

Thundercomm

Robotics Solutions

April. 2023

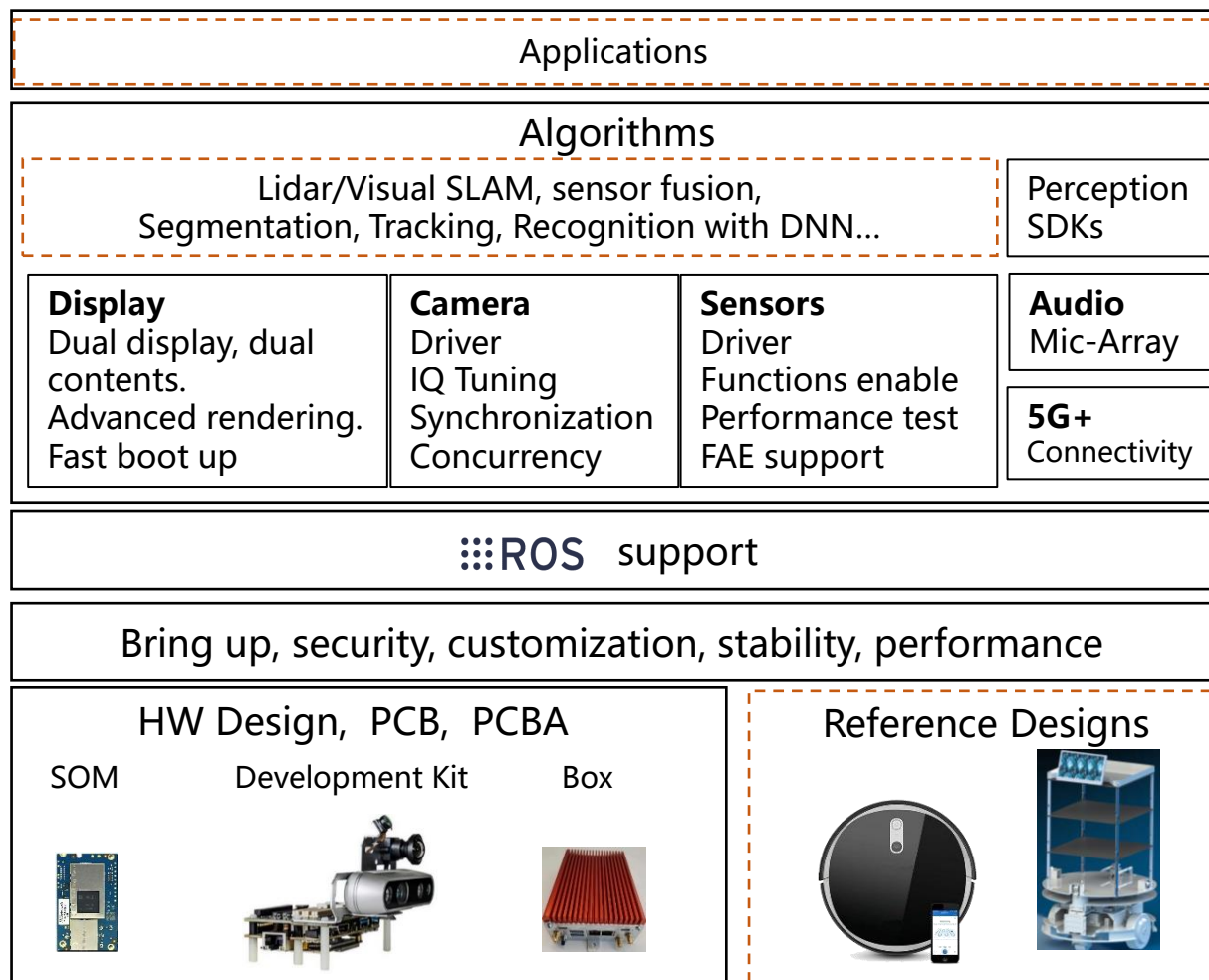
