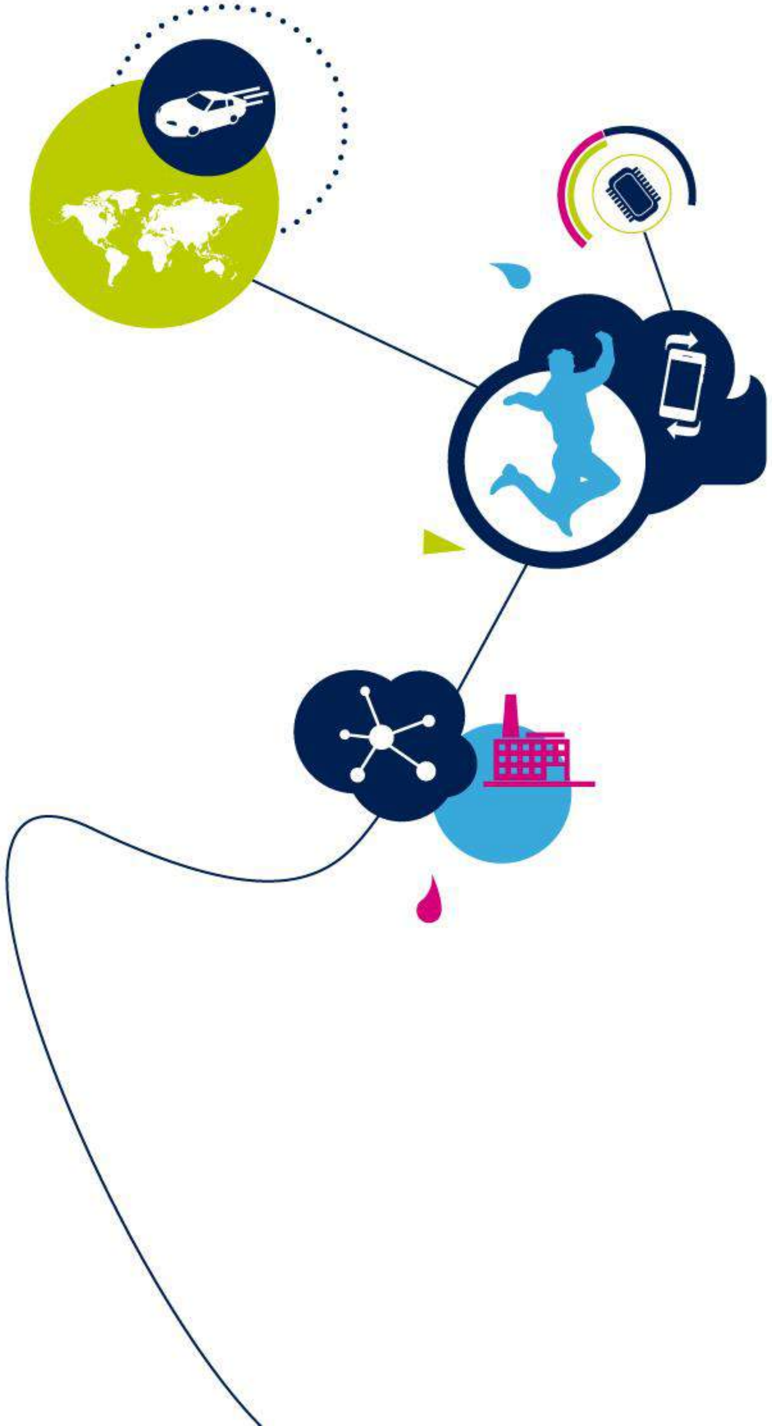
Introduction

Tait Sorensen

Group Vice President, Investor Relations



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Agenda

Time	Presentation	Speakers
9:00 a.m.	**Introduction**	**Tait Sorensen**, Group Vice President, Investor Relations
	Welcome	**Carlo Bozotti**, President and Chief Executive Officer
	Business Overview & Financials	**Carlo Ferro**, Chief Financial Officer, Executive Vice President, Finance, Legal, Infrastructure and Services
	Specialized Technologies & Manufacturing Supporting Growth	**Jean-Marc Chery**, Chief Operating Officer
	Application Strategic Focus	**Georges Penalver**, Chief Strategy Officer, Executive Vice President, Strategy, Communication, Human Resources and Quality
10:30 a.m.	**Break – Demos**	
10:50 a.m.	**Internet of Things**	**Claude Dardanne,** EVP, General Manager, MDG **Benedetto Vigna,** EVP, General Manager, AMG **Paul Cihak,** EVP, General Manager, Sales and Marketing, EMEA
	Smart Driving	**Marco Monti,** EVP, General Manager, ADG **Marco Cassis**, EVP, President, Region Asia Pacific **Bob Krysiak**, EVP, President, Region Americas, Global Mass Market & OLM Programs
	Closing Remarks	**Carlo Bozotti**, President and Chief Executive Officer
12:10 p.m.	**Q&A Panel**	**Carlo Bozotti, Jean Marc Chery, Carlo Ferro, Georges Penalver**
1:00 p.m.	**Lunch – Demos**	

Agenda – Breakout Sessions

	Private Suite 7	Private Suite 3	Private Suite 1
2:00 p.m.	**ADG** Automotive & Discrete Group **Marco Monti – Bob Krysiak**	**MDG** Microcontroller & Digital ICs Group **Claude Dardanne – Marco Cassis**	**AMG** Analog & MEMS Group **Benedetto Vigna – Paul Cihak**
2:30 p.m.	**ADG** Automotive & Discrete Group **Marco Monti – Paul Cihak**	**MDG** Microcontroller & Digital ICs Group **Claude Dardanne – Bob Krysiak**	**AMG** Analog & MEMS Group **Benedetto Vigna – Marco Cassis**
3:00 p.m.	**IMD** Imaging Product Division **Jean-Marc Chery – Marco Cassis**	**MDG** Microcontroller & Digital ICs Group **Claude Dardanne – Paul Cihak**	**AMG** Analog & MEMS Group **Benedetto Vigna – Bob Krysiak**
3:30 p.m.	**IMD** Imaging Product Division **Jean-Marc Chery – Marco Cassis**	**ADG** Automotive & Discrete Group **Marco Monti – Paul Cihak**	
4:00 p.m.	**Reception**		

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Forward Looking Statements

Some of the statements contained in this release that are not historical facts are statements of future expectations and other forward-looking statements (within the meaning of Section 27A of the Securities Act of 1933 or Section 21E of the Securities Exchange Act of 1934, each as amended) that are based on management's current views and assumptions, and are conditioned upon and also involve known and unknown risks and uncertainties that could cause actual results, performance, or events to differ materially from those anticipated by such statements, due to, among other factors:

- *Uncertain macro-economic and industry trends, which may impact end-market demand for our products;*
- *Customer demand that differs from projections;*
- *The ability to design, manufacture and sell innovative products in a rapidly changing technological environment;*
- *Unanticipated events or circumstances, which may impact our ability to execute the planned reductions in our net operating expenses and / or meet the objectives of our R&D Programs, which benefit from public funding;*
- *Changes in economic, social, labor, political, or infrastructure conditions in the locations where we, our customers, or our suppliers operate, including as a result of macro-economic or regional events, military conflicts, social unrest, labor actions, or terrorist activities;*
- *The Brexit vote and the perceptions as to the impact of the withdrawal of the U.K. may adversely affect business activity, political stability and economic conditions in the U.K., the Eurozone, the EU and elsewhere. While we do not have material operations in the U.K. and have not experienced any material impact from Brexit on our underlying business to date, we cannot predict its future implications;*
- *Financial difficulties with any of our major distributors or significant curtailment of purchases by key customers;*
- *The loading, product mix, and manufacturing performance of our production facilities;*
- *The functionalities and performance of our IT systems, which support our critical operational activities including manufacturing, finance and sales, and any breaches of our IT systems or those of our customers or suppliers;*
- *Variations in the foreign exchange markets and, more particularly, the U.S. dollar exchange rate as compared to the Euro and the other major currencies we use for our operations;*
- *The impact of intellectual property ("IP") claims by our competitors or other third parties, and our ability to obtain required licenses on reasonable terms and conditions;*
- *The ability to successfully restructure underperforming business lines and associated restructuring charges and cost savings that differ in amount or timing from our estimates;*
- *Changes in our overall tax position as a result of changes in tax laws, the outcome of tax audits or changes in international tax treaties which may impact our results of operations as well as our ability to accurately estimate tax credits, benefits, deductions and provisions and to realize deferred tax assets;*
- *The outcome of ongoing litigation as well as the impact of any new litigation to which we may become a defendant;*
- *Product liability or warranty claims, claims based on epidemic or delivery failure, or other claims relating to our products, or recalls by our customers for products containing our parts;*
- *Natural events such as severe weather, earthquakes, tsunamis, volcano eruptions or other acts of nature, health risks and epidemics in locations where we, our customers or our suppliers operate;*
- *Availability and costs of raw materials, utilities, third-party manufacturing services and technology, or other supplies required by our operations; and*
- *Industry changes resulting from vertical and horizontal consolidation among our suppliers, competitors, and customers.*

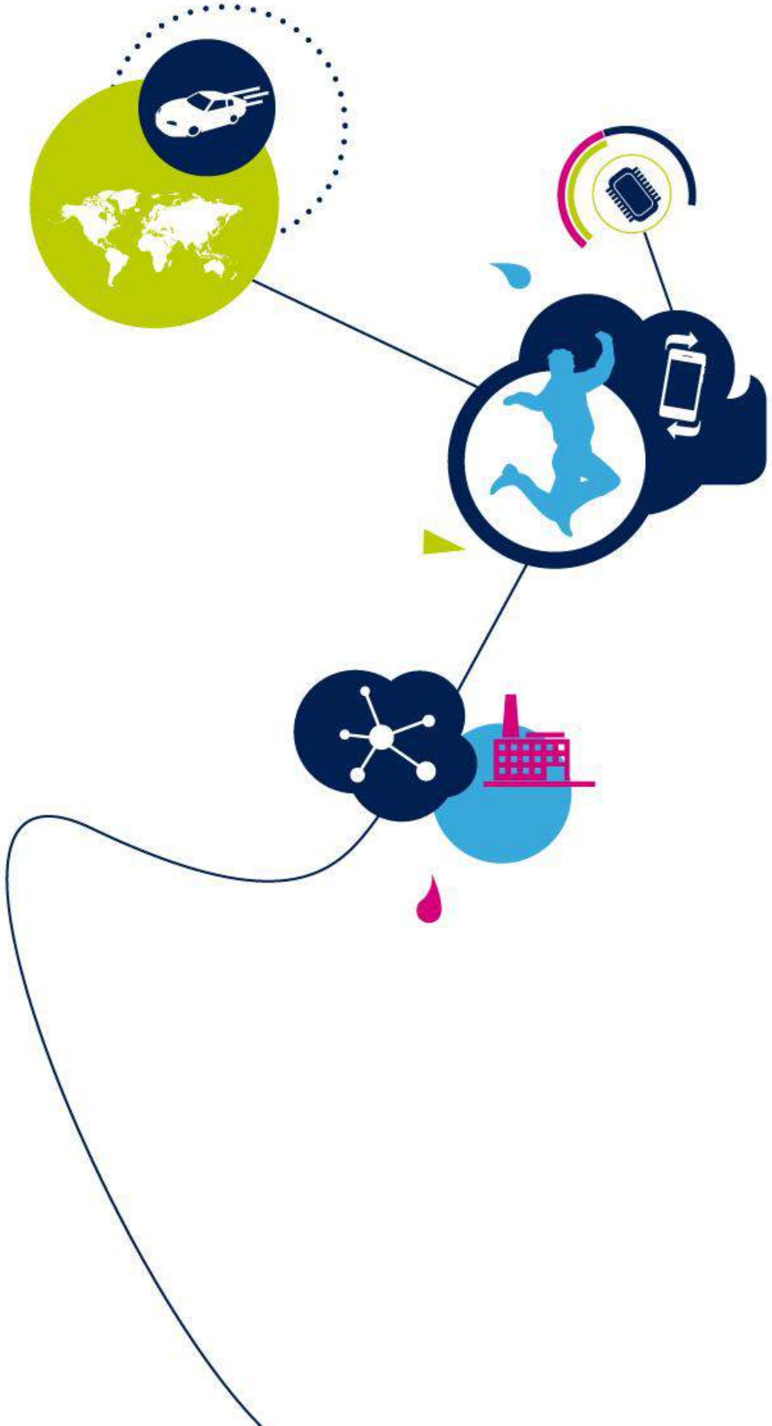
Such forward-looking statements are subject to various risks and uncertainties, which may cause actual results and performance of our business to differ materially and adversely from the forward-looking statements. Certain forward-looking statements can be identified by the use of forward looking terminology, such as "believes," "expects," "may," "are expected to," "should," "would be," "seeks" or "anticipates" or similar expressions or the negative thereof or other variations thereof or comparable terminology, or by discussions of strategy, plans or intentions.

Some of these risk factors are set forth and are discussed in more detail in "Item 3. Key Information — Risk Factors" included in our Annual Report on Form 20-F for the year ended December 31, 2015, as filed with the SEC on March 16, 2016. Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those described in this release as anticipated, believed, or expected. We do not intend, and do not assume any obligation, to update any industry information or forward-looking statements set forth in this release to reflect subsequent events or circumstances.

Business Overview & Financials

Carlo Ferro

Chief Financial Officer
Executive Vice President, Finance, Legal, Infrastructure and Services



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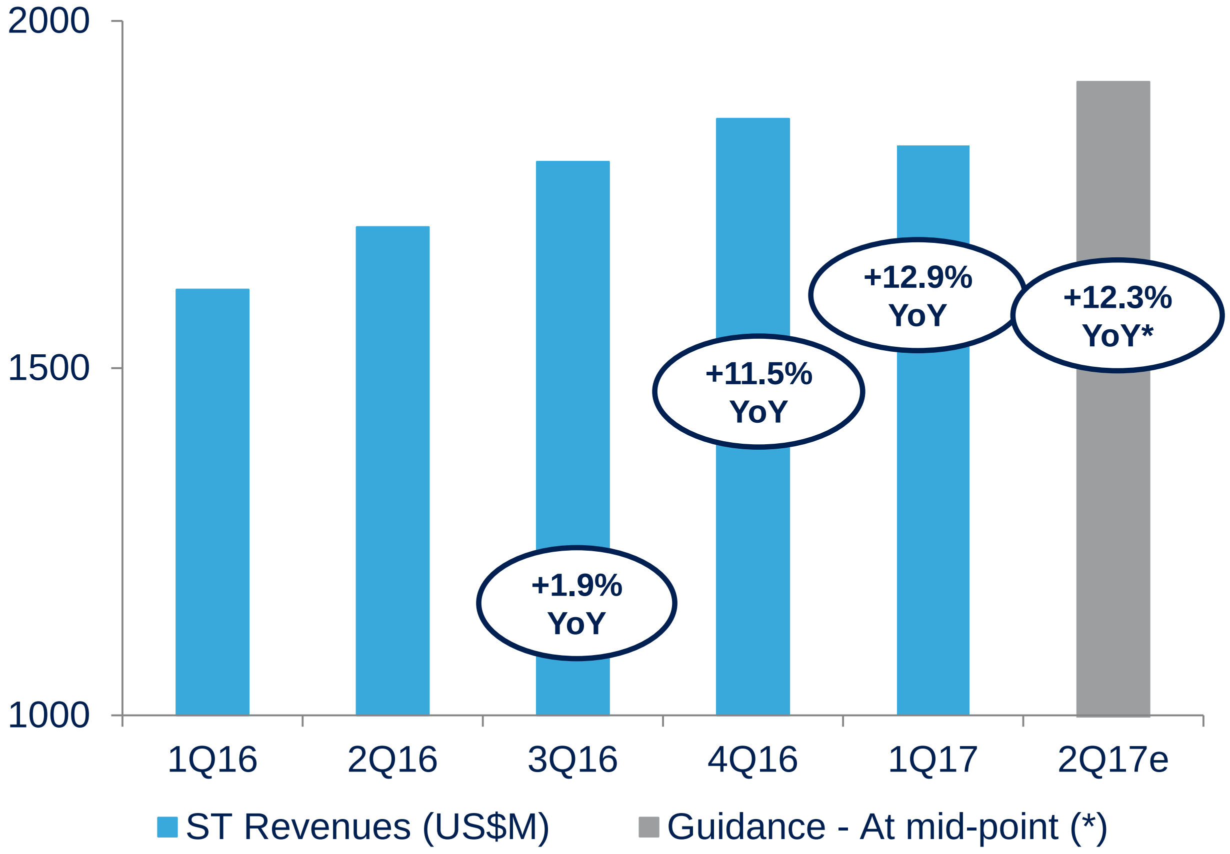
Back to Solid Revenue Growth

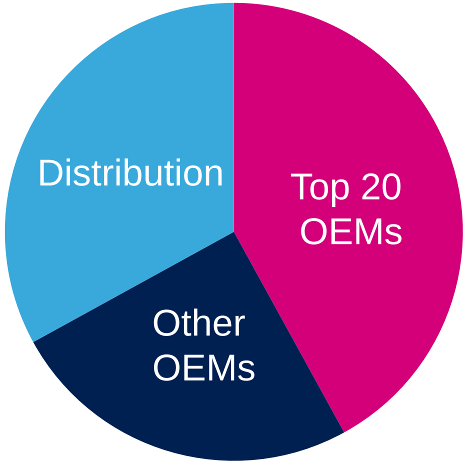


- Return to growth in 2016, acceleration in recent quarters
- Strategic focus on industry megatrends

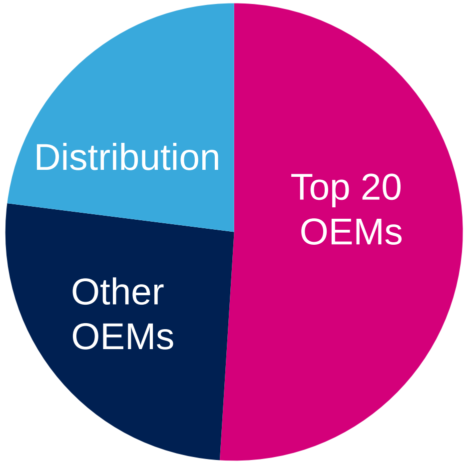
- Innovative and broad product portfolio
- Exit from Set-Top Box business ongoing
- Expect to outgrow the semiconductor industry in 2017

Balanced Revenues by Customer Channels

2016



2011



2016
Top 20 OEMs:
(alphabetically)
Apple
Bosch
Ciena
Cisco
Conti
Delta
Finisar
HP
Huawei
Lear
Magneti Marelli
Mobileye
Oppo
Philips
Samsung
Seagate
Sirius-XM
Valeo
Western Digital
ZF-TRW

Broad product portfolio serving diversified and balanced end-markets

Serving > 100,000 customers globally

- STM 32-bit MCU serving over 50,000 customers; targeting 60,000

Sales & marketing efforts boosted

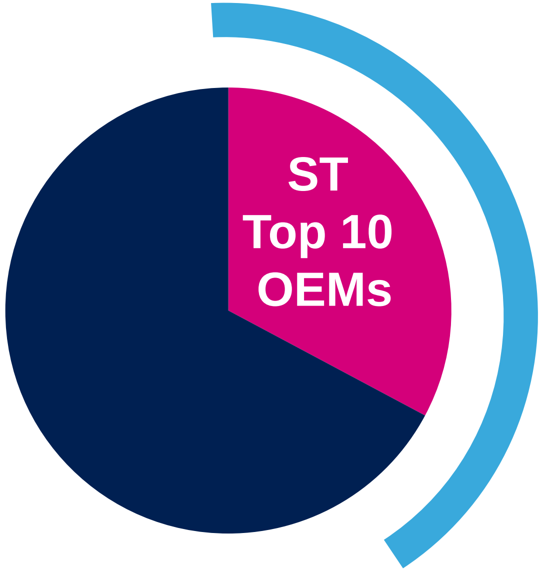
Growth in mass market and distribution

- Leveraging strong brand recognition
- Expanding ecosystem for application development
- Leveraging strong franchise with top worldwide distributors

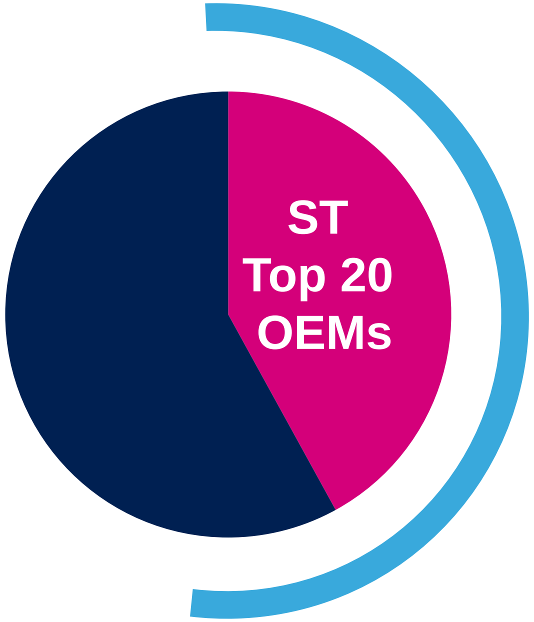
In bold Customers not in Top 20 OEMs in 2011

Balanced Concentration of Top Customers

Top 5 Buyers of Semiconductors (TAM)*



Top 10 Buyers of Semiconductors (TAM)*



Top 20 Buyers of Semiconductors (TAM)*

No customer ≥ 10% of total revenues

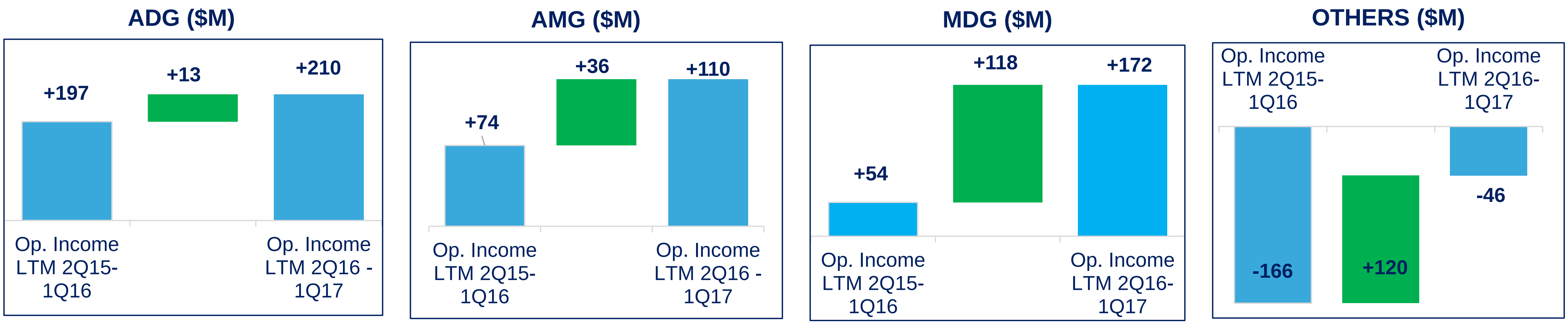
ST Top OEM customers include all Top 5 OEM buyers (Served Market) of semiconductors

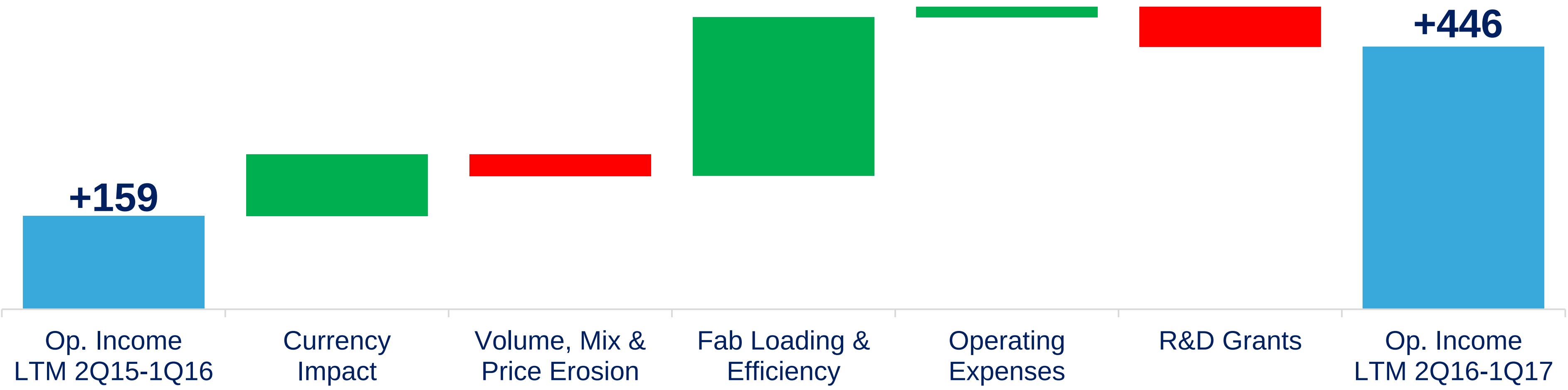
Concentration of sales to Top 5, Top 10 and Top 20 customers lower than Top semiconductor buyers concentration on TAM

*Source: IHS-Markit : December 2016

… Driving Profitability Turnaround …

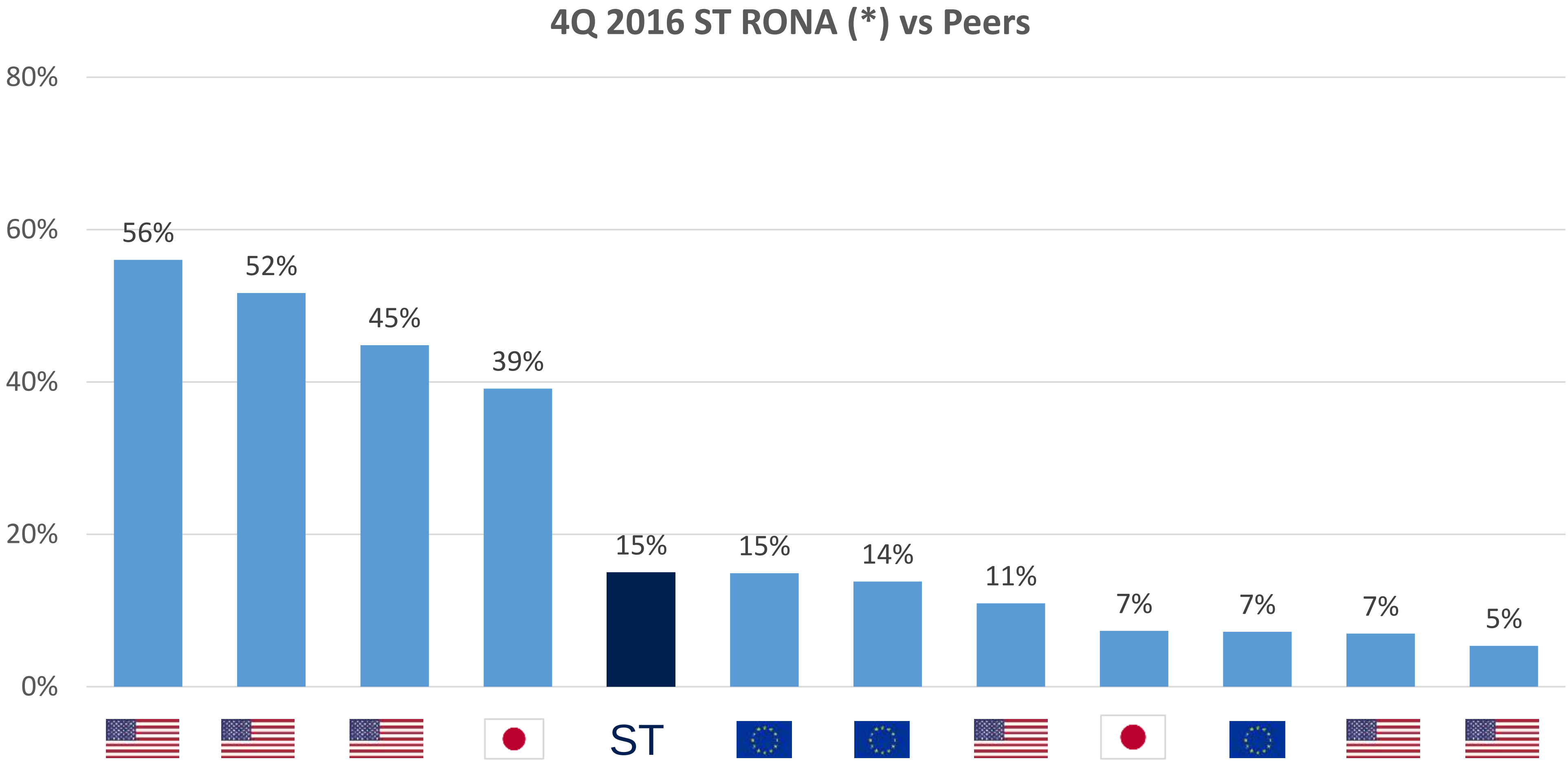
Operating Income before impairment & restructuring charges * evolution





*__Non-U.S. GAAP measure__. See Appendix for additional information explaining why the Company believes these measures are important.

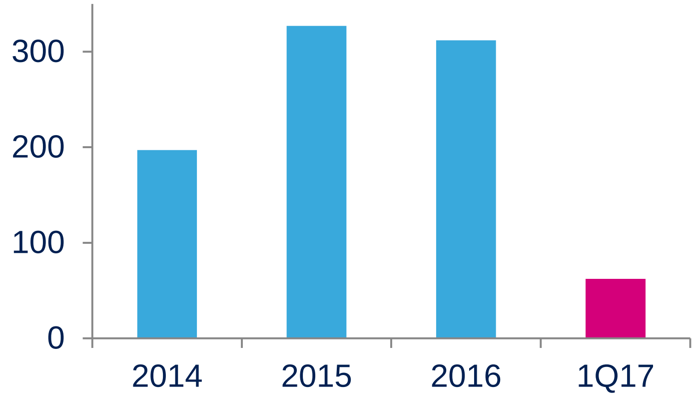
…and Expanded ROIC > WACC



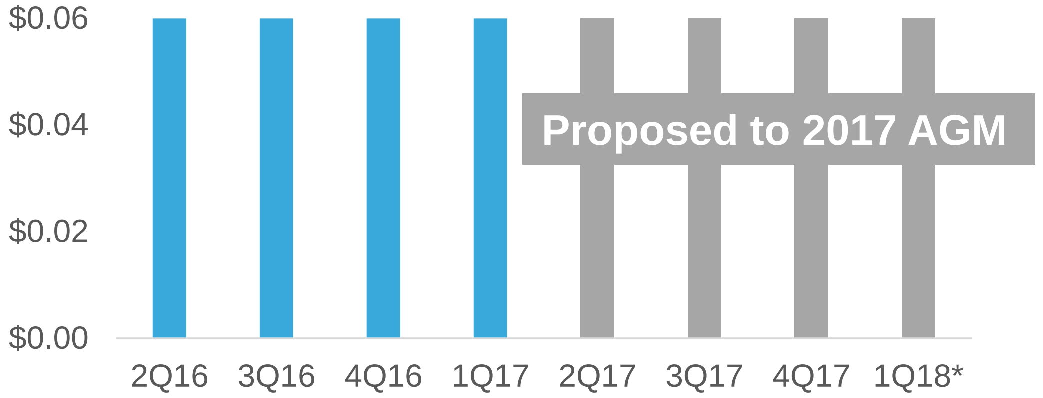
(*) RONA: Annualized 4Q16 Operating Profit pre-exceptionals / Average Net Assets (Assets – Cash / short term Investments – Non-financial Liabilities)
Peers: ADI, AMS, AVGO, IFX, MCHP, MXIM, NXP, ON, RSAS, ROHM, TXN
Source: Internal analysis based on publicly released financial statements

Keeping a Solid Capital Structure

FY16 Free Cash Flow* = $312M
1Q17 Free Cash Flow* = $62M



Cash Dividend: proposed $212M distribution in 2017 or $0.24 per share



1Q17 Net Financial Position* = $518M

End of period (US$M)	April 1 2017	December 31 2016	April 2 2016
Total Liquidity	1,976	1,964	2,040
Total Financial Debt	(1,458)	(1,451)	(1,601)
Net Financial Position*	**518**	**513**	**439**

*__Non-U.S. GAAP measure__. See Appendix for additional information explaining why the Company believes these measures are important.

A Sustainable and Profitable Growth Story

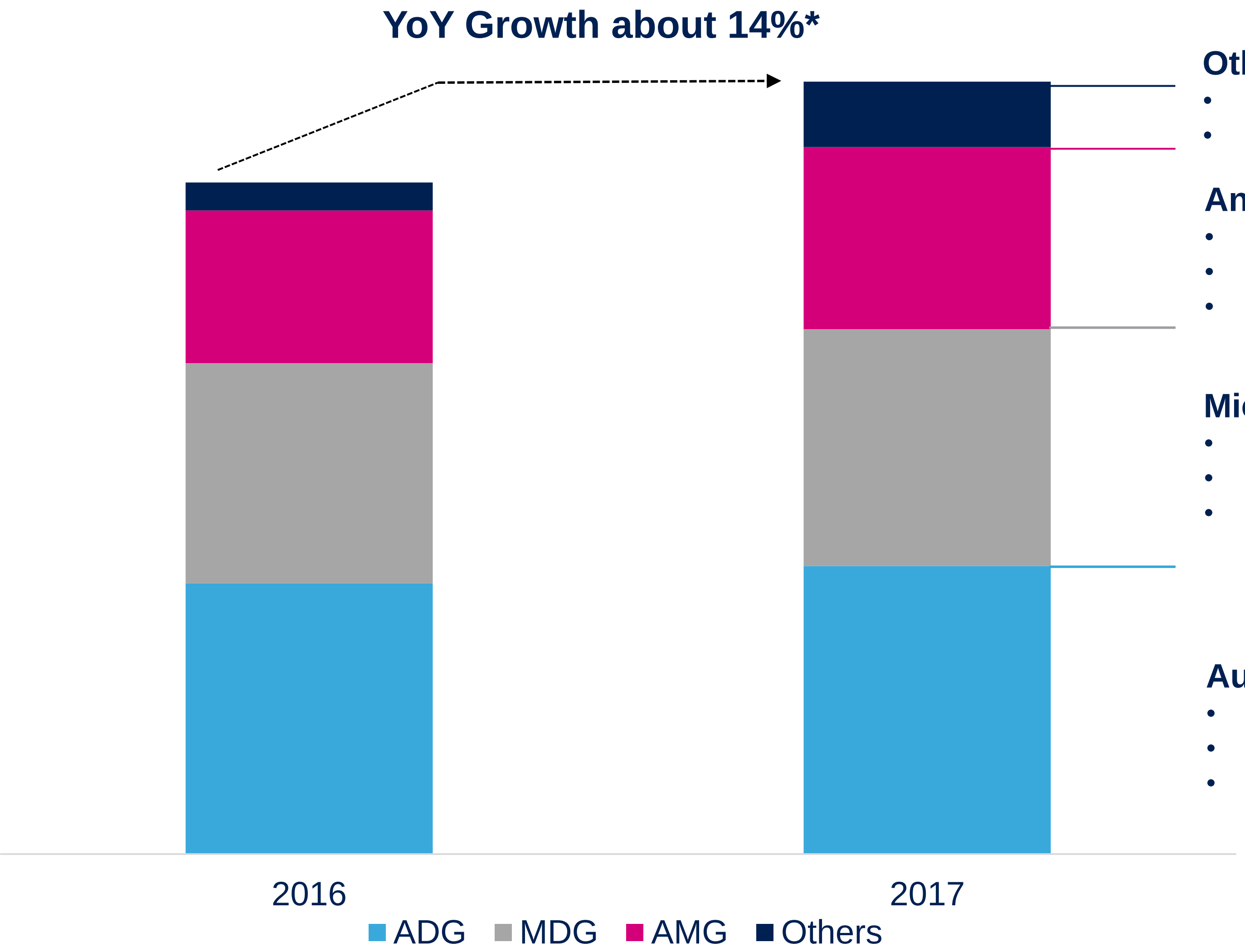
Sustainable growth

Driving margin expansion

Driving shareholder value

Profitable Growth in 2017

Growth Drivers



Others
- Time-of-Flight Solutions
- Specialized Imaging Sensors

Analog & MEMS (AMG)
- Analog ASSP
- MEMS Sensors
- General purpose analog & RF

Microcontrollers & Digital ICs (MDG)
- General purpose 32-bit MCU
- Secure MCU
- Digital ASICs

Automotive & Discrete (ADG)
- ADAS
- 32-bit MCU
- Power MOSFET

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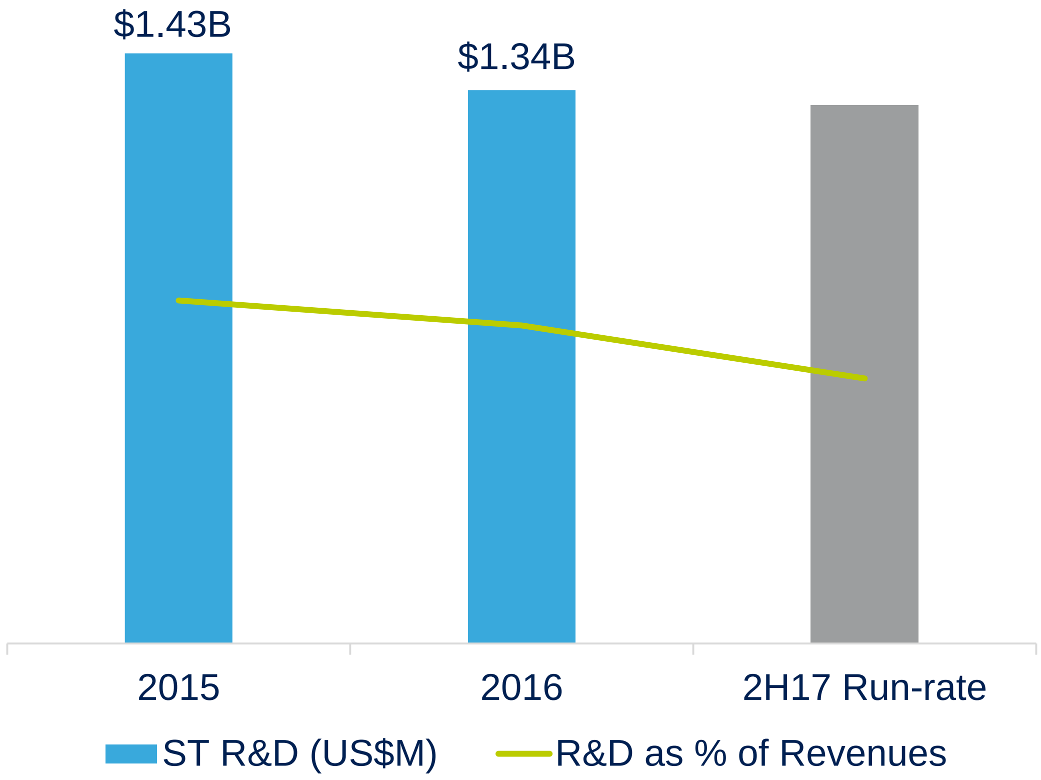
* Rounded numbers ± 1.5 percentage points - see Forward Looking Statement for full disclosure. Such statements are subject to various risks and uncertainties, which may cause actual results and performance of our business to differ materially and adversely from the forward-looking statements.

