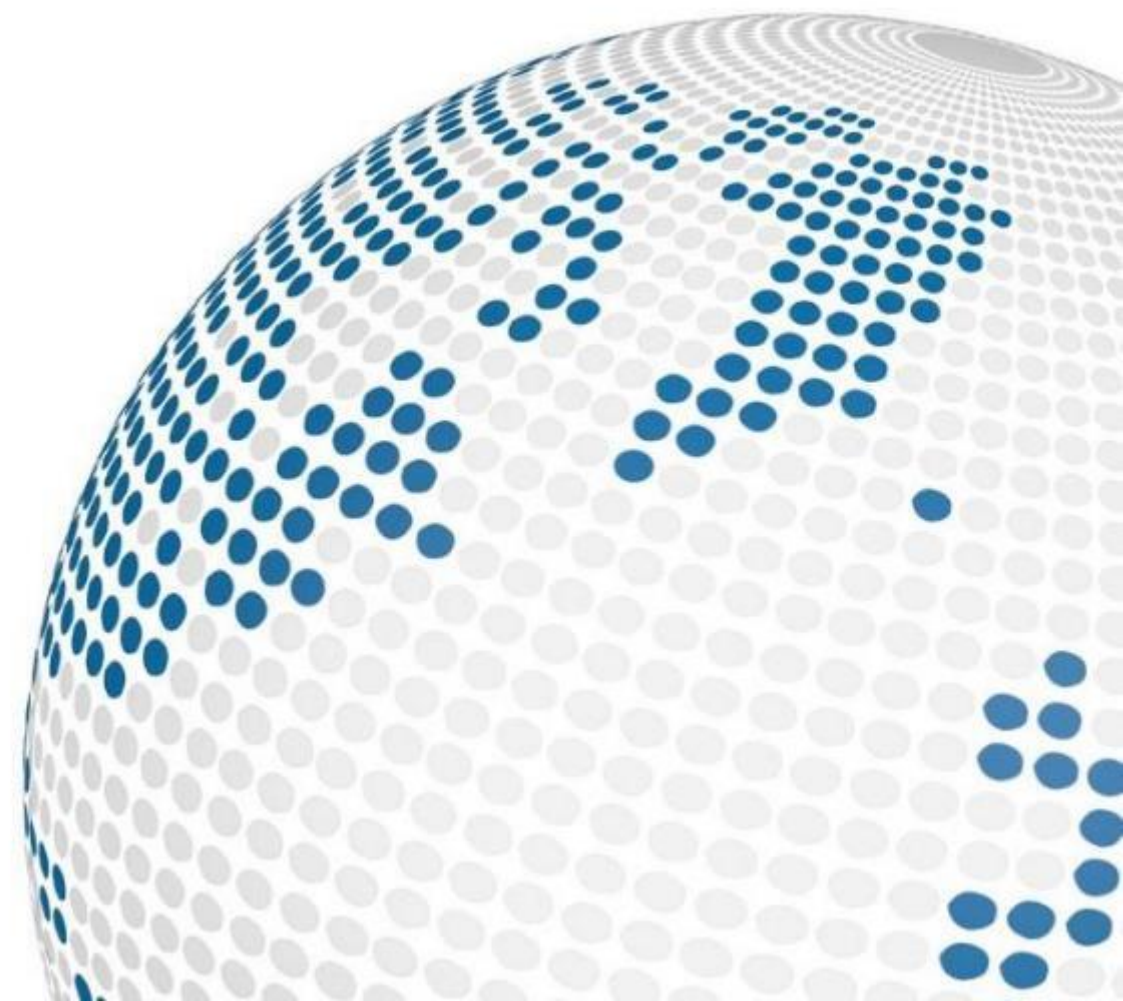# ams

Third quarter results 2019

Alexander Everke, CEO

Michael Wachsler-Markowitsch, CFO

Moritz M. Gmeiner, Head of IR

October 2019

ams at a glance

Sensing is life.

Our business

- Focused on high performance sensor solutions
- Sensor solutions, sensor ICs/sensor interfaces, related algorithms and software
- Small scale, low-power, highest sensitivity, tight integration
- Best-in-class solutions for leading OEMs

Our end markets

- Consumer (C) – H1 2019 75% of revenues
- Automotive, Industrial, Medical (AIM) – H1 2019 25% of revenues

By the numbers

- Around 9,000 employees worldwide
- Around 1,100 engineers
- 18 design centers, 3 manufacturing locations
- More than 35 years of design and manufacturing know-how
- Over 8,000 customers

Sensing enables life

Sensors – an integral part of the digital transformation

Infrastructure automation

Industrial IoT

Personal health

Smart consumer devices

Autonomous driving

Human/machine interface

Augmented reality

Smart home & building

ams strategy

Building a global leader in sensor solutions

Leading in three sensor areas

- Optical
- Imaging
- Audio

Best-in-class performance per sensor area and in sensor system solutions

- Miniaturization and integration
  - Sensor modules
  - Monolithic integration
- Sensor algorithms and sensor fusion software
- Application software for differentiating end-user experiences

Diversified business with balanced application and customer portfolio

- Long-term target mix of 60/40 split C/AIM
- Build broader customer base in each application
- Establish strong distribution channel

