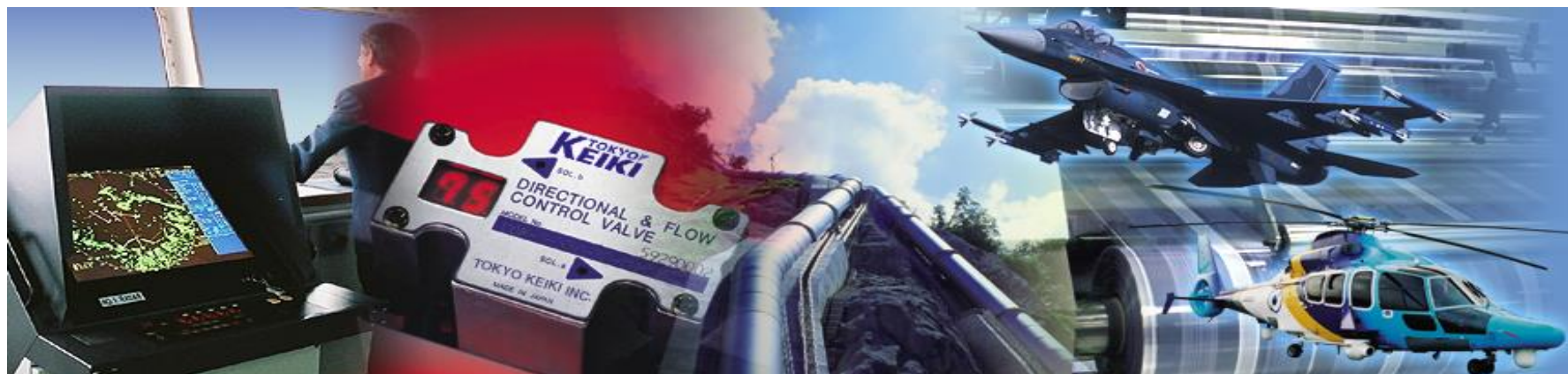


# TOKYO KEIKI INC.

## Financial Results Briefing for the Fiscal Year Ended March 31, 2018 (Fiscal 2017)

June 1, 2018

President **Kenichi WAKI**



The forward-looking statements contained in this material reflect the management's assumptions based on currently available information as of the date of announcement. Future changes in business environment and other factors may therefore cause differences with the actual situation.

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- 1. Summary of financial results for Fiscal Year Ended March 31, 2018 (Fiscal 2017)**
2. Progress and key measures in each business segment
3. Outlook for Fiscal Year Ending March 31, 2019 (Fiscal 2018)
4. New Medium-term Management Policy and Medium-term Business Plan

## Business Overview

### Defense & Communications Equipment Business

Manufacture and sale of radar warning receivers, naval gyrocompasses, submarine inertial navigation systems, inertial sensors, and microwave devices



### Marine Systems Business

Manufacture, sale, and services for marine gyrocompasses, marine autopilots, electronic chart display and information systems (ECDIS), radars, and other nautical instruments, and for satellite communications equipment, radios, and other marine communications equipment



### Hydraulics and Pneumatics Business

Manufacture and sale of hydraulic solenoid valves, pumps, motors, and hydraulic components & systems



### Fluid Measurement Equipment Business

Manufacture and sale of ultrasonic flowmeters and microwave level gauges used in water supply facilities and agricultural water



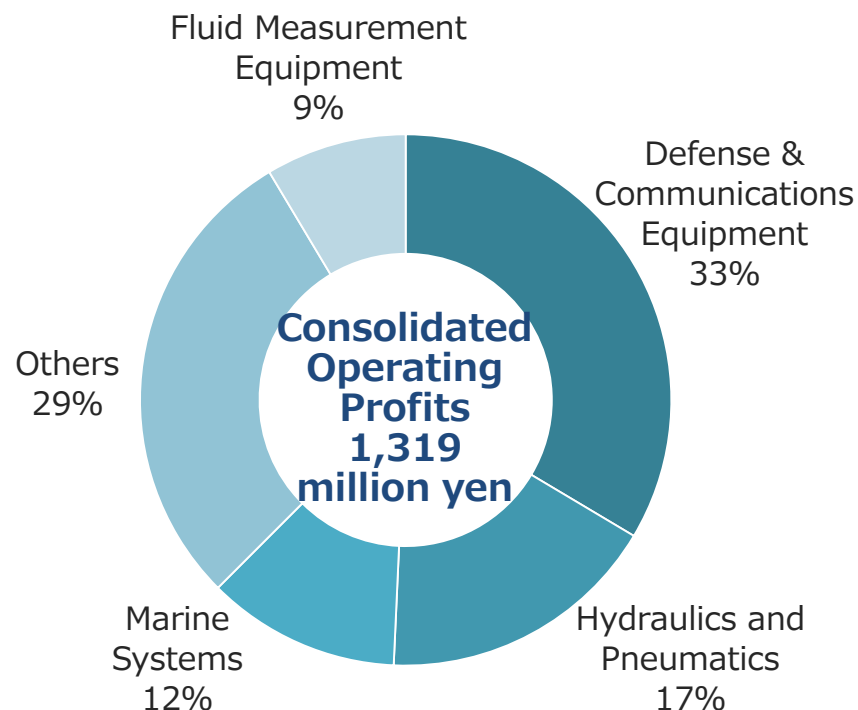
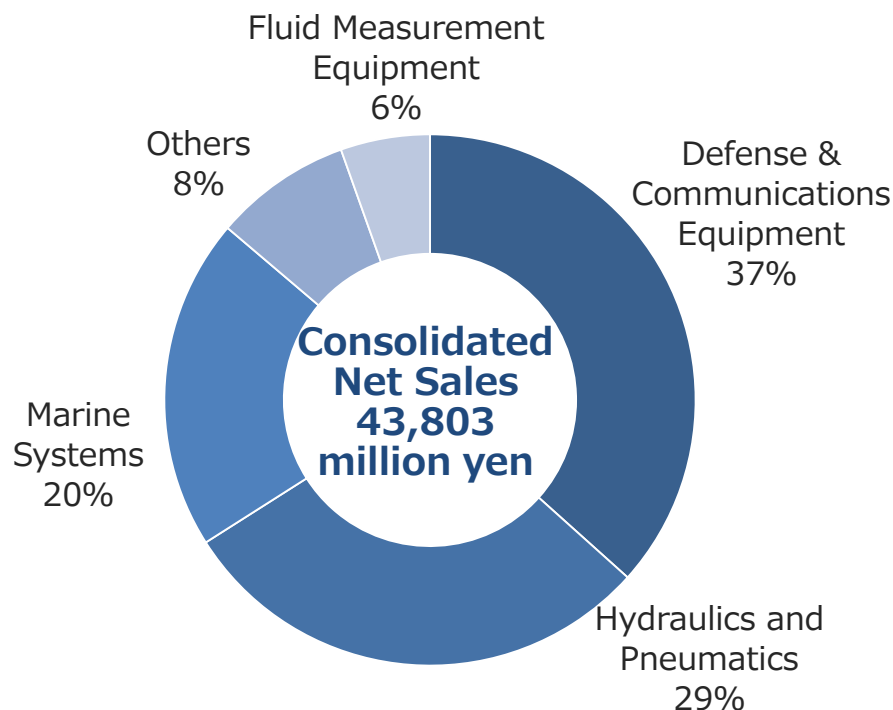
### Others

- Disaster Prevention Equipment (Transferred to Fluid Measurement Equipment Business as "Fire Extinguishing Equipment" starting fiscal 2018)
- Railway Maintenance
- Printing Inspection Equipment



# 1. Summary of financial results for Fiscal 2017

## Net sales and operating profits for Fiscal 2017



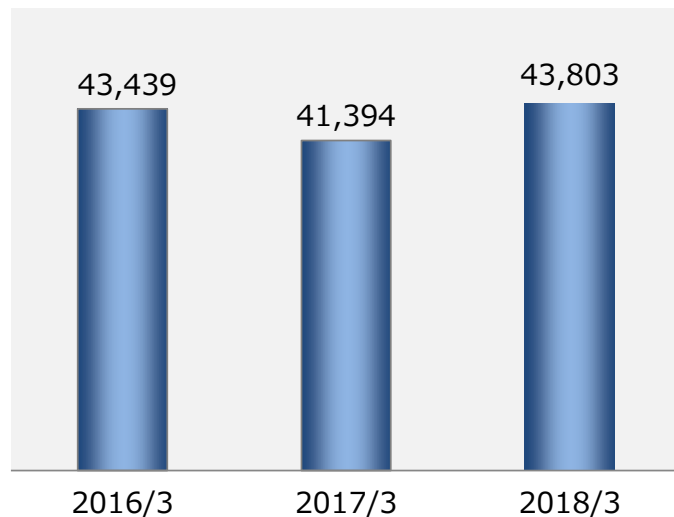
### Financial Results Summary for Fiscal 2017

- ◆ Favorable growth in public-sector market in Defense & Communications Equipment Business and in market for plastic processing machinery in Hydraulics and Pneumatics Business.

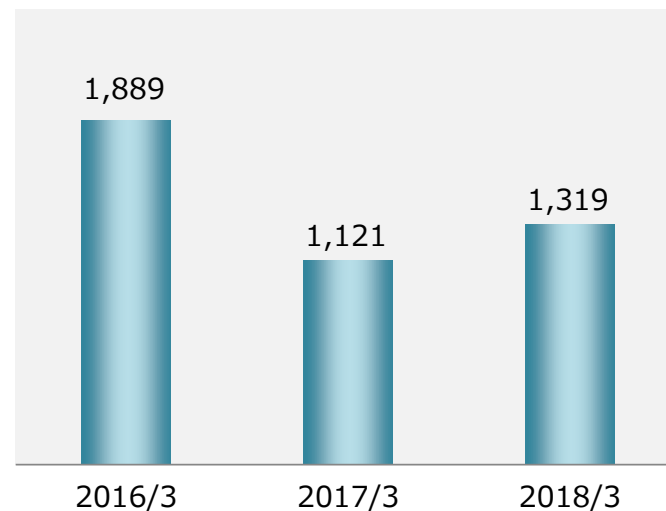
# 1. Summary of financial results for Fiscal 2017

## Changes in Consolidated Profit & Loss

【Net Sales】 (Million yen)



【Operating Profit】 (Million yen)



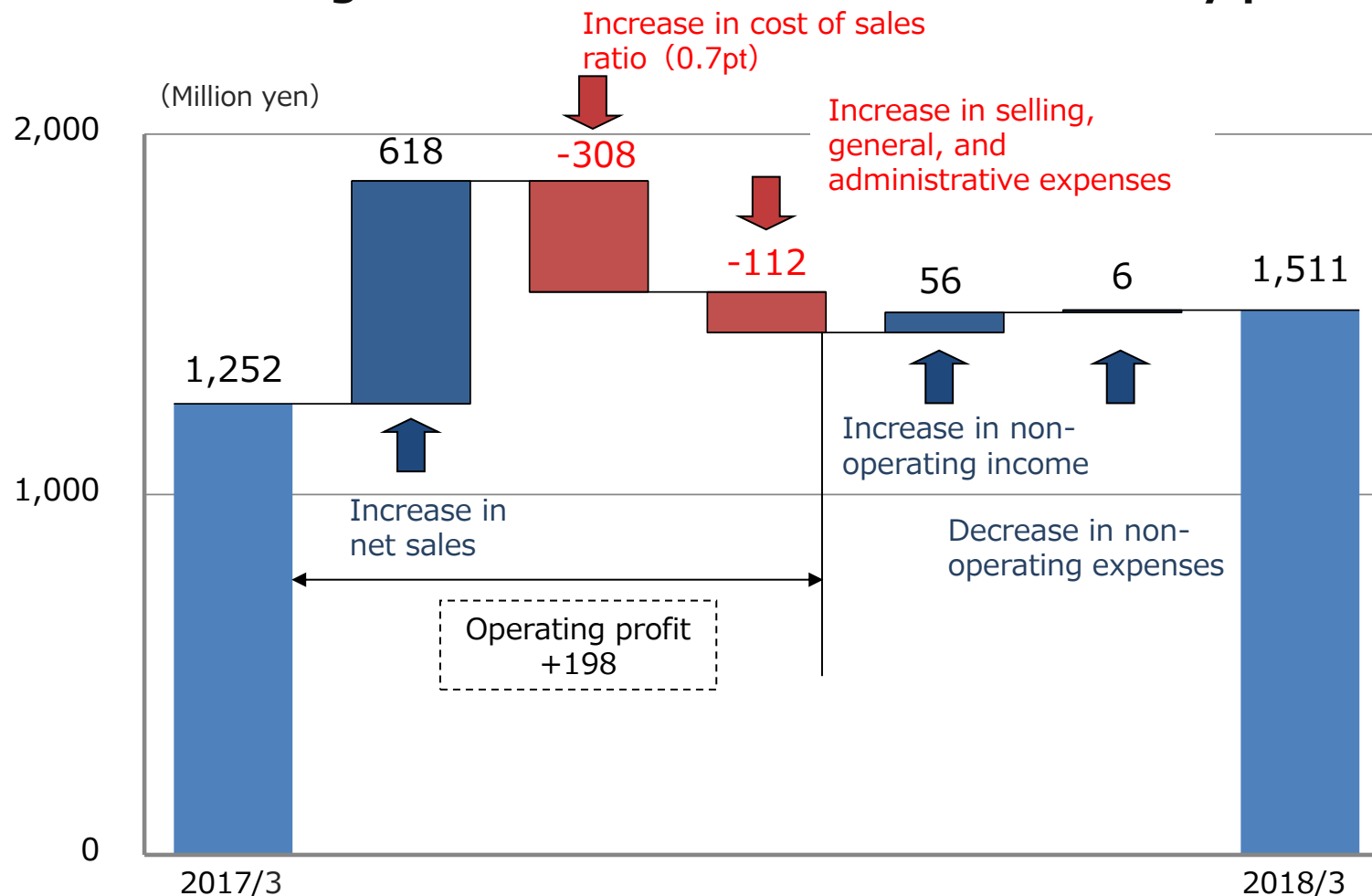
(Million yen)	2016/3	2017/3	2018/3	Amount of change	Rate of change
Net sales	43,439	41,394	43,803	2,409	5.8%
Operating profit	1,889	1,121	1,319	198	17.6%
Ordinary Profit	1,979	1,252	1,511	260	20.7%
Net Profit*	1,252	709	1,120	411	58.0%