R&D Innovation Driving Revenue Growth

R&D Investment



Leverage on growth to reduce R&D / Sales Ratio

Key Drivers

R&D effort among the highest in the industry

- Top 4 IDM R&D spend in 2016

Boosting innovation and fueling future growth

- Investing in new products in our application strategic focus areas:
  - Smart Driving and IoT
- New product revenue contribution growing faster than the average

Redeployment in past years of ~2500 people to support and accelerate growth in:

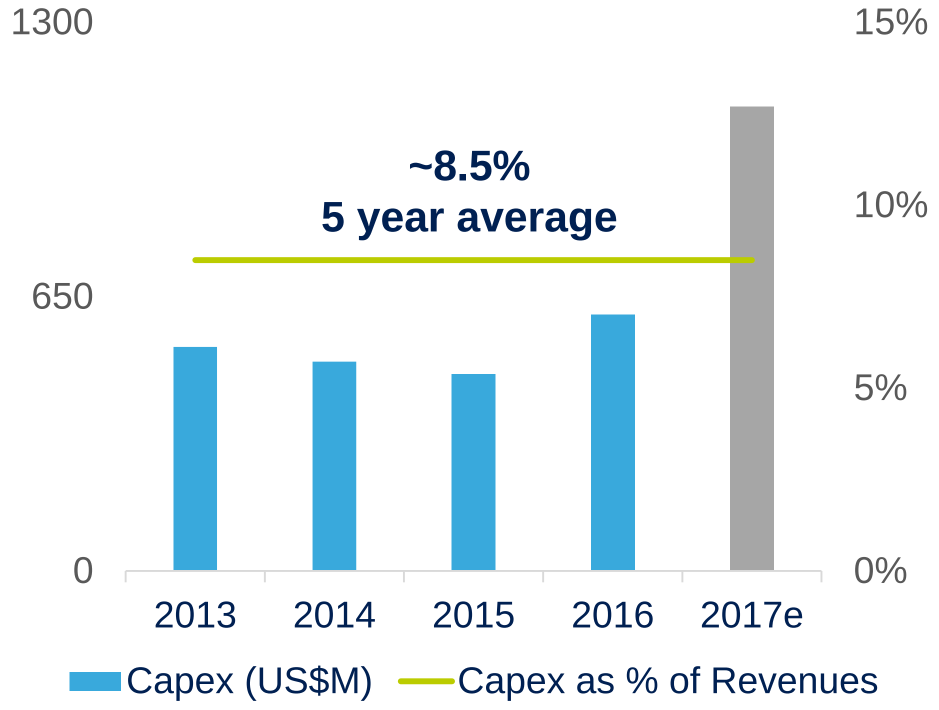
- Microcontrollers
- Digital automotive
- Digital ASICs

Opportunities to mitigate inflationary trend in next quarters:

- Completion of exit from Set-Top Box
- Favorable currency effects, net of hedging

Accelerated Investment to Support Growth

Up to $1.1B anticipated Capex in 2017
Plan under review: possible increase to support higher demand in 2H17 and beyond

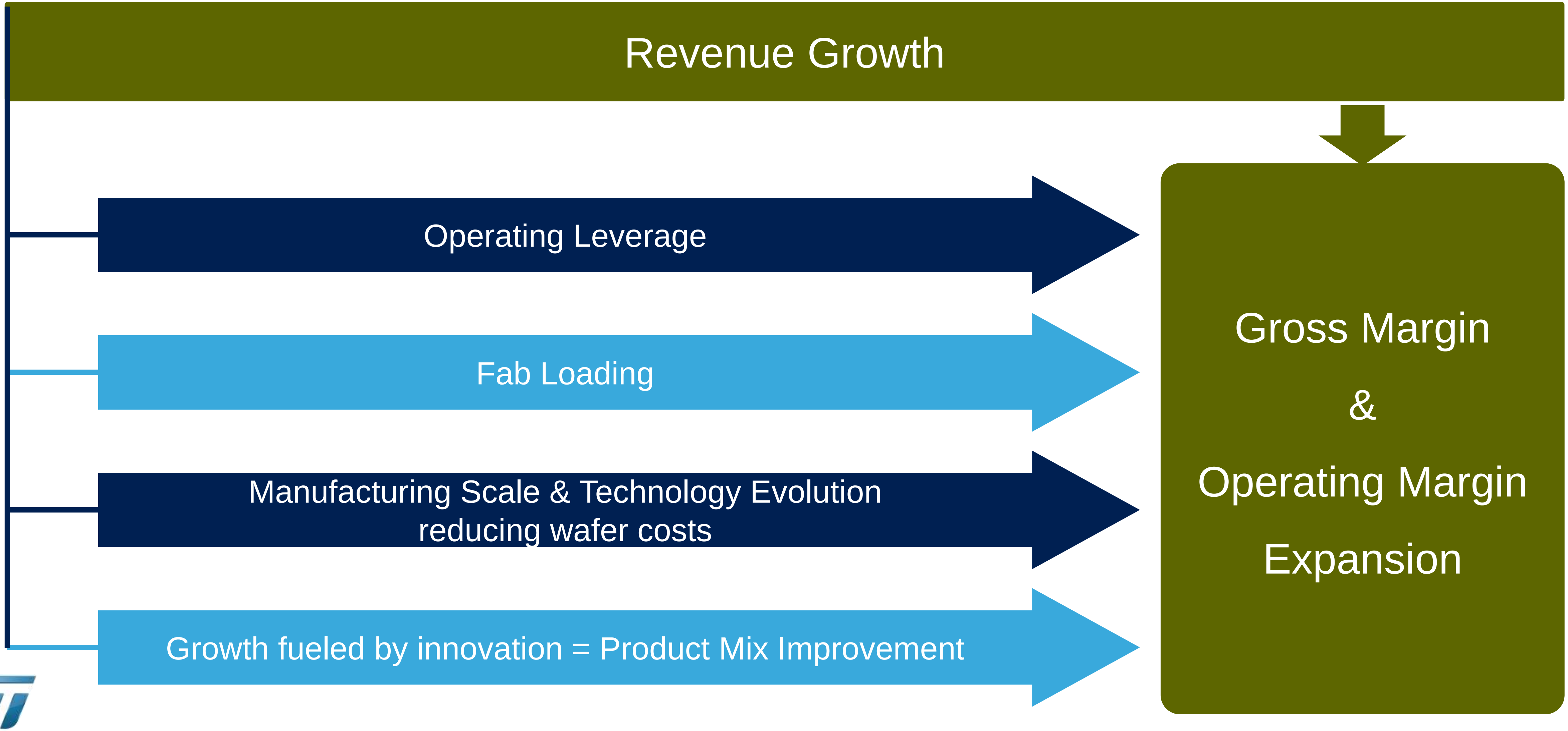


- Investing in 12” front-end manufacturing and in back-end assembly and test to support new products. In particular, a new program to ramp with substantial revenues in 2H17
- Coupled with expanded sourcing from foundry on a larger set of technologies
- Beyond 2017, Capex/Sales ratio back to model ≤10% through a cycle

Capacity & Flexibility

Revenue Growth to Improve Operating Margin

Four Drivers



Revenue Growth

Operating Leverage

Fab Loading

Manufacturing Scale & Technology Evolution reducing wafer costs

Growth fueled by innovation = Product Mix Improvement

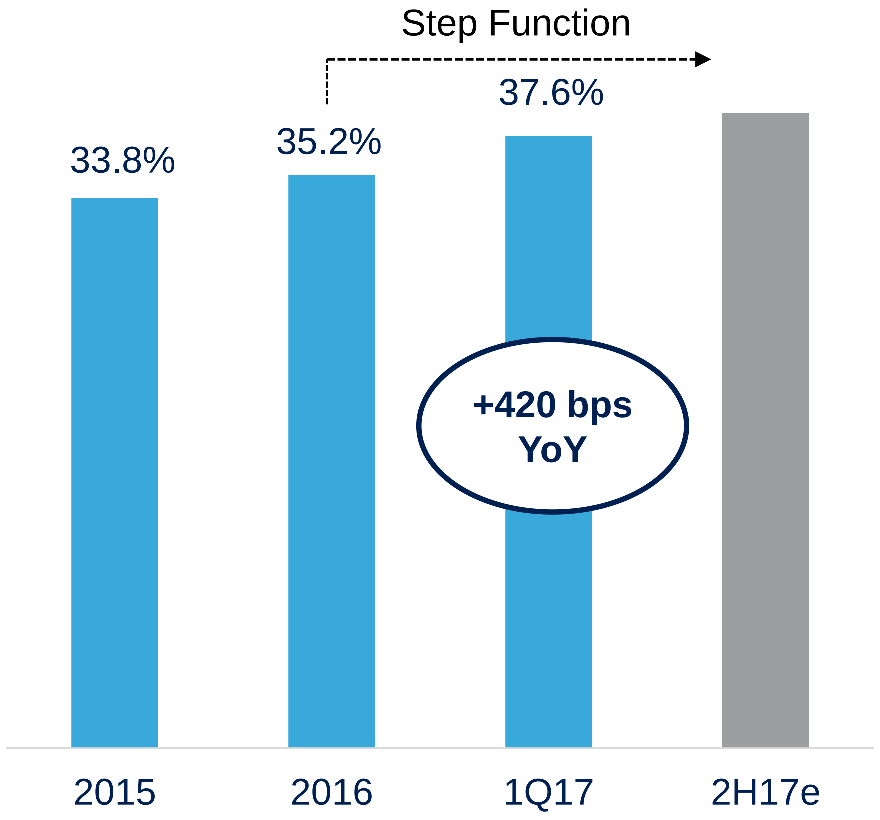
Gross Margin

&

Operating Margin

Expansion

Continued Gross Margin Improvement



Opportunities to further improve gross margin

Key Drivers

Manufacturing efficiencies

- Wafer cost reduction
  - Capacity expansion in 12” to full build-out of existing cleanroom
  - Ongoing capacity conversion from 6” to 8”
  - Higher volumes and improving yield
- Normalized fab loading resulting in negligible unused capacity charges
- Scale and Efficiency in assembly and testing
- Ongoing cost reduction to increase productivity in Bouskoura

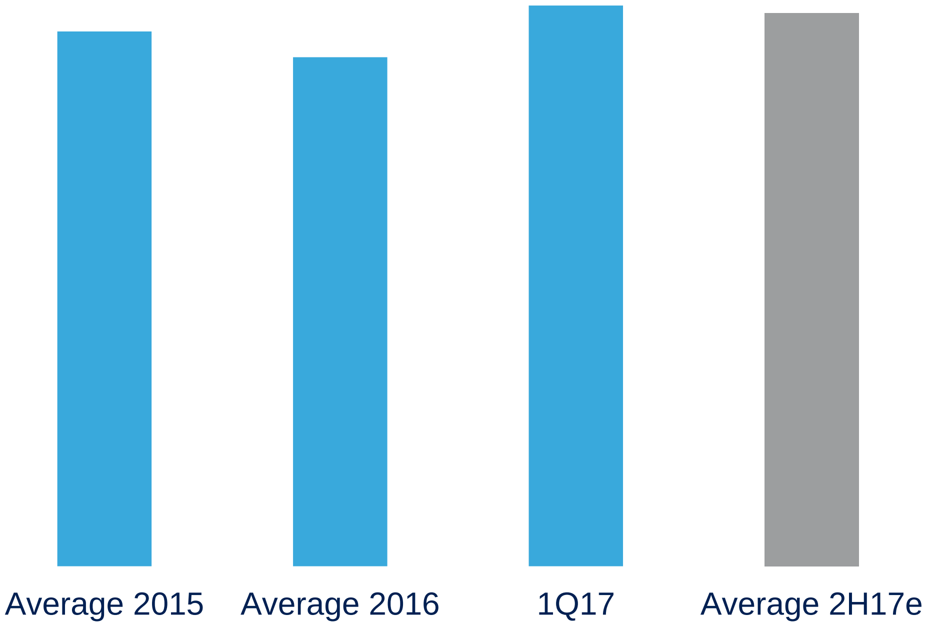
Product mix

- Innovation driving new and differentiated products and technologies
- Improving mix of products serving automotive, industrial and IoT
- Exiting discontinued businesses

Favorable currency effects, net of hedging

Operating Expense Discipline

Net Operating Expense per quarter (US$M)



Key Drivers

Set-Top Box restructuring plan on track

- 1Q17 savings annualized at $126M out of $170M targeted
- Reallocating resources to high-growth opportunities

Boosting sales & marketing efforts in all regions to capture opportunities

Inflationary dynamic to be offset by:

- Completion of Set Top Box restructuring
- Favorable Currency Effects, net of hedging

Operating expense intensity to sales to moderate

- Opex to grow at a significantly lower rate than revenue growth

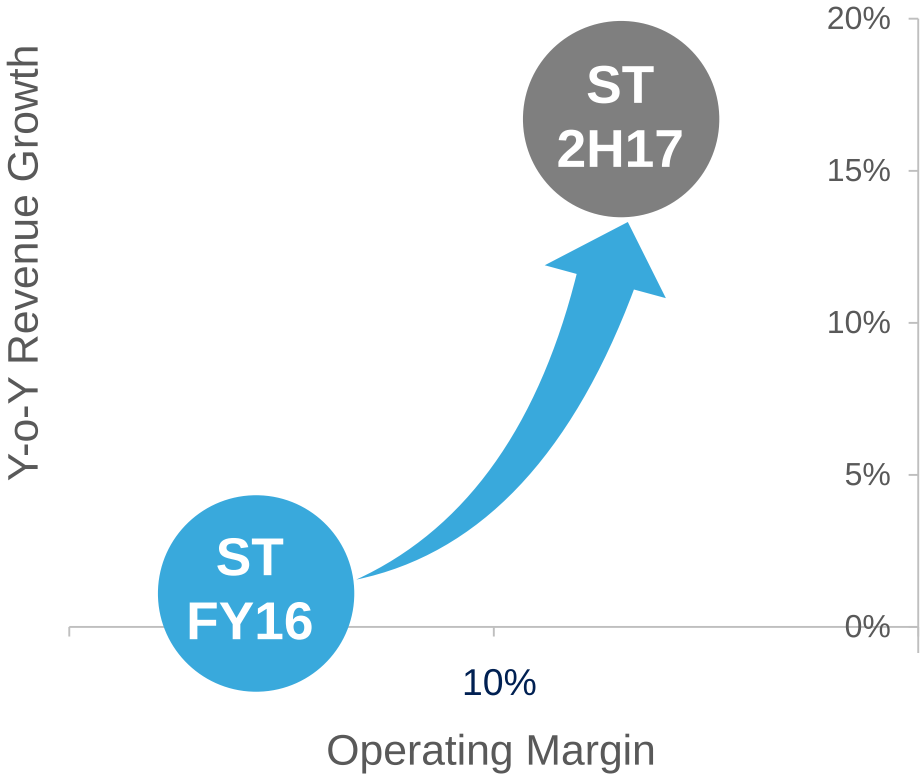
Keep ~ $550M Net Opex per quarter
Estimate 500 basis points of Operating Margin improvement from FY16 to 2H17

Improving Profitability in 2H17

Success Formula

- Revenue growth well above semiconductor industry
  - About $8B** revenues in FY17
- Execute gross margin expansion drivers
  - Maintain YoY improvement
- Capture operating leverage with disciplined OPEX management
  - Reduce OPEX to sales ratio
- Translate Operating Income into Net Earnings with minor interest expense and moderate effective tax rate (~12 to 15%)

Shareholder Value Creation



Operating Margin* Target in 2H17:
> 10%

* Operating margin before impairment and restructuring is a Non-U.S. GAAP measure. See Appendix for additional information.

** Rounded numbers ± 1.5 percentage points - see Forward Looking Statement for full disclosure. Such statements are subject to various risks and uncertainties, which may cause actual results and performance of our business to differ materially and adversely from the forward-looking statements.

ADG Expansion Contribution

Leverage technology leadership

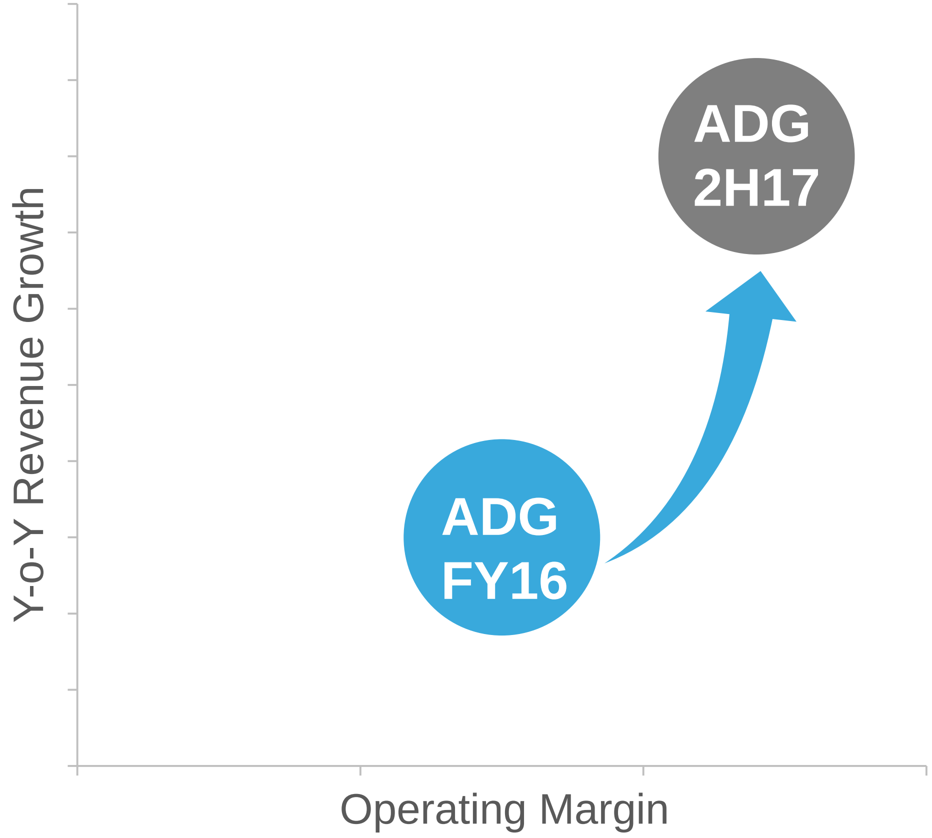
- Smart Power, eNVM, RF, FD-SOI and SiC

Revenue drivers

- ADAS (Vision & Radar)
- Automotive-grade 32-bit MCU
- Infotainment (Radio, Satellite, Terrestrial)
- Smart Power (Braking, Engine Mgmt., Distribution)
- Power MOS & Silicon Carbide for Auto & Industrial
- IPAD (Integrated Passive Active Devices)

Margin expansion drivers

- Leverage on revenue growth
- Improved mix in ADAS, infotainment & growth in distribution
- Manufacturing: 6” to 8” conversion, wafer cost in Crolles 12”, yield and productivity in testing



Operating Margin Target in 2H17 :
Low Double-Digit

AMG Expansion Contribution

Leverage technology leadership

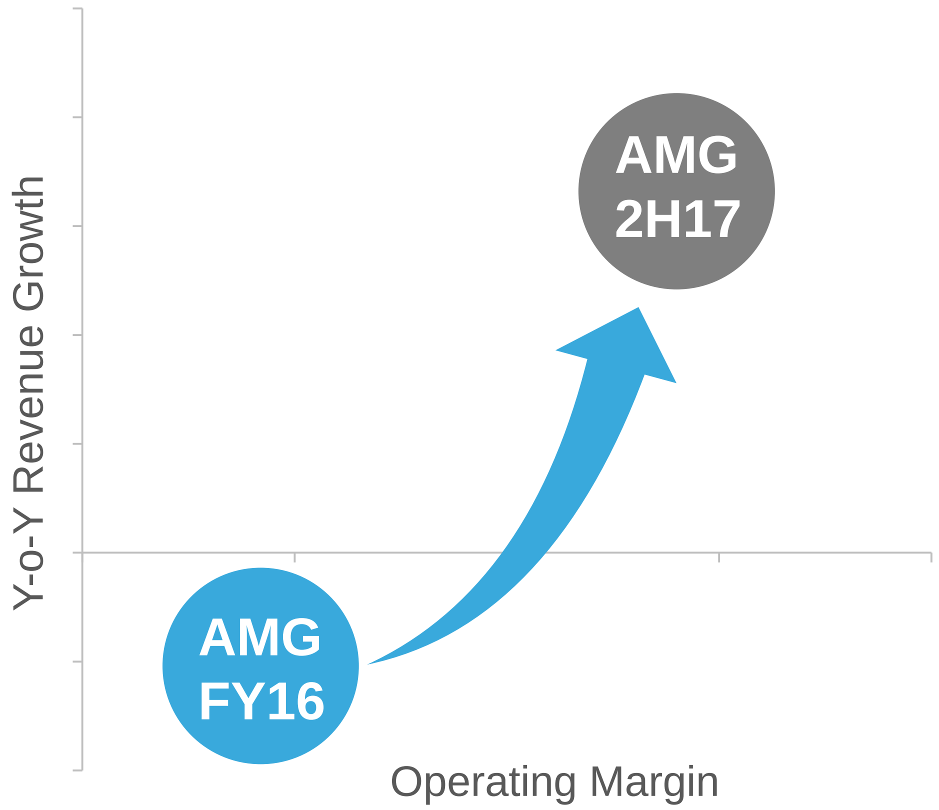
- Smart Power, Mixed Signal Analog and MEMS

Revenue drivers

- Power management combo for hard disk drives
- Analog ASSP & motion MEMS in smartphones
- Wired and wireless connectivity for IoT
- General purpose analog & motion control ICs for mass market
- Analog & MEMS for industrial & automotive

Margin expansion drivers

- Leverage on revenue growth
- Better MEMS mix: both new product & extended applications
- Manufacturing: efficiency in 8” mixed signal, loading in 8” MEMS, loading and yield in Assembly and Testing



Operating Margin Target in 2H17 : Low Teens

MDG Expansion Contribution

Leverage technology leadership

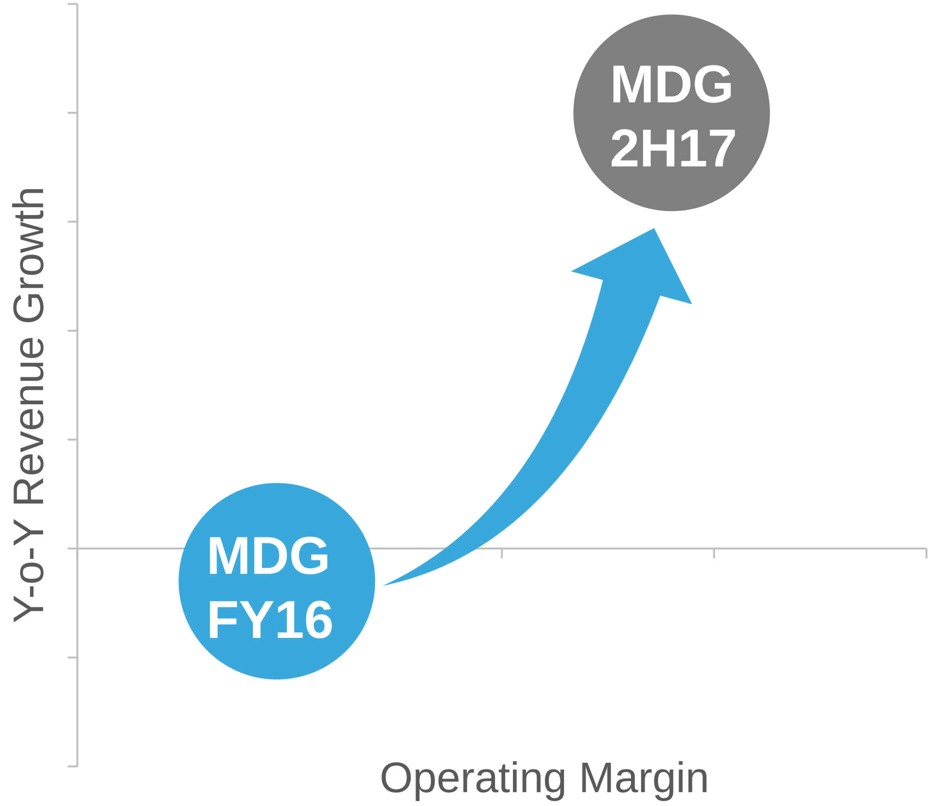
- eNVM and FD-SOI

Revenue drivers

- General Purpose STM32 MCU
- Secure Microcontrollers for smartphones
- NFC portfolio
- RF EEPROM
- Mixed Process / Digital ASICs
- Mass market expansion

Margin expansion drivers

- Leverage on revenue growth
- Wafer cost in Crolles 12” and 8”; Assembly cost
- Improved product mix in Digital ICs
- Progressive wind-down of Set-Top Box Business



Operating Margin Target in 2H17 :
Low Teens

Segment “Others” Expansion Contribution

Leverage technology leadership

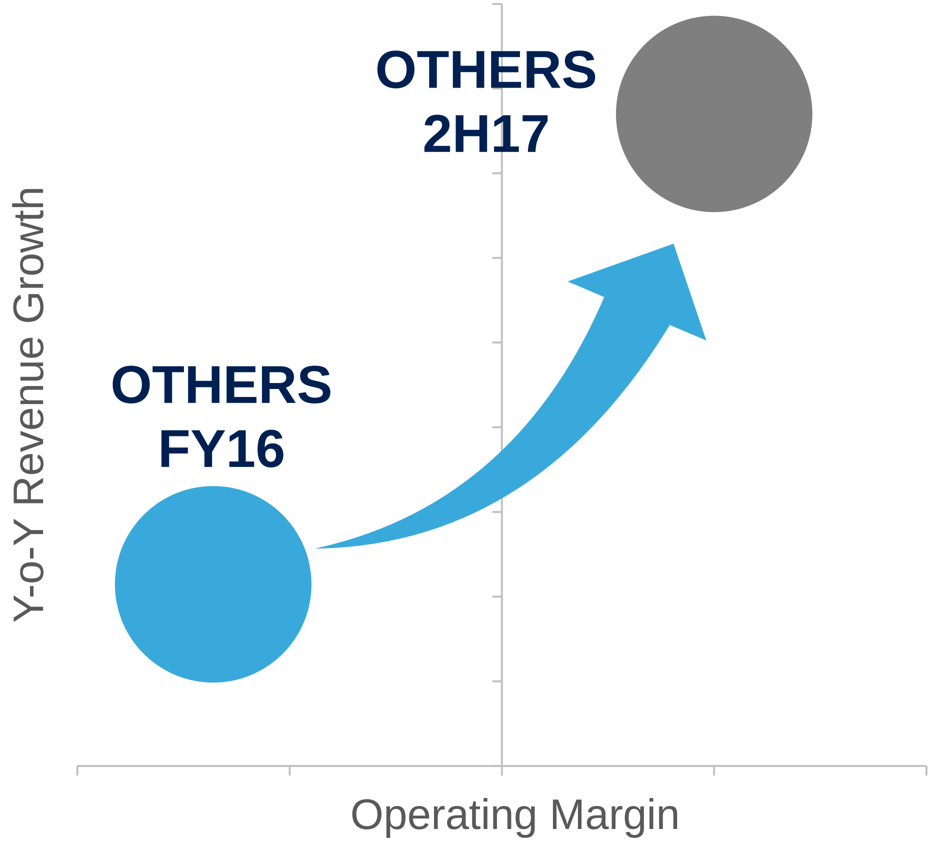
- Specialized CMOS image sensors
- Time-of-Flight Technology
- LiDAR

Revenue Drivers

- 3D sensing & customer expansion for Time-of-Flight products
- Automotive applications

Margin expansion drivers

- Leverage on revenue growth
- Wafer cost in Crolles 12” and assembly cost
- Negligible unused capacity charges

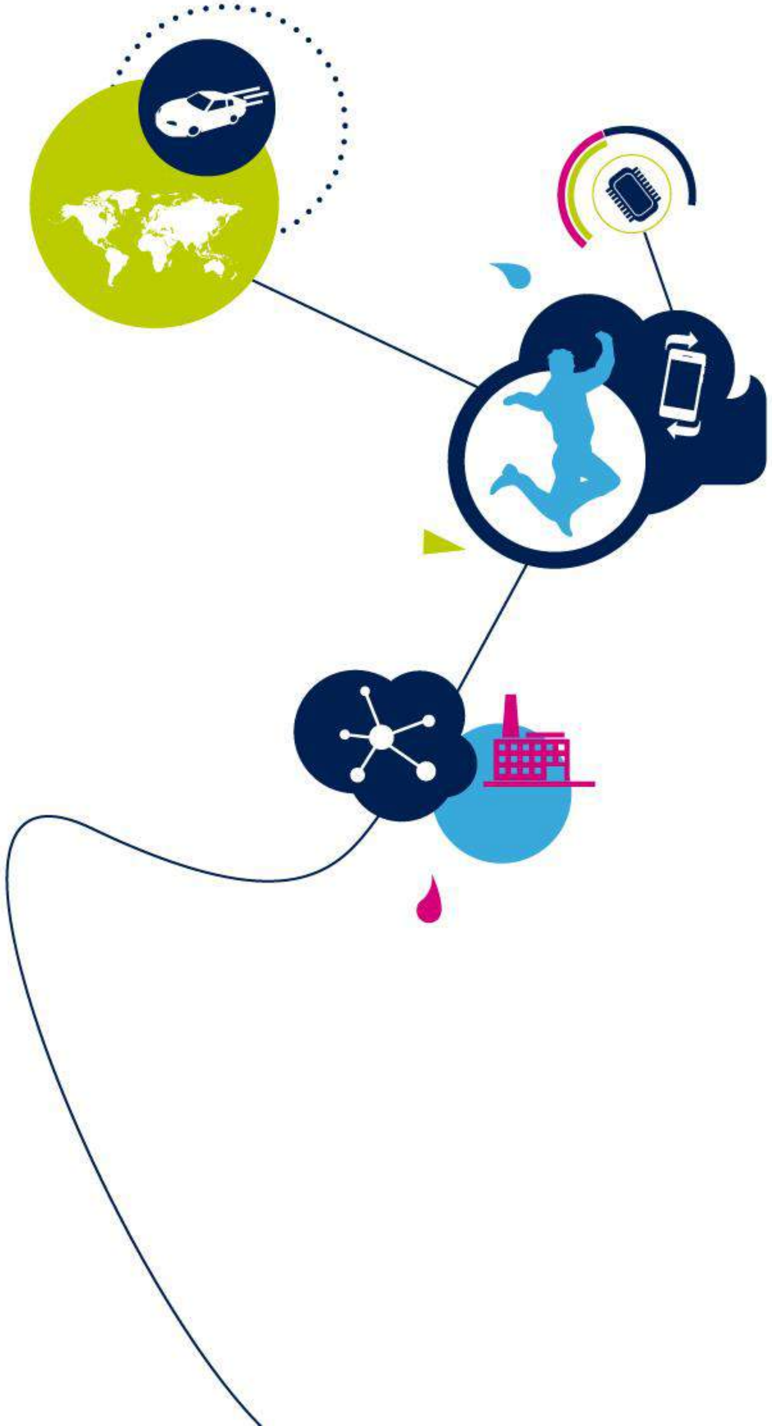


**Operating Margin Target in 2H17 :
Solid Profit**

Takeaways

- Innovative and broad product portfolio + industry momentum boosting growth across all the portfolio
- Strategic focus on industry megatrends and new programs enabling growth faster than the semiconductor market
- Margin expansion driven by operating leverage and breakthrough reduction in manufacturing cost
- Solid Capital Structure and Operating Cash Flow generation allowing investment to support growth, to reward shareholders and maintain flexibility
- Shareholder Value creation

Appendix



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Appendix

- **Free cash flow** is defined as net cash from operating activities minus net cash from (used in) investing activities, excluding payment for purchases (proceeds from the sale of) marketable securities and net cash variation for joint venture deconsolidation. We believe free cash flow provides useful information for investors and management because it measures our capacity to generate cash from our operating and investing activities to sustain our operating activities. Free cash flow is not a U.S. GAAP measure and does not represent total cash flow since it does not include the cash flows generated by or used in financing activities. In addition, our definition of free cash flow may differ from definitions used by other companies.
- **Net financial position** resources (debt) represents the balance between our total financial resources and our total financial debt. Our total financial resources include cash and cash equivalents, marketable securities, short-term deposits and restricted cash, and our total financial debt includes short term borrowings, current portion of long-term debt and long-term debt, all as reported in our consolidated balance sheet. We believe our net financial position provides useful information for investors because it gives evidence of our global position either in terms of net indebtedness or net cash position by measuring our capital resources based on cash, cash equivalents and marketable securities and the total level of our financial indebtedness. Net financial position is not a U.S. GAAP measure.
- **Operating income before impairment and restructuring charges** excludes impairment, restructuring charges and other related closure costs. It is used by management to help enhance an understanding of ongoing operations and to communicate the impact of the excluded items.
- **Adjusted net earnings and earnings per share (EPS)** are used by our management to help enhance an understanding of ongoing operations and to communicate the impact of the excluded items like impairment, restructuring charges and other related closure costs, net of the relevant tax impact.
- **Net revenues of “Others”** includes revenues from sales of Imaging Product Division, Subsystems, assembly services, and other revenue. **Operating income (loss) of “Others”** includes items such as unused capacity charges, impairment, restructuring charges and other related closure costs, phase out and start-up costs, and other unallocated expenses such as: strategic or special research and development programs, certain corporate-level operating expenses, patent claims and litigations, and other costs that are not allocated to product groups, as well as operating earnings of the Imaging Product Division, Subsystems and other products.

