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Haptic Touch

Seminar 1 April 2015

User Interface Design

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Why do we need Haptics ?

“Haptics” in HCI Hype Curve

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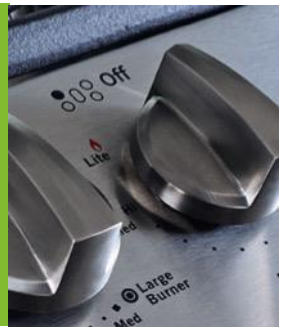
User interface dilemma

Touch screens revolutionized smart phones…

…but many people miss a physical keypad

Touch interfaces on kitchen appliances look very stylish and are easy to clean…

…but buttons & knobs are quicker and can be operated without looking



In cars, touch screens reduce clutter of buttons…

…but for most used functions, buttons will remain important

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Best of both worlds

Tactile experience of buttons, keys & sliders

Seamless flat surface user interfaces

Taptics by Apple

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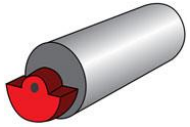
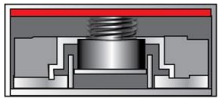
Vibration with ERM and LRA

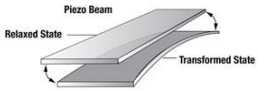
ERM: **Eccentric Rotating Mass**
Sanyo,Jinlong, Johonson Elecronics



LRA: Linear Resonant Actuator
Semco



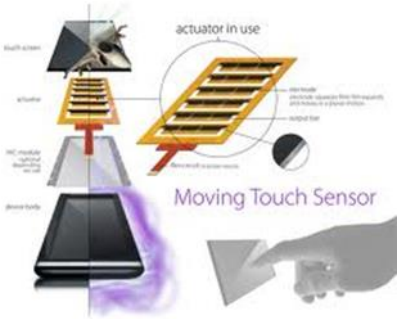
Piezo:
AAC, Murata, Hokuriku, TDK



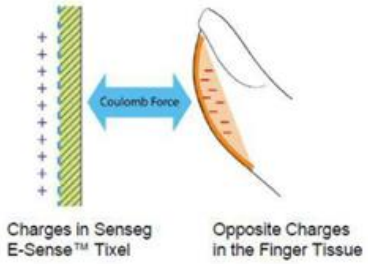
Sound Acoustic Waves
Redux

Film based technologies

- **EMP (Electrical-Mechanical Polymers)**
  Novasentis



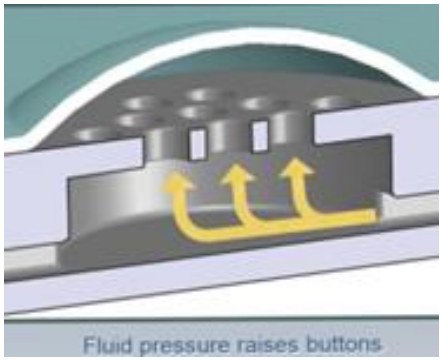
- **ES (Electrical Stimulus)**
  Sensec
  Tesla Touch/ Disney Research



Non Mature Technologies

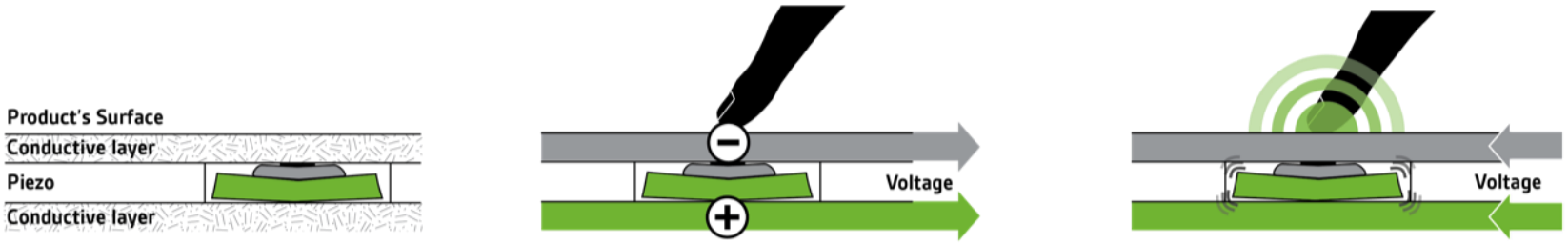
- **EAP (Electro Active Polymers)**
  Vivitouch

