

SONY

Future of Image Sensing with RISC-V

RISC-V Day Tokyo 2019

ソニーLSIデザイン株式会社
代表取締役副社長 吉田 英喜

Sony LSI Design Inc.
Executive Deputy President
Hideki Yoshida

Sony Group Summary Chart

Game & Network Services (G&NS)			Music		Pictures		Electronics Products & Solutions (EP&S)							Imaging & Sensing Solutions (I&SS)	Finance Services			Others			
Network Service	Software	Entertainment System	Visual Media and Platform	Music Publishing	Recorded Music	Media Networks	Television Production	Motion Pictures	Video	Audio	Televisions	Medical	Professional Solutions	Digital imaging Products	Internet Services	Mobile Phone	Image Sensor	Bank	Non-life Insurance	Life Insurance	Recording Media, Battery, Disk Manufacturing

Headquarters, Research & Development / Business Incubation / Brand Design Platform / Professional Services

Operation / Service Related Companies
(Manufacturing, Logistics, Procurement, Quality, Environment, Sales & Marketing, Accounting, HR, General Affairs, Information System etc.)

Sony Semiconductor Solutions Group

Sony Semiconductor Solutions Corporation (SSS)

Sony Semiconductor Manufacturing Corp. (SCK)

R&D, Product planning/design , Sales
(Sony's 100% Subsidiary / Atsugi-shi, Kanagawa)

Sony LSI Design Inc. (SLSI)

Process development, Manufacturing
(SSS's 100% Subsidiary / Kikuchi-gun, Kumamoto)

Product design
(SSS's 100% Subsidiary / Atsugi-shi, Kanagawa)

Sony Depthsensing Solutions Holding SA/NV

Development of Time of Flight (ToF)
(SSS's 100% Subsidiary / Belgium)

Altair Semiconductor Ltd.

Development of LTE modem chip
(SSS's 100% Subsidiary / Israel)

Mido Holdings Ltd.

Development and sales of software for cloud computing
(SSS's 100% Subsidiary / Switzerland)

Sony Device Technology (Thailand) Co., Ltd.

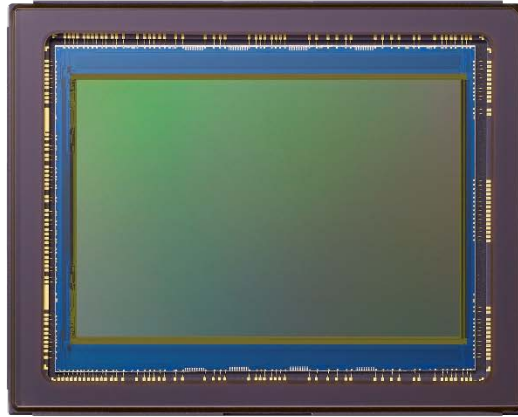
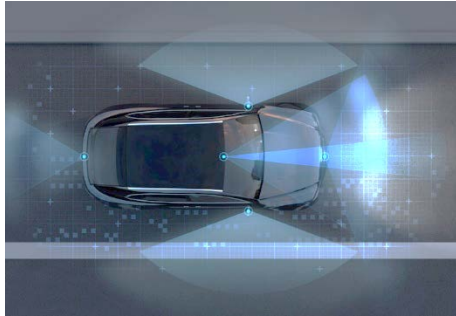
Image sensor's assembly process
(SOHBV※'s 100% Subsidiary / Thailand)

※Sony Overseas Holding B.V.

