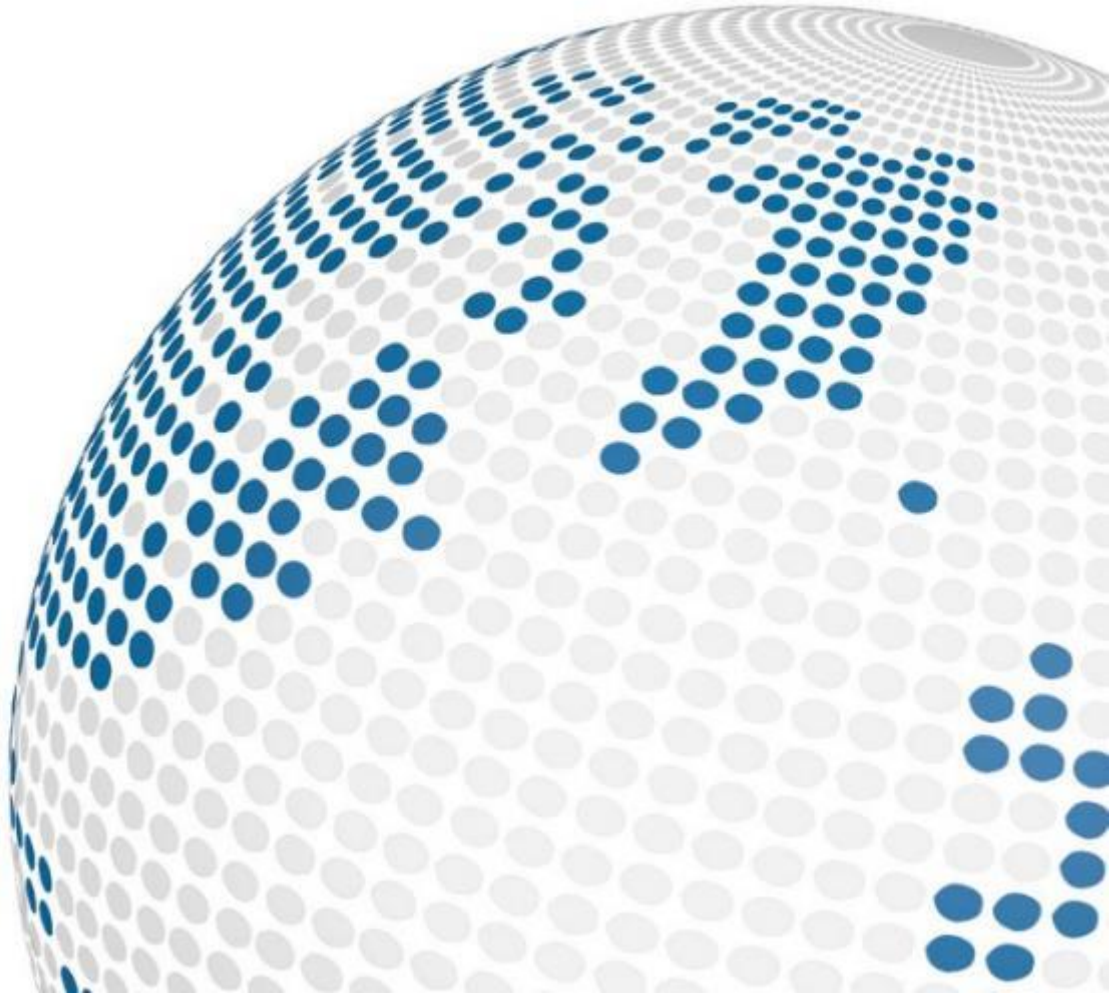
ams

Second quarter and half year results 2020

Alexander Everke, CEO
Ingo Bank, CFO
Moritz M. Gmeiner, Head of IR

July 2020

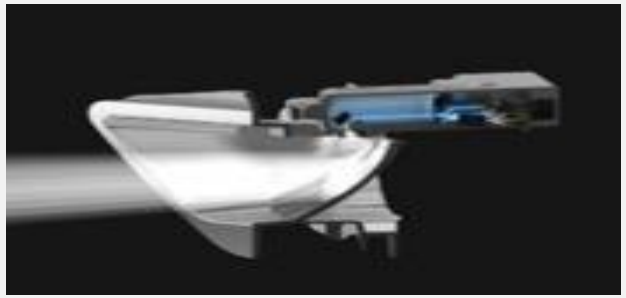


Vision for ams/OSRAM

Create the uncontested leader in optical solutions

Sensing

Illumination



Visualization

Build the leading portfolio in optical solutions

Strength across the full range of key solution components

	Emitters	Optical components + micro-modules	Detectors	Integrated circuits + algorithms
Key solution components	• LEDs • µLED • VCSELs/EELs • Lamps	• Optical elements: Lenses, light guides, DOEs • Micro-optical packaging • Optical modules	• Light sensors • Bio-sensors • Image sensors	• Emitter driver ICs • Sensor interfaces • Sensor processors (incl. algorithms)

Micro-optical/optical solutions + lamps (modules)

Target applications

Sensing

Illumination

Visualization

Create the uncontested leader in optical solutions

Innovation + leadership

Pursue real innovation and market leadership in key optical components (emitters, optics, detectors, ICs, algorithms)

Micromodule + module solutions

Develop optical micromodule/module solutions for growth applications in sensing, illumination, visualization

Diversified business

Drive diversified business with balanced application mix and broad customer portfolio

Co-operation

Work with innovation leaders in each area, then roll out to broader customer base

In-house manufacturing

Focus in-house manufacturing on process steps driving product differentiation

M&A

Accelerate the implementation of our strategy through M&A

Leading financial performance

Deliver excellent financial performance in revenue growth and profitability

Strategic position to benefit from growth trends

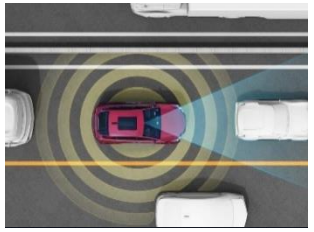
Key technology trends driving the sensing market

Next generation displays

- µLED displays with full sensor-display integration
- Smart watches, mobile devices, smart home and building, in-car displays and HABA/Industrial

Autonomous driving

- LIDAR solutions with VCSEL- and EEL-based offering
- Leveraging front and rear lighting systems as LIDAR/sensor hubs



Digital automotive lighting

- Miniaturized light projectors for exterior and interior lighting solutions

Next generation imaging

- Ultra small wafer-level cameras for AR/VR glasses
- Heads-up displays in Automotive

Bio-sensing

- Bio-sensing using mid-IR tunable laser and detector
- Optical read-out for Lateral Flow Test (LFT)
- Take on the challenge of non-invasive glucose monitoring

Industrial IoT

- Presence detection and personalization
- Position detection
- Smart functions

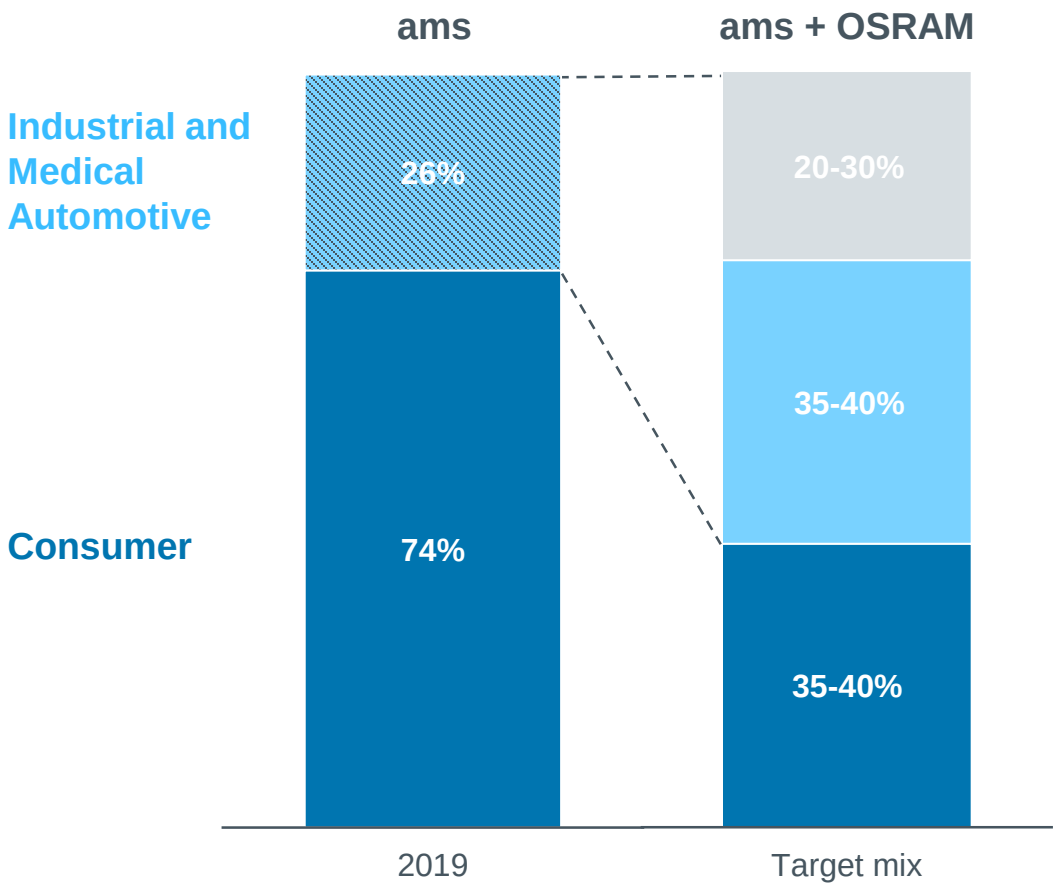
In-cabin sensing (ICS) / HMI

- Driver monitoring including attention and health + comfort settings
- Gesture detection and authentication

