



NA-MIC

*National Alliance for Medical Image Computing*

*<http://na-mic.org>*

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# **Annotation and Markup Widgets in VTK**

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# Thanks

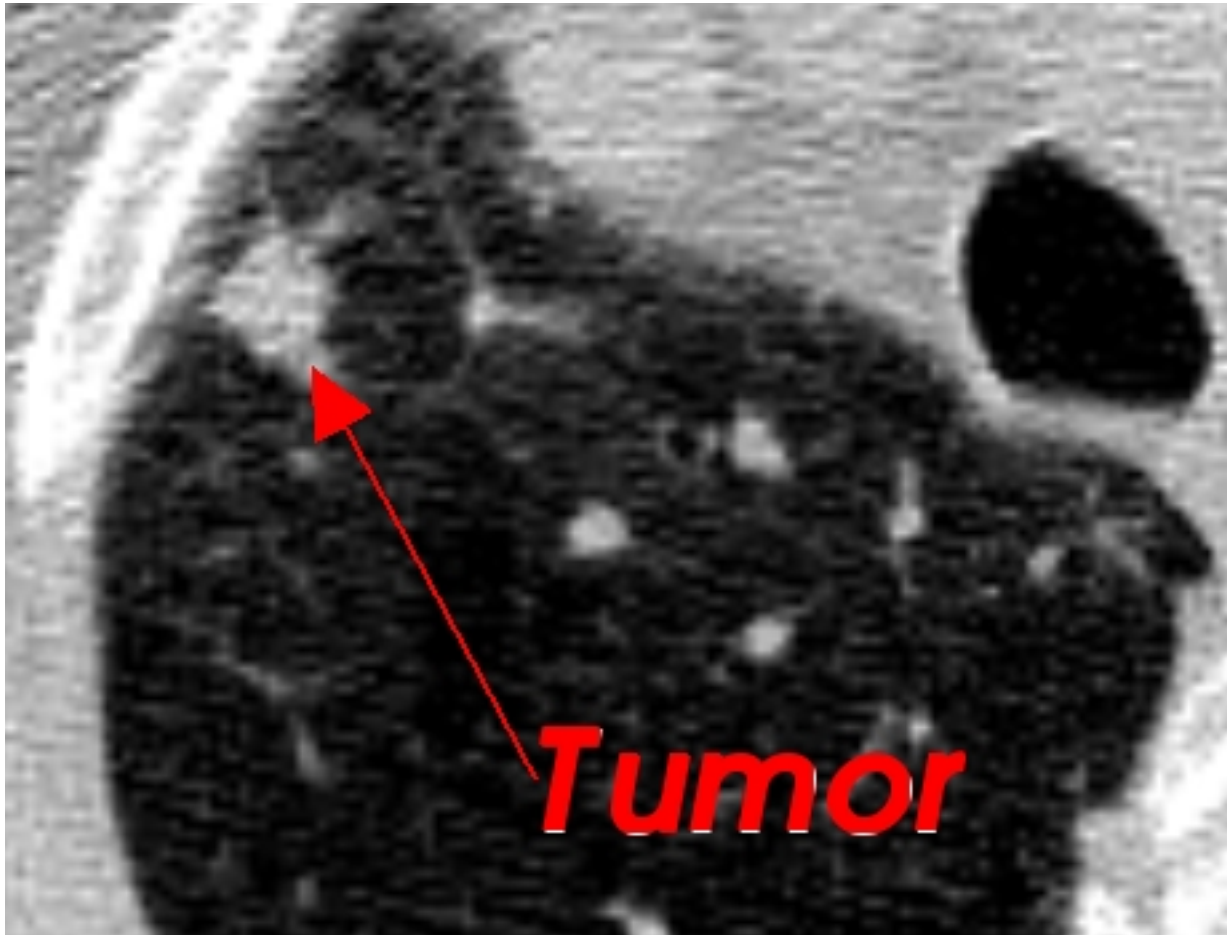
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- NIH National Center for Biomedical Computing
  - NAMIC
- National Library of Medicine / NIH
  - Dr. Terry Yoo: A2D2 awards (Algorithms, Adaptors, and Data Distribution)
- National Science Foundation
  - Visual Journal project
- Contributors
  - Will Schroeder
  - Lisa Avila
  - Karthik Krishnan
  - Brad King
  - Sebastien Barre
  - Yumin Yuan



# Caption annotations

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Annotate a 3D point with overlaid text

Customizable properties:

