Mastering™
Autodesk®
VIZ 2005

George Omura with Scott Onstott

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Mastering
Autodesk VIZ 2005
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To my children
—George Omura

To my loving partner, Jenn
—Scott Onstott
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—George Omura

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—Scott Onstott
Contents at a Glance

Introduction ................................................................. xxi

Chapter 1 • Getting to Know VIZ ........................................ 1
Chapter 2 • Introducing VIZ Objects ................................. 53
Chapter 3 • Creating Shapes with Splines ......................... 95
Chapter 4 • Editing Meshes for Complex Objects............... 151
Chapter 5 • Organizing and Editing Objects ....................... 219
Chapter 6 • Light and Shadow .......................................... 269
Chapter 7 • Enhancing Models with Materials .................... 315
Chapter 8 • Staging Your Design ....................................... 387
Chapter 9 • Working with Files ......................................... 417
Chapter 10 • Using Radiosity ............................................ 445
Chapter 11 • Using mental ray .......................................... 509
Chapter 12 • Understanding Animation ............................. 545
Chapter 13 • Creating Animations .................................... 597
Chapter 14 • Using Photoshop with VIZ ......................... 623
Chapter 15 • Combining Photographs with VIZ Designs ........ 679
Chapter 16 • Using AutoCAD-Based Applications with VIZ .... 719
Chapter 17 • Exporting to the Web .................................... 773
Appendix A • Installation Notes ....................................... 809
Appendix B • Modifers and Materials ................................. 815
Appendix C • Patches and NURBS Surfaces ....................... 843
Appendix D • Helpers and Effects ..................................... 851

Index ................................................................................ 867
# Contents

*Introduction* .............................................................................................................. xxi

## Chapter 1 • Getting to Know VIZ ................................................................. 1

Introducing VIZ 2005 Features ................................................................................. 1
Getting Started .......................................................................................................... 3
Touring the Interface ................................................................................................. 4
  The Main Menu Bar ................................................................................................. 4
  The Main Toolbar .................................................................................................. 5
  Docked and Floating Toolbars ............................................................................... 6
  Toolbar Flyouts ...................................................................................................... 8
  The Viewport ......................................................................................................... 9
  Tools for Working with the Viewport .................................................................... 9
Getting to Know the Command Panel .................................................................... 12
Understanding VIZ’s Tools ....................................................................................... 13
Working with Objects .............................................................................................. 19
  Selecting and Moving Objects ........................................................................... 19
  Rotating and Scaling Objects ............................................................................. 22
  Copying an Object ............................................................................................... 26
  Selecting Multiple Objects .................................................................................. 27
  Naming Selection Sets .......................................................................................... 32
  Editing Named Selection Sets ............................................................................. 33
Getting the View You Want ....................................................................................... 34
  Understanding the Perspective Viewing Tools .................................................... 35
  Using Multiple Viewports .................................................................................... 40
  Changing the Viewport Display and Configuration ............................................ 42
Working with the Custom UI and Defaults Switcher ............................................. 49
Summary .................................................................................................................... 52

## Chapter 2 • Introducing VIZ Objects ......................................................... 53

Understanding Standard Primitives ....................................................................... 53
  Adjusting an Object’s Parameters ........................................................................ 55
  Accessing Parameters ......................................................................................... 60
  Introducing the Standard Primitive Tools .......................................................... 61
Molding Standard Primitives with Modifiers .......................................................... 65
  Adding a Modifier ............................................................................................... 65
  Accessing Modifier Parameters ......................................................................... 68
  Inserting Modifiers Where You Want Them ....................................................... 70
  Using the Modifier Stack Tools ........................................................................... 71
How VIZ Sees Objects .............................................................................................. 73
Making Clones That Share Properties .................................................................... 74
  Creating an Instance Clone ................................................................................. 74
  Creating a Reference Clone .................................................................................. 75
Scaling and Rotating Objects with Transform Tools .............................................. 77
CONTENTS

Chapter 3 • Creating Shapes with Splines ........................................... 95

