Microsoft Research Faculty Summit 2014

15TH ANNUAL

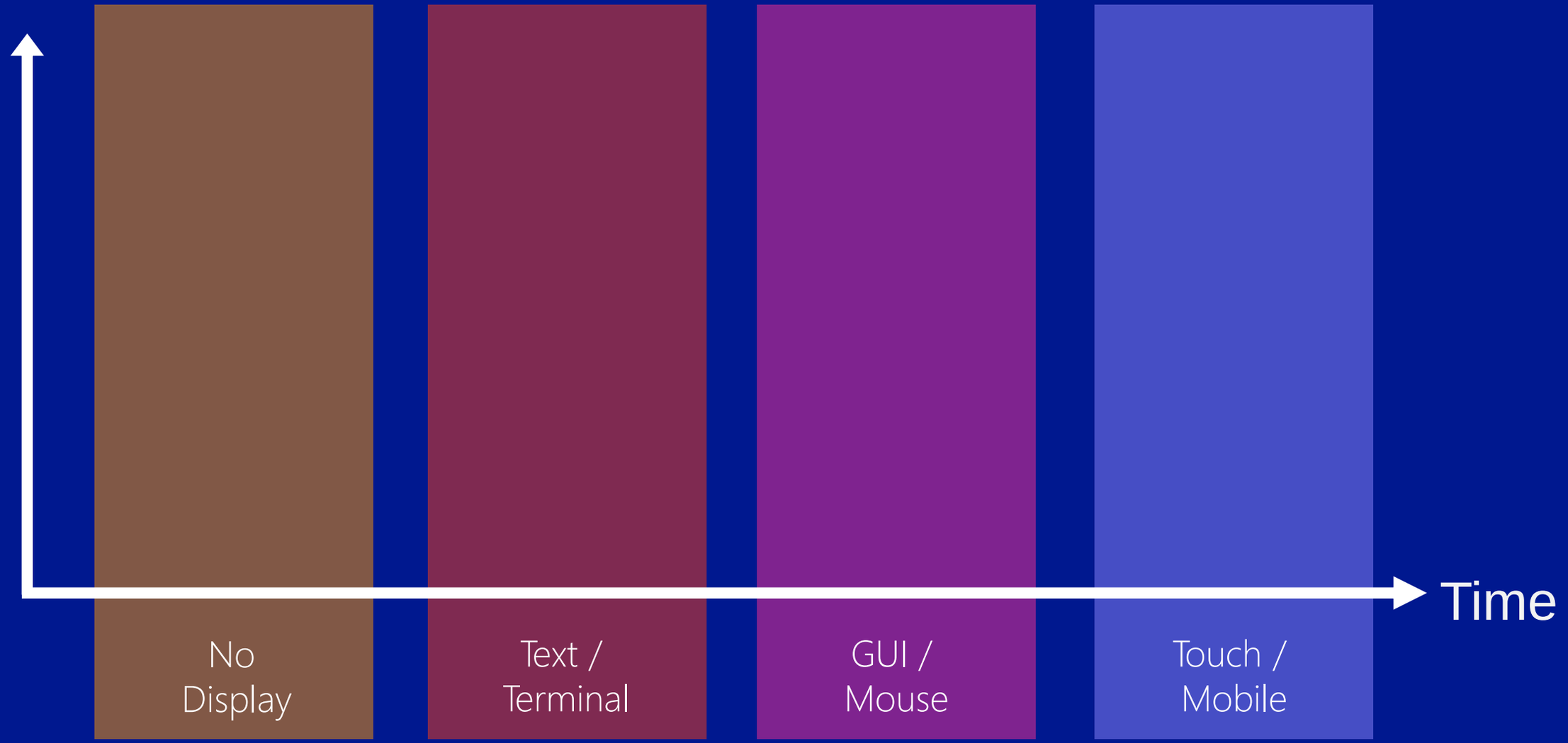
Microsoft Research
Faculty Summit
2014 15TH ANNUAL

Interacting with Small Devices in Big Ways

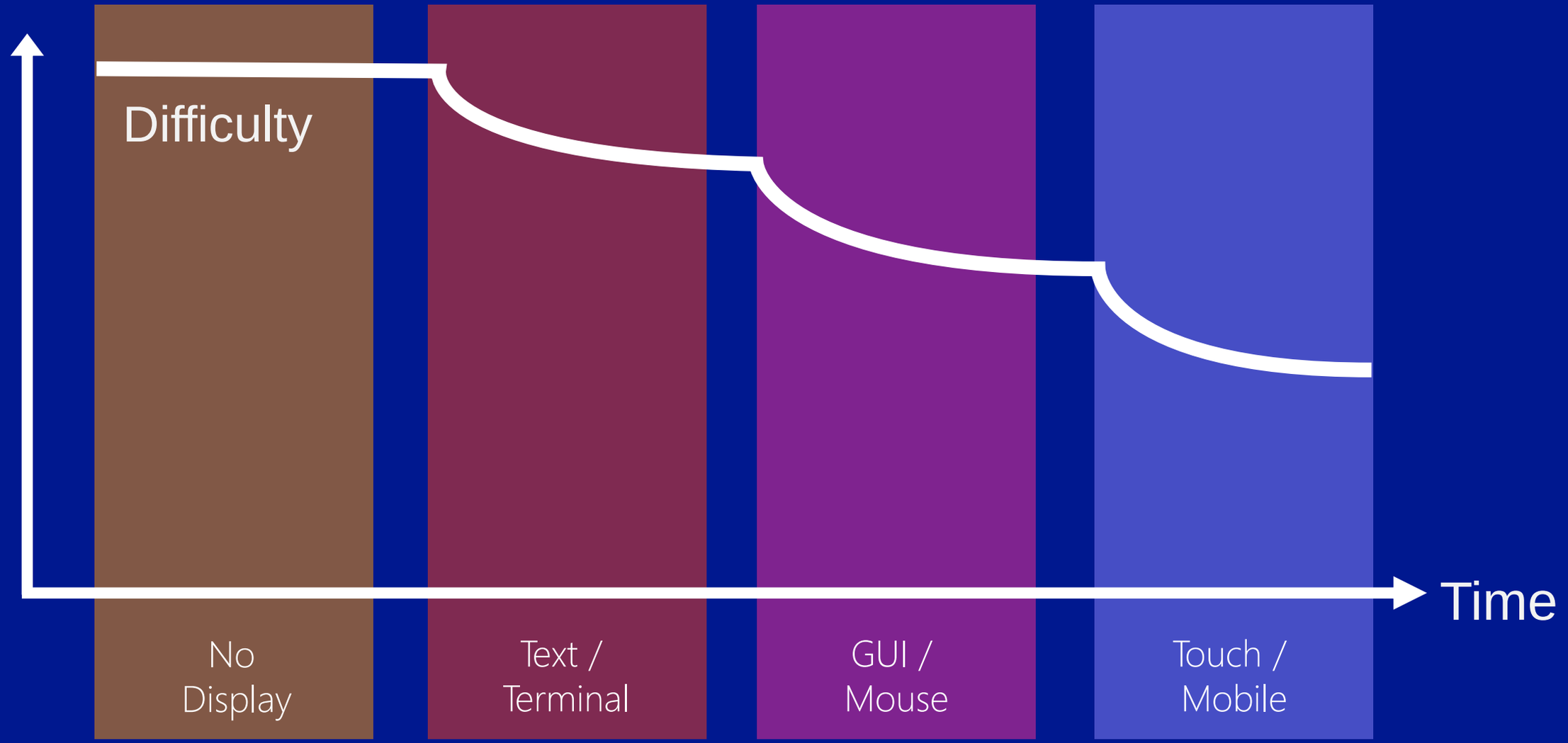
Chris Harrison Carnegie Mellon University

