AUGMENTED REALITY : THE PERFECT UI ?

Prof. dr. ing. JELLE SALDIEN

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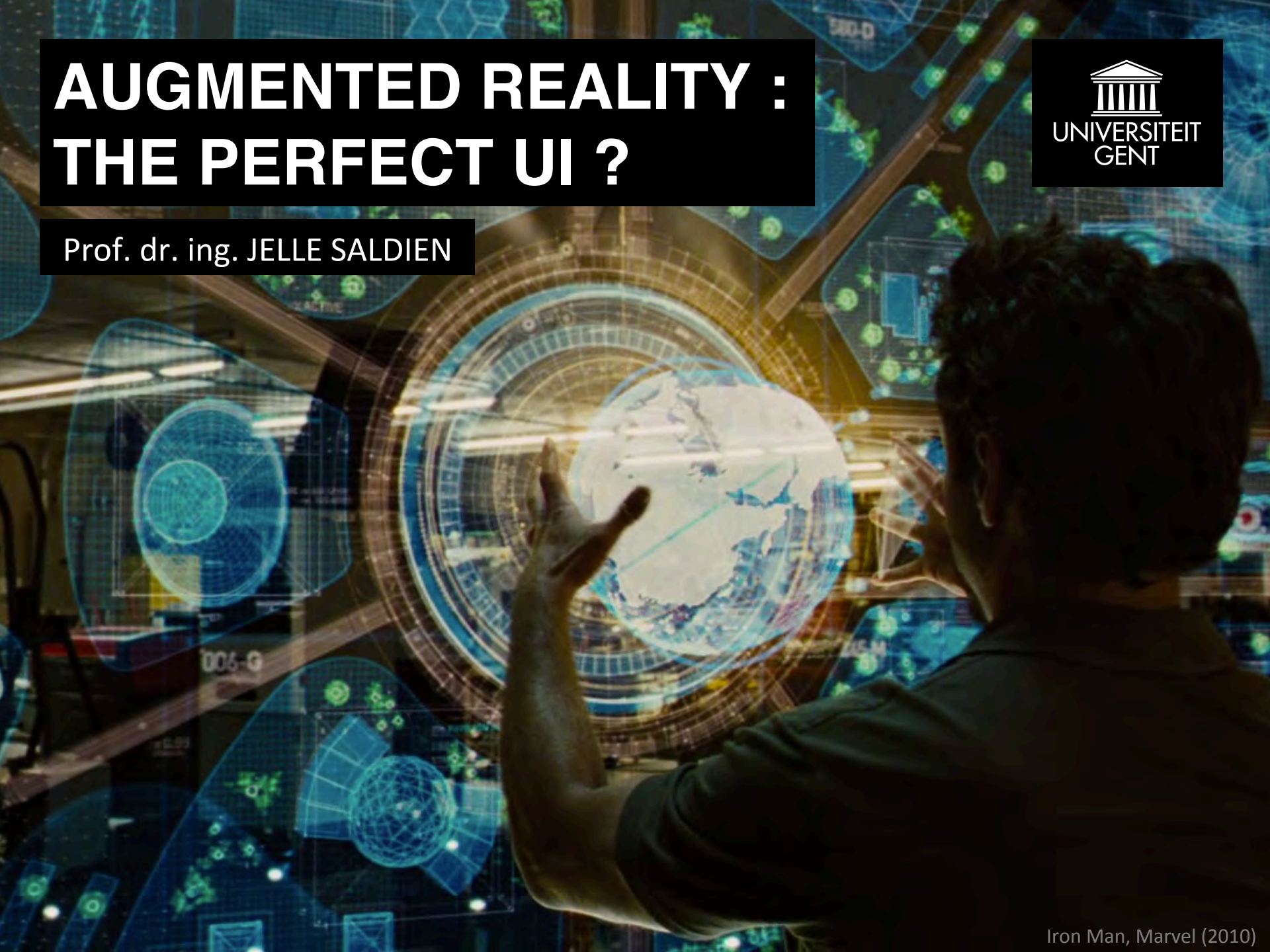
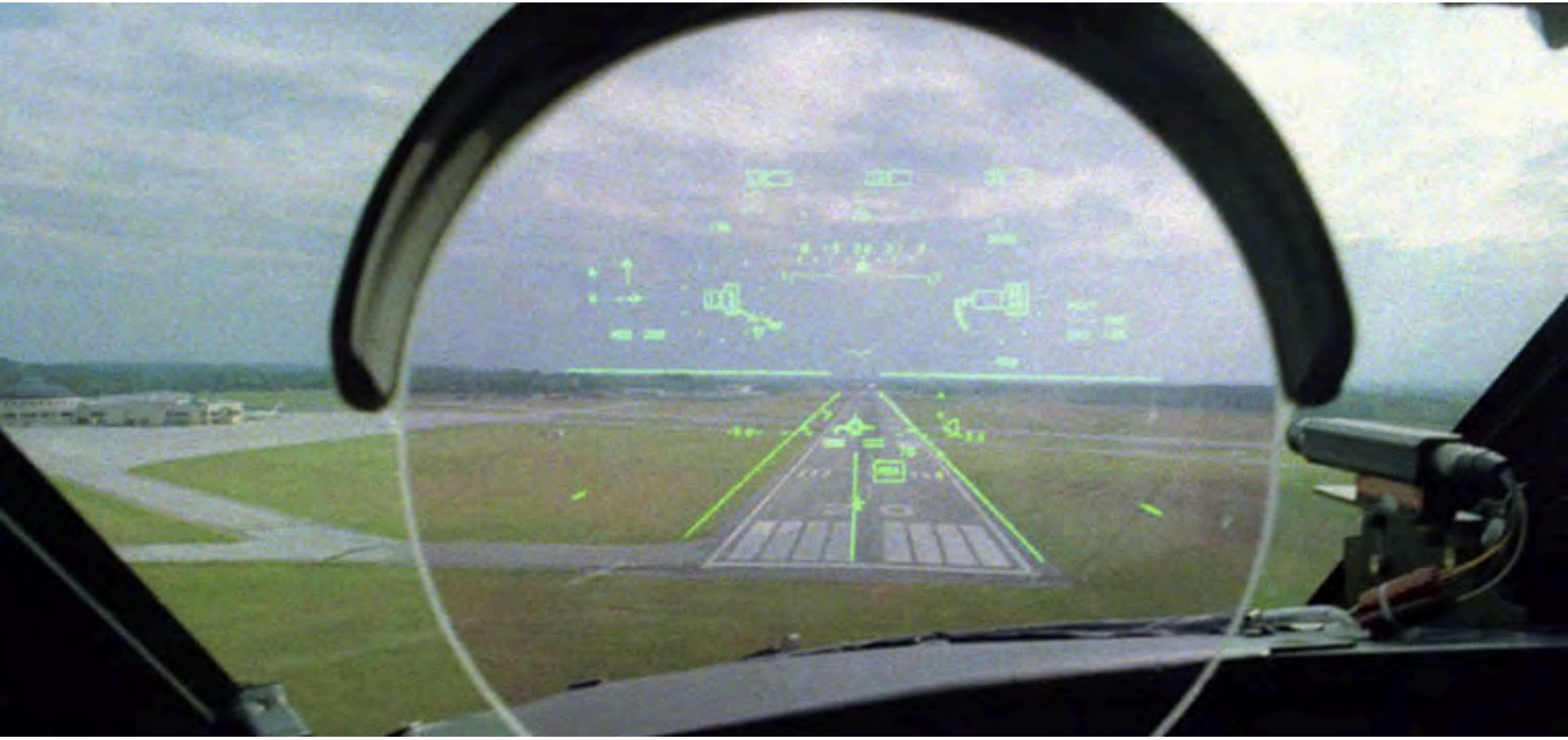


