Product Overview

# Intel® RealSense™ Depth Camera D457

October 2022

intel REALSENSE™

# Intel® RealSense™ Depth Camera D457

## IP65 rated GMSL FAKRA. Secure Performance.

The Intel® RealSense™ Depth Camera D457 is our first GMSL/FAKRA high bandwidth stereo camera. The D457 has an IP65 grade enclosure protecting it from dust ingress and projected water.

### FEATURES

**Use Environment:** Indoor/Outdoor

**IP Grade**: IP65

**Depth Technology:** Active Stereo

**Ideal Range:** 60cm to 6m*

**Minimum Depth Distance (Min-Z):** 52cm

**Image Sensor Technology**: Global Shutter; 3 µm x 3 µm pixel size

**Depth Field of View (FOV), H x V:** HD 16:9 87° × 58° (±3°)

**Depth Output Resolution & Frame Rate:** Up to 1280 × 720. Up to 90 FPS.

**RGB Resolution**: Up to 1280 × 800. Up to 60 FPS

**RGB Field of View (FOV), H x V:** 90° × 65° (±3°)

### MAJOR COMPONENTS

**Camera Module:** Intel® RealSense™ Module D450

**Vision Processor Board:** Intel® RealSense™ Vision Processor Board V5

**Interface**: GMSL (Gigabit Multimedia Serial Link) Serializer

### PHYSICAL

**Form Factor:** Camera Peripheral

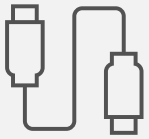
**Connectors:** FAKRA (USB 3 for debug only)

**Length x Height x Depth** : 124 mm × 29 mm × 36 mm

* Stereo cameras can see further but accuracy degrades with distance and varies depending on scene and lighting conditions

# What is GMSL / FAKRA?

GMSL (Gigabit Multimedia Serial Link) is an interface that utilizes Serializer/Deserializer (SerDes) technique. This means it uses a serializer on the transmitter side for converting data to a serial stream, and a de-serializer on the receiving side for converting serial to a parallel word for processing.



FAKRA (Fachkreis Automobile) is the connector standard; originally developed for automotive applications.