Drawing with Splines ................................................................. 96
  Drawing Straight-Line Segments ............................................. 97
  Constraining Lines Vertically and Horizontally .......................... 99
  Drawing Curves ..................................................................... 100
  Lathing a Spline .................................................................. 101
Modifying a Shape Using Sub-object Levels ................................. 103
  Adjusting the Lathe Axis ....................................................... 104
  Flipping Surface Normals ..................................................... 105
  Smoothing Spline Corners ..................................................... 106
  Enhancements to Tangent Handles .......................................... 111
  Creating Thickness with a Spline ............................................. 114
Outlining and Extruding Splines ................................................... 117
  Drawing Accurate LineSplines ............................................... 117
  Giving Walls Thickness ....................................................... 120
  Using Grids and Snaps to Align Objects Accurately .................. 121
  Adjusting a Wall Location ..................................................... 127
Combining and Extruding Primitive Splines .................................. 130
  Combining Splines ................................................................ 131
Joining Closed Splines with Boolean Tools ................................. 135
Creating a Solid Form with Splines ............................................. 139
Introducing the Spline Types ..................................................... 142
Editing Splines ....................................................................... 144
Using AEC Walls and Doors ..................................................... 145
Summary .................................................................................. 149

Chapter 4 • Editing Meshes for Complex Objects .............................. 151

Creating an Opening in a Wall with Boolean Operations .................. 151
  Hiding Shapes That Get in Way .............................................. 152
  Creating the Shape of the Opening ......................................... 154
  Subtracting the Opening from the Wall .................................... 155
  Creating Multiple Openings in a Single Wall ......................... 158
  Making Changes to the Opening............................................. 158
Tracing over a Sketch ................................................................ 160
  Importing a Bitmap Image .................................................... 161
  Scaling the Image to the Model’s Space ................................... 164
  Tracing Over the Image ......................................................... 167
  Building Objects from Traced Lines ....................................... 168
Chapter 7 • Enhancing Models with Materials .......................... 315

Understanding Bitmap Texture Maps .................................. 316
  Diffuse Color Maps .................................................. 316
  Surface Properties .................................................. 320
Adding Materials to Objects ............................................. 321
  Adding a Map Path to Help VIZ Find Bitmaps ..................... 321
  Fine-Tuning Color .................................................... 328
  Understanding Material Libraries .................................. 329
  Adding Material Mapping Coordinates ............................. 329
Understanding Mapping Coordinates .................................. 334
  What Happens When You Add the Mapping Coordinates .... 335
  Adjusting the UVW Map Gizmo ..................................... 336
Editing Materials ......................................................... 344
  Adjusting Bitmap Strength .......................................... 344
  Adjusting the Material Color ........................................ 347
  Copying Color Settings ............................................... 348
Selecting Shaders ......................................................... 349
Map Scalar Modifiers .................................................... 351
Using Bump Maps ....................................................... 354
Adding Entourage ........................................................ 356
  Hiding Unwanted Surfaces with Opacity Maps .................. 356
  Adjusting an Object to a Bitmap Shape ........................... 365
Ray Tracing Reflection and Refraction ................................ 366
Assigning Materials to Parts of an Object ............................ 368
  Opening a Group ....................................................... 368
Chapter 8 • Staging Your Design ........................................... 387
Understanding the VIZ Camera ........................................ 388
Adding a Camera ............................................................ 388
Editing the Camera Location with the Viewport Tools .......... 391
Setting Up an Interior View .............................................. 395
Creating an Environment ................................................ 397
Making Adjustments to the Background ............................... 399
Immersive Environments for Animation ............................... 405
Creating a Credible Background ....................................... 405
Using a Texture Map and Hemisphere for the Sky .............. 407
Using Render Types ...................................................... 411
Render Elements for Compositing ..................................... 413
Summary ................................................................. 416

Chapter 9 • Working with Files ........................................ 417
Gaining Access to Materials and Objects from Other Files ......... 417
Arranging Furniture with XRefs and the Asset Browser ........ 424
Replacing Objects with Objects from an External File .......... 426
Importing Files from the Asset Browser .............................. 428
Arranging Furniture with XRef Scenes .............................. 431
Using the Rendered Frame Windows ................................. 436
Printing Images ........................................................... 437
Opening Multiple Rendered Frame Windows for Comparisons .. 438
Zooming, Panning, and Controlling Channels in the Rendered Frame Window ............................. 438
Obtaining Colors from External Bitmap Files ....................... 438
Using the Asset Browser on the Internet ............................. 440
Summary ................................................................. 443

