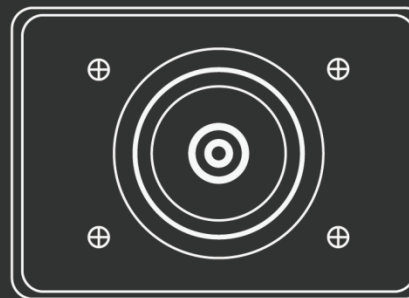




PERCEPTIN

THE PEOPLE'S AUTONOMOUS VEHICLE



Official website:

<https://www.dragonflycar.io>

Contact:

info@dragonflycar.io



PERCEPTIN

Build your autonomous vehicles in LEGO-like approach

Building autonomous vehicles is not that much different from building LEGOs — at PerceptIn, we have simplified autonomous vehicle designs and modularized the components, such that developers can simply integrate components to build their own autonomous vehicles.



What are the benefits of modular design?

- Dramatically shorten the time to market
- Reduce overall construction costs and part maintenance complexities
- Build up customized products to meet unique user needs
- Modify or replace modules without changing anything else on the product



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DRAGONFLY SENSOR MODULE

DragonFly Sensor Module is a product designed to enable outdoor low-speed autonomous vehicles and robots. The design consists of four hardware-synced high-definition global-shutter cameras (a stereo pair in the front, and a stereo pair in the back), an IMU device, and a Jetson TX1 computing module. This design provides three major functions: **perception**, **localization**, and **panoramic video streaming**.



Advantage

Hardware

- Synchronized four way cameras
- Synchronized 9-axis IMU unit
- Jetson TX1
- Ethernet/USB 3.0/HDMI interface Software

Software

- Raw data capture
- Perception- Obstacle and depth detection
- Localization-Visual odometry
- Four-way Video streaming



Typical applications



Autonomous Vehicles



Mobile Robots



Unmanned Automated Drones



Visual Map Creation



Specification

Body	Size	580 x 120 x 50mm
	Weight	1.5kg
	Material	Aluminum Alloy
	Operating Temperature	0-60 degree celsius
IMU	IMU device	MPU9250
Computing Module	Computing Unit	Jetson TX1
	Interfaces	Gigabit Ethernet/USB 3.0/HDMI
	Input Voltage	12V-19V
	Power Consumption	5W-12W
Camera	Camera	RGB
	Shutter Type	Global Shutter
	Resolution	1280x720
	Pixel Size	H: 3 um, V: 3 um
	Optical Format	¼-inch (4.5mm)
	Dynamic Range	63.9 dB
	Maximum SNR	38 dB
	White Balance	Automatic
	Frame Rates	30 FPS
	FOV	Horizontal: 80° Vertical: 64°
	Distortion	-1%(TV)
	Baseline of Stereo Camera	50 cm



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DRAGONFLY MILLIMETRE-WAVE RADAR(77GHz)

Introduction

Based on pulse-echo principle, DragonFly Millimetre-Wave Radar(77GHz) is used to monitor the surroundings of the vehicle, such as Blind Spot Detection (BSD), Lane Change Assistance (LCA), Rear Cross Traffic Alert (RCTA) and Car Door Open Warning (DOW). In addition, it can be used on autonomous vehicles for active obstacle avoidance.

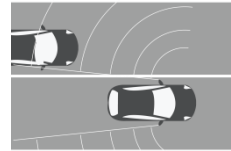
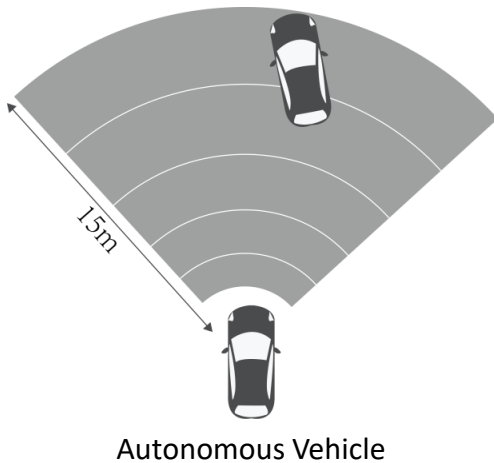
For communication, Millimetre-Wave Radar consists of two CAN interfaces that are responsible for data exchange between radar and automobile, and two High-side Drivers that are used to drive external load directly.