## Benefits include:

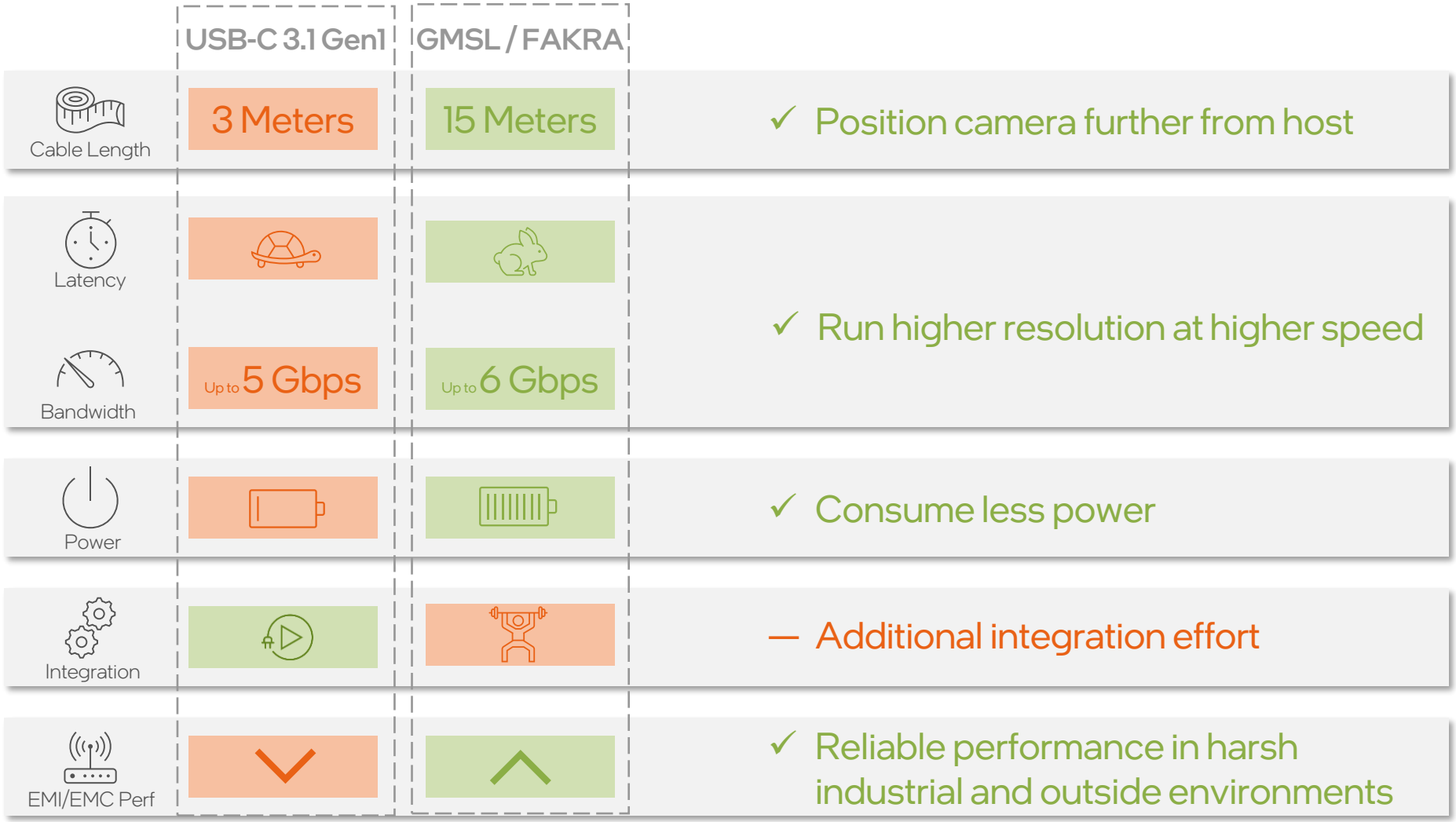
- ✓ Bandwidth to support high data rates
- ✓ Delivers data fast w/ low latency
- ✓ Long distance (up to 15m)
- ✓ Performs reliably in harsh industrial and outside environments

## Ideal for applications that require large amounts of image or video data to be transmitted, especially over long distances.

## Integration Requirements:

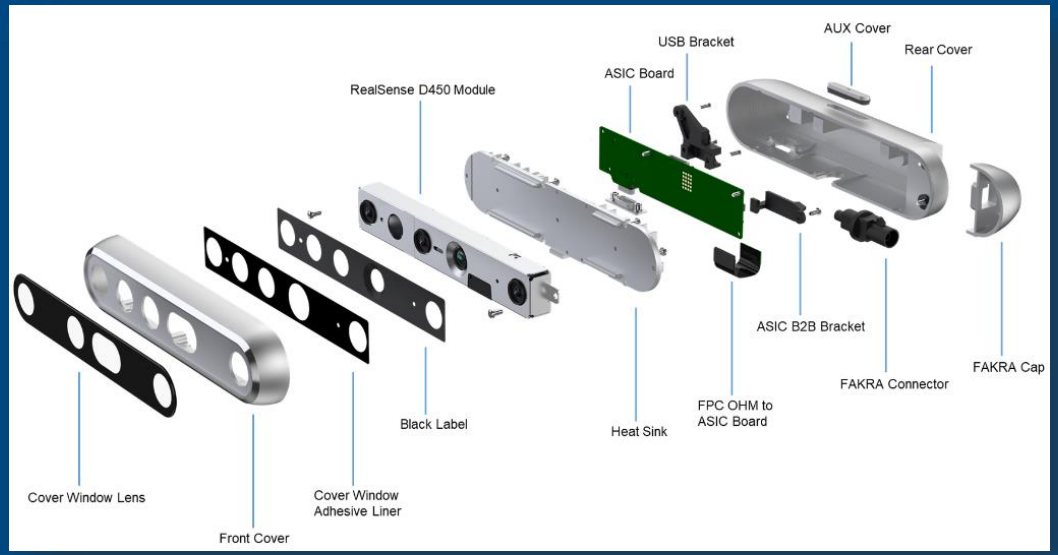
- ✓ GMSL/FAKRA supported Platform
- ✓ Platform specific GMSL/FAKRA drivers
- ✓ Deserializer board @ Host