Chapter 10 • Using Radiosity ........................................... 445
Adding Daylight to Your Model ........................................ 446
Understanding the Radiosity Workflow ............................... 450
Refining Your Radiosity Solution ...................................... 450
Setting the Material Reflectivity ....................................... 452
Understanding the Radiosity Mesh .................................... 456
Creating a Finished Rendering ......................................... 462
Working with Artificial Lights .......................................... 469
Using Photometric Lights ............................................... 470
Using a Shortcut to Generic Light Fixtures ......................... 474
CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importing the Photometric Lights Using XRefs</td>
<td>475</td>
</tr>
<tr>
<td>Adjusting Shadows for Photometric Lights</td>
<td>477</td>
</tr>
<tr>
<td>Understanding Photometric Lights</td>
<td>481</td>
</tr>
<tr>
<td>Points Are Bulbs, Linears Are Tubes, and Areas Are Rectangles</td>
<td>481</td>
</tr>
<tr>
<td>Controlling the Direction of Lights</td>
<td>482</td>
</tr>
<tr>
<td>Understanding Web Distribution</td>
<td>483</td>
</tr>
<tr>
<td>Specifying the Color Temperature and Light Intensity</td>
<td>485</td>
</tr>
<tr>
<td>Specifying Linear and Area Light Dimensions</td>
<td>487</td>
</tr>
<tr>
<td>Understanding Dynamic Range</td>
<td>487</td>
</tr>
<tr>
<td>Assembling an Articulated Luminaire</td>
<td>490</td>
</tr>
<tr>
<td>Transforming Pivot Points</td>
<td>491</td>
</tr>
<tr>
<td>Aligning the Light Source with the Fixture</td>
<td>493</td>
</tr>
<tr>
<td>Using Schematic View</td>
<td>494</td>
</tr>
<tr>
<td>Summary</td>
<td>508</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 11 • Using mental ray</th>
<th>509</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding mental ray</td>
<td>509</td>
</tr>
<tr>
<td>Setting Up mental ray</td>
<td>512</td>
</tr>
<tr>
<td>The Material Editor and mental ray</td>
<td>513</td>
</tr>
<tr>
<td>Using Photon Maps</td>
<td>517</td>
</tr>
<tr>
<td>Testing the Photon Map Effects</td>
<td>519</td>
</tr>
<tr>
<td>Final Gathering</td>
<td>530</td>
</tr>
<tr>
<td>Reviewing the Basic mental ray Workflow</td>
<td>533</td>
</tr>
<tr>
<td>Contour Renderings</td>
<td>533</td>
</tr>
<tr>
<td>Skylight Global Illumination</td>
<td>537</td>
</tr>
<tr>
<td>Image-Based Lighting and Skylight</td>
<td>540</td>
</tr>
<tr>
<td>Using High Dynamic Range Images</td>
<td>542</td>
</tr>
<tr>
<td>Summary</td>
<td>544</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 12 • Understanding Animation</th>
<th>545</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding the World of Video Time</td>
<td>546</td>
</tr>
<tr>
<td>Creating a Quick-Study Animation</td>
<td>546</td>
</tr>
<tr>
<td>Adding Camera Motion</td>
<td>549</td>
</tr>
<tr>
<td>Adjusting the Camera Path</td>
<td>550</td>
</tr>
<tr>
<td>Viewing the Camera Trajectory</td>
<td>552</td>
</tr>
<tr>
<td>Controlling the Camera Trajectory Visibility</td>
<td>554</td>
</tr>
<tr>
<td>Creating a Preview Animation</td>
<td>555</td>
</tr>
<tr>
<td>Understanding Keyframes</td>
<td>556</td>
</tr>
<tr>
<td>Increasing the Number of Frames in an Animation Segment</td>
<td>559</td>
</tr>
<tr>
<td>Accelerating and Decelerating the Camera Motion Smoothly</td>
<td>560</td>
</tr>
<tr>
<td>Editing Keyframes</td>
<td>563</td>
</tr>
<tr>
<td>Adding More Frames for Additional Camera Motion</td>
<td>566</td>
</tr>
<tr>
<td>Adding Frames to the End of a Segment</td>
<td>566</td>
</tr>
<tr>
<td>Adjusting the Camera Motion through a Keyframe</td>
<td>568</td>
</tr>
<tr>
<td>Compressing and Expanding Time</td>
<td>572</td>
</tr>
<tr>
<td>Adjusting the Camera Trajectory Using the Track View</td>
<td>579</td>
</tr>
</tbody>
</table>
## CONTENTS

