

مخبر الانتشار والهوائيات - السنة الرابعة

في هذا القسم من المخبر سيتم التالي :

- ❖ التعرف على برنامج المحاكاة HFSS
- ❖ التعرف على المحددات الأساسية للبرنامج.
- ❖ دراسة هوائي بوقي وتنفيذه باستخدام البرنامج.

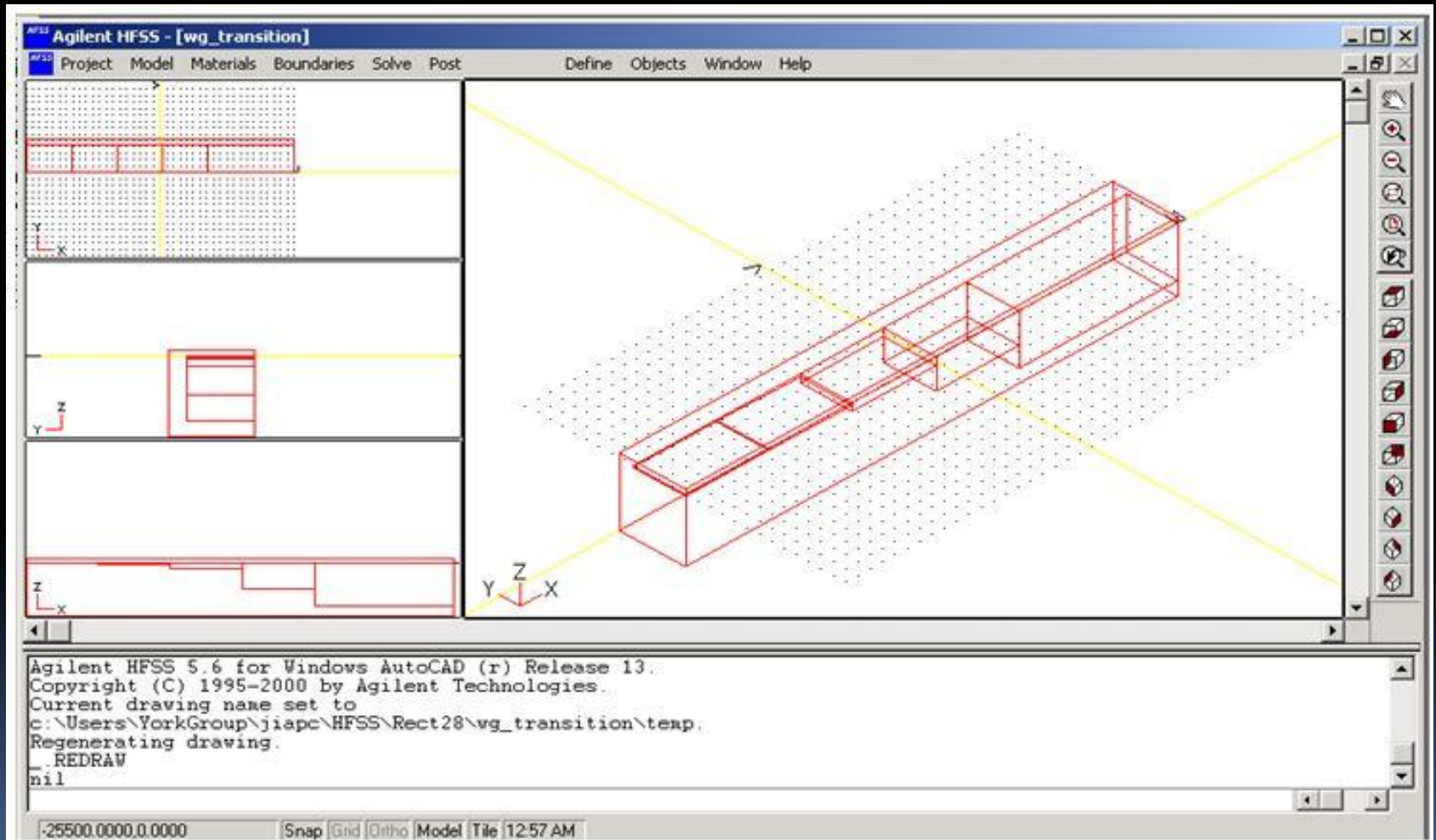
Introduction to HFSS



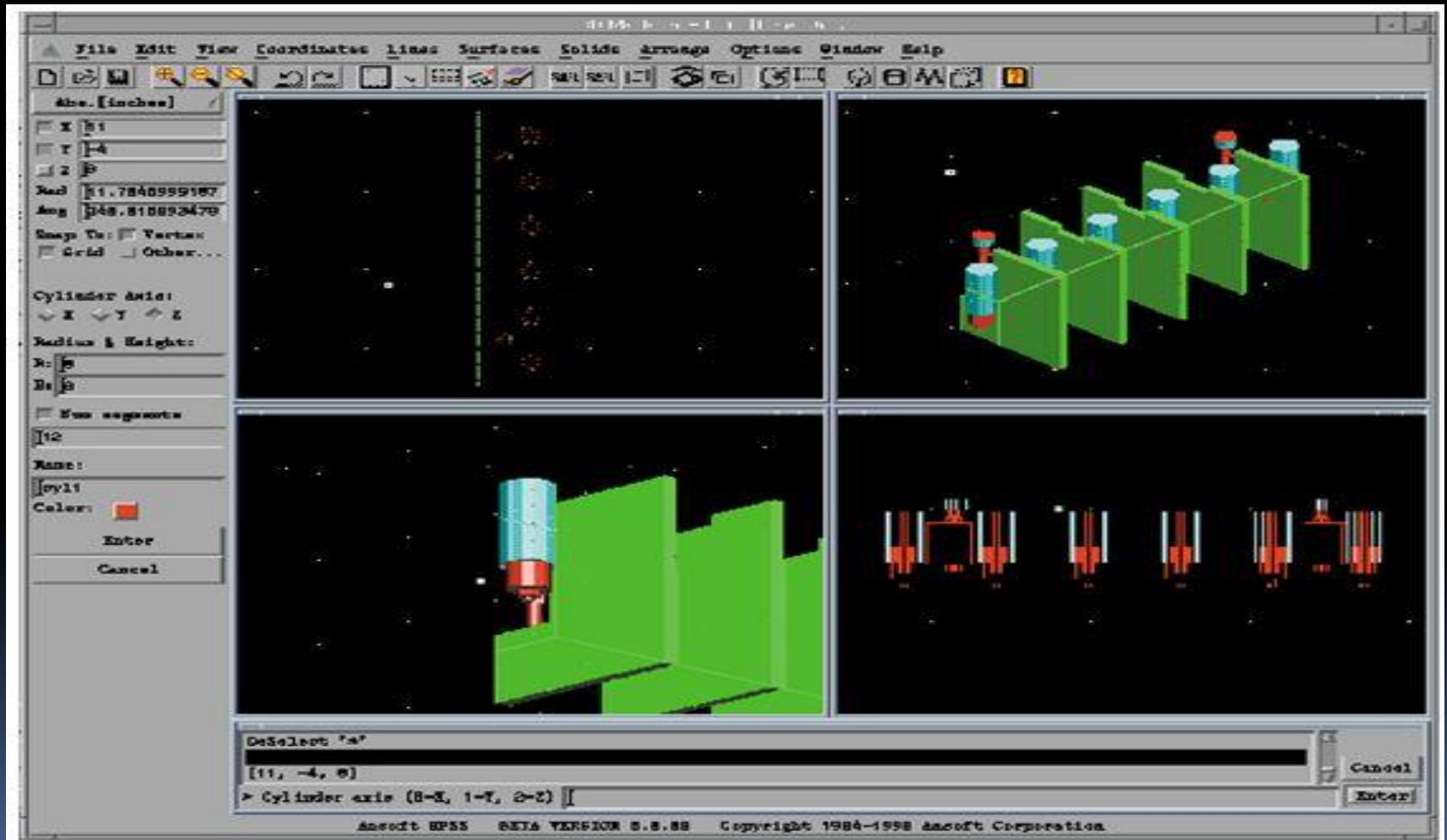
Introduction:

- HFSS اختصار لـ High Frequency Structure Simulator .
- أداة محاكاة من أجل النظم ثلاثية البعد (3D).
- يعتمد على طريقة العنصر المحدود (FEM) في المجال الترددي (Frequency Domain).
- يعتمد على حوسبة عالية الأداء تؤدي إلى سرعة بعملية النمذجة.
- هناك موزعين لهذا البرنامج: شركة Agilent وشركة Ansoft.

Agilent HFSS:



Ansoft HFSS:



Features:

- يعتمد HFSS على حوسبة عالية الأداء تؤدي إلى سرعة بعملية النمذجة.
- يمتاز بدقته العالية وقدرته على حل المسائل المتقدمة بالإضافة إلى التكنولوجيا الحسابية المتقدمة.
- يقدم دقة عالية في تحليل دارات التيار المستمر والدارات ذات الحالة العابرة.
- يحتوي HFSS على محاكي دارات خطي مضمن.