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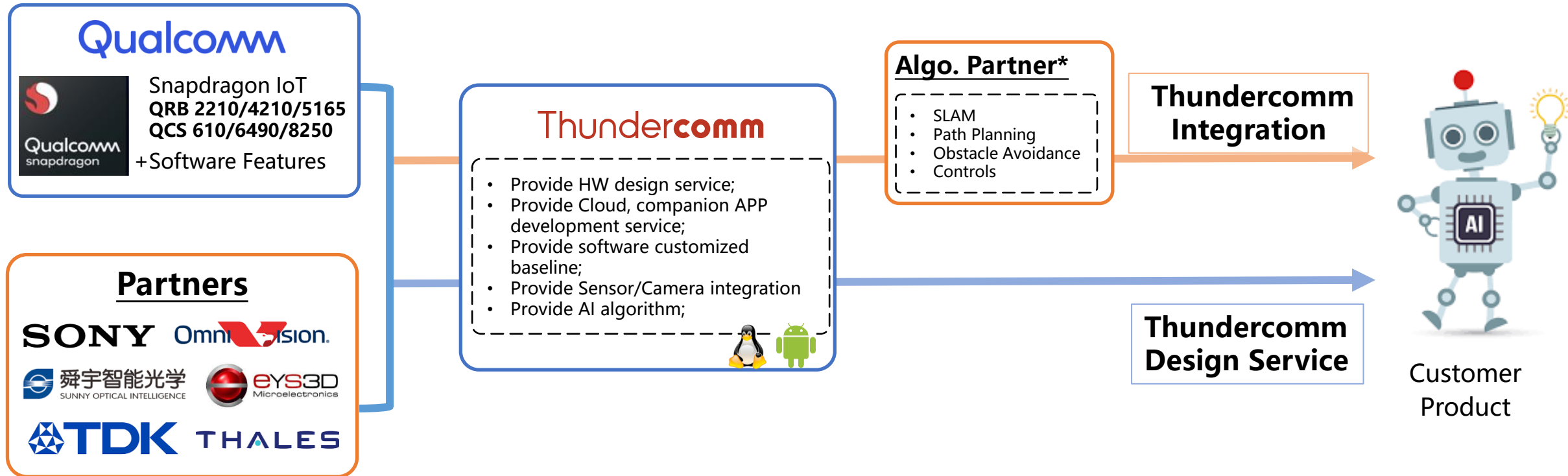