Specialized Technologies & Manufacturing Supporting Growth

Jean-Marc Chery

Chief Operating Officer

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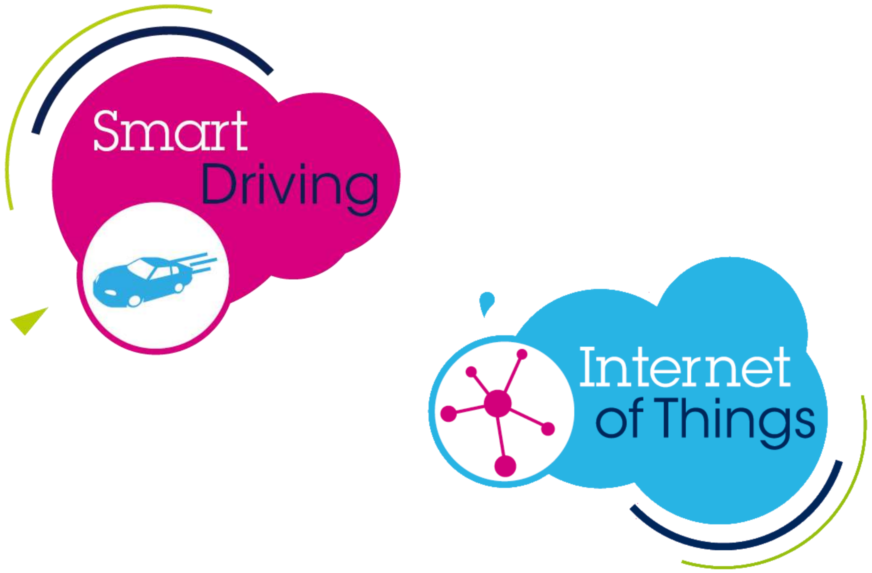
Technology Portfolio

aligned with strategic focus areas

The leading provider of technologies enabling solutions for Smart Driving and the IoT



Smart Power: BCD & VIP

Specialized Imaging Sensors

Power MOSFET & IGBT
SiC & GaN – Discrete

MEMS

Analog Mixed Signal

FD-SOI
FinFET through Foundry

Silicon Photonics

CMOS eNVM

Package technologies
Leadframe – Laminate – Wafer level - Sensors

Technology & Manufacturing Focus 2017

Silicon Carbide

MOSFETs and Diodes
for Automotive & Industrial applications

Advanced BCD

Smart Power devices
for Automotive & Industrial applications

CMOS eNVM (Embedded Non Volatile Memory)

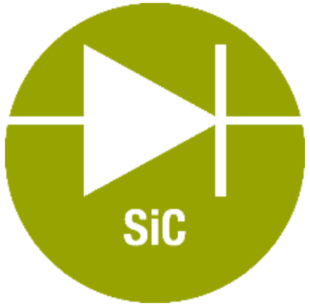
Advanced General Purpose & Secure Microcontrollers
for Consumer, Automotive, Industrial applications

Imaging

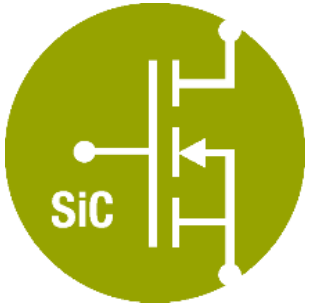
Time-of-Flight & specialized image sensors

Silicon Carbide

SiC Diodes



SiC MOSFETs

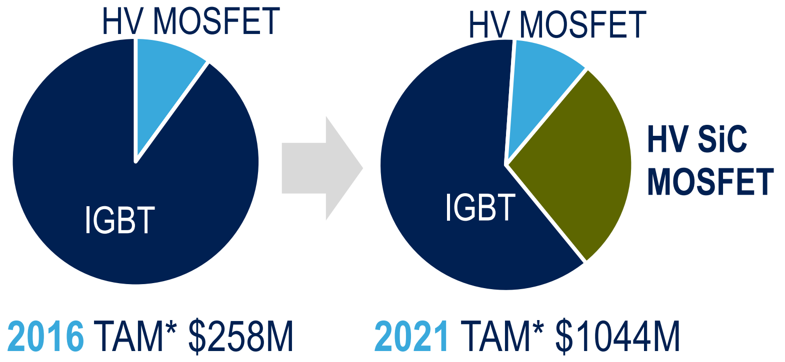


Much more efficient than IGBT

- 5x ~ 8x smaller size
- 7x lower switching loss (W)
- 40% lower total loss (W)
- 15% higher working temperature

Industrial

Vehicle Electrification



(*) Pure EVs, Hybrid Plug-in

Advanced BCD

Advanced BCD

100V
7V

Airbag – ABS – ESP
HDD – Printer – Audio amplifier
Power supply – Power management

BCD8s / 8sP / 8sAUTO (0.16µm)
BCD9s / 9sL (0.11µm)
BCD10 (90nm) – BCD11 (65nm)

SOI BCD

300V
190V

Full digital amplifier
Echography
AMOLED – Pico-projector

SOI-BCD6s (0.32µm)
SOI-BCD8s (0.16µm)
SOI-BCD9s (0.11µm)

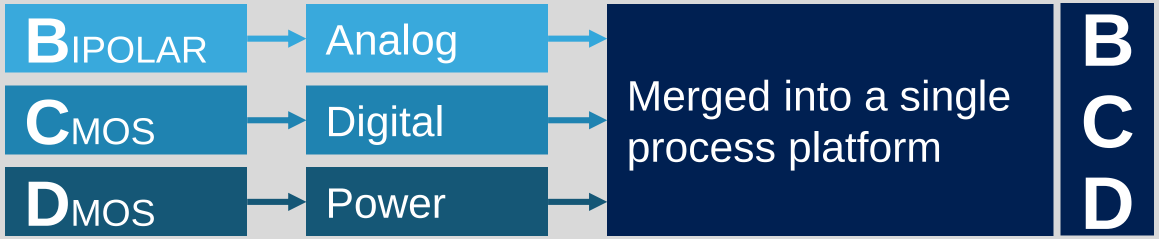
High Voltage BCD

6kV
700V

Lighting
Motors
Electrical Car

BCD6s Offline (0.32µm)
BCD6s HV Transformer (0.32µm)

Invented by ST in the 80s. Widely used today in the industry



BIPOLAR → Analog →
CMOS → Digital →
DMOS → Power →

Merged into a single process platform

B
C
D

- **Lithography Nodes Evolution**
  Increased integration to embed more digital functions
- **Power Evolution**
  Devices optimized for Low Conduction Losses and High Frequency applications
- **Process customization by application**
  Innovative process modules and materials
- **Packaging**
  Developing advanced packaging solutions

CMOS eNVM

In production

CMOS M40

eFLASH

40nm

- High performance logic for 32-bit MCUs
- High robustness
- High reliability with extended temperature

In deployment

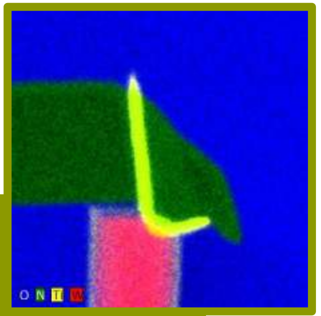
eSTM40

Proprietary Memory Cell

40nm

- Identical functionality to Split Gate Cell with size as small as Split gate 28nm
- Highly competitive solution
- Based on a ultra low power CMOS 40nm platform with analog and RF features

Next gen



ePCM

Phase Change Memory

28nm

- Leveraging on 28nm FD-SOI platform
- Above IC Phase Change Memory technology
- Compatibility with the most stringent automotive requirements

Imaging

Provide differentiated **Smart Optical Sense & Illumination** solutions

Proprietary Technologies

Advanced pixel & Silicon process

Optical package/module & Imaging system expertise

Differentiated Offering

Time-of-Flight & Specialized Image Sensors

Proximity – Ranging
Gesture – Depth map

Differentiated pixels, Visible & IR,
High Dynamic Range &
Flicker Free Imaging

Fast Growing Applications

- Autofocus & Camera Assist
- 3D Sensing
- Flicker-free Image Sensors
- LiDAR

Front-End Manufacturing

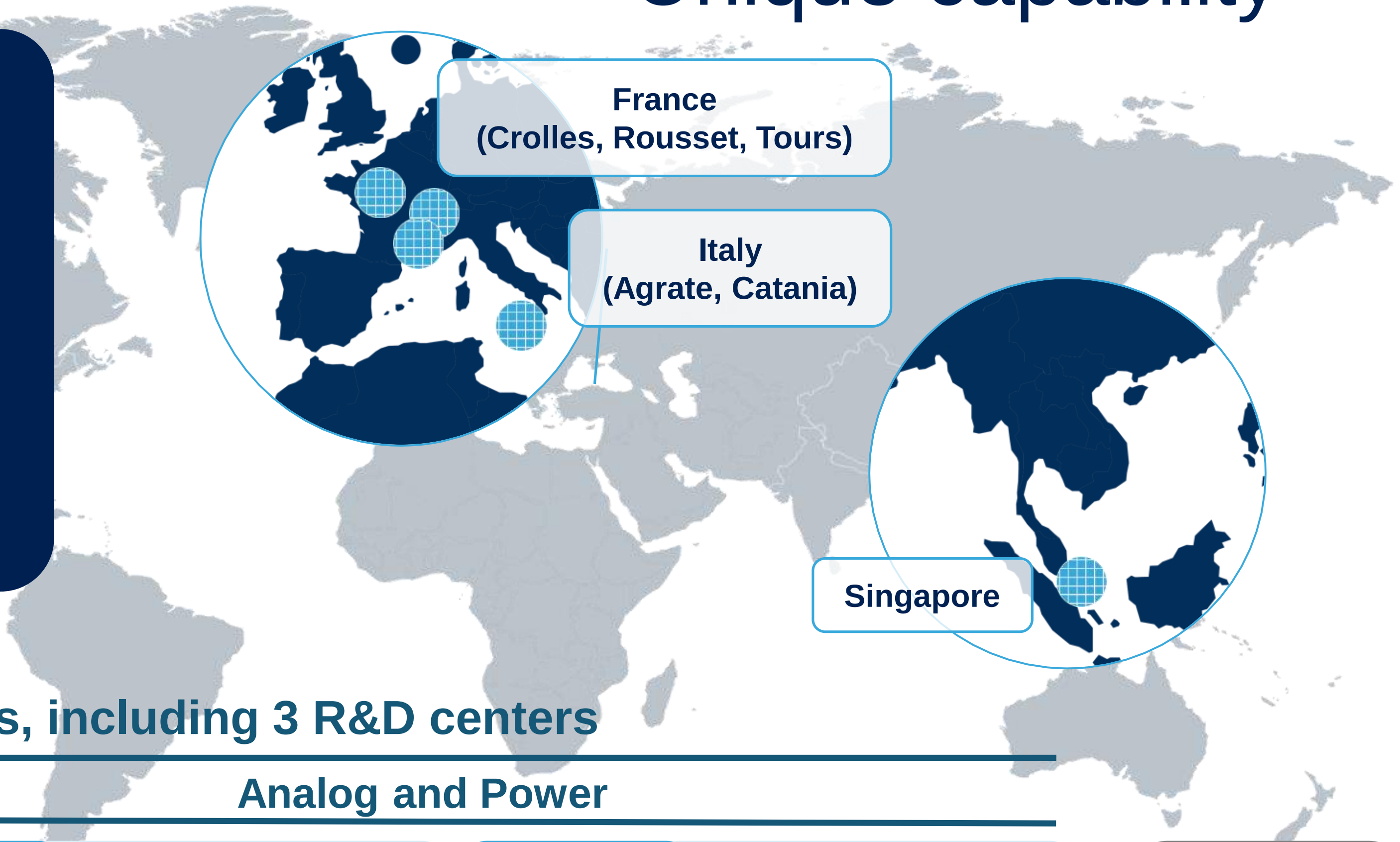
Unique capability

Technology portfolio aligned with application focus areas

Flexible IDM model with foundry partners

- Internal / external technology complementarity
- Manufacturing capacity flexibility at foundry

Clustering approach



6 Front-End sites, including 3 R&D centers

Digital		Analog and Power			
Crolles R&D	FD-SOI Logic BiCMOS & RF Specialized Imaging Embedded-NVM	Tours	Power Discrete Passive integration	Catania R&D	Advanced BCD MOSFET and Silicon Carbide
Rousset	Embedded-NVM EEPROM	Agrate R&D	Advanced BCD MEMS	Singapore	Power Discrete BCD

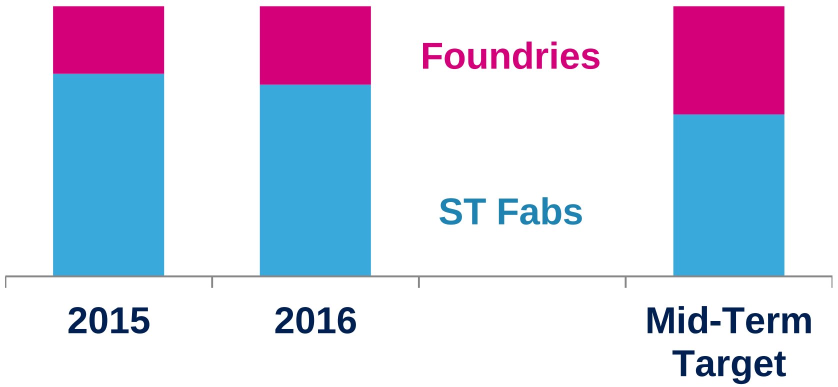
Foundry partners

Digital Manufacturing Strategy

- Multiple sourcing through technology & manufacturing partnerships
- Rousset / Crolles clustering
- Crolles 300mm increase of scale on differentiated technologies according to demand

Targeting 40% outsourcing

for CMOS including eNVM



Technology		Driver/First	Second
CMOS Bulk	≥40nm	Crolles 300	Foundry
	<40nm	Foundry	Crolles 300
CMOS eNVM	≥90nm	Rousset 200	Foundry
	<90nm	Crolles 300	Foundry
CMOS FD-SOI		Crolles 300	Foundry
FinFET		Foundry	
Specialized Imaging		Crolles 300	
BiCMOS	≥90nm	Crolles 200	
	<90nm	Crolles 300	
Silicon Photonics		Crolles 300	
HCMOS9A		Crolles 200/300	Foundry

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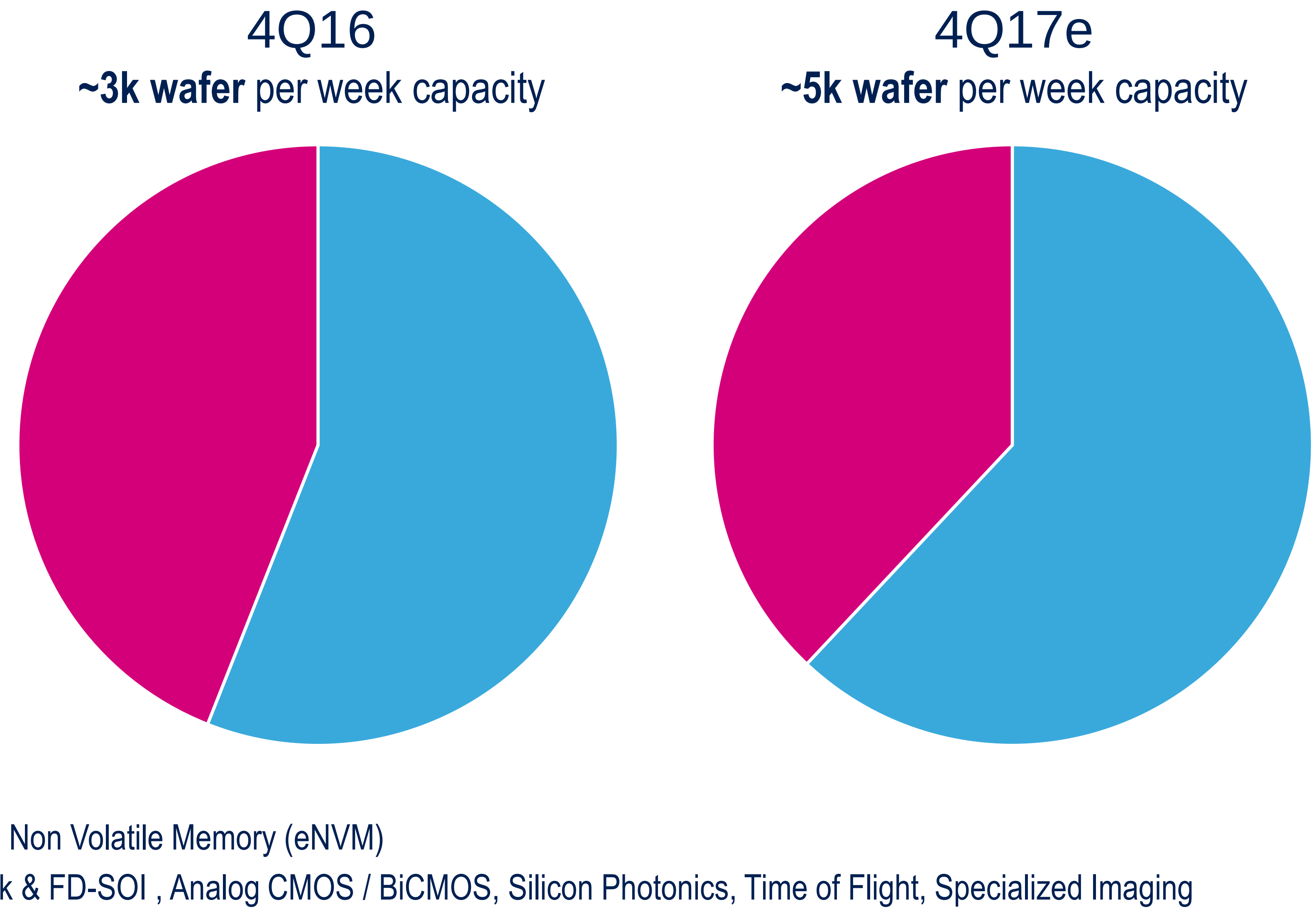
Crolles 300mm

Mix evolution with volume growth

Manufactured in Crolles
CMOS eNVM for Microcontrollers
CMOS Bulk & FD-SOI up to 28nm for digital ASICs and automotive
Analog CMOS / BiCMOS
Silicon Photonics
Time of Flight
Specialized Imaging



Analog & Power Manufacturing Strategy

Leading Technologies

- Smart Power BCD9s and BCD10 automotive and industrial
- MEMS: Piezo actuators, micromirror, motion,..
- Trench Power MOSFET
- SiC Power MOSFET planar and trench, automotive grade

Cost efficiency

- Singapore - 8” expansion in Automotive Power discrete & BCD
- Catania - 8” expansion and 6” phase-out
- Increased use of Foundries for flexibility

4 Front-End sites

Tours	**Power Discrete Passive integration**
Catania	**Advanced BCD MOSFET and Silicon Carbide**
Agrate	**Advanced BCD MEMS**
Singapore	**Power Discrete BCD**

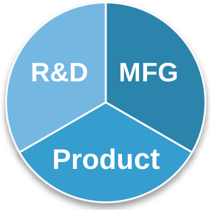
Foundry partners

Integrated Manufacturing & R&D

Agrate & Catania excellence centers

Time to market – time to volume

Clusters of leadership



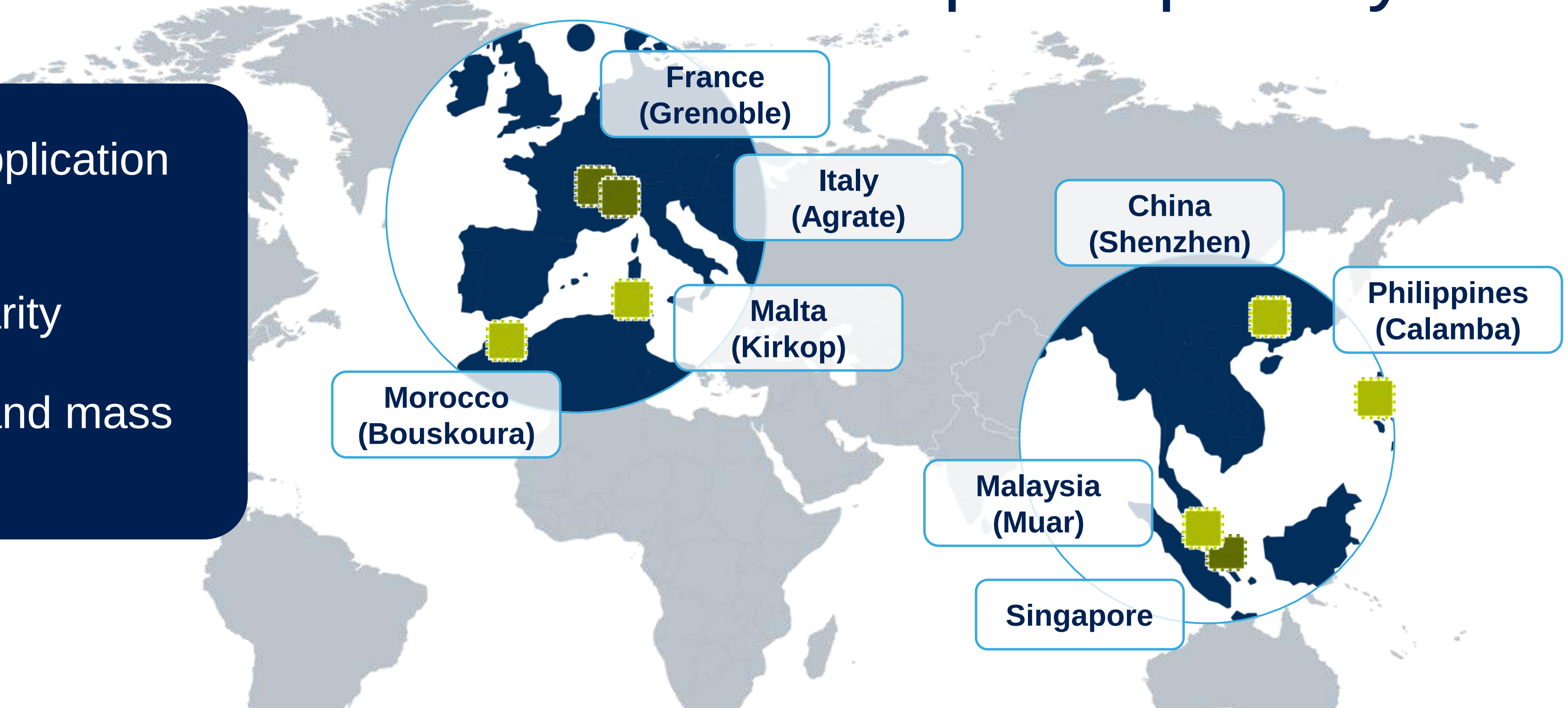
Back-End Manufacturing

Unique capability

Packaging portfolio aligned with application focus areas

Internal and external complementarity

Combining specialized packages and mass production capability



Back-End: 5 manufacturing sites + R&D centers offering over 400 packages

Bouskoura	SOIC Power SO Power TO
Calamba	QFN BGA LGA (MEMS)
Shenzhen	SOIC Power SO / Power TO WLCSP Optical sensor package
Kirkop	LGA (MEMS) Sensor package BGA QFP
Muar	QFP SOIC Power SO BGA
Grenoble Agrate Singapore Kirkop	Package R&D & Central Engineering

OSAT partners

Back-End Manufacturing Strategy

Leading Technologies

- System in Package (SiP), Motion MEMS, microphone, PZT
- Ultra thin wafers (< 50 micron)
- Very-low laminate substrates (<0.13mm)
- WLCSP
- 3D integration, flip chip interconnect
- Stacked die and silver wires (0.8-2.0 mils) on lead frame package
- Super High Density lead frames (110mm width)

Cost efficiency

- Big Data analytics (predictive maintenance, time to yield, die pairing)
- Factory automation
- Material supply chain
- Flexibility at foundries

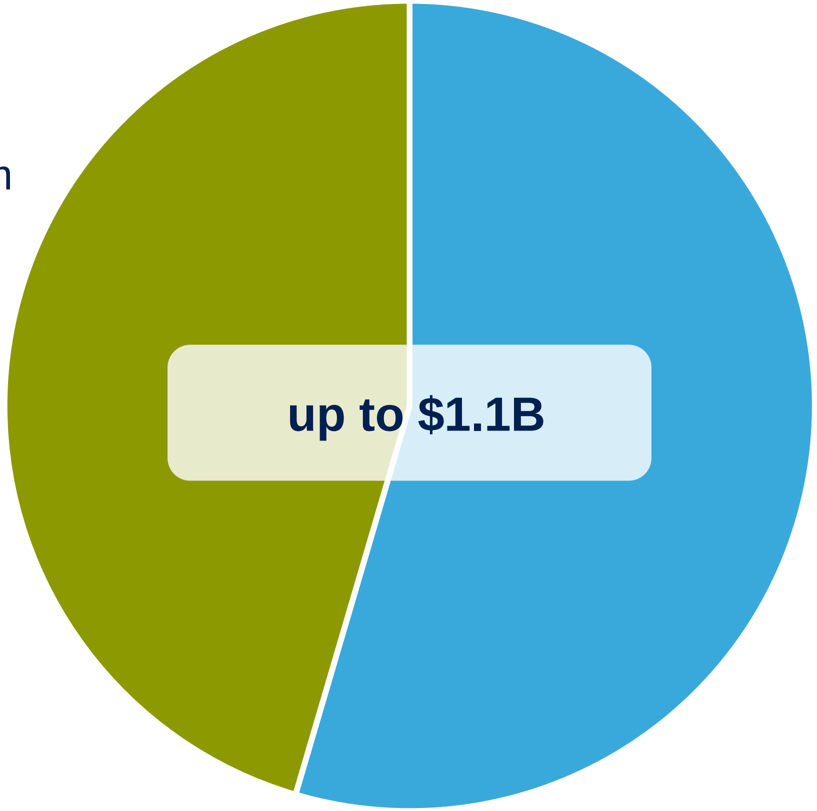
Integrated Manufacturing & R&D

- Kirkop excellence center
- Time to market – time to volume
- Design in quality

2017 Capital Spending

Probing, Assembly & Testing

- Assembly and Test for new program in Time-of-Flight technology
- Assembly and Test for Silicon Carbide
- Assembly and Test capacity to support revenue growth and new products particularly for Automotive



Front-End Manufacturing/R&D

- Capacity expansion and new technologies in the existing Crolles 12” shell
- Continued mix evolution to advanced BCD in Agrate
- 8” footprint and capacity extension and SiC 6” capacity in Catania
- 8” in Singapore for Power Discrete & BCD

Plan under review with possible increase to support our innovative product portfolio and fuel significant revenue growth in 2H 2017 and beyond

Takeaways

- Manufacturing and technology R&D fully aligned with application focus areas
- Combination of specialized and mass production offering with optimized internal and external allocation

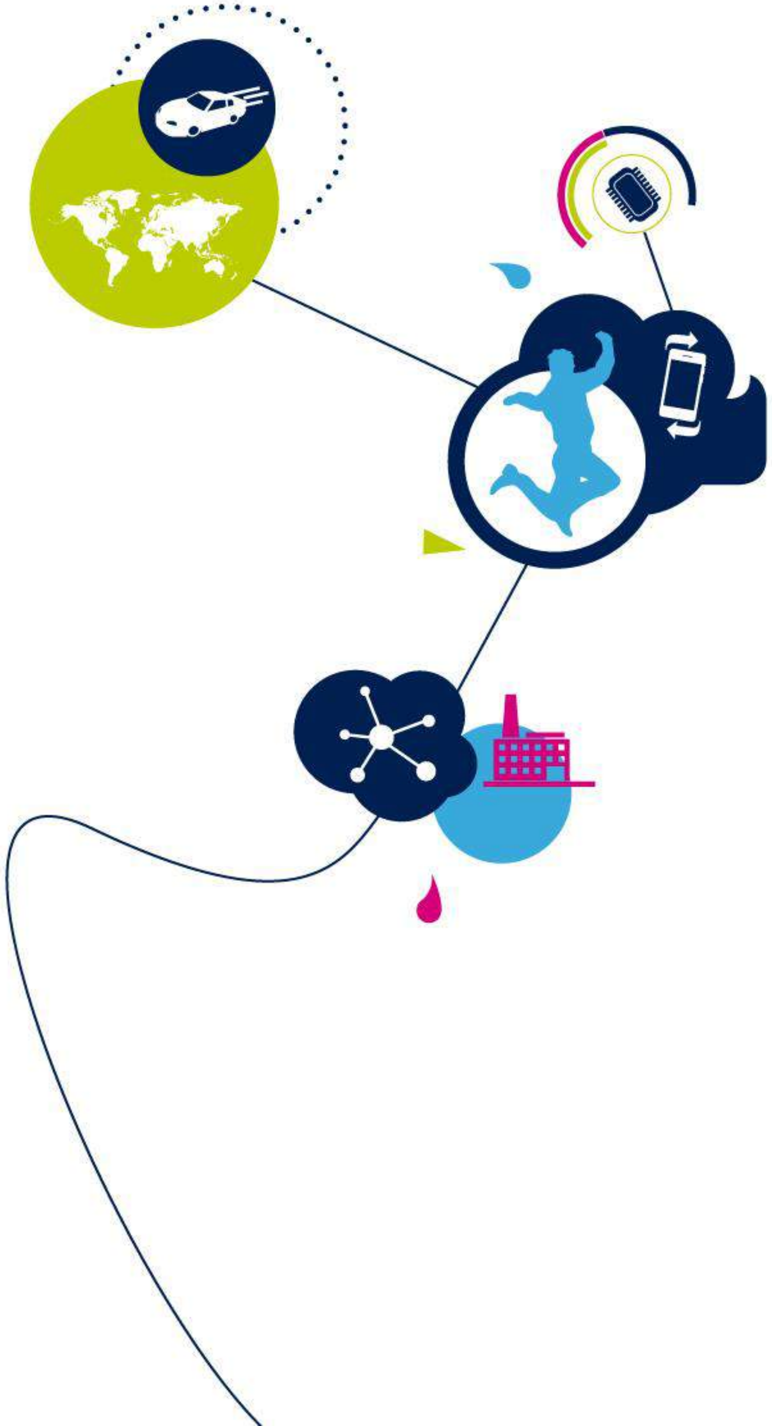
Key programs

- Silicon Carbide ramp up
- Advanced BCD technology strong growth
- CMOS Embedded Non Volatile proliferation at 40nm and Phase-Change Memories development in 28nm FD-SOI
- Time-of-Flight and specialized imaging sensors technology ramp up
- Strong 2H 2017 Manufacturing efficiency Improvement

Application Strategic Focus

Georges Penalver

Chief Strategy Officer



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Internet of Things

Smart Driving

Smart Things

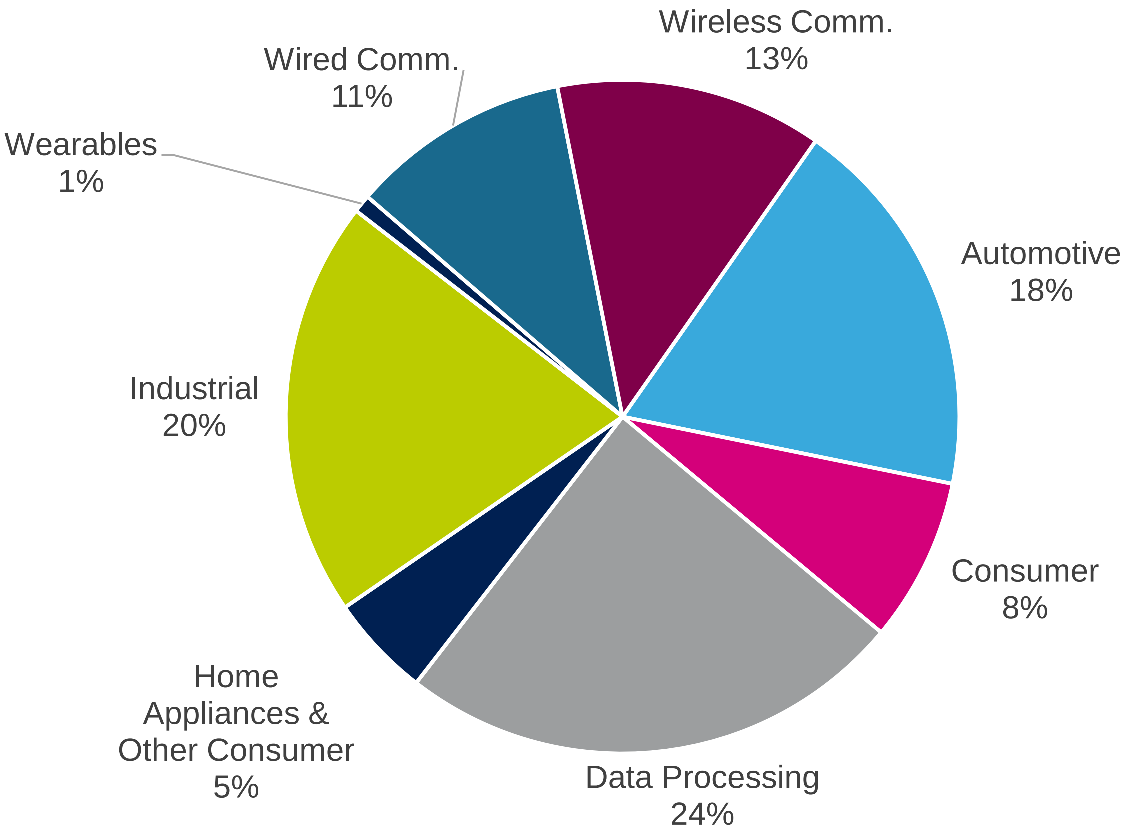
Smart Home & City

Smart Industry

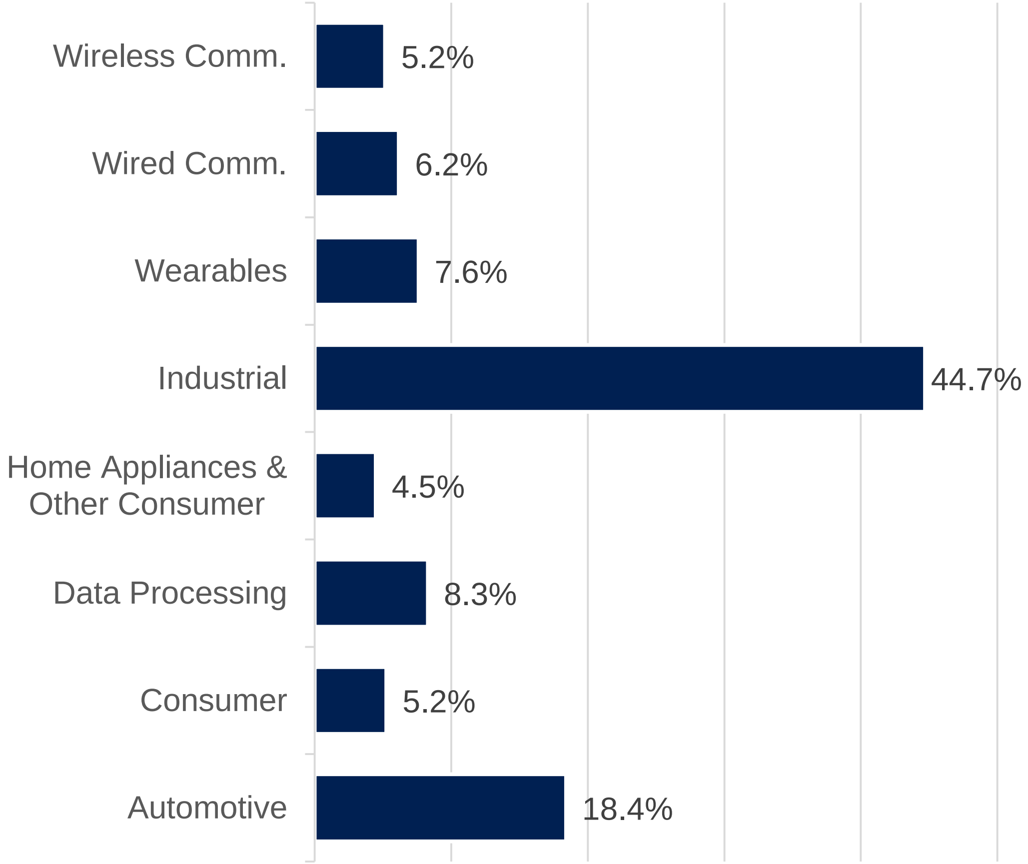
Smart Driving

ST SAM Evolution by Application

% of ST SAM 2016



Contribution to ST SAM Growth (2016-2019)



