Pauline Korukundo et al., Adv Automob Eng 2015, 4:1
http://dx.doi.org/10.4172/2167-7670.C1.002

OMICS International
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International Conference and Exhibition on
Automobile Engineering

September 01-02, 2015 Valencia, Spain

# Development of the KIIRA EV SMACK supervisory control firmware

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The growth in number and complexity of controlled electrical sub systems in the modern car has created a need for centralized control and an information interchange point. The supervisory controller provides this centralized unit. It interacts with all other networked control electronics hence controlling the dynamic driving demands. In a hybrid car, the complexity is greater because of the extra energy resources integrated into the vehicle. The supervisory controller must therefore provide efficient energy management and performance during the various vehicle specific drive cycles. This work presents the design, implementation and testing of the Kiira EV SMACK vehicle level control with key consideration of range extension capabilities of the hybrid. The Kiira EV SMACK supervisory controller oversees the human machine interfaces, low voltage electronics, the motor and generator controllers, battery management and thermal management systems. It initiates the startup of the low level controllers, implements a power source switching strategy based on speed demands and available energy resources determined by battery state of charge and fuel capacity. A model based firmware development approach was followed with utilization of the MotoHawk rapid prototyping tool built to work with MATLAB Simulink. The firmware was deployment on Woodward's 112 embedded hardware platform. The testing and verification followed hardware in the loop (HIL) testing methodology.

## Biography

Pauline Korukundo is currently doing her Master's degree in Electrical and Electronics Engineering at the University of Nottingham, UK. She obtained her BSc in Telecommunications Engineering from Makerere University, Uganda, 2012. She has worked on the Kiira EV Project and the Kiira Motors Project, as a Vehicle Electronics and Information Systems Researcher in Kampala, Uganda. Her interests are in control algorithms and high performance computing.

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