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CENTER FOR INTEGRATIVE
BIOMEDICAL COMPUTING
at the Scientific Computing and Imaging Institute

2008 WORKSHOP

***map3d* History and Concepts**

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***map3d* History**

map3d

1990: First SGI, first GL, first map3d

1992/3: First papers:

- **Visualization in Biomedical Computing 1992**
- **IEEE Visualization Conference 1992**
- **Visualizing Bioelectric Fields (Comp. Graphics and Appl.m 1993**
- **IEEE EMBS Conference, 1993**

1999: Started conversion to OpenGL

2000: First OpenGL release: Version 5.0

2003: March 2003, Version 5.4



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Why *map3d*?

map3d

Mapping: the driving application

- Spatiotemporal signals
- Electrophysiology of the heart

Graphics hardware and GL

- Interactivity is essential
- GL is (was) simple



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Goals of *map3d*

map3d

Read

- Surface based geometries
- Multichannel time signals

Render

- Color coded maps of scalars
- Plots of time signals

Provide

- Interactive control
- Interrogation of data
- Presentation graphics output



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What Does *map3d* Need?

map3d

Geometry

- Surface or pseudo-surface
- Connectivity and facets

Data

- Time signal for each point in geometry

Computer

- SGI, Windows, Linux
- Mac/OSX coming soon



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map3d

map3d Features

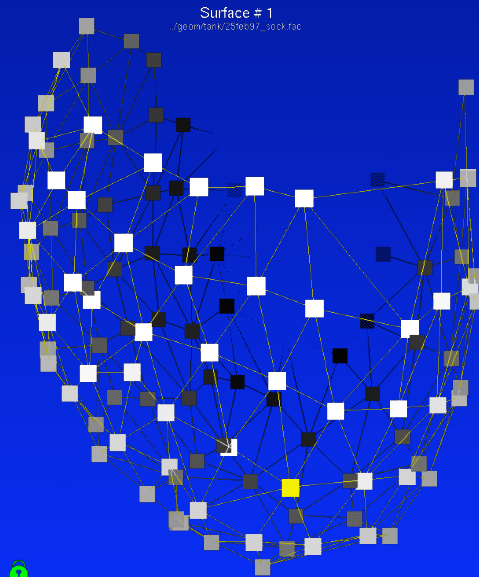
“Looking at my data has never been so much fun!”



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Map3d Rendering

map3d



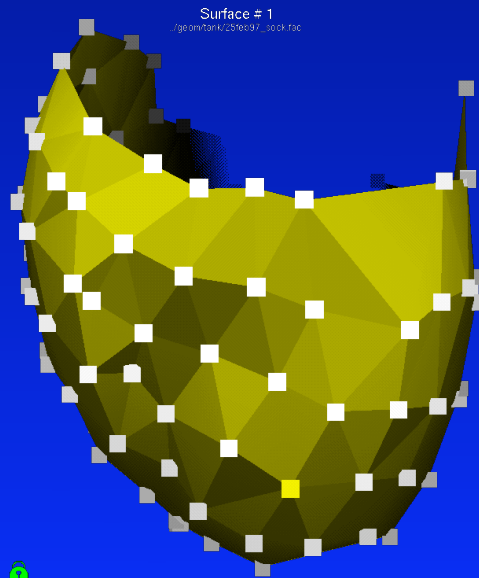
Nodes and mesh



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Map3d Rendering

map3d



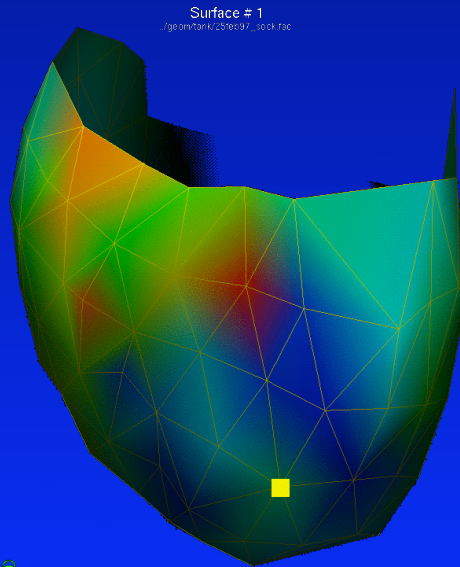
Nodes and mesh
Lighted surface



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Map3d Rendering

map3d



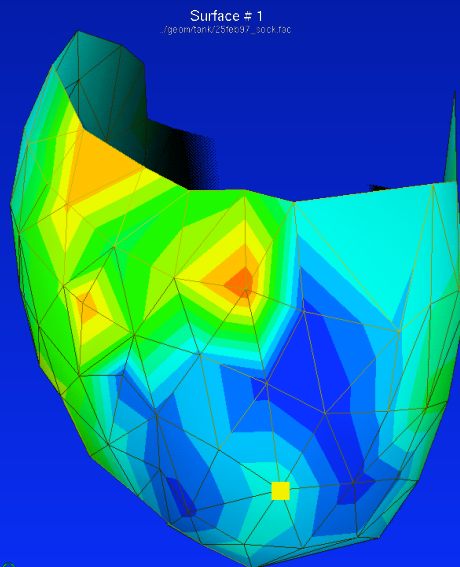
Nodes and mesh
Lighted surface
Data Gouraud



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Map3d Rendering

map3d



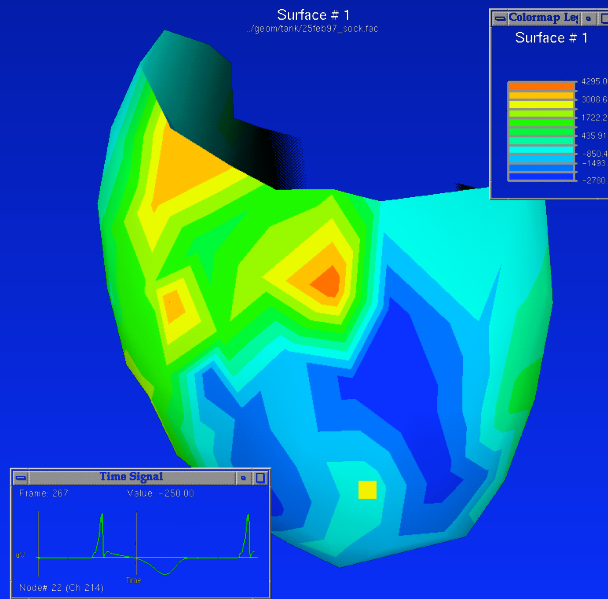
Nodes and mesh
Lighted surface
Data Gouraud
Data B-shaded



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Map3d Rendering

map3d



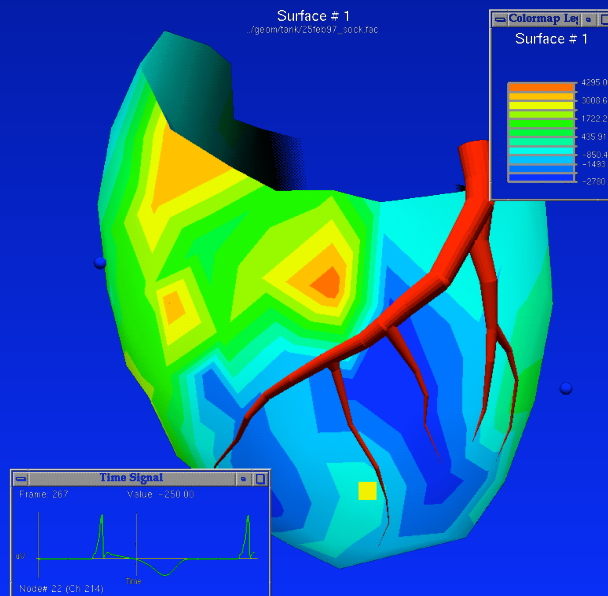
Nodes and mesh
Lighted surface
Data Gouraud
Data B-shaded
Time signals