Microsoft

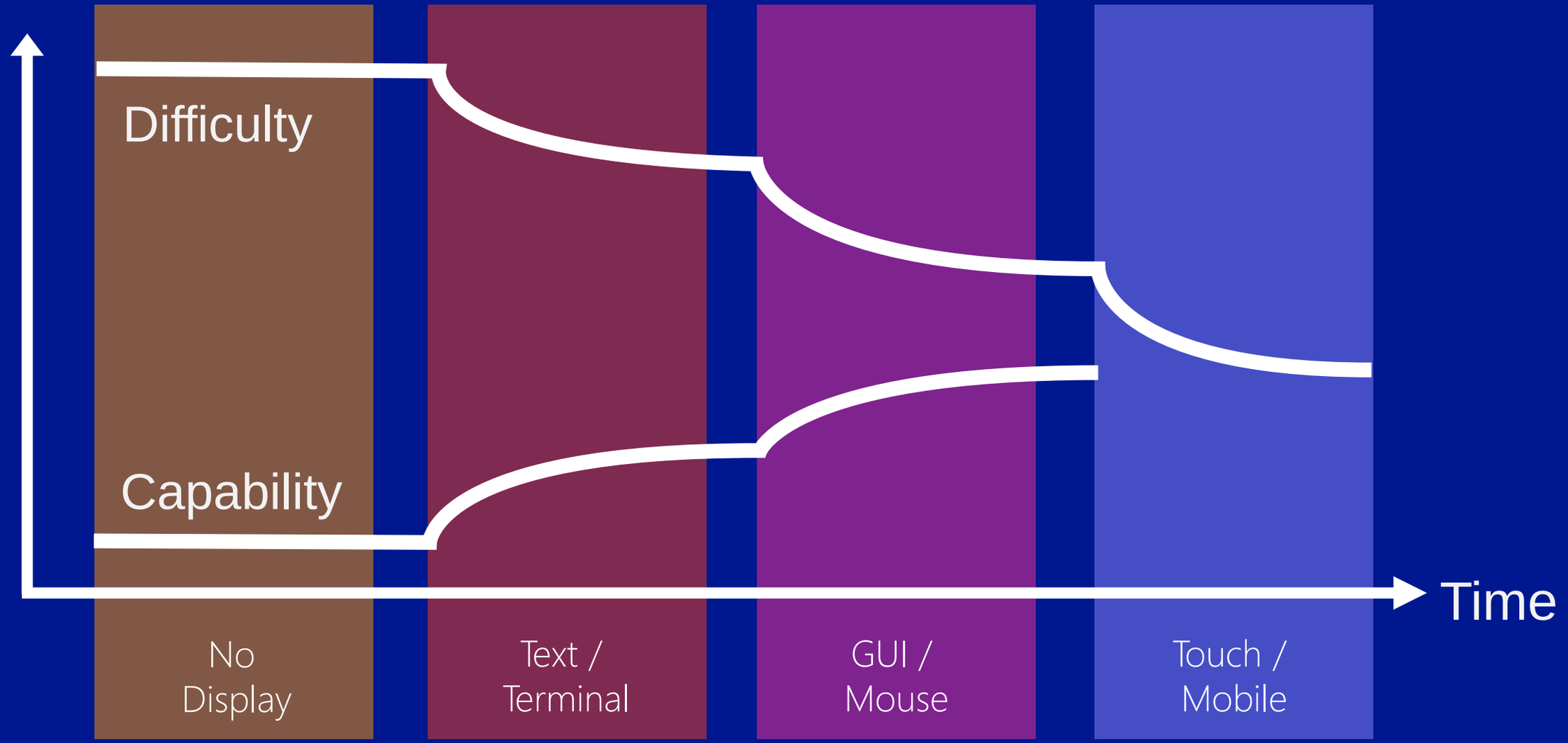
Evolution of Interfaces



Evolution of Interfaces



Evolution of Interfaces