# GMSL/FAKRA Expands RealSense Capabilities

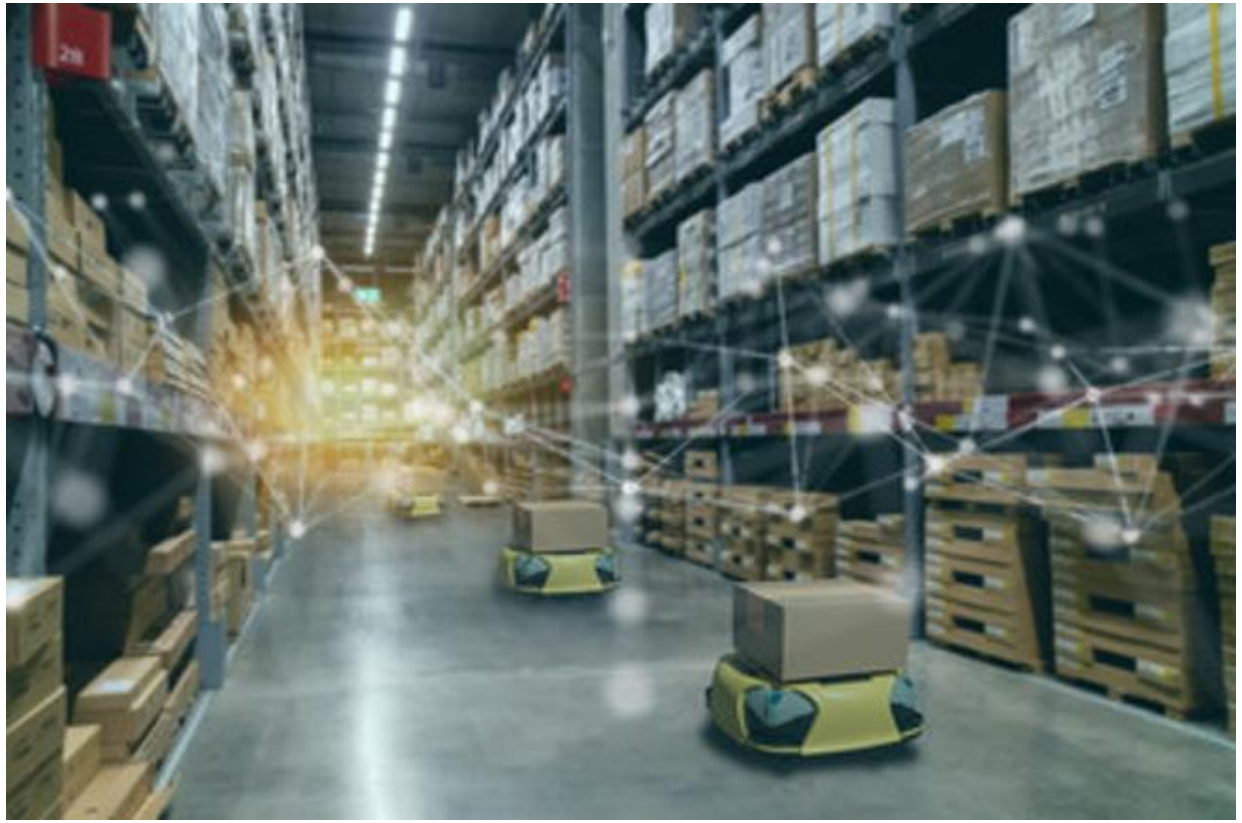


# Best for Autonomous Mobile Robots

## Long range + GMSL/FAKRA



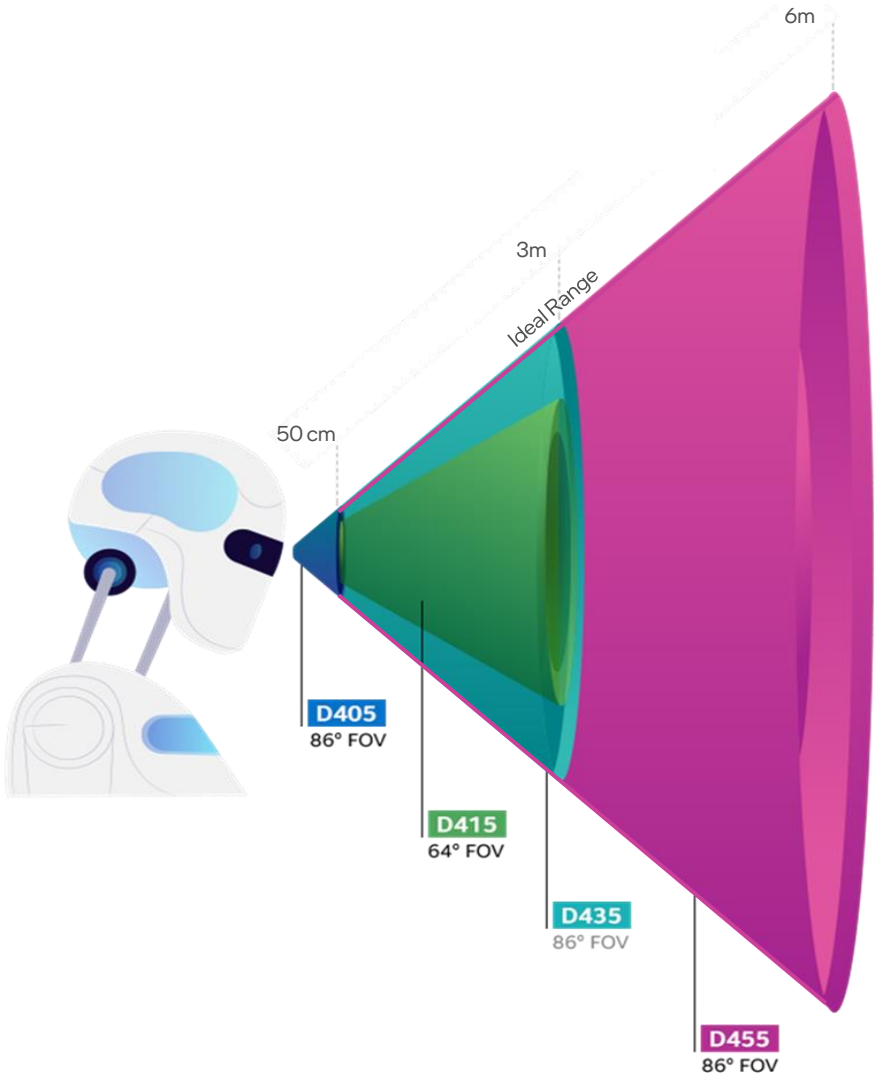

The D457 is comprised of the same D450 optical module used in the long-range D455 camera with a new Vision Processor D4 Board V5. Adding the automotive-grade FAKRA connector, GMSL high speed serializer, and IP65 grade enclosure makes it the best fit for autonomous mobile robots (AMR).



