



Join the Infineon Startup Challenge on Time of Flight Cameras for 3D Imaging

Andreas Mühlberger

07.05.2023



Are you ready for the Infineon Startup Challenge ?

You would like to integrate an 3D Time Of Flight camera into your robotics, AR / VR , image processing, drones, ... application ?

Or you are developing software stacks and solutions, other companies could need together with our hardware to realize a new application ?

Then join our Startup Challenge offering 3D ToF Technology developed by Infineon Technologies

- Get free samples of pmd Time of Flight cameras and access to Infineon experts
- Integrate the 3D Camera module into your application
- Be our guest at the demo day, present the results, network and build relationship to technical experts and decision makers within Infineon Technologies
- Receive an award as winner of the challenge



Infineon is a global leader in power systems and IoT



~56,200
employees¹

global leader

in automotive, power management, energy efficient technologies and IoT

market position

Automotive

1

Strategy Analytics,
March 2022

Power

1

Omdia,
October 2022

Microcontroller

4

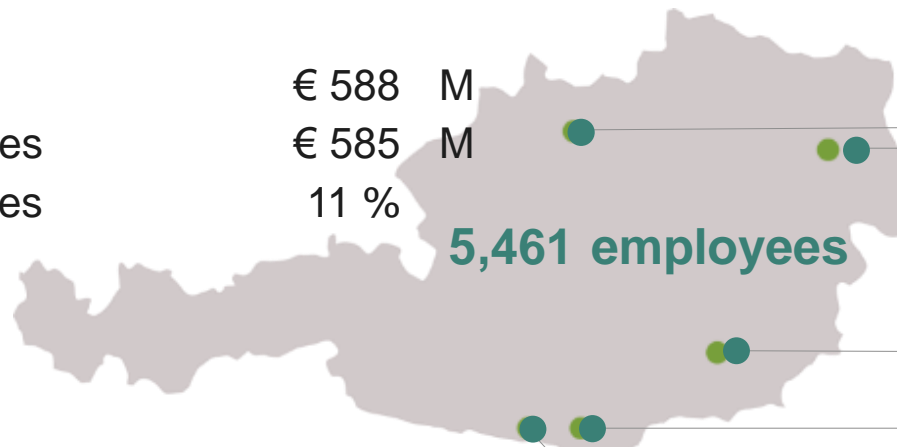
Omdia,
August 2022

¹ as of 30 September 2022

Infineon Austria – Company overview

Fiscal year 2022 (as of 30 Sep. 2022)

Turnover	€ 5,240	Bn
Earnings before taxes	€ 663	M
Investments	€ 588	M
R&D expenses	€ 585	M
R&D expenses in % of turnover	11 %	



Linz (R&D)

Vienna (Sales)

Graz (R&D)

Klagenfurt (IT)
international Headquarter role

Villach (R&D, P, B, IT)
international Headquarter roles

Subsidiaries in Austria

IT Services, Klagenfurt
KAI, Villach

Foreign subsidiaries

Infineon Technologies Romania SCS (R&D)
Infineon Technologies (Kulim) Sdn Bhd, Malaysia (P)
NoBug Consulting SRL, Romania (F&E)
NoBug DOO, Serbia (F&E)

