Pioneer "Leading-edge IoT", with eSOL's Unique OS Platform

eSOL Reports 2019 Third-Quarter Results

November 2019 by eSOL Co., Ltd.
(listed on the First Section of the Tokyo Stock Exchange: 4420)

1. Company Information

Company Information

Name	eSOL Co.,Ltd.
Foundation	May 1975
Representative	President Katsutoshi Hasegawa
Core Business	**Embedded Software** ・Software development and licensing ・Engineering services ・Consulting services **Hardware** ・Scanners, printers and custom software for retail inventory applications ・Sensing device for IoT applications
Paid-in capital	1,041million yen (as of Nov. 2018)
Employees	448 (as of Jun. 2019) *Consolidated
Group Companies	eSOL TRINITY Co.,Ltd （Consolidated subsidiary） est. Mar. 2015 AUBASS CO., LTD. （Equity method affiliate） est. Apr. 2016 eSOL Europe S.A.S.（Consolidated subsidiary） est. Mar. 2018

History

eSOL has been achieving sustainable growth in fluctuating software industry.

（Sales : JPY: mils.）

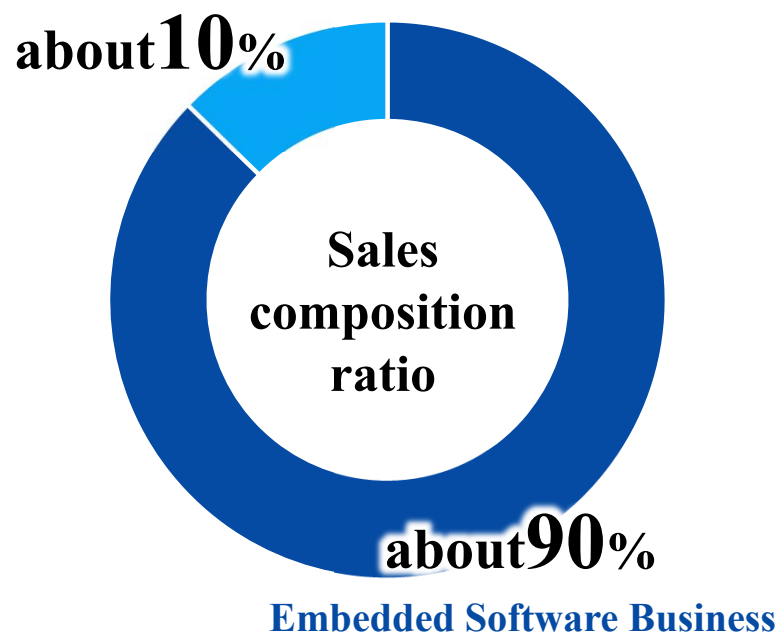

2019 Shift to the Fist Section of the Tokyo Stock Exchange

2018 Listed on Tokyo Stock Exchange Mothers

Established subsidiary, eSOL Europe S.A.S. in France

2016 Established joint venture, AUBASS CO., LTD.

2015 Established a Subsidiary, eSOL TRINITY Co., Ltd.

2014 Developed environmental data management system for agriculture, "eSOL AGRInk" series, and started IoT business

2013 Katsutoshi Hasegawa appointed President

1975 Established ERG Co., Ltd.

2001 Changed the company name to eSOL Co.,Ltd.

1984 Started selling own Platforms

Business Overview

Embedded Software Business

- Development and sales of RTOS (real-time operating system)
- Engineering services for entrusted embedded software
- Consultation related to embedded software development
- Sales of tools for embedded software development
- Education for engineers for embedded software development

Sensing Solution Business

about **10**%

Sales composition ratio

about **90**%

Embedded Software Business

Sensing Solution Business

【Logistics related business】
- In-vehicle printer for issuing designated slips
- Ordinary temperature devices (handy terminal, forklift mounted cameras, access points, etc.)
- Development and sales of strong environmental resistance handy terminal and sales-support software

【Sensor network related business】
- Proposal of sensor network system

What's Embedded Software ?

Embedded software is a piece of software that is embedded in various hardware or non-PC devices around us, for example vehicles, in order to control those electronic equipment. It excludes, however, so called "Computer" such as PC, server, or super computer. Today, many pieces of equipment is increasingly computerized. Along with that trend, the embedded software market has been expanding.
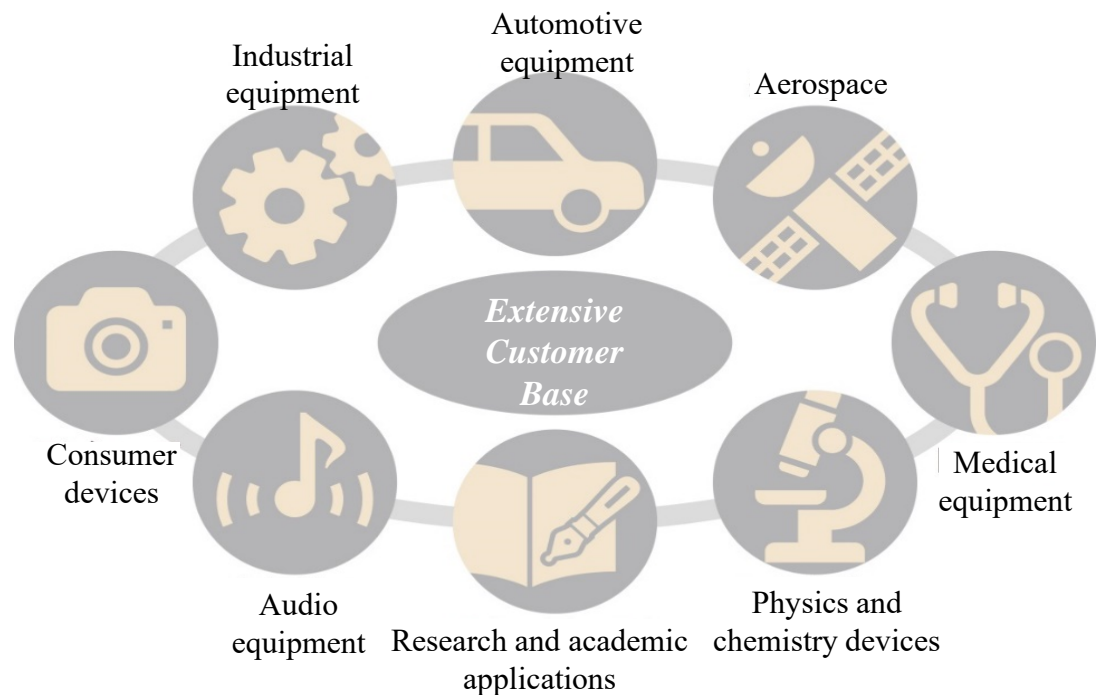
so called "Computer"

Used for:
e-mail, word processors, data storing, and data processing.
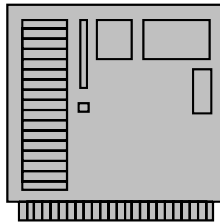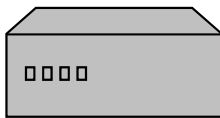
Embedded Software

Embedded for controlling electronic devices that are found almost every where around us.

