Panasonic's collaborative R&D for a better life in a better world

November 14, 2013

Takeshi Uenoyama
Panasonic Corporation

Panasonic

Contents

- Panasonic Business Policy
- Mission of R&D
- Open Innovation Strategy

  Collaborative activities with
  - Academia
  - Ventures
  - R&D partners
- Towards future

Panasonic Business Policy
~ Direction of Panasonic

Panasonic Business Policy
~ 4 strategic areas

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What should R&D create ?

Mission:

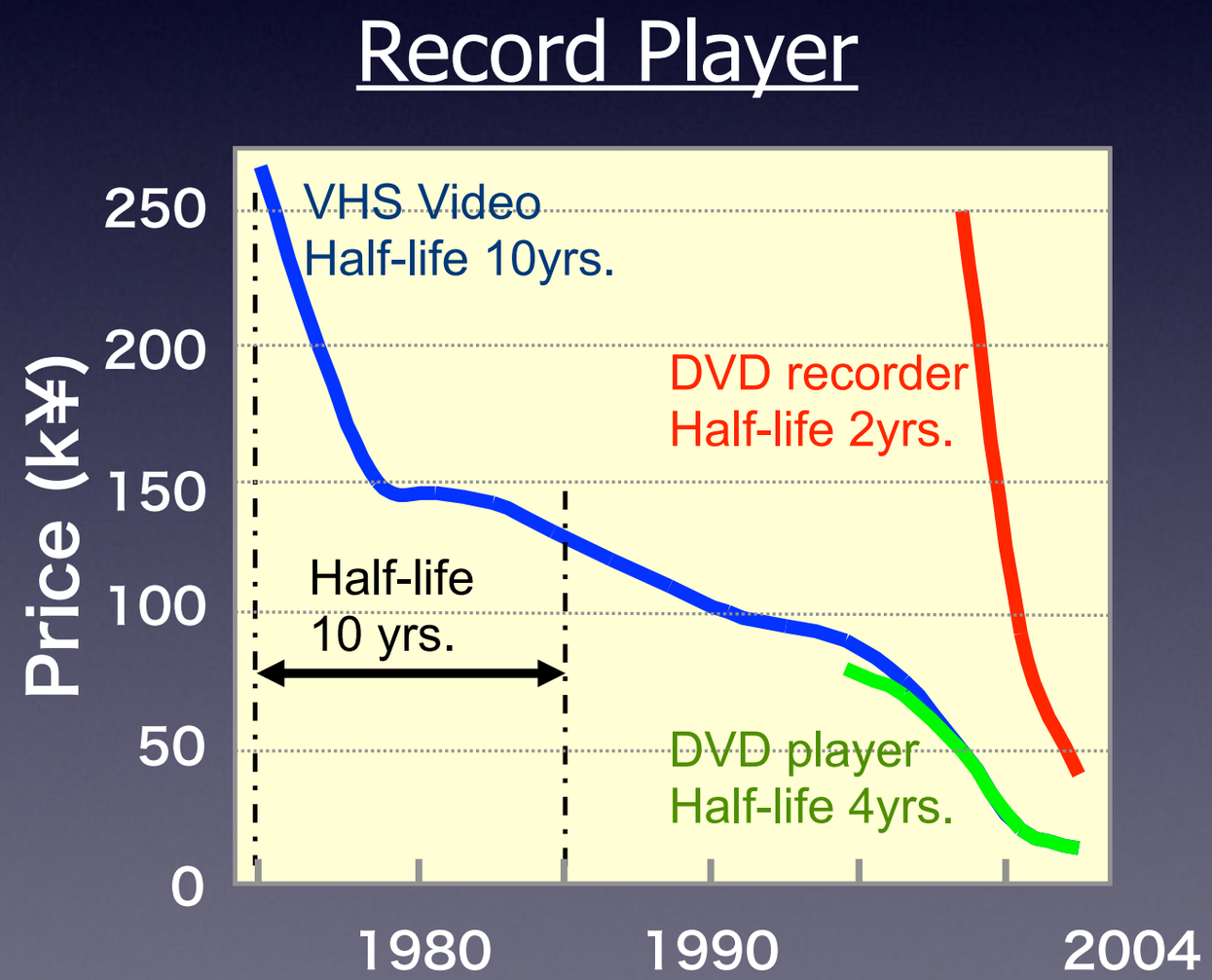
Creation of technologies to sustain the business in 5~10 years later

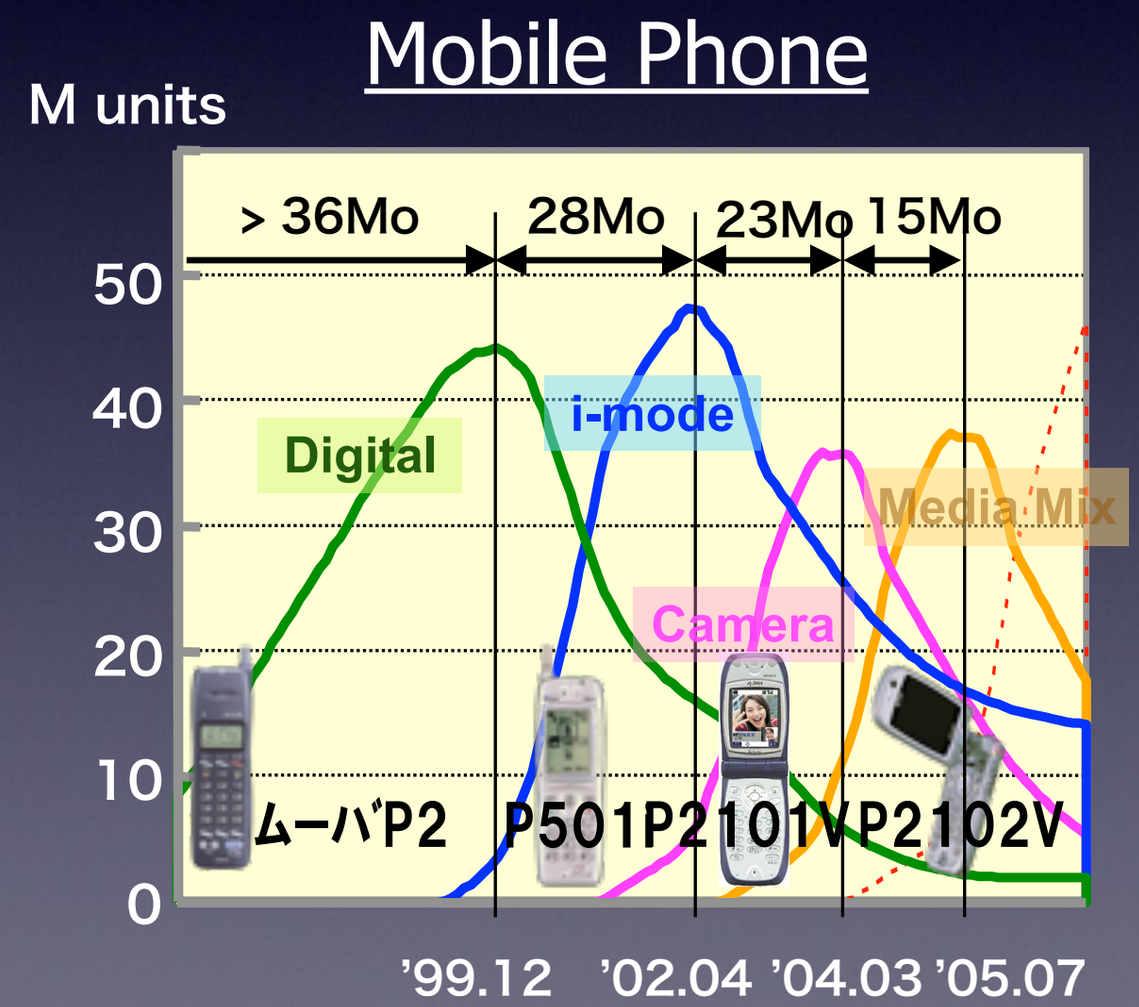
Current Problems:

- Short product life time
- Uncertainness of research themes for future businesses

Short product life time

- Digitalization has brought the high price competition
- Investment recovery has been getting hard





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Strategy of R&D

- Defining Automobile and Housing as strategic fields
- Providing a better life for B2B partners and customers through the cloud service

Cloud

Customer,hardware information
Service (energy management, security)

Strategic Field

- Housing

House, Store, Office …

- Automobile

LAWSON
ALSOK

・Government

B2B Partners / Customers

TOYOTA
mazda

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Open innovation Strategy

Current Problems:

- Short product life time
- Uncertainness of research themes for future businesses

Countermeasure:

- High speed research & development
- Many attempts by new themes
- Implementation of Eco-system

Open Innovation !!

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Approaches of open innovation

Collaborative activities with

- Academia:
  Challenging, aggressive themes

- Ventures:
  High speed R&D, eco-system

- R&D partners
  High speed, asset-light R&D, eco-system

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Collaborative activities with academia

Stanford University

ME310 Academia-industrial program
Center for Design Research
Professor Larry Leifer

- Creation of new concept for instrument
- Validation by rapid-prototyping

"This concept is the origin of IDEO"

EZ TOUCH REMOTE

A new remote control concept for the next-generation of visual entertainment

Ez Touch Remote allows for easy control with a combination of sensors and **few buttons**. Its universal design conforms to any user and any manipulation style or method. It adapts to new applications and emerging technologies, making it the most flexible remote available. The Ez Touch remote control revolutionizes how users control their visual entertainment environment.

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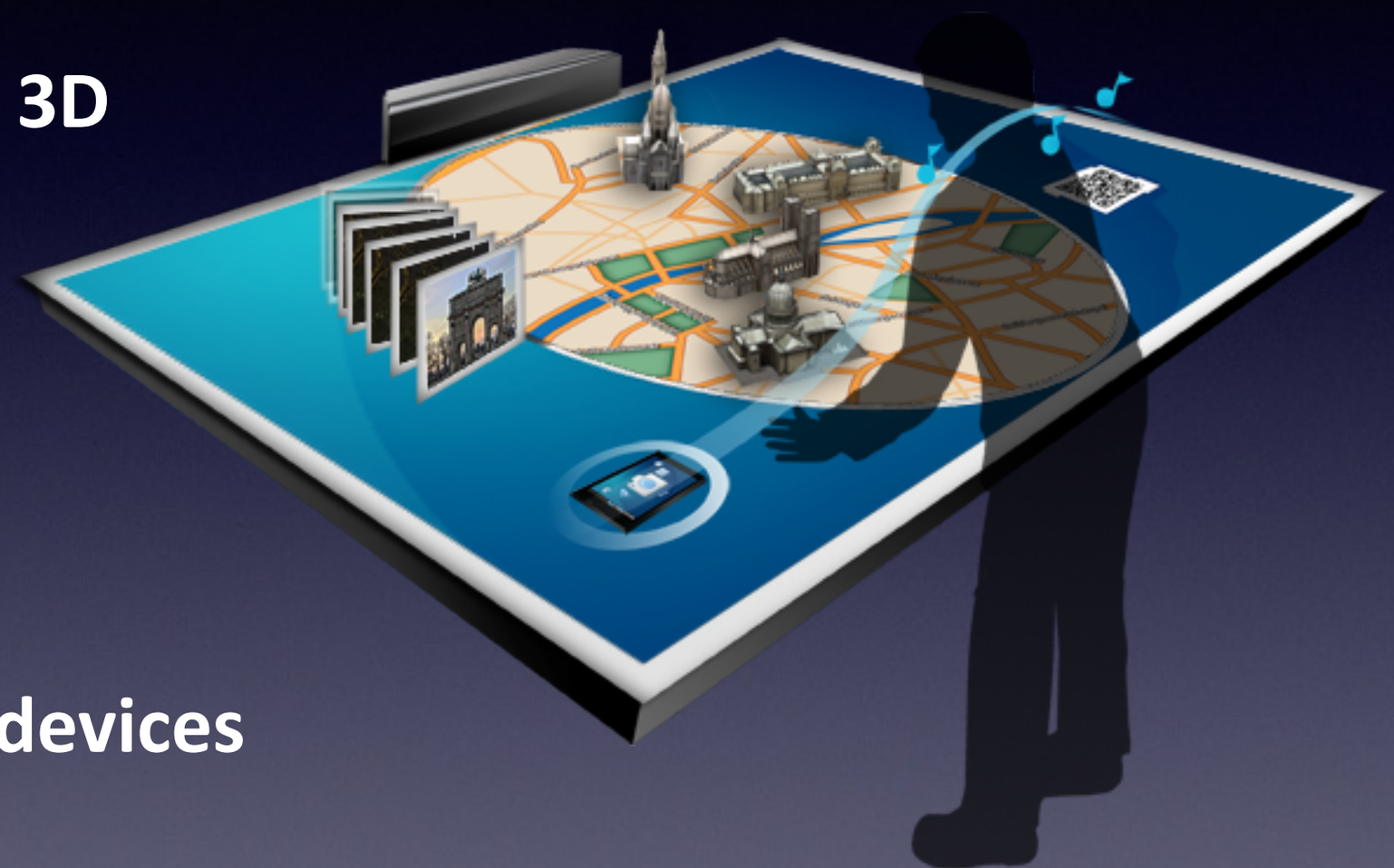
Holographic Display