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Map3d Rendering

map3d



Nodes and mesh
Lighted surface
Data Gouraud
Data B-shaded
Time signals
Landmarks



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Current Features

map3d

GTK windowing environment

- Good control of look and feel
- New UI elements

File support

- ASCII for geometry
- MATLAB for geometry and data

Image/movie capture

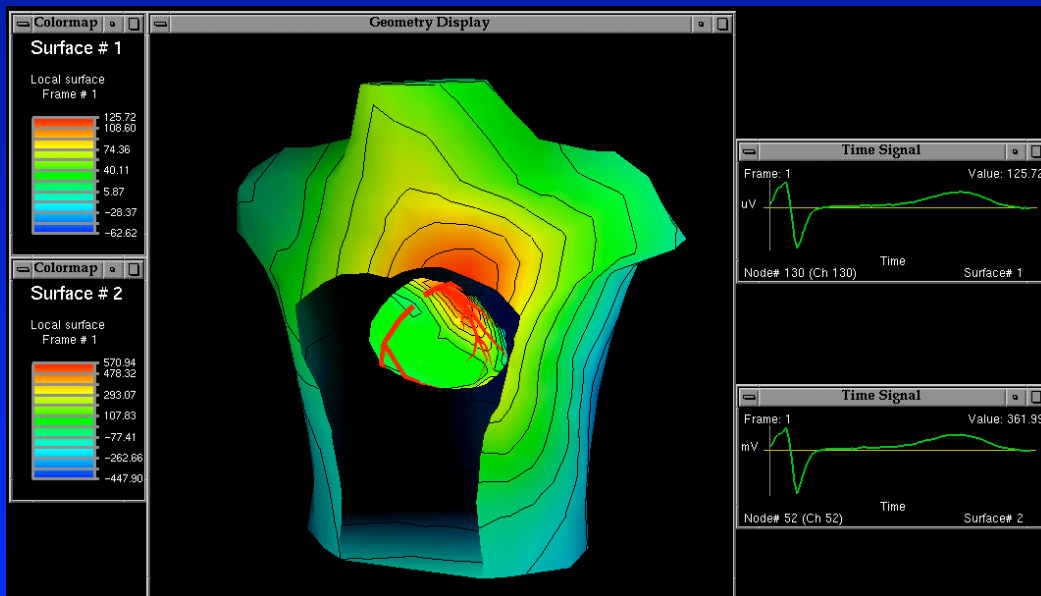
Image underlay



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Window layout

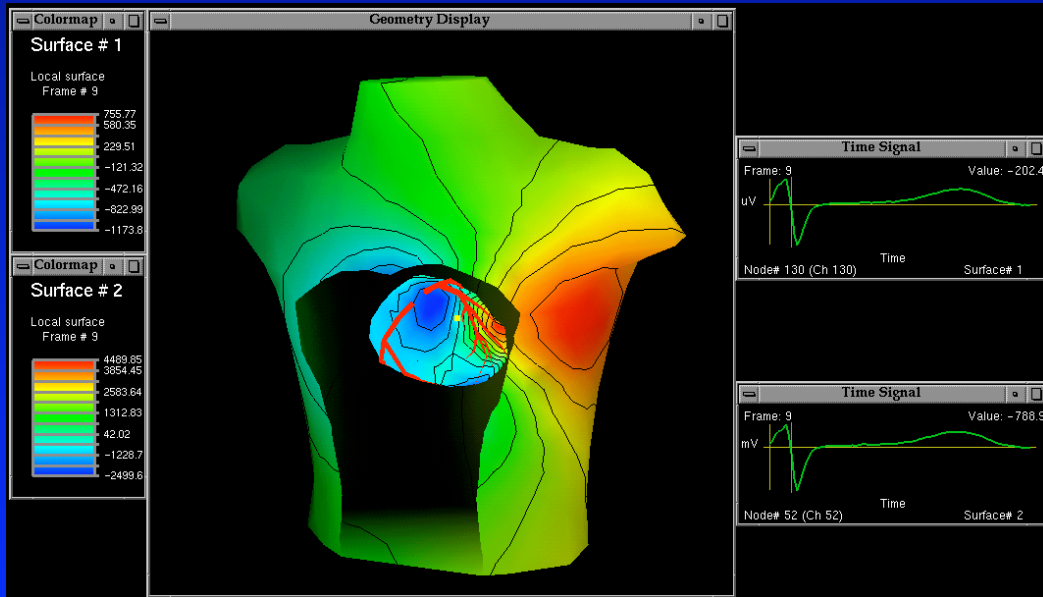