Iron Man, Marvel (2010)

AUGMENTED REALITY

HUD: HEAD UP DISPLAYS



HUD 2020, Honeywell (2005)

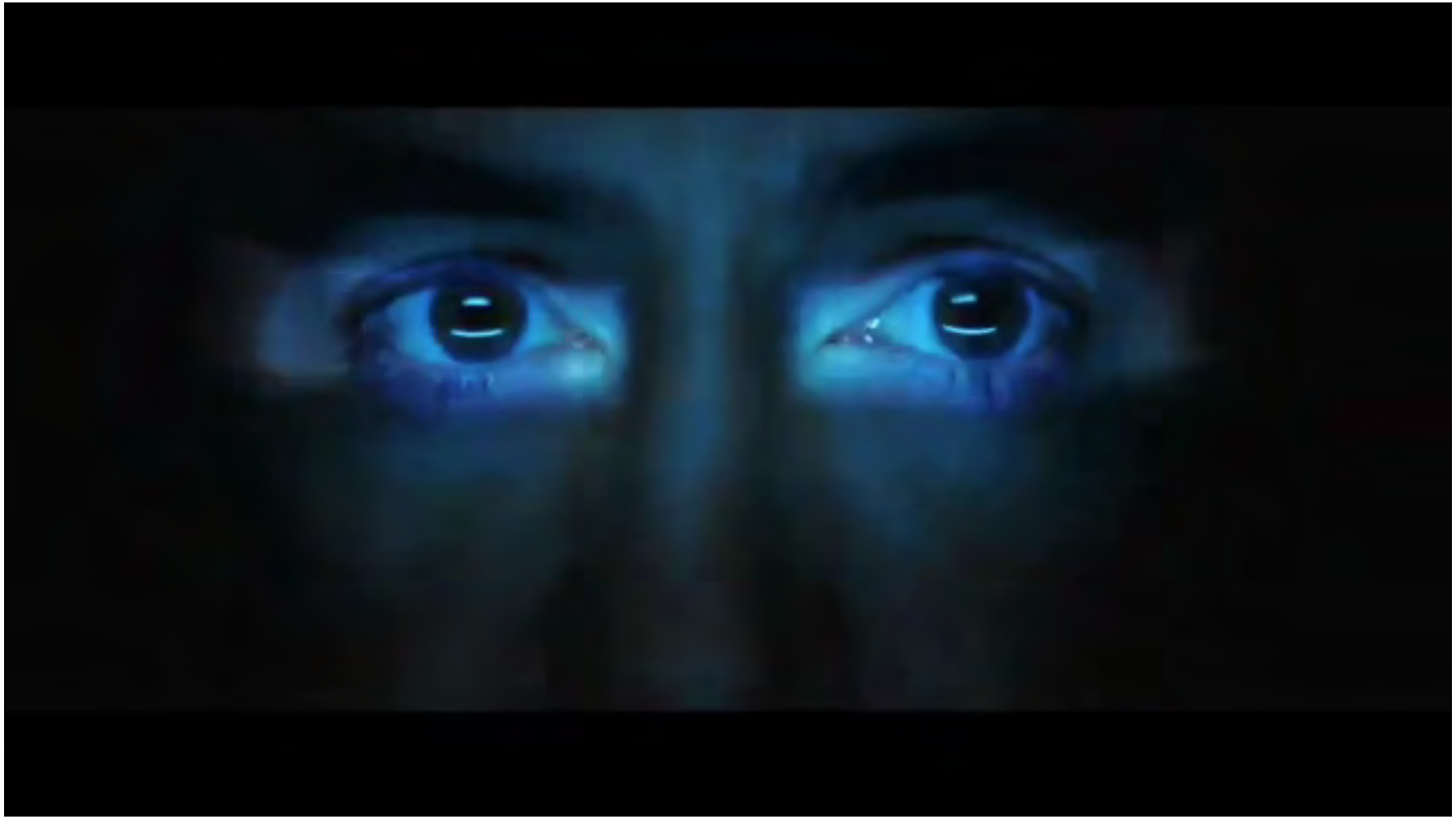
AUGMENTED REALITY

HUD: HEAD UP DISPLAYS

Iron Man, Marvel (2010)

AUGMENTED REALITY

HUD: HEAD UP DISPLAYS



Iron Man, Marvel (2010)

AUGMENTED REALITY

Augmenting the reality or the real world with extra layers of (digital) information

