

HMI Design in Automotive

Smart Materials VS Display

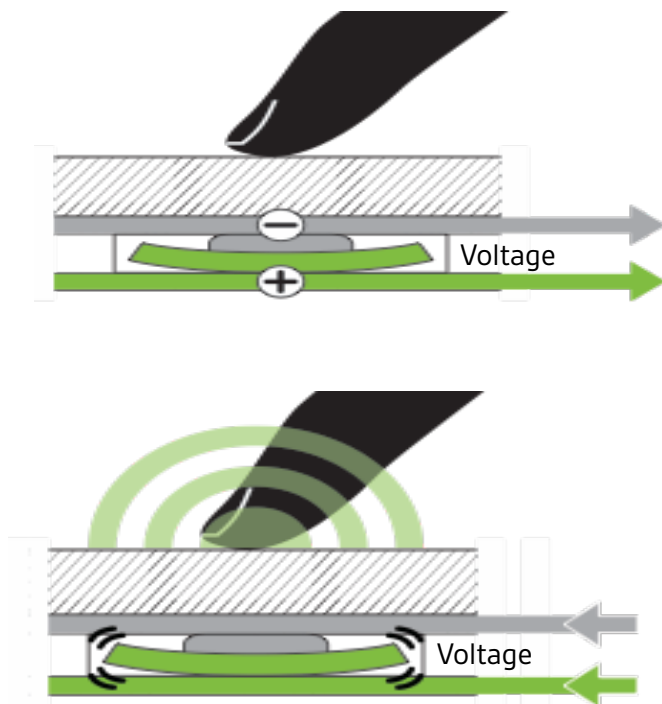
12 april 2018 - De Basiliek Veenendaal

USER INTERFACE DESIGN

Engineering & Design



Haptic Touch Technology



Active and passive haptics

Materials

Passive haptics is always present when handling physical objects



Passive haptics:

- Edges
- Ridges
- Shapes
- Texture

Sensors

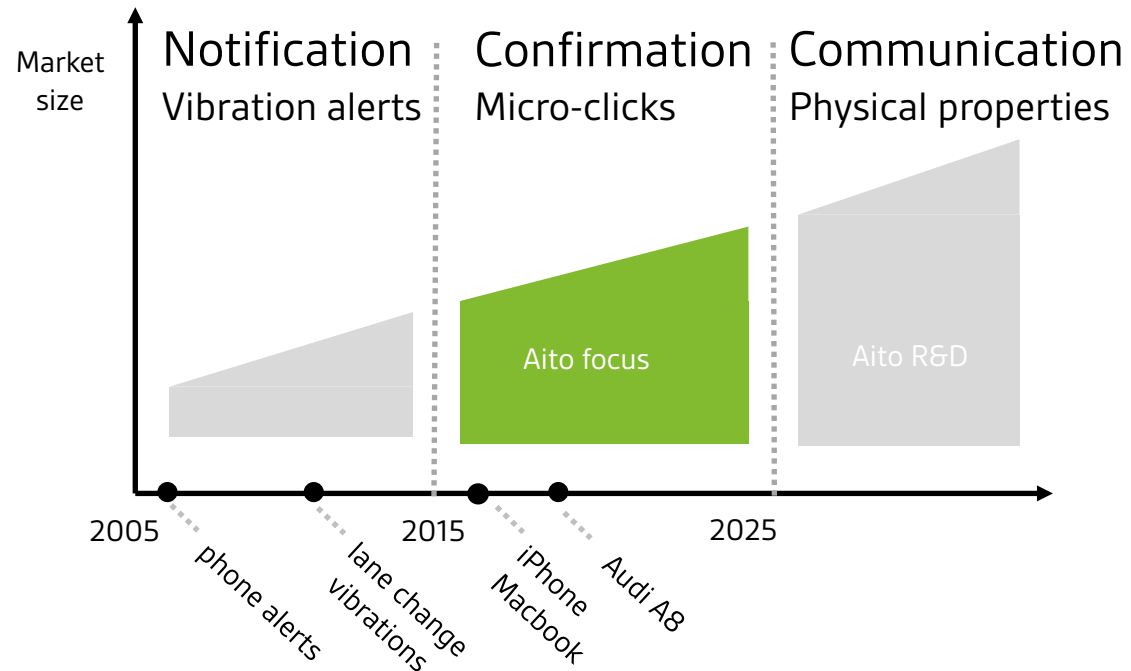
For virtual objects, interaction can only become natural when active haptics involves passive haptics



Active haptics:

- Alerts
- Confirmation
- Communication

Demand for higher quality haptics



Micro-click feedback

- Tactile sensation when pressing touch button or touch screen
- Aito's unique technology delivers most precise and natural micro-click feedback on the market

Smart Materials in Automotive

Smart Material



VS

Display



Key themes for Smart Materials



User interface as key differentiator

- No more compromises between design, quality and easy-of-use
- Integration of controls, displays and decorative parts into smart surfaces



Autonomous driving

- Shift from driving tasks to secondary tasks require adaptive user interface controls
- Provide choices in operation to cater of user preferences: touch + haptics + voice + gestures



Electric vehicles

Improvement of driving range requires even stronger focus on space and weight reduction in the cockpit

2 focus developments in automotive

Interior



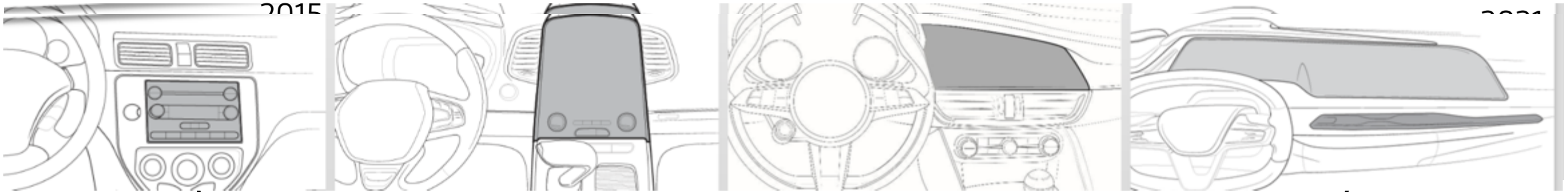
* Mr Wissmann President VDA

Connectivity

&



Transformation of the interior



Bulky boxes with traditional buttons



replaced by

Thin, smart surfaces



Aito HapticTouch

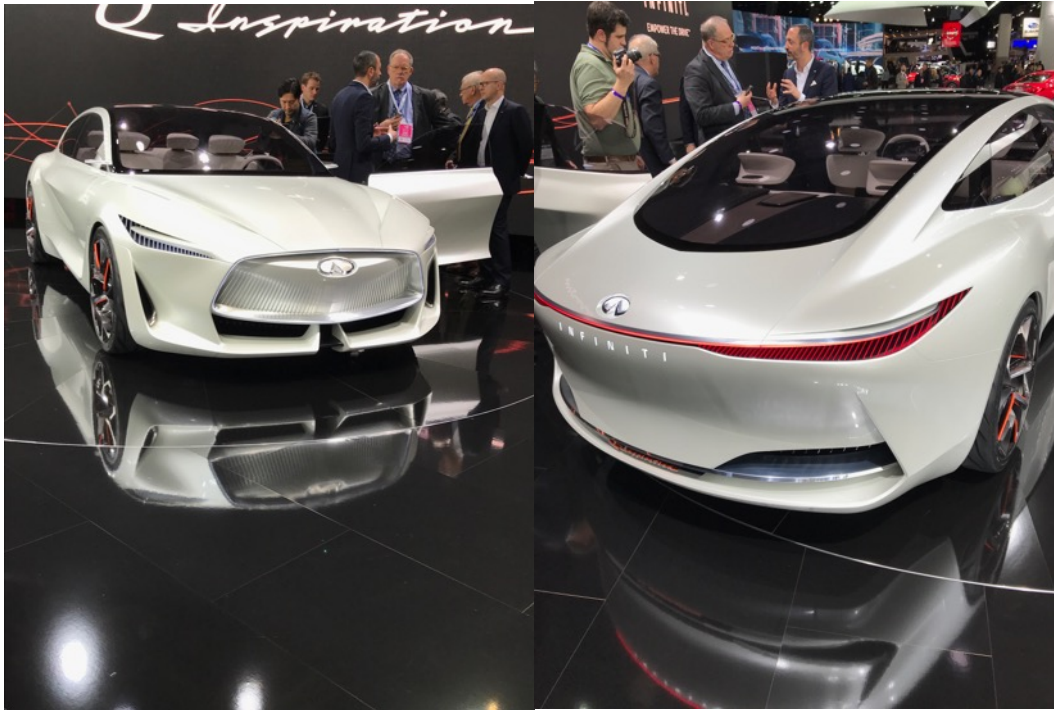
Display



Smart Materials



Infinity Q at Detroit Motor show



The Q Inspiration's cabin follows a minimalist approach, wrapping occupants in a serene, spacious and comfortable environment. The purpose being to enable users in a new era of connectivity, while simultaneously enriching the driving experience with materials of the best quality, crafted by the hands of the artist. The interior invites the passengers to explore and discover extra layers of enchanting details.