Modeling with Displacement Maps ......................................................... 668
   Using the Displace Modifier .......................................................... 669
Using the Material Editor to Create Displaced Geometry ....................... 671
   Converting a Displacement Map into an Editable Mesh ...................... 675
   Creating an Editable Mesh from a Displacement Map ...................... 676
Summary ......................................................................................... 678

### Chapter 15 • Combining Photographs with VIZ Designs ..................... 679

Mesh Editing with a Photograph .......................................................... 679
   Establishing the Basic Form ......................................................... 680
   Moving Vertices ........................................................................ 682
   Adding Curvature ....................................................................... 685
   Smoothing the Surface .............................................................. 693
Adding Detail with Photographs ............................................................ 694
   Creating a Material for the Car Side ............................................ 694
   Adding the UVW Map ................................................................. 695
   Adding the Front to the Car ......................................................... 698
   Smoothing the Mesh .................................................................. 703
Matching Your Design to a Background Image ...................................... 706
   Setting Up the Model and the Image ............................................ 706
   Adding the Background Image .................................................... 707
   Adding the Camera Match Points ............................................... 709
   Aligning the Camera Match Points to the Background Image .......... 711
   Fine-Tuning a Camera-Matched View ........................................... 715
   Matching the Design Image Quality to the Background .................. 716
Summary ......................................................................................... 717

### Chapter 16 • Using AutoCAD-Based Applications with VIZ ............... 719

Creating Topography with Splines ....................................................... 720
   Updating Changes from an AutoCAD File .................................... 725
   Exploring Terrain Options ......................................................... 726
Setting Up an AutoCAD Plan for VIZ .................................................... 729
Importing AutoCAD Plans into VIZ ....................................................... 735
   Extruding the Walls ................................................................. 736
   Extruding Headers .................................................................... 737
   Extruding the Mullions ............................................................. 738
   Adding Glass ............................................................................. 739
   Creating a Floor with Openings ................................................. 741
Exploring the File Link Manager .......................................................... 746
   Editing Linked AutoCAD Files ................................................... 748
   Understanding the Block Node Hierarchy ..................................... 749
   Understanding the File Link Manager Options ............................. 752
   Understanding File Link Settings .............................................. 754
Using the Substitute Modifier with Linked Geometry ............................. 758
Adding Stairs ............................................................................... 760
   Tracing over Imported Lines ....................................................... 760
Adjusting Stair Parameters ................................................................. 762
Creating a Circular Stair ................................................................. 763
Finishing the Stair .............................................................................. 764
Adding the Stair Walls ....................................................................... 766
Importing a Truss .............................................................................. 770
Summary ............................................................................................. 772

Chapter 17 • Exporting to the Web ..................................................... 773
Creating Panoramas ........................................................................... 774
Making Virtual Reality Worlds .......................................................... 779
Installing a VRML Client .................................................................. 780
Virtual Helpers ................................................................................... 781
Building a Virtual World .................................................................... 782
Exporting the VRML File .................................................................... 791
Exploring the World ........................................................................... 792
Exporting Shockwave 3D Content ....................................................... 795
Using Render to Texture for Real-Time Models ................................... 798
Calculating Advanced Lighting Data ................................................... 798
Baking Lighting into Textures ............................................................... 802
Examining the Baked Materials and Mapping ...................................... 806
Summary ............................................................................................. 807

Appendix A • Installation Notes .......................................................... 809
Installing VIZ .................................................................................... 809
Moving VIZ to Another Computer ...................................................... 811
Visit the Autodesk Website Often ....................................................... 813
Installing the Companion CD ............................................................. 813

Appendix B • Modifiers and Materials ................................................ 815
Modifiers .......................................................................................... 815
Selection Modifiers ............................................................................ 815
World-Space Modifiers ..................................................................... 816
Object-Space Modifiers ...................................................................... 818
Materials and Maps ........................................................................... 834
Materials (Blue Sphere) ..................................................................... 834
Maps (Green Parallelogram) ............................................................... 837