- يتيح البرنامج حساب معاملات S, اشعاع الهوائي وحساب المقطع العرضي للرادار.
- نموذج نصف متناظر او ربع متناظر او ثمن متناظر.
- حساب نماذج الحقل البعيد(النموذج الاشعاعي للحقل البعيد).
- مسح سريع عريض المجال للترددات .
- امكانية ايجاد نماذج لمقاطع عرضية ثنائية البعد مقيسة .

Applications:

- الهوائيات Antennas.
- العناصر ذات الدارات الالكترونية ذو الترددات الراديوية.
- الدارات الميكروية Microwave Circuits .
- الدارات المطبوعة Printed Circuits .
- حزم الدارات المتكاملة IC Packages .
- خطوط النقل والتعبئة Packaging.

Installing the Ansoft HFSS

متطلبات النظام: □

Microsoft Windows XP(32/64), Windows 2000, or -

.Windows 2003 Server

Pentium –based computer -

- 128MB RAM minimum

- 8MB Video Card minimum

- Mouse or other pointing device

-CD-ROM drive

Installing the Ansoft HFSS :

□ برنامه HFSS:

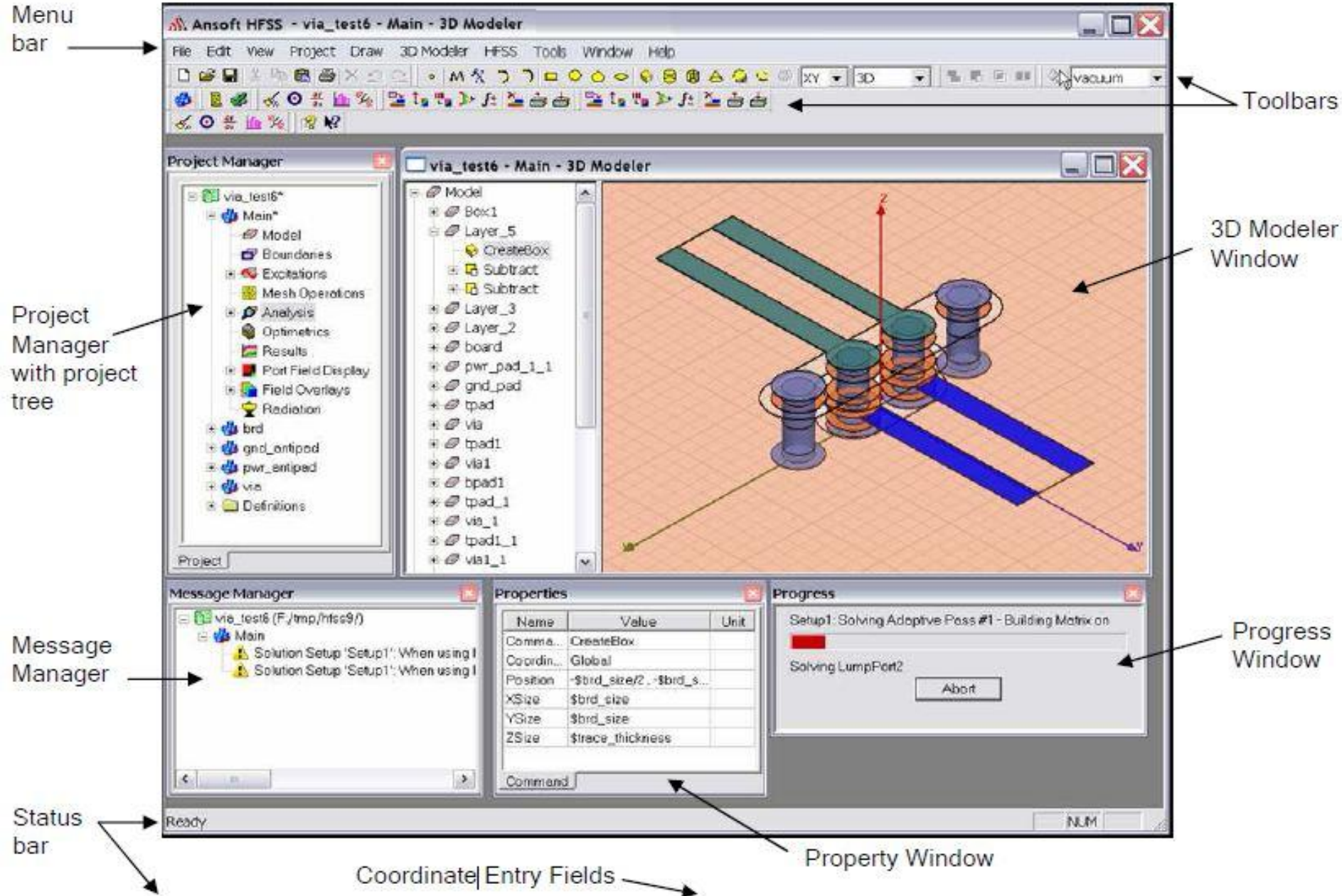
- ❖ Click the Microsoft Start button, select Programs, and select the Ansoft HFSS 15 program group. Click HFSS 15.
- ❖ Or Double click on the HFSS 15 icon Windows Desktop.



Ansoft HFSS Desktop:

برنامج HFSS: ➤

- ❖ Project Manager.
- ❖ Message Manager.
- ❖ Property Window.
- ❖ Progress Window.
- ❖ 3D Modeler Window.

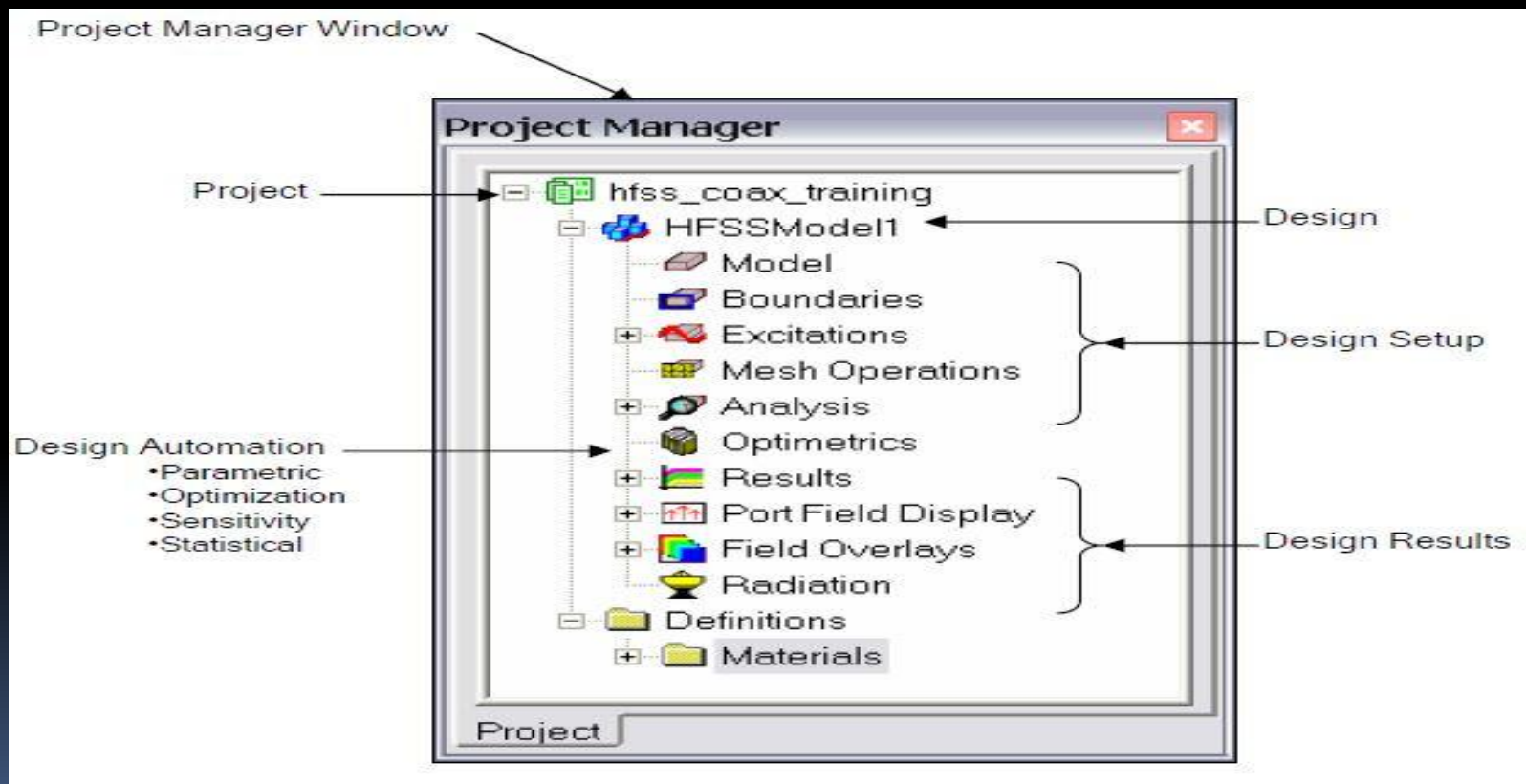


Enter the box position. X: 350.00 Y: -100.00 Z: 0.0000 Absolu Cartesia m1

Ansoft HFSS Desktop:

برنامج HFSS: ➤

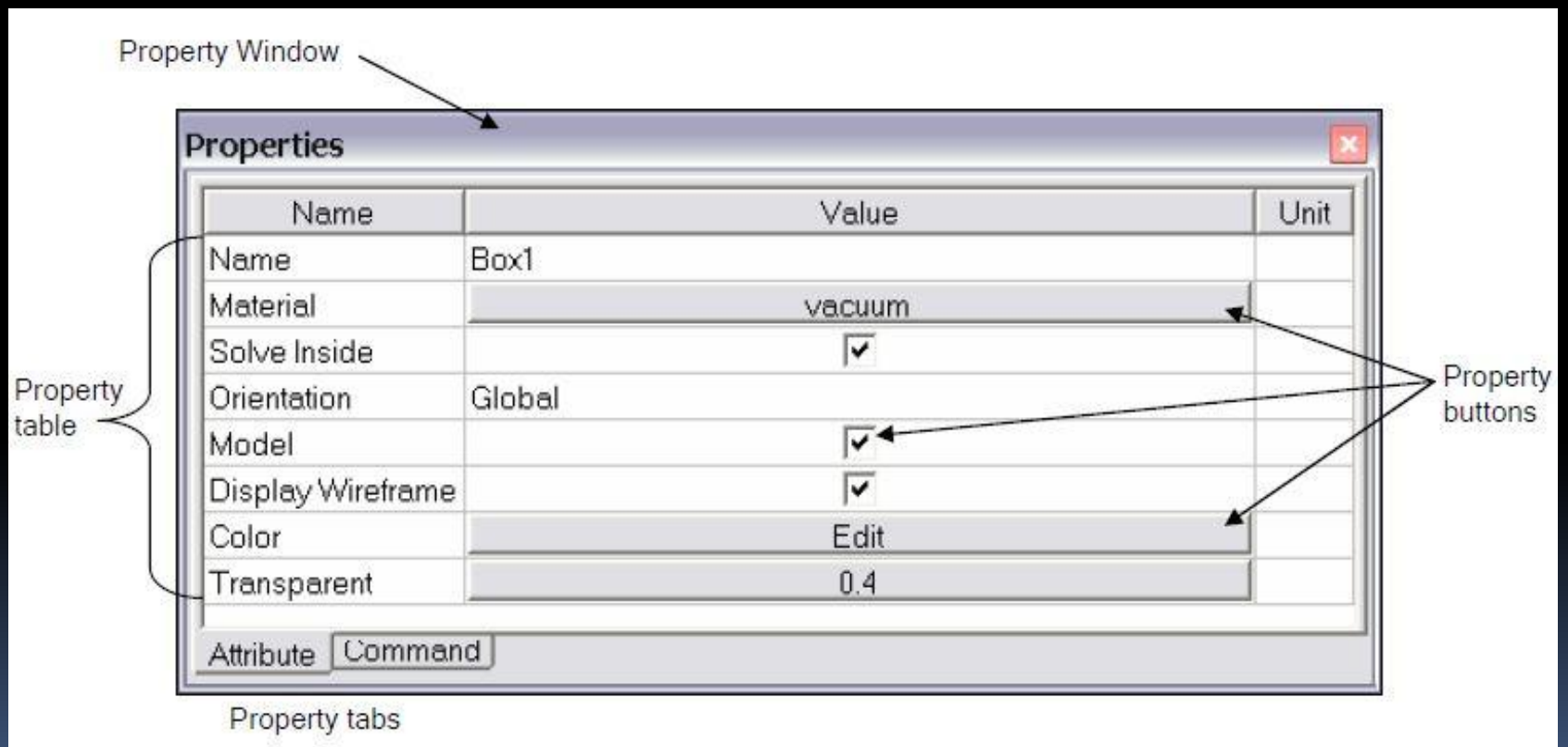
❖ Project Manager:



Ansoft HFSS Desktop:

برنامج HFSS: ➤

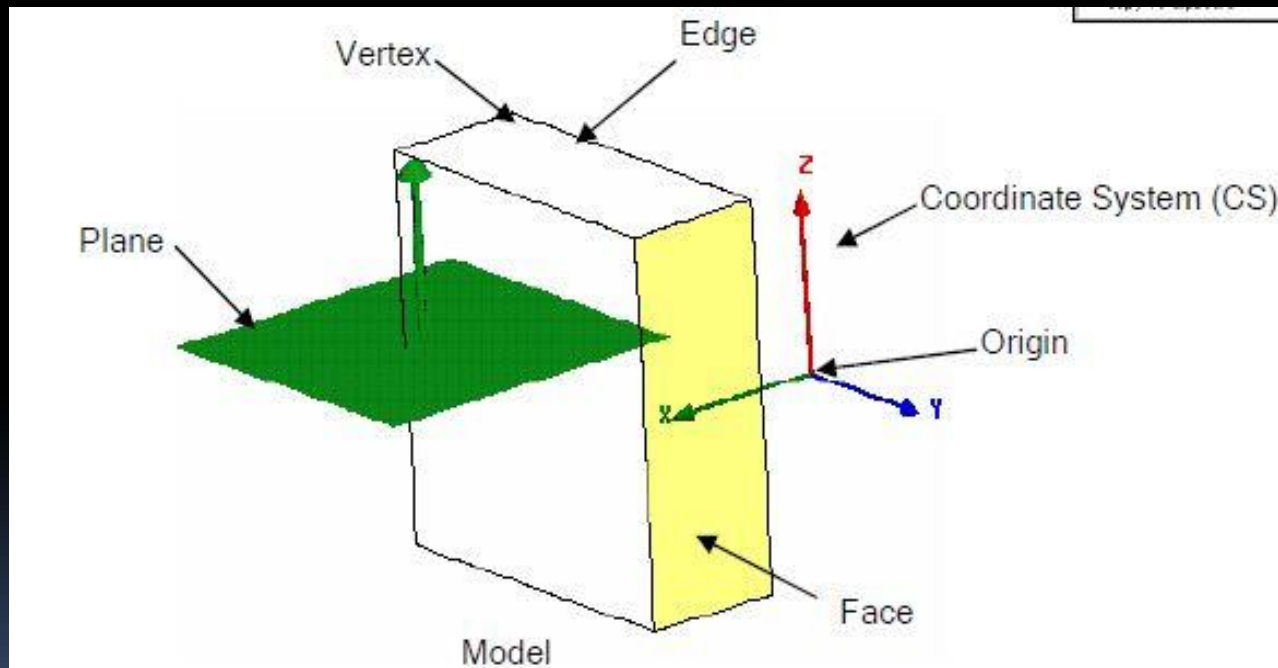
❖ Property Window:



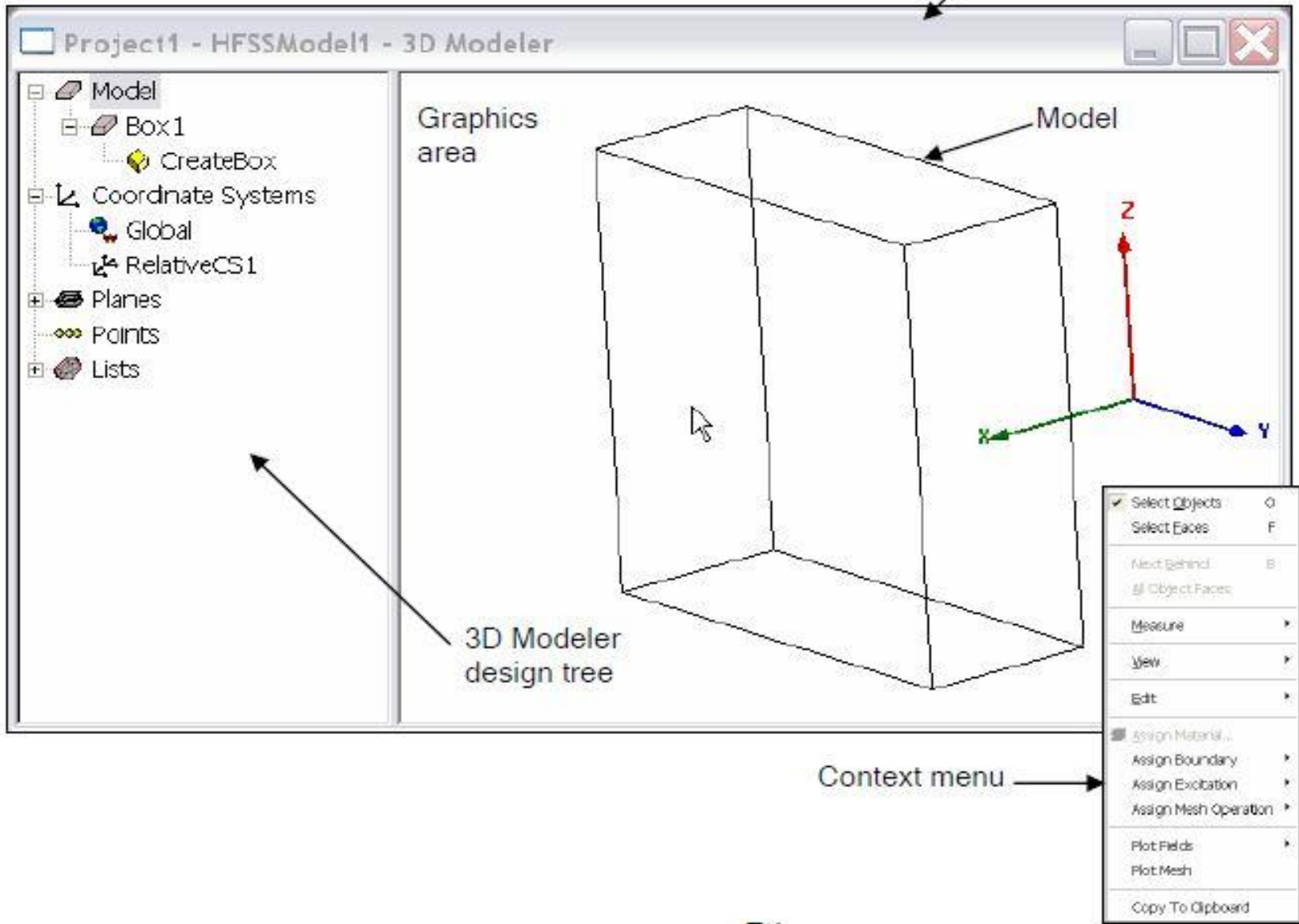
Ansoft HFSS Desktop:

➤ برنامج HFSS:

❖ 3D Modeler Window:



3D Modeler Window



Graphics area

Model

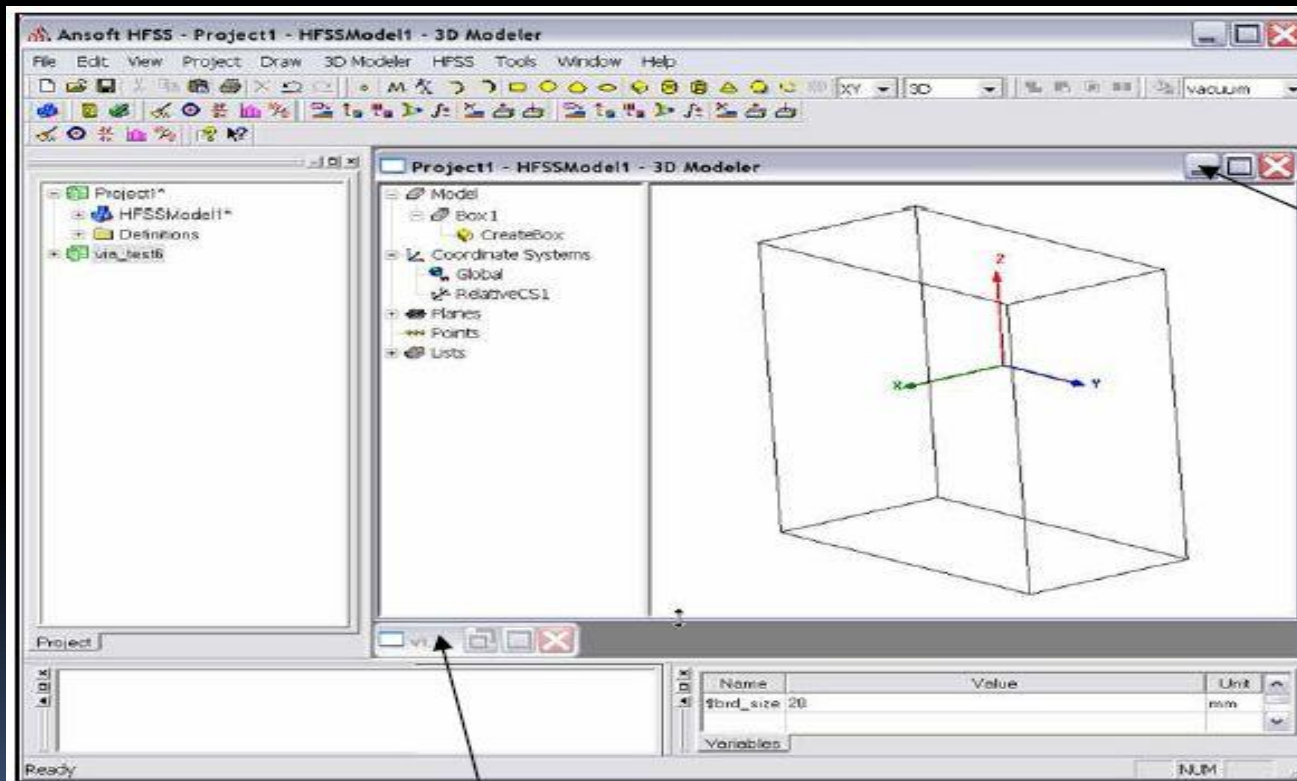
3D Modeler design tree

Context menu

Ansoft HFSS Desktop:

➤ برنامه HFSS:

❖ Design Windows:



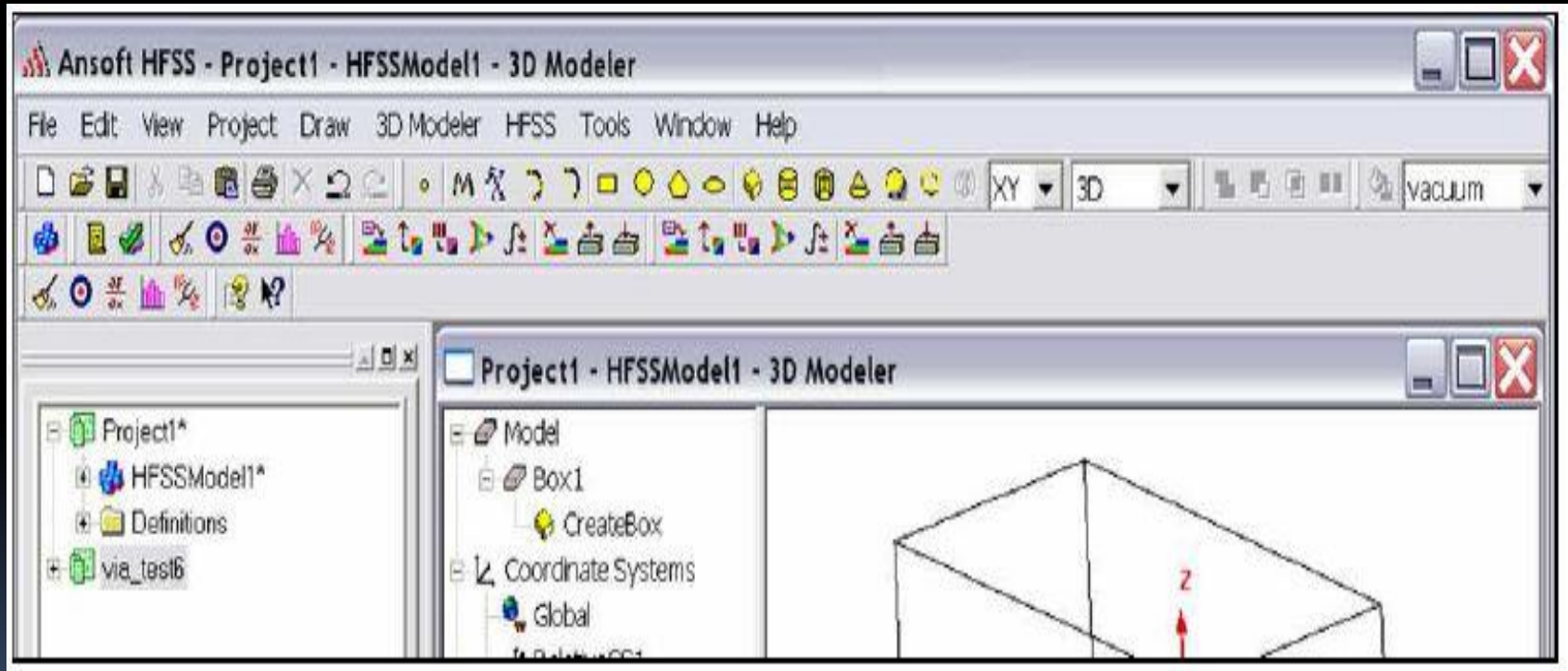
Iconize Symbol

Design icons

Ansoft HFSS Desktop:

➤ برنامج HFSS:

❖ Toolbars:



Opening a Design:

Opening a HFSS project:

- Opening a New project

File > New then select Project > Insert HFSS Design.

