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SIMULATION OF UNMANNED TRACKED VEHICLE USING VBS3 ENVIRONMENT

MEHITAMATA ROOMIKSÕIDUKI SIMULATSIOON VBS3 TARKVARA ABIL

MASTER THESIS

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7 SUMMARY

The purpose of this project is to develop a visual simulation of UGV using gaming-based simulation engine with high physical and functional fidelity, to use the simulation as a development platform for this tracked UGV.
VBS3 a Military training simulation Based on commercial game technologies, was used due to its multiple built-in features that makes it a powerful Development platform for modelling and simulation uses.
The vehicle was modelled as an add-on that can used by the VBS3 simulation this add-on contains the 3d model with the different LODs and two configuration files that first is "config.cpp" that detriments the power. Transmutation and suspension behaviour of the vehicle and the model.cfg file that control the animations of the vehicle.

The power ad transmutation response of the vehicle was model based on the real vehicle configuration and then empirically tuned using set of predefined tests, while the response of the suspension system was modelled based on visual inspection of the response of the real vehicle.
Plugin was created to model the ECU which allows the vehicle to be controlled by using velocity commands from external location, the plugin also log the position and velocity simulation model to be later used for analysis.
Finally, a series of straight line tests performed using the real vehicle. the data was analysed where a time shift between the input command and the vehicle response to that command was observed, a difference in both acceleration and declaration response between the real vehicle and simulation model suggest the model still requires more improvement.

7.1 Future work:

acceleration and deceleration behaviour of the UGV model can be improved to better match the real vehicle, by modifying the current control and data acquisition scheme in the real vehicle to allow using the throttle and breaking input directly and eliminating the effect of the ECU, then preforming tests at different terrain conditions allow the further development of the model.