Industrial equipment

Automotive equipment

Aerospace

Extensive Customer Base

Consumer devices

Medical equipment

Audio equipment

Research and academic applications

Physics and chemistry devices

Embedded Software Industry Structure

Very few companies can develop leading platforms in the world.
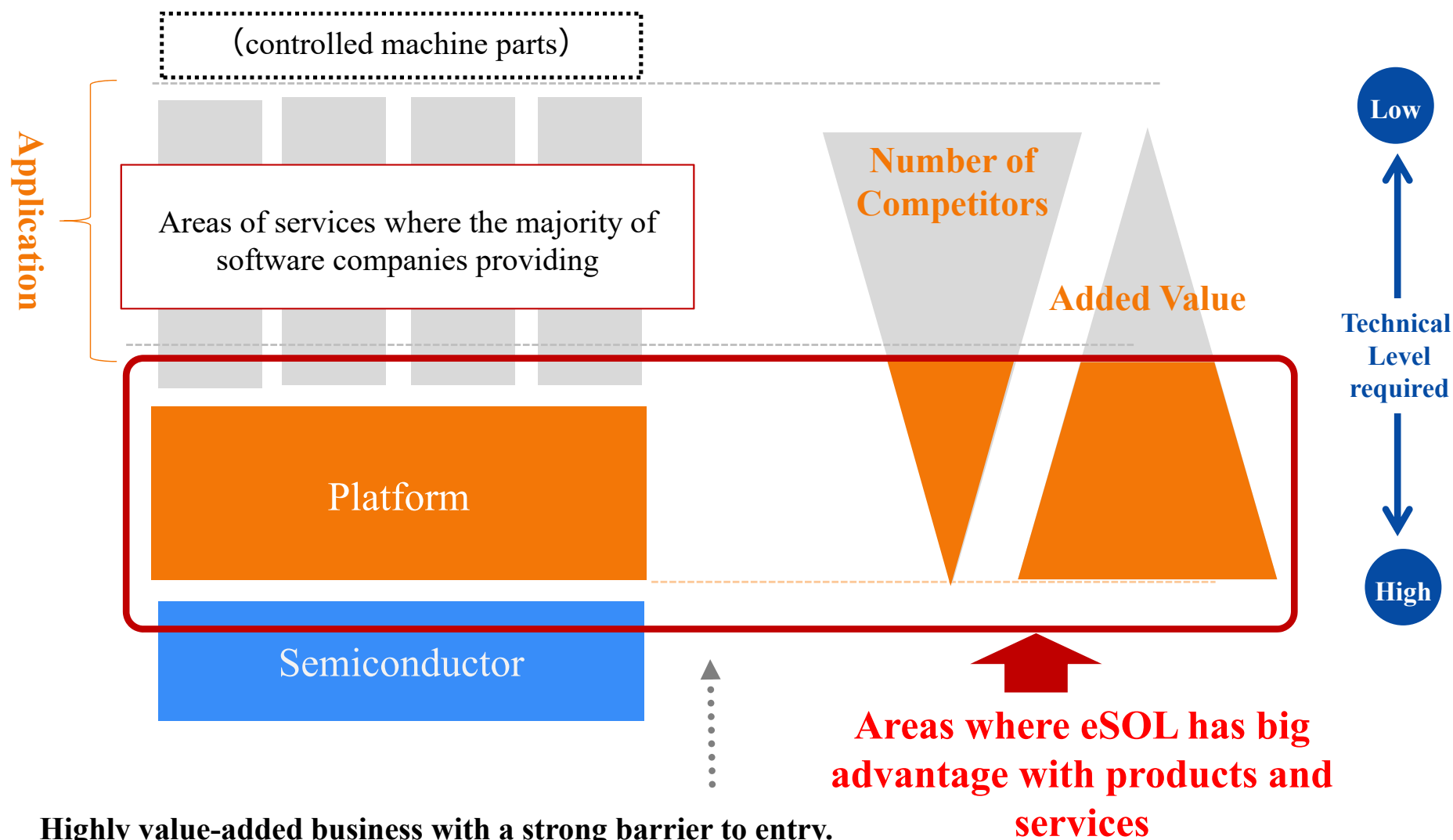
- **Highly value-added business with a strong barrier to entry.**
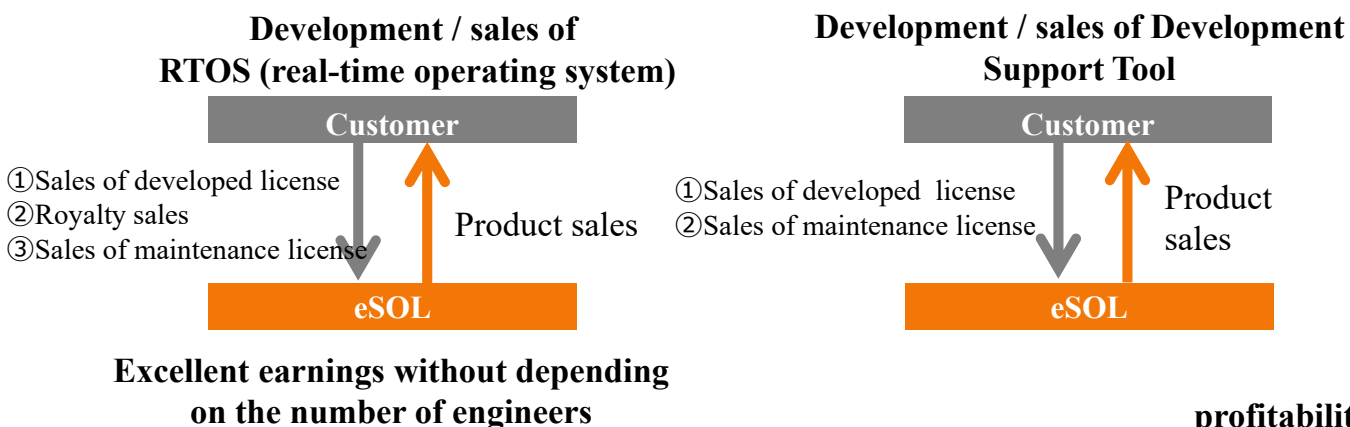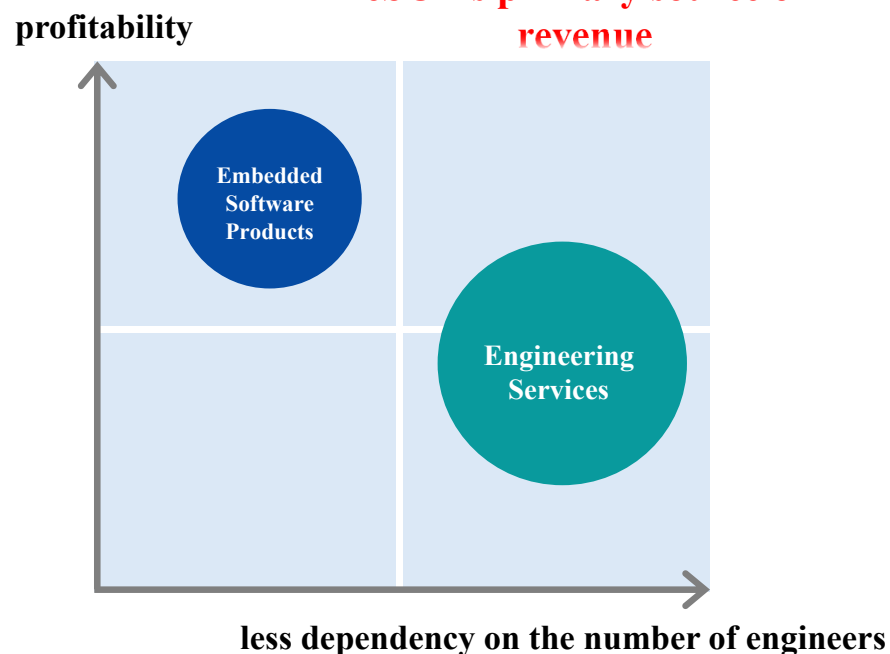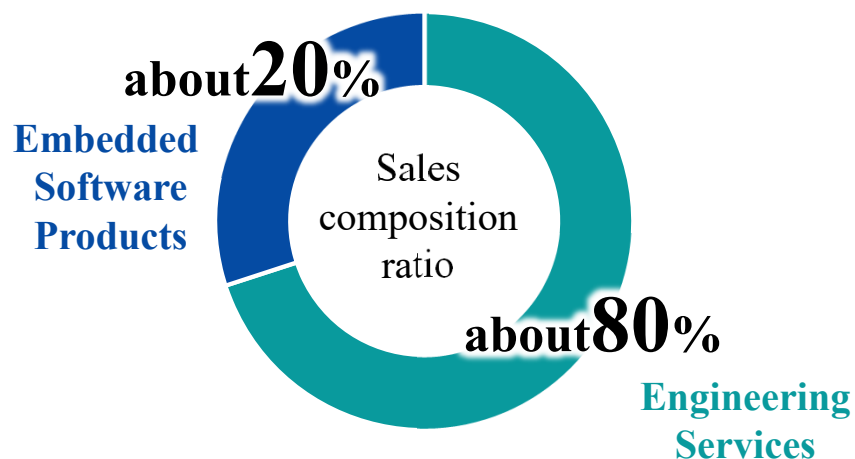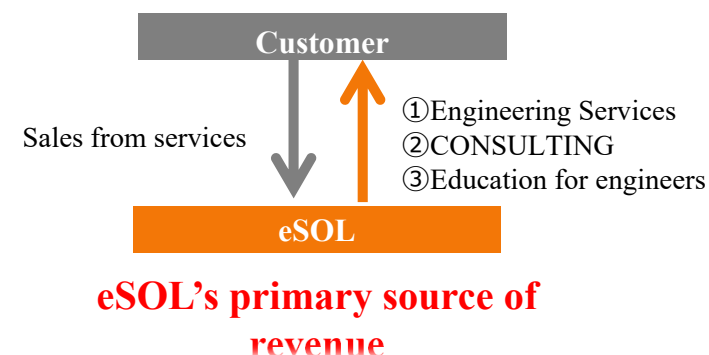- **Very few companies have unique OS.**

