First Sensor

COMPANY PRESENTATION

DEUTSCHES EIGENKAPITALFORUM 2017

Agenda

FIRST SENSOR
AT A GLANCE

OUR COMPANY

We are a leading provider of sensor technology.

1991
foundation

150.1
million sales revenues in 2016

850
employees

3
markets

9
development and production locations

33
sales regions

250
years of experience

OUR PRESENCE

We are internationally positioned.

First Sensor is headquartered in Berlin and represented at six locations in Germany and also operates sales and production sites in the USA, Canada, China, UK, France, Denmark, Sweden and the Netherlands as well as a global network of partners.

OUR EXECUTIVE BOARD

Dr. Rothweiler and Dr. Gollwitzer are experienced industry managers.

Dr. Dirk Rothweiler
CEO

since Jan. 1, 2017

Dr. Mathias Gollwitzer
CFO

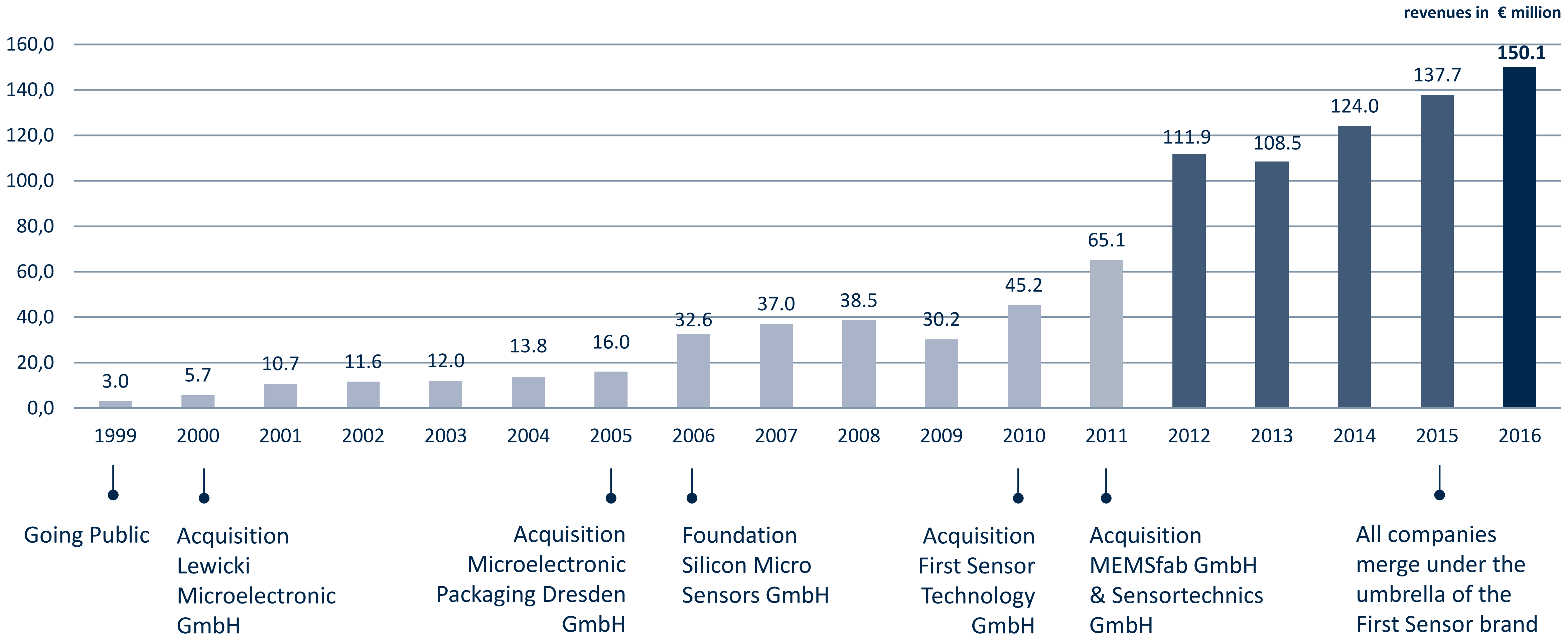
since Aug. 10, 2015

2017	CEO, First Sensor AG
2008	Executive Vice President Optical Systems, Jenoptik AG
2005	Vice President Sales and Service, TCZ
2000	Managing Director Asia-Pacific, Süss Microtec Co. Ltd.
1999	Director Sales & Marketing, Süss Microtec AG
1995	Project Manager for the Semiconductor Technology Division, Carl Zeiss
1995	Doctorate from the Department of Engineering, RWTH Aachen

2015	CFO, First Sensor AG
2012	Vice President Group Controlling, EnBW Energie Baden-Württemberg AG
2008	CFO, Mercedes-Benz France SAS
2006	Director Corporate Controlling, DaimlerChrysler AG
2005	CFO, DaimlerChrylser Belgium/Luxembourg NV/SA
2002	Director Research and Technology, Daimler AG
1999	CEO, Temic Sprachverarbeitung GmbH
1995	Director Division Controlling, Telefunken Systemtechnik Gmb
1992	Expert Adviser Finance/Controlling, Deutsche Aerospace AG

OUR PATH OF GROWTH

In 2016, the EUR150 million mark was exceeded for the first time.



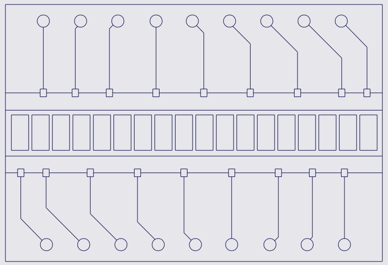
Germany is our most important market contributing 52% of sales.

*Q3 2017

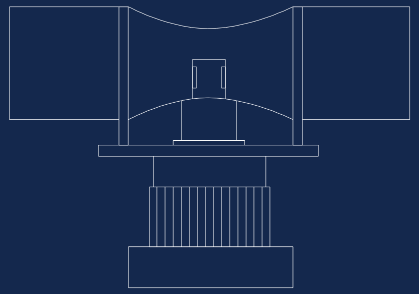
OUR RANGE OF SERVICES

We develop and produce standard products and sensor solutions.

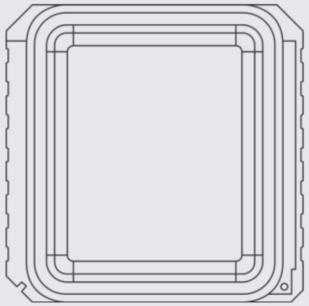
Radiation



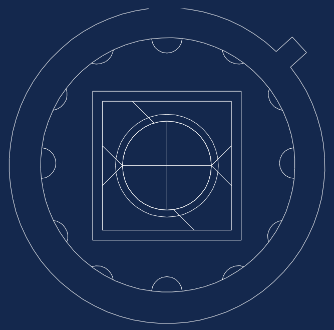
Flow



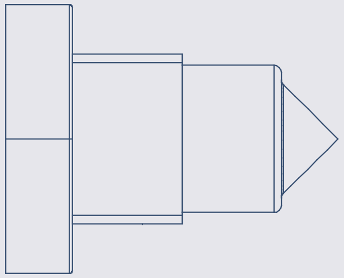
Acceleration



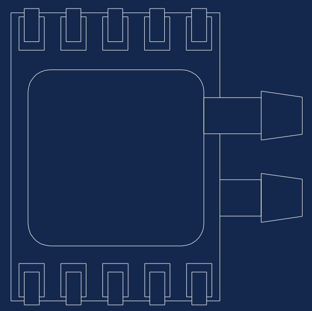
Light



Level

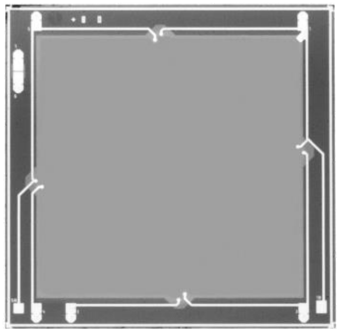


Pressure



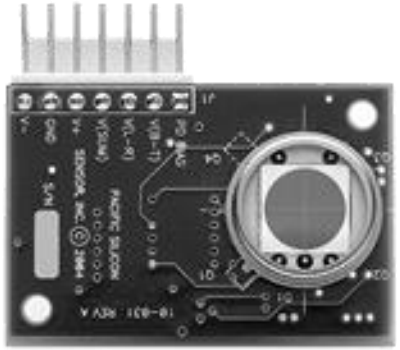
OUR COMPETITIVE ADVANTAGE
We cover the entire value chain of sensor technology.

Sensor chip



- Silicium based
- converts physical parameters into electrical signals

Packaging



Connecting microelectronic and non-electronic micro components to a housing

Sensor

- Consists of a sensor chip, a housing and electronics
- The measurement signal can be calibrated

Sensor system

- Measures and preprocesses data
- communicates with other systems

Detect | Detect & Understand

OUR MARKETS

We focus on the growth markets Industrial, Medical and Mobility.

- Industrial Process Control
- Radiation and Security
- Smart Buildings
- Length Mea-surement
- Aerospace

Sales share 2016 48%

- Diagnostics
- Medical Respiration and Pneumology
- Dialysis and Infusion

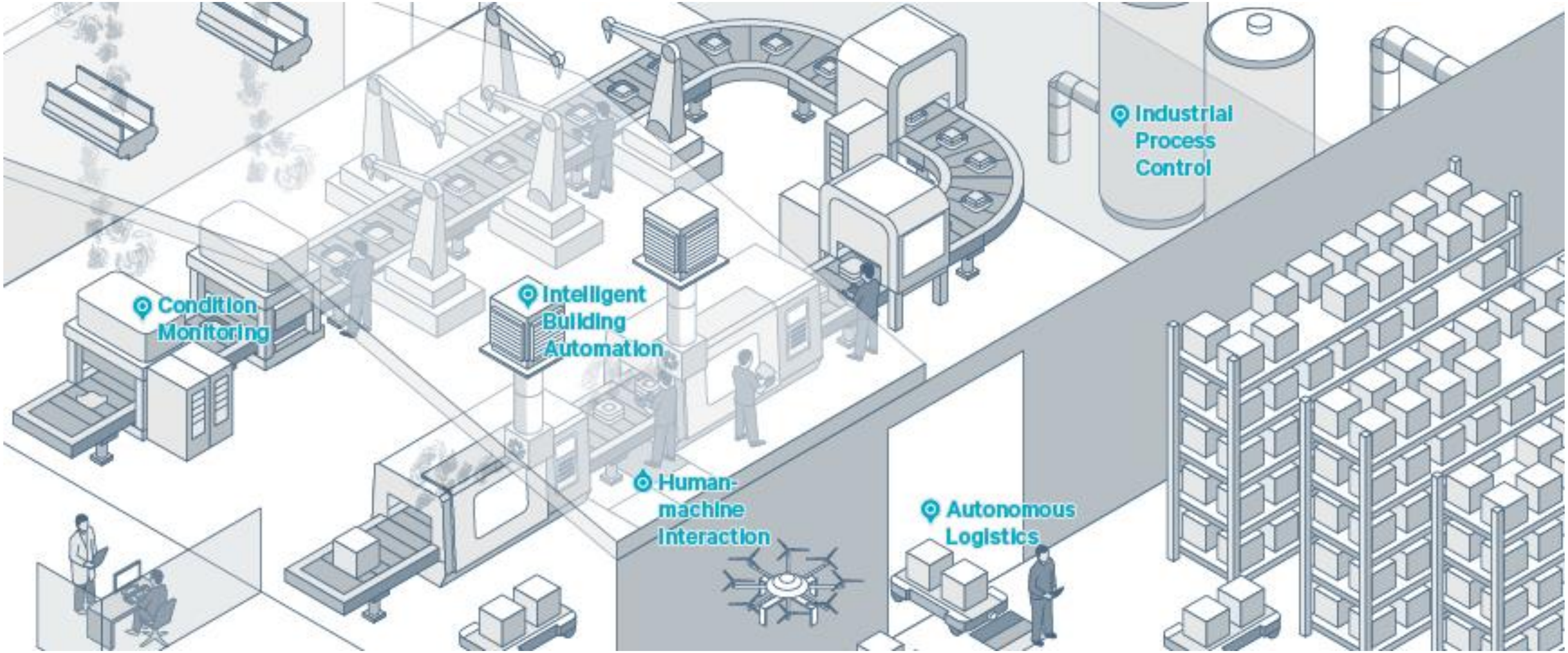
Sales share 2016 21%

- Cameras and camera systems
- Pressure Sensors
- Optical Sensors
- Flow Sensors

Sales share 2016 31%

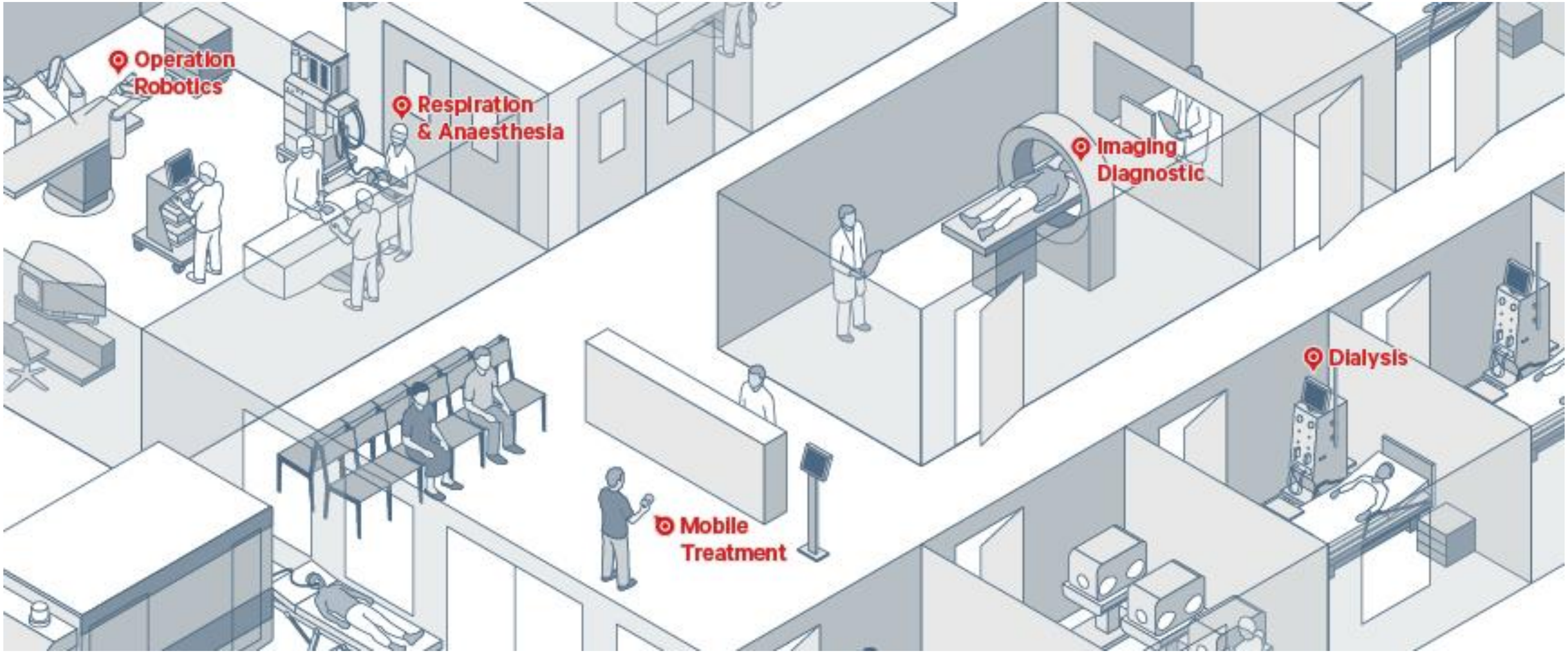
OUR TARGET MARKET INDUSTRIAL

We are there when smart things become standard.



