# Supplementary Documentation
# to the financial report for the second quarter
# of the fiscal year ending March 2024

November 14, 2023

**Eyes to the all machines**

# 2Q Highlights

- **Revenue fixed for the current fiscal year totaled 410 million yen, including 2Q results (70 million yen) and 3Q~4Q fixed (340 million yen). This exceeds the full-year results of the previous fiscal year and shows favorable performance toward achieving the fiscal year's budget**

  - In addition, product-related revenue, the measure of Kudan's business progress, are expected to increase to 280-330 million yen (The initial forecast is 150 million yen)
  - This includes 240 million yen in product licenses to Whale and additional product-related revenue in the solutions business for Europe, etc.

- **Current business expansion centered on mapping is backed by governments and markets in various countries pushing for digital twin and spatial DX promotion on a global scale, and rapid expansion of social demand is expected**

  - Digital Twin through Industry 4.0 has been increasingly promoted in Europe and the comprehensive national development plan for digital lifelines in Japan will be in full swing from 2024 onward
  - In response to this demand, Kudan's solution business are expanding, particularly in Japan and Europe

- **Business development is also progressing in the area of autonomous driving, which is directly linked to the current focus areas (mapping and robotics)**

  - Kudan concluded a capital and business alliance with Whale Dynamic, with which we have been providing technology in mapping (map generation for autonomous driving, etc.), with a view to further expanding the collaboration to autonomous driving for passenger cars
  - Expand autonomous driving-related technology collaboration to other regions such as China and the Middle East, in addition to ERASMO in Europe and automotive OEM projects in Japan and Europe
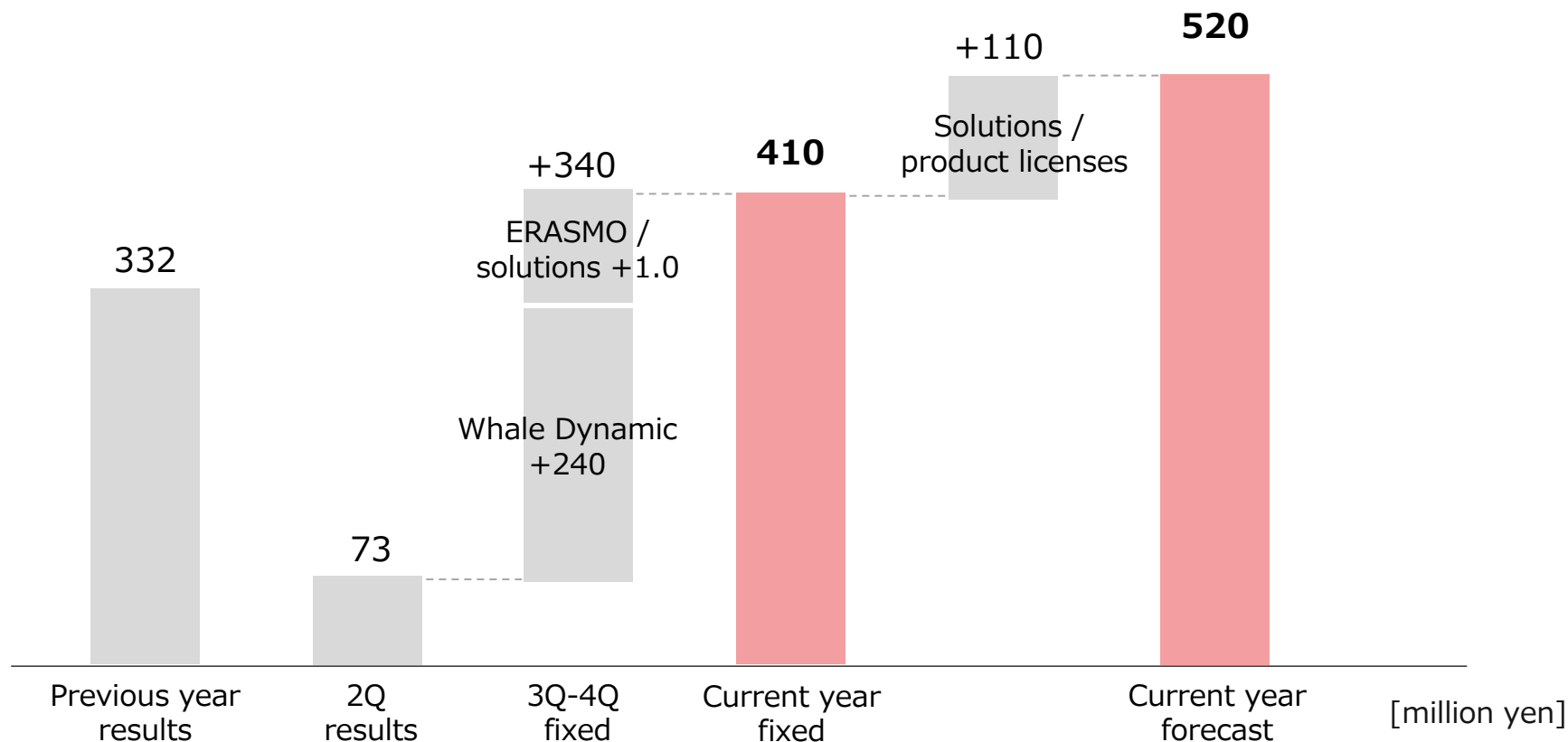
# Performance overview

- Although there is an upturn in product-related revenue and non-operating income due to foreign exchange gains (280 million yen), the initial forecast remains unchanged at this time because the majority of revenue will be recorded near the end of the fiscal year, and it is difficult to forecast the landing of revenue until then

- Cost progress is generally in line with the initial forecast, despite continued foreign currency appreciation

(Unit : million yen)

| | Performance for 2Q of FY2023 | Performance for 2Q of FY2024 | Forecast for FY2024 | Change (from the performance for 2Q of FY2023) | Performance For FY2023 (Reference) |
|---|---|---|---|---|---|
| **Net Sales** | **155** | **73** | **520** | **△52.6%** | **332** |
| **Operating Profit** | **△312** | **△395** | **△560** | **—** | **△598** |
| **Ordinary Profit** | **△81** | **△111** | **△520** | **—** | **△394** |
| **Profit Attributable to Owners of Parent** | **△84** | **△117** | **△550** | **—** | **△413** |

# Revenue

- Revenue fixed for the current fiscal year totaled 410 million yen, including 2Q results (70 million yen) and 3Q~4Q fixed (340 million yen). This exceeds the full-year results of the previous fiscal year and shows favorable performance toward achieving the fiscal year's budget

- Development and solution projects utilizing productization packages (for mapping and for robots officially released in 3Q), product license revenue, etc., are accumulating and moving forward to achieve the budget



| | | | | | |
|---|---|---|---|---|---|
| 332 | 73 | +340 ERASMO / solutions +1.0 Whale Dynamic +240 | 410 | +110 Solutions / product licenses | 520 |
| Previous year results | 2Q results | 3Q-4Q fixed | Current year fixed | | Current year forecast |

[million yen]

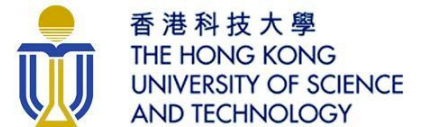# Capital and business alliance with Whale Dynamic: Company profile

- **Leverages proprietary LV4-5 technologies for a wide range of product offerings including autonomous mobile robots and autonomous driving**

- **Not only targets the rapidly evolving Chinese market, but also expands its business extensively into the global market**

| | |
|---|---|
| **Founder & CEO** (David Chang) | ▪ Led the development in "Apollo", the country's largest autonomous driving project by Chinese IT giant, Baidu, as a senior product manager. M.S., University of Cambridge, U.K. |
| **Clients/ Partners** | BYD  apollo (Bai du 百度)  THE AUTOWARE FOUNDATION (TierⅣ Intelligent Vehicle)  香港科技大學 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY |
| **Global expansion** | ▪ The only company in the world to be a member of both "Apollo" and "Autoware", the globally recognized open-source ecosystem for autonomous driving |

# Capital and business alliance with Whale Dynamic: Technological collaboration to date



– Product commercialization by WD utilizing Kudan technology was realized in July 2022, and product introduction is in progress
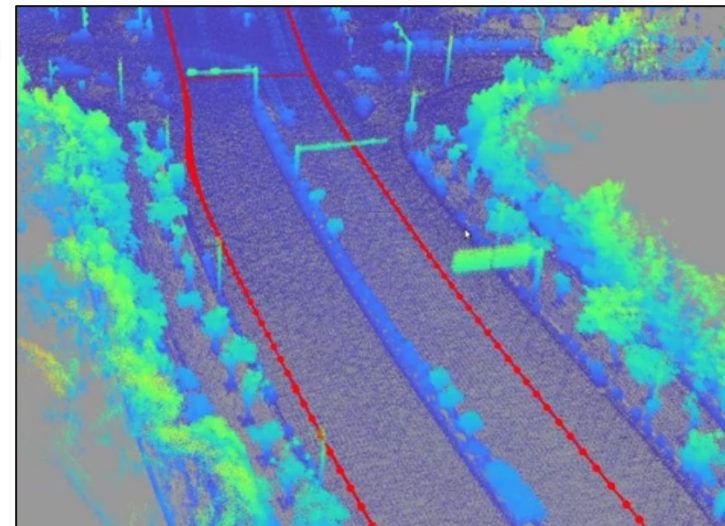
## whale dynamic

- Provides mapping for public roads (vehicle-mounted) and robot (autonomous mobile vehicle) *



## kudan

- Provide SLAM technology for localization and high-precision mapping
- Achieve higher performance with proprietary technology related to the integration of Lidar SLAM and Visual SLAM
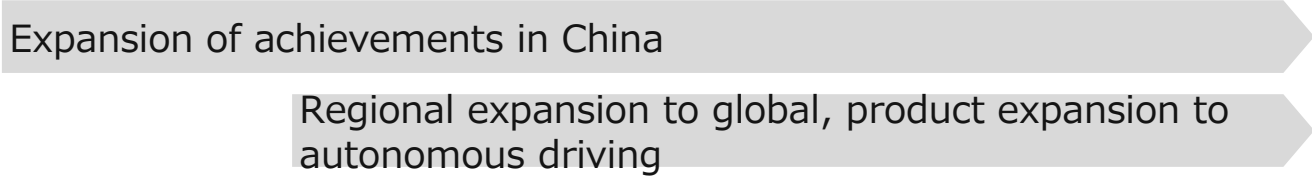


[*] URL for the demo video of technologies related to mapping (vehicle-mount) and robots (autonomous vehicles)

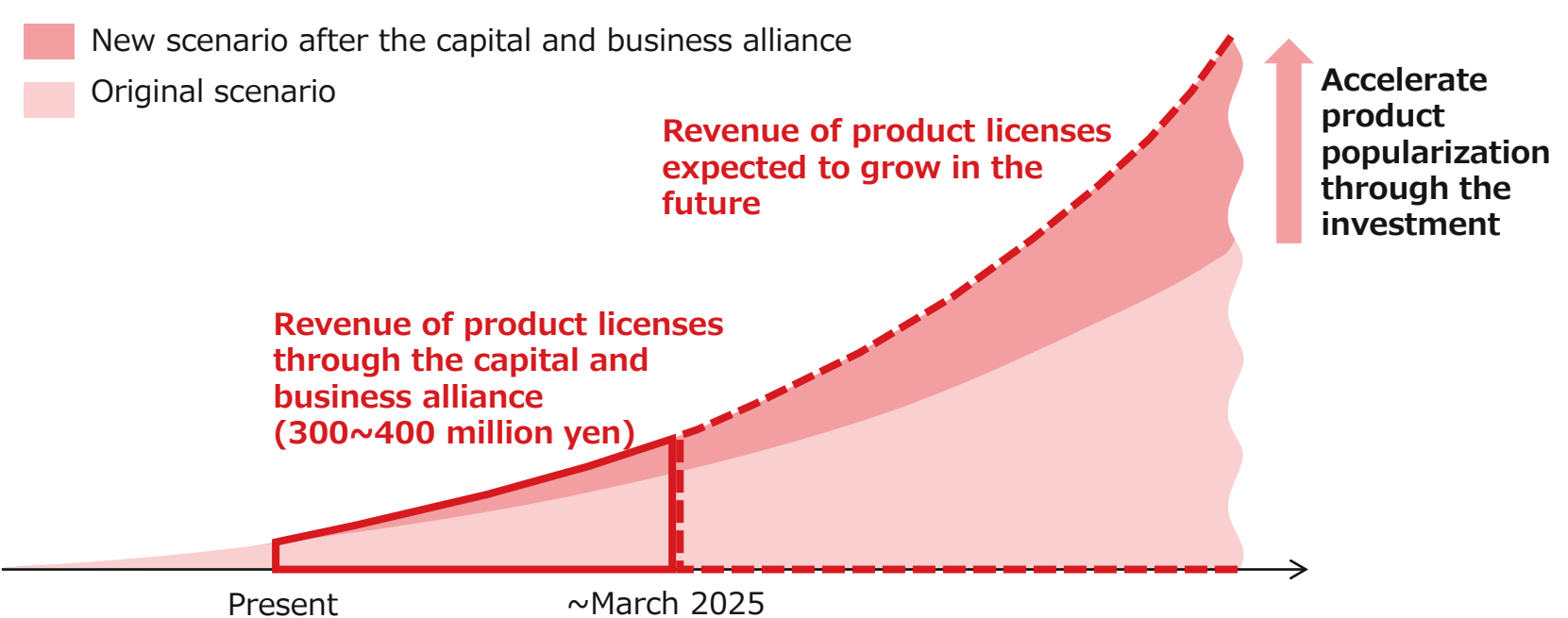# Capital and business alliance with Whale Dynamic: Overview of this alliance