Revenue Structure of eSOL's Embedded Software Business

Well-balanced profit structure with highly profitable Embedded Software Products and fairly stable Engineering Services.

● **Embedded Software Products**

● **Engineering Services**

Development / sales of RTOS (real-time operating system)

Customer

①Sales of developed license
②Royalty sales
③Sales of maintenance license

Product sales

eSOL

Excellent earnings without depending on the number of engineers

Development / sales of Development Support Tool

Customer

①Sales of developed license
②Sales of maintenance license

Product sales

eSOL

Customer

Sales from services

①Engineering Services
②CONSULTING
③Education for engineers

eSOL

eSOL's primary source of revenue

about**20%**

Embedded Software Products

Sales composition ratio

about**80%**

Engineering Services

profitability

Embedded Software Products

Engineering Services

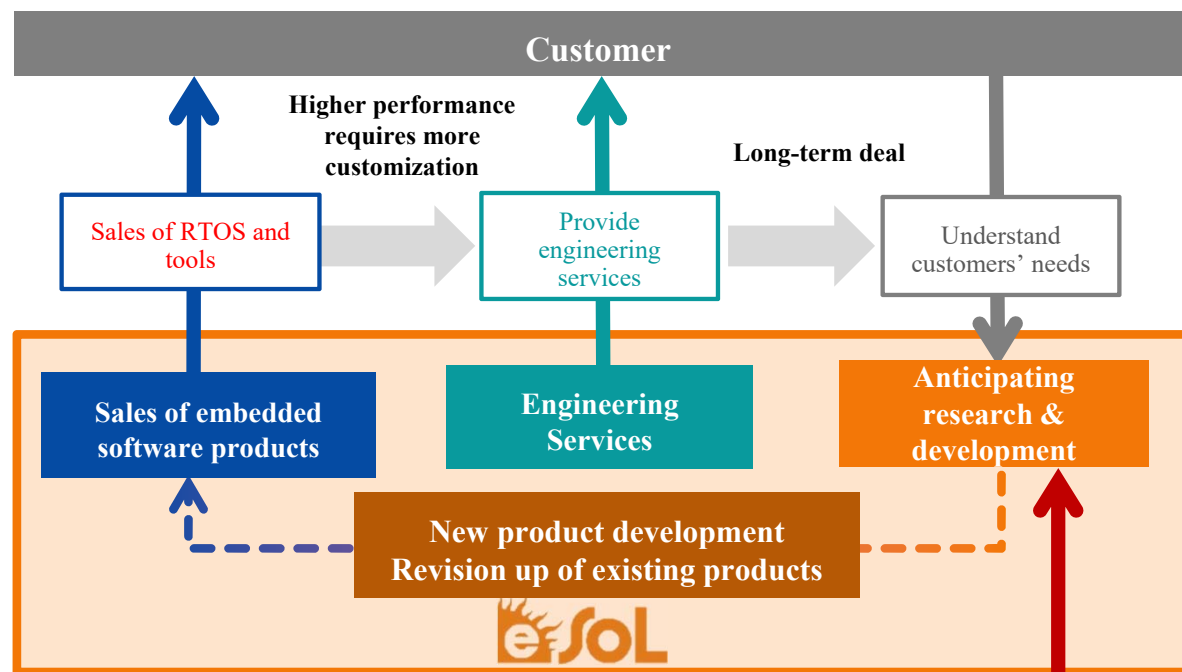**less dependency on the number of engineers**

eSOL's Embedded Software Business Character

Further business expansion has been generated by successful synergy between Embedded Software Products and Engineering Services.
Developing leading-edge products in the industry's stream of standardization.