- Opening an Existing HFSS project

select the menu File > Open then Click Open to open the project.

Set Solution Type:

Model Type:

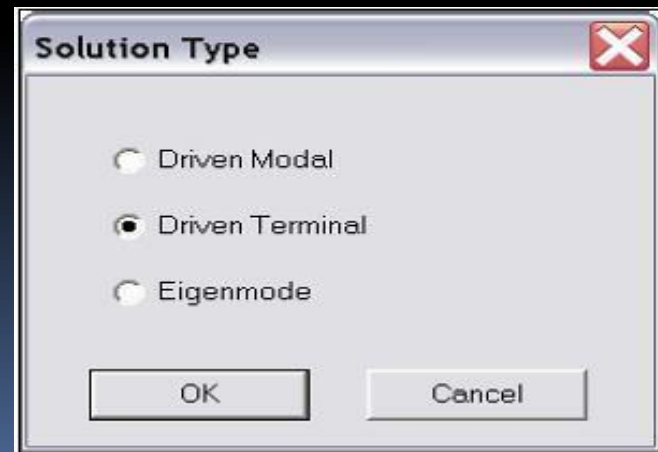
1. Driven Modal
2. Driven Terminal
3. Eignemode

- To set the solution type:

Select the menu item HFSS > Solution Type

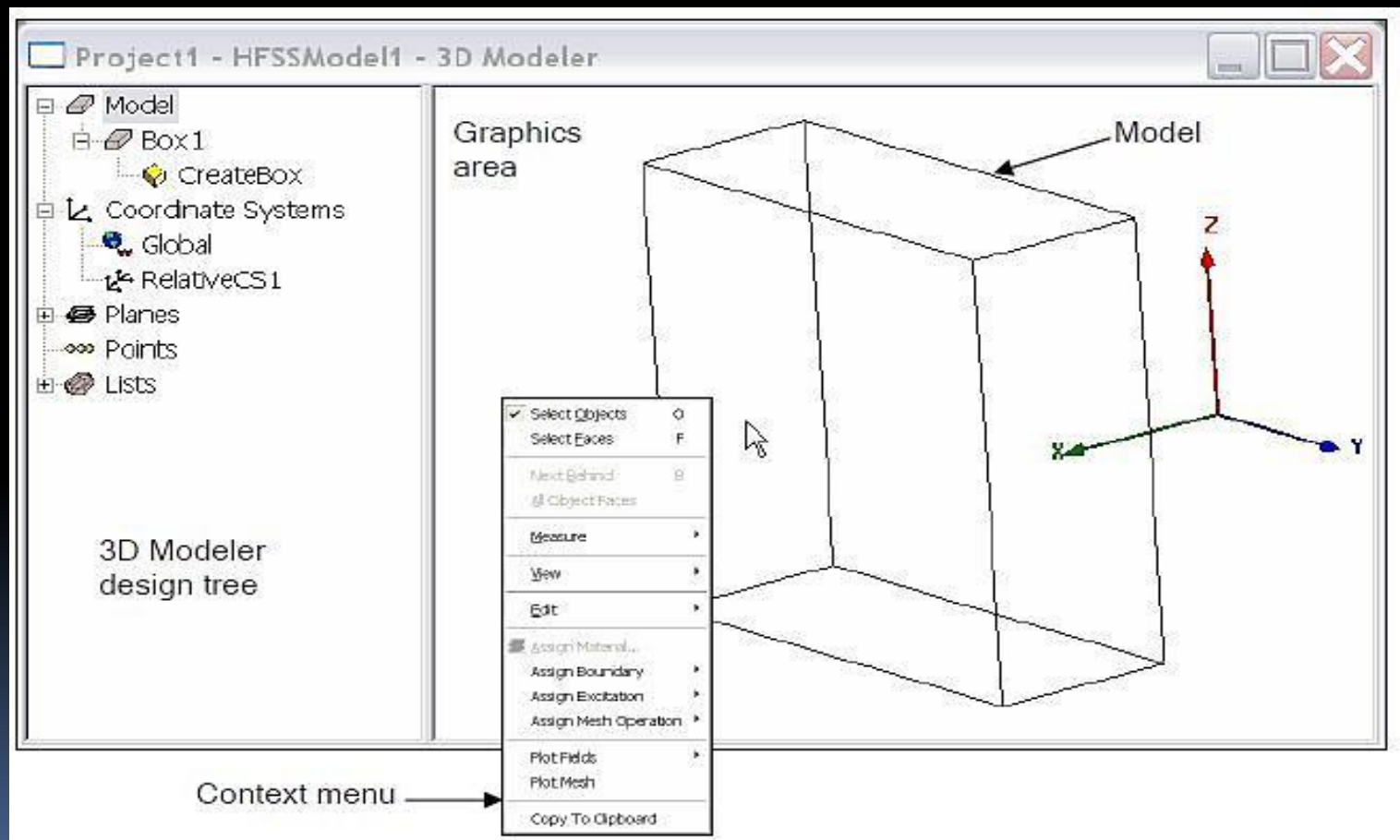
Choose one of the following

Click the OK button



Parametric Model Creation:

❖ Overview of the 3D Modeler User Interface:

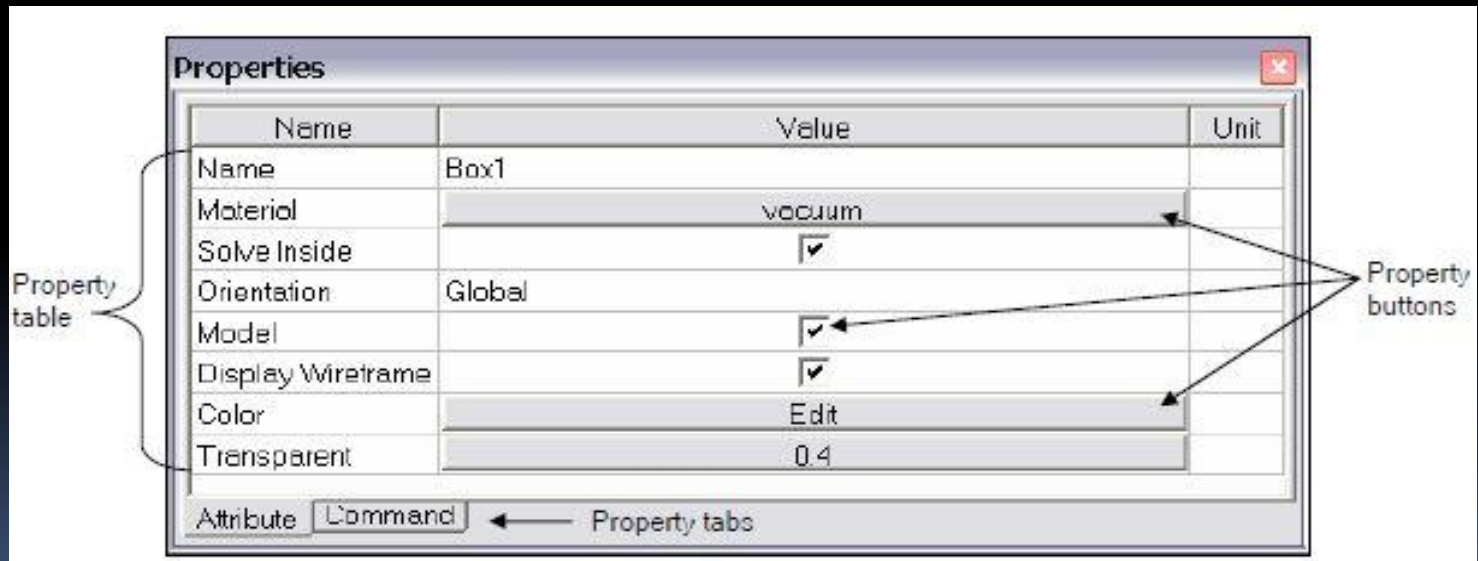


Parametric Model Creation:

❖ Overview of the 3D Modeler User Interface:

There are also two additional interfaces when using the 3D Modeler interface:

- **Property Window:**

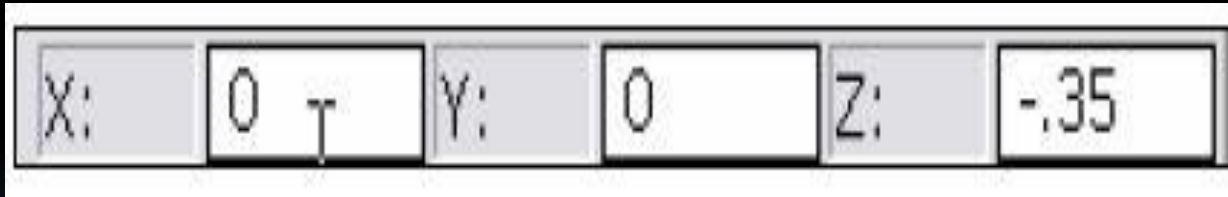


Parametric Model Creation:

❖ Overview of the 3D Modeler User Interface:

- **Status Bar/Coordinate Entry:**

displays the Coordinate Entry fields



A screenshot of a coordinate entry status bar. It consists of a horizontal row of six rectangular boxes. The first box contains the text 'X:'. The second box contains the number '0'. The third box contains the text 'Y:'. The fourth box contains the number '0'. The fifth box contains the text 'Z:'. The sixth box contains the number '-.35'. The boxes are arranged in a single row and are separated by thin vertical lines.

