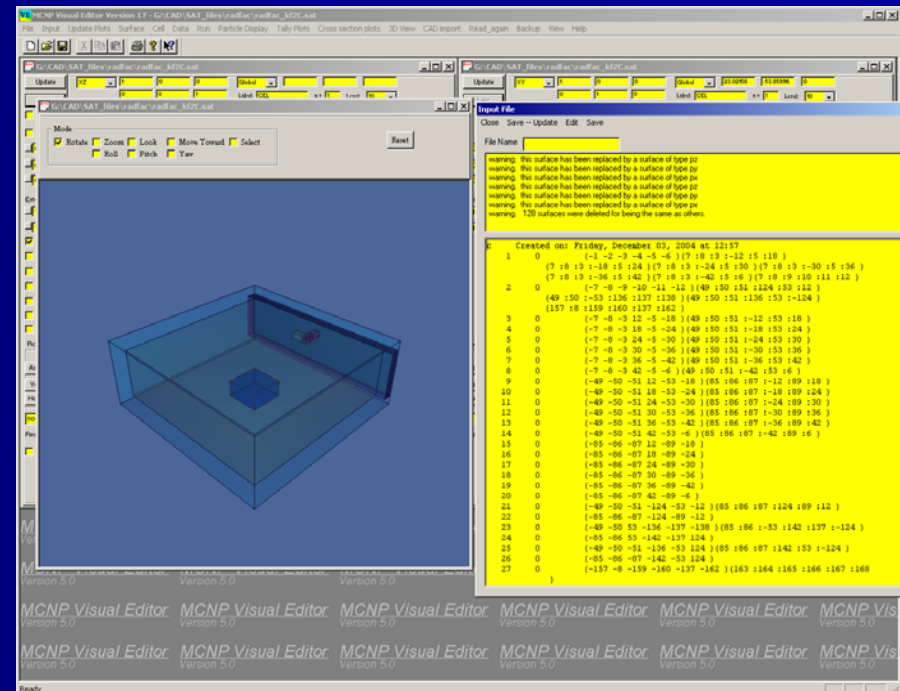


# CONVERSION OF COMPUTER AIDED DESIGN (CAD) OUTPUT FILES TO MONTE CARLO N-PARTICLE (MCNP) INPUT FILES

A. L. Schwarz and R. A. Schwarz  
Visual Editor Consultants

L. L. Carter  
Carter M. C. Analysis





# Overview

- Export 2D Drawing eXchange Format (DXF) files from CAD
  - Convert to MCNP using the MCNP Visual Editor
- Export 3D Standard ACIS Text (SAT) files from CAD
  - Convert to MCNP using the MCNP Visual Editor

# Complete Interface for MCNP

MCNP Visual Editor Version 17 - Vised25

File Input Update Plots Surface Cell Data Run Partide Display Tally Plots Cross section plots 3D View CAD import Read\_again Backup View Help