Robotic Solutions Overview

We are a leading solutions provider for robots, dedicated in helping customers building cutting-edge intelligent robotic applications in consumer, commercial, and industrial area.



From Chipset to Product



User Scenario

Different types of robots are being integrated into our daily lives.
Thundercomm is helping people build all kinds of robots



Drone



Public safety robots



Logistic robots



Professional cleaner



Lawn Mower



Controllers



Home Robots



Robotic Smart Assistant

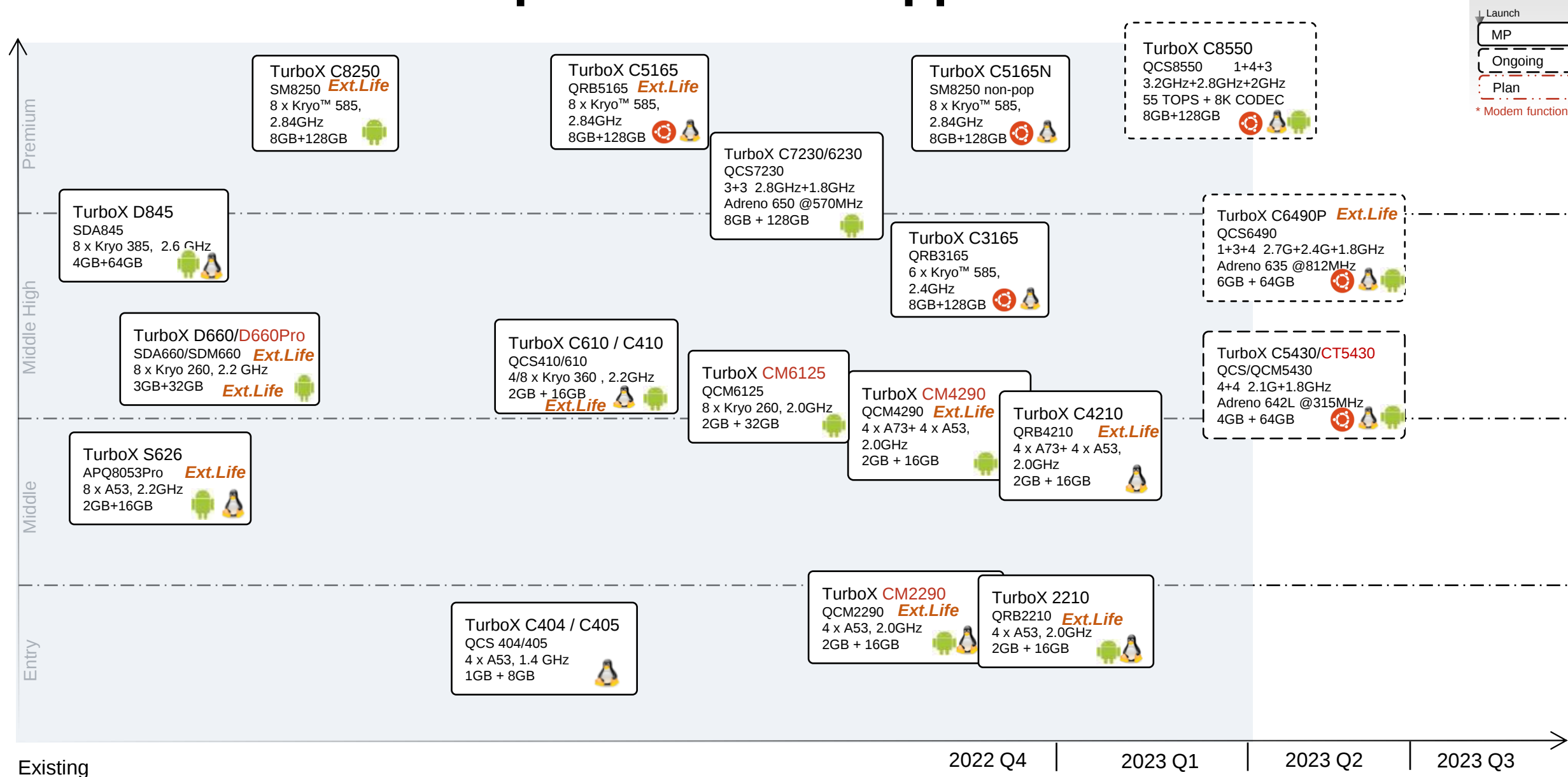
Autonomous Vehicles



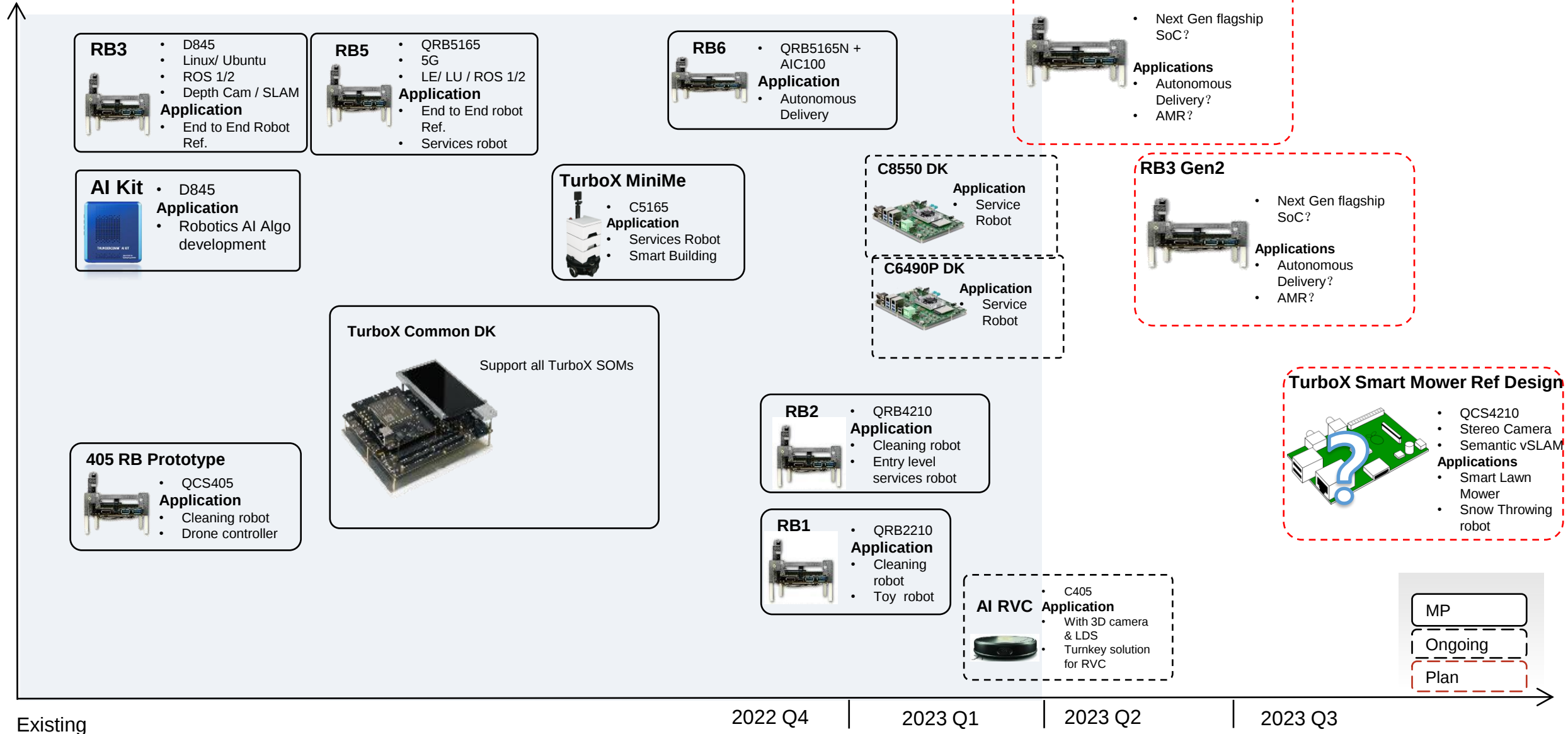
Service Robots



TurboX SOM Roadmap for Robotics Applications



Roadmap for Robotic Reference Designs



Visual Navigation Solution

Relying on stereo vision technology and high-precision Vi-SLAM algorithm, the robot provides visual navigation and positioning solutions with low cost, high precision and strong scene adaptability.

Solution Advantage



■ High precision

Position: stability 1-2mm (RMS), absolute positioning accuracy < 1%

Pose: stability 0.1°(RMS), absolute attitude accuracy < 1°



■ low cost

Low hardware cost, which can significantly reduce the cost of intelligent robot navigation and positioning



■ More robust

Based on the relocation detection mechanism and the pose fusion algorithm, the system robustness is effectively improved, and no drift or SLAM loss can be guaranteed in the texture rich scene.



■ More interactive

Provide more human-computer interaction experiences, such as gestures & wake-ups, specific areas through voice technology or APP



■ Support intelligent decision making

Supports intelligent decision making for robots and performs more complex tasks



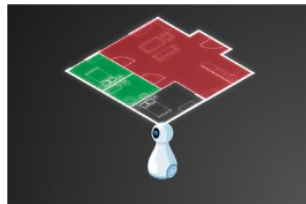
■ Easy integration

Provides an external interface that is easy to be redeveloped for secondary development, facilitating partners to quickly achieve docking adaptation of their products.