Customer

Higher performance requires more customization

Long-term deal

| Sales of RTOS and tools | → | Provide engineering services | → | Understand customers' needs |

Sales of embedded software products

Engineering Services

Anticipating research & development

New product development Revision up of existing products

profitability

Embedded Software Products

Demand creation for Engineering Services

Engineering Services

Contribution to quality improvement

less dependency on the number of engineers

Joint research

Understand industry trends

Industry standardization activities

AUTOSAR : The global development partnership in automotive industry established in 2003 to promote international standardization of automotive software infrastructure.
More than 200 companies and organizations participate: such as automobile manufacturers and automotive components manufacturers.

IEEE : Institute of electrical and electronic engineering established in 1963, having its Head Quarter in U.S. SHIM Working Group is WG belonging to a sectional committee.
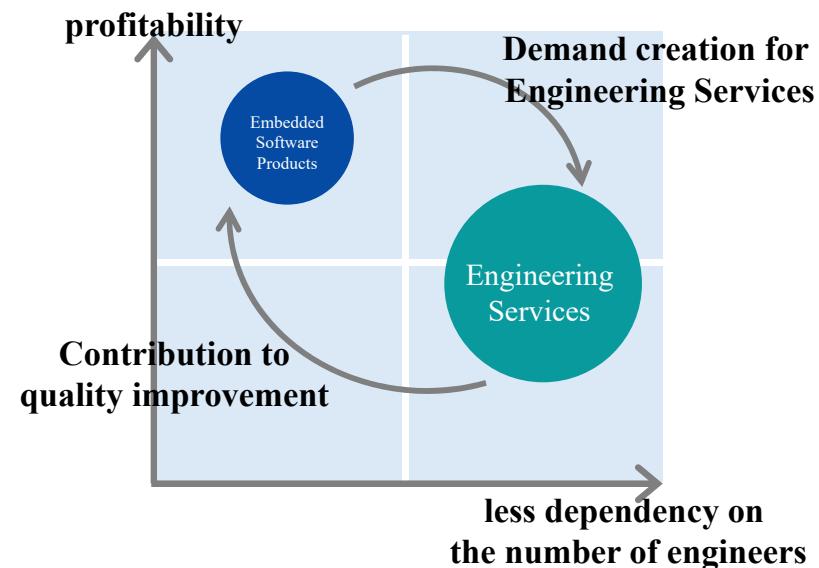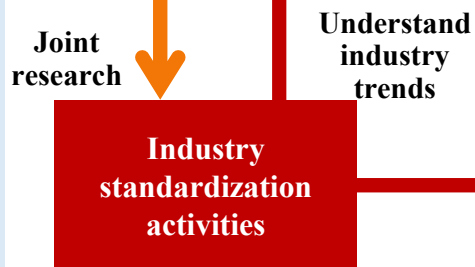
Example for Standardization

■AUTOSAR
AUTOSAR contributes to make specification with its technical expertise and knowledge for onboard system, and allow them to be reflected in state-of-the-art eSOL's software development.

■IEEE SHIM Working Group
Working group promotes to standardize specification between hardware and interface (SHIM) for effective development of software which day by day becomes sophisticated and complex. Moreover, being reflected in eSOL's software development with up-to-date specification. Masaki Gondo, eSOL CTO was appointed Chair in 2019

eSOL's Technology in Embedded Software Business

Core of this business model is established by virtue of advanced technology.

eSOL received various International Safety Standards

Received the following safety standards from
SGS-TÜV Saar GmbH:

- **eT-Kernel Compact**
  - ISO 26262 ASIL D functional safety standard for automotive products.
  - IEC 61508 SIL 4 functional safety standard for industrial equipment

- **eMCOS AUTOSAR**
  - ISO 26262 ASIL D functional safety

- **Development process for real-time OS products**
  - IEC 62304 functional safety standard for medical equipment

Stability of eSOL's Embedded Software Business

Embedded Software Business is stock business.
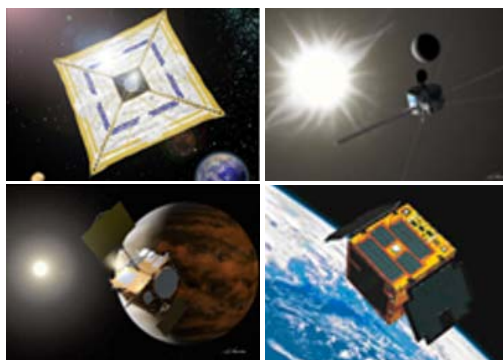Platform-repurchase demand continues.

Providing Products and Engineering Services
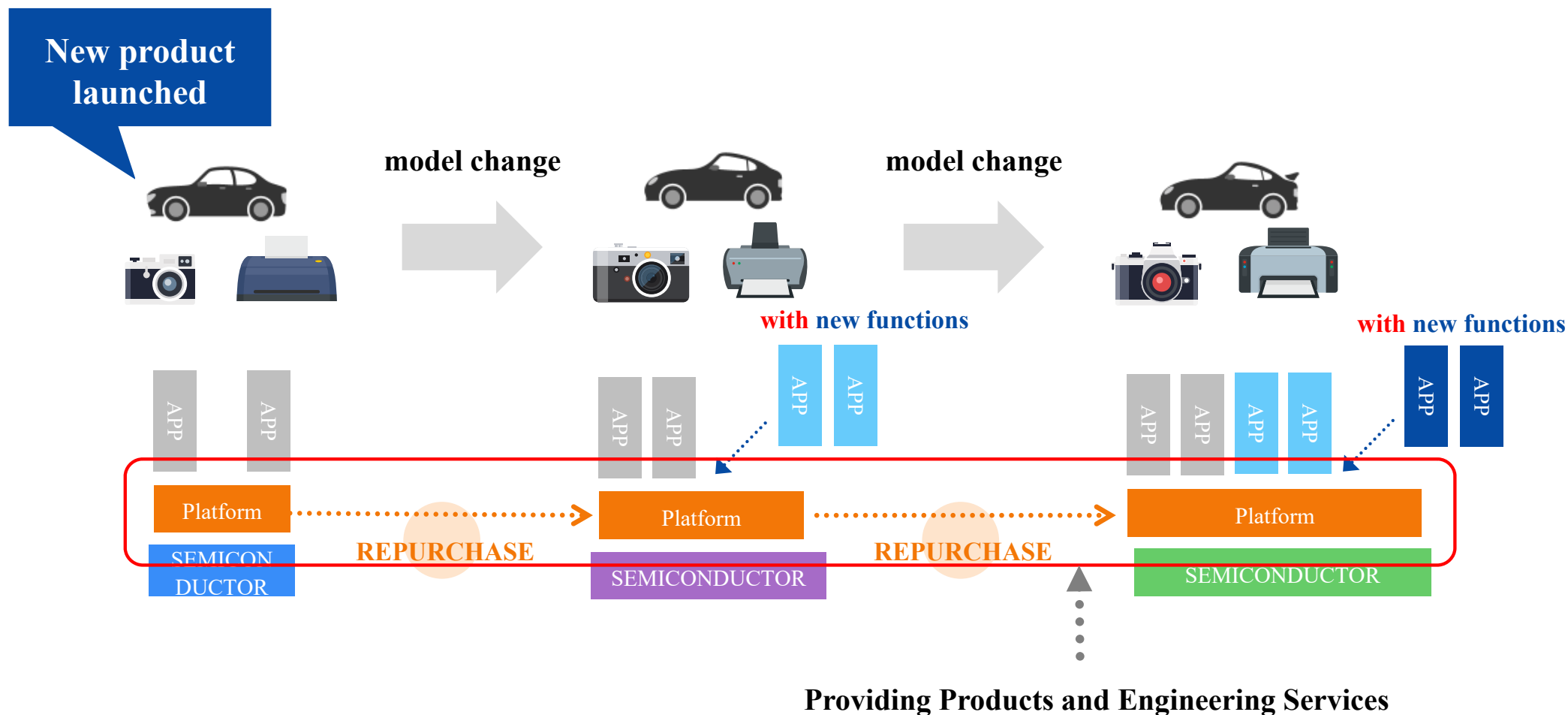
Typical examples of eSOL's Embedded Software

