

ROS TRAINING KIT



**Revolutionizing Robotics with
Autonomous Navigation**

PRODUCT OVERVIEW AND KEY FEATURES

ROS 2 OVERVIEW

Our robotics kits—**Luminous**, **Pixel**, and **Cubiform**—are designed to revolutionize education by offering hands-on experience with ROS and Ubuntu. These kits enable students and professionals to learn, simulate, and implement robotics concepts with advanced tools for navigation, perception, and control. Ideal for educational institutions, they support autonomous navigation, real-time simulations, and machine vision applications.

KEY FEATURES:

1. Luminous

- Autonomous navigation using the ROS Navigation Stack (mapping, localization, path planning).
- Manual teleoperation using a keyboard or joystick.
- Easy setup with compatibility for Ubuntu 20.04 and 22.04.
- Enables building and testing projects using ROS packages (Navigation, Perception, Manipulation).



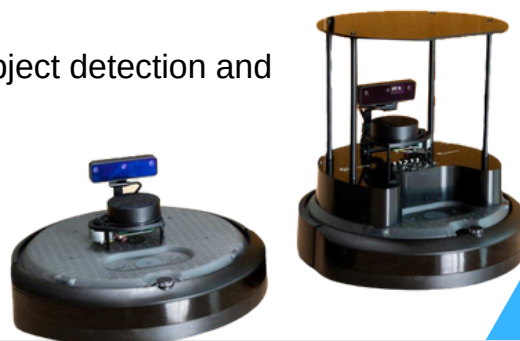
2. Pixel

- Autonomous navigation using ArUco markers for localization and path planning.
- Machine vision algorithm deployment for tasks like object detection.
- Real-time simulation and visualization for testing and development.
- Seamless control via teleoperation using a keyboard or joystick.



3. Cubiform

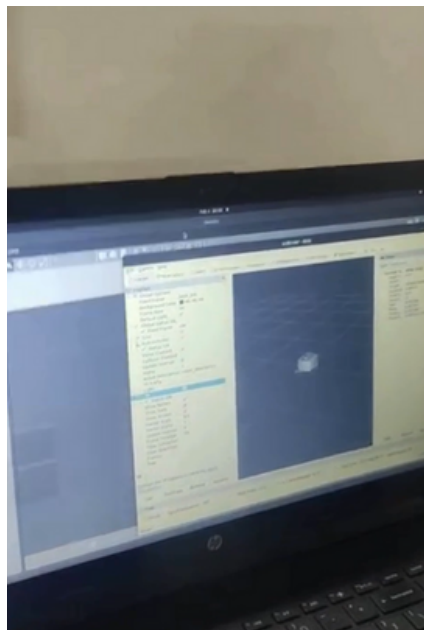
- Integrated with ROS for access to advanced robotics tools and libraries.
- Supports SLAM for map-building and navigation using depth camera data.
- Obstacle detection and dynamic path planning using depth perception.
- Machine vision algorithms for object detection and object/person following.



UNIQUE FEATURES OF THE KIT

Frame Mounted Drone:

1. ROS and Ubuntu Learning Integration: All kits come pre-configured for ROS and Ubuntu, allowing learners to create, simulate, and deploy robotics solutions.
2. Real-Time Simulation: Test and validate algorithms in a safe, virtual environment.
3. Machine Vision Support: Deploy advanced algorithms for object detection, mapping, and robotic arm control.
4. Comprehensive Robotics Training: Covers navigation, perception, manipulation, and localization techniques.



SENSORS & THEIR LEARNING OBJECTIVES

| SENSOR | FUNCTION | LEARNING OBJECTIVE |
|----------------------------|---------------------------------------|---|
| Depth Camera | Obstacle detection, mapping, SLAM | Understanding SLAM and depth perception |
| IMU Sensor | Motion tracking and stability | Learn about orientation and movement tracking |
| ArUco Marker (Pixel only) | Localization and navigation | Study computer vision-based navigation techniques |
| Ultrasonic/IR Sensors | Obstacle detection | Basics of sensor integration and obstacle avoidance |
| LiDAR (optional, Luminous) | High-precision mapping and navigation | Advanced mapping and navigation techniques |



COMPONENTS & THEIR SPECIFICATION

| Base Components | |
|-----------------|---|
| COMPONENT | SPECIFICATION |
| Processor | Raspberry Pi 4 or NVIDIA Jetson Nano for high-performance computation |
| Sensors | Depth Camera, IMU, Ultrasonic/IR Sensors, ArUco Marker support |
| Chassis | Durable and lightweight materials for efficient mobility |
| Power Source | Rechargeable battery with 4–6 hours of runtime |
| Connectivity | Wi-Fi and Bluetooth for remote control and data transfer |



LEARNING MODULES

1. Introduction to ROS:

- Setting up a ROS environment and creating workspaces.
- Basics of ROS nodes, topics, and services.

2. Navigation:

- Mapping, localization, and path planning using the ROS Navigation Stack.
- Hands-on SLAM implementation.

3. Perception:

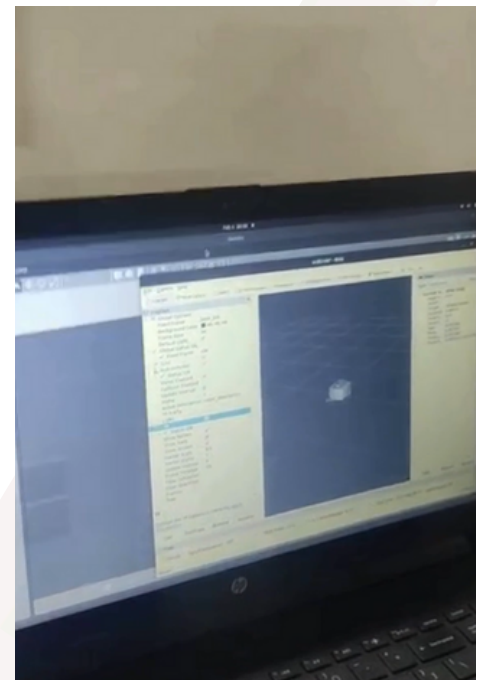
- Object detection and recognition with depth cameras and machine vision algorithms.

4. Manipulation (Luminous):

- Robotic arm control and grasping techniques.

5. Simulation:

- Building and testing algorithms in real-time simulation environments like Gazebo.



Drone simulation using Gazebo (ROS2 Humble)

ADDITIONAL FEATURES

- Pre-configured Ubuntu and ROS setup for hassle-free installation.
- Cross-platform compatibility with major operating systems.
- Extensive documentation and video tutorials for easy learning.
- Expandable with optional sensors and components for advanced projects.



Object identification

WHY CHOOSE THIS KIT?

- **Educational Focus:** Specifically designed for students and educators to simplify robotics learning.
- **Hands-On Experience:** Real-world applications in navigation, perception, and manipulation.
- **Future-Ready Skills:** Learn industry-relevant robotics concepts, including SLAM, machine vision, and ROS.
- **Comprehensive Support:** Easy setup, robust documentation, and community assistance.
- **Affordable Innovation:** Cost-effective solutions with cutting-edge features for robotics education.



**Empower your students with hands-on knowledge of
Robot Operating Systems!**

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