\* "Net profit" represents "Profit attributable to owners of parent".

- ◆ Increase in net sales for Marine Systems Business, Hydraulics and Pneumatics Business, and Defense & Communications Equipment Business, leading to 5.8% increase in total consolidated net sales.
- ◆ Profits (consolidated): Refer to next slide.

# 1. Summary of financial results for Fiscal 2017

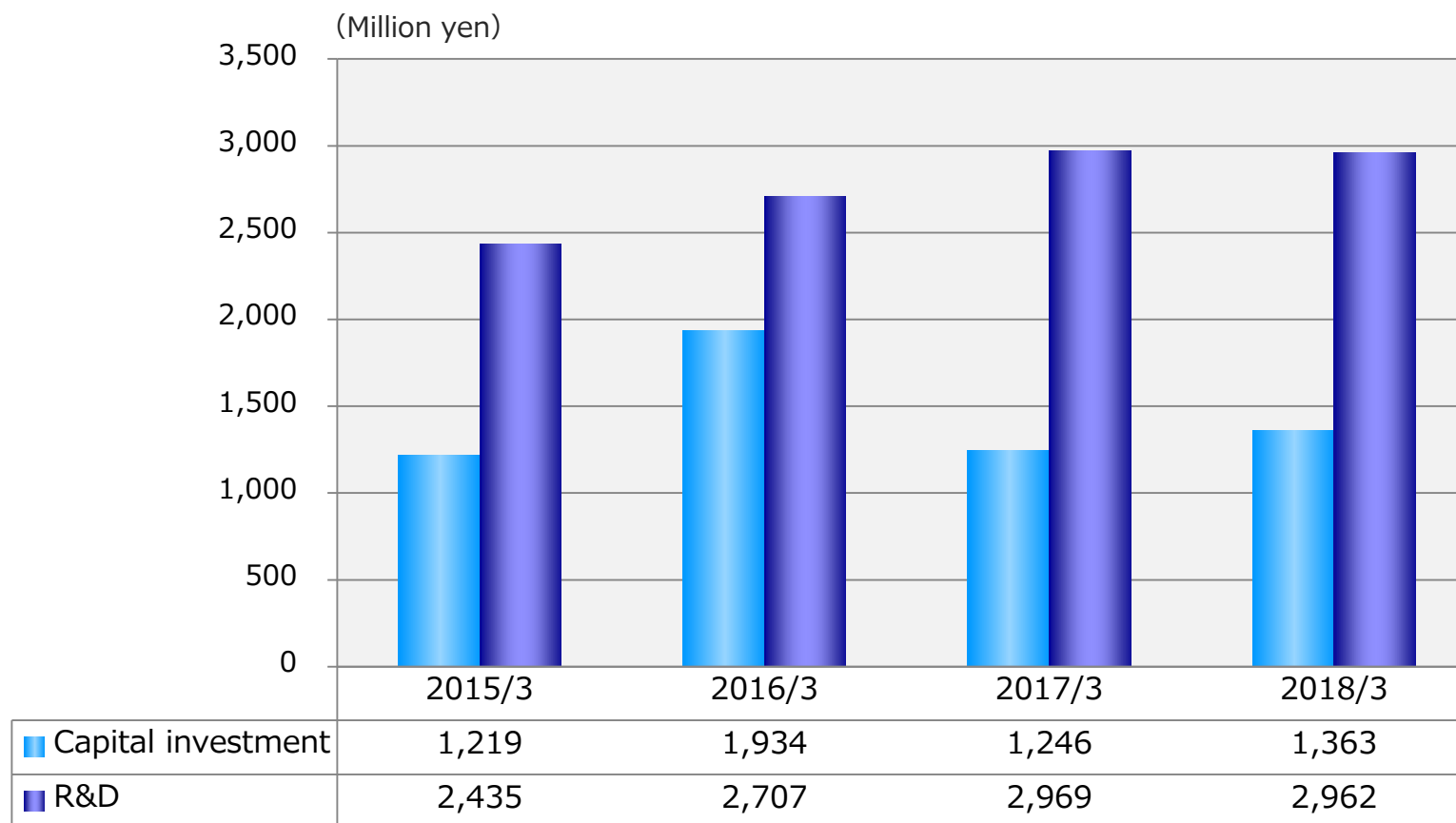
## Analysis of changes in consolidated profit and loss (Factors causing fluctuations in consolidated ordinary profit)



- ◆ Increase in operating profits due to increase in sales, despite the deterioration in cost of sales ratio and increase in selling, general, and administrative expenses.

# 1. Summary of financial results for Fiscal 2017

## Capital investment, R&D



- ◆ R&D expenses remain high due to increased R&D activities aimed at future business development for Defense & Communications Equipment Business.

# 1. Summary of financial results for Fiscal 2017

## Consolidated balance sheets (Main accounting items only)

(Assets)

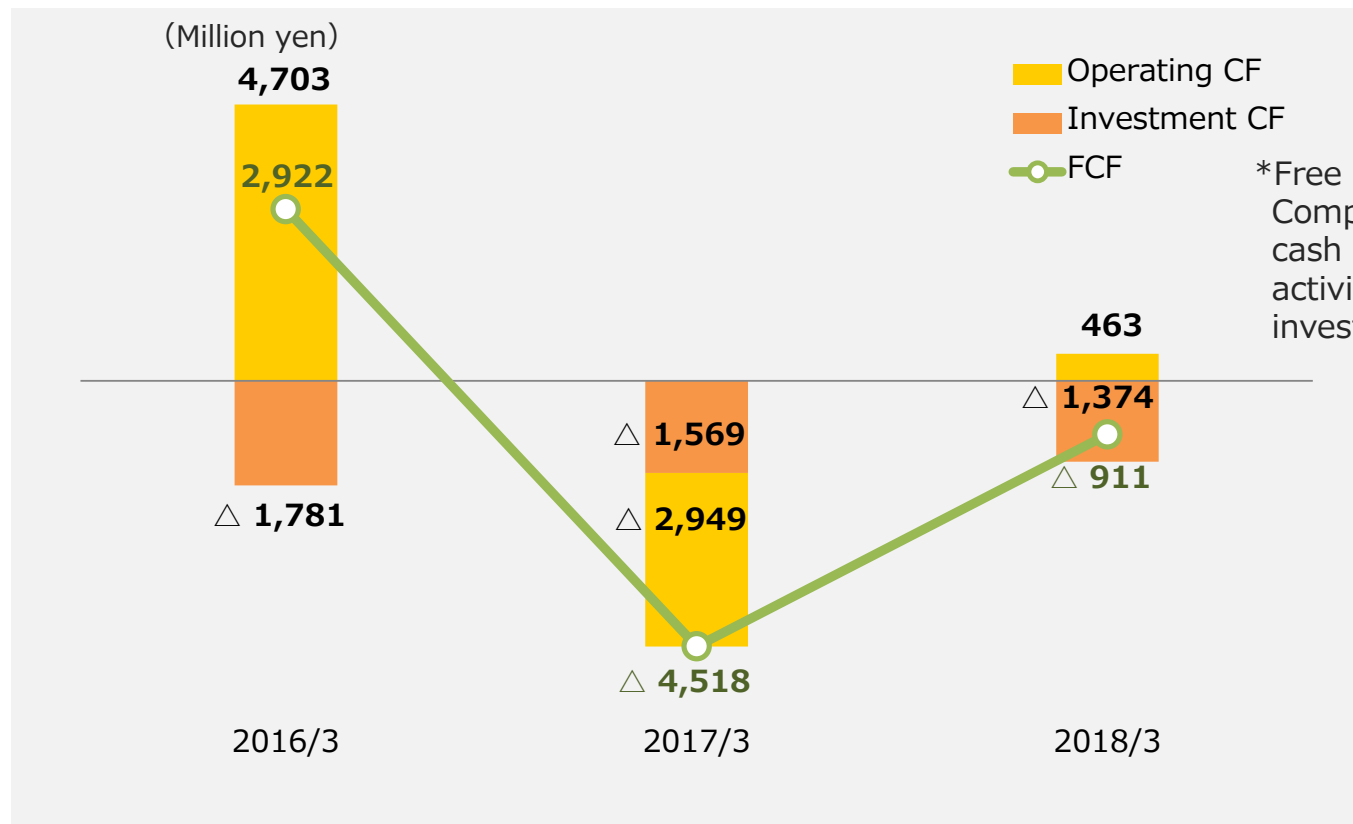
(Liabilities and net assets)

(Million yen)	As of Mar 31, 2017	As of Mar 31, 2018	Amount of change	(Million yen)	As of Mar 31, 2017	As of Mar 31, 2018	Amount of change
<b>Current assets</b>	<b>40,591</b>	<b>46,011</b>	<b>5,420</b>	<b>Current liabilities</b>	<b>20,566</b>	<b>20,580</b>	<b>14</b>
Cash and deposits	8,175	9,828	1,653	Notes and accounts payable	6,133	7,467	1,335
Notes and accounts receivable	16,307	18,198	1,891	Short-term loans payable	10,836	8,815	△2,021
Inventories	14,055	16,504	2,449	Provision for bonuses	1,014	1,110	96
Accounts receivable	482	151	△331	<b>Non-current liabilities</b>	<b>4,284</b>	<b>9,041</b>	<b>4,756</b>
Deferred tax assets	729	738	9	Long-term loans payable	2,348	7,397	5,049
<b>Non-current assets</b>	<b>11,615</b>	<b>12,035</b>	<b>419</b>	Net defined benefit liability	909	649	△260
Tangible assets	7,383	7,524	141	<b>Total liabilities</b>	<b>24,850</b>	<b>29,620</b>	<b>4,770</b>
Intangible assets	7	1	△6	<b>Shareholders' equity</b>	<b>25,915</b>	<b>26,617</b>	<b>701</b>
Investment securities	3,366	3,857	490	Retained earnings	19,135	19,923	788
Deferred tax assets	211	39	△171	<b>Total net assets</b>	<b>27,356</b>	<b>28,425</b>	<b>1,069</b>
<b>Total assets</b>	<b>52,206</b>	<b>58,045</b>	<b>5,839</b>	<b>Total liabilities and net assets</b>	<b>52,206</b>	<b>58,045</b>	<b>5,839</b>

- ◆ Approximately 2.5 billion yen increase in inventories due to increased stocking in anticipation of achieving target sales in the public-sector market in the Defense & Communications Equipment Business for later fiscal years.
- ◆ Approximately 3 billion yen increase in combined long-term and short-term loans payable as stock fund.