1. AR REDUCES HEAD AND EYE MOVEMENT
2. AR REDUCES THE COST OF ATTENTION SWITCHING
3. AR SUPPORTS SPATIAL COGNITION AND MENTAL TRANSFORMATION

AUGMENTED REALITY

"overlaying 3D instructions on the actual work pieces **REDUCED THE ERROR RATE** for an assembly task **BY 82%**, particularly diminishing cumulative errors"

Tang et al. (2003)

AR IN (FLEMISH) INDUSTRY

FLANDERS MAKE
MANUFACTURING INNOVATION NETWORK

It is our mission to strengthen **the long-term international competitiveness** of the Flemish manufacturing industry by performing **excellent, industry-driven, pre-competitive research in the following domains:**

- mechatronics
- product development methods
- advanced manufacturing technologies

AGORIA VLAANDEREN
sirris driving industry by technology
MADE DIFFERENT FACTORIES OF THE FUTURE
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AR IN (FLEMISH) INDUSTRY

FLANDERS MAKE
MANUFACTURING INNOVATION NETWORK

- WAGE GAP WITH OTHER COUNTRIES
- AGING WORKFORCE
- PRODUCTS SHORTER LIFETIME
- HIGER CUSTOMIZED PRODUCTS WITH LIMITED VOLUMES
- PRESSURE ON PERFORMANCE AND FIRST TIME RIGHT

RP8 AGILE AND HUMAN CENTERED PRODUCTION AND ROBOTIC SYSTEMS

Track 1
Turning operators into knowledge workers

Track 2
Assisting humans with robots

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KU LEUVEN

AR IN (FLEMISH) INDUSTRY

TURNING OPERATORS INTO KNOWLEDGE WORKERS

1: “PRESENTING THE RIGHT INFORMATION IN THE RIGHT FORMAT AT THE RIGHT TIME”

USING AUGMENTED REALITY

2: “CAPTURING OPERATOR KNOWLEDGE FOR TRAINING, PRODUCT DESIGN AND MANUFACTURING PROCESSES”

USING VIRTUAL REALITY

AR / VR TECHNOLOGY

AUGMENTED REALITY

VIRTUAL REALITY

Virtual Content:
textual, 2D graphical information(images),
3D geometry, videos, and 2D or 3D animations
or interactive icons/elements

