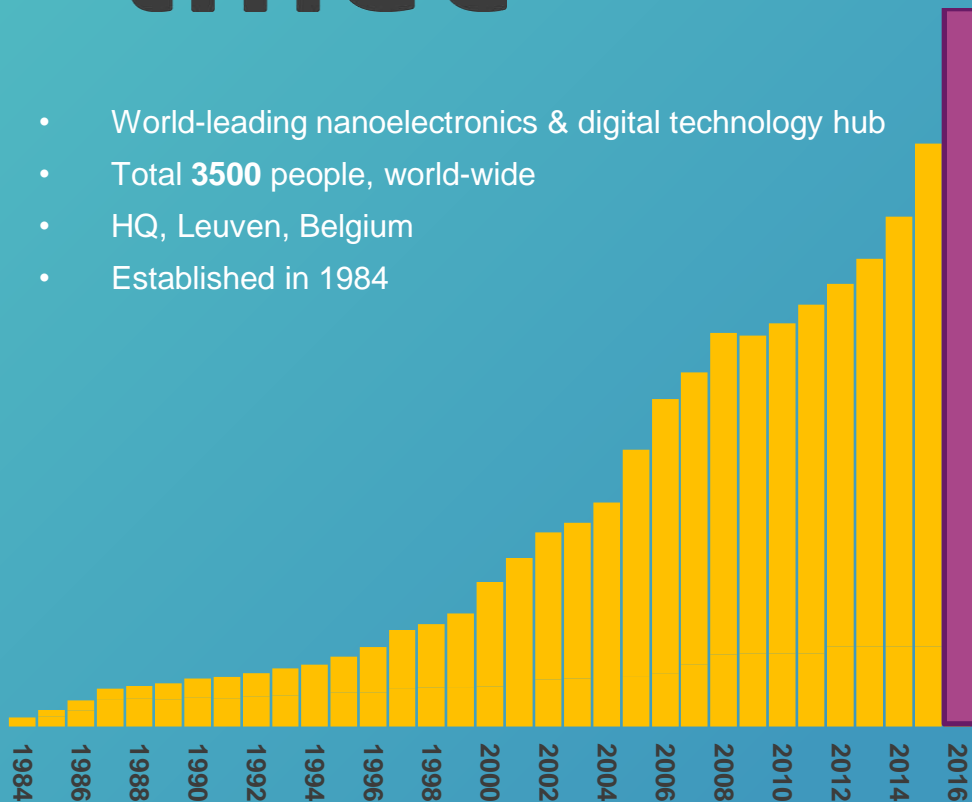




Multiview Imaging Solutions



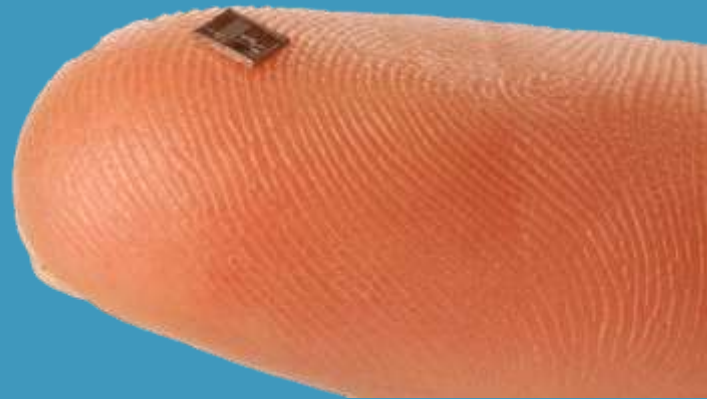
- World-leading nanoelectronics & digital technology hub
- Total **3500** people, world-wide
- HQ, Leuven, Belgium
- Established in 1984



About imec ...

REVENUE

2016: 500M€





HQ

BELGIUM

LEUVEN HQ - GHENT

THE NETHERLANDS

EINDHOVEN

USA

SAN FRANCISCO

USA

ORLANDO

INDIA

BANGALORE

CHINA

SHANGHAI

TAIWAN
HSINCHU

**Innovation
Center**

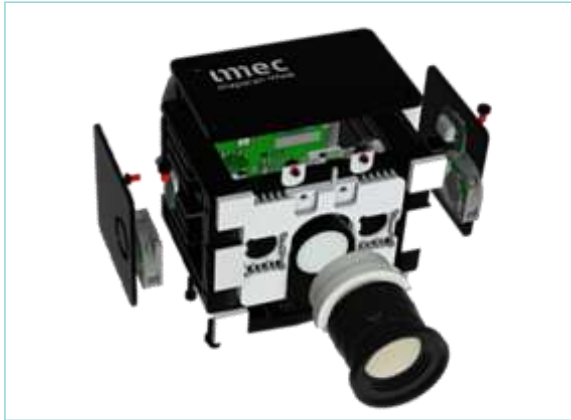
JAPAN

TOKYO

SINGAPORE

Our 3 expertise areas

Imaging Solutions



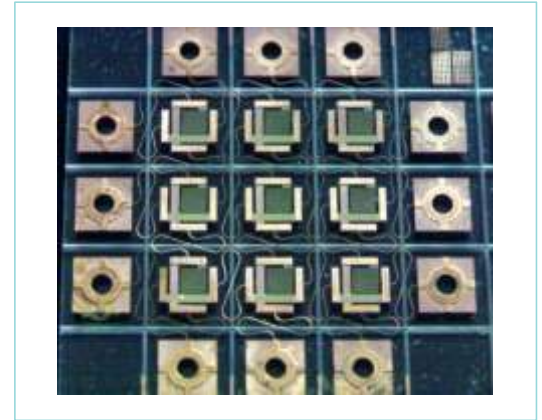
High speed 3D vision systems

IoT Smart Devices



Low power
wireless communication
wearable physiologic monitoring

Conformal Structures



MEMS semiconductor based
structures and (optical)
components

FULL TURN-KEY PRODUCT DEVELOPMENT SERVICES

ENABLING ENTREPRENEURS.....

