DOE/NV/25946--1640

"SurVisTool" Visualizing and Analyzing Multiple Time Histories Sampled Over a Surface

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For 7th Annual PDV Workshop
October 22–23, 2012
Albuquerque, NM

This work was done by National Security Technologies, LLC, under
Contract No. DE-AC52-06NA25946 with the U.S. Department of Energy.

Interactive Movie Maker

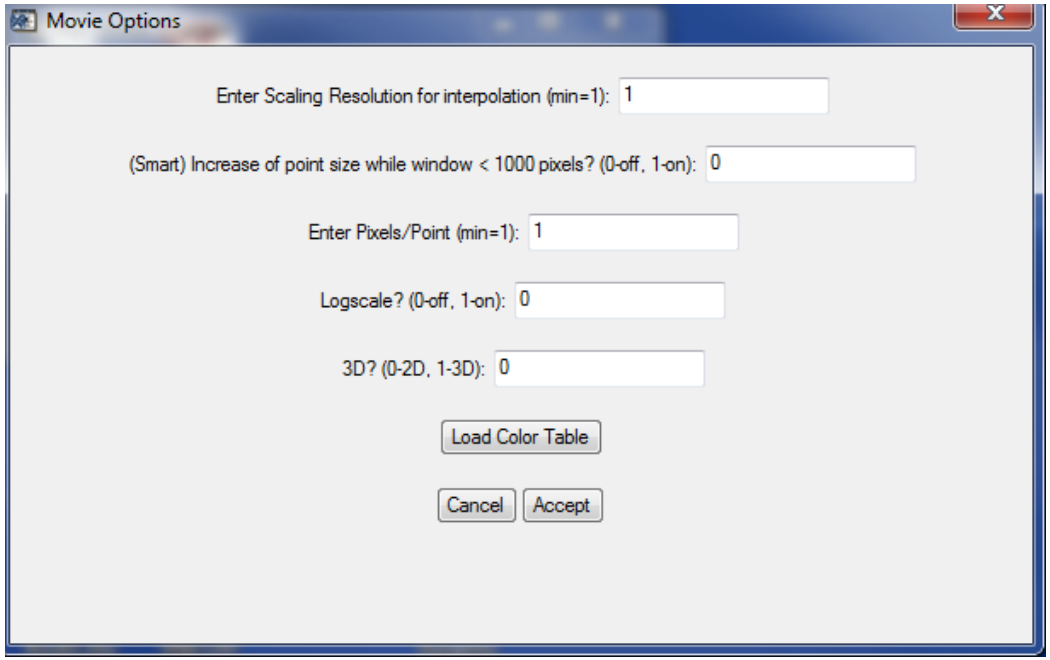
We have designed and implemented a software tool with IDL called “SurVisTool” that creates an interactive movie with a set of time history traces and their coordinates on a surface.

Major features of SurVisTool:

- Displays 2D and 3D movies with controls
- Currently, user can interact with the 2D movies
- Save movie clips
- Save points for analysis

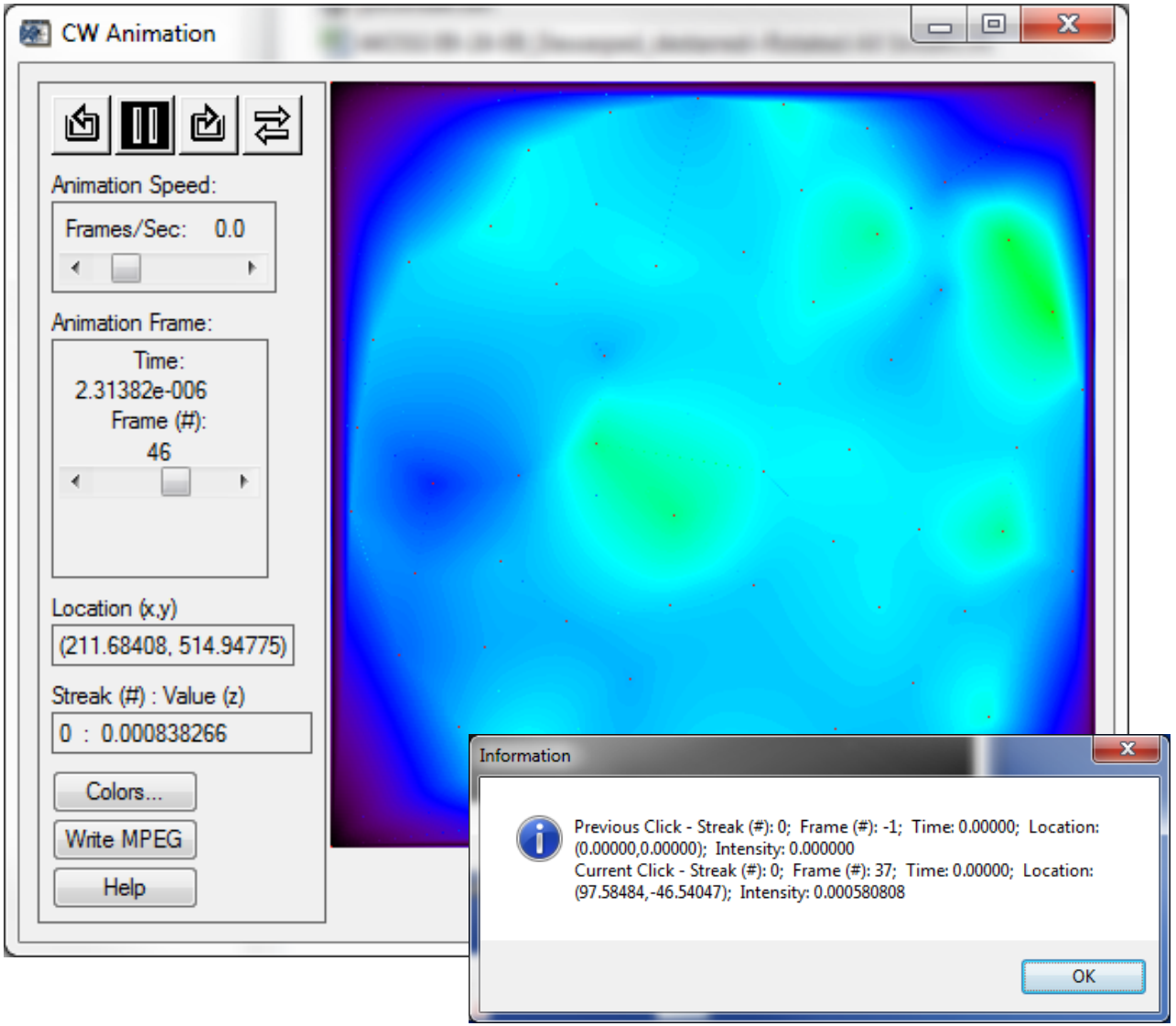
Setup screen

- Input data and coordinates
- The code defaults with largest scale image using interpolation.
- Adjustable resolution scale (or turn interpolation “off”)
- Log-linear scaling
- Interchangeable color tables