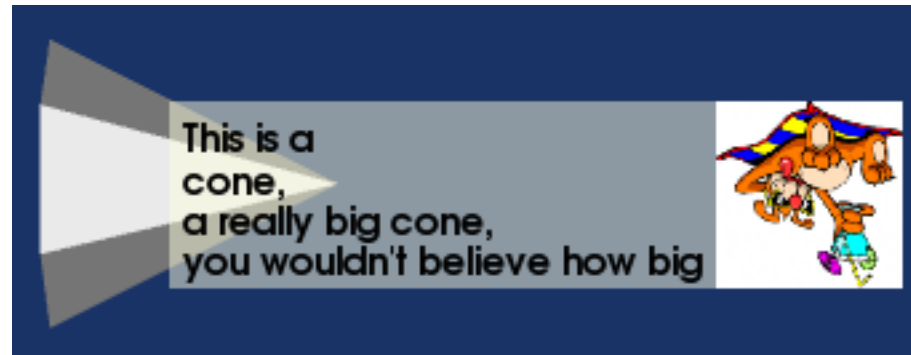
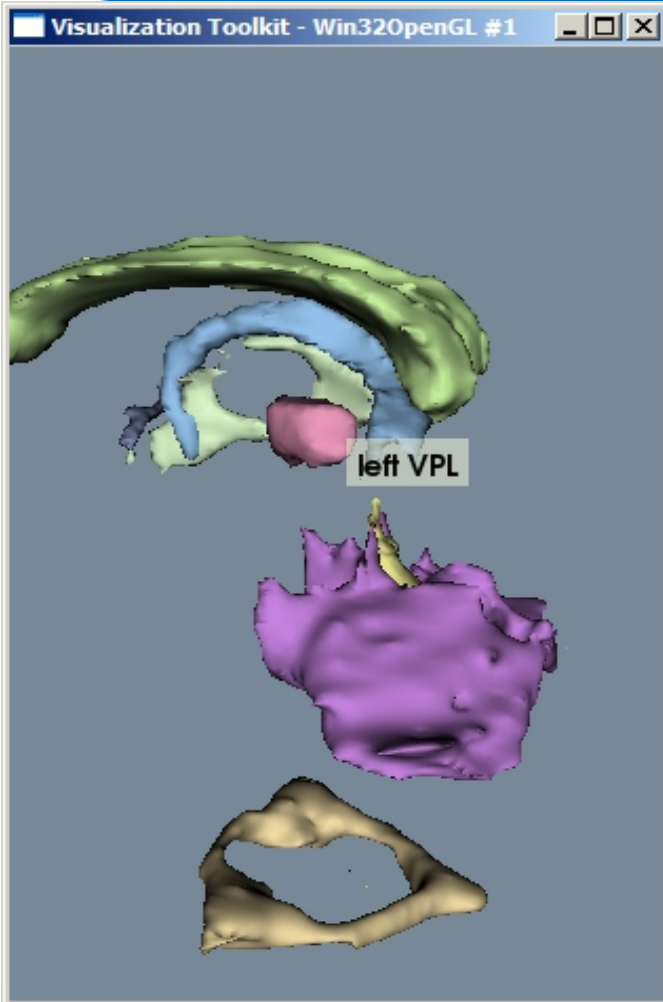
- Leader,
- Arrow shape,
- Caption font,
- BBox around text

Interactions:

- Change anchor position
- Reposition/Resize text



# Balloon annotations



Popup annotation(s) after  $t$  sec when hovering over any pickable actor(s).

Clutter free annotation of parcellated segmentations..

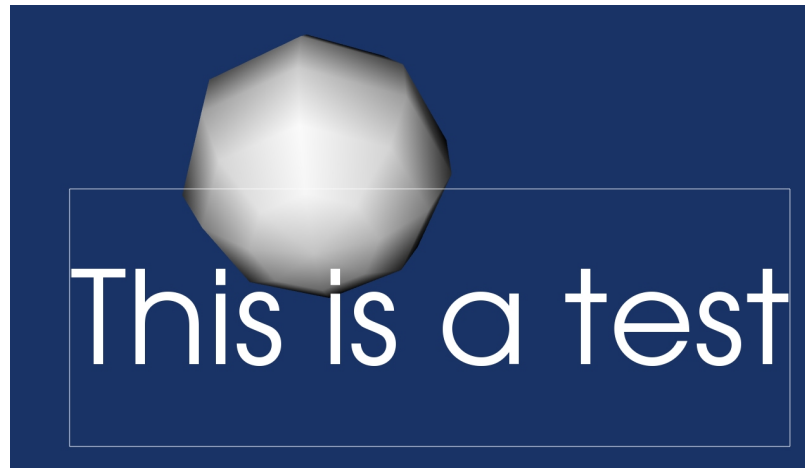
Customizable Properties:

- Delay  $t$
- Intermixed text + images/icons
- Balloon text properties



# Text annotations

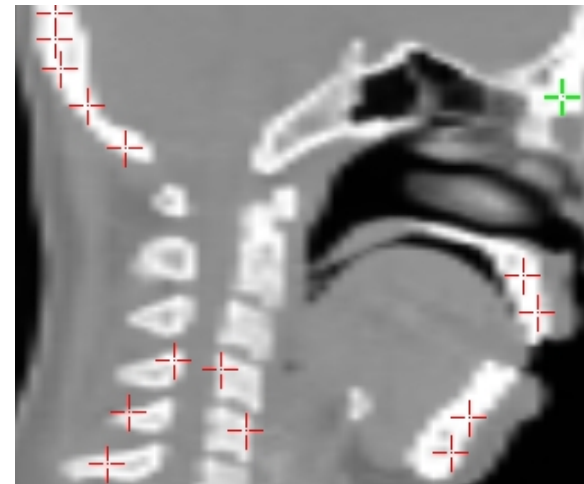
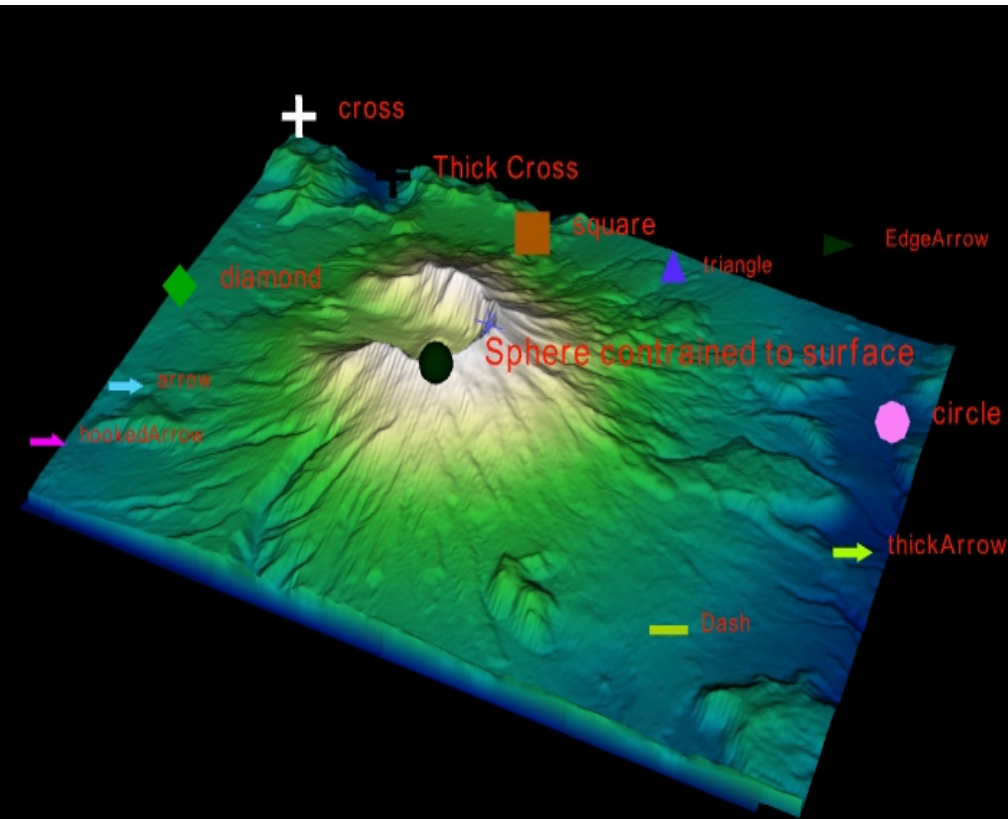
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Overlay text annotations that can be placed interactively in the scene. Text can be repositioned and resized interactively



# Fiducials

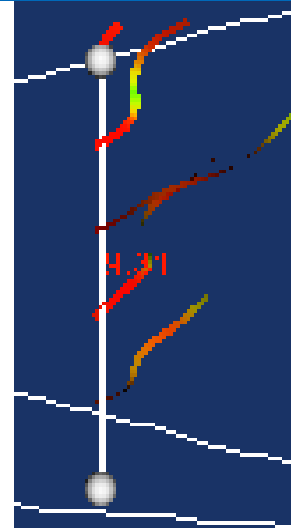
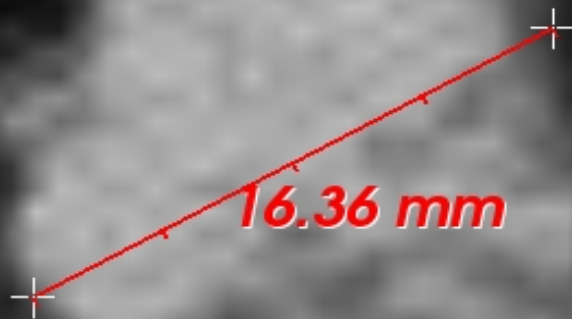


Interactive specification of 2D and 3D seeds with user specified geometry, properties, orientation, text and constraints.

Conforms to Slicer's fiducial requirements (Nicole ?)



