



# Pioneering “Leading-edge IoT”, with eSOL’s Unique OS Platform

# eSOL Co., Ltd. 2019 Annual Report

February 2020 by eSOL Co., Ltd.  
(listed on the First Section of the Tokyo Stock Exchange: 4420)

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# 1. Overview of the Company





# eSOL SPIRIT – Management Philosophy –





# Overview

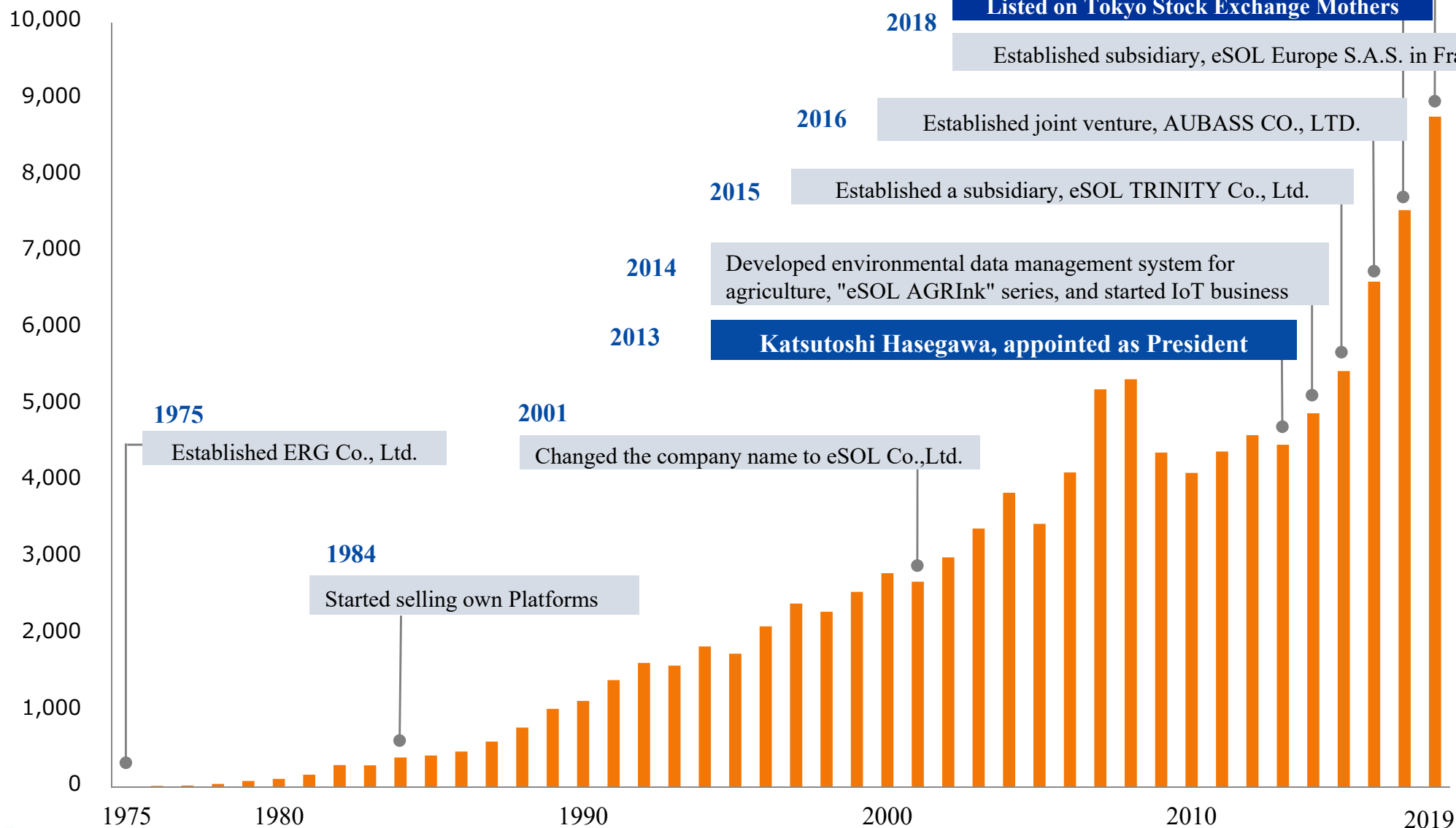
<b>Name</b>	eSOL Co., Ltd.						
<b>Foundation</b>	May 1975						
<b>Representative</b>	President Katsutoshi Hasegawa						
<b>Business</b>	<ul style="list-style-type: none"><li>● R&amp;D, manufacturing and sale of software applicable to computers/computer peripherals and hardware.</li><li>● Development and dispatch of engineers concerning software applicable to computers/computer peripherals and hardware.</li><li>● Consultancy regarding the foregoing.</li></ul>						
<b>Paid-in capital</b>	1,041 million yen as of November 12, 2018						
<b>Employees</b>	449 employees as of December 31, 2019 (consolidated base)						
<b>Group Companies</b>	<table><tr><td>eSOL TRINITY Co., Ltd (Consolidated subsidiary)</td><td>est. Mar. 2015</td></tr><tr><td>AUBASS CO., LTD. (Equity method affiliate)</td><td>est. Apr. 2016</td></tr><tr><td>eSOL Europe S.A.S. (Consolidated subsidiary)</td><td>est. Mar. 2018</td></tr></table>	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
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# History

eSOL has been achieving sustainable growth in fluctuating software industry.

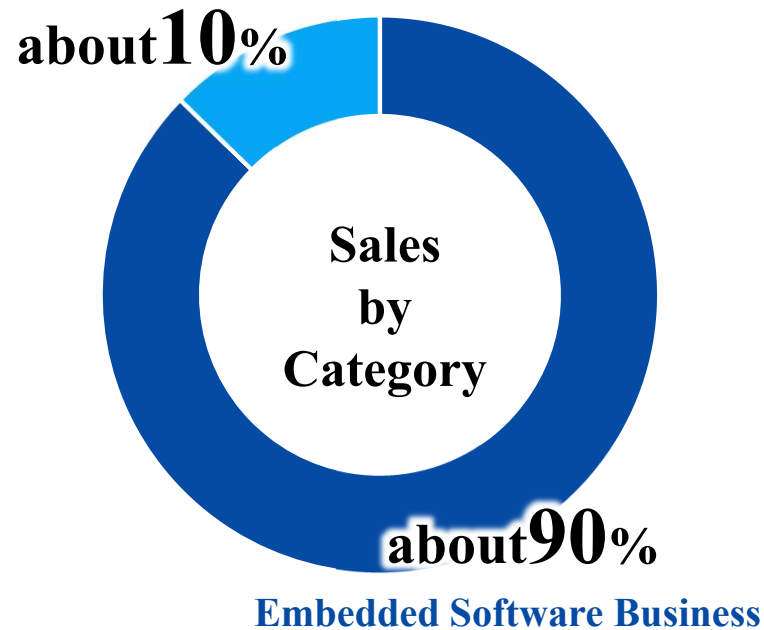
(Sales : JPY: **mils.**)





# Business Overview

## Sensing Solution Business



## Embedded Software Business

- Development and sale of RTOS (real-time operating system)
- Engineering Service for entrusted embedded software
- Consultancy related to the development of embedded software
- Sale Development Tools for embedded software
- Education to engineers that develop embedded software

## Sensing Solution Business

### 【Logistics related business】

- Automotive printer for issuing dedicated slips
- Ordinary temperature handy terminal
- Development and sale of strong environmental resistance handy terminal and sales-support software

### 【Sensor network business】

- Proposal of sensor network system

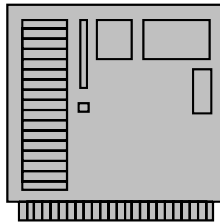
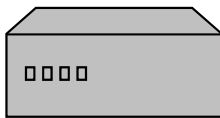


# What's Embedded Software ?

Embedded Software is a piece of software that is embedded in various equipment around us, say, vehicles, and controls the electronic equipment. It excludes, however, so called “Computer” such as PC, server, or super computer. Nowadays, many pieces of equipment are increasingly computerized, and therefore, the embedded software market is expanding.