- Holographic 3D
- Natural, free-space 3D interaction



- Can augment the interface of smaller devices (e.g. smartphones)

Point of interest exploration with virtual fly-in (e.g. restaurant)

Holographic city navigation linking to personal content from the mobile device (i.e. pictures)

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Gesture UI

Consistent and simple UI and interaction model to reduce driver distraction

- Simple relative gesture based interface
- Flexibility in the choice of input device

Availability of cloud content in-car

- Mobile device as a gateway to the cloud

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Industry on Campus

Collaborative Research Center

"Hand in hand with industries, Osaka University stresses creativity and new frontiers for industry"

Theme: Industry

Resource: Industry & University

Place: University

Facilities: University (+ Industry)

Technology: University & Industry

TechnoAlliance Osaka University

Panasonic has started from April 1st 2012

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Collaborative activities with ventures

Corporate venturing

- Since 1998
- Bay area (US) and Osaka (Japan)
- Become an insider of Silicon Valley venture community
- Minority investment in start-up companies
- As share holder, promote strategic collaboration such as joint development

Panasonic R&D Company America
Panasonic Venture Group
（Cupertino, CA）

Corporate venturing

Framework of operation

1) Searching

Networking with SV eco-system to find high potential start-ups

→

2) Collaboration Promotion

Introduction, collabo. promotion & support

→

3) Strategic Investment

Strengthen relationship, support of strategic benefit & financial return

→

4) Portfolio Management

Monitoring of business condition, follow-ons to maximize investment in technology and ROI

Portfolio Companies

<u>Policy of Portfolio</u>

Define the portfolio through “Growth” and “Technologies”

Growth: Private -> Merger/Acquisition -> Public

Technologies: Network & Communication
Semiconductor & Chipset
Service & Software
Energy & Healthcare
Materials & Electronic Devices

Less investment loss Broader coverage of tech.

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Collaborative activities with R&D partners

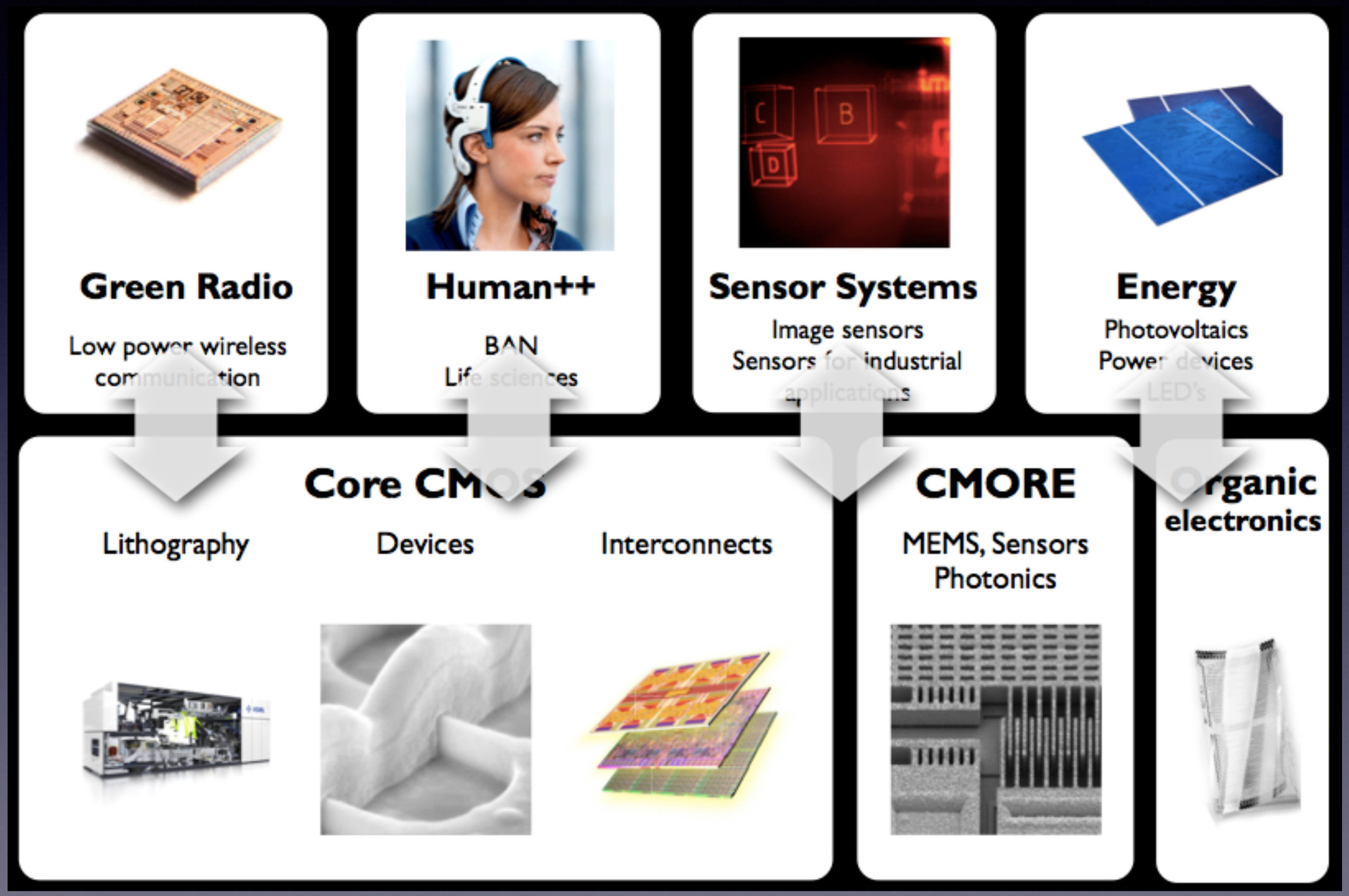
Partner: **imec** (Interuniversity Microelectronics Centre)

Advantages:

- World's greatest open innovation (2000 people, 600 companies)
- Technology hub for eco-systems
- Most advanced R&D facilities