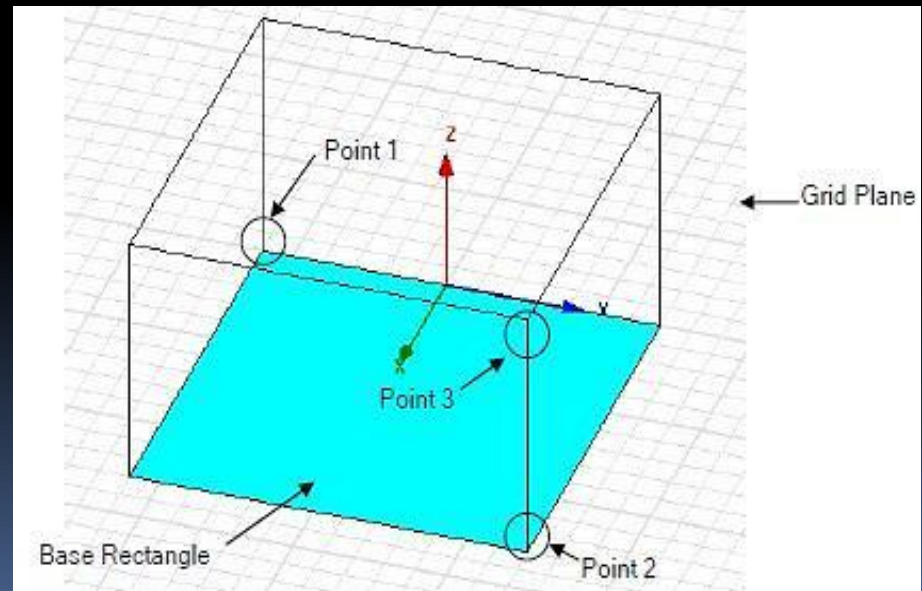
Parametric Model Creation:

❖ Creating and Viewing a Simple Structure:

✓ Following these steps:

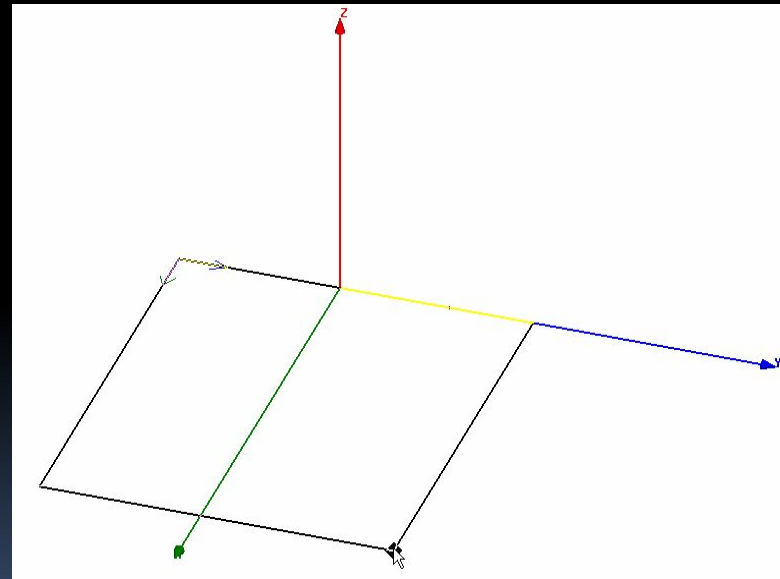
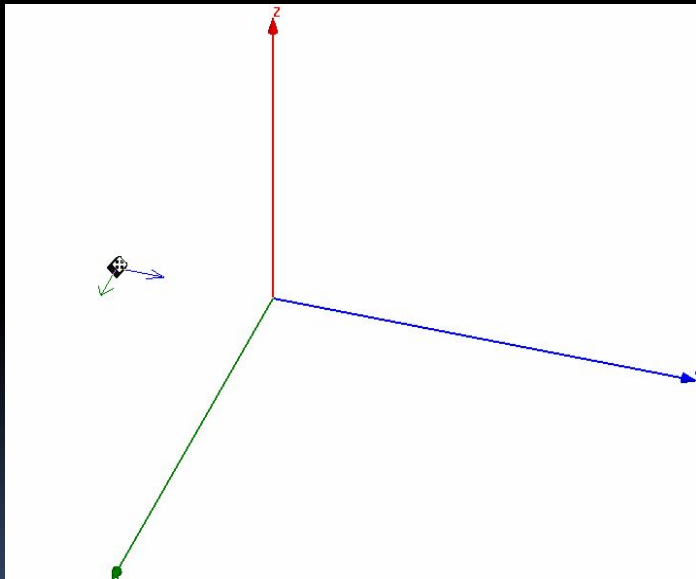
1. Set the grid plane.
2. Create the base shape of the object.
3. Set the Height.

✓ Create a Box:



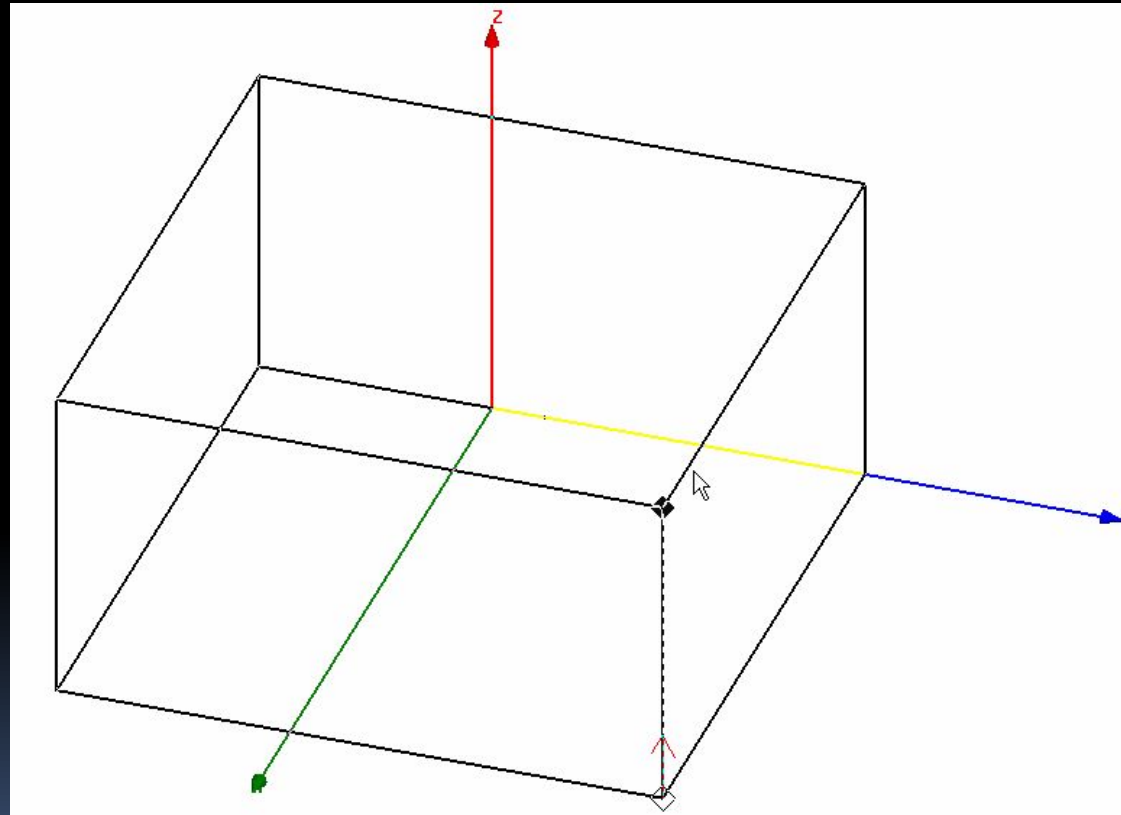
Parametric Model Creation:

- ✓ Create a Box:
 - a. Select the menu item 3D Modeler > Grid Plane > XY
 - b. Use the mouse to create the base shape



Parametric Model Creation:

✓ Create a Box:

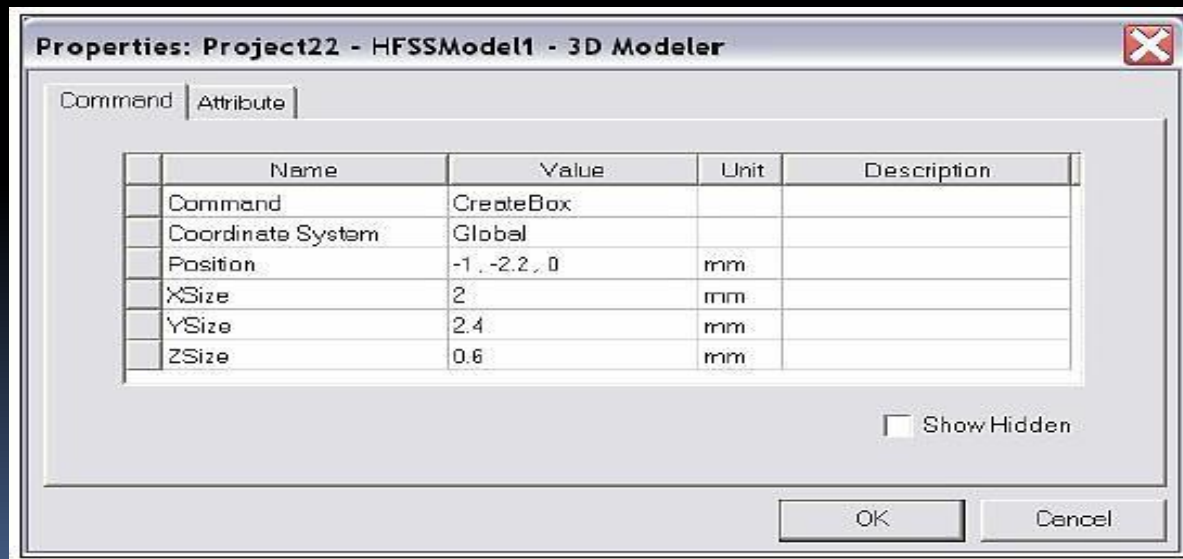


Parametric Model Creation:

✓ Object Properties:

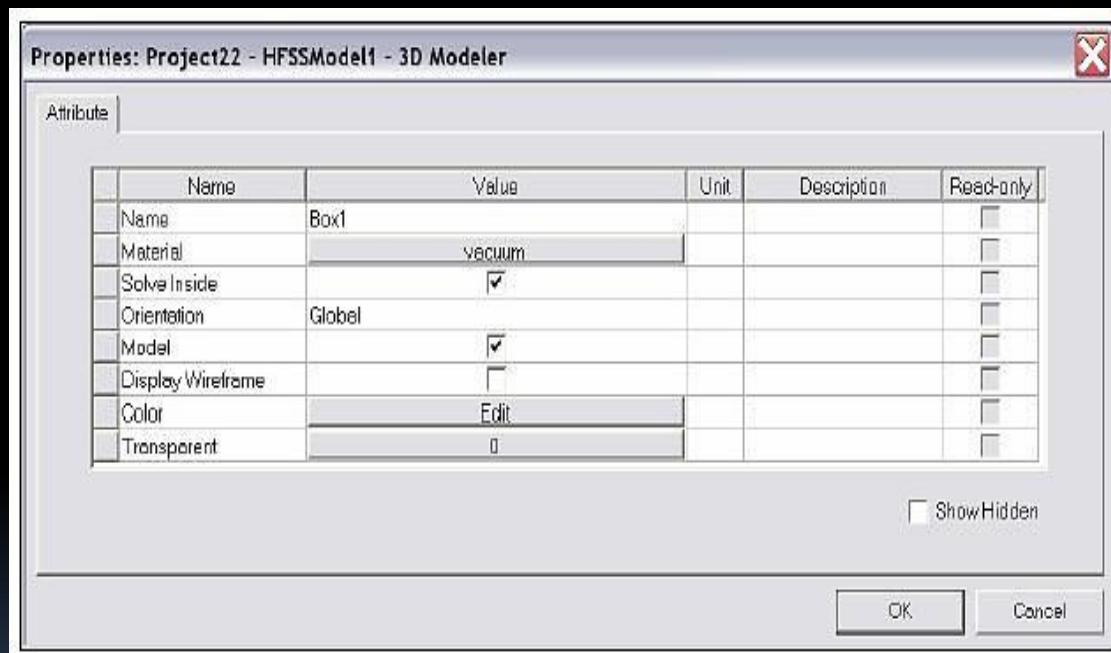
Every object has two types of properties

1. Command : Defines the structural primitive.
2. Attributes : Defines the material, display, and solve properties.



Parametric Model Creation:

✓ Object Properties:



Parametric Model Creation:

✓ Overview of Draw:

- 2D Draw Objects

The following 2D Draw objects are available: Rectangle, Circle, Line, Point, Spline, Ellipse.

- 3D Draw Objects

The following 3D Draw objects are available: Box, Cylinder, Sphere, Torus, Helix, Bond Wire, Cone.

Parametric Model Creation:

✓ Selecting Previously Defined Shapes:

- **Types of Selection**

To change the selection mode, select the menu item Edit > Select and choose the appropriate selection mode.

- **Select All Visible**

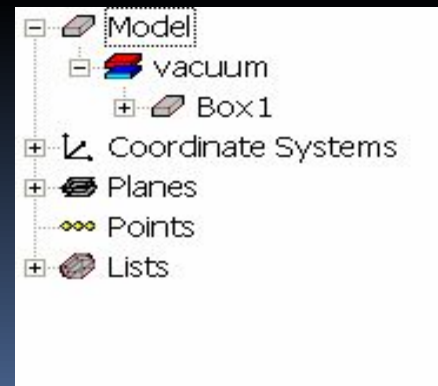
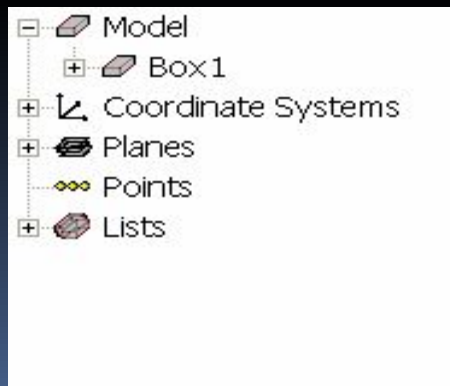
You can select all visible objects by pressing the CTRL+a key or by selecting the menu item Edit > Select All Visible.

- **Select by Name**

To select objects by Name you can use anyone of the following:

Parametric Model Creation:

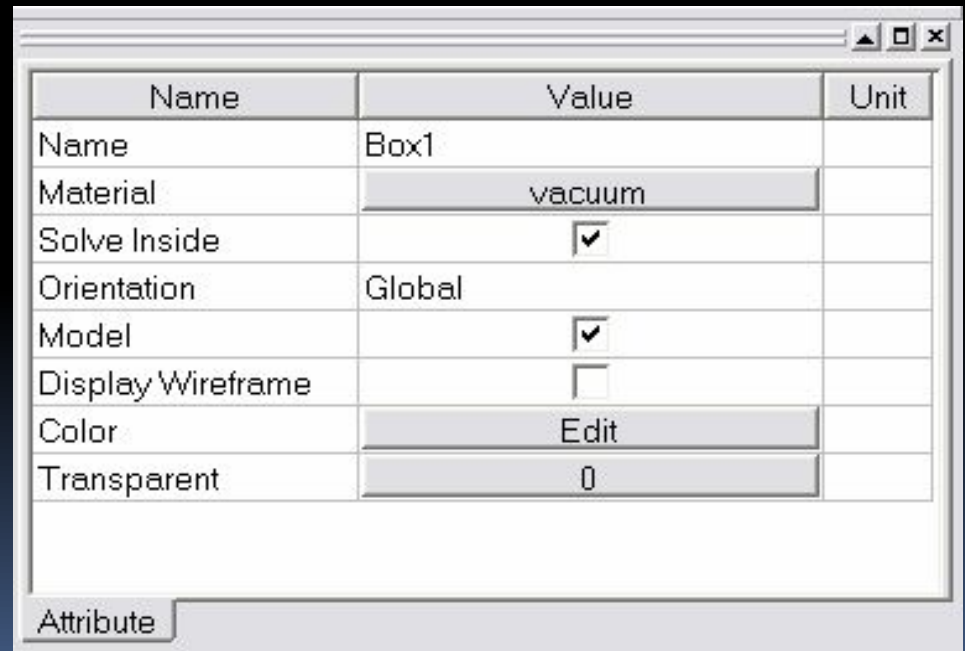
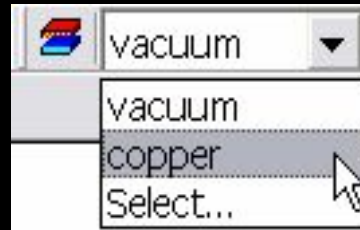
- Select the menu item Edit > Select > By Name
- Select the menu item HFSS > List
 - Select the Model tab
 - Select objects from the list
- Use the Model Tree.
 - If you open the Model folder you will find the objects sorted by Object or by Material.