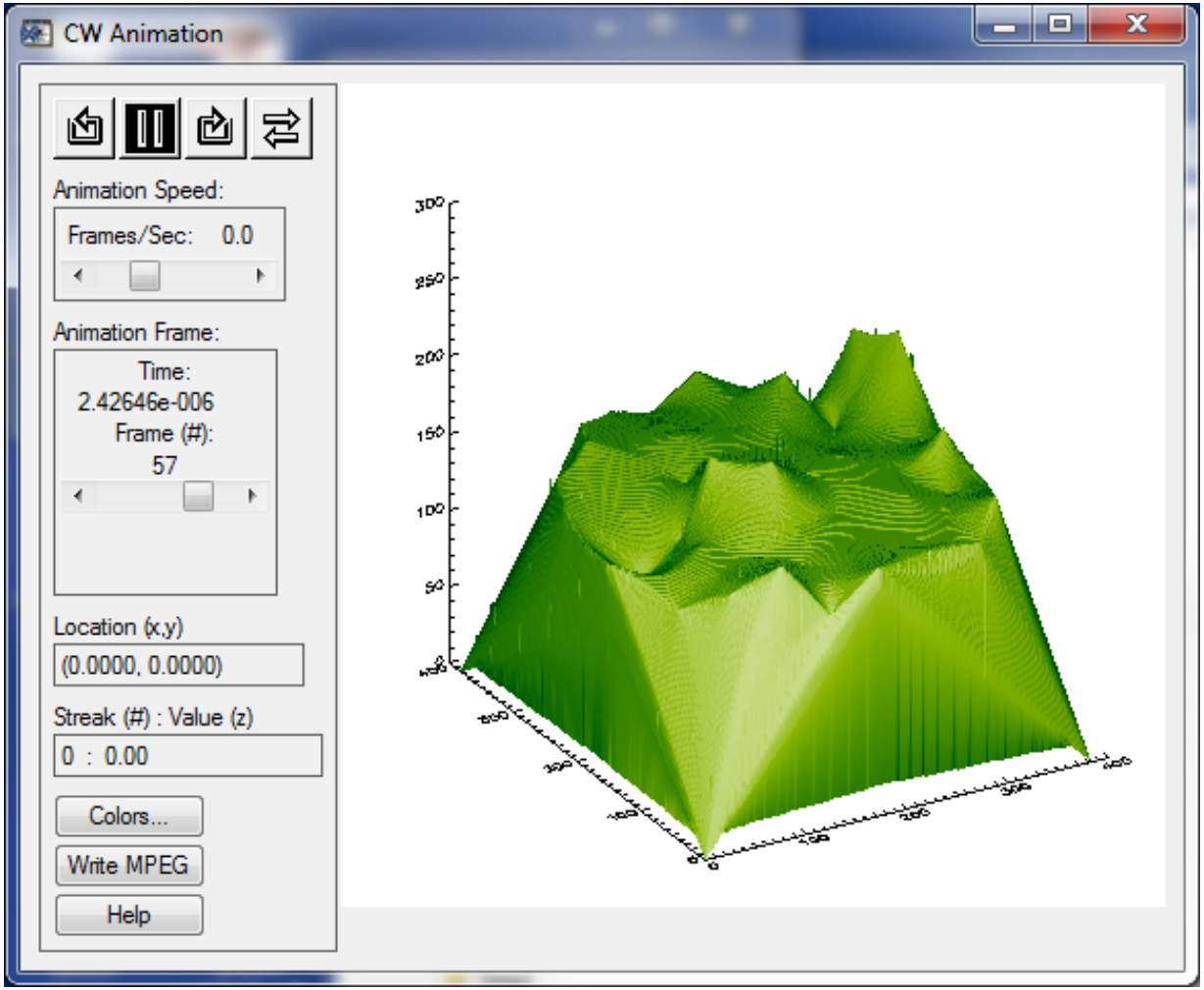
2D mode is interactive

- Slider bars control frame rate and time
- Cursor shows value at current location
- User can “select” and save points with a mouse click
- User can change color tables “on the fly”
- Animation can be saved as an MPEG



3D view

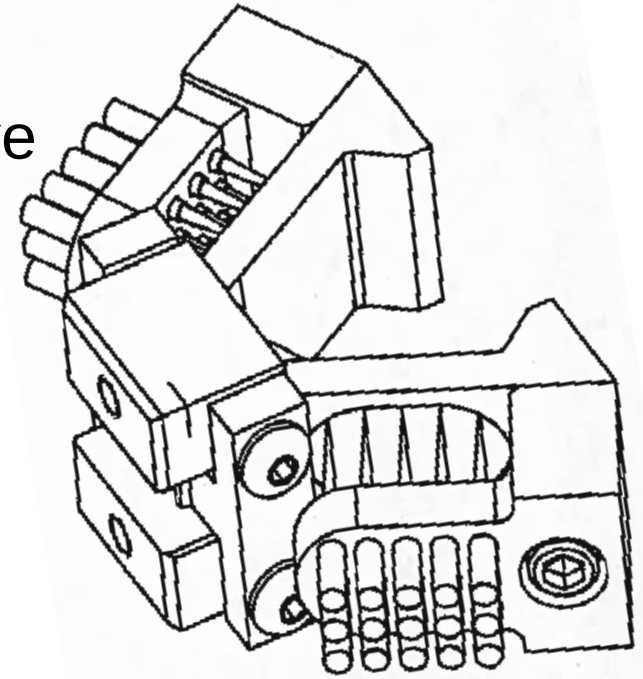
- Slider bars control frame rate and time
- User can change color tables “on the fly”
- Animation can be saved as an MPEG

