

Indoor “GPS”

For autonomous vehicles, robots,
copters and VR
(±2cm precision)

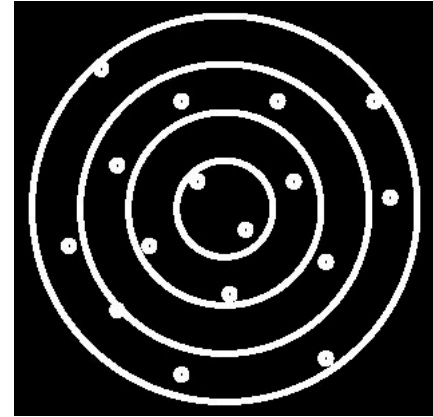


Idea

- High-precision ($\pm 2\text{cm}$) indoor navigation system for autonomous robots, vehicles, copters and virtual reality
- Indoor tracking and positioning of objects and humans equipped with mobile beacons



Problem to solve



Problem

- **GPS does not work indoor:**
 1. no direct view to satellites
 2. location precision is measured in meters rather than in centimeters (required indoor)
- Other indoor navigation systems - UWB, Bluetooth beacons, odometry, magnetometers, WiFi RSSI, laser triangulation, optical, etc. - have their **own serious limitations** – usually, either precision, or price, or size
- Without precise and timely knowledge of location, autonomous navigation is impossible



Solution

- **Off-the-shelf indoor navigation system** based on stationary **ultrasonic beacons** united by radio interface in license-free band
- Location of a mobile beacon installed on a robot (vehicle, copter, human) is calculated based on the propagation delay of ultrasonic signal to a set of stationary ultrasonic beacons using **trilateration**



Indoor “GPS” ($\pm 2\text{cm}$)

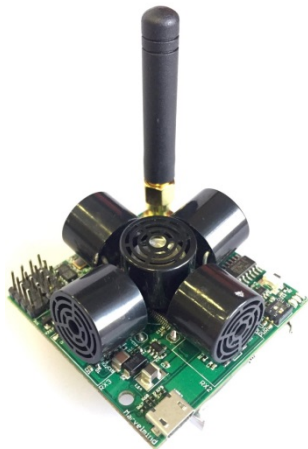
- Starter Set configuration:
 - 1 mobile beacon – 69 USD
 - 4 stationary beacons – 4x69 USD
 - 1 router – 69 USD
 - All required SW included



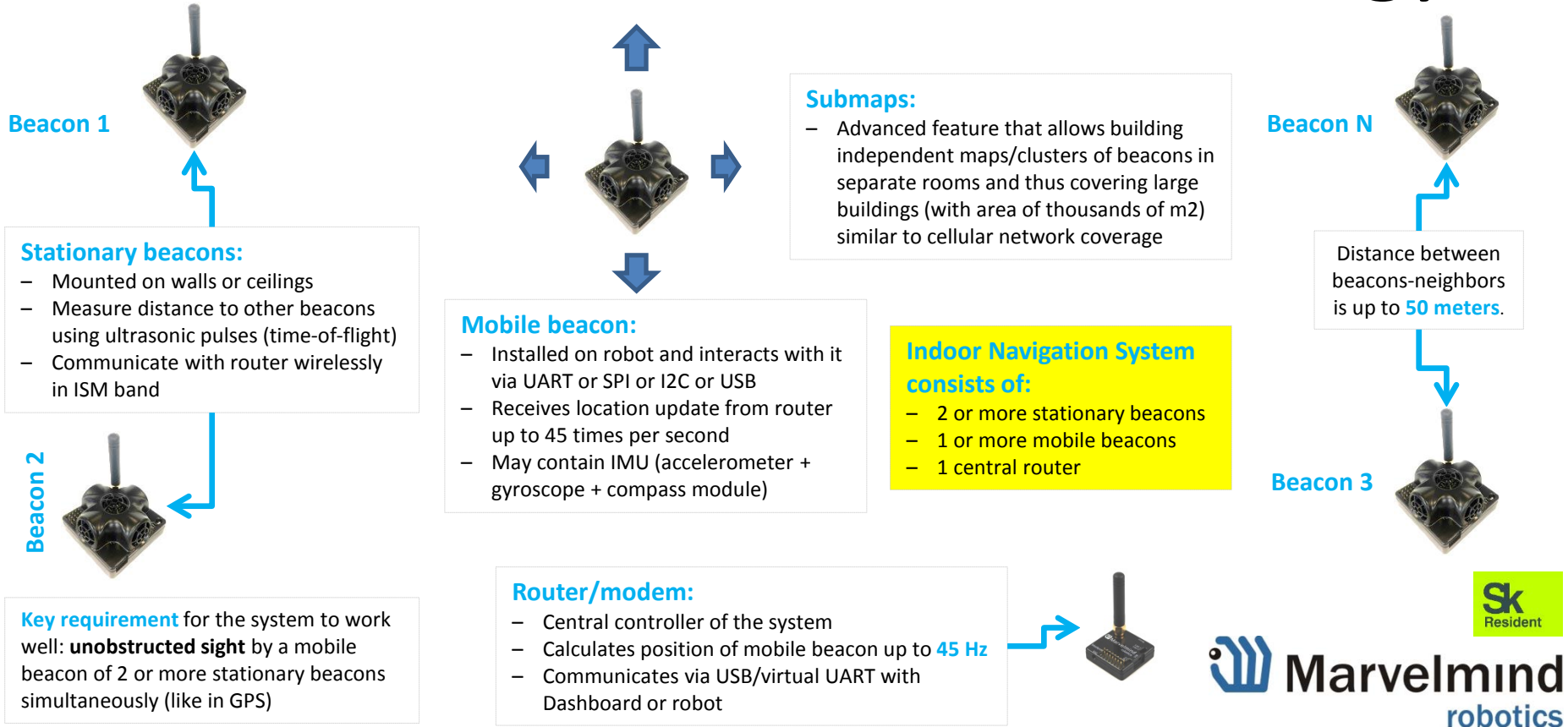
Ready to use **3D** (x, y, z) system for **399 USD**