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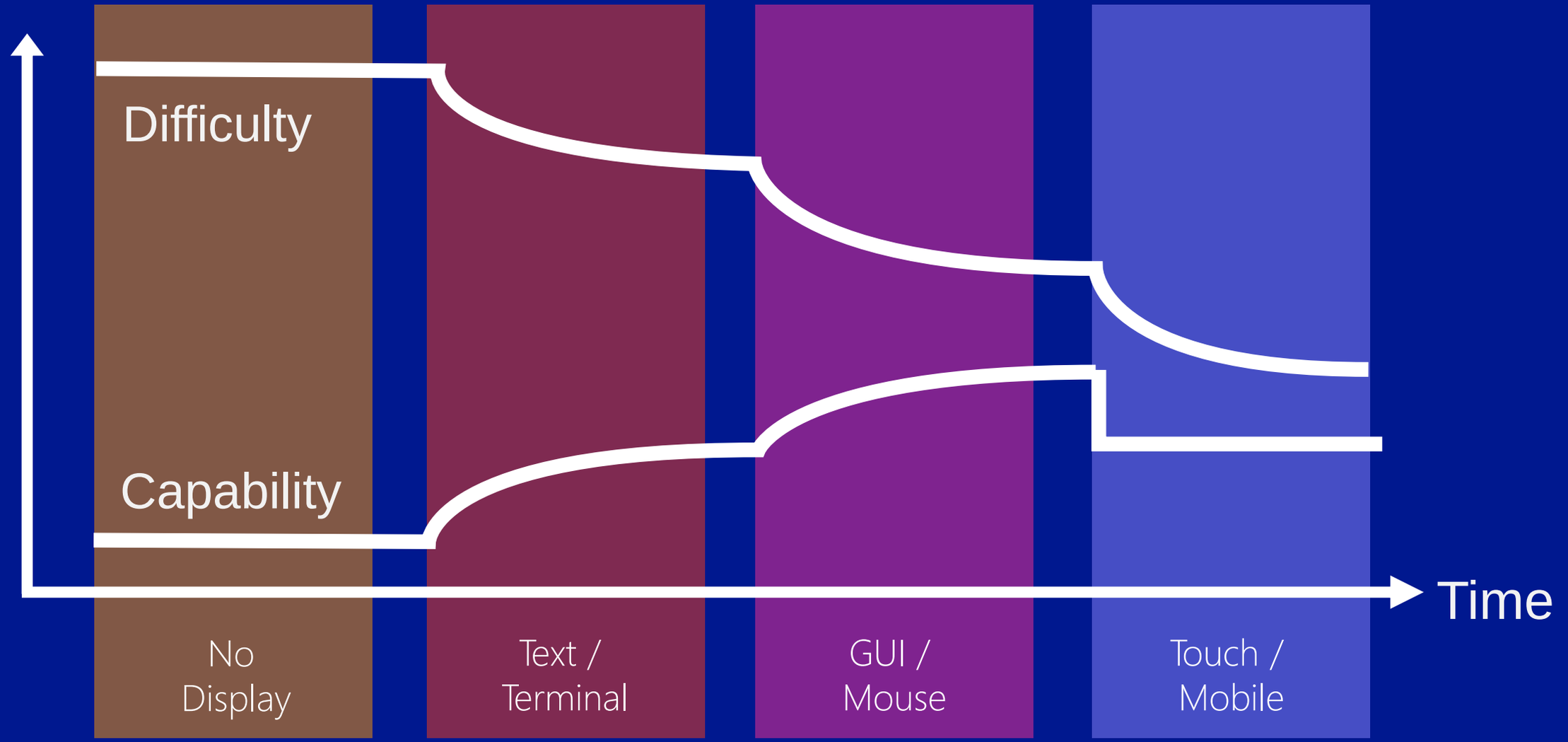
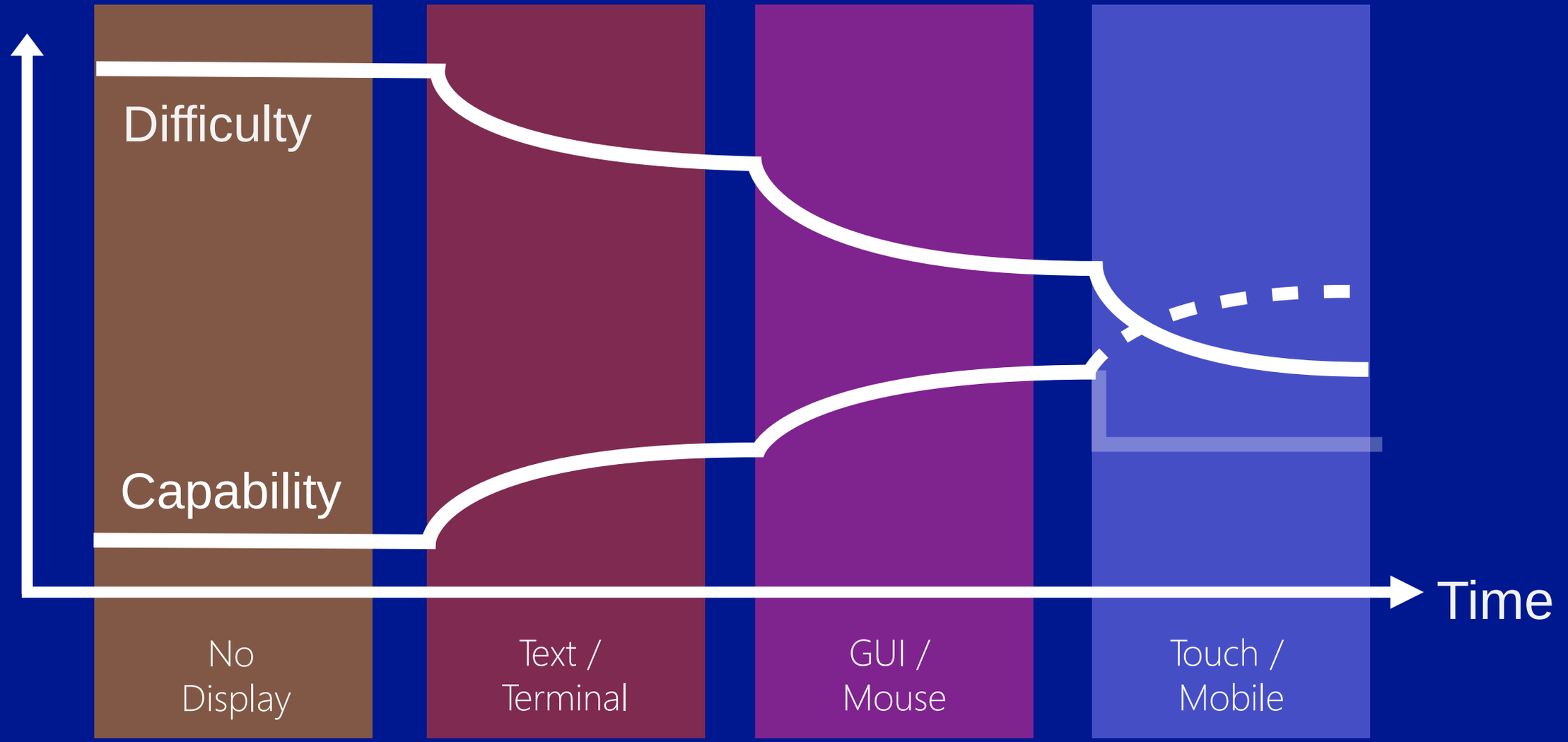
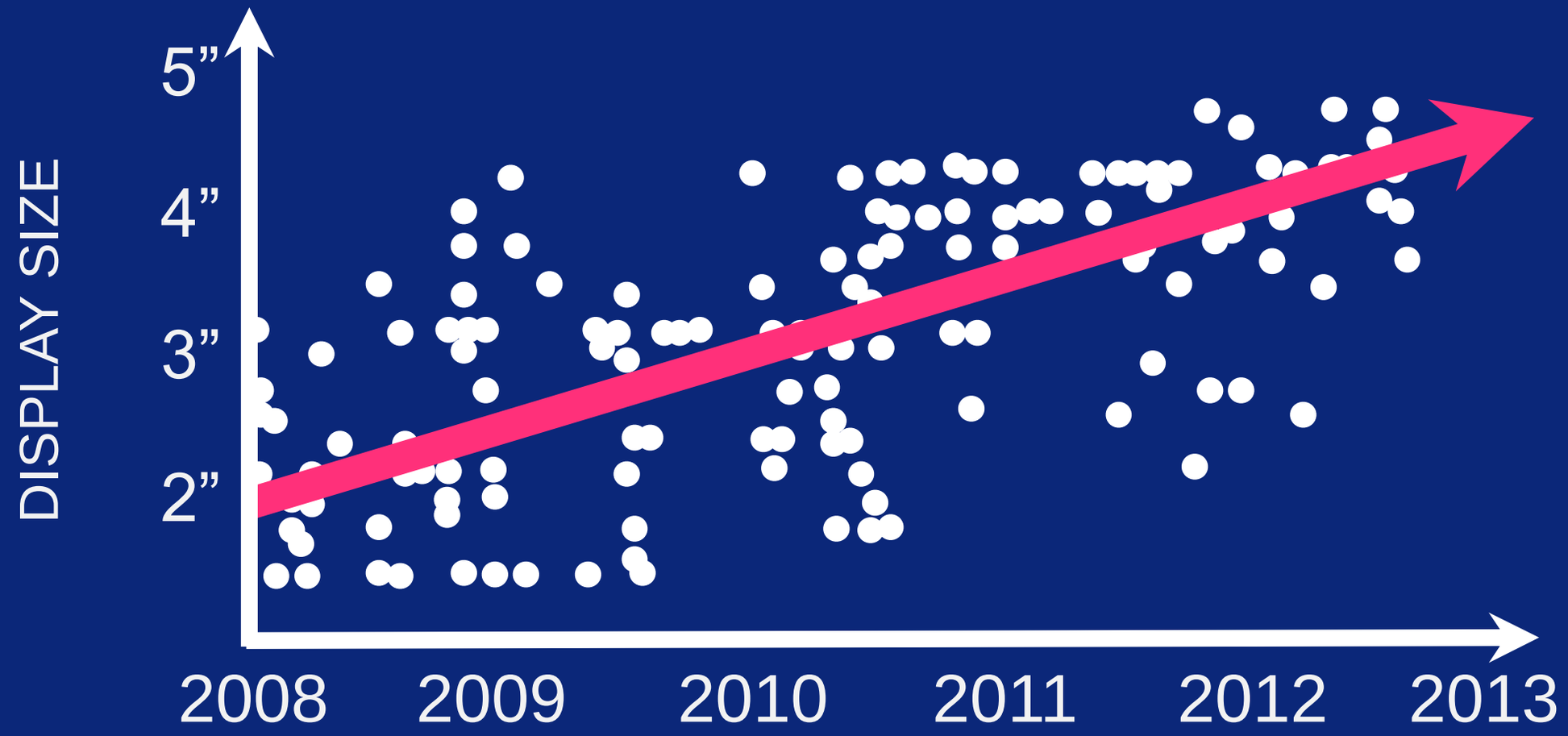