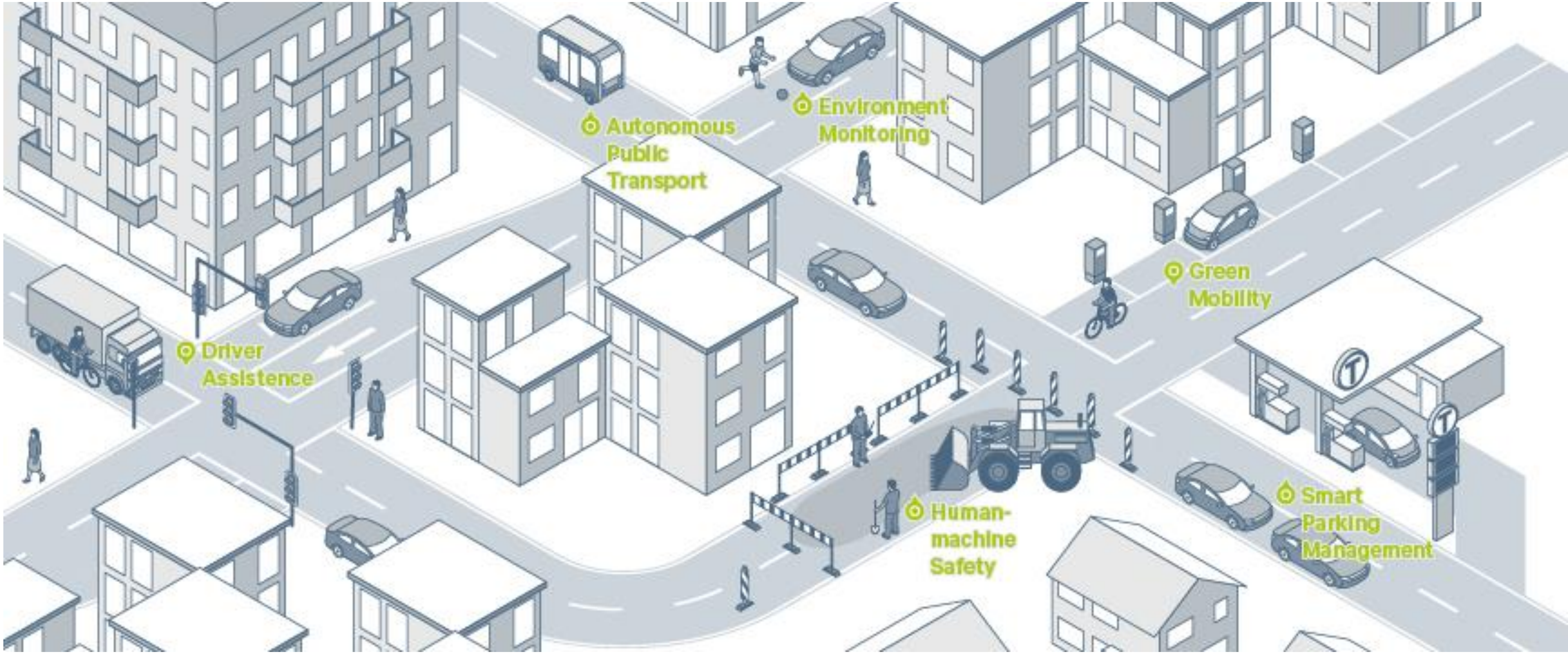
OUR TARGET MARKET MEDICAL

We are there when little miracles start being taken for granted.



OUR TARGET MARKET MOBILITY

We are there when mobility is redefined.



OUR TARGET MARKET MOBILITY

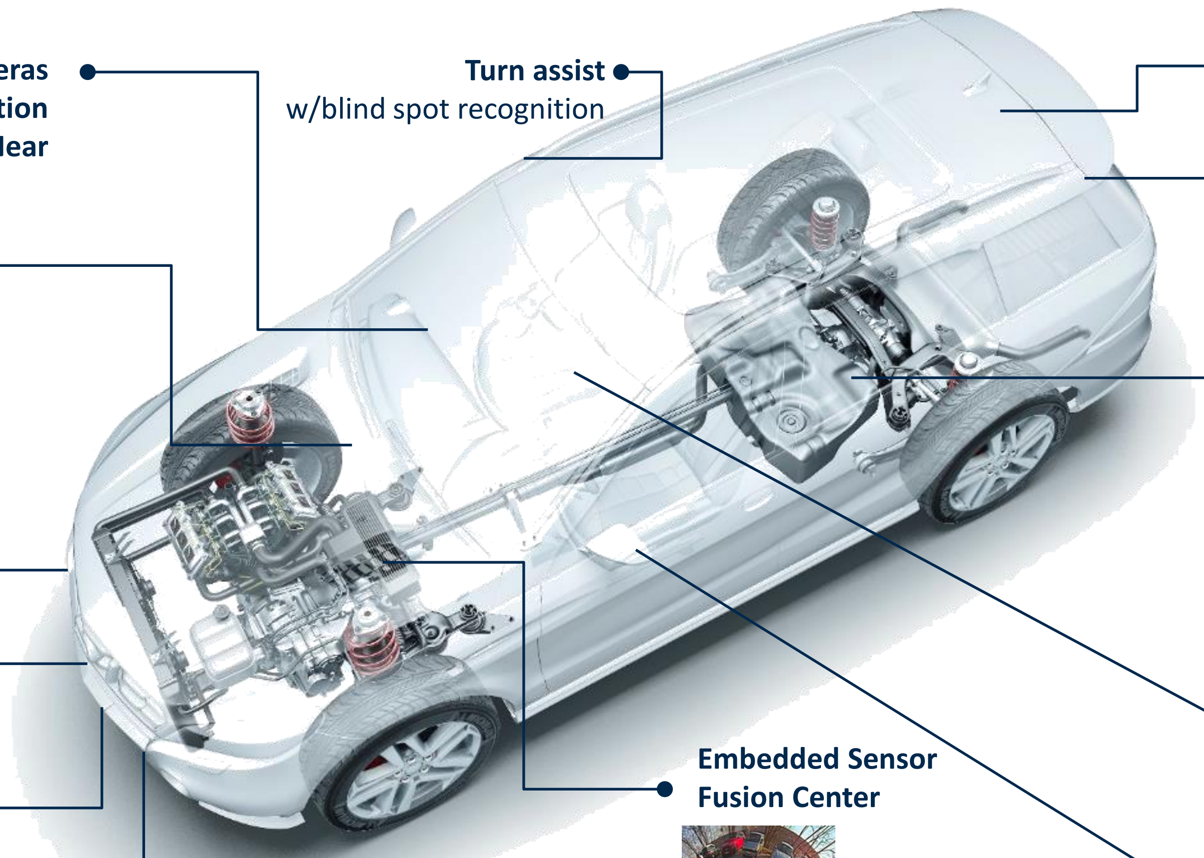
We offer a optical sensors and cameras for the automotive industry.

Multiple front cameras
Object recognition
Far and Near

Turn assist
w/blind spot recognition

Mirror replacement rear
High resolution and HDR,
Blind spot detection

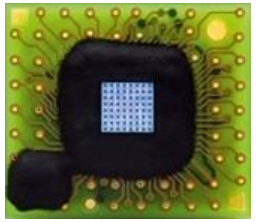
Smart rear camera
Park Assist, Trailer assist,
self-parking, night vision



Night vision via sensor fusion
360° area view camera systems,
ASIL conform

Active brake assist / ACC

Pre-Crash-Side
Assistant



Adaptive cruise control
Emergency break control
Accident reduction
Night vision

Embedded Sensor
Fusion Center

Interior camera
Driver monitoring,
Gesture recognition

Cross-Traffic
Assistant
Road condition scan

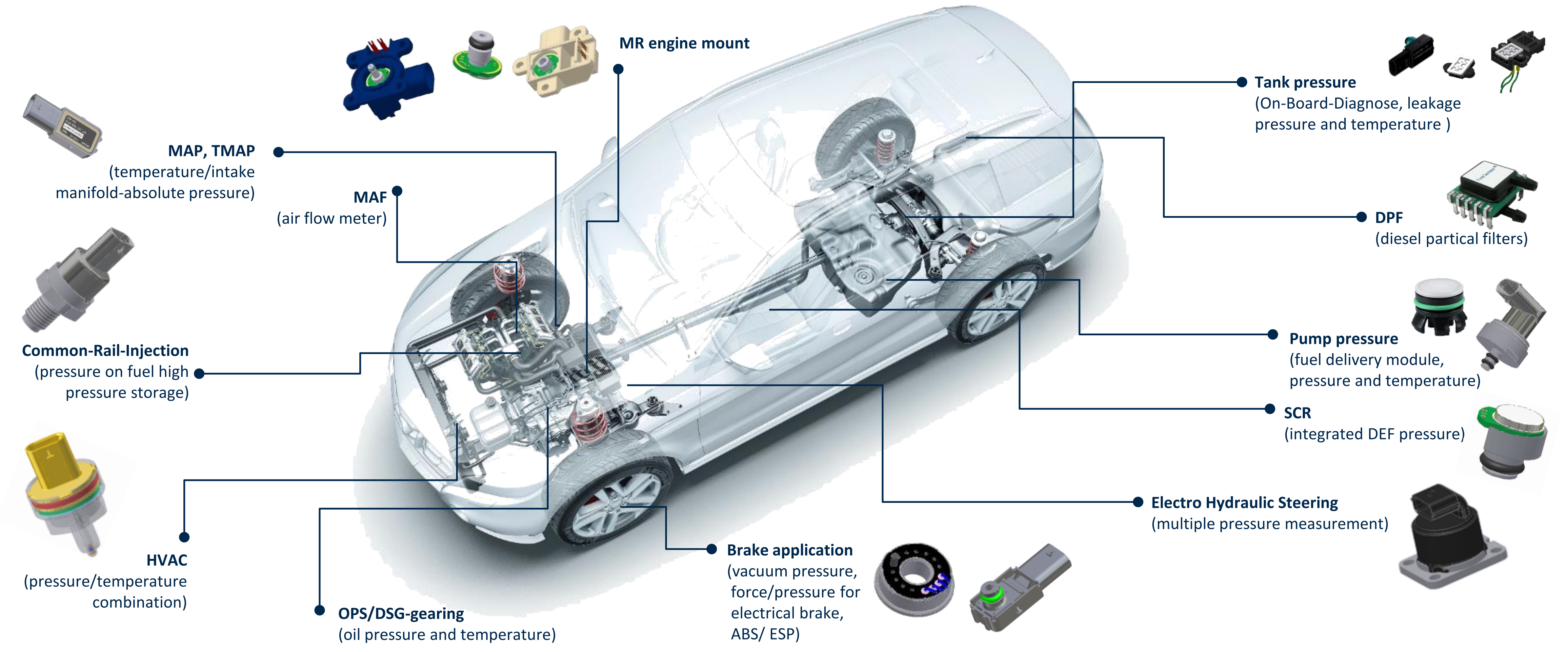
High beam control
Distance control
Object rev night

Mirror replacement
Side and rear

Company Confidential!

OUR TARGET MARKET MOBILITY

Furthermore, we are an established OEM supplier for pressure sensors.



STRATEGIC PERSPECTIVE FOR PROFITABLE GROWTH

OUR STRATEGY FOR PROFITABLE GROWTH

We generate and utilize economies of scale in 4 dimensions.

① Target Markets

Industrial

Medical

Mobility

② Key Products & Customers

Key Products

> 1 M€ p.a.

Key Customers

> 1 M € p.a.

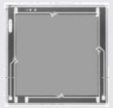
③ Forward Integration

Sensor System

Sensor

Component

Chip

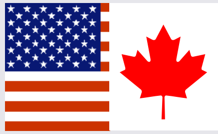


④ Internationalization

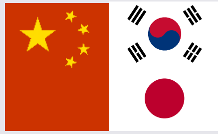
Germany

Europe

North America



Asia



Operative Excellence

OUR STRATEGY FOR PROFITABLE GROWTH

We generate and utilize economies of scale in 4 dimensions.