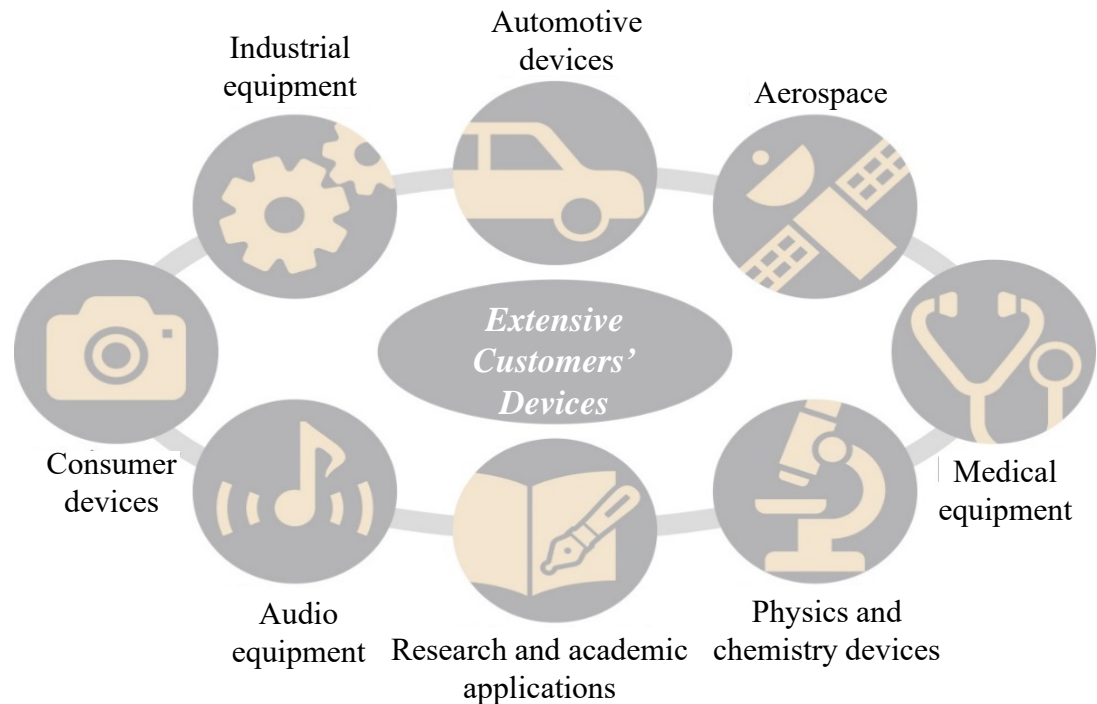
## so called “Computer”

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



## Embedded Software

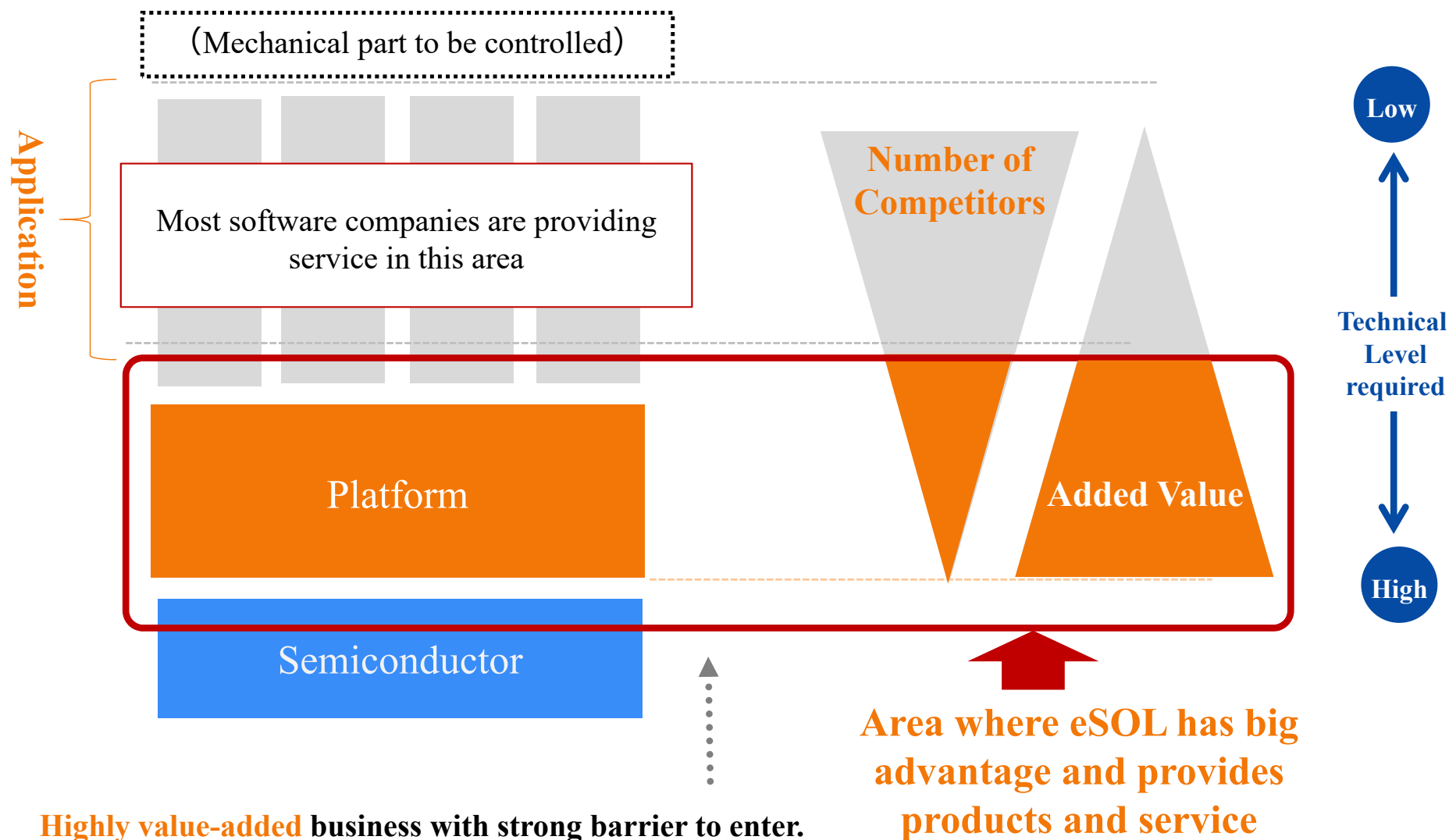
Controlling electronic devices with embedded software inside  
that can be found almost everywhere around us.