Appendix C • Patches and NURBS Surfaces ......................................... 843
Understanding Patches ...................................................................... 843
Converting a Plane into an Editable Patch .......................................... 843
Converting Other Standard Primitives to Editable Patches ................ 844
Understanding NURBS ...................................................................... 846
Looking at NURBS Curves ................................................................ 846
Creating NURBS Surfaces from Standard Primitives ....................... 849
Applying a NURBS Deformation to an Object .................................... 850
Appendix D • Helpers and Effects ............................... 851
Helpers ........................................................................... 851
  Standard Helpers .......................................................... 852
  Atmospheric Apparatus ..................................................... 855
  Camera Match ............................................................... 855
  Assembly Heads ............................................................. 855
  VRML97 .................................................................. 856
Effects .............................................................................. 856
  Atmospheric Effects ........................................................ 856
  Rendering Effects ............................................................ 860

Index............................................................................... 867
Introduction

Much of your work as a designer involves sketches and drawings throughout the design process. Such graphic representations of designs not only help convey your ideas to others, they also help you see problems with a design and help you refine your ideas. 3D computer modeling and animation take design visualization way beyond hand drawn sketches by allowing you to create a complete replica of your design and look at it from virtually any point of view.

With Autodesk VIZ 2005, you can apply color, texture, and lighting to see how variations of these elements affect your design. You get a realistic view of your design so that you can make better decisions as you progress through the design process.

Mastering Autodesk VIZ 2005 is intended to help architects and designers visualize and present their designs through images, 3D models, and animations. This book focuses on the use of Autodesk VIZ 2005 as a modeling and presentation tool. Because Mastering Autodesk VIZ 2005 is focused on design issues, you won’t find an in-depth study of character animation or animated special effects; nor will you find a book that describes every single tool and function that’s available.

You will find step-by-step tutorials covering the major functions that you’ll need as a designer. These tutorials are based on years of experience using earlier versions of VIZ and its precursor, 3D Studio MAX (now known as 3ds max), on real projects with real deadlines and requirements. You’ll learn how to construct complex geometric forms and how to apply lighting and materials to study a design. You’ll also learn how to create effects to emphasize parts of your design for presentations.

How to Use This Book

The goal of this book is to give you the appropriate skills to produce professional-level presentations of your ideas, from conceptual designs to finished renderings and animated walkthroughs. Once you’ve mastered those skills, you’ll be equipped to confidently explore Autodesk VIZ 2005 and its rich set of tools and options on your own.

To get the most from this book, you’ll want to read the chapters sequentially from front to back, doing the tutorial exercises as you go along. Each chapter builds on the skills you learned from the previous chapters, so you can think of this book as your personal, self-paced course on Autodesk VIZ 2005.

The first three chapters help you to become familiar with the way Autodesk VIZ 2005 works and how it is organized. If you are already familiar with VIZ, you may want to skim through these chapters to become familiar with some of the new features. Chapters 4 and 5 show you how to
build a fairly complex building, using a variety of tools. These chapters introduce you to some of the more common methods of construction in VIZ. Chapters 6 through 9 show you how to use lighting and materials. Chapters 10 and 11 show you advanced rendering techniques using radiosity and mental ray. Chapters 12 and 13 cover animation, and Chapters 14 through 16 delve into some of the finer points of modeling and rendering. Chapter 17 shows you techniques for generating interactive content for the World Wide Web.

At the back of the book, you’ll find a set of appendixes that offer general reference information on some of the more commonly used tools in VIZ. Once you’ve worked through the first half of the book, you can use the appendixes as an aid in your own exploration of VIZ. In fact, you may find it useful to skim over the appendixes once you’ve completed the first three or four chapters so that you’ll have some understanding of their content. You can then refer to the appendixes as you work through the rest of the book.

Finally, before you get started with the tutorials, make sure you’ve installed the sample files from the companion CD. You’ll need those files to complete many of the exercises. See Appendix A for details on installing the sample files.

**NOTE** It is important that you set up VIZ to recognize the location of the sample files from the companion CD. Make sure you perform the instructions given in the section entitled “Adding a Map Path to Help VIZ Find Bitmaps” in Chapter 7. If you like, you can set up VIZ as described in that section right after you’ve installed the samples.

### What You’ll Find

To give you a better idea of what you’ll find in this book, here is a summary of the chapters and their contents.

