Project Report On

Usa science & technology virtual museum

Submitted in the requirement for

VIRTUAL REALITY
(COSC 729/490, spring 2012)

By

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INDEX

1. TEAM PROFILE

1.1. TEAM MEMBERS

No.	Name	Graduate Status
1.	Saurabh Shirgaonkar	Doctoral
2.	Antoine Lathon	Undergraduate
3.	Sharad Shelton	Undergraduate

1.2. GROUP NUmbeR : 03

2. introduction

2.1. motivation

Most museums are located in major cities throughout the world. However, due to their widespread geographic location, many people don't get access to such objects. Recently, due to advances in technology, extreme digitization of information & ability to represent the information in 3D virtual space it is possible for individual to take a tour of these museums without even travelling worldwide. This concept has motivated me and my team members to work on such a project.

2.2. goals & objectives

❑ The project aims at developing a virtual museum which includes innovations from computer chips to fighter planes used in World War II.

❑ It includes all the innovations in the field of science & technology which have shaped the lives of people permanently. In this we have tried to construct the 3D models of real world objects to give users the real life experience of a virtual tour.

❑ Engineering and Mathematic courses are typically considered as difficult by college students and exhibit high failure rate. Due to the complication and abstract nature of

computer hardware, it is a challenge for students to understand the principles and concepts related to computer organization. The section of museum called "Inside the Computer" make Computer Organization concepts easily understandable using the virtual tour. It provides knowledge of different motherboards, parts on motherboard, IC's, computer peripherals and their working.

2.3. project plan

The USA Science & Technology Museum, comprises of landmark building consisting of several doors. Every door takes user to the different section of museum. The different sections are computers, aircrafts, ships and planetary system.

3. architecture

The USA Science & Technology Museum, uses the hierarchical architecture. As shown below in figure 3.1. comprises of landmark building consisting of several doors. Every door takes user to the different section of museum. The different sections are computers, aircrafts, ships and planetary system.
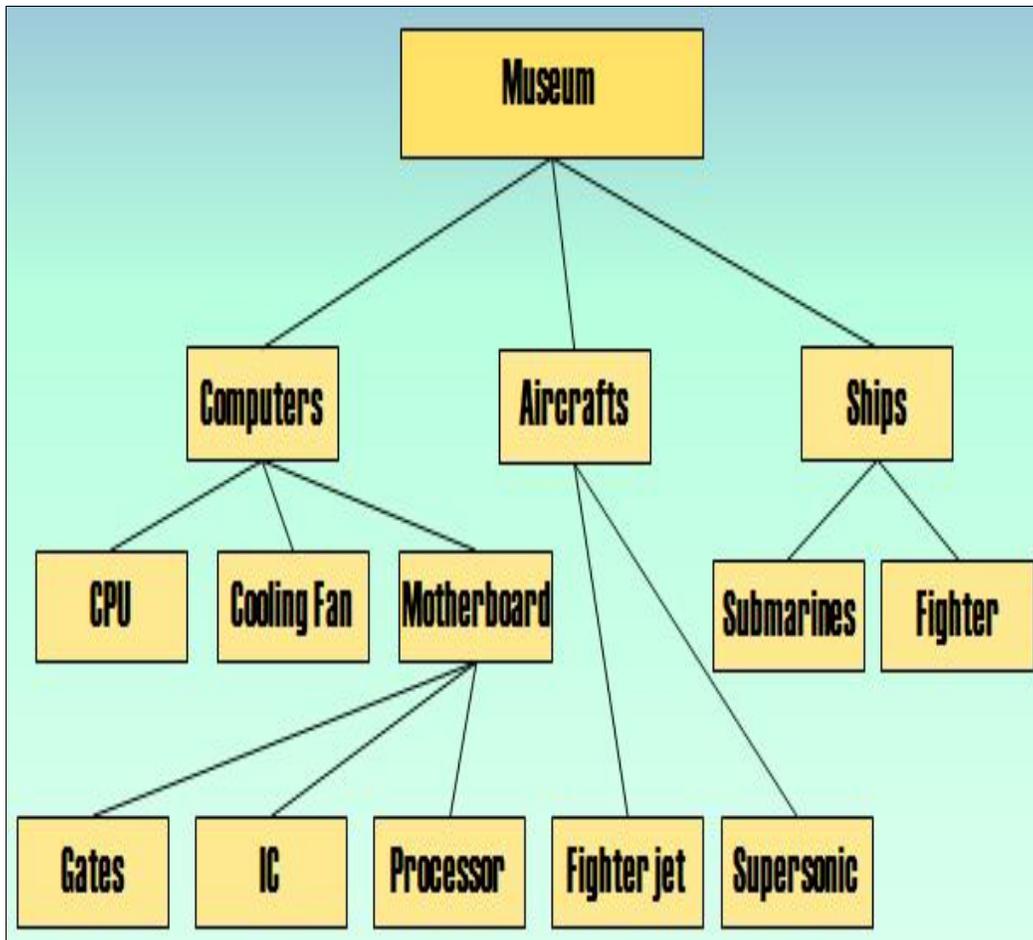
Figure 3.1. USA Science & Technology MUSeums hierarchical architecture