Financial model enabling long-term growth

- Focus on profitable growth
- Build strong margin profile across end markets

ams strategic pillars

Driving leadership in three sensing areas

Other lines

Optical sensing	Image sensing	Audio sensing	Other sensing

Optical sensing

- 3D sensing incl. VCSEL illumination (front+world-facing)
- Light analysis/proximity
- Behind-OLED sensing
- Long distance 1D ToF
- Bio- and spectral sensing
- New optical technologies

Image sensing

- High performance imaging
- Global shutter sensors
- Medical imaging
- Micro cameras

Audio sensing

- MEMS microphone ICs
- ANC noise cancelling

Position

Other sensing

- Position sensors (automotive/industrial)

3D sensing leader: success across markets

Leading player across 3D sensing technologies

- Leading portfolio of technologies, products and IP
  - Broad range of solutions for all 3D systems
  - Highly differentiated VCSEL/VCSEL array illumination
  - Leading portfolio in hardware and software IP
- Structured light (SL), time-of-flight (ToF), active stereo vision (ASV)

Very good Android growth, world-facing in high volume, new applications

**Industry-leading solution expertise, successful in all technologies and front-/world-facing**

- Leader in end-to-end system know-how for SL, ToF, ASV and front-facing/world-facing
- Strong position in illumination + VCSEL leadership, partnering with QCOM, Face++, MEGVII

Key 3D sensing supplier, SmartSens NIR image sensor partnership, Automotive traction

- High volume 3D for top consumer OEMs
- Strong Android position, fast growth in Android world-facing ToF illumination, first ASV smartphone platform + ASV solution launch
- iToF and dToF expertise to serve evolving customer needs
- SmartSens partnership: combined solutions with high QE near-infrared global shutter sensors
- Very good Automotive traction: 3D solid-state LIDAR win + engagements, in-cabin 3D win
- Well positioned in emerging markets: non-mobile consumer, early win in industrial

3D sensing: 3D LIDAR / in-cabin, VCSEL leader

Best of non-scanning/scanning
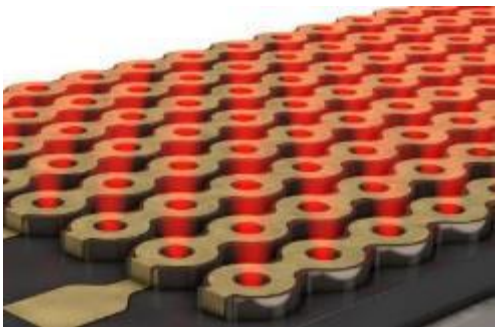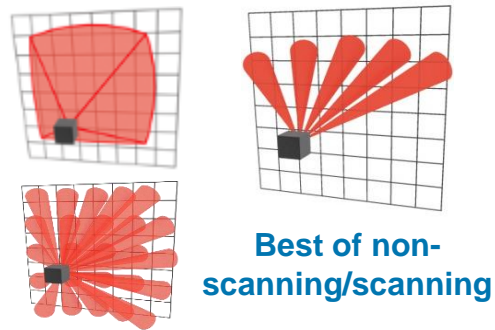
Automotive: solid-state LIDAR win, different LIDAR architecture engagements, in-cabin win

- Major solid-state LIDAR illumination win with Tier 1 supplier ZF and technology partner IBEO

- High performance true solid-state scanning:
  combines advantages of non-scanning/flash and mechanical/MEMS scanning

- Illumination system combines VCSEL array and automotive VCSEL driver, eye-safety ensured

- Line-by-line addressable high power high count VCSEL array:
  system-level advantages for multiple scanning architectures

- LIDAR VCSEL engagements with different Tier 1 suppliers across regions

- In-cabin optical 2D/3D sensing: driver monitoring, 3D ToF illuminator design-win at Tier 1 supplier, very good market traction given solution capability

Superior VCSEL technology: high differentiation, ongoing market success and wins

- Broad portfolio for illumination in all 3D technologies:
  ToF + SL illumination, ASV + SL pattern/dot projection, 1D ToF proximity

- Best-in-class high power VCSELs/high count VCSEL arrays:
  Smallest pitch (high resolution, lower system cost), leading power efficiency (up to >60% (lab) vs. typical 45-50% quantum efficiency), best beam quality (very narrow beam divergence), true high power (from mW to W to 100+W)

- External supply chain covers strong 2019 volumes, upcoming internal line adds differentiation

3D sensing: SmartSens partnership, LD 1D ToF

SmartSens partnership: high performance NIR sensors and combined 2D/3D solutions

- Partnering with leading image sensor vendor SmartSens for illumination and Near Infrared (NIR) image sensing for 2D/3D
- NIR image sensor with state-of-the-art quantum efficiency (QE) of up to 40%, ams illumination expertise and core IP in global shutter technology enable ASV and SL
- ASV reference design for consumer 3D: depth maps for payment, face recognition + AR/VR, faster time to market, competitive cost
- Significant automotive opportunity in 2D/3D in-cabin sensing: driver monitoring/identification, accelerating time to market for combined solution
- Emerging industrial market: early ASV engagement with major OEM for household device
- First revenues from partnership expected 2020

Long distance 1D ToF solution: high quality long range measurement, first design win

- Compact high performance VCSEL ToF solution for distance measurement/object detection
- Accurate measurement up to around 2.5 meters
- First Android win for laser detect autofocus (LDAF) for smartphone world-facing camera
- Additional market traction at smartphone OEMs and also IoT