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- Kudan agreed to enter into a product license agreement totaling 300-400 million yen (240 million yen is fixed[1]) in the current and next fiscal years in line with the expansion of WD's sales

- In addition, Kudan will invest 500 million yen in growth capital (400 million yen is fixed[2]) for regional expansion to global and product expansion to autonomous driving, to accelerate the popularization of WD's products and to increase and continue to expand product license sales

| **WD Business progress** | Expansion of achievements in China |
| | Regional expansion to global, product expansion to autonomous driving |

**Kudan Product-related revenue**

New scenario after the capital and business alliance
Original scenario

**Revenue of product licenses expected to grow in the future**

**Revenue of product licenses through the capital and business alliance (300~400 million yen)**

**Accelerate product popularization through the investment**

Present          ~March 2025

1, 2: Key terms and conditions were signed today and the current fiscal year's transactions are fixed

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# Capital and business alliance with Whale Dynamic: Collaboration policy to promote products and technologies of both companies

- Kudan collaborates in sales, development and support in terms of business expansion along two axes: regions and products

- Product expansion to autonomous driving is an opportunity for Kudan to further expand its customer commercialization area and scale the business significantly
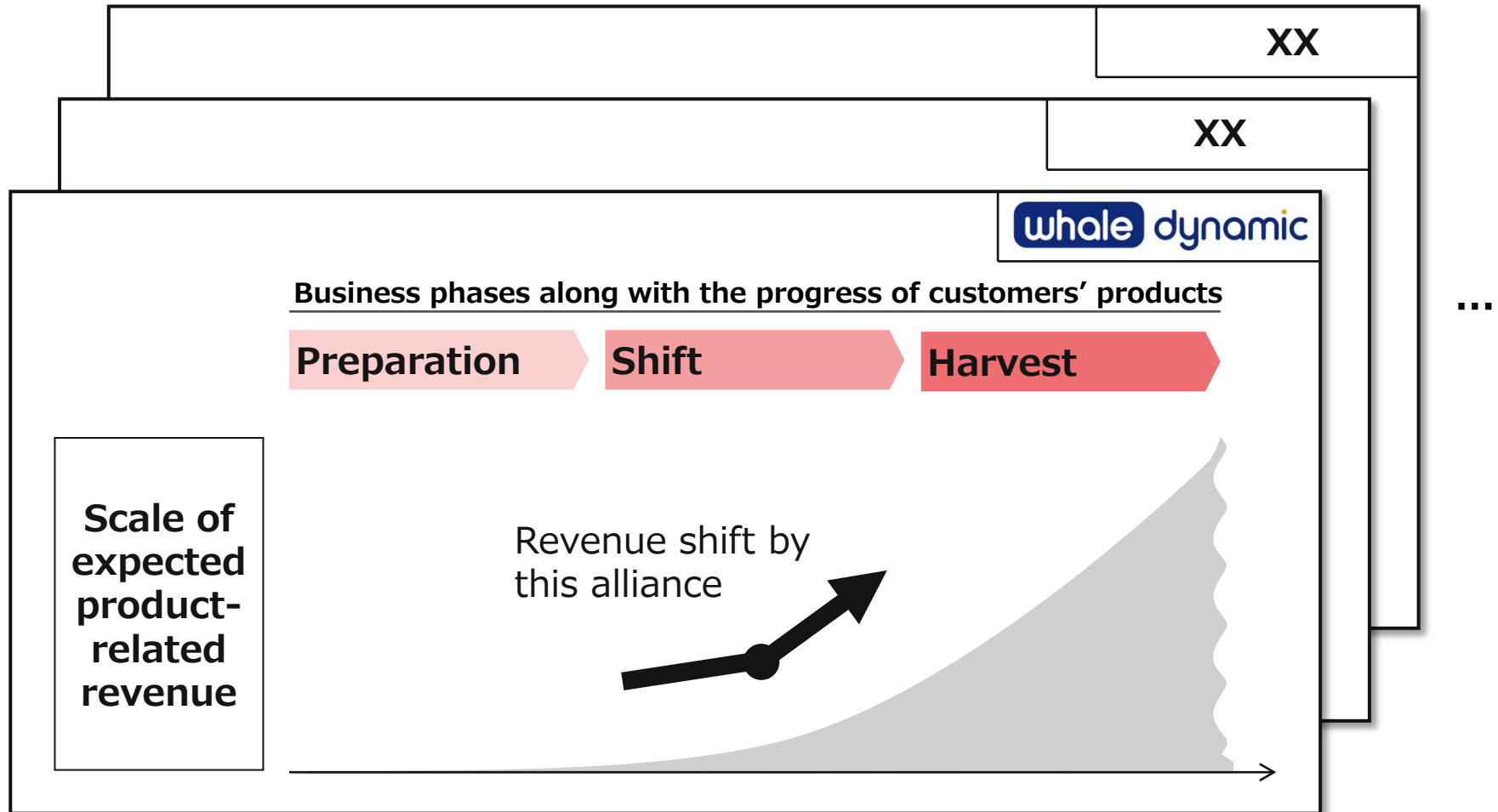
**Collaboration with Kudan on Whale Dynamic's business development**

**Expansion of achievements in China**
- As a core member company of "Baidu Apollo", China's largest autonomous driving project, WD has been working on numerous demonstration projects in the public and private sectors
- WD is accumulating cutting-edge achievements in the Chinese market, which is one of the world's fastest growing markets for autonomous driving

**Regional expansion to global**
- As global market demand is also being stimulated, project acquisition is in progress, mainly in Europe and the Middle East
- Collaborate with Kudan to provide joint global marketing, project development and support

**Product expansion to autonomous driving**
- Plan to expand product offerings from mapping (vehicle-mounted) and robot (autonomous mobile vehicle) to autonomous driving for passenger cars, and jointly develop applications for Kudan technology

**Areas for accelerated collaboration in the future**

# Future growth of product-related revenue

– Beginning with Whale Dynamic, Kudan aims to further expand product-related revenue, by promoting the progress of the business phase with customers in each of their commercialized projects

XX

XX

whale dynamic

**Business phases along with the progress of customers' products**

Preparation  →  Shift  →  Harvest

**Scale of expected product-related revenue**

Revenue shift by this alliance

...

# Growing market demand on a global scale, for digital twin and spatial DX promotion in mapping application

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## ~10T Yen

### 🇩🇪 Industry 4.0

- The "Digital Twin," one of the core technologies of the "Industry 4.0" has evolved.

- Major manufacturing companies such as Deutsche Bahn, Siemens, Mercedes, Bosch, etc. announced their multi-billion euro digital twin implementation plans one after another

## 7.7T Yen

### 🇯🇵 The comprehensive national development plan for digital lifelines

- A large-scale public-private sector project led by the Ministry of Economy, Trade and Industry (METI) to promote the automation and digitization of social infrastructure from FY2024

- Promote the implementation of spatial DX technologies including 3D map, data connection infrastructure, infrastructure management DX, autonomous driving support infrastructure

## ~20T Yen

### 🇪🇺 Digital Compass 2030

- The EU government will take the lead in promoting the development of Europe's digital infrastructure by 2030, utilizing AI, IoT, and other technologies
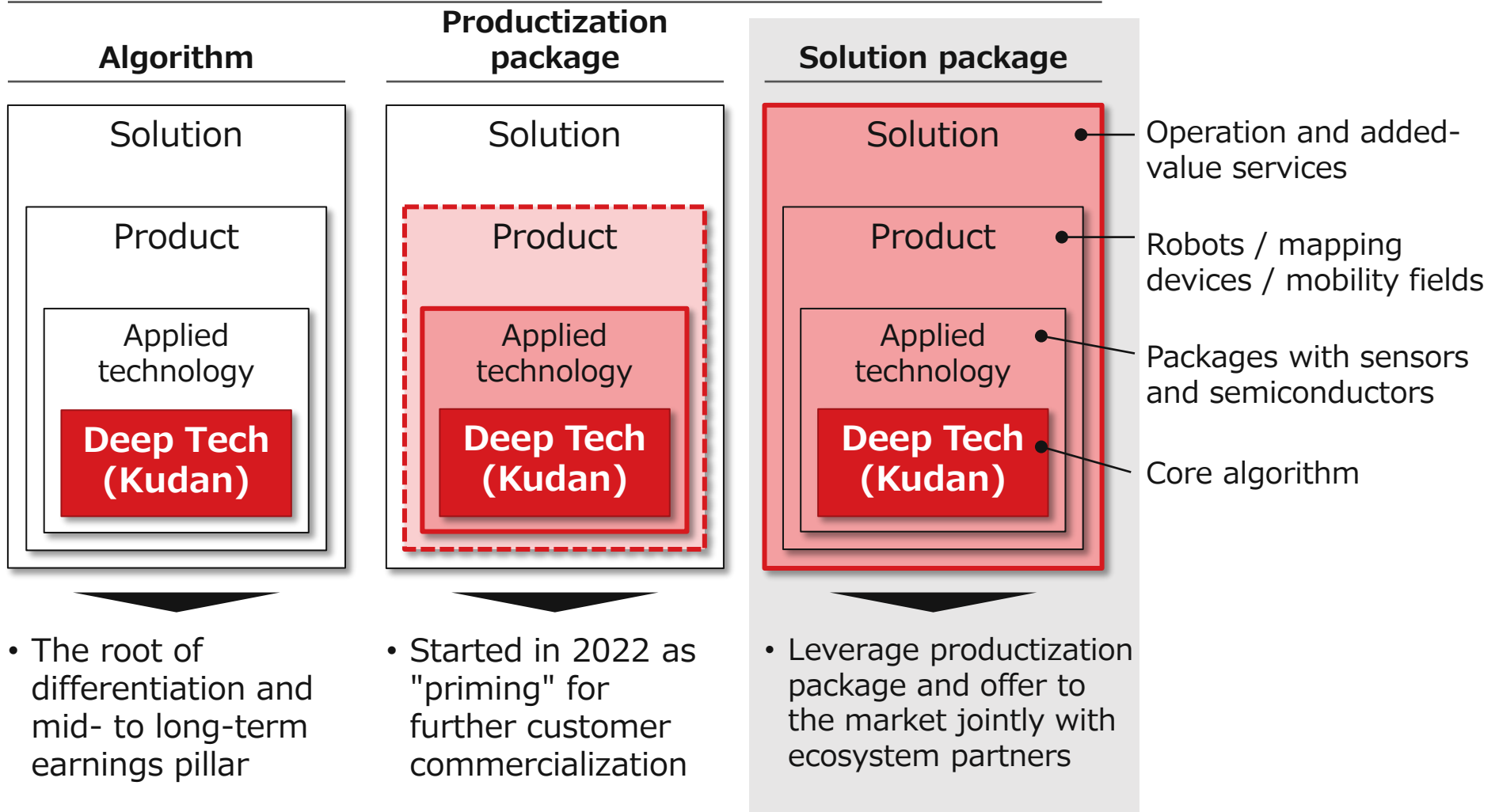
## 100T Yen

### 🇨🇳 Digital China

- A government-led project to promote the digitization of the entire social economy, including 3D map creation and spatial digitization toward 2035

- Collaborating with many domestic companies such as Baidu and Beijing Automotive Group, as well as overseas companies such as Audi

**XX Trillion Yen** Budget by each governmental policy

# Expansion of solution business

– Build and expand solutions for end customers with ecosystem partners to meet growing market demand

## Type and structure of packages offered

| Algorithm | Productization package | Solution package |
|---|---|---|
| Solution | Solution | Solution |
| Product | Product | Product |
| Applied technology | Applied technology | Applied technology |
| **Deep Tech (Kudan)** | **Deep Tech (Kudan)** | **Deep Tech (Kudan)** |

- Operation and added-value services
- Robots / mapping devices / mobility fields
- Packages with sensors and semiconductors
- Core algorithm

- The root of differentiation and mid- to long-term earnings pillar

- Started in 2022 as "priming" for further customer commercialization

- Leverage productization package and offer to the market jointly with ecosystem partners

# Expand solution business for digital asset infrastructure

- Develop DX-based solution business utilizing productization packages (mapping)
- Deployment in municipalities and public infrastructures is underway, preceding in Europe. Aim of expanding revenue to more than 100 million yen scale in the short term

## Growing demand for DX for municipalities and public infrastructure

### Public infrastructure survey and maintenance



### Building Survey

### Green Cadastre



## Provide integrated solutions from digitization to database management

### Mapping equipment / scanning



### 3D digitization by point cloud



### Information assignment / Database management



## Expected Impact

- **Data collection efficiency: 10~20x**
- **Data use efficiency: 2~5x**
- **Realization of innovation**
  - **Expand assets that can be managed**
  - **New business through information sharing**
  - **Work decentralization, etc.**