In Chapter 1, you’ll get an introduction to the VIZ interface, and you’ll get your first look at VIZ objects and how they are created. You’ll also learn how to perform some basic editing operations, such as moving, scaling, and copying objects. Toward the end of Chapter 1, you’ll be introduced to the different ways you can view your designs in VIZ.

Chapter 2 delves deeper into the workings of VIZ objects. You’ll learn about the different types of objects available in VIZ and how you can use them to create the shapes you want. You’ll learn how to manipulate VIZ’s core set of shapes, called primitives, into more complex shapes. You’ll also learn about the different ways you can duplicate shapes, and why these different duplication methods can help you quickly build your design.

Chapter 3 looks at how you can create complex forms from simple lines. Here you’ll learn how to manipulate a basic type of object called a spline shape and to turn it into a wineglass. You’ll look at creating walls and doors as well.

Chapter 4 introduces you to object and editing methods that are common to architectural projects. You’ll begin to model a well-known building, using a hand-drawn sketch as a background. You’ll also focus on drawing objects that have unusual shapes.

In Chapter 5, you’ll continue working on the building you started in Chapter 4 by exploring ways to organize parts of the design. You’ll learn how to use object names and layers to help identify parts of the design. You’ll also continue your exploration of modeling complex forms by building a complex roof form.
Chapter 6 uses another well-known building as a vehicle for introducing you to digital light and rendering. You’ll also learn about the different types of lighting and shadow and how to use them together. In addition, you’ll learn how you can create a more realistic effect in your renderings by placing lights in strategic locations.

In Chapter 7, you’ll build on the work you will have done in Chapter 6 while exploring materials. You’ll read about the many different properties of materials, such as color and bump map textures. You’ll also learn how to align a texture to a surface. You’ll also be introduced to methods for adding entourage, such as trees and foliage, to a design.

Chapter 8 continues with placing cameras in the model and setting the model in an environment. You’ll learn how to control the background to affect the mood of your renderings. You’ll also see how to selectively render parts of your model to save time.

Chapter 9 shows you different ways of using VIZ files. You’ll learn how to combine files efficiently to allow distribution of work among other members of a design team. You’ll also discover ways to share data between files. The latter part of the chapter shows how you can share models on the Internet.

Chapter 10 gives you an introduction to the ins and outs of radiosity rendering. Radiosity is a rendering method that accurately simulates the way light bounces off materials and surfaces, and it produces some of the most lifelike views available in a computer simulation.

Chapter 11 shows you how to get started rendering with mental ray. This renderer offers the highest level of realism and you will learn how to simulate global illumination and caustic optical phenomena in a step-by-step tutorial. The latter part of the chapter shows you how to light a scene using the soft light of a skylight in conjunction with image-based lighting and high dynamic range images (HDRs).

Chapter 12 introduces you to animation. You’ll learn how to create and control the animation of a camera to produce an animated flyby of the building you worked on in earlier chapters. You’ll also see how to edit an animated object’s motion, preview your animation, and control lights over time.

Chapter 13 continues your look at animation by exploring the options for file animation output, backgrounds and props, and other walkthrough animation tools.

Chapter 14 explains how you can utilize Photoshop and other image-editing programs to enhance your use of VIZ. You’ll learn how to quickly convert your own scanned images into custom-made props for your VIZ design, such as trees or foliage. You’ll also learn how to use bitmap images to create geometric forms in VIZ.

Chapter 15 continues your look at Photoshop and VIZ by showing how you can convert a scanned image of a car into a 3D model of a car. Here you’ll learn methods for editing meshes to shape them into smooth forms. In the second half of the chapter, you’ll learn how to match a design to a background image to create a montage.

Chapter 16 shows you how you can use AutoCAD-based files with VIZ. You’ll learn the different ways that you can combine both 2D and 3D AutoCAD data with VIZ design files. You’ll learn the best ways to prepare an AutoCAD drawing for import into VIZ, and you’ll learn how you can use a single AutoCAD file as a shared data source for both AutoCAD and VIZ designs. Toward the end of this chapter, you’ll be shown how to create stairs and to import truss models from AutoCAD.

Finally, Chapter 17 shows you how to export interactive content to the Internet including panoramas, virtual reality worlds, and Shockwave 3D. You will also learn how to bake scene lighting into textures for use in real-time simulation engines.
In addition to the chapters, this book contains four appendices. Appendix A has important installation notes, Appendix B is a reference for all the modifiers and materials used in VIZ 2005, and Appendix C has information about patches and NURBS surfaces, which are optional modeling tools. Finally, Appendix D contains reference material on helper objects and rendering effects.