Update: YZ 0 1 0 Global 0

Last: 0 0 1 Label: CEL

Zoom out

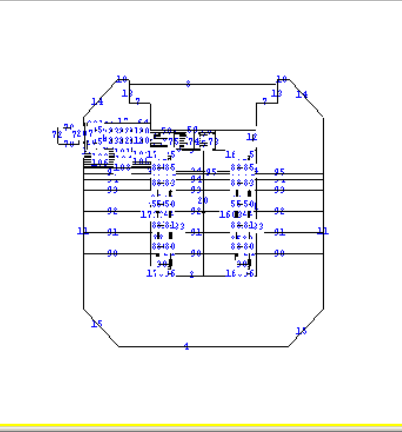
Origin: 0 0 0

Extent: 100 100

Refresh Surf 12 Cell 18

Color Facets vW Mesh Rect

Rotate about



Update: XY -0.7071066 0.7071066 0 Global -105.704

Last: -0.7071066 -0.7071066 0 Label: CEL

Zoom out

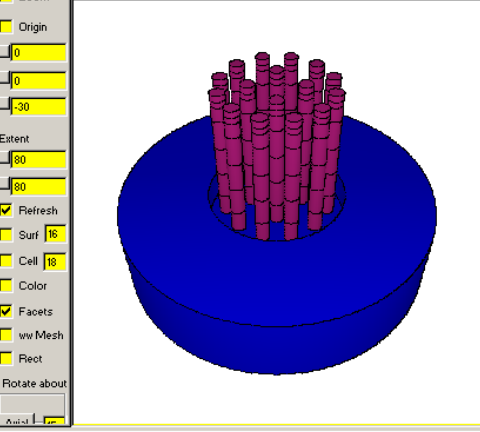
Origin: 0 0 0

Extent: 80 80

Refresh Surf 16 Cell 18

Color Facets vW Mesh Rect

Rotate about



Update: XY 0.7071066 0.7071066 0 Global -135.953

Last: -0.7071066 0.7071066 0 Label: CEL

Zoom out

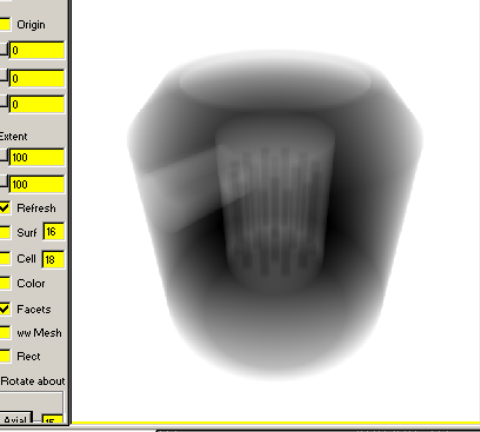
Origin: 0 0 0

Extent: 100 100

Refresh Surf 16 Cell 18

Color Facets vW Mesh Rect

Rotate about



Update: YZ 0 1 0 Global 0

Last: 0 0 1 Label: CEL

Zoom out

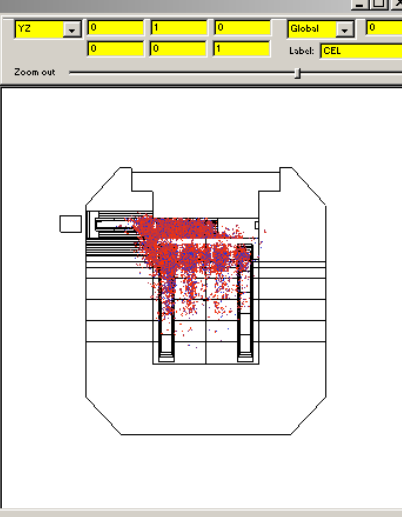
Origin: 0 0 0

Extent: 100 100

Refresh Surf 16 Cell 18

Color Facets vW Mesh Rect

Rotate about



Update: XZ 1 0 0 Global 93.6

Last: 0 0 1 Label: CEL

Zoom out

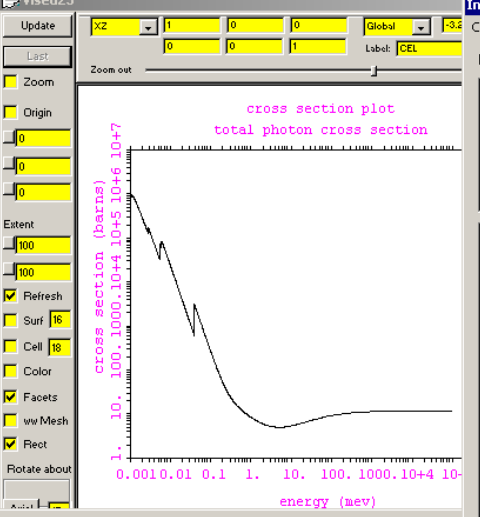
Origin: 0 0 0

Extent: 100 100

Refresh Surf 16 Cell 18

Color Facets vW Mesh Rect

Rotate about



Input File

Close Save -- Update Edit Save

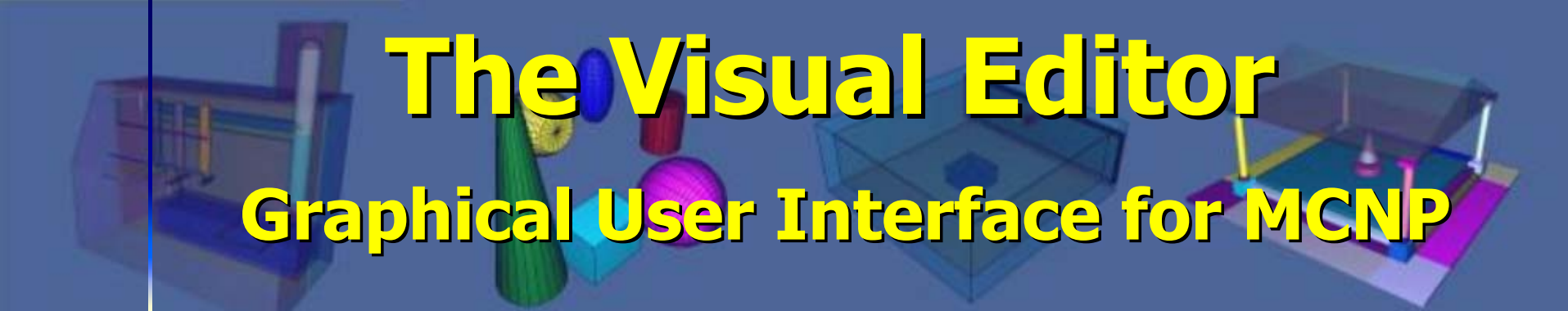
File Name

warning: plot plane coincident with surface 20  
 warning: plot plane coincident with surface 40  
 warning: plot plane coincident with surface 40  
 warning: plot plane coincident with surface 40  
 creating file inpn.sav  
 creating file inpn.sav

```

BUSS CASK -- SHIELD PLUG AND THERMAL SHIELD IN PLACE
c
comment before cell 1
1 2 -7.8 (59 -1 -7 ):(-13 7 -8 ) $CASK TOP
c
comment before cell 2
2 2 -7.8 (((-15 4 -2 -11 ):(-1 -11 2 -7 -14 )):(13
(-1 :17 :-18 :20 )):(17 :18 :11 :95 ((108 -6 ):20 :
3 0 5 12 -1 -6
4 0 (-16 1 200 -20 ):(-204 -200 202 )
5 0 (((-21 ):(11 :15 :-4 :14 :10 )):(8 -13 -10
6 0 21
7 1 -19 -80 -22 30 u=1 $INNER CAPSULE SOURCE
8 2 -7.8 -80 (-32 -23 27 ):(-30 :31 :22 ) u=1 $INNER
9 0 (-28 -24 27 ):(32 :23 ) u=1 $void between c
10 2 -7.8 -80 (-25 -29 26 ):(28 :24 :-27 ) u=1 $OUTER
11 0 (-33 -35 36 ) trcl=1 fill=1 $capsule FILL
12 0 -3 -1 34 20 40 #11 #16 #19 #20 $void above
#27
13 0 (-33 -35 36 ) trcl=2 fill=1
        
```

Ready



# The Visual Editor

## Graphical User Interface for MCNP

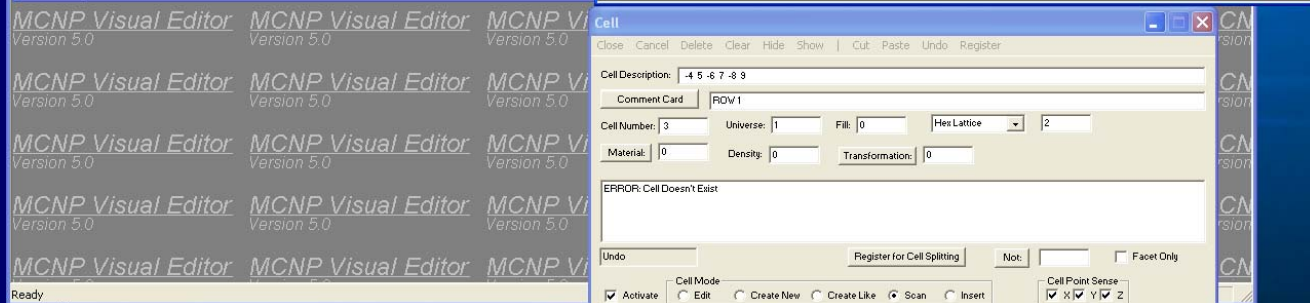
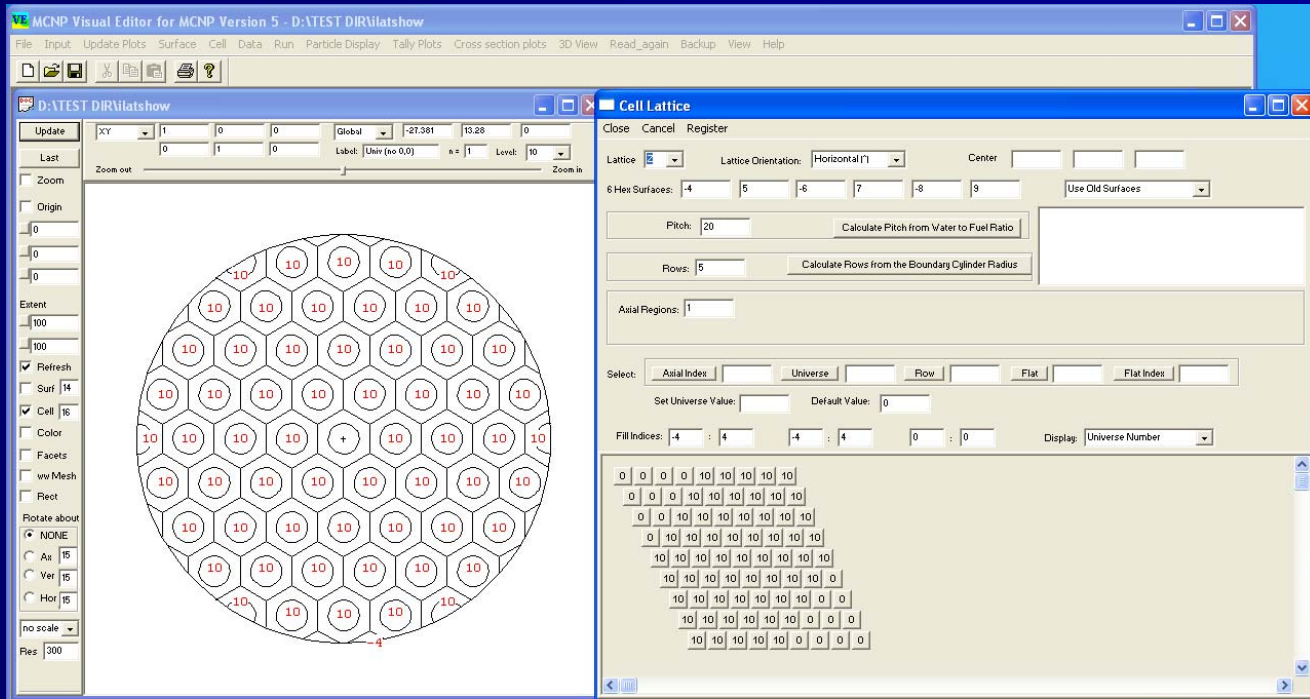
- Display Geometries with 2D views
- Create geometries
  - Universes, fills, lattices
- Some support for data cards
  - Materials, transformations, importances
- Plot particle tracks
  - SDEF Source generation points
  - Collision points
  - KCODE source point generation
- 3D plots
  - Normal, Radiograph, Transparent
- Tally plots