Parametric Model Creation:

✓ Object Attributes:

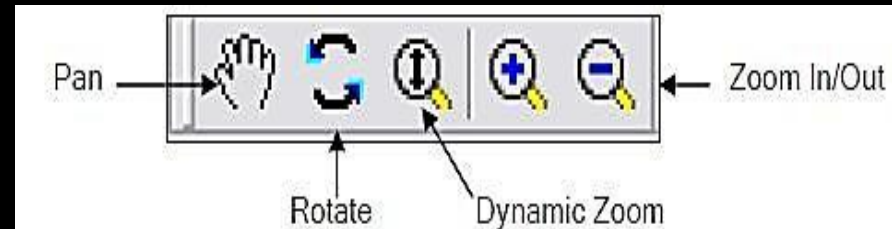
- Name
- Material
- Solve Inside
- Model Object
- Display Wireframe
- Color
- Transparency



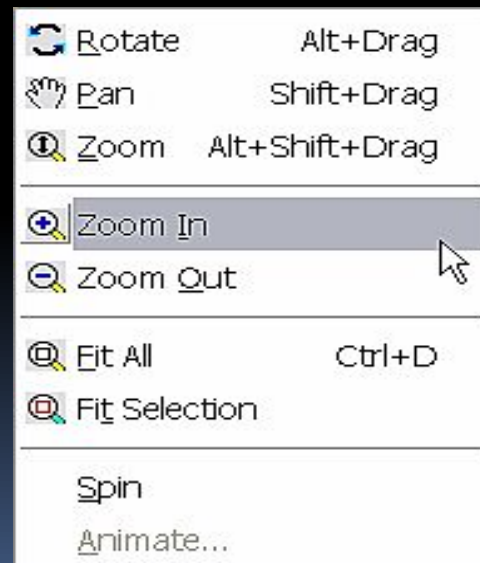
Parametric Model Creation:

✓ Changing the View:

1. Toolbar
2. Context Menu

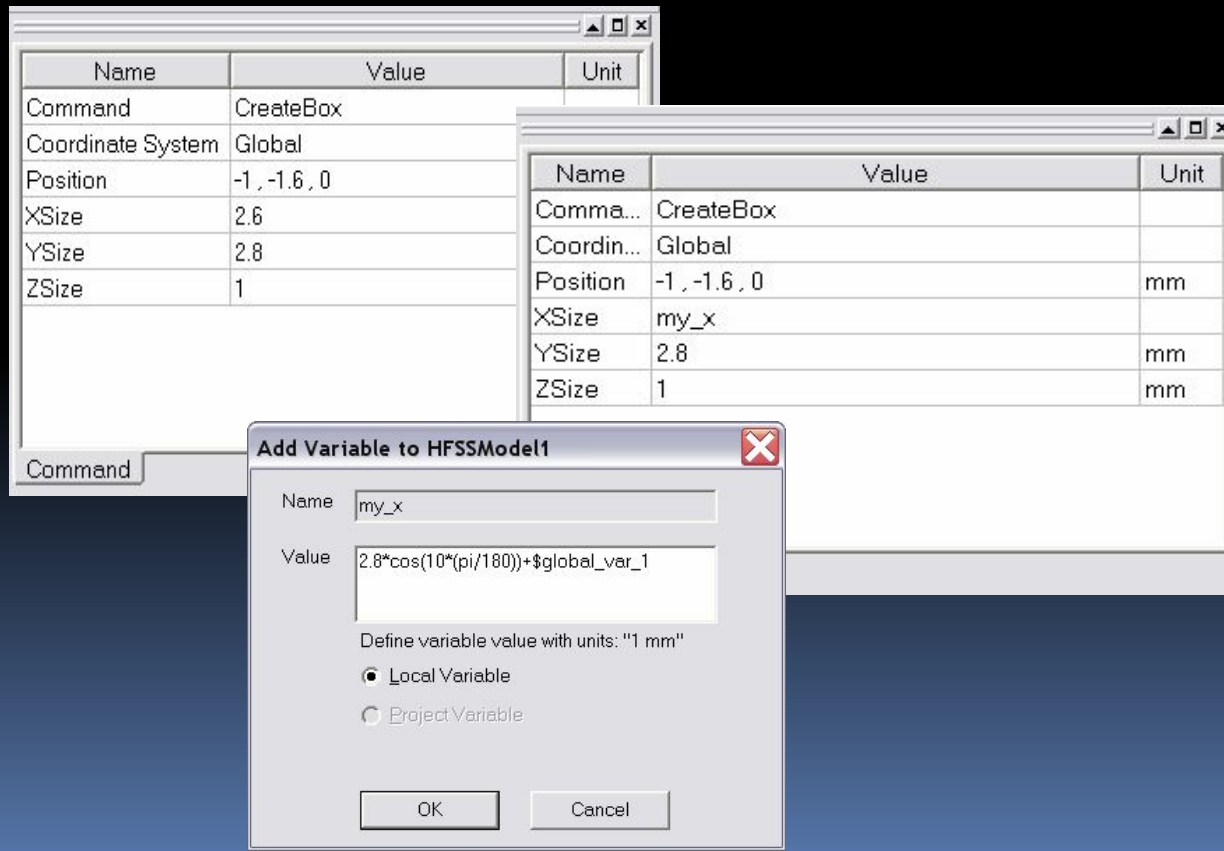


View and choose from the options outlined in the Toolbar section.



Parametric Model Creation:

- ✓ Parametric Geometry:
 - Defining Parameters



Parametric Model Creation:

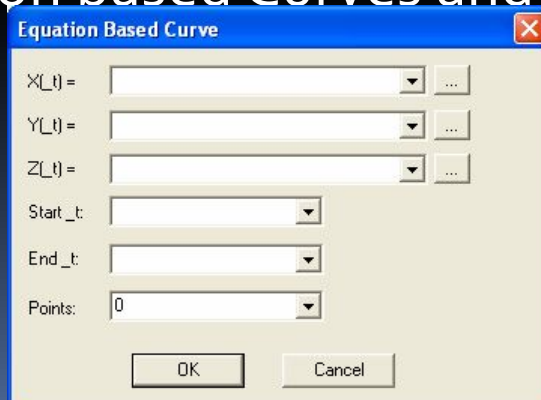
✓ Parametric Geometry:

- Variables

HFSS > Design Properties

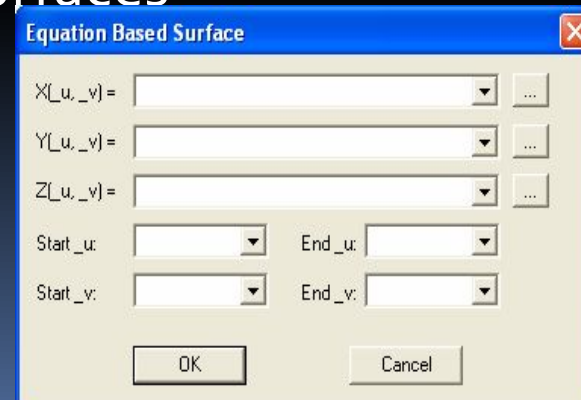
Project > Project Variables

- Units
- Equations
- Equation based Curves and Surfaces



The 'Equation Based Curve' dialog box contains the following fields:

- X[t] = [text box] [dropdown] [button]
- Y[t] = [text box] [dropdown] [button]
- Z[t] = [text box] [dropdown] [button]
- Start_t: [dropdown]
- End_t: [dropdown]
- Points: [text box with value 0] [dropdown]
- OK button
- Cancel button



The 'Equation Based Surface' dialog box contains the following fields:

- X[u,v] = [text box] [dropdown] [button]
- Y[u,v] = [text box] [dropdown] [button]
- Z[u,v] = [text box] [dropdown] [button]
- Start_u: [dropdown] End_u: [dropdown]
- Start_v: [dropdown] End_v: [dropdown]
- OK button
- Cancel button