map3d



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Rendering Gouraud

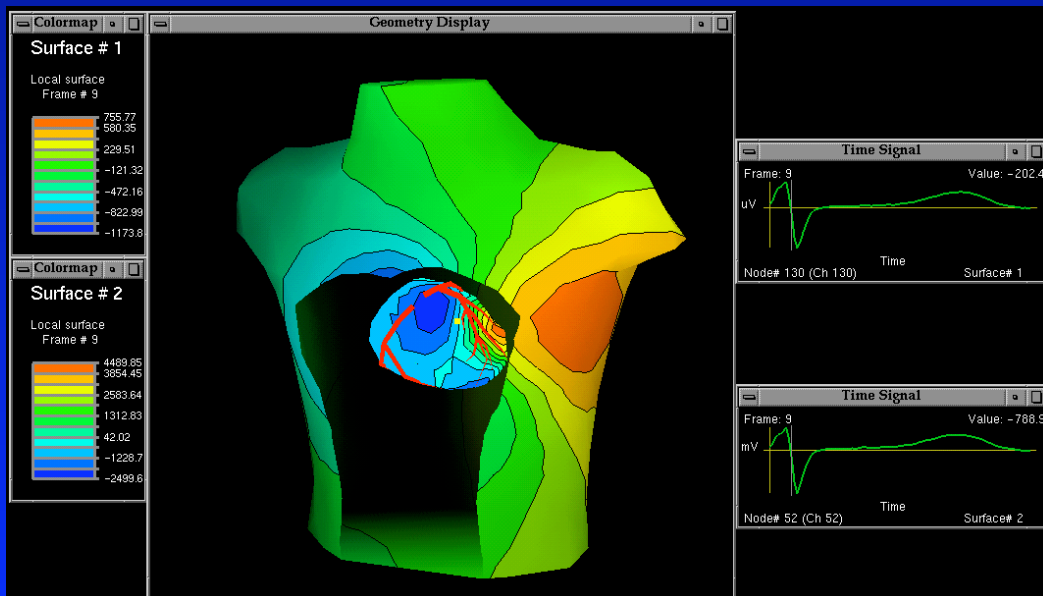
map3d



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Rendering Banded

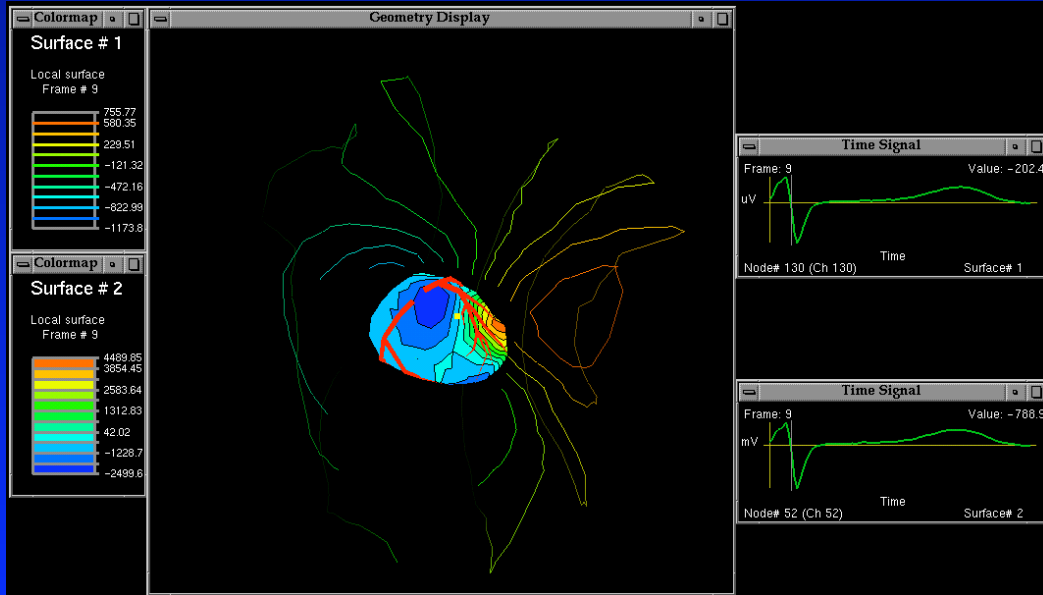
map3d



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Rendering Counters

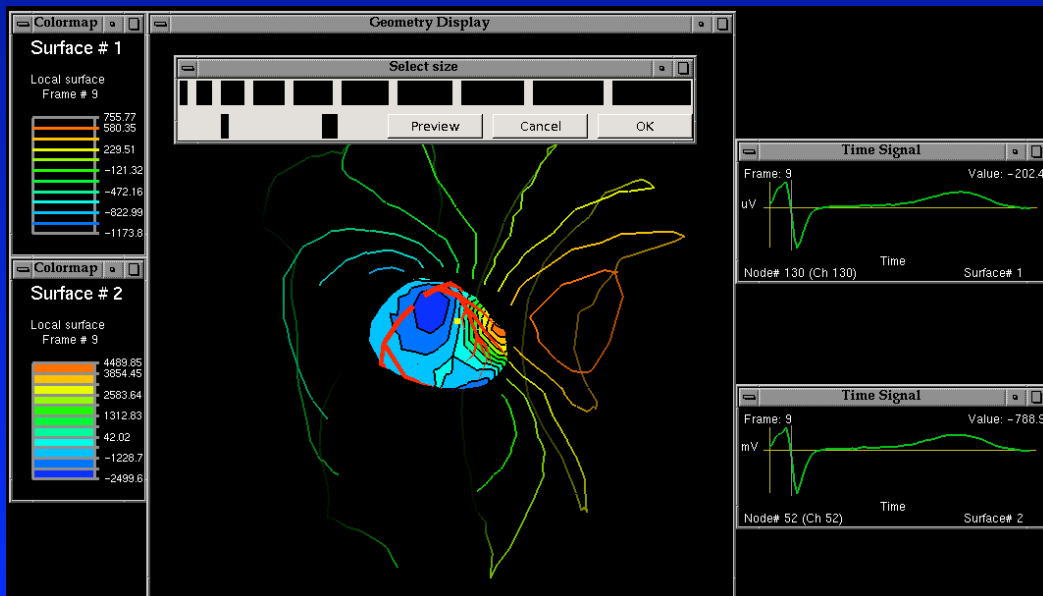
map3d



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Size Picker

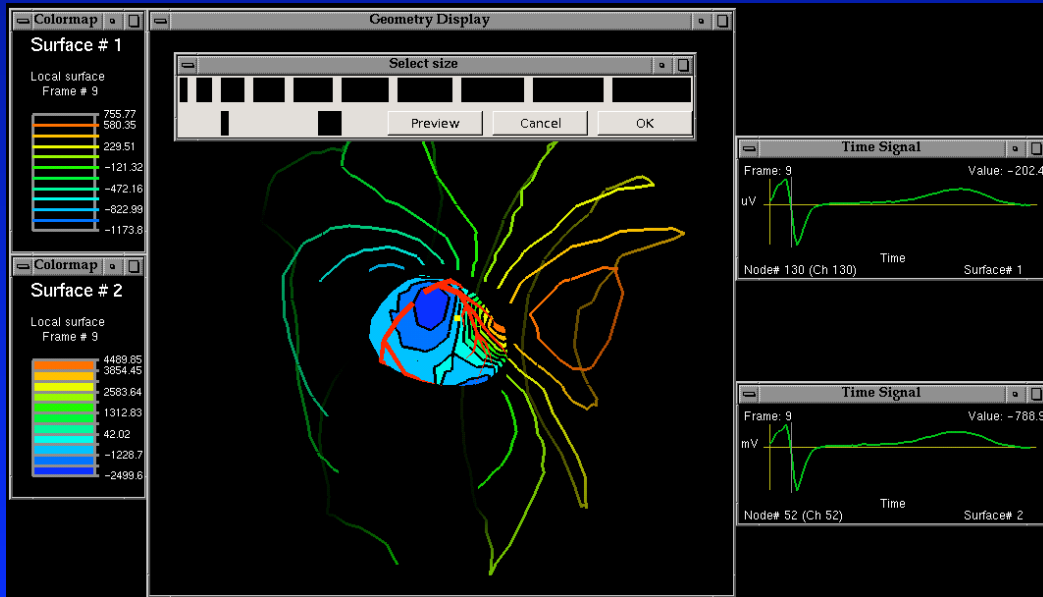
map3d



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Size Picker (2)