## Changes in consolidated cash flows (Operating CF/ Investment CF/ FCF)



- ◆ Shift to positive operating CF due to profit before income taxes (approx. 1.5 billion yen), increase in notes and accounts payable (approx. 1.3 billion yen), and depreciation (approx. 1.2 billion yen), despite the increase in inventories, etc. for large-scale project orders in the Defense Business (approx. 2.5 billion yen) and increase in notes and accounts receivable (approx. 1.9 billion yen).
- ◆ Increase in cash and cash equivalents at end of current period by 1.66 billion yen compared to the previous fiscal year.

# 1. Summary of financial results for Fiscal 2017

## Changes in major indicators

	2014/3	2015/3	2016/3	2017/3	2018/3
E P S (Yen) (Earnings per share )	28.37	27.64	15.05	8.54	67.61*
B P S (Yen) (Book-value per share)	283.10	323.21	314.11	324.81	1,695.16*
Equity ratio (%)	47.4	52.5	51.3	51.6	48.3
R O E (%) (Return on equity)	10.6	9.1	4.7	2.7	4.1
ROA (%) (Return on assets)	8.2	6.2	3.9	2.4	2.7

\*Note: The Company has implemented consolidation of common shares at a rate of 1 share for every 5 shares effective October 1, 2017.

- ◆ Equity ratio:  
Although net assets increased by 1.08 billion yen, the increase in total assets by 5.84 billion yen caused a 3.3 percentage point deterioration compared to the previous fiscal year.
- ◆ Return on equity (ROE):  
Improvement by 1.4 percentage points compared to the previous fiscal year;  
Average of 6.2% for the last five years.

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4. New Medium-term Management Policy and Medium-term Business Plan

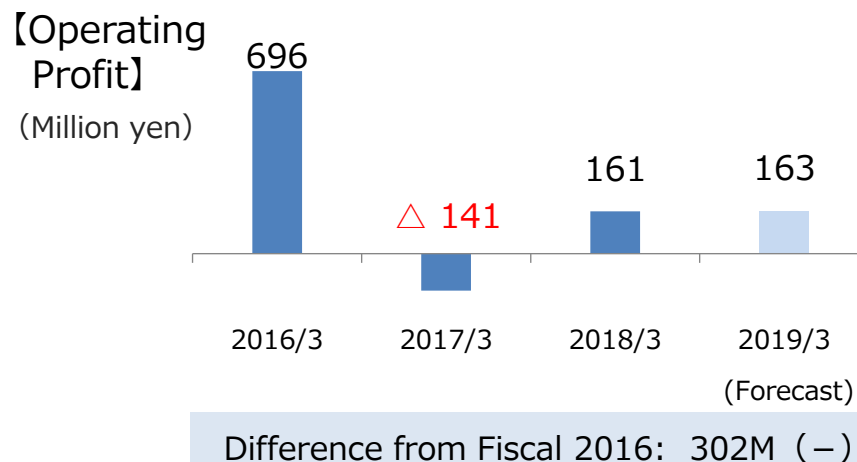
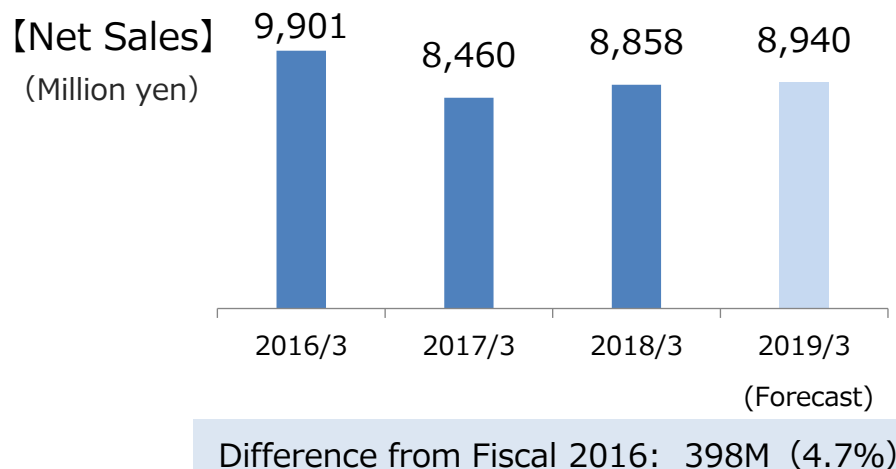
## 2. Progress and key measures in business segments

### Status of orders received and order backlog

	Amount of orders received for Fiscal 2017			Amount of order backlog at the end of Fiscal 2017		
(Million yen)	Amount	Composition ratio	Change from Fiscal 2016	Amount	Composition ratio	Change from Fiscal 2016
Marine Systems	8,581	19.4%	17.0%	2,736	10.2%	△9.2%
Hydraulics and Pneumatics	13,042	29.5%	4.2%	2,816	10.5%	7.2%
Fluid Measurement Equipment	2,326	5.3%	△9.0%	134	0.5%	△29.4%
Defense & communications Equipment	16,469	37.2%	△9.4%	19,388	72.5%	2.2%
<b>Reported segment total</b>	<b>40,416</b>	<b>91.4%</b>	<b>△0.4%</b>	<b>25,074</b>	<b>93.7%</b>	<b>1.1%</b>
Others	3,790	8.6%	△10.4%	1,675	6.3%	8.3%
Adjustment	1	0.0%	△51.8%	0	0.0%	0.0%
<b>Total</b>	<b>44,207</b>	<b>100.0%</b>	<b>△1.4%</b>	<b>26,749</b>	<b>100.0%</b>	<b>1.5%</b>

- ◆ Severe business environment continues for Marine Systems Business despite the increase in orders.
- ◆ Amount of order backlog remains high despite the decrease in orders as a repercussion of the large-scale orders received in the previous fiscal year by the Defense & Communications Equipment Business.

### 2-1. Marine Systems Business



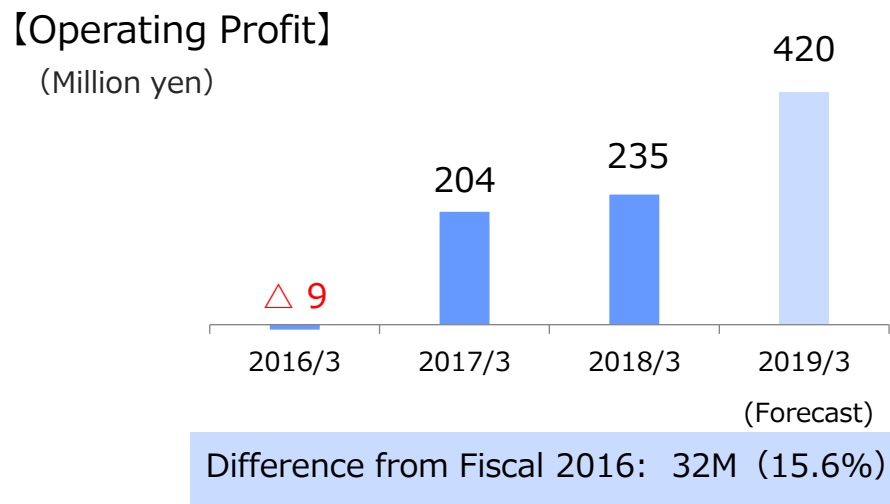
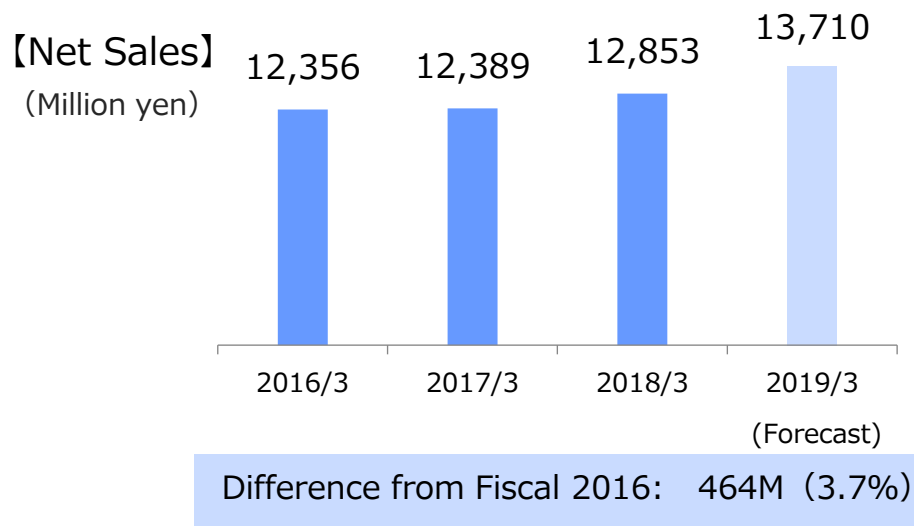
#### Fiscal 2017 Progress

- Robust domestic market for commercial ships and coastal vessels despite delayed recovery in overseas market demand.
- In terms of effect of foreign exchange, continued depreciation of the yen at +80 million yen. (Estimate rate: 104 yen per dollar; yearly average: 111 yen per dollar)

#### Future measures

- Increase market share in new shipbuilding through sales of autopilots and other equipment.
- In the conventional ship market, pursue replacement for ECDIS and other systems, additional installation of ACE and other equipment, and yearly contracts for preventive maintenance.

### 2-2. Hydraulics and Pneumatics Business



#### Fiscal 2017 Progress

- Downturn in last-minute surge in demand due to domestic emission regulations in the construction machinery market.
- Increase in demand in the plastic processing machinery market.

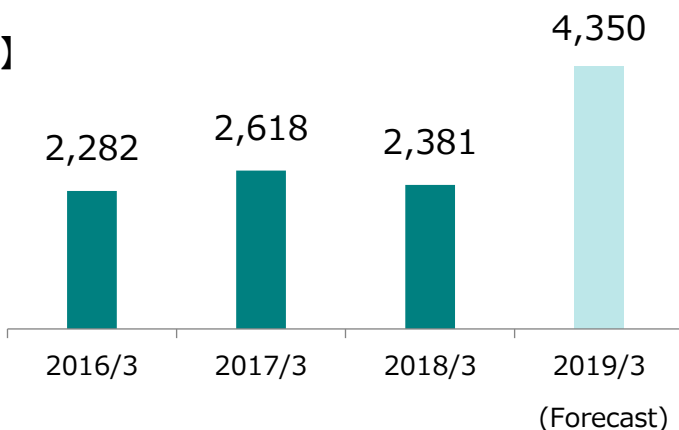
#### Future measures

- Increase shares for screw-in valves and high-density manifold blocks (TMCD) in the construction machinery market and agricultural machinery market.
- Promote sales of highly energy-efficient ESS, etc. in the injection molding machinery market and die cast machinery market.