- **Transparent fluid based actuation films**
  Tactus



Haptic Touch

Smart piezo sensing technology



1 Build-up **2** Sensing **3** Haptic & Audio

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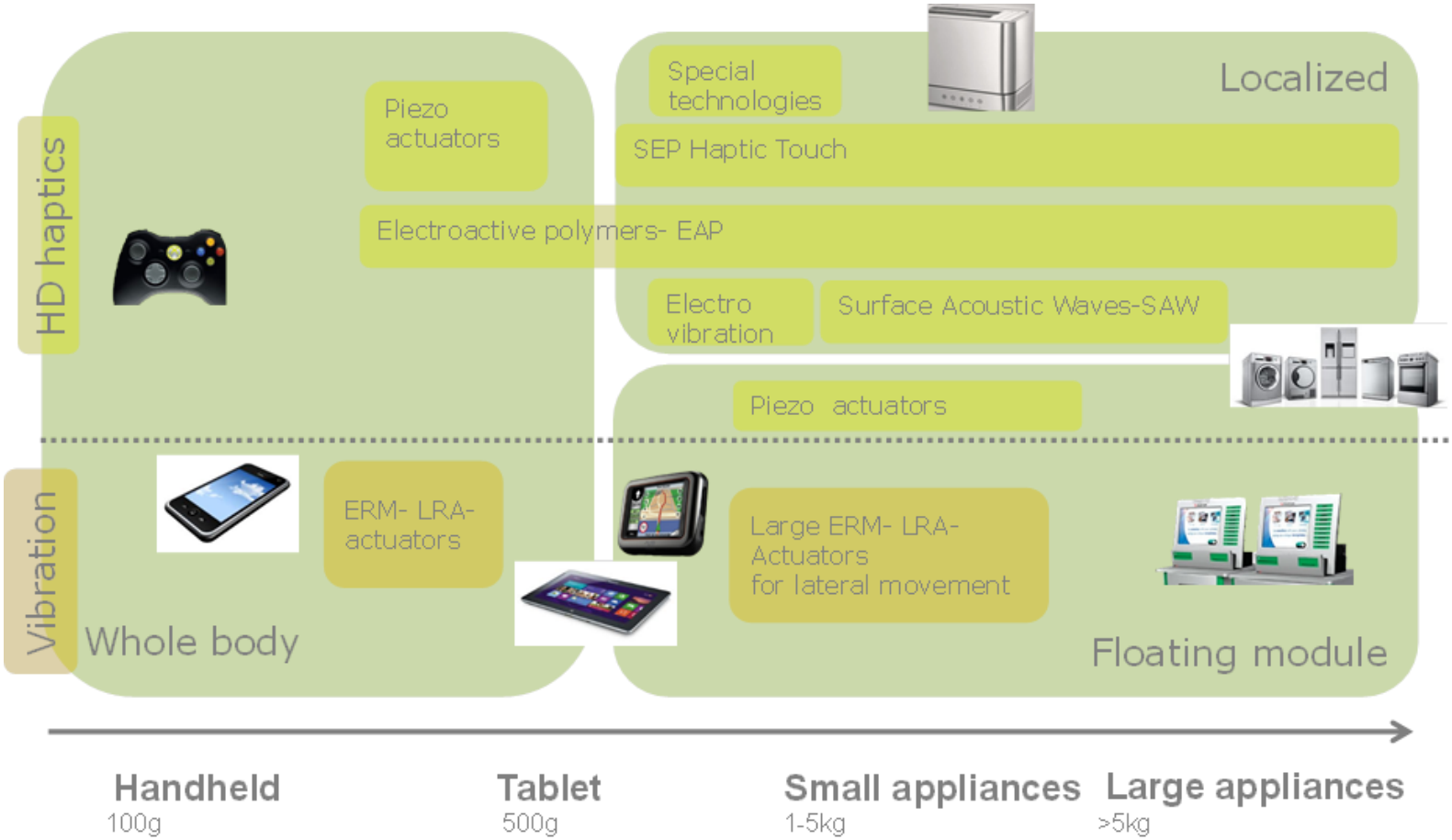
Relation Technology-product