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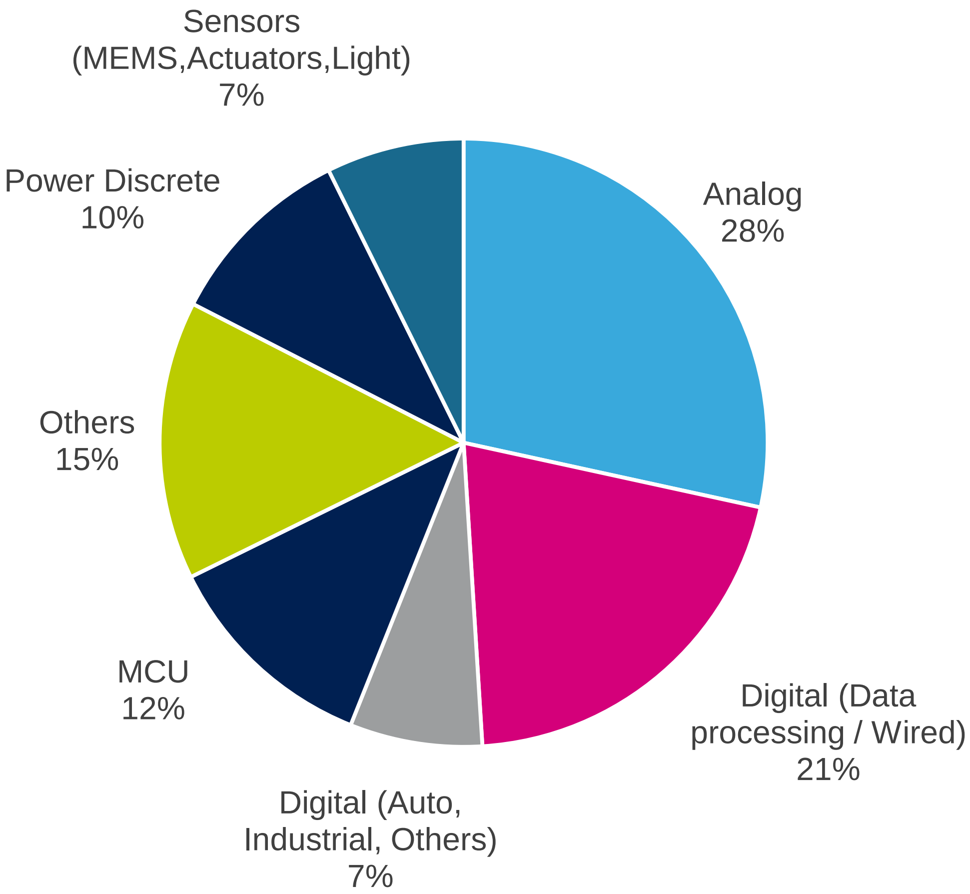
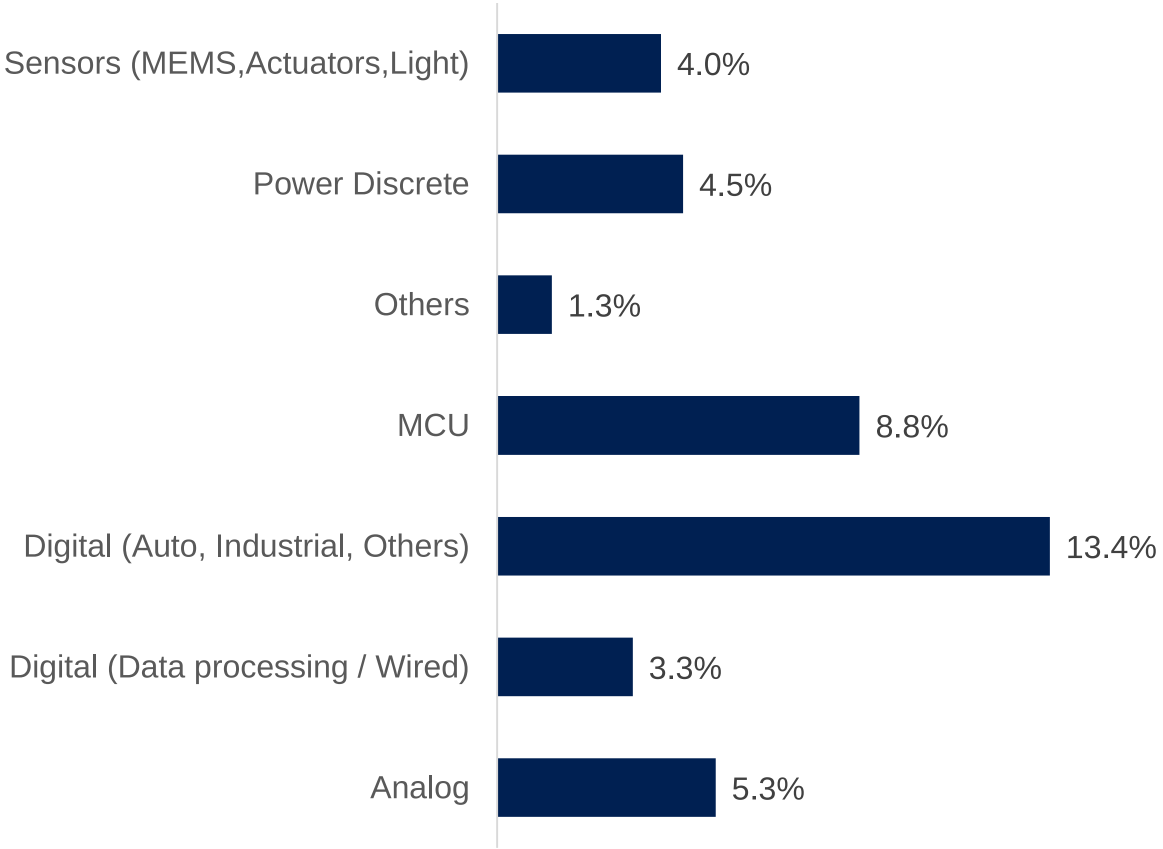
Source: IHS-Markit / Strategy Analytics

ST SAM Evolution by Product

% of ST SAM 2016



ST SAM Growth (CAGR 2016-2019)



Source: IHS-Markit, AMFT, Light sensors Report, 2017

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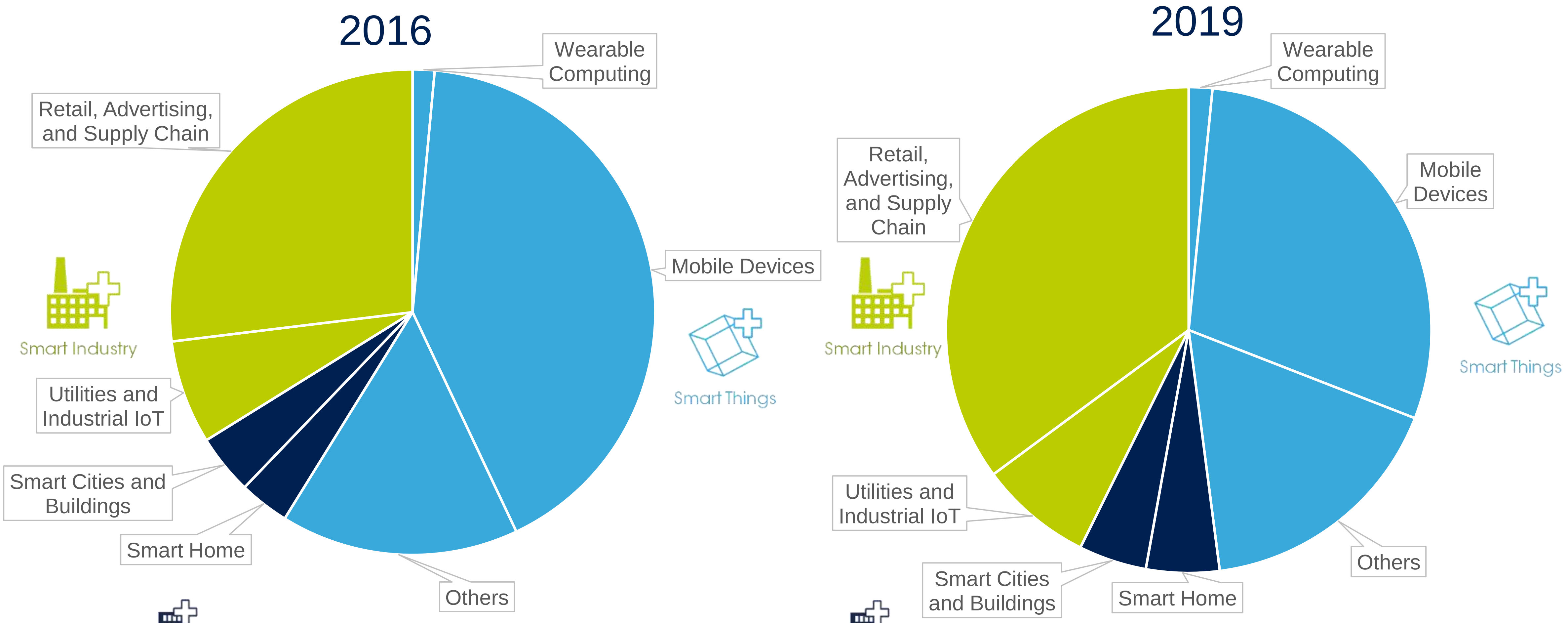
Internet of Things

Smart Things

Smart Home & City

Smart Industry

Internet of Things Connected Devices



Smart Home & City

15 Billion

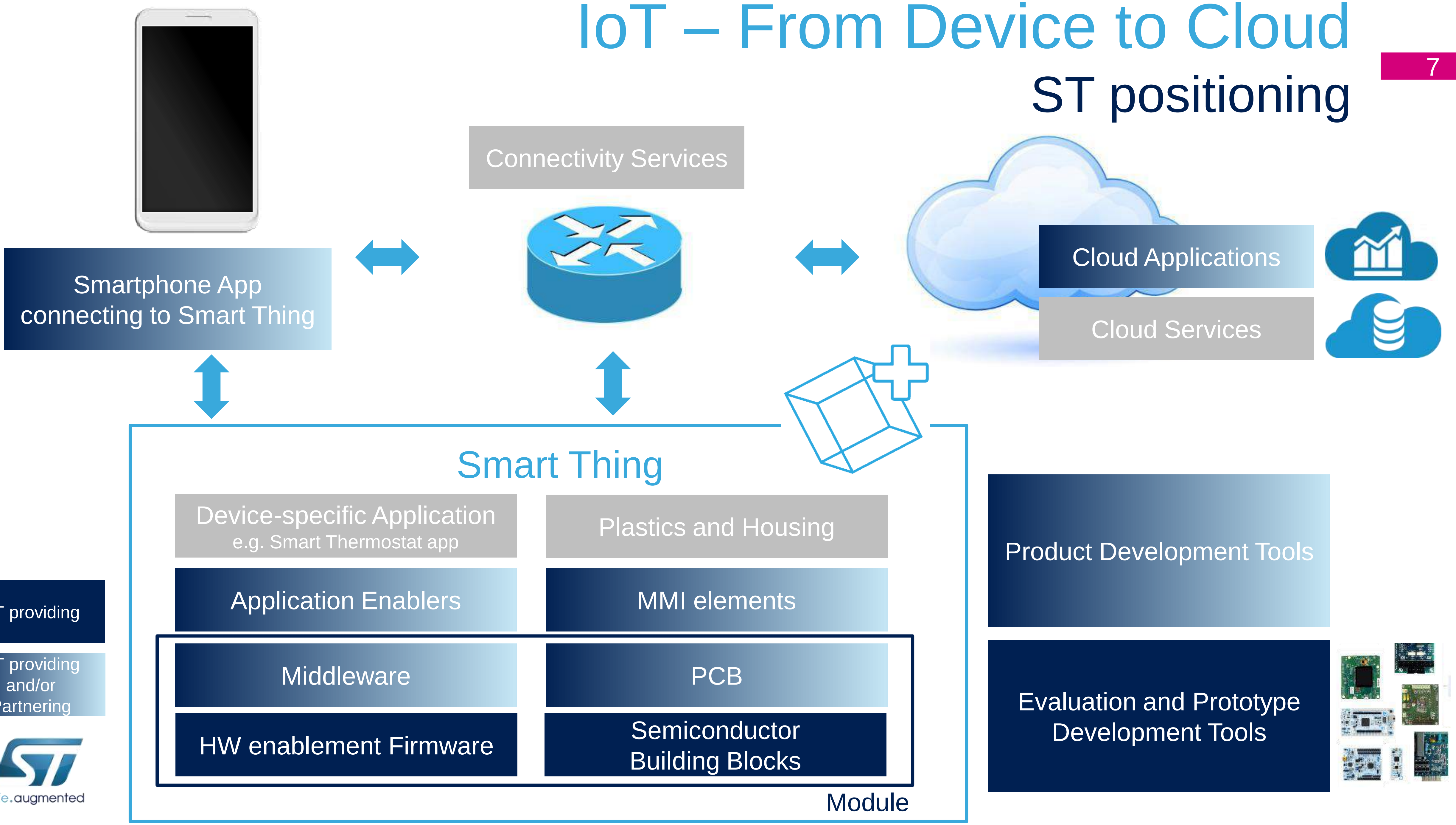
Smart Home & City

26 Billion

Source: IHS-Markit, excluding PC & digital home, connected cars

IoT – From Device to Cloud

ST positioning



Connectivity Services

Smartphone App connecting to Smart Thing

Cloud Applications

Cloud Services

Smart Thing

Device-specific Application
e.g. Smart Thermostat app

Plastics and Housing

Application Enablers

MMI elements

Middleware

PCB

HW enablement Firmware

Semiconductor Building Blocks

Module

Product Development Tools

Evaluation and Prototype Development Tools

ST providing

ST providing and/or Partnering

The Building Blocks of the IoT

	Processing	Security	Sensing & Actuating	Connectivity	Conditioning & Protection	Motor Control	Power & Energy Management
Smart Things	Ultra-Low Power to High Performance	Scalable security solutions	Full range of sensors and actuators	10 cm to 10 km	Nano Amps to Kilo Amps	Power conversion Monitoring Drivers	Nano Watt to Mega Watt
Smart Home & City							
Smart Industry							

ST Strategy and Offer for the IoT

IoT is an end-to-end system from device to cloud involving many actors

ST has a coherent strategy to cover the market needs

The right building blocks for IoT devices	Lower barriers for developers getting started	Lower barriers from prototyping to first product	Lower barriers to connect devices to the Cloud	Enable product & service commercialization
Building Blocks	**Stackable Boards & modular SW**	**Application specific SW**	**Integration of Cloud Provider SDKs**	**Partner Program**

Building Blocks

- Processing
- Security
- Sensing & Actuating
- Connectivity
- Motor Control
- Power & Energy Management
- Conditioning & Protection

Stackable Boards & modular SW

Application specific SW

- Audio Algorithms
- Sensor Fusion

Pre-integrated Software for vertical Applications

- Smart Home
- Building automation
- Wearable

Integration of Cloud Provider SDKs

amazon webservices™

Microsoft Azure

Watson IoT

Ready to use Smartphone Apps

Partner Program

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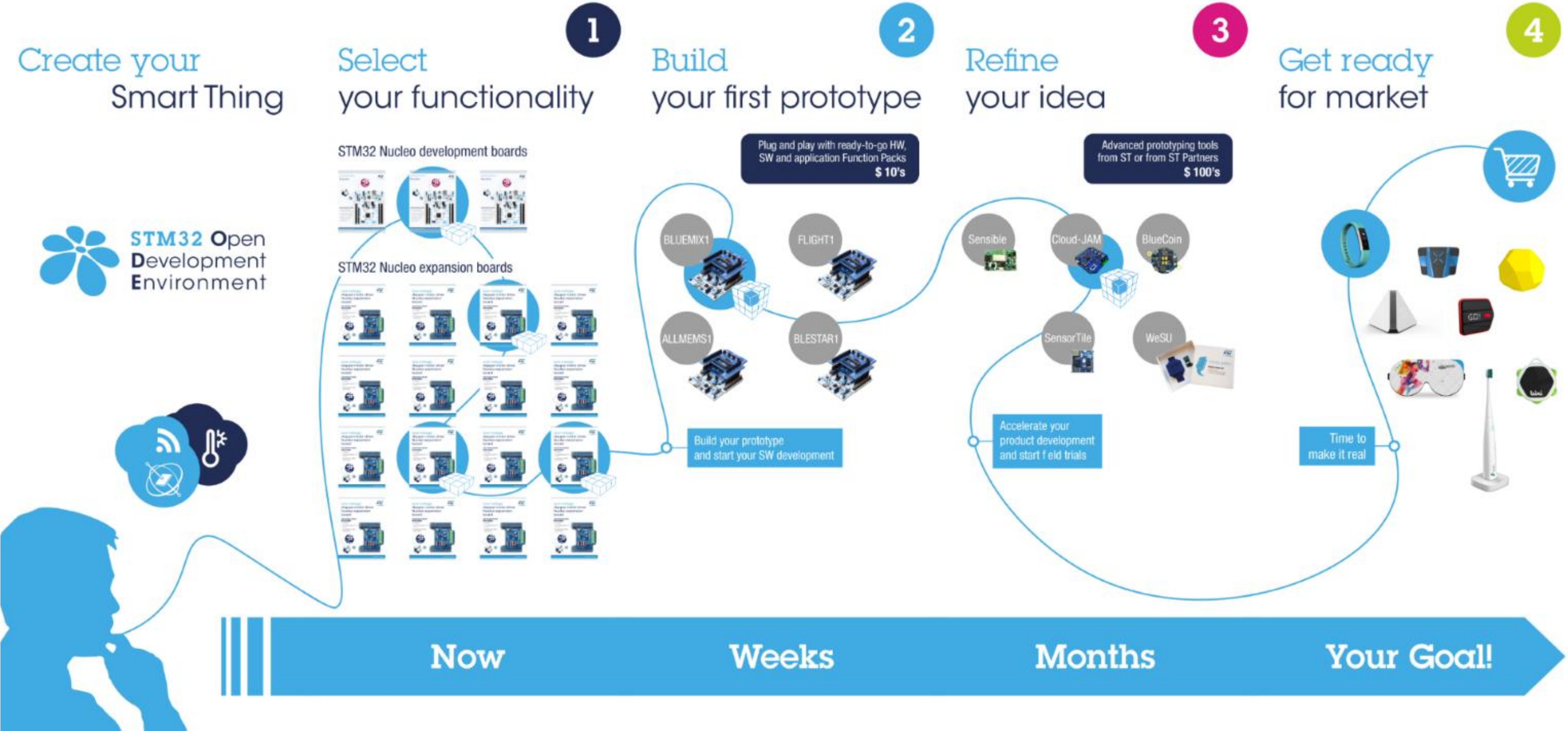
Partner Program

IoT Product Development

Make it easy and make it fast



Create your Smart Thing

1 **Select** your functionality

2 **Build** your first prototype

3 **Refine** your idea

4 **Get ready** for market

STM32 Open Development Environment

STM32 Nucleo development boards

STM32 Nucleo expansion boards

Plug and play with ready-to-go HW, SW and application Function Packs
$ 10's

Build your prototype and start your SW development

Advanced prototyping tools from ST or from ST Partners
$ 100's

Accelerate your product development and start field trials

Time to make it real

ST Solutions for the IoT

INTEGRATION

Common SW Platform

3 Cloud Provider SDKs supported, enabling sensor-to-cloud

131 SW packages from drivers to full application examples and Mobile Applications

STM32 Cube

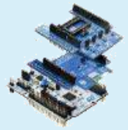
STM32 Open Development Environment

Wearable

IoT Smart Things

Smart Home

Building automation



Modular Hardware

STM32

27 STM32 Nucleo development boards
Covering the broad portfolio of STM32 MCU families

32 STM32 Nucleo expansion boards (X-NUCLEO)
Offering peripheral functions

STM32 Nucleo

Form factor boards

ST & 3rd party form-factor boards

Modular Hardware

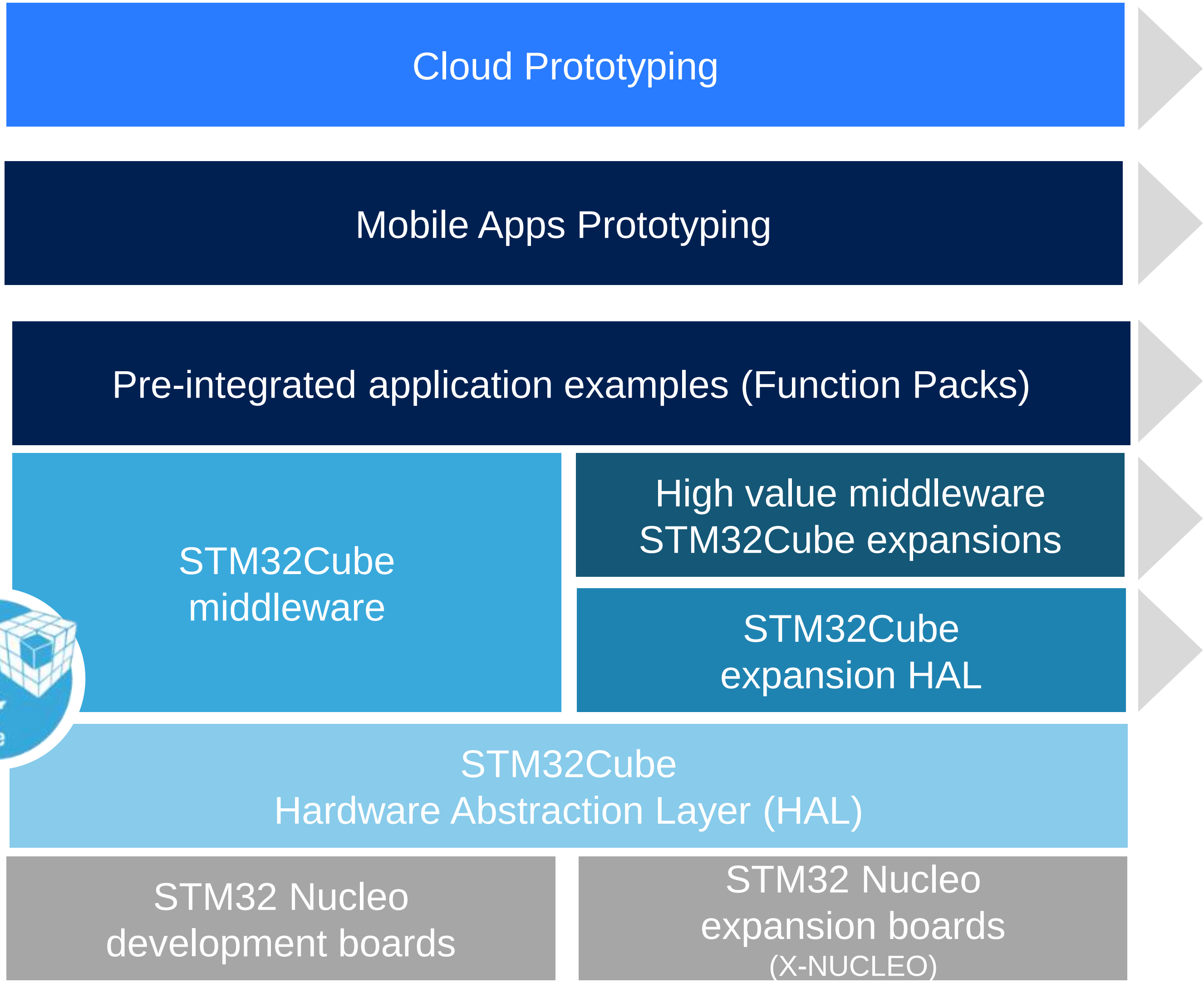
27 development boards and growing… in two flavors (Processing & Security)

Covering all STM32 microcontroller families
and different development needs

32 expansion boards and growing… covering all the key functions

Sense 5	Connect 9	Power Drive 3	Move Actuate 12	Translate 3
Motion & environmental sensors	BLE	Power management	Motor drive	Audio amplifier
Proximity sensor	Wi-Fi	LED boost	Actuator	OpAmp
Microphone	Sub-GHz			
	NFC			

Software for end-to-end Cloud Solutions



Cloud Prototyping

Mobile Apps Prototyping

Pre-integrated application examples (Function Packs)

STM32Cube middleware

High value middleware STM32Cube expansions

STM32Cube expansion HAL

STM32Cube Hardware Abstraction Layer (HAL)

STM32 Nucleo development boards

STM32 Nucleo expansion boards (X-NUCLEO)

3 Cloud providers SDK supported for direct connection to the Cloud

21 Mobile applications

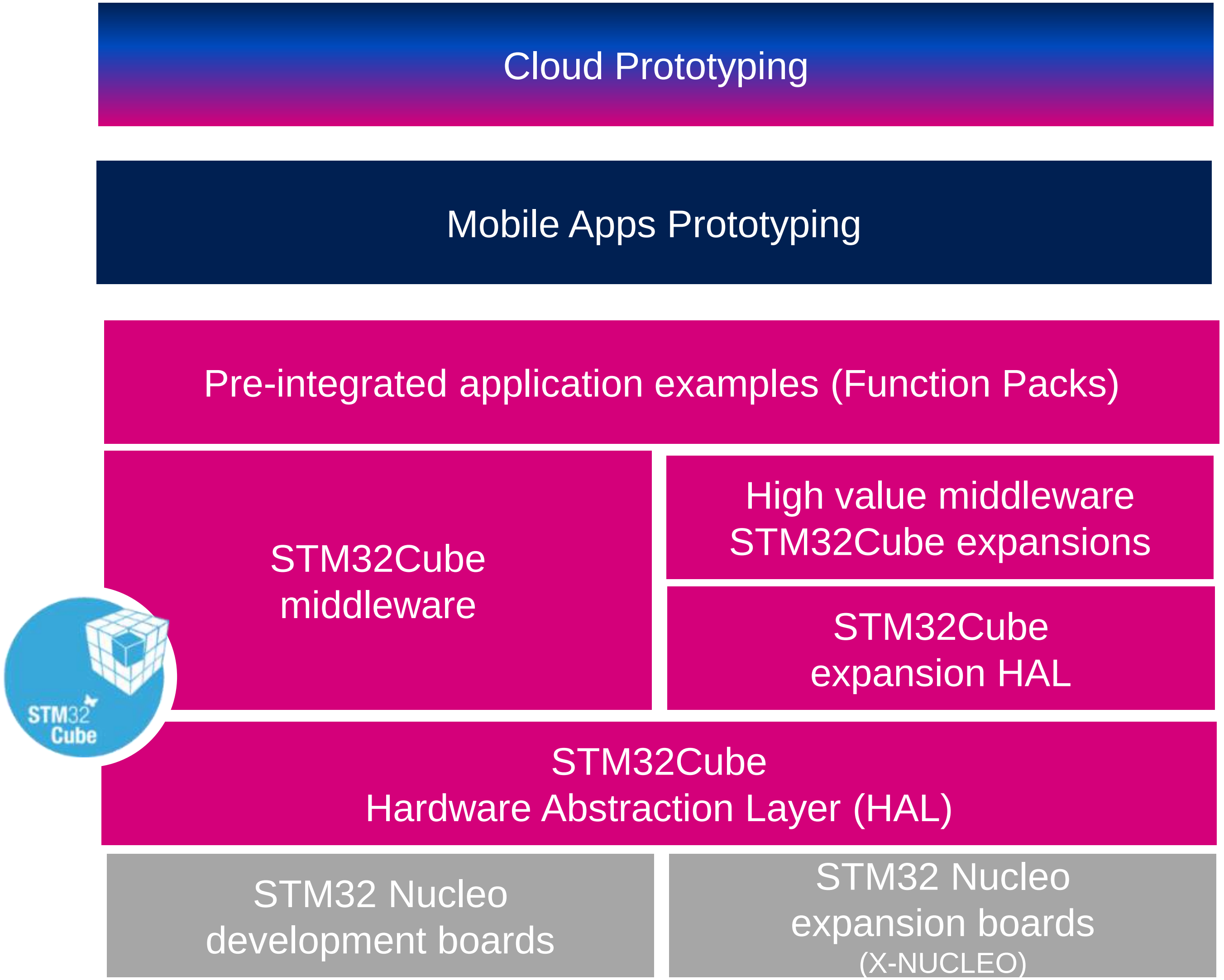
Sample applications, with ready-made Integrated Developer Environment projects

16 High value Libraries (Audio, Connectivity, Sensor ..) with usage examples and free-to-use license

94 Specific pre-integrated drivers and libraries with usage examples supporting STM32 Nucleo expansion boards

STM32 Open Development Environment

Pre-integrated Application Packages



Cloud Prototyping

Mobile Apps Prototyping

Pre-integrated application examples (Function Packs)

STM32Cube middleware

High value middleware STM32Cube expansions

STM32Cube expansion HAL

STM32Cube Hardware Abstraction Layer (HAL)

STM32 Nucleo development boards

STM32 Nucleo expansion boards (X-NUCLEO)

Function Packs

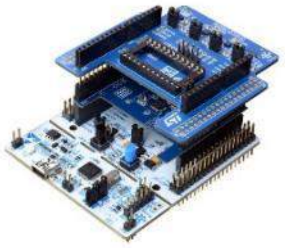
Pre-packaged functionalities
used in most popular application domains

Wearable

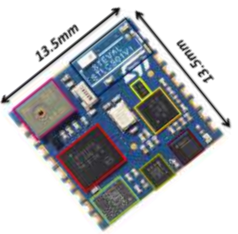
IoT
Smart Things

Home
applications

Building
automation

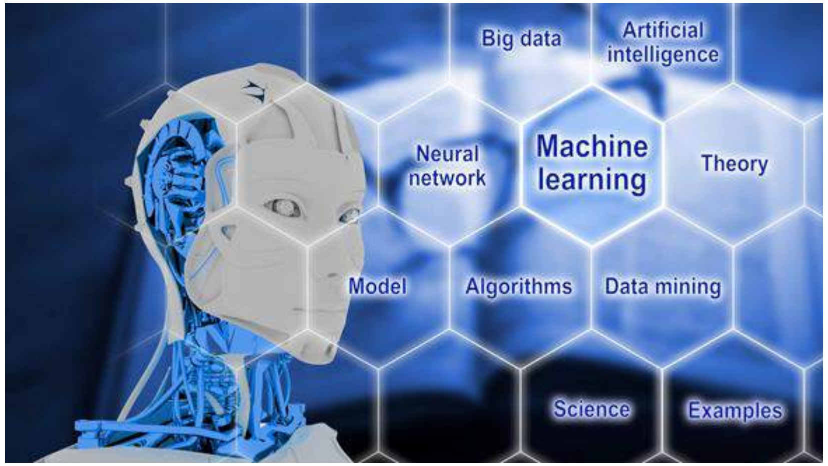


integrating functionality
from several expansion boards



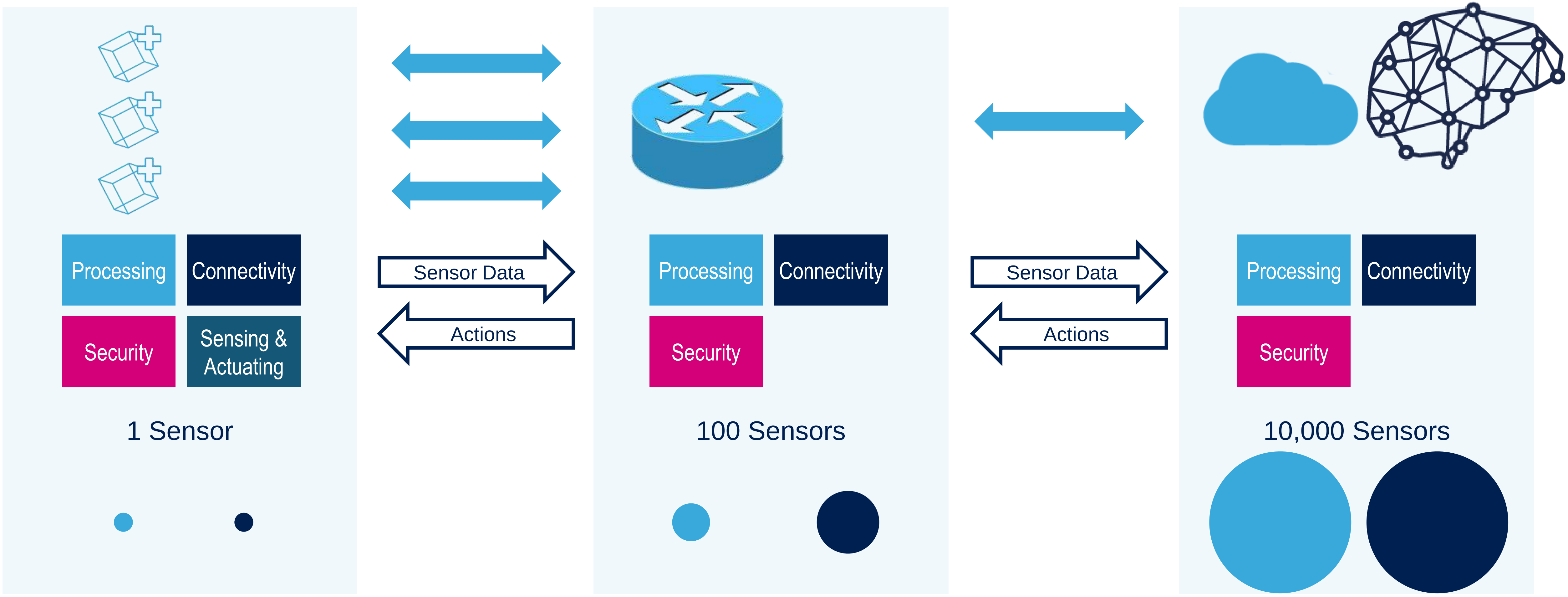
STM32 Open
Development
Environment

The Artificial Intelligence Opportunities



Artificial Intelligence

Centralized

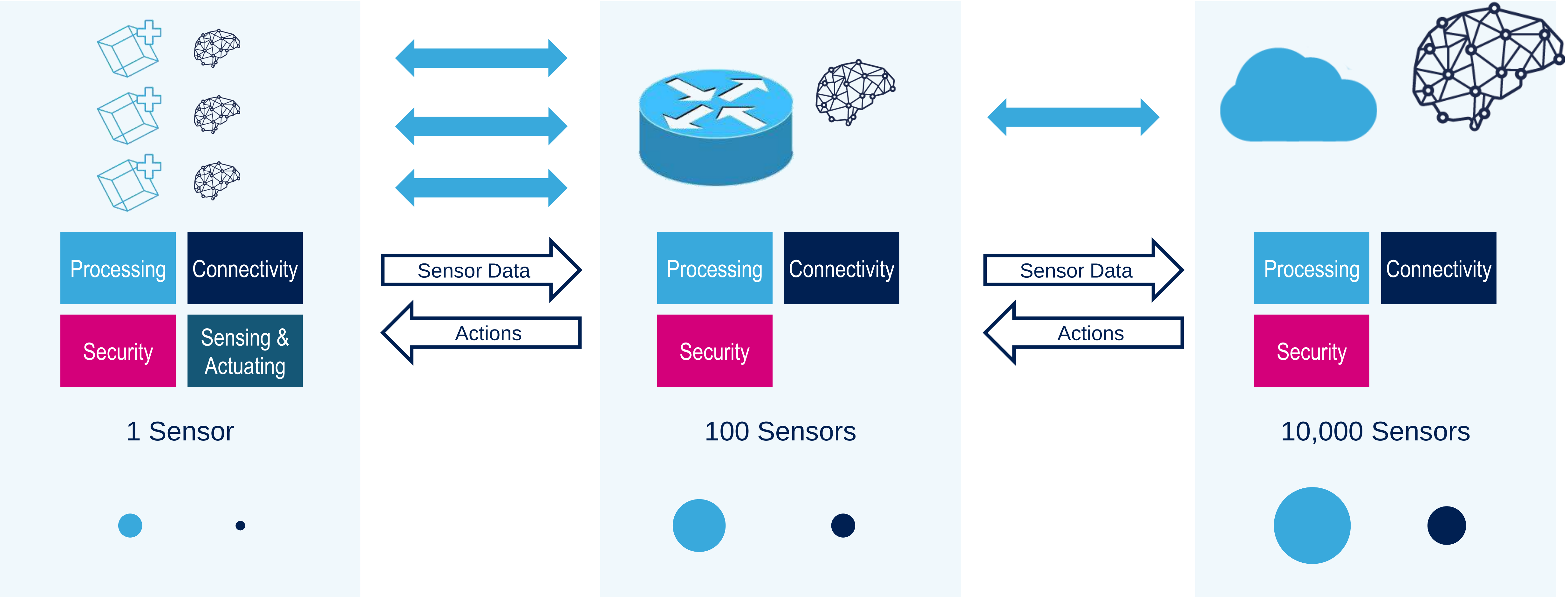


● Processing Requirements

● Connectivity/Bandwidth Requirements

Artificial Intelligence

Distributed



Processing
Connectivity
Security
Sensing & Actuating

1 Sensor

Sensor Data
Actions

Processing
Connectivity
Security

100 Sensors

Sensor Data
Actions

Processing
Connectivity
Security

10,000 Sensors

● Processing Requirements
● Connectivity/Bandwidth Requirements

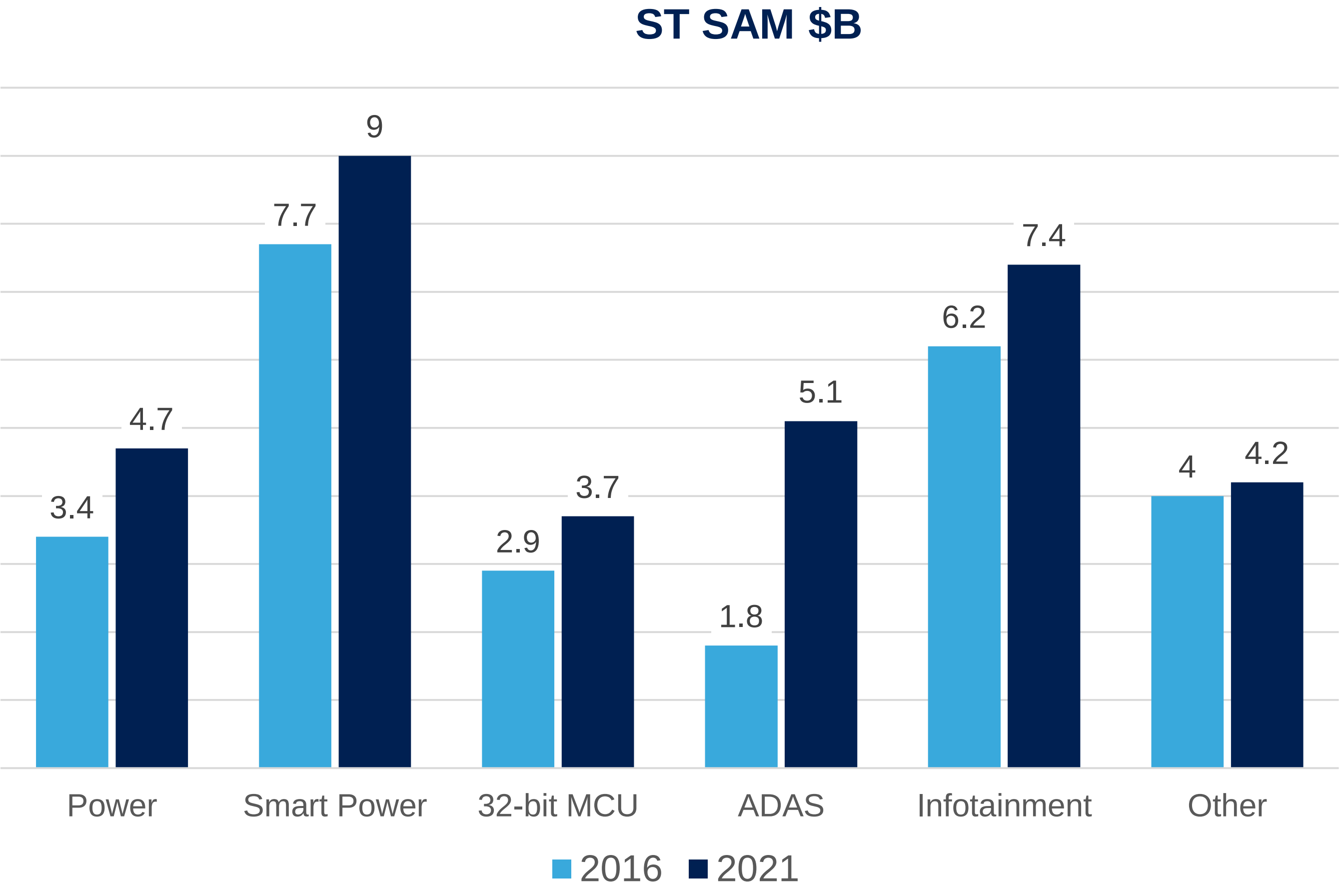
The AI Opportunity for ST

- The are many benefits to distributed AI
  - Reduced central processing needs
  - Reduced data communication requirements
  - Faster response time
  - Improved privacy and data security
  - Overall reduced energy needs
- STM32 microcontrollers with integrated neural networks will be ideal to provide distributed artificial intelligence
- ST already working on proof-of-concept architectures, suitable for integration into various devices
- This new wave of AI will also create demand for many more smart sensors and actuator nodes