### 2-3. Fluid Measurement Equipment Business

#### 【Net Sales】

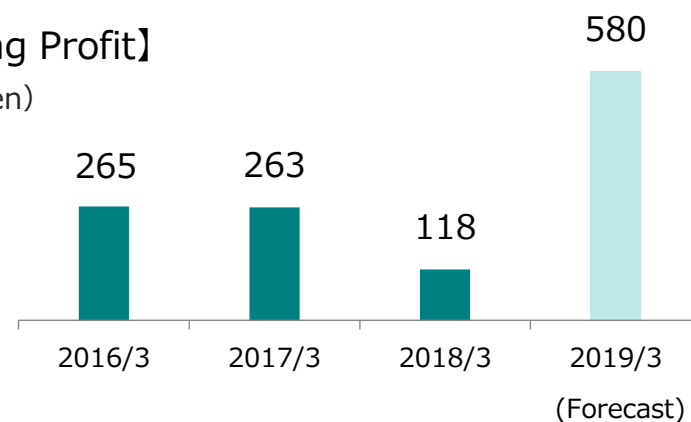
(Million yen)



Difference from Fiscal 2016:  $\Delta 237\text{M}$  ( $\Delta 9.0\%$ )

#### 【Operating Profit】

(Million yen)



Difference from Fiscal 2016:  $\Delta 146\text{M}$  ( $\Delta 55.3\%$ )

#### Fiscal 2017 Progress

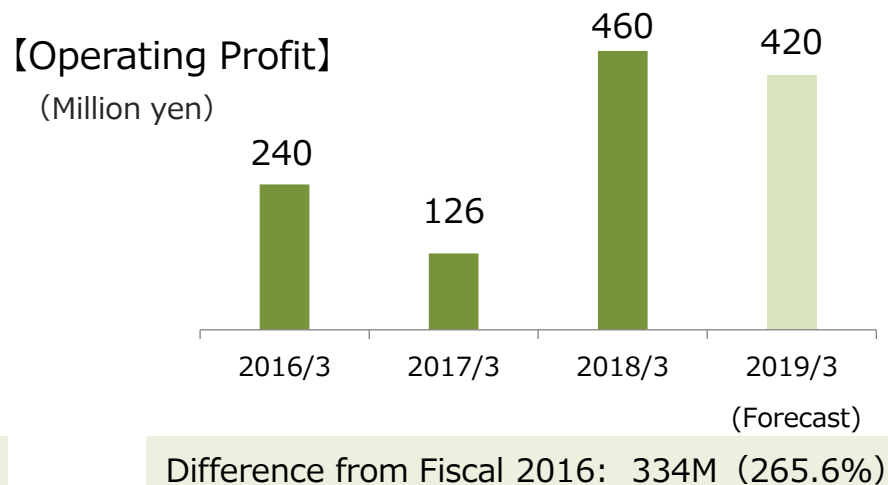
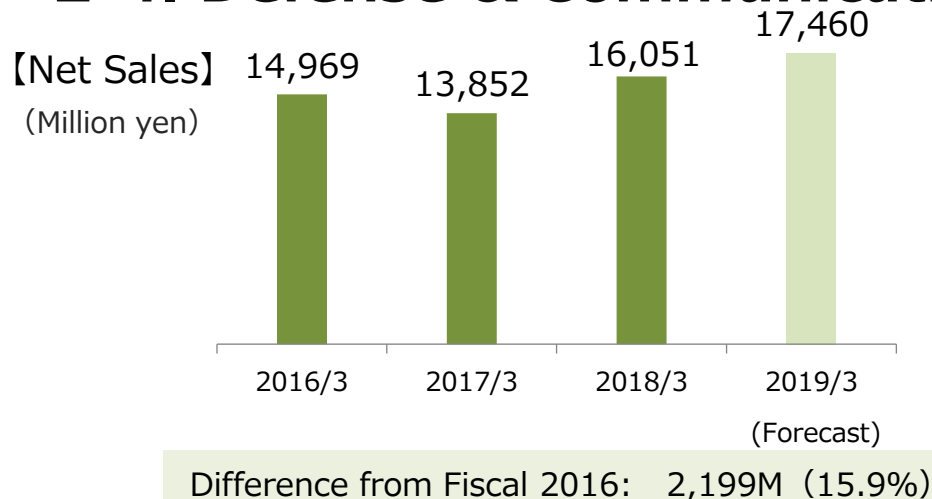
- In the public-sector market, prioritization of budget for disaster rehabilitation works related to heavy rains, etc., resulted in order delays for instrumentation works.

#### Future measures

- In the public-sector market, acquire prime contract orders for large-scale projects, and expand and improve line-up for disaster-prevention-related products.
- In the private-sector market, promote sales of microwave level gauges to oil and chemical plants.
- In the overseas market, accelerate sales promotion activities through the Vietnam representative office.
- In the fire extinguishing equipment market\*, respond to increase in demand related to "statutory safety inspections of valves for gas-based fire extinguishers"

\*"Disaster Prevention Equipment Business," which had been included under "Other Businesses" until this fiscal year, shall be included under the "Fluid Measurement Equipment Business" from Fiscal 2018 and managed as the "Fire extinguishing equipment market".

### 2-4. Defense & Communications Equipment Business



#### Public-sector market

##### Fiscal 2017 Progress

- Start of mass production and shipments of radar warning receivers for the F-15 fighter aircraft.
- Increase number of AIS base station systems and radars for the Japan Coast Guard.

##### Future measures

- In the Defense business, revise the shipping plan for radar warning receivers for the F-15.  
(Change in yearly sales but not in total sales volume)

Order and Sales Plan for 3 Main Products (reflecting revision of shipping plan for F-15 radar warning receivers)

(Billion yen)	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	Total
Order	3.7	4.3	2.3	3.8	1.7	0.0	15.8
Sales	0.2	0.0	2.5	3.3	6.3	3.5	15.8

- In the Maritime Traffic business, promote sales of new models of solid-state radar for overseas VTS operators and system integrators.



### 2-4. Defense & Communications Equipment Business

#### Private-sector market

##### Fiscal 2017 Progress

##### <inertial sensor and applied equipment>

- Start receiving orders and commencing shipments related to full-scale production of automatic steering assist devices for agricultural machinery (for rice planter machinery). (Fiscal 2018 orders: 310 units)
- Begin shipments of new model road roughness profilometer and analysis systems for expressway construction.

##### <Communication & control equipment>

- Begin full scale production and shipment of microwave power generators for semiconductor production equipment.
- Replacement of equipment related to terrestrial digital broadcasting.
- Increase in demand for satellite communications antenna stabilizers.

##### Future measures

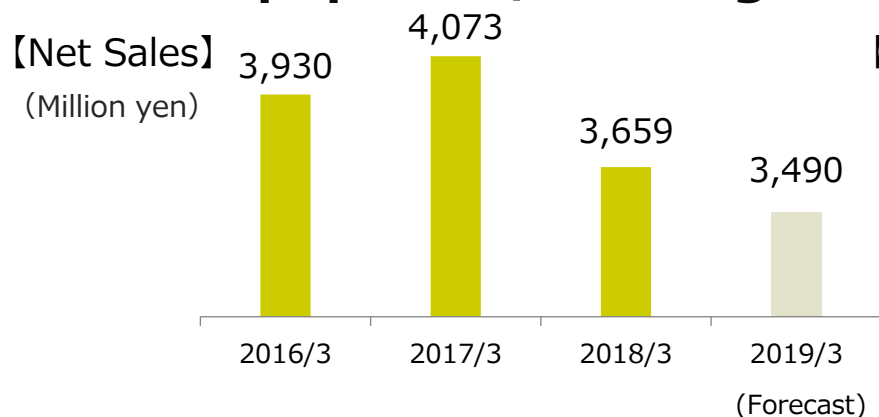
##### <inertial sensor and applied equipment>

- Expand applications of automatic steering assist devices for agricultural machinery, and develop products aimed at tractors.

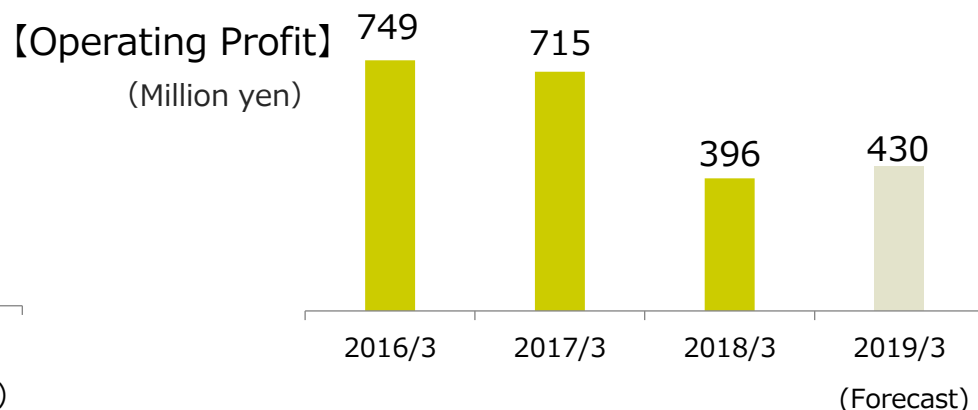
##### <Communication & control equipment>

- Increase order intake for microwave power generators for semiconductor production equipment.
- Develop and invest in microwave amplifiers for other fields to expand market.

### 2-5. Others (Railway Maintenance/Disaster Prevention Equipment/Printing Inspection Equipment)



Difference from Fiscal 2016:  $\Delta 414\text{M}$  ( $\Delta 10.2\%$ )



Difference from Fiscal 2016:  $\Delta 319\text{M}$  (44.6%)

\*"Disaster Prevention Equipment Business," which had been included under "Other Businesses" until this fiscal year, shall be included under the "Fluid Measurement Equipment Business" from Fiscal 2018 and managed as the "Fire extinguishing equipment market".

#### Fiscal 2017 Progress

- Favorable growth in Disaster Prevention Equipment Business.
- Decrease in income and profits due to the drop-off in demand for replacement of rail inspection cars in the Railway Maintenance Business and delays in market introduction of new products in the Printing Inspection Equipment Business.

#### Future measures

- Railway Maintenance: As the first overseas order, ensure smooth delivery of the rail inspection car.
- Printing Inspection Equipment: Increase shares for new products and printing quality inspection devices.
- Disaster Prevention Equipment  $\Rightarrow$  Integrate with Fluid Measurement Equipment.

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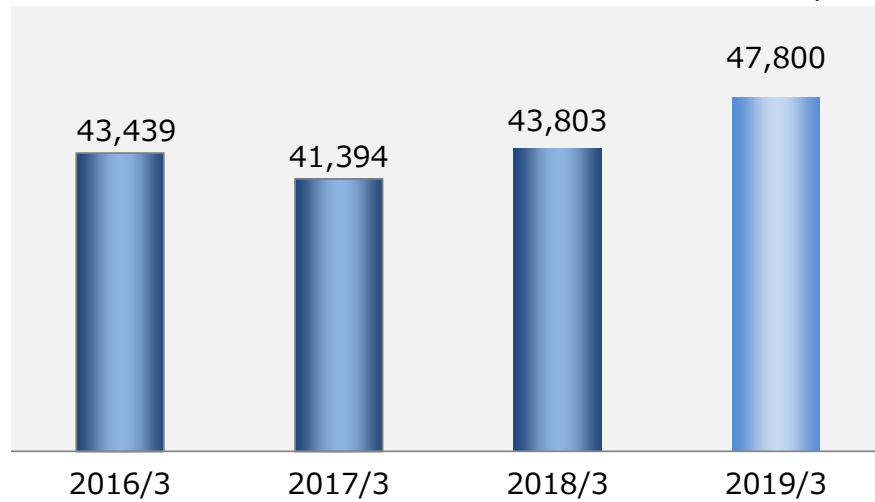
1. Summary of financial results for Fiscal Year Ended March 31, 2018 (Fiscal 2017)
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### 3. Outlook for Fiscal 2018

## Net sales and operating profit forecast

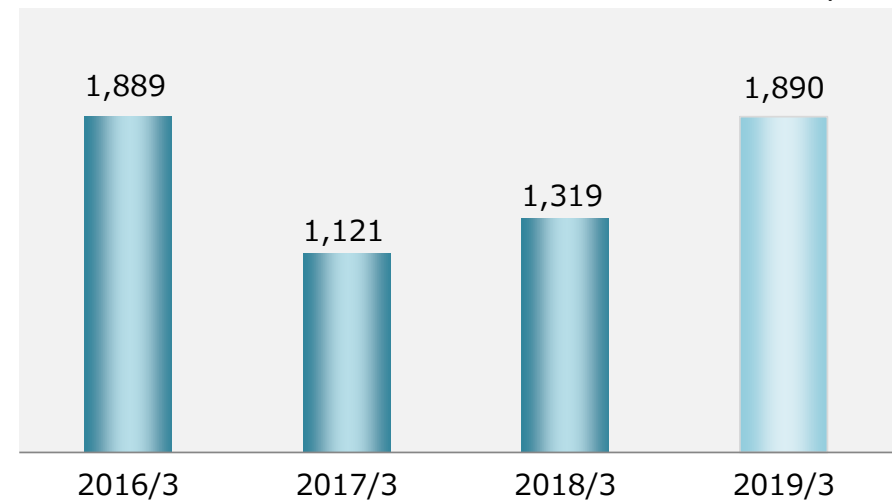
【Net Sales】

(Million yen)



【Operating Profit】

(Million yen)



(Forecast)

(Forecast)