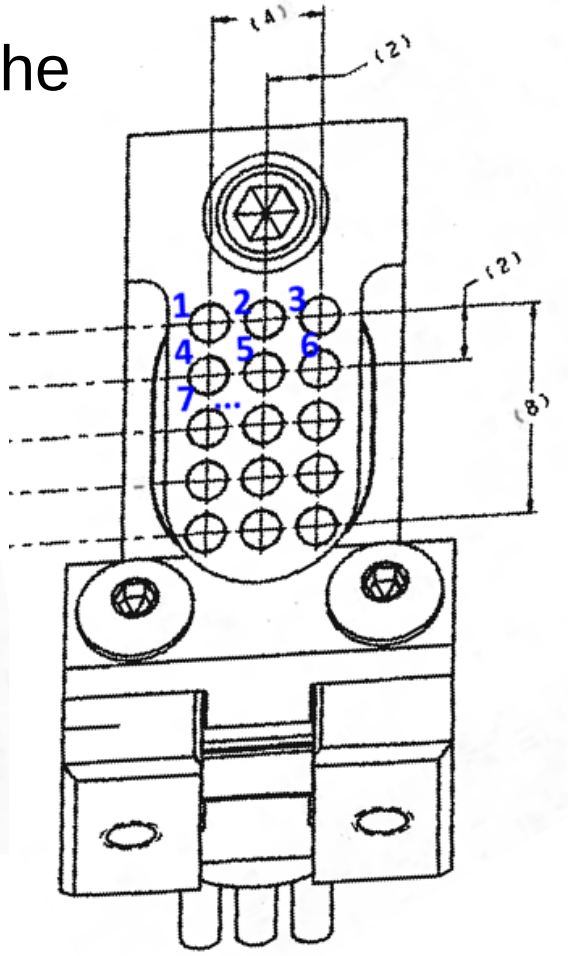


Example 1

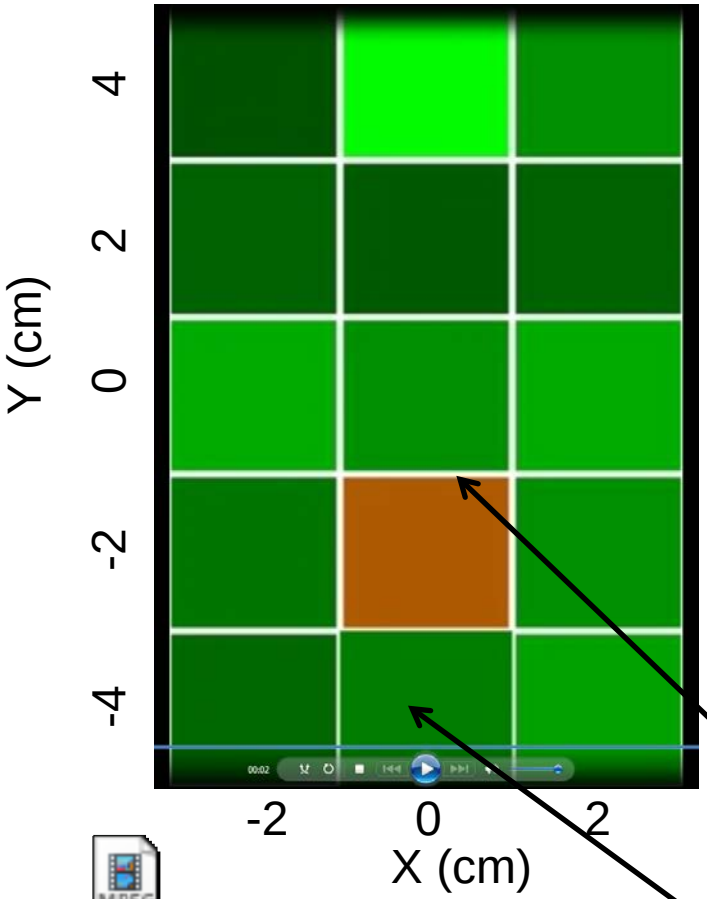
Resolution: LLNL calibration shot

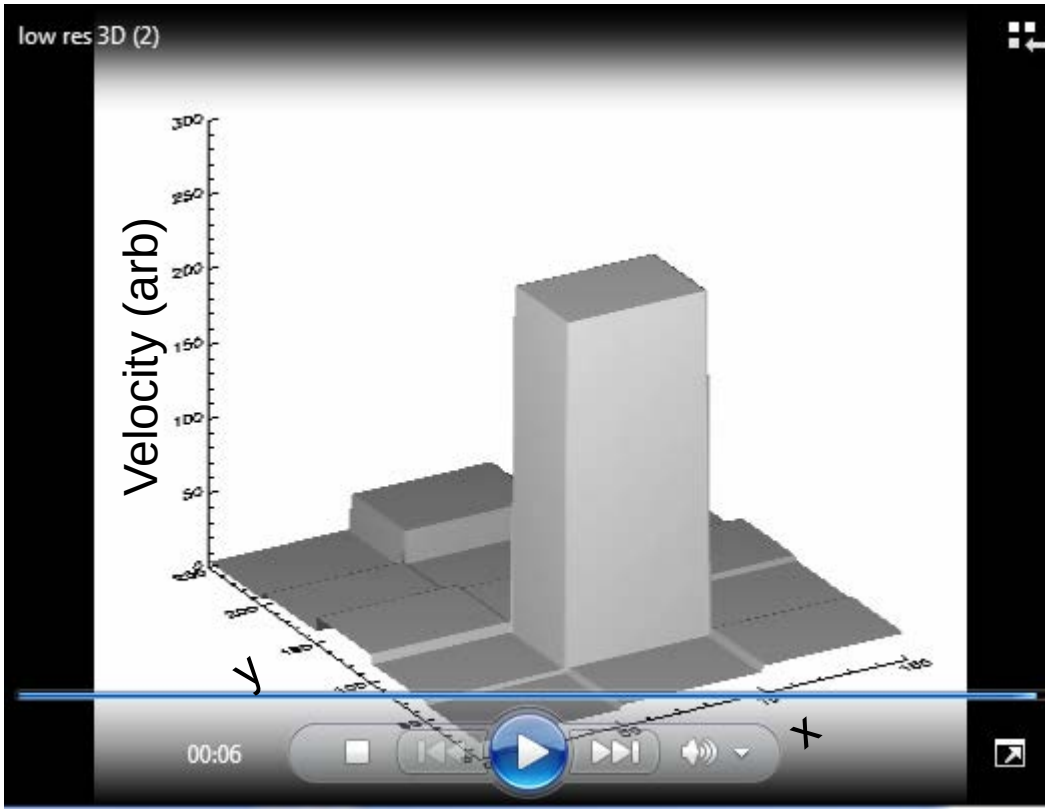
- MPDV diagnostic
- 14/15 channels in a uniform array over the surface
- 335 time steps
- Ramp shock wave





Low resolution movies (channels on a grid)