# Industry Structure of Embedded Software

Very few companies can develop leading platforms in the world.



- **Highly value-added** business with strong barrier to enter.
- Very few companies have **unique OS**.





# Revenue Structure of eSOL's Embedded Software Business

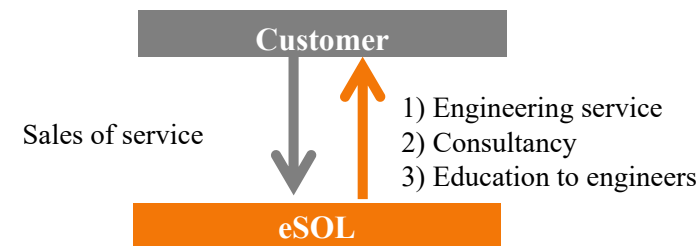
Well-balanced profit structure with highly profitable “Embedded Software Products” and fairly stable “Engineering Service”.

## ● Embedded Software Products

## ● Engineering Services

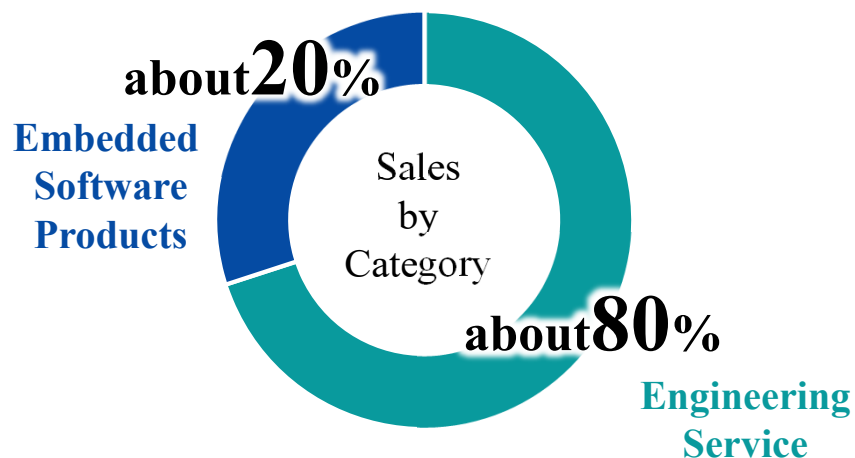
Development / sale of  
RTOS (real-time operating system)

