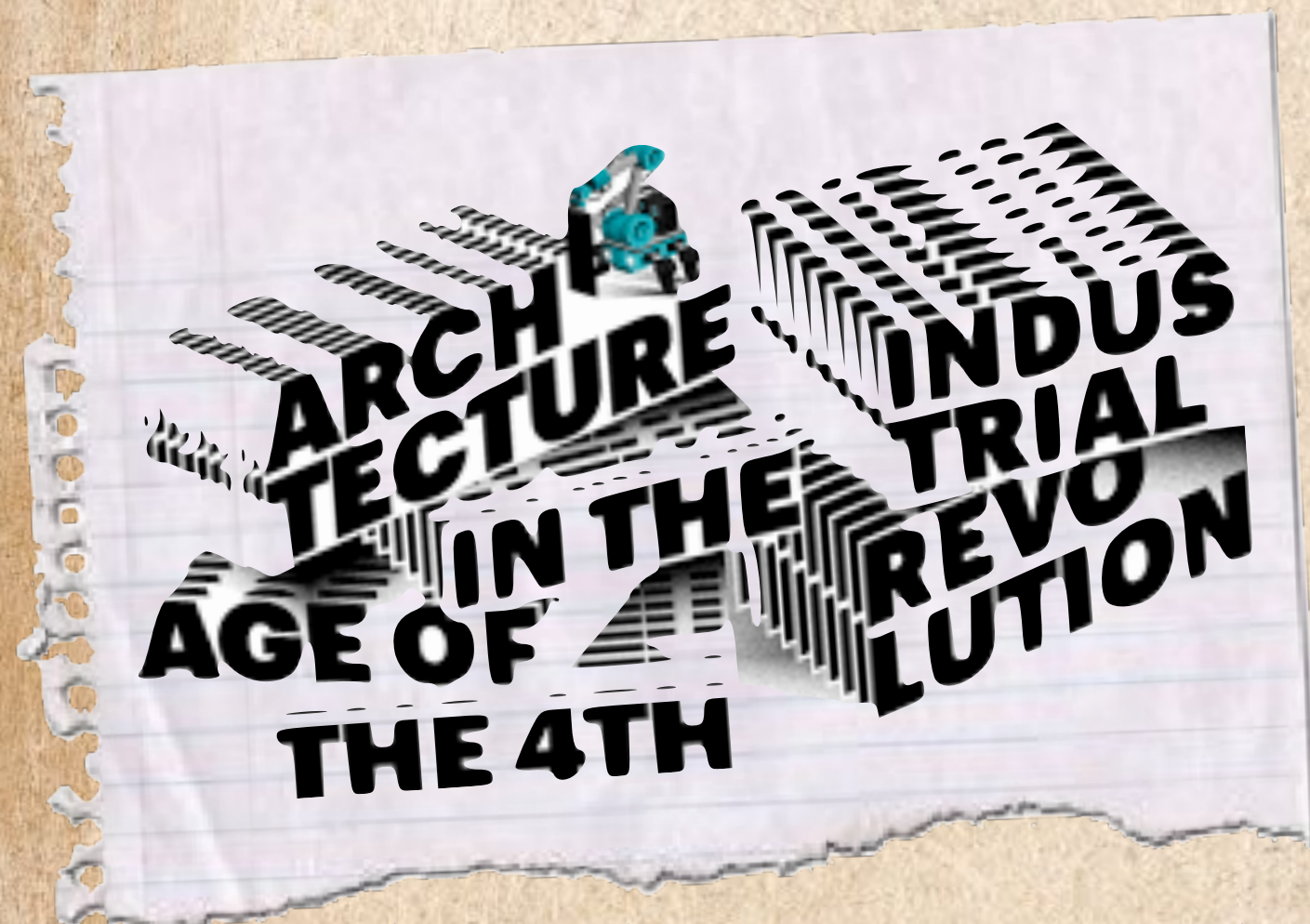Bom dia!

A Multivariant Design Tool based on affordable VAM-Technologies Interactive Design and Flexible Immersion

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VAM-Technologies and Terminology

- ◉ **Virtual Reality**
  As early as the development of perspective drawings, or the invention of photography.

- ◉ **Augmented Reality**
  Thomas Caudell and David Mizell coined the phrase in 1992 at Boeing.

