

# **3D Models**

**CSCI 4830/7000**

**Spring 2010**

# The Goal

- Create a file that can be loaded into an OpenGL program and display an arbitrary three dimensional object
  - Must be general enough to describe any object
    - May need to accept some limitations
  - Must be flexible in creation and use
  - Must be efficient

# Utah Teapot

- Defined in terms of a set of Bezier patches
- Complex shape
- Has Problems
  - Lid
  - Spout



# Stanford Bunny

- Intended to replace teapot
- Input by 3D scanner
- Very complex



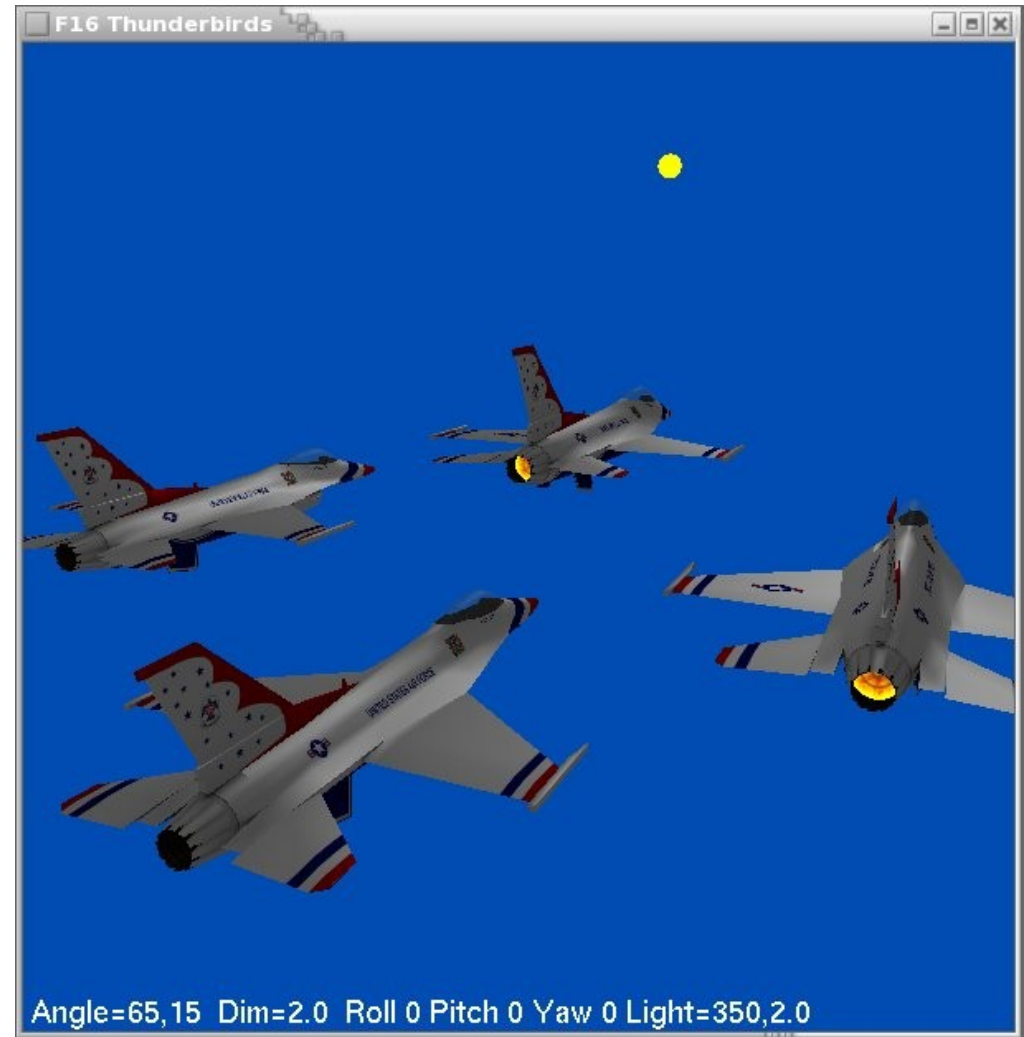
# Stanford Armadillo

- Input by 3D scanner
- Extremely Complex
- Good for testing performance



# Super Bible F16

- Moderately Complex
- Introduces challenges
  - Textures
  - Transparency
  - Emission Color
  - Control surfaces



# Design Decisions

- ASCII Text
  - Easier to view
  - Free format or line oriented
- Binary
  - Efficient
  - Byte gender
  - Word length
- Structure

# Structure

- What must be stored
  - facets or patches
  - direct or hierarchy
- Efficiency
  - Store once, load many times
- Simplify loader implementation
  - Header to simplify memory management
  - Simple instruction set
  - File management (e.g. textures)



# Example File Formats

- PLY
  - Also called Stanford Triangle Format
  - Text and binary versions
- OBJ
  - Developed by Wavefront Technologies
  - Relatively simple text format
  - Supported by many programs
- 3DS
  - Developed by Autodesk
  - Binary files
  - Lots of advanced features