# Distance measurement

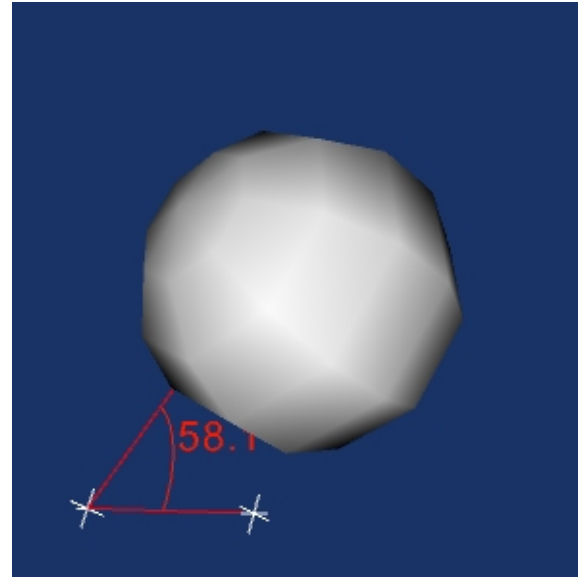
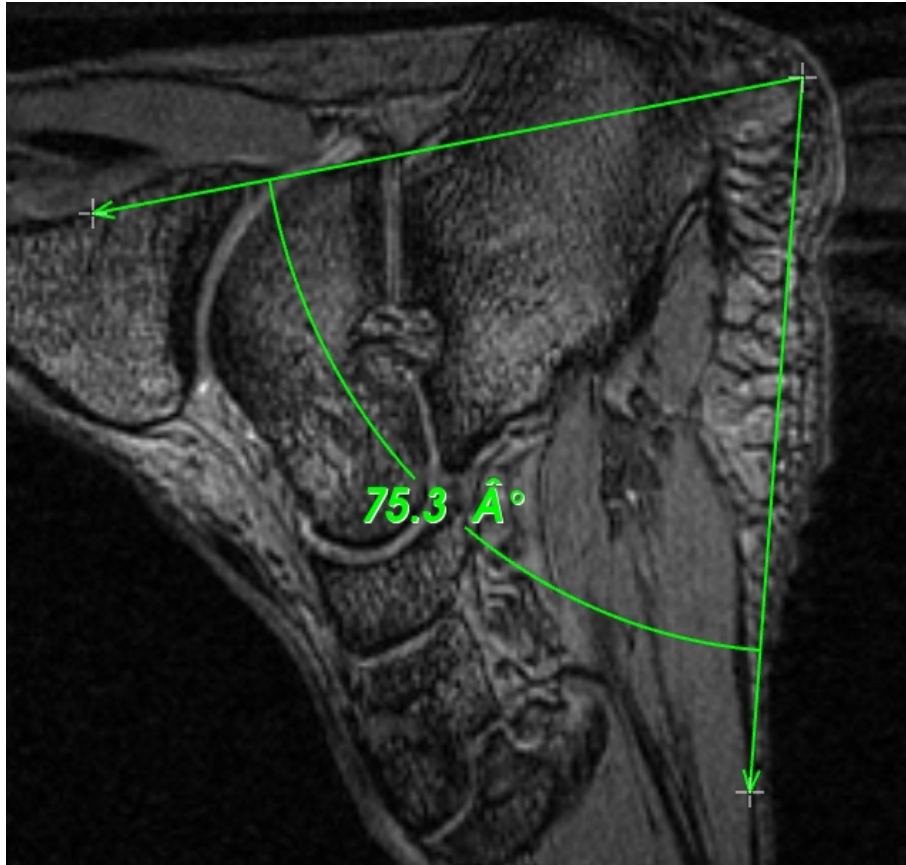


Distance measurement widgets for 2D (overlay) and 3D.

- Configurable handles
- Constrained handles



# Angle measurement



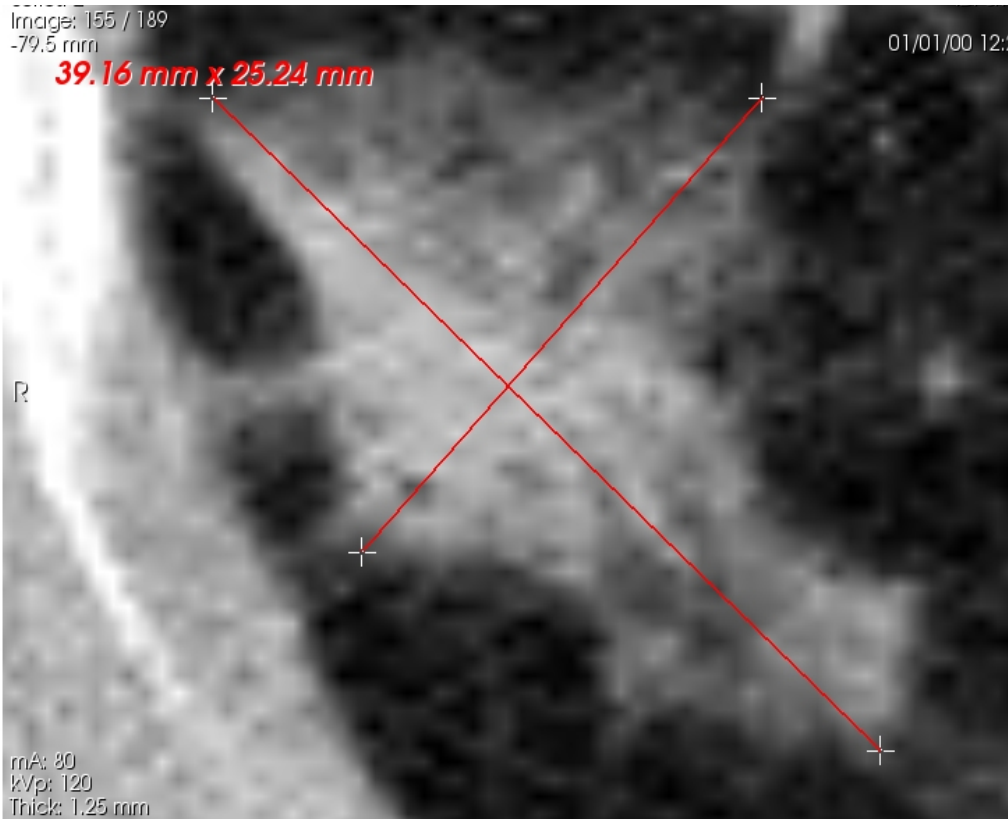
Angle measurements widgets for 2D (overlay) and 3D.