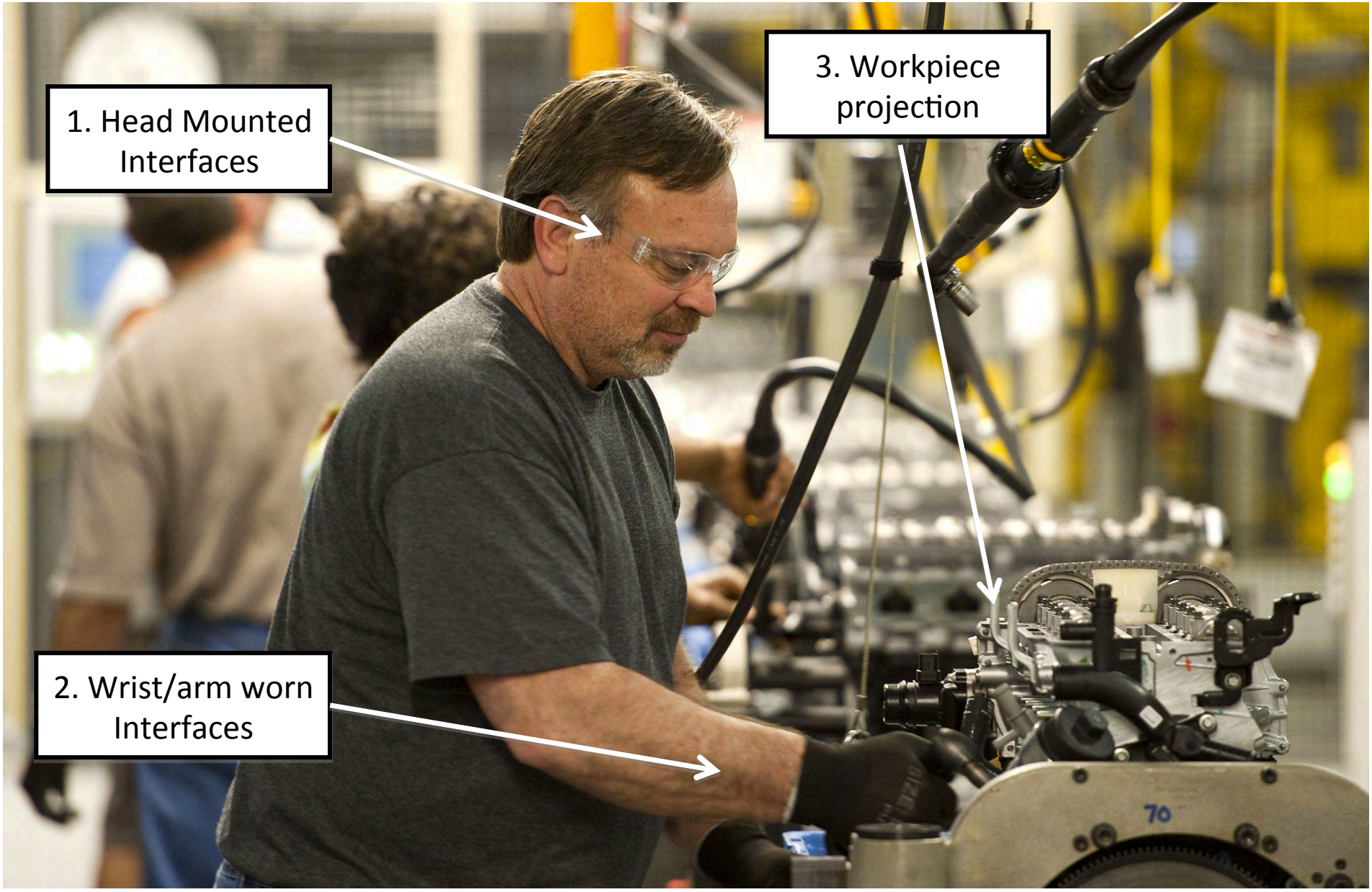
Alignment with the real world (e.g. using trackers)

Changing viewpoint (e.g. using IMU)

A phantom model of parts of the real world (to avoid occlusion)

Virtual model of the world

TURNING OPERATORS INTO KNOWLEDGE WORKERS



AUGMENTED REALITY

HMD: HEAD MOUNTED DISPLAYS

PRO

- Handsfree
- Wearable
- Personal

CON

- Human adaptation
- Stigma and image
- Battery life
- Available software and SDKs

AUGMENTED REALITY

TABLETS / SMART PHONES

I-Mechanic, ARMedia (2013)

AUGMENTED REALITY

HMD: ORDER PICKING

KiSoft Vision, KNAPP (2011)

AUGMENTED REALITY

HMD: ORDER PICKING

Smartpick, TNT (2015)

AUGMENTED REALITY

HMD: EPSON SCOPE AR

Epson BT-200, Scope AR (2014)

AUGMENTED REALITY

+ 3D GESTURES

MOVIE PREDICTION: TONY STARK

Iron Man, Marvel (2010)

AUGMENTED REALITY

+ 3D GESTURES

HMD: WEARABLE 3D HOLOGRAMS

Meta 1, Meta Company (2014)

AUGMENTED REALITY

+ 3D GESTURES

HMD: WEARABLE 3D HOLOGRAMS

Meta 1, Meta Company (2014)

AUGMENTED REALITY

+ 3D GESTURES

HMD: WEARABLE 3D HOLOGRAMS

Microsoft HoloLens

Windows 10

Hololens, Microsoft (2014)

AUGMENTED REALITY

+ 2D GESTURES

PROJECTION ON SURFACES

Sixth Sense, MIT (2009)

