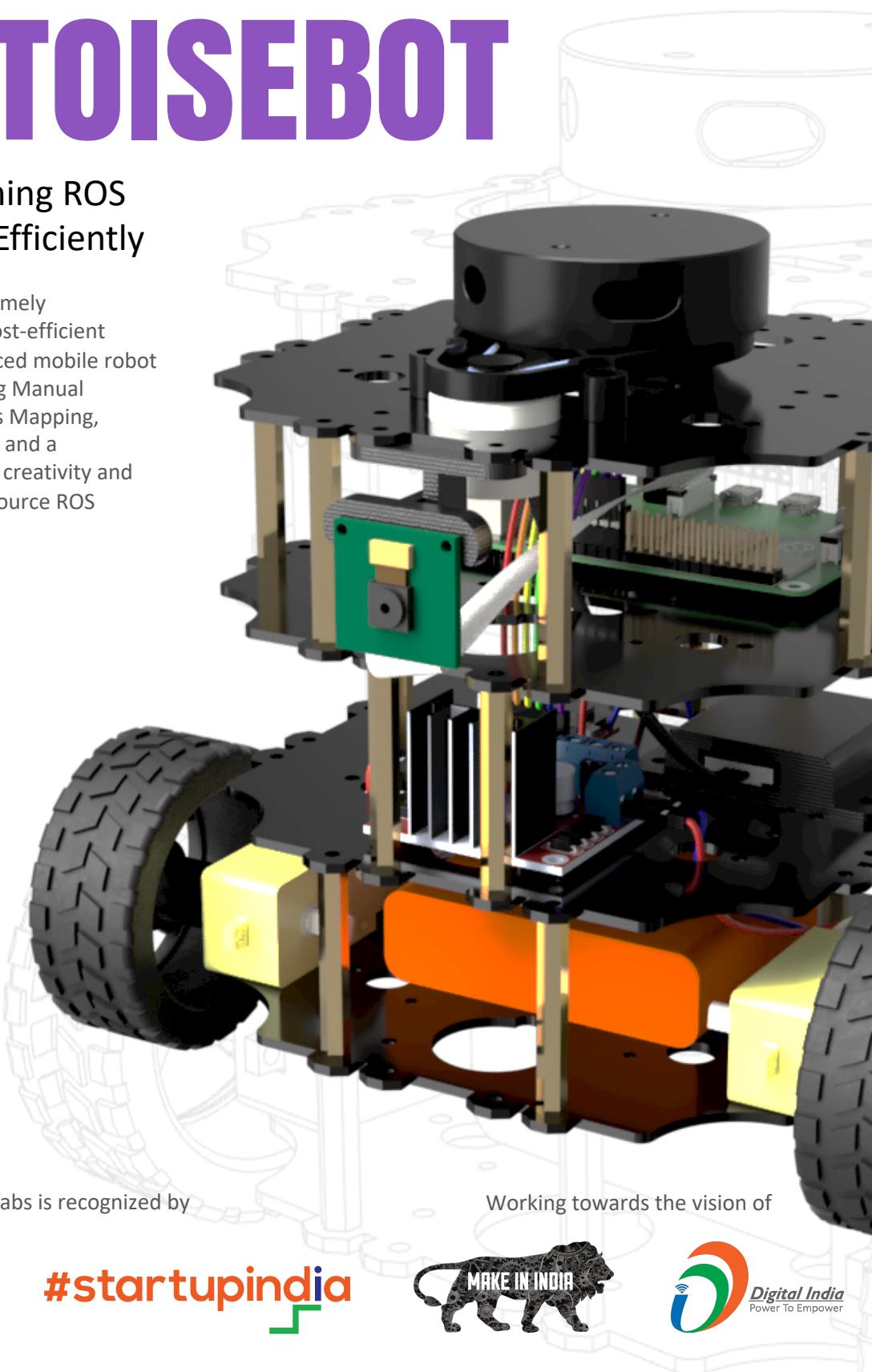


TORTOISEBOT

Simplify Learning ROS
Affordably & Efficiently

TortoiseBot is an extremely learner-friendly and cost-efficient ROS based Open-Sourced mobile robot that is capable of doing Manual as well as Autonomous Mapping, Navigation, Simulation and a lot more thanks to the creativity and support of the Open-Source ROS Community!