Optical sensing

Worldwide leader in light sensing solutions

- Leading in optical sensing
- Leading in sensors, illumination solutions and high performance optical systems
- High quality optical sensing at Top 15 smartphone OEMs
- Upcoming growth markets in automotive + industrial

Broad portfolio: 3D sensing incl. VCSEL, display management/proximity, other applications

- 3D sensing expert: leading portfolio and system know-how, major consumer customers
- High performance VCSELs for 3D/optical sensing: strong in consumer, automotive momentum
- Innovative behind-OLED light/proximity sensing: market adoption expanding rapidly
- TrueColor display management, color ALS/proximity, ultra-small proximity for wireless earbuds

Technology leadership in new applications and markets

- 3D sensing: consumer adoption enabling strong automotive and early industrial traction
- Biosensing: high quality blood pressure and other health data capture
- Optical technologies create new uses and sensing applications in all end markets

Leadership in 3D and new optical technologies for large new markets and applications

Optical sensing: Rapid behind-OLED expansion

Behind-OLED light and proximity sensing solution

- Display management innovation: optical sensing behind the OLED display
- Enables industry trend for maximum screen-to-body ratio and bezel-less phone designs
- Complex unmatched sensing technology: very low light levels through OLED + proximity lighting emitted through display
- Very attractive adoption curve, establishing a key feature for high end smartphone displays
- Fast penetration of leading smartphone OEMs and major platforms at higher content
- Further development of under-display technologies including 3D

Expanding market success: high volumes across major OEMs and 2019 platforms

Image sensing
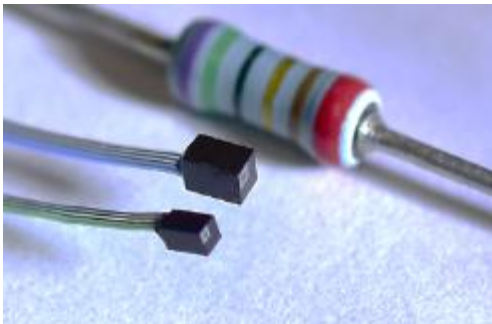
Leading in advanced image sensing for industrial + medical

- **Industrial** – Leading in global shutter technology for advanced industrial applications
- High value global shutter CMOS imaging for high speed machine vision, inspection, factory automation
- **Medical** – Global leader in medical imaging sensor solutions
- High performance, cost-optimized systems for computed tomography (CT) and digital X-ray, expanding market position in Asia
- Clearer images at lower radiation dose for better diagnostics in 3D-CT and digital X-ray
- NanEye micro camera technology: versatile highly miniaturized camera solutions ($\leq 1mm^2$)

Strong position and attractive opportunities in growth markets and new applications

- Ongoing strong traction for NanEye micro cameras
  - world's smallest endoscopy cameras, growth market in disposable medical endoscopes
  - new consumer and industrial applications leverage near-invisible footprint
- SmartSens partnership for high performance high QE NIR sensors
  - combined global shutter IP and application expertise for faster time-to-market
  - progressing with ASV 3D reference design for multiple consumer applications

NanEye micro cameras and SmartSens NIR partnership drive new opportunities

Audio sensing

ANC (active noise cancellation)

- Best-in-class high performance noise reduction (>40dB)
- Clear leader with broad portfolio for wired/wireless accessories
  - significantly better audio experience
  - very low power, very small form factor
- Innovative solution for high quality digital ANC in loose-fitting true wireless earbuds, consumer OEM traction
- Augmented hearing: selective noise cancelling by-pass, e.g. for speech
- Single wire power/communication interface for mobile audio charging POW:COM
- Strongly positioned in growing volume market

MEMS microphone interface ICs

- Market leading in expanding high volume market
- Broad portfolio for low noise and tight integration
- Home assistant/IoT market growth with multiple microphones per device
- Strong customer partnership focused on attractive segments

Innovative digital ANC for loose-fitting wireless earbuds: high OEM interest

Hybrid volume manufacturing model

Internal: Differentiated manufacturing
Outsourced/external: Standard process manufacturing

Internal front-end wafer manufacturing, Austria

- 8" CMOS/specialty analog to 180nm, 190+k wafers p.a.
- Optical filter production

Internal optical manufacturing/backend + upcoming VCSEL manufacturing, Singapore

- Leader in high-performance optical system technologies
- Advanced optical assembly/backend, WLO/optical filter production
- Significant improvements in production efficiency and operations
- Internal VCSEL capacity: 6" 2,000 wspm line for high performance products, expected front-end ramp from around year-end 2019

**External manufacturing partnerships for scalability and flexibility**

- High volume wafer suppliers (TSMC, UMC), standard and semi-custom packaging
- Outsourced VCSEL supply chain: capacity partners, serving strong 2019 VCSEL needs