Our Embedded Software has been adopted across industries. Moreover, market size and importance are growing year by year along with IoT becomes familiar.

Automotive devices
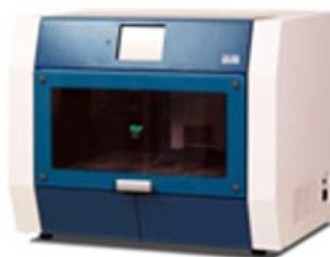

Aerospace

Consumer devices

Industrial equipment

Audio equipment

Physics and chemistry devices

Diverse needs such as research and academic use

Prospective strategy: Promising driver lies in automobile industry

Since 2016, eSOL has been contributing as "Premium Partner" to the global development partnership organized in automobile industry : AUTOSAR.
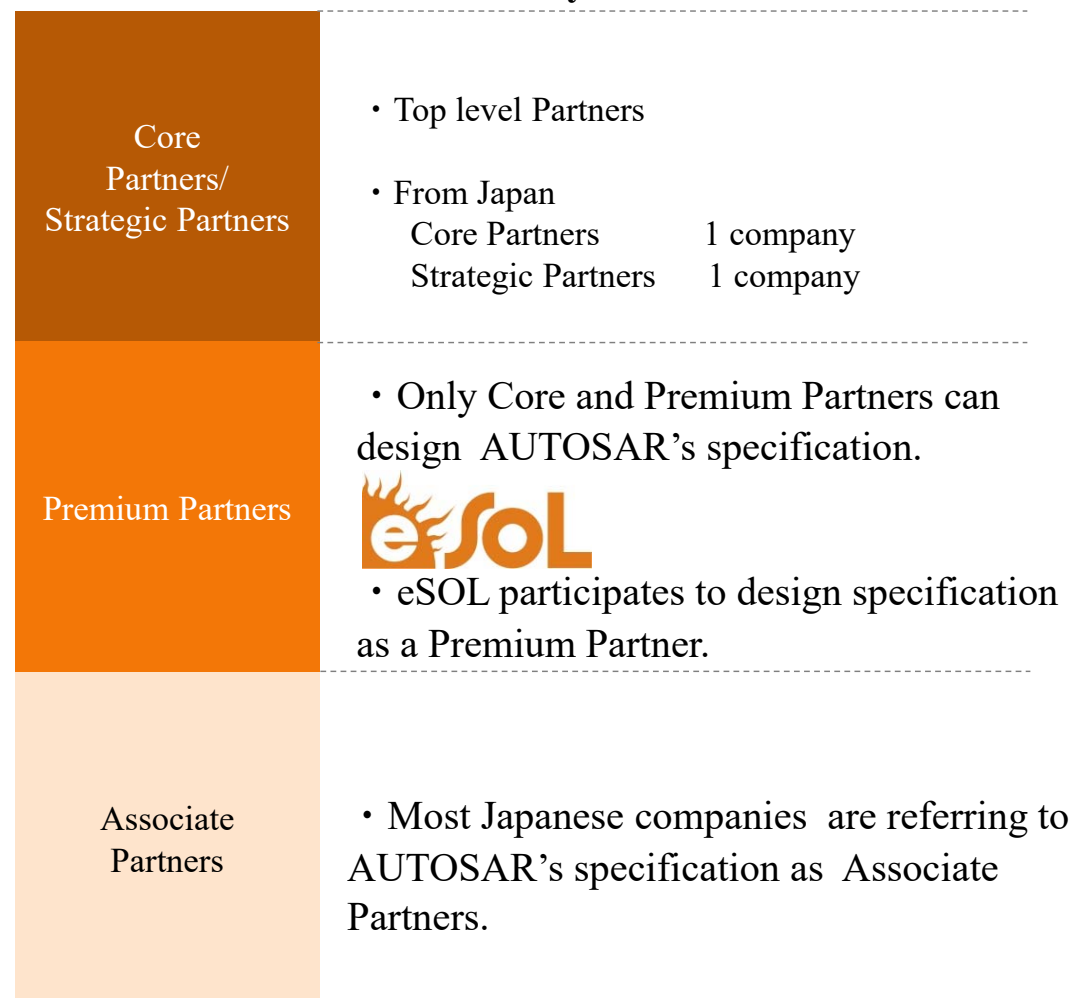
AUTOSAR

What's AUTOSAR ?   https://www.autosar.org/

- **Global development partnership of the automobile industry organized in July 2003.**
- **Consists of more than 200 firms and organizations such as manufacturers of automobiles and automotive components.**
- **Aiming to realize effective development of software and ensure security measure through standardizing basic specification of onboard software.**
- **Already adopted in Europe in mass-produced vehicles, while growing across the other regions including Japan .**

> **According to CITI Research**
>
> AUTOSAR is expected to reduce development cost by 30%.

Outline of AUTOSAR hierarchy

Core Partners/ Strategic Partners	・Top level Partners ・From Japan Core Partners　　　 1 company Strategic Partners　 1 company
Premium Partners	・Only Core and Premium Partners can design AUTOSAR's specification. eSOL ・eSOL participates to design specification as a Premium Partner.
Associate Partners	・Most Japanese companies are referring to AUTOSAR's specification as Associate Partners.