Evolution of Interfaces



Smartphone Releases



Sony Xperia Z Ultra
2013

Size ≠ Capability

HCI Grand Challenge!

Sony Smartwatch
2013

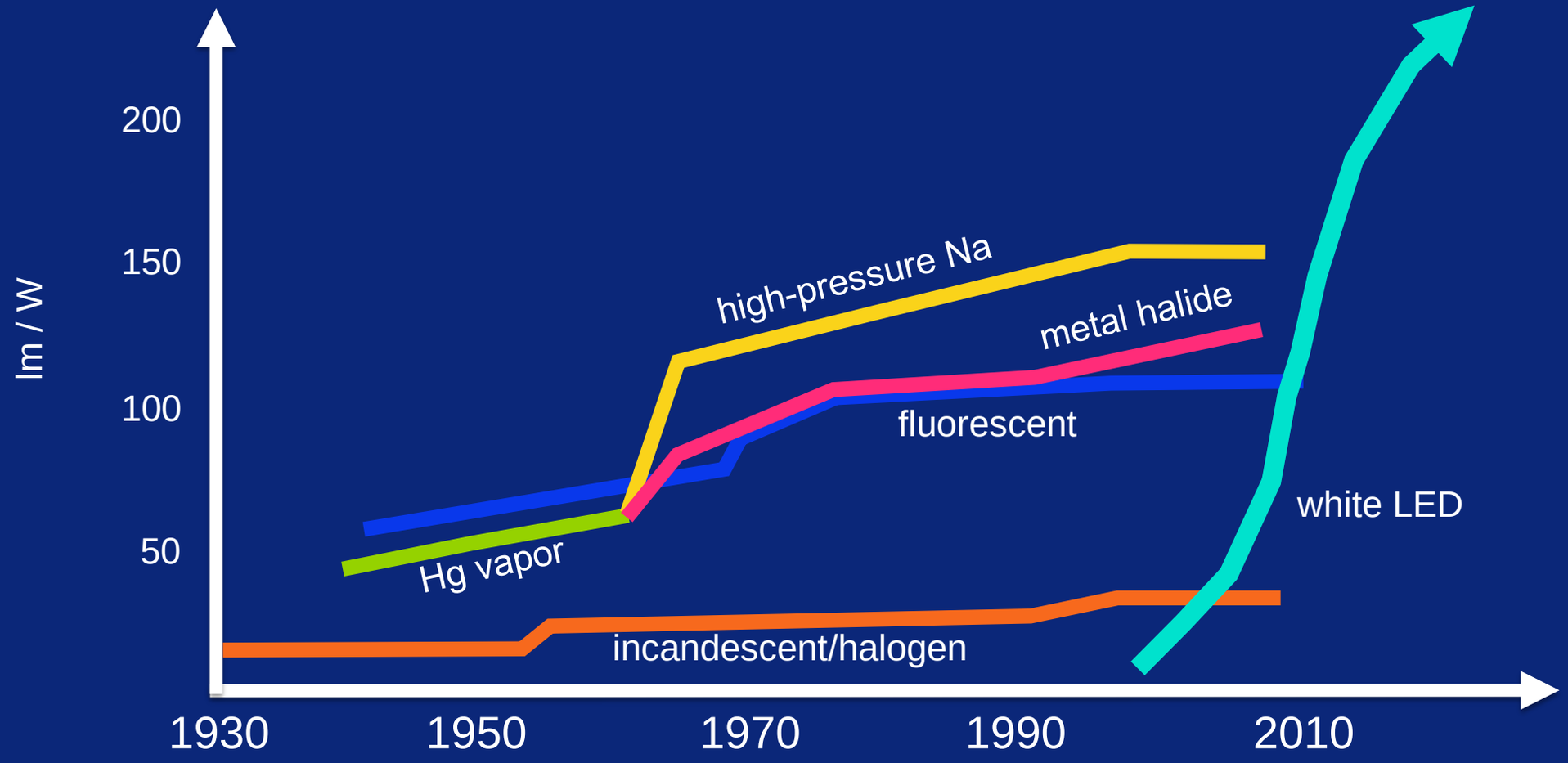
Decouple I/O from physical size

(aka provide more surface area)

Google Glass

Skinput (CHI 2010)

Lighting Efficiency



Laput, Xiao, Chen, Hudson, Harrison - to be published at UIST 2014

Improve I/O Richness

(aka make better use of existing surface area)

command
option
command
option
control

Touch Type

TapSense (UIST 2011)

