Project Alloy with Intel® RealSense Technology:

Merging the REAL & the VIRTUAL Worlds

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Definitions…

- Virtual Reality
  - Places the user in a virtual environment, generating sensory stimuli (visual, vestibular, auditory, haptic, …) that provide the sensation of “presence” and “immersion”
- Augmented Reality
  - Places virtual objects in the real-world, in some cases also providing sensory cues to the user that are consistent between the physical scene and the augmented elements
- Merged Reality
  - Blends real-world environment and elements within the virtual environment with consistent perceptual cues, in some cases with scene understanding and natural interactions

(In)famous “User Experience” Issues

- Visual experiences
  - “Screen-door” effects due to “low” display resolutions
  - Field-of-view (FOV) limitations
  - Motion artifacts due to “low” display frame-rates
- System/ergonomic issues
  - Tethered headsets (lighter) vs. all-in-one systems (heavier)
  - Computing power vs. application richness
  - Tracking setup vs. integrated “inside-out” tracking, 3-DOF vs. 6-DOF
- Inconsistent cues from the visual and vestibular sensory systems
  - Motion that is “felt” but not “seen”
  - Motion that is “seen but not “felt”
  - Both systems detect motion but they do not correspond
- Inconsistent oculomotor cues
  - Eye accommodation/convergence mismatch
  - Incorrect focus/blur cues
- Missing or inconsistent proprioception cues
- …

Project Alloy: A Merged Reality Device

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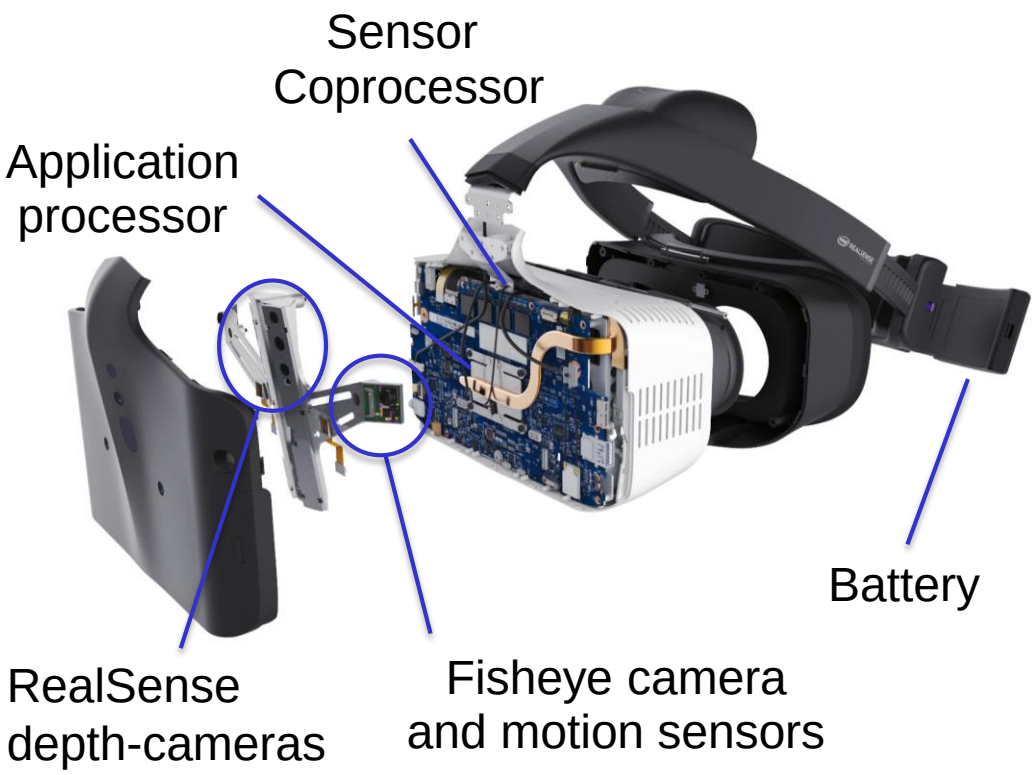
Project Alloy: A Merged Reality Device