# Solution partner for digital asset infrastructure

- Concluded a basic agreement with STS Group, headquartered in Hungary, to jointly develop a digital asset infrastructure solution business in Europe as a strategic business partner

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| Company profile | • Founded in 2002, a plant engineering and turnkey solution provider in the renewable energy area<br><br>• Business is the design, construction, and operation of power generation facilities for renewable energy sources, such as solar and wind power, and other lifelines<br><br>• Implement digital technology into business processes at an early stage to provide highly reliable, cost-effective solutions |
|---|---|
| Regional expansion | Hungary, Germany, Central and Eastern Europe, Balkans, Baltic States |
| Clients | Major European energy-related companies such as E.ON, RWE, MAVIR |

# Project highlights

**Projects toward customer commercialization** → **Productization package** → **Customer products**

## Robotics

**Robots related company** (USA)
Continue testing of autonomous mobile robots for logistics warehouses in a large-scale environment

**Robots related company** (USA)
Completed technical verification of autonomous mobile robots for hospitals in multiple environments. Significant progress has been made toward commercialization

(Japan, Taiwan, South Korea, EU)
Ongoing evaluation projects using productization packages for robots, with an increasing number of customers adopting the packages

**Intel** (USA)
Latest release of Kudan Visual SLAM, a major update for the AMR platform

**Movel AI** (Singapore)
Continued small-scale introduction for end customers

**Whale Dynamic** (China)
Fixed 240 million yen in product licenses, and accelerate regional expansion into global markets

## Mapping

**Mapping system company** (India)
Mapping device development has been progressed ahead of plan and the discussion of a commercial agreement began

**Mapping system company** (USA)
Final verification and preparation work for commercialization is in progress

**Mapping service company** (Japan)
Kudan technology has been adopted for drone mapping solution, and development project has launched

(EU)
Sales of the productization package for mapping has expanded. Utilize this package to develop solution business as priming

**Vecow** (Taiwan)
Progress in business development utilizing productization packages for mapping

**UCS** (South Korea)
Steady growth in number of additional license orders

# Appendix : Company Overview

# Business Model

# AP will be the basis for broad range of industries alongside AI

- The artificial perception technology provided by Kudan (providing machines with "eyes") both complements and operates in unison with artificial intelligence (providing machines with "brains") to allow a range of machinery (robots and computers) to move and function autonomously
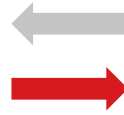
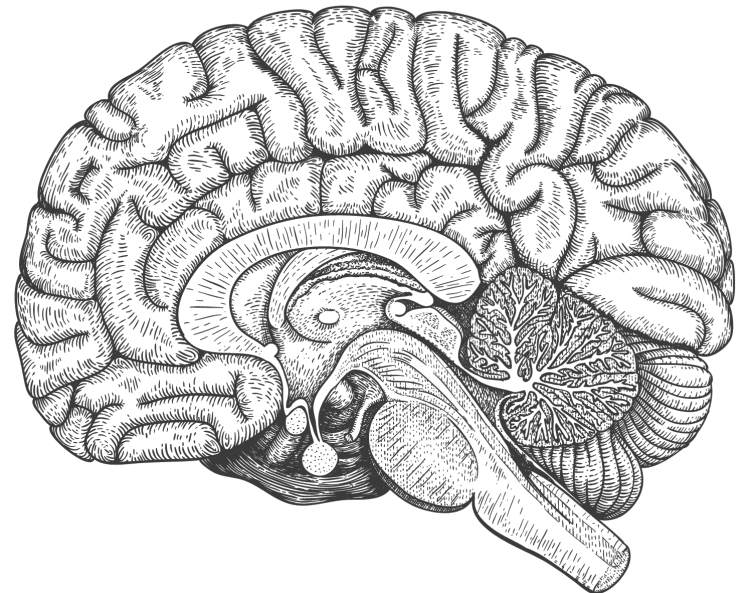**Artificial Perception**          **Artificial Intelligence**

||

**The "eyes" of machines, allowing them to perceive and understand their environment**

**The "brains" of machines, allowing them to make appropriate decisions**

# Relation to the evolution of AI

– With the evolution of AI, the need for AP to connect machines and real space will continue to grow

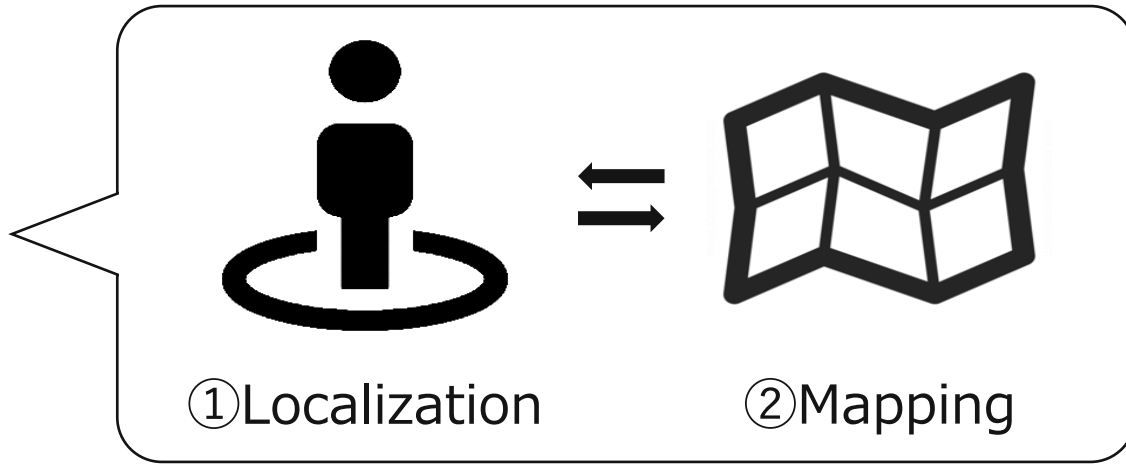**From "Internet AI" that does not act directly in real space**

**To "Embodied AI" that can act directly in real space**
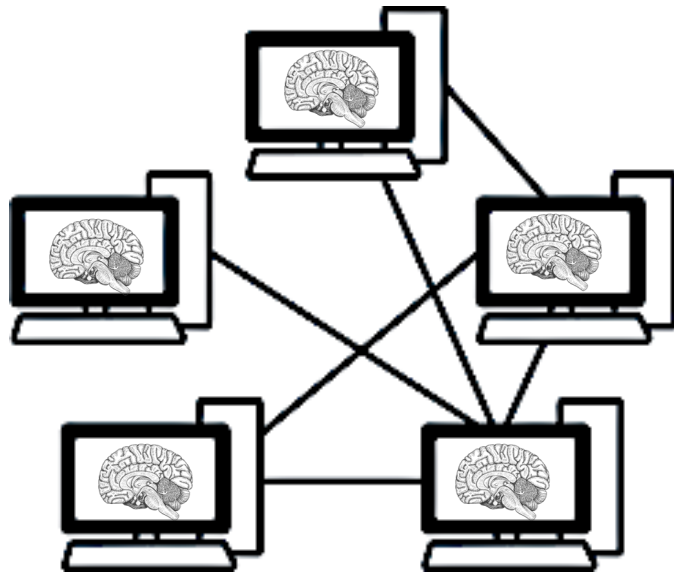
# SLAM (Simultaneous Localization and Mapping) as the core of AP technology

- AP technology is a group of Deep Tech centered on SLAM (Simultaneous Localization and Mapping)
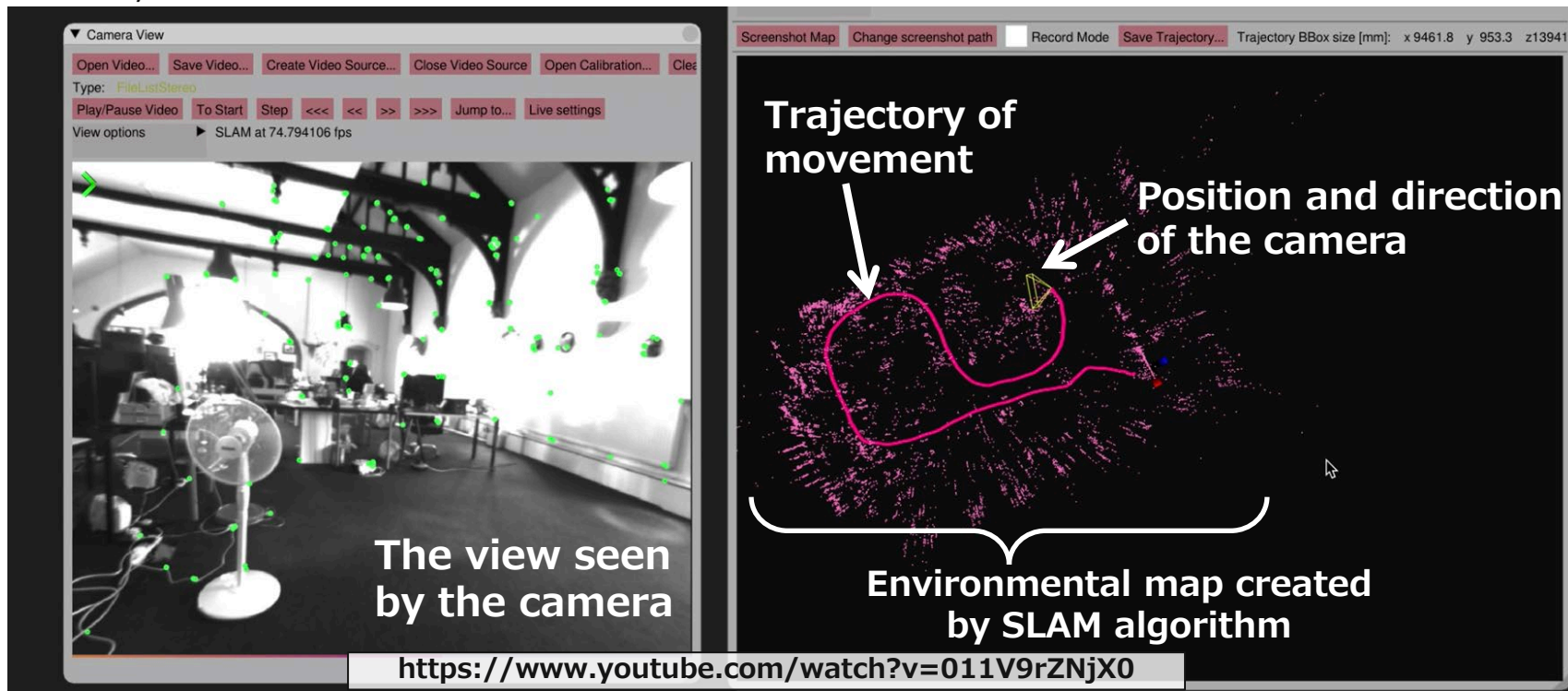
**SLAM technology** **(Simultaneous Localization and Mapping)**

①Localization          ②Mapping

**Re-localization technology**

**Tight-coupling technology**

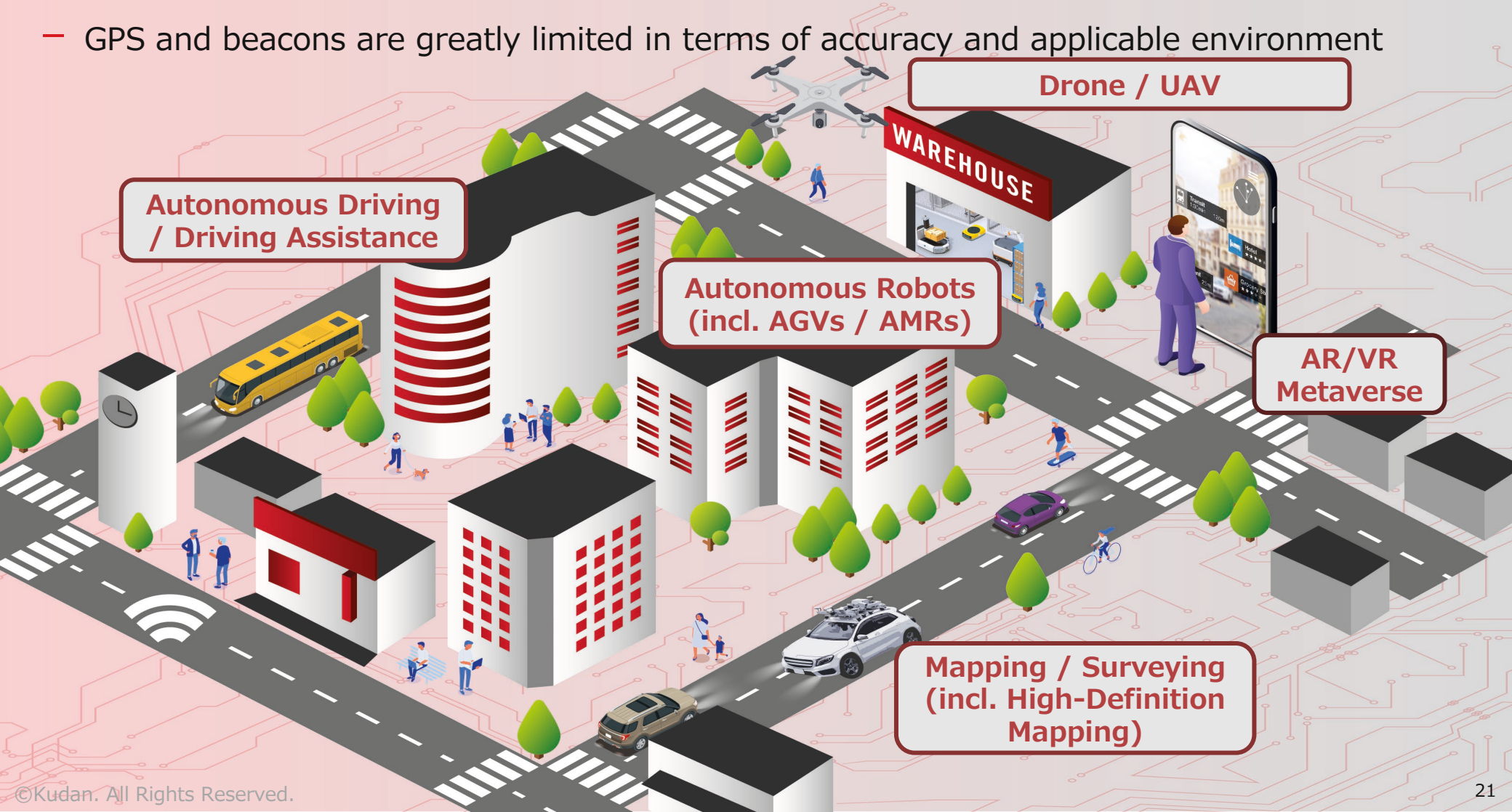# What is SLAM (Simultaneous Localization and Mapping)?