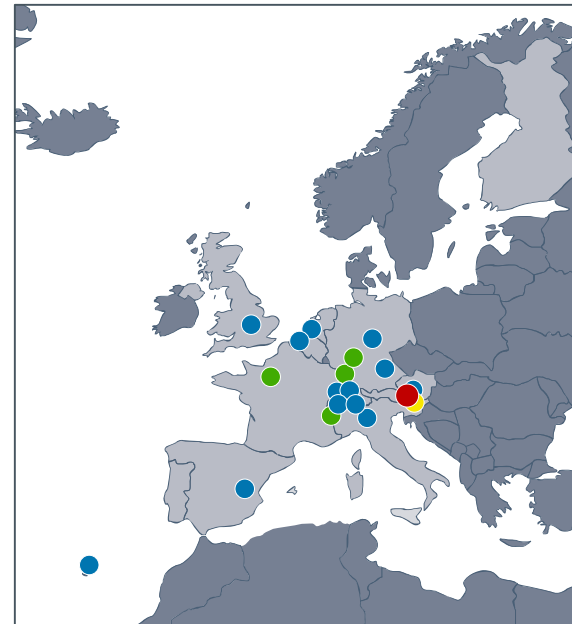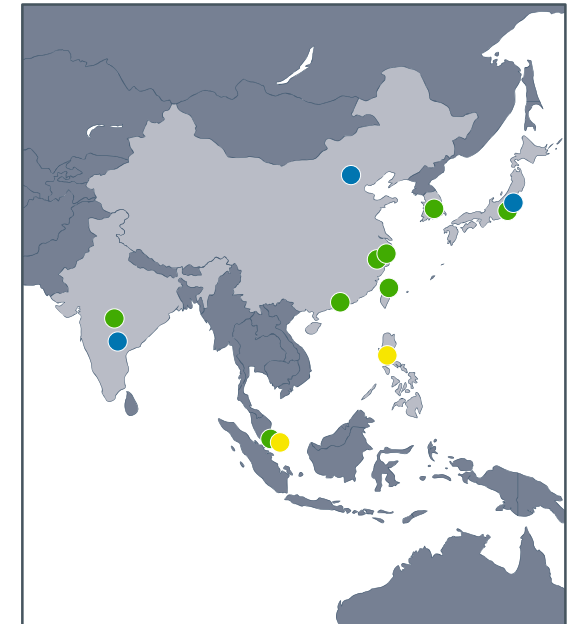**In-house test, Philippines/Singapore/Austria**

Benefiting from manufacturing efficiencies in Singapore

Global network

- 🔴 Headquarters
- 🔵 Design centers
- 🟡 Manufacturing/Test
- 🟢 Sales/customer support locations
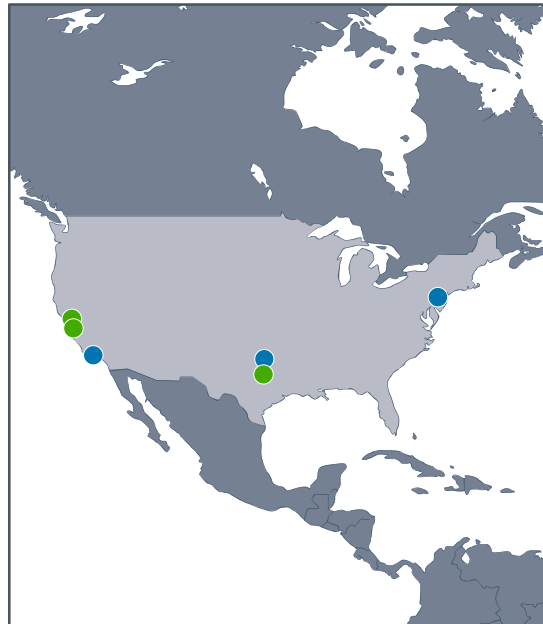
Americas

Europe

Asia

- **18 design centers**
  Austria, Belgium, China, Germany (2), Italy, India, Japan, Netherlands, Portugal, Spain, Switzerland (3), UK, USA (3)
- **Manufacturing locations**
  Austria, Singapore
- **Test center**
  Philippines, Singapore, Austria

Key figures

USDm

			9M 2019	9M 2018	Q3 2019	Q3 2018
Total revenues			1,438.7 +30%	1,107.9	645.0 +41%	458.7
Gross margin	(adjusted) [1]		39%	30%	44%	33%
	(IFRS reported)		37%	27%	42%	31%
Result from operations (EBIT)	(adjusted) [1]		250.5	81.6	177.9	57.6
	(IFRS reported)		163.8	5.7	146.5	35.7
Net result	(adjusted) [3]		173.7 +1,604%	10.2	158.1 +789%	17.8
EPS (basic/diluted)	(adjusted) [3]	CHF [2]	2.18 / 2.13	0.13 / 0.13	1.92 / 1.87	0.22 / 0.21
		USD [2]	2.17 / 2.12	0.13 / 0.12	1.95 / 1.91	0.22 / 0.21

