Introducing Intel® RealSense™ Robotics Innovation Program – ROS Integration

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Perceptual Computing - Advanced Technologies Israel

Agenda

- Intel RealSense – intro
- Intel RealSense Robotics Innovation program
  - What is it, what is our goal and how we are planning to achieve it
- Summary
- Questions

Intel® RealSense™ Technology

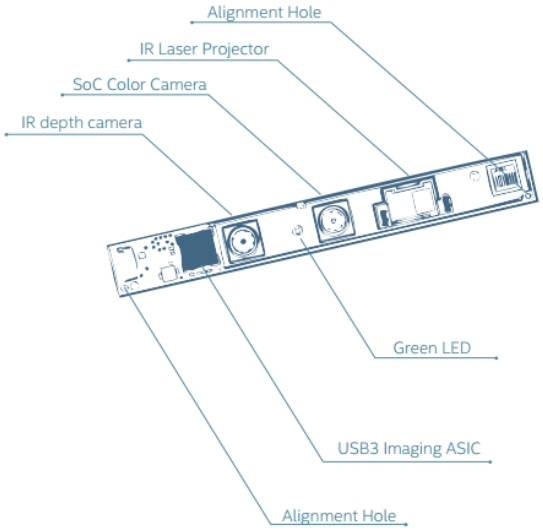
Add "Senses" to the "Brain" :

Eyes, Ears, Voice, Touch, Emotion and ***Context***

for an immersive, intuitive and exciting life-like experience

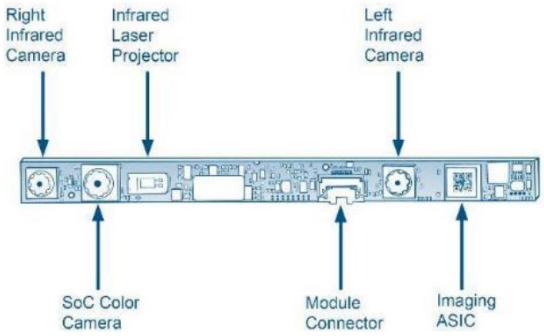
Short Range/Long Range

Intel® RealSense™ Short Range 3D Camera (F200)



	Color	Depth (IR)
Active Pixels	1920x1080	640x480
Aspect ratio	16:9	4:3
Frame rate	30/60/120 FPS	30/60/120 FPS
Field of view (D x V x H)	77x43x70 (Cone)	90x59x73 (Cone)
Effective Range	-	0.2m – 1.2m

Intel® RealSense™ Long Range 3D Camera (R200)



	Color	Depth (IR)
Active Pixels	1920x1080	640x480
Aspect ratio	16:9	4:3
Frame rate	30 FPS	30/60/90 FPS
Field of view (D x V x H)	77x47x70 (Cone)	70x46x59 (Cone)
Effective Range	-	0.6m – 3.5m*

*For outdoors use cases, depth is reported at a greater range (up to about 10 m) with lower accuracy.

Intel® RealSense™ SDK

Gesture-Enabled content consumption	Immersive Telepresence	Edutainment Games/Kits for kids	3D Obj view 3D Print & Share	Virtual Instructor for Education	3D Body Scanner (see, share, print)
3D Obj & Face Scanner; 3D Print	Interactive Books	Content Creation Virtual Green Room	3D Room Scanner for Decoration	3D-based Photo Post-Processing	Collaborative Games

Speech Command & Control

RealSense™ SDK Run Time API

SW & MW Framework

Gesture Recognition	Background Removal	3D Face Tracking & Recognition	3D Scene Understanding	Hands/ Fingers tracking	3D Obj Tracking & Recognition	Expression	Speech Engines

Intel® RealSense™ Technology

“This is just the beginning”

Intel® RealSense™ Technology

User Facing RealSense 2014 3D (F200) Camera	World Facing RealSense 2015 3D (R200) Camera	Multi-User Interaction based on RealSense	Dynamic Social Interaction
AIOs, Laptops, 2in 1s	*Tablets*	*AIOs, Laptops, 2in1s, Tablets*	**Autonomous Machines, Wearables**

From *Human – Computer Interaction* to *Human – World Interaction*

Robots and Wearables are ultimate hardware platforms for Perceptual Computing Technologies driving this revolution