- Configurable handles and properties





# BiDimensional measurement

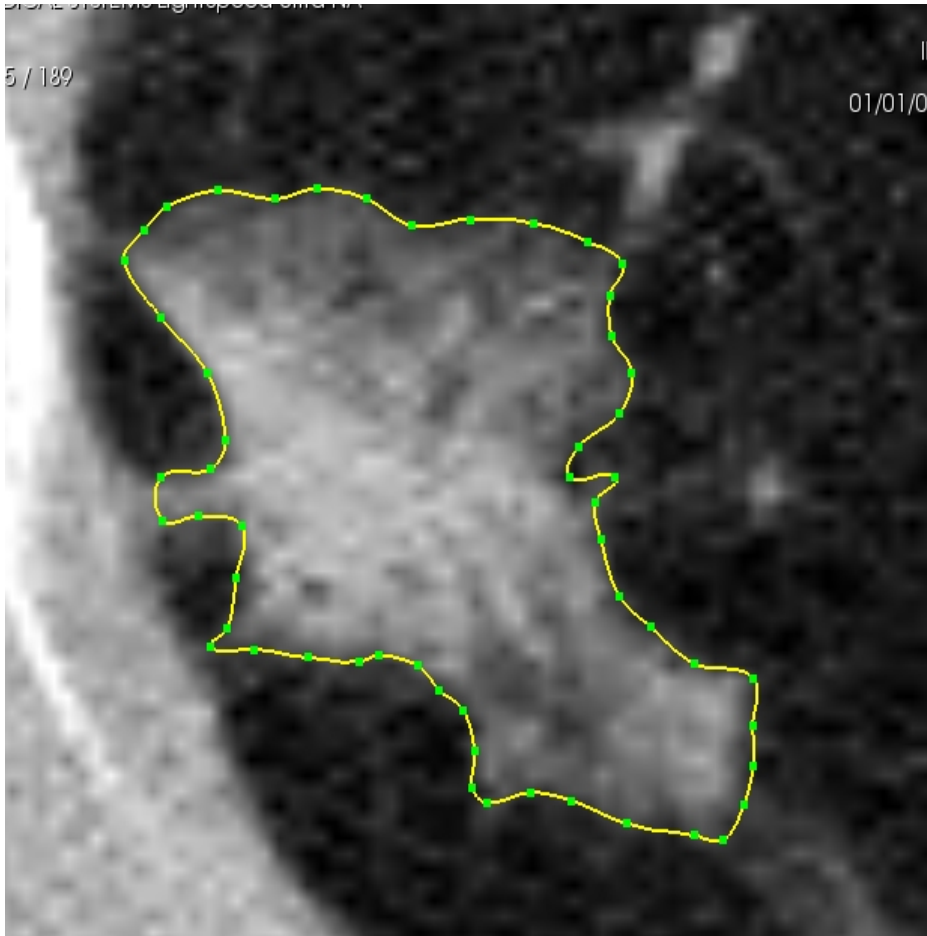


Interactive definition of BiDimensional measurements for tumors etc (WHO) on slices.

2D widget, intended for measurement on ImageActors.