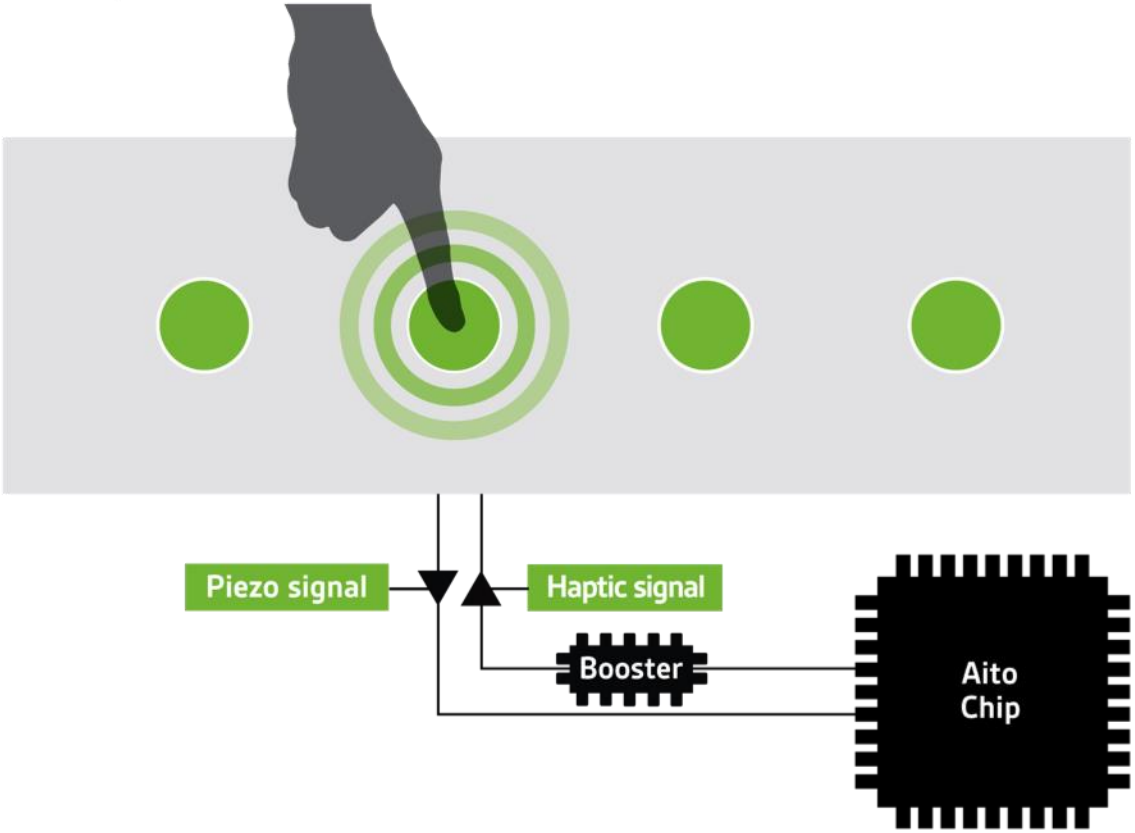


Haptic Touch in detail

Unique proprietary technology based on advanced signal processing

Main components:

- **Aito Chip**
- **Haptic Booster**
- **Piezo Element**



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Main advantages

Best haptic feel

- Natural & intuitive
- Very precise, fast & reliable
- Local, high-definition haptic
- Coupling of sensing & actuation signals

Thinnest form

- Sensing & feedback by same piezo element, saves additional actuator
- Thickness of <0.4 mm

Lowest power

- All vibration energy is delivered to finger tip
- Piezo element generates energy when pressed
- 10X reduction (compared to RM/LRA)

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Applications...