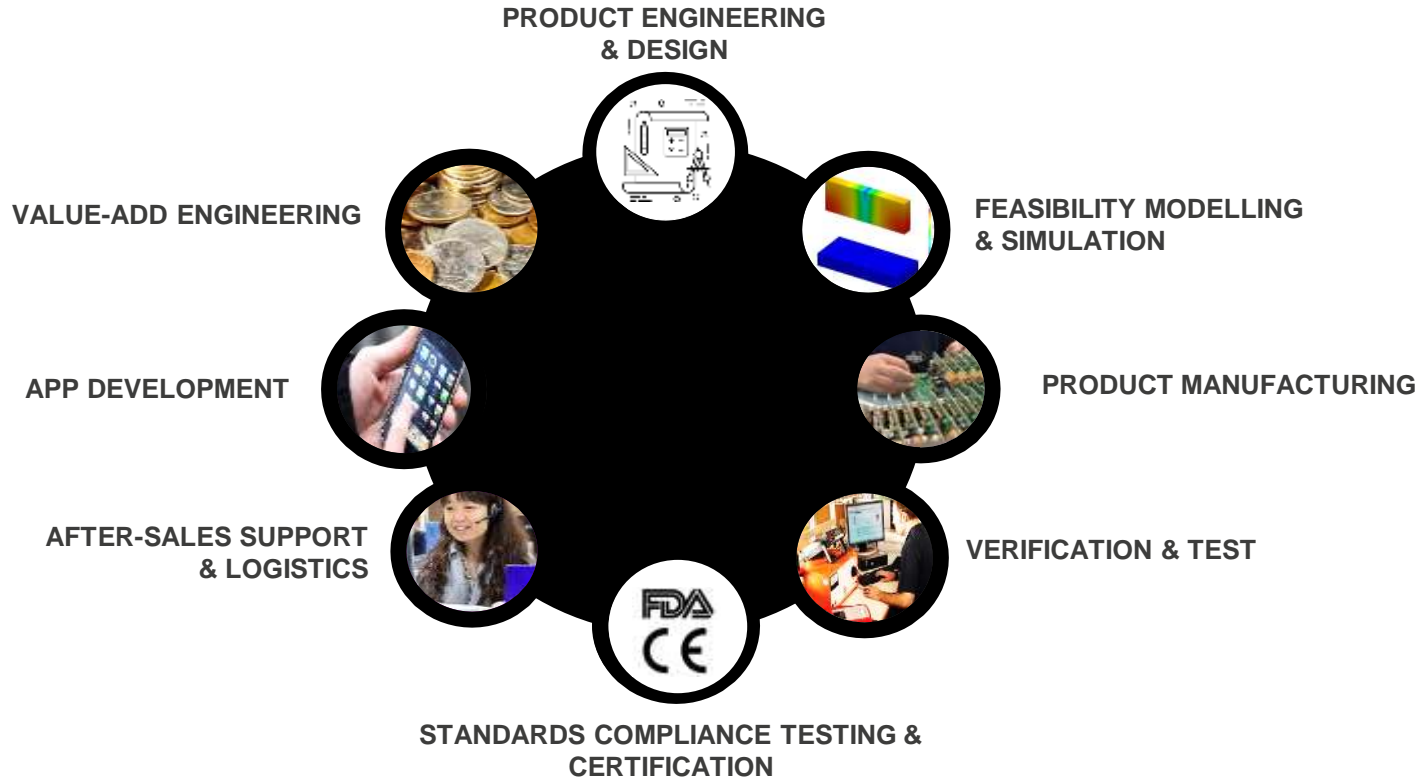
TO FAST-TRACK MARKET ENTRY AND SCALE-UP

MARKET-READY PRODUCTS

FROM INNOVATIVE PRODUCT IDEA TO VOLUME PRODUCTION

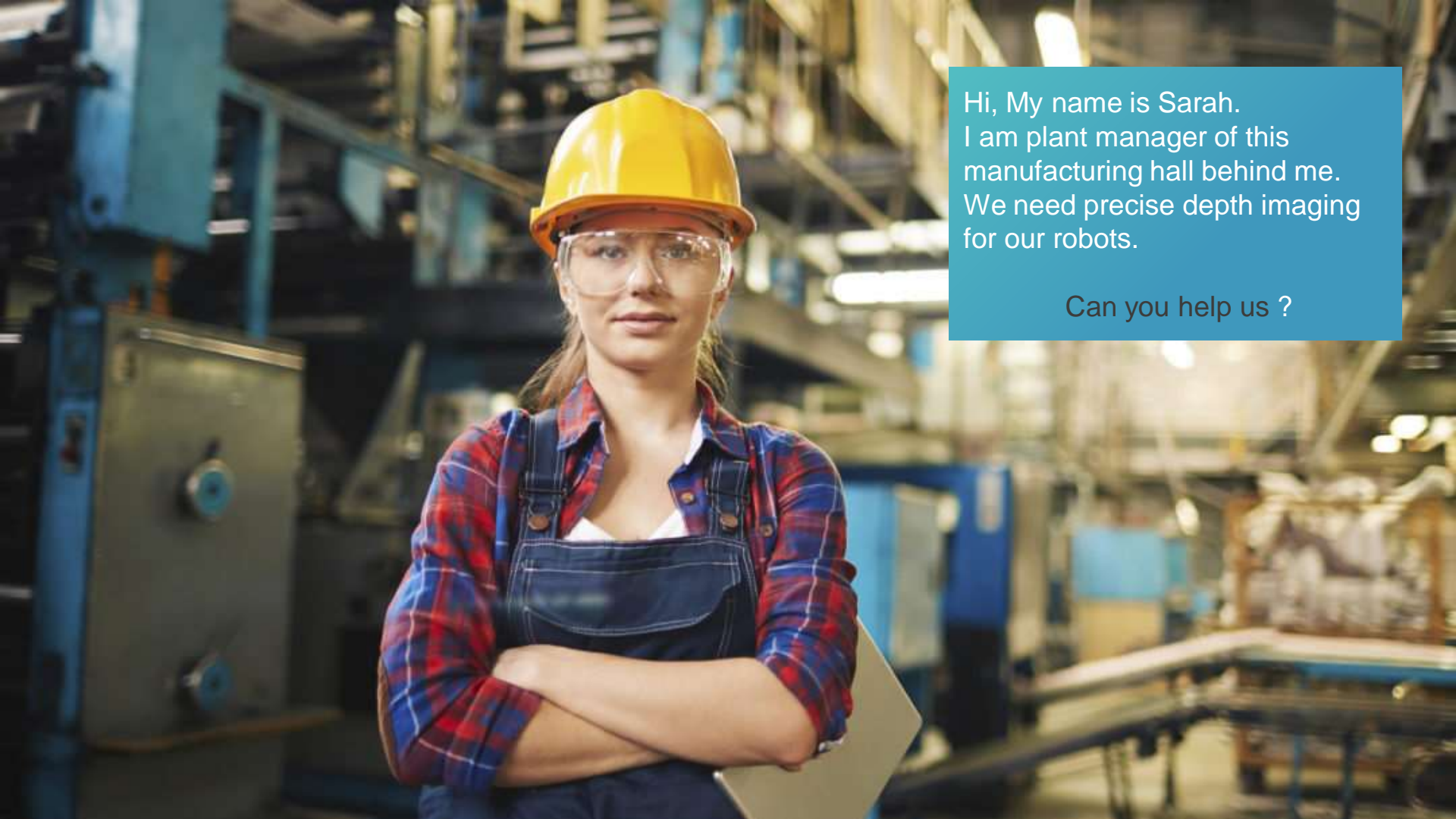


IMEC INNOVATION SERVICES