Chris Harrison Julia Schwarz Scott Hudson

SAMSUNG

SAMSUNG

SAMSUNG
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec pharetra ullamcorper auctor. Aliquam erat volutpat. Cras sapien mi, consectetur vel suscipit eu, tincidunt eu turpis. Donec id nisl vel tortor lobortis pellentesque. Integer feugiat accumsan tortor, id ultricies nunc imperdiet in. Pellentesque ac bibendum lacus. Maecenas sed nibh vitae massa rhoncus molestie molestie tempor ipsum. Nam eget dolor sit amet nulla lobortis aliquam nec sit amet mi. Duis quis dui urna. Praesent sit amet elit vitae ante tincidunt ultricies et in nisi.
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Impact Force

FingerSense
Chris Harrison Julia Schwarz Robert Xiao Scott Hudson

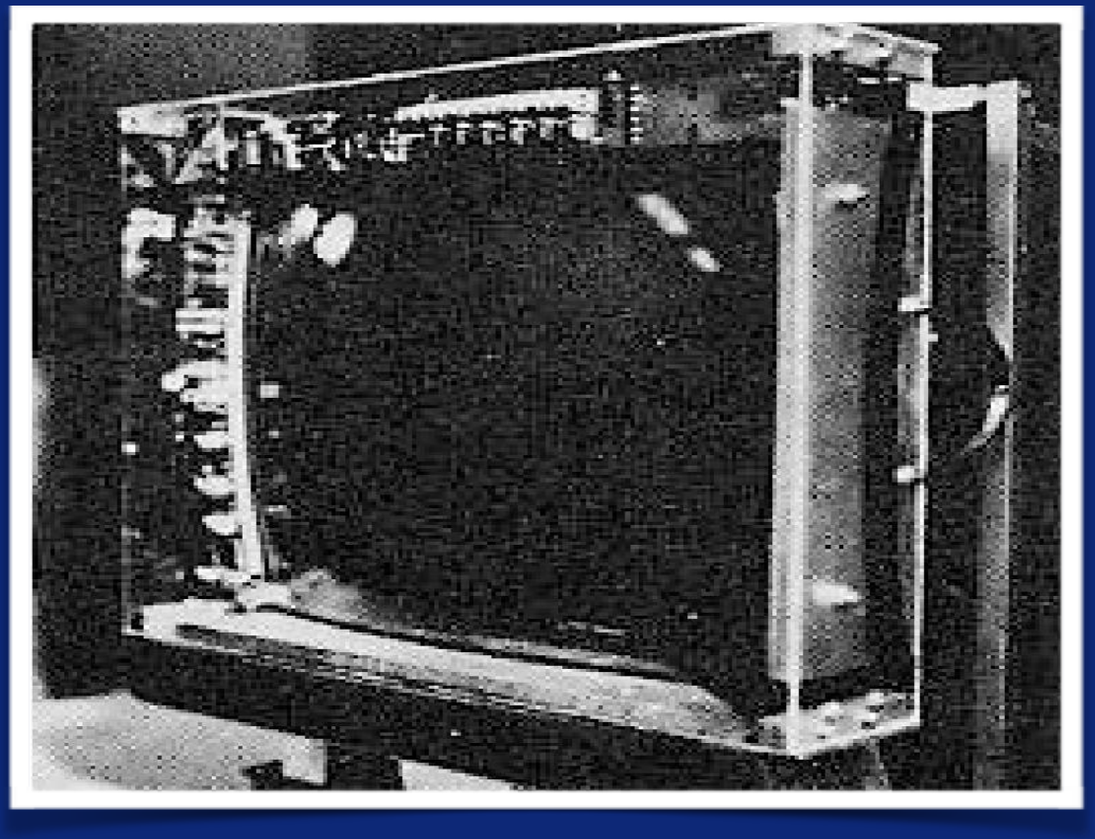
SAMSUNG

SAMSUNG

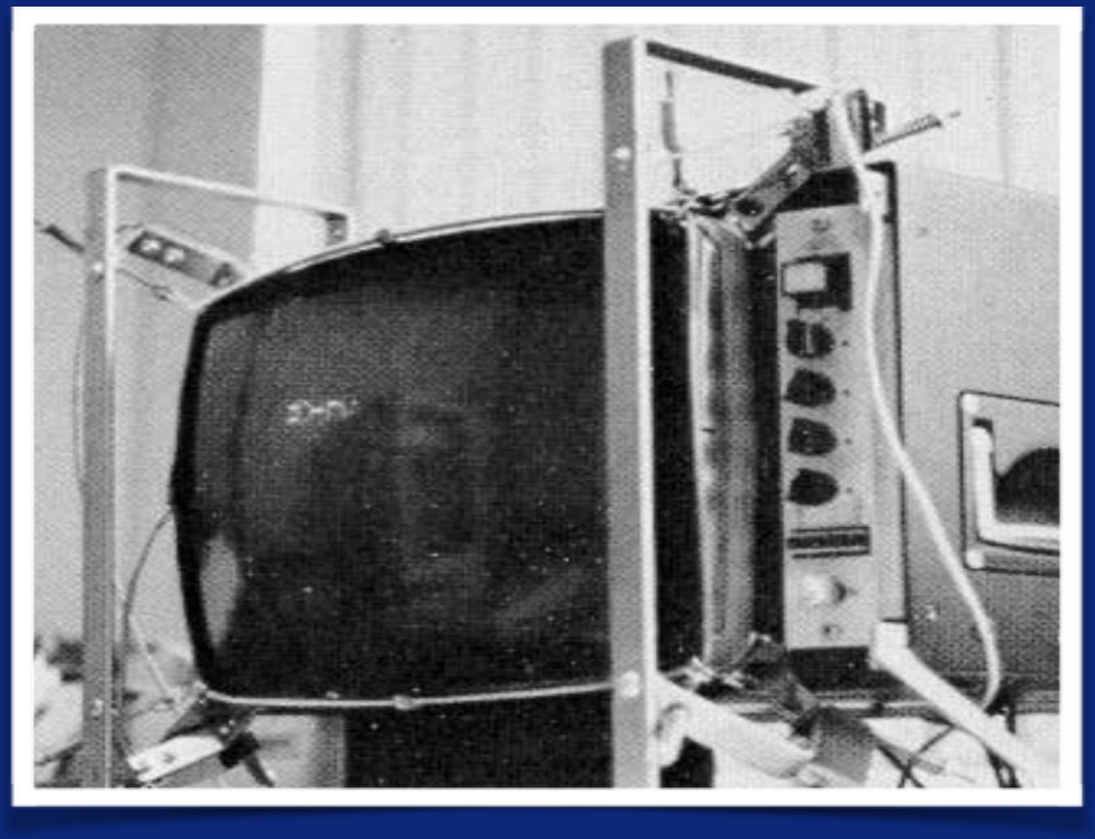
Shear

Shear Input (CHI 2012)