Development / sale of Development  
Support Tools

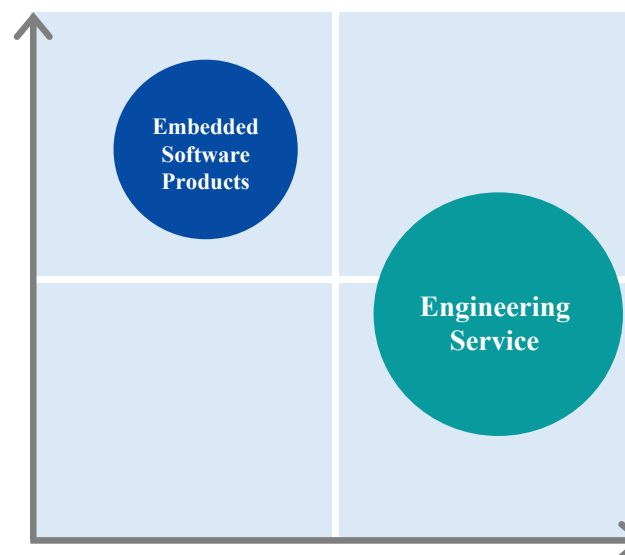


**eSOL's primary source of revenue**

Excellent earnings without depending  
on the number of engineers



profitability

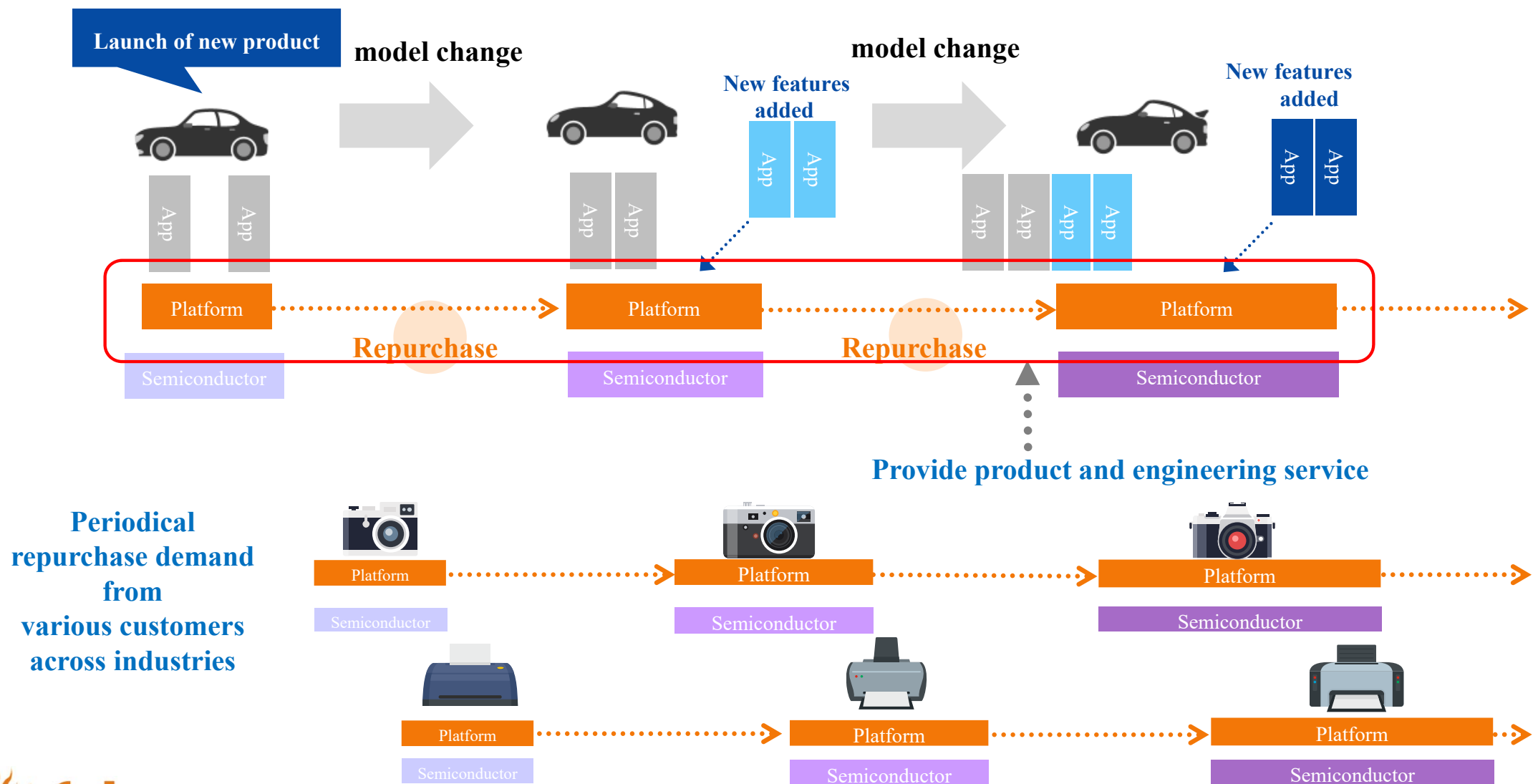


dependency on the number of engineers



# Stability of eSOL's Embedded Software Business

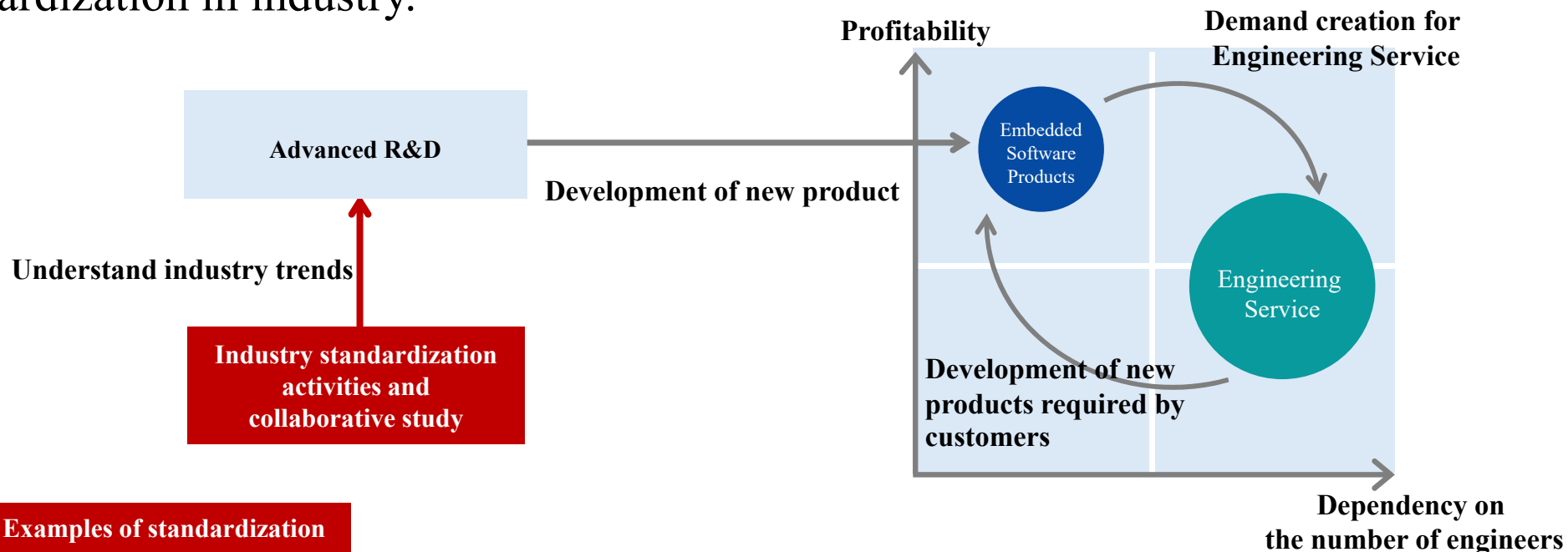
Embedded Software Business is stock business.  
Platform-repurchase demand continues.





# Strength of eSOL's Embedded Software Business

eSOL expands its business through successful synergy between Embedded Software Products and Engineering Service, developing leading-edge products along the trend of standardization in industry.



## ■ AUTOSAR

AUTOSAR is the global development partnership of automotive industry established in 2003 and consists of more than 200 member-companies/organizations such as automobile manufacturer and automotive components manufacturer. Besides, AUTOSAR has been contributing to make specifications with its technical expertise and the knowledge of onboard system, while enabling eSOL to reflect such specialties in our state-of-the-art software development.

## ■ IEEE SHIM WG

IEEE is the institute of electrical and electronic engineering established in 1963 having its Head Quarter in the United States. SHIM Working Group belongs to the sectional committee of computer in IEEE. Mr. Masaki Gondo, CTO, leads WG as the chair, where the global standard was established and took effect as IEEE Std 2804: it enables the efficient development of software applicable to state-of-the-art hardware, e.g., many-core used for automated driving.



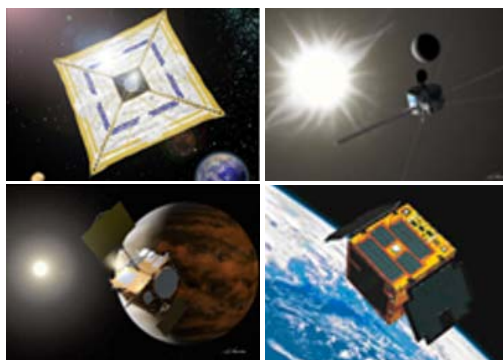
# Typical Examples of eSOL's Embedded Software

Embedded Software has been adopted across industries. Moreover, its market and importance are more growing every year as IoT becomes more familiar.

## Automotive devices



## Aerospace



## Consumer devices



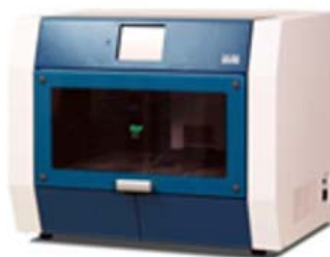
## Industrial equipment



## Audio equipment



## Physics and chemistry devices



## Diverse needs lie in such as research and academic use







# Sensing Solution Business Products

Our programming expertise is applied in the product planning, manufacturing guidance and sale of hardware.

## Logistics related business



Automotive printer for issuing designated slips



POS handy terminal system



Transformer



Dedicated terminal holder for forklift

## Strong environmental resistance technology with mature expertise



## Sensor network business

Farm management system, disaster prevention system etc.