Sensing Solution Business Products

Product planning, manufacturing guidance, and sale of hardware through applying our programming expertise

Logistics related business

In-vehicle printer for issuing designated slips

POS handy terminal

Terminal holder specialized for forklift

Sensor network related business

Farm management system

Sediment disaster preventive system

Strong environmental resistance technology with years of cumulative efforts
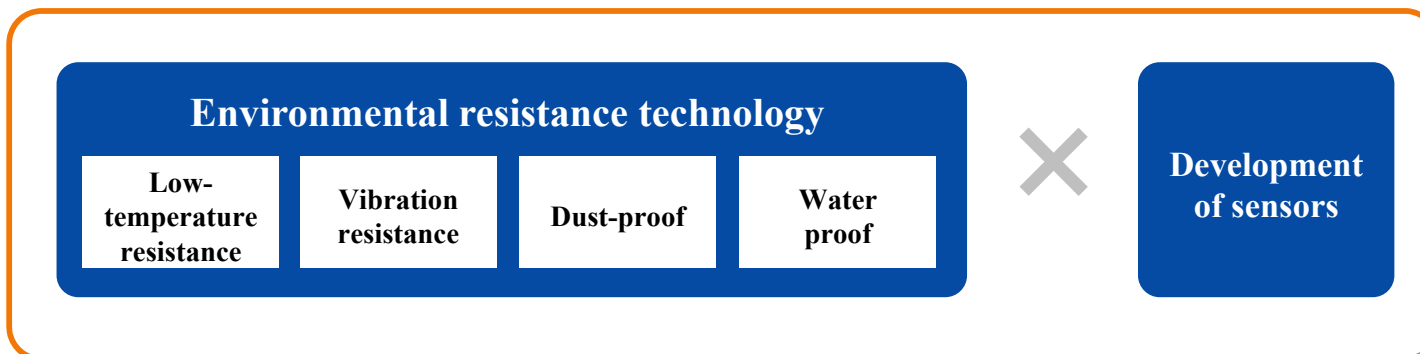
Prospective sensing solution business: IoT market

We continue research aiming at commercialization

eSOL's Strength

Environmental resistance technology

| Low-temperature resistance | Vibration resistance | Dust-proof | Water proof |

× **Development of sensors**

Create sensor network system that enables effective and work saving operation

Target is that industries falling behind ICT

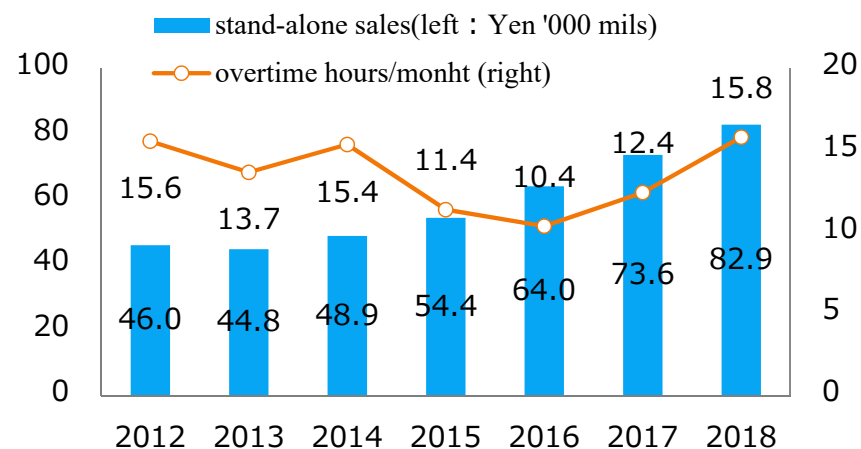| **Disaster prevention** | **Maintain constant water level of paddy fields** | **Pasturage** | **Marine product** |

Remarkable employees' satisfaction, which is our strength

Anticipated other industries in implementing "Reform of Working Practice" from 2012, which has resulted in engineers' increased motivation.
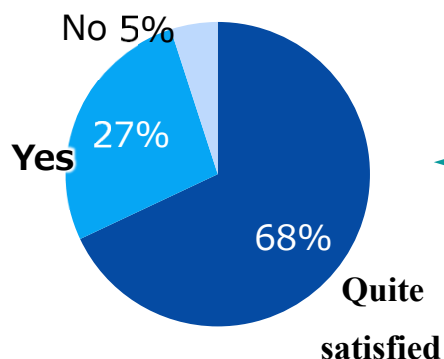
Consciousness survey of engineers
(5 out of 5)

Legend: job satisfaction, work environment

Is eSOL worth working ?
（July 2018 inquiry）

No 5%
Yes 27%
68% Quite satisfied

Engineer's' comments

- **Wanted to develop own OS, I joined eSOL.**
- **I feel satisfied everyday as I realize my skills are growing.**

Sale and "Reform of Working Practice" relationship

Legend: stand-alone sales(left：Yen '000 mils), overtime hours/monht (right)

Year	2012	2013	2014	2015	2016	2017	2018
overtime	15.6	13.7	15.4	11.4	10.4	12.4	15.8
sales	46.0	44.8	48.9	54.4	64.0	73.6	82.9

In 7 years, overtime hours remain at approximately the same level, however, sale has grown by 1.8 times from 2012.

Average length of service

10.9years

(＋ 1.8years from 2012）

Annual paid leave consumed

75.1%

(+4.8% from 2012）

Topics: As the firm implementing "Reform of Working Practice" which the government is promoting, eSOL was introduced in both the Public Service Announcement and The Tokyo Shinbun (2019.2.20) .

（Public Service Announcement URL）
https://www.gov-online.go.jp/cam/hatarakikata/jirei/25.html

2.   eSOL reports for FY2019 3Q Results

FY 2019 Q3

Summary of business results

（JPY mn）

	FY2018 Q3	FY2019 Q3	YoY Increase	YoY
Sales	6,497	**7,384**	+886	+13.7%
Gross profit	1,922	**2,376**	+454	+23.6%
Operating profit	599	**737**	+137	+22.9%
Recurring profit	610	**850**	+240	+39.4%
Net income	434	**614**	+179	+41.2%

（JPY mn）

SEGMENT		FY2018 Q3	FY2019 Q3	YoY
Sales		6,497	**7,384**	+13.7%
	Embedded Software Business	5,885	**6,845**	+16.3%
	Embedded Software Products	1,323	**1,439**	+8.8%
	Engineering Services	4,562	**5,405**	+18.5%
	Sensing Solution Business	603	**535**	△11.3%
	Consolidation adjustment	8	**3**	—
Gross profit		1,922	**2,376**	+23.6%
	Embedded Software Business	1,740	**2,150**	+23.5%
	Sensing Solution Business	170	**218**	+28.1%
	Consolidation adjustment	10	**7**	—
Operating profit		599	**737**	+22.9%
	Embedded Software Business	618	**713**	+15.3%
	Sensing Solution Business	-29	**16**	—
	Consolidation adjustment	10	**7**	—

■ Revenue growth in Embedded Software Business due to sales increase to Automotive and FA devices industries.