4. MODELING

4.1. virtual environment

❑ Virtual environment will includes 3D models of aircrafts used during world war II. It includes the fleet of submarines/ warships used by advanced countries like Russia, USA, Germany and Japan.

❑ The computer section includes models of IC's, monitors, motherboard, peripherals, IC'c, Logic Gates, wires, cables, capacitors, processor with cooling fan assembly.

4.2. VRML FunctionaLity

❑ Use of Sensors

  ⇨ Touch : The Touch Sensor node generates events based on the input from a pointing device such as when user touches the IC on power supply unit.

  ⇨ Time : The Time Sensor node generates events as time passes. It will be used to run animations such as rotation of cooling fan and glowing of CPU led on motherboard

❑ Use of Lights

  ⇨ Point & Directional lights : An omni-directional & directional light source is used to illuminate the environment.

❑ Use Of Interpolators

  ⇨ Coordinate Interpolator : It will allows to perform key frame animation on a set of vertices and objects like registers and capacitors in SMPS power supply.

❑ Use of Anchor Tag

⇨ Anchor Tag : An anchor tag is placed on doors of museum building which links to different sections (means rooms) of the museum. Anchor tag is also used in different rooms to link and enter lobby and common areas.

❑ Sample VRML Coe for UFO'S

⇨ The code below is used to display and animate the UFO's in the planetary system.

```
        ## Code for UFO's / Flying Saucer Starts

DEF UFO Transform {


    children [
       Transform {
         scale 1 0.8 1
         children Shape {
           geometry Sphere { radius 0.5}

           appearance Appearance {
             material Material {
                diffuseColor 0 1 0
                transparency 0.4
             }
           }
         }
       }

       Transform {
          scale 5 0.5 5
          translation 0 -0.25 0

          children Shape {
            geometry Sphere { radius 0.3 }

            appearance Appearance {
              material Material {
                 diffuseColor 1 0 0

              }
            }
          }
       }

    ]
}

DEF UFO2 Transform {
translation 0 20 0
```

```
    children [
        Transform {
          scale 1 0.8 1
          children Shape {
            geometry Sphere { radius 0.5}

            appearance Appearance {
               material Material {
                  diffuseColor 0 0 1
                  transparency 0.4
               }
            }
          }
        }

        Transform {
           scale 5 0.5 5
           translation 0 -0.25 0

           children Shape {
             geometry Sphere { radius 0.3 }

             appearance Appearance {
                material Material {
                   diffuseColor 1 0 0

                }
             }
           }
        }

    ]
}

DEF UFO3 Transform {
translation 0 -20 0
   children [
       Transform {
         scale 1 0.8 1
         children Shape {
           geometry Sphere { radius 0.5}

           appearance Appearance {
              material Material {
                 diffuseColor 0 0 1
                 transparency 0.4
              }
           }
         }
       }

       Transform {
          scale 5 0.5 5
          translation 0 -0.25 0
```

```
          children Shape {
            geometry Sphere { radius 0.3 }

            appearance Appearance {
               material Material {
                  diffuseColor 1 0 0

               }
            }
          }}
          ]
}

DEF PI_UFO1 PositionInterpolator {
   key [ 0, 0.125, 0.25, 0.375, 0.5, 0.625, 0.75, 0.875, 1 ]
   keyValue [ -20  0  0,  -5  1  0,
              -1  2  0,  -1.6  0.5  5,
              2  0.5  7, 5  0.5  6,
              3  0.5  8,  1  0  9,
              -20  0  0
            ]
}

DEF PI_UFO2 PositionInterpolator {
   key [ 0, 0.125, 0.25, 0.375, 0.5, 0.625, 0.75, 0.875, 1 ]
   keyValue [ 0  20  -10,  0  20  -10,
              0  20  -10,  0  5  -10,
              0  5  -7,  0  5  -2,
              2  5  -2,  15  5  -2,
              -20  0  0
            ]
}

DEF PI_UFO3 PositionInterpolator {
   key [ 0, 0.125, 0.25, 0.375, 0.5, 0.625, 0.75, 0.875, 1 ]
   keyValue [ 0  -20  15, 0  -5  15,
              -2  -4  15,  2  -3  15,
              -1  -2  7,   0  -1  2,
              -2  -0.5  2,  -15  -1  2,
              -20  0  0
            ]
}

DEF TIME TimeSensor {
   loop TRUE
   cycleInterval 5
}
ROUTE TIME.fraction_changed TO PI_UFO1.set_fraction
ROUTE PI_UFO1.value_changed     TO UFO.set_translation
ROUTE TIME.fraction_changed TO PI_UFO2.set_fraction
ROUTE PI_UFO2.value_changed     TO UFO2.set_translation
ROUTE TIME.fraction_changed TO PI_UFO3.set_fraction
ROUTE PI_UFO3.value_changed     TO UFO3.set_translation

## Code for UFO's / Flying Saucer Ends
```