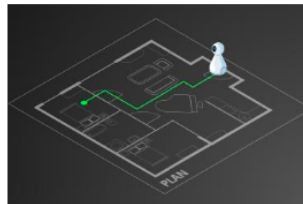
Functional Module



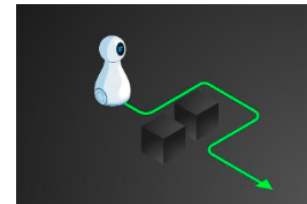
Navigation and positioning



Space mapping



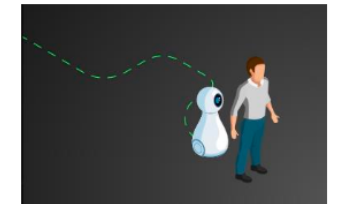
Path planning



Intelligent obstacle avoidance



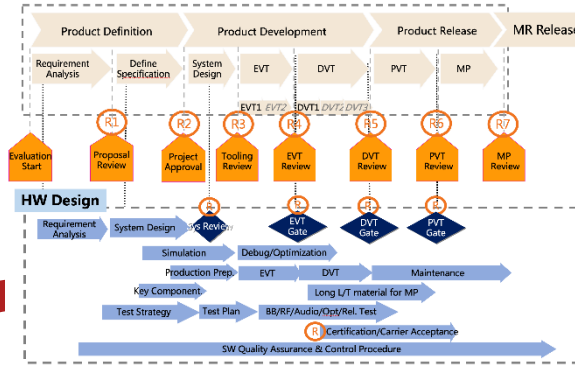
Image Identification



Smart character follow

HW/Device Full Stack Capabilities

- ~ 150 HW Engineers in BJ,SZ, DL and TW, ~60% of team have 16 years+ experience
- Covering consuming/industrial and Auto-grade design domain
- 4G/5G RF and ANT design & test expertise
- PI/SI/Thermal simulation



EE Design

Mech Design

- Solid experience in-house Mech design
- Rich experience on **molding**, CNC and surface finishing process.
- Extensive product coverage: mobile phone, camera, Industrial, Auto-IOT products
- Deep experience in thermal system simulation and design.

Product Verification

Quality&NPI

Manufacturing

DFM

- Components Distance, Placements of Devices
- Panel Design and Confirm Process and Product Evaluation

DFT

- Test Points, Test plan and test specification
- Fixture Plan and Review
- Test flowchart defined with client's confirmation

Coverage

- Check the coverage of test plan
- Coding and demo with D-Kits development

GR & R

- Review Repeatability/Reproducibility PT ratio Value
- Verify if test environment and test system is stable

VAL

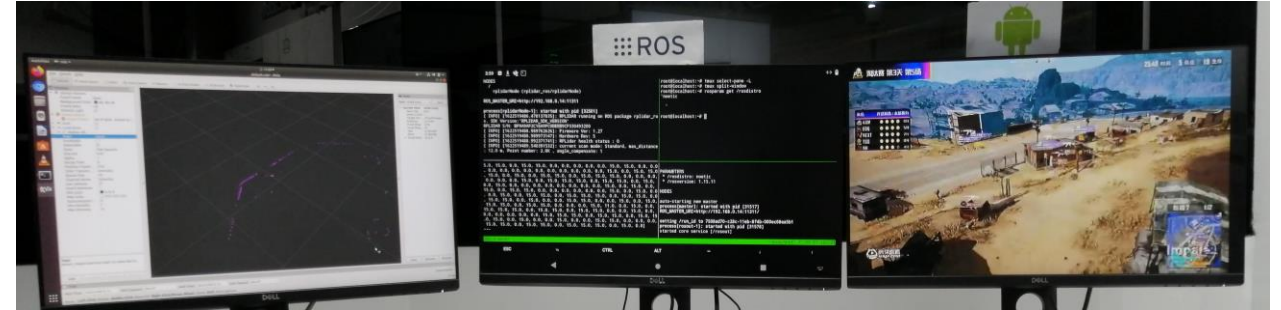
- Golden sample verification
- Test program control

Software Support & Robotics SDK

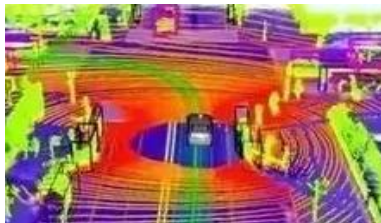
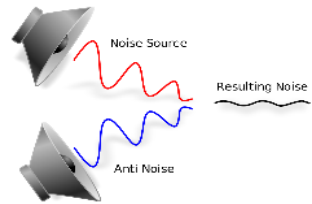
- Customized lightweight OS + Small RAM & fast bootup