Panasonic has joined from 2004

Research Programs for Full Eco System



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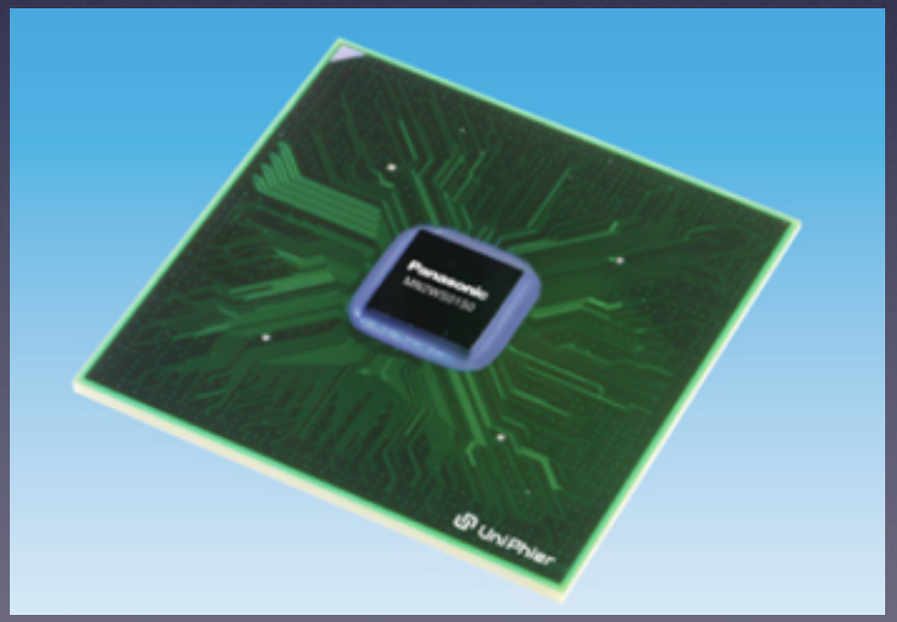
World 1st volume production of sLSI

45nm Low Power process(2007)
- ArF immersion lithography
- Strain technology
- H.264/3D graphics

32nm gate-first process(2010)
- ArF immersion lithography
- Extremely low k (ε=2.4)
- Hf high k + metal gate
- Blu-ray recorder



@ Uozu factory

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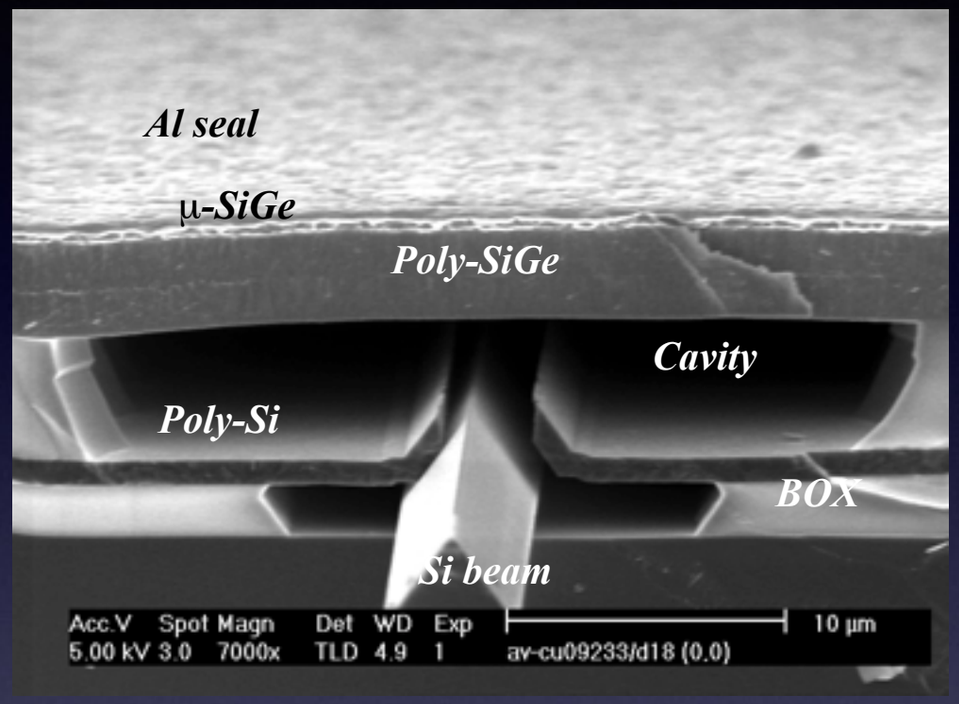
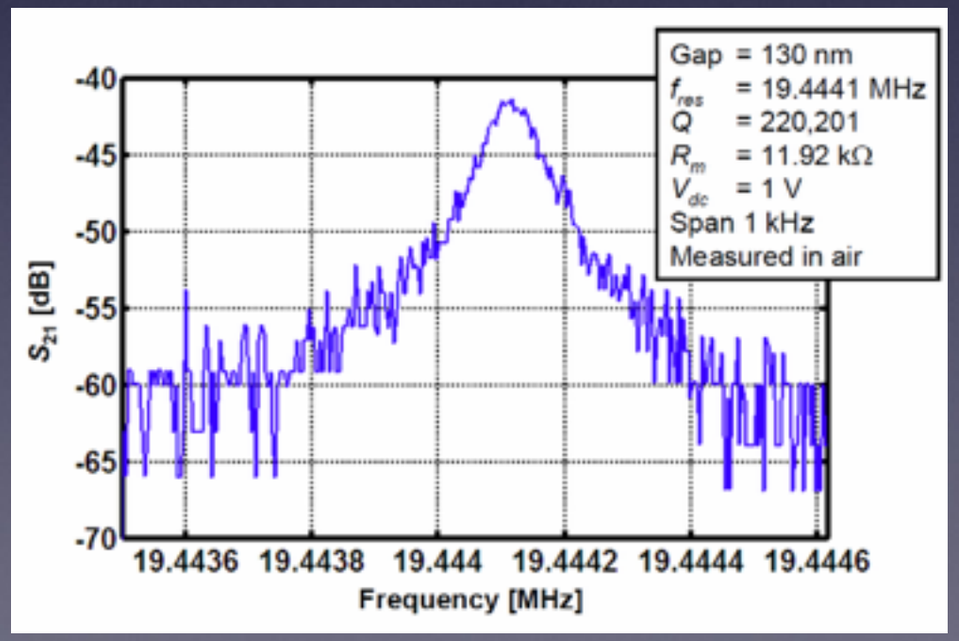
MEMS Resonator

High Q-factor
- Torsional vibration mode (Q>220,000)
- Low voltage driving (1.8V)

Ultra small package
- SiGe thin film vacuum package (<30Pa)
- High hydrostatic strength (>10MPa)

Active area: 0.4mm x 0.4mm





(from IEDM 2010)