AUTOMOTIVE

- Infotainment
- Climate control
- Interior lights
- Car entry
- Seat adjustment

MOBILE

- Back-cover & side controls
- Personalized alerts
- For smart phones, tablets, e-readers

CONSUMER

- Kitchen appliances
- TV controls
- Audio controls

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… and key technology benefits

AUTOMOTIVE

- Replace all clunky knobs with flat haptic controls
- Integrate user interfaces with decorative elements
- Haptic is safety requirement (‘eyes on the road’)

MOBILE

- Move from existing ‘whole device vibration’ towards precise and realistic haptic experience
- Add controls on back or side of device body for most-used functions or discrete alerts

CONSUMER

- Use of new materials such as steel or wood requires new solution
- Good alternative to unreliable or unresponsive existing touch solutions

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Complete solution

Easy to design-in, enabling new product designs

Configure experiences

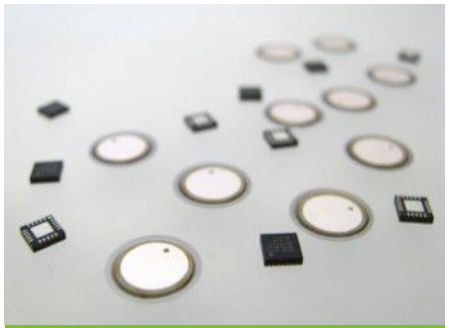
Touch, sound, light and feedback – configure and adjust them on the fly with Aito's easy-to-use design tool

More than a button

Design smart user interfaces, such as sliders or 'pressure sensitive' buttons (think of famous camera shutter button)

Material of your choice

Steel, plastic, leather or wood – Aito provides no limitations on which product material to choose.



Off-the-shelf components

Aito's solution works with standard, low- cost piezos and electronics.

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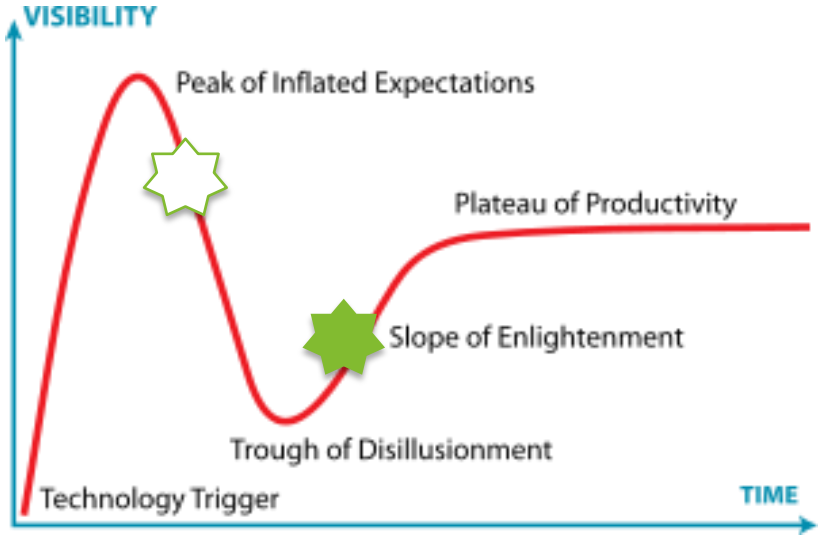
Right position at Hype curve

With Haptic Touch



Leap made:

by focusing on modularization and supply chains from very beginning

Source: Hype curve by Garner,

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