Short Communication

International Journal of
Innovative Research in Computer and Communication Engineering

2020
Vol.5 No.3.4

Computer Graphics 2015: Hardware-in-the-loop simulation of a jet engine fuel control unit Using LabView

Seyed Reza Hashemi

Azad University, Iran

There had been an emphasys of simulation tools for transportation industry since early 80's whereas on pedestrian movements several studies and models had been researched since 90's. Today there are tools which will provide the methatical analysis of the behaviours and predictions regarding the proposed development. These methatical interpretations can only be understood by specialized Transport planners or Engineers, whereas most crucial decisions regarding any proposed development is that the virtue of Political and Public will. the necessity for simplifying the Methatimatics and converging into a simplified visual medium which will be understood by Public and politiations to access the impact is that the reason behind the event of the algorithm that defines this paper. The raw mathematical outputs from the traffic simulations are converted to top quality 3D visualization employing a computer game rendering processor. Traffic simulation software concentrates on mathematical accuracy of the traffic behaviour instead of realistic and accurate visualization of the traffic and its surroundings. This is often primarily thanks to the lack of existing software to handle detailed, complex 3D models and structures within the simulation environment. This technology (VR Platform) is currently under the exclusive IP of Sunovatech and is employed because the core a part of Visualization process wherein thousands of vehicles and pedestrians are animated as an automatic process. Using the VR platform a highly realistic and accurate simulation of vehicles, pedestrians and their traffic infrastructure like signals and buildings are often achieved. This technology offers decision makers, the traffic engineer and general public a singular insight into traffic operations. It's highly cost effective and a perfect tool for presenting complex ideas in any public consultation, presentation or litigation process. This presentation will specialize in the way to combine the realistic human and transportation simulations during a 3D visualization alongside urban design elements. The utilization of simulation altogether 3D visualization projects gives an accurate result to planners, engineers, architects and emergency response department to check and approve the planning of the infrastructure. With this technology we've created stunning visualization and supply solutions to multibillion projects. With the integrate of 3D visualization software with the Traffic Micro simulation tools to make an in depth to real environment in terms of behaviour, volumes, and routings. Calibrated and Validated Micro simulation models are being combined with the powerful rendering tool to visualize proposals before they're implemented on ground.

The turboshaft engine is that the major component within the system of most marine vehicles and proper control of its function as a sub-system within the system features a direct impact on the performance of the vehicle's propulsion system. The engine performance control is performed through the fuel system. The fuel system of a turboshaft turbine engine consists of two parts: electronic control unit and fuel control unit which is that the actuator of the fuel system. During this article, a hardware-in-the-loop simulation is presented for testing and verifying the performance of the fuel control unit. Within the hardware-in-the-loop simulation, the fuel control unit in hardware form is tested in reference to the numerically simulated model of engine and electronic control unit. During this simulation, a Wiener model for the turboshaft engine is developed which is validated with the experimental data. Subsequently, a multi-loop fuel controller algorithm is meant for the engine and therefore the parameters are optimized in order that the time response and physical constraints are satisfied. Within the next step, a state-of-the-art hydraulic test setup is made and implemented to perform the hardware-in-the-loop test. The test system contains personal and industrial computer, sensors, hydraulic components, and data acquisition cards to attach software and hardware parts to every other. During this hardware-in-the-loop simulator, a host–target structure is employed for real-time simulation of the software models. The results show the effectiveness of hardware-in-the-loop simulation in fuel control unit evaluation and verify the steady and transient performance of the designed actuator.

The customer develops and manufactures high-technology components for aircraft-, rocket- and turbine engines, in cooperation with the world's leading engine manufacturers. The complete Authority Digital Engine Control (FADEC) for the engine within the Swedish JAS-39 Gripen fighter is continuously maintained and updated and need thorough testing before release into a true aircraft. One major a part of the testing is HIL simulation where the FADEC is connected to a simulated reaction-propulsion engine making it possible to execute system tests without the necessity of engine testing. So as to enhance the HIL testing, the customer needed better simulator performance. A replacement HIL system was therefore designed by the Test System Design group in Sweden.

This work is partly presented at 2nd International Conference and Expo on Computer Graphics & Animation on September 21-22, 2015 held at San Antonio, USA