- Technology that simultaneously determines where we are (Localization) and what our surroundings look like (Mapping) based on input from sensors such as cameras and Lidars

- We can keep a track of how we move while creating a map in a new environment (tracking), and recognize where we are based on a map we created beforehand (re-localization)

- Unlike GPS and beacons, which use external radio waves to detect location, SLAM can recognize its own location as a stand-alone software and can be used in a wider range of environments, situations, and use cases



**Trajectory of movement**

**Position and direction of the camera**

**The view seen by the camera**

**Environmental map created by SLAM algorithm**

https://www.youtube.com/watch?v=011V9rZNjX0

\* Refer to our YouTube channel (the URL below) for further demo movies of our technologies
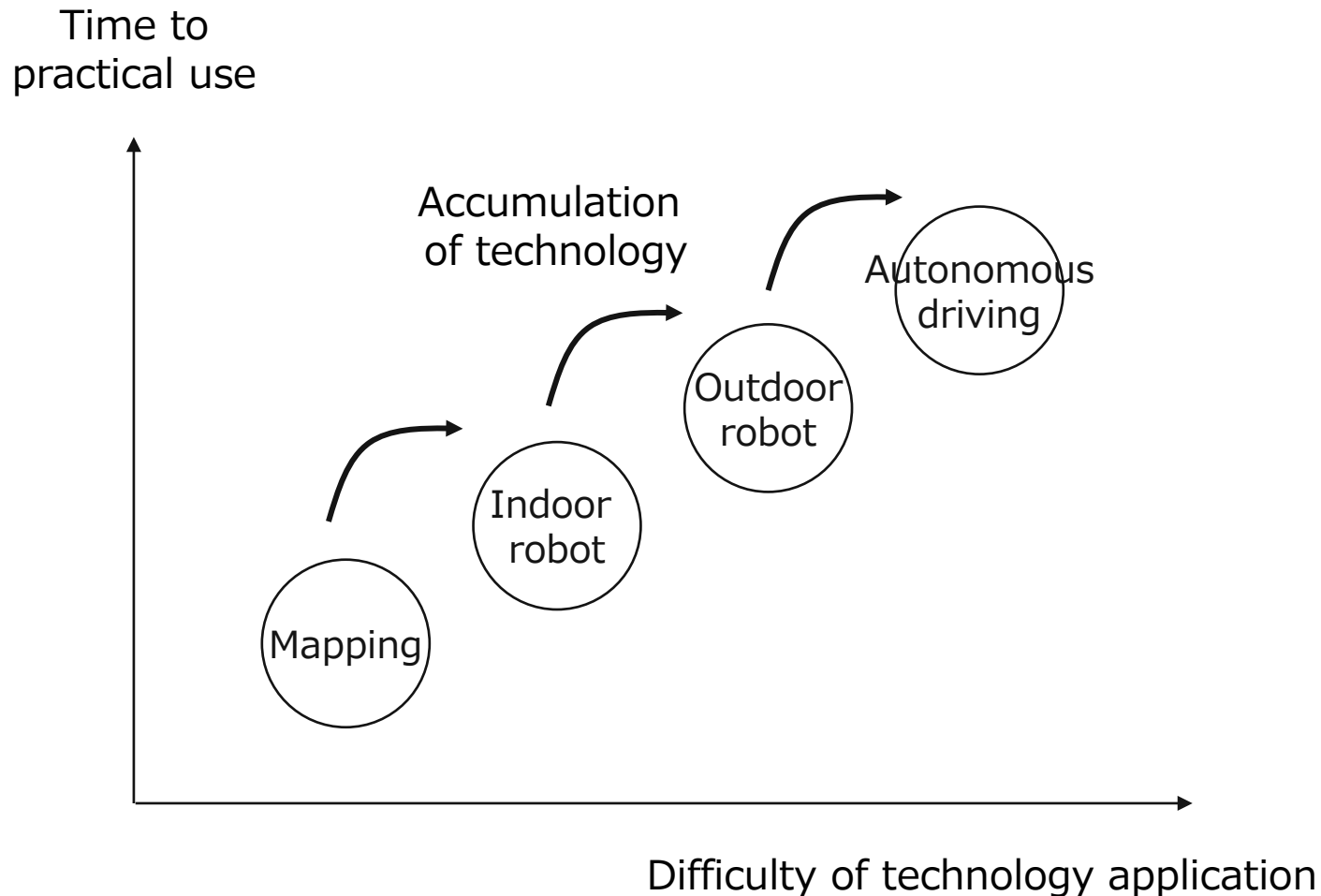https://www.youtube.com/user/KudanLimited/featured

# Broad range of SLAM application

- Localization & Mapping technology centered SLAM is necessary in cases where moving machines and equipment need to change their subsequent movements and outputs depending on their positions and movements

- GPS and beacons are greatly limited in terms of accuracy and applicable environment

**Drone / UAV**

WAREHOUSE

**Autonomous Driving / Driving Assistance**

**Autonomous Robots (incl. AGVs / AMRs)**

**AR/VR Metaverse**

**Mapping / Surveying (incl. High-Definition Mapping)**

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# Broader applications through accumulation of technology

- Proceed strategically to realize full automation in stages in each area and realize subsequent applied technologies

Time to practical use

Accumulation of technology

Autonomous driving

Outdoor robot

Indoor robot

Mapping

Difficulty of technology application

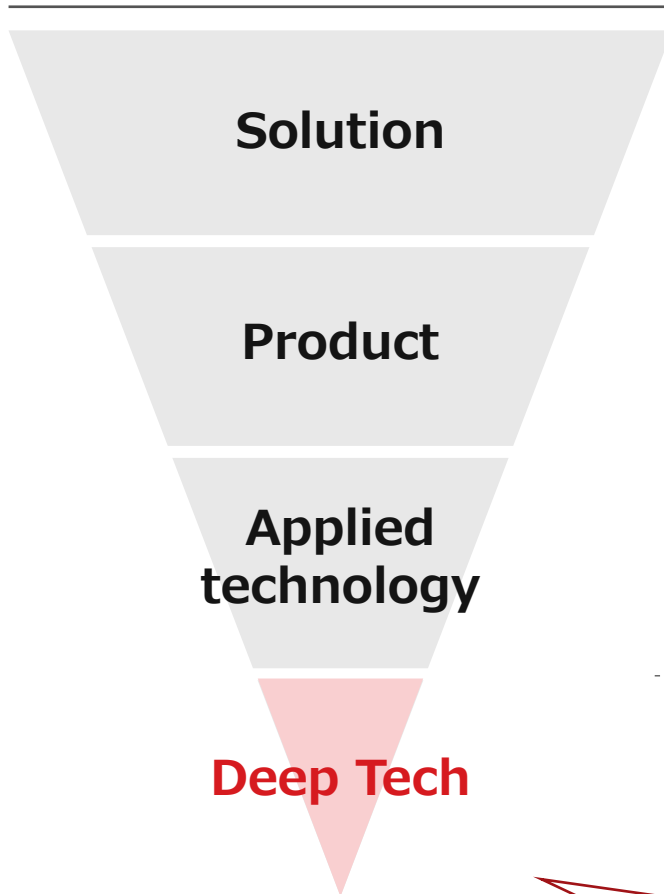# Evolution of the technological axis (evolution of the eye)

- Full automation is difficult to achieve through the accumulation of non-automatic and semi-automatic technologies

- Kudan's technology targets full automation
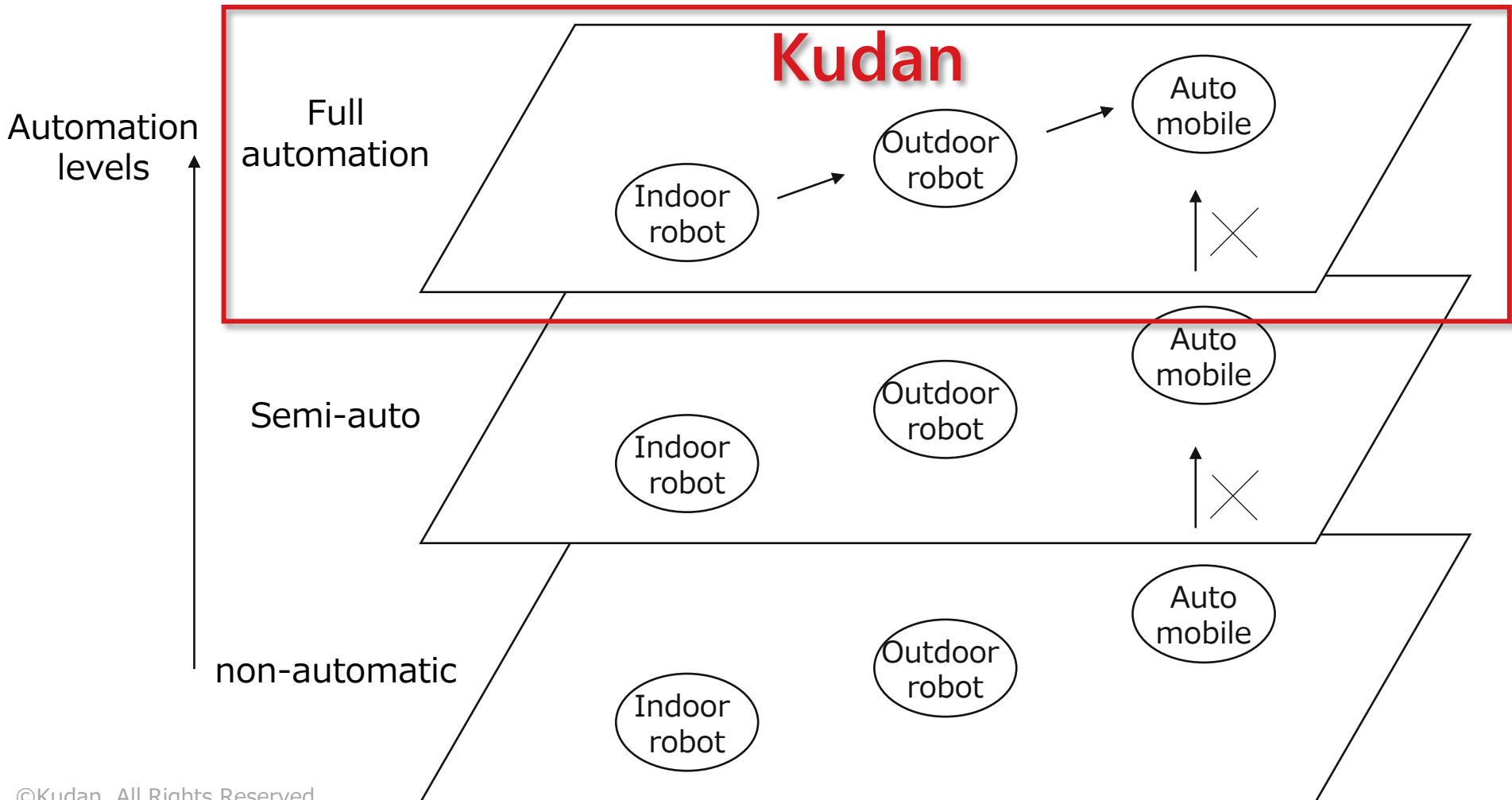
# "ARM-like position" targeted by our small number of professionals

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| Layers of technology industries | Players in Artificial Perception |
|---|---|