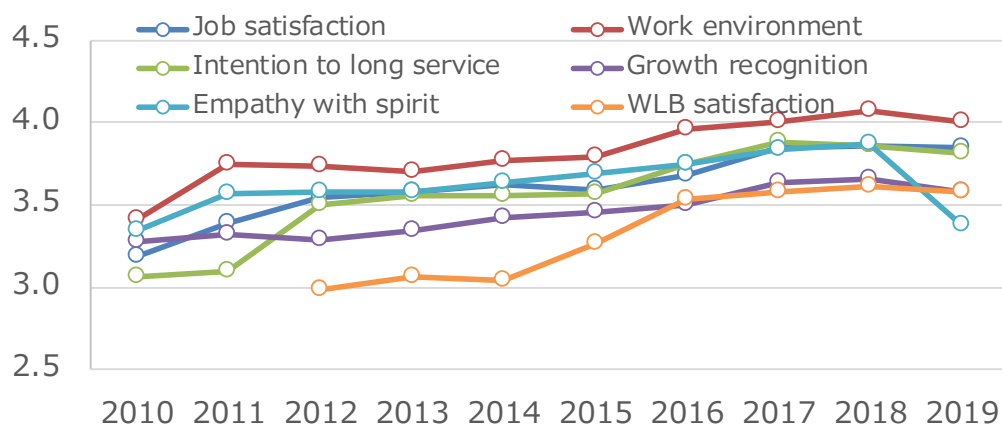




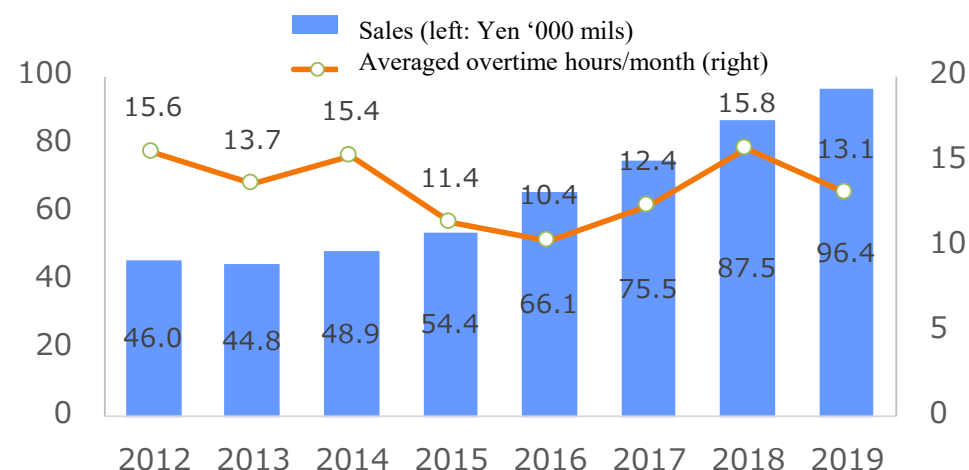
# Fair Degree of Employees' Satisfaction is Our Strength

eSOL has implemented “Reform of Working Practice” since 2012, much earlier than other companies in industry; engineers' motivation has improved.

## Awareness survey of engineers (5 out of 5)

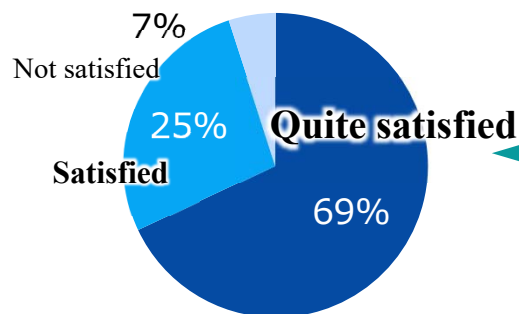


## Sales vs “Reform of Working Practice”



## What do you think about working in eSOL ?

(July 2019 inquiry)



### Engineers' comments

- I joined eSOL wishing to develop unique OS.
- I feel myself motivated as my skill improves day by day.

In the past 8 years, overtime hours have remained on the almost same level, while sales has grown twofold.

**Average**  
**length of service**  
**10.7 years**  
(+1.6 years from 2012)

**Annual paid leave**  
**consumed**  
**81.4%**  
(+11.1pt from 2012)

### Topics

eSOL has been enhancing the quality of Work Life Balance as one of the company's strategy, and more specific, supporting male employees so that they can take child-care leave easily. Recently, Work Life Balance Co. and Forbes Japan collaborated to issue the feature article — “All male employees should take child-care leave”. The article featured Mr. Hasegawa, President, as one of the “Managers encouraging employees to take child-care leave”. We are very happy if you would refer to below

<https://forbesjapan.com/articles/detail/31248>



## 2. How Our Business Going On



# Prospective Strategy: Promising Driver lies in Automotive Industry

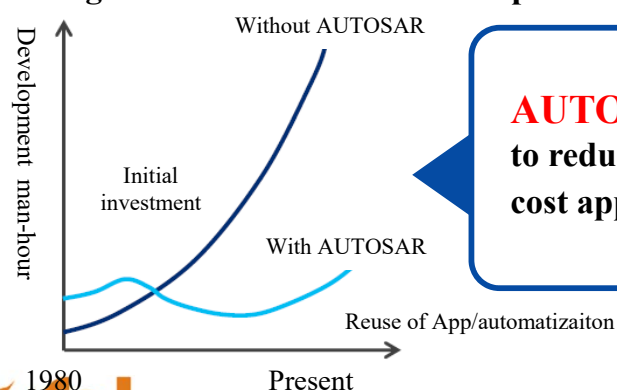
Since 2016, eSOL has been doing fine service as “Premium Partner” in **AUTOSAR**, the global development partnership organized in automotive industry.



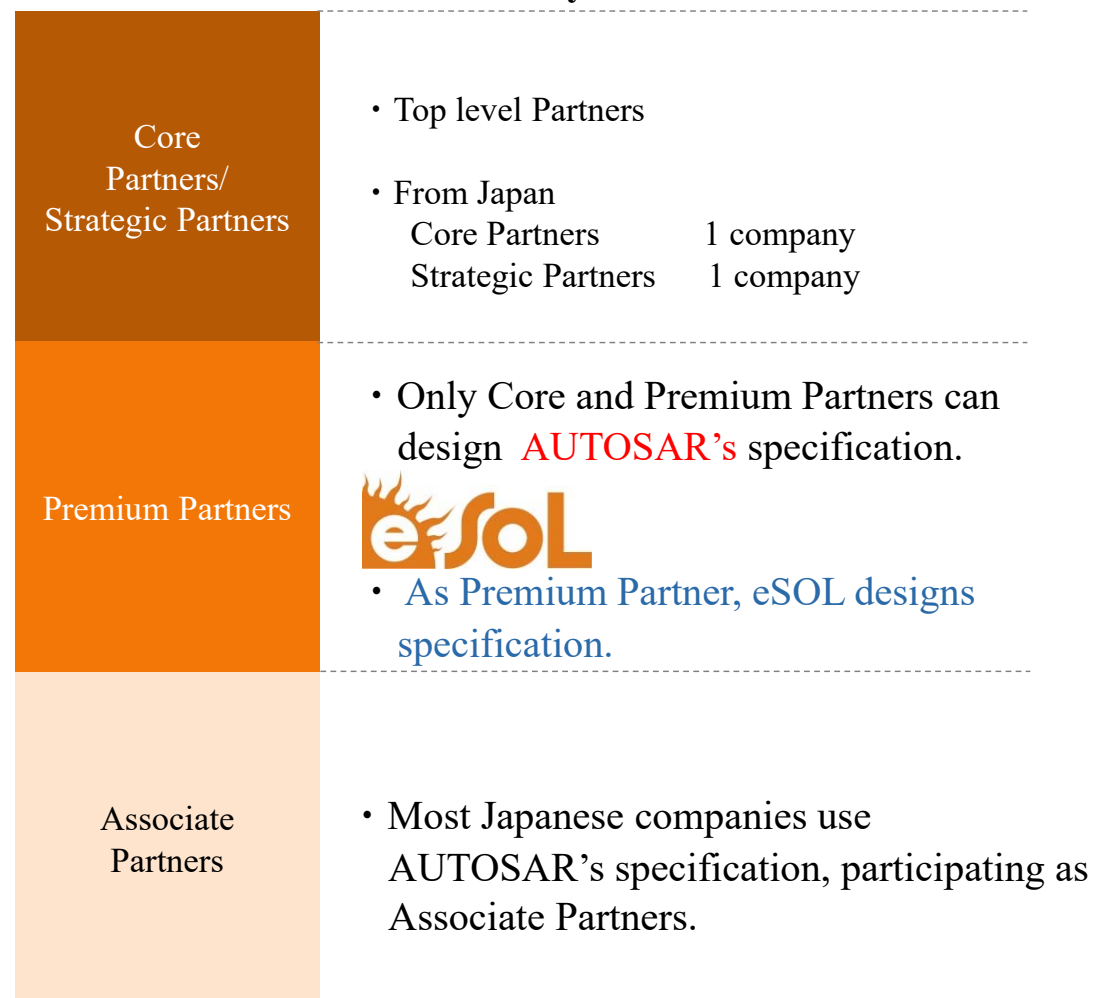
## What's AUTOSAR ? <https://www.autosar.org/>

- Global development partnership of the automotive industry organized in July 2003.
- Consists of more than 200 member-companies/organizations such as automotive manufacturers and automotive components manufacturers.
- Aiming to realize effective development of software and ensure security measures through standardizing basic specifications of onboard software.
- AUTOSAR's specifications have already adopted in mass-produced vehicles in Europe, also being adopted across other regions including Japan .