[1] Excl. acquisition-related and share-based compensation costs
[2] Earnings per share in CHF were converted using the average currency exchange rate for the respective periods
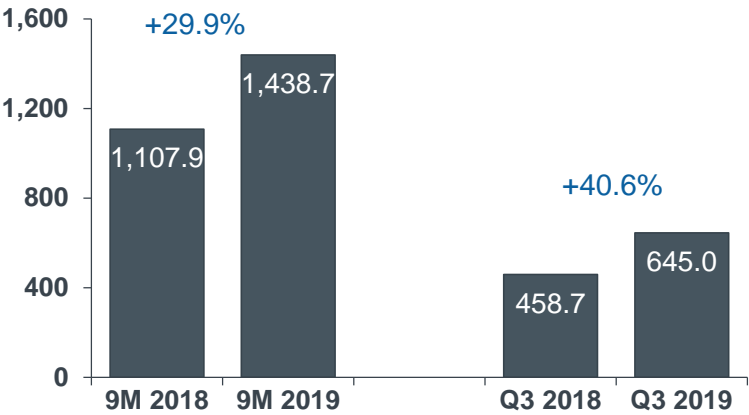[3] Net result and earnings per share excluding valuation effect of the option element of the issued USD convertible bond
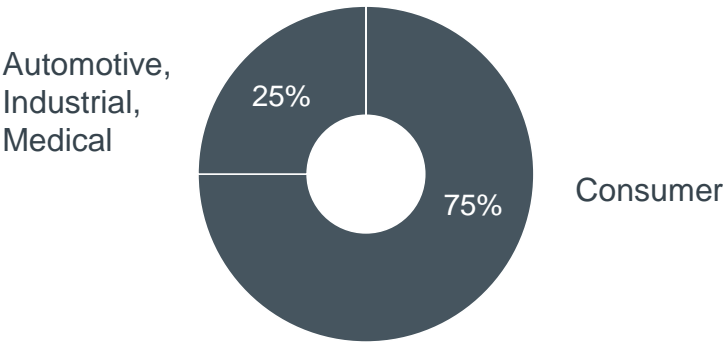
Financial results

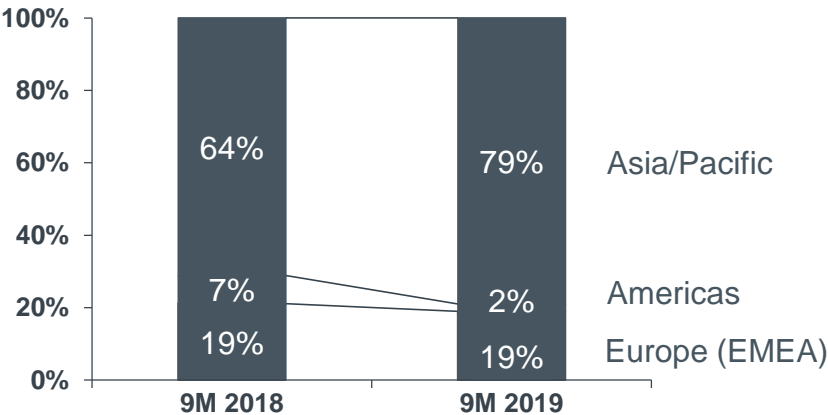**USDm**

Total revenues

1,107.9	1,438.7	458.7	645.0
9M 2018	9M 2019	Q3 2018	Q3 2019

+29.9%

+40.6%

Total revenues by market H1 2019

Automotive, Industrial, Medical — 25%

Consumer — 75%

Total revenues by region

	9M 2018	9M 2019	
Asia/Pacific	64%	79%	
Americas	7%	2%	
Europe (EMEA)	19%	19%	

Total backlog

	Jun 30 2019	Sep 30 2019
	301.4	253.1

Consignment stock agreements approx. USD 24-27m
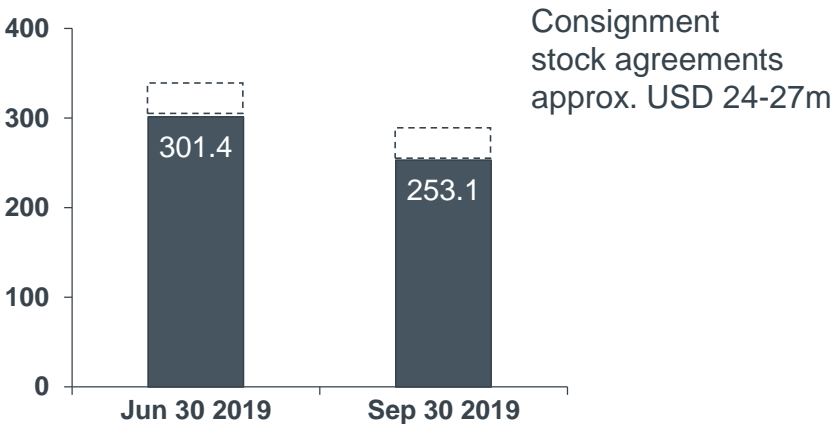
Financial results