5.project snapshots

1>US MUSeUM BUilding
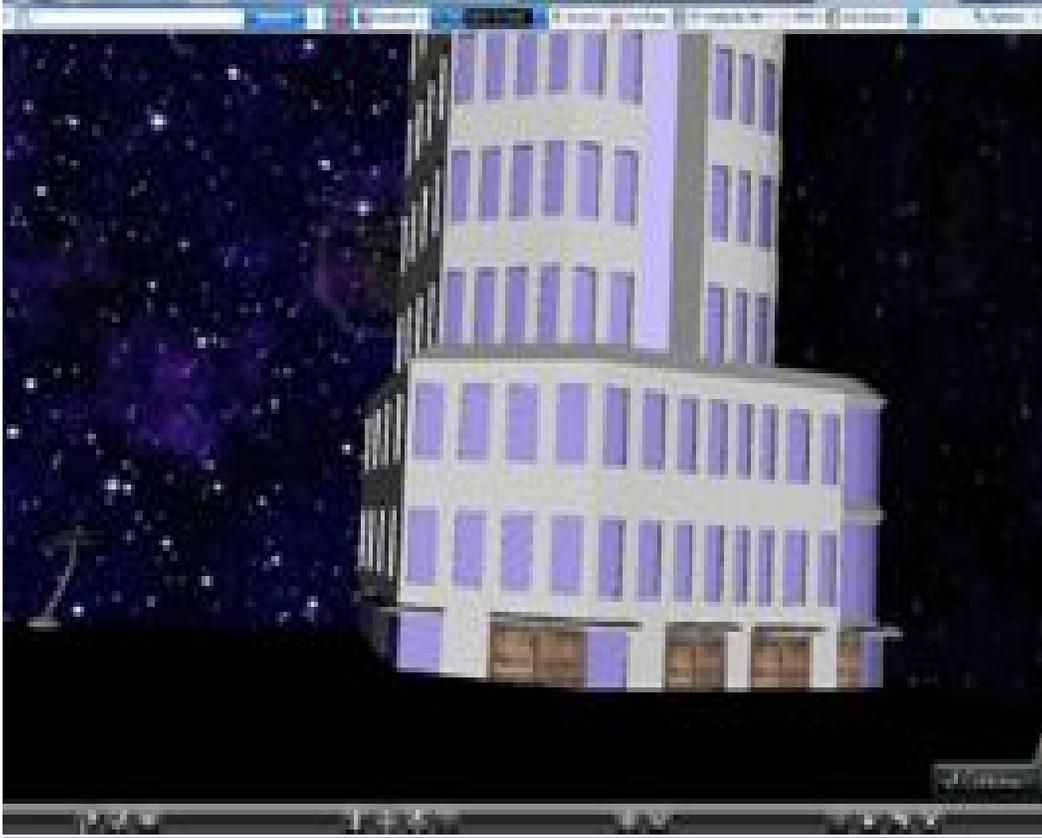
Figure 5.1 : Figure shows the museum building and the doors at the bottom of building. these doors take users to different rooms when user clicks on them.