# ROIs - Contour annotation

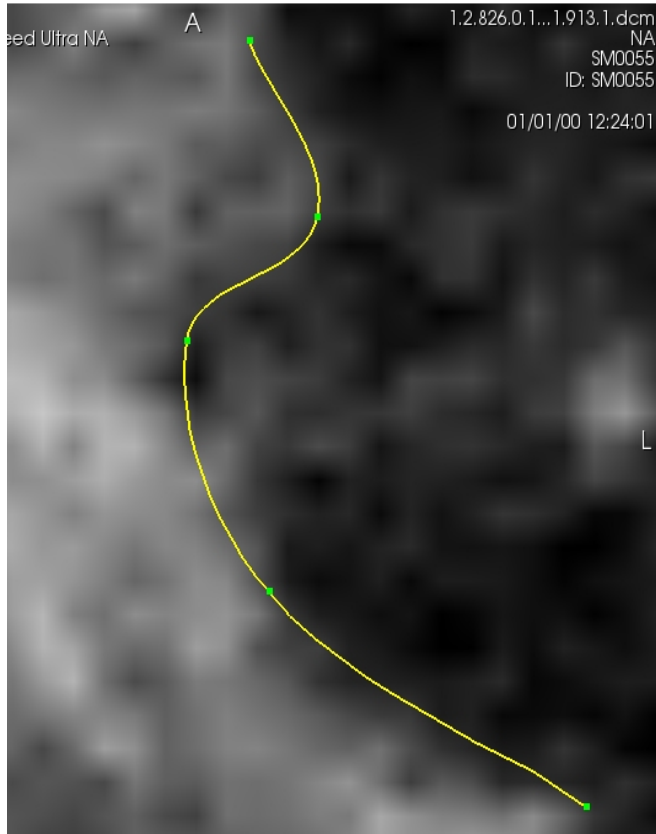


Interactive outlining in 2D and 3D for tumor measurement / manual segmentation

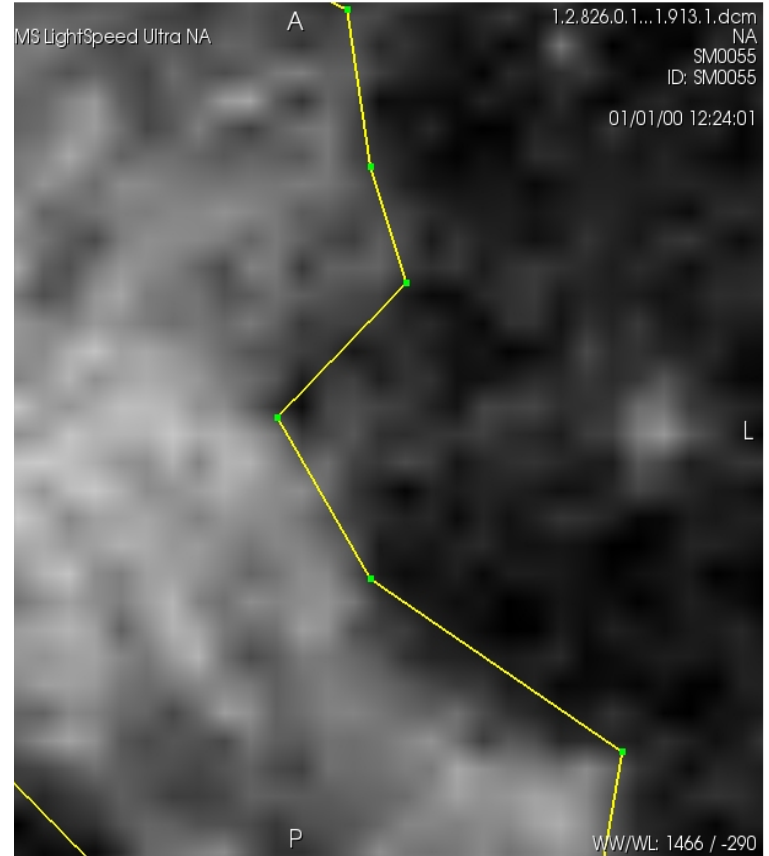
- Closed / open contours
- Variety of interpolation methods between control points
- Variety of constraints on control point placement
- Convenience classes for mean / variance / perimeter / area. *KK ?*
- Convenience classes for rasterization (for segmentation) *KK*