AUGMENTED REALITY

PROJECTION ON OBJECTS

Werklicht Pro, EXTEND3D

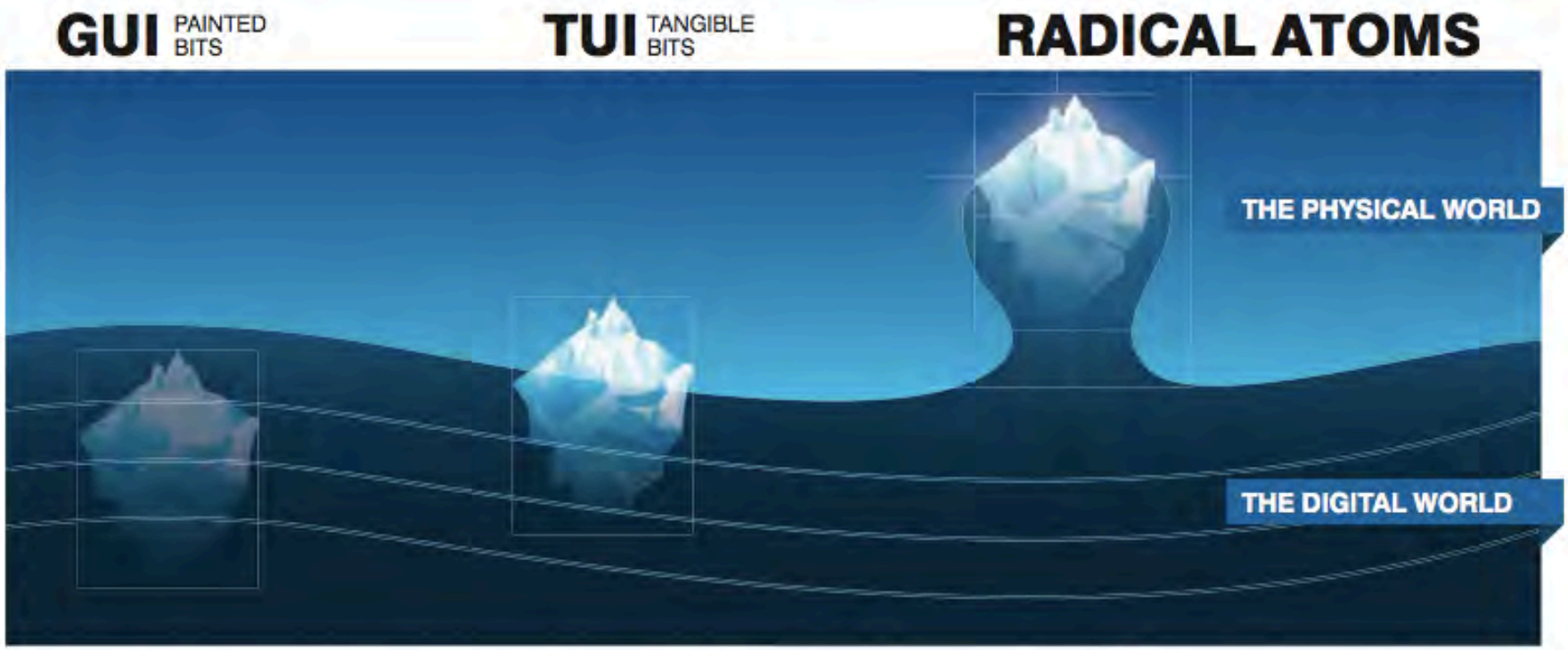
AUGMENTED REALITY = THE FUTURE?

YES
if

WE MAKE IT
MORE
TANGIBLE

TANGIBLE AUGMENTED REALITY ?

TANGIBLE USER INTERFACE



Hiroshi Ishii, MIT (2012)

TANGIBLE USER INTERFACE

+ PROJECTION

inFORM – TANGIBLE MEDIA GROUP

Tangible Media Group, MIT (2013)

TANGIBLE AUGMENTED RALITY

AIREAL: INTERACTIVE TACTILE EXPERIENCES IN FREE AIR

Disney Research (2013)

TANGIBLE AUGMENTED RALITY

DEXMO: WEARABLE MECHANICAL EXOSKELETON

Dexta Robotics (2015)

TANGIBLE AUGMENTED RALITY

DEXMO: WEARABLE MECHANICAL EXOSKELETON

Dexta Robotics (2015)