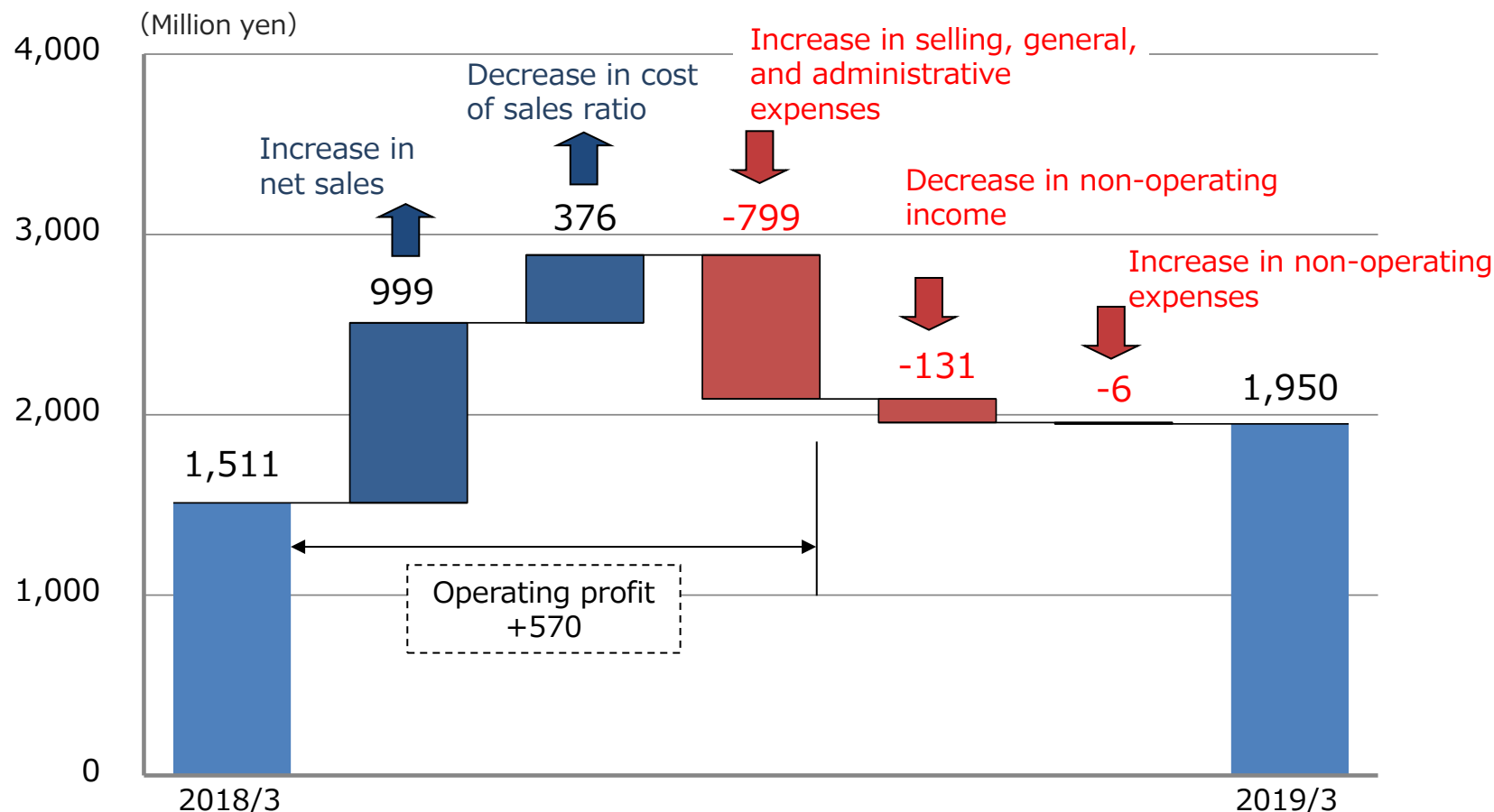
(Million yen)	2016/3	2017/3	2018/3	2019/3 (Forecast)	Amount of change	Rate of change
Net sales	43,439	41,394	43,803	47,800	4,000	9.1%
Operating profit	1,889	1,121	1,319	1,890	570	43.3%
Ordinary Profit	1,979	1,252	1,511	1,950	440	29.0%
Net Profit*	1,252	709	1,120	1,400	280	25.0%

\* "Net profit" represents "Profit attributable to owners of parent".

- ◆ Increase in net sales (consolidated) for the four business segments.
- ◆ Profits (consolidated): Refer to next slide.

### 3. Outlook for Fiscal 2018

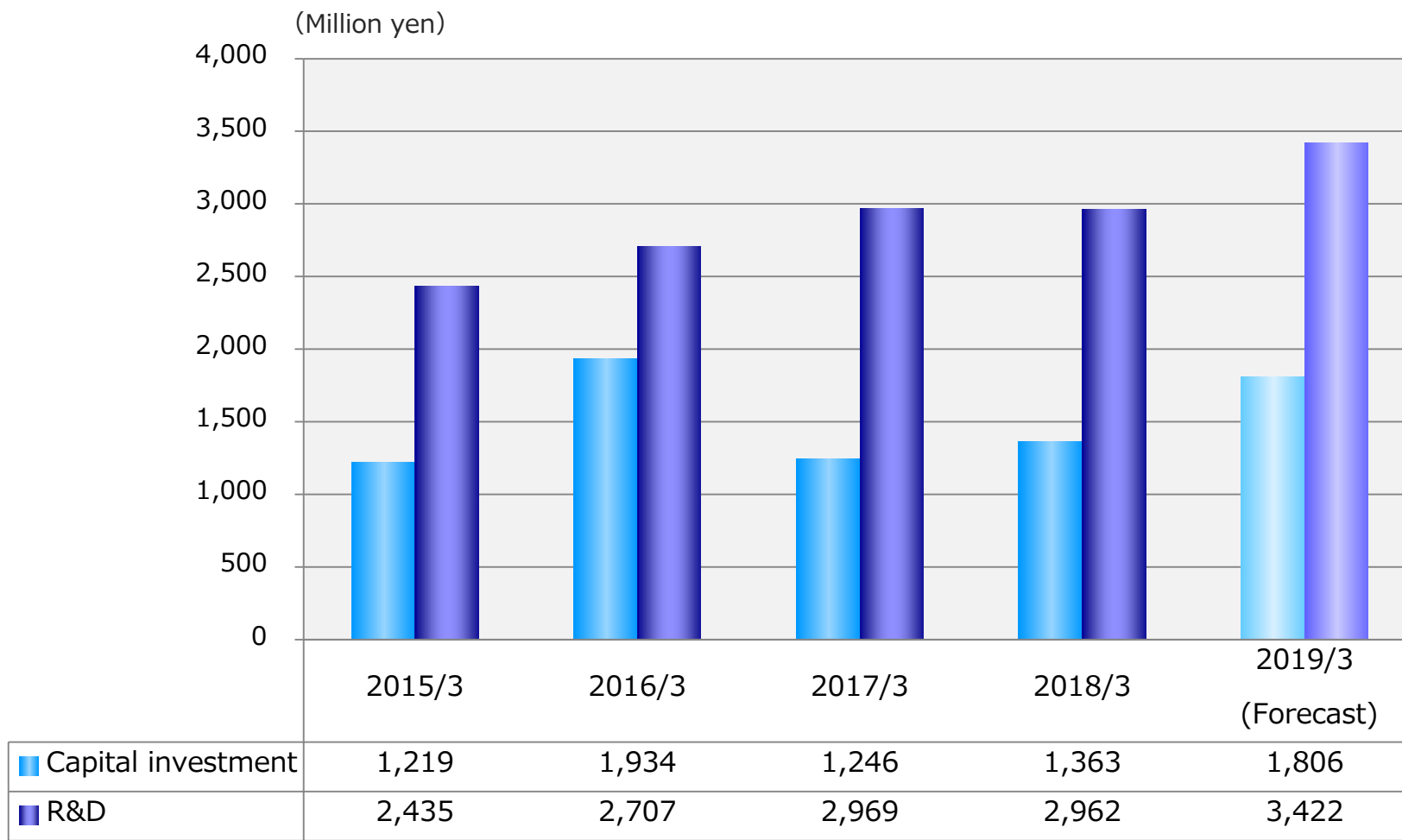
## Analysis of changes in consolidated profit and loss (Factors causing fluctuations in consolidated ordinary profits)



- ◆ Increase in operating profits due to increase in sales and improvement in cost of sales ratio, despite the expected increase in selling, general, and administrative expenses due to increased R&D expenses aimed at growth.

### 3. Outlook for Fiscal 2018

## Capital investment, R&D expense forecast



## Profit returns to shareholders

### [Basic policy]

Implement stable returns to shareholders while maintaining balance with financial capacity.

### Regarding the use of internal reserves

Allocate investments aimed at “new technology research” “new product development,” “productivity improvement,” “overseas base expansion,” “human resource development,” “organizational capacity building,” “management resource enhancement,” etc., which serve as the sources for profitability (earning power), in order to achieve sustainable growth and improve medium-to-long-term corporate value, while taking capital efficiency into account.

### Dividend for the last five years and forecast for Fiscal 2018

	2014/3	2015/3	2016/3	2017/3	2018/3	2019/3 (Forecast)
Annual dividend per share (yen)	4.50	4.50	5.00 (Common, 4 + Commemorative, 1)	4.00	20.00	25.00
Payout ratio (consolidated) (%)	15.9	16.3	33.2	46.8	29.6	29.5
Total return ratio (consolidated) (%)	19.4	19.9	39.8	46.8	37.1	—

\*From Fiscal 2017 onward, dividend amounts are those after consolidation of shares.  
(Dividend amount before consolidation of shares is 1/5 of amount shown.)

### Status of recent acquisition of treasury shares

	Aug 2011	May 2014	May 2015	Nov 2015	Nov 2017
Total number of reacquired shares (thousand yen)	1,300	310	300	335	58※
Acquisition cost (million yen)	165	84	84	84	85

\*November 2017 shows the number after consolidation of shares.

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# New Medium-term Management Policy (Fiscal 2018 onward)

## Continue basic policies of previous Medium-term Management Policy

### Background for establishment

Despite the gradual achievement of foundations for growth in accordance with the growth strategies based on the basic policies of the previous management policy, we are not yet on the planned trajectory to achieving sustained growth.



### The New Medium-term Management Policy will continue to uphold the previous basic policies

- Due to rapid changes in the external environment, the term of implementation will not be set to a five-year period and will be changed as needed.
- The 3-year Medium-term Business Plan will be reviewed every year (rolling plan).

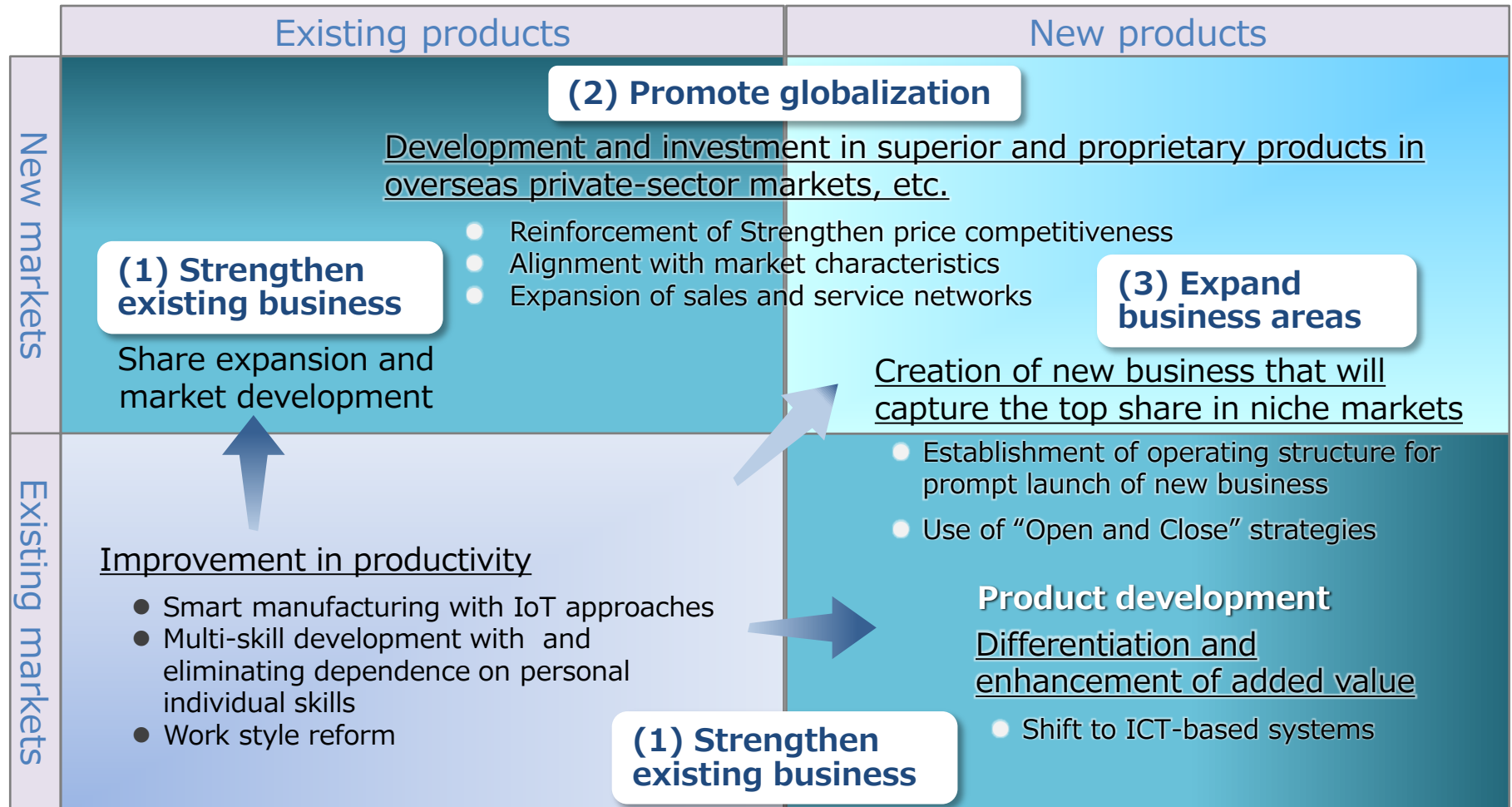
### Goals

Through growth strategies based on the three basic policies, as the market leader,

- Improve and innovate technologies and skills to maintain edge over other companies,
- Continue to create proprietary, high-value-added products that are indispensable in the current generation and to society,
- Contribute to safety and preservation of the environment,
- Maintain annual growth in income and profits in the short-run,
- Dramatically improve profits and cash flow by heightening our earning capacity in the medium to long term, and
- Strive to meet the demands and expectations of the diverse range of our stakeholders.