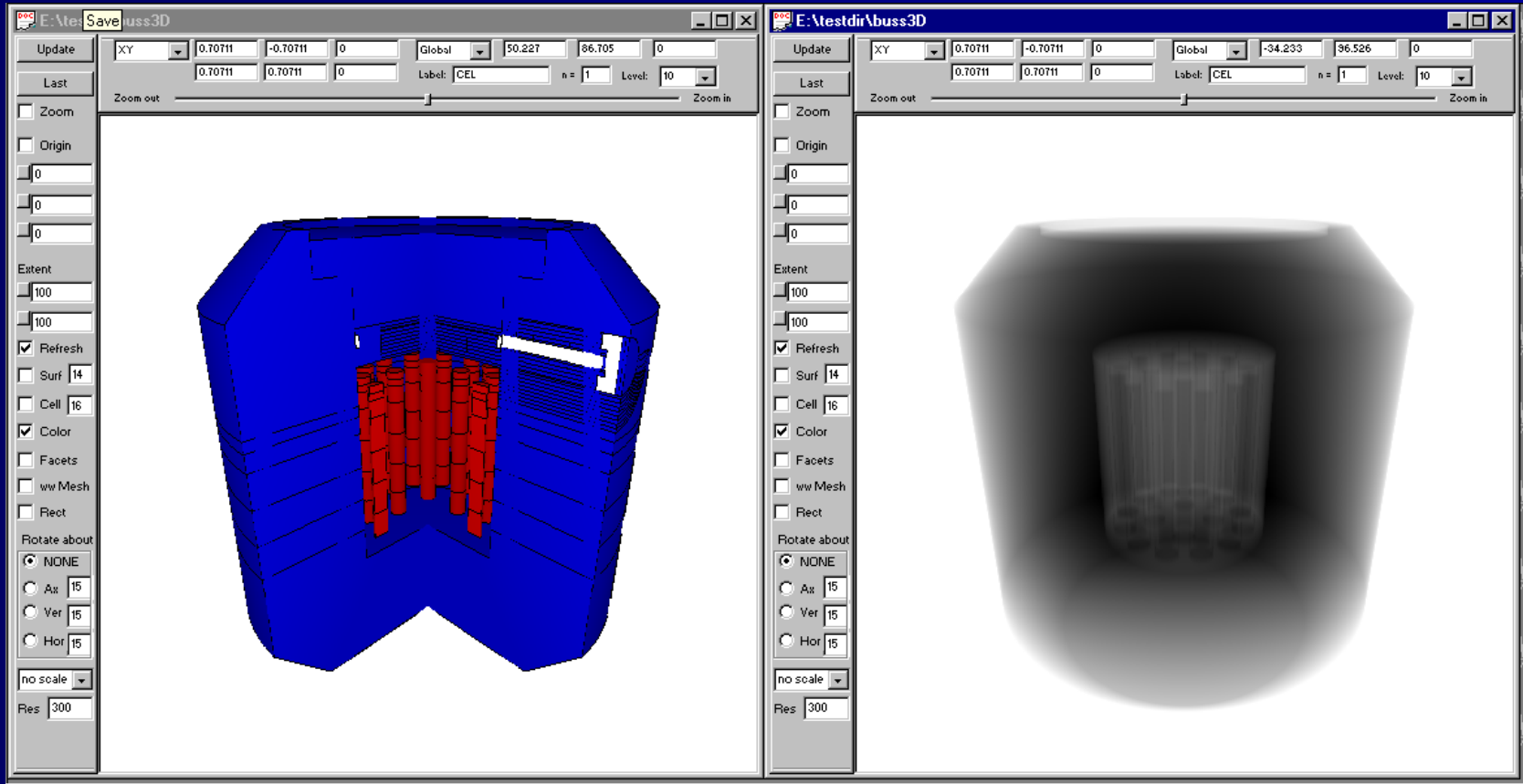
# How the Visual Editor works

- Visual C++ code is linked to the MCNP Fortran code.
- The Visual Editor Fortran modifications are now a part of the LANL Version 5 Fortran code.
- The C++ and Fortran share data and memory.

# Visual Editor Capabilities Lattice Display/Creation



# Visual Editor Capabilites 3D Ray Traced Imaging



# Visual Editor Capabilities 3D Plots of Lattice Geometries

The screenshot displays the MCNP Visual Editor interface for MCNP Version 5. The main window shows a 3D plot of a lattice geometry, which is a complex structure composed of many small, interconnected cells. The plot is rendered in a greenish-yellow color. The interface includes a menu bar (File, Input, Update Plots, Surface, Cell, Data, Run, Particle Display, Tally Plots, Cross section plots, 3D View, Read\_again, Backup, View, Help) and a toolbar with various icons for file operations and viewing. A status bar at the bottom indicates 'Ready'.

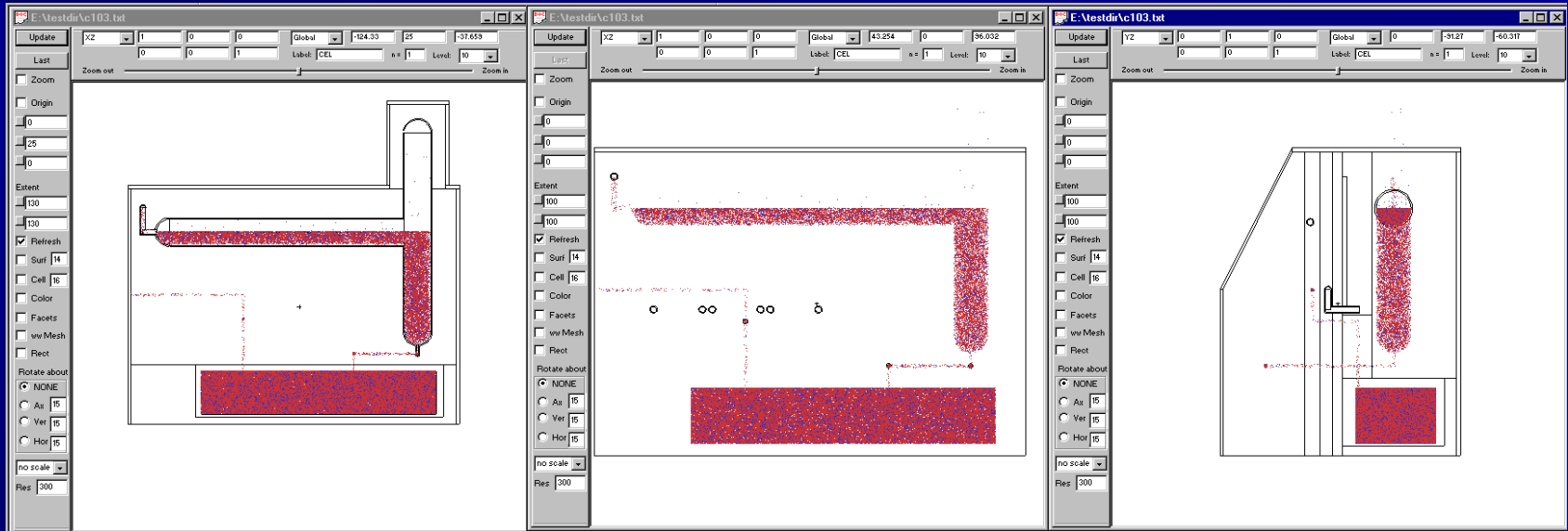
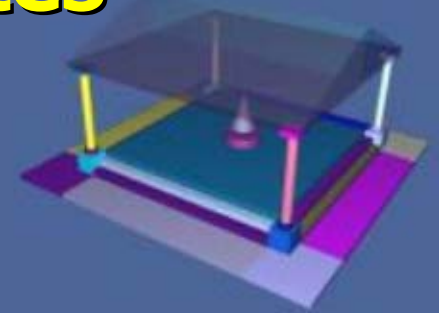
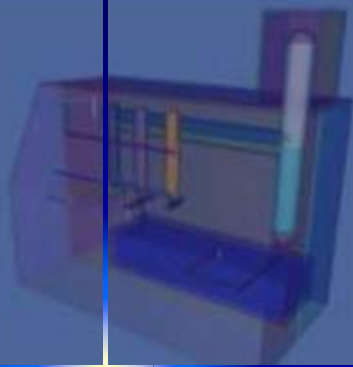
The 3D Plotting dialog box is open, showing the following settings:

- Close Normal 3D Plot Radiographic 3D
- NPS = 998499 CTME (secs) = 156.18
- Viewpoint: X Y Z 150
- Enter cell numbers or cell ranges separated by spaces or commas. For example, 145-6-8
- 3D data used to make the plot:
  - Update Plot Basis: Horizontal (1, 0, 0) Vertical (0, 1, 0)
  - Origin-Source Vector: (0, 0, 1)
- Radiography Options:
  - Darkness indicates ray length (selected)
  - Ray length corresponding to pure black (cm)
  - Darkness indicates (ray length) \* (cross section)
- Color by Cell Draw lines around cells Color cells by material
- Use 3D shading Use distance shading Point source
- Hide plot plane image Hide cookie cutters Plot to outside world
- Resolution: 1000
- Warning: surface 108 is not used for anything.
- Status: imen is done plot is done part is done mcrun is done