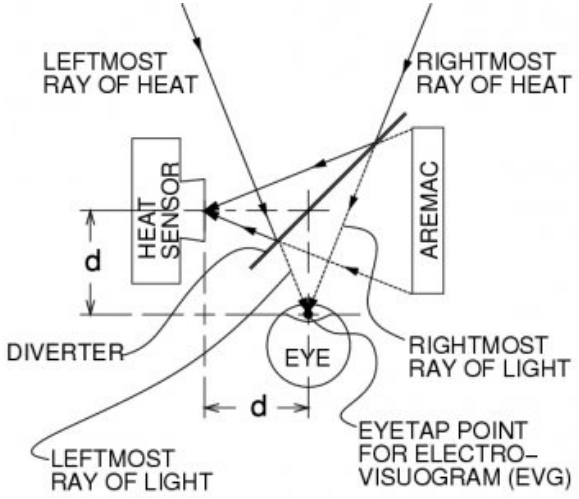
AUGMENTED REALITY – WHAT IS NEXT?

MEDIATED REALITY

- AUGMENT
- DIMINISH
- ENHANCE
- MODIFY

MEDIATED REALITY

EYETAP



Steve Mann, MIT (1980)

Steve Mann, MIT (1990)

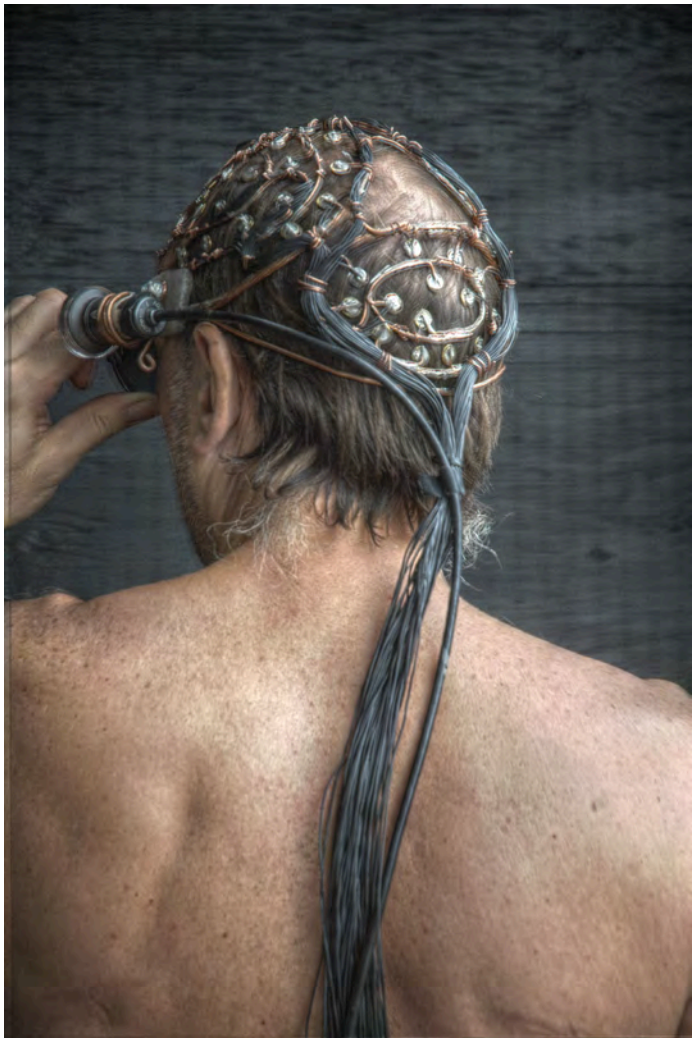
MEDIATED REALITY

EYETAP

Steve Mann, MIT (2010)

HUMANISTIC INTELLIGENCE

Mindmesh : Seeing and remembering better



Steve Mann, MIT (2014)

HUMANISTIC INTELLIGENCE = CYBORG

Robocop (2014)

THANK YOU

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Prof. dr. ing. JELLE SALDIEN

Jelle.saldien@ugent.be

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