**Solution**

▪ Operation and added-value services

**Product**

▪ Products in robotics / wearable / mobility fields

**Applied technology**

▪ Packages with sensors and semiconductors
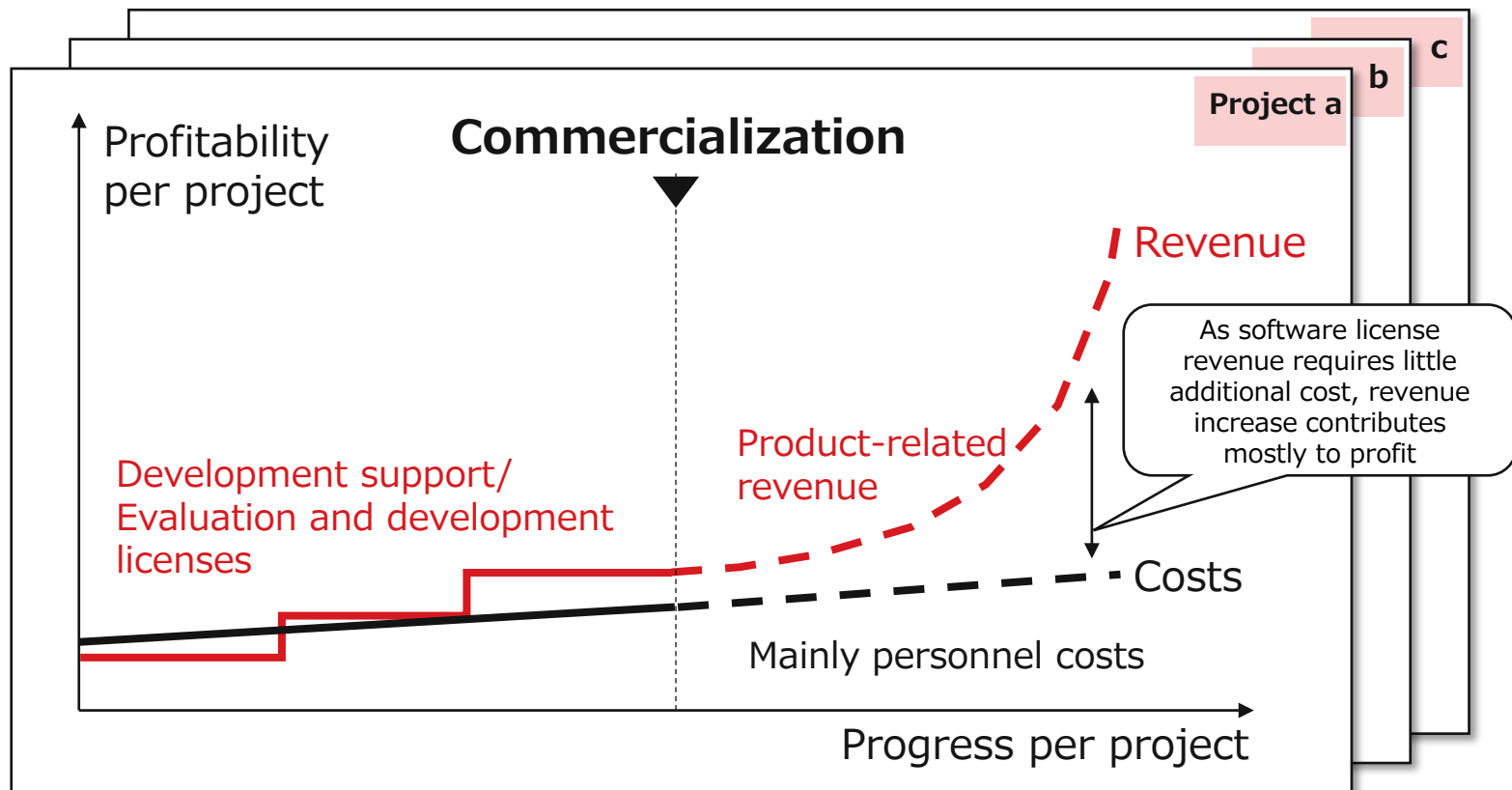
**Deep Tech**

▪ **Algorithms** **kudan**
**(Software development & licensing business)**

**Maximum value with a small number of professionals, difficult to replace**

# Revenue model

- Currently, the majority of projects are in the "evaluation and development" phase, a business phase that is in the red due to prior investment in R&D expenses
- A certain scale of profitability and growth is expected in evaluation and development licenses/customer development support, but we aim to dramatically increase profit by building up significant product-related revenue through market penetration of technology by popularization of customer products



Profitability per project

**Commercialization**

Revenue

Product-related revenue

Development support/ Evaluation and development licenses

As software license revenue requires little additional cost, revenue increase contributes mostly to profit

Costs

Mainly personnel costs

Progress per project

Project a

b

c

# Source of competitiveness

# A "globally born" technical group

**GB Bristol (R&D/Sales)**
- Kudan group founded in 2011
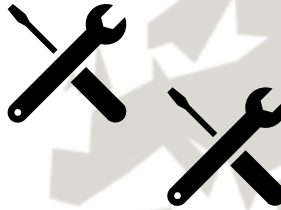
**JP Tokyo (Admin/Sales)**
- Established in 2014
- Listed on TSE Mothers (currently, Growth) in 2018

**DE Munich (R&D/Sales)**
- Artisense founded in 2017
- Kudan's investment in Artisense in 2020
- Kudan's acquisition of Artisense in 2021

**US Silicon Valley (Sales)**
- Established in 2020

An elite company led by a world-class SLAM researcher
- Dr. Cremers, Chief Professor, Technical University of Munich
- 63,000 citations of his work in academic papers, h-index 116

# Demand for technology that is not open-source and has been professionally developed for commercial use

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| | **Artificial Intelligence** | **Artificial Perception** |
|---|---|---|
| **Characteristic** | ▪ Algorithm is simple （several hundreds of lines） | ▪ Algorithm is complex （several hundred thousand lines） |
| **Development environment** | ▪ Can be completed on Internet | ▪ Hardware integration and demonstration in a real-world environment are essential |
| **Open-source** | ▪ Practical | ▪ Not practical |
| **Technological competitiveness** | ▪ **Quality and quantity of data** 　（**= capital strength** ） | ▪ **Accumulation of development capabilities and technological demonstrations** |

**Specialized companies like Kudan are developing the technology with a rare talent pool**
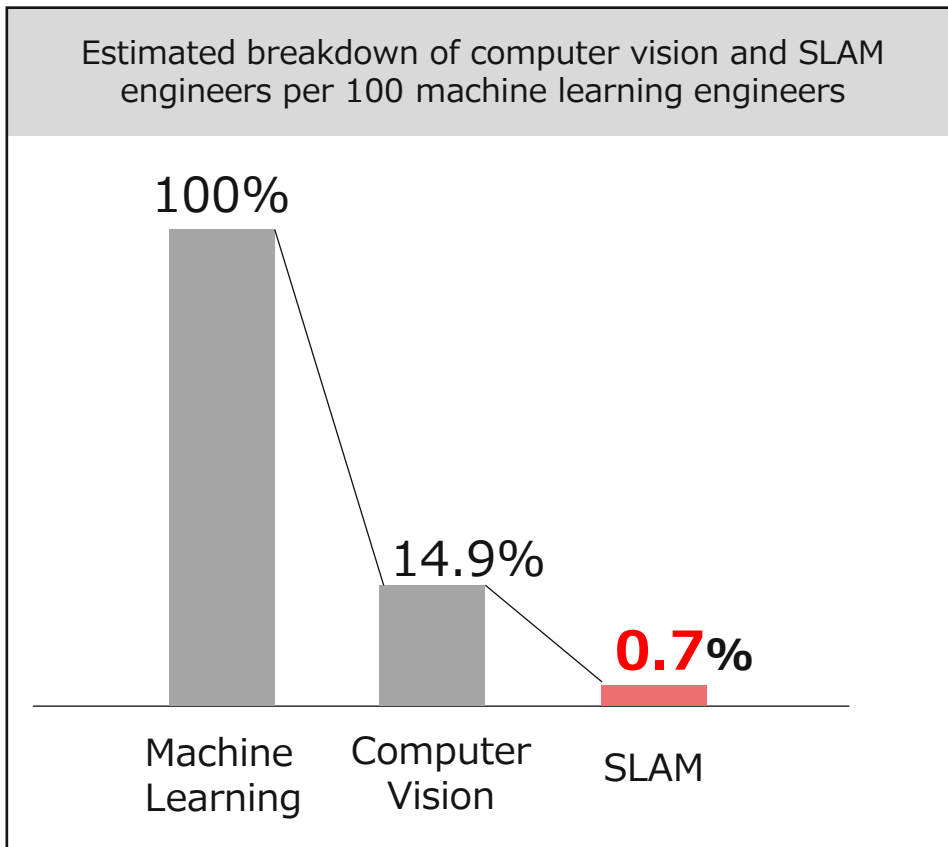
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# Acquired world-class technical team to support R&D

Researchers and engineers specializing in SLAM technology are extremely rare, even in the field of computer vision. Despite this, Kudan and Artisense employ many world-class professionals with PhDs in the field
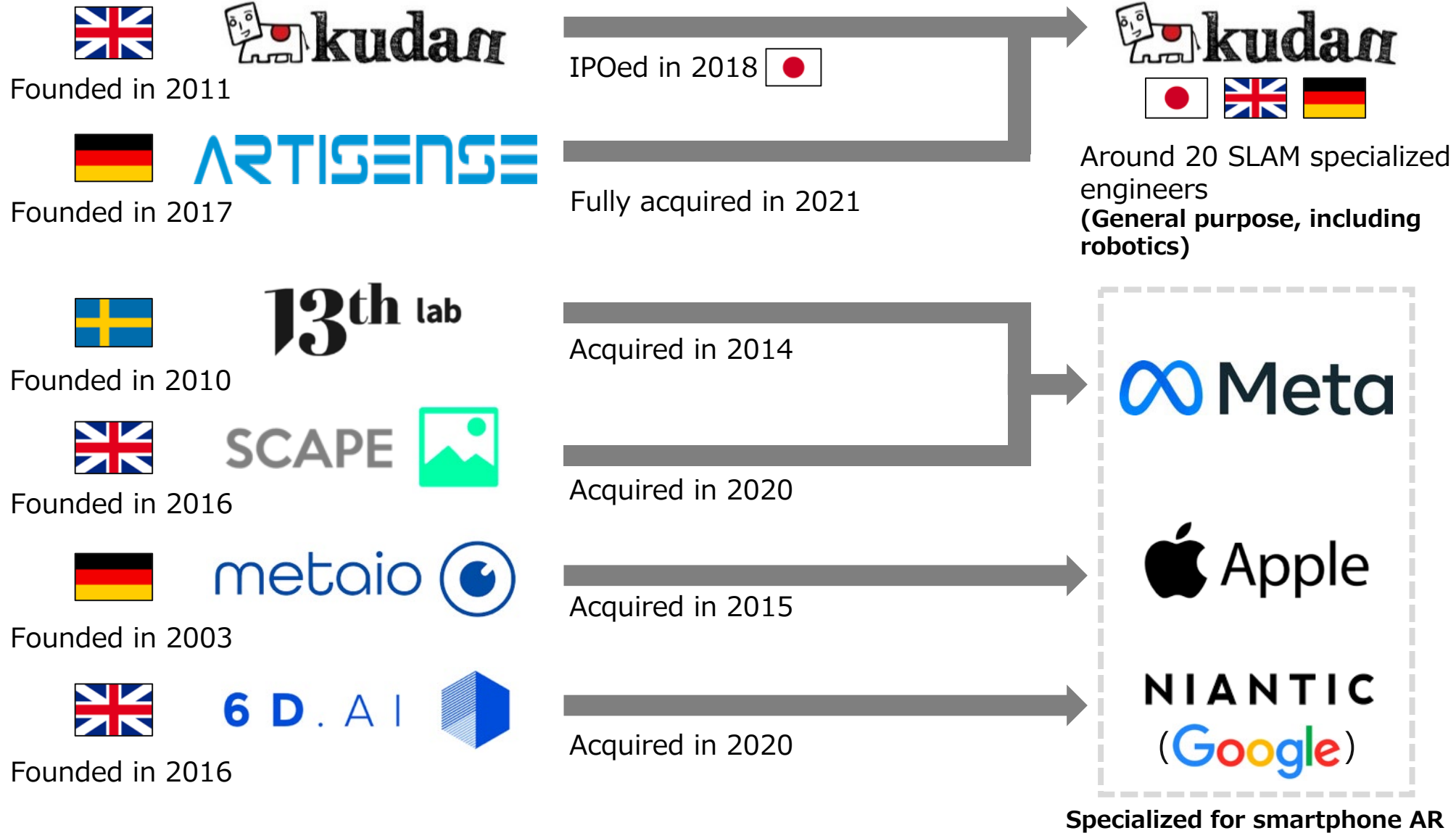
University of BRISTOL

Technical University of Munich — TUM

**There is our CSO, Professor Cremers**

Estimated breakdown of computer vision and SLAM engineers per 100 machine learning engineers

100% — Machine Learning

14.9% — Computer Vision

**0.7**% — SLAM

LinkedIn — Q "vision google"

386件の結果 — Q "vision facebook"

93件の結果 — Q "Vision Microsoft"