Sensing Solution Business shifted the strategy to concentrate on the sales of own Handy Terminal. As a result, the Operating profit of the Business moved into the black, because of margin improvement, partially offset by decrease in sales compared to the previous 3Q.

Sales increased as the whole group.

■ Two segments achieved the growth in Operating profit, and contributed to the growth of Operating profit for the whole group.
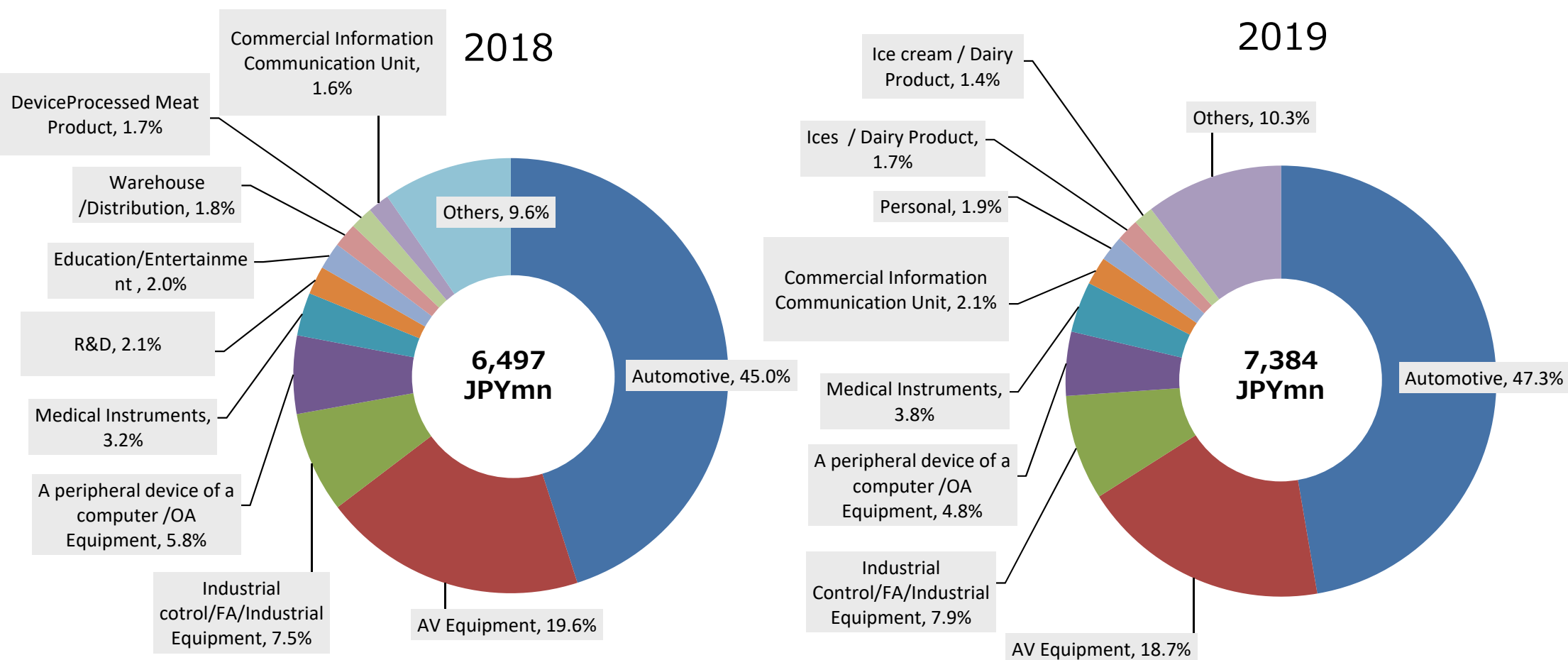
Segment information by customer（Sales）

2018

Commercial Information Communication Unit, 1.6%

DeviceProcessed Meat Product, 1.7%

Warehouse /Distribution, 1.8%

Education/Entertainme nt , 2.0%

R&D, 2.1%

Medical Instruments, 3.2%

A peripheral device of a computer /OA Equipment, 5.8%

Industrial cotrol/FA/Industrial Equipment, 7.5%

Others, 9.6%

6,497 JPYmn

Automotive, 45.0%

AV Equipment, 19.6%

2019

Ice cream / Dairy Product, 1.4%

Ices / Dairy Product, 1.7%

Personal, 1.9%

Commercial Information Communication Unit, 2.1%

Medical Instruments, 3.8%

A peripheral device of a computer /OA Equipment, 4.8%

Industrial Control/FA/Industrial Equipment, 7.9%

Others, 10.3%

7,384 JPYmn

Automotive, 47.3%

AV Equipment, 18.7%

FY 2019 Q3

A policy for Research and Development investment

- About 10% of stand-alone sales is being invested continuously in Research and Development, and Revision Up.

- By accepting the latest technology, we prevent software product from becoming obsolete.

Research and Development investment

（JPY: mils)

	FY 2018 Q3	FY 2019 Q3
Sales	6,497	7,384
R&D Investment	544	665
・Research and Development investment	233	396
・Revision Up investment	311	269
R&D/Sales	8.4%	9.0%
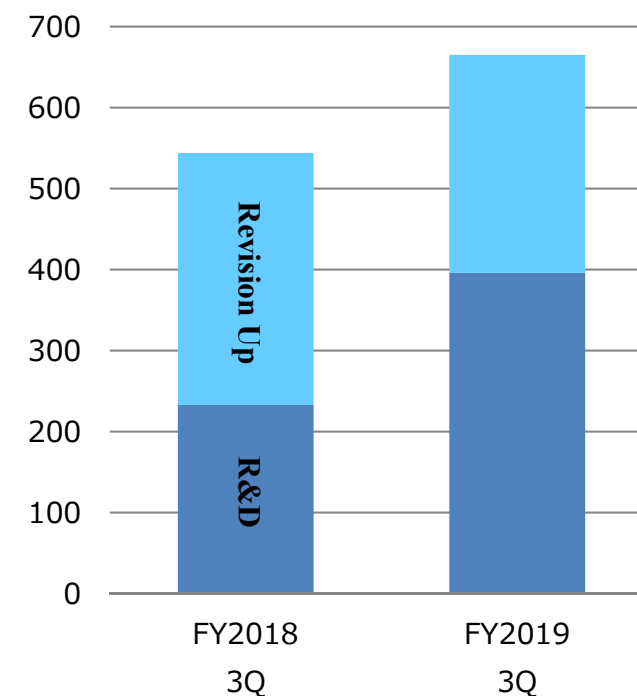
*Revision Up investment: Investment for function maintenance