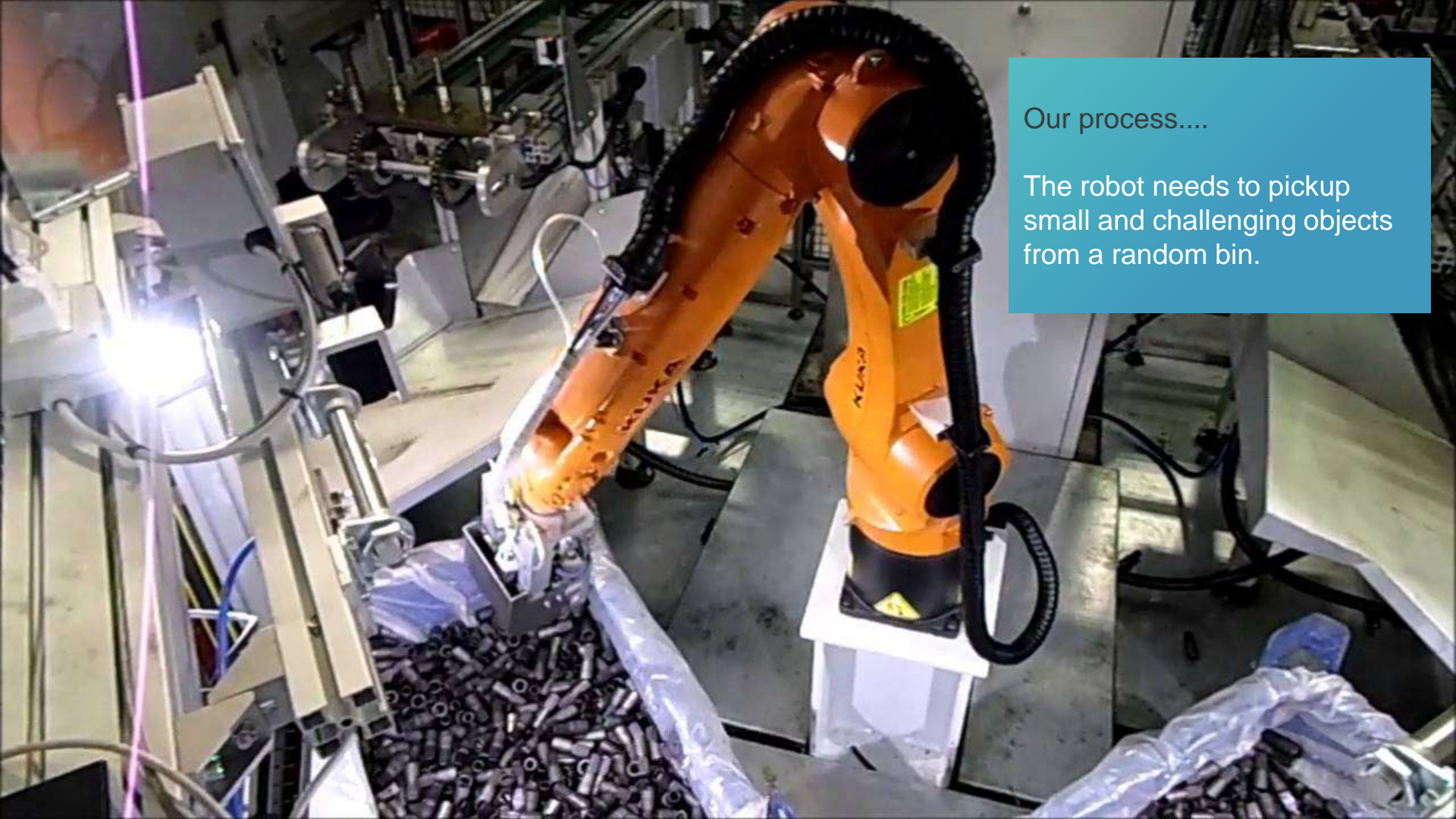


Add world-class vision to your system



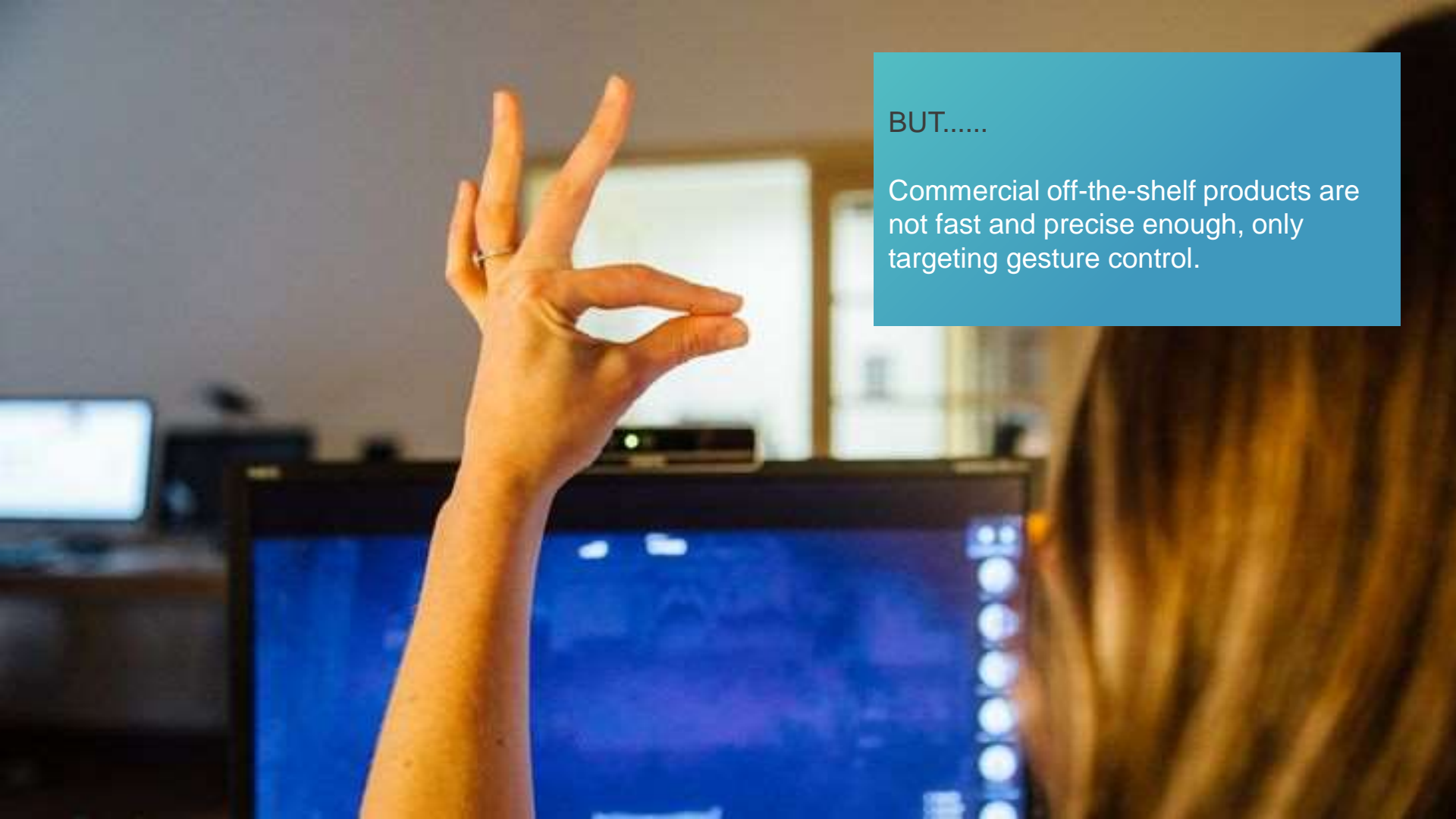
Hi, My name is Sarah.
I am plant manager of this
manufacturing hall behind me.
We need precise depth imaging
for our robots.

Can you help us ?



Our process....

The robot needs to pickup small and challenging objects from a random bin.



BUT.....

Commercial off-the-shelf products are not fast and precise enough, only targeting gesture control.