Diversified and balanced end market exposure

Well-diversified combined revenue mix

Revenue share %

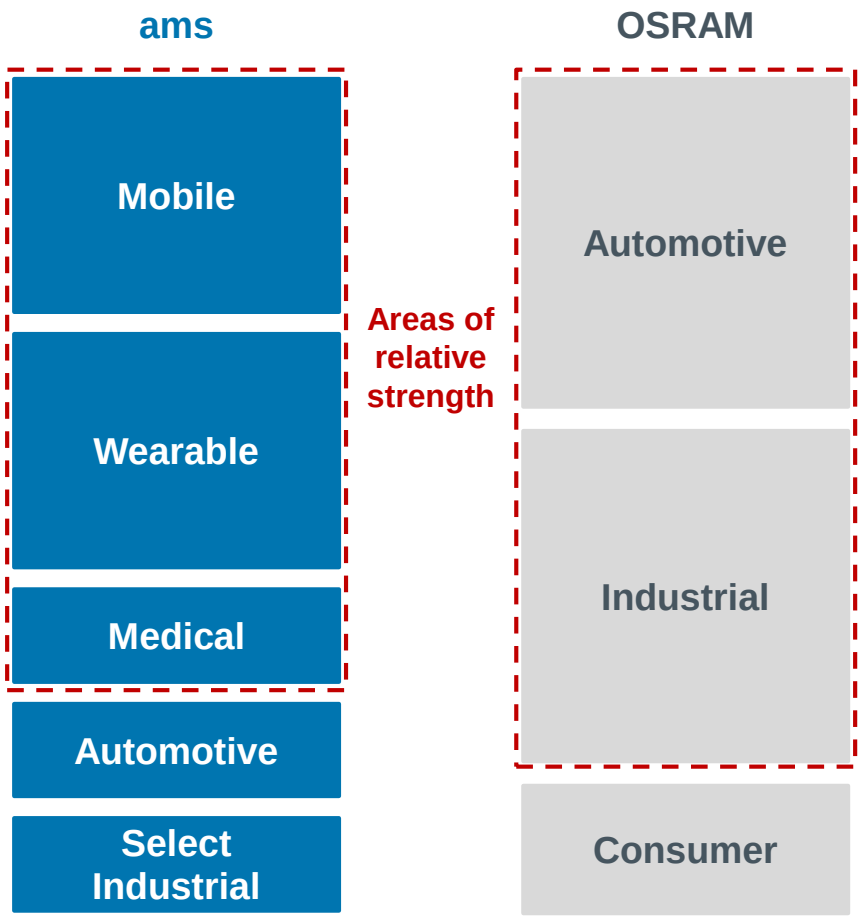


Balanced exposure and business profile

- **Extensive and accelerated diversification of revenues**
- **Meaningful but balanced size in Automotive, focus on growth areas**
- **Reduced exposure to Consumer**
- **Driving technology-based differentiation in targeted segments**

Strong relationships power combined go-to-market

Complementary go-to-market access



Extending customer reach across differentiated industries

ams

- All leading mobile and consumer OEMs
- Major medical imaging vendors

OSRAM

- Automotive OEMs, Tier 1s and Industrial clients
- Large Automotive sales force

Leverage high touch organization and serve combined customer base across markets

Combined manufacturing/innovation footprint

Well-invested asset base following investment cycle: clear scale + potential for optimization

ams sites OSRAM sites

ams and OSRAM Opto Semiconductors manufacturing footprint displayed on map

Invest and innovate in European front-end

- Consolidate front-end LED production
- Accelerate micro-LED manufacturing process development
- Meaningful expected job additions across manufacturing and engineering
- Significant capacity available for growth with limited additional capex

Optimize Asian manufacturing footprint

- Established three large scale new sites in recent years
- Assess consolidation of LED back-end production in Asia
- Explore streamlining of combined Asian manufacturing footprint
- Significant capacity available for growth with limited additional capex

Tangible synergies leverage combination

		Expected annual run-rate pre-tax synergies 3 years after closing[1]
COGS synergies	▪ Optimize LED front-end production ▪ Assess consolidation of LED back-end production ▪ Optimize ams' Asian manufacturing footprint	**>EUR120m**
OPEX synergies	▪ Align corporate functions incl. marketing ▪ Integrate IT functions and systems across ams and OSRAM ▪ Optimize combined R&D programs	**>EUR120m**
Revenue synergies	▪ Leverage complementary go-to-market strengths ▪ Accelerate roadmaps in new optical solution areas	**>EUR60m** **Longer term** 

Note:
1 Synergies based on assessment of summer 2019; run-rate synergies expected to be achieved by year 3 post closing; one-off expected integration costs of up to. EUR400m

ams at a glance

(ams standalone)

Sensing is life: high performance sensor solutions for leading OEMs, focus on sensor-rich markets

Key figures

961 Revenues H1 2020 USD m	**22%** Revenue growth year-on-year	**8,000** Customers
9,000 Employees	**1,100** Engineers	**>3,000** patents

Our markets (H1 2020)

Consumer – 83% of revenues



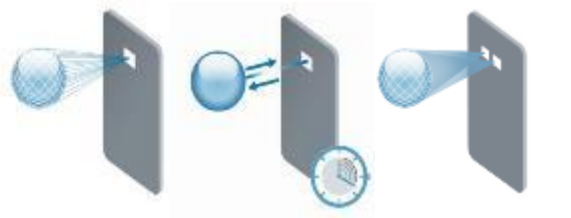
Automotive, Industrial, Medical – 17% of revenues



Sensing enables life

Sensors – an integral part of the digital transformation

3D sensing: leading across technologies



Structured Light | Time-of-Flight | Active Stereo Vision

Leading player across 3D sensing architectures

- Industry-leading portfolio of technologies, products and IP
  - Broad coverage of all 3D architectures
  - Highly differentiated VCSEL/VCSEL array illumination
  - Outstanding portfolio in hardware, software, algorithm IP
  - High QE near-infrared global shutter image sensing
- Positioned for customer needs in all architectures:
  Structured light (SL), time-of-flight (iToF/dToF), active stereo vision (ASV)

Strong across smartphone market, leading expertise in SL/iToF/dToF/ASV

Industry-leading solution expertise

- Leader in system know-how for SL, iToF, dToF, ASV, front-facing/world-facing
- Strong in 3D illumination, VCSEL leadership, adding NIR sensing to drive solutions

Key 3D sensing supplier in Consumer, upcoming Automotive LIDAR, early Industrial

- High volume 3D for top consumer OEMs
- Leading position in Android world-facing iToF illumination, behind-OLED 3D development in ASV, ASV full solution demos, dToF development
- Automotive momentum: solid-state 3D and other LIDAR, in-cabin sensing
- Industrial early moves: household, growing interest in secure access

3D sensing: NIR sensing, ASV, BOLED 3D

High performance near-infrared (NIR) sensing

- Ultra-sensitive ams NIR image sensing with state-of-the-art quantum efficiency (QE) of up to 40%
- Incorporating ams illumination expertise and core IP in global shutter technology, partnership with SmartSens

NIR sensing drives ASV solutions, BOLED 3D development

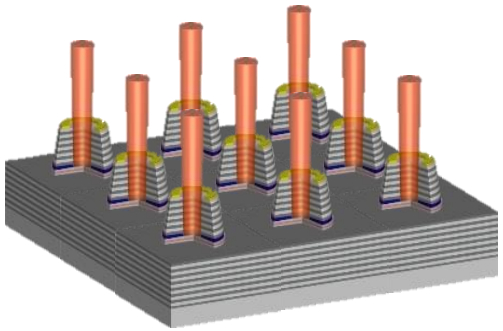
ASV: leveraging 3D expertise for ams system solution