RigBetel Labs is recognized by



Government of India
Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade

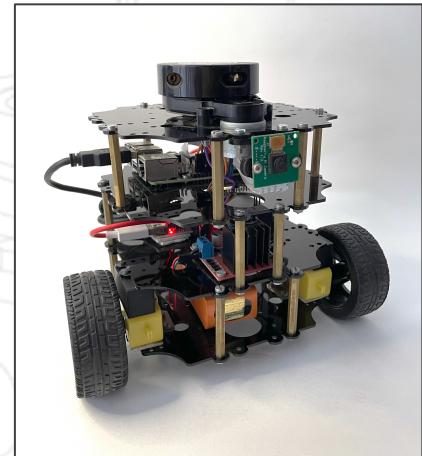
Working towards the vision of



Available for purchase online at: TortoiseBot.com and RigBetelLabs.com/TortoiseBot
Or Call us at: +91 8432152998

MULTI-PURPOSE STARTER KIT FOR ROS (Robot Operating System)

TortoiseBot is out-of-the-box the simplest, and most cost efficient ROS based robot that has Mapping and Navigation capabilities. The core of TortoiseBot is a Raspberry Pi 4 running Raspberry Pi OS with pre-installed ROS. So the user can simply assemble the robot with included assembly guide in just 30 minutes and start working on the robot immediately without any additional setup. The robot also has support for Gazebo Physics Simulator where you can simulate your robot algorithms without actually risking the robot and also visualize the sensor data in RViz. TortoiseBot is based on a simple principle of - “ **Everything that you need, Nothing that you don't!** ” Adhering to this motto, we have tried to minimize the components and eliminate expensive and difficult-to-use elements like encoders & IMU, instead replaced it with our cutting-edge & reliable software that uses relational reasoning to give precise odometry values thus reducing the cost by almost 40%. TortoiseBot is modular with various other sensors that work with Raspberry Pi which makes it the best pick for research in Robotics & AI.



KEY FEATURES



DIY Assembly Kit



AI Enabled Robot



FPV Live Camera



Python/C++ Programming



2 Wheel Drive



Sensor Fusion



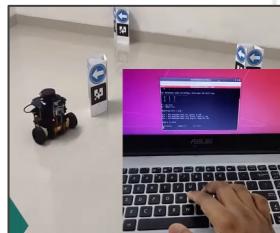
ROS Based



Open-Source

SAMPLE APPLICATIONS

TELE-OPERATION AND LIVE CAMERA VIEW



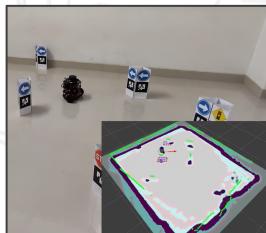
Included with the TortoiseBot software is the code to control the robot through your computer's keyboard or any joystick along with live camera feed

PERCEPTION AND MAPPING



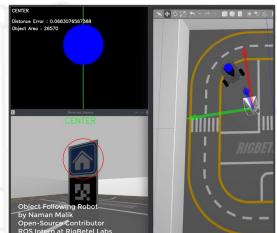
TortoiseBot comes equipped with all required sensor for localizing itself in an unknown environment and also make a map of the surrounding aka SLAM

EXPLORATION AND NAVIGATION



TortoiseBot can autonomously navigate in known & unknown environments using Exploration and Navigation Stack offered by ROS

COMPUTER VISION & AI APPLICATIONS



Using onboard Camera, the computer vision and AI applications you can build with TortoiseBot is limitless with streaming speed of upto 60fps at 720p