Smart
Driving

Smart Driving

Smart Driving



Key Applications

- Active Safety - Passive Safety
- Electric & Hybrid Vehicle Electrification
- Infotainment - Telematics
- Powertrain
  Direct Injection Engine
  Automatic Gearbox
  Braking - Steering

Source: Strategy Analytics

Smart Driving

Smart Driving is about putting the driving experience of the car occupants as the focus point

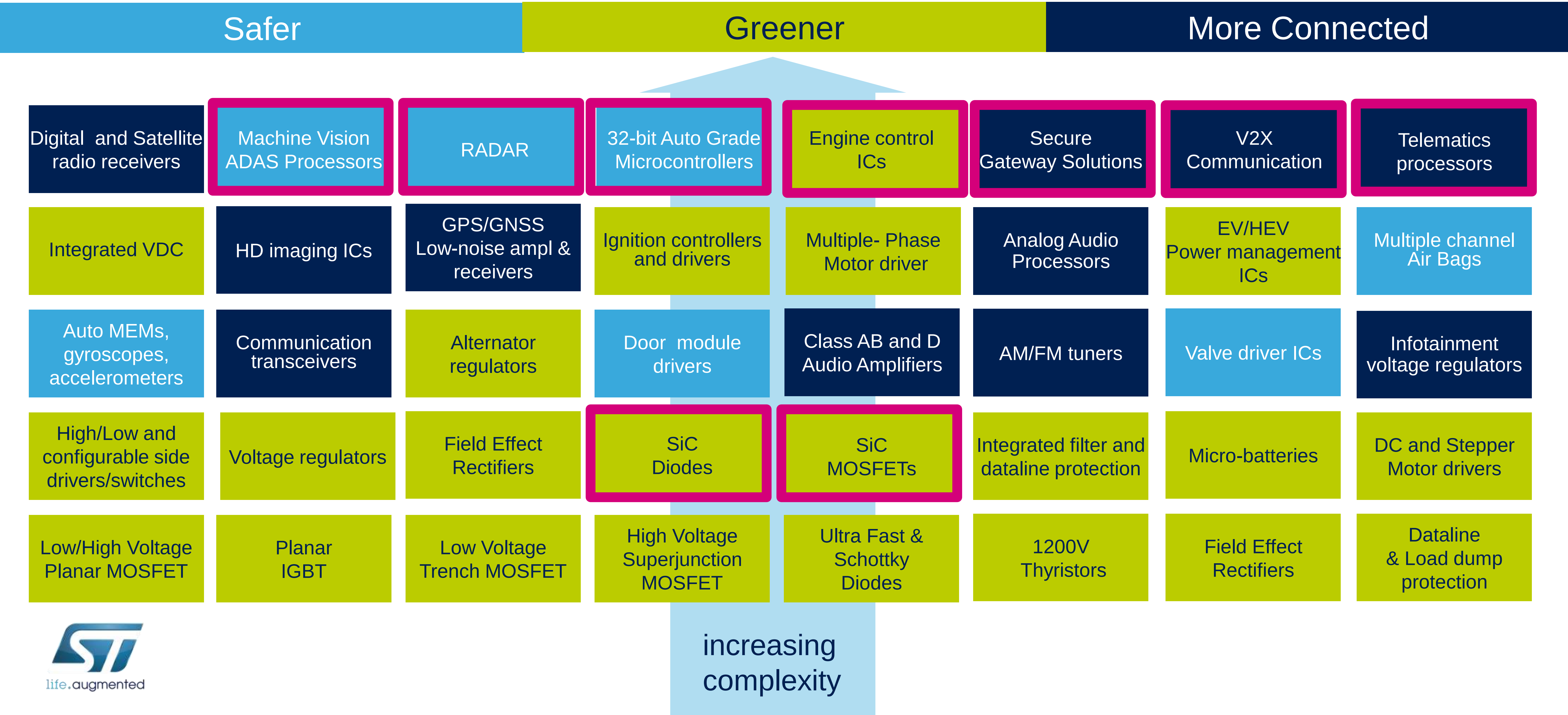
ST is making driving safer, greener and more connected through a fusion of technology

safer

greener

more connected

The Building Blocks of Smart Driving



Safer | Greener | More Connected

Digital and Satellite radio receivers	Machine Vision ADAS Processors	RADAR	32-bit Auto Grade Microcontrollers	Engine control ICs	Secure Gateway Solutions	V2X Communication	Telematics processors
Integrated VDC	HD imaging ICs	GPS/GNSS Low-noise ampl & receivers	Ignition controllers and drivers	Multiple- Phase Motor driver	Analog Audio Processors	EV/HEV Power management ICs	Multiple channel Air Bags
Auto MEMs, gyroscopes, accelerometers	Communication transceivers	Alternator regulators	Door module drivers	Class AB and D Audio Amplifiers	AM/FM tuners	Valve driver ICs	Infotainment voltage regulators
High/Low and configurable side drivers/switches	Voltage regulators	Field Effect Rectifiers	SiC Diodes	SiC MOSFETs	Integrated filter and dataline protection	Micro-batteries	DC and Stepper Motor drivers
Low/High Voltage Planar MOSFET	Planar IGBT	Low Voltage Trench MOSFET	High Voltage Superjunction MOSFET	Ultra Fast & Schottky Diodes	1200V Thyristors	Field Effect Rectifiers	Dataline & Load dump protection

increasing complexity

ST Strategy and Offer for Automotive

Safer | Greener | More Connected

Technology & Product leadership, focusing on high growth areas

- BCD 90nm
- ViPower 180nm
- eFlash 28nm
- CMOS 40nm
- FD-SOI 28nm
- SiC

- Machine Vision
- RADAR
- Positioning
- V2X
- Smart Power
- Engine Mgment

Continuing partnerships with automotive leaders to drive innovation

Car Manufacturers

Audi

TOYOTA

Tier 1 OEMs

BOSCH

Continental

Technology Leaders

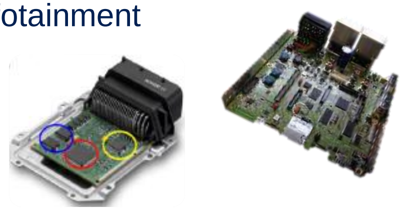
MOBILEYE

Autotalks

Reinforce leadership in emerging markets also through distribution

Full Kit Solutions

Engine and Body control, Infotainment



Dedicated Products

Roadmap for Emerging Mkts

China Emission Engine control

Specific MCU solutions

Partnerships for long-term success in China

Local Partners

MADE IN CHINA 中国制造 2025

System Solutions for the Chinese Market

长安汽车 CHANGAN

Great Wall Focus Dedication Specialization

ZKX 中科芯 EPOCH TECHNOLOGY IMECAS

ST Supply Chain, Manufacturing & Quality

In-house manufacturing

Quality

Automotive Quality mindset

30 Years of Qualification Experience

AEC-Q100-2 compliant product portfolios

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Internet of Things

Smart Driving

Smart Things

Smart Home & City

Smart Industry

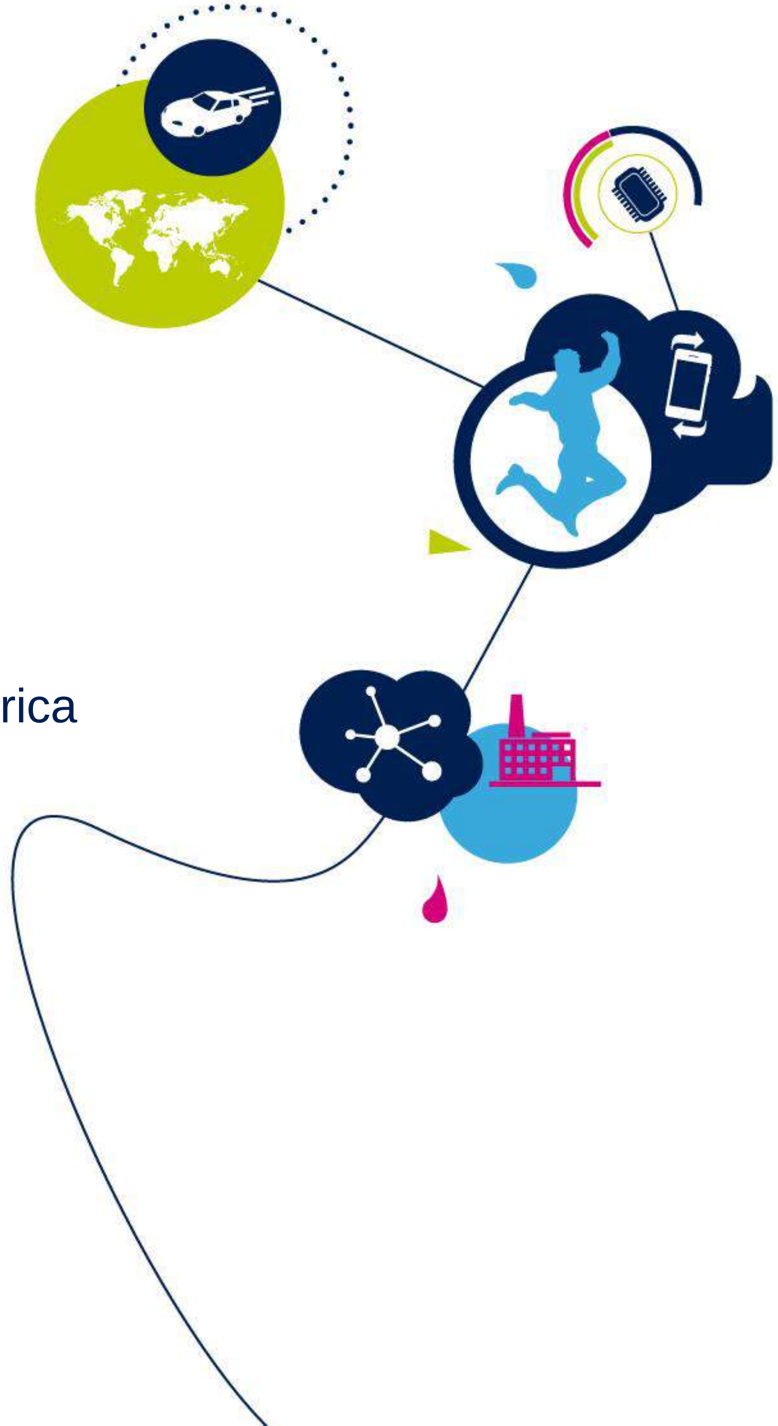
Smart Driving

Internet of Things

Paul Cihak
EVP, General Manager, Sales and Marketing, Europe, Middle East and Africa

Claude Dardanne
EVP, General Manager, Microcontroller and Digital ICs Group

Benedetto Vigna
EVP, General Manager, Analog and MEMS Group



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Internet of Things

Smart Things

Smart Home & City

Smart Industry

ST Offer for IoT

	Processing	Security	Sensing & Actuating	Connectivity	Conditioning & Protection	Motor Control	Power & Energy Management
Smart Things	Ultra-Low Power to High Performance	Scalable security solutions	Full range of sensors and actuators	10 cm to 10 km	Nano Amps to Kilo Amps	Power conversion Monitoring Drivers	Nano Watt to Mega Watt
Smart Home & City							
Smart Industry							

Everything for Traditional Markets

Sensing & Actuating

Full range of sensors and actuators

Conditioning & Protection

Nano Amps to Kilo Amps

Power & Energy Management

Nano Watt to Mega Watt

Application Processing

From Ultra-Low Power to High Performance

STM32

Consumer

Industrial

Communication

Health

Data Processing

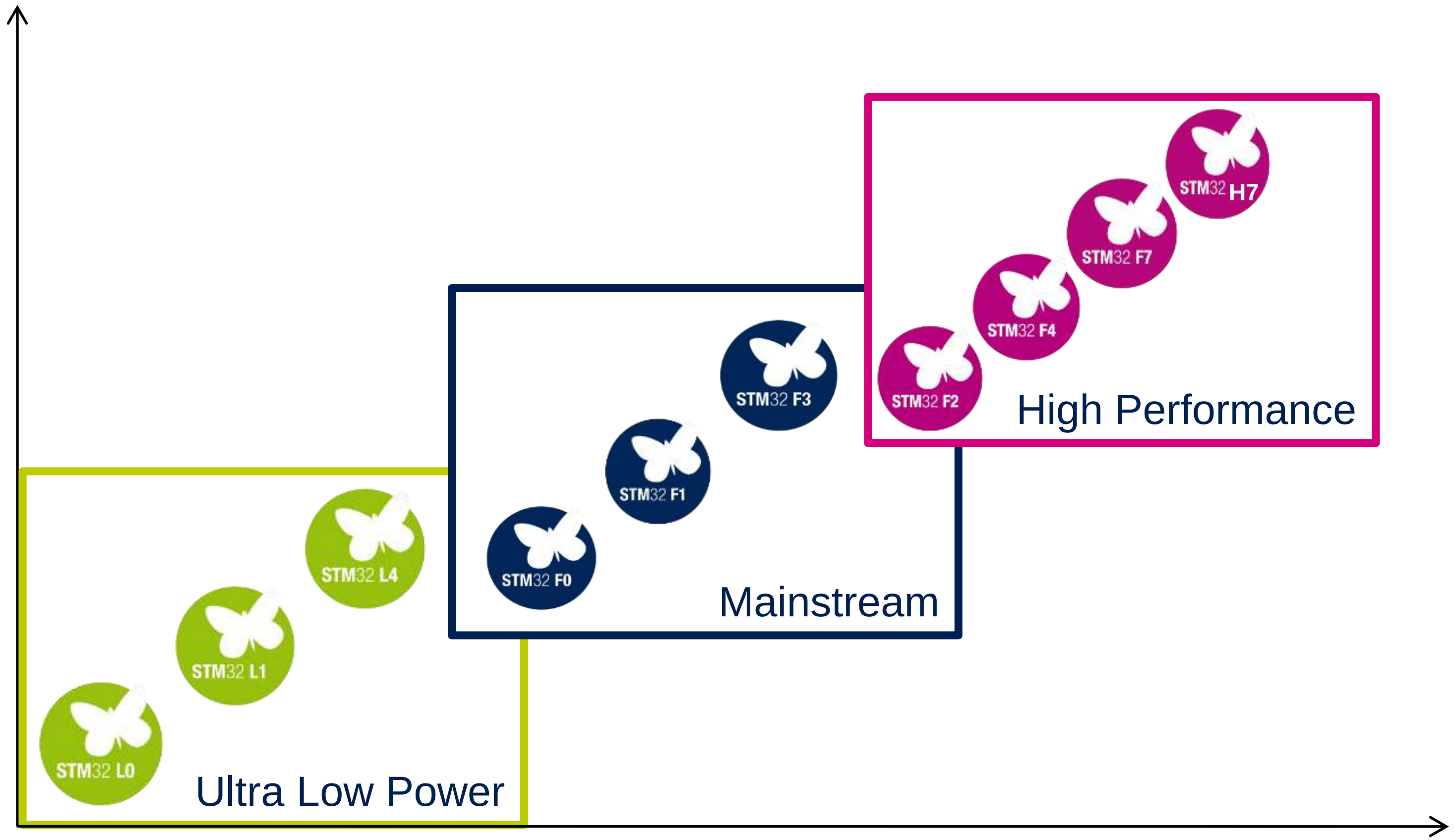
Home Appliance

Automotive

STM32

The brain of many applications

- #3 MCU Supplier worldwide*
- 32-bit MCU leader*
- STM32 portfolio
  - 10 series
  - >700 Part Numbers
- 50K customers WW
  - > 2 Billion units shipped
  - 1 Billion units yearly run rate
- Applications coverage
  - Consumer
  - Automation
  - Healthcare
  - Industrial
  - Smartphone
  - …



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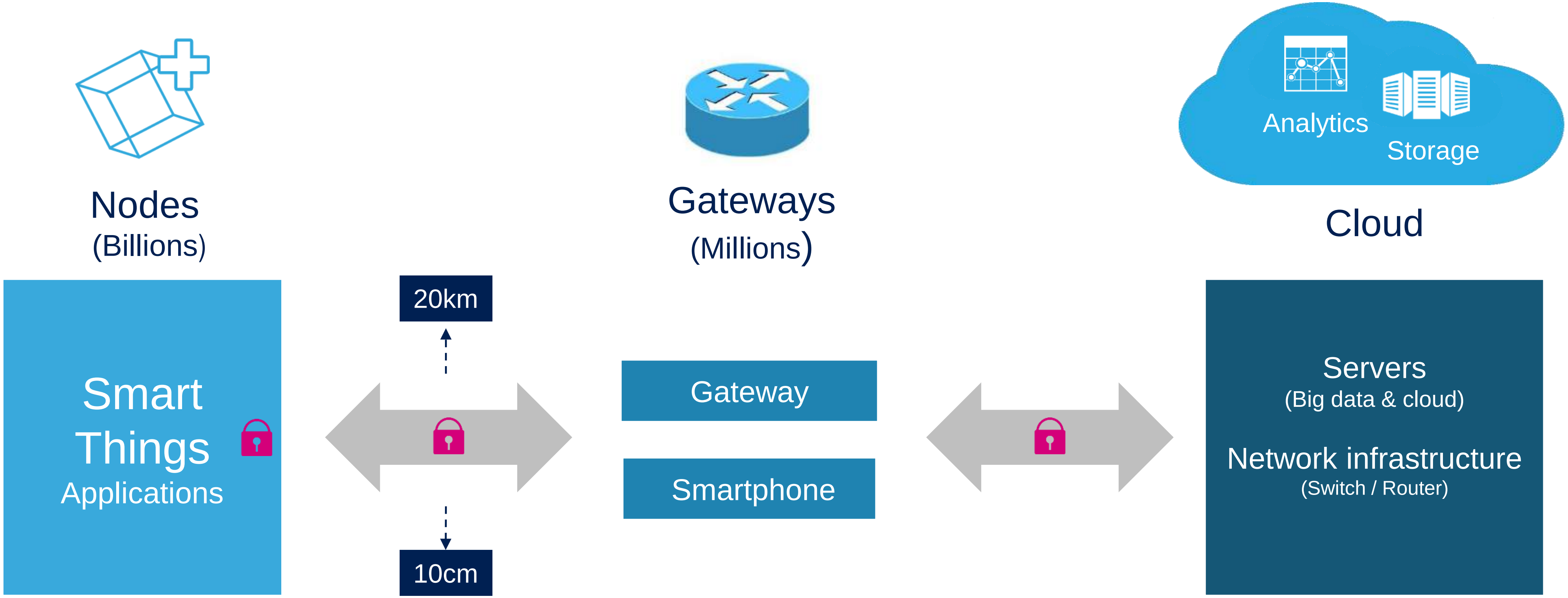
* Excluding Automotive, source IHS-Markit

The IoT Trend

Any system able to leverage the Internet and its ecosystem



Nodes
(Billions)

Gateways
(Millions)

Cloud

Smart Things
Applications

20km

10cm

Gateway

Smartphone

Servers
(Big data & cloud)

Network infrastructure
(Switch / Router)

Everything for the Internet of Things

Sensing & Actuating

Full range of sensors and actuators

Signal Conditioning & Protection

Nano Amps to Kilo Amps

Power & Energy Management

Nano Watt to Mega Watt

Application Processing

Ultra-Low Power

To High Performance

STM32

Connectivity

10 cm to 20 km

Security

Scalable Security solutions

- Smart Things
- Smart Home
- Smart City
- Smart Industry

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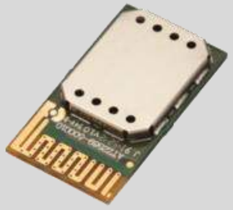
Powering a broad range of connectivity solutions

From module to SOC, meeting requirements for time-to-market and volume

- NFC
- 2.4GHz: Bluetooth SMART, ZigBee, THREAD
- 2.4/5GHz: Wi-Fi
- Sub-1GHz: LoRa, 6LoWPAN, SIGFOX, M-Bus wireless
- Cellular: 4G LTE-M, LTE-NB-IOT, GSM

STM32

Module  Partners

System In Package (SiP)  ST and/or Partners

System On Chip (SoC)  ST

STM32

Embedding scalable security

Solutions for ultra-low power and high performance platforms

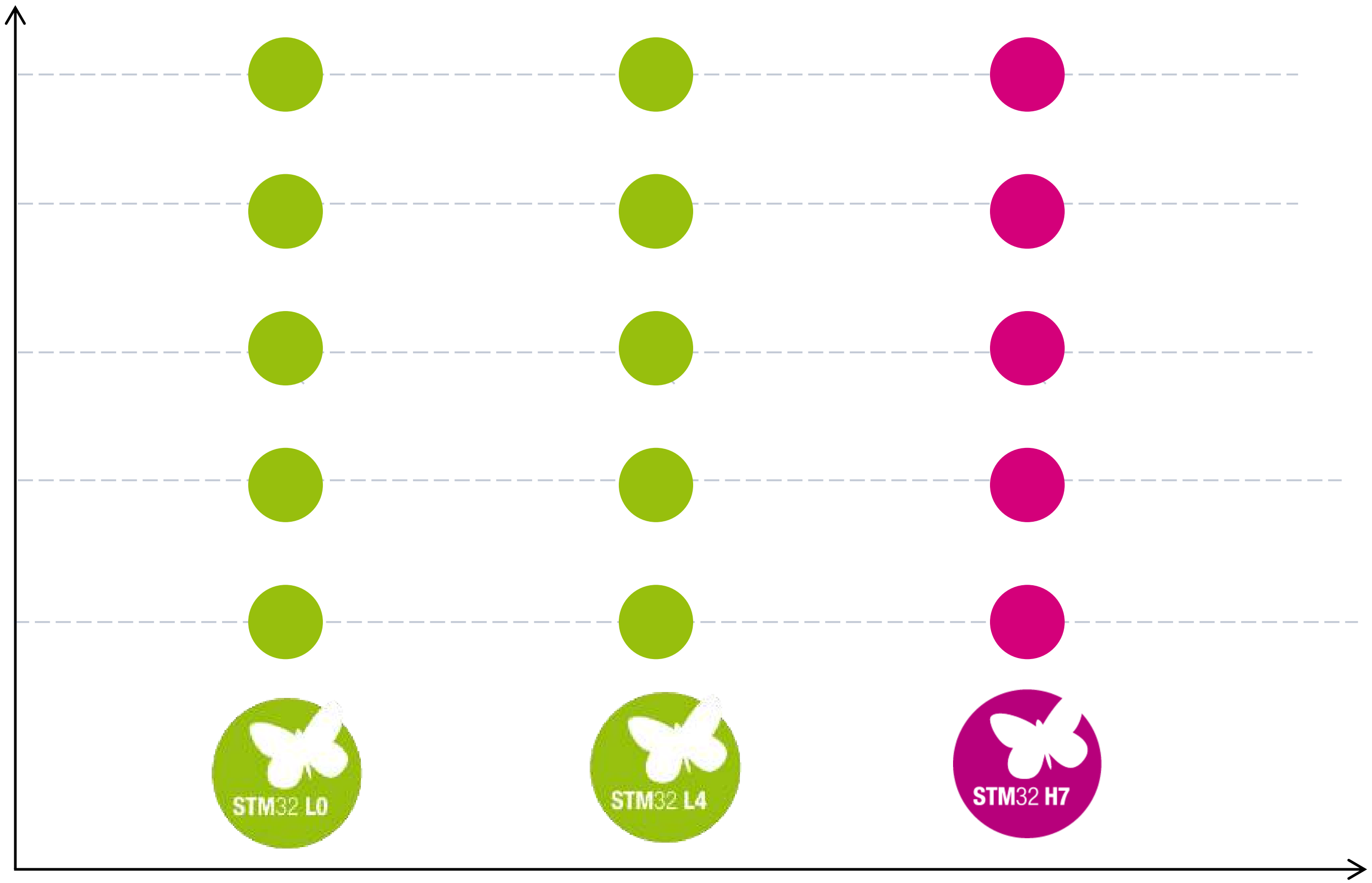
Security Services

Monitoring

Cryptography

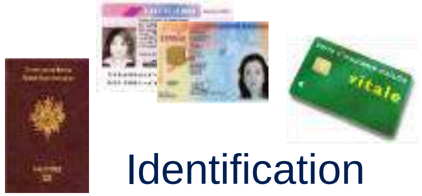
Isolation

Secure storage



STM32 + Secure MCU

Covering all market needs

Payment

Identification

Smart Grid, Industrial gateways

Healthcare



Smart meter

Appliances
Smart home

Wearables

Connectivity

4G LTE -M -NB-IOT
GSM
LoRa
SIGFOX One network A billion dreams
6LoWPAN
M-Bus wireless
Bluetooth
Wi Fi
Bluetooth SMART
THREAD

Security

ST31/33/54 SE

STM32 MCU ↔ STSAFE

STM32 MCU

STM32 MCU

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NFC + Secure Element

State-of-the-art secure solution for mobile transactions

Application Processing

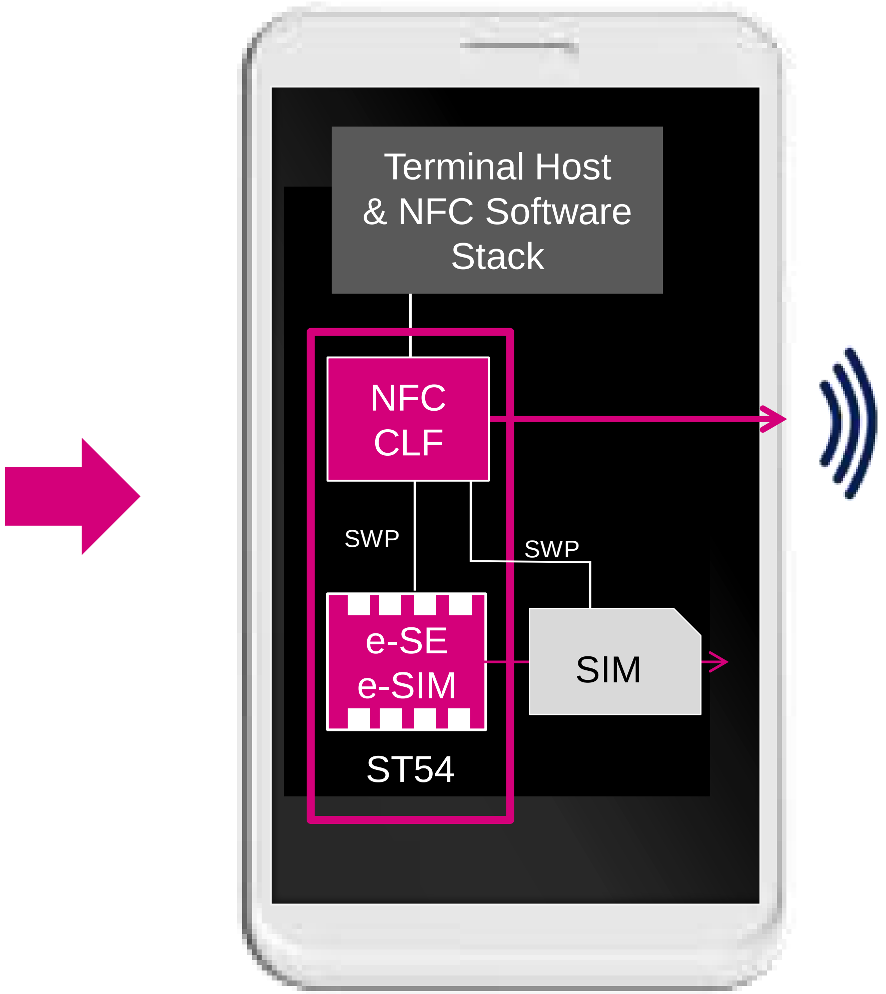
Payment
Transportation
Biometric authentication
Embedded SIM
Access Control

Connectivity

Boosted Near Field Communication Controller

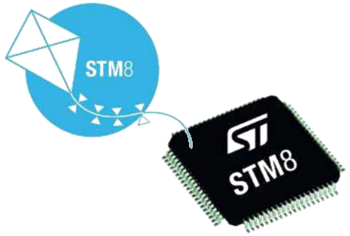
Security

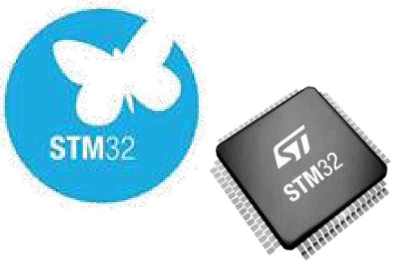
State-of-the-art Common Criteria and EMVCo certifications



Expanding the Ecosystem

Growing our customer base





Accessible ecosystem for application development

STM32 Nucleo

HW & SW development tools and environments

STM32 Nucleo development kits

Discovery Kits

Evaluation Boards

3rd Party boards

Expansion Boards

STM32 Open Development Environment

ARM mbed enabled

STM32 Cube

STM8 Cube

Free SW platforms for all OSes

Community & Support

Educational Programs & MOOC

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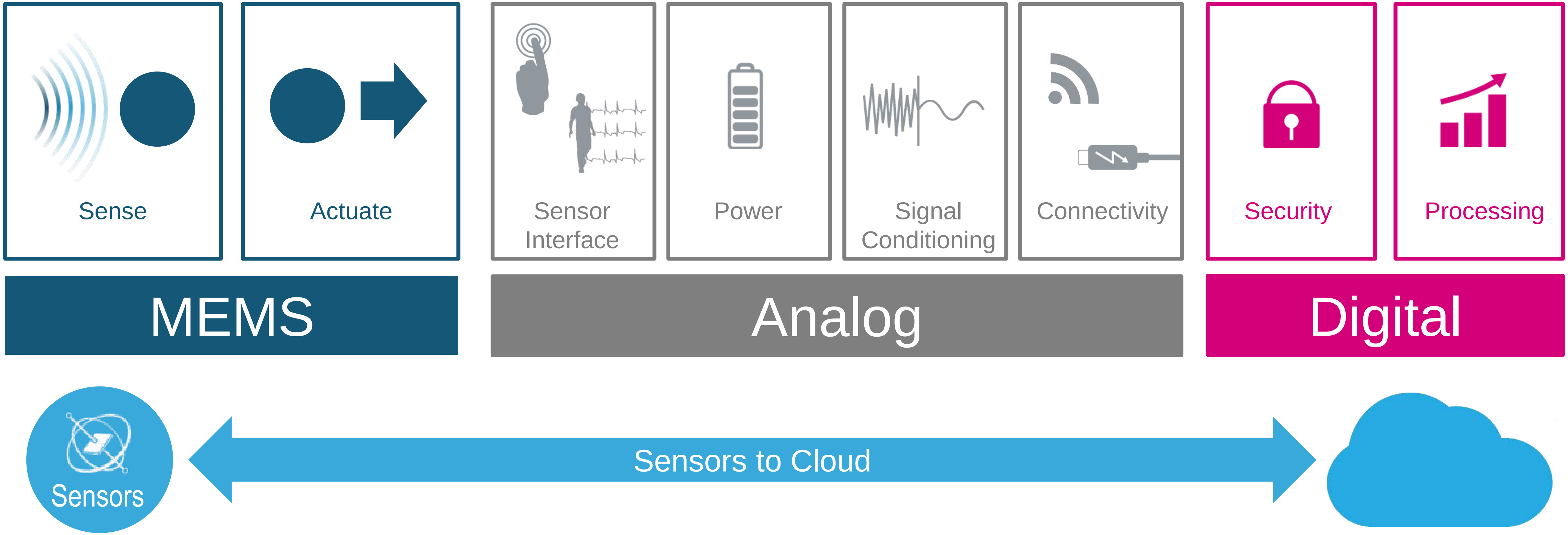
MEMS and Analog Empower the IoT



Today only a tiny portion of the sensory data that would be useful is captured, stored and analyzed
…and even smaller part of that is used to carry out actions through actuators

Analog & MEMS for every IoT Application

	Sensing & Actuating	Connectivity	Conditioning & Protection	Motor Control	Power & Energy Management
Smart Home & City	Environmental Sensors Microphones	Sub-1GHz Wi-Fi Modules	General purpose analog	Motor control for appliances	Smart Metering Home applicance power
Smart Things	Motion & Environmental Sensors Actuators	Bluetooth Low Energy	ESD protection Baluns LDO	Motor control for battery powered devices	Wireless charging Fast charging AMOLED Display Power
Smart Industry	Industrial Motion Sensors Current sensors	IO-Link Power Line Communications	Protection devices High performance op amps	Intelligent power drivers Galvanic isolated ICs	Power conversion Power Modules & Discrete

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MEMS and Analog Empower the IoT Today