USDm, % of revenues

Gross profit, gross margin (adj.) [1]
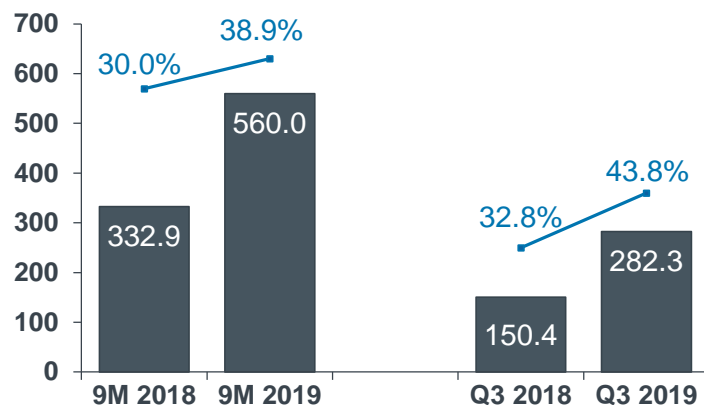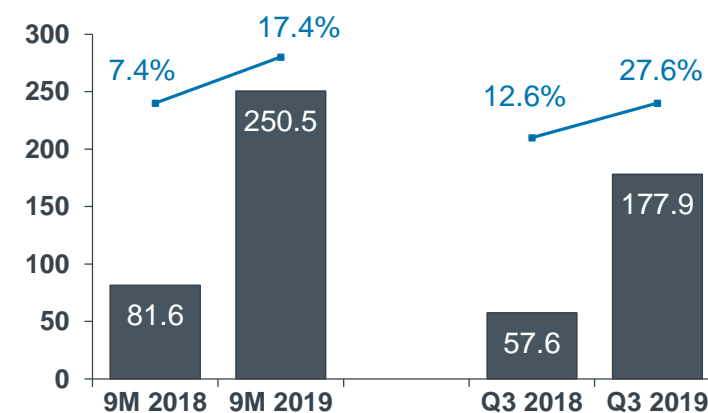

R&D
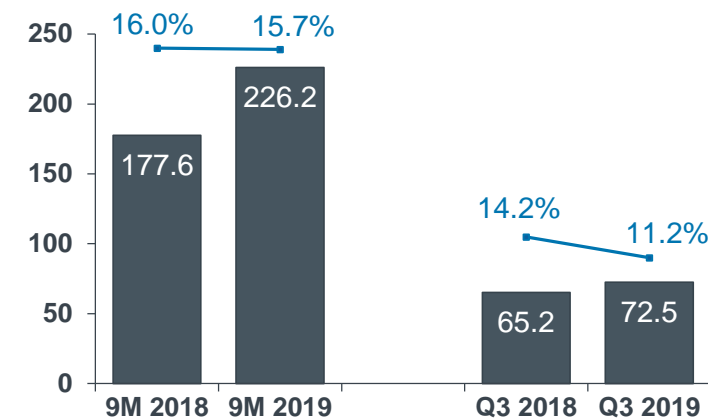
SG&A
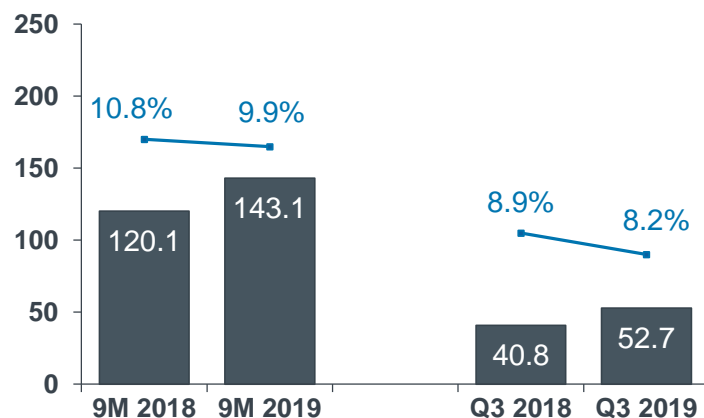
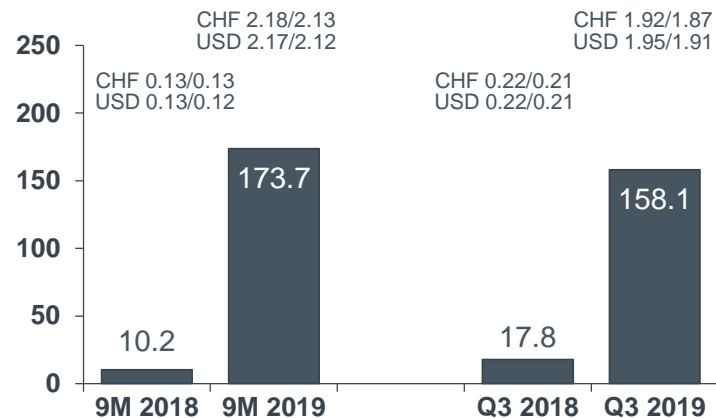**EBIT, EBIT margin (adj.)** [1]

[1] Excl. acquisition-related and share-based compensation costs

Financial results

USDm, % of revenues

Net result, EPS (basic/diluted) (adj.) [1]

CHF 2.18/2.13
USD 2.17/2.12

CHF 0.13/0.13
USD 0.13/0.12

CHF 0.22/0.21
USD 0.22/0.21

CHF 1.92/1.87
USD 1.95/1.91

	9M 2018	9M 2019	Q3 2018	Q3 2019
Value	10.2	173.7	17.8	158.1

Operating cash flow

	9M 2018	9M 2019	Q3 2018	Q3 2019
Value	64.7	443.4	82.2	299.0
%	5.8%	30.8%	17.9%	46.4%

Net debt, cash + short term investments

Net debt

Cash + short term invest.