Intel® RealSense™ Robotics Innovation Program

- A strategic program, aiming to develop technology to support ***rapid cycles of innovation*** in the robotic world of research, focused on Intel® RealSense™ Technology

- Our Goal:

Support *YOU* in your quest to innovate and create the next big thing in robotics

Intel® RealSense™ Technology - ROS Integration

Intel® RealSense™ Robotics Innovation Program

- RealSense-ROS pilots has been kicked off in April'15 with select universities
  - Gathered feedback and requirements

- A lot of traction…
  - Our offering available to all ROS community - announcement made by our CEO @IDF15

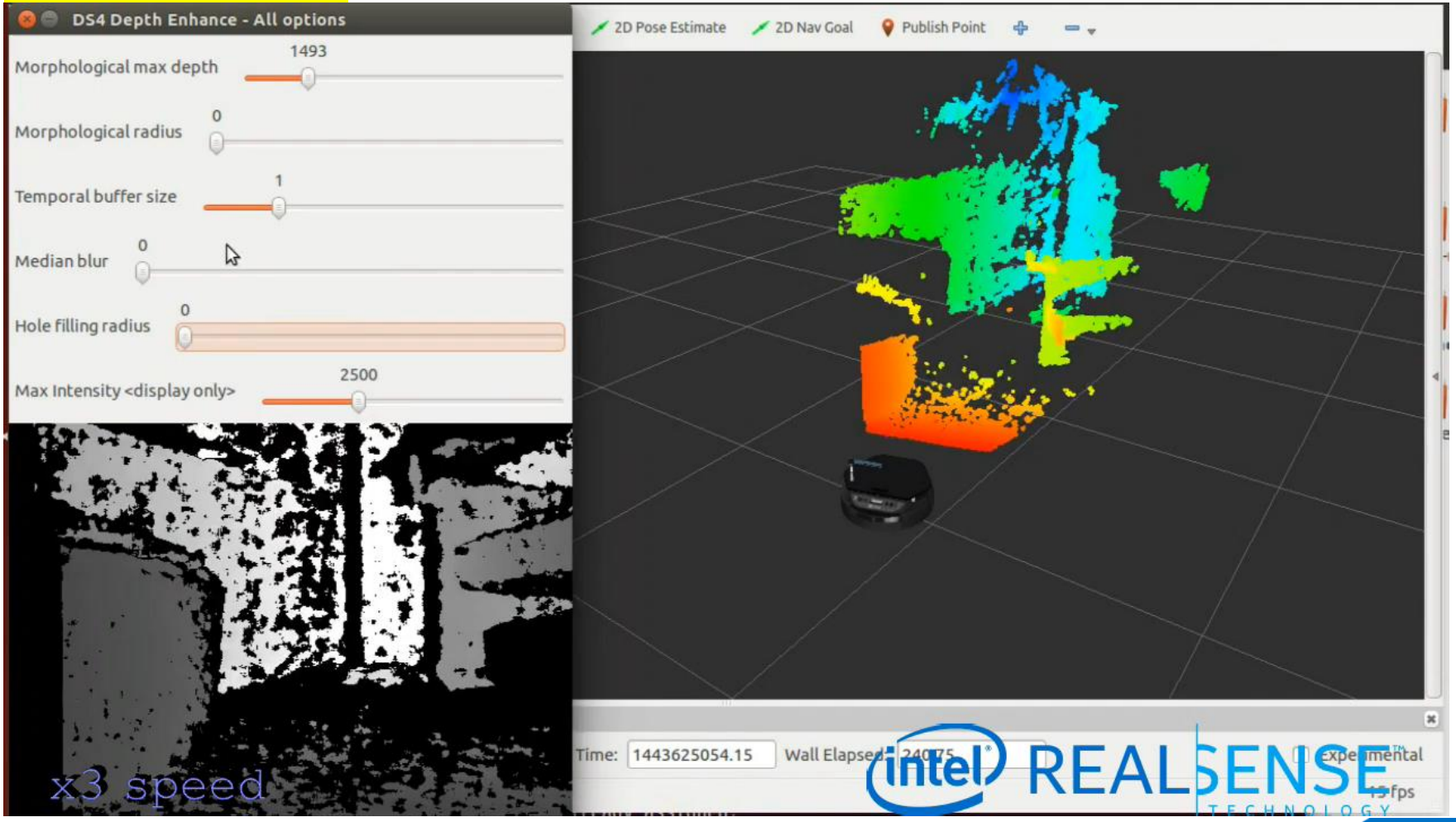
http://wiki.ros.org/RealSense

Intel® RealSense™ Technology - ROS Integration

- Camera access
  - RGB, Depth, IR, PointCloud
- CV basic modules
  - Plane analysis, Depth enhancements, Blob detection…
- Advanced modules
  - Person detection and tracking, skeleton tracking, gestures, object recognition, localization and mapping, scanning…