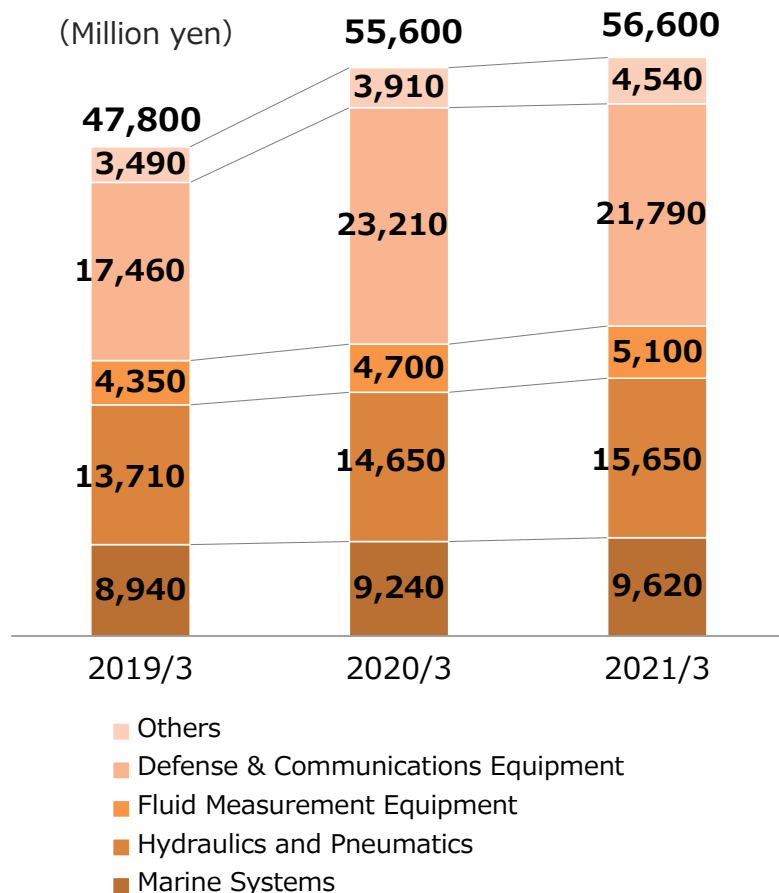
## Basic strategies

- (1) Strengthen existing business
- (2) Promote globalization
- (3) Expand business areas

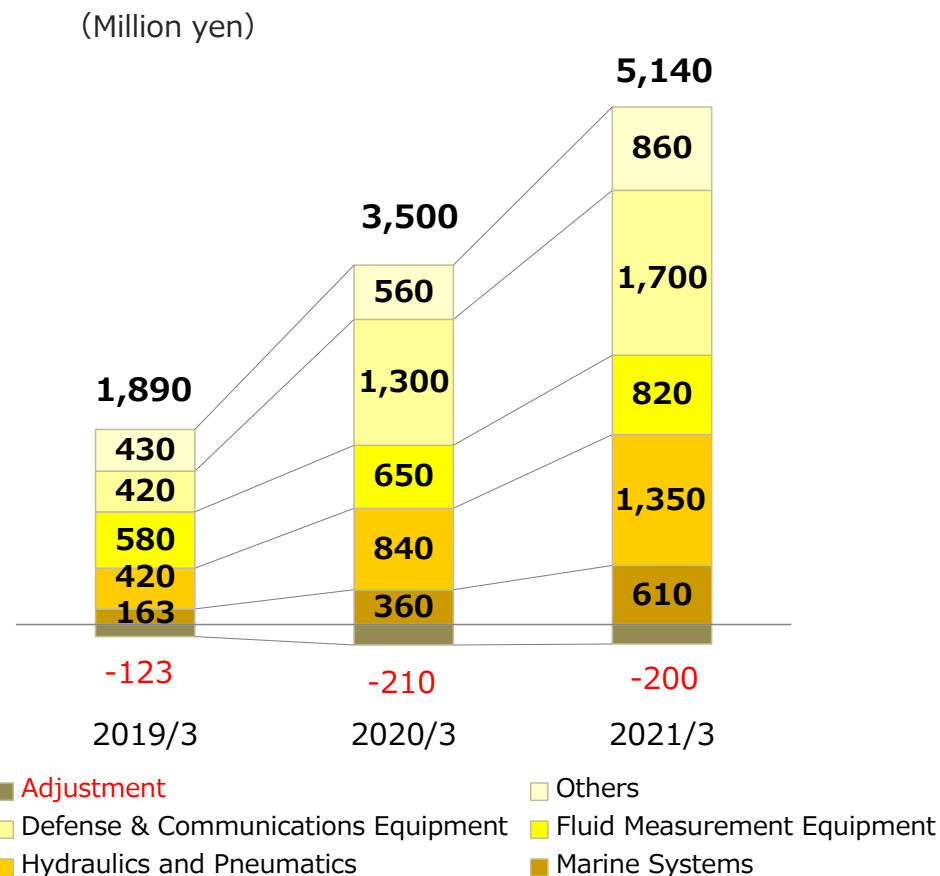


## Three-year Medium-term Business Plan starting from Fiscal 2018

【Net Sales】



【Operating Profit】



Highest consolidated net sales to date is 68,178 million yen (Fiscal 1991).

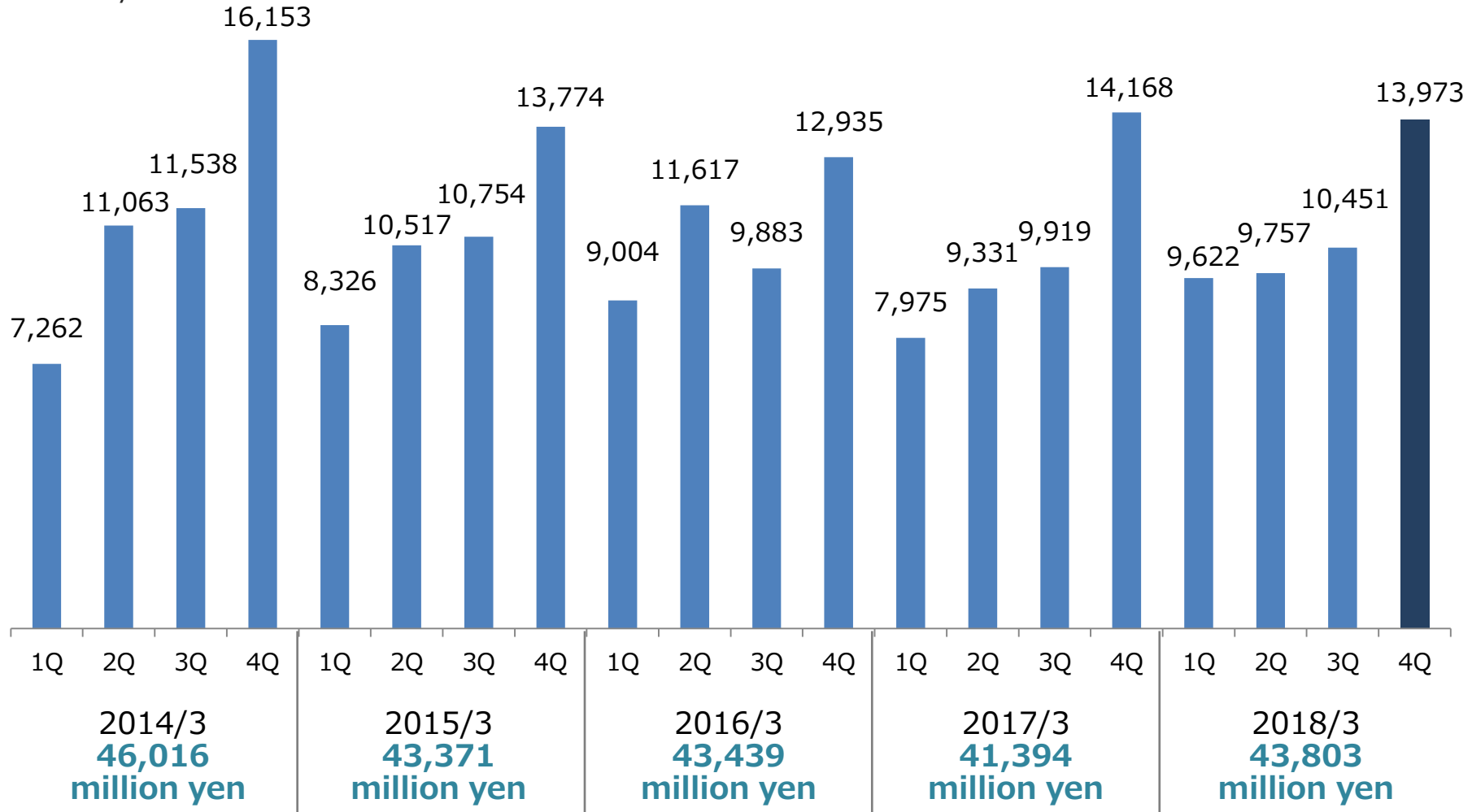
## References

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- Quarterly changes in net sales and operating profits
- Changes in net sales and operating profits by segment

