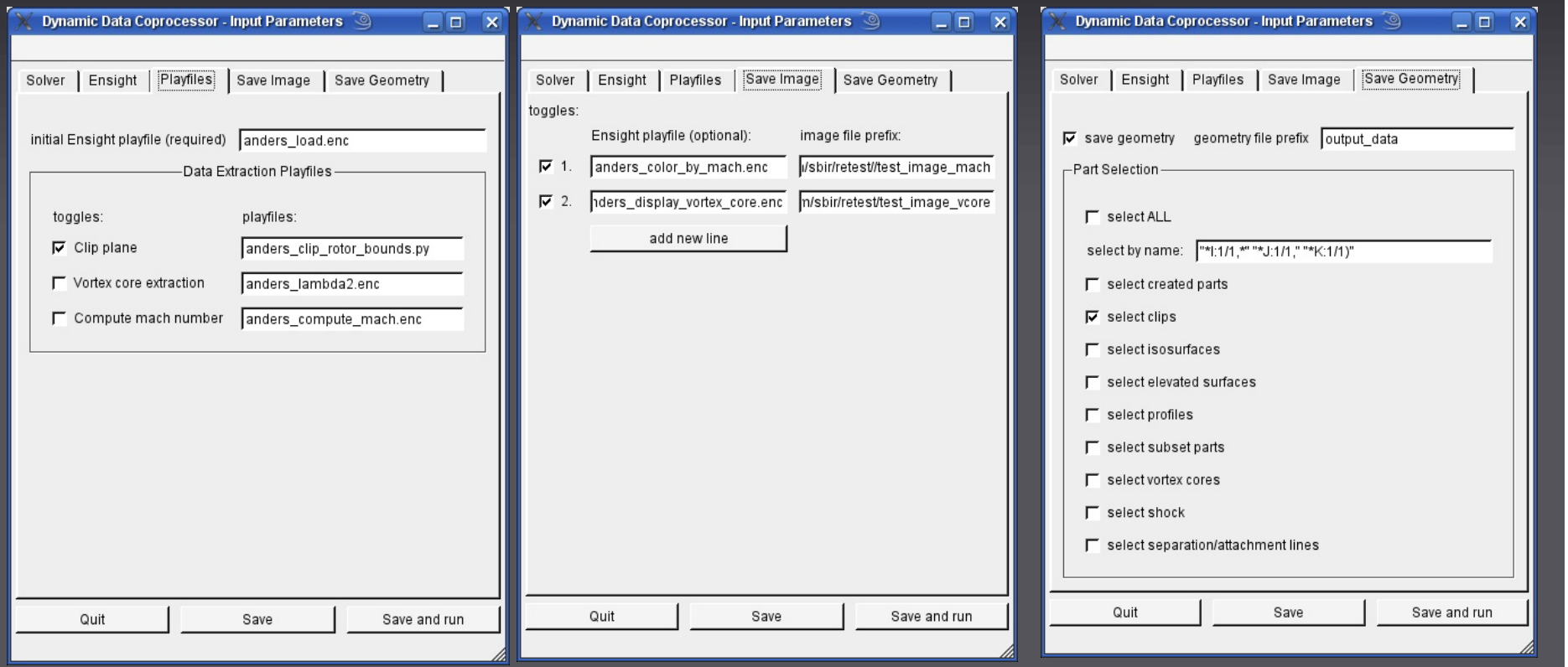


Other Interfaces – Semi Interactive

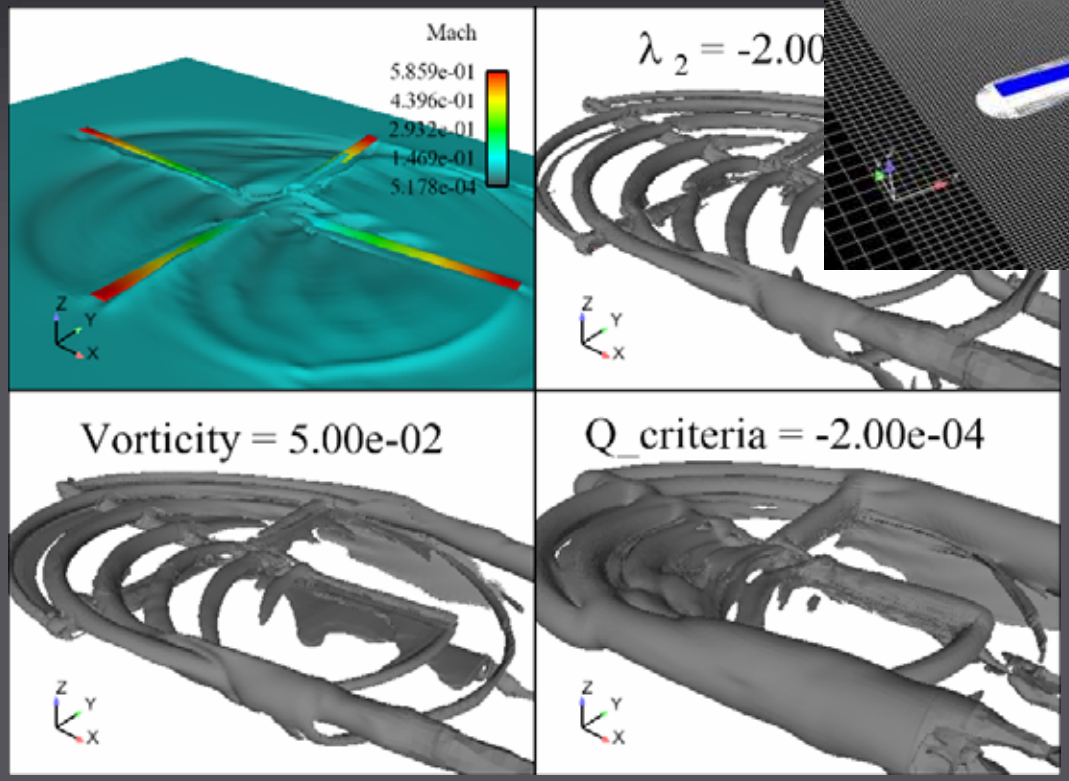
- Site specific Templates
  - Create generic component capabilities
  - Perhaps XML based
  - Must know prior to simulation what extractions will be useful
  - Extracts can be images (for animations) or geometry + variables per timestep