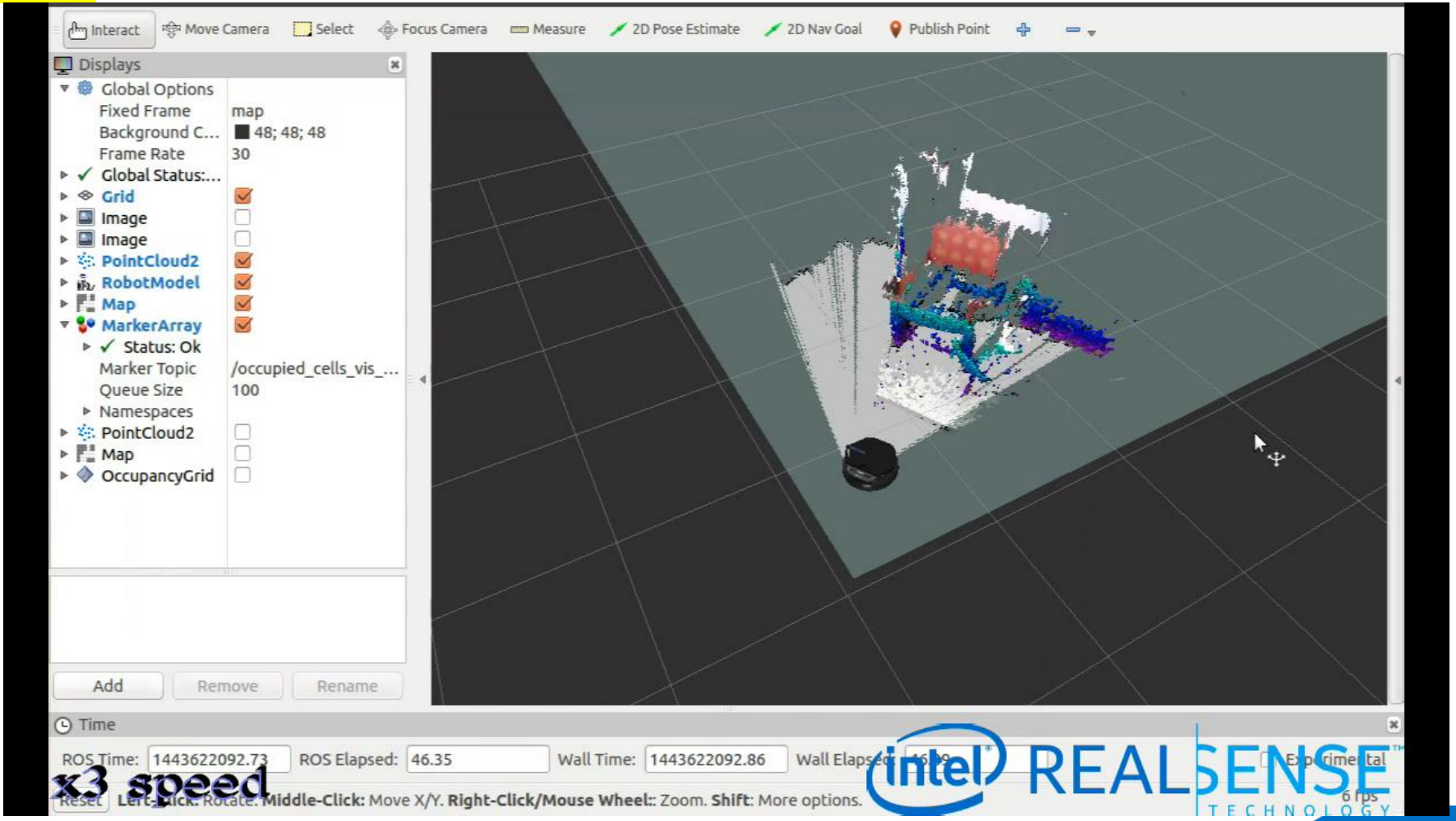
Videos

Depth Enhancement :