You’ll also find a bonus chapter on the companion CD that covers some of the more technical issues you’ll face when you’re ready to distribute your animations. You’ll learn about the different video storage options that are available and how they work. You’ll also learn methods for getting the best quality from your animations.

System Requirements

This book assumes that you already have Autodesk VIZ 2005 and a PC on which to run the software. In addition, you should perform a full installation of Autodesk VIZ 2005, including the optional tutorials and plug-ins. (See Appendix A for more on the installation of VIZ for this book.) The following list shows you the minimum system requirements for VIZ:

- Intel- or AMD-based Processor at 300MHz
- 512MB RAM
- 3GB free disk space before VIZ software installation
- Graphics card supporting 1024×768 16-bit color display with 64MB RAM
- CD-ROM drive
- Microsoft Windows 2000 or XP (Professional or Home Edition)
- Autodesk does not support VIZ on Windows Me, NT, 98, 95, or 3.1.

Tip You can obtain a trial version of VIZ from an Autodesk VIZ 2005 reseller. Check www.autodesk.com for details.

The 3GB of free disk space includes space for sample files and general work space for your projects. For later chapters, you may want to have a copy of AutoCAD version 2005 or 2004 and Photoshop CS or 7. You can obtain a trial version of Photoshop from the Adobe website. As of this writing, you can order a trial version of AutoCAD 2005 from Autodesk’s website. It’s not essential to have these other programs, but you may find them useful companions to VIZ.

What’s on the Companion CD

As mentioned earlier, you’ll want to make sure that you’ve installed the sample files from the companion CD that’s included with this book. They are needed for many of the exercises that you’ll encounter. You’ll find installation instructions for the sample files in Appendix A. The companion CD also contains a VIZ trial version and a bonus chapter on distributing VIZ animations on videotape.
Chapter 1

Getting to Know VIZ

Welcome to Mastering Autodesk VIZ 2005. Once again, Autodesk VIZ 2005 benefits from the development of its sister product, 3ds max, to give architects and other design professionals an indispensable design tool. VIZ 2005 gives designers cutting edge rendering technology, easier-to-use architectural materials, improved communication with other software, enhancements to modeling and animation tools, and improvements in the user interface.

This chapter introduces some of VIZ 2005’s special features and then gets you started working with the VIZ 2005 interface.

◆ Introducing VIZ 2005 Features
◆ Getting Started
◆ Touring the Interface
◆ Working with Objects
◆ Getting the View You Want
◆ Working with the Custom UI and Defaults Switcher

Introducing VIZ 2005 Features

With the new Architectural material (Figure 1.1), it has become far easier to render realistic real-world materials in VIZ 2005. Featuring a preset list of commonly used building surfaces, this new material type will certainly save you time texturing your models.

Note Architectural is now the default material in VIZ 2005.

If you’re an AutoCAD or Architectural Desktop user, you’ll find that importing and linking your building data into VIZ has been completely overhauled and greatly improved. A new Layer manager has been designed to work seamlessly with your existing AutoCAD and/or Architectural Desktop models and helps you to maintain the same project organization, materials, and layer standards.
VIZ 2005 now includes *mental ray*, which was formerly sold as a separate high-end rendering plug-in. mental ray is a film-quality rendering solution, fully integrated with VIZ 2005, that allows the most realistic rendering possible today, including global illumination, caustics, soft shadows, area and volume lights, ray tracing, reflections and refractions, motion blur, and depth-of-field effects. Mental ray includes a robust shader language for those with a programming bent, and a highly efficient rendering pipeline, where incremental changes in an animation are the only portions of the frames that get rendered. In addition, VIZ 2005 now supports High Dynamic Range Image (HDRI) files, keeping up with the cutting edge in computer graphics.

The *radiosity rendering* system that was introduced in VIZ 4 is still available, and it remains a time-tested way to create accurate study models of a design by inserting light-fixture specifications. By simulating the way light works in the real world, radiosity rendering takes much of the guesswork out of lighting design. With VIZ 2005, you won’t need to wait until a project is built to see if your lighting design works the way you intended. Natural outdoor lighting has also been improved to give you a realistic representation of your design.

