Project Status Report #1

Team Name: Autonomists

Date: December 22, 2025

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1. Executive Summary

The team has successfully completed the initial hardware set-up for the BFMC 2026 challenge and successfully controlled the car via the GUI. As of this report, the vehicle is fully operational, communication is established via the Startup GUI, and the team is currently transitioning into the embedded development phase on the STM32 platform.

2. Technical Developments & Task Status

2.1 Power System Restoration & Custom Integration

- **Battery Integration:** As the kit was provided without a power source, we successfully integrated a **GenX 7.4V 2S 3300mAh 40C LiPo** battery to support sustained high-performance testing.
- **Power Board Troubleshooting:** Initial diagnostics revealed that the **BAT2** port on the power board was damaged and failing to receive power when the switch was engaged. After performing continuity testing, we successfully rerouted the battery input to the **BAT1** port, effectively restoring power to all onboard systems.

2.2 Sensor Diagnostics & Verification

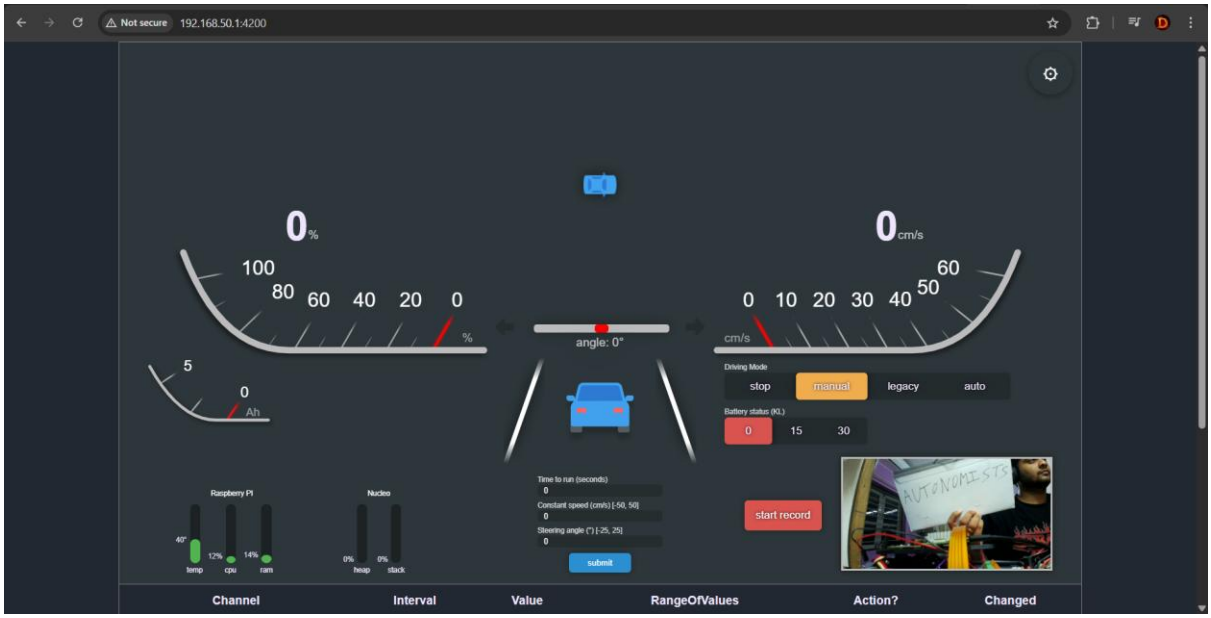
- **IMU Troubleshooting:** During early integration, we observed inconsistent data streams from the Inertial Measurement Unit (IMU). To determine if the issue was hardware-level damage or software-related, we interfaced the IMU with our own Raspberry Pi.
- **Validation Results:** Data logs from the RPi 5 confirmed the hardware's integrity. This diagnostic step allowed us to conclude that the hardware is functional and the previous issues were likely related to mounting offsets or initial calibration needs.

2.3 Current Stage: Embedded Development & Control

With the hardware verified, we have officially moved into the Embedded Development Phase:

- **Low-Level Control:** We are currently utilizing the provided startup code to analyze the interaction between the Raspberry Pi 5 (Brain) and the Nucleo Board (Embedded).
- **STM32 Learning Path:** Our current focus is mastering the STM32 Hardware Abstraction Layer (HAL). We are studying how the Nucleo processes high-level commands from the Pi and translates them into PWM signals for the DC motors.

3. Images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192.168.50.1:4200
0 %
100 80 60 40 20 0
%
0 cm/s
0 10 20 30 40 50 60
cm/s
angle: 0°
5
0
Ah
Driving Mode
stop
manual
legacy
auto
Battery status (KL)
0
15
30
Raspberry PI
Nucleo
40°
temp
12%
cpu
14%
ram
0%
heap
0%
stack
Time to run (seconds)
0
Constant speed (cm/s) [-50, 50]
0
Steering angle (°) [-25, 25]
0
submit
start record
Channel
Interval
Value
RangeOfValues
Action?
Changed