# Which D4XX is right for you?

| | D405 | D415 | D435 (i) (f) | D455/D457 |
|---|---|---|---|---|
| **Typical Use Case** | Pick & Place<br>Defect Detection | Collision avoidance / Recognition and Interaction / Scanning | | |
| **Value** | Shortest Range | Mid-Range Value | Mid-Range WFOV/Flexibility<br>(IMU or IR Pass Filter optional) | Longest Range / Matched<br>Depth & RGB FOV |
| **Ideal Range** [1] | 7cm to 50cm | .5m to 3m | .3m to 3m | .6m to 6m |
| **Depth Accuracy** [2] | 1.4% at 20cm | 2% at 2m | | 2% at 4m |
| **Min Z @ Max Resolution** | Sub-mm @ 7cm | Min Z ~45cm | Min Z ~28cm | Min Z ~52cm |
| **Max Depth Resolution** | 1280x720 @ 30fps<br>640x360 @ 90fps | 1280x720 @ 30fps / 848x480 @ 90fps | | |
| **Depth FOV HD/Shutter** [3] | 87°x58°<br>Global | 65°x40°<br>Rolling | 87°x58°<br>Global | |
| **RGB FOV/ Shutter** [3] | 1MP 87°x58°<br>Global via Left Depth Imager | 2MP 69°x42°<br>Rolling | 2MP 69°x42°<br>Rolling | 1MP 90°x65°<br>Global |
| **Dimensions** (WxHxD mm) | 42x42x22 | 99x23x20 | 90x25x25 | 124x29x26 |
| **IMU** | No | | Optional (D435i) | Yes |
| **Depth Filter** | IR Cut | No | Optional (D435f) | No |

[1]Stereo cameras see much further but Z-error rises geometrically after this point, meaning the accuracy declines beyond this range.
[2]Z-accuracy as measured as out of the factory.
[3]FOV (HxV) is measured up to +/-3° of stated value.



| FEATURES | Specifications |
|---|---|
| Use Environment | Indoor/Outdoor |
| IP Grade | IP65 |
| Depth Technology | Active Stereo |
| Image Sensor Technology | Global Shutter; 3 µm x 3 µm pixel size |
| Depth Field of View (FOV), H x V | HD 16:9, 87° × 58° (±3°) |
| Depth Output Resolution & Frame rate | Up to 1280 × 720. Up to 90 FPS |
| Minimum Depth Distance (Min-Z) | 52cm |
| Ideal Range | 60cm to 6m* |
| RGB Resolution | Up to 1280 × 800. Up to 60 FPS |
| RGB Field of View (FOV), H x V | 90° × 65° (±3°) |
| Form Factor | Camera Peripheral |
| Connectors | GMSL/FAKRA (USB 3 for debug only) |
| Dimension (Length x Height x Depth) | 124 mm × 29 mm × 36 mm |

*Please see the Intel RealSense Depth Camera D457 datasheet for further details on operating conditions and performance data

# D457 Messaging

## New GMSL/FAKRA IP65 Camera

The Intel® RealSense™ Depth Camera D457 is based on our popular longest range D455 camera with 3 global shutter wide Field of View sensors and IMU. D457 integrates the same D450 optical module from D455, along with a new Intel® RealSense™ Vision Processor D4 Board V5, embedding the D4 ASIC with a GMSL serializer and a FAKRA connector. The D457 has an IP65 rated enclosure which is dust tight and protected from projected water.

## Perfect for robotic applications

The D457 depth camera adds a GMSL serializer and FAKRA connector to the Intel RealSense camera product line. GMSL/FAKRA is a lower power, lower ESD/EMI noise, lower latency, and a longer cable length interface compared with USB and higher bandwidth compared to Ethernet. For these reasons, this cable and connector standard is preferred for robotic applications. It requires a compatible host platform with a GMSL de-serializer and FAKRA connector. The USB connector is used for production line and debug only.

## Supported by SDK 2.0 for Ease of Integration

With many different depth products joining the Intel RealSense family, we recognize that our customers want the ability to easily upgrade from one generation or product line to the next. The D457 is supported with the same cross-platform open-source Intel® RealSense™ SDK 2.0, with a separate kernel driver package for the GMSL serializer. It is tested and verified on leading platforms with GMSL de-serializer and FAKRA connector support.