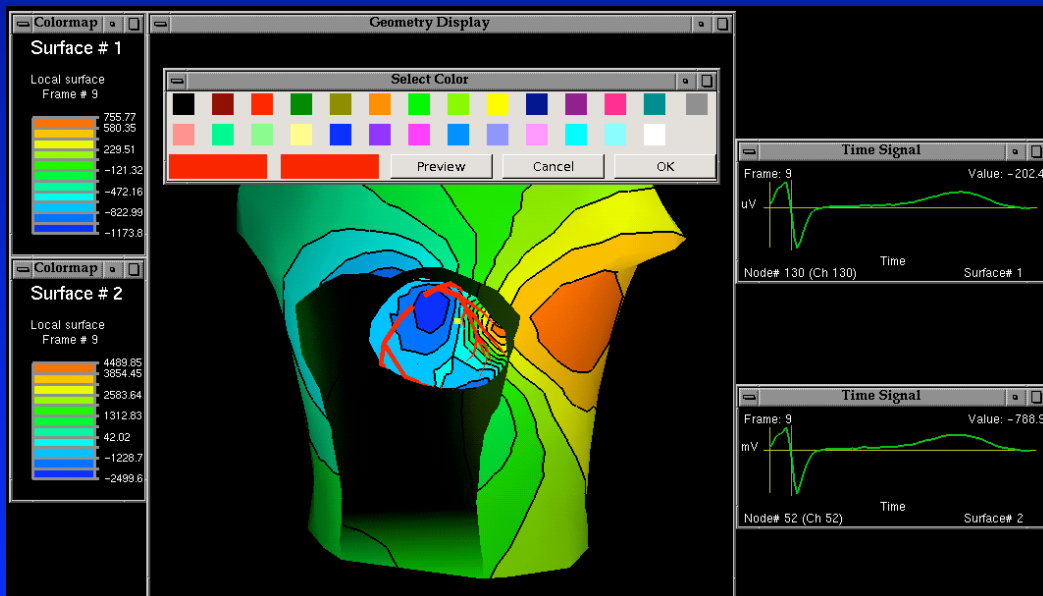
map3d



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Color Picker

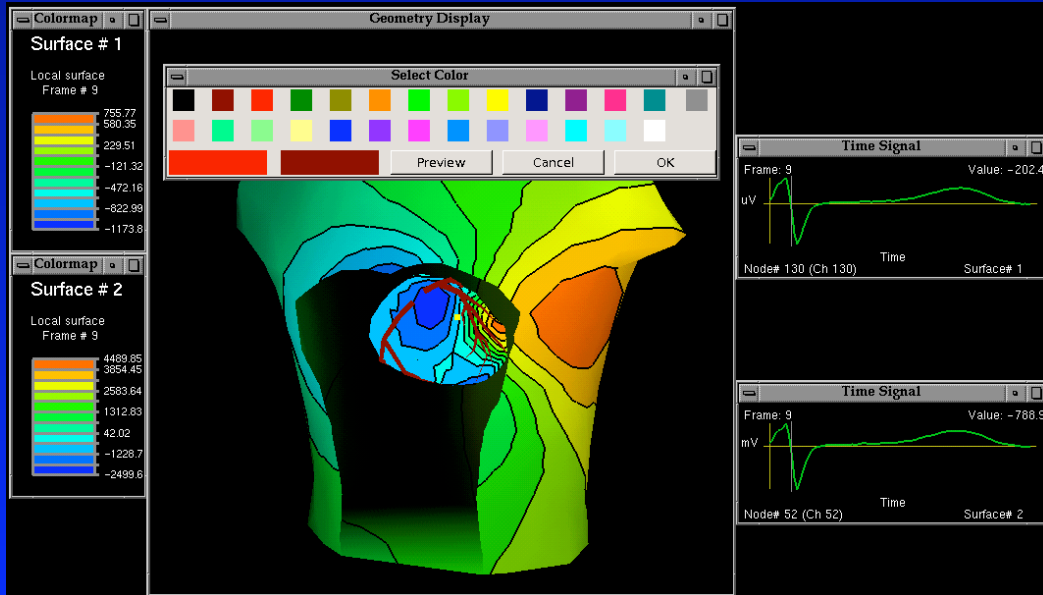
map3d



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Color Picker (2)

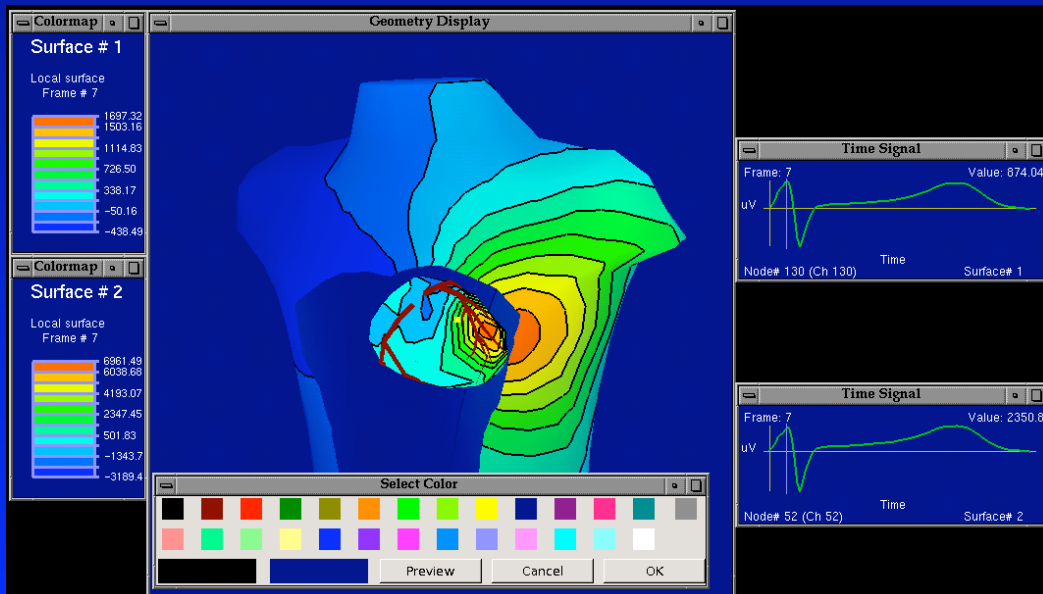
map3d



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Background Color

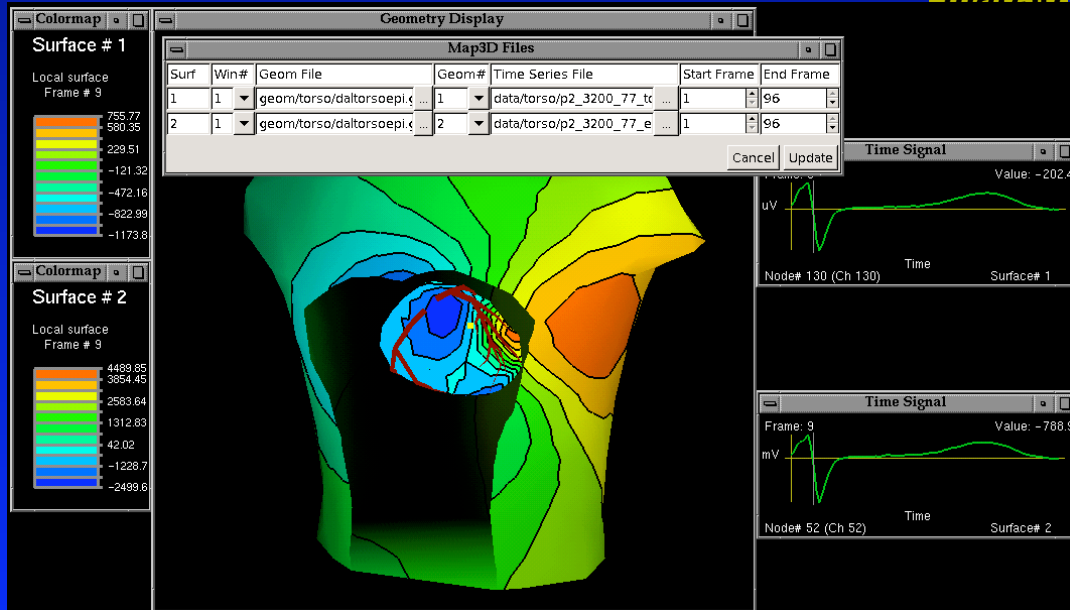
map3d



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Reloading Data/Geometry

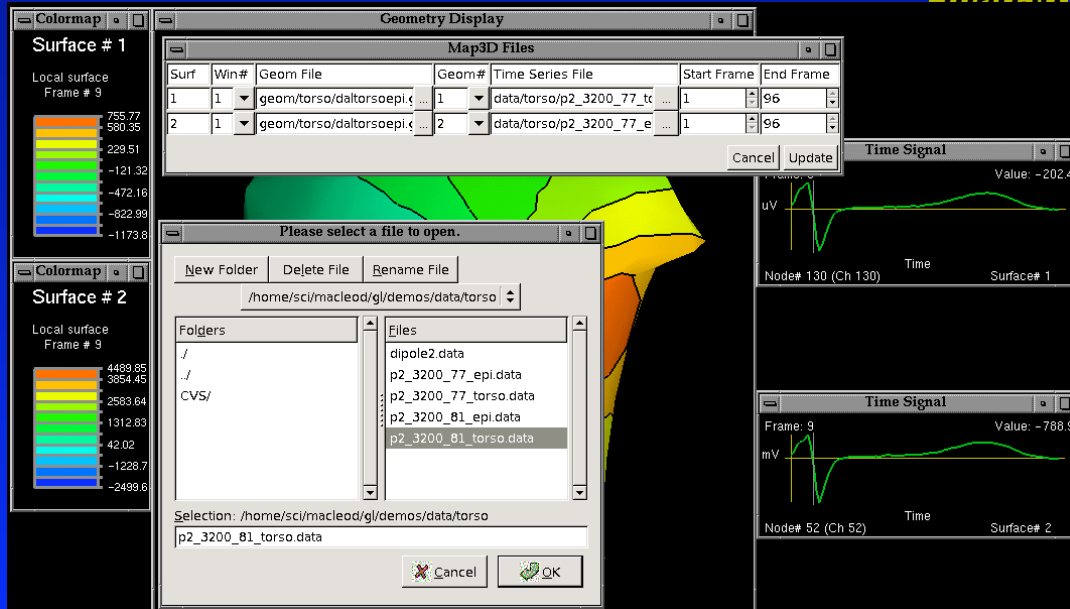
map3d



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Reloading Data/Geometry

map3d



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Reloading Data/Geometry

map3d

Geometry Display

Map3D Files

Surf	Win#	Geom File	Geom#	Time Series File	Start Frame	End Frame
1	1	geom/torso/daltorsoepi...	1	/home/sci/macloed/gl/der ...	1	96
2	1	geom/torso/daltorsoepi...	2	data/torso/p2_3200_77_e ...	1	96

Please select a file to open.

