



COMPANY PROFILE

Robotics engineering for real applications.

Autonomous mobile robots · Custom robotic systems · Embedded & motion control · Industrial integration

AUTONOMY

EMBEDDED

MOTION

INTEGRATION

R&D

Founded 2018

10+ years hands-on engineering

Coimbatore · India

AADITHSLAB.COM

2026

Engineering across the complete robotic machine.

Aadith's Lab develops robotic systems and subsystems where mechanics, electronics, control and robotics software must operate as one engineered system.

2018

Aadith's Lab founded

10+

Years hands-on engineering

2020+

Customer engineering deliveries

INDIA

Coimbatore, Tamil Nadu

01

Autonomous mobility

AMRs, localization, mapping, navigation, sensing and vehicle-level control.

02

Custom robotic machines

Purpose-built electromechanical systems around a specific task, payload or research objective.

03

Embedded & motion control

Custom controllers, real-time firmware, motor control, feedback, power and communication.

04

Industrial integration

Robot arms, PLCs, sensors, machine I/O, networks, diagnostics and surrounding equipment.

A multidisciplinary stack - designed as one system.

The engineering scope can start at a complete machine or deep inside one subsystem. The same system-level approach keeps interfaces, timing, power and diagnostics coherent.

01

Autonomous systems

Localization, SLAM, navigation, perception, odometry, mission logic and deployment-oriented diagnostics.

02

Mobile robotics

Differential-drive architecture, drivetrain, payload integration, sensing, power and machine-level controls.

03

Embedded control

Custom electronics, STM32 firmware, real-time I/O, sensing, communication and machine states.

04

Motion systems

DC / BLDC drives, FOC, position-velocity-current control, encoders, homing and coordinated motion.

05

Robotic manipulation

Robot arms, grippers, lifting axes, MoveIt 2, trajectory execution, vision and end-effector interfaces.

06

Industrial integration

PLCs, CAN/CAN-FD, Ethernet, RS-485, external machines, safety interfaces, diagnostics and operator I/O.

ENGINEERING STACK

ROS 2

Nav2

MoveIt 2

OMPL

ros2_control

STM32

FreeRTOS

CAN / CAN-FD

RS-485

Ethernet

LiDAR

Depth cameras

IMU & encoders

BLDC / FOC

LiFePO4

BMS & power

PLC integration

Custom PCB

AMR engineering from drivetrain to autonomy.

Reliable autonomous mobility depends on the complete machine: wheel traction, encoder quality, motor control, sensor placement, timing, networking, power behavior and payload integration.

MACHINE STACK

PERCEPTION

LiDAR · depth · IMU · vision

LOCALIZATION

Odometry · fusion · maps

NAVIGATION

Planning · obstacle handling

MOTION

Motor control · braking · feedback

PAYLOAD

Lifter · arm · conveyor · custom top module

WHAT WE ENGINEER

01

Mobility & mechanics

Differential drive, motors, gearboxes, wheels, braking, structure and service access.

02

Navigation & behavior

ROS 2 / Nav2, mapping, localization, planning, obstacle handling and mission logic.

03

Embedded & industrial I/O

Custom controllers, CAN, Ethernet, RS-485, PLC interfaces and deterministic machine control.

04

Power architecture

LiFePO4 batteries, BMS, charging, DC rails, current distribution and power-state management.