Team Size

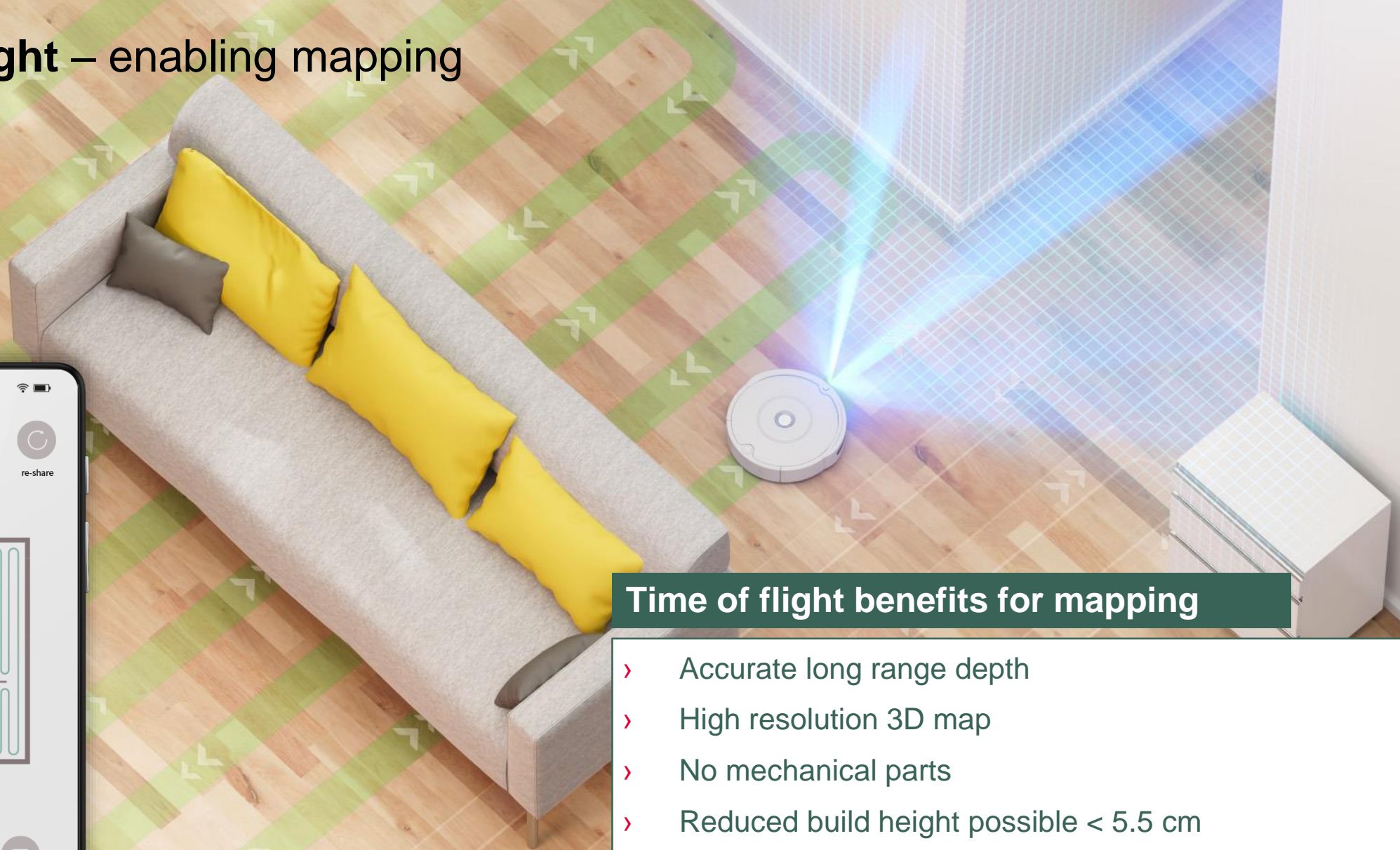
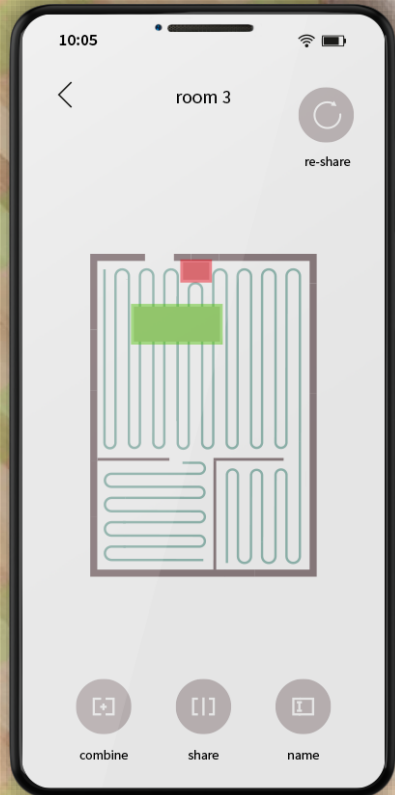
Total R&D Team size 2,378
Villach 4,520 | Graz 517 | Klagenfurt 214 | Linz 200 | Vienna 10



