

# Abdul Mustafa Muhammad Mohib

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## EDUCATION

**University of Waterloo**  
*Bachelor of Applied Science – Mechatronics Engineering*

**Waterloo, ON**  
*Sep 2024 – Present*

## EXPERIENCE

### Robotics Software Engineer

**Jan 2026 – May 2026**

*Studica Robotics*

*Mississauga, ON*

- Built a **full-stack** robot control platform using **React, TypeScript, Node.js/Express, Vite, and Prisma** enabling real-time block-based programming of physical robots, supporting **100+** reusable blocks in 10+ categories
- Created and tune autonomous navigation capabilities in **ROS2 Humble**, integrating **Nav2, SLAM, and pose-to-pose planning** in known and unknown environments using **LIDAR, depth cameras, and EKF**
- Implemented and validated multiple drive models (**mecanum strafing, differential, multi-drive**), enabling precise velocity and pose control of physically unique robots, while simulating movements through **Gazebo**
- Designed a **hardware-agnostic** runtime configuration layer, allowing robots with different sensors, kinematics, and peripherals to be configured via a web interface without code changes, cutting robot code time by **45%**

### Robotics Software Engineer

**May 2025 – Sep 2025**

*IMC / Nukote Coating Systems Canada*

*Burlington, ON*

- Developed mobile robotic crawlers capable of autonomous SIPP waterproofing treatment for pipelines up to **300ft deep**, enhancing structural integrity and extending service life by **80 years**
- Engineered a new modular robot integrating **ClearCore motion controllers, ClearPath servos, motor drives and Teknic BLDC motors**, writing end-to-end firmware in **C++, C, and Python**, GUI logic, and Pi communication scripts for projects values up to **\$3M+**
- Diagnosed and resolved grounding, communication, and mechanical faults; standardized electrical layouts and wiring protocols, reducing production idle time by **40%** and improving deployment reliability across multiple units

### Embedded Software Engineer

**Sep 2024 – Mar 2025**

*Waterloo Rocketry*

*Waterloo, ON*

- Implemented a flight-critical real-time timer module for an **STM32 MCU** using **FreeRTOS, C, and C++**, increasing scheduling precision by **45%** during avionics operations
- Built multi-threaded firmware architecture optimizing inter-peripheral communication with advanced queuing; reduced data-handling latency by **5ms** and cut runtime overhead by **40%** in telemetry-critical subsystems
- Led validation of **20+ mission-critical firmware unit tests** using GoogleTest + FFF mocking frameworks under BARR compliance; collaborated with avionics and telemetry teams to synchronize tasks and decrease development time by **50%**

## PROJECTS

### Autonomous Robot Simulator | *ROS2, Docker, Gazebo, C++, Foxglove*

**Oct 2025**

- Developed a full **ROS2-based** navigation stack enabling a simulated **differential-drive** robot to autonomously navigate from point A to B using **LiDAR-based costmaps, A\* global planning, and Pure Pursuit control**
- Integrated multi-node **ROS2 architecture** including **mapping, localization, planning, and control**, with real-time visualization and debugging using **Foxglove and RViz2**
- Validated navigation and control behavior in **Gazebo** simulation and containerized the system using **Docker Compose** to enable reproducible testing and rapid iteration

### Autonomous Drone | *ROS2, PX4, ArduPilot, Linux, Raspberry Pi*

**Sep 2024**

- Developed an **autonomous drone navigation system** using ROS2 integrated with **PX4 and ArduPilot**, enabling **closed-loop pose-to-pose** waypoint flight on real hardware
- Implemented **state estimation** and navigation workflows using onboard **IMU** and sensor data to produce stable pose estimates for **real-time flight control**
- Integrated **autonomy logic** with embedded **Linux systems** on **Raspberry Pi**, enabling reliable communication and control between ROS2 and the flight controller.

## TECHNICAL SKILLS

**Languages:** C++, Python, C, JavaScript, TypeScript, Java, SQL

**Embedded:** STM32, FreeRTOS, ClearCore, Arduino, Raspberry Pi, Linux, Docker, UART, SPI, I2C, CAN

**Robotics/Software:** ROS2, Nav2, SLAM, Localization, State Estimation, Motion Planning, Gazebo, RViz2, Foxglove

**Hardware/Design:** Soldering, Wiring & Grounding, Circuit Analysis, SolidWorks, AutoCAD, Oscilloscopes