- ◉ **Mixed Reality**
  Similar of age, early 90'ies
  also: Intereality, Hybrids

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Different concepts

- Virtual realities handle only virtual models

- The technique of augmentation is to augment a layer from reality with a virtual created layer

- Mixed Realities may combine several layers and feedback from both the reality and the virtual modes

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Perception of those realities

The real world
$$P = R$$
P is always 1; or 100%

Virtual Reality
$$P = V$$

Augmented Reality
$$P = R + V$$

Mixed Reality
$$P = n*(R + V)$$

Technique

In essence, all technologies are compositions.

From them, "AR" is the most widely accepted and understood technical term.

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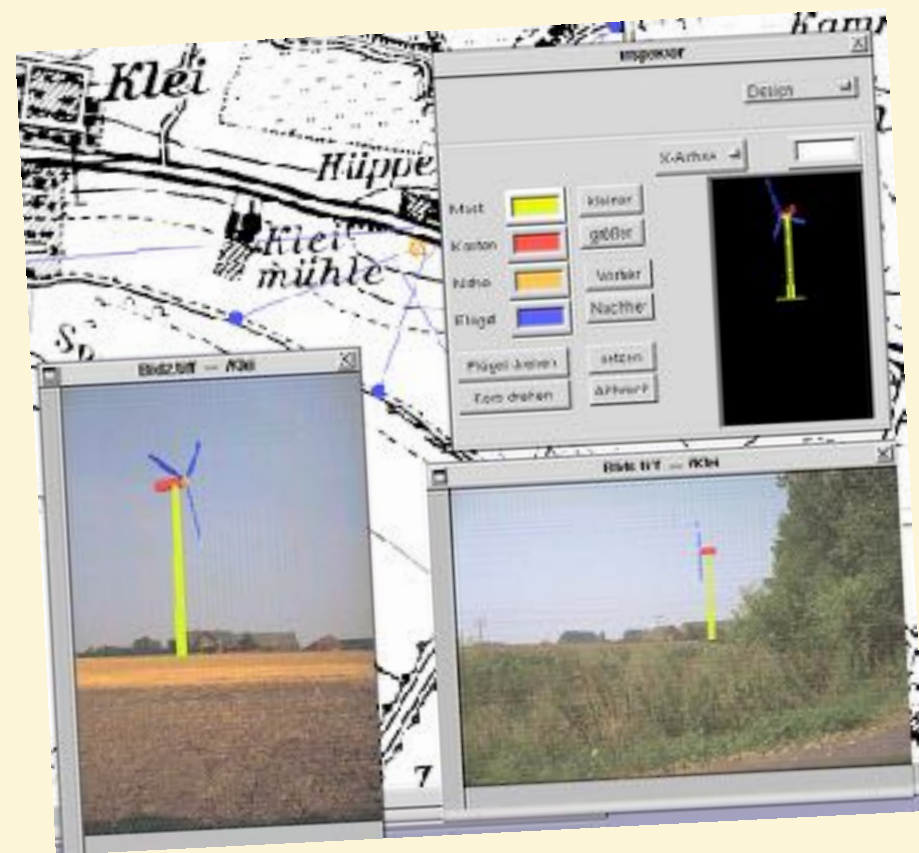XXIII SIGraDi/37th eCAADe Conference in Porto, PT 2019.