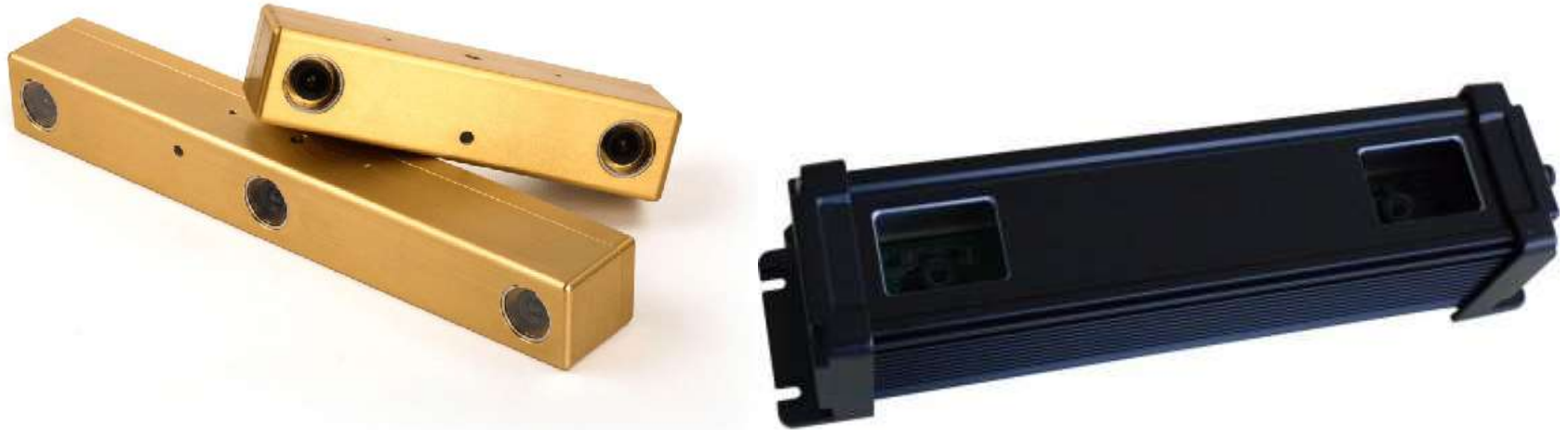
Our issues..

- Our internal developed devices, based on existing cameras are too big & bulky.
- We are also tied to some specific interfaces which limits the achievable performance.



Lacking in.....

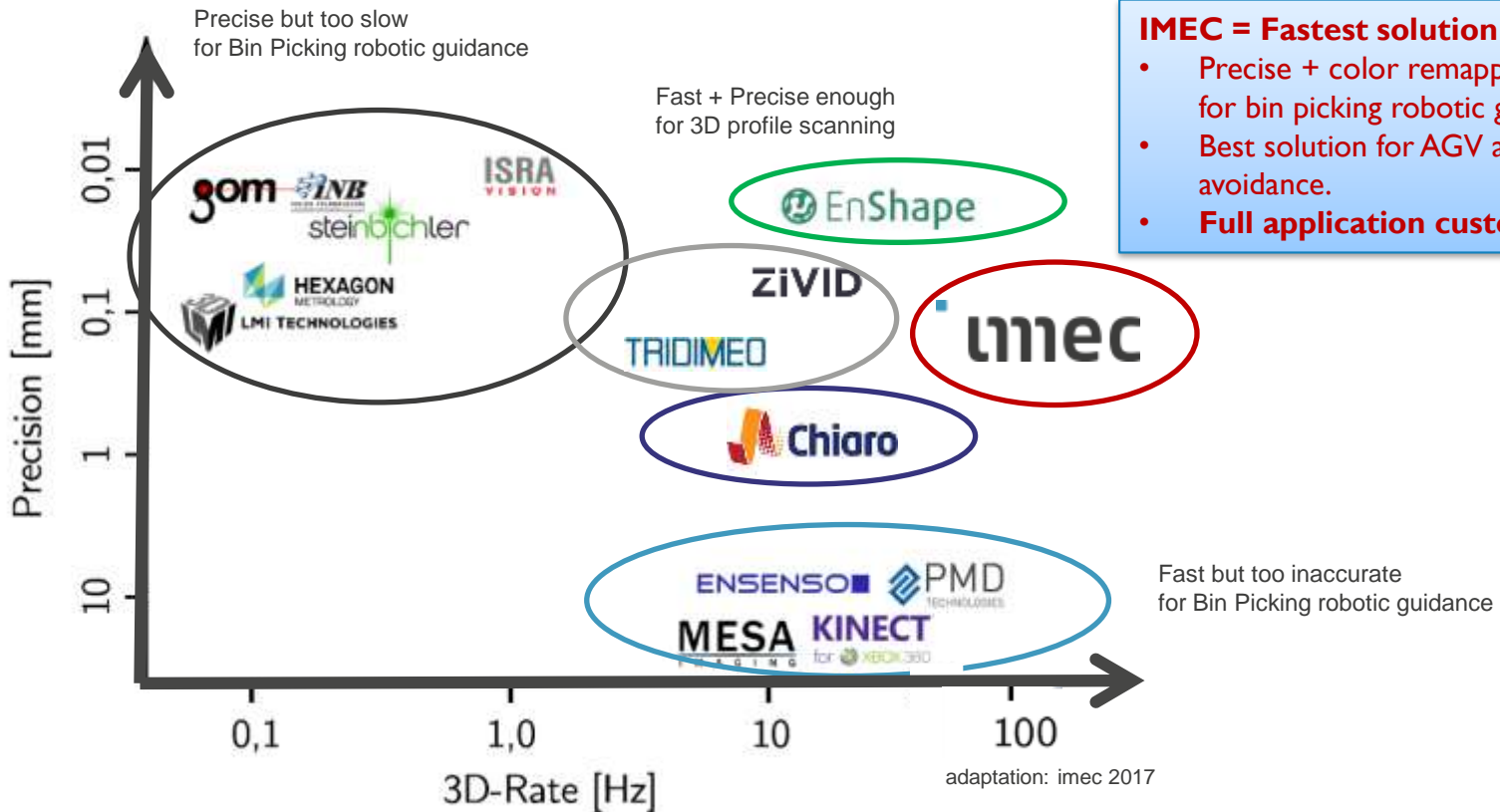
- Existing industrial solutions don't have the exact optical specification we need.
- We also would like to optimize the output data for our existing software.
- Moreover camera systems that are available are very expensive



imec can help you !!