05

Payload integration

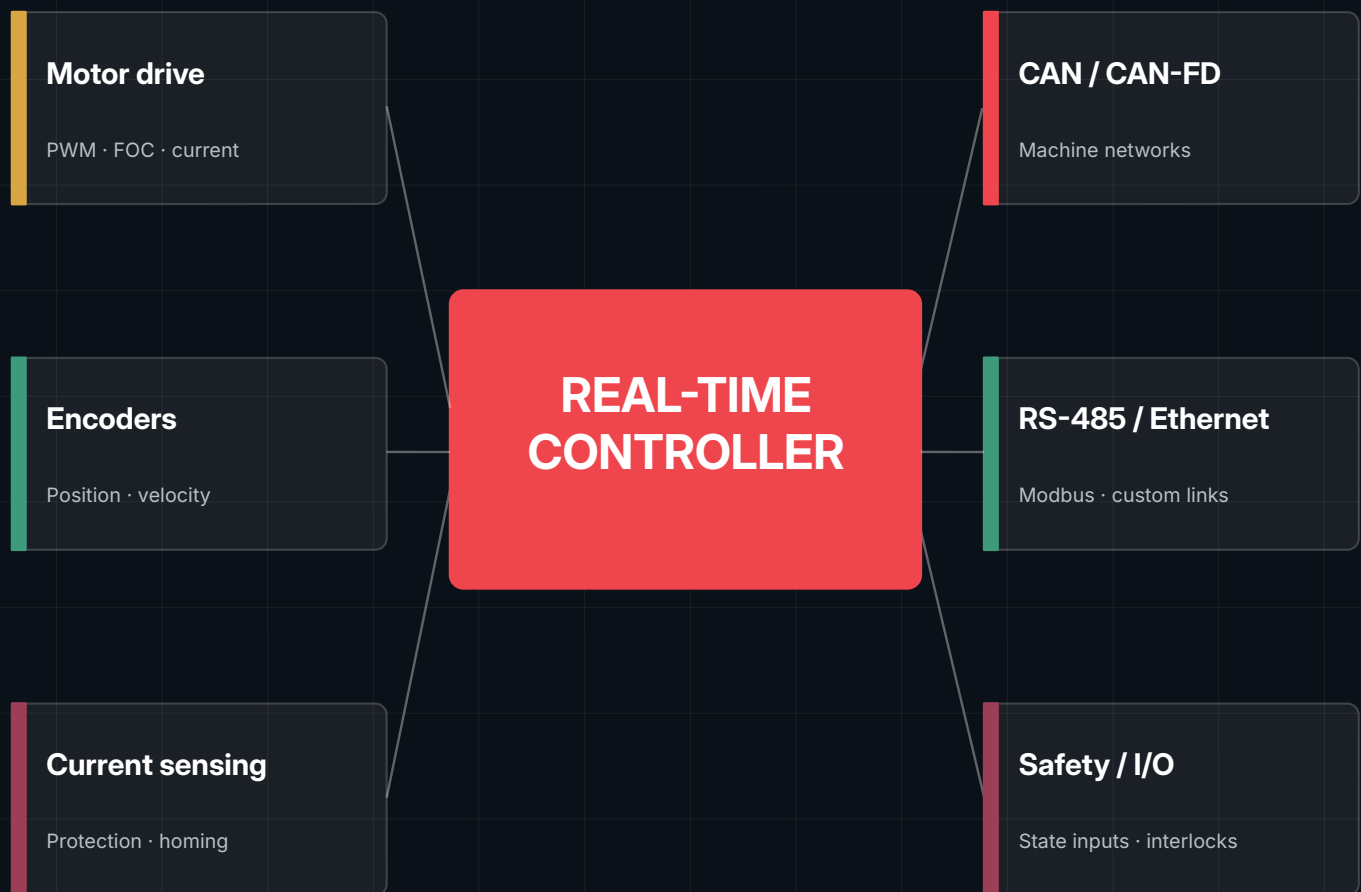
Lifters, conveyors, robot arms, grippers and application-specific payload hardware.

Typical applications

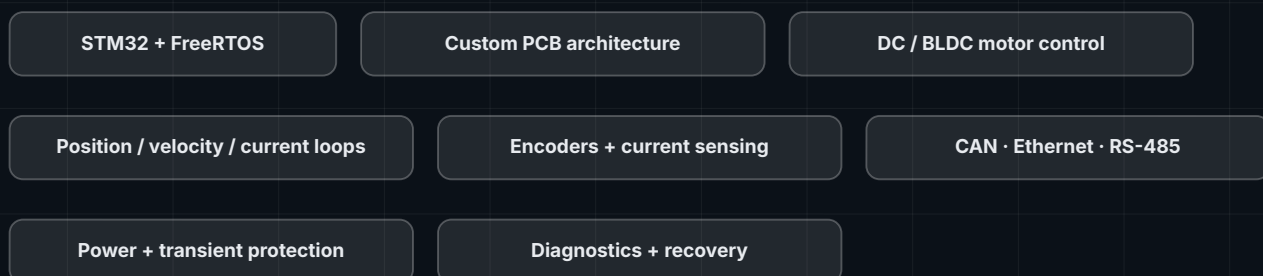
Material movement · Research platforms · Mobile manipulation · Inspection · Machine tending · Custom payload transport

Custom controllers when the machine needs deeper control.

Robotic systems often need deterministic control, specialized I/O or electrical interfaces that standard modules cannot provide. Custom embedded development lets the controller match the actual machine.