Infinity Q at Detroit Motor show



Smart Materials = integrated Sensors

Sensing

Capsensing, Piezo-sensing, Haptics, Gesture, Proximity etc

Illuminating

OLED, Glassfiber, LED array

Heating

Strong request in electric cars

Displays

Smart Material

Design

- Difficult to customize the shape, always glass
- Difficult to integrate in dashboard
- Black (dead) surface when not in use

- any material possible, customisation
- standard part of Dashboard
- At any time part of the design

Usability

- Low, quite dangerous in a car
- Often multiple input layers

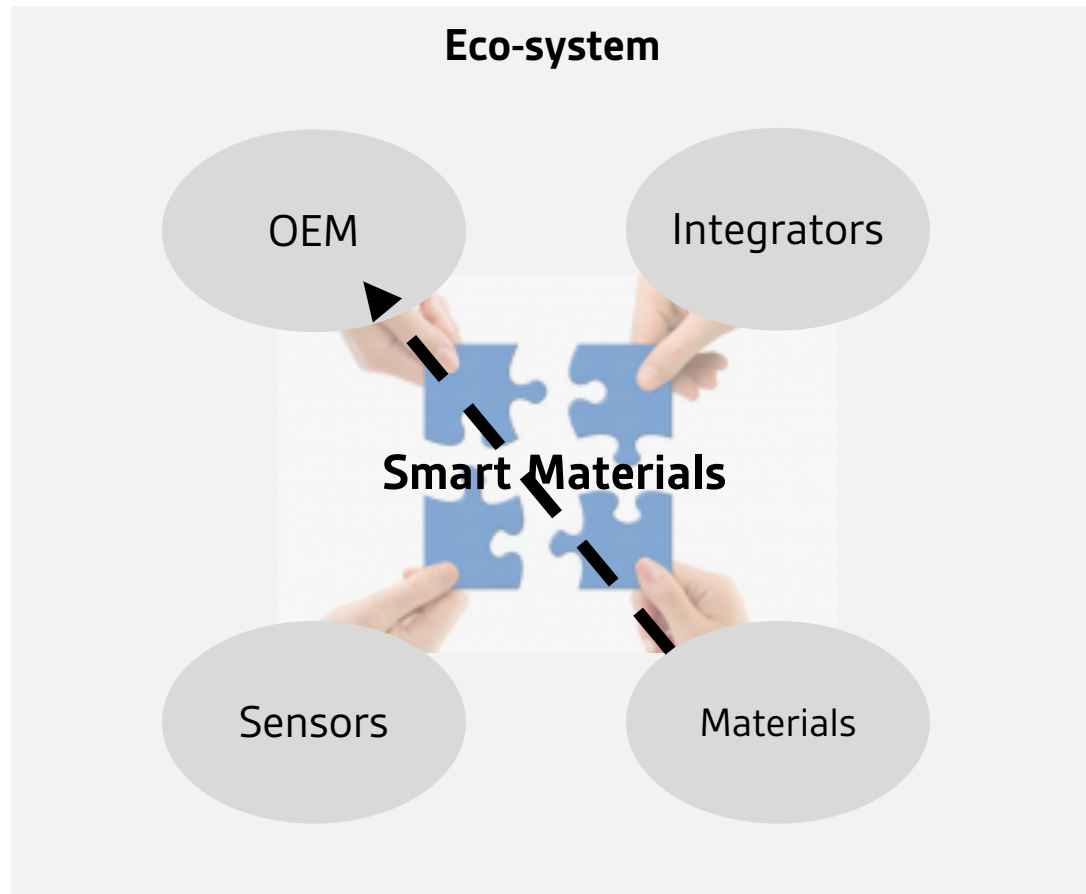
- intuitive at logic positions
- focus on input only

Interaction

- Graphical without limitations
- Active Haptics but difficult to implement

- Symbol illumination
- Active & Passive Haptics

Supply Chain



Smart Materials

- Materials are the visible parts and thus custom specific
- Sensors are thin layers which are relative easy to integrate (lamine) with materials: printed electronics!
- Functions can be designed custom specific with software
- Current Integrators have relative little knowledge about material. Electronics are relative standard

Conclusion

1. Mechanical buttons will disappear in cars, as well as the related modules
2. Displays will be for visualization only
3. Material suppliers and printed electronics will play a bigger role in the supply chain
4. Customization through choice of material and software settings