Sony IR Day 2018

Semiconductors Segment

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Business Executive
Sony Corporation
Representative Director and President
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Agenda

1. FY2017 Review
2. FY2018 Action Plan
3. FY2018 – FY2020 Mid-Range Plan
1. FY2017 Review

Achieved record high profit for the Semiconductors business

Operating Income Analysis (bln yen)

<table>
<thead>
<tr>
<th>Sales 773.1</th>
<th>Operating Income 850.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Sensors 649.4</td>
<td></td>
</tr>
<tr>
<td>Mobile Sensor 164.0</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

Sales: Image Sensors $48.6

Achievements

- Increased image sensor sales and profit
- Steady customer expansion for automotive image sensors
- Improved operating results in the non-image sensor businesses

Issues

- Ability to respond to fluctuations in demand from Chinese smartphone manufacturers
- Optimization of inventory level
- High currency sensitivity

FY16: 1 USD = 108.4 yen
FY17: 110.9 yen
2. FY2018 Action Plan

Our View of the Image Sensor Market

Mobile application growth led by dual lens and sensing. Growth in new areas expected.

<table>
<thead>
<tr>
<th>Trend in World Wide Image Sensor Shipment Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Area</td>
</tr>
<tr>
<td>Mobile Sensing</td>
</tr>
<tr>
<td>Mobile Dual Lens (Sub Camera)</td>
</tr>
<tr>
<td>Mobile Front + Rear</td>
</tr>
<tr>
<td>AV</td>
</tr>
</tbody>
</table>

**New Area**
- Automotive: Rise of the ADAS market
- Factory Automation: Market expansion due to smart manufacturing
- Security: Market expansion due to automatic monitoring using AI technology

**Mobile Area**
- Market expansion from dual lens and mobile sensing

**AV Area**
- Expansion of high-end sensor market

*Source: Sony*
Activities for Mobile

Evolve in plane, time and space to deliver “KANDO” in addition to achieving DSLR camera-like image quality.

Evolution of Mobile Sensors

<table>
<thead>
<tr>
<th>Present</th>
<th>Future ~</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Image Quality</strong>&lt;br&gt;High Dynamic Range / High Sensitivity / Low Noise&lt;br&gt;No blocked up shadows&lt;br&gt;Sharpness even in dark places</td>
<td><strong>Plane</strong>&lt;br&gt;Wide Angle / Enlargement&lt;br&gt;Free from Structure&lt;br&gt;<strong>Time</strong>&lt;br&gt;Super Slow&lt;br&gt;Free from Shutter&lt;br&gt;<strong>Space</strong>&lt;br&gt;Depth / Focus&lt;br&gt;Three-Dimensional / Immersive</td>
</tr>
</tbody>
</table>

Activities for Sensing

Succeeded in developing back-illuminated high-resolution ToF* sensor capable of distance measurement. Anticipate deployment to a wide range of use cases.

Development of ToF Sensor | Use Cases of ToF Sensor
---|---
Front-illuminated ToF Sensor | Automotive
Back-illuminated ToF Sensor | Mobile

*aToF: Time of Flight
Activities for Automotive

Completed commercialization of stacked image sensor for ADAS.
Strengthen cooperation with key players.

Realization of “Safety Cocoon”

Cooperation with Key Players*

Semiconductors Segment

Activities for Factory Automation

The market is expanding due to industrial automation.
Transition from CCD to CMOS sensor proceeds.

Evolution of FA Sensors

Present | Future ~
---|---
CCD | Front-illuminated CMOS GS*
Low Error Rate | Increase Throughput
| Back-illuminated CMOS GS
| High Speed and High Resolution Inspection
| Stacked CMOS GS
| Automation of Production Line

Infrared Sensor

Sugar
Salt
Invisible Light Inspection

*GS: Global Shutter
Activities for Security

The security market is expanding due to the penetration of automatic monitoring using AI technology.

Evolution of Security Sensors

<table>
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<tr>
<th>Present</th>
<th>Future ~</th>
</tr>
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<tbody>
<tr>
<td>Back-illuminated CMOS</td>
<td>Low Noise Miniaturization</td>
</tr>
<tr>
<td>High Sensitivity</td>
<td>Stacked</td>
</tr>
<tr>
<td>Wider Area Image Capturing in Outdoors</td>
<td>Optimization for AI monitoring</td>
</tr>
<tr>
<td>Full Color Image Capturing at Night</td>
<td>High-definition Image Capturing in Wider Area</td>
</tr>
<tr>
<td>Region Control</td>
<td>Data Capacity Reduction</td>
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Activities for Technology Development (1)

Proceed with technology development that creates added value responding to market needs.

Direction of Technology Development

<table>
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<th>Future ~</th>
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<tr>
<td>Performance Evolution</td>
<td>Sensitivity Improvement</td>
</tr>
<tr>
<td>Function Expansion</td>
<td>Miniaturization and High Functionality</td>
</tr>
<tr>
<td>Performance Expansion</td>
<td>Productivity Improvement and Space Saving</td>
</tr>
<tr>
<td>Back-illuminated</td>
<td>Pixel-Parallel ADC</td>
</tr>
<tr>
<td>Stacked</td>
<td>Image Distortion Cancellation</td>
</tr>
<tr>
<td>Cu-Cu* Connection</td>
<td>Event Driven</td>
</tr>
<tr>
<td>Power Consumption 1/100</td>
<td></td>
</tr>
<tr>
<td>ToF</td>
<td>Region Control</td>
</tr>
<tr>
<td>Distance Information Detection</td>
<td>Data Capacity Reduction</td>
</tr>
<tr>
<td>Polarization</td>
<td>Infrared</td>
</tr>
<tr>
<td>Distortion and Scratch Detection</td>
<td>Invisible Light Inspection</td>
</tr>
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*Cu-Cu: Copper to Copper
Activities for Technology Development (2)

Developed event-driven stacked CMOS image sensor realizing 1/100 power consumption.

Realized by stacked structure with Cu-Cu connection

Activities for Technology Development (3)

Quick Response & Anti-shake Motion Detection

Movie
**FY2018 Forecast**

### Increase Capital Investment and R&D to Accelerate “Preparation”

**Operating Income Analysis (bln yen)**

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**Environment**

- Advancement of dual lens for smartphones
- Rise of sensing and automotive market
- Appreciation of the yen and sluggish smartphone market growth are risks

**Basic Policy**

- Increase capital investment and R&D to accelerate “Preparation”
- Maximize profitability of mobile and AV fields which are the leading profit drivers
- Foster new areas such as sensing and automotive
- Continue activities to reduce manufacturing cost of sensors

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**3. FY2018 – FY2020 Mid-Range Plan**
Financial Target for FY2020

**Financial Target for FY2020**
- Operating Income 160 - 200 billion yen
  *1 USD = 105 yen

  Sales Amount (For Reference): 1,100 billion yen

**Mid-Range Plan for FY2020**
- Maximize mobile sensor profit by enhancing response to environmental changes
- Aim for profit contribution by new areas including sensing and automotive business
- Promote technology development including function and performance expansion

SONY