# Contour annotation (contd) Suite of Interpolators..



Bezier interpolation  
vtkBezierContourLineInterpolator



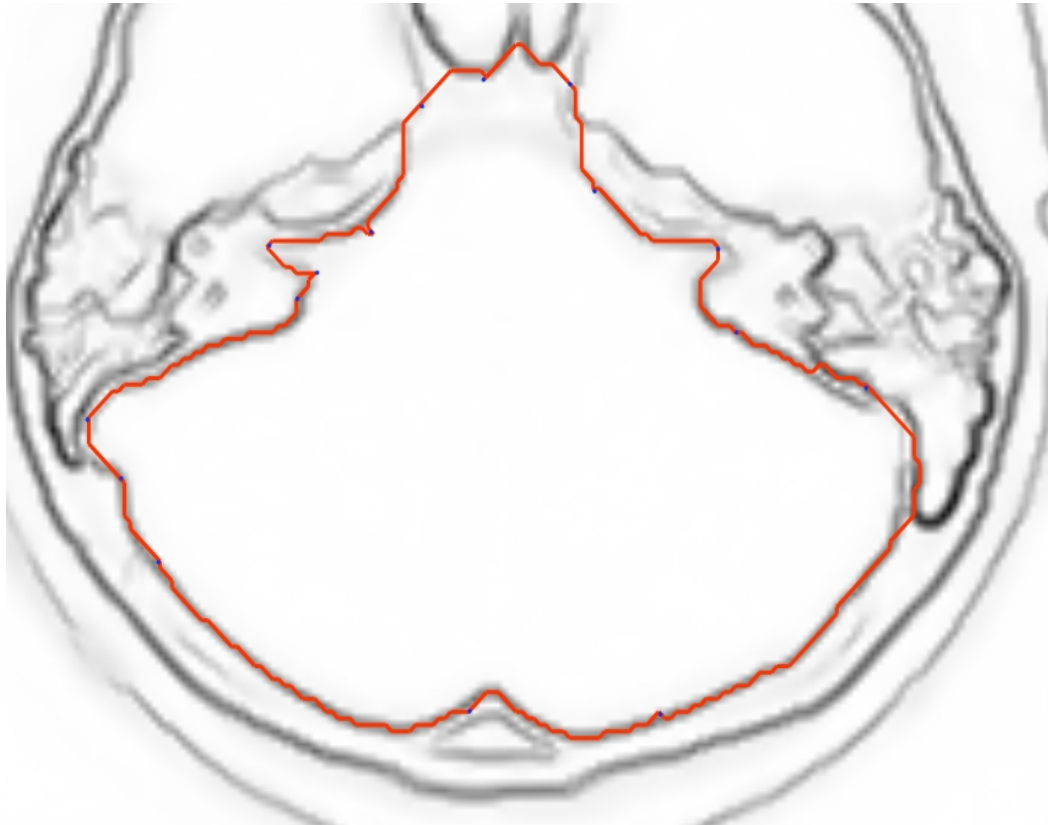
(Free form) no interpolation  
vtkLinearContourLineInterpolator



# Contour annotation (contd)

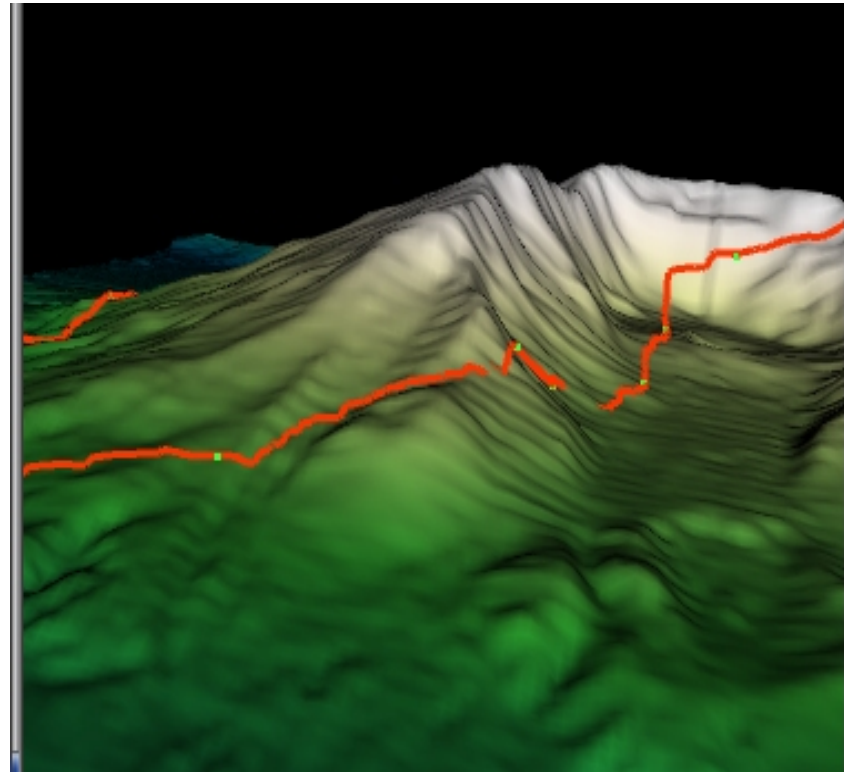
## Suite of Interpolators..

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Live wire interpolation  
(semi-automated segmentation)

[vtkDijkstraImageContourLineInterpolator](#)