① Target Markets

Industrial

Medical

Mobility

② Key Products & Customers

Key Products

> 1 M€ p.a.

Key Customers

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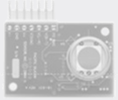
③ Forward Integration

Sensor System

Sensor

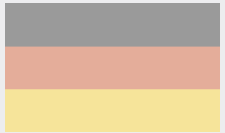
Component



Chip

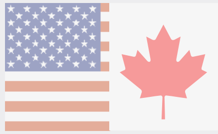
④ Internationalization

Germany

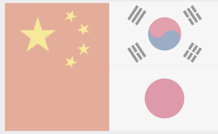


Europe

North America



Asia



Operative Excellence

DIMENSION 1: CLEAR FOCUS ON OUR TARGET MARKETS

We participate in above average growth markets.

Industrial	Medical	Mobility
YOLE Développement: + 6.0 % up to 2018 + 10.8 % up to 2020	YOLE Développement: + 11.0 % up to 2020	YOLE Développement: + 13.0 % up to 2018 + 10.8 % up to 2020
Gartner: + 9.0 % up to 2020		

AMA Verband für Sensorik + Messtechnik: + 5.0 % in 2017

OUR STRATEGY FOR PROFITABLE GROWTH

We generate and utilize economies of scale in 4 dimensions.

1 Target Markets

Industrial

Medical

Mobility

2 Key Products & Customers

Key Products

> 1 M€ p.a.

Key Customers

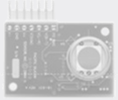
> 1 M € p.a.

3 Forward Integration

Sensor System

Sensor

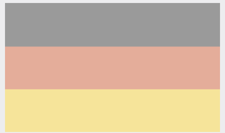
Component



Chip

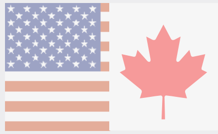
4 Internationalization

Germany

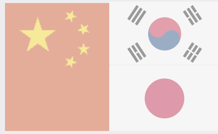


Europe

North America



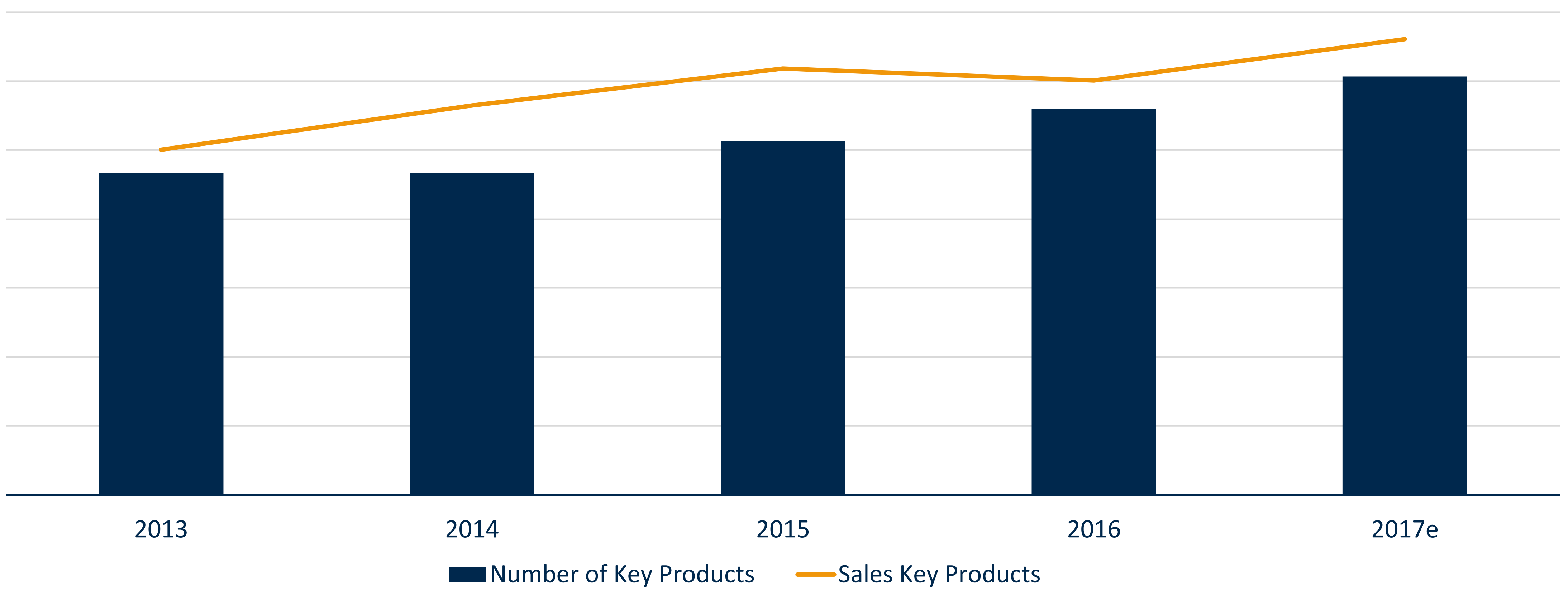
Asia



Operative Excellence

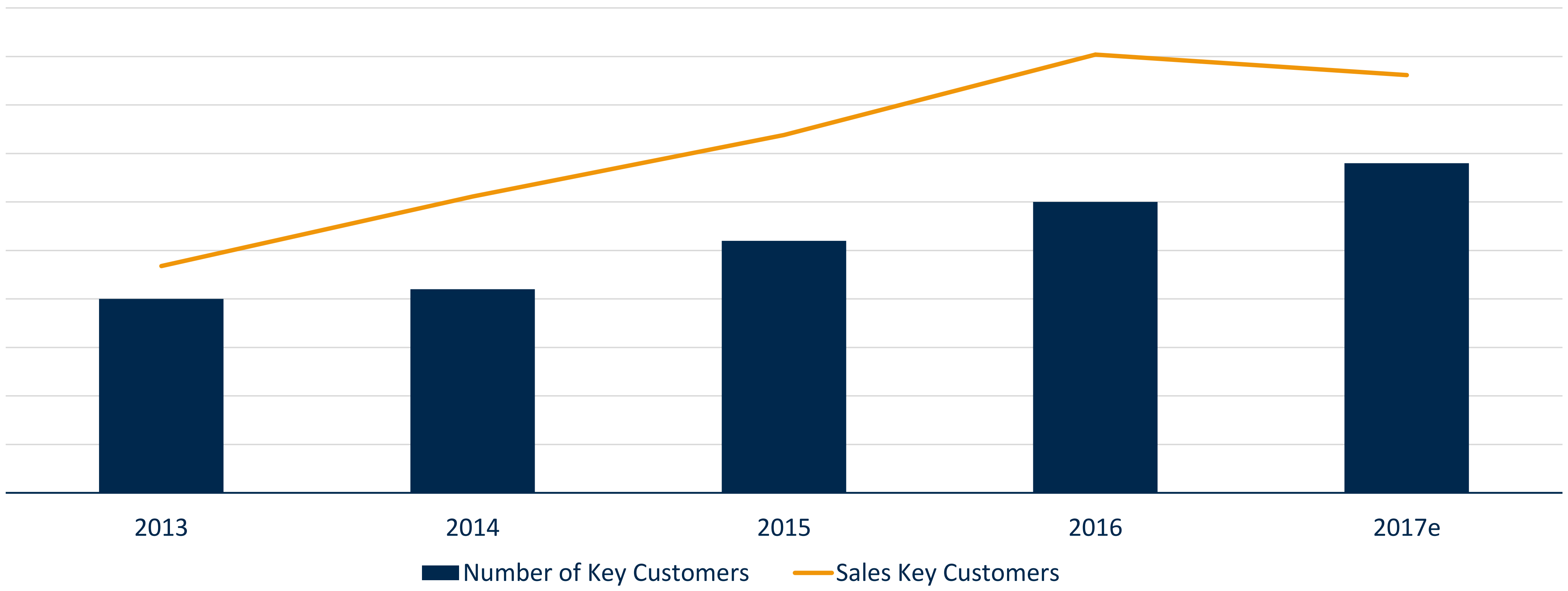
DIMENSION 2: CLEAR FOCUS ON KEY PRODUCTS

In the next years, we will grow with existing and new key products.



DIMENSION 2: CLEAR FOCUS ON KEY CUSTOMERS

In the next years, we will grow with existing and new key customers.



DIMENSION 2: CLEAR FOCUS ON KEY PRODUCTS & CUSTOMERS

Why is this efficient?

Key Products	Key Customers

- Single respective product developments result in relatively large quantities and therefore sales volumes.
- Sales per head in both sales and engineering increases – our existing team will be able to handle larger revenue streams.
- „Mix & Noise“ in operations are decreased due to reduced parts variety and transactions per revenue.
- Our supply chain and own production will gain in productivity and can be managed with fewer resources per revenue.
- With higher quantities per part our purchasing power will increase.
- With more varietal purity we increase the stability of our value creation process.
- Lead time, on time delivery and quality will improve as a result.

Our growth becomes more scalable and our profitability increases.

OUR STRATEGY FOR PROFITABLE GROWTH

We generate and utilize economies of scale in 4 dimensions.

① Target Markets

Industrial

Medical

Mobility

② Key Products & Customers

Key Products

> 1 M€ p.a.

Key Customers

> 1 M € p.a.

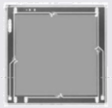
③ Forward Integration

Sensor System

Sensor

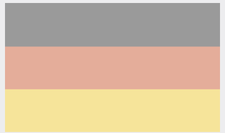
Component

Chip



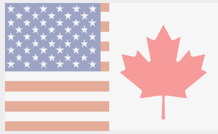
④ Internationalization

Germany

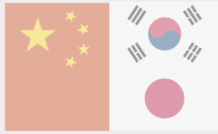


Europe

North America



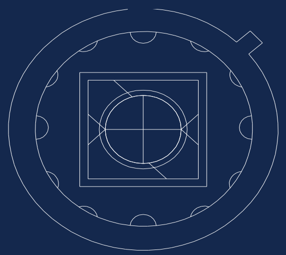
Asia



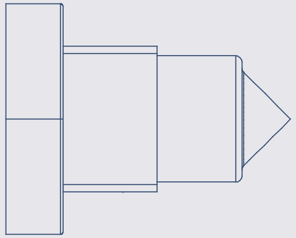
Operative Excellence

We base our forward integration initiatives on clear product roadmaps.

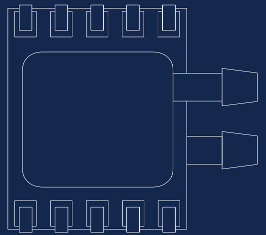
Light



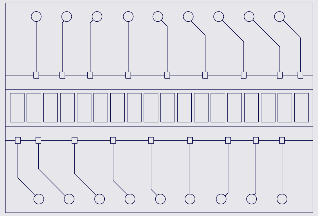
Level



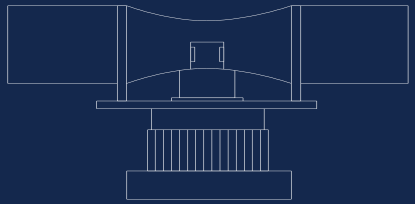
Pressure



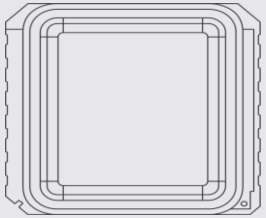
Radiation



Flow



Acceleration



Integrated Manufacturing Service

Multi Sensor Systems

OUR STRATEGY FOR PROFITABLE GROWTH

We generate and utilize economies of scale in 4 dimensions.

1 Target Markets

Industrial

Medical

Mobility

2 Key Products & Customers

Key Products

> 1 M€ p.a.

Key Customers

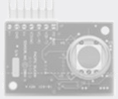
> 1 M € p.a.