>65 Million
Smart meters equipped with ST powerline connectivity

> 120 Million
LED lighting solutions shipped

1 out of 3
automotive non-safety applications use ST MEMS

> 90%
of major home appliance makers use ST power ICs

2.5 Billion
power factor correctors (PFC) shipped

Smart Home & City

>12 Billion
ST MEMS sensors and actuators shipped

> 180 Million
Touchscreen Controllers powering Smartphones

> 3 Billion
General Purpose Analog devices shipped in 2016

> 650 Million
AMOLED Drivers shipped

Smart Things

1 out of 2
Programmable logic controllers use ST smart power devices

> 1 Billion
I/O channels in factories with ST drivers and protections

1 out of 3
Motion control solutions use ST power management devices

4 out of 5
Motion control solutions are protected by ST

> 500 Million
Low voltage motors driven by ST smart power solutions

Smart Industry

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Smart Metering

> 65M

Smart Meters equipped with ST Powerline Connectivity Solutions

Smart Meter Install Base CAGR 2017-2022

20%

Complete BOM Coverage

PLC Modem

Microcontroller

Power Supply Controller

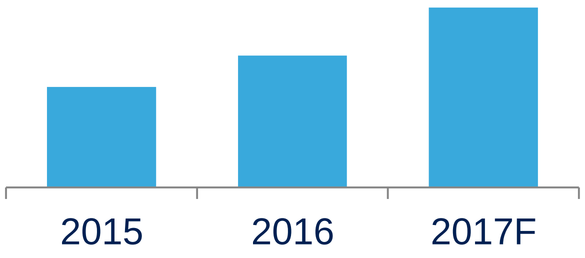
MEMS

RF Connectivity

Standard Products

> $10 / Meter

ST Sales in Smart Meter



Smart Electricity Metering

Smart Gas Flow Metering

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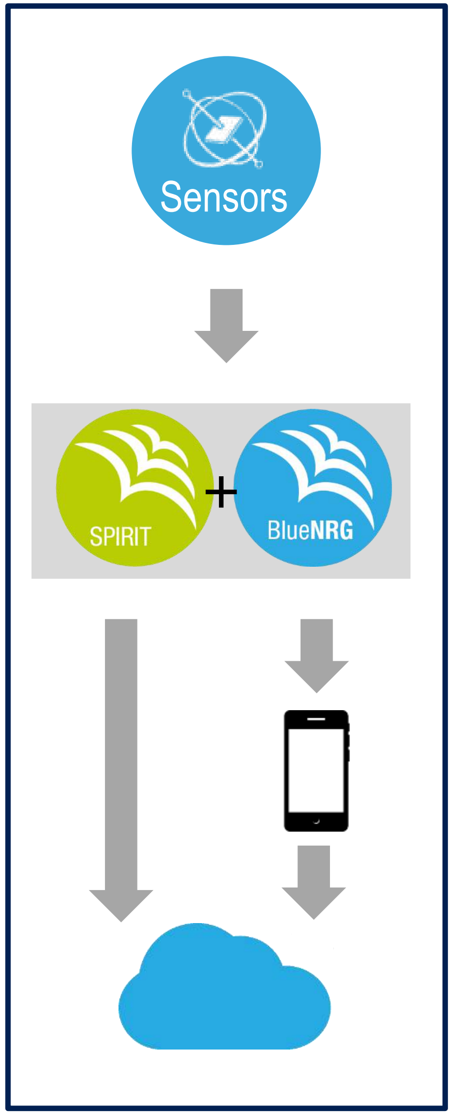
Source: ABI Research, ST

Wireless Connectivity Solutions

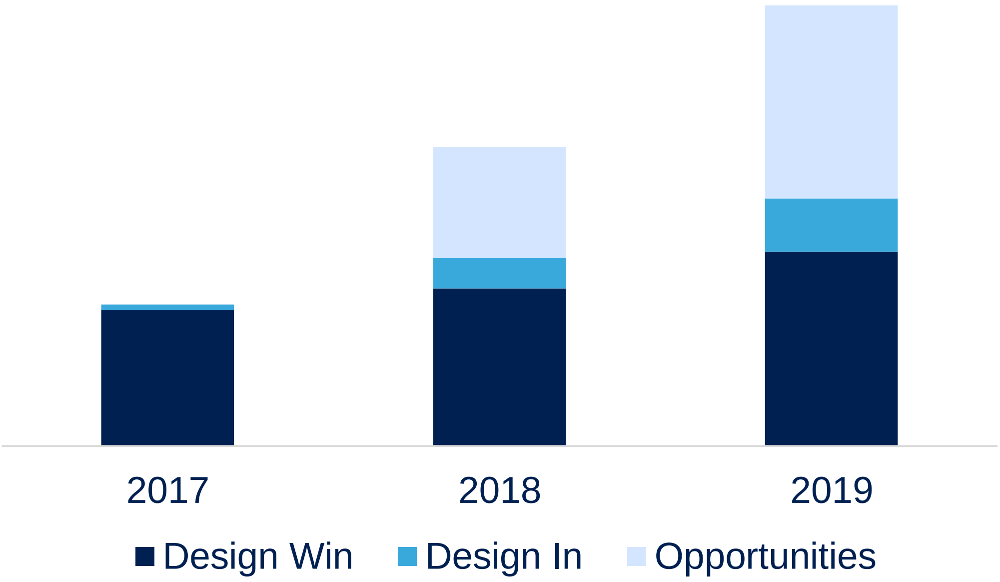
Bluetooth Low Energy & Sub-GHz

BlueNRG Family
Ultra Low Power Bluetooth Low Energy Processors

SPIRIT Family
Sub-1GHz Radio Transceivers



RF Solutions Design Pipeline

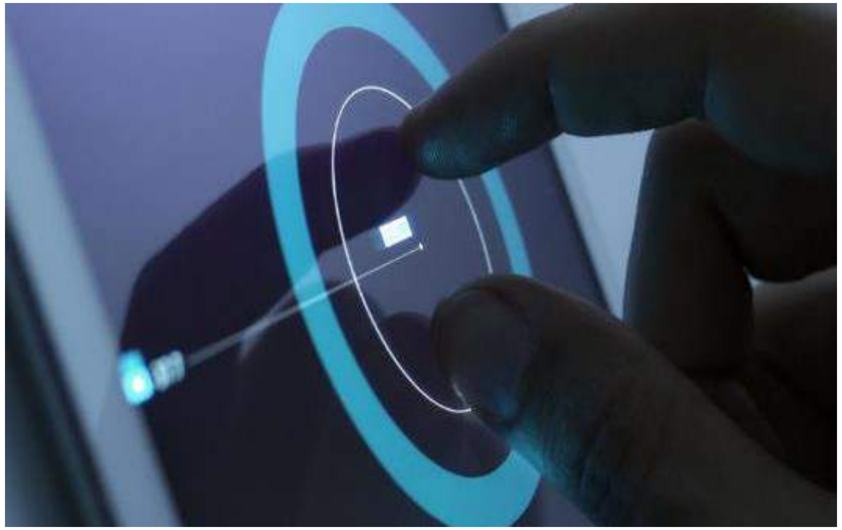


Design Win = Design won. First customer order received

Design In = ST product selected by customer. First customer order not yet received

Opportunity = Identified opportunity with active design-in ongoing

Analog for Smart Things



FingerTip Smart Touch Screen controller
Low latency, Low power

AMOLED Display PMIC

General Purpose Analog
Signal conditioning and power management

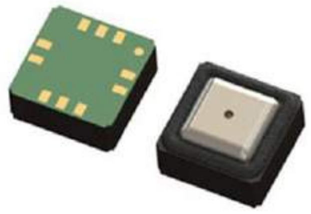
Multi Mode Qi/Airfuel Wireless Power
Bi-directional - Receiver & Transmitter

Magnetic Resonance
In partnership with WiTricity™

Charging Solutions
USB Type-C and Power Delivery, Fast Charge

Smart Things

Leading MEMS Sensors for the IoT

OPTICAL IMAGE STABILIZATION **GYROSCOPE**	ACCELEROMETER & GYROSCOPE **6-AXIS IMU**	ULTRA LOW POWER **ACCELEROMETER**	HIGH ACCURACY **PRESSURE SENSOR**	ACCELEROMETER & MAGNETOMETER **COMPASS**
L2G2IS	LSM6DSM	LIS2DW12	LPS22HB / LPS35HW	LSM303
High performance and accuracy	Low power, low noise for User Interface and Image Stabilization	Embedded smart functions for wearable applications	Compact, low power, water resistant	Compact, high accuracy, with pedometer.
				

Smart Industry

IIS2DH	3-axis accelerometer with digital output
I3G4250D	3-axis digital output gyroscope
IIS328DQ	3-axis digital output accelerometer

LONGEVITY 10 YEARS COMMITMENT

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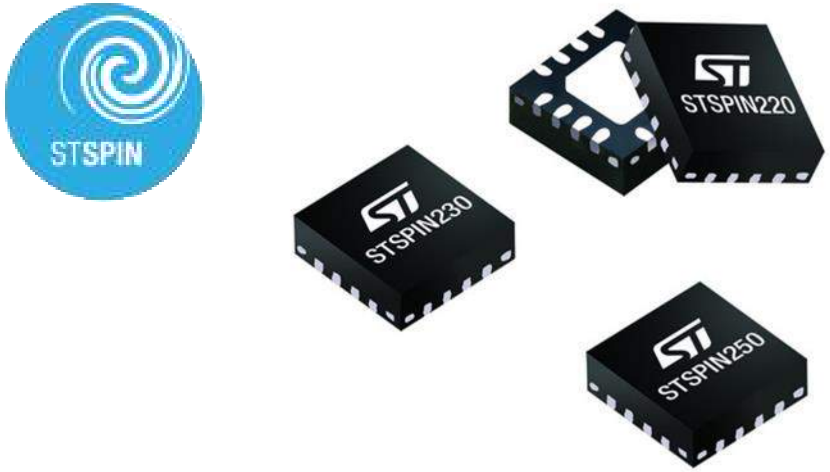
Size, Power & Simplicity

Motor control for the IoT

Analog solutions

World’s smallest motor drivers to streamline design and boost runtime

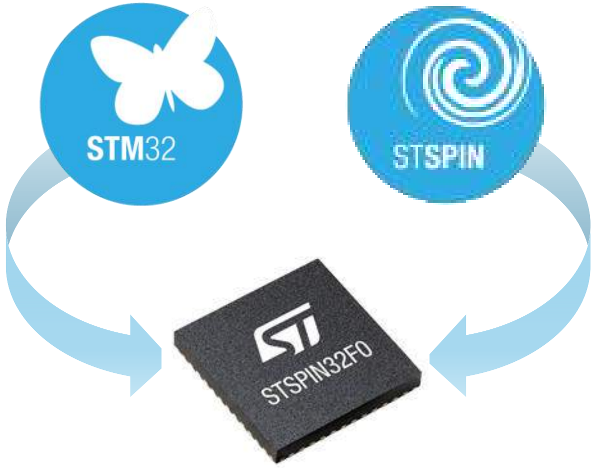


- Tiny 3mm x 3mm package
- Standby current of less than 80nA
- Down to 1.8V operating voltage for ultra low power

Smart Industry

Digital solutions

Power and Simplicity in Intelligent Motion-Control Device



- Highly integrated system-in-package 7mm x 7mm
- Powerful ST ecosystem comprising tools and software including motor-control algorithms

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ST Active in Smart Industry Worldwide

Industrial IoT (IIoT)

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Smart Industry

Enabling smarter, safer and more efficient factories and workplaces

Smart Industry

- Factories that produce in a more efficient manner
- More flexibility and customization possibilities in the supply chain
- More sustainable production with less waste and less energy used
- Safer working environments for people
- Better man-machine cooperation in the work place
- Optimized usage of machines and tools

Challenges & Opportunities

Electric motors use

60%

of industry electricity

Increase machine life by up to

20%

with condition-based maintenance

Industrial IoT Devices

9.4B

by 2025

ST Covers Key Smart Industry Applications

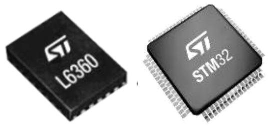
Application	ST Product Family																	
	Motor Drivers	Motor Drivers SiP with MCU	Gate Drivers	Intelligent Power Switches	Galvanic isolated ICs	ASICs with Embed Diagnos-tics	Safety Integrity Level (SIL) ICs	AC-DC Conversion	Power Mgmt	Digital Power	Power Modules & Discrete	MOSFET IGBT SIC	Signal Conditioning & Protection	MCU	Secure MCU	Wired Connectivity	Wireless Connectivity	Sensors
Industrial Robots	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Programmable Logic Controller				●	●	●	●	●	●			●	●	●	●	●	●	●
Industrial Power & Energy Management			●		●	●	●	●	●	●	●	●	●	●	●	●	●	
Smart Motion Control	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●

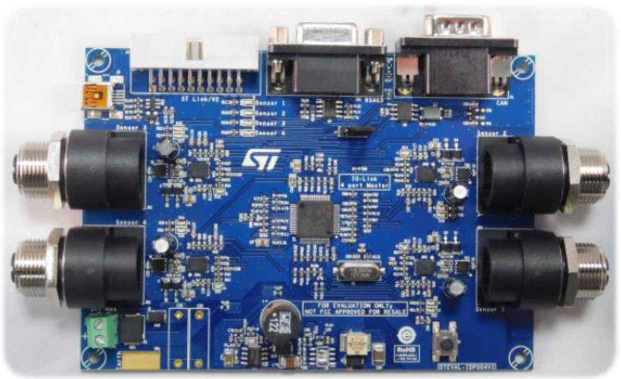
Programmable Logic Controller

Distributed Sensor Nodes connected with IO-Link

IO-Link Master Controller

- 4x IO-Link Master Controller
- Protection devices
- 32-Bit Microcontroller



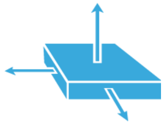


Temperature sensor

IO-Link

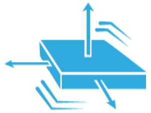
- IO-Link Transceiver
- Temperature Sensor
- 32-Bit Microcontroller

IO-Link



Accelerometer

- IO-Link Transceiver
- Accelerometer
- 32-Bit Microcontroller



Vibration sensor

IO-Link

- IO-Link Transceiver
- Vibration Sensor
- 32-Bit Microcontroller

IO-Link

Proximity sensor

- IO-Link Transceiver
- Time-of-Flight Sensor
- 32-Bit Microcontroller

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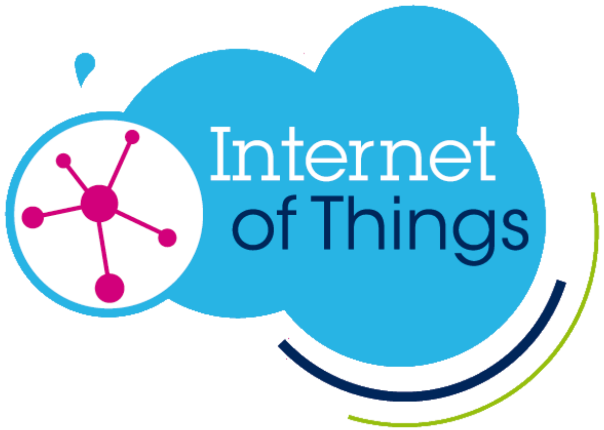
Takeaways

- Internet of Things offers many opportunities for ST from Sensor to Cloud
- We have all the building blocks for the IoT
  - STM32 processing solutions with integrated security and connectivity
  - MEMS and Analog portfolio from consumer to industrial applications
- Our constantly expanding development ecosystems around the STM32, including cloud connectivity, make IoT design fast and affordable
- The needs of global Smart Industry initiatives fit perfectly with ST’s long experience and product offering

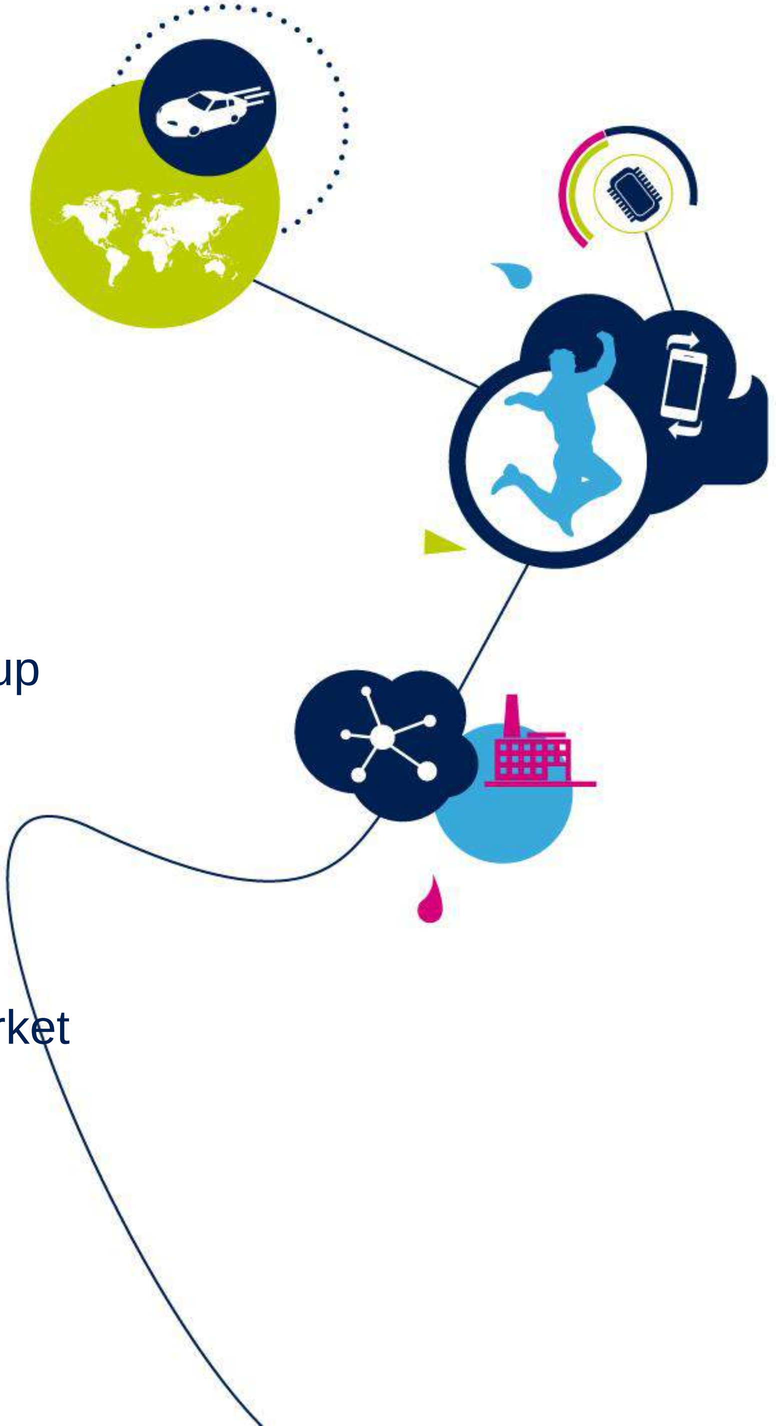


Smart Driving

Marco Monti
Executive Vice President, General Manager, Automotive & Discrete Group

Marco Cassis
Executive Vice President, President, Region Asia Pacific

Bob Krysiak
Executive Vice President, President, Region Americas, Global Mass Market and Online Marketing Program



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ST: Global and Diversified Automotive Leader

with over 30 years experience

Broad Automotive Offer

- Automotive Microcontrollers
- Infotainment and Telematics
- V2X
- Radar & Vision ADAS
- Automotive Sensors
- Power & Smart Power

32% of ST revenue

Market Share (on SAM) **9%**

2016

>$2.2B Revenue

+6% Y-o-Y

2015

$2.1B Revenue

#1

- Engine Management
- 24 GHz RADAR
- ADAS Safety
- Entry & Mid-end Telematics
- Car Audio Amplifiers
- GNSS
- Smart Power

ST Leadership in key Automotive Applications

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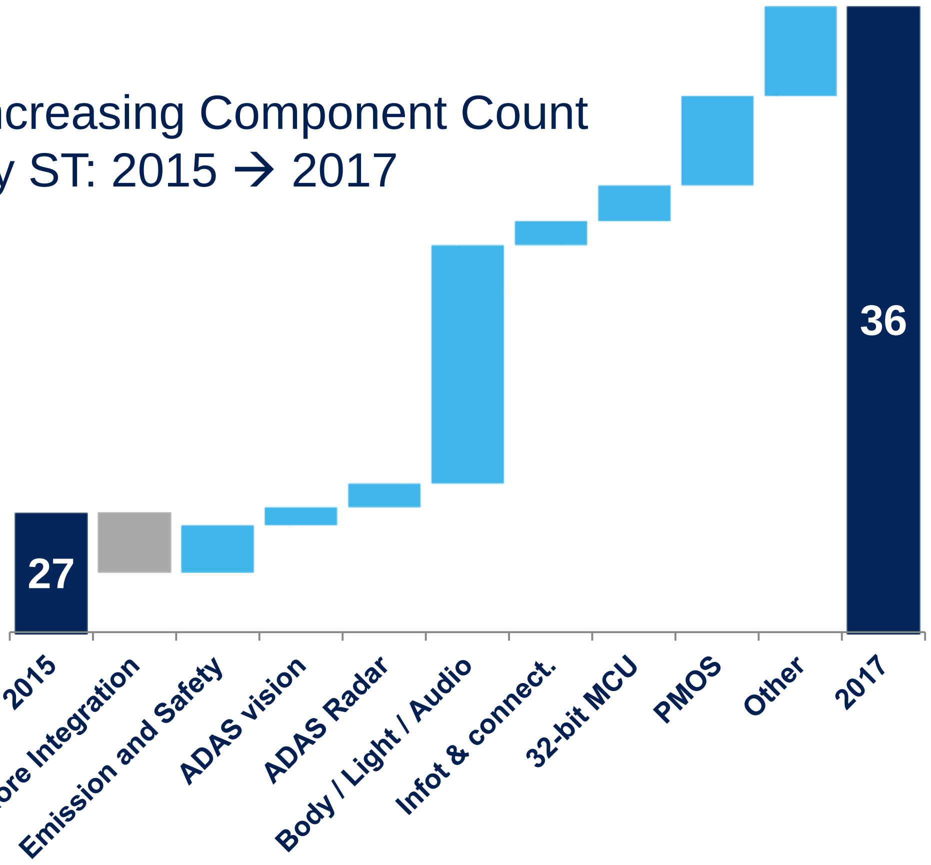
Source: Strategy Analytics, ST

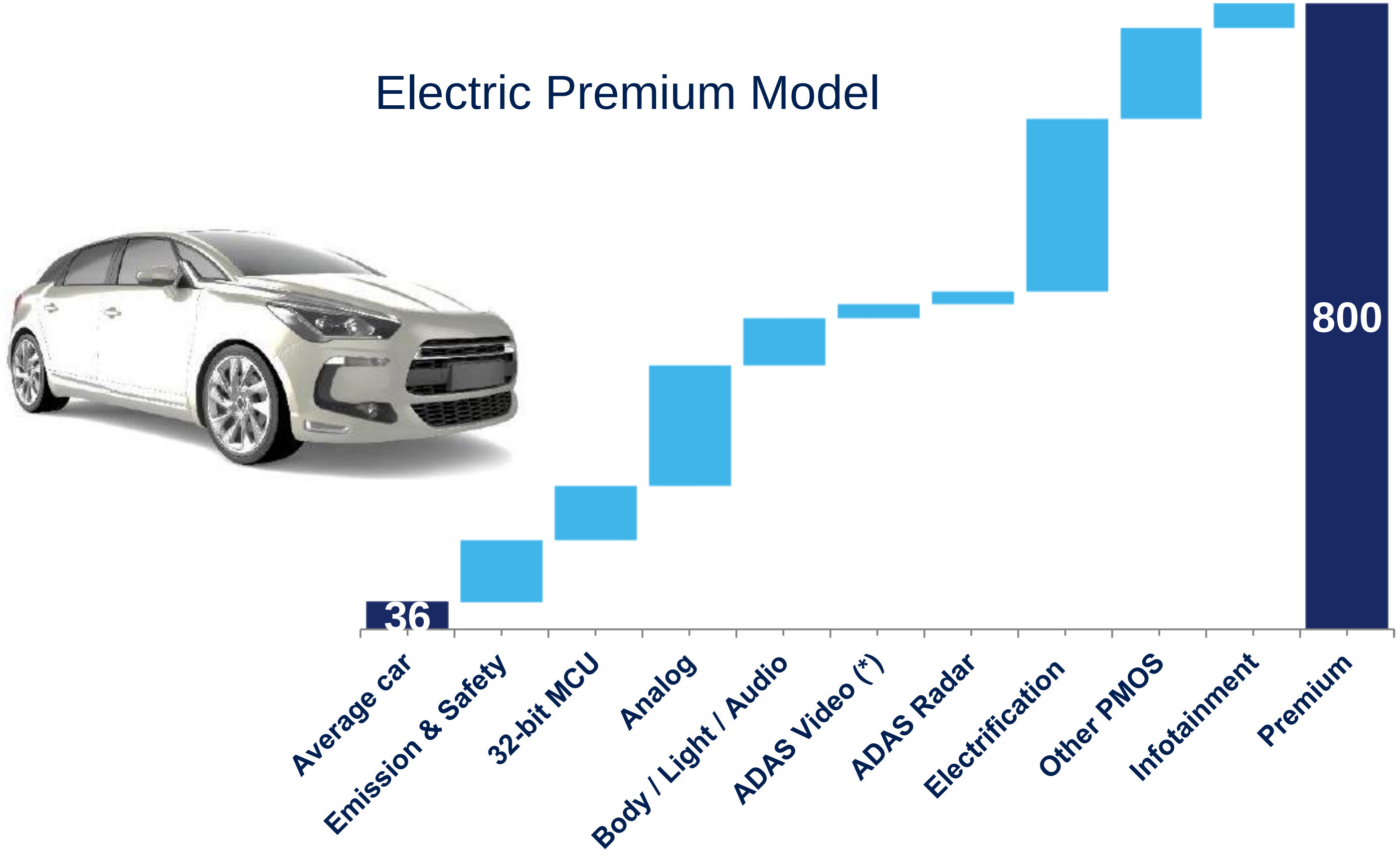
Strong Commitment to Automotive

36 ST components on average for each new car produced, up to 800 ST components in premium models

Increasing Component Count
by ST: 2015 → 2017



Electric Premium Model



(*) including surround view

Smart Driving

Expectations for 2017

safer | greener | more connected

- EyeQ4 FD-SOI volume ramp-up from Crolles 300mm for several car makers
- Increasing volumes of surround view video solution with premium car makers
- 20Mpcs of RADAR based ICs to be shipped, ramping up 77GHz RF solution
- Continuing double-digit growth of 32-bit automotive MCU after ~50% growth in 2016
- SiC transistor volume ramp-up in H2 for electrical traction and on-board charging
- Infotainment platforms ramp-up with European, Japanese, Korean and American OEMs
- 17 new Smart Power ASICs (BCD9 110nm) entering production for key applications
- Accelerating growth in MEMS, general purpose analog, EEPROM and 8-bit MCU for automotive

Automotive Industry Transformation

From complex mechanics to car simplification and user experience focus

Computational Power

Mechanical era

Car Engine

Electronics era

Gasoline / Diesel ECUs

Software in-car networking era

Data Processing
Hybrid Engine

End-to-End User Experience
Environmentally Friendly
Cloud / Data Business Model

Connectivity
& Full Electrification

Poor Drivability
High maintenance costs

Electronic Engine Control
Manual Gearbox

Automatic Gearbox
Driver Assisted

Smooth Electric Engine
No gearbox / No thermal engine
Maintenance free

1900 1970 1990 2010 Today

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Smart Driving

Smart Driving is about making the User Experience the Focus Point

User Value Added Services

Social Domain

YouTube

facebook.

Google news

WhatsApp

amazon

tripadvisor

Lufthansa

Spotify

User

Automotive Domain

androidauto

Software over-the -air

Parking Services

Insurance Services

Apple CarPlay

Remote Assistance

Effortless Electric Driving

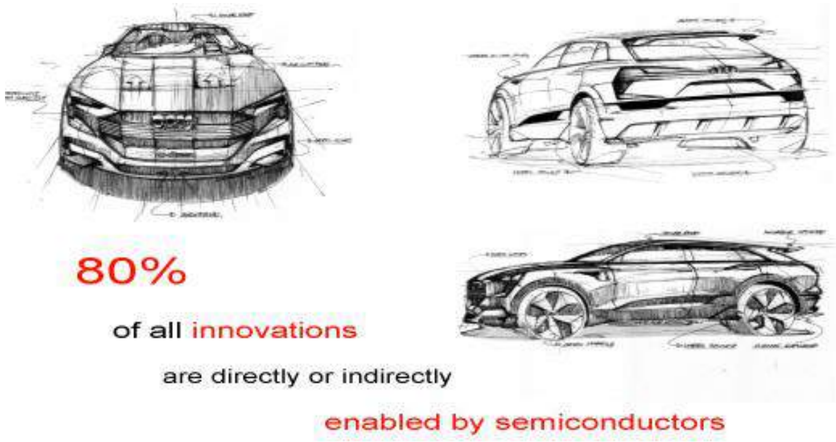
Battery Mileage

Charging Services

Maintenance free

Semiconductors Leading the new Mobility Transformation

Automotive Semiconductor Innovation



80%

of all innovations

are directly or indirectly

enabled by semiconductors

Courtesy of Audi

2016- 2021 Highlights

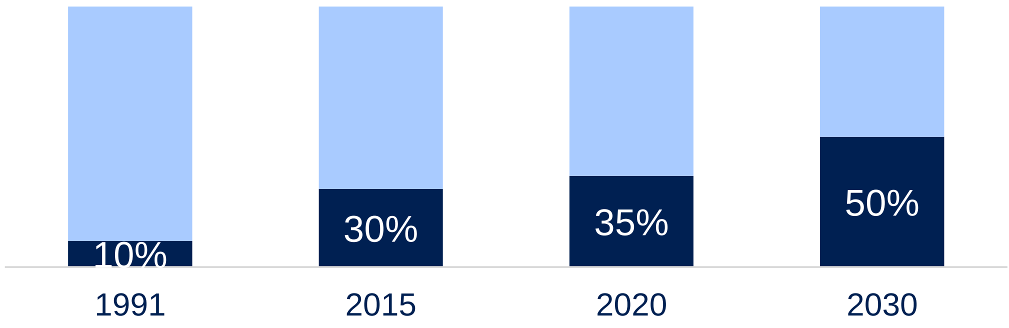
Semiconductor Market CAGR +3.3%

Automotive Semiconductors +5.2%

ADAS Semiconductor growth +23.2%

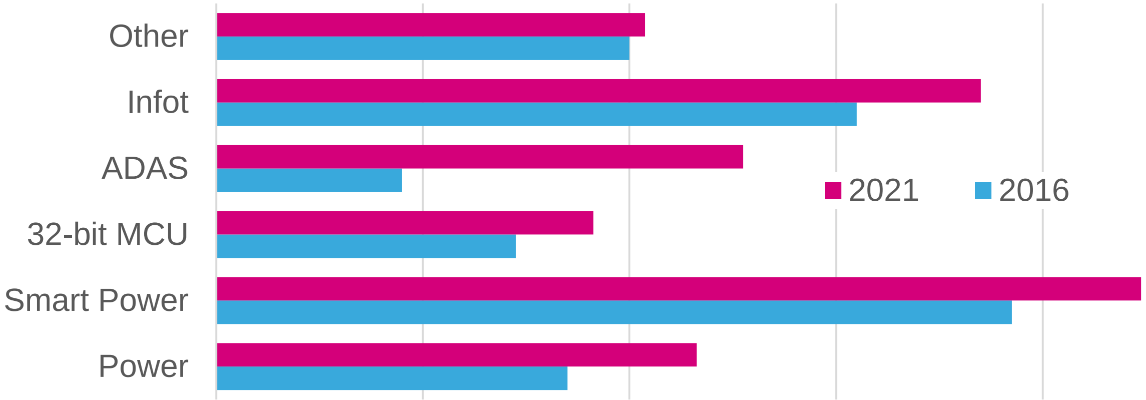
Electrification Semiconductor growth +18.9%

Electronic Component as % of Vehicle Cost (*)



(*) Data source: www.pwc.de

2016 to 2021 Automotive Semiconductor Market



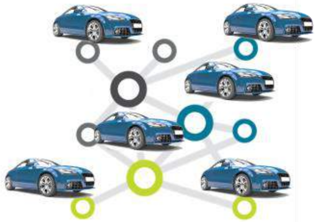
Innovative Connectivity making Driving Smarter

Electrical vehicles connected seamlessly with the world (V2X)

Car elements connected together

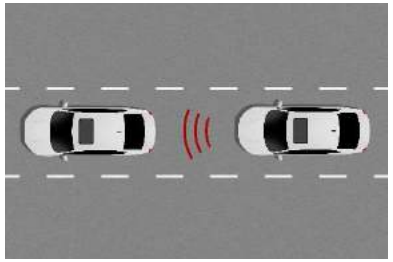
Connectivity drives Infotainment

Connectivity improves Safety

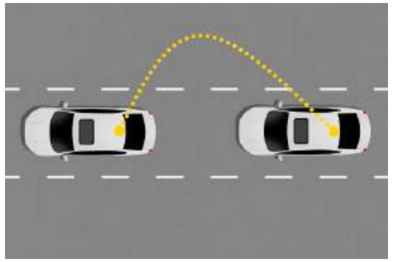


Swarm Distributed Intelligence

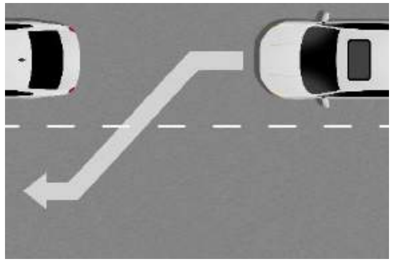
Swarm Distributed Intelligence allows Cars to Know What, Where and When things happen



Cars Sense….



Cars Communicate….



Cars Decide

Vehicles in the Network: Today

Multiple communication channels

Wi-Fi

- Access to the cloud
- Vehicle-to-Vehicle Communications
- Vehicle-to-Infrastructure Communications

Terrestrial

- Digital Radio Audio/Data broadcast
- Modem connectivity
- Smartphone integration
- Emergency Call

Telematics (*)

530M$

2016 Market

ADAS Safety (*)

735M$

2016 Market

Satellite

- Navigation
- Satellite audio and data stream
- Insurance Box, pay-per-use

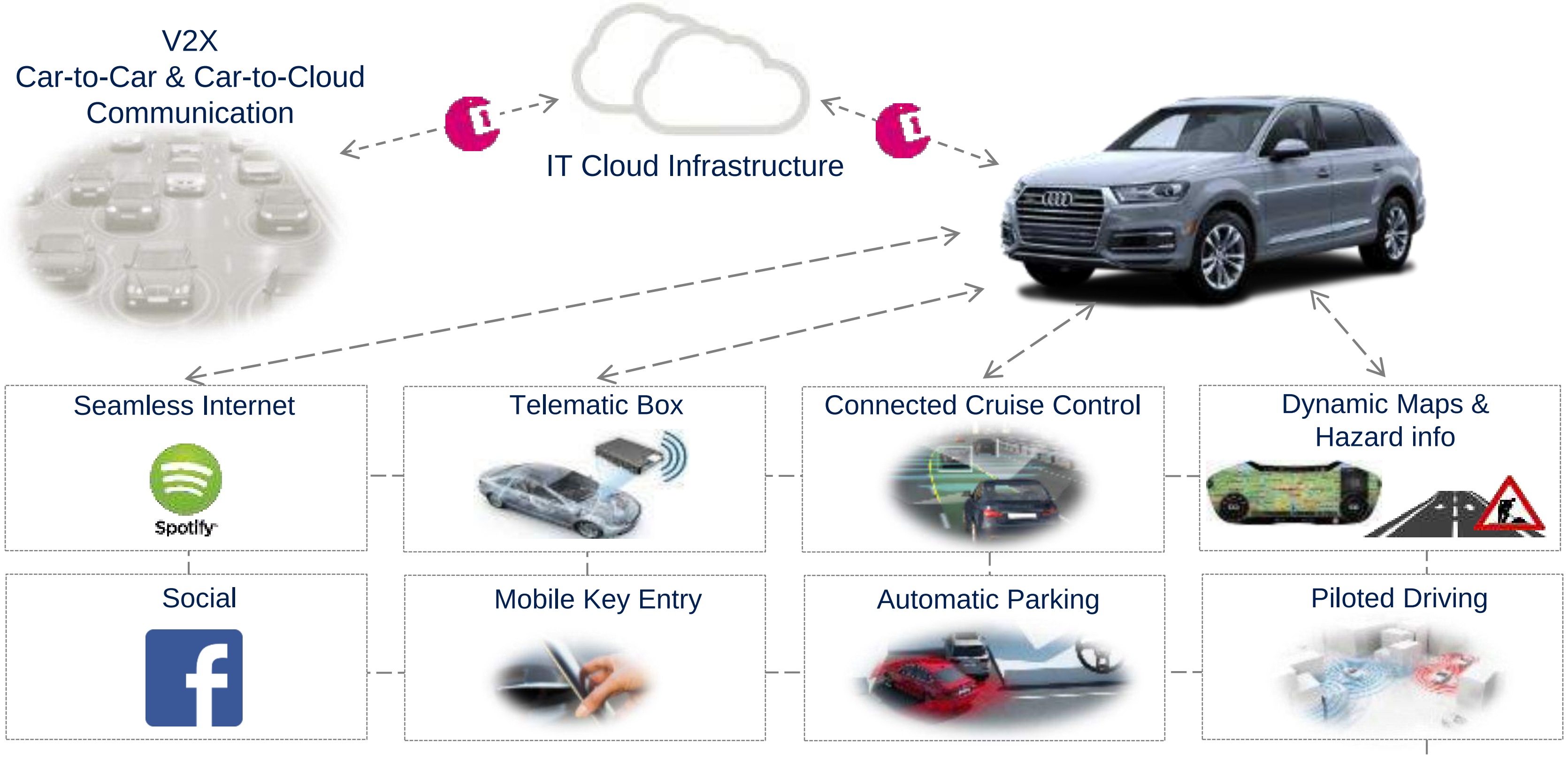
Vision & RADAR Sensing

- ADAS
- Assisted driving
- Autonomous driving

(*) ADAS Safety: Collision Warning, Distance Warning, Lane Departure, Source: Strategy Analytics, Internal data

The Evolution: Vehicles to Everything

All communication channels are fused to enhance functionality



V2X
Car-to-Car & Car-to-Cloud
Communication

IT Cloud Infrastructure

Seamless Internet

Telematic Box

Connected Cruise Control

Dynamic Maps & Hazard info

Social

Mobile Key Entry

Automatic Parking

Piloted Driving

More connected vehicles enable innovative new functionalities for customers
Additional 730M$ Market Opportunity by 2021 (*) on top of traditional ADAS

V2X Enabling Elements

- Sub-meter GNSS positioning
- Level 3+ vision based ADAS
    - Vision processor
    - RF (24/77 GHz) redundancy
    - Sensor fusion
- Wi-Fi communication
    - Secured
    - Automotive grade
- Cellular connectivity and Smart Phone integration processor

ST has technology leadership in all these technologies

(*) 2021 market for V2X and extended adoption rate of vision based system to enable new services (ST internal data).