SUPERIOR SOLUTIONS



adaptation: imec 2017

IMEC IMAGING OFFERING

- **Multiple image sensors integration**
 - Build to specification within one system.
 - No complex cable networking
 - No performance limitations due to interface choice limitations
- **Development of Application Specific Algorithm**
 - In-house expertise
 - Experienced R&D team.
 - Enabling ultra fast and low-latency data-processing.
- **Offering of full-fetched software SDK**
 - Adaption of output format to meet customer's needs.
 - Utilization of Linux drivers
 - Preference, if Android App is needed, can be provided.

imec Taiwan innovation services

- **Active Multiview Vision**
 - 15+ imec patents (USA, EU, Taiwan)
 - Flexible to adapt broad applications
 - Experience in GPU, intel Core, FPGA, processor based algorithm since 2007 (Belgium), and 2009 (Taiwan)
 - Broad application including DVR, Gesture control, cell phone, distance measurement, hyperspectral imaging and 3D scanner
- **Optical component design**
 - Technical challenging lens design
 - Imaging and non-image optical design
 - Multichannel CS- and C-mount lens design
 - Optical modeling in Zemax with fabrication tolerance analysis
 - Pixel-based polarizer integration to achieve high contrast to 1:10K
- **Prototyping and pre-production**
 - Image system prototyping and pre-production
 - Specific functional camera system development and mass production
 - Experience on GPU, intel core, FPGA and processor systems
 - Experience on sensing system integration and SNR control.

3 areas of competencies in

Imaging Processing, Optical Design & Supply Chain Management

Successful customer cases...

For Sarah we made a custom stereo camera with

- Sub-millimetre depth precision,
- High framerate and
- Colour remapping.

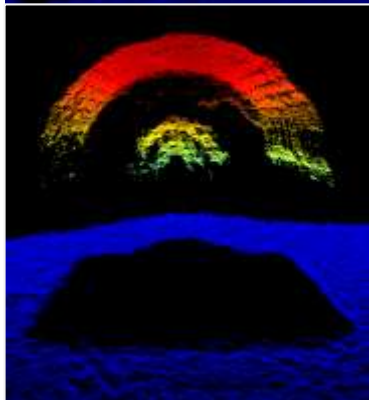
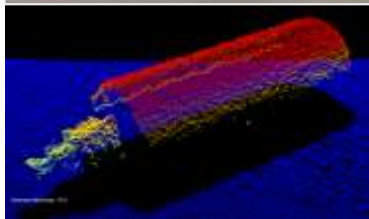


imec AMV camera



- High resolution scan
- High frame rate
- Precision measurement
- Dense depth output
- Color Point-Cloud data output
- Near/middle scanning range
- GigE connection port
- Windows/Linux host
- Aluminum encasing
- Fan less design

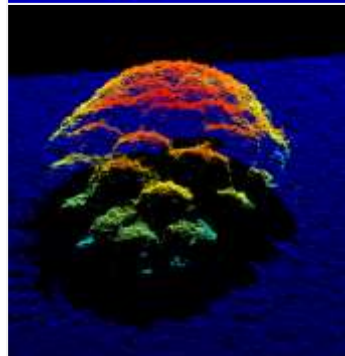
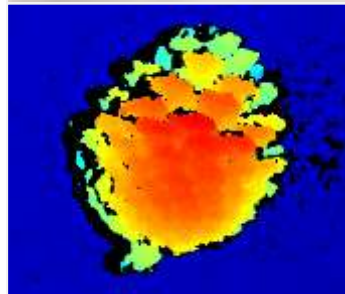
Auto-calibration