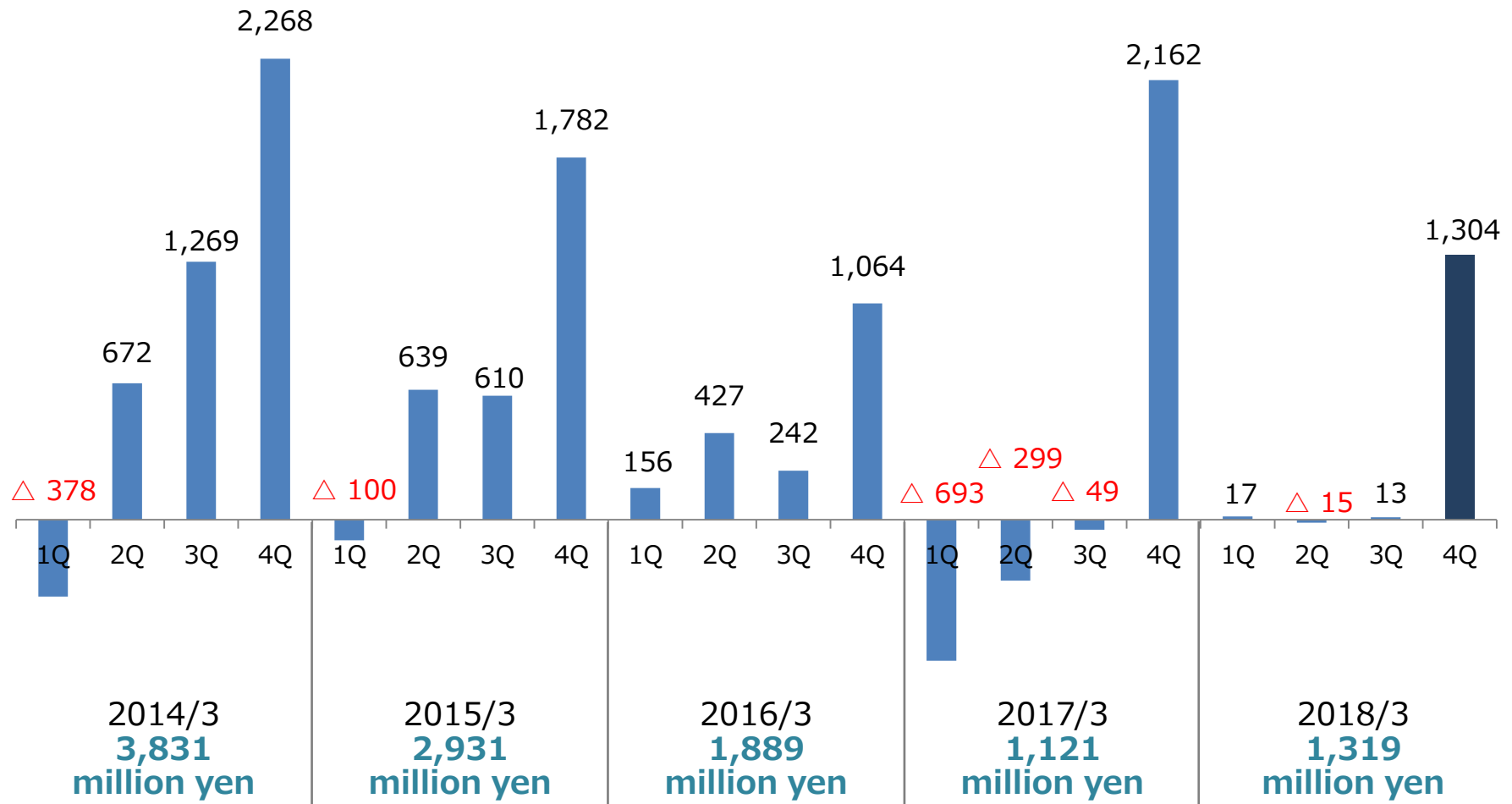
## Quarterly changes in net sales

(Million yen)



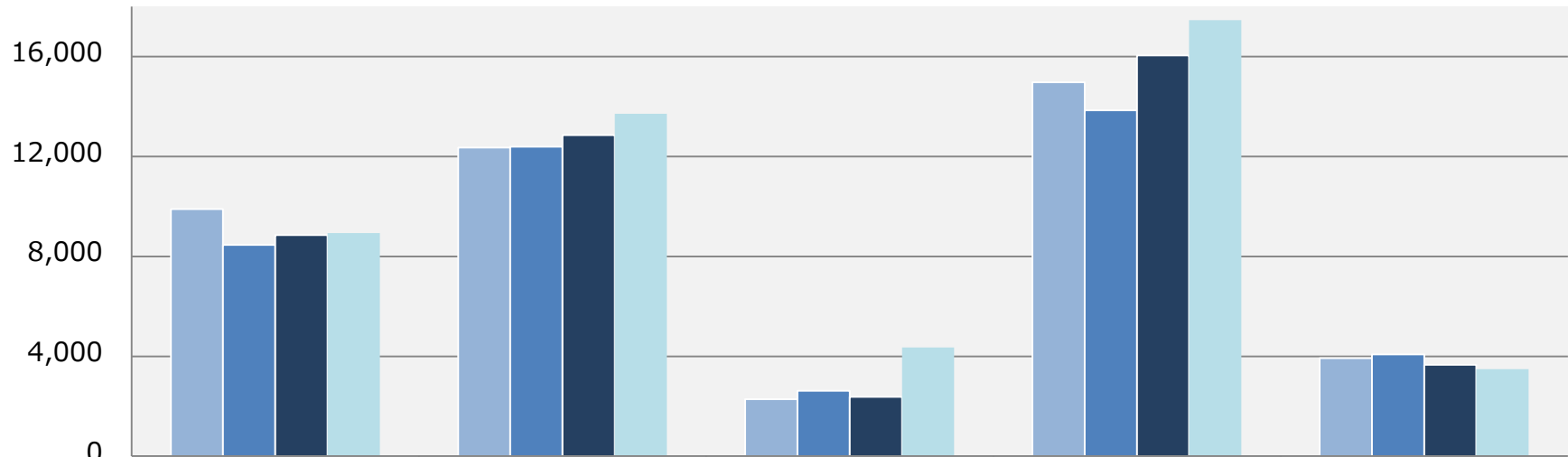
## Quarterly changes in operating profits

(Million yen)



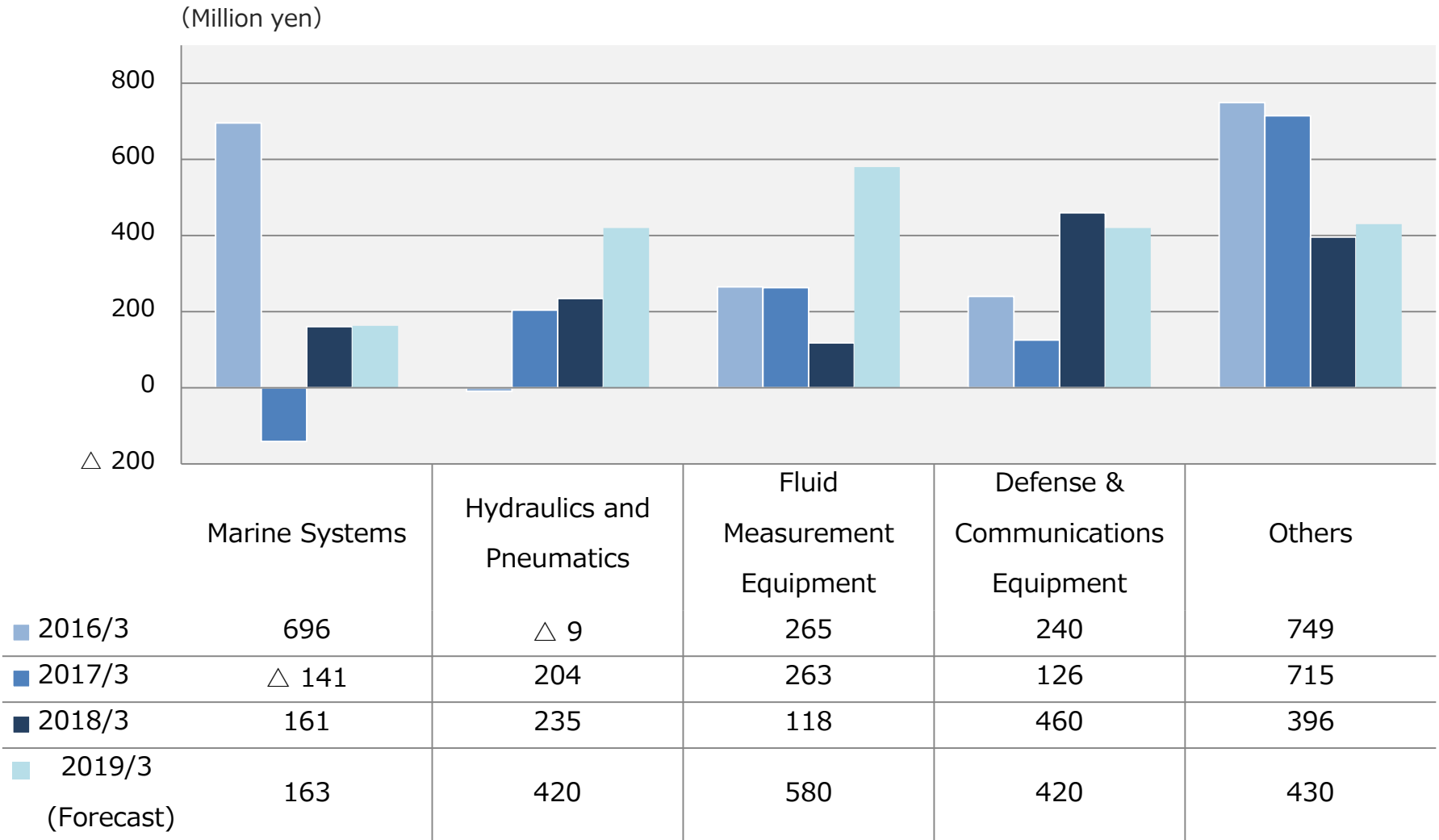
## Changes in net sales by segment

(Million yen)



	Marine Systems	Hydraulics and Pneumatics	Fluid Measurement Equipment	Defense & Communications Equipment	Others
2016/3	9,901	12,356	2,282	14,969	3,930
2017/3	8,460	12,389	2,618	13,852	4,073
2018/3	8,858	12,853	2,381	16,051	3,659
2019/3 (Forecast)	8,940	13,710	4,350	17,460	3,490

## Changes in operating profits by segment



\*Operating profits before adjustment



TOKYO KEIKI, INC.  
Glossary of terms used in  
the Financial Results Briefing Materials

	Term	Description
Marine Systems Business		
1	Gyrocompass	<p>A gyrocompass applies the mutual effects of gravity, the earth's rotation and the characteristics of the "gyroscope". Its key features are:</p> <ul style="list-style-type: none"> <li>(1) indication of true north (magnetic compasses show magnetic north),</li> <li>(2) capability to serially output heading signals to other equipment,</li> <li>(3) capability to be positioned anywhere,</li> <li>(4) resistance to hull magnetism and other disturbances.</li> </ul> <p>As the critical "sensitive element" gyro rotor rotates continuously at high speeds for long periods, regular maintenance is recommended and in cases of severe wear due to cumulative operating time, replacement (overhaul) of the gyro rotor may be required. Periodic maintenance services are an integral part of our Marine Systems business.</p>
2	Marine autopilot (automatic steering device for ships)	<p>The autopilot receives signals from heading sensors such as gyrocompasses and uses them to automatically control the rudder to efficiently navigate towards the preset direction.</p> <p>The Autopilot PR-9000 Series, a key product of our company, boasts a large color LCD display as well as repeater and various navigational data displays that reduce the burden on crews and contribute to safer navigation.</p> <p>The PR-9000 features improved system independence and incorporates functions that strengthen operational monitoring of equipment to improve overall safety and reliability. In addition, the autopilot's route control function (ACE) automatically plots the route toward the next destination by adjusting only the heading to that destination from the current position and factors in estimated disturbances (tidal activity), departure from route, etc. to provide optimal control of the rudder in guiding the vessel on the newly designated route. This reduces departure from routes, shortens voyage, reduces unnecessary steering, and reduces the load of nautical operations, thereby contributing to safety and energy conservation. The ACE function can now be added to the autopilot of existing ships by using the course control unit.</p>
3	Electronic chart display and information system (ECDIS)	<p>The electronic chart and display information system, or "ECDIS", has functions for displaying the electronic navigational chart (ENC, electronic information needed for navigation safety, such as on position, course, speed, etc., in addition to the information contained in traditional nautical charts) and the ship's current position on the same screen and also superimposes other information (radar, planned routes, etc.) as well. Starting July 2012, its use has gradually become mandatory.</p>
4	Flowmeter for bunker fuel (fuel oil for ships)	<p>A long-standing problem in fueling commercial ships during port calls is the malpractice, so-called "cappuccino effect", wherein bunker barge (ship fueling vessel) operators introduce air to froth up and increase the volume of fuel. If 5% of the volume of 400,000 tons of bunker fuel supplied every year is due to foaming, the annual loss would amount to 1.2 billion yen. This problem is addressed by using precision Coriolis type flowmeters that measure density and temperature and we provide Coriolis flowmeters of our business alliance partner Oval for accurate bunker fuel measurement.</p>

5	Fiber optic gyroscope (FOG)	A fiber optic gyroscope detects mechanical revolutions using optical interference. A coiled optical fiber is used for the sensor. Two beams from a laser are injected into the optical fiber but in opposite directions. Due to the Sagnac effect, the beam travelling against the rotation experiences a slightly shorter path delay than the other beam. The resulting differential phase shift is measured through interferometry, thus translating one component of the angular velocity into a shift of the interference pattern which is measured photometrically. Our FOG products are used in attitude and heading reference systems for helicopters and attitude-sensing systems for tunnel excavation. We are currently pursuing the commercialization of FOG compasses for ships. Unlike mechanical gyros, a key feature of the FOG is the absence of moving parts, leading to its high reliability. For applications requiring higher resolution than what FOG can provide, we also offer ring laser gyros that are used in the inertial measurement systems of escort ships and submarines, applications that require high accuracy and reliability.
6	Offshore support vessels	There are two main types of offshore support vessels; namely, platform supply vessels (PSV) and anchor handling tug supply (AHTS) vessels. PSVs are primarily used in the transport of supplies and fuel to oil and gas field development rigs, while AHTS vessels are used to move excavation rigs to different locations, for hoisting the anchor from the sea floor, rig towing, and laying down submarine pipeline. PSV and AHTS vessels both have special maneuvering systems such as dynamic positioning systems (DPS) that employ the ship's propulsion unit to maintain the vessel in a fixed position.
7	Regulation of CO2 emissions (for ships)	The treaty for the prevention of pollution from ships (MARPOL Treaty), which is the first attempt at regulating CO2 emissions in the international shipping industry through the International Maritime Organization (IMO), has been partially amended. These regulations are expected to lead to an approximately 20% reduction in CO2 emissions by 2030, compared to the non-implementation of any measures. These regulations should also boost the international competitiveness of Japan's maritime industry by providing a global platform where the country can demonstrate its technical prowess in energy savings.
8	Digital course recorder	A course recorder is a device that automatically records the ship's heading and rudder angle information over time. Conventional course recorders are mechanical devices that continuously pen records on a rolled record sheet. The digital course recorder does not use pens or record sheets but instead records and stores the ship's heading and rudder angle information in memory which reduces running costs and contributes to the environment. The digital course recorder's large LCD display also allows handwritten input to provide operability similar to the traditional way of note taking on record paper.