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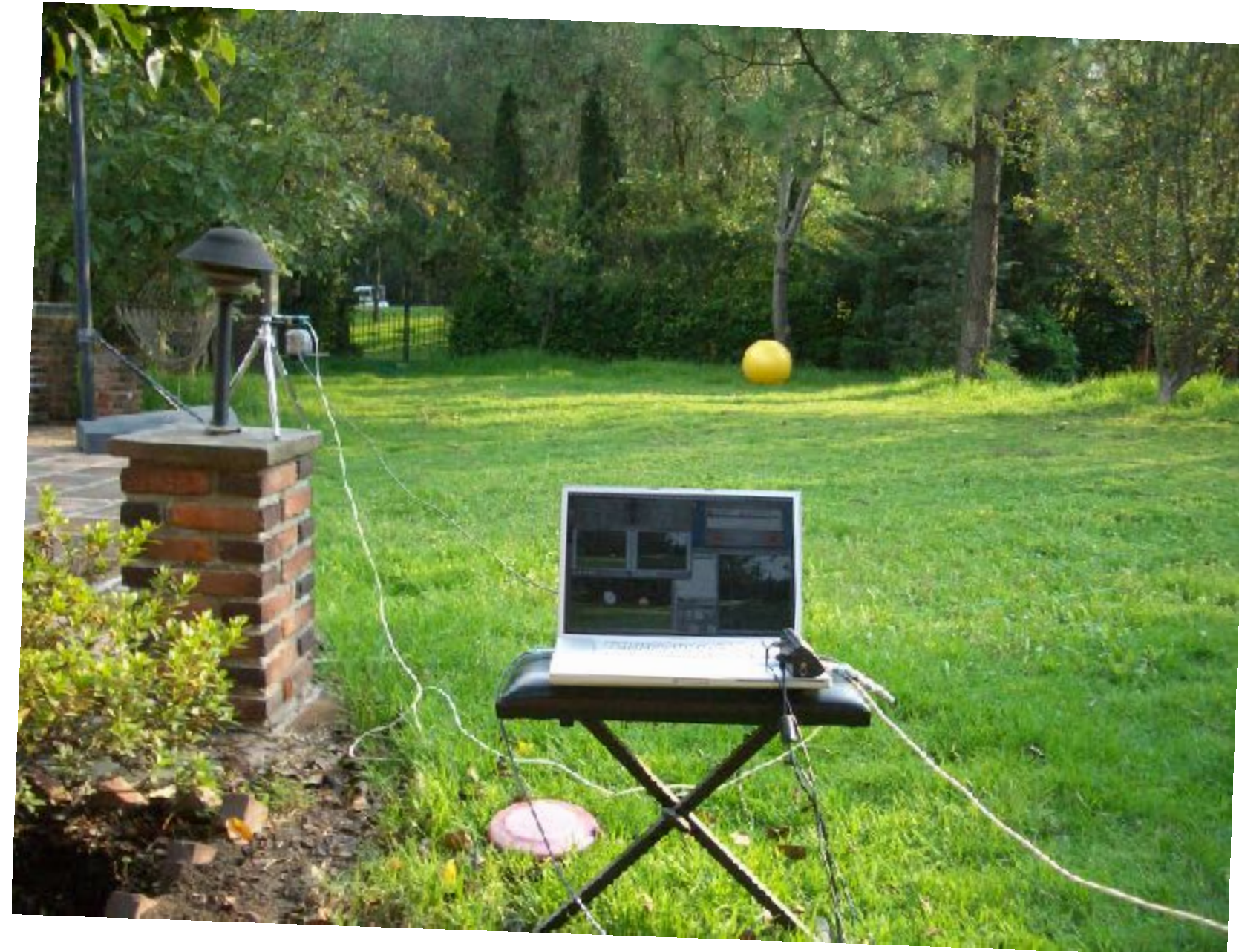Interactive Design and Flexible Immersion   © Werner Lonsing 2019

