

COMPARISON OF VARIOUS SOFTWARE TOOLS FOR 3D-MODELING AND DEVELOPMENT OF STANDARDIZED PROCEDURE FOR MODELING IN THE FIELD OF FACTORY DESIGN

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Abstract

In the contemporary world there are several aims that must be realized of the manufacturing companies to remain competitive in the future. It is proved that the utilization of a lot of software for 3D modeling and visualization is the solution to remain competitive in future. It is not enough to use some software for modeling in 3D. A complete process includes one software for 3D-modeling and one software for 3D visualization. The various types to export a model created with different software for 3D modeling to 3D visualization can born several problems. The actual paper proposals a simple solution for this process. Certainly this is an experimental solution and it can be considerate a learning experiment.

1. STATE OF THE ART

Today, the planning of factories started out of new requirements on manufacturing companies. To remain competitive in the future, the ability to change and mobility are central aims that must be realized. The digital factory offers a solution for mastering the new requirements on factory planning. There has never been a complete review of a vision of a digital factory including its realization in virtual reality [3].

A key element of the digital factory is the modeling and visualization of 3D factory models. Numerous software tools are available for this purpose. The aim of this article is to examine two common software tools for her suitability for the factory planning and to design a simple model in virtual reality. The result is a standardized procedure in the factory planning for the modeling and visualization.

The current article treats a small part from the factory design experience. It aims to obtain a solution for virtual reality transfer. The software used for analysis is Maya and 3D Studio Max each working on different system platforms. These platforms are Linux for Maya and Windows for 3D Studio Max. Also it used AMIRA like software for visualization in 3D.

The aim of this project was to examine Maya and 3D Studio Max software tools for her suitability for the factory planning and to design a simple model in virtual reality. The extended content [3] was structured in five chapters that included: modeling, state of the art, export to 3D visualization, working in 3D visualization and final analysis for the current project.

2. CREATING AND EDITING OBJECTS

In the first chapters was included the experience in connection with modeling a simple model with the both software. Here it was described all steps for create a simple model. Besides the modeling process it was experimented the possibilities to use lights and rendering options in the scene view. Also it was tried to create animation with these models (Figure 1 – Models in Maya – left and 3D Studio Max- right).

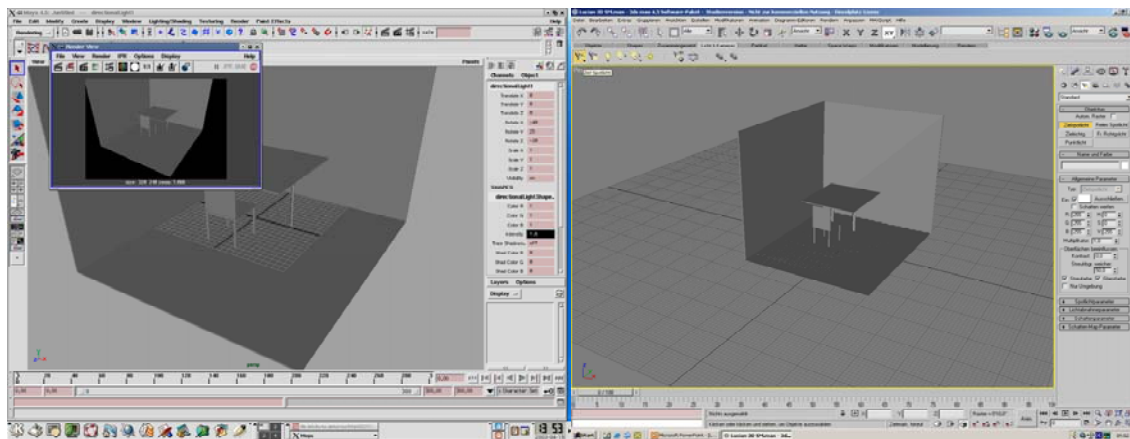


Figure 1 – Models in Maya – left and 3D Studio Max- right

3. VIRTUAL REALITY TRANSFER

The virtual reality transfer is the target for the current project. The preparation for transfer is important for the both software. 3D Studio Max preparation for transfer is easier than Maya preparation. Maya preparation for transfer is most complicated because the system platform is Linux. Maya saves the files with *.mb extension. The .mb extension indicates that it saved the scenes as a Maya binary file – the default file type for a Maya scene. The file browsers have an option for saving the scene as Maya binary file (extension .mb) or as a Maya ASCII file (extension .ma). The Maya binary file is often the preferred choice because it is more compact in size than the ASCII version. Some experienced users prefer the ASCII file type because it contains commands that can be trouble-shot and edited directly as an alternative to using the Maya interface [3].