/home/sci/macloed/gl/demos/data/torso

Folders: / . / CVS/

Files: dipole2.data p2_3200_77_epi.data p2_3200_77_torso.data p2_3200_81_epi.data p2_3200_81_torso.data

Selection: /home/sci/macloed/gl/demos/data/torso
p2_3200_81_epi.data

Time Signal

Node# 130 (Ch 130) Time Surface# 1 Value: -202.4

Time Signal

Frame: 9 mV Node# 52 (Ch 52) Time Surface# 2 Value: -788.9



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Reloading Data/Geometry

map3d

Geometry Display

Map3D Files

Surf	Win#	Geom File	Geom#	Time Series File	Start Frame	End Frame
1	1	geom/torso/daltorsoepi...	1	/home/sci/macloed/gl/der ...	1	96
2	1	geom/torso/daltorsoepi...	2	/home/sci/macloed/gl/der ...	1	96

Time Signal

Node# 130 (Ch 130) Time Surface# 1 Value: -202.4

Time Signal

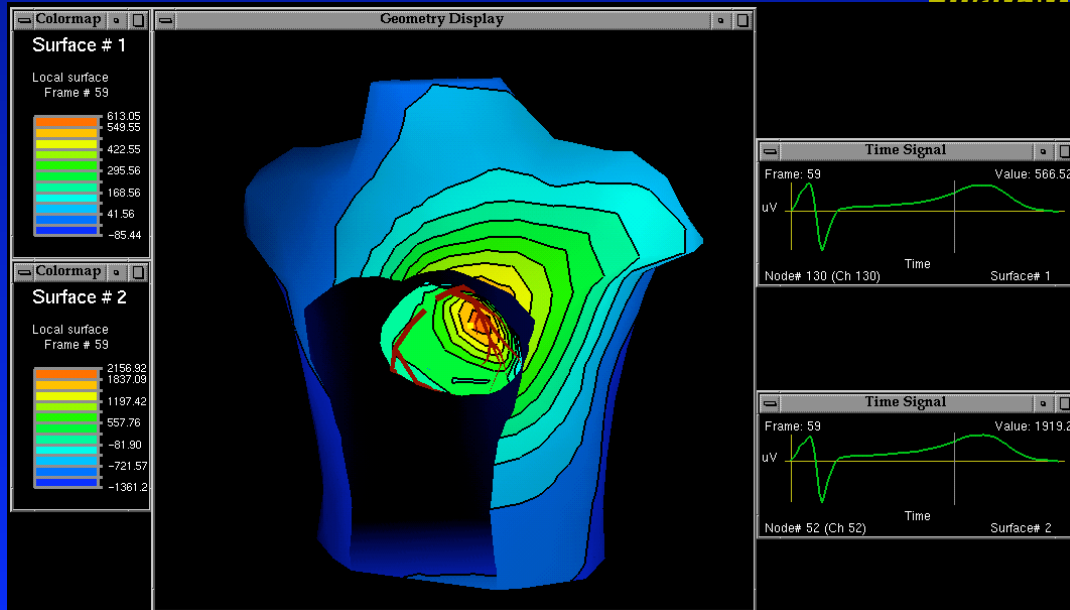
Frame: 9 mV Node# 52 (Ch 52) Time Surface# 2 Value: -788.9



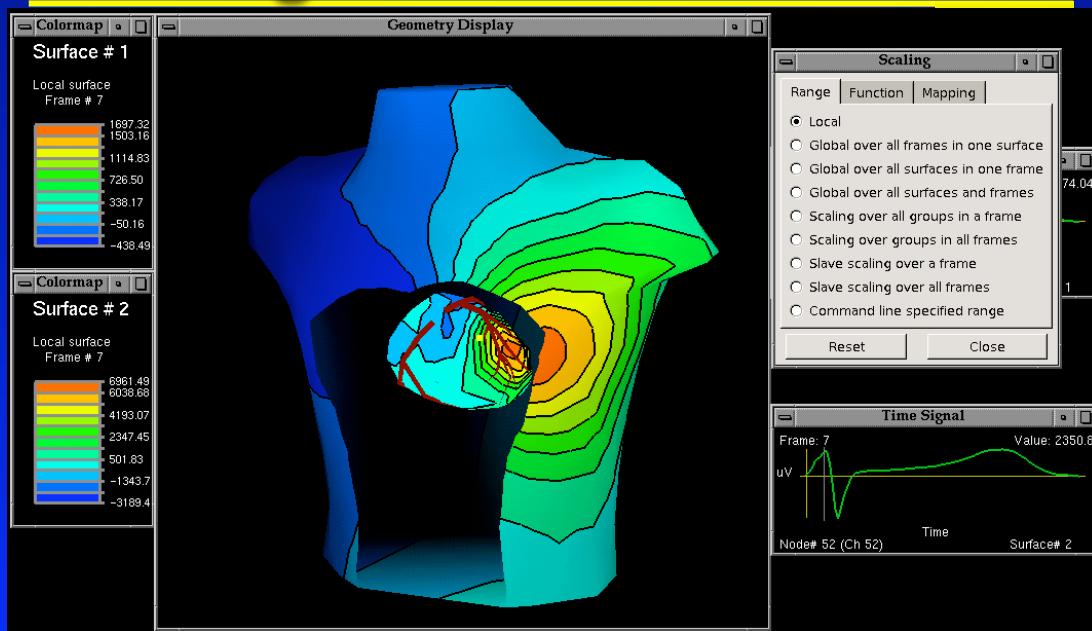
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Reloading Data/Geometry