Hydraulics and Pneumatics Business		
9	Direct drive pump control systems	This direct drive pump control system improves energy efficiency and economizes power consumption by optimally controlling the rotation of the servomotor that drives the hydraulic pump. The system maintains pump delivery pressures and flow rates at optimum levels by controlling the torque and speed of the servomotor, resulting in significant energy savings in the hydraulic systems of injection molding and other machinery.
10	Monitor and controller (for construction machinery)	The monitor and controller responds to joystick command signals of hydraulic excavators and other construction machinery to control proportional solenoid valves and display the operational status of equipment.
11	DAPDNA	The <i>dynamically reconfigurable processor</i> “DAPDNA” integrates a unique high-performance RISC core digital application processor (DAP) and a distributed network architecture (DNA) matrix of processing elements (PE) in a single chip. DAPDNA switches PE functional parameters and PE inter-connections (configurations) within a single clock cycle. High speed hardware processing and software flexibility are both achieved with DAPDNA’s parallel operation involving hundreds of computing units and dynamic configuration switching. DAPDNA is incorporated in our company’s printing inspection systems as well as in multi-function printers of major manufacturers.
12	RFID	Radio Frequency Identification (RFID) allows exchange of information through short-range wireless communication using electromagnetic fields and radio waves from RF tags embedded with ID information. Contactless IC cards used for fare cards (Suica, PASMO, etc.) and e-money cards (Edy, etc.) are a type of RFID. Our RFID products have been used mainly for building exit/entry control, but they are now being used as part of keyless entry systems for construction machineries.
Fluid Measurement Equipment Business		
13	Ultrasonic flowmeters	An ultrasonic flowmeter measures flow rate (flow velocity × cross-sectional area) inside pipes using transmission signals and reflection signals generated by directing ultrasonic signals through fluids (liquids and gases) flowing in the pipes. Flow rate is determined by multiplying the cross-sectional area of the pipe by the flow velocity that is calculated from the difference in the transit times of the ultrasonic signals propagated with and opposite to the flow. Tokyo Keiki pioneered development of the world’s first ultrasonic flowmeter for general industrial use in 1963.

14	Microwave level gauges	The Tokyo Keiki microwave level gauge utilizes radar technology to measure the level of a liquid surface. Radio waves are propagated between the gauge's antenna and the target surface and the propagation time is converted into measurement of the level of the liquid surface. A key characteristic of the gauge is its ability to carry out non-contact measurement of liquids and other fluids. Our latest high-frequency microwave level gauge utilizes 26 GHz and its narrowed beam width provides reliable and highly accurate measurement of fluid level even in tanks that are compact (small diameter) or tanks that incorporate agitators and other intricate structural components.
15	Instrumentation systems	Instrumentation systems are measurement systems that incorporate measurement instruments, control devices, etc. and are used to control production processes and the like. In the field of fluid management, such instrumentation systems are utilized, for example, to measure flow and control pumps and valves to achieve desired flow rates.
<b>Defense and Communications Equipment Business</b>		
16	Radar warning receivers (countermeasure system, ESM system)	Radar warning receivers are incorporated in military and other aircraft to warn aircrews of threats from other aircraft, marine vessels and/or surface anti-aircraft systems by detecting the radio emissions transmitted by their radar systems. The radar warning receivers determine and indicate the type of radio emission, its direction, and whether your aircraft has been acquired ("locked on"). The proprietary radar warning receivers as well as ESM (Electronic Support Measures) systems developed and provided by Tokyo Keiki can detect position as well as enable specific analysis of RF signals. The systems are mainly designed for aircraft such as fighters, helicopters and cargo aircraft.
17	Inertial navigation systems	Inertial navigation systems incorporate built-in sensors (Inertial Measurement Unit (IMU), etc.) to provide information such as on position and speed that are critical for the navigation of submarines, missiles and aircraft without dependence on any external signals.
18	Helicopter video relay systems	<p>The helicopter video relay system incorporates GPS, inertial sensors, accelerometers, and magnetic azimuth sensors that constantly monitor the aircraft's position and attitude/heading to provide accurate and stable transmission of live video broadcast feeds from helicopters in flight to ground-based or mobile-based stations.</p> <p>[Antenna directioning systems (ADS)] The ADS employs microwave and inertial sensor technologies to control the relay antenna so that it always faces the receiving station.</p> <p>[Direction-finding receiving systems] The direction-finding receiving system captures video signals transmitted by ground personnel at long range, displays the incoming direction of the signals, and directs the helicopter's receiving antenna in that direction.</p>

19	F-15	The F-15 fighter was the third fighter jet put into service by the Japan Air Self-Defense Force (JASDF). Tokyo Keiki has provided equipment such as radar warning receivers, air data computers, radar indicators/signal processors, attitude and heading reference systems, and multi-functional color displays for this aircraft. With the obsolescence of the F-15's early version avionics, the JASDF is currently upgrading the avionics and we are supplying new radar warning receivers as part of this upgrade. In addition some of the aircraft are being modified with our ESM systems to enhance their capabilities.
20	F-35	The F-35 stealth fighter was developed and manufactured by Lockheed Martin Corporation. The JSDf will be introducing 42 F-35s to succeed the F-4EJ fighter.
21	Vessel traffic services (VTS) system	Vessel traffic services (VTS) are services implemented by a competent authority and are designed to improve the safety and efficiency of vessel traffic and protect the environment. In Japan VTS services are carried out by the Japan Coast Guard. VTS systems support VTS operators by providing situational awareness and communication and decision support tools including radar images that show vessel position and software that alerts VTS operators when dangerous maritime traffic situations are predicted from data analysis.
22	Solid state radars	Solid state radars are pulse-compression radars using solid state devices, which replace conventional magnetrons (electron tubes). As high voltage circuits are not used, these solid state radars consume less power, are smaller in size and compared with magnetron radars, radiate less spurious radio emissions. With such advantages, these radars help address increasing social demands related to the maintenance and improvement of the environment and promotion of wireless communications. The solid state radars provided to the Japan Coast Guard for VTS (Vessel Traffic Services) have significantly improved detection performance and resolution and boast excellent compliance with the increasingly stringent requirements pertaining to "Radio Regulations Concerning Permissible Values for Spurious Emission Intensity of Radio Equipment".
23	SSPA	Solid state power amplifiers (SSPA) are high power amplifiers that employ solid state devices. SSPA's offer advantages such as high reliability and excellent linear characteristics compared with conventional electron tube (magnetron and TWT) amplifiers. They are used in microwave heaters and plasma generators, as well as in artificial satellites and various types of radars.
24	ISM Band	ISM (industrial, scientific and medical) bands refer to frequency bands that are reserved specifically for industrial, scientific and medical purposes but not communications. ISM bands are utilized, for example, by microwave heaters (microwave ovens, etc.) and plasma generators for semiconductor manufacturing equipment.

25	Agricultural tractor guidance devices Automatic steering assist devices	<p>Agricultural tractor guidance devices are support devices that enable laborsaving and efficient precision operations that involve large areas of cultivated land. They provide various types of useful information to operators, such as on the optimum routes for covering large fields.</p> <p>Automatic steering assist devices provide automatic steering functions in addition to the guidance system. These devices not only reduce the burden on the operator but also enable more precise and efficient farming operations, even with unskilled workers.</p> <p>Unlike the systems of other companies that rely solely on the global navigation satellite system (GNSS), our tractor guidance system is a hybrid system that combines inertial sensors with GNSS which minimizes errors that may result from satellite signal interference caused by windbreaks, unevenness in the terrain, etc.</p>
26	Satellite communications antenna stabilizer	<p>Conventional satellite news-gathering (SNG) systems, or news broadcast systems using communication satellites, can only transmit radio waves toward communications satellites when broadcast vehicles are at a full stop due to the difficulty in accurately directing the antenna toward the target satellite if the vehicle is in motion.</p> <p>Our mobile satellite communications antenna stabilizer incorporates proprietary microwave and inertial sensor technologies in combination with mechanical control to solve this problem and enable automatic and precision control of the antenna even from a moving vehicle. It is currently being used not only for broadcasting, but also for satellite communications with vessels.</p>
<b>Others</b>		
27	Ultrasonic Flaw Detector	<p>An ultrasonic flaw detector is a type of non-destructive inspection device that enables detection of defects inside of a target object by using ultrasonic technology. This device consists of pulse generator, probe, receiver and display. Ultrasonic waves are propagated into the target object and characteristics of the waves reflected from defects within the object are processed to enable determination of their location and size.</p> <p>This technology is employed by our group for rail maintenance in a variety of products such as rail inspection cars and portable flaw detectors.</p>
28	Switch Profile Gauge	<p>A railroad switch (turnout) is a mechanical installation that enables railway trains to be guided from one track to another and consists of several components such as tongue rails, lead rails, crossings and guard rails.</p> <p>Our switch inspection device (SPG series) provides important measurements (e.g., wear values and distortion) that are critical to switch maintenance management and the device can also save these measurements as digitalized data. The mechanization of these previously manually accomplished tasks greatly boosts efficiency and labor savings.</p>

29	DataDepot™ System	<p>The 'DataDepot™ System' is a non-contact and high speed communication system which is developed specifically for railway use. Chainage information and locational information on structures (bridges, level crossings, stations, tunnels, etc.) are recorded to memory tags (DataDepot™) that are affixed to railway sleepers. Rail maintenance rolling stock identifies its running location by reading this information with an antenna mounted beneath the car body. This information is also utilized to record abnormal sections of rail as detected by rail inspection systems as well as for automatic control of rolling stock equipment. Features of the memory tag include no-battery, long-life, completely sealed construction, and excellent environmental resistance. The system also incorporates spread spectrum technology for superior noise immunity. In addition, use of the system is permitted without a license under Japanese Radio Law.</p> <p>Because location accuracy is higher compared with GPS and available even inside tunnels, this system has been adopted by many railway companies as well as recently for commercial trains.</p>
30	Halon 1301 fire-extinguishing systems	<p>Gas-based fire extinguishing systems are used in various applications, from large open spaces such as multistory parking garages to specific pieces of equipment such as printing machines. Among the different types of gas-based extinguishing systems, halogenated (Halon 1301) extinguishing systems offer advantages that include low volume of gas discharge that prevents suffocation, long-term storage stability, no polluting residue, and superior electrical insulating properties that make them safe for use around electronic devices. These features make these systems ideal for use in areas where people enter, such as mechanical parking structures as well as computer server rooms, communication equipment rooms, and facilities for manufacturing dangerous materials.</p> <p>Although Halon is considered to be an ideal fire extinguishing agent, as a CFC compound, production of new Halon ceased in January 1994. Use of the existing supply of Halon however is not prohibited and new Halon 1301 fire extinguishing systems have been approved for critical applications. The recycling and reuse of Halon 1301 is strictly controlled and through its website, the Fire and Disaster Management Agency encourages the recycling of Halon 1301 in order to prevent its release into the atmosphere by careless disposal and to preserve the environment.</p>



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