Untethered, all-in-one design

- Multi-room scale mobility, no setup

Intel® RealSense™ Technology

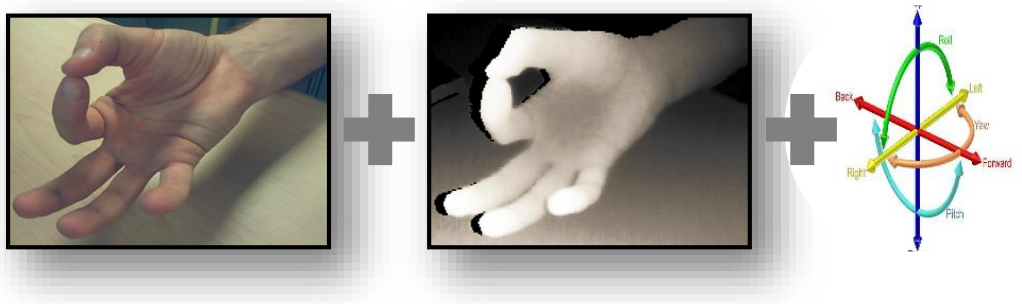
- Integrated 6DOF tracking
- Hand tracking & interaction
- Merged reality experiences

High-performance computing

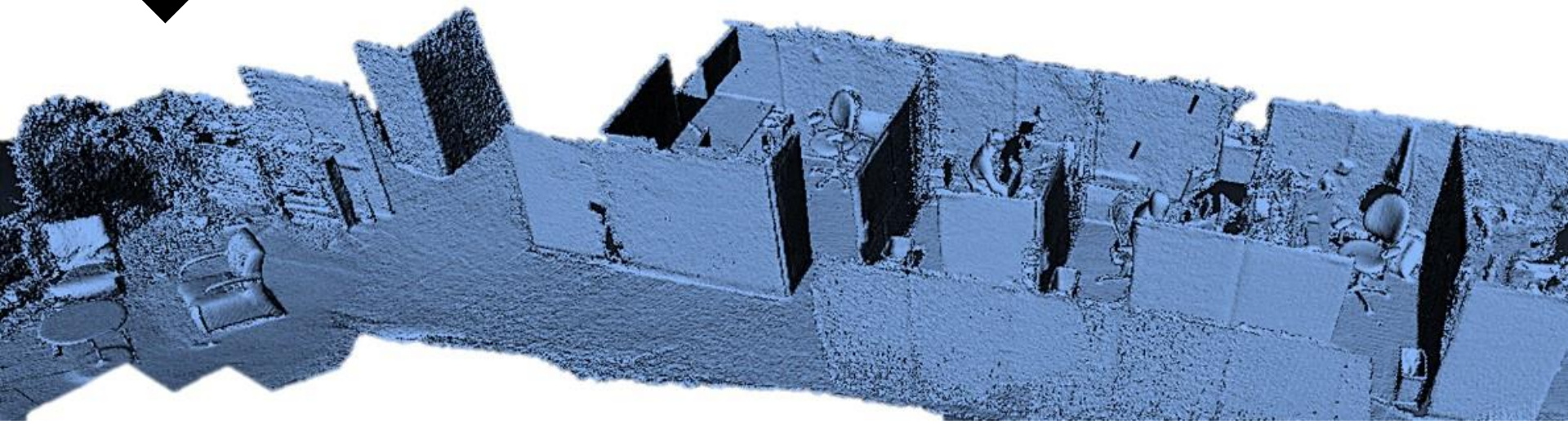
- PC-class processor, graphics and accelerators