Chris Harrison Scott Hudson



Herot '78



Minsky '84

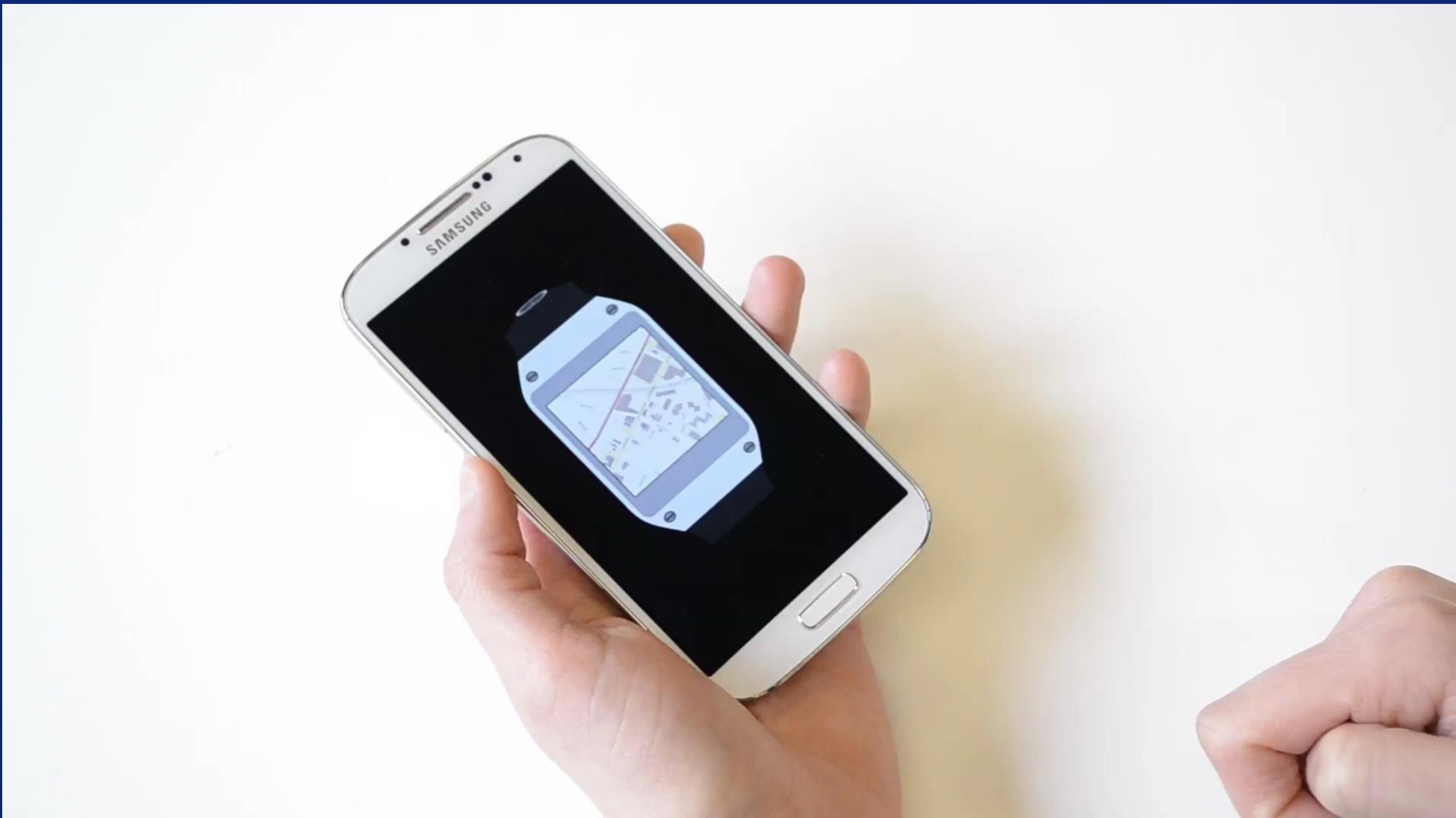
Finger Pose

Qeexo
Julia Schwarz Robert Xiao Chris Harrison

SAMSUNG

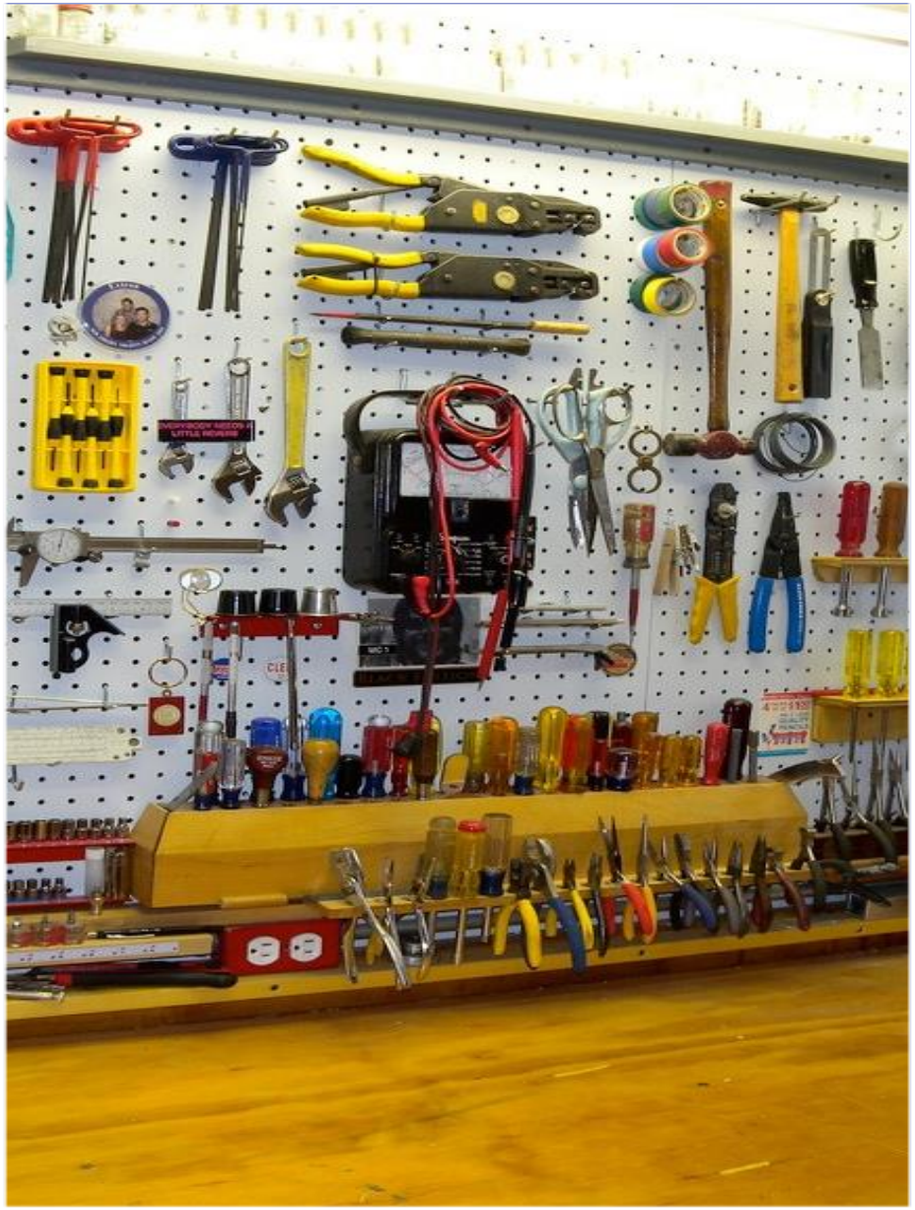
SAMSUNG

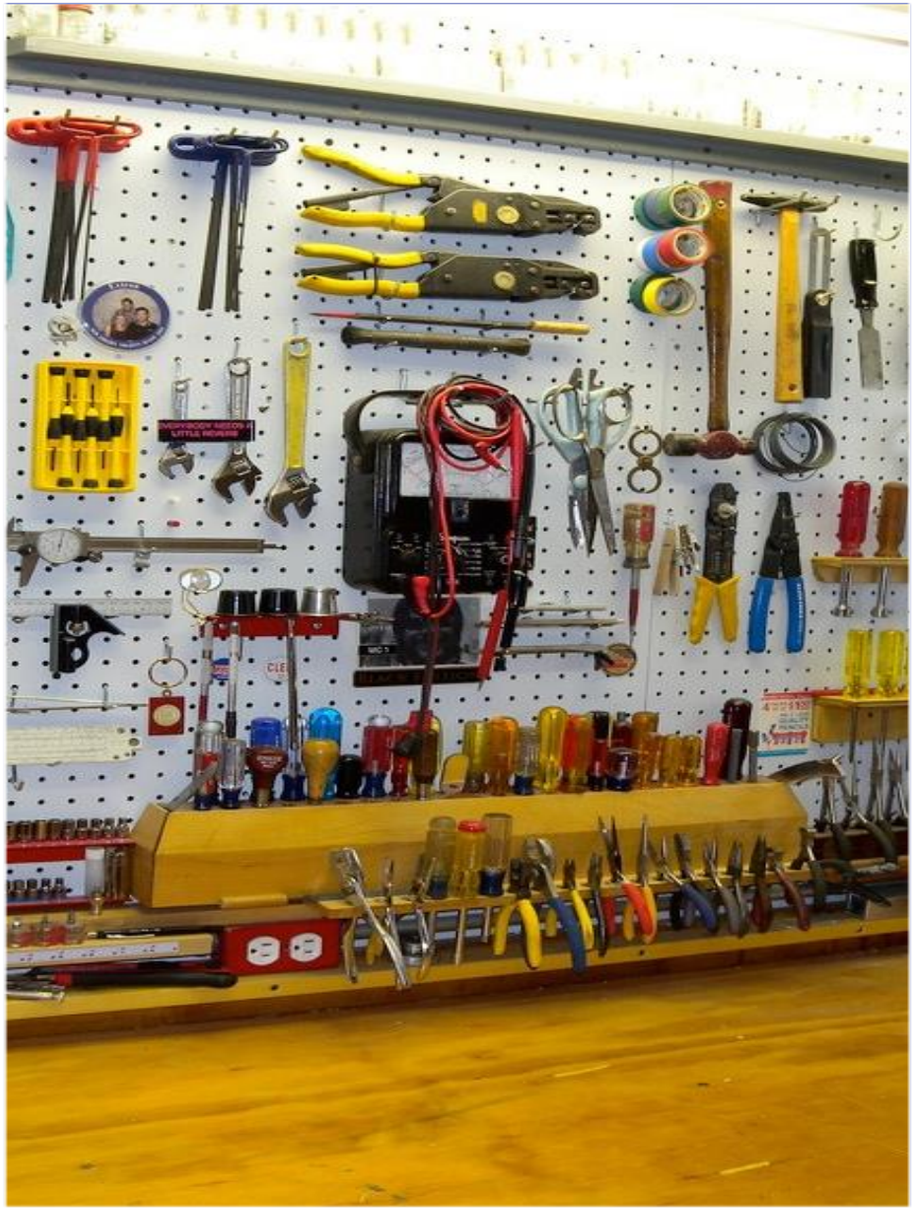
SAMSUNG

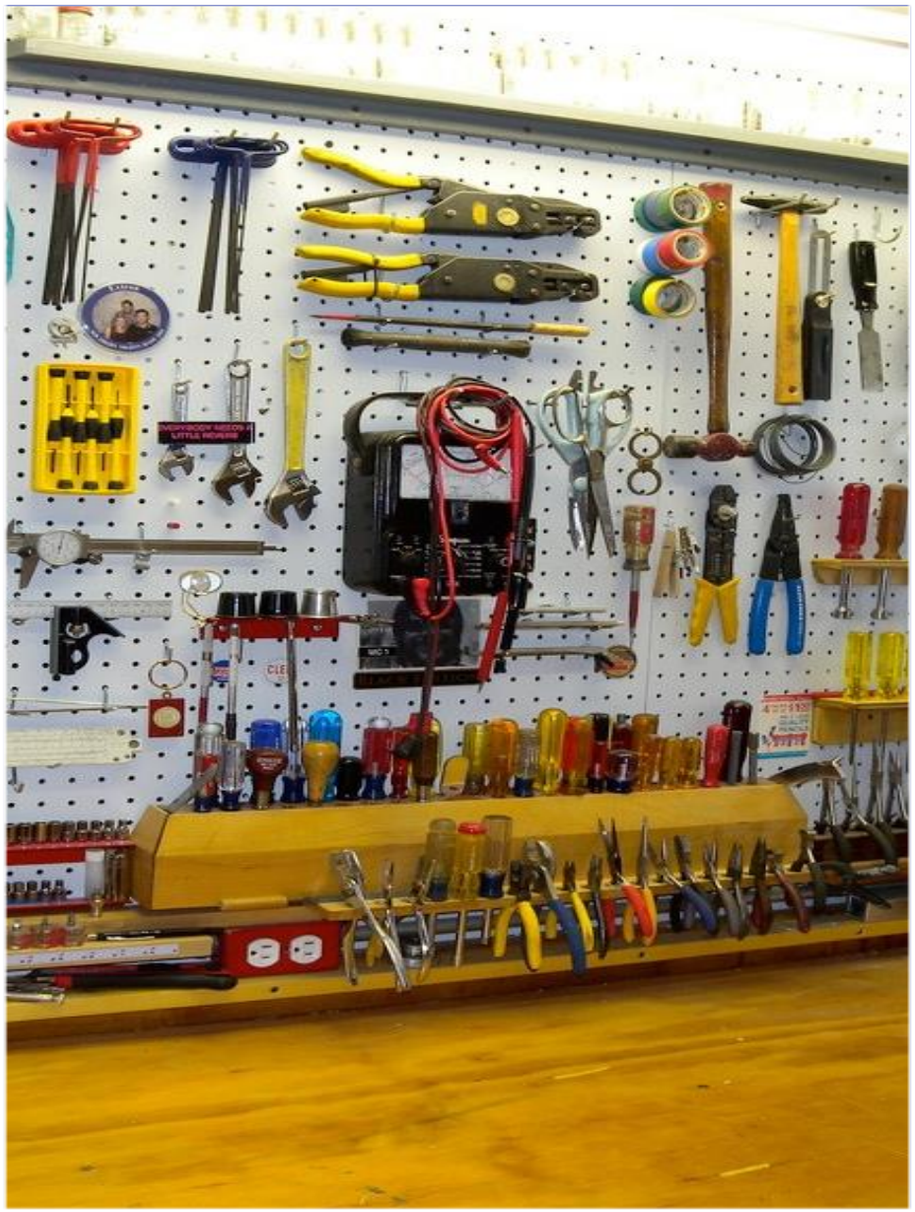

SAMSUNG

Hand Grasp

TouchTools (CHI 2014)
Chris Harrison Robert Xiao Julia Schwarz Scott Hudson







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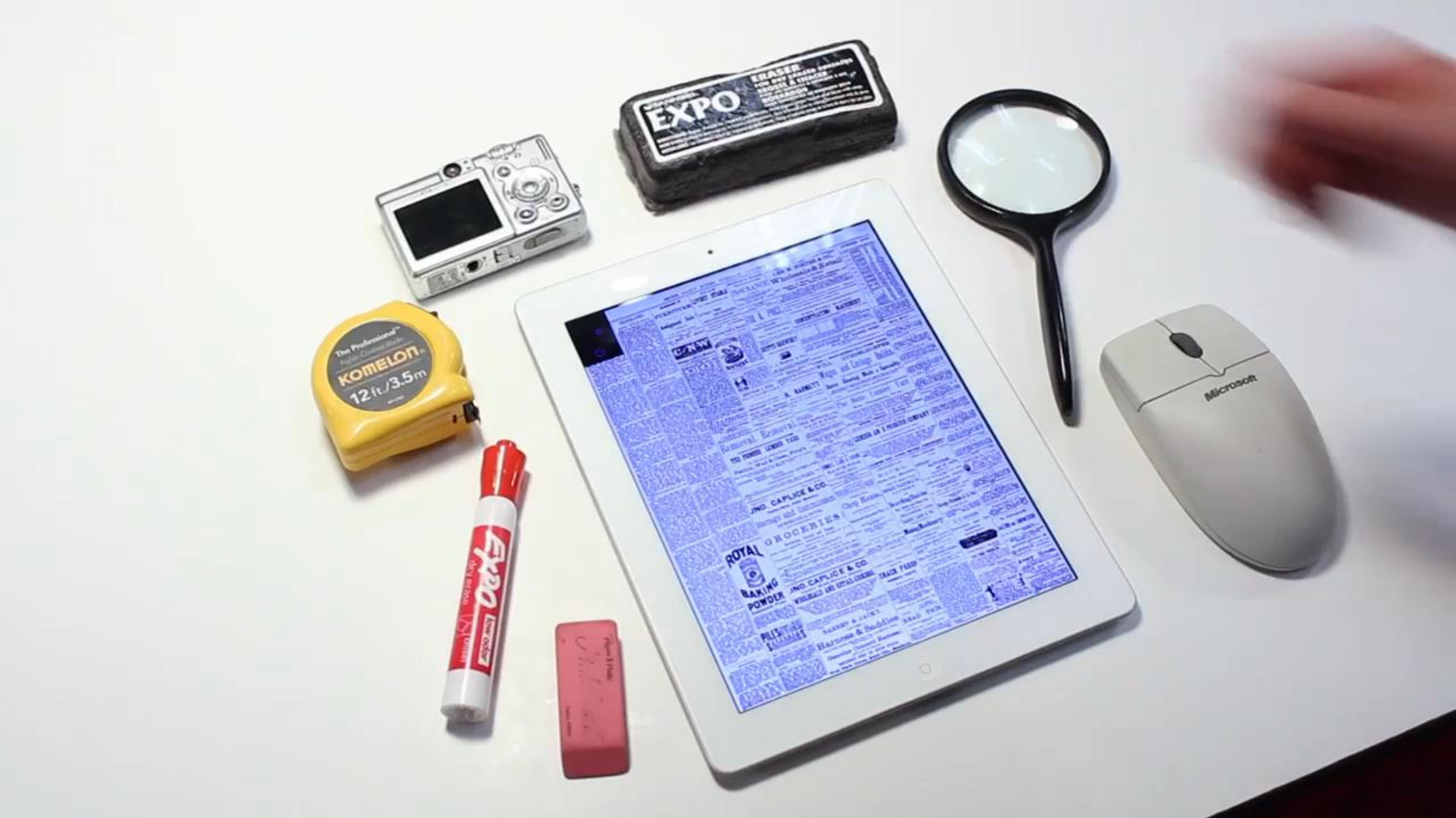
EXPO
ERASER