Historical AR

Mid 1990's

AmbiViewer 2002 – 07

ACADIA '09

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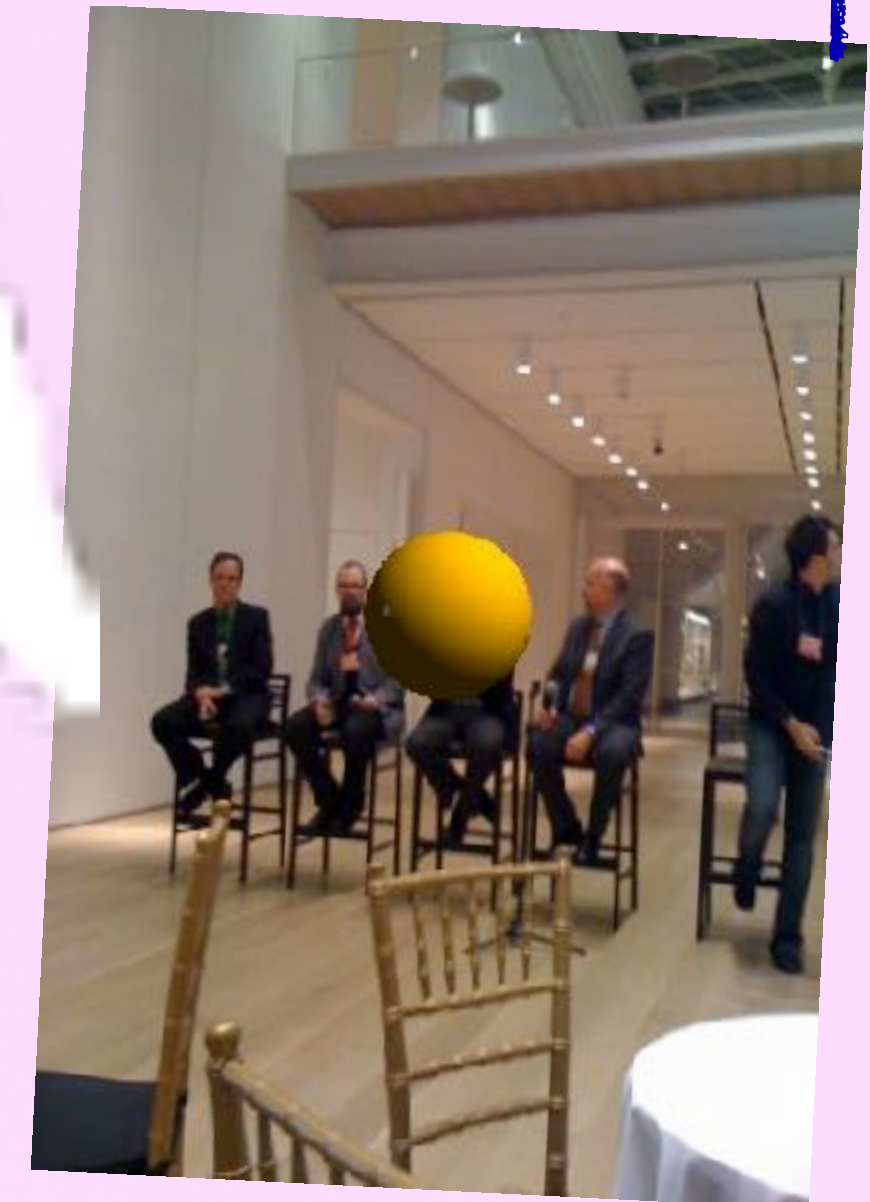
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Historical Concept

camera feed

tracking

composing

modeling

Camera: SouthernReel

SouthernReel

Introduction

Please note that this software was written for Mac OS X 10.2 with 10.3 in mind and does not support Macs with Intel processors

SouthernReel is a program for displaying and recording videos provided by almost every video camera or computers running Mac OS X and supported by Quicktime. It is just another program for watching the outcome of your video camera, like a Dv camera, the iSight, another firewire camera, or one of those cheap USB webcams. Connect a camera, start the program and watch the video or record a clip. The most distinctive feature between these programs is the design of the start/stop button.
Here is my suggestion.

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Tracking: SimpleGPS

SimpleGPS

Introduction

SimpleGPS is, as its name stated, a small utility to display information produced by some GPS receivers on for computers running Mac OS X. It is mainly designed to be a tool for viewing all kind of informations while traveling or hanging around. SimpleGPS has no mapping, tracking or storing functions whatsoever of its own.
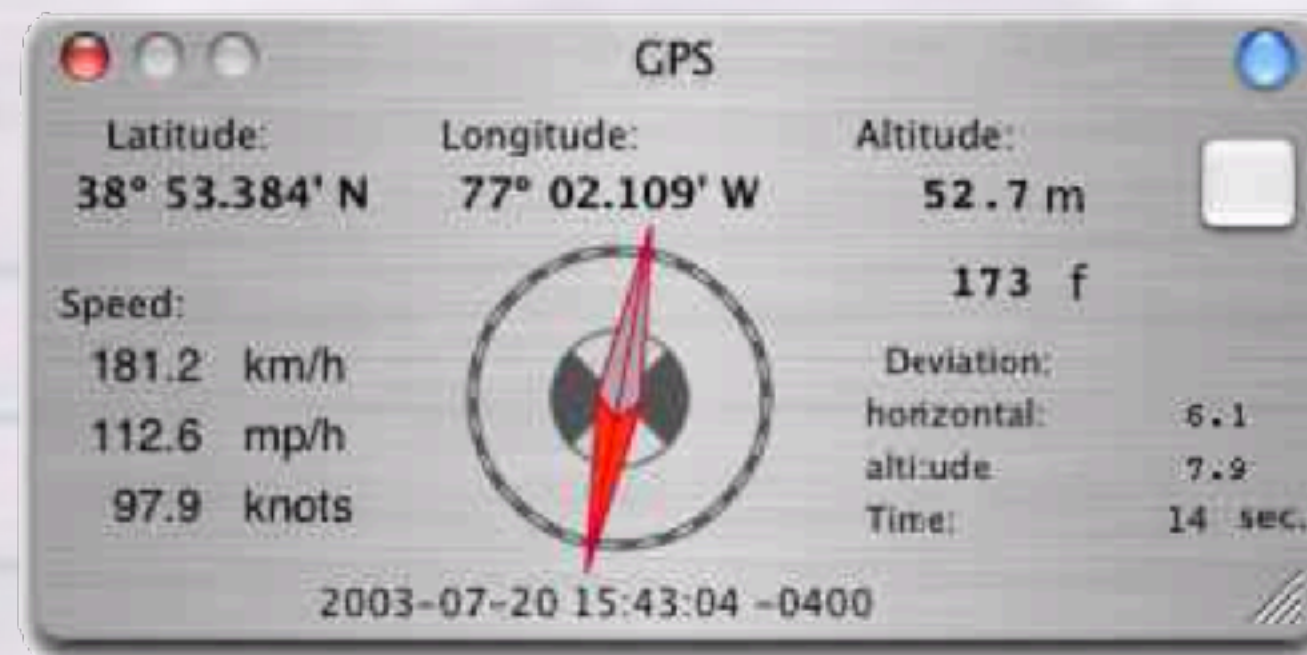
The program supports only the NMEA 0183 protocol (inofficial sources are here or here), which uses exact specified ASCII-strings and requires a transfer-rate set to 4800 baud. Because only serial receivers are available, only those are supported. Meanwhile there are some bluetooth GPS-receivers available, but those are still very expensive, and they have no other advantages. This keeps in mind, that GPS is a 20+ year old technology, based on even older standards.