For finding compatibility between this two software and virtual reality software (AMIRA) is another point that it was treating. AMIRA is a 3D visualization and modeling

system. AMIRA is a modular and object – oriented software system. Its basic system components are modules and data objects [4]. Networks can be created with a minimal amount of user interaction. Parameters of data objects and modules can be modified in AMIRA's interaction area. All AMIRA components can be controlled via TCI command interface. The biggest part of the screen is occupied by a 3D graphics window. Additional 3D views can be created if it is necessary. AMIRA is based on the latest release of the TGS Open Inventor graphics toolkit [5]. In addition, several modules apply direct OpenGL rendering to achieve special rendering effects or to maximize performance. It is necessary to choose a compatible extension for all three software. This extension is VRML (see the Figure 2, 3 and 4).

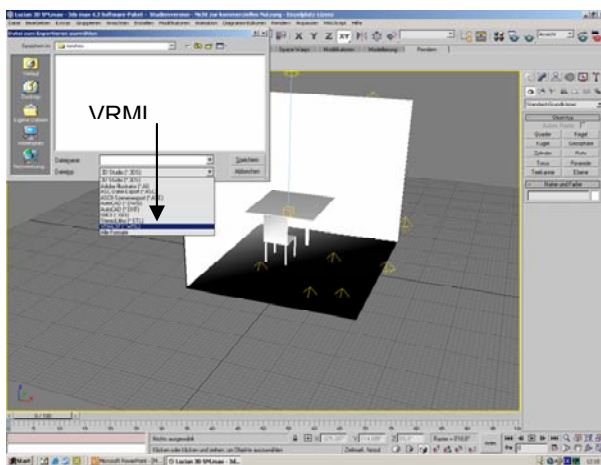


Figure 2 - Transfer 3D Studio Max to AMIRA (VRML extension)

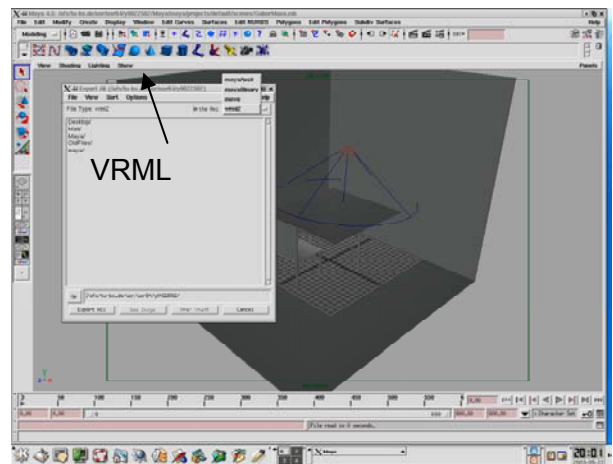


Figure 3 - Transfer Maya to AMIRA (VRML extension)