- Integrating NIR sensor expands 3D offering for solution development
- Full 3D system capability based on leading 3D portfolio and expertise
- Front-facing ASV system – VCSEL to biometrics: projector illumination (VCSEL, driver, optics, module), ams IP NIR sensor, software (depth mapping, biometrics)
- Accelerating implementation of ASV system solutions:
  Consumer 3D, Automotive 2D/3D in-cabin sensing (ICS), early industrial (household, access)

BOLED 3D development

- Invisible BOLED 3D – moving 3D behind display:
  high security, high convenience, attractive design,
  ASV-based full system in development, potential to explore SL architecture

3D sensing: dToF development, VCSELs



dToF 3D: leading know-how in upcoming 3D architecture

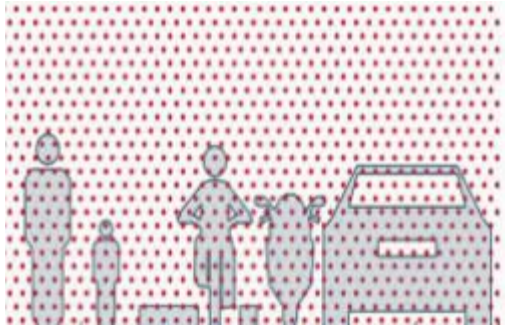
- dToF offers outstanding 3D performance for difficult lighting conditions (high brightness) and longer distances
- Very attractive, technically complex architecture
- dToF roadmap for illumination and systems development
  - portfolio of VCSEL illumination, optics, SPAD, related IC
  - targeting high performance + long distance
  - strong ams IP, high value proposition
- Expecting dToF to emerge into important 3D area
- Market interest in dToF future WF applications increasing

dToF development roadmap for longer distance WF 3D: innovation focus

Superior VCSEL technology as basis: high differentiation, driving 3D strength + solutions

- Leading portfolio for illumination in all 3D architectures:
  iToF/dToF/SL illumination, ASV/SL dot projection, 1D ToF distance + 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 supports high volumes, ramp-up of internal line ongoing

3D sensing: Automotive 3D LIDAR, in-cabin



Best of non-scanning/scanning

3D LIDAR: leading illumination technology provider

- Major solid-state LIDAR illumination win with Tier 1 supplier ZF + leading technology provider IBEO
- High performance true solid-state scanning: combining advantages of non-scanning/flash + mechanical/MEMS scanning
- Line-by-line addressable high power high count VCSEL array: system-level advantages across scanning architectures
- VCSEL illumination systems for multiple LIDAR architectures (true solid-state, mechanical scan, flash), may include automotive eye-safety VCSEL driver
- Strong partnership with IBEO drives market traction, LIDAR illumination wins in different geographies

Automotive 3D offers major opportunities, market traction in in-cabin sensing

In-cabin optical sensing (ICS): sizeable emerging market, strong traction, first win/projects

- Identified applications: driver monitoring (drowsiness, distraction), driver interaction (gestures), occupant monitoring (airbag management, rear seat)
- Very good market traction given solution capability and automotive expertise
- Full ams 3D driver monitoring system demo for in-dashboard integration
- First 3D ToF illumination for Tier 1 supplier, product development for additional projects

Optical sensing

A worldwide leader in light sensing solutions

- Leading in optical sensing:
  sensors, illumination solutions, high performance optical systems
- High quality optical sensing at top consumer OEMs
- Driving innovation in optical technologies
- Upcoming growth markets in Automotive + Industrial

Leadership in 3D and optical sensing for consumer and non-consumer markets

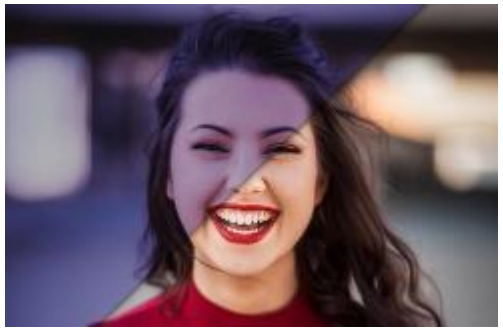
Broad portfolio: 3D sensing incl. VCSEL, display management/proximity, BOLED

- 3D sensing: leading portfolio + system expertise, all technologies, major consumer OEMs
- High performance VCSELs for 3D/optical sensing: strong in consumer, early automotive lead
- Innovative behind-OLED light/prox sensing: fast adoption, enabling BOLED 3D (development)
- Display management ALS/proximity, ultra-small proximity for wireless earbuds, camera AWB

Technology leadership for new markets: spectral sensing, bio-sensing

- Biosensing: high quality blood pressure + health data measurement
- Spectral sensing: bio/medical sample analysis innovation, highly accurate optical read-out for lateral flow test (LFT), first partnership for Covid-19 antibody fast point-of-care diagnostics

Optical sensing: BOLED sensing, spectral AWB



Behind-OLED (BOLED) light and proximity sensing

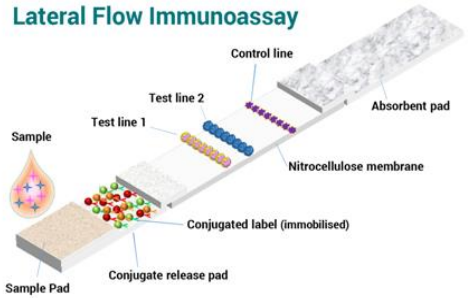
- Invisible high quality optical sensing behind OLED displays
- Complex industry-leading technology and sensor solution: very low light levels passing through OLED (approx. 4%), proximity lighting emitted through display
- Fast penetration of leading smartphone OEMs and major platforms at higher content
- Valuable feature for high end smartphone displays, enables industry trend for maximum screen-to-body ratio and bezel-less designs
- Multi-generation roadmap driving performance/sensitivity, basis for BOLED 3D: BOLED ASV system in development

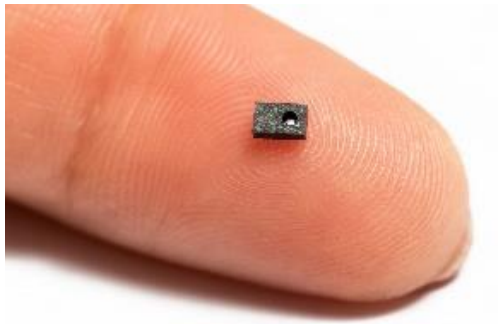
BOLED adoption ongoing: major OEMs + platforms; innovative AWB market success

High accuracy auto white balancing (AWB) for smartphone cameras

- Integrated spectral sensing solution for highly accurate AWB: 11-channel spectrum analysis of light environment and light source mix
- Correct white-point balancing: key photographic function to realize best picture quality, compensate image colors for distorting effects of ambient light environment
- Unparalleled image quality even in high color contrast scenes, vivid natural colors
- First major high-end smartphone platform, higher DXOMARK camera ranking

Optical sensing: spectral read-out for medical LFT





Spectral sensing high accuracy read-out for medical LFT tests

- Innovative application for spectral sensing in medical lateral flow testing (LFT)
- Established medical testing method for bacteria, viruses and other medical samples
- Unmatched technology for optical LFT read-out and analysis with very high accuracy
- Fast diagnostics at point-of-care, avoids expensive lab equipment and shipping samples
- First partnership with European test provider Senova
  - LFT for Covid-19 antibody identification, integrated test kit with spectral sensor + Bluetooth
  - moving toward first production in H2 2020E
- Strong market interest, exploring several additional industry partnerships for different medical LFT uses

Innovation enables fast diagnostics at point-of-care; first partner for Covid-19 antibodies

Image sensing

Leading in advanced image sensing for Industrial + Medical

- **Industrial** – Leading vendor 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: clearer images at lower radiation doses for improved diagnostics
- CT for Covid-19 clinical diagnostics helping medical imaging demand
- NanEye micro cameras: versatile solutions (≤1mm^2), leading for next gen medical endoscopy

Leading in global shutter + Medical Imaging; Covid-19 diagnostics demand in Medical

High performance high QE NIR image sensing:
driving 3D system offering, promising power savings in mobile 3D systems

- Ultra-sensitive NIR sensors, state-of-the art quantum efficiency (QE) of up to 40%
- ams global shutter IP + application expertise for faster time-to-market, SmartSens partnership
- Integrating NIR sensors into 3D offering creates full ams systems
- 3D ASV full system solution demos: Automotive (driver recognition), Industrial (access)
- Enabling ASV BOLED 3D development

Audio sensing

ANC (active noise cancellation)

- Best-in-class high performance noise reduction (>40dB)
- Leading vendor, broad portfolio for wired/wireless accessories
  - significantly better audio experience
  - very low power, very small form factor
- Augmented hearing: selective noise cancelling by-pass, e.g. for speech
- Innovation for high quality digital ANC in loose-fitting true wireless earbuds:
  - not requiring plug-in-type earpieces, more comfortable wear
  - consumer OEM design ongoing