Time of flight – Application Example: Mapping



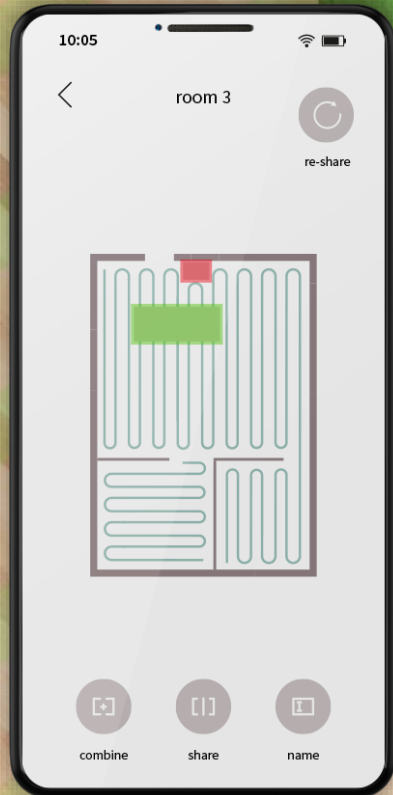
Time of flight – enabling mapping



Time of flight benefits for mapping

- > Accurate long range depth
- > High resolution 3D map
- > No mechanical parts
- > Reduced build height possible < 5.5 cm
- > ToF imagers provide 3D point cloud and IR night vision data this allows to operate in the dark

Time of flight – enabling mapping



Time of flight benefits for mapping

- > Accurate long range depth
- > High resolution 3D map
- > No mechanical parts
- > Reduced build height possible < 5.5 cm
- > ToF imagers provide 3D point cloud and IR night vision data this allows to operate in the dark

Time of flight – advanced obstacle avoidance



Time of flight benefits for obstacle avoidance

- › Obstacle segmentation is inherent for 3D ToF imagers
- › No previous training required to detect obstacles
- › High resolution 640 x 480 pixel ToF data allows to detect even small objects

Time of flight – Cliff-detection



Time of flight benefits for cliff-detection

- > No additional sensor required
- > Reduced wiring effort and assembly cost compared to traditional cliff-detection sensors

REAL3™ Time of flight imager portfolio

Leading position in the industry

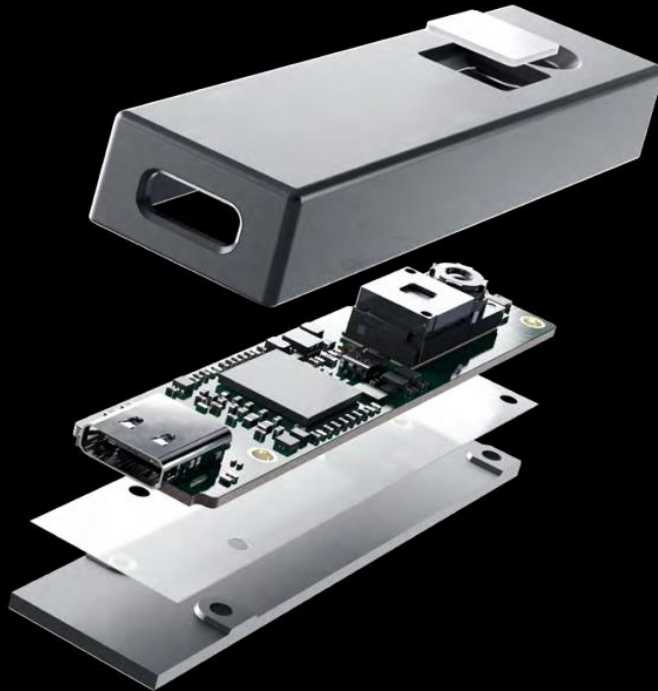
	Automotive & Industrial		Consumer		
		 ISO 26262 compliant			
Imager	IRS1125A	IRS2877A	IRS2381C	IRS2877C	IRS2875C
Package T_ambient	10x10 LFBGA-84 -40°C to 105°C	9x9 LFBGA-65 -40°C to 105°C	bare die 20°C to 65°C	bare die 20°C to 65°C	bare die 20°C to 65°C
Status	volume production	EES avail.	volume production	volume production	volume production
Resolution	CIF 352x287	VGA 640x480	HQVGA 224x172	VGA 640x480	HQVGA 240x180
Driver Support	Discrete driver	IRS9100C and IRS9102C VCSEL driver supported (Link)			
Applications	<ul style="list-style-type: none"> • Car occupancy detection • Gestures • Short range LIDAR • Industrial robotic 	<ul style="list-style-type: none"> • Including Functional Safety 	<ul style="list-style-type: none"> • smartphone user-facing • smartphone world-facing • robotics • IoT 	<ul style="list-style-type: none"> • smartphone user-facing • smartphone world-facing • AR HMD • IoT 	<ul style="list-style-type: none"> • smartphone world-facing • robotics • industrial • IoT