- ROS 2 & ROS for Android



- CV & ML Algorithms



- Swarm robotics with Edge computing

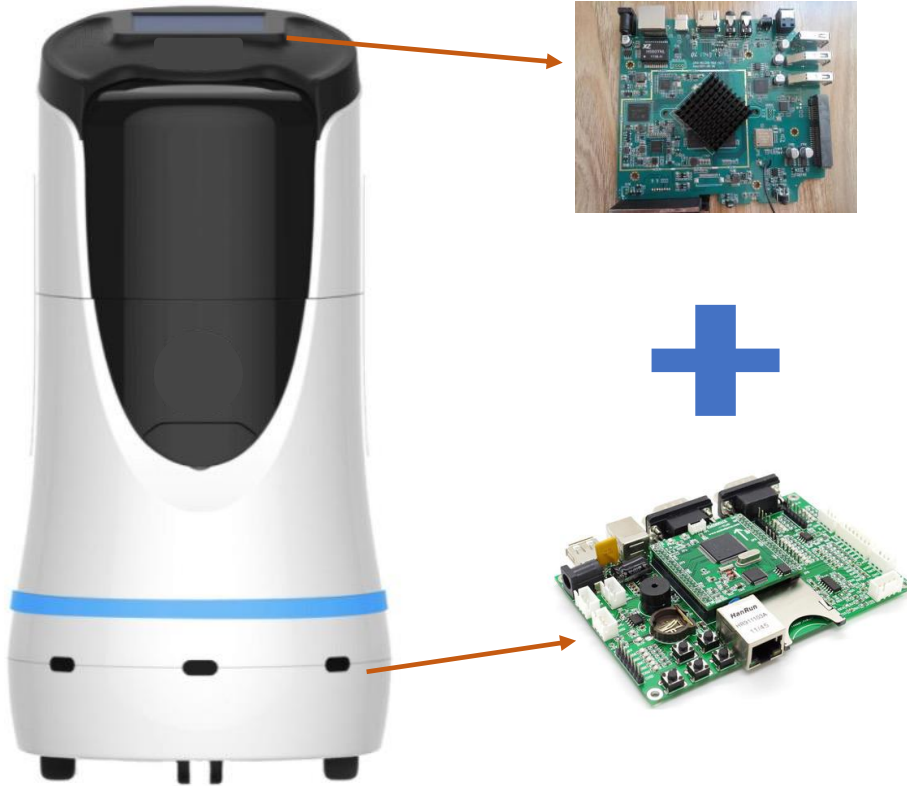


- Solutions for Virtual robots



Thundercomm Service Robot Solutions

Old-school



Two Systems, double the cost, with multiple complexity

New-era

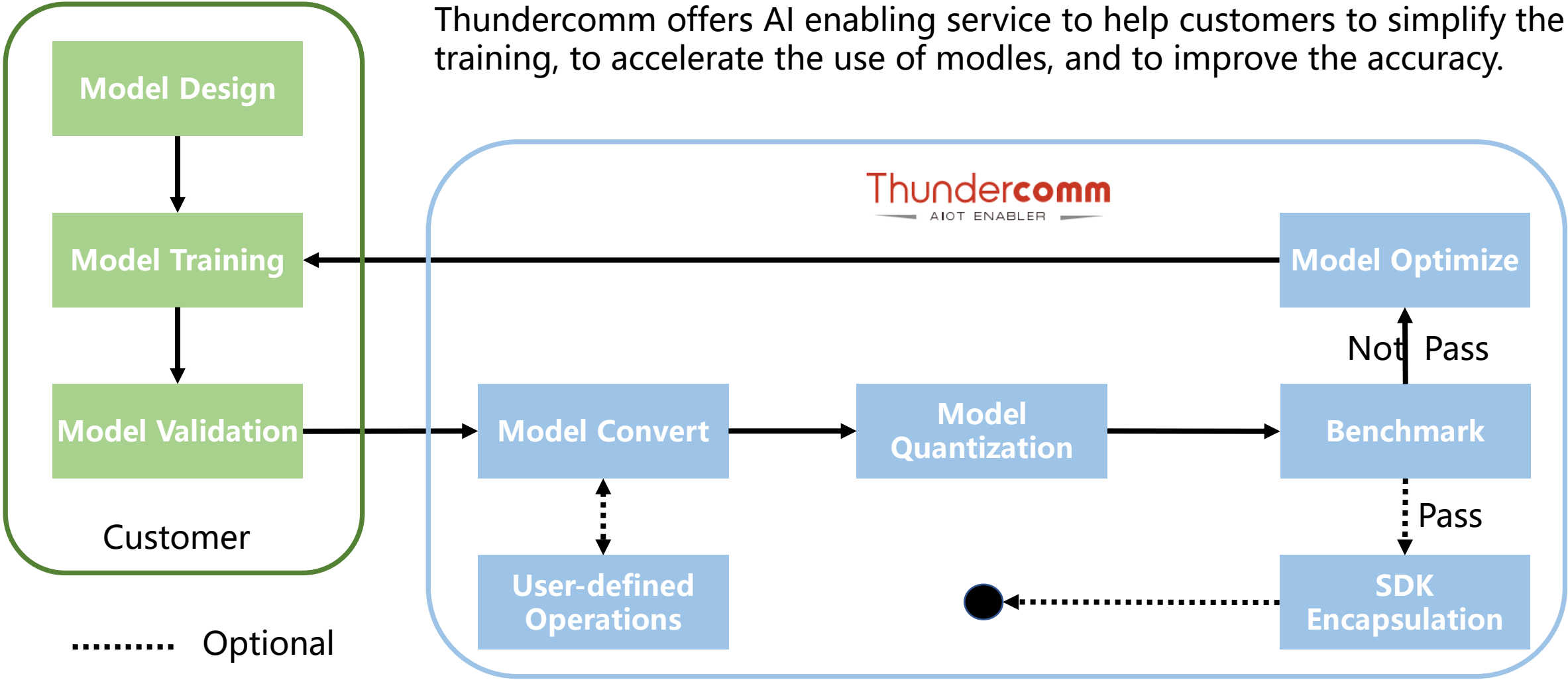


Thundercomm ROS+Android
solutions can apply to
C6125/C610/D845/C865 platforms

Single chip, dual OS, with multiple performance

AI Enabling

Thundercomm offers AI enabling service to help customers to simplify the training, to accelerate the use of modles, and to improve the accuracy.



Thundercomm Cloud + APP Solutions

Existing complete package to support robot applications. Based on PaaS, multi-cloud deployment and dynamic expansion, Thundercomm provide end-to-end SW product kit to support smart home application.