# D457 Headlines and Quotes

## New GMSL/FAKRA IP65 Camera

“The Intel® RealSense™ Depth Camera D457 integrates the same D450 optical module from D455, along with a new Intel® RealSense™ Vision Processor D4 Board V5, embedding the D4 ASIC with a GMSL serializer and a FAKRA connector. The D457 has an IP65 rated enclosure which is dust tight and protected from projected water.”

Joel Hagberg, head of product management and marketing, Intel RealSense Group

## Perfect for robotic applications

“The D457 depth camera adds a GMSL serializer and FAKRA connector to the Intel RealSense camera product line. The GMSL/FAKRA interface, connector and longer cable length interface are used extensively in the automotive industry and are perfect for use with Autonomous Mobile Robots.”

Joel Hagberg, head of product management and marketing, Intel RealSense Group

## Supported by SDK 2.0 for Ease of Integration

”As with all cameras in the D400 series, the D457 is supported by the Intel® RealSense™ software development kit (SDK) making it easy for existing customers to use.”

Joel Hagberg, head of product management and marketing, Intel RealSense Group

# D457 Q&A

## 1. What is Intel® RealSense™ Depth Camera D457?

The Intel® RealSense™ Depth Camera D457 features our longest range, widest field of view global shutter camera with a GMSL serializer and FAKRA connector.

## 2. What is the size of the peripheral?

Based on the D455 camera, the peripheral dimensions are 124 mm (X) × 29 mm (Y) × 36 mm (Z).

## 3. Why GMSL/FAKRA?

There are many benefits to GMSL/FAKRA over USB & Ethernet, including:

- Higher bandwidth of 6Gb vs. 1Gb Ethernet
- Can support long cable length (15m) vs. 3m USB3
- GMSL/ FAKRA has better EMI than USB
- GMSL/FAKRA has lower power and lower latency compared to USB

## 4. Why are other D400 cameras USB?

All the Intel® RealSense™ Depth Camera in the D400 family have an USB interface. The main reasons include:

- USB is natively supported by all the operating systems, making it easy to integrate to most platforms
- Many low cost platforms do not have GMSL/FAKRA interface
- The drivers to support GMSL/FAKRA are developed per platform so require more integration effort from the customers

# Q&A Continued

## 5. What are the target markets?

The D457 is mainly targeted for the autonomous mobile robotic market and other customers that use the GMSL/Fakra in their platforms.

## 6. How to integrate the D457 camera into the platform?

Integration of the D457 into a platform, requires a GMSL/FAKRA de-serializer connecting to the Host platform. The D457 will require a Maxim de-serializer please check the datasheet for further information.

The D457 is supported with the same cross-platform open-source Intel® RealSense™ SDK 2.0, with a separate kernel driver package for the MIPI interface, that is connected to the GMSL serializer. It is tested and verified on leading platforms with GMSL de-serializer and FAKRA connector support.

## 7. Is there a module version of the D457?

Yes. D457 is comprised of the same D450 Optical module used in D455 camera with a new Intel® RealSense™ Vision Processor D4 Board V5.

## 8. Can I purchase a reference platform with the integrated D457 camera?

Yes, please contact your Intel distribution partner or Intel sales person for details on reference platforms.

Please check the datasheet for further information.

Contact our sales for additional platforms' support.

# Q&A Continued

## 9. What is in the box?

The box product comes in a single pack box. It has a peripheral, a GMSL cable , tripod and a get started guide.

## 10. Is there a bulk version?

Yes. The Intel® RealSense™ Depth Camera D457 comes in 30 pack bulk version with only the peripheral – no cable, tripod or retail box.

## 11. Where can I purchase?

Head to our store at https://store.intelrealsense.com/ or through any authorized Intel Distributor.

## 12. Where can I get more information?

Head over to https://intelrealsense.com/. On our site we have more information and links to datasheets, webinars, whitepapers, use cases and many other useful sources for information.