Real-Time 3D-Sensing with Intel RealSense Technology

Real-Time
Color + Depth +
6-DOF Motion
Sensing



Dense 3D
Reconstruction



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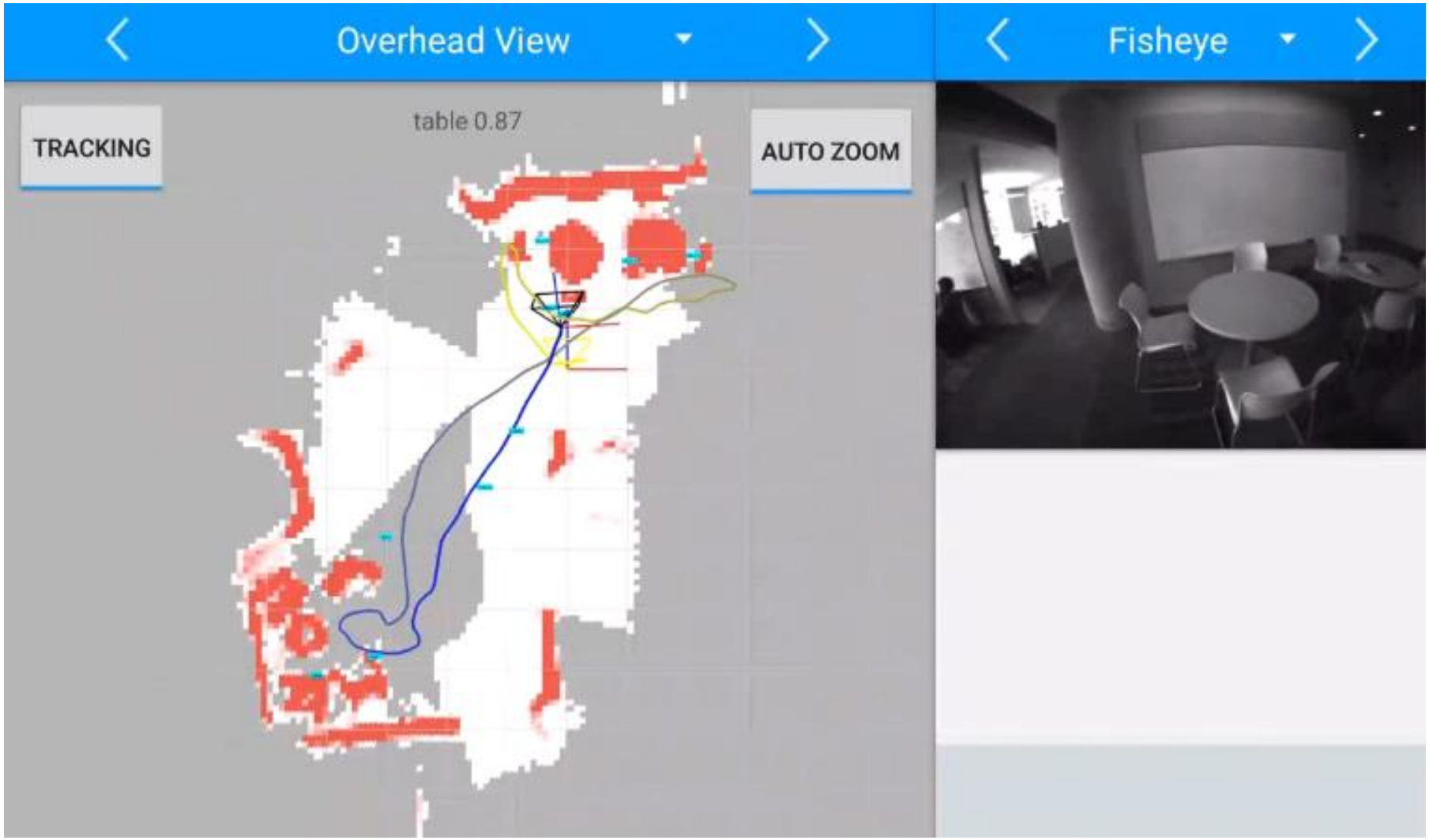
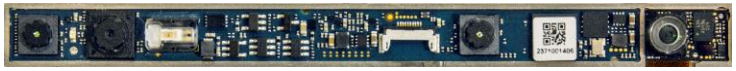
6-DOF Tracking and Scene Understanding with RealSense



Intel RealSense Technology

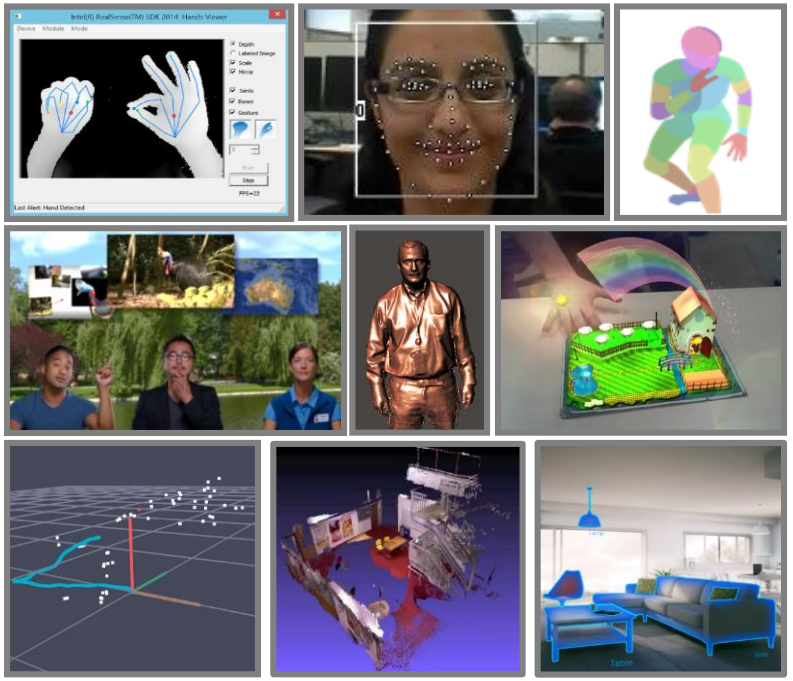
Model: SR300
(Short-range usages)