Focus on ANC solutions, strong position in acces-sory market

ams 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

Robust manufacturing platform in Covid-19 situation

Internal optical manufacturing/backend + VCSEL manufacturing, Singapore

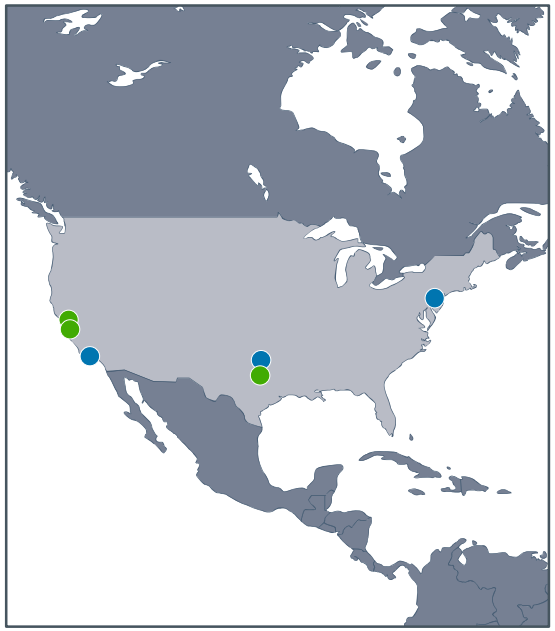
- Leading in high-performance optical system technologies
- Advanced optical assembly/backend, optical component production
- Highly efficient manufacturing operations with volume/capacity/product flexibility
- Internal VCSEL capacity: 6” 2,000 wspm line, front-end ramp ongoing

External manufacturing partnerships for scalability and flexibility

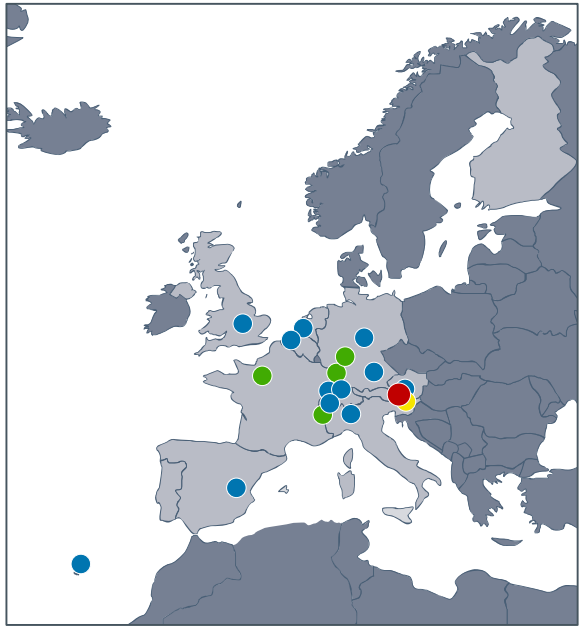
- High volume wafer suppliers (TSMC, UMC), standard and semi-custom packaging
- Outsourced VCSEL supply chain: capacity partners, serving different VCSEL needs

In-house test, Philippines/Singapore/Austria

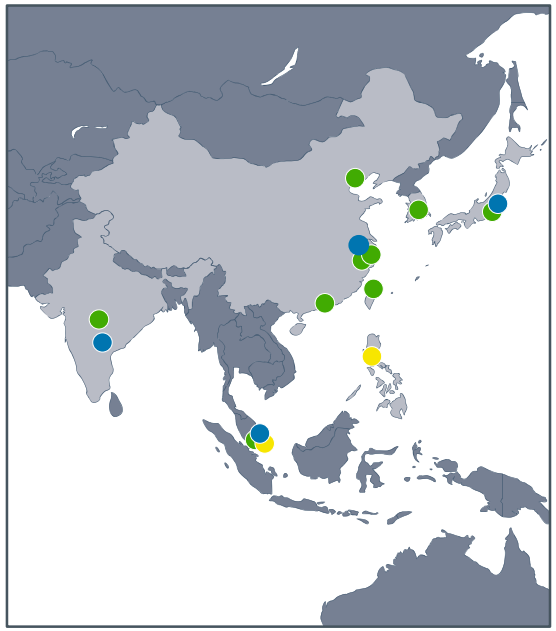
ams global network



Americas



Europe



Asia

- Headquarters
- Design/Application center
- Manufacturing/Test
- Sales/customer support locations

- **19 Design and application centers**
  Austria, Belgium, China, Germany (2), Italy, India, Japan, Netherlands, Portugal, Singapore, Spain, Switzerland (3), UK, USA (3)
- **Manufacturing locations**
  Austria, Singapore
- **Test centers**
  Philippines, Singapore, Austria

Overview key financials

USDm

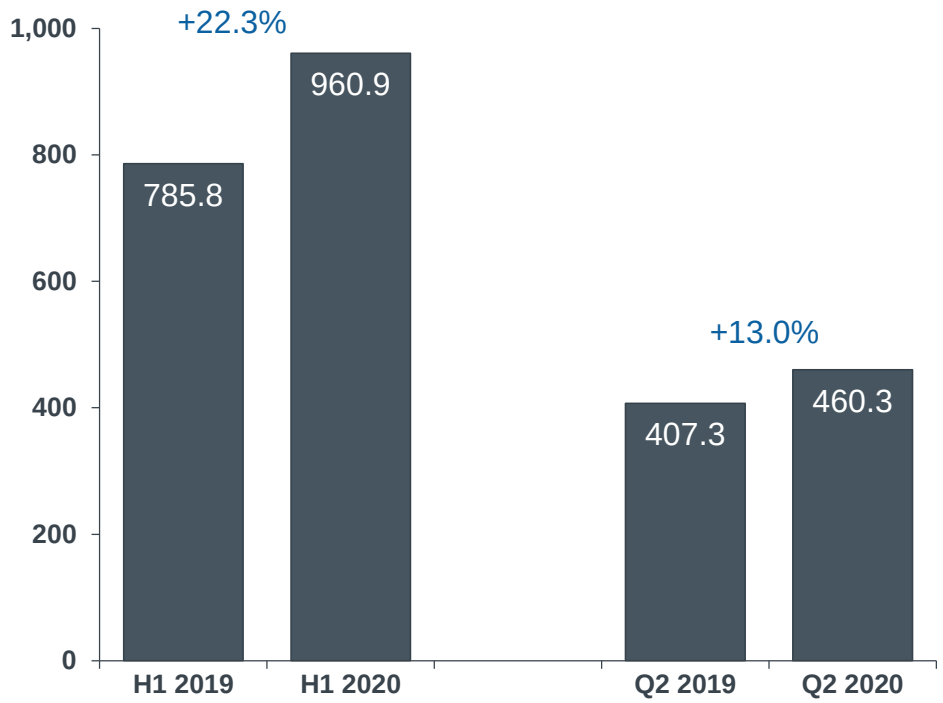
			H1 2020	H1 2019	Q2 2020	Q2 2019
Total revenues			960.9 +22%	785.8	460.3 +13%	407.3
Gross margin	(adjusted)[1)] (IFRS reported)		40% 37%	35% 32%	40% 37%	37% 35%
Result from operations (EBIT)	(adjusted)[1)] (IFRS reported)		191.0 98.9	71.8 17.1	90.1 39.2	49.0 21.5
EBIT margin	(adjusted)[1)] (IFRS reported)		20% 10%	9% 2%	20% 9%	12% 5%
Net result	(adjusted)[1)] (IFRS reported)		82.2 -9.8	70.2 15.5	56.8 5.9	52.2 24.7
EPS (basic/diluted)	(adjusted)[1)]	CHF[2)] USD	0.47 / 0.50 0.48 / 0.52	0.89 / 0.88 0.87 / 0.86	0.21 / 0.20 0.22 / 0.20	0.66 / 0.61 0.65 / 0.60
EPS (basic/diluted)	(IFRS reported)	CHF[2)] USD	-0.06 / 0.00 -0.06 / 0.00	0.19 / 0.19 0.19 / 0.19	0.02 / 0.01 0.02 / 0.01	0.31 / 0.28 0.31 / 0.28