lowres.mpg

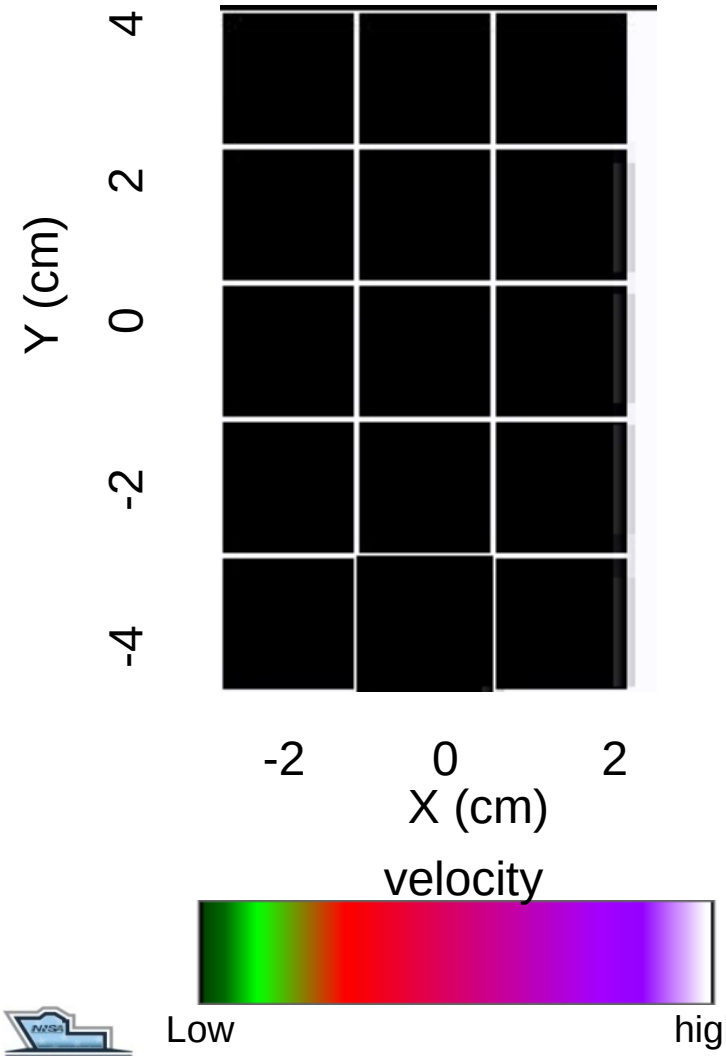
low res 3D.mpg

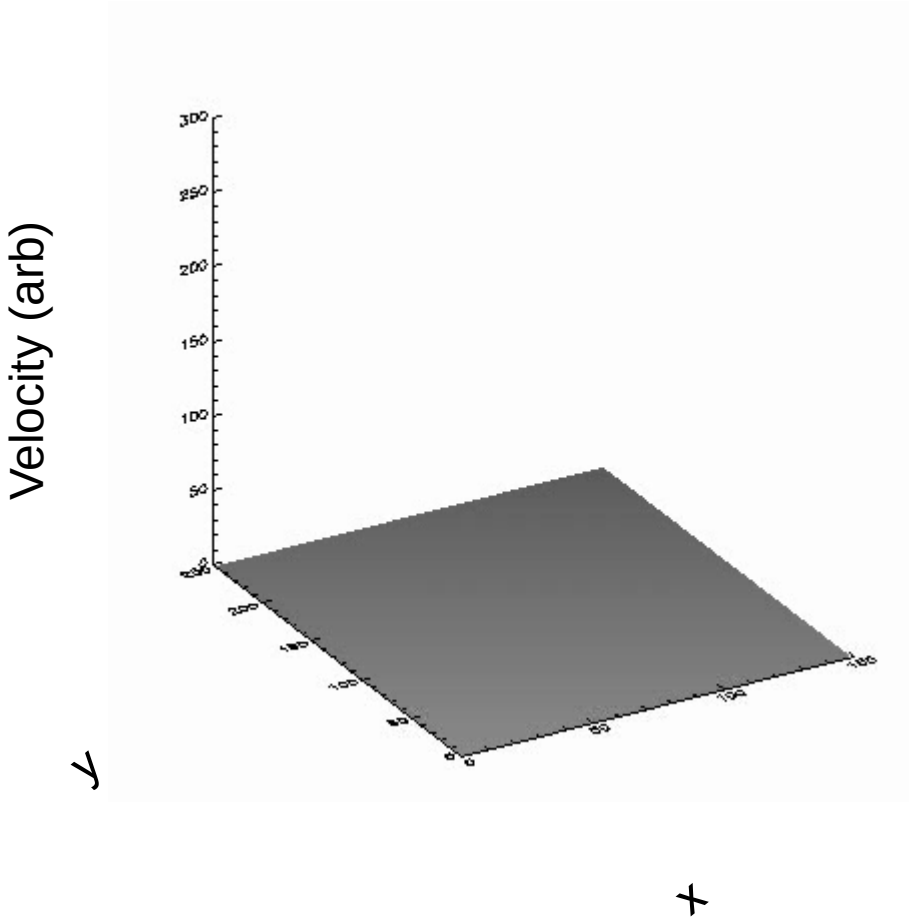
White outlines identify original data

Missing channels are interpolated

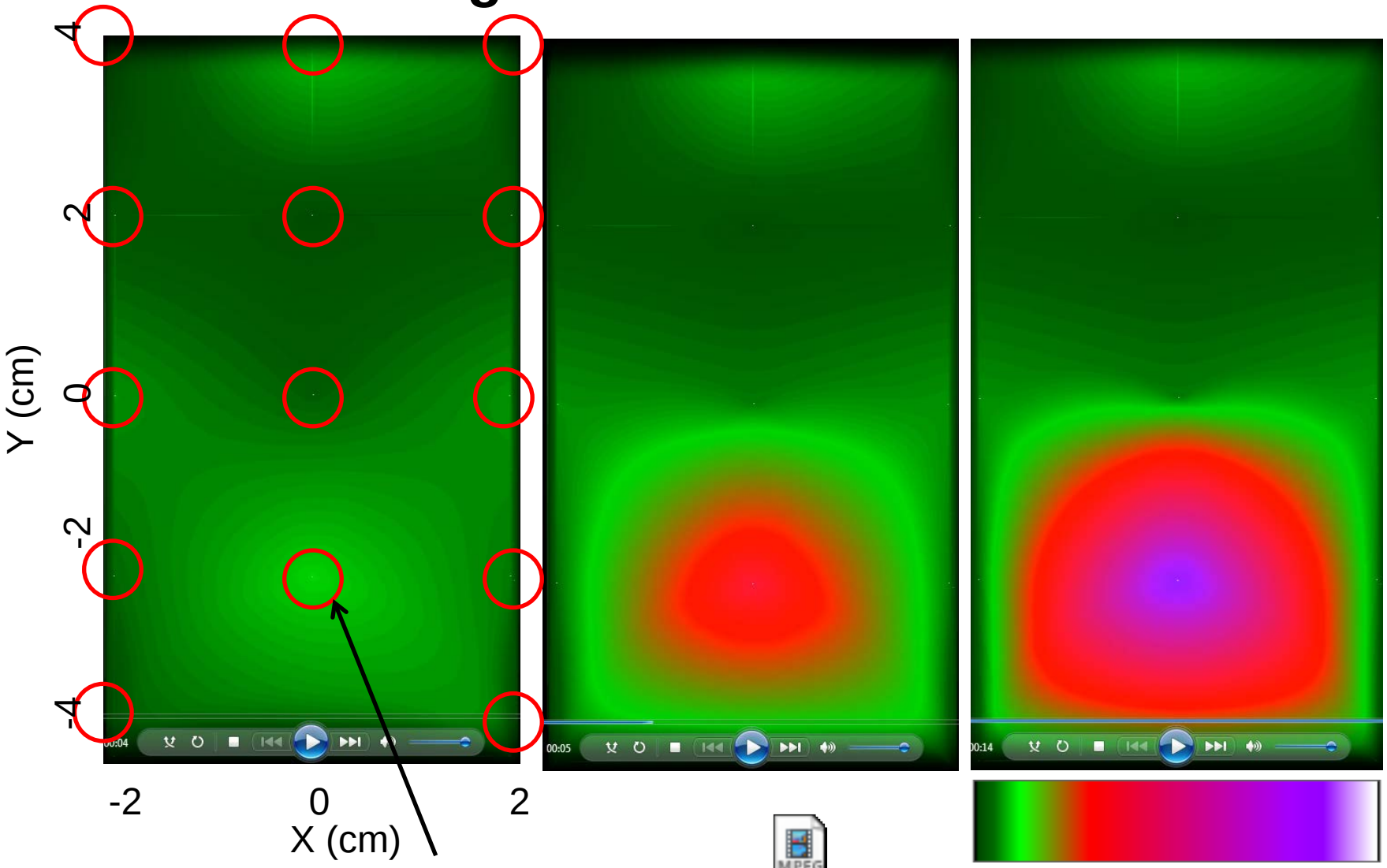
velocity

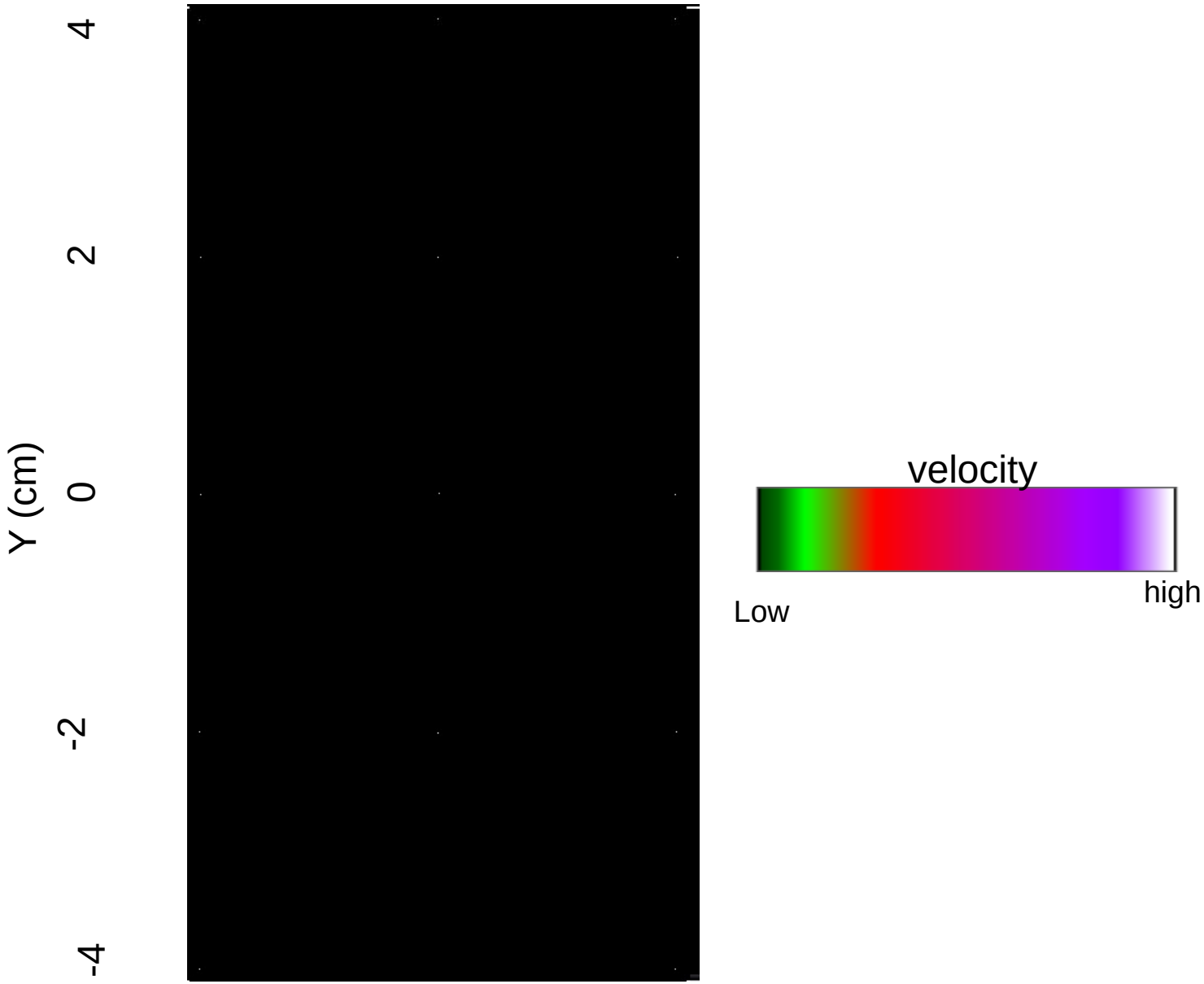
Low high


Y (cm)
4
2
0
-2
-4
-2
0
2
X (cm)
velocity
Low
high

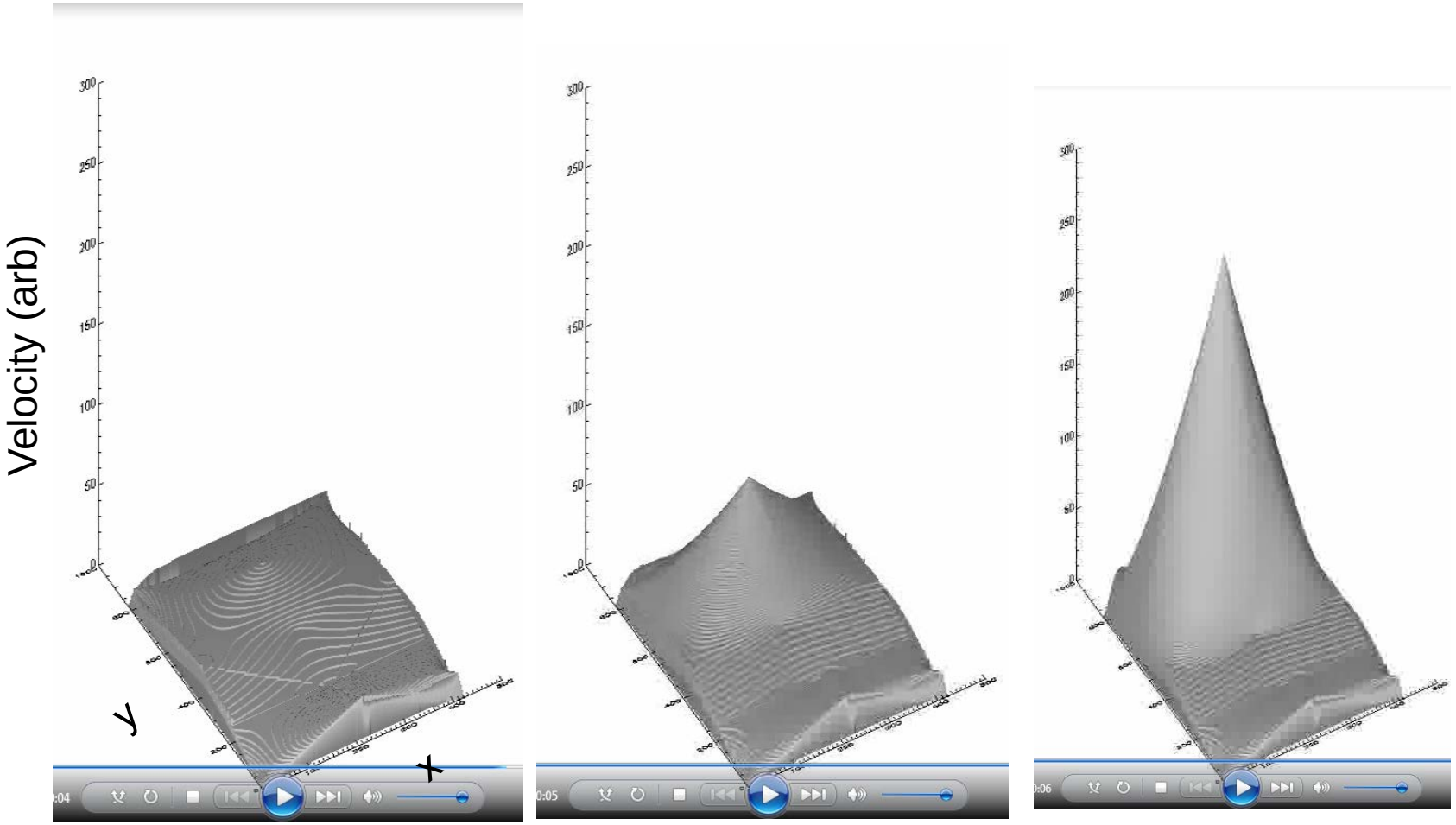

Velocity (arb)
300
250
200
150
100
50
Y
X

High resolution 2D movie