2> InsIde the computer room

Figure 5.2 : Start Screen of the room inside the computer. When user
clicks on the components the user is linked to those sections.

3> Integrated cIrcuIt technology
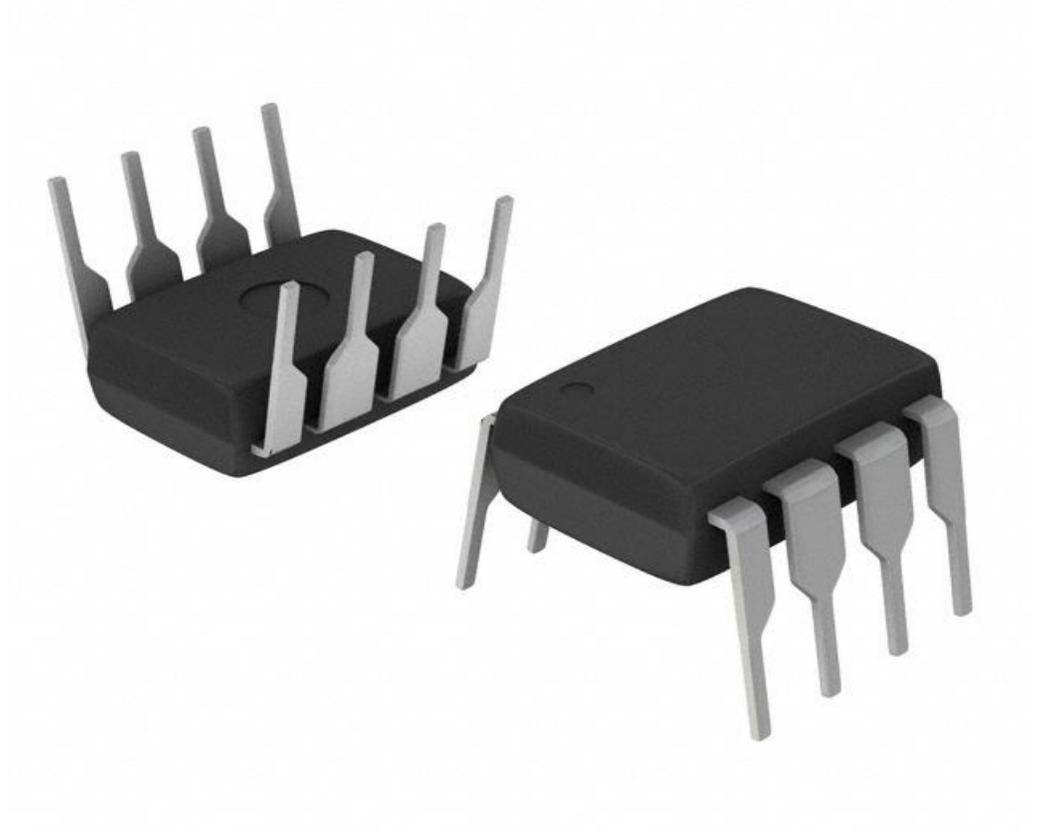
Figure 5.3 : IC technology which changed the direction of computer development, making the computer smaller, faster and more reliable.