307件の結果を表示中

LinkedInメンバー
Senior Software Development Engineer at Micros
アメリカ合衆国 グレーター・シアトル エリア
現在: Microsoft - Senior Software Development Engineer

LinkedInメンバー
Vision System Administrator at Mead and Hunt
アメリカ合衆国 ウィスコンシン州 マディソン エリア
過去: RMT Inc - Business System Analyst

LinkedInメンバー

**Other companies trying to organize SLAM engineer teams of the same level and scale will require large investments in both recruitment and labor costs**

*Based on a LinkedIn search

# Related technologies are acquired in the world, only a few independent SLAM development companies left

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**kudan**
Founded in 2011

IPOed in 2018 🇯🇵 ⟶ **kudan** 🇯🇵 🇬🇧 🇩🇪

**ARTISENSE**
Founded in 2017

Fully acquired in 2021

Around 20 SLAM specialized engineers
**(General purpose, including robotics)**

**13th lab**
Founded in 2010

Acquired in 2014 ⟶ **∞ Meta**

**SCAPE**
Founded in 2016

Acquired in 2020

**metaio**
Founded in 2003

Acquired in 2015 ⟶ **🍎 Apple**

**6 D . A I**
Founded in 2016

Acquired in 2020 ⟶ **NIANTIC (Google)**

**Specialized for smartphone AR**

# While the increase of acquisitions of the related technologies, Kudan leads the market in track record and awareness



- More limited numbers of SLAM-focus / SLAM-feature software companies due to acquisitions by larger technology companies
- Kudan has been in a leading position in terms of breadth of offering, track record and awareness in the market

## SLAM-focus / SLAM-feature software player

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- Offers Indirect & Direct Visual SLAM and Lidar-SLAM
- Flexible sensor options
- Track records in various applications such as AR, robotics and autonomous driving

**SLAMCORE**

- Only Indirect Visual SLAM
- Optimized for limited camera models

**sevensense**

- Only Indirect Visual SLAM
- Optimized for specific cameras, focus only on robotics area

**VanGogh Imaging**

- Focus on very specific medical application

**outsight**

- Only Lidar-SLAM
- Optimize for their own hardware kit

# Development projects and partnership with global leading players have been increasing

| Timing | | | Main target applications and project overview | |
|---|---|---|---|---|
| **FY20** | May. | | **Robotics**) Partnership with Thales group for next-gen tracking system development | THALES |
| | Aug. | | **Mobility**) Signed with Japan Unisys to collaborate as Business Scaling Partner | UNISYS |
| | Sep. | | **Mobility**) Partnership with Macnica to develop new value-added solutions for mobility business | macnica |
| | | | **Robotics, Mapping**) Partnership with Ouster. Provide localization and mapping solutions with Lidar | OUSTER |
| | Nov. | | **AR**) Develop RGB-D SLAM on smartphones with ToF sensor with Sony Semiconductor Solutions | SONY |
| | Jan. | | **Robotics, Mapping**) Partnership with Cepton on Lidar-SLAM and joint exhibition demo | CEPTON |
| | | | **Robotics, Mapping**) Partnership with Velodyne on Lidar-SLAM | Velodyne Lidar |
| **FY21** | May | | **Robotics**) Launch SLAM library for Qualcomm® Robotics RB3 Platform with their technical support | Qualcomm |
| | | | **Robotics**) Joint development of 3D SLAM demo application with Analog Devices | ANALOG DEVICES |
| | Nov. | | **Robotics**) Partnership with Vecow to jointly offer integrated solution for autonomous mobile robots | Vecow |
| | | | **AR, Mobility**) Artisense released Automotive AR navigation demo with HERE technologies and NNG | here NNG |
| | Dec. | | **General**) Achieved 40% image process acceleration with Synopsys ARC EV processor IP on Kudan SLAM | SYNOPSYS |
| | Mar. | | **General**) Joined NVIDIA Inception Partner Network | NVIDIA |
| **FY22** | Apr. | | **AR**) Released utilization of Kudan SLAM in NTT docomo's developing AR cloud | docomo |
| | May. | | **Robotics**) Partnership with robotics developer UGO to integrate Kudan SLAM into robotics and joint sales | ugo |
| | Jul. | | **Mapping**) Signed a Developing License General Agreement with BIMEXPERTS and develop joint solutions | BIMEXPERTS |
| | Aug. | | **Robotics**) Partnership with ADLINK, development of AMR, integration of Kudan SLAM into robotics, joint sales | ADLINK |
| | | | **General**) Joined Texas Instrument's partnership network in robotics | TEXAS INSTRUMENTS |
| | | | **General**) Become official SLAM partner with Ouster, a leading Lidar provider, and start offering tools on HP | OUSTER |
| | Oct. | | **Autonomous Driving**) Participation with Renault and other companies in ERASMO, autonomous driving project by EU research institute | |
| **FY23.24** | Oct. | | **Robotics**) Adopted as a commercial SLAM for Edge Insight, Intel's platform for AMR | intel |
| | | | **Robotics, Mapping**) Partnership with Innoviz to promote digital mapping project | INNOVIZ TECHNOLOGIES |
| | Apr. | | **Robotics**) Partnership with Cadence to enhance SLAM performance for robotics | cadence |

# Achieve commercial-level customer commercialization

- **Progress exceeded expectations, mainly for robotics and mapping** (4 projects in total)
- Among them, full-adoption of commercial SLAM in a major semiconductor product is **the world's first achievement （Intel).**

**Number of customer commercialization projects in FY2023 (cumulative total)**

| 1Q | 2Q | 3Q | 4Q |
|---|---|---|---|



**Robotics** (MOVEL AI) — 4Q
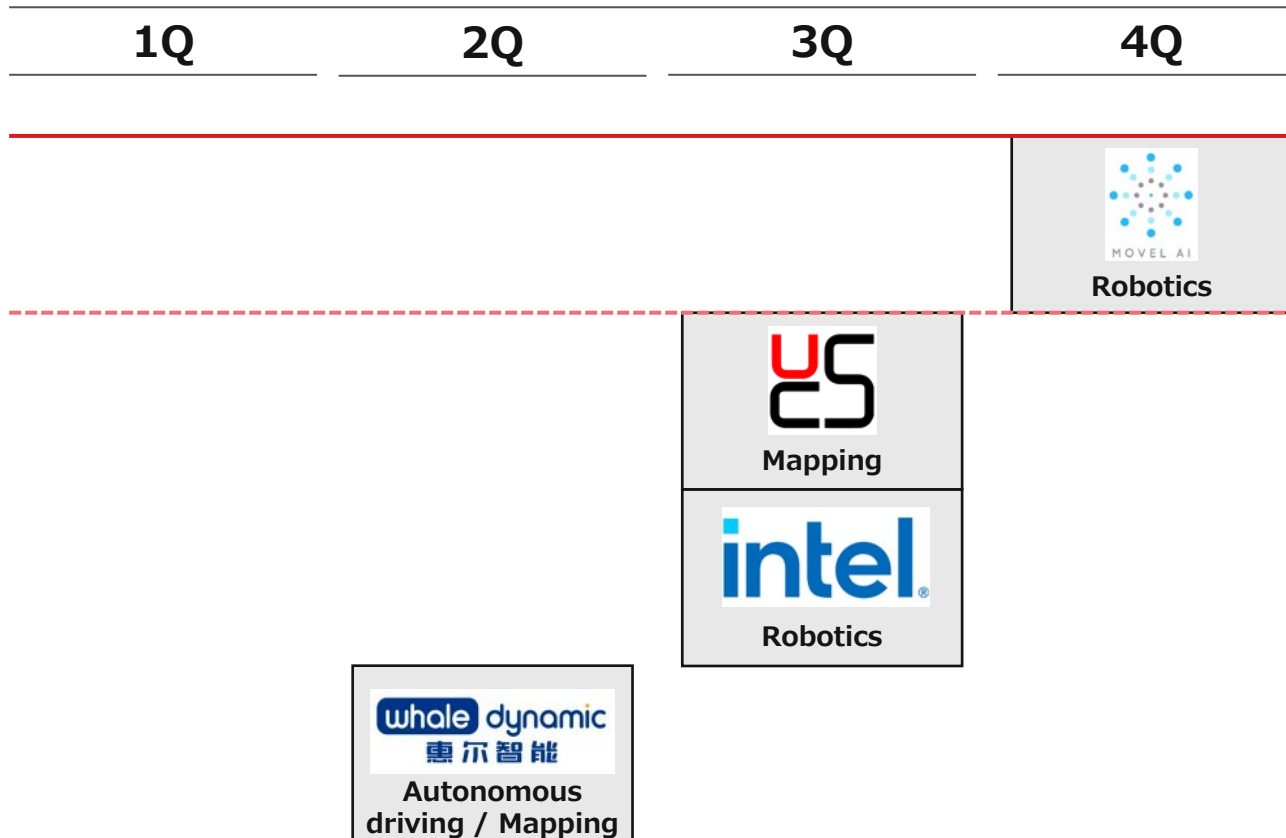
**Achievements in FY2023 (4 in total)**

**The forecast as of May in FY2022 （3 in total)**

**Mapping** (UCS) — 3Q

**Robotics** (intel) — 3Q

**Autonomous driving / Mapping** (whale dynamic 惠尔智能) — 2Q

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# Product①: About Whale Dynamic

- **Leverages proprietary LV4-5 technologies for a wide range of product offerings including autonomous mobile robots and autonomous driving**

- **Not only targets the rapidly evolving Chinese market, but also expands its business extensively into the global market**

| | |
|---|---|
| **Founder & CEO** (David Chang) | ▪ Led the development in "Apollo", the country's largest autonomous driving project by Chinese IT giant, Baidu, as a senior product manager. M.S., University of Cambridge, U.K. |
| **Clients/ Partners** | BYD    apollo (Bai 百度)    THE AUTOWARE FOUNDATION (TierⅣ Intelligent Vehicle)    香港科技大學 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY |
| **Global expansion** | ▪ The only company in the world to be a member of both "Apollo" and "Autoware", the globally recognized open-source ecosystem for autonomous driving |

# Product①: Whale Dynamic's Product Release

kudan

- Product commercialization by WD utilizing Kudan technology was realized in July 2022, and product introduction is in progress
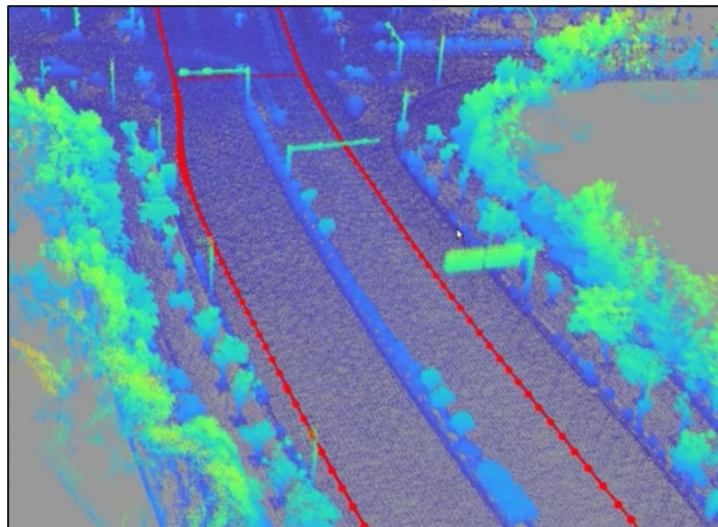
**whale dynamic**

- Provides mapping for public roads (vehicle-mounted) and robot (autonomous mobile vehicle) *

**kudan**

- Provide SLAM technology for localization and high-precision mapping
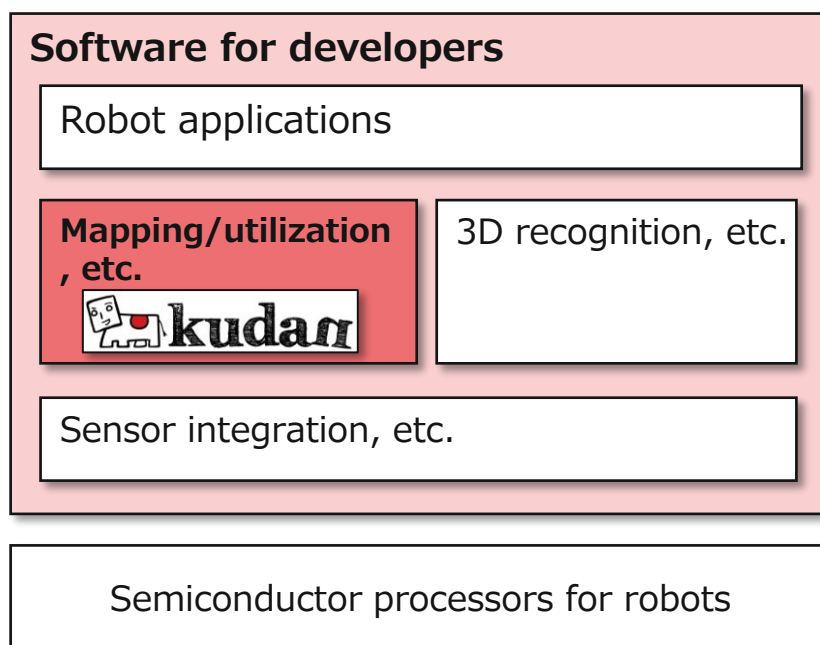- Achieve higher performance with proprietary technology related to the integration of Lidar SLAM and Visual SLAM