Advantage

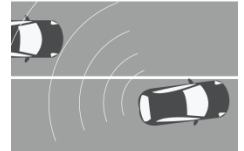
- Cost Effective
- Production quality solution for autonomous driving and robotics
- Sensitive millimeter wave system (e.g. detection of low reflecting objects)
- Short reaction time (first-time detection), and fast reaction on suddenly appearing obstacles (e.g. pedestrians, changing scenes)



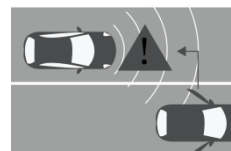
Typical applications



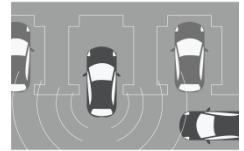
BSD



LCA



DOW



RTCA

- * The autonomous vehicle is equipped with four Millimetre-Wave Radars.
- * The vehicle is equipped with two Millimetre-Wave Radars for BSD, DOW, RTCA, LCA.



Specification

Temperature
Tolerance

-40°C ~ 100°C

Material

Hybrid sandwich materials which is free of air intervals when the temperature is changed

Water
Absorption

≤ 0.1% in the condition of 23°C/50%RH

Heat
Resistance

No degeneration staying beyond 24h in the condition of +90°C without ventilation

Anti-ultraviolet
Performance

Persistently

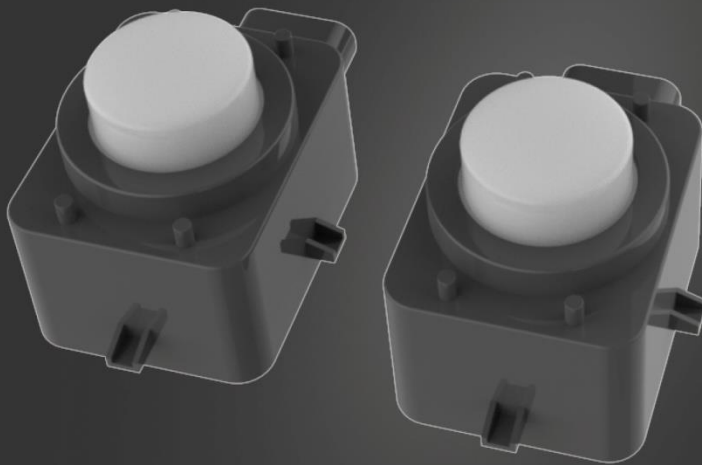
Tendency to Stick
with Rain Drops

Low water adhesion

* The property can be different if synthetic material or density is different, even the same specific material is used.



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***DRAGONFLY
SONAR***

Introduction

DragonFly Sonar can recognize and monitor obstacles within 5 meters. It consists of a long-range ultrasonic sensor and an Electronic Control Unit (ECU). The Ultrasonic sensor can transmit short ultrasonic impulses reflected from surrounding objects. Advanced digital processing evaluates signal attributes of the reflected echoes and thus enable state-of-the-art object detection in terms of speed and robustness. DragonFly Sonar supports multichannel operation, providing high measuring update rates and avoiding mutual interference. In addition, DragonFly Sonar can be used on autonomous vehicles for passive obstacle avoidance. The number of sensors can be flexibly configured in lined with different functional requirements.



Advantage

- Cost effective
- High quality solution for autonomous driving and robotics
- Sensitive ultrasonic system(e.g. detection of low reflecting objects)
- Short reaction time (first-time detection), and fast reaction on suddenly appearing obstacles (e.g. pedestrians, changing scenes)
- Detection range up to 5m.



Typical applications



Blind Area Monitoring (BSD)



Side Involvement Obstacle Detection (SIOD)



Parking Assist (PAS)



Specification

Ultrasonic Sensor

Probe Beam Angle	Horizontal:85° Vertical:30°
Ultrasonic Frequency	58±1kHz
Range Of Working Temperature	-40℃~85℃
Waterproof Level	IPx9
Type Of Data	Analog
Detection Distance	<5m
Blind Zone	<30m
Number Of Obstacles Identified	1

ECU

MCU	Horizontal:85° Vertical:30°
Number of Radar Channel	4ch
Operating Voltage	12V
Range Of Working Temperature	-40℃~85℃
Communication Tyoe	CAN(500 kbps)
Vibration, Environment, Reliability Requirements	Meet the vehicle regulations



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DRAGONFLY **GNSS**

Introduction

The Global Navigation Satellite System (GNSS) is used on autonomous vehicles as a key element of the communication and navigation. The GNSS receiver consists of an antenna and a processor which computes position, time and some other information. Measurements from a minimum of four satellites are required to establish three-dimensional position and time. Accuracy is dependent on the precision of the measurements from the satellites and the relative positions (geometry) of the satellites used.