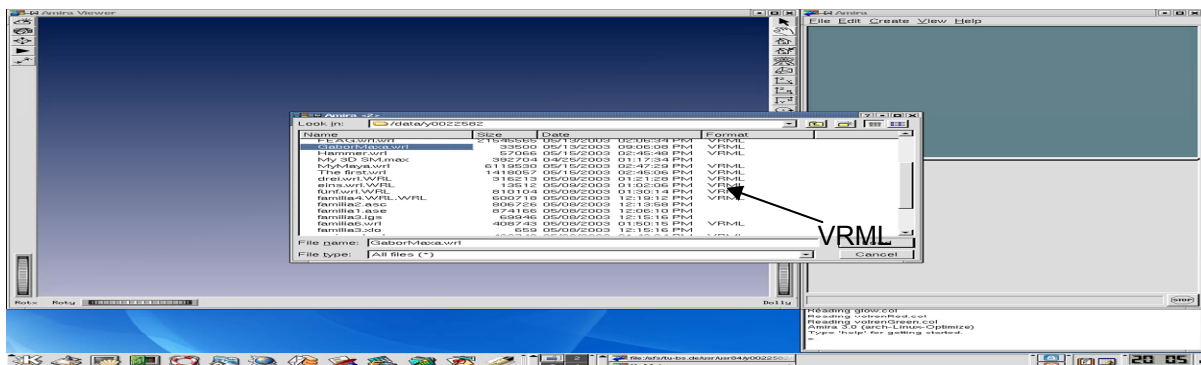


Figure 4 - Load in AMIRA (VRML extension)

4. VISUALIZATION

The possibilities for 3D visualization software (AMIRA) are probated through a film creating. There are two possibilities to create a film in AMIRA software: with the help of Camera Path option or mpeg option using. The one possibility is the utilization of Seek

button. A good visualization is makes with Stereo Viewing option help. The last experience is the observation for the film created (see Figure 5).

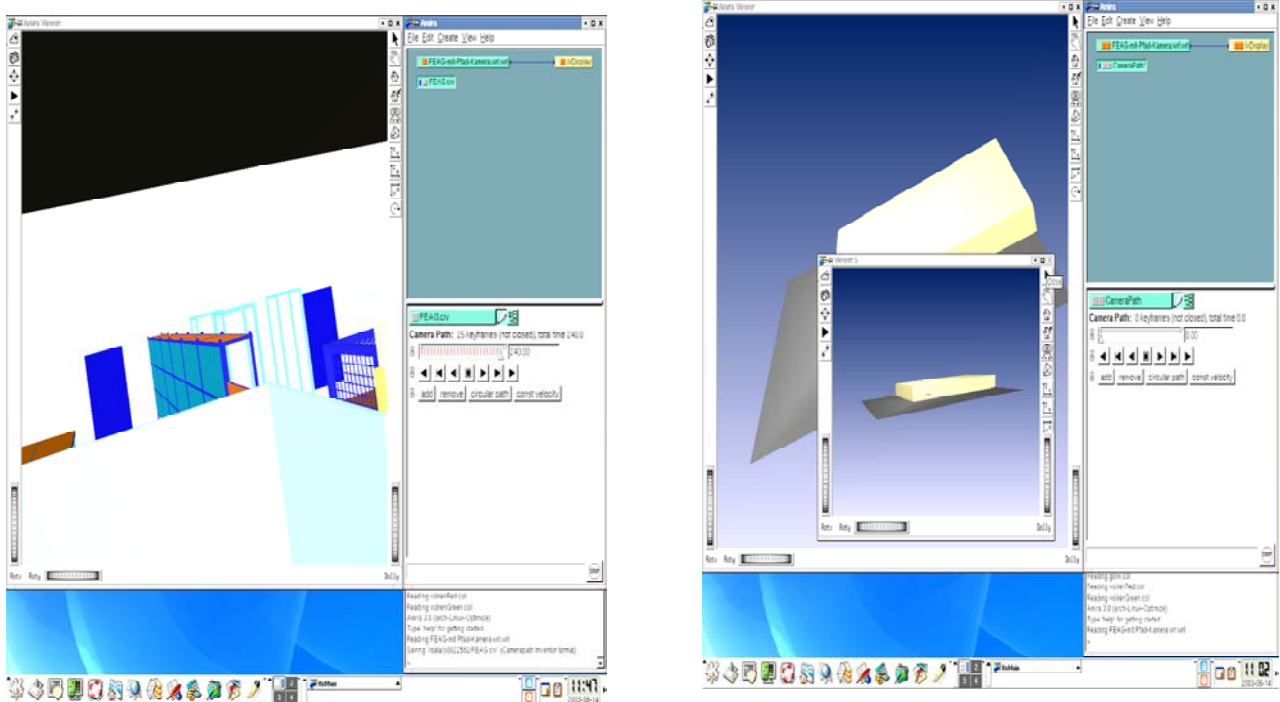
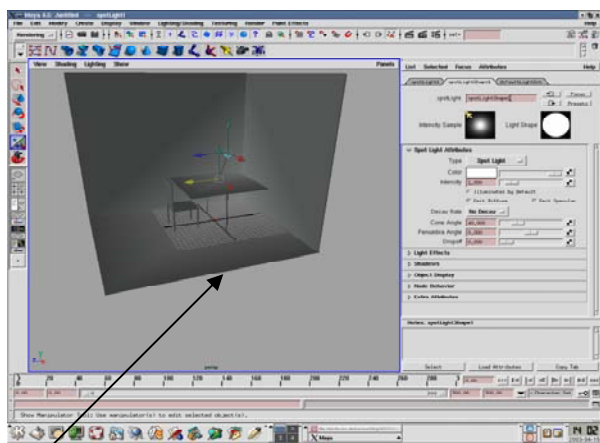
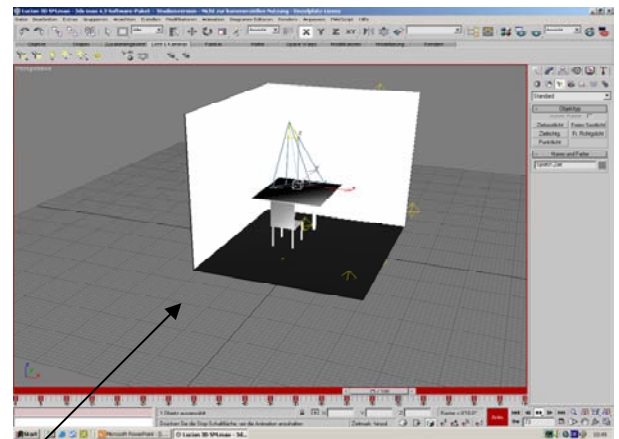