3 Forward Integration

Sensor System

Sensor

Component



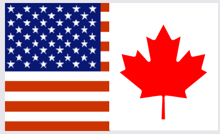
Chip

4 Internationalization

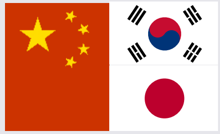
Germany

Europe

North Amerika



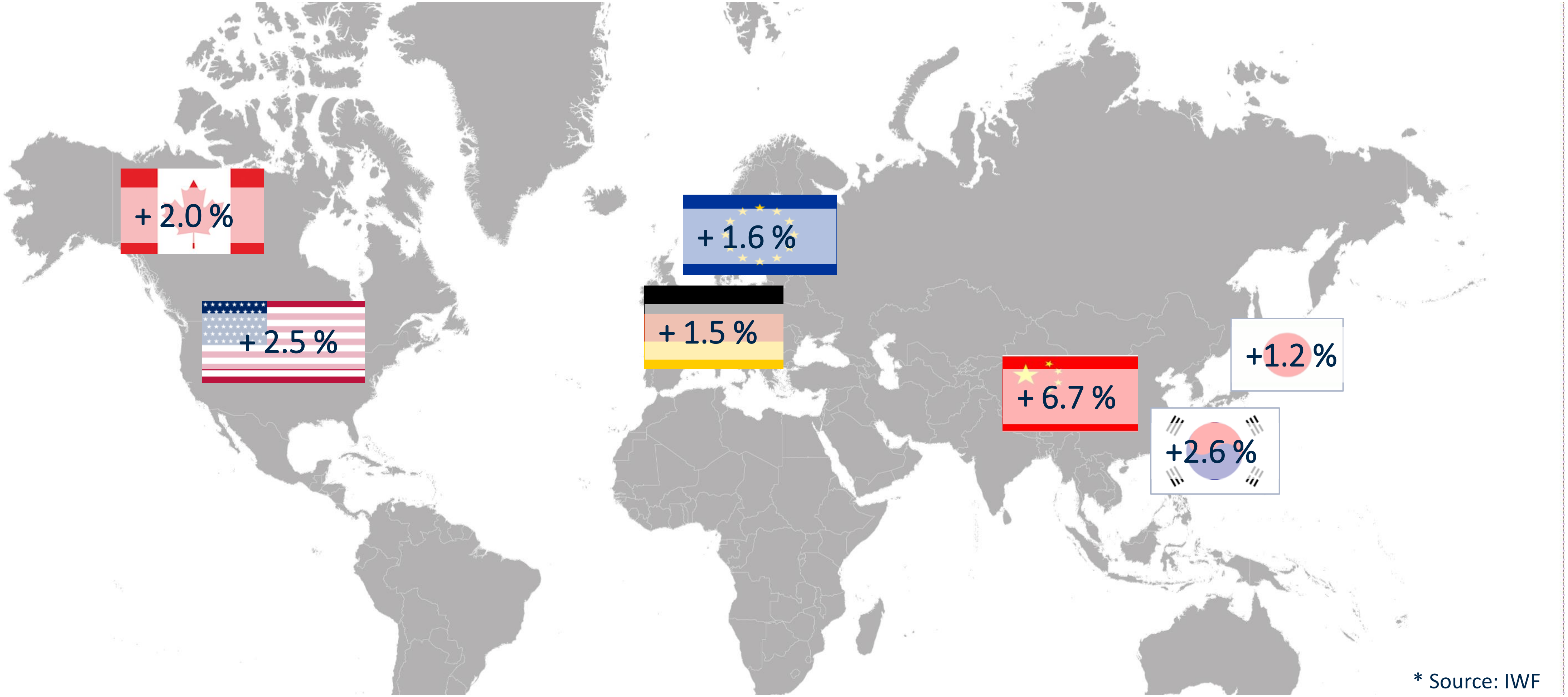
Asia



Operative Excellence

DIMENSION 4: CLEAR FOCUS ON INTERNATIONALIZATION

We will participate in the solid growth* of our targeted sales regions.



* Source: IWF

OUR STRATEGY FOR PROFITABLE GROWTH

We generate and utilize economies of scale in 4 dimensions.

1 Target Markets

Industrial

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Mobility

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Key Products

> 1 M€ p.a.

Key Customers

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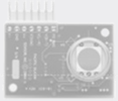
3 Forward Integration

Sensor System

Sensor

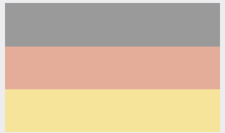
Component



Chip

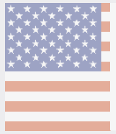
4 Internationalization

Germany

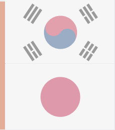


Europe

North Amerika



Asia



Operative Excellence

We concentrate on five core initiatives.

Top Initiatives
Lead Time, On-Time Delivery, Quality
Core Processes
One ERP
T‘s & C‘s Harmonization
Portofolio Optimization

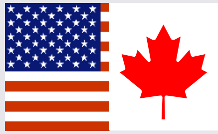
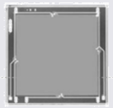
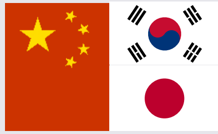
BESIDES OUR GUIDANCE FOR 2017, THIS APPROACH TOWARDS PROFITABLE GROWTH SUPPORTS OUR MID-TERM ASPIRATION.

Guidance 2017			Mid-term Aspiration		
Sales	140 – 145	M €	Sales	10	% CAGR
EBIT-Margin	5 – 6	%	EBIT-Margin	10	%

GROWTH DRIVER LIDAR

GROWTH DRIVER LIDAR

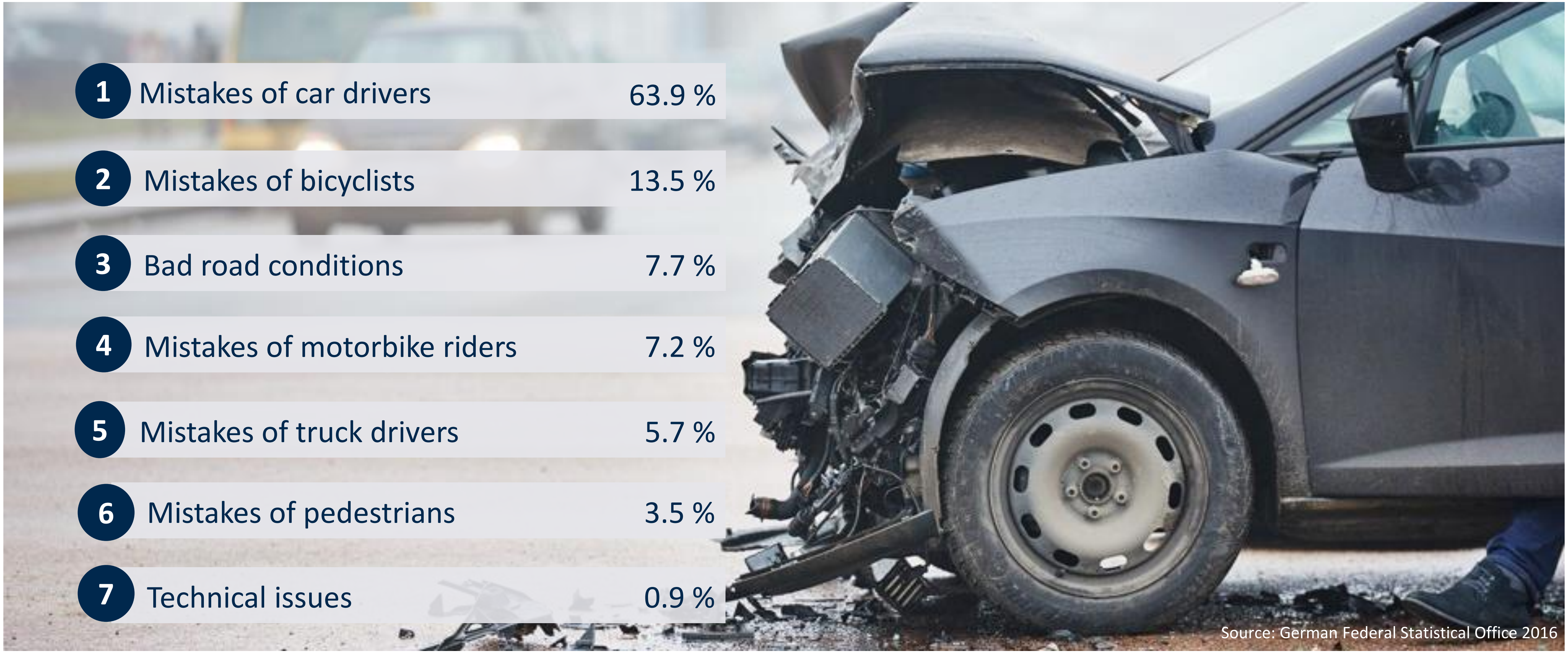
LiDAR is relevant factor within our strategy for profitable growth.

① Target Markets	② Key Products & Customers	③ Forward Integration	④ Internationalization
Industrial 	Key Products > 1 M€ p.a. 	Sensor System 	Germany 
Medical 	Key Customers > 1 M € p.a. 	Sensor 	Europe 
Mobility 		Component 	North America 
		Chip 	Asia 

Operative Excellence

GROWTH DRIVER LIDAR

Main reason for accidents are preventable human mistakes.

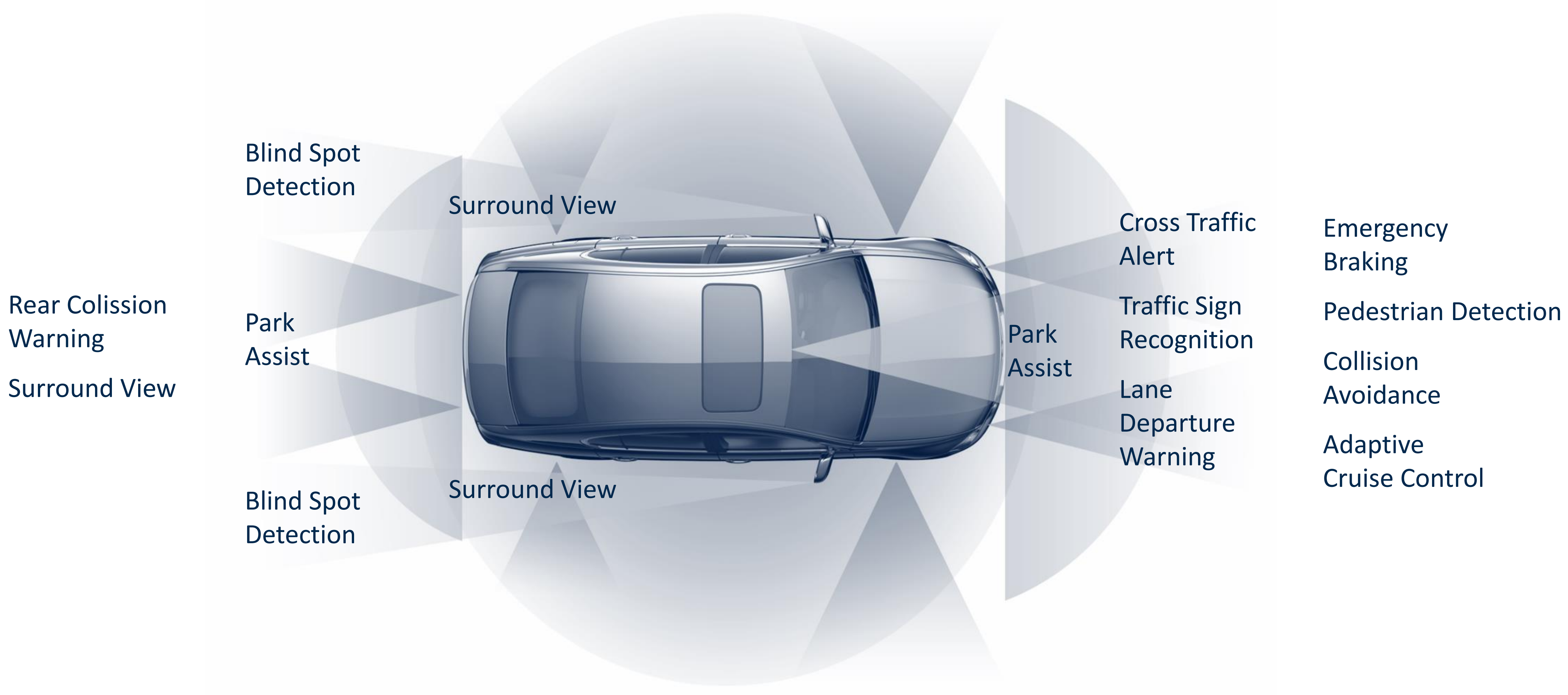


1	Mistakes of car drivers	63.9 %
2	Mistakes of bicyclists	13.5 %
3	Bad road conditions	7.7 %
4	Mistakes of motorbike riders	7.2 %
5	Mistakes of truck drivers	5.7 %
6	Mistakes of pedestrians	3.5 %
7	Technical issues	0.9 %

Source: German Federal Statistical Office 2016

GROWTH DRIVER LIDAR

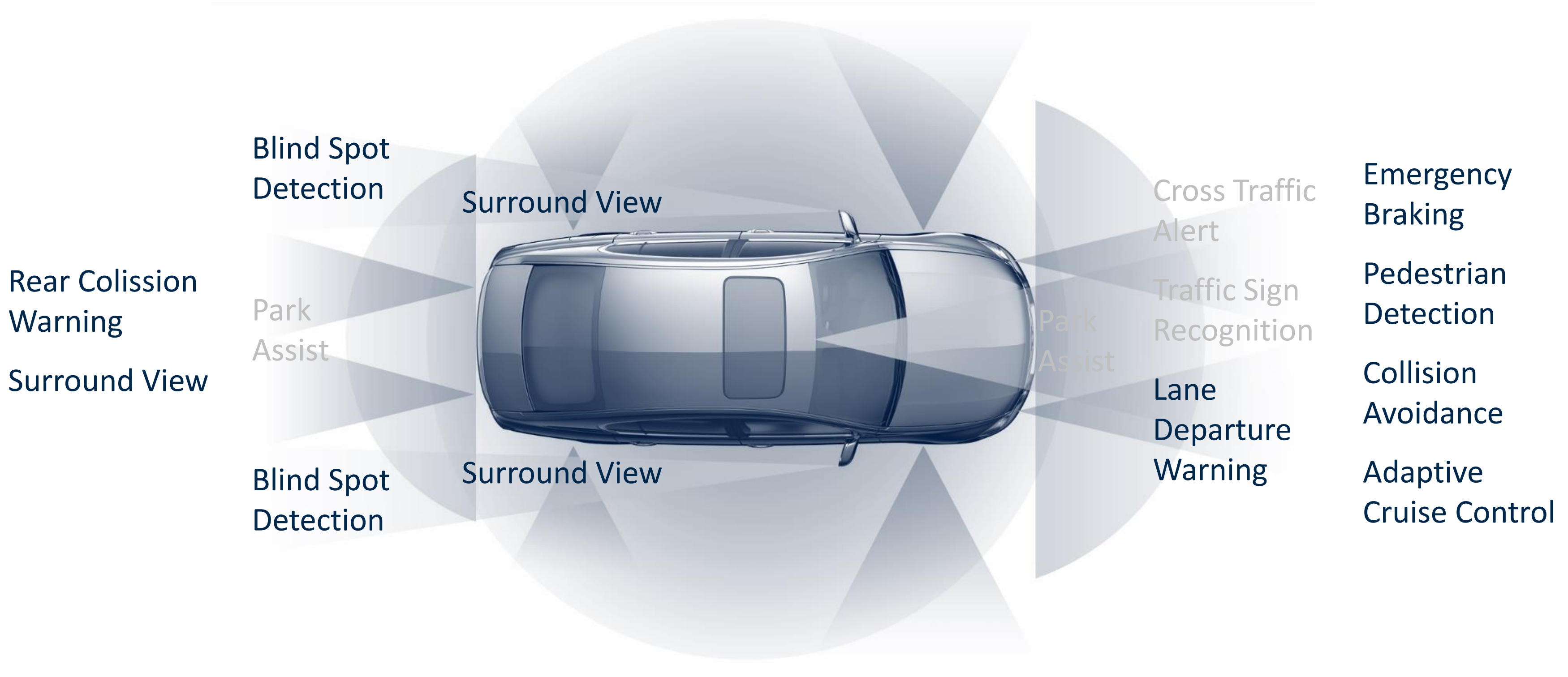
Sensors in vehicles assist the drivers and provide more road safety.