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Modern AR: ARKit and similar

- Introduced in 2017

- Integrated hard- and software

- VIO (visual inertial odometry)

- Liberated the concept from the technology

no more

- tracking

- camera feed

- composition (mostly)

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The virtual experiences

The augmented lie:

Presentations on the internet are always looking good.

But where is the gear?

Physical gear

Gear are all devices, markers and other installations to permit the desired experience.

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Perception of realities with gear

The real world $P = R$

Virtual Reality $P = V + G$

Augmented Reality $P = R + V + G$

Mixed Reality $P = n*(R + V) + G$

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Multi-variant toolset

different scales

flexible immersion

tools

Different scales

Model-scale for figural space
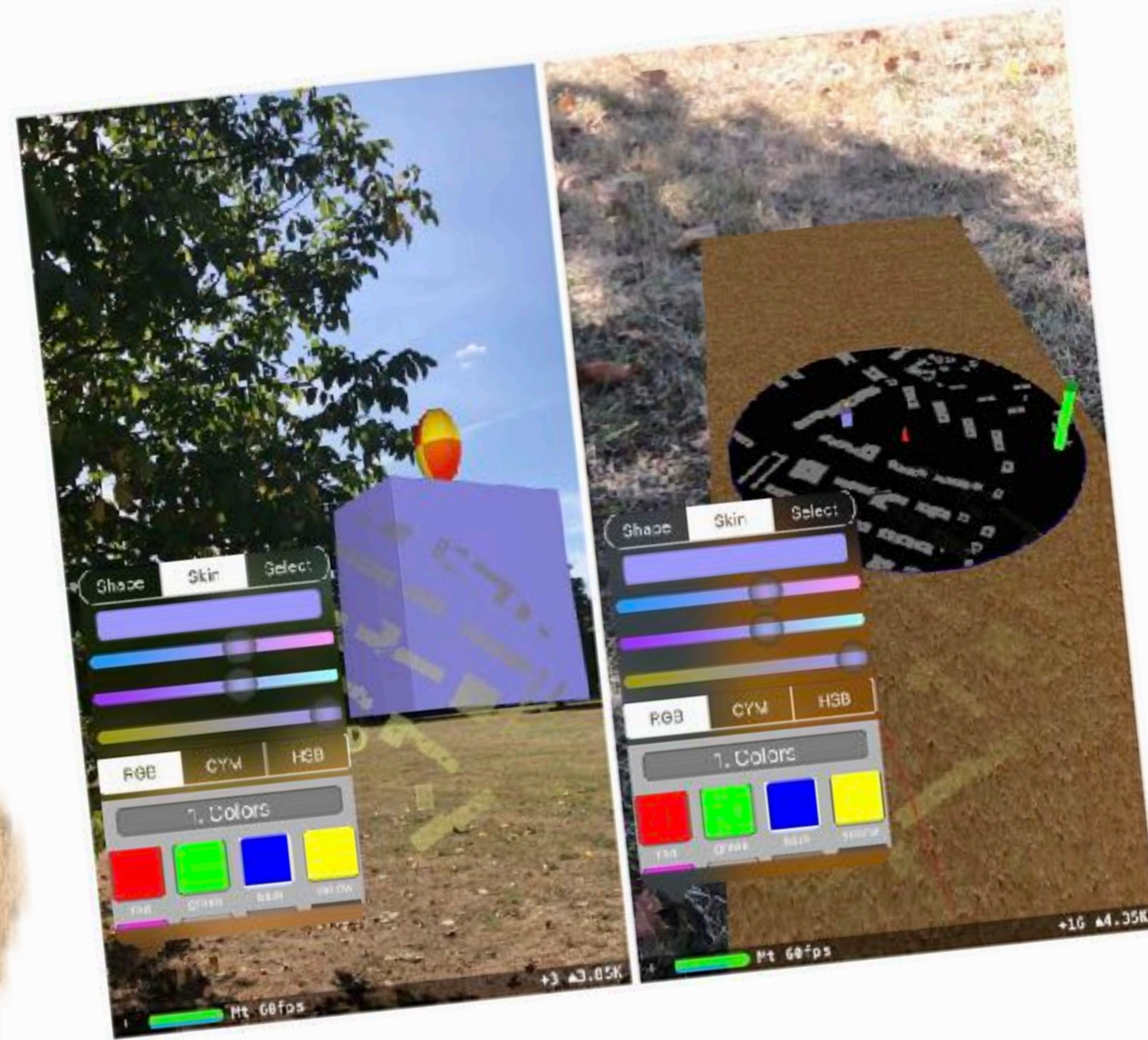

Panoramic-scale for environmental space

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Switching scales

Editing a design

Panoramic view

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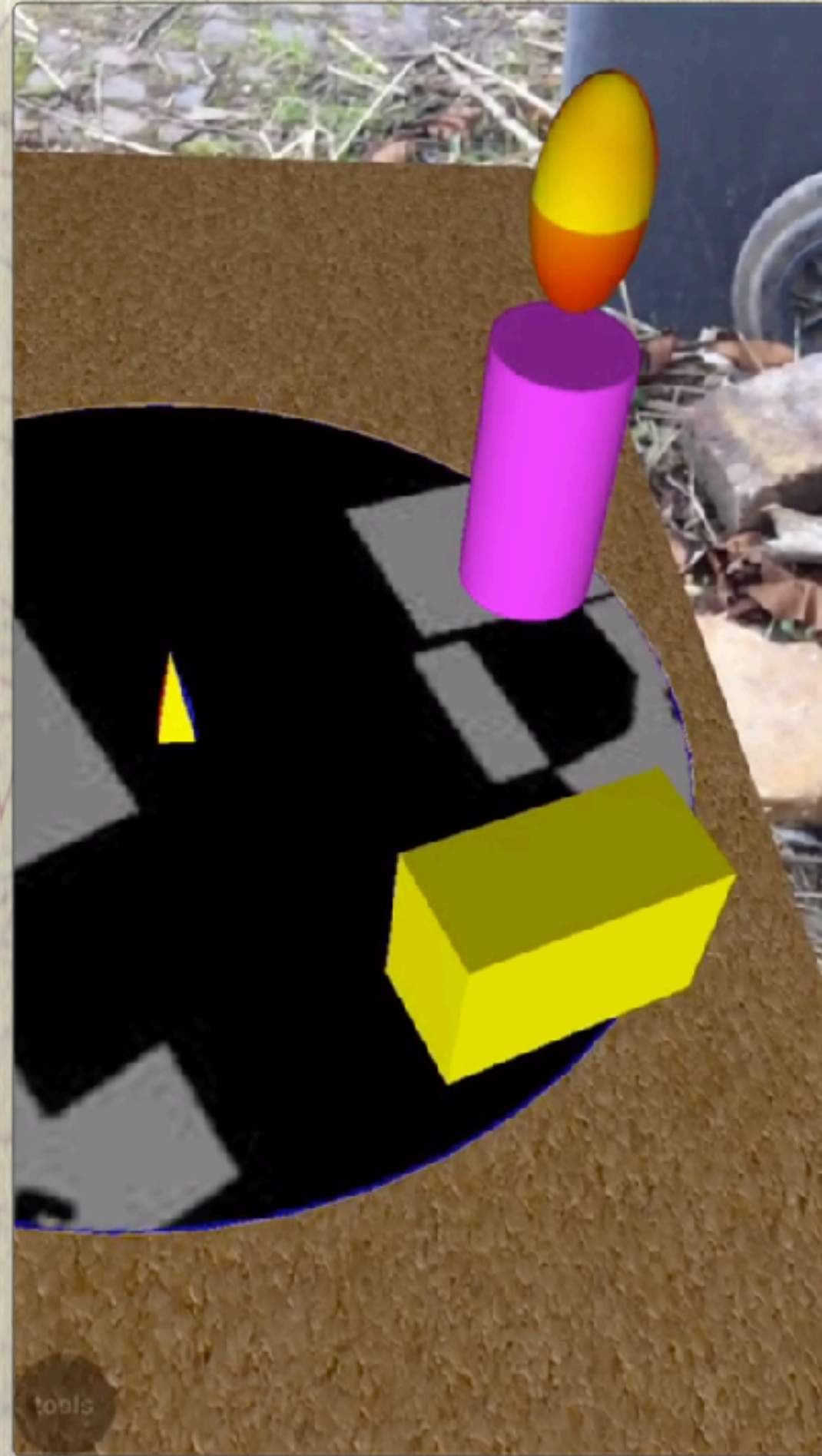Interactive Design and Flexible Immersion   © Werner Lonsing 2019