If your computer is connected to a computer network, you can harness processor time from the other computers to reduce the time it takes to render a single image or even an entire animation. A new stand-alone command-line rendering tool with access to rendering presets (also available in VIZ itself) allows for more efficient unattended processing of your rendered artwork. As with earlier versions of VIZ, you can also take advantage of multiprocessor systems to improve speed.

Autodesk VIZ 2005 is also designed to take advantage of the Internet both as a reader and publisher. With its Asset Browser and an Internet connection, you can quickly acquire 3D models and
props that are available on the Web. You can also publish your own interactive content to the Web in the form of wraparound panoramas, virtual reality worlds, and Shockwave 3D models. Render to Texture, also known as Texture Baking, is a new feature that allows you to “bake” your beautifully lit rendered views into surfaces for use in real-time interactive models.

Finally, VIZ 2005 offers a set of improvements based on user feedback. The interface has been updated to match the improvements recently made to VIZ’s sophisticated sibling, 3ds max 6. The animation Track view has been better organized by being split into two specialized editors, the Dope Sheet and the Curve Editor. There are numerous improvements to modeling tools including enhancements to Editable Splines, patches, and polys. In addition, the new Shell modifier offers you a new way of modeling by giving thickness to surfaces.

Getting Started

Although many of VIZ’s components are typical for a Windows program, quite a few are unique. To begin exploring the VIZ 2005 interface, start the program by doing one of the following:

◆ Double-click the Autodesk VIZ 2005 icon on the Desktop.
◆ Choose Start ➤ Programs ➤ Autodesk VIZ 2005 ➤ Autodesk VIZ 2005.

You’ll see a variety of components in the VIZ window (see Figure 1.2)—some that are familiar and others that are not.

**Figure 1.2**
The standard Autodesk VIZ 2005 window
At the top, you see a typical menu bar and toolbar. There are two new floating toolbars called Layers and Extras. The Tab panel from VIZ 4 is gone, thus simplifying the interface. In the center, you see the viewport area, which currently shows a perspective view. At the lower right corner of the screen, you see the viewport navigation tools for adjusting your views in the main viewport. You also see the time controls for creating animations, the prompt line and status bar, and something called the MAXScript Mini Listener (for creating macros). On the right side, you see the Command Panel, which contains nearly all the tools you’ll use to create and edit objects in VIZ. Let’s take a closer look at each of these components.

Touring the Interface

VIZ offers a wealth of tools, and their sheer number can be overwhelming. To get a basic understanding of the VIZ window, let’s look at each of the window components individually, starting with the menu bar.

The Main Menu Bar

At the top of the screen is the main menu bar. Here, you find the typical Windows commands for file maintenance, as well as commands specifically for Autodesk VIZ 2005.

The options in the menu bar are organized in the same way as they are in most other Windows applications. Clicking an option issues a command, and you’re expected to take some action. An option that’s followed by three periods, called an ellipsis, opens a dialog box, usually to allow you to make changes to settings related to the option. An option with a right-pointing arrow displays more options in what is called a cascading menu.

Try out the menu bar by taking a look at the Units Setup dialog box.

1. Choose Customize ➤ Units Setup. The Units Setup dialog box displays.

2. Select the US Standard radio button, and make sure that Feet w/Decimal Inches is selected below it, and that the Feet radio button is selected for Default Units.
3. Click the System Unit Setup button and you will see another small dialog box. Make sure 1 system unit is set equal to 1 inch. Do not change anything else in the System Unit Setup dialog box and click OK twice to close both dialog boxes.

By checking the Units Setup dialog box, you ensure that in future exercises, you’ll be working with the same units that are discussed in this book.

**NOTE** Autodesk VIZ 2005 is something of a chameleon. It can change its appearance, depending on the focus of your modeling needs. If your VIZ 2005 window doesn’t look the way it does in the figures in this book, choose Customize ➤ Revert to Startup Layout. You’ll see a warning message telling you that any user interface (UI) changes you have made will be lost. Click OK to set up your VIZ windows to match the interface you see in this book.

**The Main Toolbar**

Just below the menu bar is the main toolbar. The tools on this toolbar offer tool tips to help you remember their purpose.

To the far left of the toolbar are the Undo and Redo options.