### Image of cost reduction in development with **AUTOSAR**



## Outline of AUTOSAR hierarchy







# Press Release



## Press Release

June 11, 2019

eSOL Co., Ltd.

### Denso Vehicle Surround View Adopts eSOL eT-Kernel Safety RTOS

*Supporting Development of Mechanisms for Guaranteeing Safety*

Tokyo, Japan. June 11, 2019 -eSOL, a leading developer of real-time embedded software solutions, today announced that eSOL's eT-Kernel™ Multi-Core Edition (MCE) base platform has been selected for use in a vehicle surround view system developed by DENSO Corporation. eT-Kernel MCE is a software platform that incorporates eT-Kernel MCE, a real-time operating system (RTOS) for multi-core processors that supports Functional Safety (FuSa). eSOL will also supply services to support the development of safety mechanisms based on its extensive knowledge and experience with Functional Safety compliance. This will help achieve the required level of safety and reliability to satisfy Functional Safety standards in the development of vehicle periphery monitoring systems, in addition to its demanding real-time performance and quality requirements.



The vehicle periphery monitoring system developed by DENSO combines high-resolution cameras and image processing to stitch together images from the cameras mounted around the periphery of a vehicle, thereby providing clear video pictures and advanced detection functions.

eT-Kernel has acquired product certification under the ISO 26262 (road vehicles) and IEC 61508 (industrial equipment) Functional Safety standards at the highest safety levels (ASIL D and SIL 4 respectively). Similarly, eSOL's development process for RTOS products has also been certified compliant with the IEC 62304 safety standard for medical equipment. The eBinder® development environment, meanwhile, supports high reliability and enables development to be undertaken in a way that satisfies the requirements of ISO 26262 and IEC 61508. For eT-Kernel and eBinder users, eSOL also supplies the eT-Kernel Safety Package, which packages together safety manuals, reports, and other documentation containing the evidence and related information associated with implementing Functional Safety on user systems that incorporate eSOL products. eSOL provides comprehensive support for achieving Functional Safety in ways that suit user needs, thereby allowing users to focus on the development of their own products and on achieving compliance with Functional Safety standards.



"I am honored that DENSO Corporation has chosen to use the eT-Kernel MCE base platform in its vehicle surround view systems. At eSOL, we provide a high level of support for ensuring quality and safety in automotive system development, drawing on our extensive involvement in the development of embedded systems with demanding real-time performance and reliability requirements, and also on the experience and know-how we have built up from acquiring Functional Safety certification for our own products," said Nobuyuki Ueyama, Executive Vice President of eSOL.

#### ■ For Reference

##### eT-Kernel MCE

eT-Kernel Multi-Core Edition (MCE) is an RTOS for embedded systems using a multi-core processor. Featuring eSOL's proprietary Blended Scheduling, the eT-Kernel MCE enables the coexistence of both symmetrical (SMP) and asymmetrical (AMP) multi-core processing in a single system. Four scheduling modes are available based on Single Processor Mode



## Press Release

February 6, 2020  
eSOL Co., Ltd.

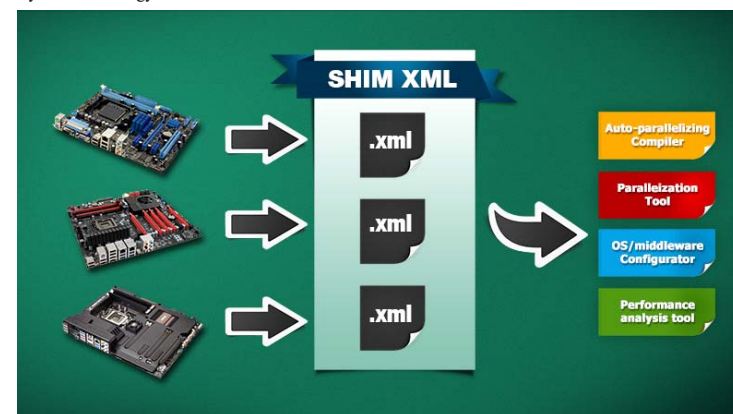
### eSOL-Promoted SHIM Interface Becomes IEEE Std 2804 International Standard

~ IEEE SHIM Working Group Chaired by eSOL CTO Masaki Gondo ~

Tokyo, Japan. February 6, 2020 -eSOL, a leading developer of real-time embedded software solutions, today announced that SHIM has been formalized as IEEE Std 2804-2019, the first such standard to be formulated by the IEEE Computer Society/Design Automation/Software-Hardware Interface for Multi-many-core Working Group (IEEE C/DA/SHIM WG), which was established in February of last year within the Institute of Electrical and Electronics Engineers (IEEE). The Multi-many-core Working Group's role was to work on the standardization of hardware architecture descriptions from the standpoint of software design. Masaki Gondo, eSOL's CTO and Technology Headquarters GM, played a central role in formulating the standard, serving as working group chair and making continuous contributions that resulted in the standard being issued less than one year after the working group got underway, an extraordinarily short time for an IEEE standard.



The IEEE C/DA/SHIM WG was established in February 2019 as a working group for the standardization of hardware architecture descriptions from the standpoint of software design within the Design Automation Standards Committee of the IEEE Computer Society, one of the 39 separate societies within the IEEE. This working group is in charge of defining descriptive standards of architecture from the standpoint of software design for Software-Hardware Interface for Multi-many core (SHIM), as well as providing XML schemas to abstract the key hardware properties that are critical to enabling multi-many-core tools. The XML interface will assist in reducing costs for supporting new multi-many-core hardware. This is expected to spur development of new and innovative multi-many-core tools for building an ecosystem of multi-many-core technology.



Existing tools that already use IEEE Std 2804 include the eMBP model-based parallelizer being developed by eSOL in partnership with Nagoya University and SLX from Silexica GmbH for which eSOL Trinity acts as an agent. Compliance with IEEE Std 2804 enables these tools to provide prompt support for new multi-many-core chips from different vendors.



# Sensor Network Related Business

Newly implemented CSR activity enhances our corporate value by utilizing disaster preventive system.

Damage caused by landslides from typhoon and local heavy rain or floods is being more and more serious every year, in addition, supply chain (network) stops every time disaster occurs and affects life-line.



We estimate the risk of landslide and flood

Companies considering BCP (Business Continuity Plan) **30.5%** 2019 by Cabinet Office



**Review of BCP is urgent issue for companies**

Objective:

- introduce disaster sensor system to BCP;
- enhance CSR (Corporate Social Responsibility); and
- achieve SDGs (Sustainable Development Goals) through a. and b.