Videos

Scan


Interact
Move Camera
Select
Focus Camera
Measure
2D Pose Estimate
2D Nav Goal
Publish Point
Displays
Global Options
Fixed Frame
map
Background C...
48; 48; 48
Frame Rate
30
Global Status:...
Grid
Image
Image
PointCloud2
RobotModel
Map
MarkerArray
Status: Ok
Marker Topic
/occupied_cells_vis_...
Queue Size
100
Namespaces
PointCloud2
Map
OccupancyGrid
Add
Remove
Rename
Time
ROS Time:
1443622092.73
ROS Elapsed:
46.35
Wall Time:
1443622092.86
Wall Elapsed:
Experimental
Reset
Left-Click: Rotate. Middle-Click: Move X/Y. Right-Click/Mouse Wheel:: Zoom. Shift: More options.
6 fps
x3 speed
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REALSENSE
TECHNOLOGY

Videos

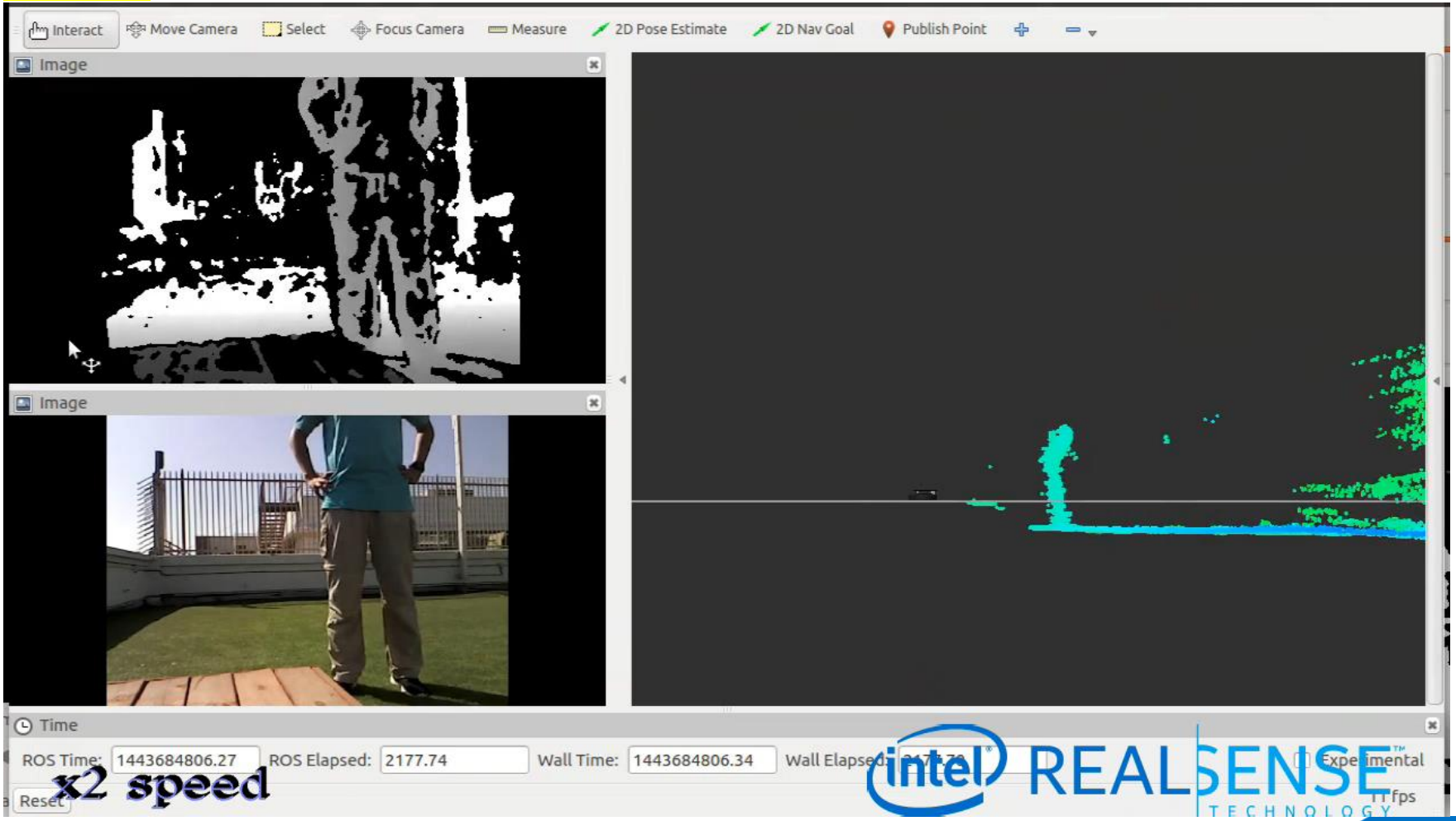
Autonomous Navigation

Videos