Model: R200/LR200
(Longer-range usages)



Model: ZR300
(Longer-range usages + motion sensing)

+

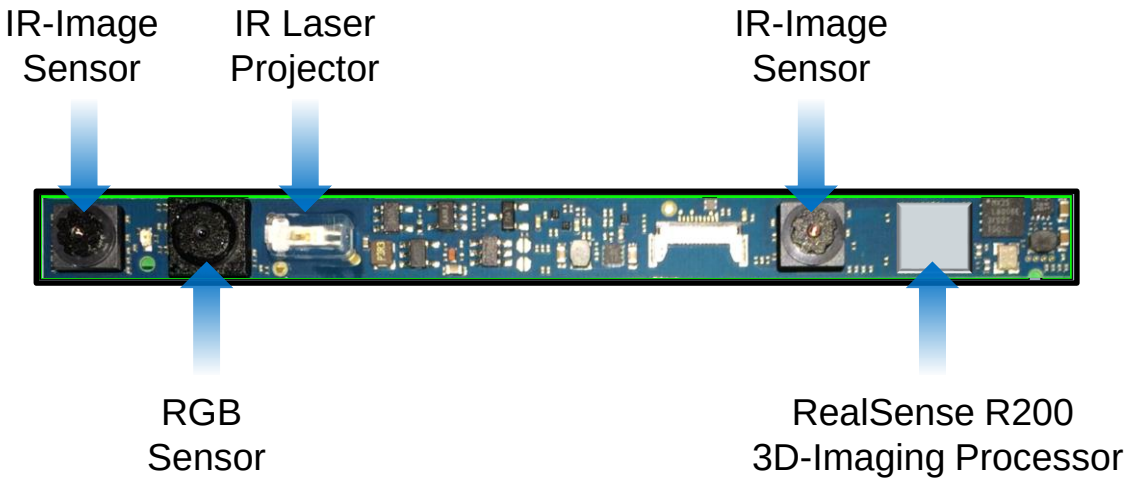


3D-Sensing Hardware:
“Capture the World in 3D”

3D-Perception Software:
“Understand What You See”

www.intel.com/RealSense/sdk

RealSense LR200 Module Architecture



- Active illumination with IR-texture when necessary
- ASIC hardware-acceleration for disparity/depth computation
- Low-power and high-frame-rate operation
- Robust factory-calibrated module with multi-sensor sync

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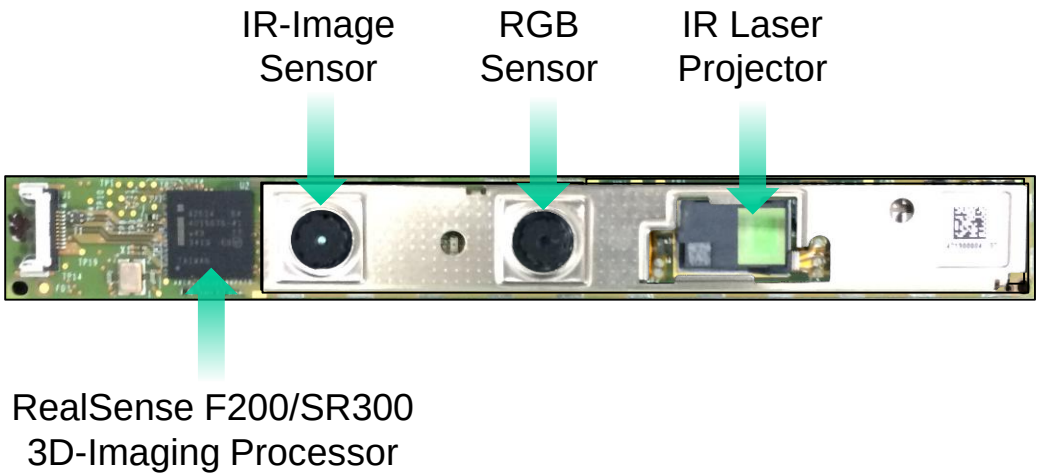
RealSense F200/SR300 Module Architecture