×

[*] URL for the demo video of technologies related to mapping (vehicle-mount) and robots (autonomous vehicles)

# Product②: Adoption for the Intel product

- The world's first commercial SLAM fully adopted on a major semiconductor platform, as a company specializing in this technology area

- Intel's platform provides comprehensive software functions, in which our technology is a core module, for elemental technologies of next-generation autonomous mobility capabilities that robot manufacturers need to invest significantly in to develop in-house

- In addition, dedicated customization specifically for the linked Intel hardware chip delivers a significant improvement in SLAM performance

- This is expected to greatly eliminate hurdles to commercial development for robot manufacturers adopting Intel products and expand efficient and rapid practical application of autonomous mobile robots

**Intel's package for robots***

| **Software for developers** |
| --- |
| Robot applications |

| **Mapping/utilization, etc.** <br> kudan | 3D recognition, etc. |
| --- | --- |

| Sensor integration, etc. |
| --- |

| Semiconductor processors for robots |
| --- |

- Among the various software required for robot development, the mapping and utilization module is at the core of the product's autonomous mobility capability

- The software processing method is optimized to match the characteristics of Intel's semiconductor circuits, enabling extremely high-speed processing. This was achieved through joint development with Intel

[*] See below for detailed product information
https://contents.xj-storage.jp/xcontents/AS02977/0f99200a/333d/40c0/9924/c4b15824611d/140120221013544058.pdf

- Developed a handheld mapping device implementing Kudan technology in about 6 months with UCS, a Korean mapping solution provider, and have already sold several units. This proves the maturity of Kudan technology, which enables a customer to quickly develop and complete integration to a customer product.
- Kudan 3D-Lidar SLAM enables accurate mapping with an inexpensive sensor set, realizing product commercialization at a competitive price
- We will meet the high market demand for simple and affordable mapping solutions on a global level for a variety of applications, including research, surveying and inspection of forests, roads, buildings, and indoor facilities
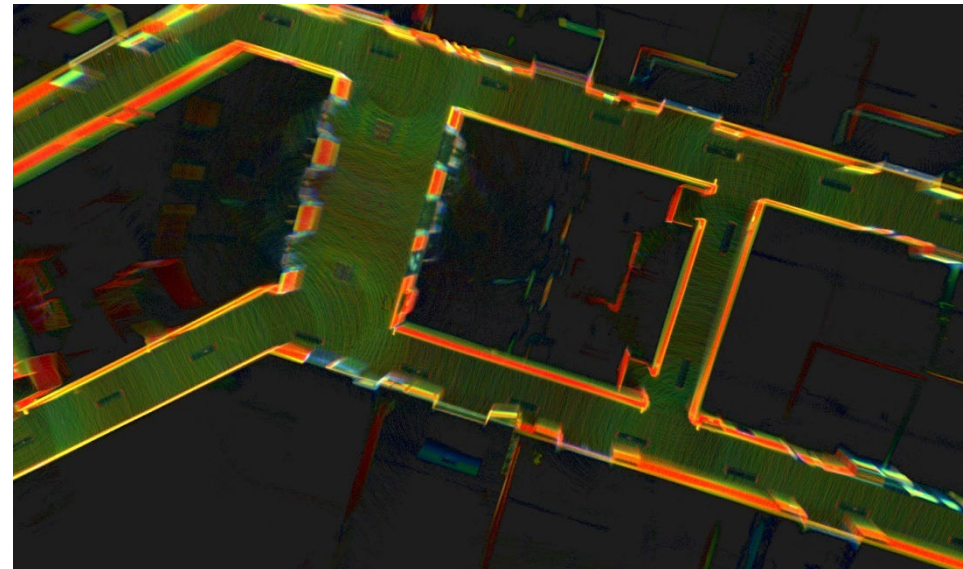
# Product④: Product release with Movel AI

- Kudan Visual SLAM/3D-Lidar SLAM is incorporated into Seirios, an all-in-one commercial software solution for autonomous mobile robots (AMR) from Movel AI, a Singapore-based robot software company
- This will enable us to offer highly accurate navigation and fleet management solutions to our customers in the future
- The Kudan SLAM integrated solution is now available for the global market and is expected to have a commercial deployment on customer sites

# Completed integration of hybrid technology into customers' products

- Succeeded in making the world's first hybrid technology of indirect and direct SLAM as a commercial SLAM technology. By integrating the advantages of both methods, a significant improvement in basic performance has been achieved, which is expected to contribute to the expansion of the customer base in a wider range of applications

- In addition to application of the technology in customers' projects, integration of the technology into customers' products has been completed, and is expected to contribute to product-related revenue in FY24 onward

## Hybrid SLAM

- Faster processing without sacrificing recognition accuracy
- Higher stability without relying on individually optimized implementations

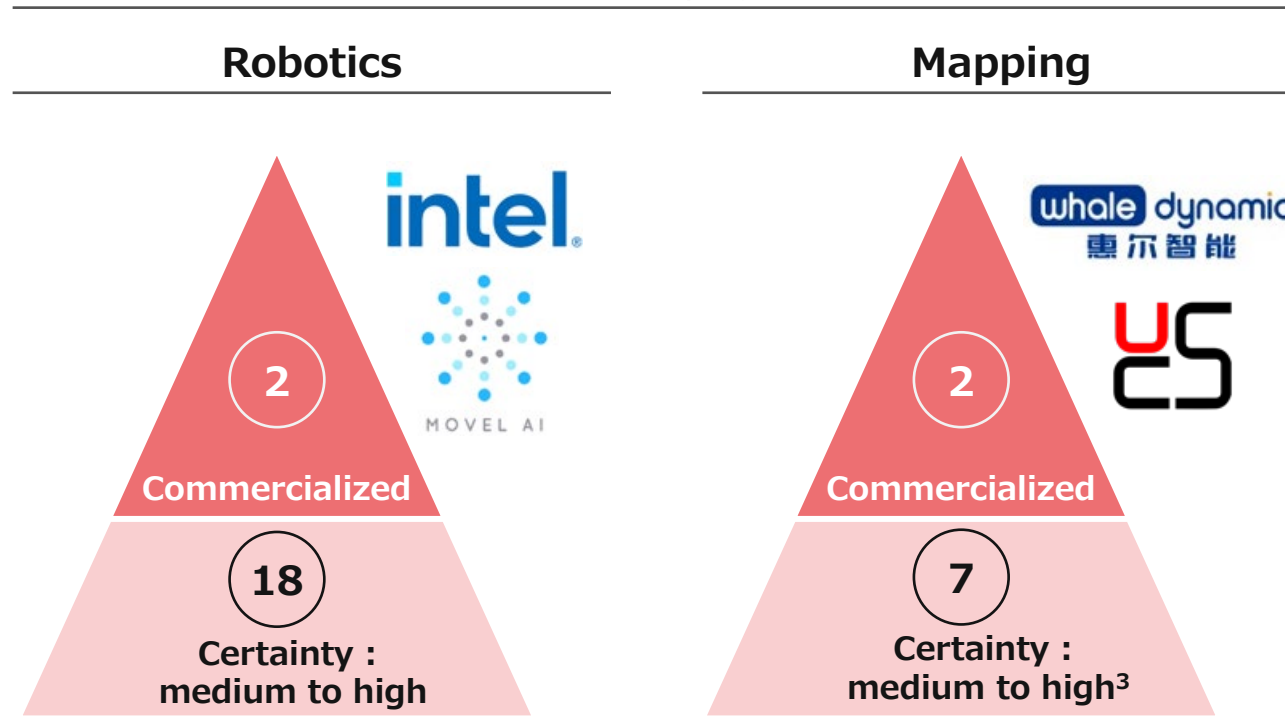| Indirect SLAM | | Direct SLAM |
|---|---|---|
| • Fast processing, versatile | ✕ | • Precise recognition, high stability |
| kudan | | ARTISENSE |

# Future Growth Potential

# Measures to boost product-related revenue ① : Narrowing down focus areas

- With the launch of customer commercialization, **revenue associated with customer products** (product-related revenue[1]) **are expected to become the main pillar of growth in the mid to long term, and Kudan is aiming for full-fledged launch of such revenue**

- **Narrowed down and focused on two markets, "robotics" and "mapping,"[2]** which have already been commercialized and **are expected to launch quickly in the future**

## Customer commercialization progress
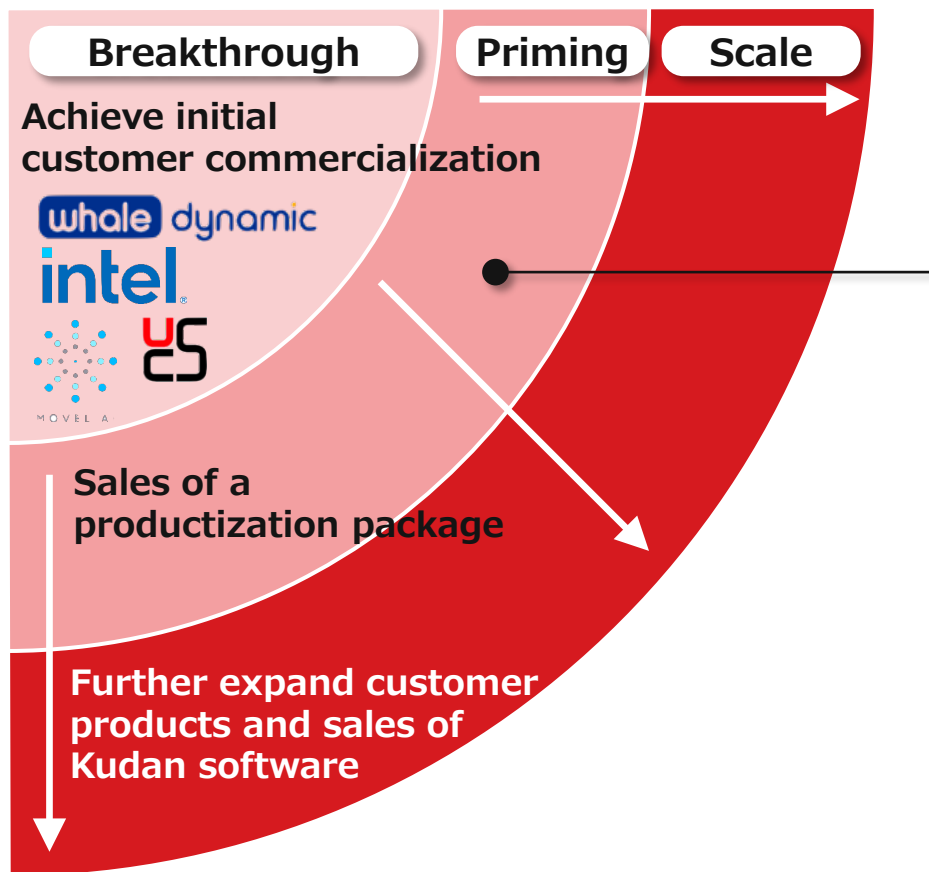### [Number of projects]

| Robotics | Mapping |
|----------|---------|



Robotics:
- **2** Commercialized (intel / MOVEL AI)
- **18** Certainty : medium to high

Mapping:
- **2** Commercialized (whale dynamic 惠尔智能 / UCS)
- **7** Certainty : medium to high[3]

# Measures to boost product-related revenue ② : Provide a productization package

‒ In addition, Kudan has started developing and providing a productization package, and **aims for "priming" effects to further expand customer commercialization and increase sales of Kudan software**

**Expanding business by selling a productization package**

**Breakthrough** | **Priming** | **Scale**

**Achieve initial customer commercialization**

whale dynamic

intel.

uc5

MOVEL A

**Sales of a productization package**

**Further expand customer products and sales of Kudan software**

A package that shortens the development and test operation period of customer products and can also be directly put to practical use as products
(e.g., mapping kit)
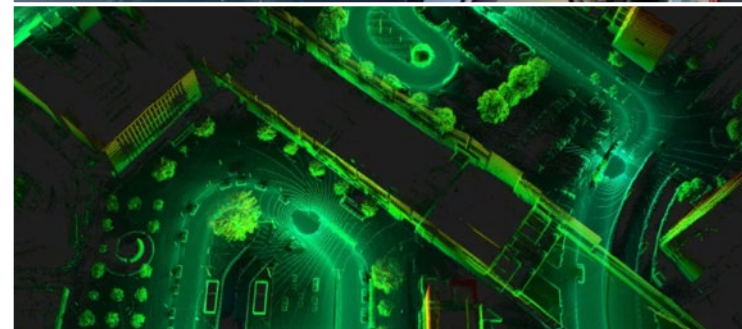
# Annual earnings forecast for FY2024

kudan

- Overall revenue growth was solid, driven by the expansion of product-related revenue. Costs increased from the previous year due to development and sales of a productization package and strengthened organizational structure to expand product-related revenue

- R&D subsidy income from foreign governments is continuously expected to be received as non-operating income