	9M 2018	9M 2019	9M 2018	9M 2019
Value	1,536.6	1,116.5	362.0	1,065.4

Capital expenditures

	9M 2018	9M 2019	Q3 2018	Q3 2019
Value	413.1	168.2	101.7	34.6
%	37.3%	11.7%	22.2%	5.4%
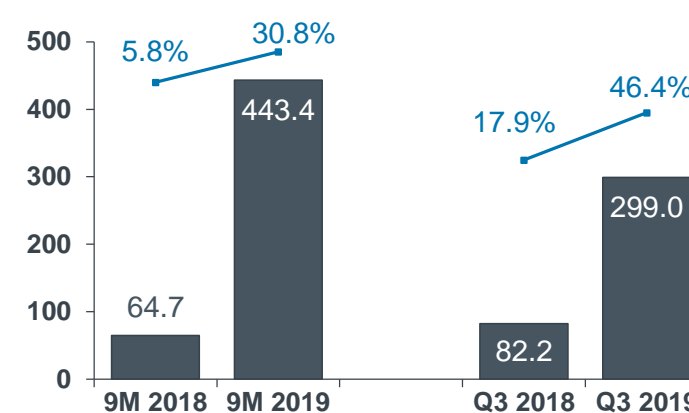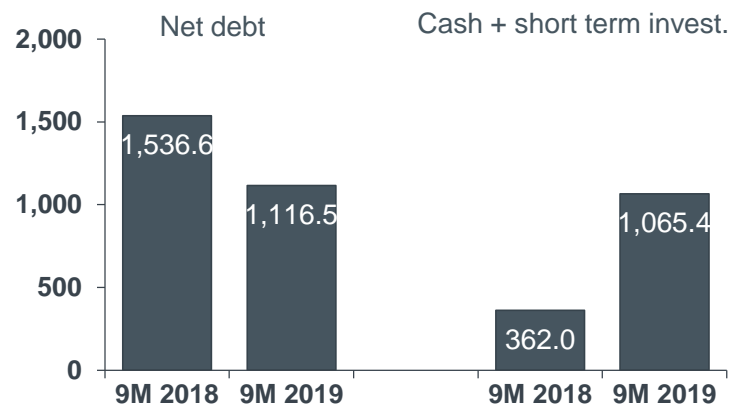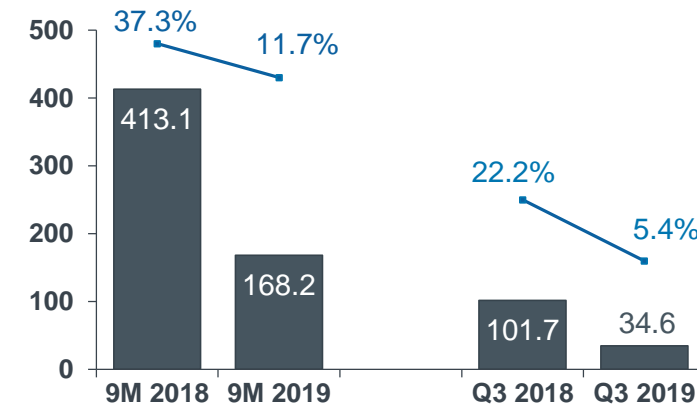
[1] Net result and earnings per share excluding valuation effect of the option element of the issued USD convertible bond

ams

Shaping the world with sensor solutions

ams
Sensing is life.