GROWTH DRIVER LIDAR

LiDAR is an important technology for many of these safety applications.

Long-Range Radar	Short-/ Medium-Range Radar	**LiDAR**	Camera	Ultrasound

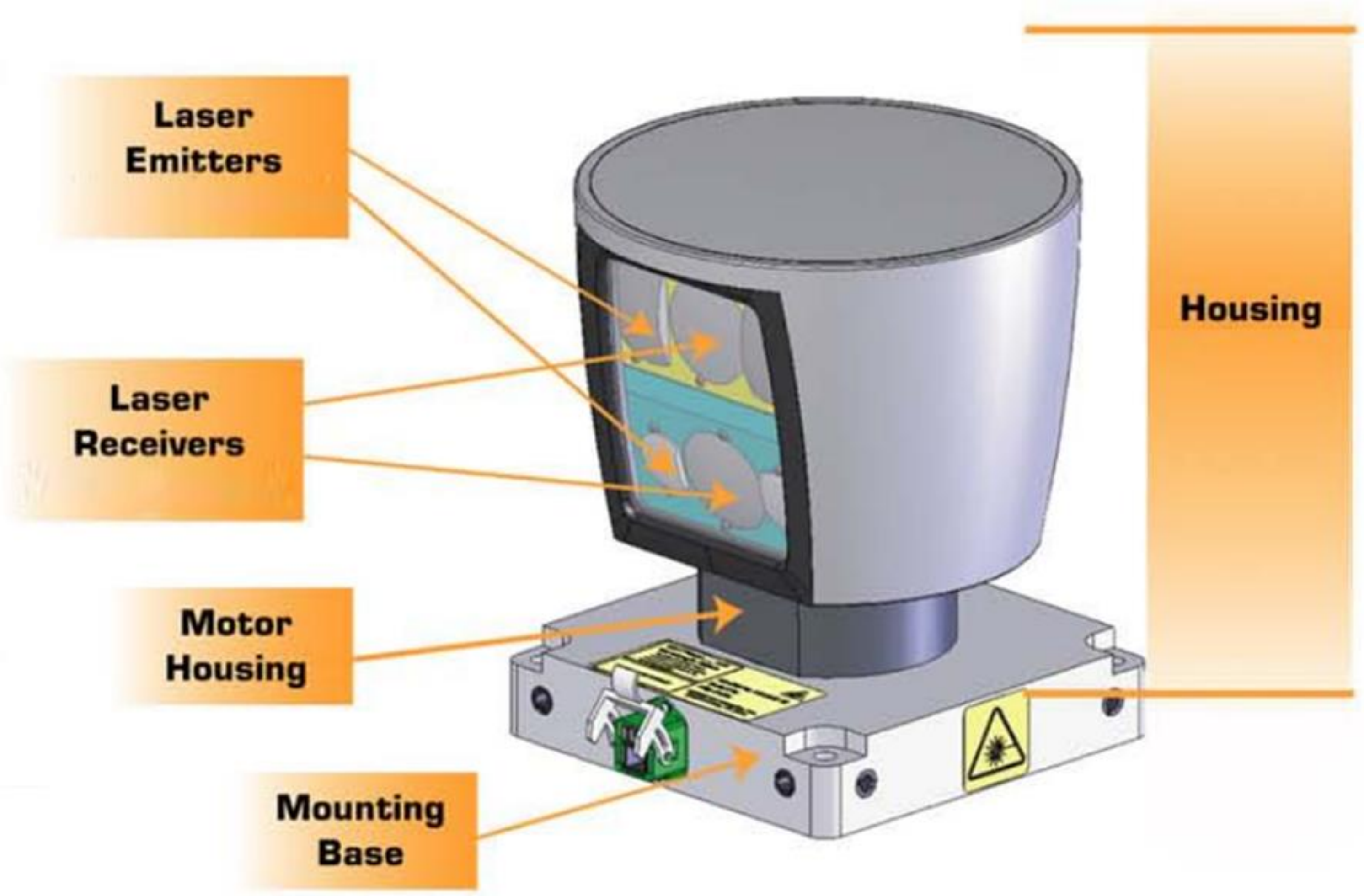


First Sensor

Reason: LiDAR provides the highest resolution even for large distances.

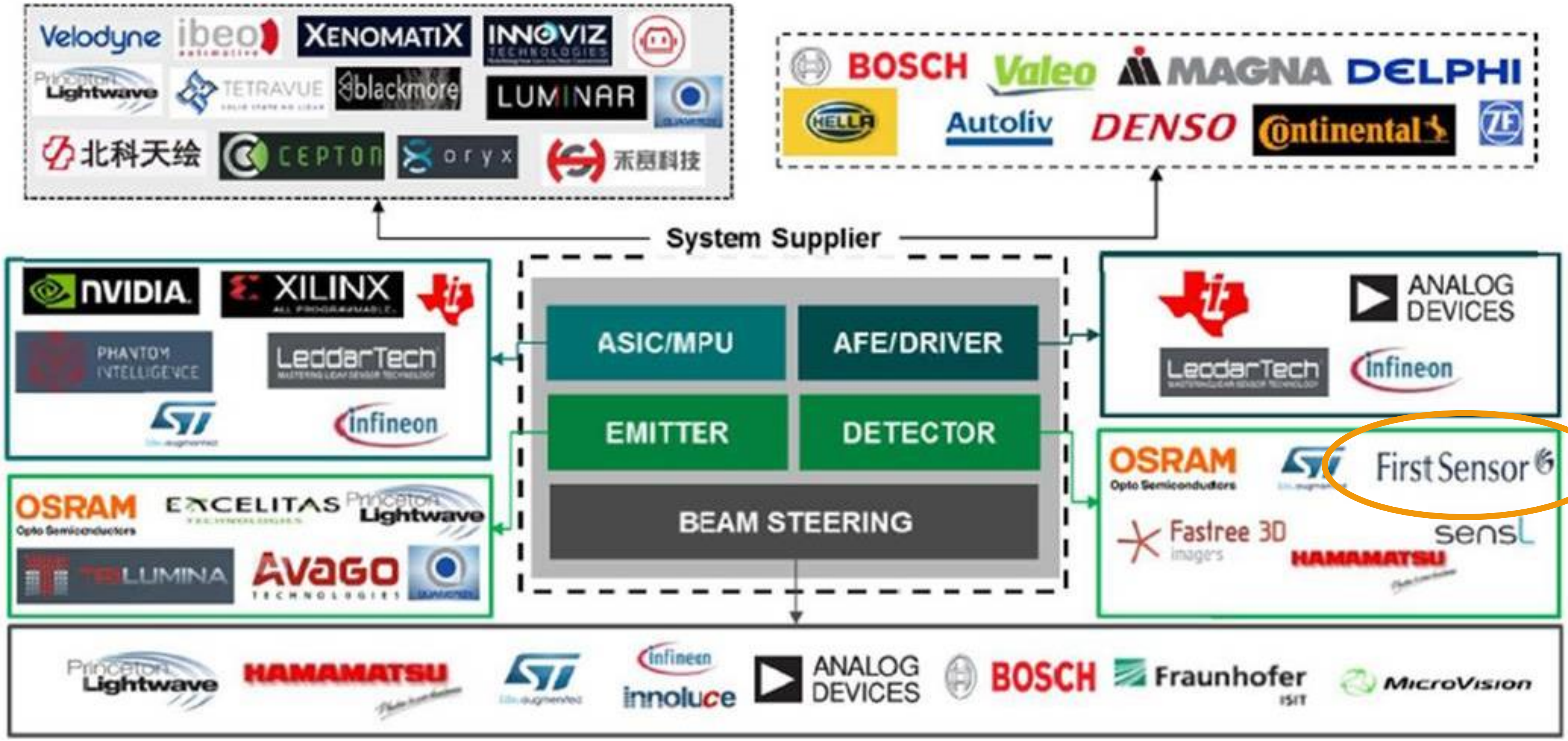
Criteria	LIDAR (pulsed ToF)	Radar		Ultra-sonic	Cameras		PMD
		Short distance	Long distance		Mono	Stereo	
Max range (m)	150 -250	55 - 100	150 - 200	2 - 4	40 - 60 (120 coarse)	60	7 - 10
Min range (m)	1	0,25 - 1	1	0.25	0.3	0.3	0.3 – 0.8
Precision (m)	0.1 (newer: 0.04)	0.25 – 0.75	0.3 – 3.75	Very good	3	0.2 – 0.3	good
Velocity measurement	Indirectly via distance t1-t0	directly via Doppler effect		hardly	hardly	Indirect via dist.	Indirect via dist.
Horizontal field of view	30° - 180°	55° Scan: 120°	16°, Scan: 60°	60°	45° - 190°	45°	40 - 69°
Horizontal resolution	0.01° - 1°	10.5°	3.5°	bad	< 0.1° - 0.3°	< 0.1°	0.2°
Vertical field of view	3° - 16°	3° - 13°	3° - 13°	30°	45°	45°	40 - 56°
Vertical resolution	0.8° - 1°	4.5°	4.5°	bad	< 0.1°	< 0.1°	0.2°

In LiDAR systems different components work hand in hand.



Source: Velodyne

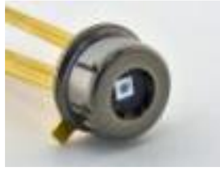
First Sensor is an important supplier for the detectors in LiDAR systems.



Source: YOLE

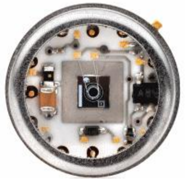
GROWTH DRIVER LIDAR

With our APD we have captured a leading share for more than 10 years.



Single APD with amplifier

DARPA Urban Challenge; First Sensor APDs in all winning teams

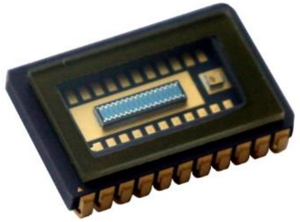


Industrial hybrids (APD+TIA in one package)

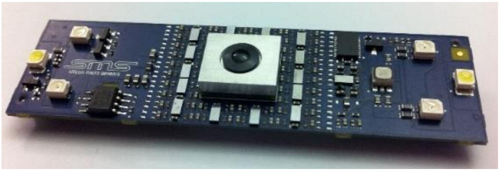
Few Pixel APD-Array in SMD package for ACC / AEC-Q 101 qualified by FIS

… 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018

12 Pixel APD-Array in ceramic package for ACC



Gesture recognition with 64 pixel APD-Array

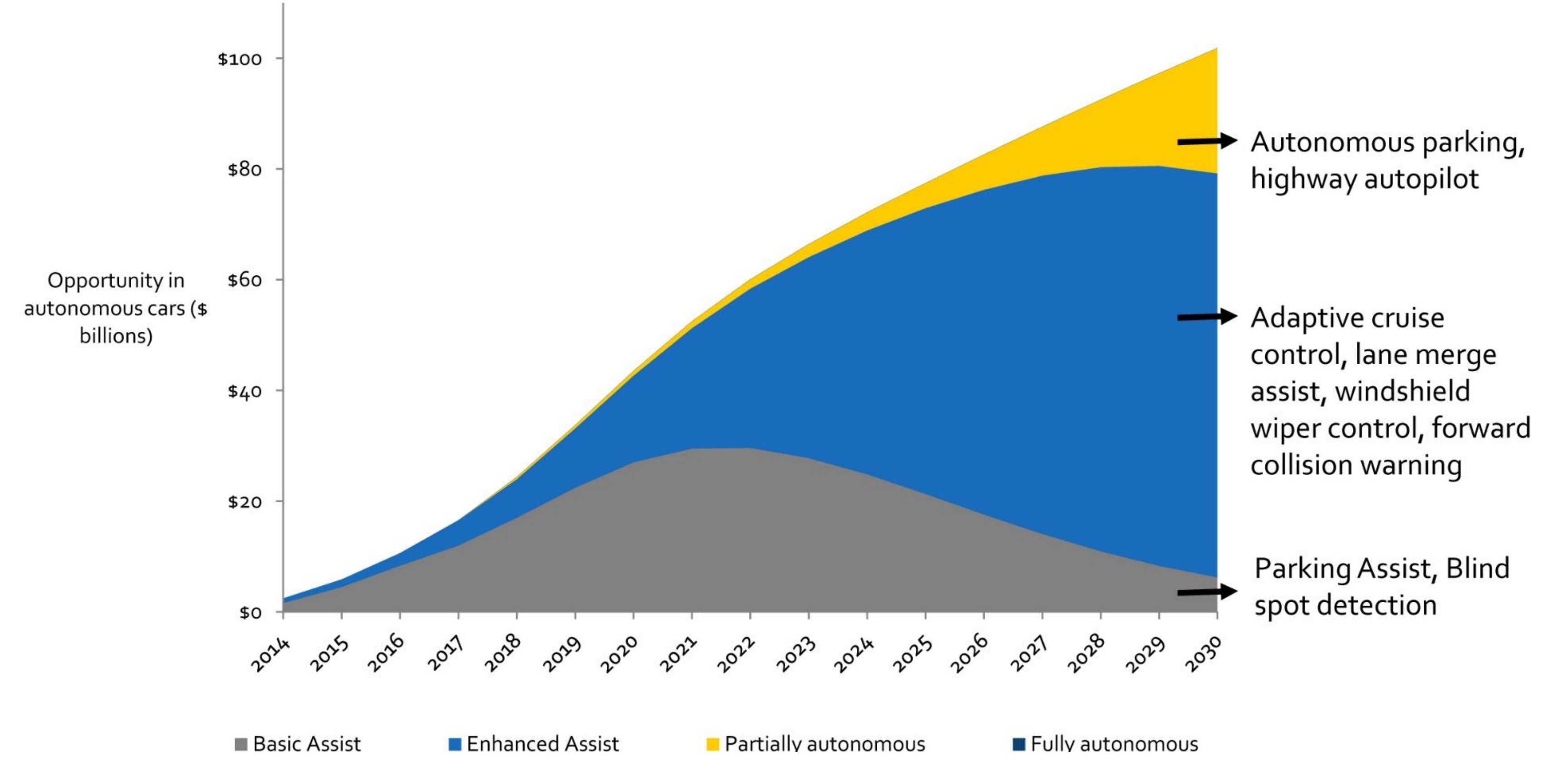


Receiver module with APD-Array, HV, TIA, MUX, Timing discriminator

Receiver module with APD and electronics integrated in one package

Therefore we will participate in the growth of the driver assist market.