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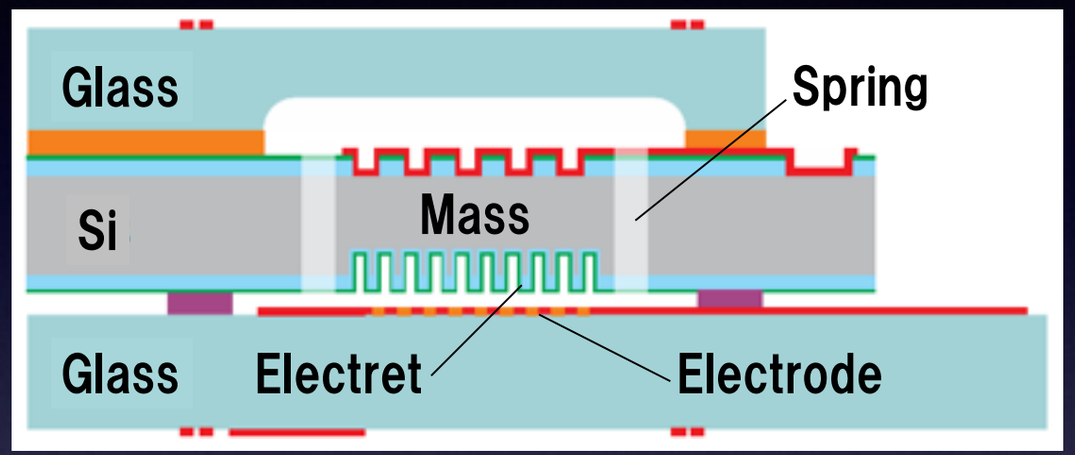
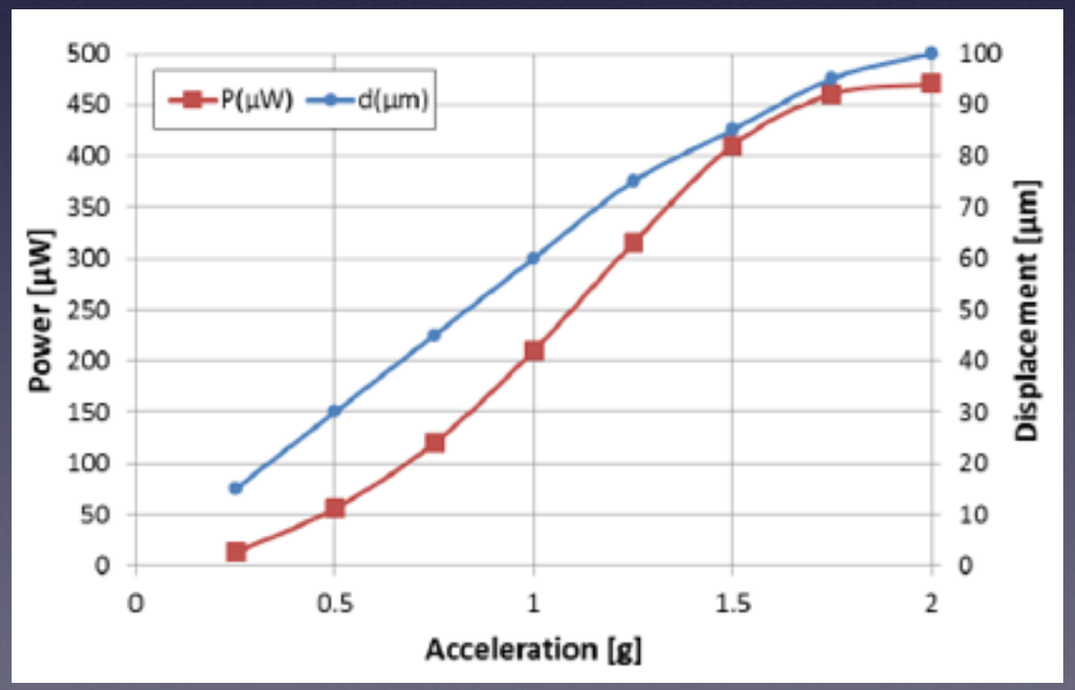
Electro-static Energy Harvester for Automotive

High output power
- 500uW@2G, 1000Hz
- Utilizing shock induced resonance

Long term stability
- Corrugated SiO/SiN electret (>120V)
- Si spring (Deep-RIE)

Active area: 14mm x 12mm





(from Transducer 2013)