### 3. eSOL reports FY2019 Results



# FY 2019 Results - Summary

## Summary of results

(JPY: mils)

	2018	2019	Valiance from 2018	vs 2019 Forecast	
				Forecast	Achieved
Sales	8,752	<b>9,644</b>	<b>+ 10.2%</b>	9,780	98.6%
Operating income	698	<b>748</b>	<b>+ 7.2%</b>	690	108.5%
Income from continuing operation	687	<b>867</b>	<b>+ 26.2%</b>	800	108.3%
Net income	524	<b>659</b>	<b>+ 25.8%</b>	574	114.8%

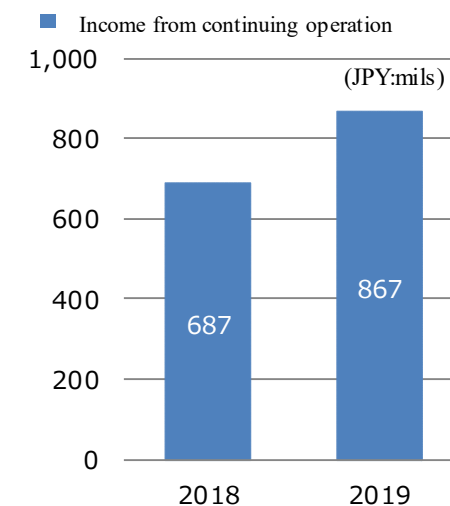
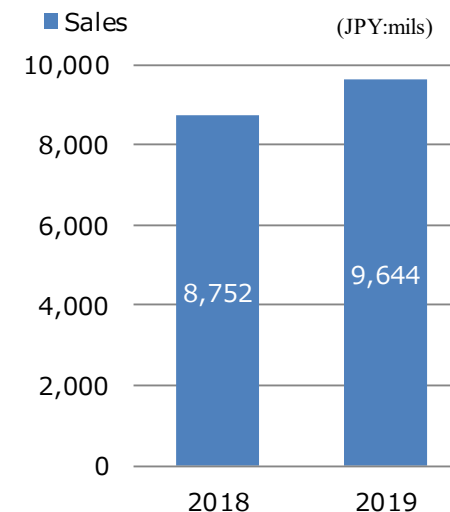
- Embedded Software Business achieved increase both in sales and profits, resulting from the expansion of sales to automobiles and FA equipment.

Sensing Solution Business went into the black due to margin improvement owing to the successful strategy shift which concentrates on the sale of own Handy Terminal.

Operating profit grew due to increase in profit and being in the black achieved by two segments respectively.

- Allocated R&D expense related to entrusted NEDO\* project to Selling expense, and revenue from the project into Other income.

\*New Energy and Industrial Technology Development Organization







# FY 2019 Results - Summary

## Results by segment - summary

(JPY: mils)

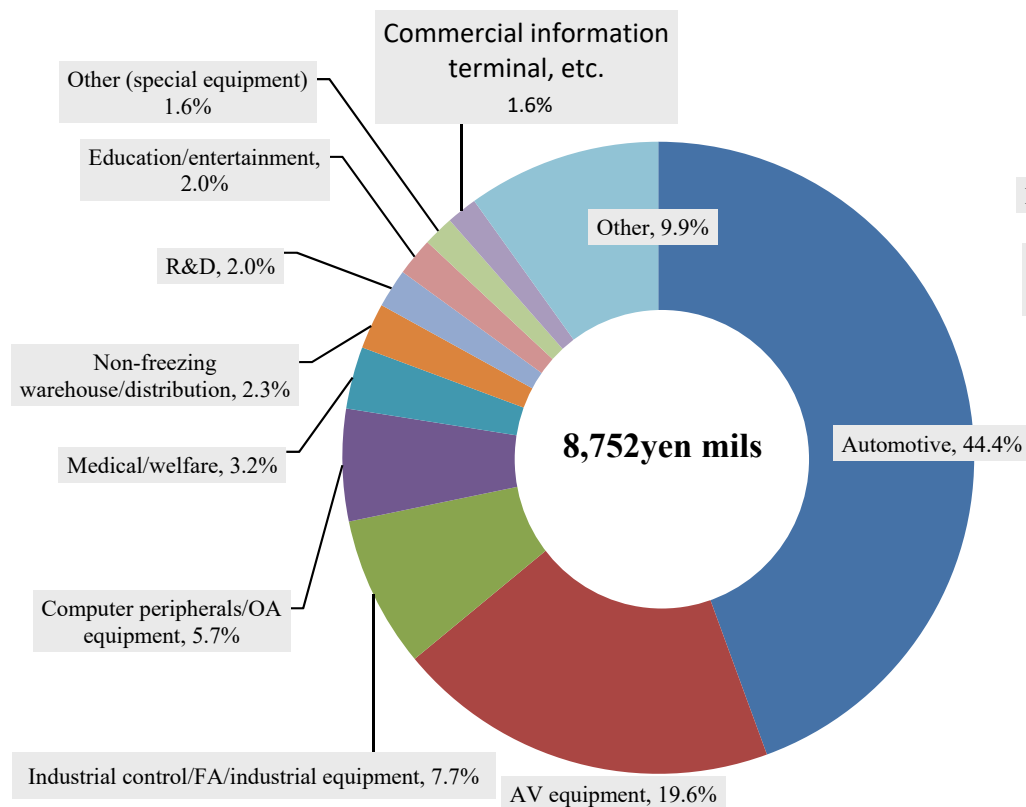
By Segment		2018	2019	Valiance from 2018 (%)
Sales		8,752	<b>9,644</b>	+ 10.2%
	Embedded Software Business	7,906	<b>8,928</b>	+ 12.9%
	Embedded Software Product	1,699	<b>1,779</b>	+ 4.7%
	Engineering Service	6,207	<b>7,149</b>	+ 15.2%
	Sensing Solution Buiness	818	<b>736</b>	△10.0%
	Adjustments for consolidation	27	<b>-20</b>	—
Gross margine on sales		2,604	<b>2,995</b>	+ 15.0%
	Embedded Software Products	2,351	<b>2,709</b>	+ 15.2%
	Sensing Solution Buiness	221	<b>300</b>	+ 35.3%
	Adjustments for consolidation	30	<b>-14</b>	—
Operating income		698	<b>748</b>	+ 7.2%
	Embedded Software Products	717	<b>737</b>	+ 2.9%
	Sensing Solution Buiness	-49	<b>25</b>	—
	Adjustments for consolidation	30	<b>-14</b>	—