High precision



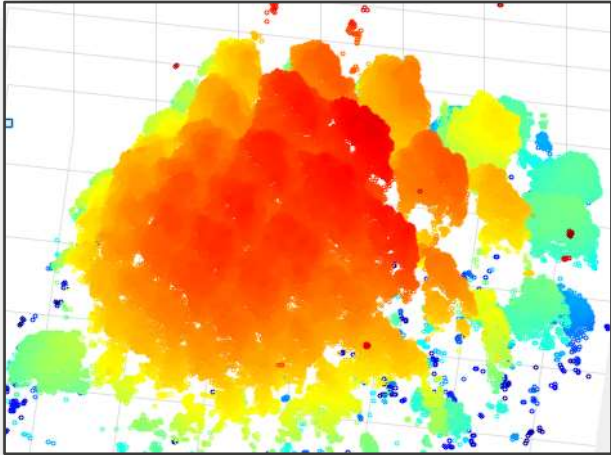
Ultra framerate



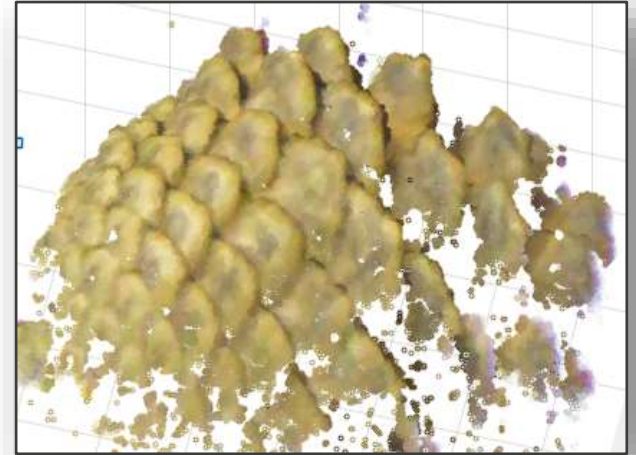
Color remapping



High precision depth and color remapping



Scan depth map

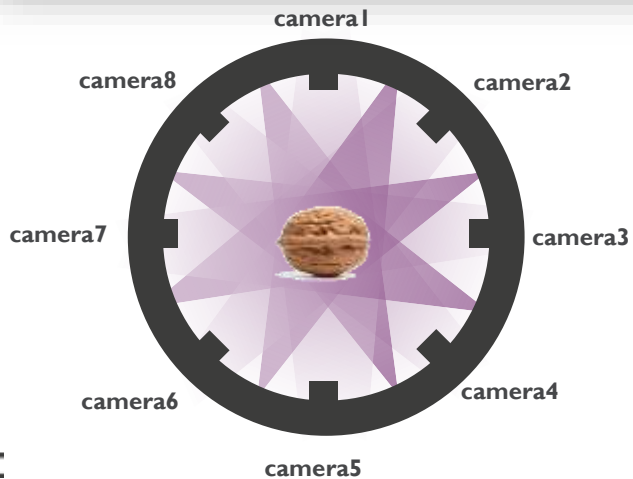


Synthesized view
from depth map



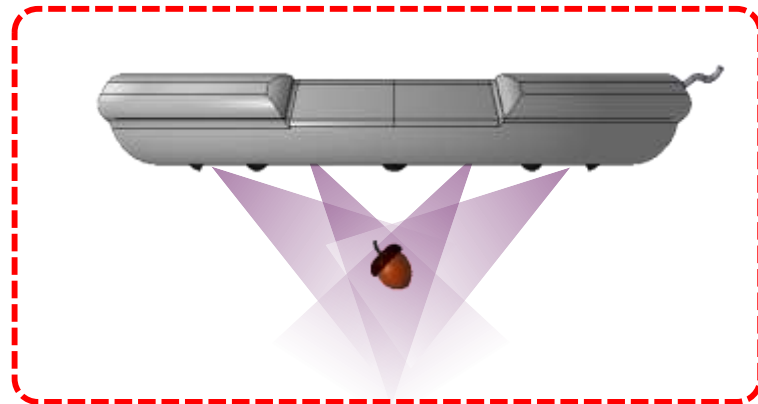
Camera view

imec Multiview camera system



Successful customer cases...

Currently we are helping Sarah to the next step by building a integrated, industrial grade, precise, full surround Multiview camera



More product offering
from imec ...

Hyperspectral Imaging

Compact hyperspectral imaging



AGRICULTURE



CAMERAS ON DRONES INSPECT
FOOD ON THE FIELD

FOOD QUALITY



HYPERSPECTRA IMAGING FOR
FOOD INSPECTION

SKIN CARE



MEDICAL GRADE CONSUMER
DEVICE FOR SKIN CARE
MONITORING

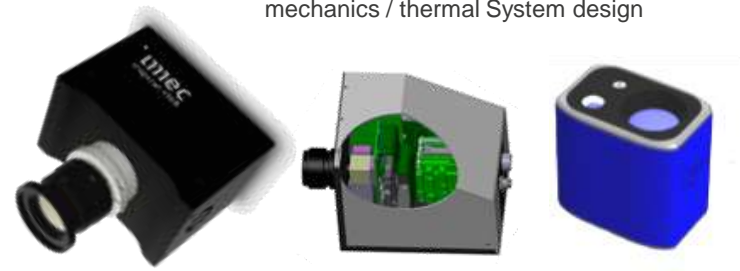
Hyperspectral imaging solutions



Spectral imaging system Software & Calibration



Careful electrical / optical / mechanics / thermal System design



For Precision agriculture using UAV

SOIL ANALYSIS

GROWS MONITORING

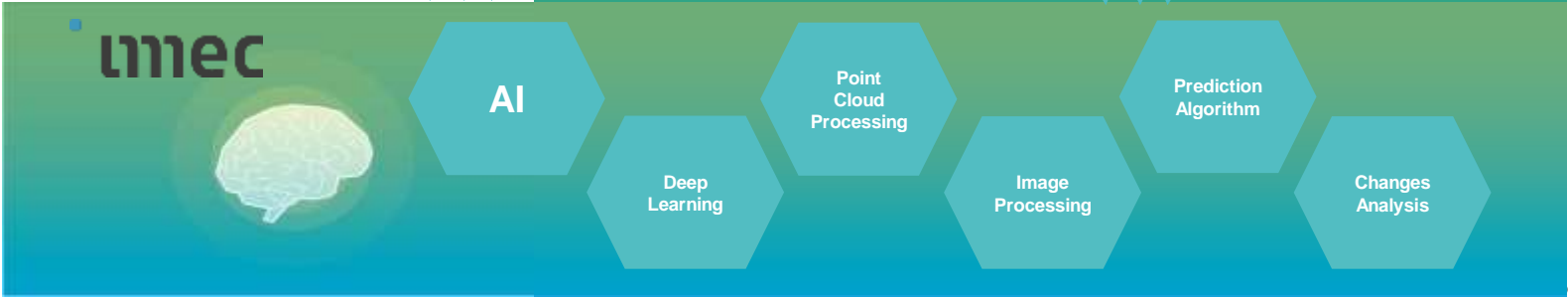
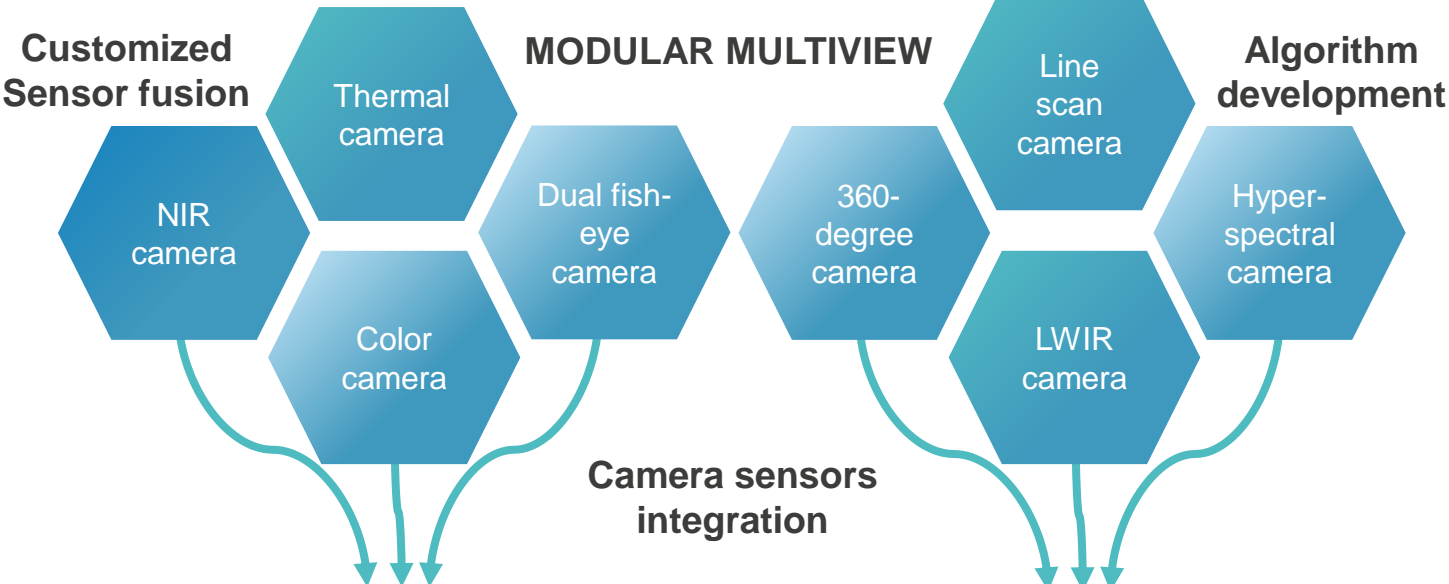
DISEASE AND WEEDS ALERTS