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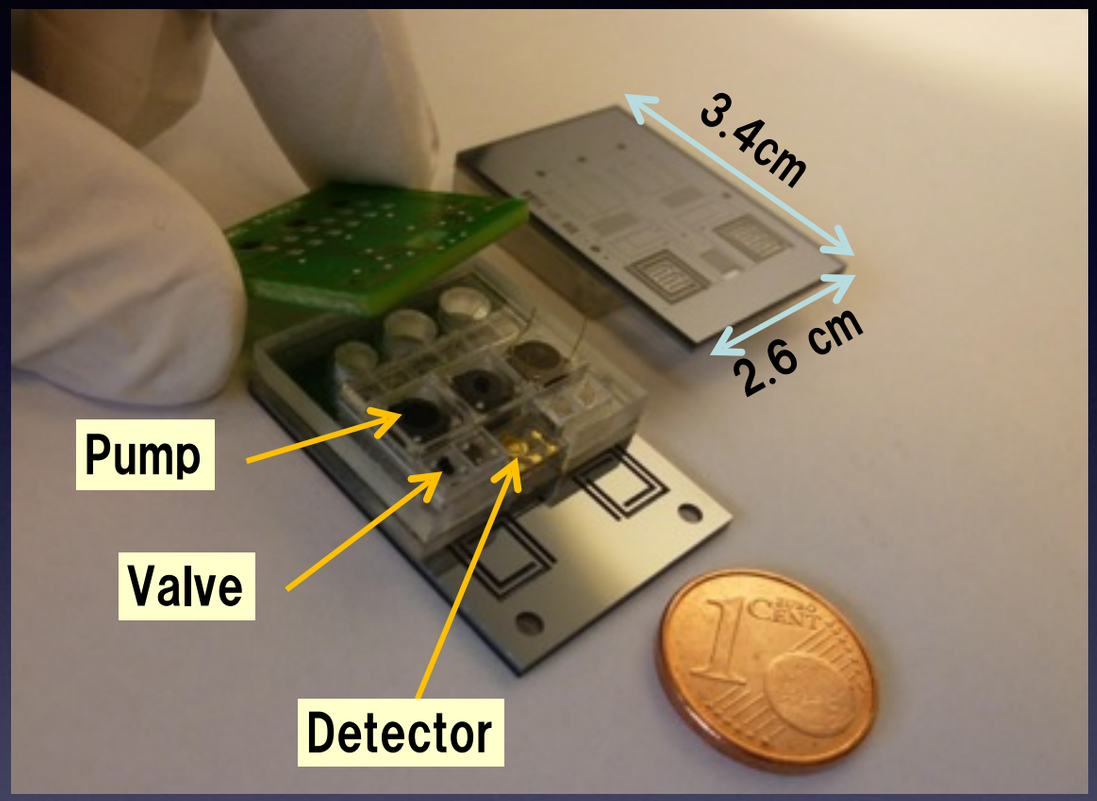
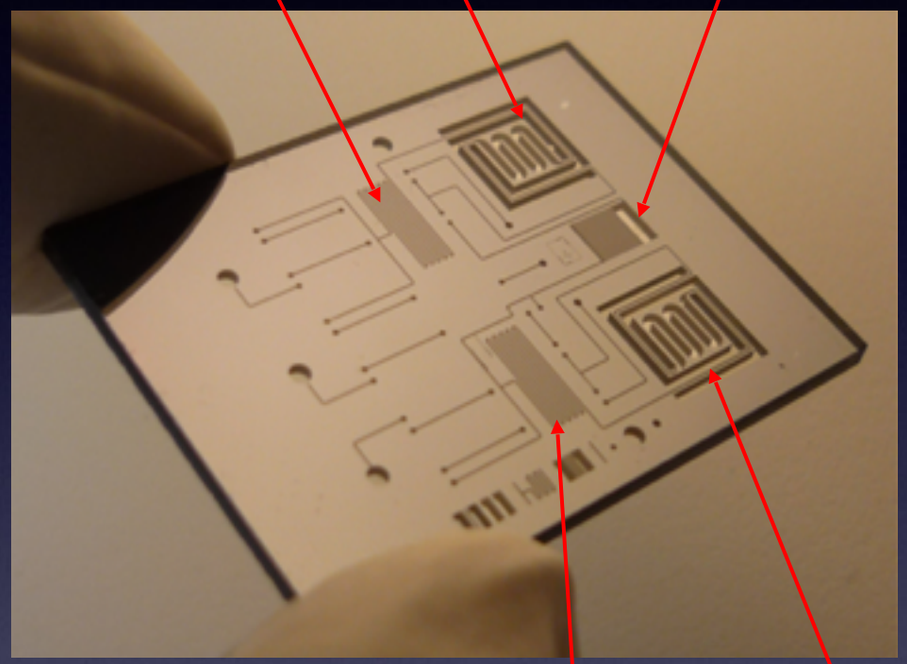
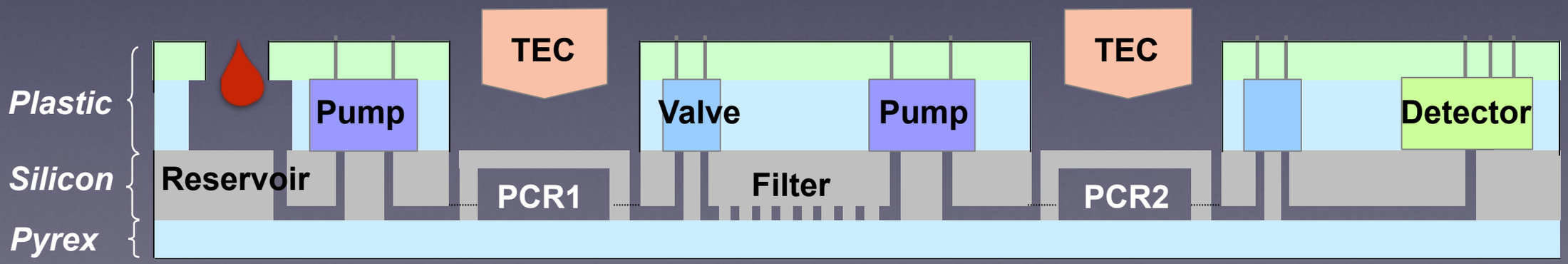
A lab on chip for direct SNP detection







(from SSDM2013)

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Imec-Panasonic Join Press Release and Publications of EEG sensors

Headquarters News

Nov 28, 2011

Panasonic Develops Estimation Technology using Brain Wave Patterns for Acceptable Maximum Sound Volume of Hearing Aids

▾ Specifications ▾ About Panasonic ▾ Media Contacts

Osaka, Japan - Panasonic today announced the development of a new technology for fitting hearing aids. Focusing on electroencephalogram (EEG) brain wave patterns recorded when example sounds heard at the normal sound volume are played into the user's ears during the test, the new technology enables to estimate the loudest level of sound the user can comfortably tolerate. This development allows for reducing the strain on the users and the time required to fit hearing aids. Panasonic started clinical evaluation of this method in cooperation with the University of Fukui, with an aim to put it into practice as an automatic volume level fitting system for hearing aids in the fiscal year starting April 2015.

Panasonic's new technology based on electroencephalogram pattern analysis enables to accurately and objectively estimate acceptable maximum sound volume of hearing aids for each user, without the need to exposing the user to loud sound in hearing test.

