Week 7 **Lecture Outline**

I. Camera Animation
- A. Physical Attributes in the Digital Realm
  1. Pro - CG cameras offer the digital cinematographer an infinite amount of possibilities for control.
  2. Con - Often this infinite controllability, and the exactness of computer animation systems result in stale unimaginative camera work
  3. Goal - to restrict our infinitely free camera into mimicking the physical realm.
  4. DisplayTgls -> Object Toggles -> Camera (allows for viewing of the cameras eye, view and pyramid of interest in modeling windows.)
  5. Window -> Edit -> Camera (Setting up your digital camera.)
  6. Animation -> Playback Options -> Optimization Options (turn camera optimization off, this displays the camera frustrum during playback in the modeling view.)
- B. Hierarchical Animation of the Camera
  1. Pros and Cons
     a. Pro - Achieves an easily editable, channel independent mode of camera control.
     b. Pro - Allows for easy import / export of curve data for other animation packages and motion control rigs.
     c. Con - lengthy setup.
  2. Hierarchical Structure of the Camera Rig (Top to Bottom)
     a. XYZ Translate
     b. PAN (YROT if Y is up, ZROT if Z is up)
     c. TILT (XROT)
     d. ROLL (ZROT if Y is up, YROT if Z is up)
     e. Camera Node
  3. Setup
     a. Create a new camera using Layouts -> New Camera, then name it.
     b. Group the camera to itself four times.
     c. Limit inimitable parameters in the parameter control window for each node.
     d. Window -> Edit -> Camera -> Camera Lock ON.
        i. Restricts the movement and animation of the lower nodes of a camera.
        ii. Disables Dolly - Track - Zoom in the perspective window.
        iii. Creates an atmosphere where deliberate calculation makes animating the camera more controlled.
        iv. Eliminates the fly by the seat of your pants animation in the perspective window using Dolly -Track - and Zoom.
- C. Animating the Cameras Lower Nodes
  1. Pros and Cons
     a. Pro - The most expedient way of animating the camera.
     b. Con - Every Set Keyframe generates 30 keyframes across all of the lower nodes of the camera.
     c. Con - Camera animation is unpredictable when applying transforms.
     d. Con - There is no way to change the cameras pivot point.

e. Con - Animation channels not easily separated, or translated. Editing one channel will effect all other channels.

2. Setup
   a. Create a new camera using Layouts -> New Camera, then name it.
   b. Selecting Your Camera
      i. In the Perspective window select the Camera Picker icon (farther left camera). This selects the three dag nodes below the camera currently used in the perspective window.)
         1. Creates animation that is somewhat predictable, in that all of the cameras parts are synced together, view, eye, and up.
         2. One can only animated the camera using the camera transforms in the Palette window.
      ii. You may also individually select the eye, view, and up dag nodes in the SBD window.
         1. Only XFORM-MOVE can be used on these nodes in the modeling world.
         2. Results from a logical move of a view, eye, up node can be erratic and unpredictable.
   c. Use Palette -> Camera transforms to move the camera in the perspective view.
   d. Set keyframes at desired positions, then move the camera again.

D. Animating the Cameras Attributes
   1. By selecting the lowest nodes of the camera geometry, you can animate camera attributes.
      a. Pros - allow for sophisticated camera operations, such as focus pulls and zooms.
      b. Cons - requires some advanced knowledge of photographic principles such as depth of field, f-stop, and focal length.
   2. Setup
      a. Select the lower nodes of the camera geometry.
      b. Limit the animateable parameters in the Parameter Control window.
         i. Select the Camera node that appears below Local.
         ii. Expand the view and turn on and off the parameters you wish to animate.
      c. Use the Window -> Edit -> Camera to set attribute values.
         i. Then Animation -> Set Keyframe -> Local
         ii. Move the time slider to the next position, and repeat.

E. Aesthetics
   1. Focal Length
      a. Wide angle - 10-16mm
         i. Deep focus
         ii. Steadier camera movement
         iii. Objects appear smaller and further away.
         iv. Exaggerated perspective

b. Normal - 25mm
    i. Normal magnification, perspective, DOF etc.
    ii. Most closely represents the human eye.
c. Telephoto - >=75mm
    i. High magnification, objects appear big and close.
    ii. Flattened out perspective
    iii. Shallow depth of field
    iv. Shakier camera movement

2. Composition
    a. Main Directions
        I. Horizontal lines suggest calmness and normalcy.
        ii. Vertical lines suggest power, formality and strength.
        iii. Both horizontal and vertical lines indicate stability, and reality.
        iv. By tilting the horizontal line, you generate instability.
    b. Magnetism
        i. Larger objects in the frame draw the viewers eyes.
        ii. Objects closer to the edges, and corners of the screen exert a strong pull on objects in the frame.
    c. Asymmetry
        I. People tend to pay more attention to objects on screen right.
        ii. A diagonal line from the bottom of screen left to the top of screen right indicates an uphill slant.
        iii. Proportional or symmetrical composition in the frame is usually not dynamic.
        iv. Rule of Thirds - places the object of interest approximately 1/3 to either side of the frame. (more dynamic.)
    d. Figure Ground
        i. People organize pictures into a stable ground against which less stable objects/figures operate.
        ii. The figure seems to lay in front of the back the ground field.
        iii. Figures then can exhibit typical spatial and graphic characteristics that read as “right”.
    e. Psychological Closure
        i. When confronted with pictorial images, we tend to organize objects into geometric patterns, such as triangles, squares, etc.
        ii. The mind fills in the connection between points of interest and the pattern is called gestalt.
        iii. The whole gestalt is larger then the sum of its individual elements.