Advantage

- Support GPS, GLONASS, Beidou and Galileo signals reception
- Stable phase center guarantees the accuracy of positioning within millimeter-level
- Strong anti-interference ability to endure the challenging operating environments
- Small form factor with IP67 ruggedized structure



Electrical And Physical Specifications

Electrical Specification

Voltage	5V DC
LNA Output	4.75~5.10V, 0~100 mA
Ripple Voltage	100mV p-p(max)
Power Consumption	2.3W(typical)

Physical Specifications

Antenna Input	2×TNC
Temperature	Working: -40℃ ~ +85℃ Storage: -55℃ ~ +95℃
Humidity	95% No condensation

Functional Ports

2 × UART (RS232)	1 × DC (5.5MM*2.5MM)	2 × TNC (Female)
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GNSS Antenna Specification

Performance

GPS	L1/L2/L5
GLONASS	L1/L2/L3
BDS	B1/B2/B3
GALILEO	E1/E6/E5a/E5b
Nominal Impedance	50Ω
Polarization	RHCP
Axial Ratio	≤3dB
LNA Gain	40dB(typical)
Noise Figure	≤2dB
Output/Input VSWR	≤2.0
Operation Voltage	+3.3VDC to +12VDC
Operation Current	45mA(maximum)

Mechanical

Dimensions	Φ152*62.2mm
Connector	TNC female
Weight	≤500g
Base Screw Thread	5/8"-11UNC

Environmental

Operating Temperature	-40℃ to +85℃
Storage Temperature	-55℃ to +85℃
Humidity	95% non-condensing
Water/Dust Resistance	IP67

Foundation Plate Specification

Parameters

Model	M90SD
Screw Threshold	5/8"-11UNC (Top) M10 (Bottom)
Size	Φ87×91
Weight	0.18kg
Magnetic Suction	≥30kg
Material	Aluminum



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DRAGONFLY POD

DragonFly Pod, a safe and reliable self-driving pod, fulfill passenger's last-mile task by adapting latest computer vision technology. It is design to self-drive in low-speed scenarios, such as university campuses, industrial parks, and areas with limited traffic.

* Customization service is available upon request



Advantage



Two-seats

Large space and comfortable



Low-speed

<20 miles/h



Restricted Area

Operate within park, campus etc.



Equipped with sensitive sensor module

1 DragonFly Sensor Module + 1 Sonar
+1 GPS + 1 Millimeters Wave Radar



Typical applications



Airport



University Campus



Agricultural base



Industrial Park



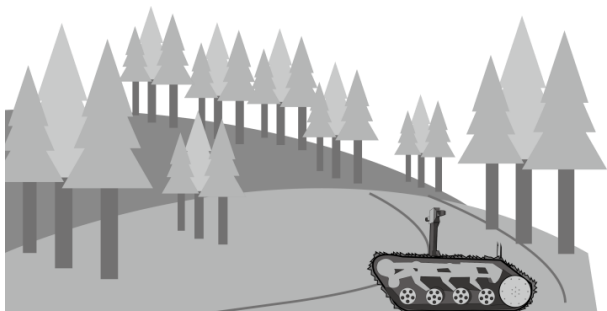
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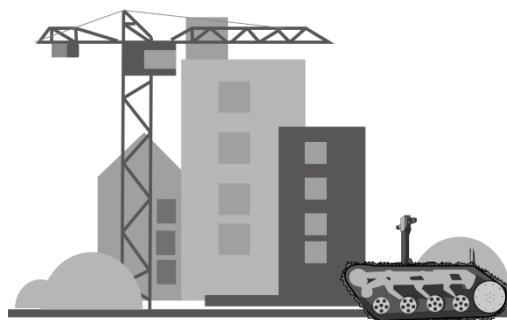
DRAGONFLY ***EXPLORATION VEHICLE***

DragonFly Exploration Vehicle is a solution to provide smart operation in extreme working conditions and harsh environment. It is a self-driving autonomous vehicle applied in the scenarios of limited or restricted access. Through the equipped camera, people can get the on-site real-time information, which can protect them from dangerous and toxic working environment.

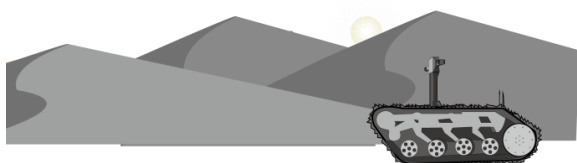
* Customization service is available upon request

 Typical applications

Agriculture Site/Forest



Construction Site



Desert



Mining Site



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**THE PEOPLE'S
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