[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

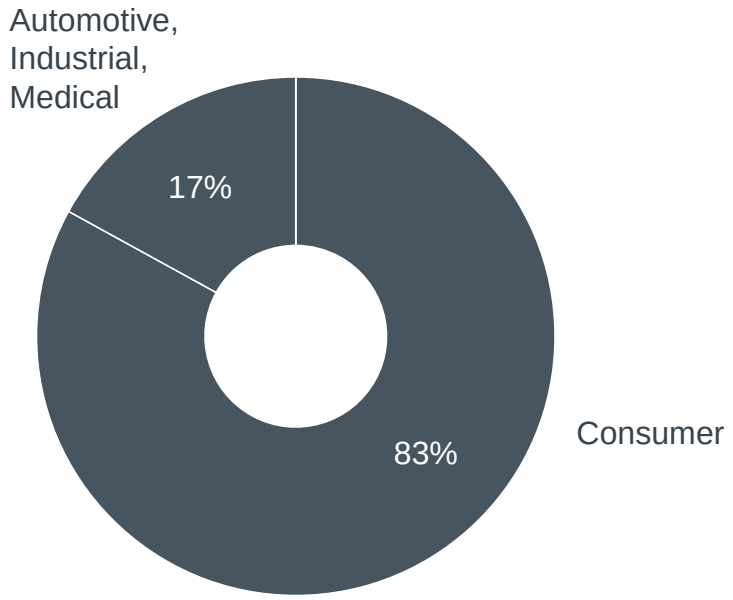
Revenues

USDm

Total revenues



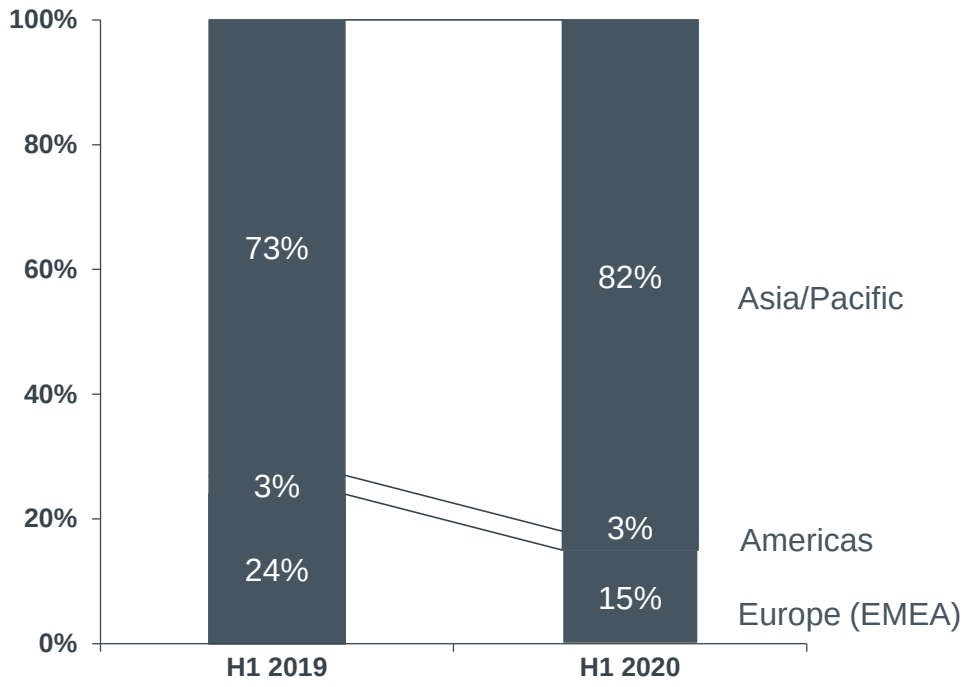
Total revenues by market H1 2020



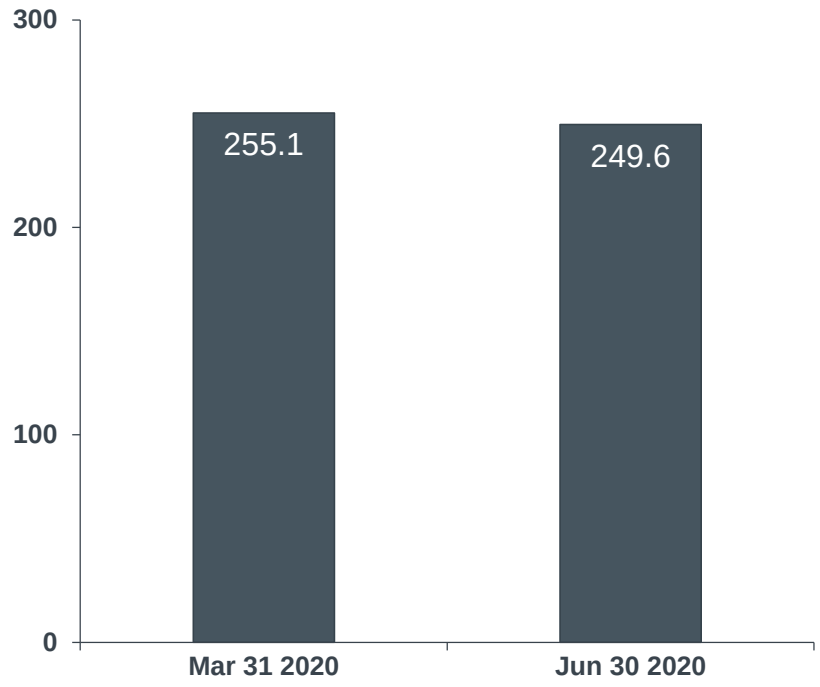
Regional revenue distribution and backlog

USDm

Total revenues by region



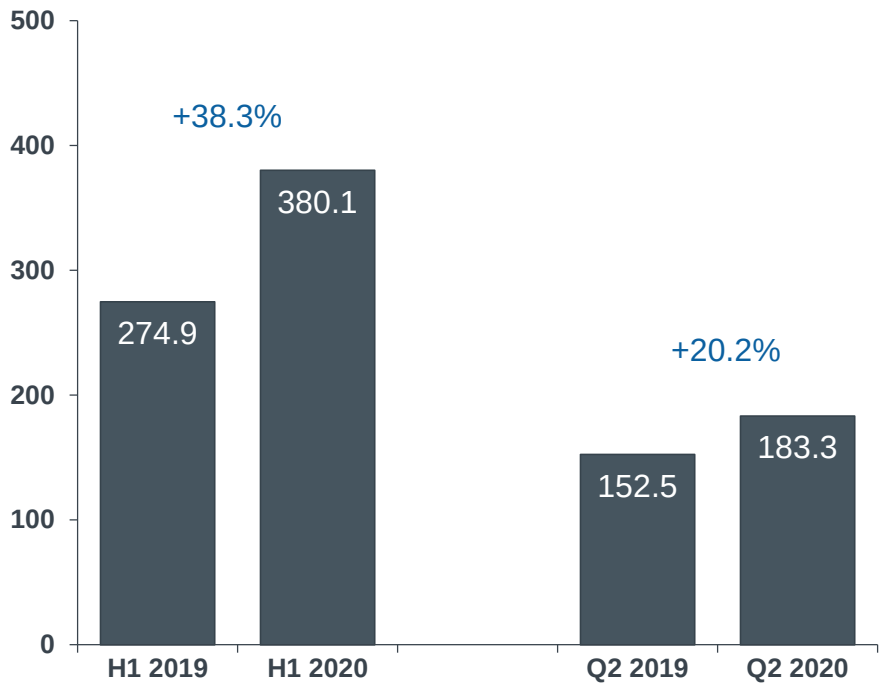
Total backlog



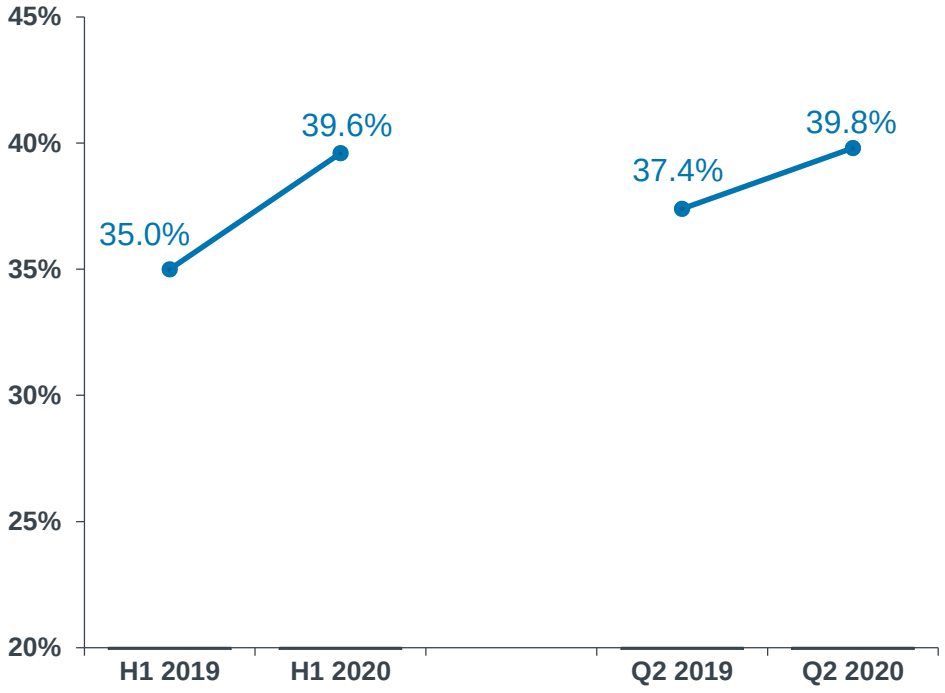
Gross profit and gross margin

USDm, % of revenues

Gross profit (adj.)[1)]