KOMELON
12 ft./3.5m
Microsoft
ROYAL
BAKING
POWDER
GROCERIES

- Finger chording [Elias '07, Freeman '08, ..]
- Touch type [Paradiso '05, Lopes '11, ..]
- Impact force [Lopes '11, Hinckey '11, ..]
- Shear [Herot '78, Minsky '84, Heo '11, Lee '12, ..]
- Pressure [Ramos '04, Stewart '10, Heo '12, Hwang '13, ..]
- Torque [Heo '11, Hinckey '11, ..]
- Pitch [Wang '09, Roudaut '09, Rogers '10, Holz '10, ..]
- Yaw [Wang '09, Rogers '10, Holz '10, ..]
- Contact area [Benko '06, Wilson 08, Wang '09, Schmidt '10, Holz '10, ..]
- Contact shape [Rekimoto '02, Wu '03, Epps '06, Cao '08, Wilson '08, Wigdor '11]
- Who is touching [Dietz '01, Marquardt '11, Ramakers '12, Holz '13, ..]
- Which finger [Holz '10, Marquardt '11, Kung '12, Ewerling '12, ..]
- Grasp pose [Schmidt '10, Marquardt '11, Ewerling '12, Murugappan '12, ..]

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leave (on Tuesday)

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Carnegie Mellon University

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