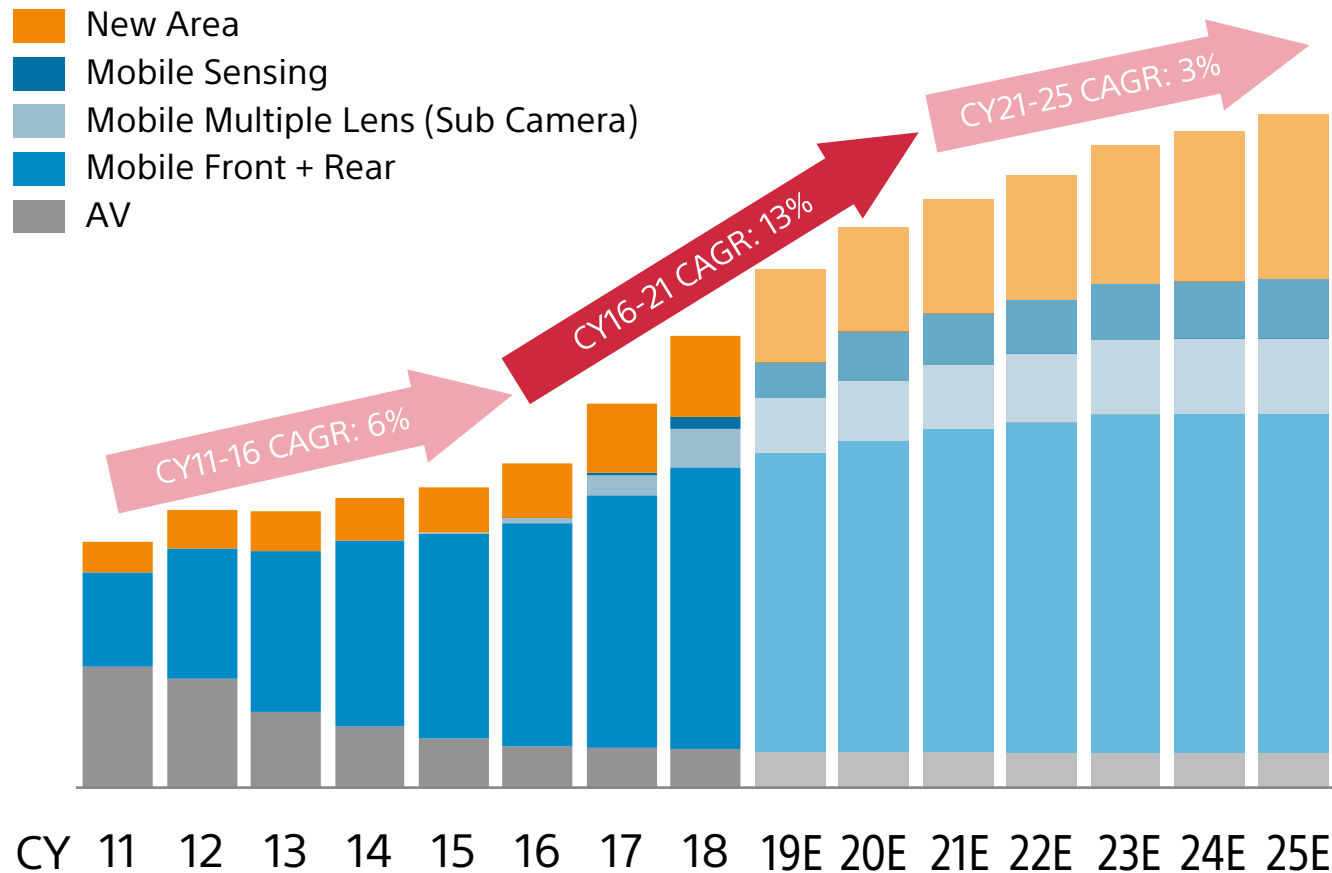
Sony Precision Devices (Huizhou) Co., Ltd.