Gross margin (adj.)[1)]

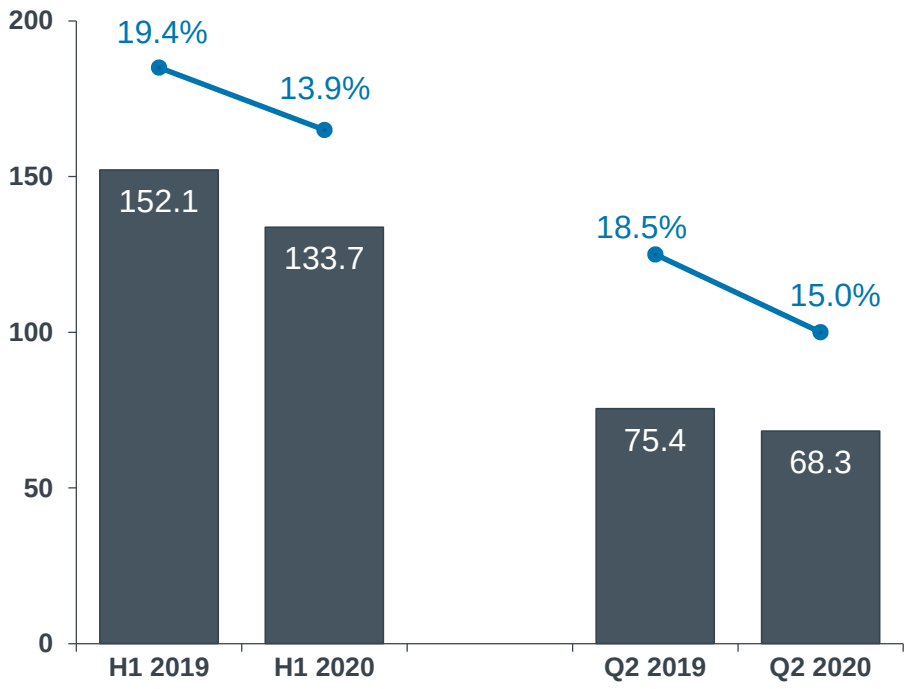


1) Excl. acquisition-related and share-based compensation costs

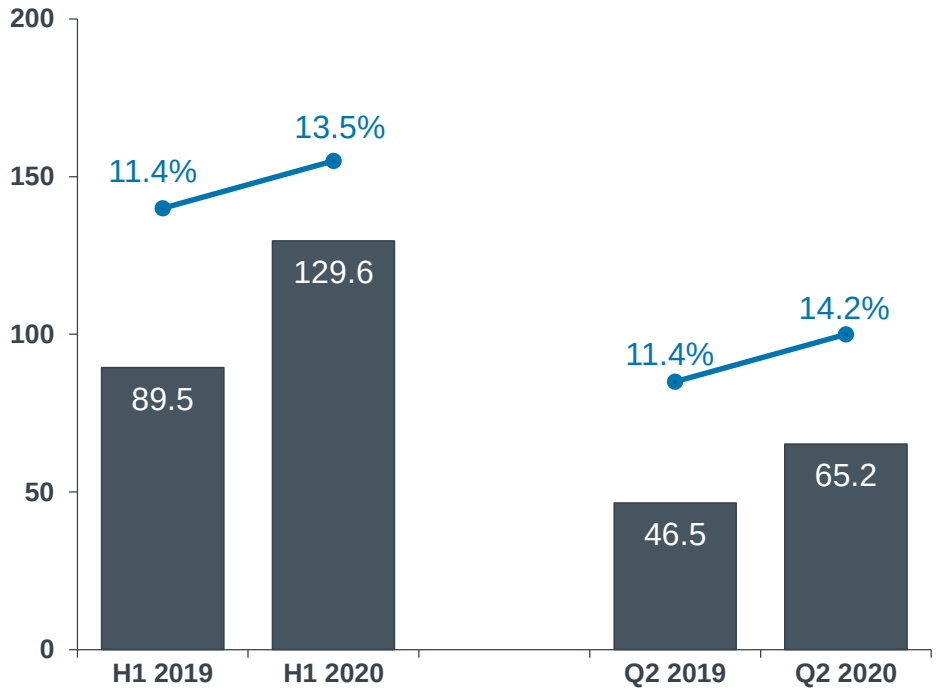
Operating expenses

USDm, % of revenues

R&D



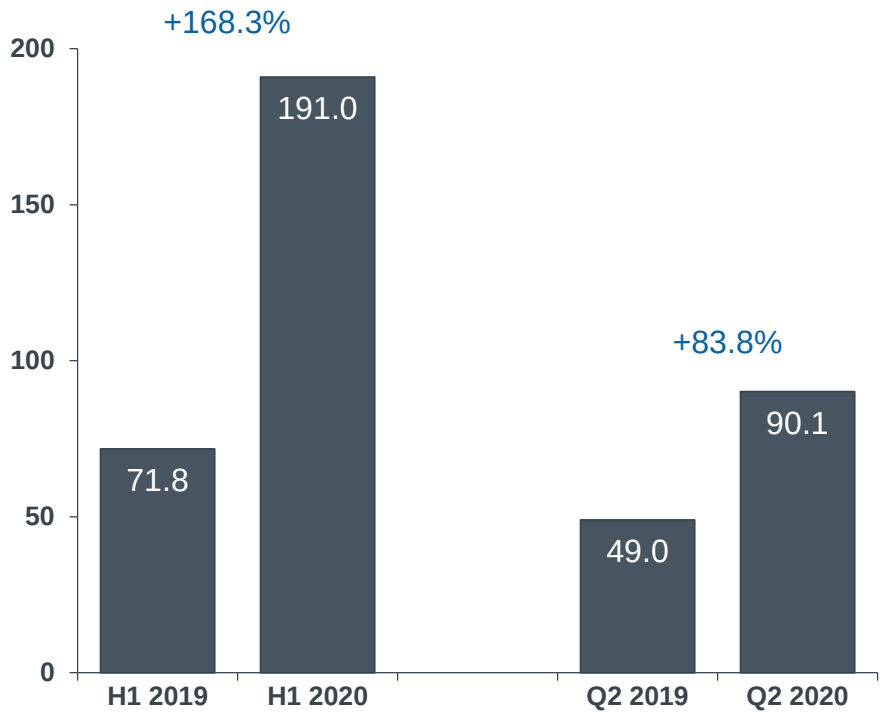
SG&A



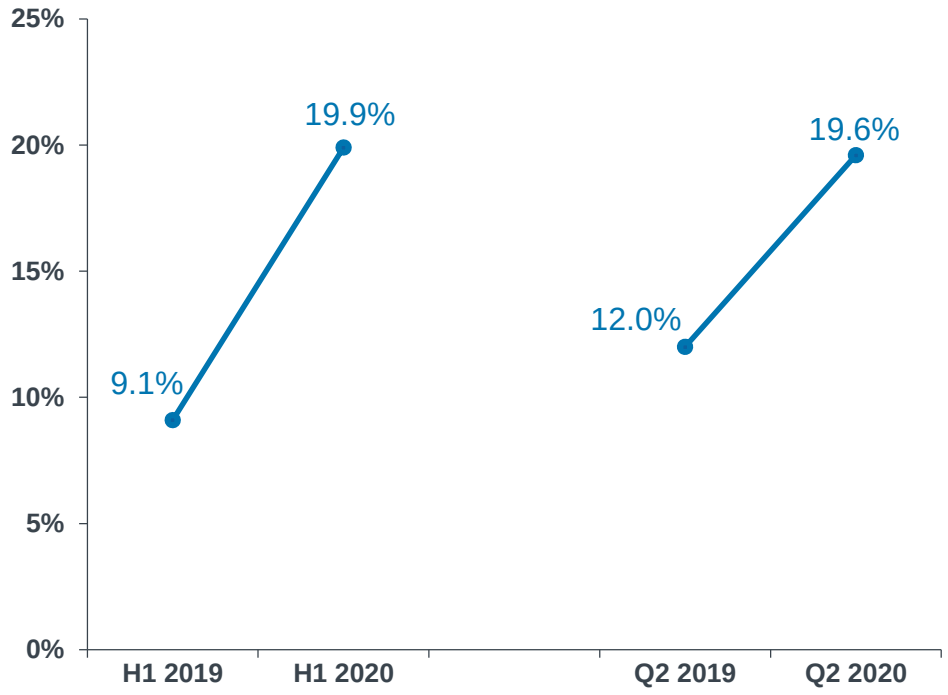
Adjusted result from operations (EBIT)

USDm, % of revenues

EBIT (adj.)[1)]



EBIT margin (adj.)[1)]