pmd / Infineon REAL3™ flexx2

Time of Flight Evaluation Kit ([Link](#))

pmd 3D Sensing Family

flexx2 | Getting Started Guide



Camera Data

ToF-Sensor	IRS2381C Infineon® REAL3™ 3D Image Sensor IC based on pmd ToF Technology
Resolution	HQVGA 224 x 172 pixels (38k)
Measurement Range	0.1 – 4 m
Depth Resolution	<= 1% of Distance, all Operation Modes
Viewing Angle (H x V)	56° x 44°
Illumination	940 nm, VCSEL, Laser Class 1
Sunlight Tolerance	At 100K Lumens (Full Sunlight), loses ~10% max Range vs. Indoors
Framerate	Up to 60fps (3D Frames), 9 pre-defined Modes
Power Consumption	570mW – 680mW, USB 3.0 compliant
Interface	USB 3.0 (Data & Power)
Data Output	3D PointCloud and IR Image
Operating Temperature	0-70 Degrees Celsius

Software Development Kit

Software	Royale SDK (C++ based, supports Matlab, OpenCV, ROS 1/2)
Operating System	Windows 10, Linux/ARM*

Dimensions

Size	71.9 x 19.2 x 10.6 mm
Weight	13g (Camera only, without Accesories)

pmd / Infineon REAL3™ flexx2wide

Time of Flight Evaluation Kit

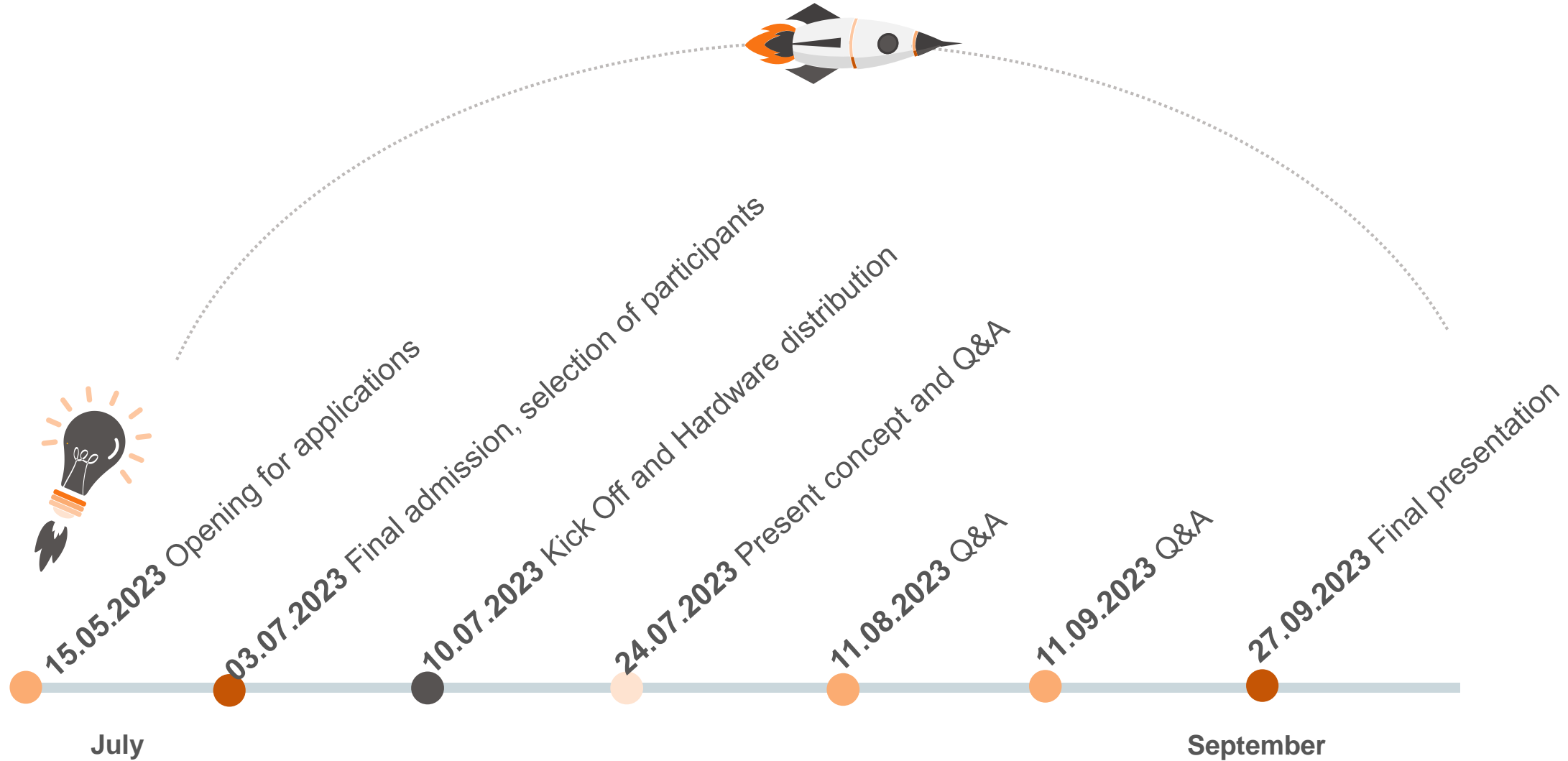


Dimensions	85 x 23 x 17 mm
Weight without USB cable	26g
Resolution	240 x 180 Depth Pixels, 43,200 Depth Points
Depth resolution	<= 4% of distance, all operation modes
ToF-Sensor	IRS2975C Infineon® REAL3™ 3D Image Sensor IC based on pmd technology
Measurement range	0.1 – 7 m
Framerate	Up to 60fps (3D frames); 9 pre-defined operation modes
Power consumption	USB3.X compliant, min. 300mW, max. 1500mW
Illumination	940 nm, VCSEL, Laser Class 1
Software	Royale SDK (C++ based, supports Python, OpenCV, ROS 1/2)
Viewing angle (H x V)	106° x 86°
Interface	USB C (data & power)
