3D visualization techniques

Example of visualizing 3D data

Flow of air over a blunt fin

- There are 5 data components and associated 3D coordinate information
- 3 of the scalar components contribute to form a vector
  - momentum vector
- Data file format (ASCII)

```
density x-momentum y-momentum z-momentum stagnation x y z
```

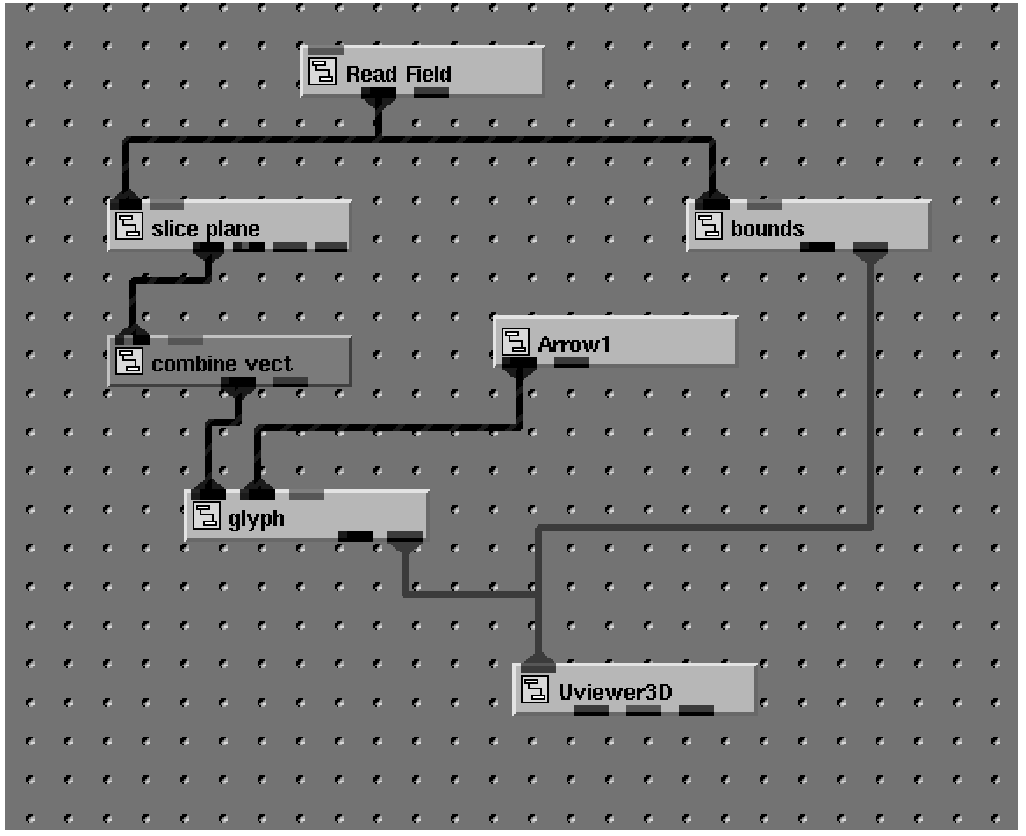
- Data on a 10x8x8 irregular grid

fin.fld

```
# AVS field file
# Bluntfin
ndim = ?
dim1 = ?
dim2 = ?
dim3 = ?
nspace = ?
veclen = ?
data = ?
field = ?
label = density x-momentum y-momentum z-momentum stagnation
variable 1 file = /usr/express/auxdata/fin.dat filetype = ?
    skip = ? offset = ? stride = ?
variable 2 file = /usr/express/auxdata/fin.dat filetype = ?
    skip = ? offset = ? stride= ?
variable 3 file = /usr/express/auxdata/fin.dat filetype = ?
    skip = ? offset = ? stride = ?
```

```
variable 4 file = /usr/express/auxdata/fin.dat filetype = ?
    skip = ? offset = ? stride = ?
variable 5 file = /usr/express/auxdata/fin.dat filetype = ?
    skip = ? offset = ? stride = ?
coord 1 file = /usr/express/auxdata/fin.dat filetype = ?
    skip = ? offset = ? stride = ?
coord 2 file = /usr/express/auxdata/fin.dat filetype = ?
    skip = ? offset = ? stride = ?
coord 3 file = /usr/express/auxdata/fin.dat filetype = ?
    skip = ? offset = ? stride = ?
```