4> SMPS Power SuPPl y cross section view
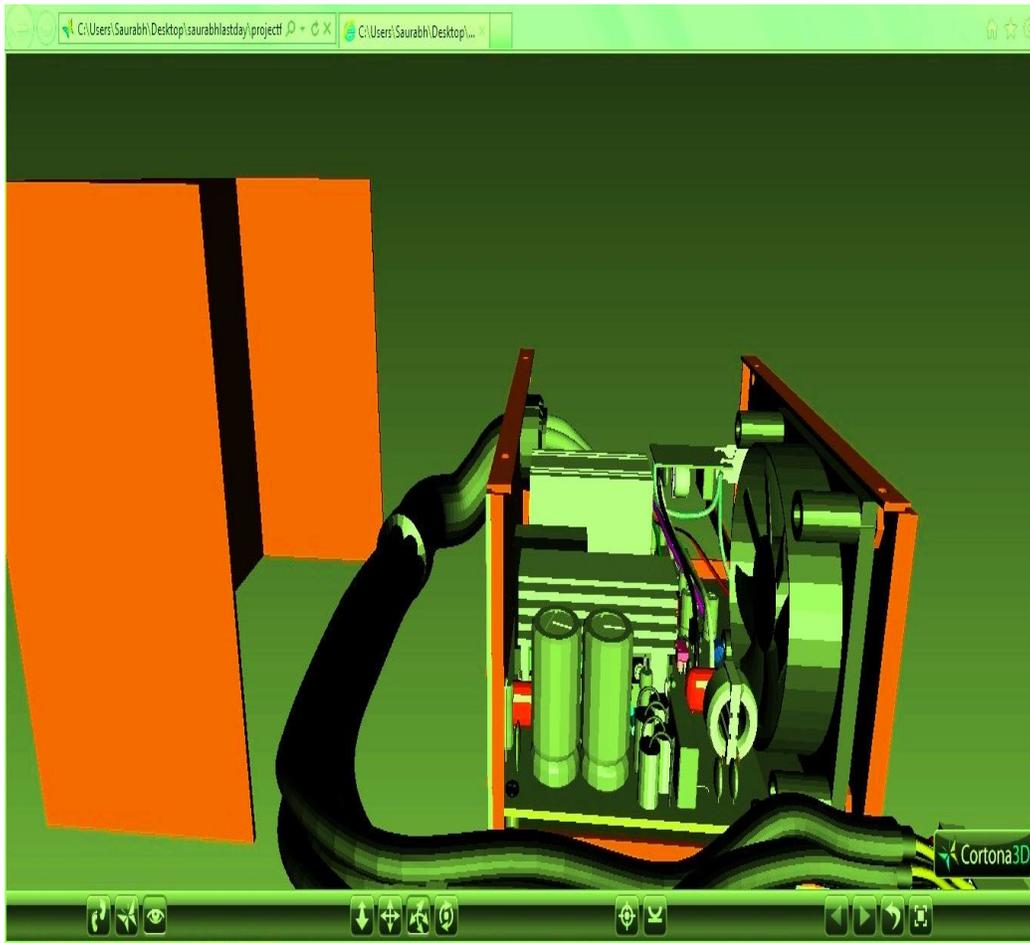
Figure 5.4 : SMPS Power SuPPl y with cool ing fan, capacitors, transistors and connectors in 3d form