Data Output	3D point Cloud and IR image
Sunlight Tolerance	At 100K Lumens (Full Sunlight), Loses ~50% max range vs. Indoors
Operating System	Windows 10, Linux/ARM *

*32Bit tested on Raspbian GNU/Linux 10 (Buster) Raspberry Pi 3 reference 2020-08-20 64Bit tested on Odroid C2 with Ubuntu Mate 16.04 ARM 64

This is preliminary desired specification and there might be minor changes in the final product specification

Timeline



Next steps

Registration

You are interested to join? Register and describe your project and your company



1

Assessment and selection

After reviewing all the registrations we will select up to 10 projects to join us at this challenge

2

Participation

Receive all your hardware and platform access and start making

3

Support

Experts will help throughout your journey

4



Let's stay in contact!

Find out more about Infineon Austria and IPCEI
Microelectronics www.infineon.com/ipceimeaustria or
send an email to ipcei.me.austria@infineon.com



Acknowledgement



This work is funded by the Austrian Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology, the Austrian Federal Ministry of Digital and Economic Affairs, and implemented by austria wirtschaftsservice (aws) and the Austrian Research Promotion Agency (FFG)

in the frame of the
Important Project of Common European Interest (IPCEI)
on Microelectronics.

The IPCEI on Microelectronics is also funded by Public Authorities from Germany, France, Italy and U.K.

-  **Federal Ministry
Republic of Austria**
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology
-  **Federal Ministry
Republic of Austria**
Digital and
Economic Affairs

