Movin On, Project Information

Electric longboards have been around since Louis Finkle first started selling them in 1997, but despite being on the market for over twenty years, there remains a paucity of electric longboards that are portable and low hassle to use. The aim of this project is to produce a fully functional prototype of a portable and convenient electric longboard. The board will be collapsible so that it will be easy to store and carry around when not in use. It will also be hands-free, doing away with inconvenience of using unintuitive and feedback impaired wireless controllers for motor control, a feature unique to our board.

This project, started in late January of this year, is currently in the preliminary design state, in which the overall board design is decided upon, the 1st design iteration of the PCBs that will hold the board's electronics is created, and the specific battery and motors that will be used for the board are determined. After the conclusion of this phase at the end of March, the detailed design phase, which will last until mid-May will begin, in which the prototype design for the board, including both electrical and mechanical components will be finished. The following seven months (until mid-December when the project concludes) will be spent building the prototype, creation of necessary software, functionality testing, making any needed design modifications indicating by results of said testing, and then construction of the finalized design. The final paper will be submitted to the Standards Education Commitee in mid-December because that is when our project will conclude and thus when we will best be able to discuss the overall results of the project.

The ISO 11898-1 (CANbus protocol) and ISO 11898-2 (high speed physical layer for CANbus) will be the technical industry standards that the project will aim to implement. CAN will be used to allow the μC(s) (micro-controllers), that are reading the peripheral sensors necessary for determining acceleration and deceleration commands, to communicate with the DSC (digital signal controller) that is implementing the FOC motor control algorithm. CAN was selected, as opposed to other transmission protocols such as RS-232 or IC^2, because of its robust error detection capabilities, relatively high data transmission rate, and its tolerance of large amounts of electrical noise.

While the actual arbitration, synchronization, message transmission, and bus error detection will be implemented by purchased CAN transceivers installed on the board and wired into the μC(s) and DSC, a portion of ISO 11898-2 will be implemented by the project, specifically the creation of the physical bus composed of shielded, twisted pair wire with 120 Ω termination resistors at both ends, and shielded twisted pair branches for each node. Additionally, a portion of the software layer described in ISO 11898-1 will be implemented: specifically the creation of unique identifiers for each potential message, and error handling for any of the error states detected on the bus by the CAN transceivers.