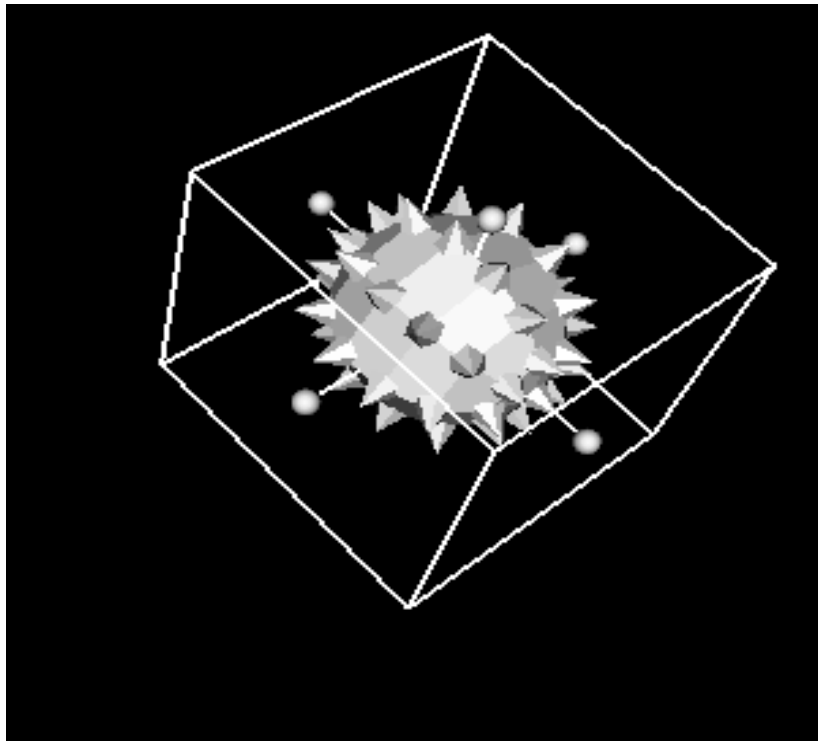


Surface constrained interpolation

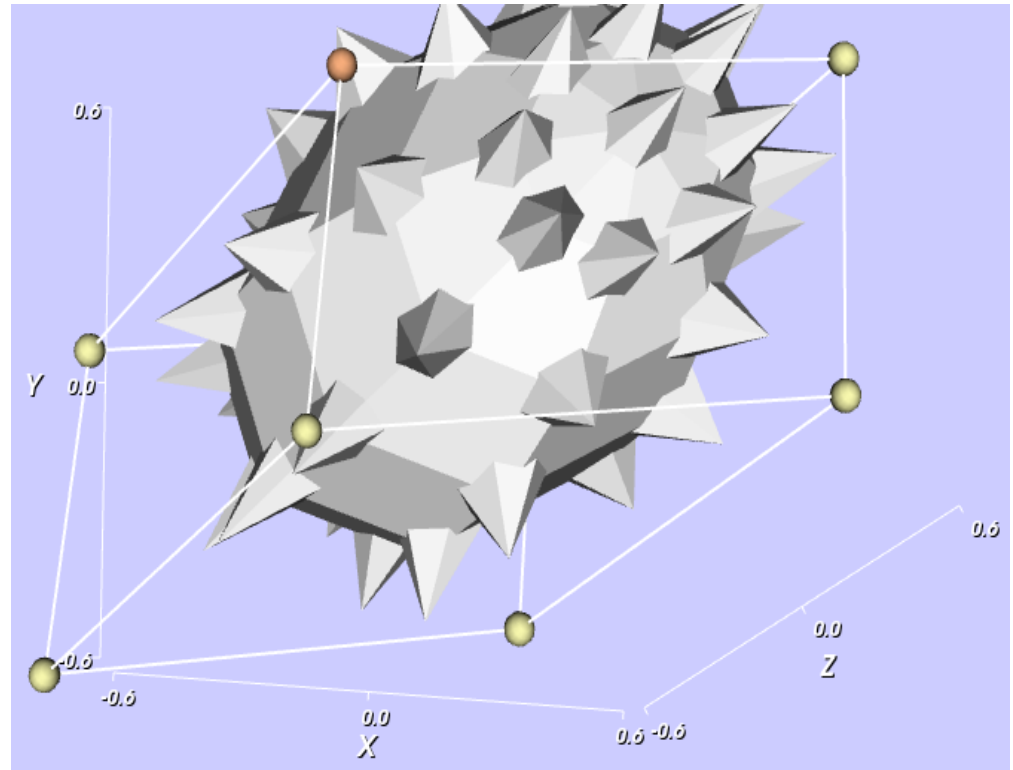
[vtkPolygonalSurfaceContourLineInterpolator](#)



# ROIs - Box Annotation



Orthogonal bounding box widget



Paralleloiped widget



# Example code

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## Annotations

- **TestCaptionWidget.cxx**
- **TestTextWidget.cxx**
- **TestBalloonWidget.cxx**

## Measurements

### Fiducials

- **TestSeedWidget.cxx**
- **TestConstrainedHandleWidget.cxx**
- **TestHandleWidget.cxx**
- **TestPolygonalHandleRepresentations.cxx**
- **TestPolygonalRepresentationHandleWidget.cxx**

### Distance

- **TestDistanceWidget.cxx**
  - **TestLineWidget2.cxx**
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# Example code

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## Measurements (contd)

### Angle

- TestAngleWidget2D.cxx
- TestAngleWidget3D.cxx

### BiDimensional

- TestBiDimensionalWidget.cxx

## ROI

### Contour

- TestImageActorContourWidget.cxx
- TestContourWidget2.cxx
- TestDijkstralImageGeodesicPath.cxx
- TestDijkstraGraphGeodesicPath.cxx

### Bounding box

- TestBoxWidget2.cxx
  - TestParallelopipedWidget.cxx
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