ST Leadership

Sub-meter Positioning

Teseo GNSS (in production)

- Multi-constellation capability
- Navigation
- Data collection
- Flexible architecture
  - standalone / baseband integration

ST Performance

- +20% Y-o-Y Sales
- Leading with Major OEMs
- 20% Market share (*)

Multi-constellation and Multiband GNSS signal processing for decimeter precision

ST Technology

Expertise

Teseo APP - Automotive Precise Positioning
Sampling 2017

- Multi-constellation capability
- Decimeter precise vehicle positioning
- Highway Autopilot, Autonomous Driving
- Valet / Automatic Parking
- Data Mining with Driver & Roads Profiling
- Black box full functionality

Strategic partnerships

BeiDou 1~2~3

ALLYSTAR

BAIC

SAIC

CEC 中国电子 CHINA ELECTRONICS

Source: Strategy Analytics & ST

ST Leadership

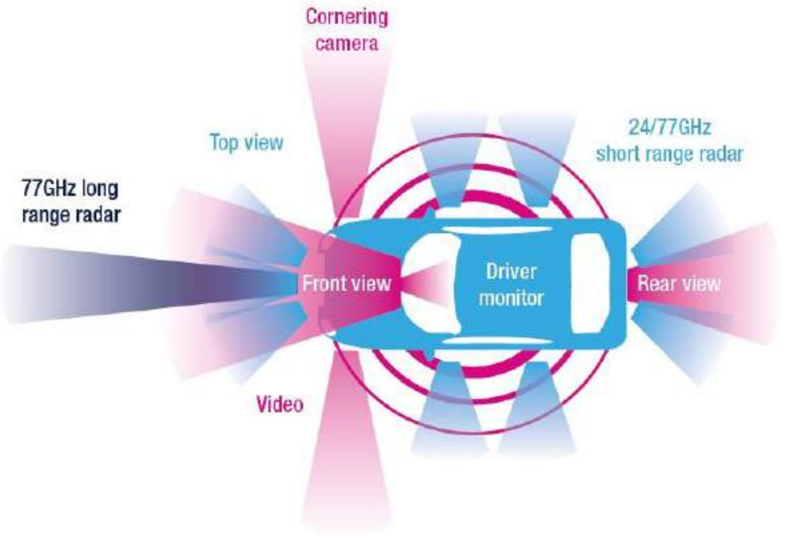
Vision Processors & RADAR sensors

The ADAS functionality

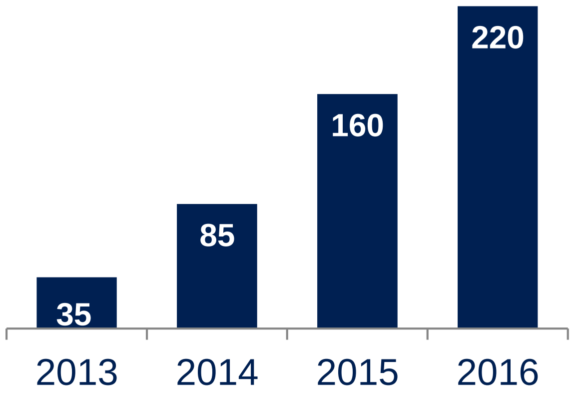
#1 with 30% market share in ADAS safety

#1 Machine Vision in 2016

#1 in RF RADAR Transceivers Market in 2016



ST Sales in ADAS (M$)



2005
- Mobileye 1st Gen

2010
- Mobileye 2nd Gen
- 1st 24GHz Gen

2015
- Mobileye 3rd Gen
- 2nd 24GHz Gen
- 1st 77GHz Gen

2017
- Mobileye 4th Gen
- 2nd 77GHz Gen
- Auto Parking MPU
- Surround view Video Processor

2020
- Mobileye 5th Gen
- High data rate Radar MCU
- 360º Vision video processor

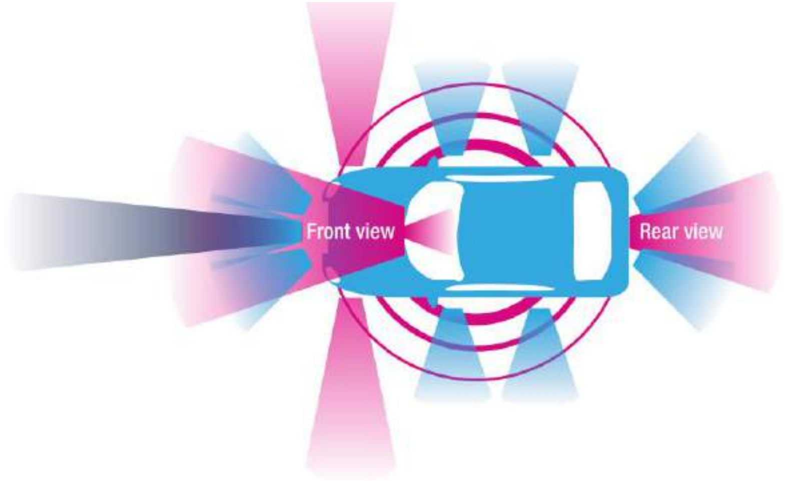
Highest Growth in RADAR Transceivers (> 20Munits expected to be shipped)

Powering de facto market standard for vision based ADAS (EyeQ)

Progressively expanding vision-based ADAS solutions

Vision Processing beyond ADAS

non-safety features enabled by connected real-time vision processors



Mobileye & HERE partnership

Dynamic HD MAPS

Application examples

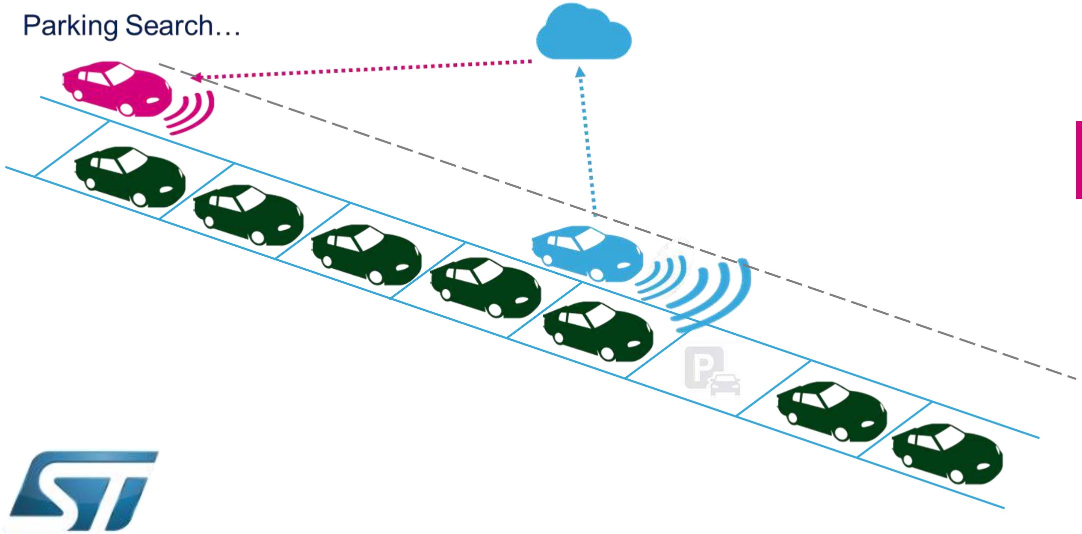
Available Parking Identification

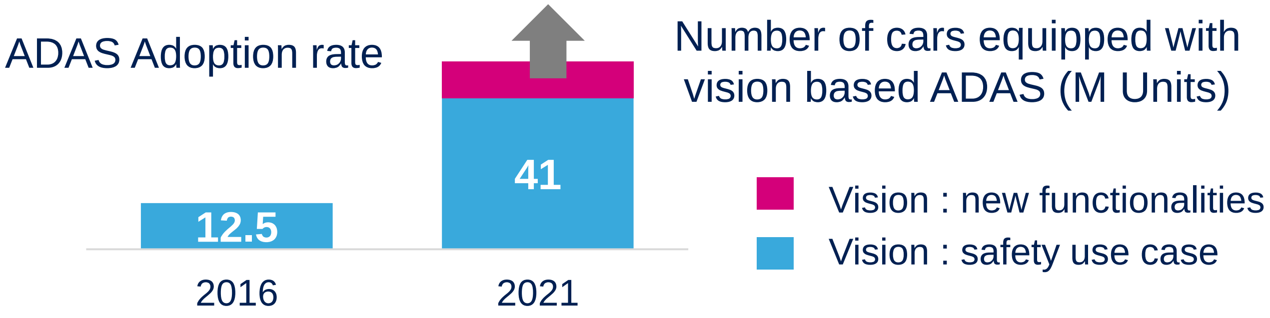
Road Condition Reporting

Localized Hazard Information

Queue Management

NEW end-user functionalities boost ST product adoption rate





(*) Strategy Analytics Jan 2017, internal data

ST Leadership

V2X Communication Wi-Fi 11.p

ST – Autotalks Technology at a glance

- DSRC: Wi-Fi -11.p
- ST Multicore ARM real-time processor IPs (HW+SW)
- Autotalks modem proprietary IPs (HW+SW)
- Full Compliance with US Mandate
- Fully proven Cyber Security protection
- Cutting Edge RF performances
- High operating temperature for Auto Grade quality

V2X Opportunity 2023

>50%

2023 Market Share

200 M$

2023 Opportunity

Awarded Business

10

OEMs Awarded

US, EMEA, JAPAN

V2X in 2019, VW Golf 8

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Cellular Connectivity

Complete Solution to bring Connectivity to every car

560 M$

2021 Market Value

Accordo platform
Smartphone Integration Processor

- Multi-core ARM processor
- Full phone replication in dashboard
- Multi-standard capabilities
- Advanced graphic to complement car HMI
- Automotive quality

Telemaco platform
Telematics and Connectivity Processor

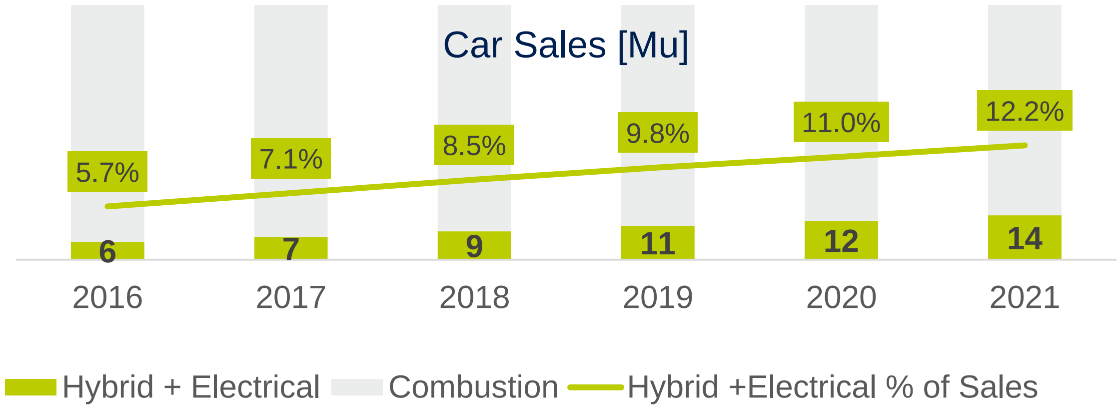
- Multi-core ARM processor
- Unique embedded security module
- Automotive quality
- Flexible system architecture

(*) Strategy Analytics Jan 2017, internal data

Car Electrification Trend

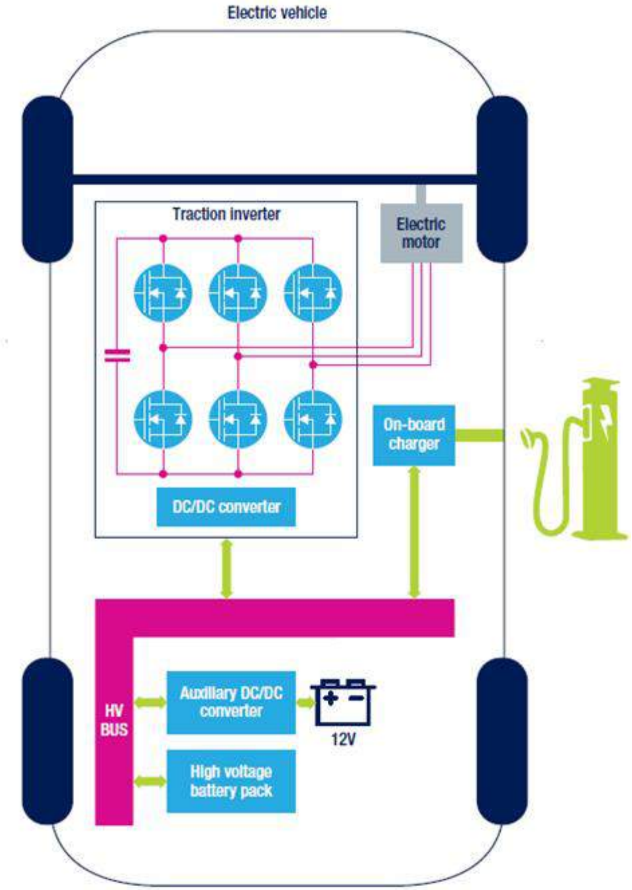
Major opportunity to expand car silicon contents

Vehicle Sales Progression 2016-2021



~600$ Additional Opportunity per Vehicle (*)

Electrification enabling elements



- Efficient main inverter driver
- Fast Charging
  - In-car charging
  - Fast charging station & Infrastructure
- Li-Ion Battery management

ST has technology leadership in all these technologies

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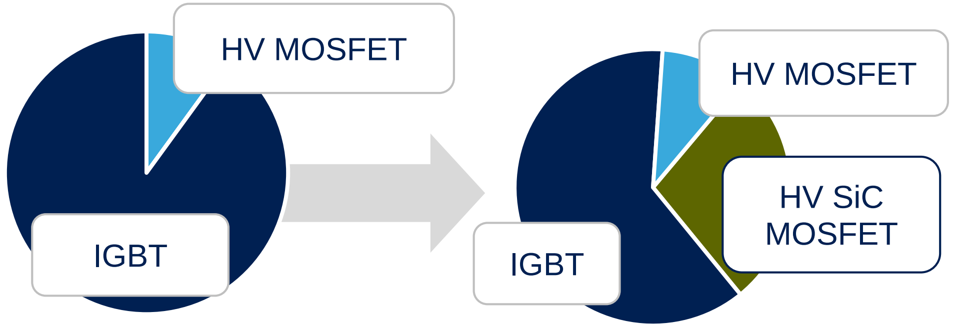
ST Leadership

SiC Technology
main inverter and charging

Market Evolution (*)

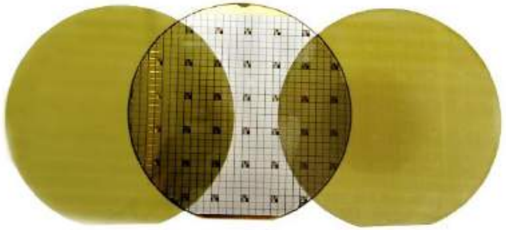


2016 TAM* $258M

2021 TAM* $1044M

SiC Advantages vs. Conventional IGBT

- 5 ~ 8x smaller size
- 7x lower switching loss (W)
- 40% lower total loss (W)
- 15% higher working temperature



Execution on track

- SiC diode in full volume production
- Transistor qualified
- Customer qualification in progress
- Capacity in place
- Supply chain secured
- Full production in H2 ‘17

ST unique competitive offer

- Main inverter SiC MOSFET (650/1200V)
- Chargers SiC diode (650/1200V)
- On Board Charger SiC MOSFET (650/1200V)

Many joint programs started with several car makers

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(*) Pure EV’s, Hybrid Plug-in

ST Leadership

ST supporting Chinese Electrical Mobility

ST will supply a battery controller compliant to the “Made in China 2025” initiative. Developed with Chinese partners using an innovative architecture based upon ST’s BCD super integrated technology

Made in China 2025

Beijing Government

MADE IN CHINA 中国制造 2025

Battery Makers

BMS ECU Makers

Car Makers

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IMECAS Chinese Institute of Microelectronics

EPOCH: System Provider

ZKX 中科芯

Chinese Targets for Electric & Hybrid Vehicles

In 2020 **40%** of the batteries pack on Chinese EV/HEV cars must be produced in China, in 2025 this number will rise to **70%**

2M Modules in 2020

5M Modules in 2025

50M ICs in 2025

MEMS Sensors & Analog for Smart Driving

Motion Sensors

For Automotive Safety, Navigation & Telematics

6-axis inertial modules
for navigation assistance

Hi-g accelerometers
for airbag applications

Medium-g accelerometers
for telematics boxes

Gyroscopes
for vehicle dynamics applications

General Purpose Analog

For Automotive Applications

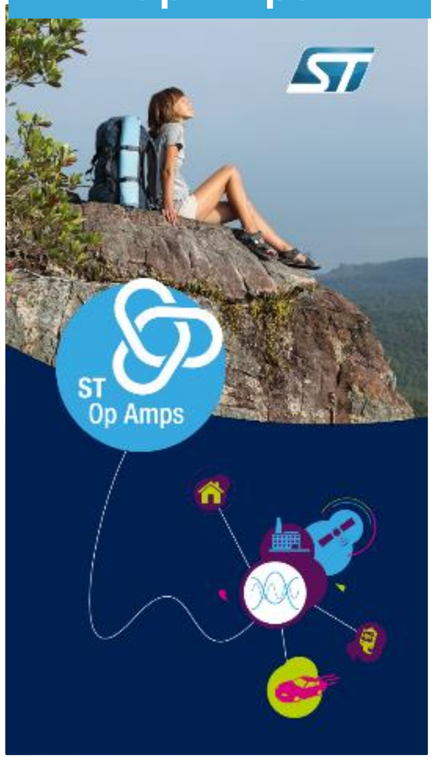
Automotive Power Management

DC-DC

LDO

LED Drivers

Performance Op Amps



Smart Automotive Camera Solutions

Transforming Driver Assistance

Sensing & Viewing Camera
Front-Facing View
Rear & Surround View
eMirror

In-Cabin Optical Sense
Driver monitor
Gesture control
Occupancy Detection

LiDAR
Autonomous Driving
through Sensor Fusion

- Leading high-performance HDR & Flicker Free solution
- Leveraging IP, know-how and supply chain expertize from high-volume consumer
- Supply security through In-house manufacturing
- Proprietary silicon technologies

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Secure MCU, EEPROM & 8-bit MCU for Automotive

Security & Reliability for connected vehicles

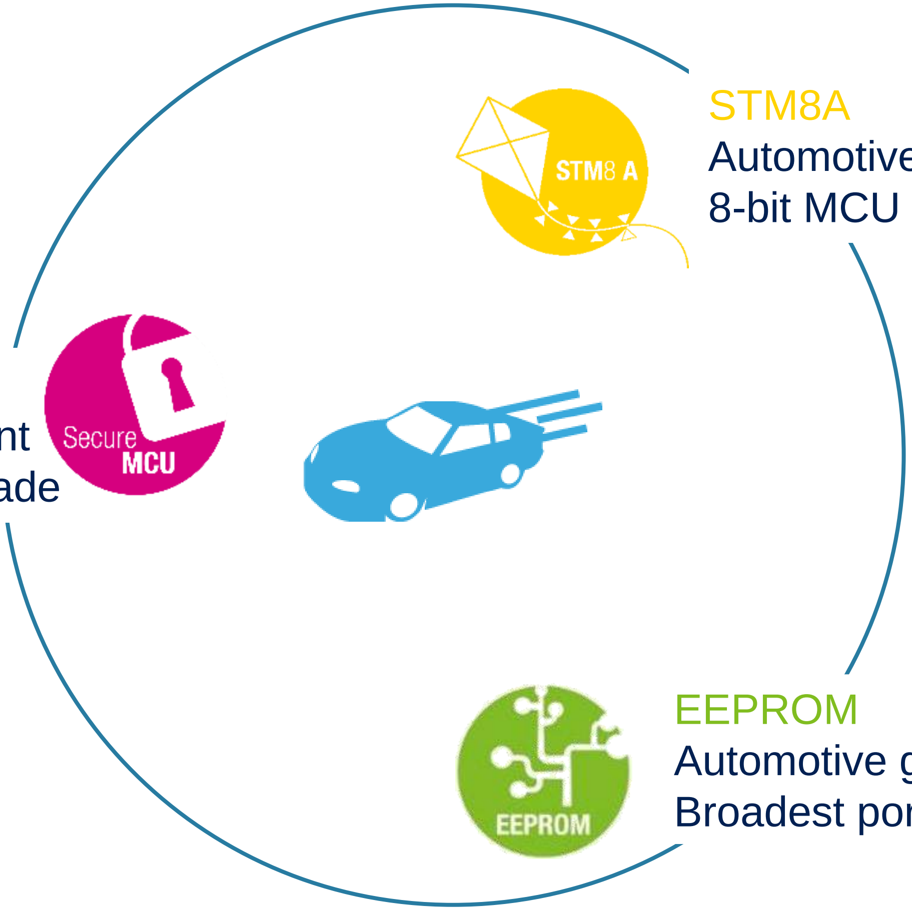
Security Functions

- Passenger safety
  - Guarantee vehicle behavior
- Data privacy
  - Guarantee sensitive data & keys are not manipulated
- Integrity
  - Platform integrity check
  - Secure firmware upgrade
- Confidentiality
  - Secure communication
  - Secure storage
- Authentication
  - Genuine device

Telematics control unit

Secure Gateway

Electronic Control Unit



STM8A
Automotive grade
8-bit MCU

ST33G1M2A
Secure Element
Automotive grade

EEPROM
Automotive grade
Broadest portfolio

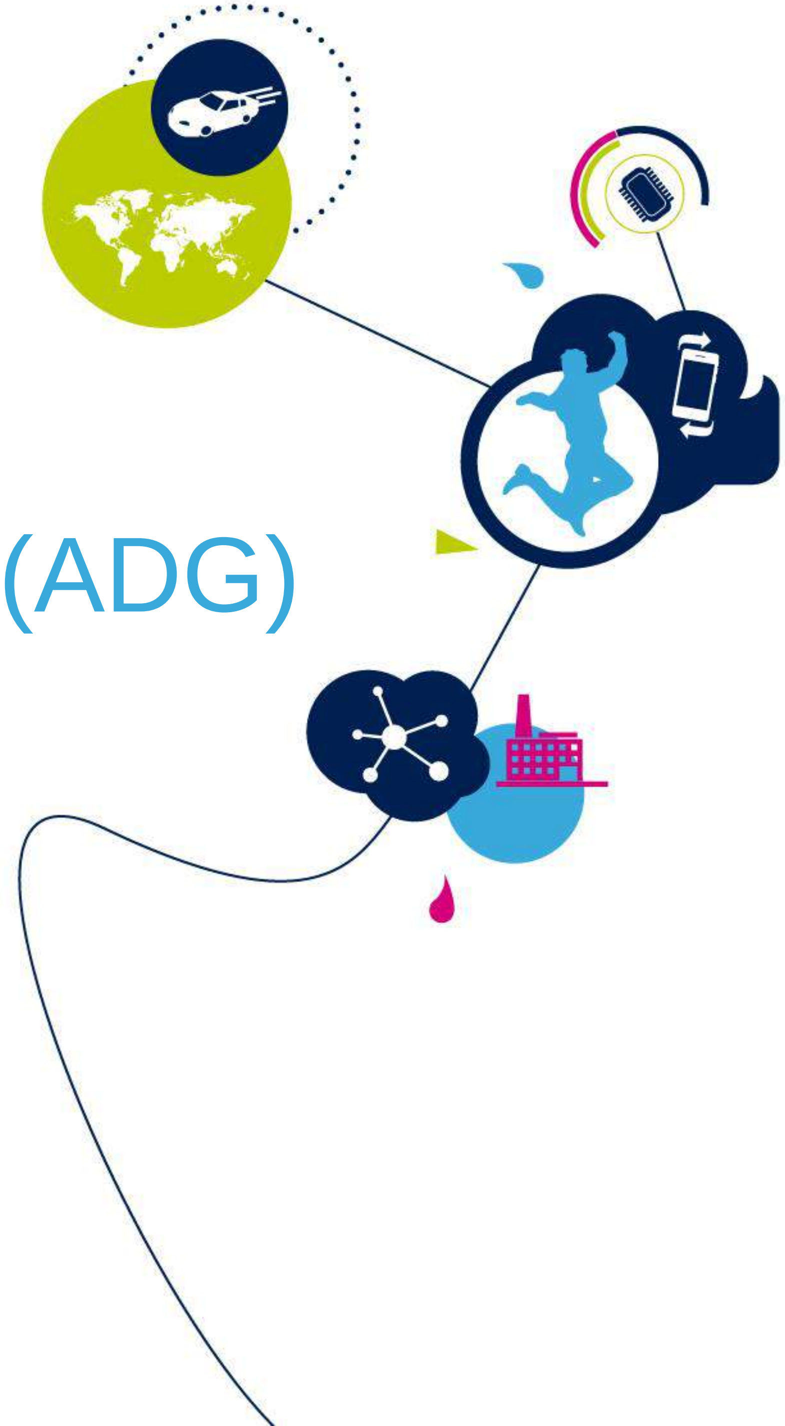
Takeaways

- ST is a market leader in Automotive with a full product offer
- Car connectivity and electrification are progressively changing the automotive industry
  - Seamless connectivity with infrastructure, other vehicles and the cloud makes the car safer and enhances the user experience
  - Electrification reduces impact on the environment, maintenance cost and offers improved drivability
- Connectivity and electrification are progressively increasing the silicon content in every vehicle
- ST is ready to serve this market transformation with its connectivity products, power technologies and full system solutions

Automotive and Discrete Group (ADG)

Marco Monti

Executive Vice President
General Manager, Automotive and Discrete Group



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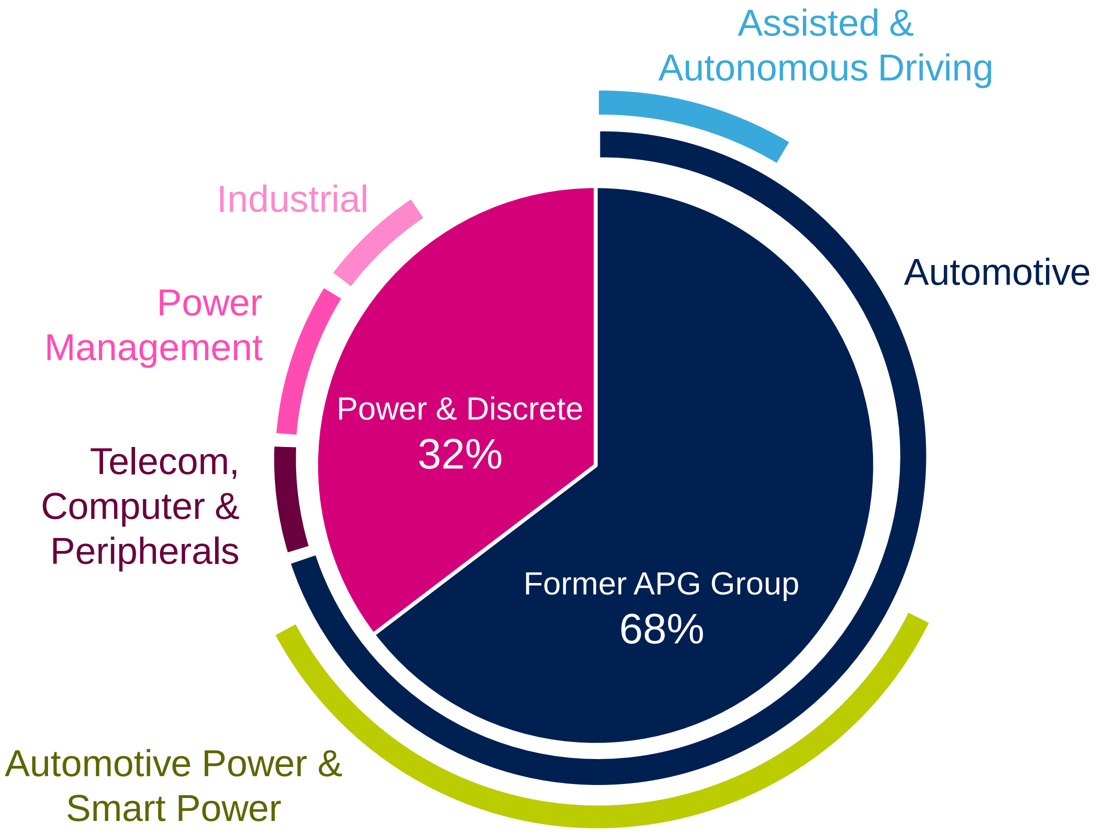
Automotive & Discrete Group in FY'16

Group Revenues by Core Application



AUTOMOTIVE (*)

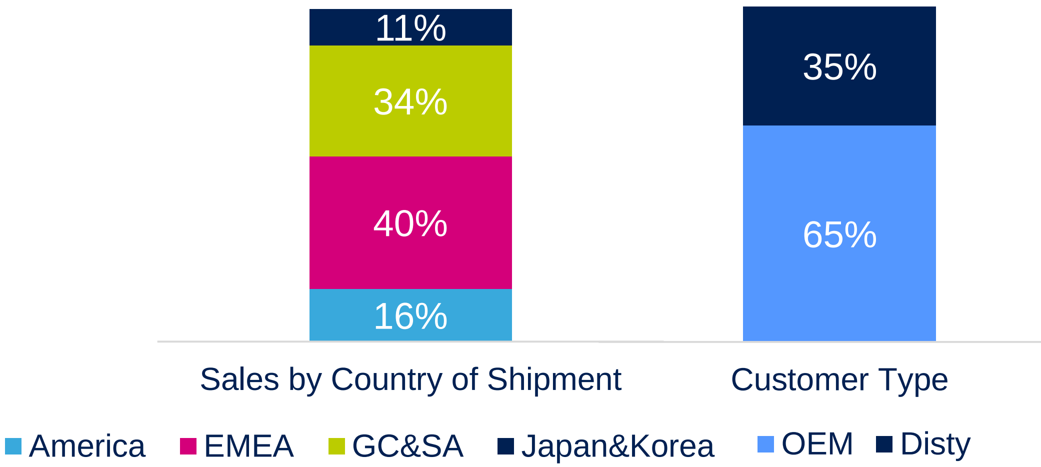
FY '16 Revenue: 2.0 B$

Smart Driving

Internet of Things

POWER & DISCRETE (**)

FY '16 Revenue: 0.8 B$



(*) ADG Turnover in Automotive Markek

(**) Power Schottky, Ultrafast & SiC diodes EOS, ESD, Lighting protections & IPAD's sold in IoT market

Extended Product Portfolio

Power & Discrete

- SiC devices
- IGBT
- PowerMOS
- Diodes
- AC Switches
- EMI, EOS & ESD Protections
- Integrated Filters

Super-Integrated ICs & ASICs

- Engine control and power management ICs
- Alternator and Voltage regulators
- Ignition controllers and drivers
- DC, stepper and multiphase motor controllers
- Braking/ABS drivers
- Passive safety sensors and controllers
- Internal external light controllers
- LED and active lighting
- Door module drivers
- Car networking ICs
- GNSS Positioning
- Audio Amplifiers
- Analog, digital and satellite tuners

Highly Advanced Processing

- Vision and RADAR based processors
- Radar 24/77 GHz transceivers
- ADAS ASICs
- Telematics processors
- HD Imaging ICs
- Auto-grade Microcontrollers
- V2X Processors
- Audio processors

Internet of Things

Smart Driving

Focus area

Smart Driving

Market Positioning: At a glance

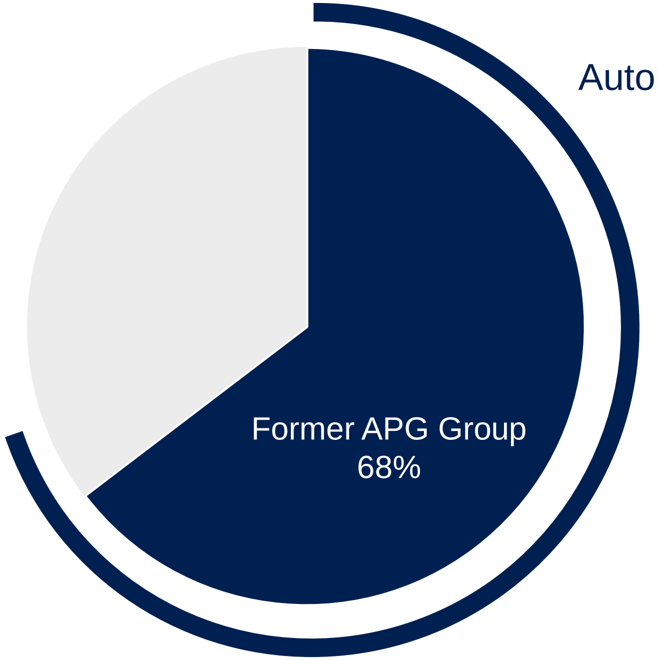
Market Segment	Leading Position
Power & Discrete	#1 High Voltage Power MOSFETs #1 Thyristors & Triacs 22% Share #1 Protection, IPAD™ & Power rectifier (*) 14% Mkt Share
Automotive Smart Power	#1 ST in Smart Power 26% Mkt Share in Powertrain 48% Mkt Share in Lighting 11% Mkt Share in Chassis & Safety
Infotainment & ADAS	#1 Audio Amplifier & Digital Tuner #1 Positioning #2 Infotainment ASSPs #1 ADAS Safety Systems Machine Vision 24GHz Radar RxTx
MCUs 32-bit SPC5	+0.5B$ Additional Awards in 2016 Fastest Growing Product Family in ADG

#4 Automotive TAM (*)

#2 Thyristors, Rectifiers and Other Diodes TAM (*)

(*) on SAM: Power Schottky, Ultrafast & SiC diodes EOS, ESD, Lighting protections & IPAD's
Source IHS-Markit

ADG: Automotive



2016 ADG SAM

$26B

- Strong Market presence
  - 30+ years leadership in automotive
  - ADG provide 90% of ST revenue in Automotive
- Significant Innovation breakthroughs
  - New materials for power electronics, ready for production (SiC)
  - Expanding the roadmap in Low Voltage MOSFETs
  - Fast Revenue Growth in digital products for ADAS, 32-bit MCUs and solutions for telematics, e-Call and V2X
  - Proliferating products in latest Vertical Power and BCD smart power technologies, targeting new applications
  - Cutting edge technologies portfolio, Ips, automotive design methodologies, dual source approach for supply security
- Strong cooperation with car makers and market leaders

Automotive Microcontrollers

Power & Smart Power

Infotainment and Telematics

Radar & Vision ADAS

V2X

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Source: Strategy Analytics

Smart Driving

What to expect in 2017

Revenue Growth

ADAS: Assisted Driving

- Exceeding 30Mpcs of RADAR based ICs shipped to the market, ramping up 77 GHz FD-SOI RF solution

32-bit MCUs

- Continuing double digit growth of 32-bit automotive micro after ~50% growth in 2016