Progress

(JPY mn)

	FY2019 Q3	FY2019		FY2018	
	result value	PLANNED VALUE	progress rate	result value	increase/ decrease
Sales	**7,384**	9,780	75.5%	8,752	＋11.8%
Operating profit	**737**	690	106.8%	698	△1.2%
Recurring profit	**850**	800	106.2%	687	＋16.5%
Net income	**614**	574	106.9%	524	＋9.6%

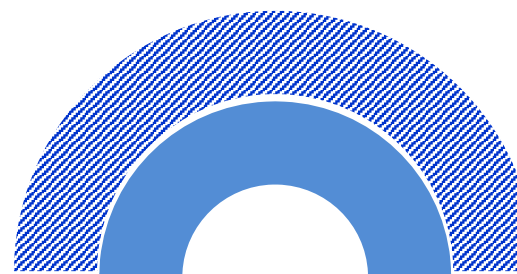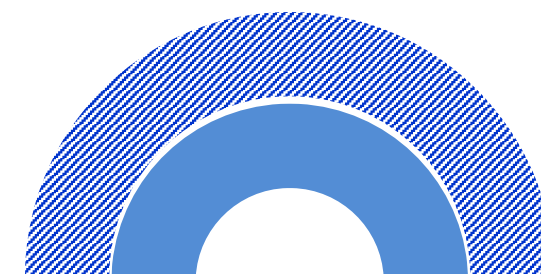| Sales	Operating profit	Recurring profit	Net income
Plan			
3QActuals			
75.5%	106.8%	106.2%	106.9%
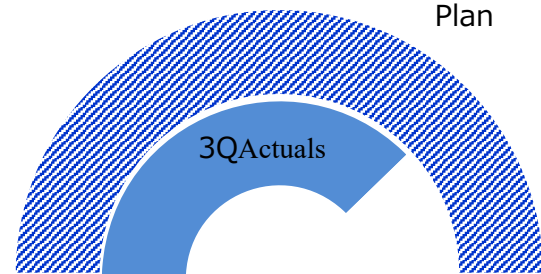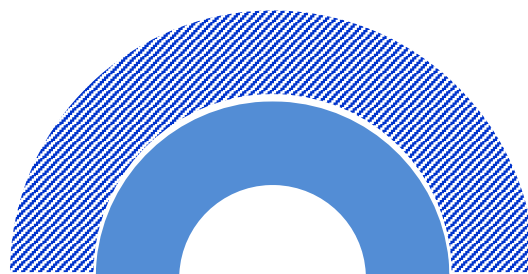
- Actual sales exceeds Plan some.
- Actuals of Operating profit and its under show high achievements against Plan due to the effects of improved Sales margin, and also, reduced Selling & Administrative expenses.

3.   How Our Business Going On

The Current Challenges

Performing field tests with vehicles loading eSOL's OS "eMCOS"

- R&D for High-performance and Low power scalable OS -

Accomplished January,2019

PC

AutoWare +ROS Lite
eMCOS + Manycore

Camera and LiDAR Drivers

Localization (NDT_matching)

Path planning (lane stop)

Path following (pure pursuit)

Control

LiDAR   Camera

without PC

To be Accomplished December,2019

AutoWare +ROS Lite
eMCOS + Manycore

Camera and LiDAR Drivers

Localization (NDT_matching)

Path planning (lane stop)

Path following (pure pursuit)

Control

LiDAR   Camera

23

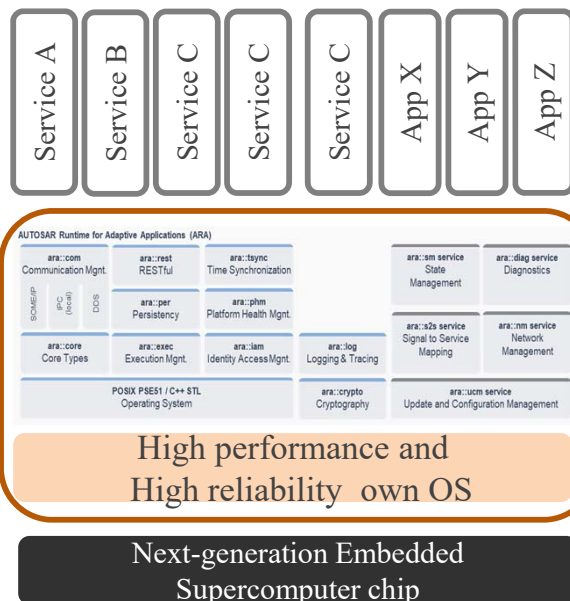# eSOL as Key Platform of Autonomous

eSOL provides Intelligence system platform including autonomous.

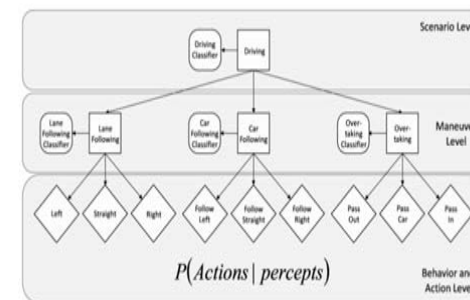**C**onnected
Autonomous
Shared & Service
Electric

Platform of
Intelligence system

High reliability AI framework
for autonomous

| Service A | Service B | Service C | Service C | Service C | App X | App Y | App Z |

AUTOSAR Runtime for Adaptive Applications (ARA)

ara::com Communication Mgnt.	ara::rest RESTful	ara::tsync Time Synchronization		ara::sm service State Management	ara::diag service Diagnostics
SOME/IP, IPC (local), DDS	ara::per Persistency	ara::phm Platform Health Mgnt.			
ara::core Core Types	ara::exec Execution Mgnt.	ara::iam Identity Access Mgnt.	ara::log Logging & Tracing	ara::s2s service Signal to Service Mapping	ara::nm service Network Management
POSIX PSE51 / C++ STL Operating System			ara::crypto Cryptography	ara::ucm service Update and Configuration Management	

High performance and
High reliability own OS

Next-generation Embedded
Supercomputer chip

Notes on this material

Any statements contained in this document that are not historical facts are forward-looking statements based on publicly available information at the time of issuing this document, and therefore, will not guarantee such as the result of operation in the future.

All forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from expectations.

Uncertainties above include but not limited to factors for economical condition in Japan or overseas and trend in the related industries.

eSOL undertakes no obligation to publicly update or revise any forward-looking statements.

Information other than eSOL group contained in this documents is publicly known, and also, eSOL undertakes no obligation to guarantee its accuracy or adequacy.

Contact for information
eSOL Co.,Ltd.
Corporate Planning office
Tel : +81-3-5365-1560
e-mail : esol-ir@esol.co.jp
WEB　: https://www.esol.com/