# Visual Editor Capabilites

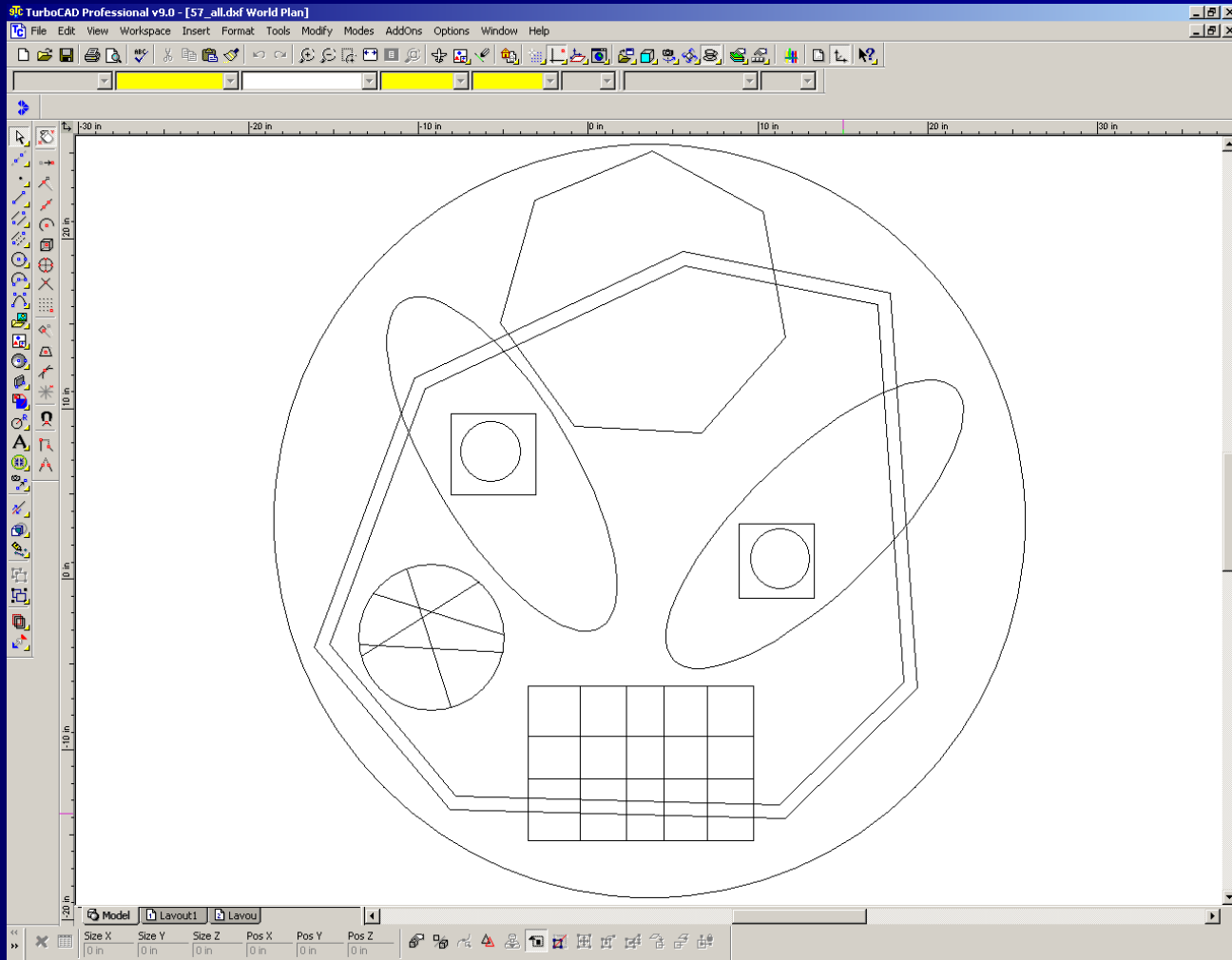
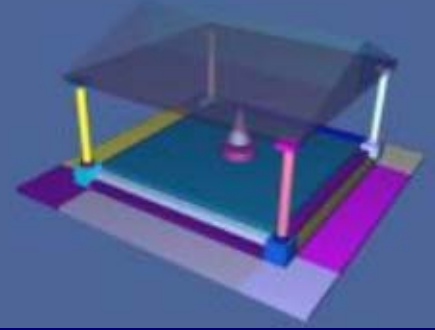
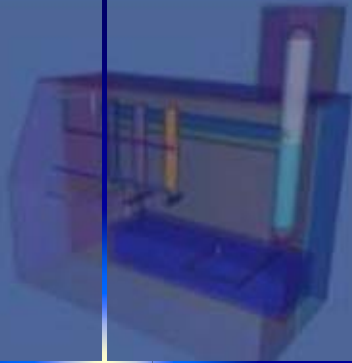
## Collision Plots



# 2D CAD conversion

## Generate in CAD

### Export as a DXF File



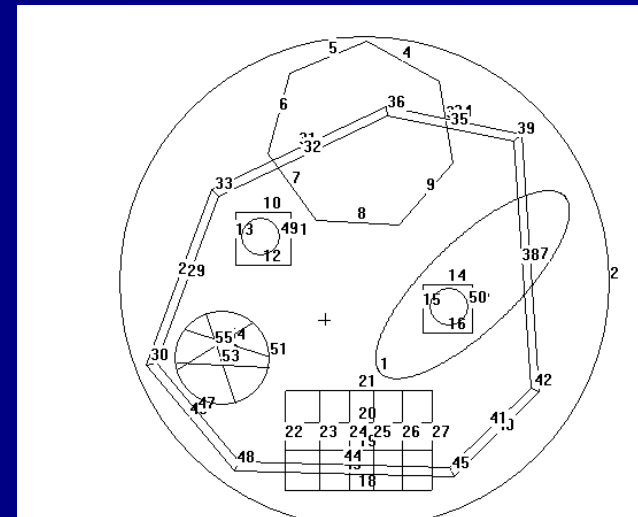
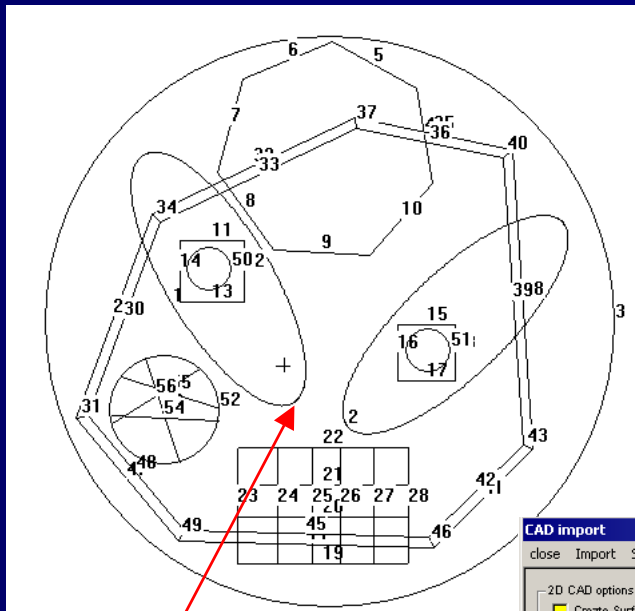
# 2D CAD conversion

## Read 2D dxf File into Visual Editor

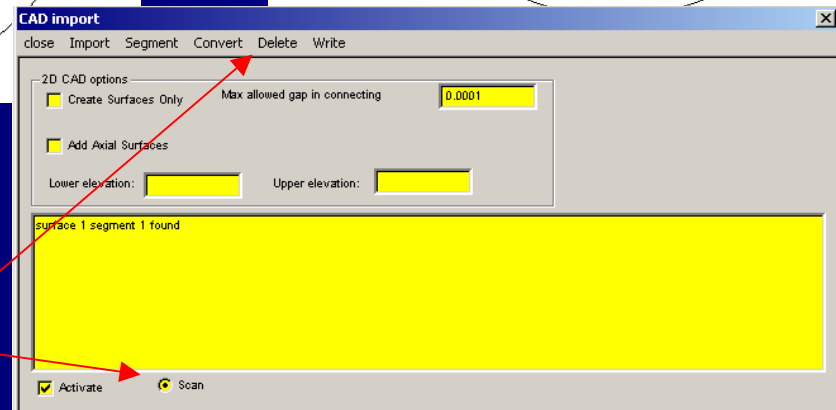
The screenshot displays the MCNP Visual Editor interface. The main window shows a 2D CAD drawing of a complex mechanical part, likely a turbine component, with numerous numbered vertices and edges. The drawing is rendered in a wireframe style. The software interface includes a menu bar at the top with options like File, Input, Update Plots, Surface, Cell, Data, Run, Particle Display, Tally Plots, Cross section plots, 3D View, CAD import, Read\_again, Backup, View, and Help. Below the menu bar are several toolbars and control panels. On the left, there are panels for 'Update' (with X2, Y2, Z2, Global, Label, n, Level settings), 'Zoom' (with Zoom out, Zoom in, and Extent controls), and 'CAD import' (with options for '2D CAD options', 'Add Axial Surfaces', and 'Lower elevation'). In the bottom center, an 'Open' dialog box is visible, showing a list of files in the 'test problems' directory. The file '57\_all.dxf' is selected. The status bar at the bottom indicates 'Ready'.