TECHNICAL SPECIFICATIONS – ROBOT

Dimensions :	
Length	151 mm / 15.1 cm / 0.15 m
Width	197.6 mm / 19.76 cm / 0.1976 m
Height	174.1 mm / 17.41 cm / 0.1741 m
Weight	0.9 Kg / 1.98 Lbs (±0.05 Kg / ± 0.011 Lbs) + 0.3 Kg (Charger)
Payload :	
Total Payload	2 Kg / 4.4 Lbs
Robot Payload (Excluding robot's own weight)	1.1 Kg / 2.4 Lbs
Customization :	
Colors Available (Wheel, LiDAR, Chassis)	Black , Blue
Processor :	
CPU	Raspberry Pi 4 Model B with Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
RAM	2GB LPDDR4-3200 SDRAM
Graphics Support	OpenGL ES 3.1, Vulkan 1.0
Storage	16 GB Class 10 Sandisk Micro SH/SDHC Card (upto 98MB/s speed)
Power :	
Battery	18650 Li-ion 2000mAh 11.1v 3S1P Protected Battery Pack-3c
Charging Time (with included charger)	2 hours (10v to 11.8v ; Can use external fast charger if needed)
Idle Mode	4+ hours runtime (Recommend to shutdown at 10v)
Scanning Mode	2 hours 45 minutes runtime
Full Load Mode	1 hour 30 minutes runtime
Speed and Performance :	
Linear Velocity Range (Min to Max)	0.03 m/s to 0.21 m/s
Angular Velocity Range (Min to Max)	0.55 m/s to 2.35 m/s (Minimum turning radius of 85.93 mm)
Position Accuracy	±0.05 m ; ±0.17 radians
Communication / Connectivity :	
Wi-Fi	2.4 GHz and 5.0 GHz IEEE 802.11ac wireless LAN
Bluetooth	Bluetooth 5.0, BLE
I/O	2x USB 3.0 ports; 2x USB 2.0 ports; Gigabit Ethernet; Standard Raspberry Pi 40-pin GPIO header

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TECHNICAL SPECIFICATIONS – SENSORS

Camera :

Resolution	5 MegaPixel
Sensor type & resolution	OmniVision OV5647 ; 2592 × 1944 pixels
Interface type	CSI (Camera Serial Interface)
Video formats	1080p @ 30fps, 720p @ 60fps and 640x480p 60/90fps
Dynamic range	67 dB @ 8x gain
Fixed focus	1 m to infinity
Focal length	3.60 mm ±0.01
Horizontal field of view	53.50 ±0.13 degrees
Vertical field of view	41.41 ±0.11 degrees

LiDAR :