Smart RVC Highlight

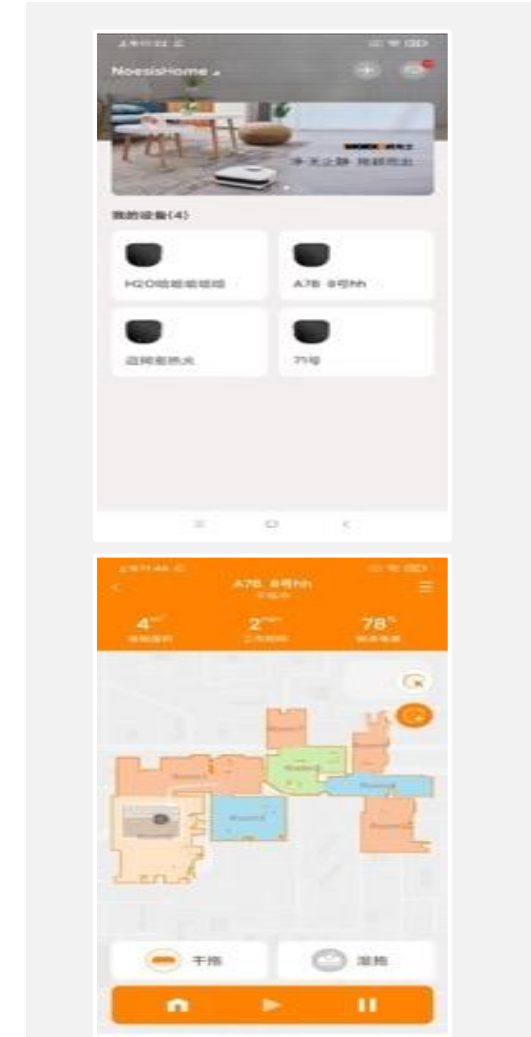
Core value

- **Easy access:** with existing product, customer can deploy their system with minimum code change
- **PaaS:** All-inclusive solutions for different use cases
- **Data management:** Local data management and analysis for customer high-level decision making
- **Service Architecture:** World leading SW platform
- **Data protection and security:** Full fill EU GDPR standard, protect customer privacy
- **Local Service:** With CDN, provide best connectivity
- **Performance:** SLA 99.99%, can handle complex use.

Demo features



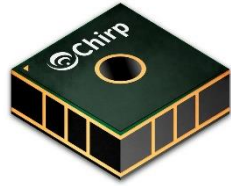
- Device management
- Mapping
- Remote control
- Video streaming
- Two-way voice chat
- Device register and multi-device management.
- Dynamic SW release and OTA
- Operation management



Uniting Partners

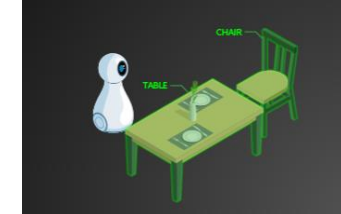
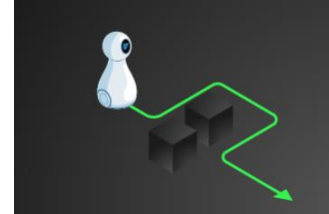
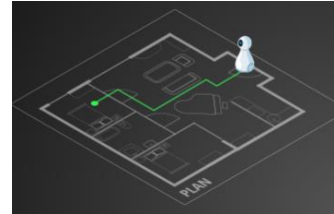
❖ Modules & Blocks

- Sensors
- Display
- Mobility



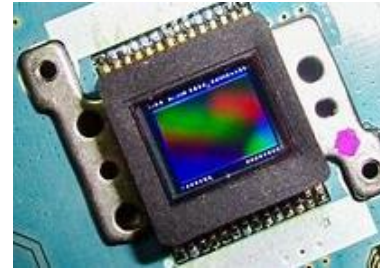
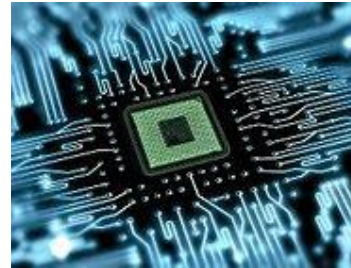
❖ Key Algorithm

- GPS/RTK
- vSLAM
- Path Planning
- Recognition & Tracking
- Human-Robot-Interaction



❖ Silicon

- Computation
- Imaging



❖ Industry

- Define standards and draft white papers for emerging industries



White papers of automotive interior robots

Facilitating robotic applications

❖ TurboX robotic brain

- ❖ Thundercomm TurboX SoM as advanced computational core
- ❖ Customized OS and middleware
- ❖ Impressive AI power + 5G connectivity.

❖ End-to-end robotic solution

- **Robotic development kit**
 - All-in-one HW+SW package for developer
 - Commercialized Qualcomm® Robotics RB3/RB5 Platforms
- **Customized robotic solutions**
 - Support variety of robots from home to sky.
 - HW design consultant, enablement and manufacture
 - OS, Drivers, Middleware & SDK, SW with stability & performance.
 - Sensor integration & camera tuning
 - Various algorithm collection: Audio, SLAM & ML-powered vision.
 - Experienced talent pool, fast FAE, and diverse 3rd party partners
- **Reference designs**
 - Provide turnkey solutions for popular robotic applications

❖ Robotics & Smart World

- Bring teamed robots to smart home/building/campus/city
- Mobile Apps, Cloud service & AIOT-powered ecosystem.



Success Stories





Thundercomm

Empowering Every IoT Device with Our Technology

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