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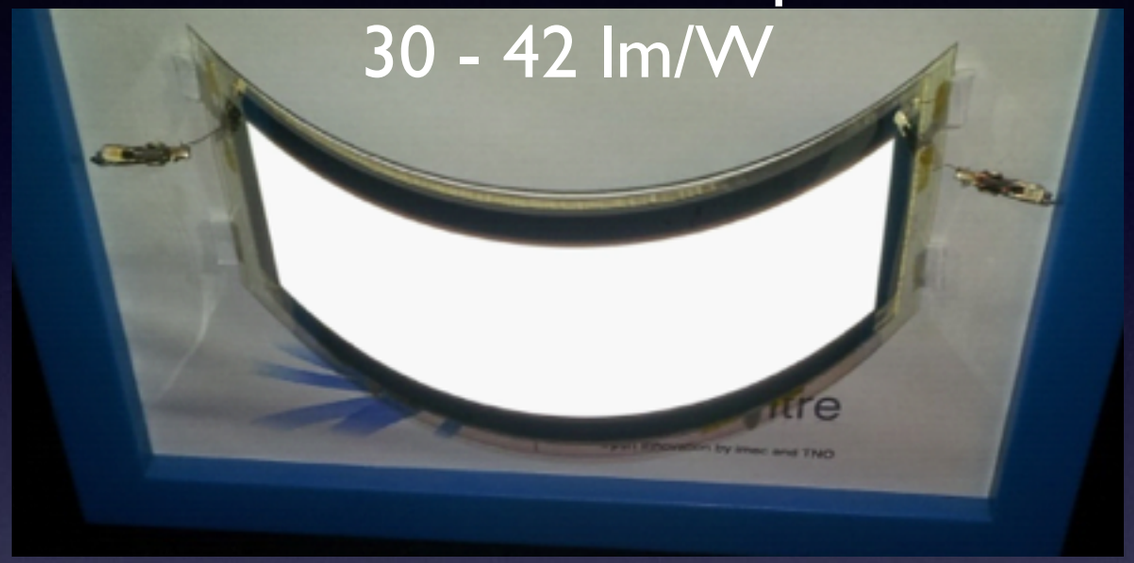
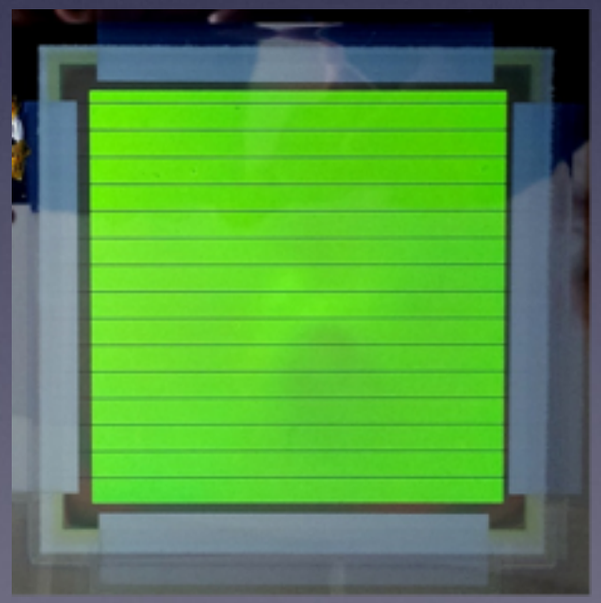
OLED Lighting tiles

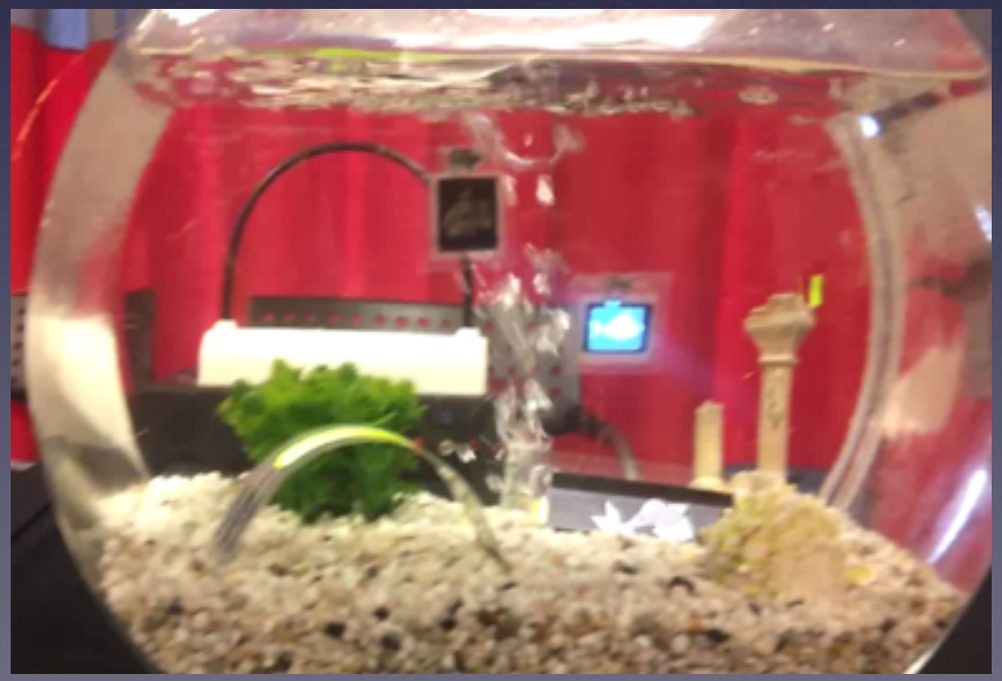
Flexible OLEDs on plastic
30 - 42 lm/W



Humidity barrier
- Reaches OLED specs
- Stands 10.000 rolls @ 1 cm
- Stands -50C +250C