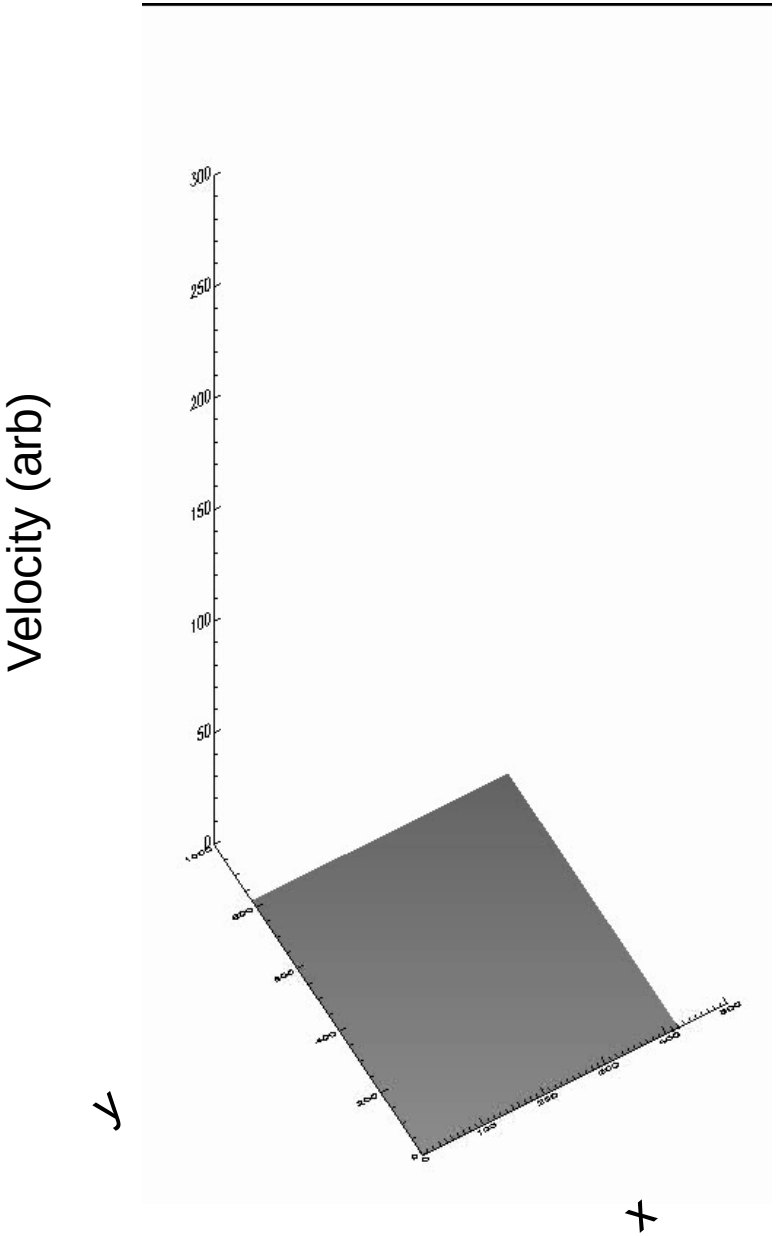



4
2
0
-2
-4
Y (cm)
-2
0
2
10
X (cm)
velocity
high
Low

High resolution 3D movie



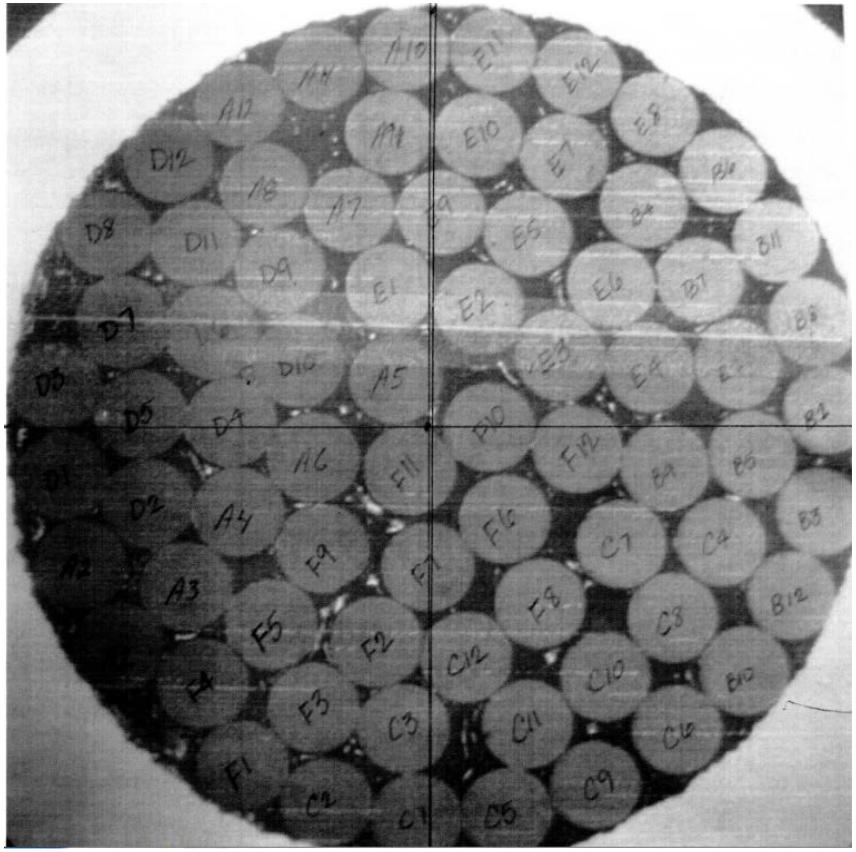
shot13D rev.mpg


Velocity (arb)
300
250
200
150
100
50
0
y
x

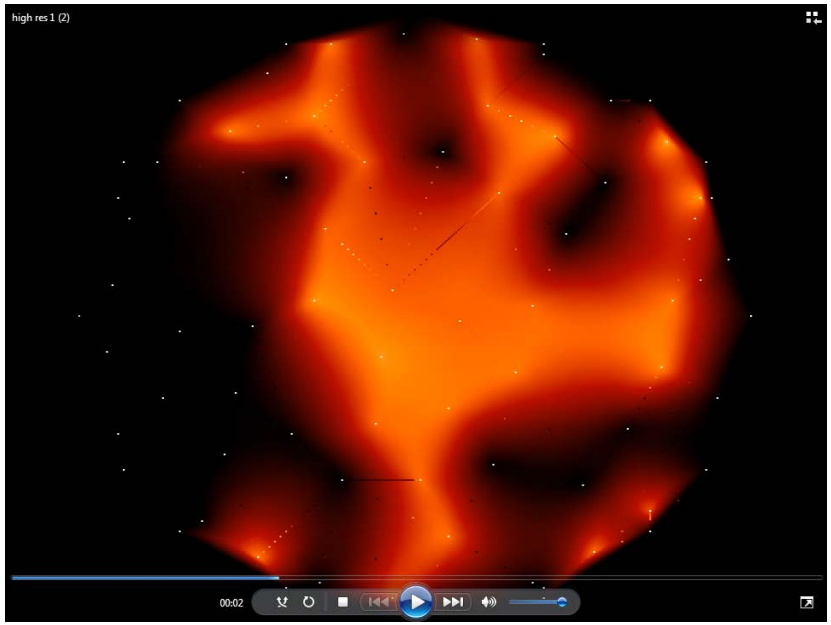
Example 2

HE detonation data

- MPDV diagnostic
- 53 (out of 72) channels, 1039 time steps
- Irregular array



Color tables enhance different features