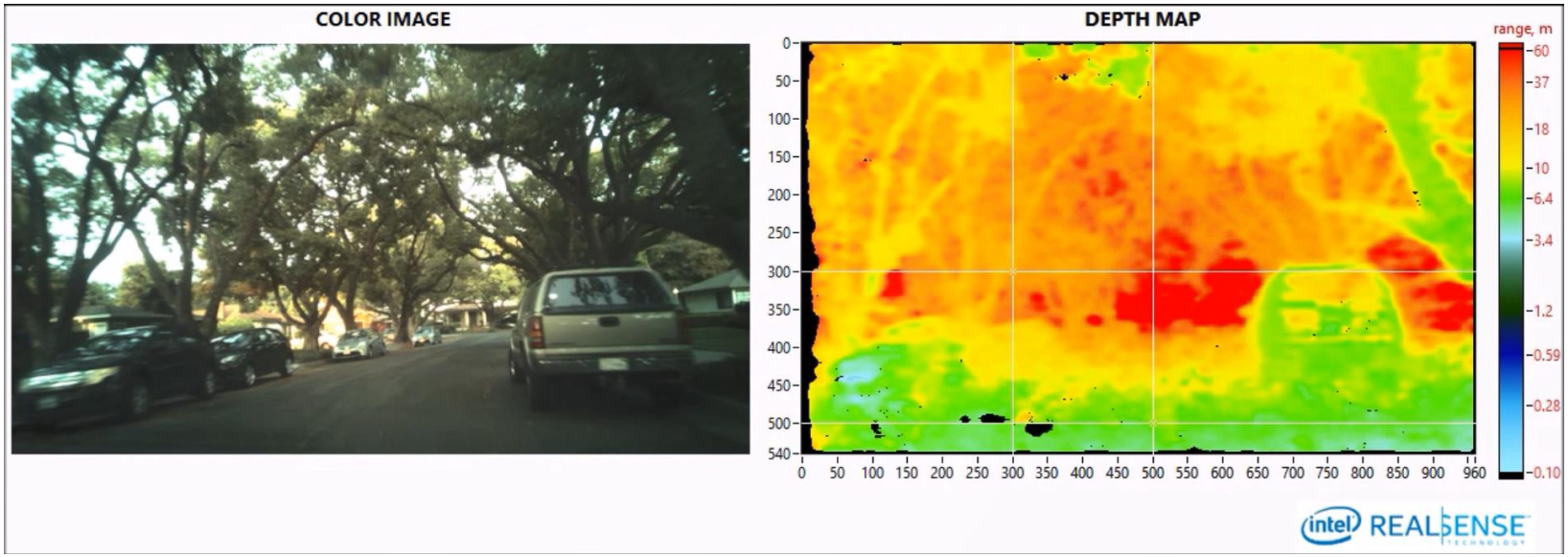


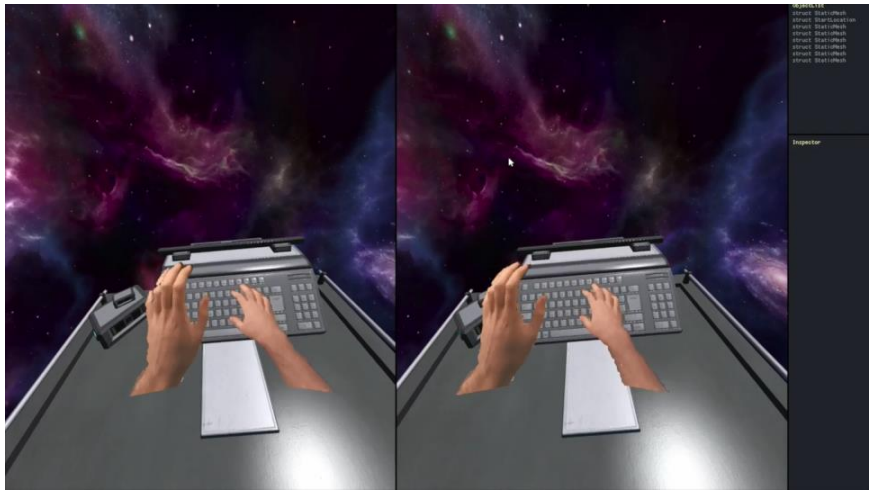
- IR laser + MEMS projector for illumination with binary codes
- ASIC hardware-acceleration for depth computation
- Low-power and high-frame-rate operation
- Robust factory-calibrated module with multi-sensor sync