Figure 5 – Visualization in AMIRA



Maya



3D Studio Max

Figure 6 – Differences between the both software

5. CONCLUSIONS

The process was simple but the differences are observable when in the scene view was introducing complex elements from lights and animation 3D field. It tried to respect the same parameters for lights, rendering and animation. However the differences between the both software it was remarketed (see Figure 6). For more fidelity in conclusion build-

ing process for this project it was necessary to use a complex model because it is possible to verify the limits for the 3D software used a modeling for 3D visualization software too. The scene for experience was created in 3D Studio Max and has more adaptations like lights, camera for animation and other. The result is presented in the figure 7.

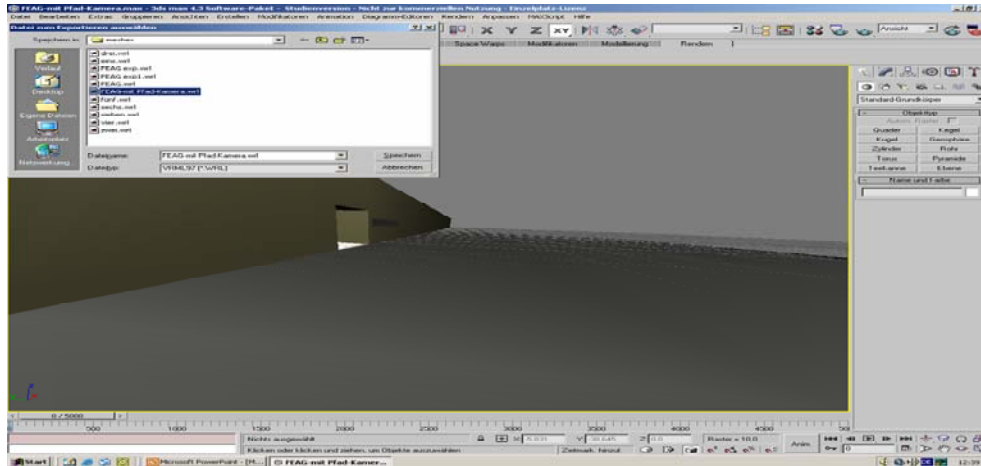


Figure 7 – Export the scene created in 3D Studio Max and open AMIRA for 3D Visualization

