

# Integration and Testing of a Quadruped Robot with ROS2

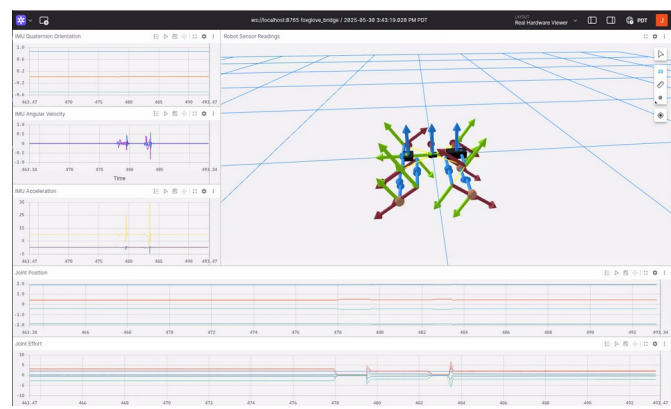
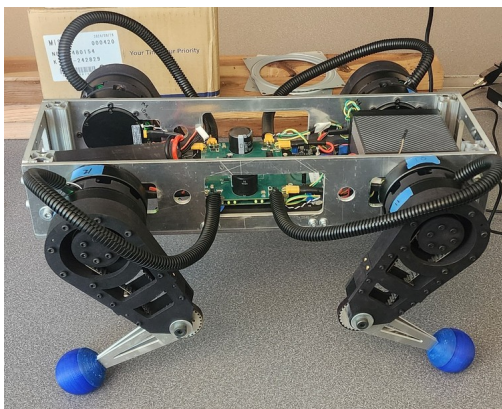
A Masters Thesis Defense in Mechanical Engineering

Presented By:                      Jeremy West  
Committee Members:        Dr Siyuan Xing (Chair, ME)  
   Charlie Refvem (ME)  
   Dr. Shreeshan Jena (BMED)

The Cal Poly Legged Robotics Group has been developing research and teaching platforms for agile legged robotics since 2020. These platforms are expected to provide students with opportunities to develop complete legged-robot systems from low-level control to advanced robotics tasks such as motion planning and decision making. However, the current prototyped quadruped robot lacked the software and sensing capabilities for high-level quadrupedal gaits and advanced robotic research.

To address these challenges, this project developed Switch, a robotic platform that builds upon the previous BRUCE platform with significant hardware and software upgrades. Switch features a modular design that allows individual software or hardware components to be upgraded or "switched" independently. The software architecture for Switch is built on ROS2 Jazzy with ROS2 control, supporting wireless development and control. The onboard NVIDIA Jetson AGX Orin Dev Kit provides wireless access over intranet, with comprehensive data access managed through ROS2 interfaces and real-time data visualization using Foxglove, including digital-twin capabilities.

The software package developed for Switch is versatile and adaptive. With minimal configuration, a robot control applications can be deployed on similar hardware platforms. Switch provides a foundation for future work, including machine learning integration and software reuse across future CPLRG projects, supporting research and education at Cal Poly in controls engineering.



3pm Wednesday July 9, 2025 in building 192 room 118

or

Zoom: <https://calpoly.zoom.us/j/88019400035>