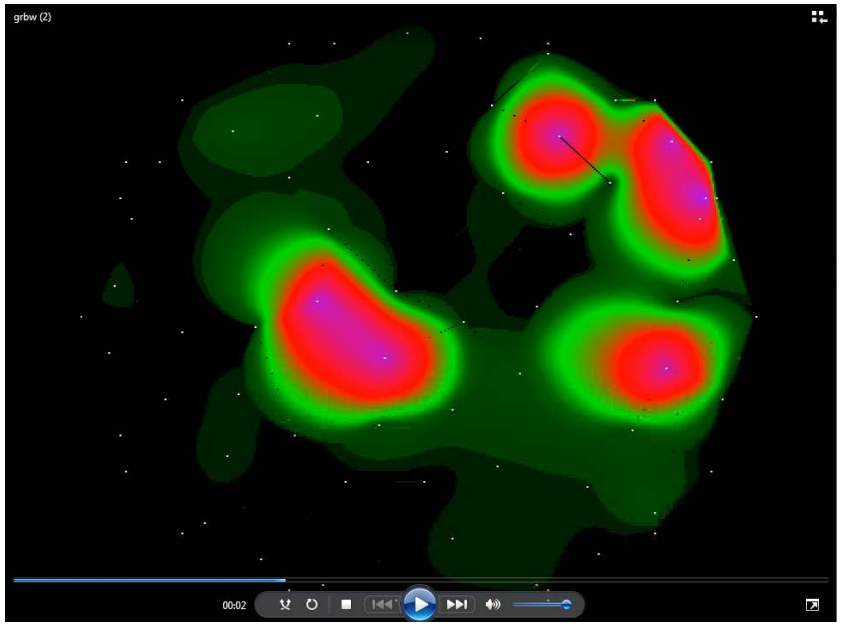


velocity

Low high

high res 1.mpg

Red temperature
general trend



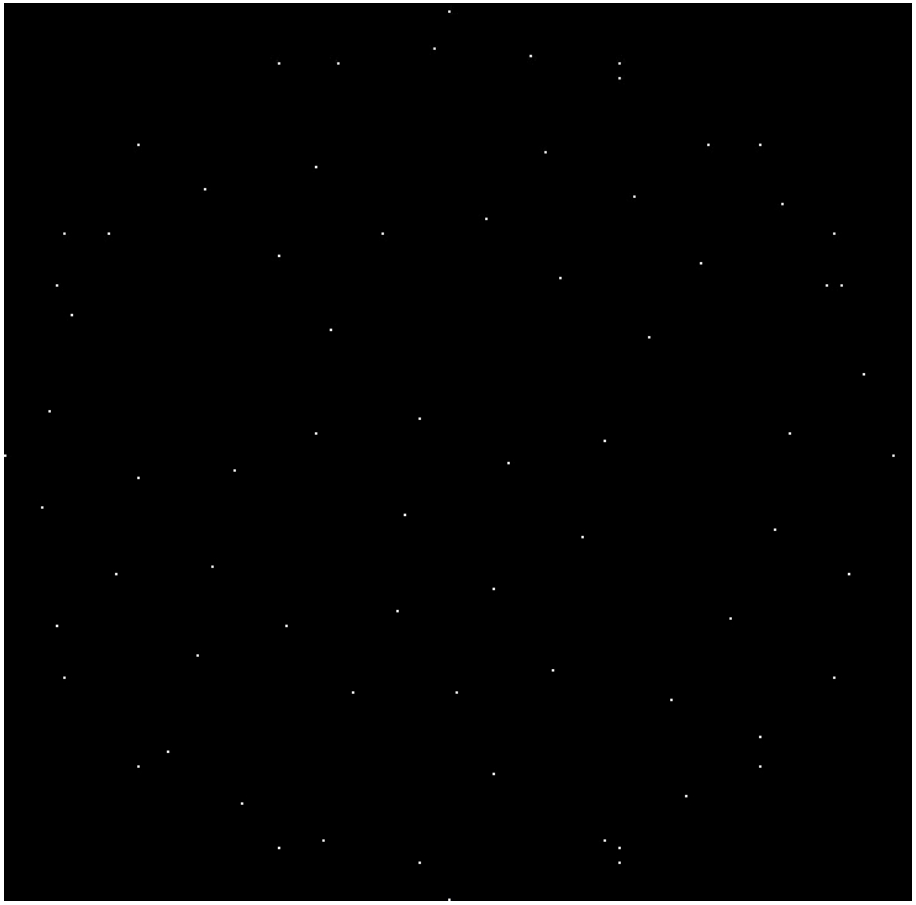
velocity

Low high

grbw.mpg

Green-red-blue-white
Small amplitudes, small variations, and fluctuations

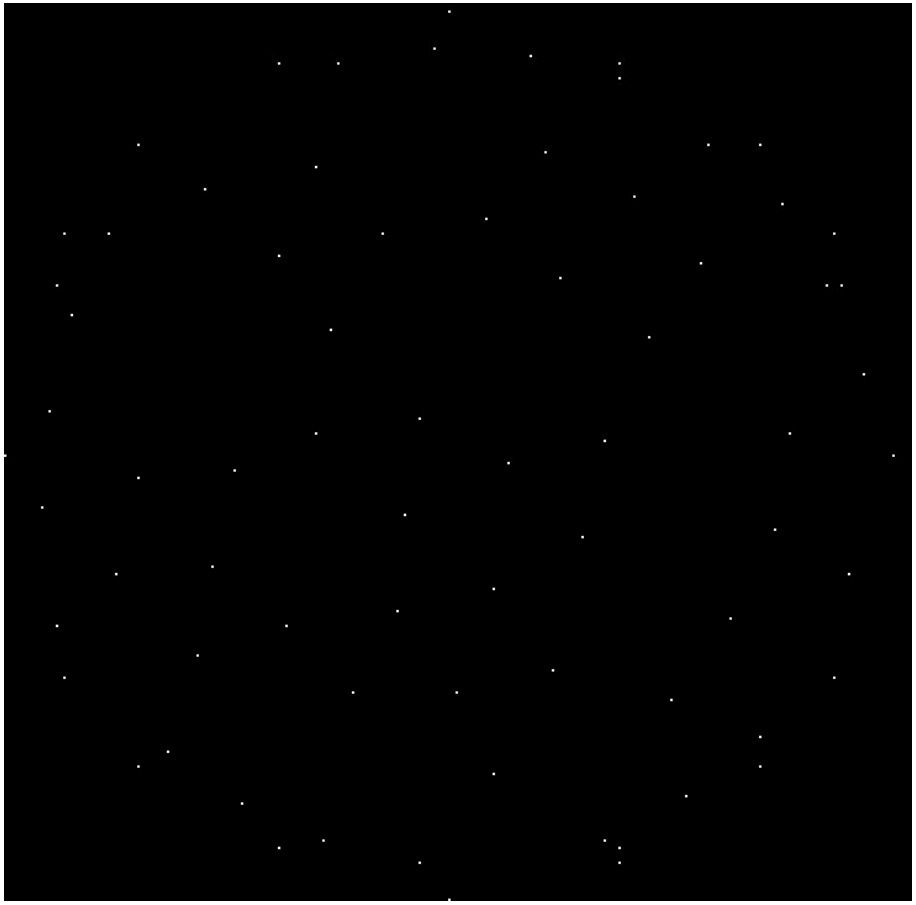
Red temperature
general trend



velocity

Low high

Green-red-blue-white
Small amplitudes, small variations



velocity

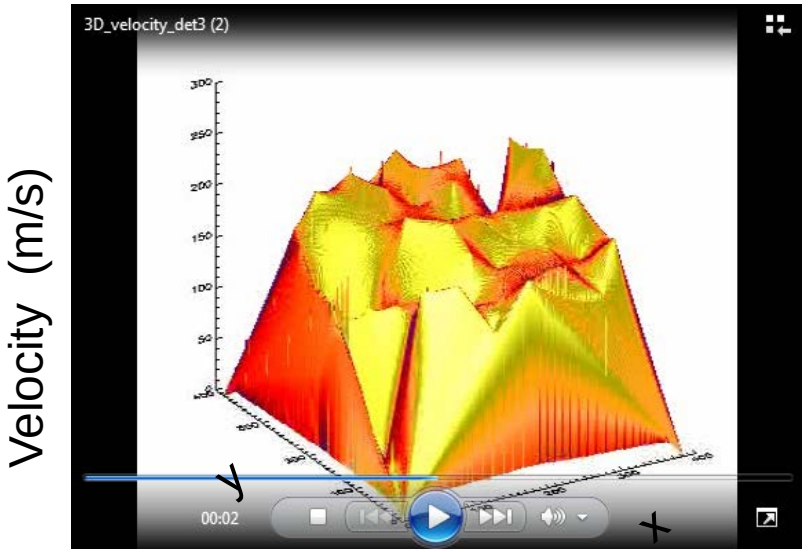