NUTRIENT DEFICIENCY DIAGNOSTICS

YIELD PREDICTION

Multiview imaging for Industrial Inspection

SMART VISION & IMAGING



SMART VISION & IMAGING ECOSYSTEM

Cloud Operating System



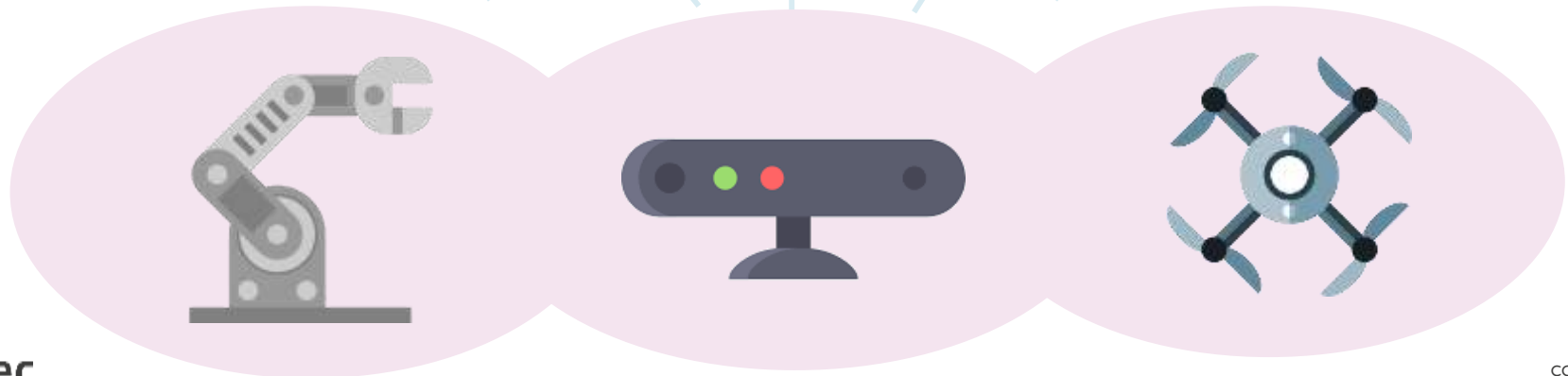
Gateway



Gateway



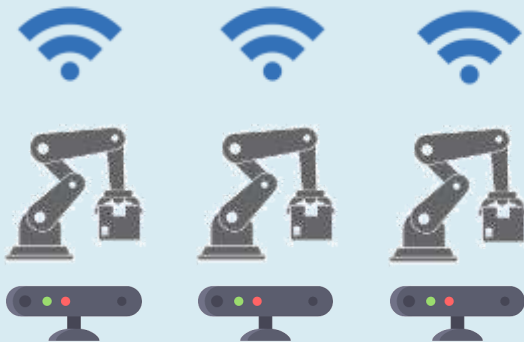
Gateway



SMART VISION & IMAGING

INDUSTRIAL 4.0

Production Floor



Processing algorithm on the edge
Ex: stereovision + object detection

Central Management Server



Dashboard
Decision making



Warehouse



Pallet detection
Vehicle sensors

SMART VISION & IMAGING

UAV INSPECTION



Image data
capture

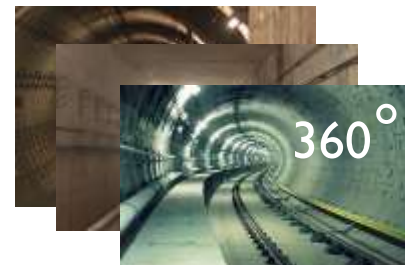


Post-processing

Rail Track Inspection
Corrugation
Missing components
Precision measurements



Tunnel Inspection
Water Leakage
Crack detection
Missing Components



imec



Artificial Intelligence, Neural Networking,
Deep learning, Advanced image analysis



umec

embracing a better life