5> LCD FLat SCreen monitor
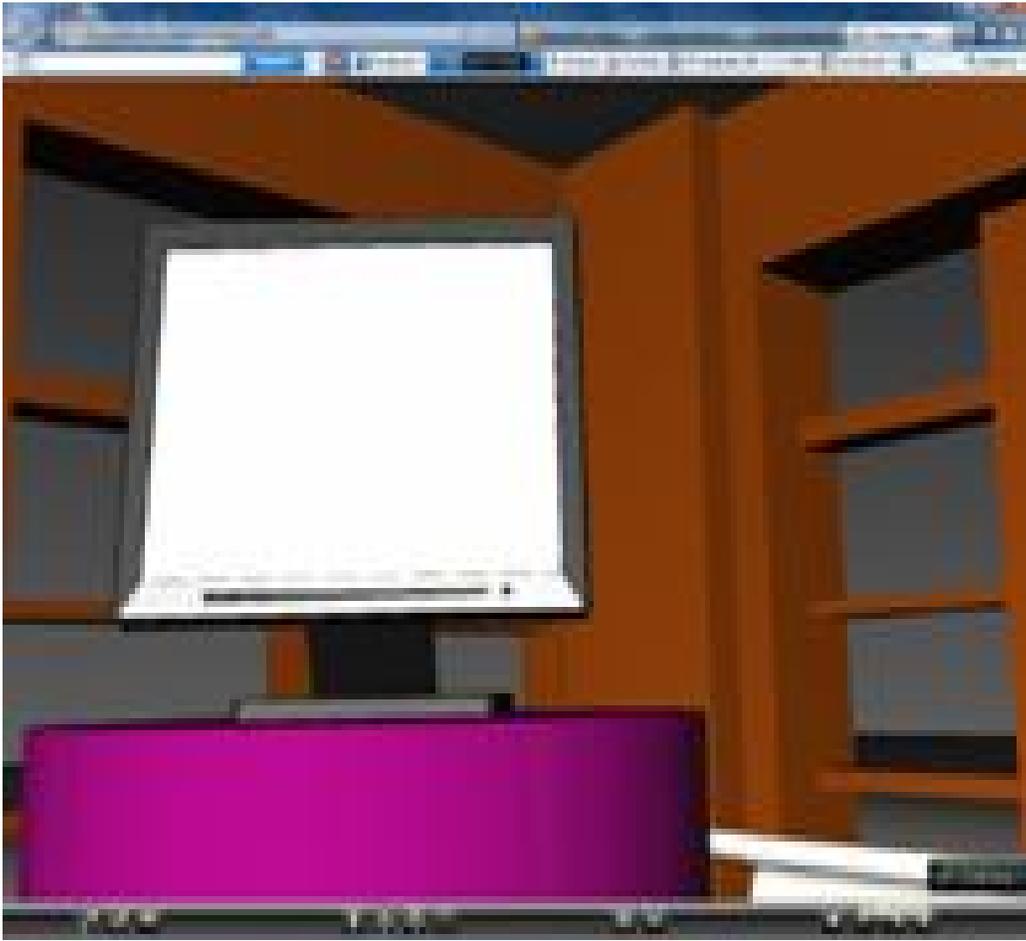
Figure 5.5 : Computer room with LCD monitor on DispLay

6> planetary system
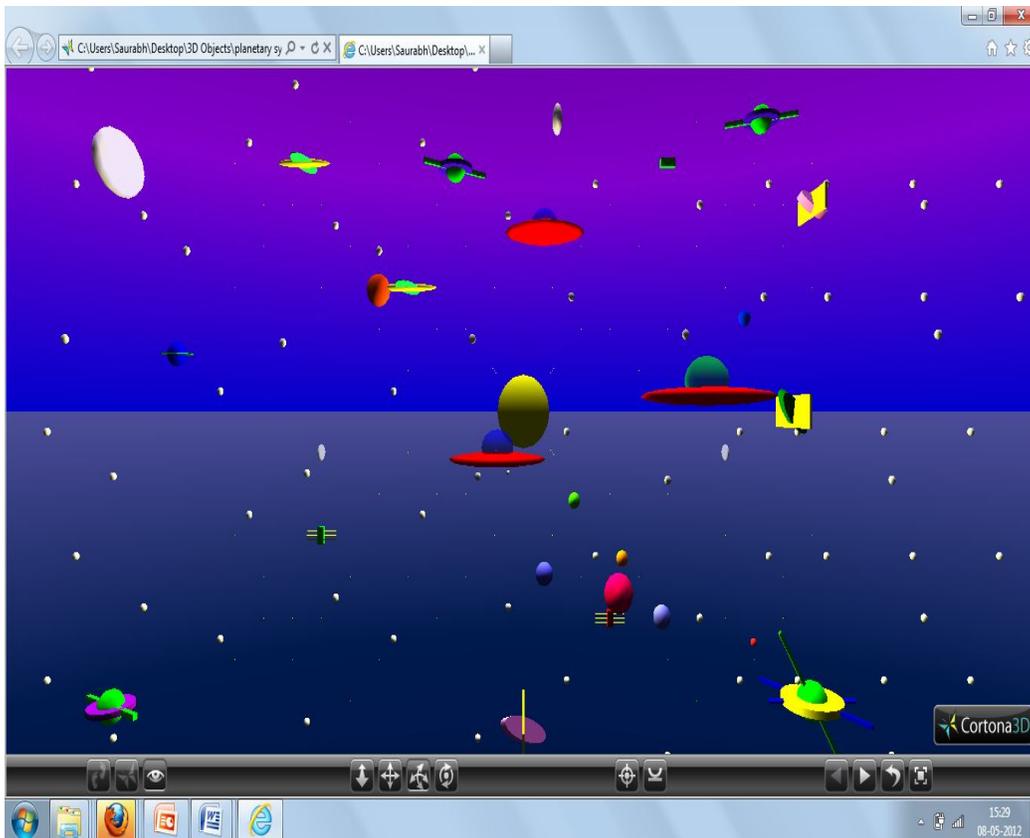
Figure 5.6 : planetary system with UFO, sUn, stars, planets, space
stations and asteroids