File Name	File Name	File Name
42_split1_circ_mult.dxf	48_arc_line.dxf	53_array3.dxf
43_split1_mult.dxf	49_inaze_1.dxf	53_array3.inp
44_split1_mult1.dxf	5_array.dxf	54_array4.dxf
45_split1_multa.dxf	50_circ_seg2.dxf	55_array5.dxf
46_split1_rect.dxf	51_array1.dxf	56_array3a.dxf
47_split1a.dxf	52_array2.dxf	57_all.dxf

# 2D CAD conversion Removed Unwanted Surfaces

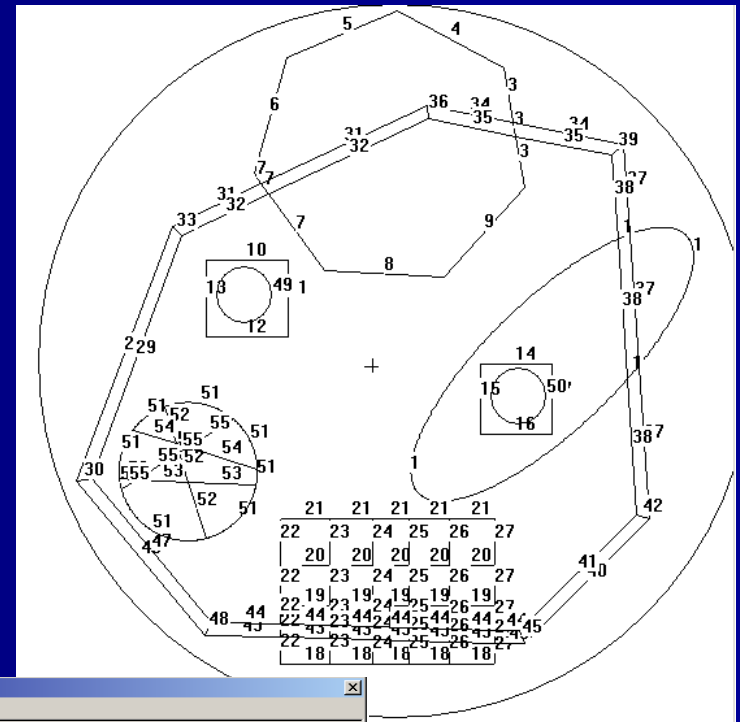
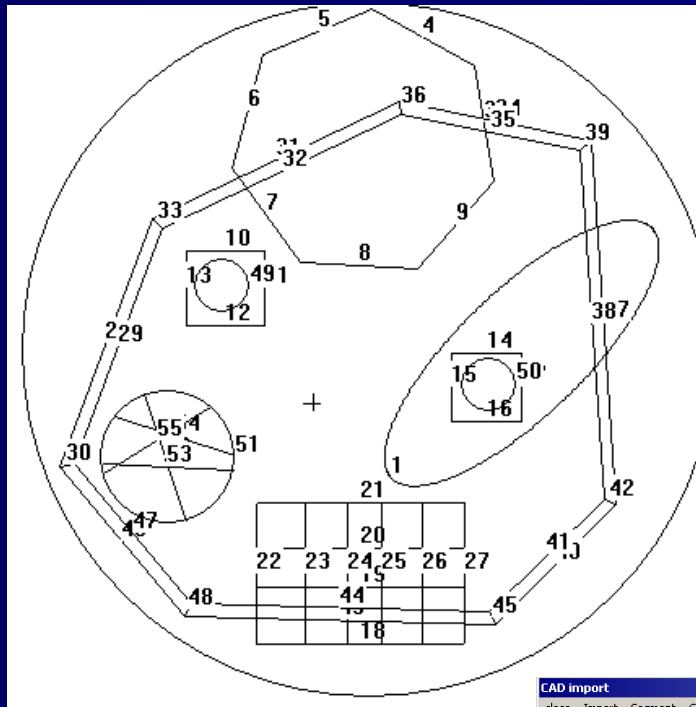


Remove this ellipse  
Using Scan-Delete

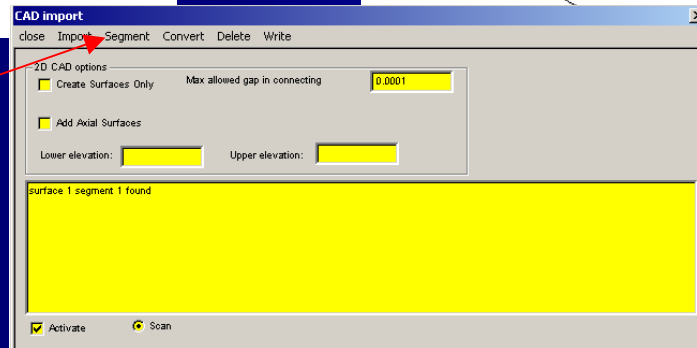


# 2D CAD conversion

## Segment the surfaces



Segment the surface



# 2D CAD conversion Convert to MCNP

The screenshot displays the MCNP Visual Editor interface. The main window shows a 2D CAD model of a complex, multi-faceted object with various internal features like holes and a grid. The interface includes a menu bar (File, Input, Update Plots, Surface, Cell, Data, Run, Particle Display, Tally Plots, Cross section plots, 3D View, CAD import), a toolbar, and a control panel with options for Update, Zoom, Origin, Extent, Refresh, Surf, Cell, Color, Facets, View Mesh, Plot, Rotate about, Axial, Vert, Horiz, Res, and Pscript.

The right-hand pane shows the 'Input File' window, which contains the following text:

```
# cells = 50
# surfaces = 77
# transformations = 0
MCNP loaded.

REPORT ANY PROBLEMS WITH THE VISUAL EDITOR TO RANDY SCHWARZ email: randyschwarz@mcnpvised.com
Ready
```

Below this, the 'CAD CONVERSION' section shows the generated MCNP input code, created on Friday, March 25, 2005 at 14:15. The code is as follows:

```
c
CAD CONVERSION Created on: Friday, March 25, 2005 at 14:15
1 0 2
2 0 -2 ((1 :-37 ))((37 :59 :60 :-43 :40 )){
(37 :34 :-57 :-46 :-43 :-59 ))((3 :4 :-5 :-6 :-7 :-58 :57 )){
(-31 :-28 :-46 :57 :58 ))((-22 :-18 :27 :-60 :59 ))}
3 0 (-1 37 )
4 0 ((-37 -61 -62 ):(-37 39 38 61 ):(1 63 62 -61 ))
5 0 (-34 3 35 -39 )
6 0 ((-3 -4 -64 34 ):(-4 5 6 7 -31 64 ))
7 0 (31 33 -32 -7 )
8 0 (28 -30 -29 -33 )
9 0 (46 -48 -47 30 )
10 0 (43 -22 -44 48 )
11 0 (22 18 -23 -43 )
12 0 (18 -24 -43 23 )
13 0 (18 -25 -43 24 )
14 0 (18 -26 -43 25 )
15 0 (18 -27 -43 26 )
16 0 (43 -45 -44 27 )
17 0 (-40 -42 41 45 )
18 0 (((-37 65 38 42 ):(1 67 66 -65 ):(38 -65 -66 ))
19 0 (-1 38 -1 -37 )
20 0 (-3 -34 36 35 )
21 0 (7 -32 -36 31 )
22 0 (22 -44 -23 43 )
23 0 (23 43 -24 -44 )
24 0 (24 -44 -25 43 )
25 0 (25 43 -26 -44 )
26 0 (26 -44 -27 43 )
27 0 (((29 32 -7 -68 47 ):(-8 -72 73 21 -74 68 ((-69 1 75 -76 )
(1 75 76 ))):(9 -70 -38 -71 69 )):(3 -35 -38 70 ))
(1 75 69 71 -77 -72 ):(-38 -41 44 27 72 ):(27 -73 -72 ))
(-22 44 47 68 74 ))(-13 :10 :11 :-12 )$1
28 0 (13 -10 -11 12 )$9
29 0 -49
30 0 (-51 -53 52 )
31 0 (-51 -54 55 52 53 )
32 0 (-51 55 54 )
33 0 (-51 52 54 -55 )
34 0 (-51 54 -52 )
```