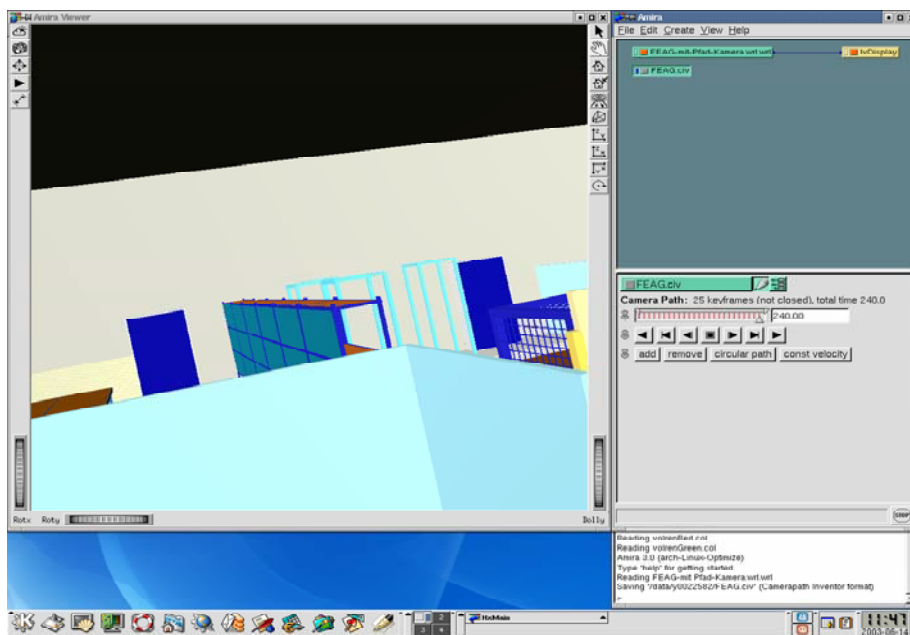


Figure 8 – Use the options Camera Path to create a film

The possibilities for 3D visualization software (AMIRA) are probated through a film creating. There are two possibilities to create a film in AMIRA software: with the help of Camera Path option or mpeg option using. For an easy experimental work was used the first possibility. AMIRA offer multiple possibilities to create a film. The one possibility is the utilization of Seek button to create frames for the film. A good visualization is made with Stereo Viewing option help. The last experience is the comportment observation for the film created. The result is presented in figure 8.

Maya and 3D Studio Max software are professional solutions for 3D factory design. The current project is a contribution of high experience in 3D virtual reality field. The target is 3D Studio Max and Maya reviews and its possibilities for transfer simple models to virtual reality. Also is most important to observe the differences between this two software tools. Maya is the 3D rendering and animation system that addresses the needs of a wide variety of digital content creators. What makes 3D such a useful tool is the way it simulates real objects. The way objects appear in perspective, the way a surface bends and twists, or the way a light illuminates a space – all of these complex 3D effects can now be recreated to highlight the essence of a designer's intent. By incorporating Maya into the design workflow, industrial designers can view their models and communicate their design ideas in various realistic conditions during the entire design and engineering workflow [1, 6].

Maya is perfectly suited for a designer's visualization needs; it is an integrated package that mixes, animation, texturing, dynamics, lighting and rendering tools all in one package. Maya's advanced visualization capabilities together with the digital assets created in Studio Tools or other CAID or CAD packages creates a sophisticated way to produce highly realistic images and renderings for the presentation of design intent across all stages of the design workflow [1, 6]. It is possible to energize design concepts by enabling the world to understand the intents, from early product visuals to sophisticated animations and renderings. Using Maya, the latest 3D visualization software, it can create sophisticated photo-realistic design-representations. Also, 3D Studio Max is professional software for 3D – modeling, animation and rendering. It offers an integrated platform for visual effects, character animation and for next generation games. The 3D Studio Max software architecture offers perfect tools for animation industry. 3D Studio Max offers possibilities to applying more ideas from factory design. It is ideal for modeling and rendering and it can help for design experiences [2, 7]. Certainly this is an experimental solution and it can be considerate a learning experiment. This analysis is relevant for the future process and for implementing the good solutions in 3D factory design. The benefits of using 3D visualization will be in all the time an important point for the good future in the design field.

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