7> MIG FIGhter plane
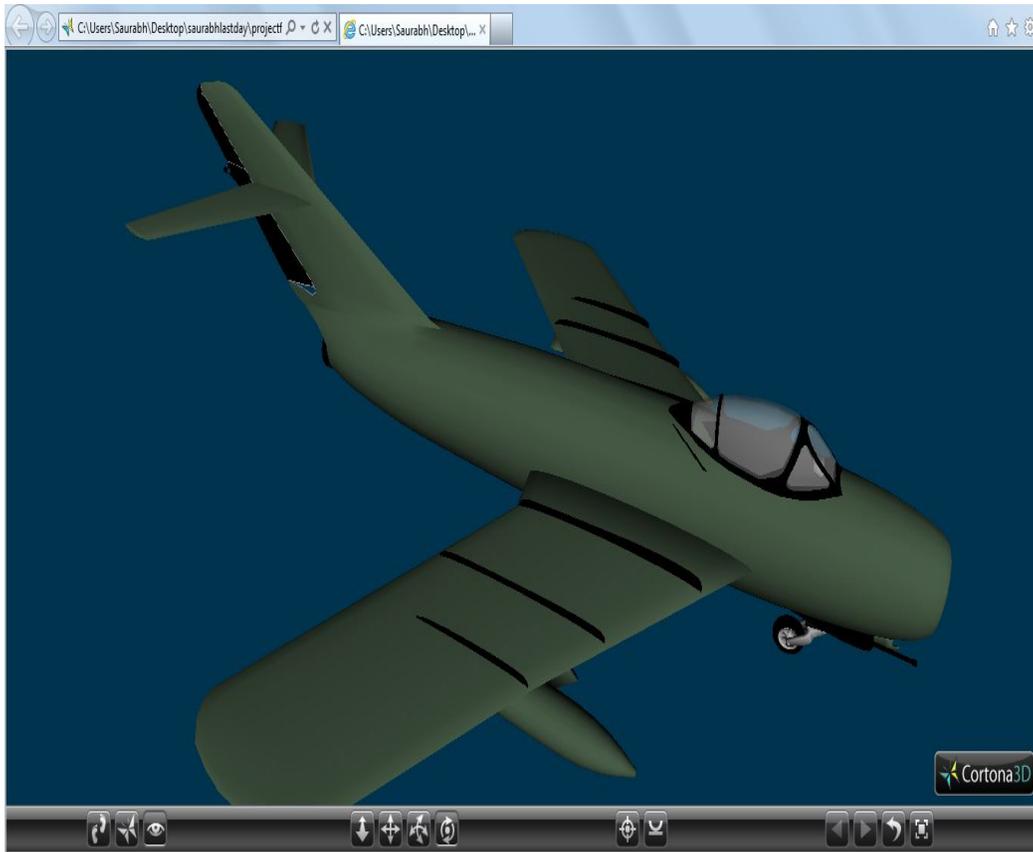
Figure 5.7 : Russian mig fighter plane