Concept of flexible Immersion

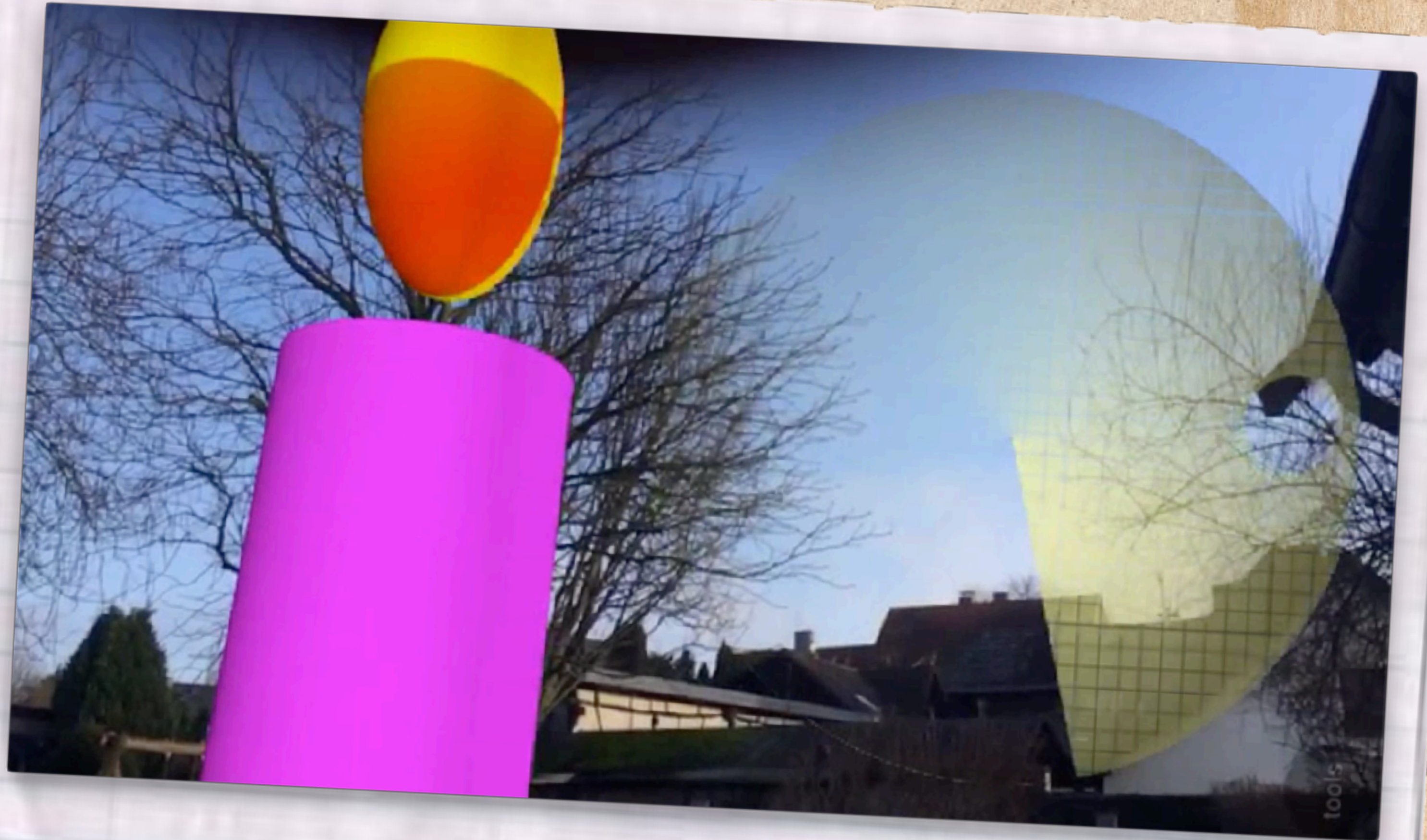| Model combined with	mono	stereo
black background	Holographic	**HUD** Heads-up display, e.g. Hololens
Camera feed	Screen-display	**HMD** Heads-mounted display, e.g. Vive, Oculus