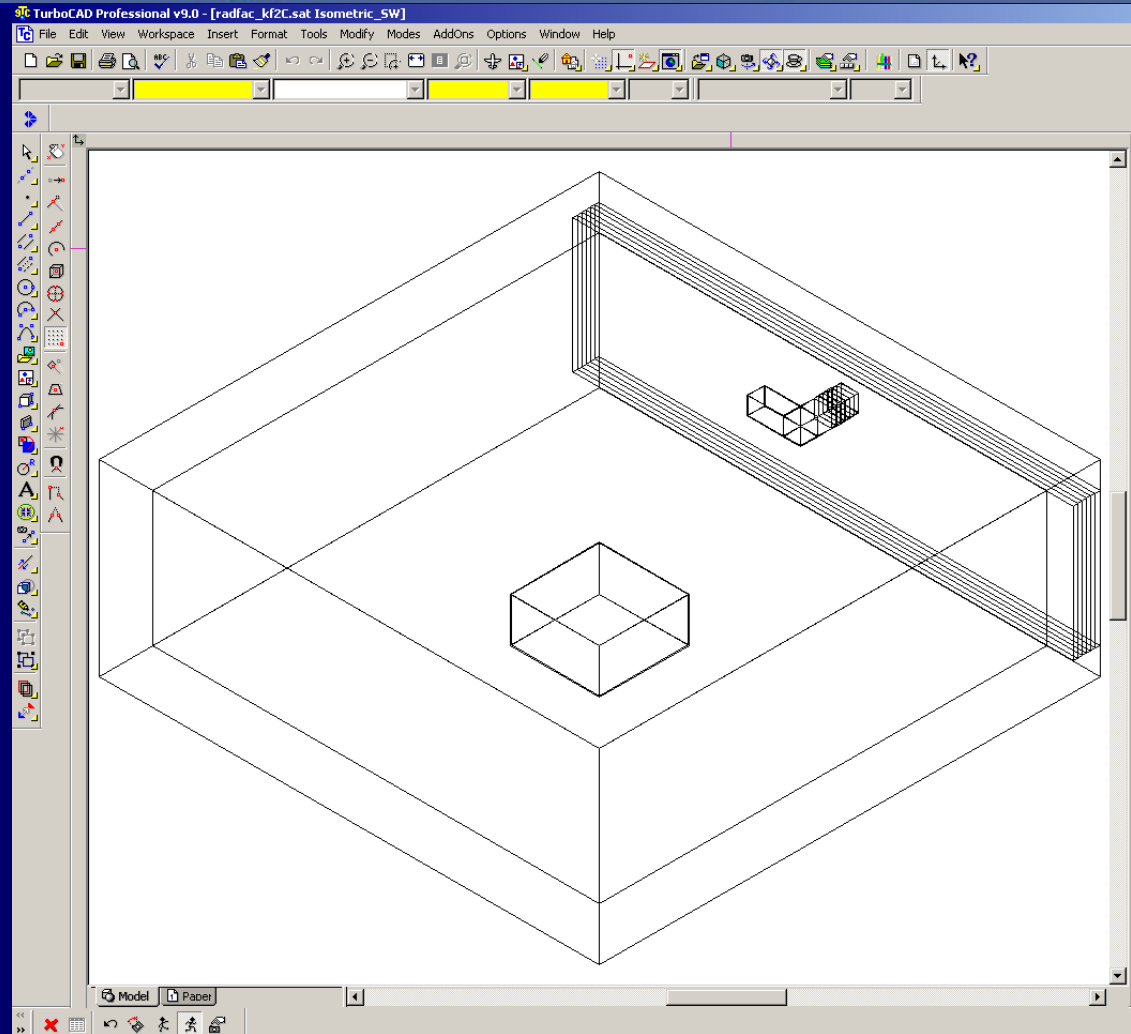
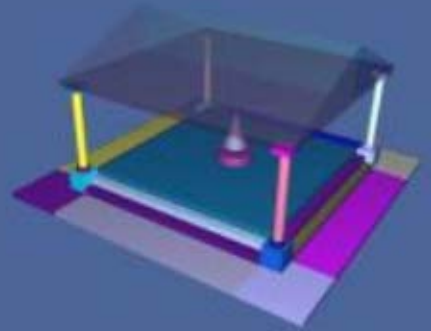
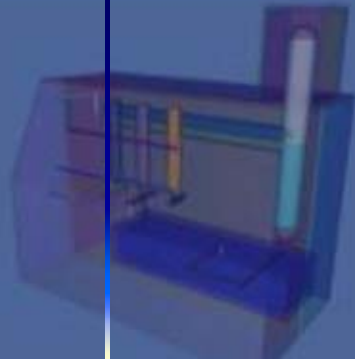
# 2D CAD conversion Limitations

- Can not convert intersecting circles/ellipses
- All geometries are extruded axially
- Different geometries have same axial cross section
  - Axial cross section of a cylinder converts to a box.
  - Spheres convert to cylinders.

# 3D CAD conversion

## Generate in CAD

## Export as a SAT file





# 3D CAD conversion

## Read SAT File into Visual Editor

### 3D View of CAD Geometry Displayed

MCNP Visual Editor Version 17 - G:\CAD\SAT\_files\radfac\radfac\_kf2C.sat

File Input Update Plots Surface Cell Data Run Particle Display Tally Plots Cross section plots 3D View CAD import Read\_again Backup View Help

G:\CAD\SAT\_files\radfac\radfac\_kf2C.sat

Update: XZ 1 0 0 Global 14.62014 -20.10172 0

Mode: Rotate Zoom Look Move Toward Select Roll Pitch Yaw

Extent: 100 100

3D CAD import

Close Import Convert

3D CAD options

Do not Display the 3D geometry  Create Surfaces Only  Parse  Split KF 2

Body 1, SAT index 0, center: x=0.000000, y=0.000000, z=0.000000  
Body 2, SAT index 1, center: x=0.000000, y=0.000000, z=0.000000  
Body 3, SAT index 2, center: x=0.000000, y=0.000000, z=0.000000  
Body 4, SAT index 3, center: x=0.000000, y=0.000000, z=0.000000  
Body 5, SAT index 4, center: x=0.000000, y=0.000000, z=0.000000  
Body 6, SAT index 5, center: x=0.000000, y=0.000000, z=0.000000  
Body 7, SAT index 6, center: x=0.000000, y=0.000000, z=0.000000  
Body 8, SAT index 7, center: x=0.000000, y=0.000000, z=0.000000  
Body 9, SAT index 8, center: x=0.000000, y=0.000000, z=0.000000  
Body 10, SAT index 9, center: x=0.000000, y=0.000000, z=0.000000  
Body 11, SAT index 10, center: x=0.000000, y=0.000000, z=0.000000  
Body 12, SAT index 11, center: x=0.000000, y=0.000000, z=0.000000  
Body 13, SAT index 12, center: x=0.000000, y=0.000000, z=0.000000  
Body 14, SAT index 13, center: x=0.000000, y=0.000000, z=0.000000  
Body 15, SAT index 14, center: x=0.000000, y=0.000000, z=0.000000  
Body 16, SAT index 15, center: x=0.000000, y=0.000000, z=0.000000  
Body 17, SAT index 16, center: x=0.000000, y=0.000000, z=0.000000

db: Edge=2140, body=28, lump=110, shell=139, face=2122, facenum = 6, coedge=1263  
db: Edge=2840, body=28, lump=110, shell=139, face=664, facenum = 4, coedge=2126  
db: Edge=2840, body=28, lump=110, shell=139, face=1240, facenum = 5, coedge=2140  
db: Edge=2140, body=28, lump=110, shell=139, face=1240, facenum = 5, coedge=2130  
db: Edge=2140, body=28, lump=110, shell=139, face=2122, facenum = 6, coedge=1264  
CAD input complete.  
Select "Convert" to create the MCNP input file.

# 3D CAD conversion Convert to MCNP

The screenshot displays the MCNP Visual Editor interface. The main window shows a 3D wireframe model of a rectangular structure with various surfaces and edges labeled with numbers (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29). The interface includes a menu bar (File, Input, Update Plots, Surface, Cell, Data, Run, Particle Display, Tally Plots, Cross section plots, 3D View, CAD import, Read\_again, Backup, View, Help) and a toolbar. The 'Input File' window is open, showing the following text:

```
REPORT ANY PROBLEMS WITH THE VISUAL EDITOR TO RANDY SCHWARZ email: randyschwarz@mcnpvised.c
Ready
warning: plot plane coincident with surface 8
```