Global driver assist market will grow to $102 billion by 2030

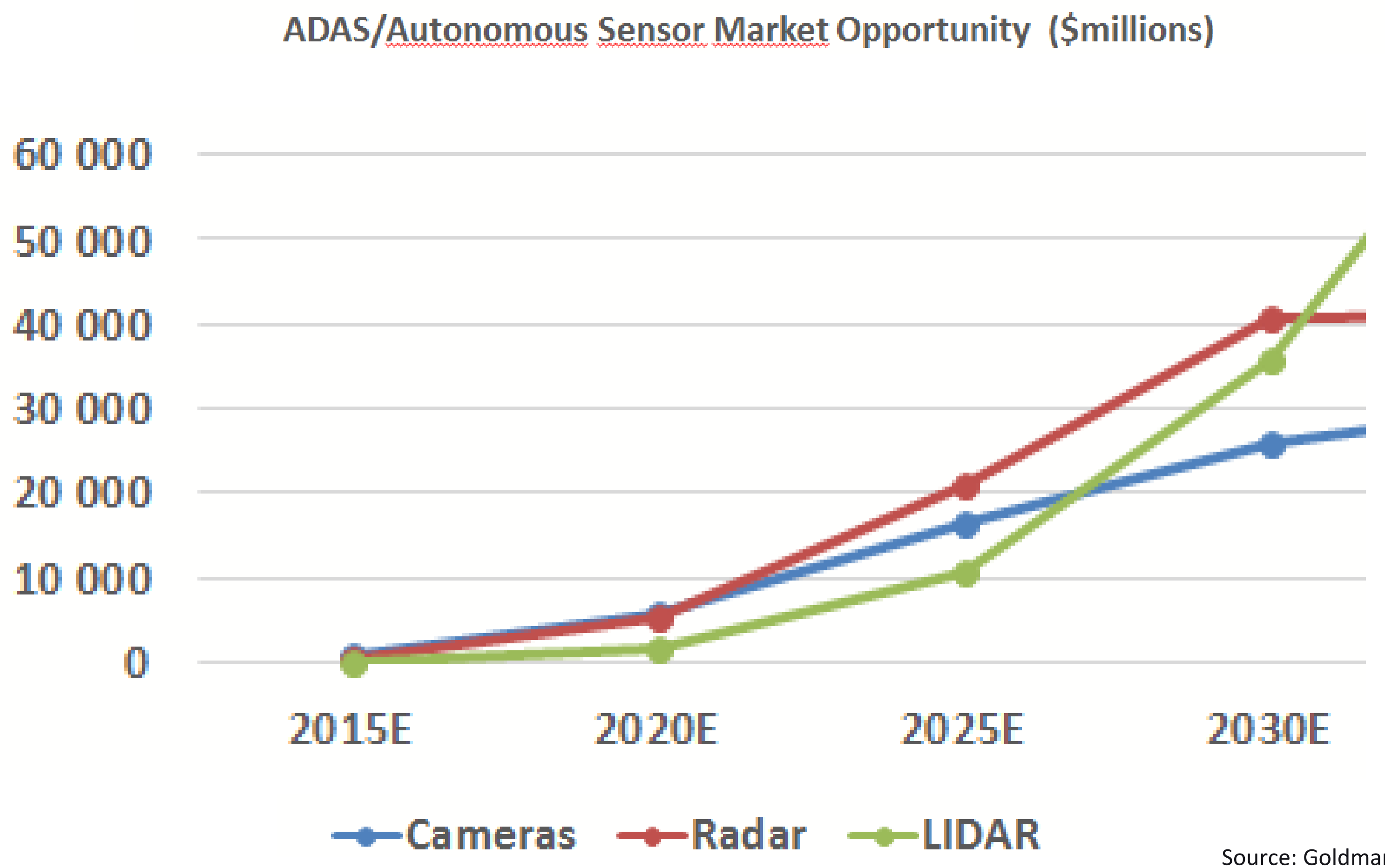


- 2017: 94 m vehicles produced (2.2% CAGR 17-22, 2017 IHS Markit)
- Automotive semiconductor revenue for ADAS grows with 20.9% (CAGR 17-22, 2017 IHS Markit)
- Estimates as high as 10% of new cars with self-driving features in 2020

Source: Lux Research 2017

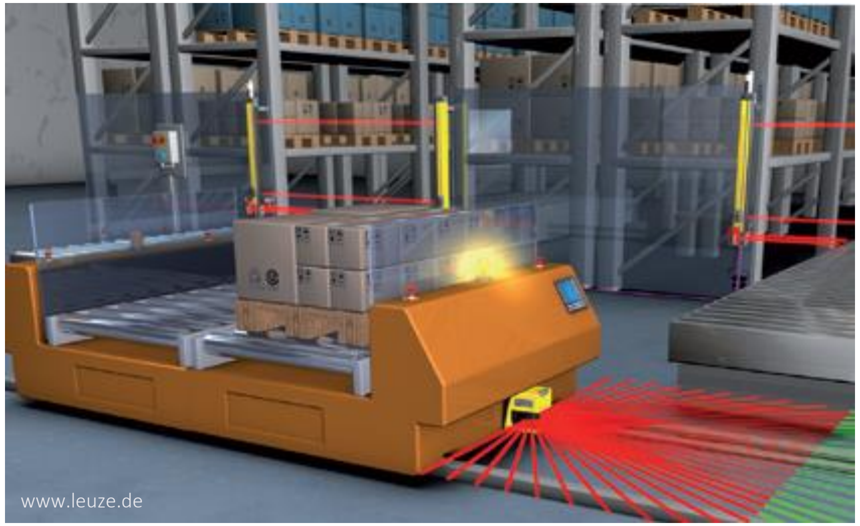
GROWTH DRIVER LIDAR

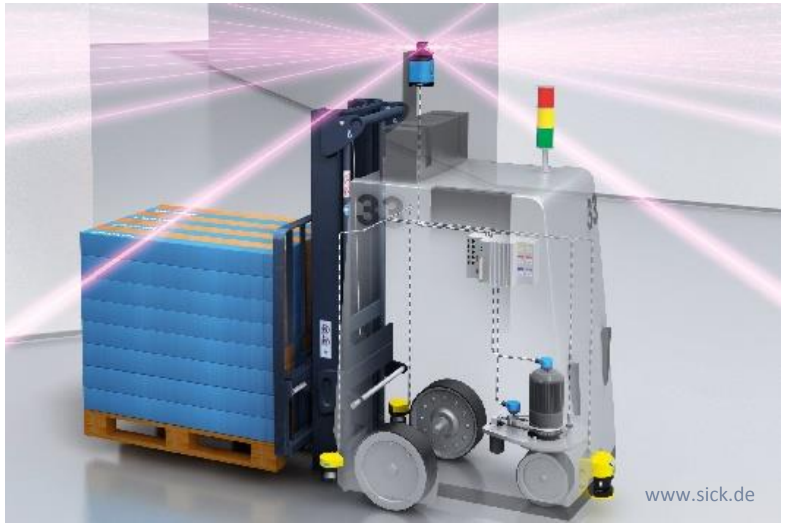
In this growing mobility market LiDAR will play the most important role.



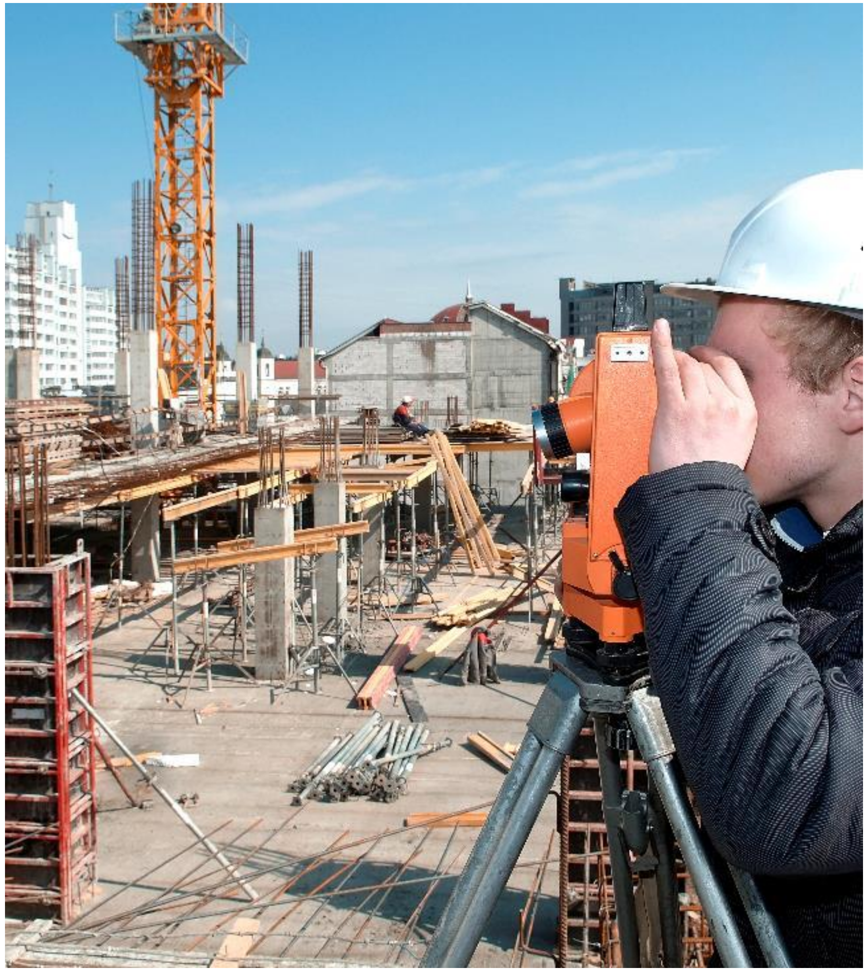
Source: Goldman Sachs Global Investment Research

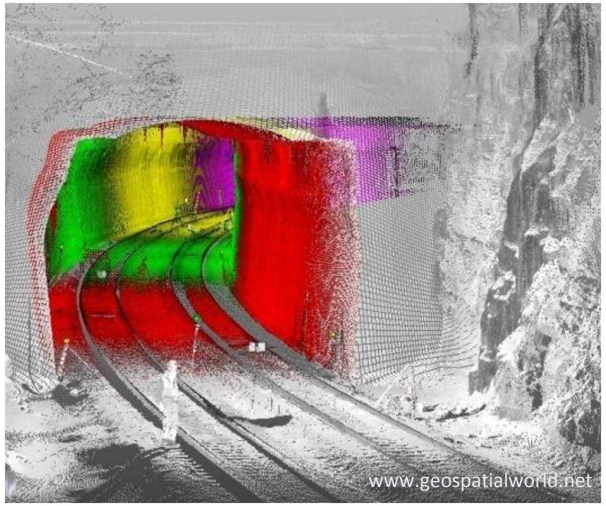
But LiDAR also has applications in the industrial market, e.g. logistics…