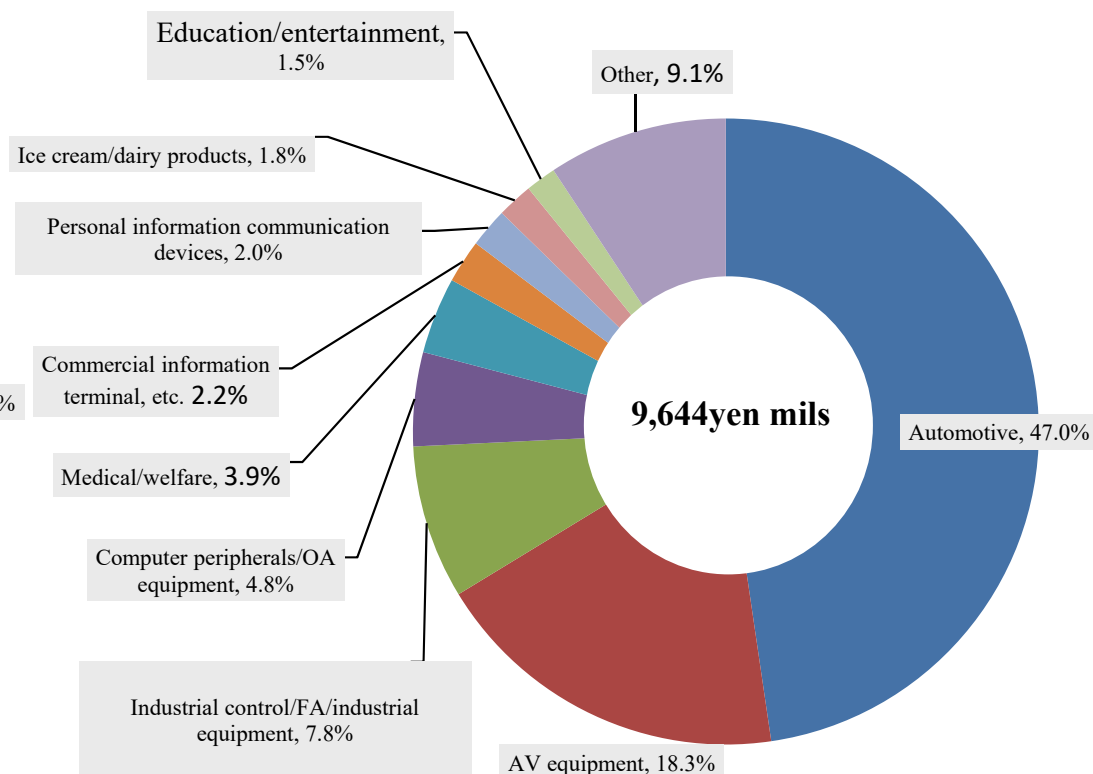
# FY 2019 Results - Summary

## Segment information by customer (Sales)

2018



2019





## 4. FY2020 Forecast



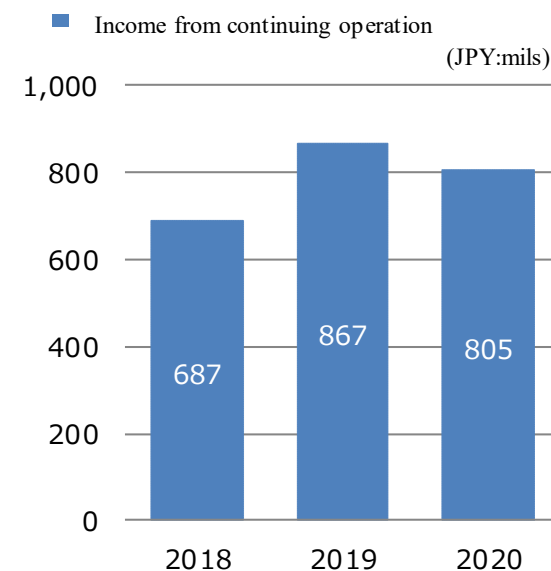
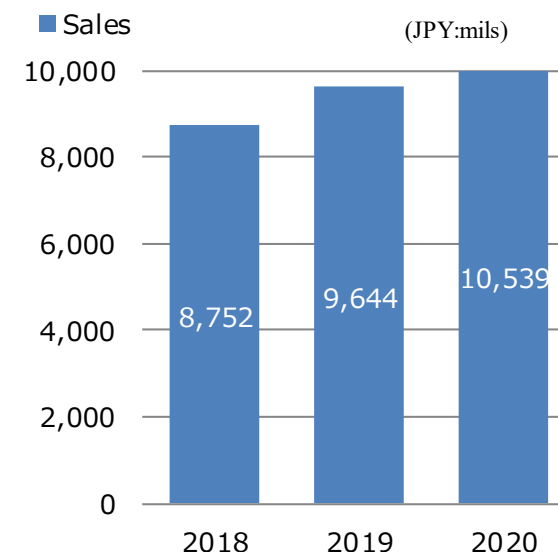
# FY 2020 Forecast

## Forecast

	2019		2020		(JPY : mils)	
	FY2019 2Q cumulative	FY2019	FY2020 2Q cumulative	FY2020	2Q cumulative	FY
Sales	4,811	9,644	4,973	10,539	+3.4%	+9.3%
Operating income	415	748	200	598	△51.7%	△20.0%
Income from continuing operation	519	867	399	805	△23.1%	△7.2%
Net income	362	659	295	591	△18.3%	△10.3%

- Expect 10% increase in sales revenue as well as the prior period.
- The whole group accelerates investment in the development of unique OS which targets at automotive industry where computerization has been increasingly adopted.
- We plant to allocate revenue from NEDO project, “Innovative AI Chips and Next-Generation Computing Technology Development”, to Other income as well as we did in the prior period.

\*New Energy and Industrial Technology Development Organization







# FY 2020 Forecast 【Investment in Development】

As a Japanese vendor with unique OS, we invest in development targeting at global market.

## ■ Basic policy: investment in development

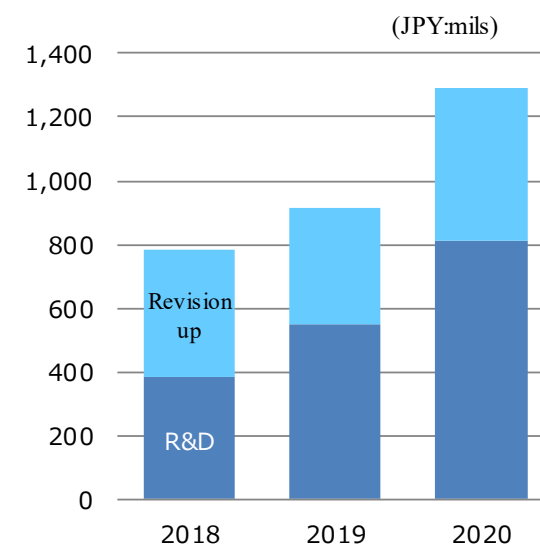
Allocate approx. 10% of sales revenue and continuously invest in R&D and Revision Up expense.

## ■ Policy for this FY

The whole group, including overseas affiliates, accelerates investment in the development of unique OS which targets at automotive industry where computerization has been increasingly adopted.

## ■ Forecast for this FY

(JPY: mils)					
	2018	2019	2020	Valiance from 2019	
Consolidated sales revenue	8,752	9,644	<b>10,539</b>	<b>+9.3%</b>	
Investment in development	781	916	<b>1,292</b>	<b>+41.1%</b>	
R&D	383	551	<b>811</b>	<b>+47.2%</b>	
Revision up	398	364	<b>480</b>	<b>+31.9%</b>	
Investment against sales ratio	8.9%	9.5%	<b>12.3%</b>		



Revision up : investment to maintain the function of product



# FY 2020 Forecast 【Remuneration to Shareholders】

eSOL will remunerate shareholders in accordance with the following policies.

## ■ Dividend Policy

Stable financial position

Dividend cover in accordance with performance

Investment in the improvement of corporate value by using internal reserve (investment in development, human development, etc.)

## ■ Amount of Dividend

	2019	2020
Dividend per share	*5.50yen	5.50yen
(interim dividend included)	(0.00yen)	(1.50yen)
Dividend cover	17.0%	18.9%

\*memorial dividend of 1.50yen/share is included



# 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.  
President's office  
Tel : +81-3-5365-1560  
e-mail : [esol-ir@esol.co.jp](mailto:esol-ir@esol.co.jp)  
WEB : <https://www.esol.com/>