Flexible Immersion

normal
overlay

stereo

holo

$$P - G = n*(R + V)$$

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Tools in 3-dimensional spaces

New pens with markers

ARPen

New and old ARPen

App from RWTH Aachen

https://hci.rwth-aachen.de/arpen-ios

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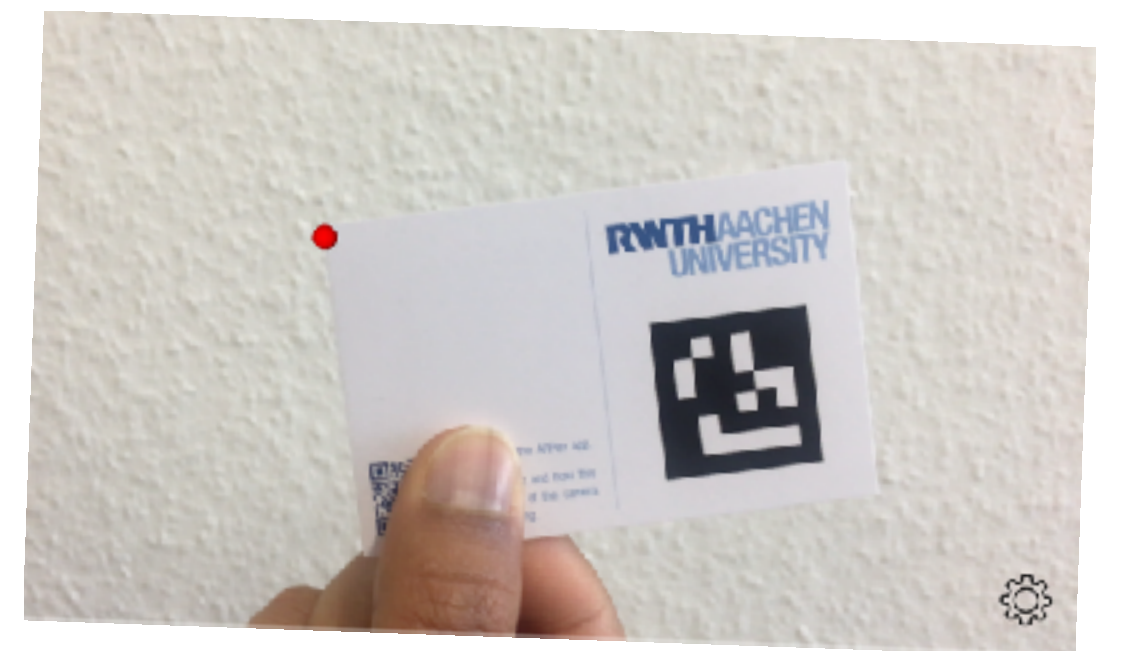
Markers for Multi-tool

aruco markers

6 magnetic markers

inside the pens

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... as presented there

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Future development

- occlusion

- semantic segmentation

- transparent models

- smart markers

- chip inside

- IDs

- some lighting

- feedback on the pen

- visual and haptic

- gestures

- collaboration

- networking

- even more markers for different users

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Obrigado!

Thank you!

zzz zz

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