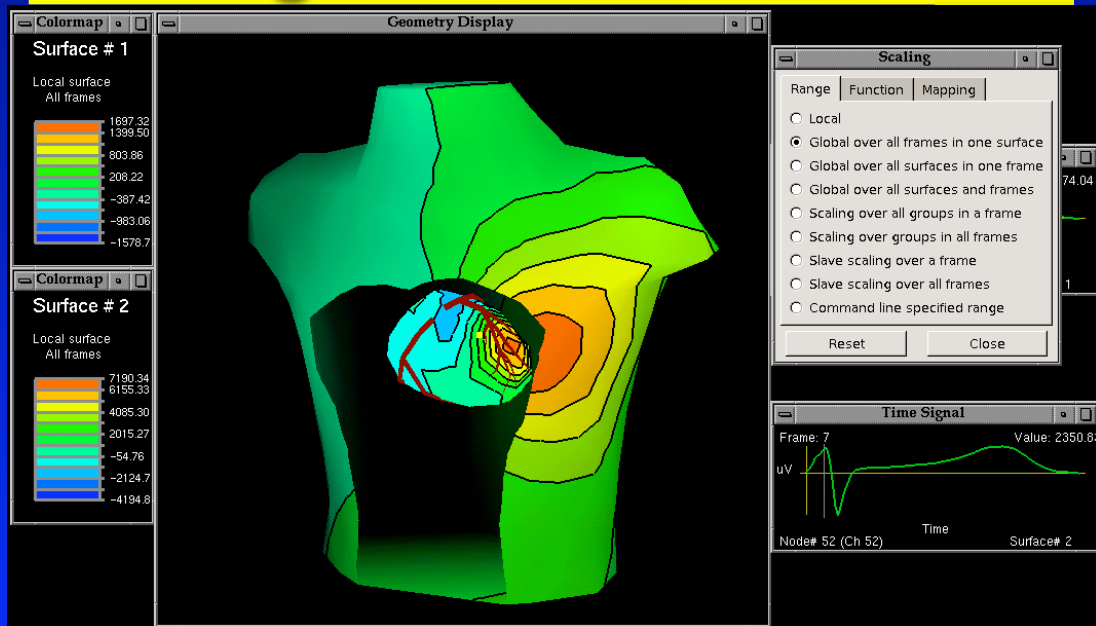
map3d



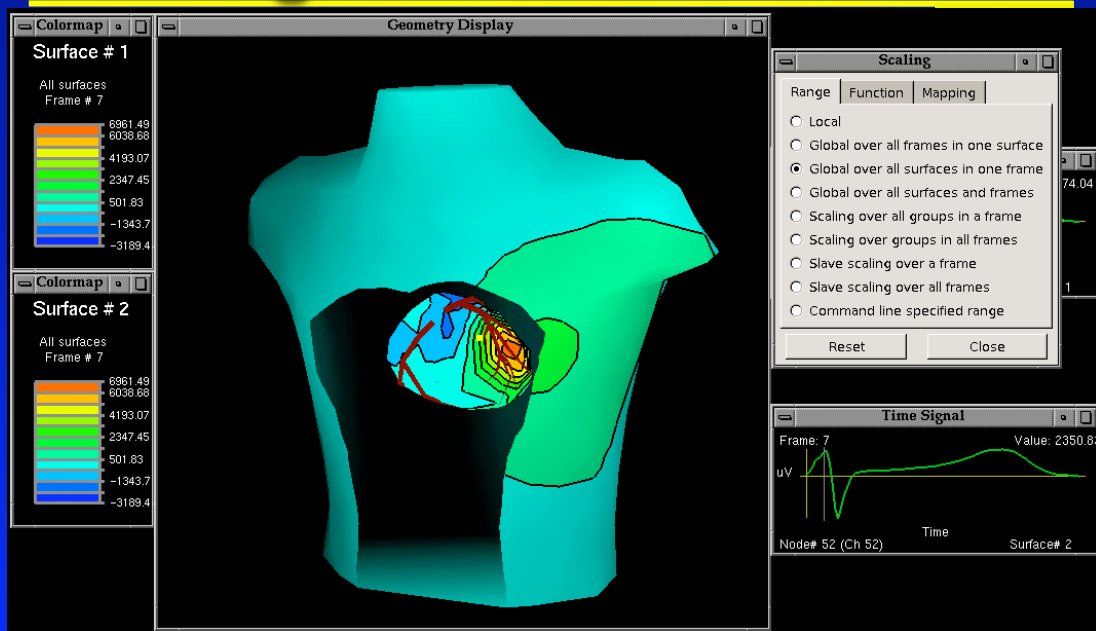
Scaling Window



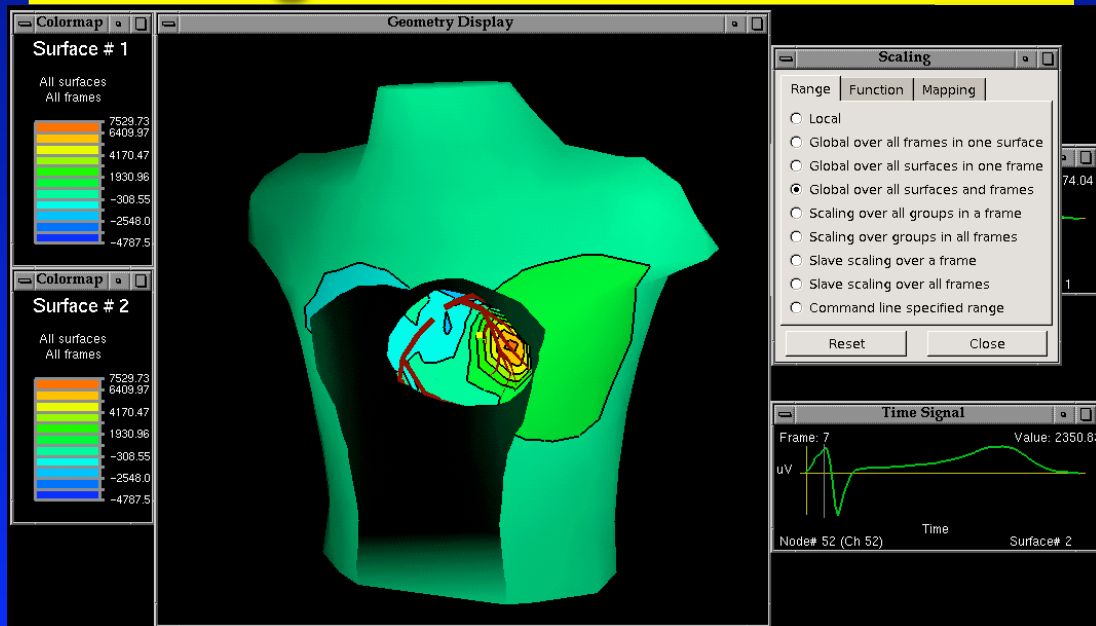
Scaling Window



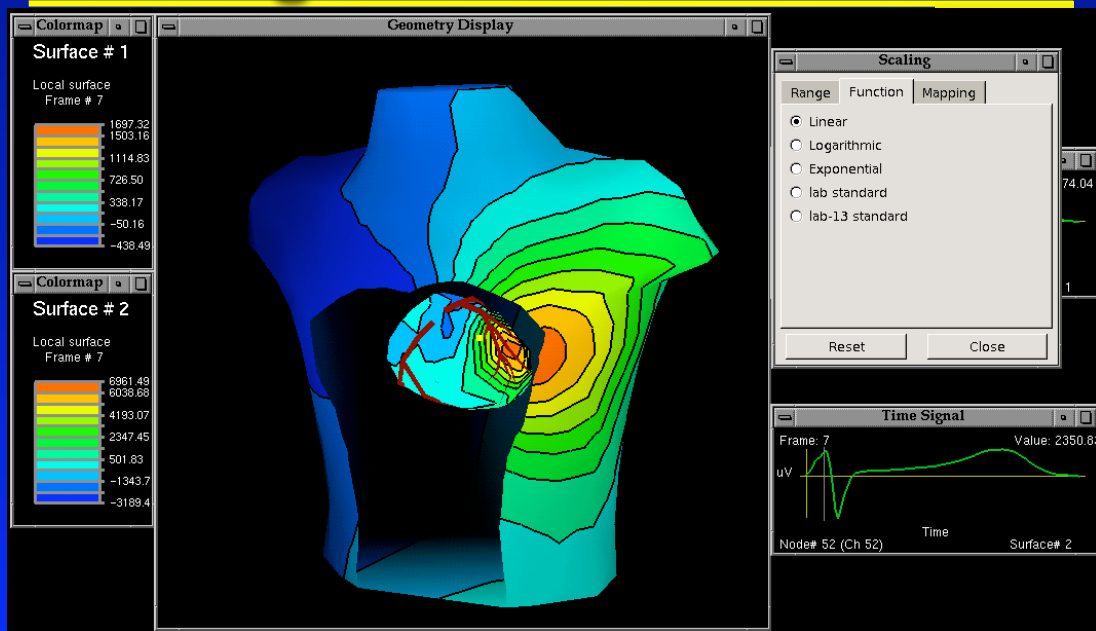
Scaling Window



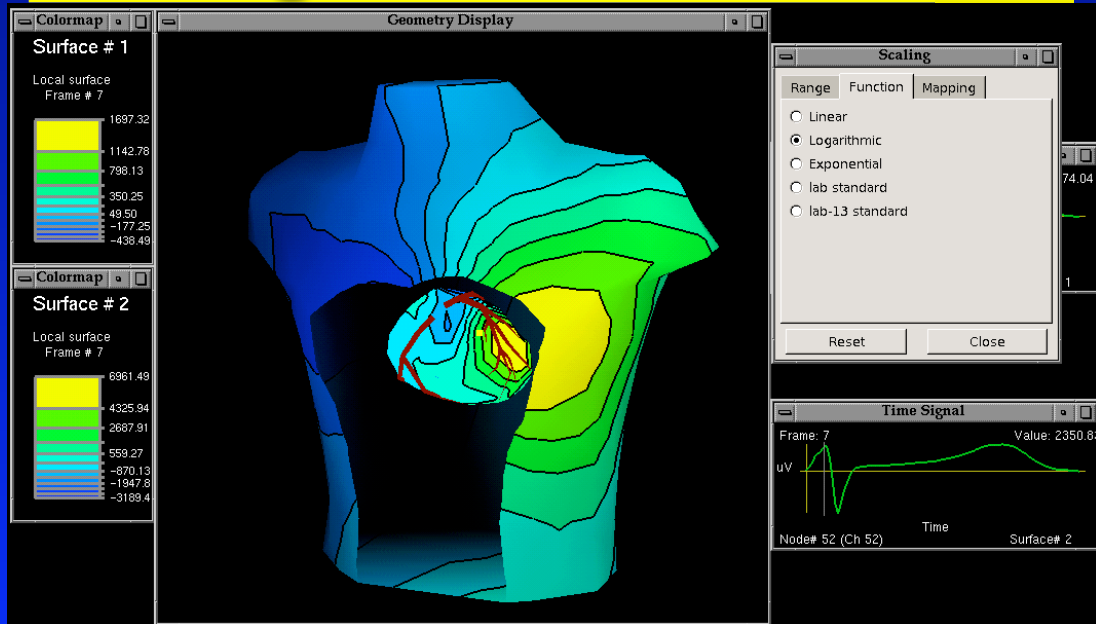
Scaling Window



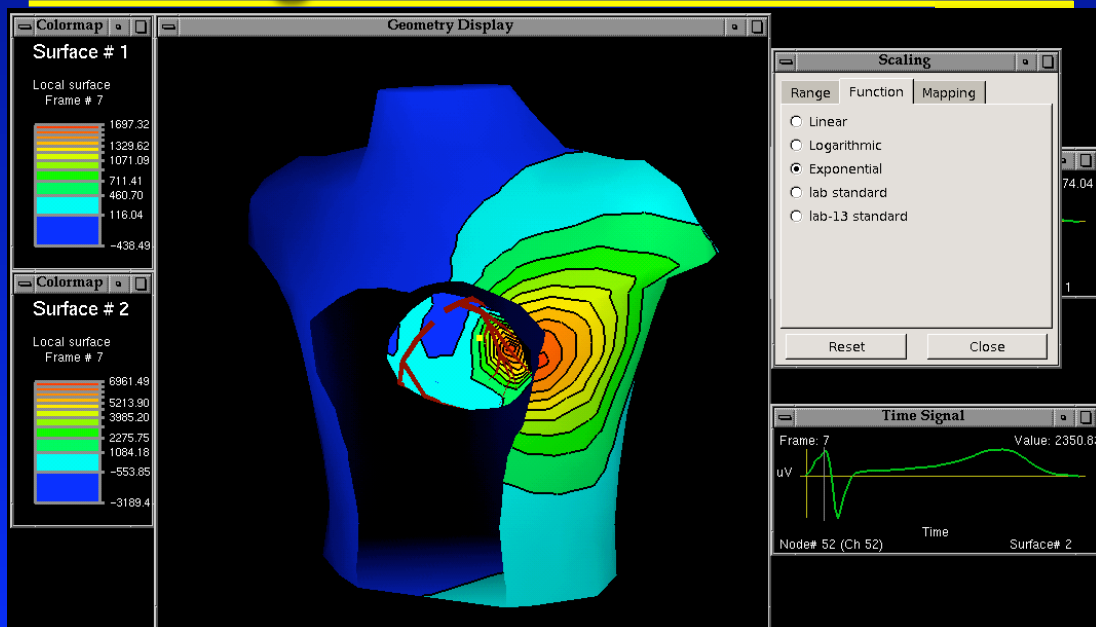
Scaling Window