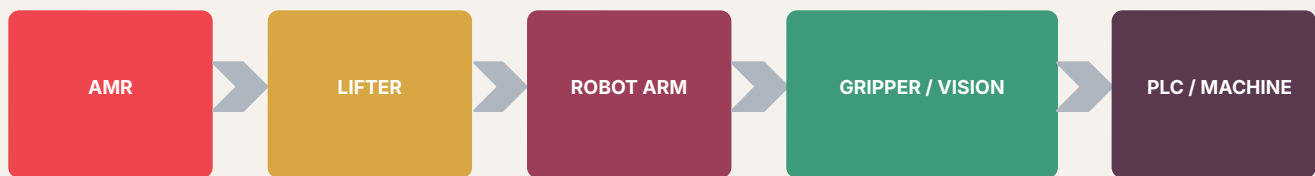
CONTROL SCOPE



The difficult part is often between the products.

A robot arm, mobile base, PLC and sensor can each work independently and still fail as a system. Integration requires clear interfaces, timing, state management, fault handling and physical coordination.

COMPLETE-SYSTEM FLOW



ROBOT INTEGRATION

Robot arms & end effectors

Drivers, motion planning, trajectory execution and tool interfaces.

PLC & machine interfaces

Handshake logic, digital I/O and industrial communication.

Vision & sensing

Depth cameras, fiducials, alignment and perception-driven actions.

Diagnostics & fault handling

State propagation, logging and service-oriented feedback.

RESEARCH ROBOTICS

Open architecture

Accessible sensing, motion, diagnostics and control interfaces.

Configurable mobility

Payload mounting, sensing layouts and power matched to experiments.

ROS 2 robotics

Navigation, ros2_control, motion planning and custom device interfaces.

Low-level access

CAN, Ethernet, embedded I/O and real-time interfaces for R&D.

Projects that built today's engineering capability.

Selected public projects document the development path behind current robotics work. Customer engagements are not published where confidentiality applies.

2017

Hexapod

MULTI-AXIS MOTION

Six-legged robot with 18 actuated joints. ROS-based programming, simultaneous body-and-leg kinematics, gait control and minimum-jerk trajectory generation.

2018

3-DOF articulated robot

KINEMATICS + TRAJECTORIES

Articulated robot with a teach pendant, forward/inverse kinematics, stored points and smooth motion using velocity, acceleration and jerk-constrained trajectories.

2019

Project IceCube

AUTONOMOUS MOBILE ROBOT

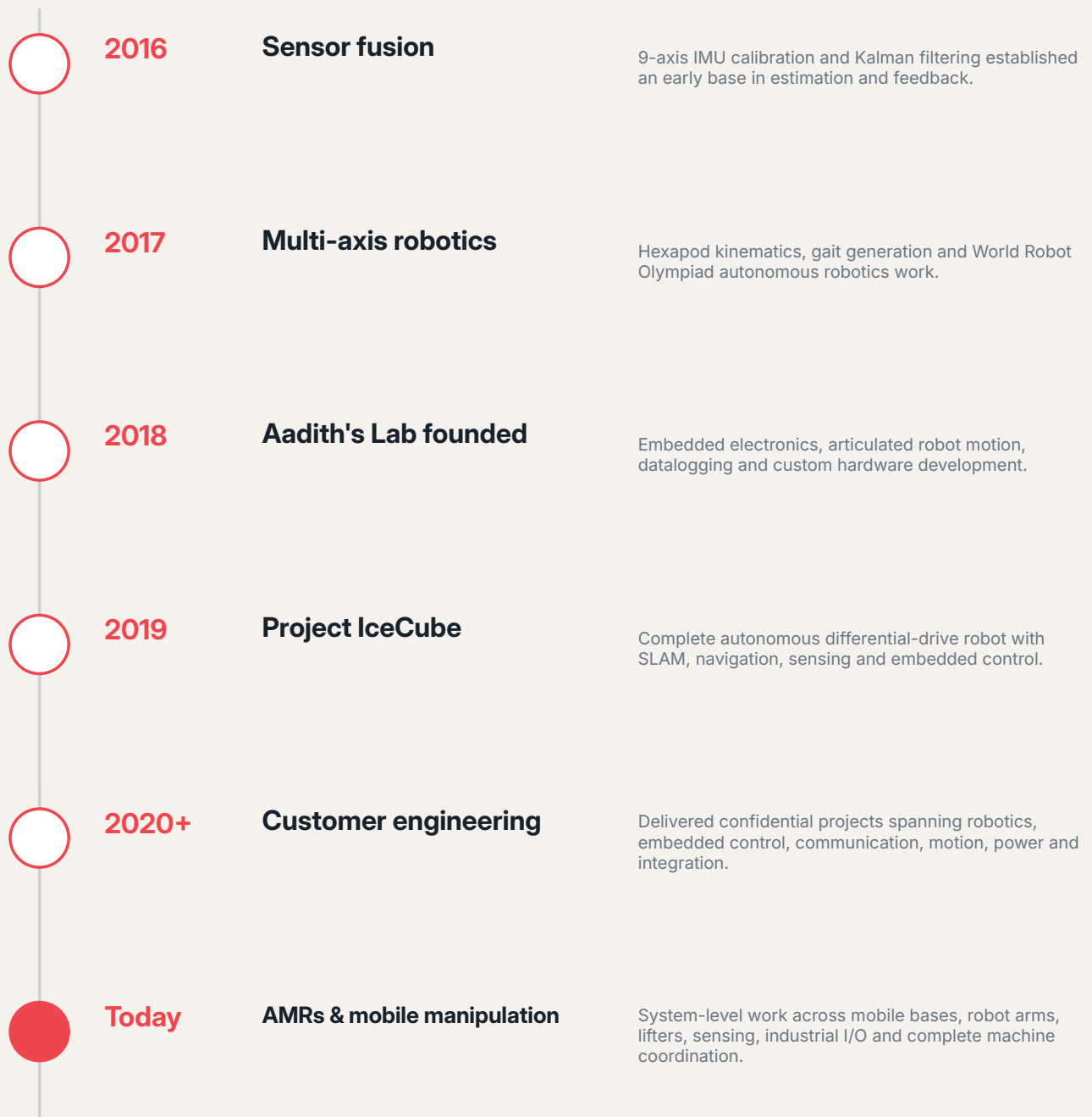
Differential-drive autonomous robot combining 2D LiDAR, wheel odometry, IMU, cameras, ROS, SLAM, navigation, embedded electronics, onboard compute and battery management.