The 'Input File' window also displays the following MCNP input file content:

```
Created on: Friday, March 25, 2005 at 14:35
1 0 (-1 -2 -3 -4 -5 -6 ) (7 : 8 : 3 : -12 : 5 : 18 )
( 7 : 8 : 3 : -18 : 5 : 24 ) ( 7 : 8 : 3 : -24 : 5 : 30 ) ( 7 : 8 : 3 : -30 : 5 : 36 )
( 7 : 8 : 3 : -36 : 5 : 42 ) ( 7 : 8 : 3 : -42 : 5 : 48 ) ( 7 : 8 : 9 : 10 : 11 : 12 )
2 0 (-7 -8 -9 -10 -11 -12 ) ( 49 : 50 : 51 : 124 : 53 : 12 )
( 49 : 50 : -53 : 136 : 137 : 138 ) ( 49 : 50 : 51 : 136 : 53 : -124 )
( 157 : 8 : 159 : 160 : 137 : 162 )
3 0 (-7 -8 -3 12 -5 -18 ) ( 49 : 50 : 51 : -12 : 53 : 18 )
4 0 (-7 -8 -3 18 -5 -24 ) ( 49 : 50 : 51 : -18 : 53 : 24 )
5 0 (-7 -8 -3 24 -5 -30 ) ( 49 : 50 : 51 : -24 : 53 : 30 )
6 0 (-7 -8 -3 30 -5 -36 ) ( 49 : 50 : 51 : -30 : 53 : 36 )
7 0 (-7 -8 -3 36 -5 -42 ) ( 49 : 50 : 51 : -36 : 53 : 42 )
8 0 (-7 -8 -3 42 -5 -6 ) ( 49 : 50 : 51 : -42 : 53 : 6 )
9 0 (-49 -50 -51 12 -53 -18 ) ( 85 : 86 : 87 : -12 : 89 : 18 )
10 0 (-49 -50 -51 18 -53 -24 ) ( 85 : 86 : 87 : -18 : 89 : 24 )
11 0 (-49 -50 -51 24 -53 -30 ) ( 85 : 86 : 87 : -24 : 89 : 30 )
12 0 (-49 -50 -51 30 -53 -36 ) ( 85 : 86 : 87 : -30 : 89 : 36 )
13 0 (-49 -50 -51 36 -53 -42 ) ( 85 : 86 : 87 : -36 : 89 : 42 )
14 0 (-49 -50 -51 42 -53 -6 ) ( 85 : 86 : 87 : -42 : 89 : 6 )
15 0 (-85 -86 -87 12 -89 -18 )
16 0 (-85 -86 -87 18 -89 -24 )
17 0 (-85 -86 -87 24 -89 -30 )
18 0 (-85 -86 -87 30 -89 -36 )
19 0 (-85 -86 -87 36 -89 -42 )
20 0 (-85 -86 -87 42 -89 -6 )
21 0 (-49 -50 -51 -124 -53 -12 ) ( 85 : 86 : 87 : 124 : 89 : 12 )
22 0 (-85 -86 -87 -124 -89 -12 )
23 0 (-49 -50 53 -136 -137 -138 ) ( 85 : 86 : -53 : 142 : 137 : -124 )
24 0 (-85 -86 53 -142 -137 124 )
25 0 (-49 -50 -51 -136 -53 124 ) ( 85 : 86 : 87 : 142 : 53 : -124 )
26 0 (-85 -86 -87 -142 -53 124 )
27 0 (-157 -8 -159 -160 -137 -162 ) ( 163 : 164 : 165 : 166 : 167 : 168
)
28 0 (-163 -164 -165 -166 -167 -168 )
29 0 ( 1 : 2 : 3 : 4 : 5 : 6 )

1 p 0 0 1 360
2 p 0 0 -1 60
3 p 0 -1 0 560
4 p -1 0 0 560
5 p 0 1 0 560
6 p 1 0 0 560
7 p 0 0 1 360
```

# 3D CAD conversion

## View MCNP Geometry in 3D

The screenshot shows the MCNP Visual Editor interface. The main window displays a 3D model of a rectangular slab (purple) with a smaller rectangular block (cyan) on top. The interface includes a menu bar, a toolbar, and a mode selection panel with options like Rotate, Zoom, Look, Move Toward, Select, Roll, Pitch, and Yaw.

The console window on the right displays the following text:

```

warning: this surface has been replaced by a surface of type pz
warning: this surface has been replaced by a surface of type py
warning: this surface has been replaced by a surface of type pz
warning: this surface has been replaced by a surface of type py
warning: this surface has been replaced by a surface of type px
comment: 128 surfaces were deleted for being the same as others.

Created on: Friday, March 25, 2005 at 14:35
c
1 0 (-1 -2 -3 -4 -5 -6 ) (7 : 8 : 3 :-12 : 5 : 18 )
(7 : 8 : 3 :-18 : 5 : 24 ) (7 : 8 : 3 :-24 : 5 : 30 ) (7 : 8 : 3 :-30 : 5 : 36 )
(7 : 8 : 3 :-36 : 5 : 42 ) (7 : 8 : 3 :-42 : 5 : 6 ) (7 : 8 : 9 : 10 : 11 : 12 )
2 0 (-7 -8 -9 -10 -11 -12 ) (49 : 50 : 51 : 124 : 53 : 12 )
(49 : 50 :-53 : 136 : 137 : 138 ) (49 : 50 : 51 : 136 : 53 :-124 )
(157 : 8 : 159 : 160 : 137 : 162 )
3 0 (-7 -8 -3 12 -5 -18 ) (49 : 50 : 51 :-12 : 53 : 18 )
4 0 (-7 -8 -3 18 -5 -24 ) (49 : 50 : 51 :-18 : 53 : 24 )
5 0 (-7 -8 -3 24 -5 -30 ) (49 : 50 : 51 :-24 : 53 : 30 )
6 0 (-7 -8 -3 30 -5 -36 ) (49 : 50 : 51 :-30 : 53 : 36 )
7 0 (-7 -8 -3 36 -5 -42 ) (49 : 50 : 51 :-36 : 53 : 42 )
8 0 (-7 -8 -3 42 -5 -6 ) (49 : 50 : 51 :-42 : 53 : 6 )
9 0 (-49 -50 -51 12 -53 -18 ) (85 : 86 : 87 :-12 : 89 : 18 )
10 0 (-49 -50 -51 18 -53 -24 ) (85 : 86 : 87 :-18 : 89 : 24 )
11 0 (-49 -50 -51 24 -53 -30 ) (85 : 86 : 87 :-24 : 89 : 30 )
12 0 (-49 -50 -51 30 -53 -36 ) (85 : 86 : 87 :-30 : 89 : 36 )
13 0 (-49 -50 -51 36 -53 -42 ) (85 : 86 : 87 :-36 : 89 : 42 )
14 0 (-49 -50 -51 42 -53 -6 ) (85 : 86 : 87 :-42 : 89 : 6 )
15 0 (-85 -86 -87 12 -89 -18 )
16 0 (-85 -86 -87 18 -89 -24 )
17 0 (-85 -86 -87 24 -89 -30 )
18 0 (-85 -86 -87 30 -89 -36 )
19 0 (-85 -86 -87 36 -89 -42 )
20 0 (-85 -86 -87 42 -89 -6 )
21 0 (-49 -50 -51 -124 -53 -12 ) (85 : 86 : 87 : 124 : 89 : 12 )
22 0 (-85 -86 -87 -124 -89 -12 )
23 0 (-49 -50 53 -136 -137 -138 ) (85 : 86 : -53 : 142 : 137 :-124 )
24 0 (-85 -86 53 -142 -137 124 )
25 0 (-49 -50 -51 -136 -53 124 ) (85 : 86 : 87 : 142 : 53 :-124 )
26 0 (-85 -86 -87 -142 -53 124 )
27 0 (-157 -8 -159 -160 -137 -162 ) (163 : 164 : 165 : 166 : 167 : 168 )
)
28 0 (-163 -164 -165 -166 -167 -168 )
29 0 (1 : 2 : 3 : 4 : 5 : 6 )

1 p 0 0 1 360
2 p 0 0 -1 60
  
```

At the bottom of the console window, it says "Cell Found = 27".



# 3D CAD conversion

## Two Different Modes

- Use CAD to Create the MCNP geometry.
  - Define the geometry without using subtractions or unions
  - Conversion program will determine the subtractions and unions.
- Read an already existing fully defined geometry
  - All space must be defined
  - May need to simplify overly complex cells

# Example 3D CAD conversion Building

The screenshot displays the MCNP Visual Editor interface for a 3D CAD conversion of a building. The main window shows a 3D perspective view of a building structure. A secondary window displays a 2D plot of a room, showing the floor plan and walls. The interface includes a menu bar (File, Input, Update Plots, Surface, Cell, Data, Run, Particle Display, Tally Plots, Cross section plots, 3D View, CAD import, Read\_again, Backup, View, Help) and a toolbar. The CAD import window is open, showing the 3D CAD options and the resulting MCNP input file.