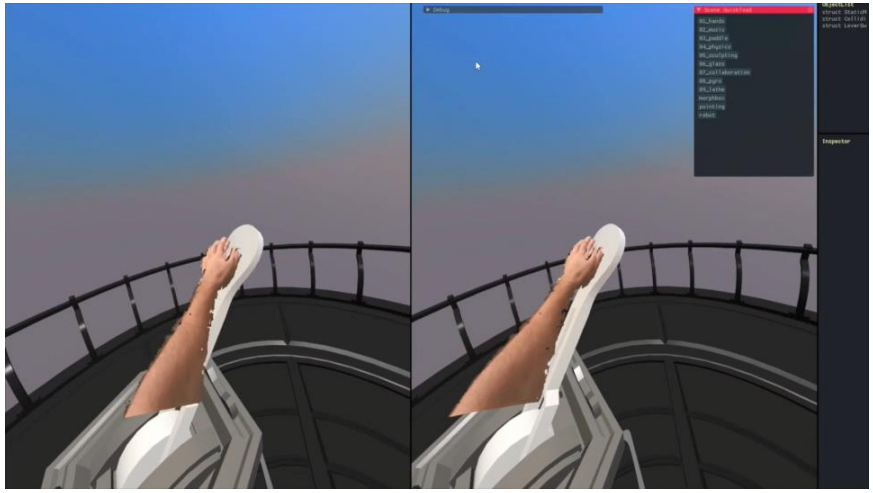
Next Generation: RealSense 400 Series

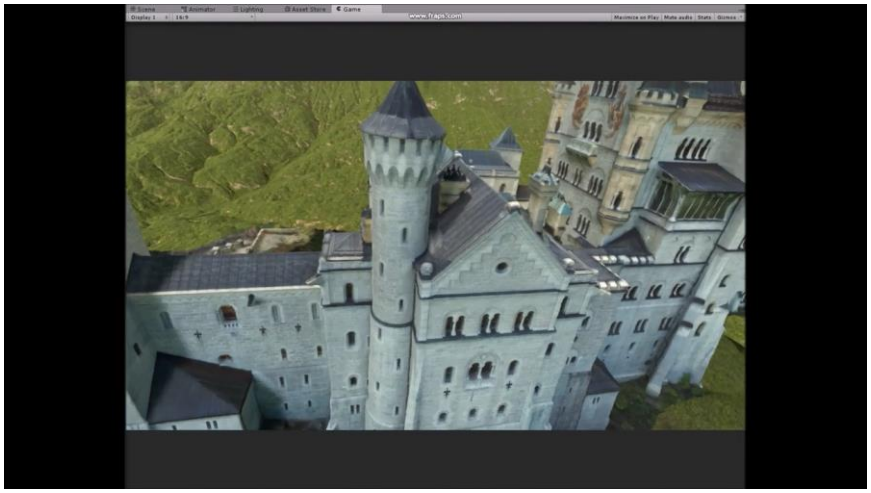
- Improved Range and Accuracy
- Indoor and Outdoor Usage
- Lower Power and Smaller Form Factor
- Sampling Q4’16

Next Generation: RealSense 400 Series









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Merged Reality Experiences With Intel® RealSense™ Technology