Flexible OLEDs
made on metal foil
All printed process



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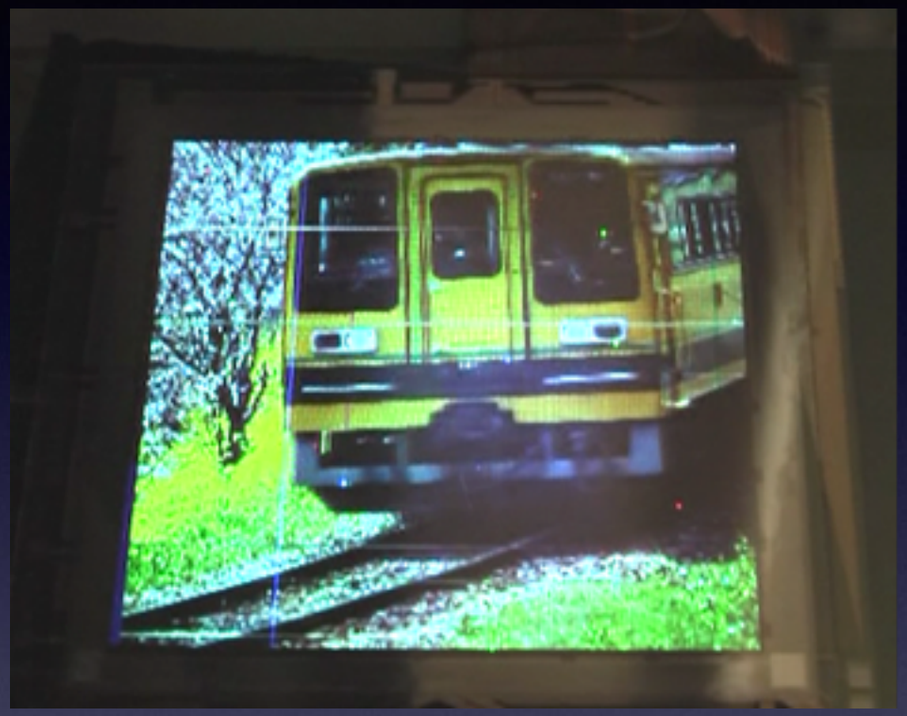
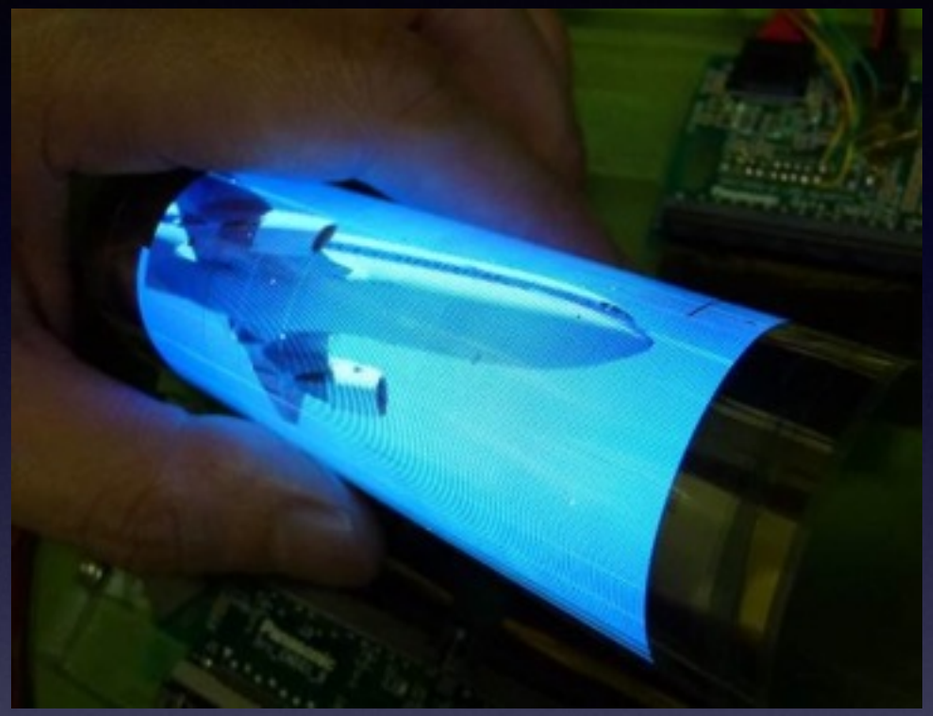
4.0” Full-color Top-Emission Flexible AMOLED





Diagonal	4.0 inch
Number of pixels	224 x RGB x 224
Pixel Size	318 μm x 318 μm
Resolution	80 ppi
Pixel circuit	2Tr + 1C
OLED structure	Top-emission
Substrate	PEN
Contrast	1:10,000
Bending radius	10 mm

(from SID2013)

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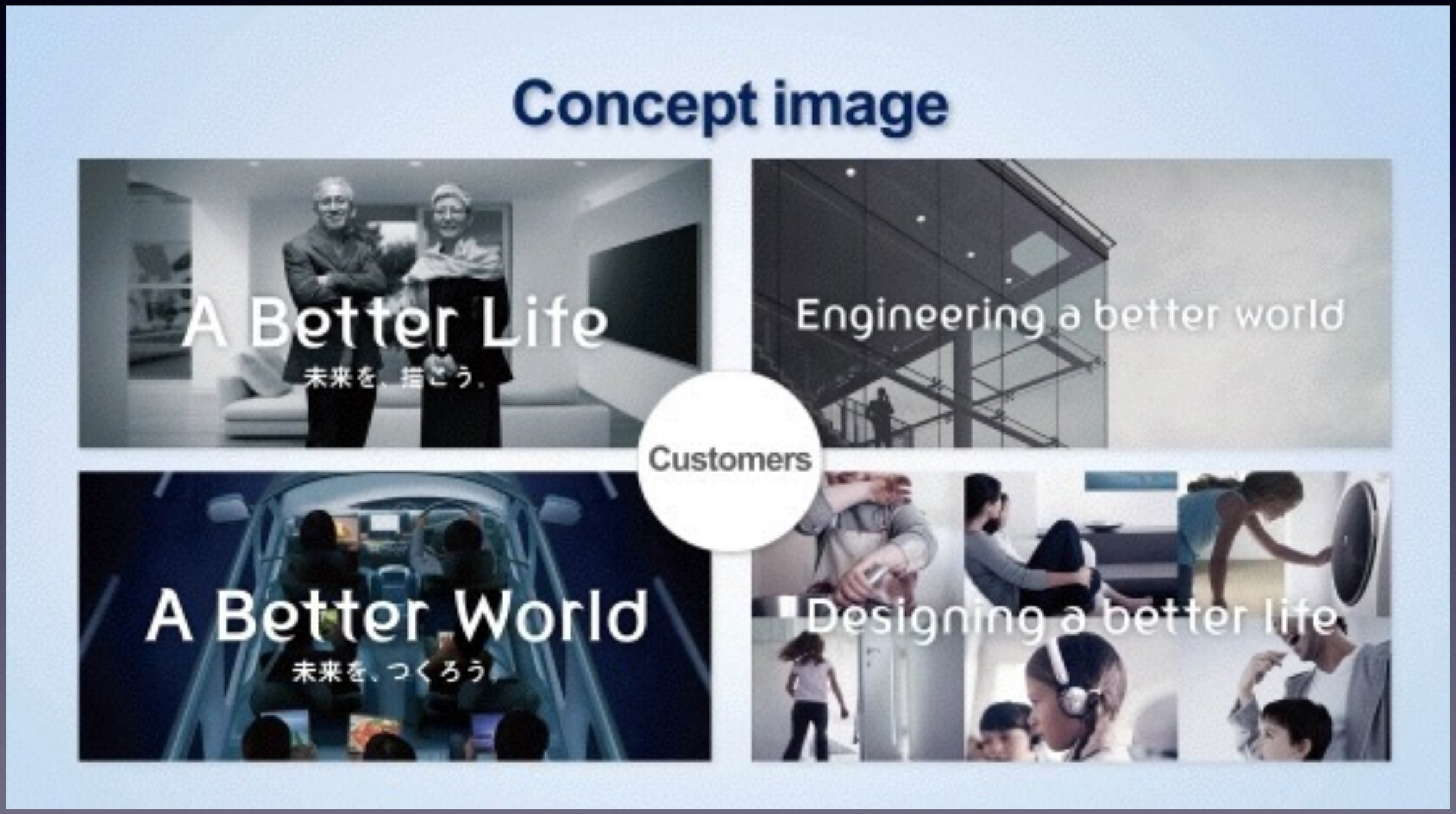
Deliver A Better Life, A Better World to Customers in the world !



Thank you for your attention