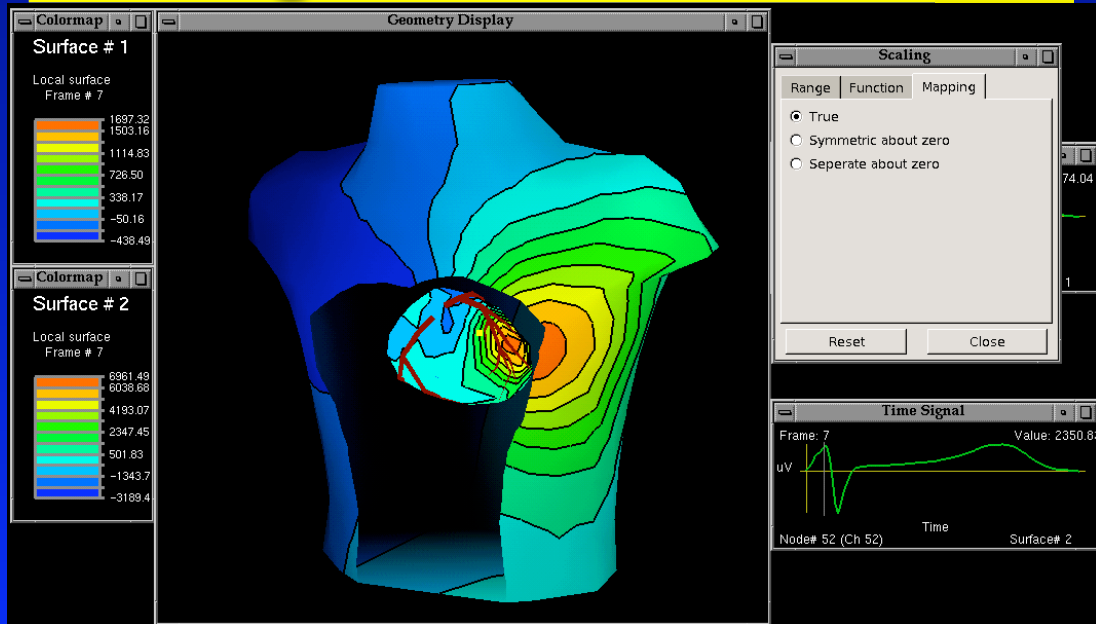
Scaling Window



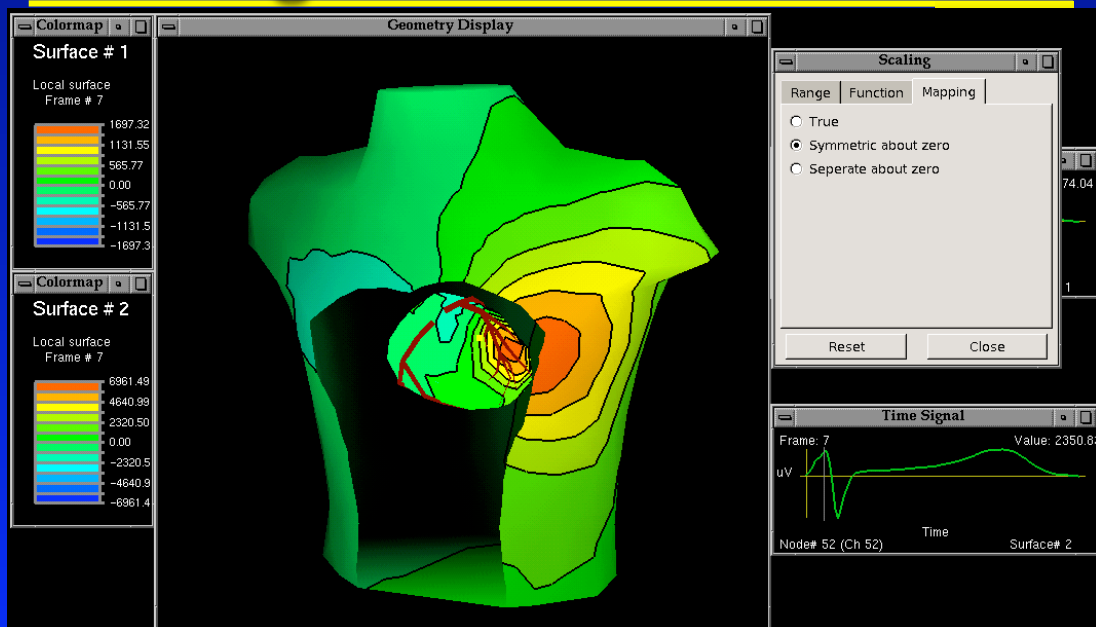
Scaling Window



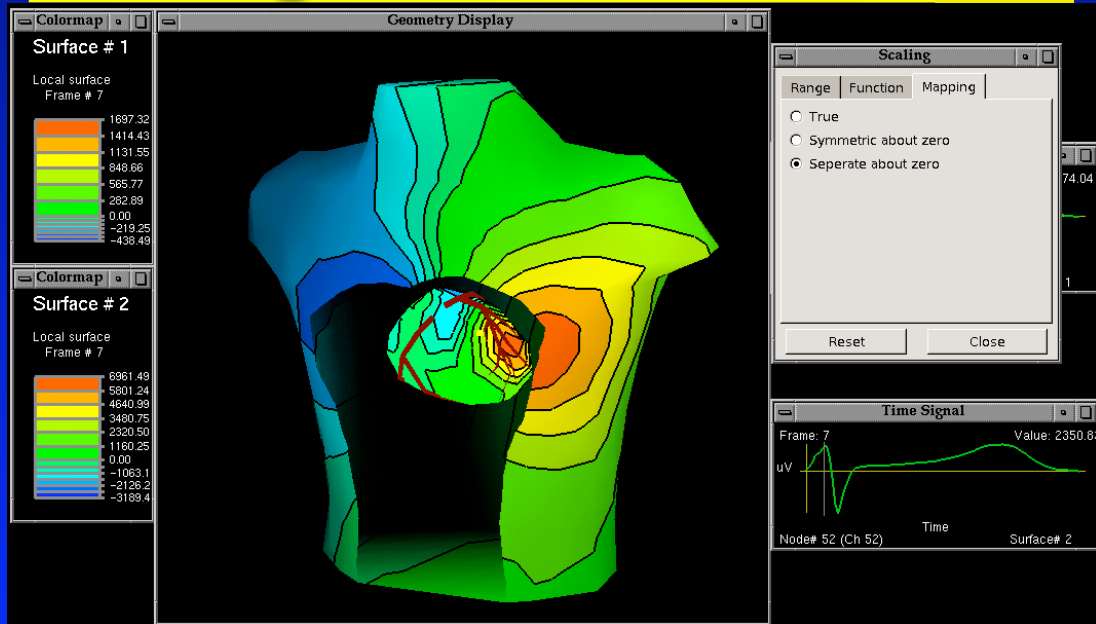
Scaling Window



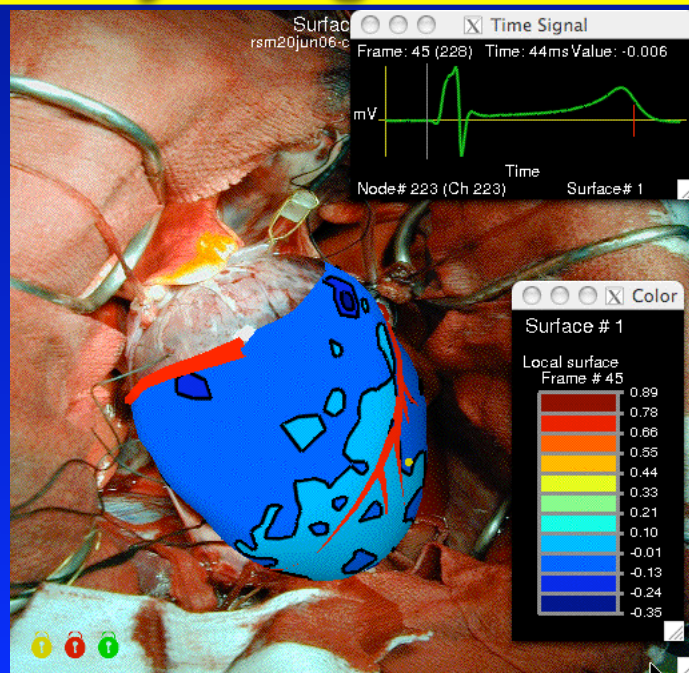
Scaling Window



Scaling Window

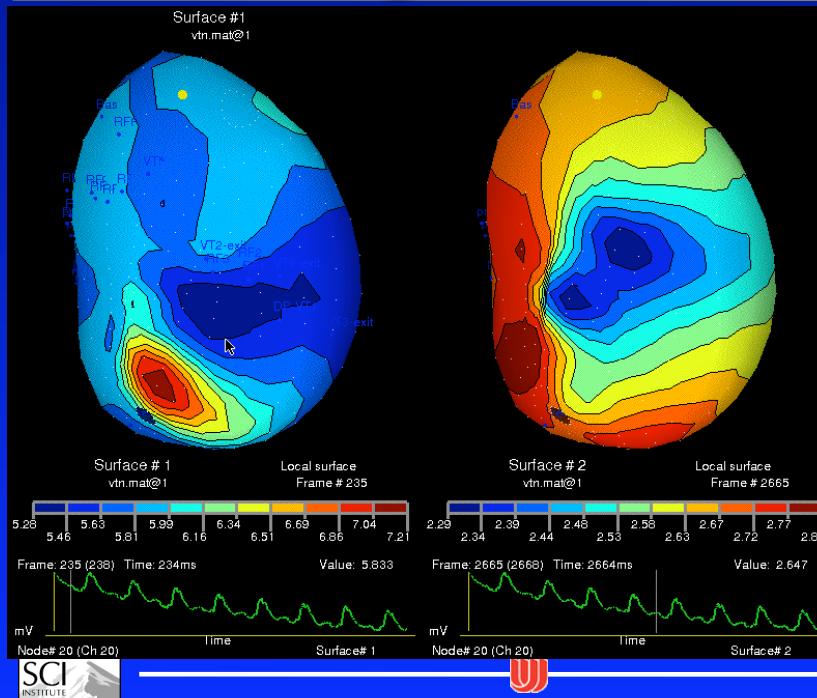


Underlay Image/Movie



Visualizing Clinical Data

map3d



Reentrant VT data
computing with the
Endocardial Solutions
Incorporated (St. Jude
Medical) system and
visualized in map3d

Data courtesy Ed
Ciaccio, Columbia
University



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What Next?

map3d

Not much: stable application

- You tell us!

OS updates

Big fixes

Incremental new features



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