AAC - Feature #4032

Development Model-Based Digital Twin and Torque Vectoring Control for Three-Wheeler EV

02/19/2026 01:23 PM - DEV YADAV

Status:	New	**Start date:**	02/19/2026
Priority:	High	**Due date:**	05/01/2026
Assignee:	DEV YADAV	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
Target version:		**Spent time:**	0:00 hour

Description

History

#1 - 02/20/2026 08:25 AM - DEV YADAV

- File yaliEV_twin_timeline .pdf added

- File Motor_Characterization__PMSM_Digital_twin.pdf added

Project Plan Timeline & Current Status Update:

Milestone 1: Scenario-Synchronized Digital Twin Development
1. PMSM Wheel Hub Motor Characterization
The PMSM wheel hub motor characterization is currently pending due to the installation of a new dynamo-meter setup at the Motors and Controllers Laboratory, Department of Engineering Design.
A demonstration dynamo-meter setup is presently available; however, it is intended only for learning purposes and cannot be used for detailed motor characterization.

In the interim, I am utilizing this setup to gain hands-on experience in operating the dynamometer and understanding PMSM characterization procedures, including performance mapping and parameter identification.

2. MATLAB Road-Runner – Scenario-Based Simulation
Currently learning and working with MATLAB Road-Runner for scenario creation and environment modeling.
Road-Runner will be used for scenario-based simulation and validation of the digital twin model, enabling synchronized testing under controlled driving conditions.

Milestone 2: Torque Vectoring Development & Deployment

Parallelly working on developing the controller in MATLAB Simulink environment.
Workflow:
Instead of writing c++ CODE independently and designing controller independently in Simulink, i am working on Controller model such that it is compatible to generate C/C++ code using "Simulink CODER" so we could deploy directly onto hardware.

#2 - 02/20/2026 10:07 AM - DEV YADAV

- File ADIS16470.pdf added

- File IMU_sensor_YALI (1).pdf added

For the standardization and validation of our digital twin model and controller, we are planning to conduct a few real-time test cases on the vehicle. Accurate sensor data is essential for these experiments.

We require both steering and IMU sensor inputs for this testing.

The steering sensors currently available with Yali are suitable for our requirements. However, the existing IMU sensors are not technically adequate in terms of precision and data quality required for digital twin validation.

After conducting technical research, we have identified an IMU sensor that appears suitable for our use case.

IMU Sensor datasheet and purchase link are in report:

For your perusal, we are attaching:

- The study report outlining our technical requirements
- Benchmark research papers supporting the selected specifications

We request your support in facilitating the procurement of the identified IMU sensor and related components required for the testing.

Kindly review and guide us on the process to proceed with the purchase.

Files

yaliEV_twin_timeline .pdf	78.6 KB	02/20/2026	DEV YADAV
Motor_Characterization__PMSM_Digital_twin.pdf	108 KB	02/20/2026	DEV YADAV
IMU_sensor_YALI (1).pdf	159 KB	02/20/2026	DEV YADAV
ADIS16470.pdf	1.29 MB	02/20/2026	DEV YADAV