Visualizing vector data

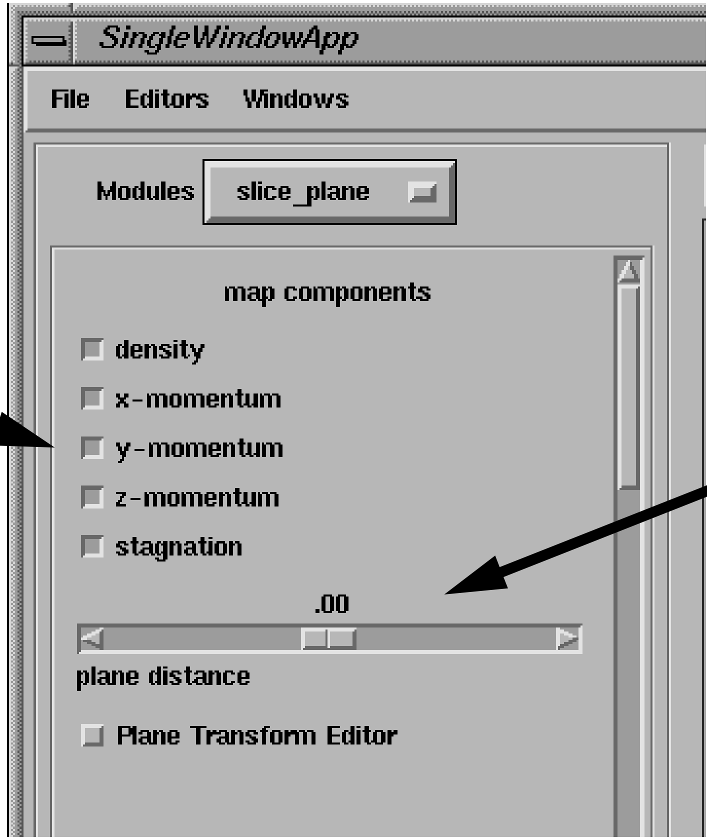


Visualizing vector data

- `slice_plane`
  - extracts arbitrary 2D slice from 3D field
- `combine_vect`
  - selects some or all components of 3D field
- `glyph`
  - creates geometrical object indicating field values
  - uses `Arrow1`
- `bounds`
  - generates a bounding frame of the 3D field