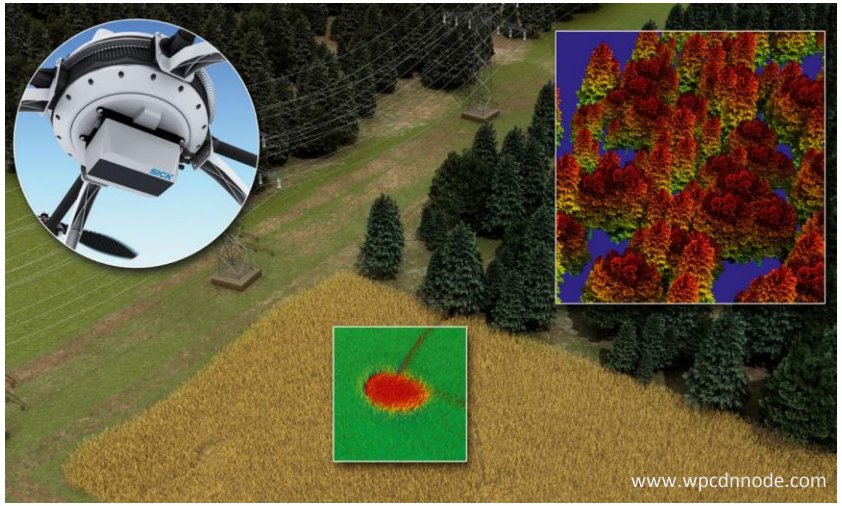




GROWTH DRIVER LIDAR
…mapping and construction…



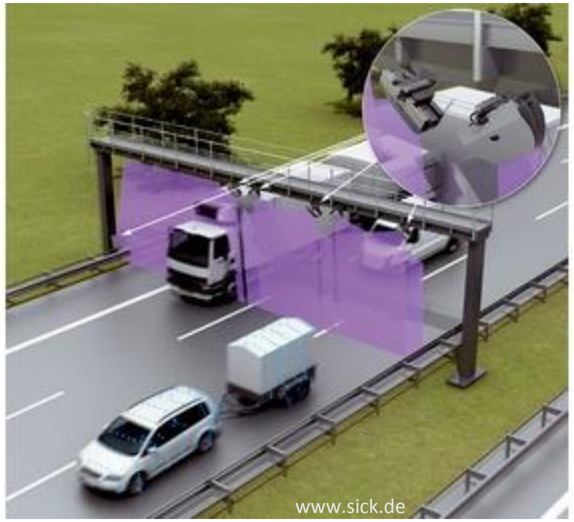




www.geospatialworld.net

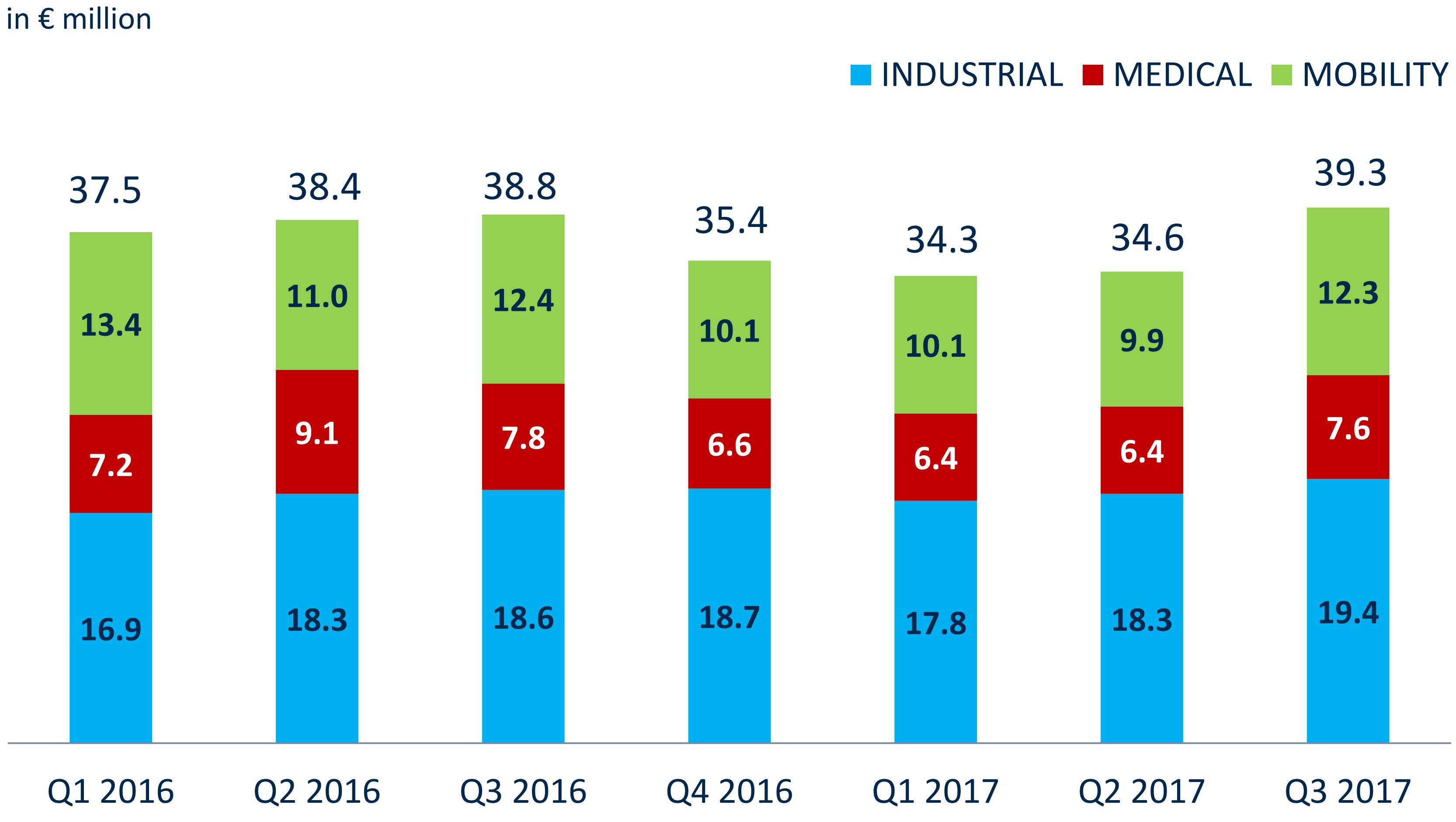
www.microsoft.com

GROWTH DRIVER LIDAR
…and traffic control & security.



Q3 INTERIM REPORT 2017

Q3 sales with € 39.3 million back on track; + 1.3 % over previous year



Comments

Dynamic start into the second half of 2017

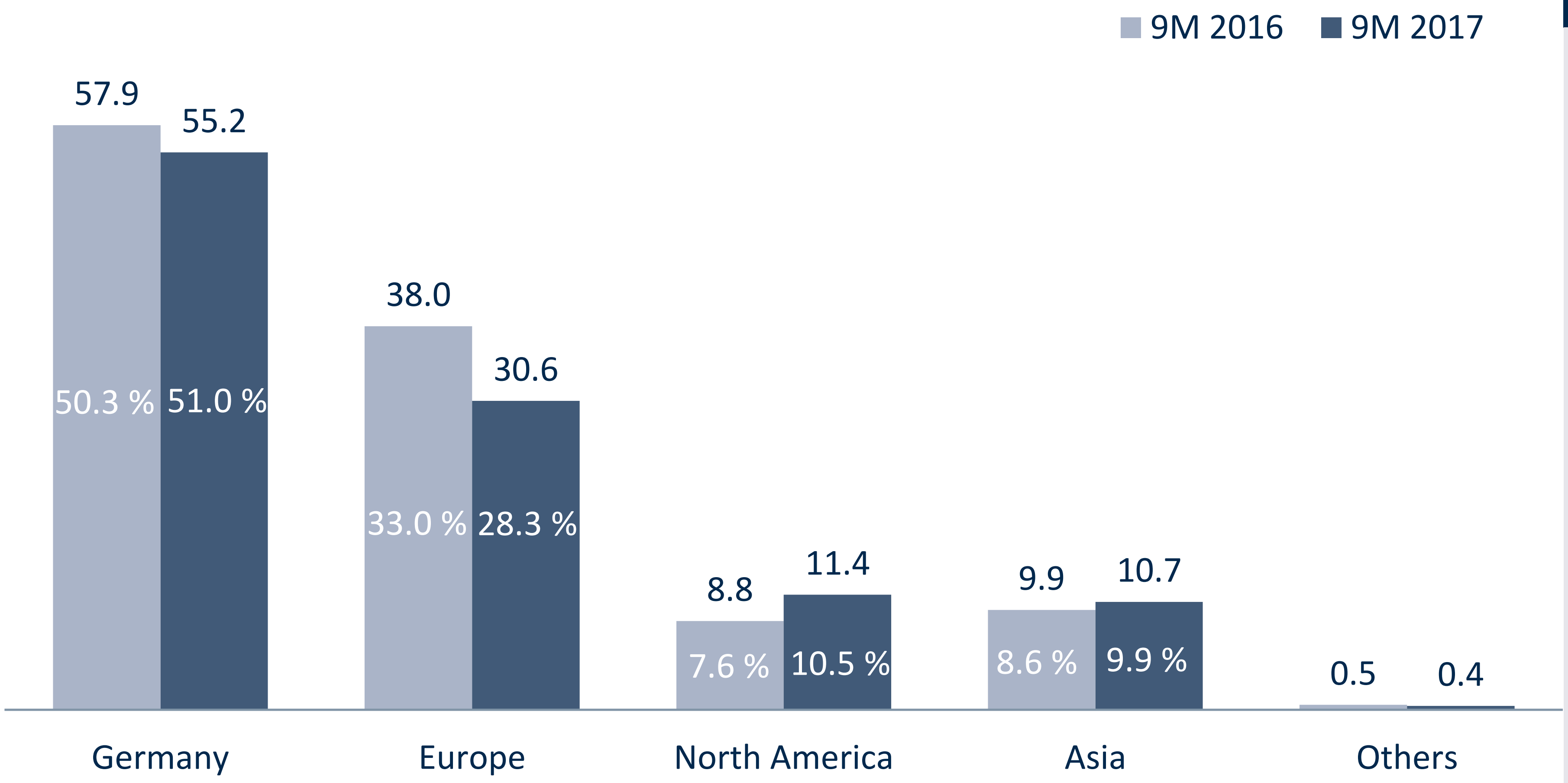
Sales up 1.3 % on Q3 2016

IND: +4.1%, MED: -3.0%, MOB: -0,4% (qoq)

Catch-up effect on slow H1 and early deliveries before year-end closing of production

Share of sales in North America and Asia further climbing

Sales in € million, sales share in %



Comments

Germany still accounts for half of sales

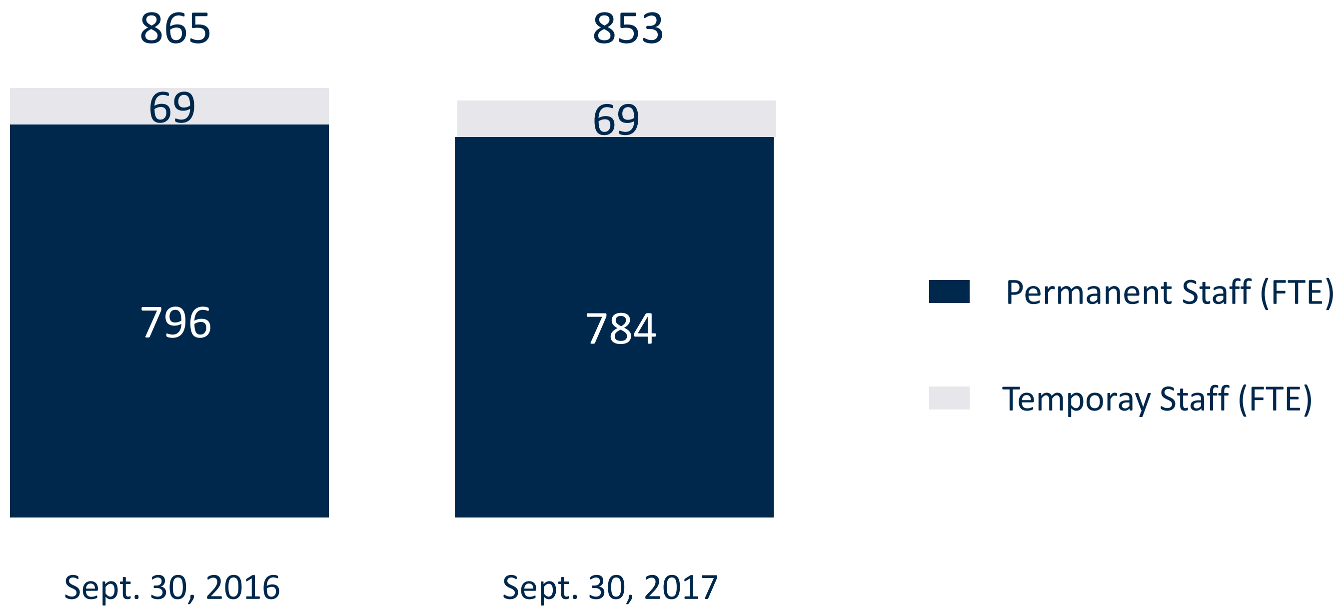
Other European Countries contribute 28.3 %

Strong performance in North America – sales doubled within the last two years – and in Asia

Q3 INTERIM REPORT 2017

Sales per employee rises to 50.1 TEUR in Q3 2017

	Q3 2016	Q3 2017	
personnel expenses:	€ 11.2 million	€ 11.3 million	+1.6%
sales per employee:	€ 48.8 thousand	€ 50.1 thousand	-2.6%