Multi-room Scale Movement & Tracking

Collision Avoidance

Hand Tracking & Interaction

3D Scanning

Multi-user Interaction & Collaboration

Mixed Reality

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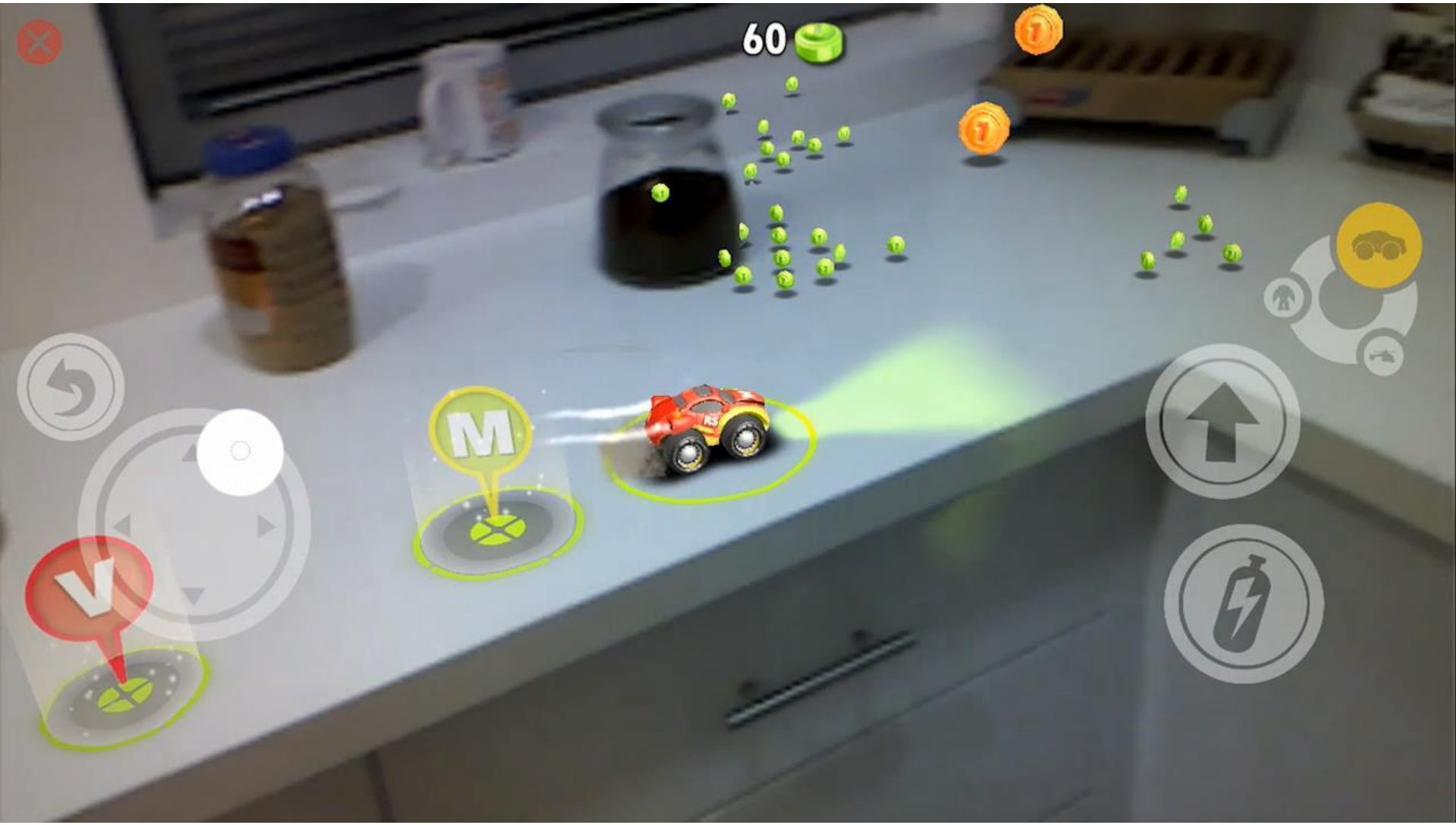
Blending Virtual Objects in the Real World with Intel® RealSense™ Technology



Various Application Areas for RealSense

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RealSense Developer Kits

SR300 & LR200 Developer Kit	ZR300 Developer Kit	Intel® RealSense™ Robotic Developer Kit	Intel® Joule™ Developer Kit	Intel® Aero Platform	Intel® Euclid™ Developer Kit
Short-range and long-range usages	Long-range usages with motion sensing	Explore and create prototypes	System on module for rapid prototyping to production	Optimized for UAV HW & SW development	Turnkey solution integrating sensing, compute, connectivity
Available on Click.intel.com	Dec'16	Available on Click.intel.com	Q4'16 with ZR300	Board available on Click.intel.com Drone in Nov'16	Q1'17

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Summary

- Project Alloy with RealSense is adding “human-like sensing” to VR, merging the “real” and the “virtual” worlds.
- Join us in developing exciting new interactive and immersive applications!
- For more information on RealSense, please visit:

  www.intel.com/RealSense/developer

Q&A