Manufacturing of Optical pickup
(Sony China's 100% Subsidiary / China)

Sony Sensors Used in Various Applications Around the World



Worldwide Image Sensor Shipments (Revenue Basis)



New Area

- Automotive: No change in the speed of growth of the ADAS market
- Factory Automation : Growth market in the mid to long term
- Security : Stagnant market from late FY18 to early FY19. Expect recovery in FY19

Mobile Area

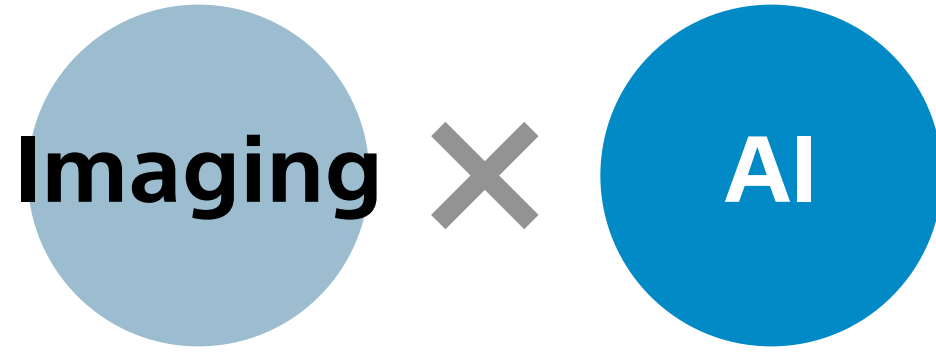
- Market expansion from multiple lens and large sized sensors
- Steady adoption of sensing products although the pace of market growth is slower than expected

AV Area

- No change in expansion of high-end sensor market

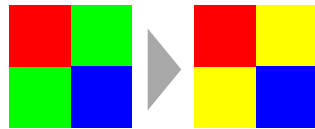
※Source: Sony

Image Sensors × AI Possibilities

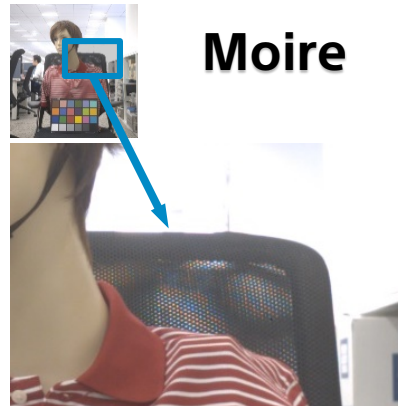


Better Picture Quality

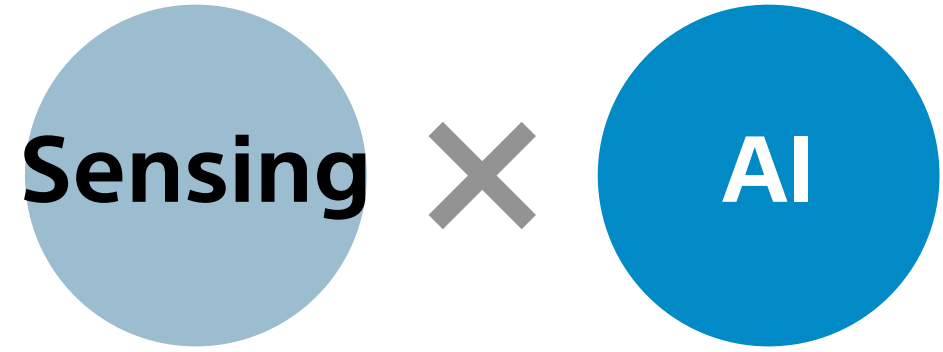
Possibilities limited to
the number of human eyes