  - Or Reports!
  - Post-process or a co-process
  - Could be Web based

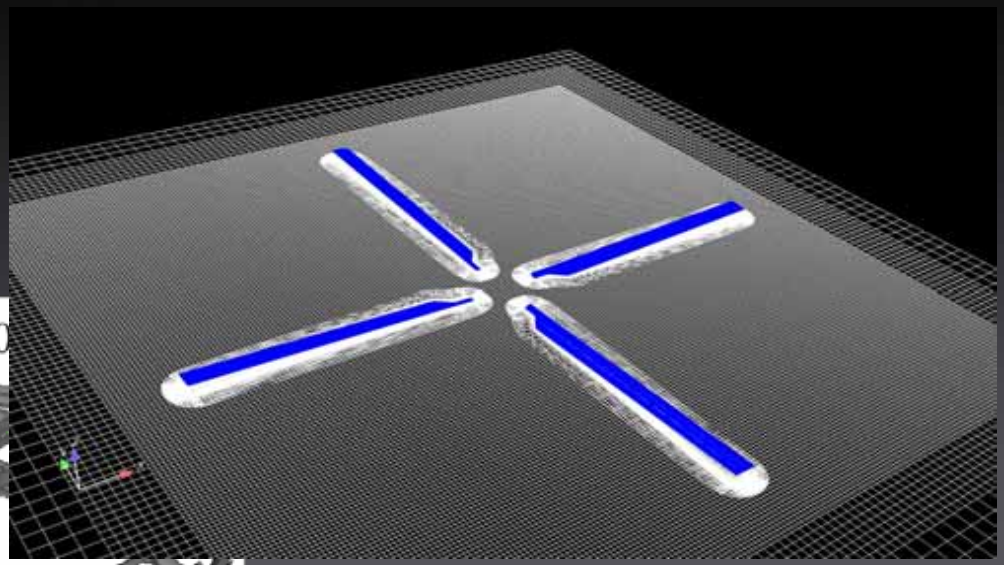
Other Interfaces – Semi Interactive

- Solver is started
- User Opens GUI to “check off” desired extracts and outputs



Other Interfaces – Semi Interactive





Thank You!

Questions?

darin@ensight.com