slice_plane

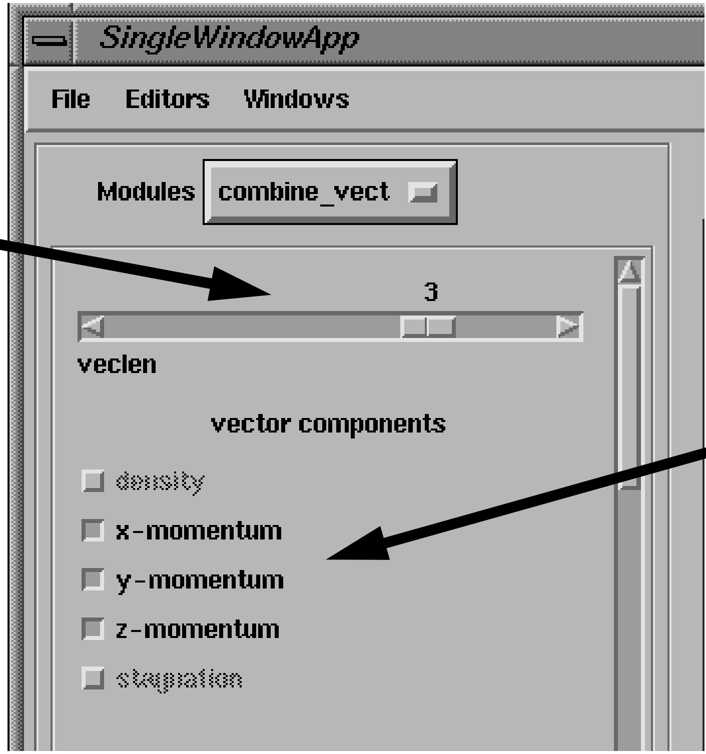
Select which components to transfer



Move the slice through field perpendicular to current orientation

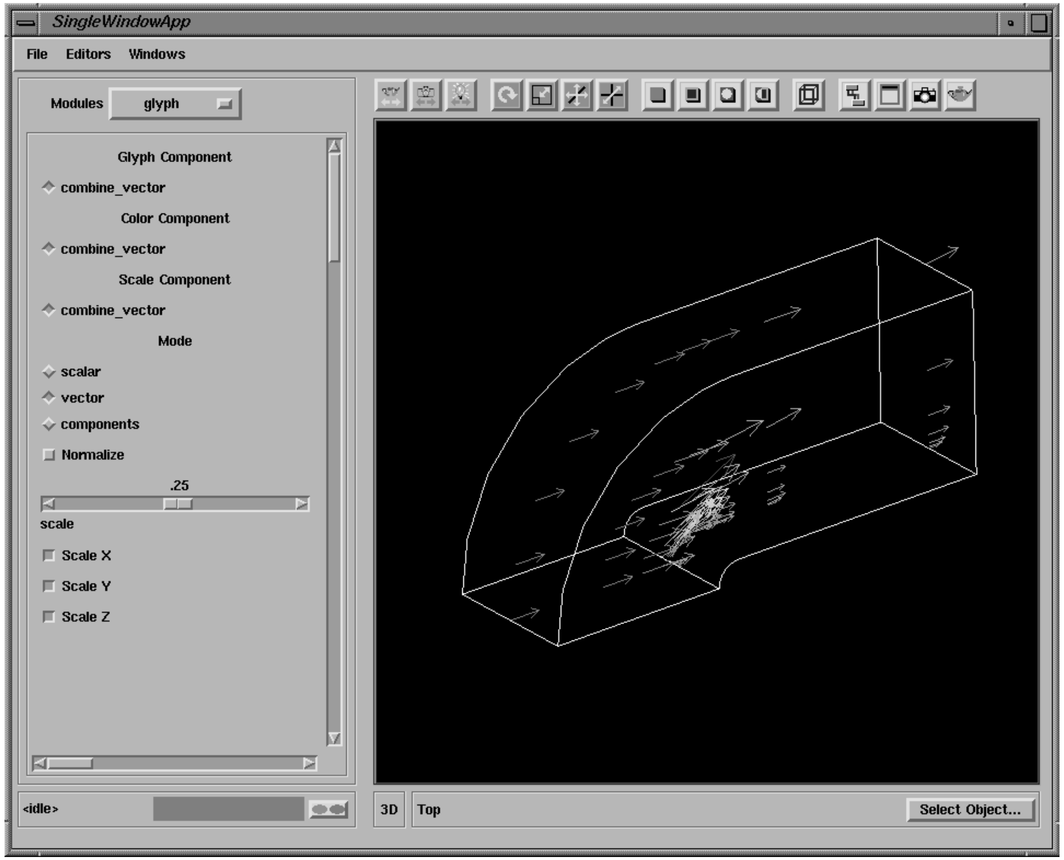
combine_vect

Specify *number* of components to combine

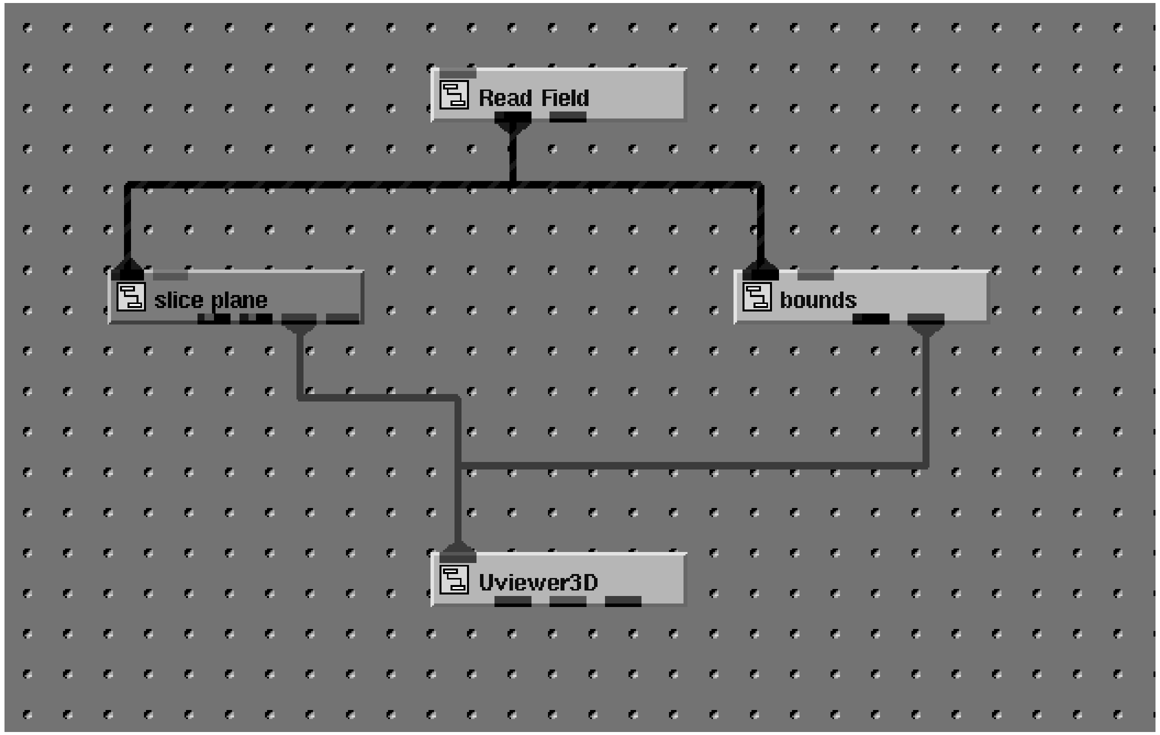


Specify *which* components to combine to form a vector