Person tracking

Videos

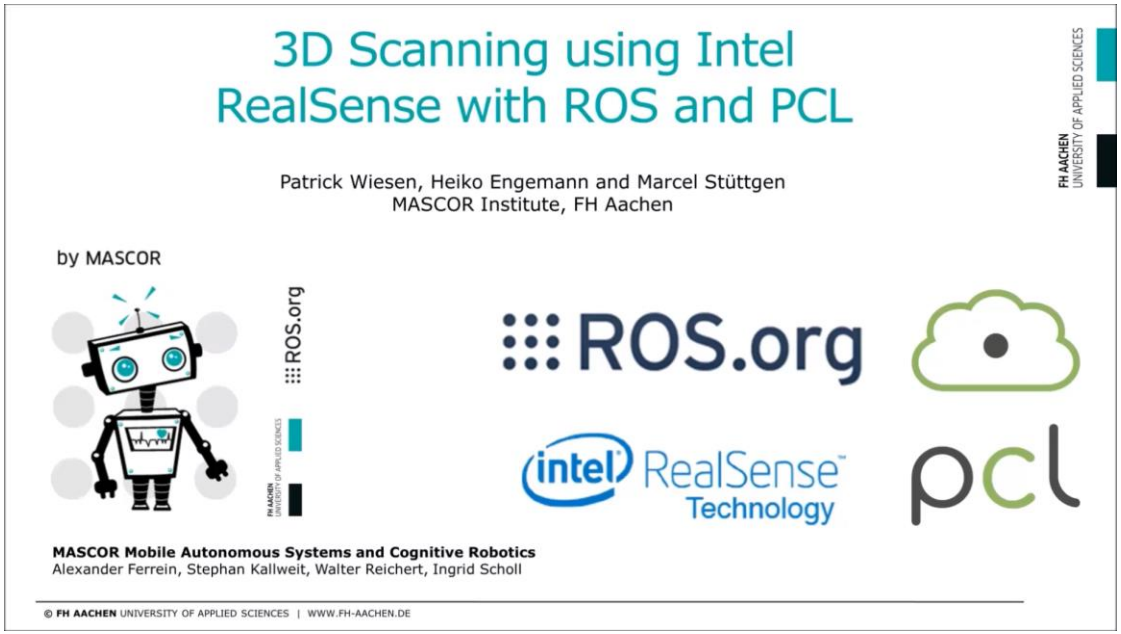
Outside



Videos

Partners work

Short Range Camera (MASCOR Institute, FH Aachen)



Long Range Camera (TUM)

Summary

There is huge pull to Intel RealSense technology in robotics community

RealSense has competitive advantage in comparison with other peripheral depth sensors

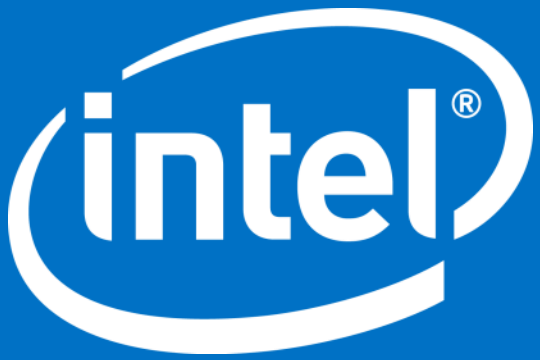
- Significantly small form factor
- Low weight
- Low cost
- Multi-range support; short (F200) and long (R200)
- Larger range support of lighting conditions
- Very rich technology engines that support mobile set-up

“This is just the beginning”

Questions?

Gila Kamhi, Amit Moran

Perceptual Computing – Advanced Technologies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