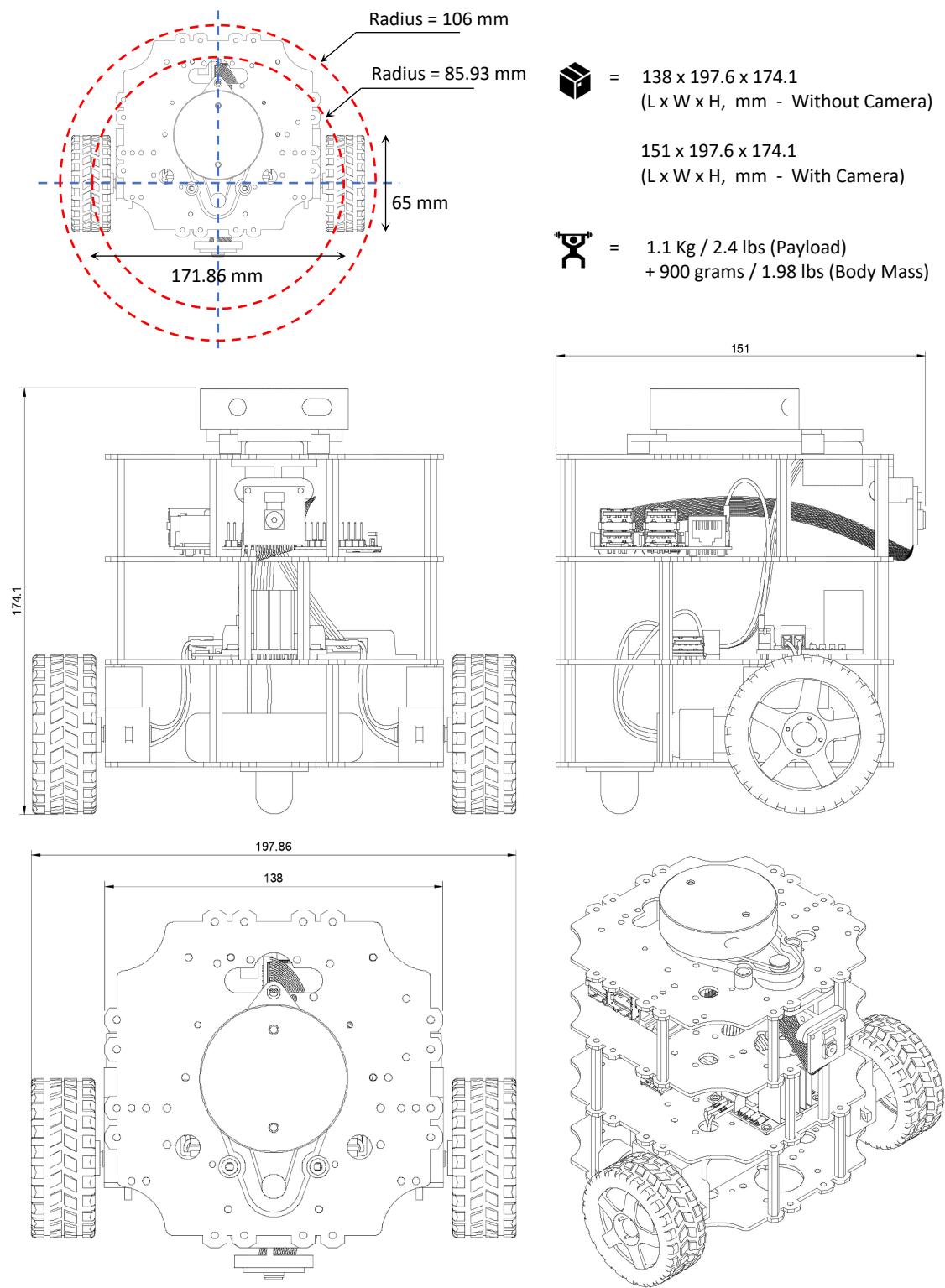
Field of View	360 degrees
Sample rate	3000 Hz
Scanning Frequency	4-8 Hz (Recommended 7Hz ; Can be controlled by variable PWM)
Scanning Range (Min to Max)	0.05 m to 10.00 m (Accurate readings from 0.1 m to 8.0 m)
Communication Type	UART at 3.3v converted to USB at 5v
Operating Voltage	4.8v to 5.2v

Note: TortoiseBot is compatible with all the sensors that could work with Raspberry Pi by coding in Python, C, C++ or using ROS Packages

PACKAGE CONTENTS

M3 x 10mm Nut & Bolts	x40	LiDAR kit with data convertor & cable	x1
M3 x 25mm Nut, Bolt, Washers	x4	USB C Power Cable for Raspberry Pi	x1
M2 x 10mm Screws	x2	Raspberry Pi 4 Model B 2GB RAM with 16 GB SD Card	x1
M3 x 40mm M-F Brass Spacers	x18	Raspberry Pi Camera with cable	x1
2 in 1 Dual head Screw Driver/Tester	x1	Li-ion Battery 11.1 V 2000 mAh	x1
TortoiseBot Chassis Plate	x4	12V 2Amps Li-ion Battery Charger	x1
Plastic Camera Mount	x1	60 RPM BO Motor, Wheel, Bracket Set with wires	x2
Plastic Motor Mount	x2	Caster Wheel	x1
L298N 2 Amp Motor Driver Module	x1	Female to Female Jumper Wires	x7
Battery Checker Module with DC Jack	x1	Power Distribution Module with Battery Connector	x1

TECHNICAL DRAWING WITH DIMENSIONS



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