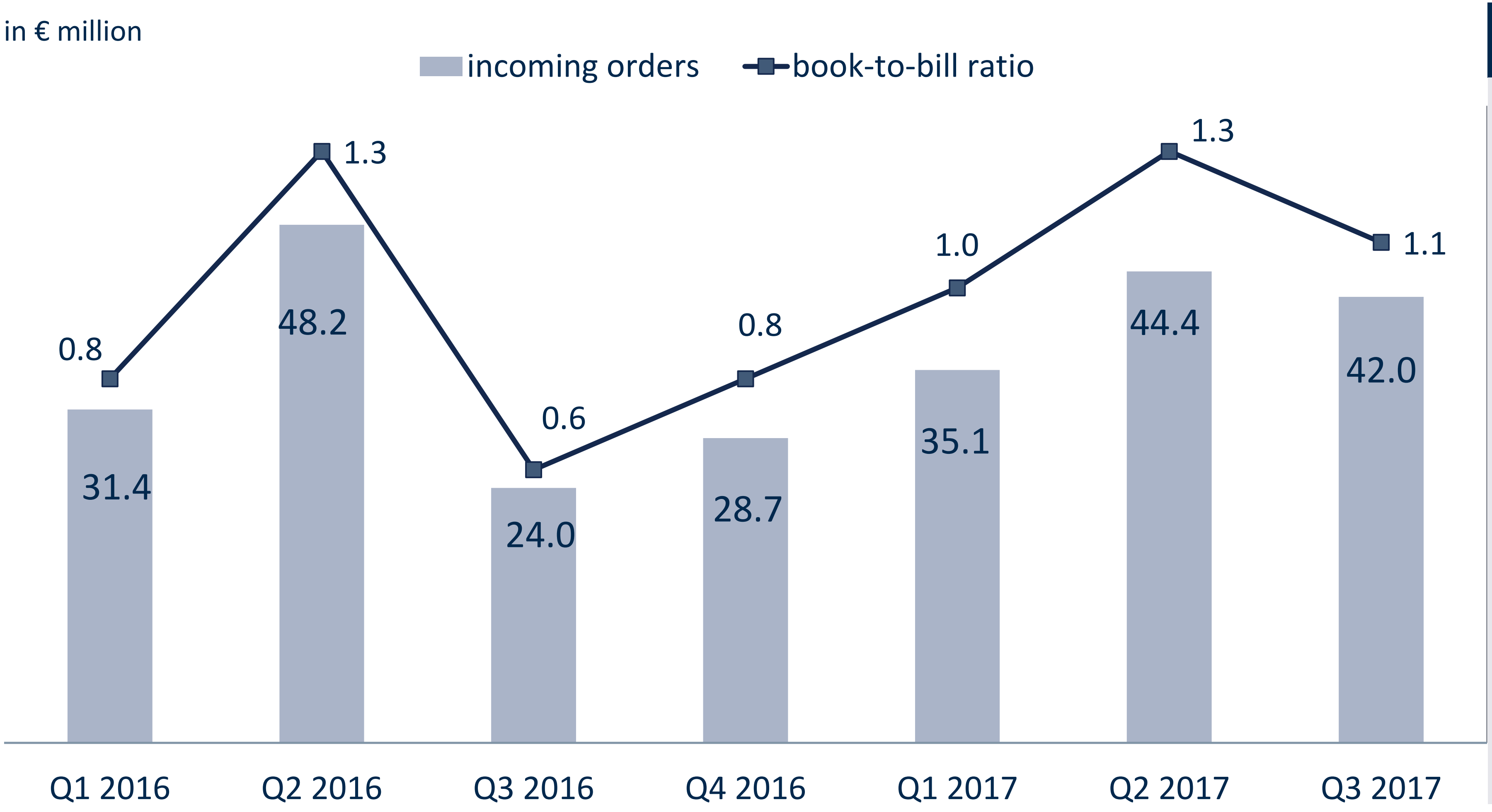
Comments

Number of employees largely unchanged

Increase of personnel expense by wage raise and shift to higher qualified staff

Sales per employee after nine month € 138.2 thousand (previous year: € 144.2 thousand)

Order intake still on high level at € 42.0 million



Comments

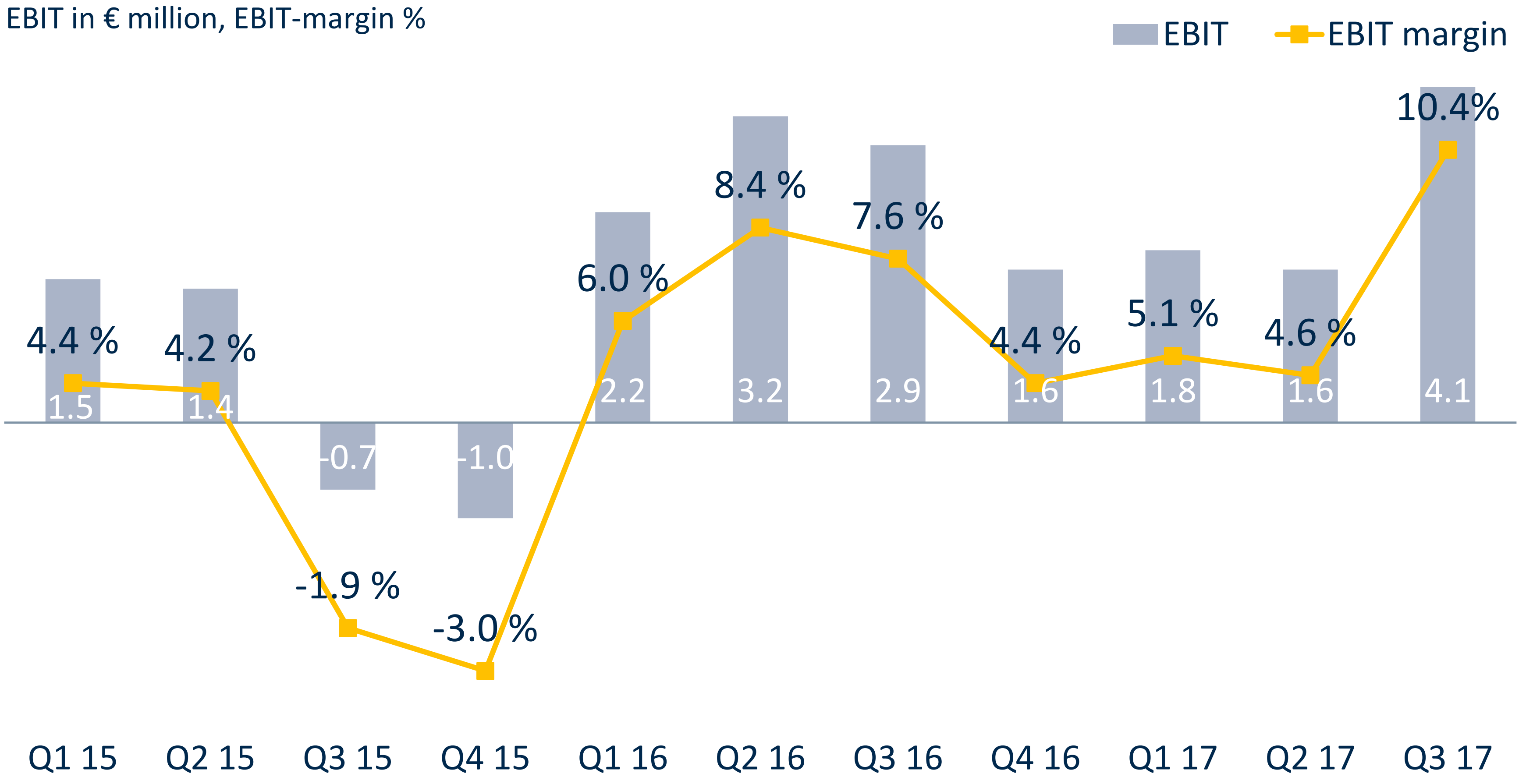
Order intake in Q3 almost on Q2 level

Total order intake in 2017 is € 121.5 million after € 103.6 million in 2016

Order backlog at Sept. 30: € 96.5 million

BtB ratio supports further growth

EBIT of € 4.1 million in Q3, margin climbs to 10.4 percent



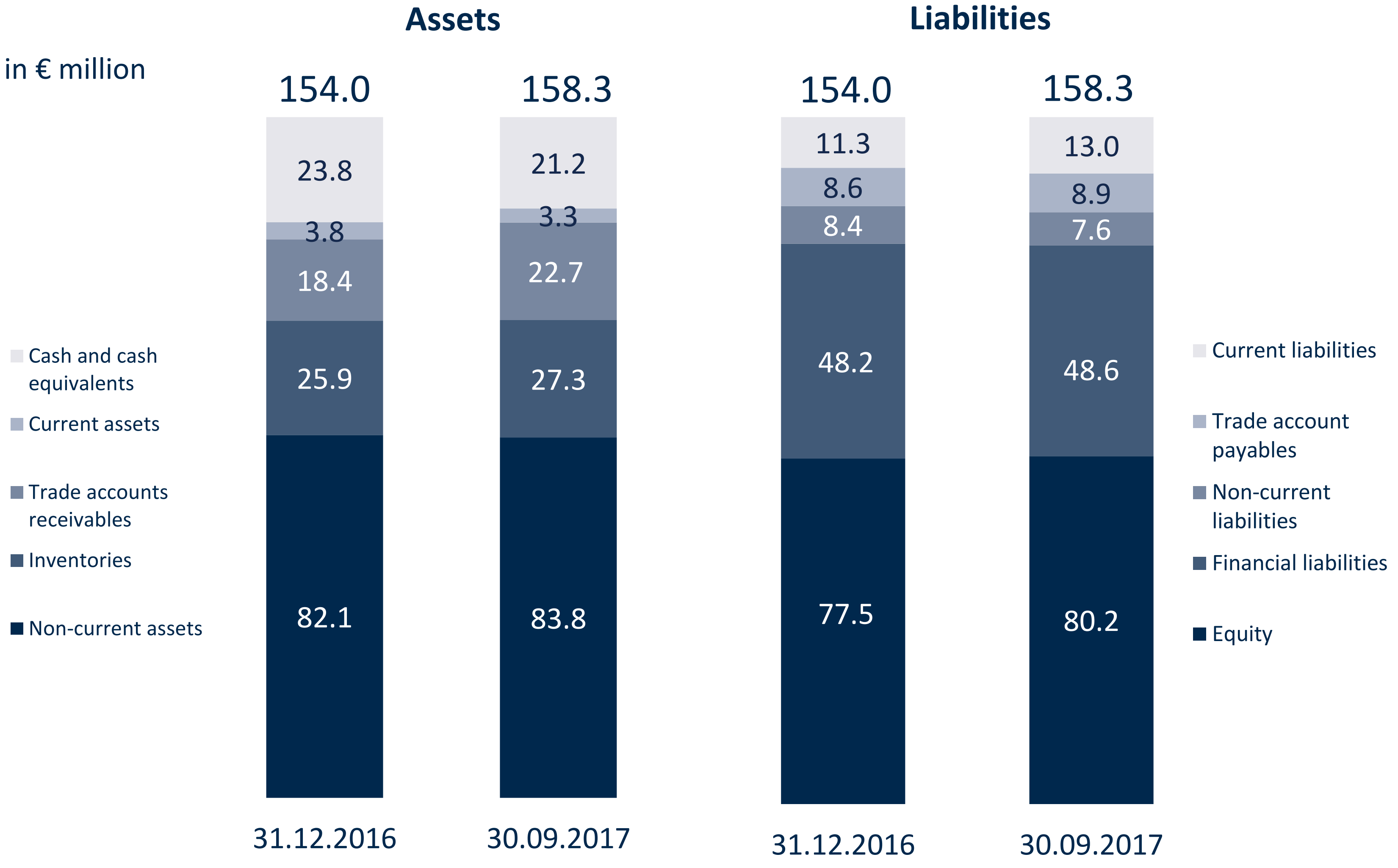
Comments

9M margin 6.9 %

Increase in sales with positive effect on profitability

Also contribution by product mix (material cost ratio down to 48.3 percent) and efficiency gains

Balance sheet total rises by 2.8 percent from € 154.0 to € 158.3 million



Comments

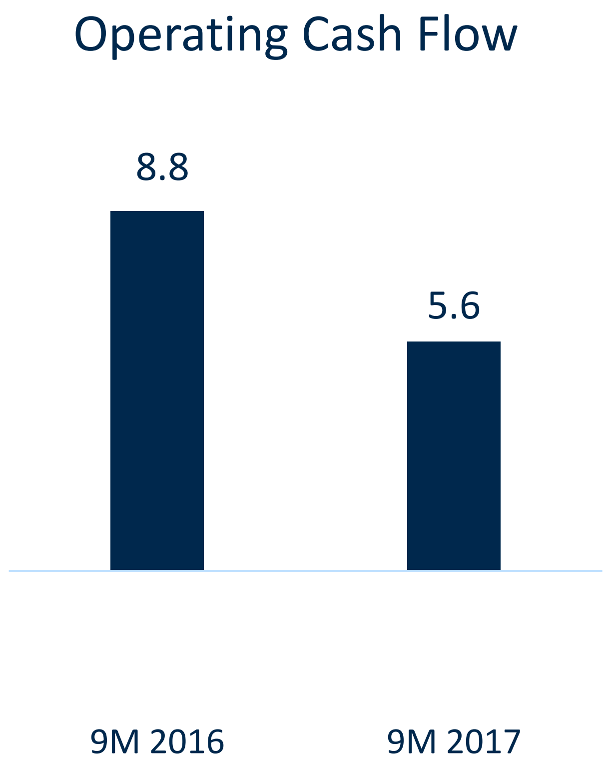
WC: Inventories and trade receivables + € 5.7 million

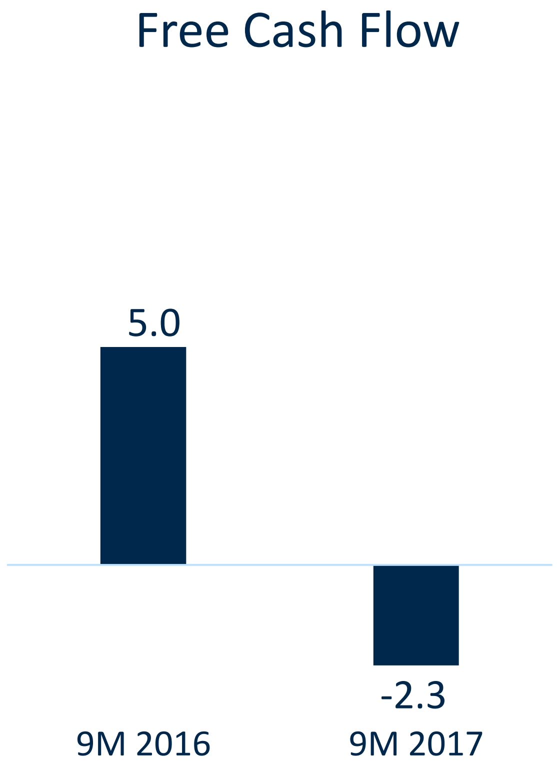
Net debt down to € 27.5 million

Equity ratio 50.7 %

Operating Cashflow burdened by increase in Working Capital and taxes

in € million





Comments

Changes in WC and taxes burdened CF

Investment volume up to almost € 8 mill after 9M

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