Indoor "GPS" – close up view



Indoor “GPS” – basic technology



Customers in 35+ countries

Selected customers



PORSCHE



Virtual reality

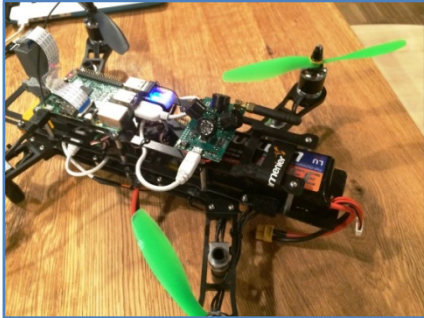


Use cases

Automatic delivery
inside large buildings

Tracing people –
safety + productivity

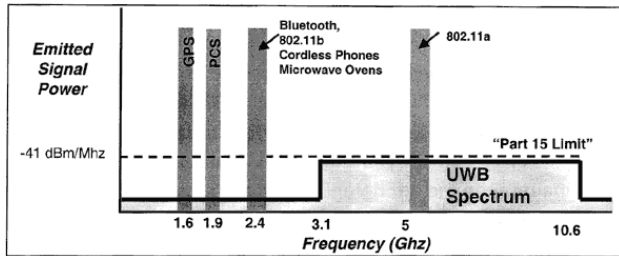
Advertising
robots with high-
tech charm - shows,
shopping malls



Autonomous drones
indoor



Competition



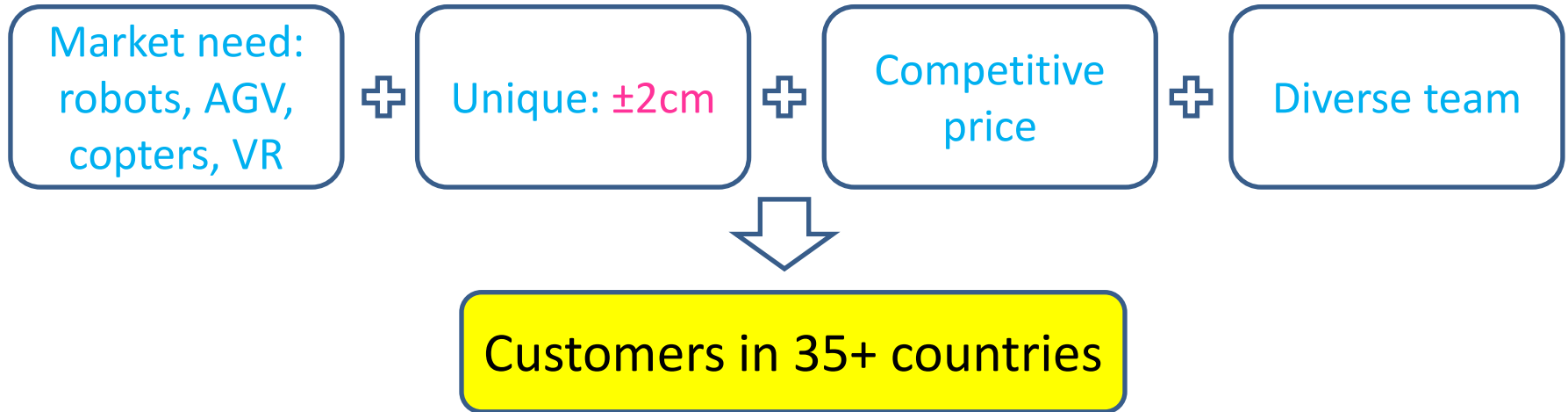
LIDAR
Inertial
Optical flow
Structured light
Laser triangulation
Odometry
GPS
Magnetic field



Precision: 2cm vs. 10-30cm – we are 5-10 times more precise
Price: 2..50x – we are 10 times less expensive



Summary



Marvelmind Robotics
www.marvelmind.com
info@marvelmind.com

<http://www.marvelmind.com/#video> – selected video demos

<http://www.marvelmind.com/#customers> – selected customers

Thank you!

<http://www.marvelmind.com/>