Profit and loss statement

USDm

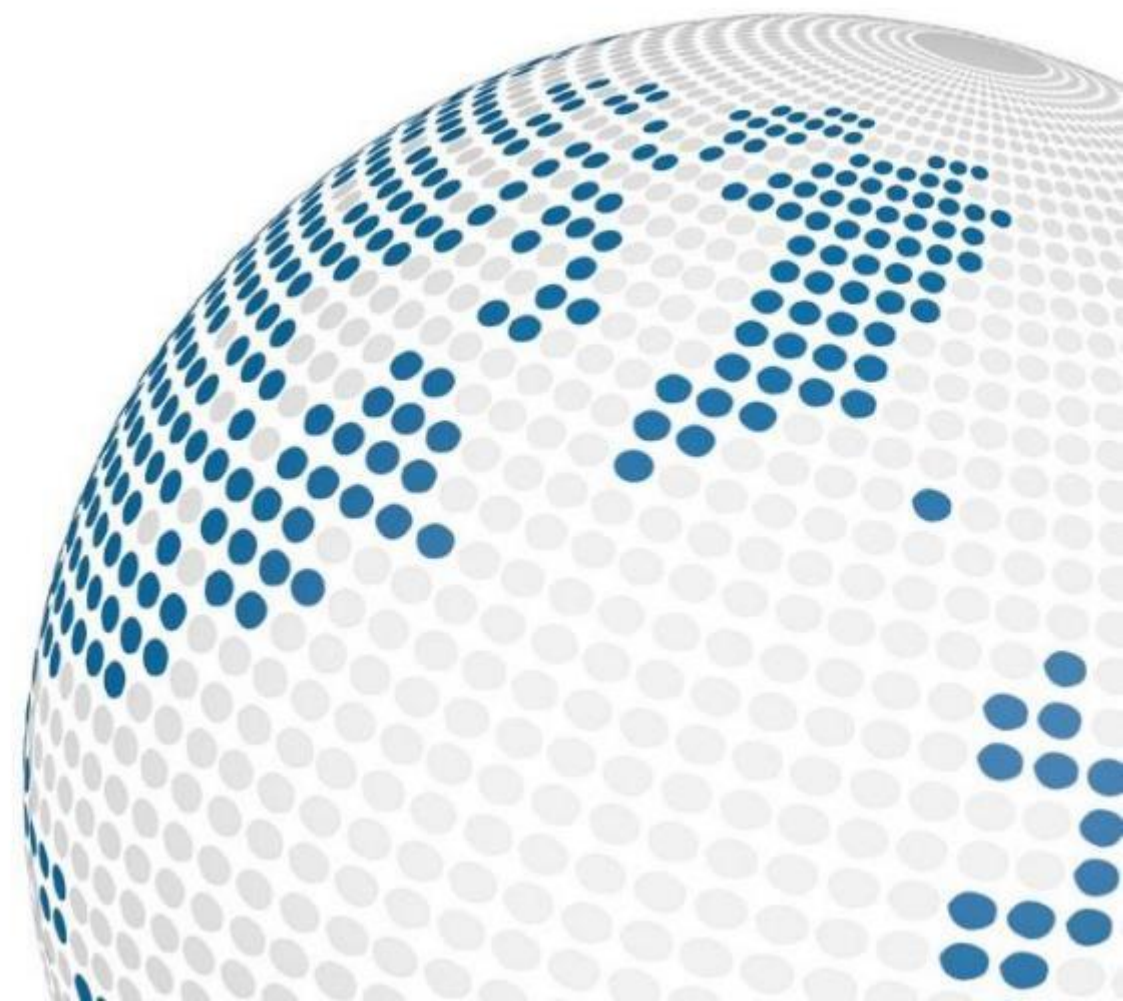| (IFRS)	9M 2019	9M 2018	Q3 2019	Q3 2018
Total revenues	1,438.7	1,107.9	645.0	458.7
• Products	1,400.8	1,071.9	635.9	445.5
• Foundry	37.9	36.0	9.1	13.2
Gross profit	526.4	296.7	271.1	140.2
• Gross margin (adjusted [1])	38.9%	30.0%	43.8%	32.8%
• Gross margin (IFRS reported)	36.6%	26.8%	42.0%	30.6%
Research and development	-226.2	-177.6	-72.5	-65.2
Selling, general and administrative	-143.1	-120.1	-52.7	-40.9
Other operating income/expenses	6.9	7.2	0.7	1.7
Result from operations (EBIT)	163.8	5.7	146.5	35.7
• EBIT margin (adjusted [1])	17.4%	7.4%	27.6%	12.6%
• EBIT margin (IFRS reported)	11.4%	0.5%	22.7%	7.8%
Net financing costs	14.1	103.9	11.8	33.3
Result before tax	177.8	109.6	158.3	68.9
Income tax result	-4.2	-6.8	-0.3	-3.1
Net result (adjusted [2])	173.7	10.2	158.1	17.8
Net result (IFRS reported)	173.6	102.9	158.0	65.8

[1] Excl. acquisition-related and share-based compensation costs
[2] Net result excluding valuation effect of the option element of the issued convertible bond

Balance sheet

USDm

Assets (IFRS)	Sep 30, 2019	Dec 31, 2018	Liabilities and equity	Sep 30, 2019	Dec 31, 2018
Cash and short term invest.	889.7	695.6	Interest-bearing debt	287.2	244.8
Financial Investments	175.7	0.0	Trade liabilities	177.5	195.7
Trade receivables	217.7	134.7	Tax liabilities	15.8	18.3
Inventories	267.4	344.9	Provisions	98.6	89.8
Other current assets	51.3	42.3	Other liabilities	67.4	61.8
Assets held for sale	111.8	0.0	Liabil. associated w. assets held for sale	0.7	0.0
Total current assets	**1,713.6**	**1,217.4**	**Total current liabilities**	**647.1**	**610.4**
Fixed assets	1,316.3	1,342.5	Interest-bearing debt	1,894.7	1,779.2
Intangible assets	1,433.7	1,359.3	Employee benefits	47.0	44.9
Investments in associates	3.2	3.3	Deferred tax liabilities	70.8	73.1
Deferred tax asset	18.2	18.2	Other liabilities	180.6	41.4
Other non-current assets	8.6	8.2			
Long-term financial assets	39.1	40.0			
Total non-current assets	**2,829.0**	**2,771.1**	**Total non-current liabilities**	**2,192.9**	**1,938.5**
			Shareholders' equity	**1,702.5**	**1,439.6**
Total assets	**4,542.6**	**3,988.5**	**Total liabil. and equity**	**4,542.6**	**3,988.5**

Cash flow statement

USDm

(IFRS)	9M 2019	9M 2018	Q3 2019	Q3 2018
Result before tax	177.8	109.6	158.3	68.9
Depreciation	230.1	170.2	78.9	59.8
Cash flow from operations	443.4	64.7	299.0	82.2
Capital expenditures	-168.3	-413.1	-34.6	-101.8
Cash flow from investing activities	-340.2	-416.4	-200.9	-76.2
Proceeds from borrowings	352.7	237.4	338.6	181.4
Proceeds from issue of convertible bond	0.0	680.7	0.0	0.0
Repayment of debt	-130.5	-340.1	-22.7	-3.3
Repayment of convertible bond	-80.6	0.0	-5.9	0.0
Dividends paid	0.0	-30.7	0.0	0.0
Cash flow from financing activities	76.8	359.4	297.1	122.7
Change in cash and cash equivalents (incl. effects of changes in foreign exchange rates)	194.1	5.6	413.6	128.8
Cash and cash equivalents at end of period	889.7	362.0	889.7	362.0