- In the previous fiscal year, Kudan aimed to change to the profitable earnings structure in FY24, but will prioritize business transformation and revenue expansion to accelerate the launch of product-related revenue
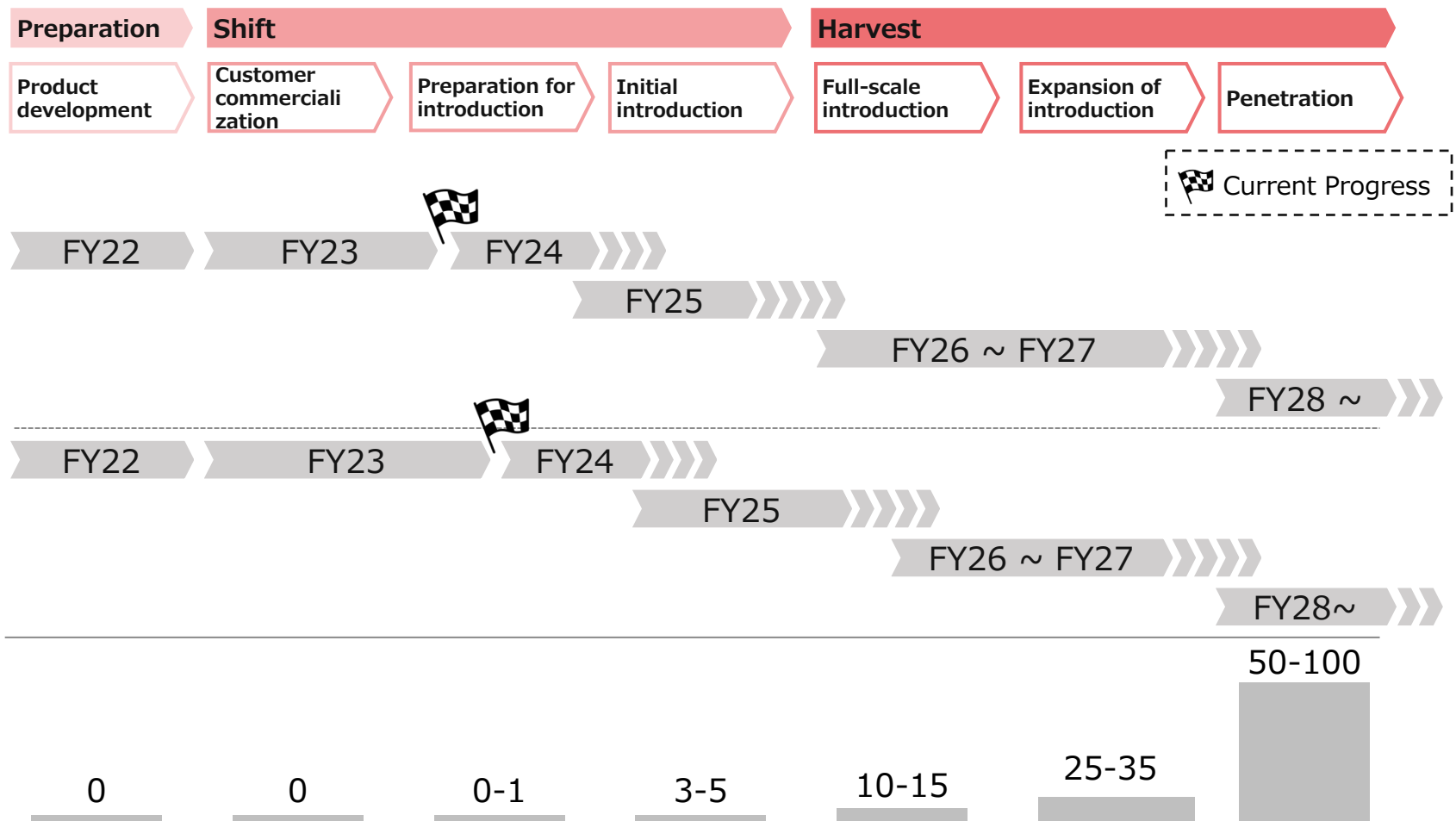
(Unit : million yen)

| | Performance for FY2022 | Performance for FY2023 | Forecast for FY2024 |
|---|---|---|---|
| **Net Sales** (Prior to accounting standards change) | **271** **(296)** | **332** | **520** |
| **Operating Profit** | △**433** | △**598** | △**560** |
| **Ordinary Profit** (incl. "share of loss of entities accounted for using equity method") | △**681** (△403) | △**394** | △**520** |
| **Profit Attributable to Owners of Parent** (incl. impairment losses) | △**2,237** (△1,474) | △**413** | △**550** |

# Business progress toward growth (short- and mid-term)

— Aiming to increase product-related revenue through the introduction and market penetration of customers' products, Kudan will continue to strategically promote measures to accelerate it, using the progress stage of customers' products as an indicator

## Business phases along with the progress of customers' products

| Preparation | Shift | | | Harvest | | |
|---|---|---|---|---|---|---|
| Product development | Customer commercialization | Preparation for introduction | Initial introduction | Full-scale introduction | Expansion of introduction | Penetration |

**Progress forecast in focus areas**

🏁 Current Progress

**Robotics**

FY22  FY23  🏁 FY24 ⟩⟩⟩
FY25 ⟩⟩⟩
FY26 ~ FY27 ⟩⟩⟩
FY28 ~ ⟩⟩⟩

**Mapping**

FY22  FY23  🏁 FY24 ⟩⟩⟩
FY25 ⟩⟩⟩
FY26 ~ FY27 ⟩⟩⟩
FY28~ ⟩⟩⟩

**Scale of expected product-related revenue**※

| 0 | 0 | 0-1 | 3-5 | 10-15 | 25-35 | 50-100 |

※The penetration phase is set at 100

1. Due to the progress of the business phase, the indicator of emphasis in the business has been changed from the number of customer commercialization to the progress stage of customer commercialization

# Progress in partnership

- In addition to the adoption of Kudan technology in the Intel's commercial product, Kudan has also expanded and deepened its partnerships with a group of leading semiconductor and sensor companies that are also expanding their ecosystems, progressing forward significantly toward making Kudan technology an industry standard

- In FY24, work with Intel to enhance product functionality, provide customer implementation support, and conduct promotions to expand product sales

- Moreover, Kudan will strengthen partnerships with semiconductor and sensor companies for further customer commercialization as well as with system integrators that implement Kudan technology as solutions

**Business co-creation and technology development partner**[1]      **Product partner**

| **Initiatives** | • Client referrals and joint participation in projects<br>• Marketing and event planning<br>• Technology development and implementation collaboration | • Partners provide Kudan's technology embedded products |

**Semiconductor and sensor companies**

**OUSTER**
Event co-sponsorship

**INNOVIZ TECHNOLOGIES**
**cādence**
New partnership

**NVIDIA**
**ADLINK** LEADING EDGE COMPUTING
Development progress

**intel**
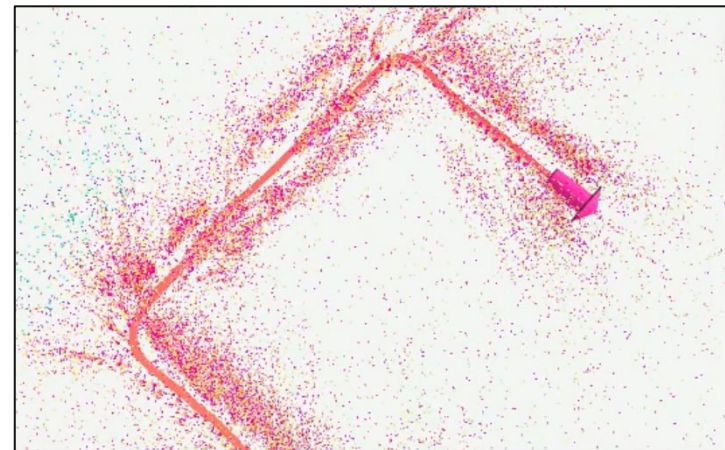Commercialization[2]

1. A partial selection of partner companies
2. Commercialization definition: Kudan SLAM is incorporated as part of a partner product and delivered to the end customer via the partner

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# Examples of next-generation technology demonstrations

- In areas other than the focus area (robotics and mapping), select projects and work on demonstrations from mid- to long-term perspectives
- In addition to hybrid SLAM, AI-embedded localization and sensor integration for autonomous driving were demonstrated, achieving effective results.

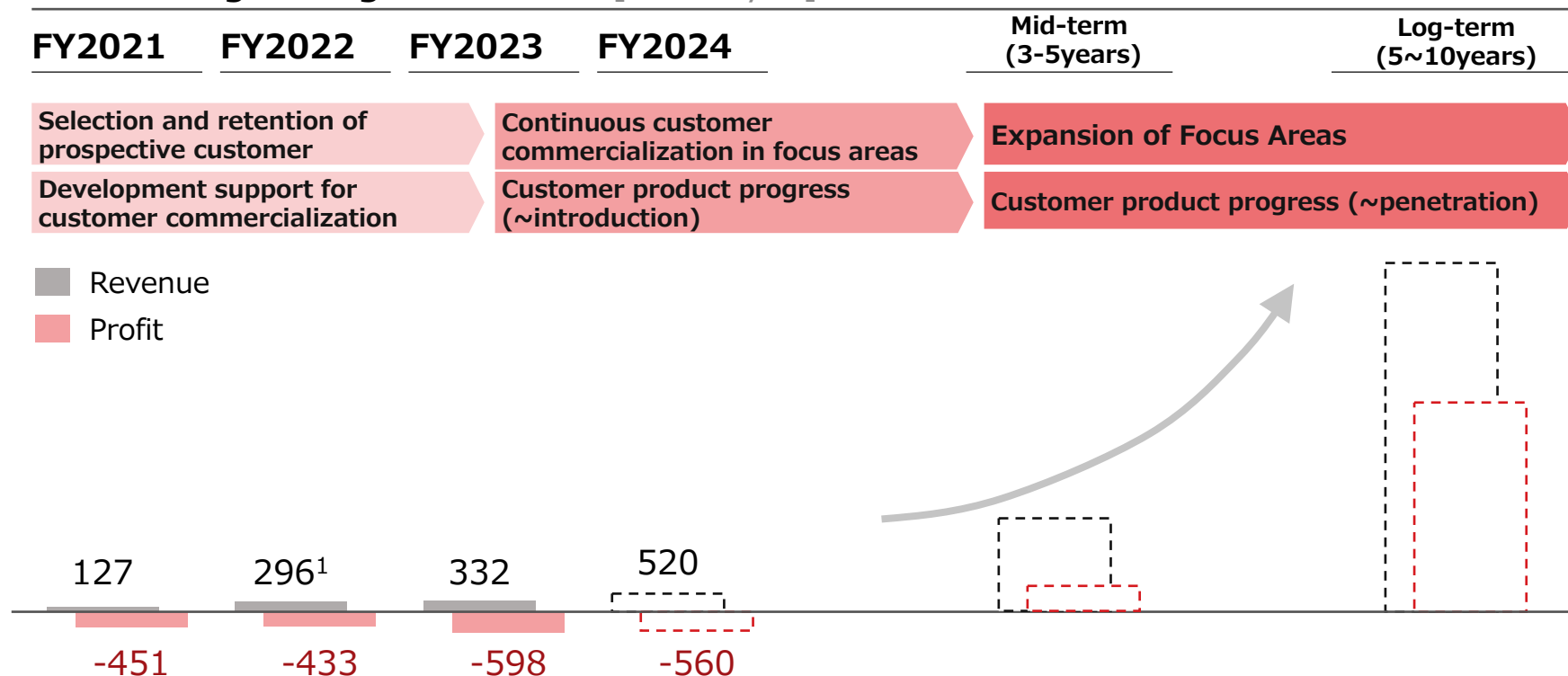**Project image (e,g., major European automotive company)**

Collaboration with GPS manufacturers and automotive companies to establish vehicle location recognition technology in urban areas, which is difficult even with next-generation high-precision GPS

- **Continuously push forward customer commercialization and progress of customer products** to quickly achieve the transformation of the earnings structure
- Aim for dramatic profit growth by building up significant product-related revenue **through market penetration of technology by expanding focus areas and spreading customer products**

**Mid- to long-term growth vision** [million yen]

| FY2021 | FY2022 | FY2023 | FY2024 | Mid-term (3-5years) | Log-term (5~10years) |
|--------|--------|--------|--------|---------------------|----------------------|

Selection and retention of prospective customer

Continuous customer commercialization in focus areas

Expansion of Focus Areas

Development support for customer commercialization

Customer product progress (~introduction)

Customer product progress (~penetration)

- Revenue
- Profit

127   296[1]   332   520

-451   -433   -598   -560

1. Revenue adjusted for the impact due to accounting standards change

# Important Notice

- This document contains Kudan's plans, estimates and expectations for the future based on its current business situation and industry trends.

- All such projections for the future inherently involve uncertainty and a wide variety of risks.

- It is conceivable that risks both understood and unforeseen, uncertainties and other factors may cause actual results to differ from the projections contained within this document.

- Kudan offers no guarantee of the accuracy of its projections for the future and accepts that they may differ significantly from actual results.

- All projections for the future included in this document are based upon information available to Kudan as of November 14th, 2023, and may not be updated or changed to reflect future developments or changes in status.