**MCNP Visual Editor Version 17 - G:\CAD\SAT\_files\test examples\6\_31-EXAMPLE5-BUILDING3.sat**

File Input Update Plots Surface Cell Data Run Particle Display Tally Plots Cross section plots 3D View CAD import Read\_again Backup View Help

Mode: Rotate Zoom Look Move Toward Select Roll Pitch Yaw

Update: XY 1 0 0 Global 2337.132 261.343 98.5304  
Last: 0 1 0 Label: CEL n = 1 Level: 10

Zoom out Zoom in

Origin: 1312.273 491.1899 98.5304

Extent: 1778.279 1778.279

Refresh  Surf 16 Cell 16 Color Facets  view Mesh Rect Rotate about Axial 16

Input File: Close Save Update Edit

```
warning plot plane coincident with surface 44
warning plot plane coincident with surface 21
warning plot plane coincident with surface 44
warning plot plane coincident with surface 44
warning plot plane coincident with surface 44
warning plot plane coincident with surface 44
warning plot plane coincident with surface 44
warning plot plane coincident with surface 44
warning plot plane coincident with surface 44
warning plot plane coincident with surface 44
warning plot plane coincident with surface 44
warning plot plane coincident with surface 21
```

Created on: Friday, March 25, 2005 at 14:49

```
1 0 (-1 -2 -3 -4 -5 -6 )
2 0 (-1 -2 5 -4 -11 -6 )
3 0 (-13 -14 -15 -16 -17 -6 )
4 0 (-13 -14 -21 -16 15 -6 )
5 0 (-25 -2 -3 -28 -11 -30 )(1 : 2 : 3 : 4 : 5 : 6 )
(1 : 2 : -5 : 4 : 11 : 6 )
6 0 (-25 -2 11 -34 -35 -30 )
7 0 (-25 -2 17 -28 3 -30 )
8 0 (-43 -44 -21 -46 -47 -48 )(25 : 2 : 3 : 28 : 11 : 30 )
(13 : 14 : 15 : 16 : 17 : 6 )(13 : 14 : 21 : 16 : -15 : 6 )
(25 : 2 : -11 : 34 : 35 : 30 )(25 : 2 : -17 : 28 : 1 : 3 : 30 )
```

CAD 3D import: Close Import Convert

3D CAD options: Do not Display the 3D geometry Create Surfaces Only Parse Split KF 2

Body 1, SAT index 0, center: x=2050.000000, y=965.000000, z=130.000000  
Body 2, SAT index 1, center: x=2050.000000, y=975.000000, z=130.000000  
Body 3, SAT index 2, center: x=2000.000000, y=15.000000, z=140.000000  
Body 4, SAT index 3, center: x=2000.000000, y=5.000000, z=140.000000  
Body 5, SAT index 4, center: x=2010.000000, y=970.000000, z=160.000000  
Body 6, SAT index 5, center: x=2000.000000, y=1120.000000, z=160.000000  
Body 7, SAT index 6, center: x=2010.000000, y=490.000000, z=160.000000  
Body 8, SAT index 7, center: x=1250.000000, y=650.000000, z=160.000000

# Example 3D CAD conversion Building

The screenshot displays the MCNP Visual Editor interface for a 3D CAD conversion project. The main window shows a 3D model of a building with a central tower and a square base. The interface includes a menu bar, a toolbar, and a control panel with options like Rotate, Zoom, and Look. A 2D wireframe view of the building's structure is shown on the right, with dimensions and labels. An input file window is open at the bottom, showing the conversion results and a list of surfaces.

**MCNP Visual Editor Version 17 - G:\CAD\SAT\_files\test examples\3D\_36-TEMPLE1-IN-SPHERE.sat**

File Input Update Plots Surface Cell Data Run Particle Display Tally Plots Cross section plots 3D View CAD Import Read\_again Backup View Help

Mode:  Rotate  Zoom  Look  Move Toward  Select  
 Roll  Pitch  Yaw

Update: X2 0 1 0 0 Global: -1.167586 0 4.217234  
Last: 0 0 0 1 Label: CEL n=1 Level: 10  
Zoom out Zoom in

Origin: 0.1850628 0 -0.1318364  
Extent: 18.62086 18.62086  
 Refresh  Surf 18  Cell 18  
 Color  Facets  View Mesh  Rect

Input File: # cells = 0, # surfaces = 0, # transformations = 0, MCNP loaded. REPORT ANY PROBLEMS WITH THE VISUAL EDITOR TO RANDY SCHWARZ email: randyschwarz@mcnpvised.com. Ready. 143 identical surfaces found. see out file. warning, flag set for outside cell 1 complete, number cells given to C= 41

CAD 3D import:  Do not Display the 3D ger  Create Surfaces Only  Parse  Split KF 2

Body 1, SAT index 0, center: x=0.000000, y=0.000000, z=0.000000  
Body 2, SAT index 1, center: x=0.000000, y=14.000000, z=2.250000  
Body 3, SAT index 2, center: x=0.000000, y=-14.000000, z=2.250000  
Body 4, SAT index 3, center: x=4.000000, y=0.000000, z=11.166667  
Body 5, SAT index 4, center: x=0.000000, y=0.000000, z=9.250000  
Body 6, SAT index 5, center: x=0.000000, y=11.500000, z=1.666650  
Body 7, SAT index 6, center: x=0.000000, y=-11.500000, z=1.333350  
Body 8, SAT index 7, center: x=0.000000, y=-11.500000, z=1.666650

```
Created on: Friday, March 25, 2005 at 14:49
c
1 0
(-1)(2:3:4:5:6:7)(2:3:10:5:12:7)
(14:15:16:-6:-12)(-16:20:-12:22:-6:24)
(25:-2:-6:5:29:7)(31:-2:-29:5:35:7)
(25:-2:-12:5:41:7)(31:-2:-41:5:47:7)(49:50:-47:5:-35:7)
(2:3:4:-47:-22:-35:60)(61:62)(63:64:-62)
(66:-49:-64)(-15:170:16:-12:-6)(31:-2:76:-47:-5:-35)
(25:-2:22:-47:-76:-35)(86:87:88)(-2:49:147:-5:-12:22)
(2:3:10:-5:47:60)(101:-49:-87)(-20:-88:106:107:108:109)
(110:87:88)(-2:49:35:-5:-6:22)(2:3:4:-5:35:60)
(125:-49:-87)(-20:-88:130:107:132:109)(2:3:4:-47:-24:-35)
:139)(25:-2:24:-47:144:-35)(31:-2:-144:-47:-7:-35)
(152:87:88)(2:3:10:-7:47:139)(-2:49:47:-7:-12:24)
(167:-49:-87)(-20:-88:106:173:108:175)(176:87:88)
```

# Example 3D CAD conversion

## Duct with 3 Bends

MENP Visual Editor Version 17 - G:\CAD\SAT\_files\solid\_model\3ducts\3ducts\_kf4.sat

File Input Update Plots Surface Cell Data Run Particle Display Tally Plots Cross section plots 3D View CAD import Read\_again Backup View Help

G:\CAD\SAT\_files\solid\_model\3ducts\3ducts\_kf4.sat

Mode:  Rotate  Zoom  Look  Move Toward  Select  Roll  Pitch  Yaw

Update: KEY: [1] [0] [0] Global: [1552854] [3473015] [0.002348]

Last: Zoom out: [0] [1] [0] Label: [CEL] \*+ Level: [90] Zoom in

Origin

Extent: [9172953] [25.22949] [9.002348]

Refresh

Surf: [16]

Cell: [18]

Color

Facets

wv Mesh

Rect

Input File: Close Save -- Update Edit

warning: plot plane coincident with surface 17  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42  
 warning: plot plane coincident with surface 42

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1	0	(-1 -2 -3 -4 ) (-5 -6 -7 -8 -9 -10 )
2	0	(7 -8 -9 :10 ) (-5 -6 -17 -18 -19 -20 )
3	0	(-1 -2 -3 -4 ) (6 -26 -17 -18 -19 -20 )
4	0	(-31 -32 -33 -34 ) (-5 -36 -17 -38 -19 18 )
5	0	(-26 -42 -43 -44 ) (31 32 33 -38 34 18 )
6	0	(-51 -52 -53 -58 -55 18 )
7	0	(-51 -52 -53 -18 -55 -62 )
8	0	(-51 -52 -53 62 44 -68 )
9	0	(26 -52 -71 62 -73 -68 )
10	0	(6 -26 -71 62 -73 -68 )
11	0	(-5 -6 -71 62 -73 -68 )
12	0	(51 :52 :53 :55 ) (26 42 43 -38 44 18 )
13	0	(51 :52 :53 :55 ) (26 42 43 -18 44 -62 )
14	0	(51 :52 :53 :56 ) (62 26 42 43 44 4 )

CAD 3D import: Close Import Convert

3D CAD options:  Do not Display the 3D get  Create Surfaces Onl  Parse  Split KF [4]

Body 1, SAT index 0, center: x=0.000000, y=0.000000, z=0.000000  
 Body 2, SAT index 1, center: x=10.000000, y=25.000000, z=0.000000  
 Body 3, SAT index 2, center: x=10.000000, y=25.000000, z=0.000000  
 Body 4, SAT index 3, center: x=0.000000, y=25.000000, z=15.000000  
 Body 5, SAT index 4, center: x=0.000000, y=0.000000, z=0.000000  
 Body 6, SAT index 5, center: x=0.000000, y=0.000000, z=0.000000  
 Body 7, SAT index 6, center: x=0.000000, y=0.000000, z=0.000000  
 Body 8, SAT index 7, center: x=0.000000, y=0.000000, z=0.000000



# Request for Test Geometries

- Test 2D and 3D conversion on complex geometries.
  - Send geometries to Randy Schwarz

[www.mcnpvised.com](http://www.mcnpvised.com)