8> Harpoon missile
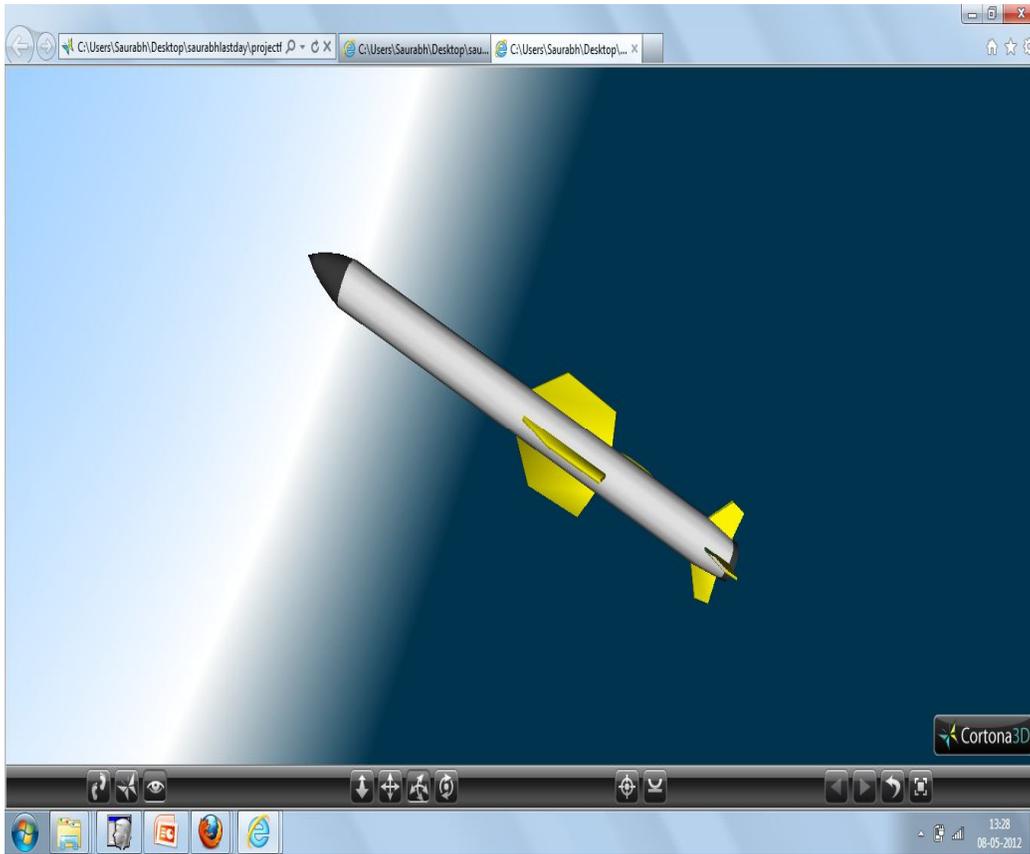
Figure 5.8 : USa 'S harpoon missile

9> Processors working

Figure 5.9 : how processor works explained conceptually

6.Uses of project

- Concept Understanding : I will help virtual museum visitors to learn computer related concept.

- Training : It can be used during training sessions. To impart and demonstrate in 3D world the innovations in science & technology. The students can experience and learn about planetary system, their positions and encounter their experience with UFO's in 3D virtual world.

7.development tools

- 3ds MAX : Models of aircraft, ships and IC'c were downloaded from internet and using 3D Max, lights, cameras, textures and anchor tags were added.

- VRML : Maximum coding was done in VRML. The planetary system was done in VRML which includes the planets, UFO's, satellite, space stations, asteroids and stars.

- Virtools : It was used to develop the complete and independent module "How processor works".

8.ShortcomingS, problems encountered & Future work

We plan to add more interactivity, sound effects and animations to the virtual world. Adding textures to the 3D models will give the environment a more lively and real look. We plan to add mode functionality which will help to train students in different fields like aeronautical engineering, computer engineering, science and mathematics. We plan to further develop an environment which will help historians to do an in-depth study of artifacts kept in the museum. We mainly faced problems during modeling the 3D environment, but with help

of VR forums we could manage to overcome it. Due to limited time frame we could not all the features which we had planned. We plan to implement the remaining functionality as future work.

9. references

- Downloaded Major Models from : http://www.turbosquid.com/
- How A Processor Works: Book

    http://www.turbosquid.com/FullPreview/Index.cfm/ID/549279
- How A Processor Works : All other Resources and Models from within Virtools 5.0
- Models of Planes : www.rccplane.com
- Textbook : 3ds Max 2011 By Kelly L

10. Acknowledgements

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