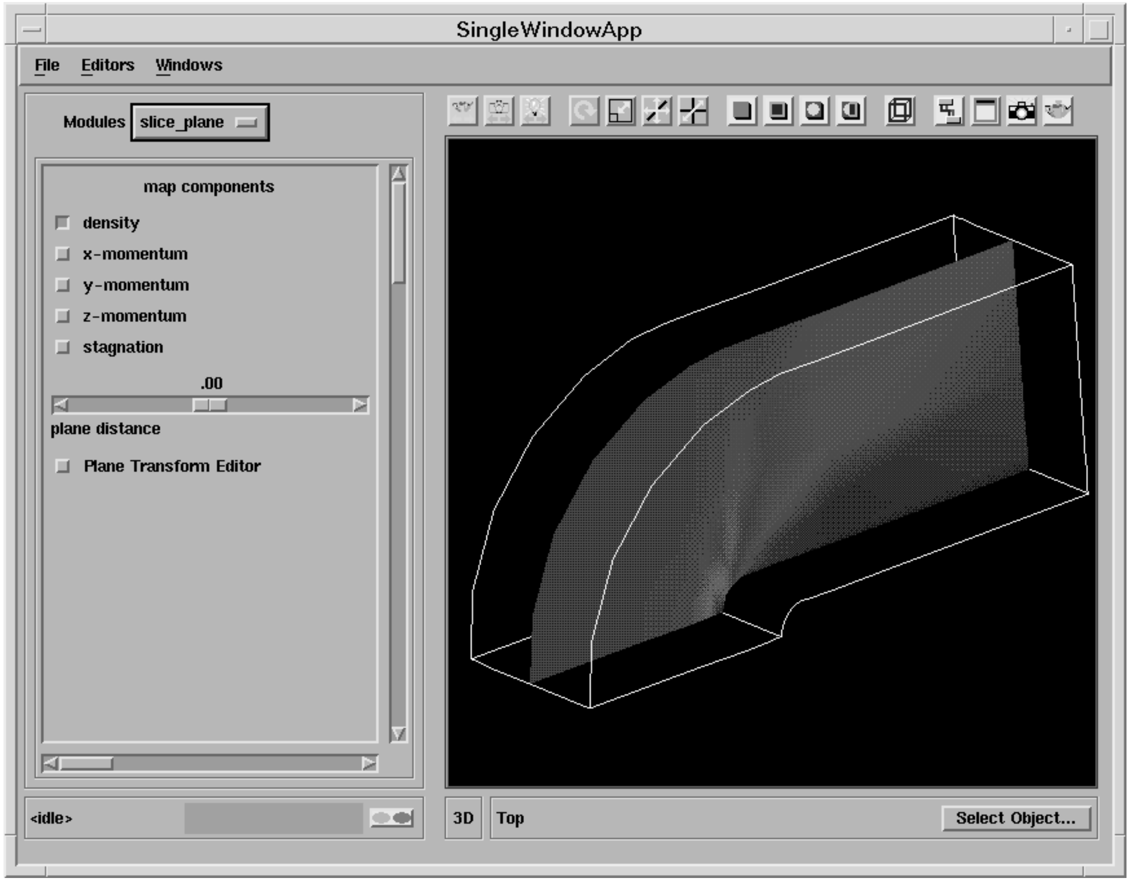
glyph and Arrow1



Visualizing scalar data



slice_plane


SingleWindowApp
File
Editors
Windows
Modules
slice_plane
map components
density
x-momentum
y-momentum
z-momentum
stagnation
.00
plane distance
Plane Transform Editor
<idle>
3D
Top
Select Object...

3D field exercise

Exercise 2 Chapter 4