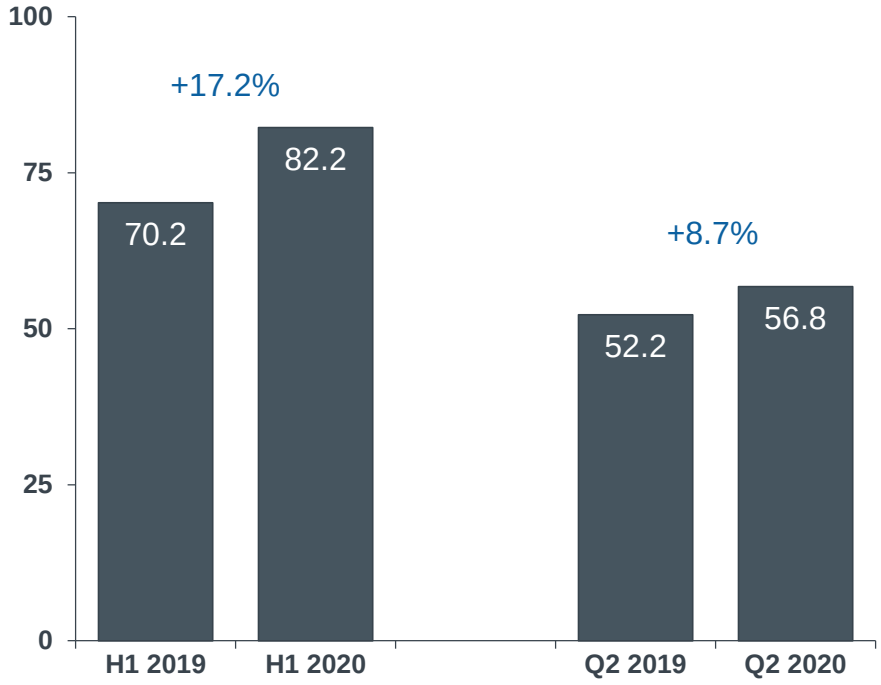


1) Excl. acquisition-related and share-based compensation costs

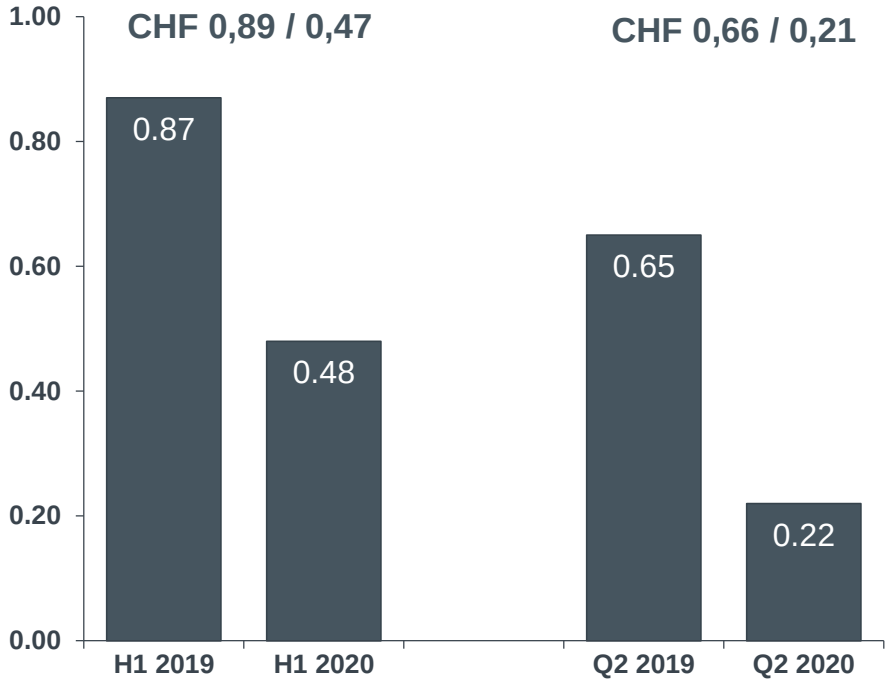
Net result and EPS

USDm, USD per share

Net result (adj.)[1)]



EPS basic (adj.)[1)2)]

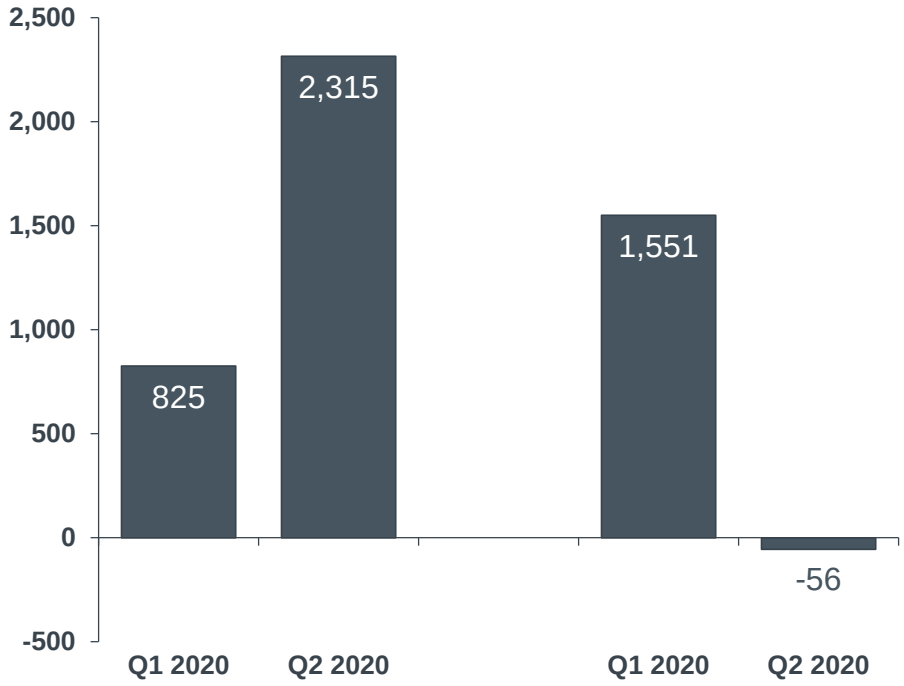


1) Excl. acquisition-related and share-based compensation costs; EPS diluted (adjusted) H1 2020: USD 0.52 / CHF 0.50, Q2 2020: USD 0.20 / CHF 0.20
2) Reflecting new share count for 2020 figures after capital increase in Q2 2020