Low high

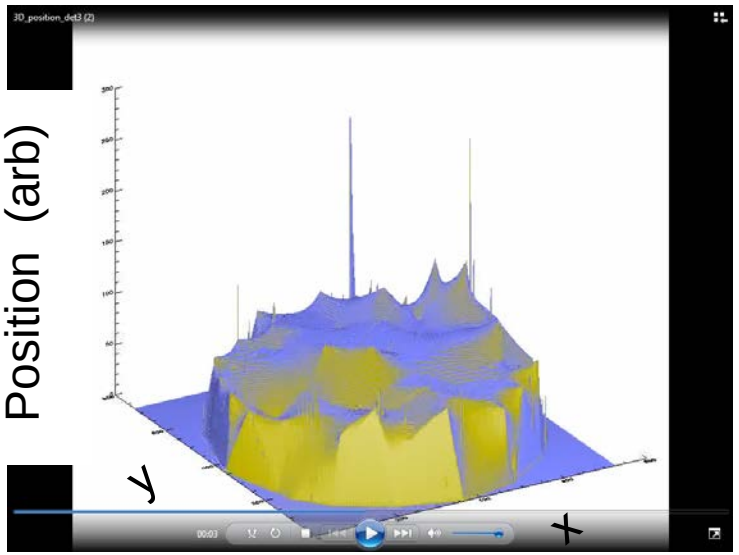
3D projection

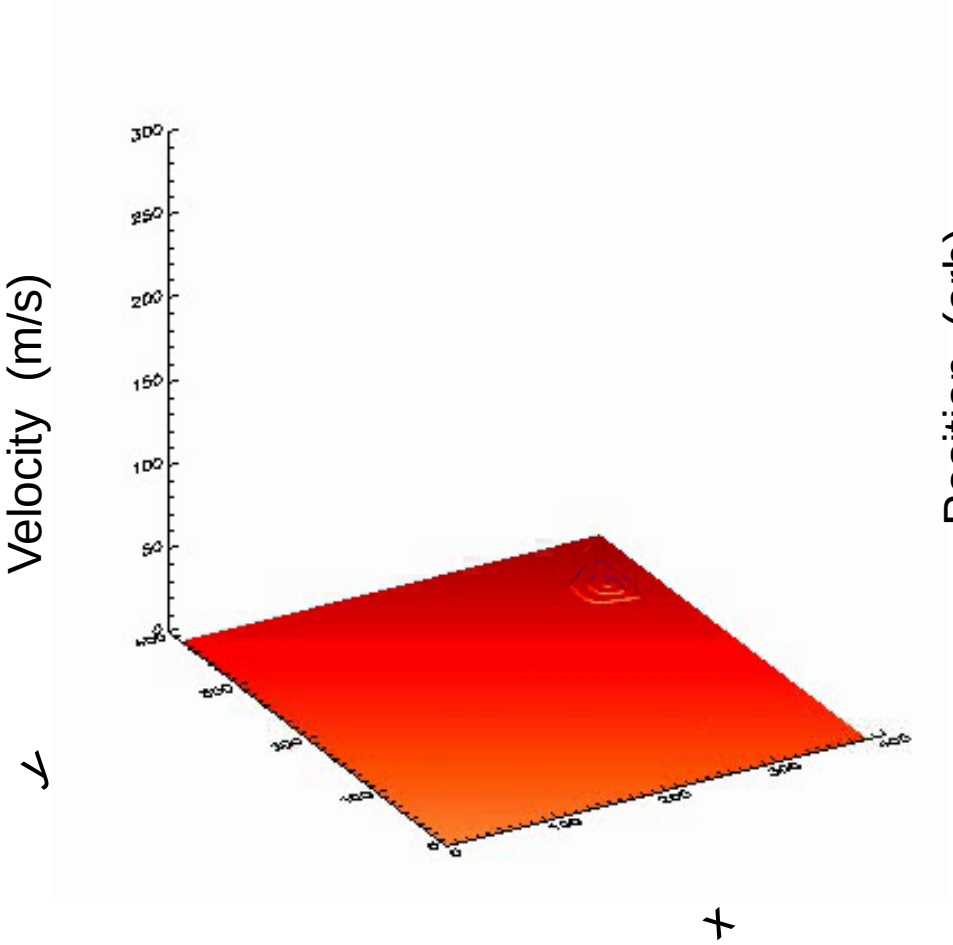
Compare velocity with position

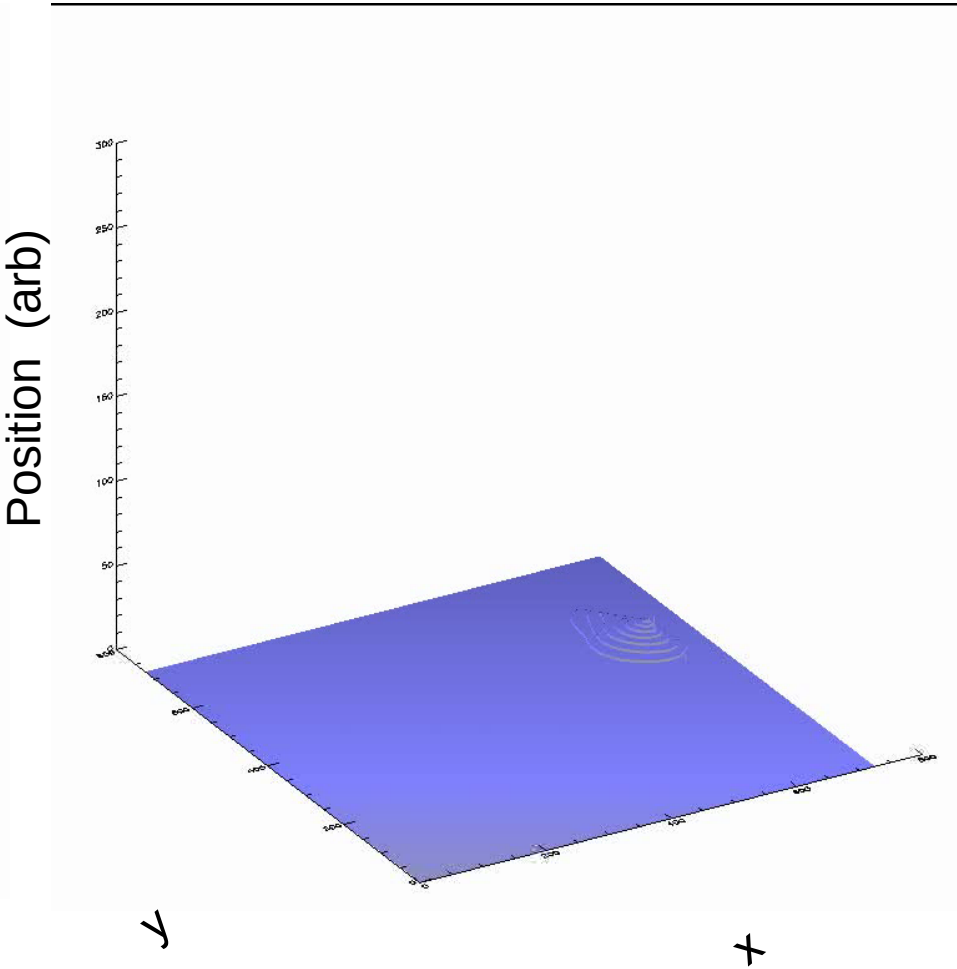
3D_velocity_det3.mpg

3D_position_det3.mpg






Velocity (m/s)
300
250
200
150
100
50
y
x


Position (arb)
300
250
200
150
100
50
y
x

Comments and wishes

- The program is limited by the number of pixels in the visualization rather than number of channels or the length of the time history (128 channels? Why not?)

- Can work with any 2D data set (synthetic data, streaked data, multi point VISAR)

Code is in its infancy with a long wish list

- Edit window for selected points
- Time-trace line out
- Contour display
- Color key
- Handle non-rectangular boundaries
- Interactive 3D point of view

SurVisTool

- User can interact with the movie in 2D mode
- 3D mode
- Save movie clips
- Save points for analysis