Utilizes complementary colors
High sensitivity and color
reproduction

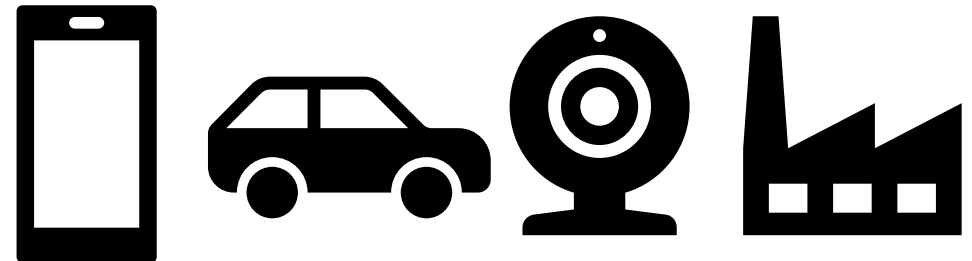


Eliminates moiré
Correction beyond
physical limitations



Recognition and Machine Vision

Unlimited Possibilities



Role of Image Sensors in the AI Era



What Image Sensors Aimed To Do Up Until Today

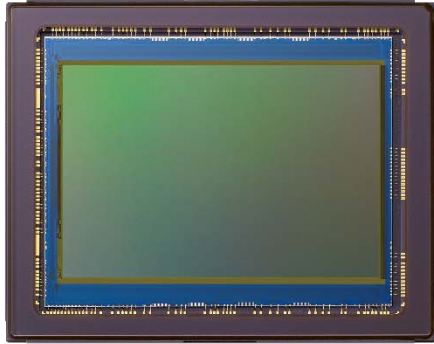
Create clean images based on how human eyes see the world

What Image Sensors Aim To Do Going Forward

Create clean image data based on how AI sees the world

Integration of Edge AI Processing and Sensor Hardware

Sony Image Sensors

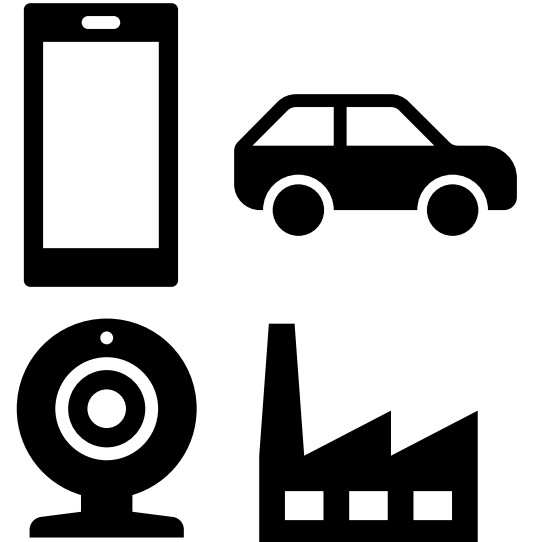


Approximately 51%* global market share
Superb expertise in data output space

AI



Applications



Integrate edge AI processing and sensor hardware
Pursue a recurring revenue business model

※Revenue basis, Source: Sony



Calista Redmond, "Guiding the Future of RISC-V", RISC-V Workshop Zurich

RISC-V
ushers in
new era of
silicon design



RISC-V Foundation

Sony's Initiative to OSS: Communityとの対話

- **Sony圏内にはOSS Communityから強く信頼され高く評価されているメンバーがいます**

Tim Bird

OSS Communityの中でEmbedded Linuxを代表するメンバーです。さまざまなOSS Communityのkey personと親交がありリスペクトされています。もちろん技術的知識も広範かつ高度なものを持っています。また、2017年から2年間、**Linux Foundation Technical Advisory Board MemberとしてLinux Communityを代表する一人**として活躍。



Frank Rowand

Communityの中でEmbedded Linux、特にReal time preemptionやDevice treeなどboot processに精通するメンバーです。Device treeについてはLinux communityの中でmaintainer（主開発者）に指名されています。



SONY

Purpose

Fill the world with emotion,
through the power of creativity and technology.



SONY

Values

Dreams & Curiosity

Pioneer the future with dreams and curiosity.

Diversity

Pursue the creation of the very best by harnessing diversity and varying viewpoints.

Integrity & Sincerity

Earn the trust for the Sony brand through ethical and responsible conduct.

Sustainability

Fulfill our stakeholder responsibilities through disciplined business practices.



Polarization Image Sensor Technology "Polarsens™" Video

- Introduction part
 - English
<https://youtu.be/q17AlnHds54>
 - Japanese
https://youtu.be/JMD_9nXE6qw
- Application part
 - English
<https://youtu.be/C5hhKcMYRGI>
 - Japanese
https://youtu.be/631jd_ndoOQ