Cash and net debt, operating cash flow

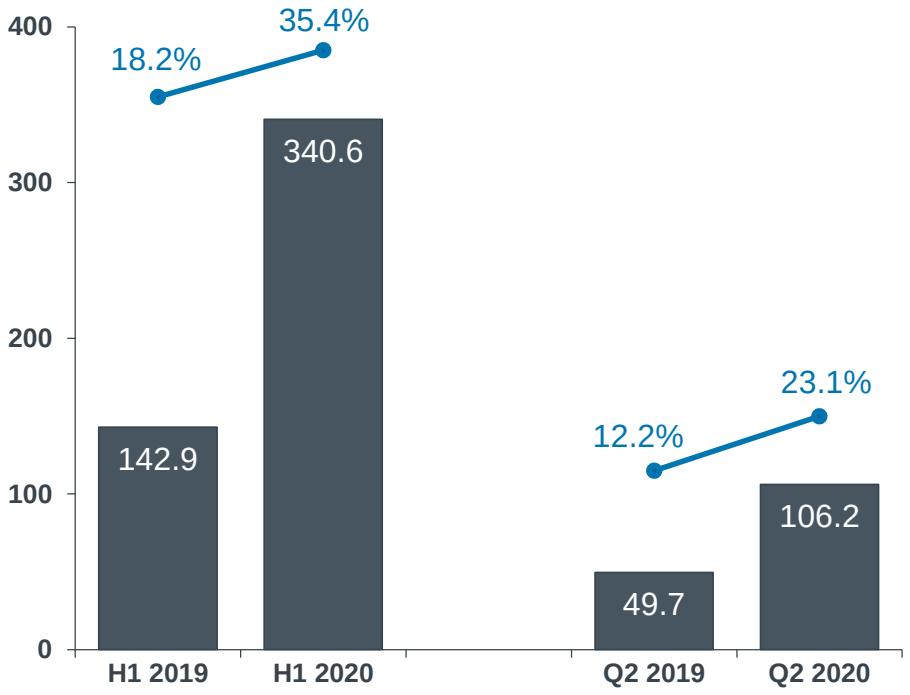
USDm, % of revenues

Cash



Net debt

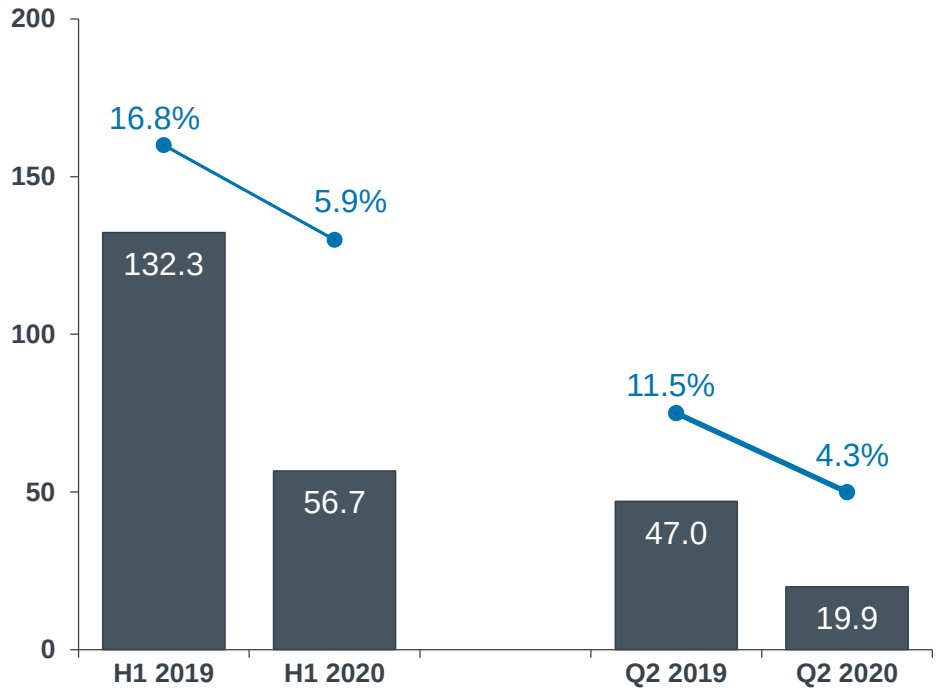
Operating cash flow



Capital expenditures

USDm, % of revenues

Capital expenditures



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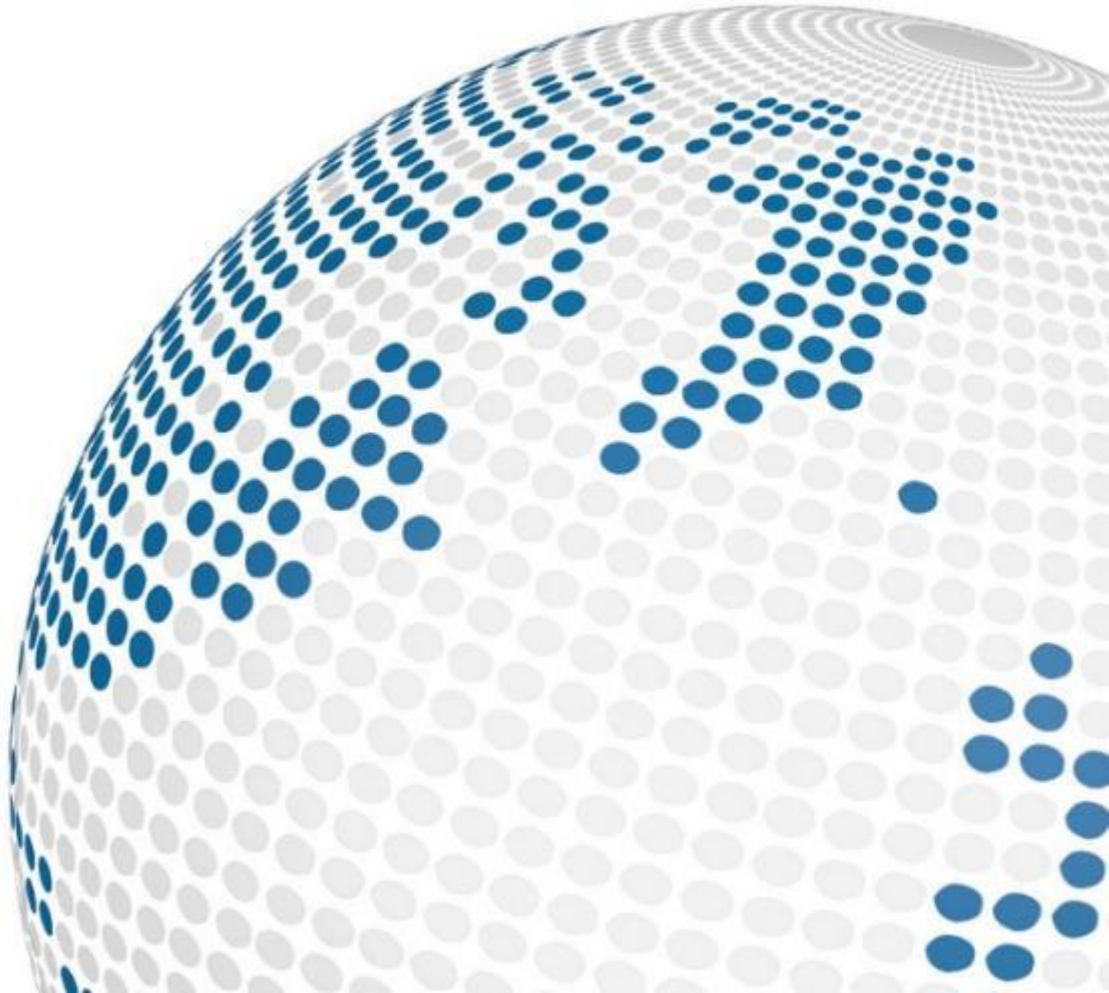

Profit and loss statement

USDm

(IFRS)	H1 2020	H1 2019	Q2 2020	Q2 2019
Revenues	960.9	785.8	460.3	407.3
Gross profit • Gross margin (adjusted[1)]) • Gross margin (IFRS reported)	356.4 39.6% 37.1%	252.7 35.0% 32.2%	170.7 39.8% 37.1%	141.3 37.4% 34.7%
Research and development **Selling, general and administrative** **Other operating income/expenses**	-133.7 -129.6 6.6	-152.1 -89.5 6.0	-68.3 -65.2 2.5	-75.4 -46.5 2.0
Result from operations (EBIT) • EBIT margin (adjusted[1)]) • EBIT margin (IFRS reported)	98.9 19.9% 10.3%	17.1 9.1% 2.2%	39.2 19.6% 8.5%	21.5 12.0% 5.3%
Net financing costs	-104.9	2.2	-32.2	5.0
Result before tax **Income tax result**	-6.0 -3.8	19.4 -3.9	7.1 -1.1	26.4 -1.8
Net result (adjusted[1)]) **Net result** (IFRS reported)	82.2 -9.8	70.2 15.5	56.8 5.9	52.2 24.7

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

Balance sheet

USDm

Assets (IFRS)	Jun 30, 2020	Dec 31, 2019	Liabilities and equity	Jun 30, 2020	Dec 31, 2019
Cash and short term invest.	2,315.4	551.3	Interest-bearing debt	1,027.9	861.0
Trade receivables	121.4	222.4	Trade liabilities	156.3	149.2
Inventories	246.3	231.5	Tax liabilities	26.1	21.6
Other current assets	150.3	142.9	Provisions	109.6	124.2
Assets held for sale	0.0	94.8	Other liabilities	134.8	170.5
Total current assets	2,833.4	1,242.9	Total current liabilities	1,454.6	1,326.5
Fixed assets	1,179.7	1,244.9	Interest-bearing debt	1,231.8	1,432.7
Intangible assets	1,221.4	1,242.6	Employee benefits	53.7	54.0
Right of use assets	130.7	135.3	Deferred tax liabilities	66.3	69.0
Investments in associates	52.6	30.7	Other liabilities	130.6	140.4
Deferred tax asset	8.0	9.4			
Other non-current assets	2.8	2.0			
Long-term financial assets	1,113.0	976.0			
Total non-current assets	3,708.1	3,640.9	Total non-current liabilities	1,482.5	1,696.0
			Shareholders' equity	3,604.5	1,861.3
Total assets	6,541.5	4,883.8	Total liabil. and equity	6,541.5	4,883.8

Cash flow statement

USDm

(IFRS)	H1 2020	H1 2019	Q2 2020	Q2 2019
Result before tax	-6.0	19.4	7.1	26.4
Depreciation	166.4	149.7	82.8	75.4
Cash flow from operations	340.6	142.9	106.2	49.7
Capital expenditures	-56.7	-132.3	-19.9	-47.0
Cash flow from investing activities	-207.2	-137.9	-46.2	-45.3
Proceeds from borrowings	101.9	13.9	2.0	0.2
Repayment of debt	-152.0	-106.7	-118.5	-67.6
Dividends paid	0.0	0.0	0.0	0.0
Changes resulting from capital increase	1,816.5	0.0	1,816.5	0.0
Cash flow from financing activities	1,631.0	-218.2	1,438.1	-153.4
Change in cash and cash equivalents (incl. effects of changes in foreign exchange rates)	1,764.1	-217.4	1,489.5	-155.9
Cash and cash equivalents at end of period	2,315.4	471.3	2,315.4	471.3