2020 - TODAY · CUSTOMER ENGINEERING

Multiple delivered projects for industrial customers and government institutes under confidentiality.

From sensor fusion to complete autonomous machines.

The progression has been cumulative: each generation added deeper mechanics, control, sensing, autonomy and integration capability rather than treating them as separate disciplines.



The goal is not a collection of technologies. It is a machine that behaves coherently in the real application.

Define. Architect. Prototype. Integrate.

Engagements can start at the complete-machine level or deep inside one subsystem. The process stays evidence-driven and hardware-oriented.

01

DEFINE

Payload · environment · motion · runtime · interfaces · cycle time · safety constraints

02

ARCHITECT

Mechanics · sensing · power · control · communication · software defined together

03

PROTOTYPE

Critical assumptions tested on real hardware early - before the architecture hardens

04

INTEGRATE & REFINE

Subsystems validated together with attention to reliability, diagnostics and serviceability

ENGAGEMENT MODELS

Complete robotic system

Architecture, prototyping and integration of a complete robotic machine around the application.

Subsystem / controller

Embedded control, motor control, sensing, firmware, power or communication as focused engineering work.

Robot & equipment integration

AMRs, arms, PLCs, sensors and surrounding machines integrated into a dependable workflow.

Engineering consultation / R&D

Architecture reviews, feasibility, prototyping support and technical problem solving for robotics programs.



PRADYUM AADITH

Founder & Robotics Engineer

10+ years of hands-on engineering across autonomous robotics, embedded systems, motion control, industrial communication and complete machine integration.

COIMBATORE · INDIA

From Project IceCube to modern AMRs.

The engineering path began with embedded sensing, estimation and multi-axis robotics, then expanded into complete autonomous systems. Project IceCube in 2019 brought navigation, sensor fusion, embedded control, power and onboard computing together in one differential-drive robot. Since 2020, that systems approach has continued through customer engineering and larger AMR, manipulation and industrial-integration programs.

SELECTED EXPERIENCE

2016 - 2017

Sensor fusion · kinematics · Hexapod · autonomous competition robotics

2018

Aadith's Lab founded · articulated robot · custom embedded electronics

2019

Project IceCube · ROS · SLAM · navigation · complete autonomous robot

2020 - today

Confidential customer engineering for industrial companies and government institutes

Today

AMRs · mobile manipulation · embedded controllers · power · industrial integration



START A PROJECT

Tell us what the machine needs to do.

For a useful first discussion, share the application, payload, operating environment, required motion, speed or cycle time, available interfaces, existing equipment and current development stage.

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