Audio Amplifiers

- Expanding volumes in audio following contracts with our premium audio partners

Silicon Carbide MOSFETs and Diodes

- SiC volume ramp-up for electrical traction and on-board charging (Catania 6”)

Product Mix Innovation

ADAS: Pioneering Autonomous Driving

- EyeQ4 FD-SOI volume ramp-up from Crolles 300mm for several car makers
- New use Cases for Eye-Q vision based processor on top of traditional Autonomous Driving functionality

Infotainment Processing

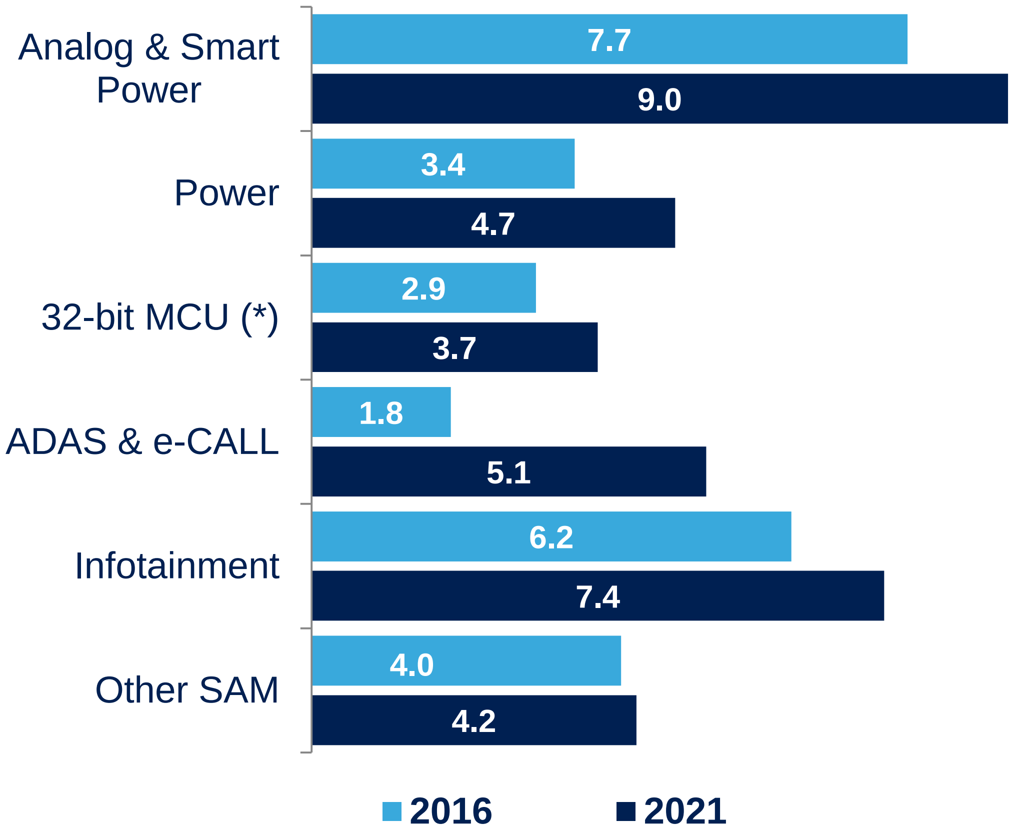
- Accordo platform ramp-up with European, Japanese, Korean, American OEM’s

Power & Smartpower

- 15 new Smart Power ASICs (BCD9 110nm) entering production for key applications
- Several Smart Switches (M07 350nm) expanding volumes in New Tier-1 Lighting platforms

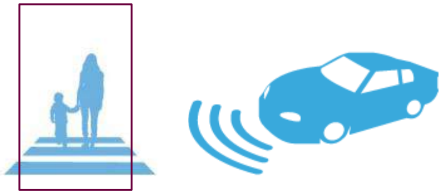
Focus on High Growth Areas

Automotive Industry Growth by Segment

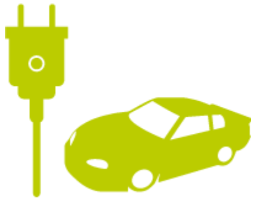


ST Focus & Portfolio Leadership

1 **ADAS**
Vision based and Radar



2 **Car Electrification**
High Voltage & Low voltage
Power & Smartpower



3 **32-bit Automotive with security**
Gateway, Radar, Body, Transmission

4 **Telematics & Entertaiment**
Audio, Positioning, Tuners, Processors

(*) 32-bit embedded flash MCUs for powertrain, chassis, airbag, ADAS & body ; Infotainment included audio amplifiers

Smart Driving

Smartpower Market

FY ‘16 Market Positioning

8B$
Total Market

4.3B$
Servable Market

#1 → #1+
Smart Power ICs

20%
Market Share

50%
Lighting
Mkt share

20%
Parking Brake
Mkt share

14%
Chassis & Safety
Mkt share

28%
Engine Mgmt.
Mkt Share

Key Products and Design Wins

Strategy

- From Commodity ASIC to differentiated scalable ASSPs, new roadmaps for high value market segments
- Push on new Smart Power Foundry Business

Major Award

- 100 M$ Award on Transmission for #1 WW electronic manufacturer
- 40 M$ Award for Battery Management solution with a Chinese market leader

Innovation Leadership

- ST Market leadership for world 1st solution for parking brake
- New Switches & Bridges for Power Distribution & Motor Control for 48V

Key Customers

Continental

BOSCH

UAES

TRW

(*):market share on SAM Source: Strategy Analytics

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Power for Electrification

FY ‘16 Market Positioning

$2.8B Total Market

#1 in High Voltage MOSFETs

#1 in Thyristors and Triacs

#1 in Power Rectifiers(*)

#5 in Automotive Power Transistors

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Key Products and Design Wins

SiC MOSFETs

- New 650V /1200V product family tailored for motor control
- Product Qualified. Production Started

SiC DIODEs & ULTRAFAST Rectifiers

- Fast, Efficient, High temperature
- Chargers and DC-DC converters

TRIACS, Thyristors

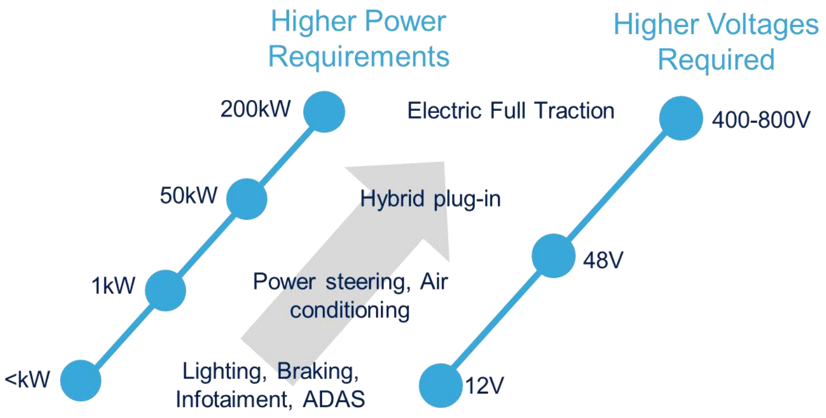
- Largest product portfolio in the industry
- For on-board chargers to limit in-rush current at system connection

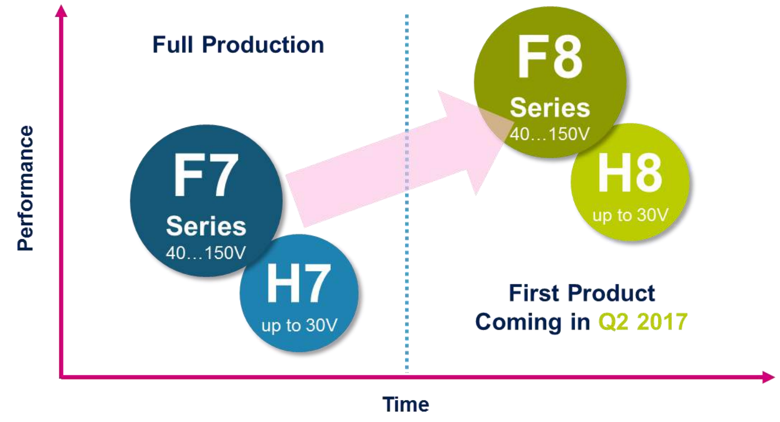
LV MOSFETs

- Extending STripFET F7/H7 LV MOSFET roadmap with 22 new part Numbers in 2017
- Sampling STripFET F8/H8 for enhanced switching performance

(*) Power Schottky, Ultrafast & SiC diodes

Key Technologies





Automotive 32-bit MCUs

FY '16 Market Positioning

3.5B$ Total Market

75% TAM coverage with focus on Body, Powertrain, Chassis & Safety

0.5B$ 2016 Awarded Business

2.5B$ Market for products with security by 2021

Key Products and Design Wins

Revenue Growth

- Design win momentum keeps going (+0.5B$ / 50M$/y increase)
- Strong high double digit Backlog
- Production of 40nm generation for Gateway and Transmission
- Started shipping 77Ghz Radar applications in High volumes

Enlarged portfolio with focus on Core Applications

- Body applications, Secure Gateway, Radar systems, Battery management, Park Pilot & Safety applications
- Progress in line with expectations for new high-end family with ARM R52 core, eNVM in Crolles with 28FDSOI technology

Security

- 100% of new products with embedded security subsystem to capture Security Market opportunity in Automotive

Key Customers

(*):market share on SAM Source: Strategy Analytics

Advanced Driver Assistance

FY ‘16 Market Positioning

735M$

Servable Market(*)(**)

#1

ADAS Safety Segment

Machine Vision

Radar Transceivers Market

Key Products and Design Wins

Machine Vision

- Strong Partnership with Mobileye
- EyeQ4 production in 2017.
- EyeQ5 is at advanced design stage

Surround View

- Shipping in volumes Parking Camera Processor
- Started design of Advanced Surround View Processor

Radar

- Sampling 2nd Generation 77Ghz Radar Transceivers
- 24GHz adoption is growing. New system partition under evaluation to reduce system cost and expand proliferation

ADAS ASICS

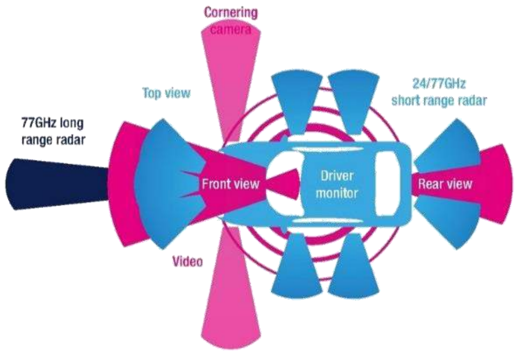
- For high speed interconnect technology
- For far infrared vision processors

Power Management

- Sampling Safety Multi-voltage regulators compatible

with Several ADAS applications

Key Customers



MOBILEYE

Autoliv

BOSCH

Up to 25 Advanced Sensors per car to scan the environment

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(*) Core apps: Forward collision warning, lane departure warning, pedestrian detection, adaptive cruise control, blind-spot detection

(**) TAM excludes camera, memories and optoelectronics

Smart Driving

Telematics & Infotainment

FY ‘16 Market Positioning

3.8B$ Servable Market

#1
Positioning
Audio Amplifiers
Digital Tuners

#2
Infotainment ASSPs
Terrestrial Tuners

Key Products and Design Wins

Infotainment & Telematics Processors

- Accordo2 in high-volumes, further 6 projects SOP within 4Q’17
- Telemaco 2 in high-volumes, 3 further projects by 3Q’17
- Telemaco 3P (with Security) now awarded for a major EMEA OEM
- Cooperation with AirBiquity for SW Updates for Connected Vehicles
- Autotalks: V2V (Craton2+Pluton2) awarded for 10 OEMs

Terrestrial Tuners

- AM/FM CMOS Tuners started production at 2 major Tier1’s
- Full Digital Tuners Kit (including Digital Co-processor for DAB and HD) awarded by 3 major Tier1

New Market Segments

- Sampling Multicore Processors for Digital Clusters
- 2 New Class-D power Amplifiers with 2 channel and 1 channel option
- Investment on Precise Positioning for autonomous driving
- Added Positioning Module to product line up to expand sales to a wider set of customers in multiple application domains
- New investment launched for Software Radio Receivers

Key Customers

BOSCH
BOSE
Continental
Clarion
HARMAN
JVC KENWOOD
Pioneer
SiriusXM SATELLITE RADIO
ALPINE

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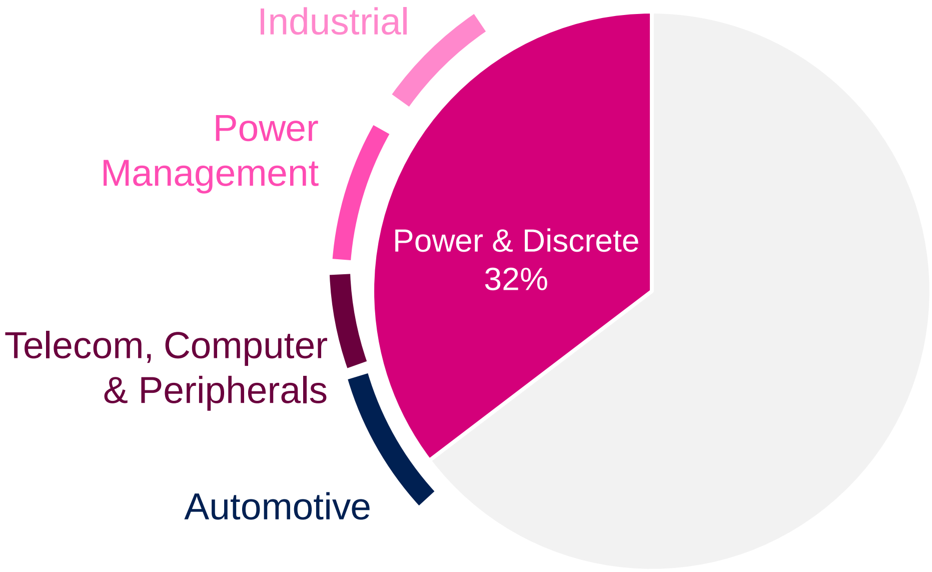
(*):market share on SAM Source: Strategy Analytics

ADG: Power & Discrete



$11B

2016 ADG SAM

- **From General Purpose Discrete to Differentiated Discrete around Application clusters**
  - Automotive, Servers, Appliances, IOT wireless nodes, mobile phones
- **New product Categories**
  - Continuing to renew the portfolio at a fast pace (>20% of sales on new products)
  - New Medium Power SCR & Triacs, several new passive integration configurations
  - Extended Silicon Carbide offer from Diodes to MOSFETs
  - New high voltage product line to maximize efficiency in Server Power converters and Appliance Motor Inverters
  - New low voltage family for High efficient servers
- **Packaging Innovations**
  - Ultra miniaturization for protections
  - New Power Packages for high-power applications with optimized power density including Intelligent Power Modules, High Power Modules

(*) Power Schottky, Ultrafast & SiC diodes EOS, ESD, Lighting protections & IPAD's
(**) Excluding (automotive)

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Smart Driving

Internet of Things

Discrete

What to expect in 2017

Revenue Growth

DISCRETE

- Strong double-digit broad range growth

PROTECTIONS

- Ramping up in new mobile phone platforms after a transition year

LOW VOLTAGE MOSFETs

- Several customers starting with new Advanced Trench Products for servers, industrial and automotive (30 new part numbers)

SILICON CARBIDE MOSFETS

- SiC MOSFETS volume ramp-up for industrial

INTELLIGENT POWER MODULES

- Several programs for Home Appliances with leading WW makers

Product Mix Innovation

SIC DIODES and HIGH VOLTAGE SCR

- Several cars to production in 2017 for on-board chargers

IPAD

- New wins for tunability filters for Smart Phone 4G capability

FERD Diode

- New wins for high efficiency game console CPUs power supplies

HIGH VOLTAGE MOSFETs

- Several programs for Server, Automotive and Telecom racks with high double digit growth (80 new part numbers)

POWER MODULES

- Started production 1st wave of high power products (ACEPACK) for multiple markets

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ADG: Power & Discrete

MOSFET, IGBT, Diodes & SCR/Triacs

Application Segment | **Selected Technology** | **Innovation Examples**

Up to 1500V

Industrial Motor Control, Solar Factory Automation, Metering, Fast Automotive Chargers

Up to 700V

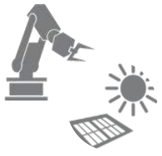
Home Appliances, Power Management, LED Lighting, Automotive Electric Traction

40V - 150V

Automotive Electronics, E-Bikes, UPS Power Mgmt

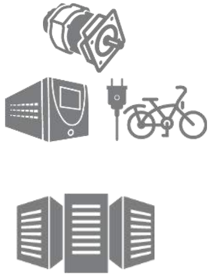
Up to 60V

Servers, Computer Peripherals,Telecom



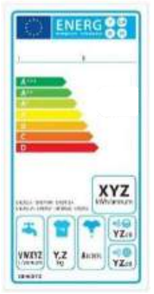
IGBT, SiC DIODEs & MOSFETs, Power MOSFETs (MDmesh™) ACEPACK™, Power Bipolars, HV SCR

Power MOSFETs (MDmesh™) IGBT, SiC DIODEs & MOSFETs Intelligent Power Module (SLLIMM™) Power Bipolars, AC Switches & ULTRAFAST



Power MOSFETs (STripFET™) Power Bipolars, Power Schottky & FERD

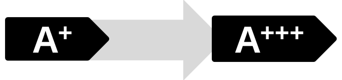
Home Appliances



New Super Junction HV MOS with ultrafast, soft body diode

-50% dissipation

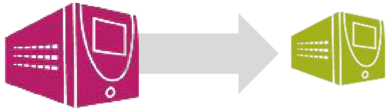
32 products in 2017



Datacenters

New low voltage Trench MOSFET technologies for synchronous rectification in power supplies

2x Power Density



60W/inc^3 30W/inc^3

13 products in 2017

From stand alone Packages to Modules

ADG: Power & Discrete

Protection, Integrated Discrete Devices

Market & Positioning

2015 SAM ~$1.6B$

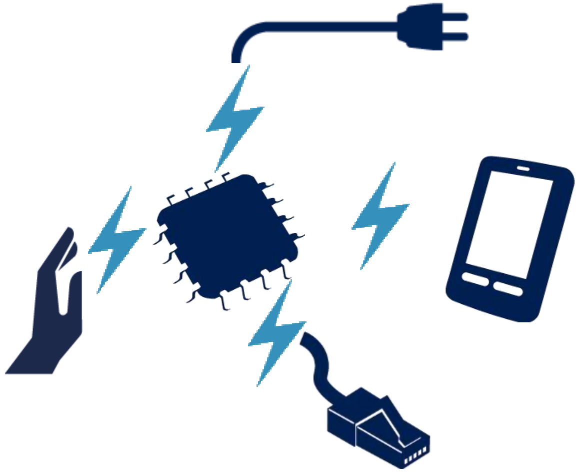
#1 EOS,ESD, Lighting Protection

10% Market Share

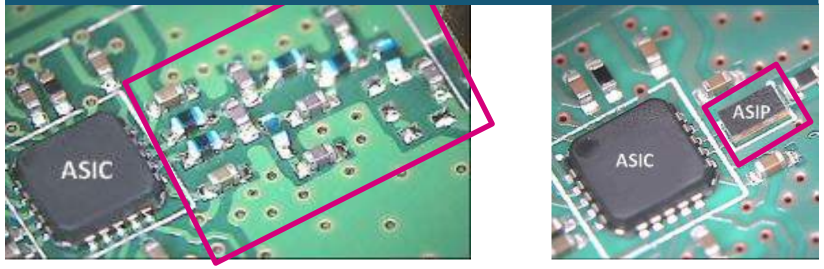
#1 **IPAD™** Integrated Passive & Active Devices

14%

Industry Domain



Automotive Ethernet Filter



Improves performance and drastically reduces space (-70%)

Product Offering

Protection Devices

Consumer high-speed ports,
Automotive CAN, LIN, FlexRay
TVS for EOS protection, USB Type C,
Power over Ethernet

EMI Filtering, Signal Conditioning, RF IPDs

Antenna Tuning for Smartphones
RF Coupling interfaces (WiFi-BT)
BroadReach Signal Filtering

Leadership Technology & Manufacturing with dual source option

Power and Analog

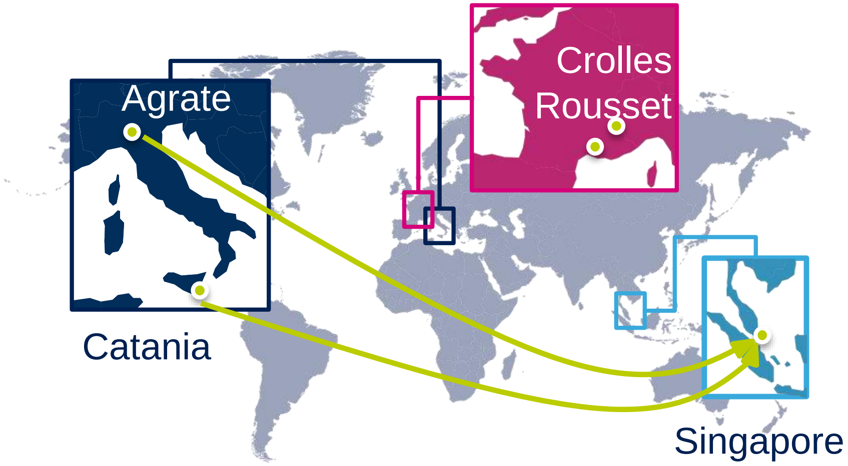
Power Transistors
(LV, SiC & SJ MOSFET, GaN)

Other Discrete
(FERD, Si)

Mixed Signal

BIPOLAR CMOS DMOS
(90nm eNVM)

Vertical Smart Power
(110nm)



Digital

Advanced CMOS FD-SOI
(28nm)

Specialized CMOS Imaging Sensor

eNVM
GP & secure MCU Automotive MCU
EEPROM
(FD'SOI 28nm NVM)

AMS/RF CMOS
(40nm RF)

BiCMOS


6" SiC


8" Smart Power, Power, BiCMOS


12" CMOS and eNVM

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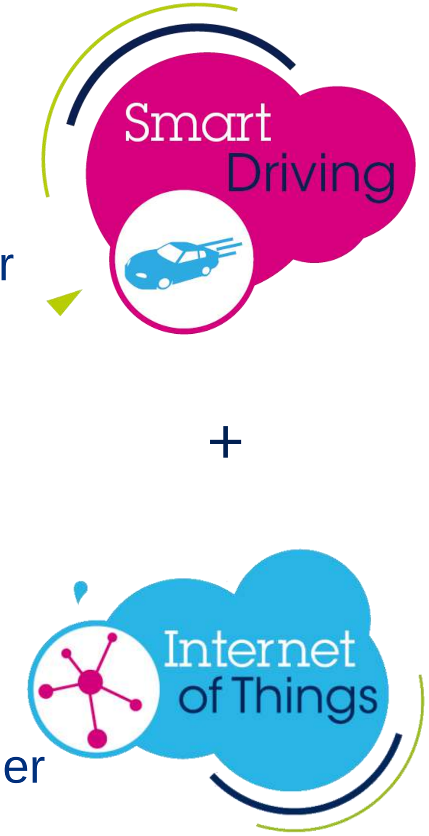
Takeaways

- Three Pillars
  - Automotive Application Specific products
  - Multimarket Power Discrete
  - Protections
- Smart Driving
  - Reconfirmed growth in business line such ADAS, 32-bit MCU, Telematics, Smart power
  - Contribution from new drivers especially in Power Discrete for 2017
  - ST’s value proposition is attracting new customers interested in co-designing products leveraging ST’s Automotive know-how, IPs and technologies
- Internet of Things
  - Power Discrete: Differentiating roadmap vs. competition to lead in energy conversion efficiency and create stable long term growth drivers
  - 2017 growth clustered in smartphones, servers, telecom equipment, appliance and other industrial markets

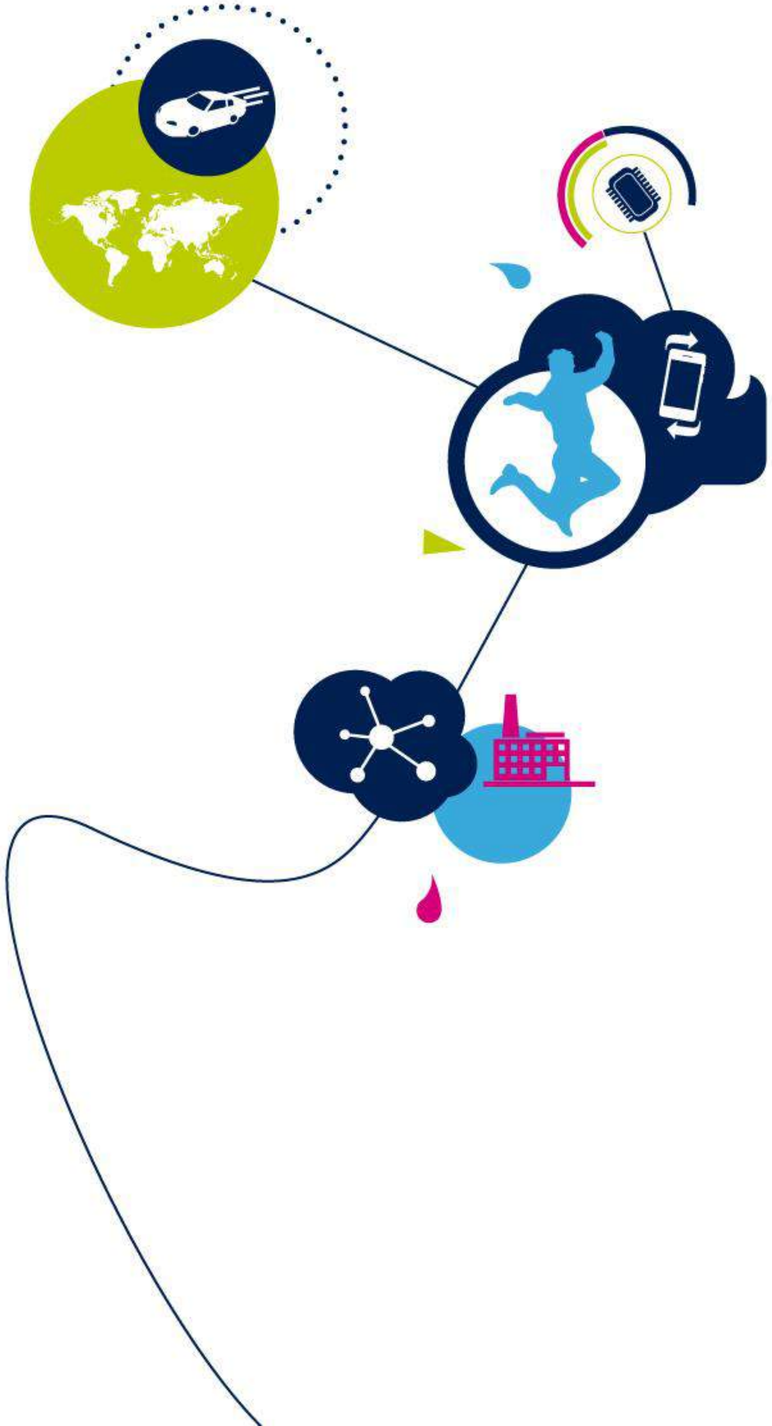


Microcontrollers & Digital ICs Group (MDG)

Claude Dardanne
EVP, General Manager, Microcontroller and Digital ICs Group

Flavio Benetti

VP, General Manager Digital & Mixed Signal ASICs



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Microcontrollers and Digital ICs Group (MDG)

Product Lines

General Purpose MCU

General Purpose Microcontrollers

- STM32 – 32-bit MCUs
- Ultra-low-power / High performance
- Broad choice of peripherals
- Broadest portfolio
- 10 years longevity for industrial applications

Secure MCU

Secure Microcontrollers

- Mobile Security (SIM, eSIM, NFC ctrl and e-SE)
- Automotive grade Secure MCUs
- Banking, ID and transport
- Authentication for secure IoT & anti-counterfeiting
- Turnkey solutions including certified HW+SW

EEPROM

Serial & RF Memories & Readers

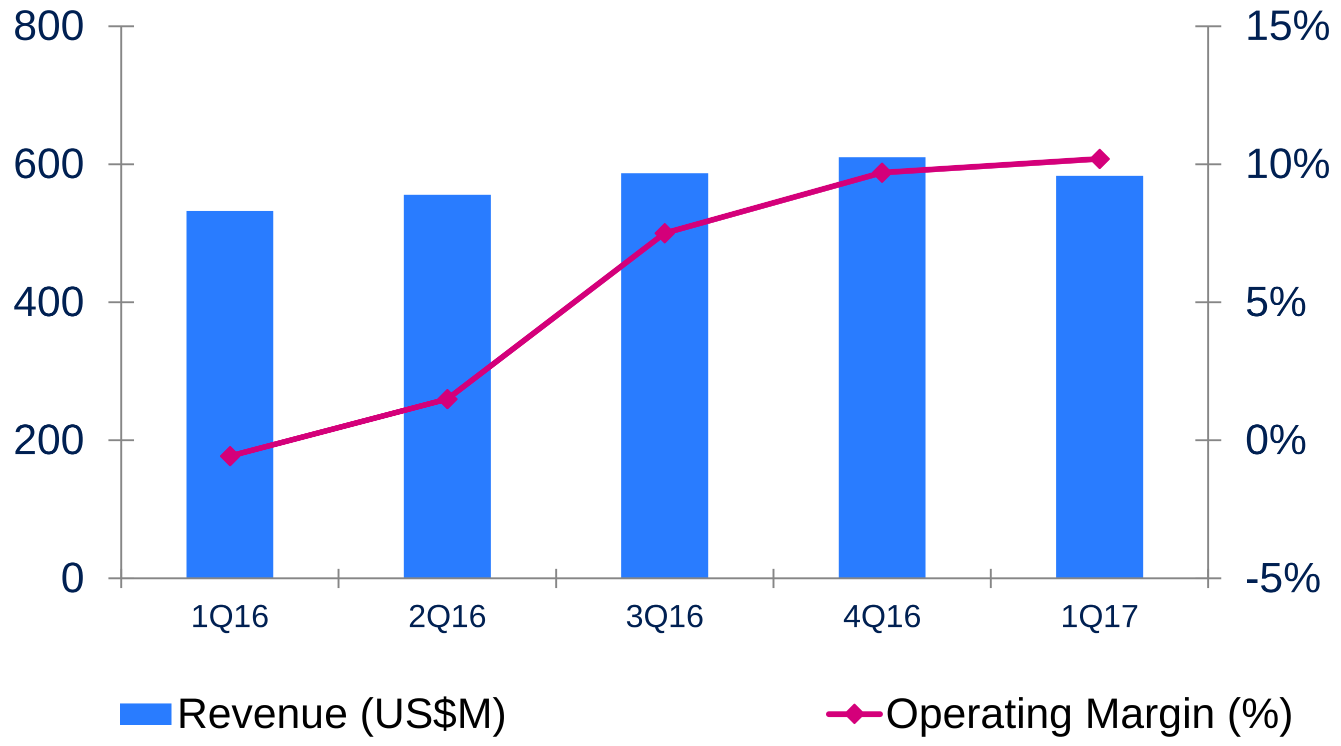
- High-performance & high-endurance EEPROM
- HF and NFC RFID tags, RF readers
- Advanced packaging options → Wafer Level Chip Scale Package (WLCSP)
- Automotive grade

Digital & Mixed Signal ASICs (DMA) Aerospace Defense & Legacy

- Electronic & photonics ICs for optical interconnect
- Technologies for 5G base stations ICs
- High complexity Networking digital ASICs
- State-of-the-art in house FD-SOI advanced process
- FinFET High Integration ASICs capability

FY16 & Q117 MDG Results

Before impairment and restructuring charges



Microcontrollers & Digital ICs

2016 Revenues = $2,285M
Operating Margin = 4.7%

2H 2017 Target

Operating Margin = Low Teens

MDG includes Set-Top Box business under phase-out

MDG Positioning in 2016

General Purpose Microcontrollers*

#3 Worldwide supplier 2016

Secure Microcontrollers

#4 Worldwide supplier 2016

Consolidated MCU*

#3 Worldwide supplier 2016

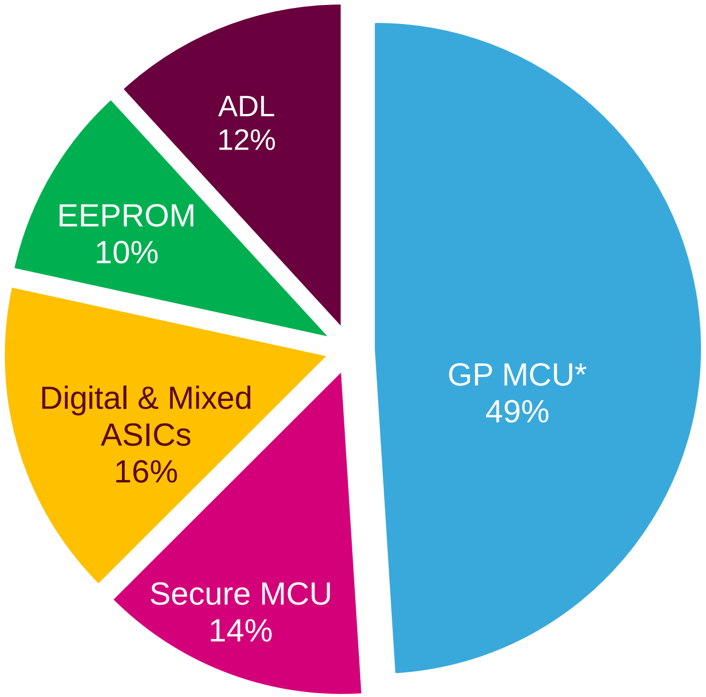
EEPROM memories

#1 Worldwide supplier 2016

Digital & Mixed Signal ASICs

Aerospace & Defense, Legacy

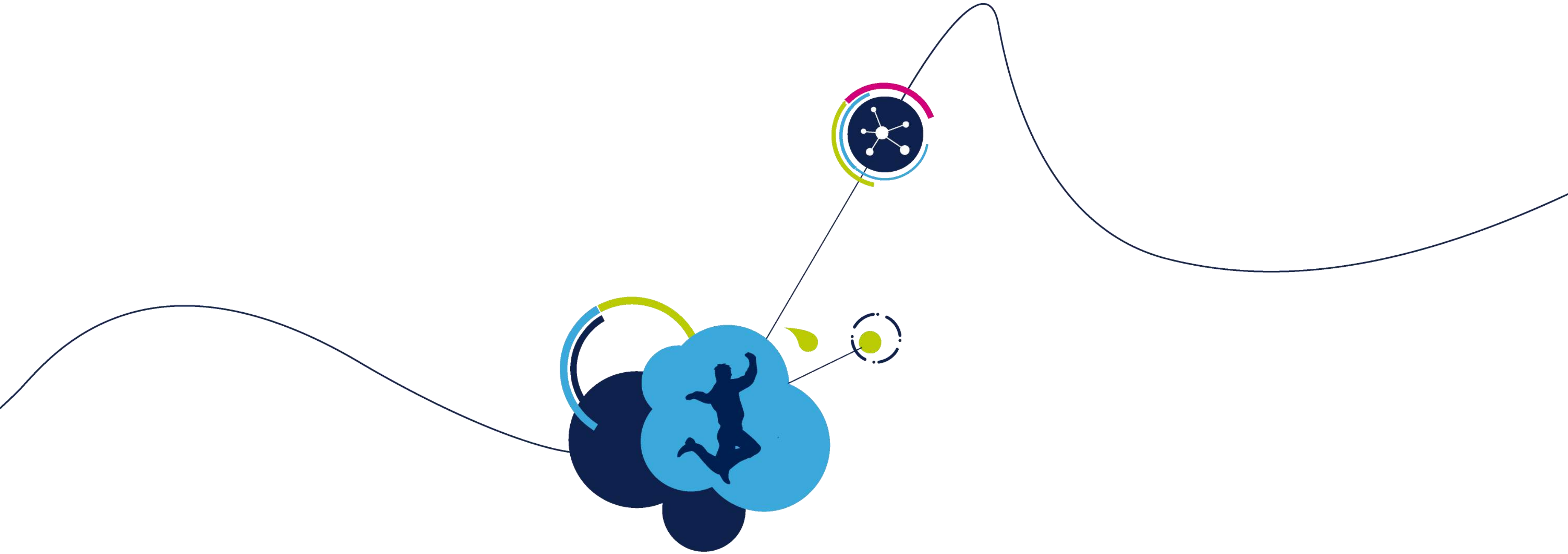
MDG 2016 Business by Activities



Major growth opportunity:
General Purpose MCU* + Secure MCU

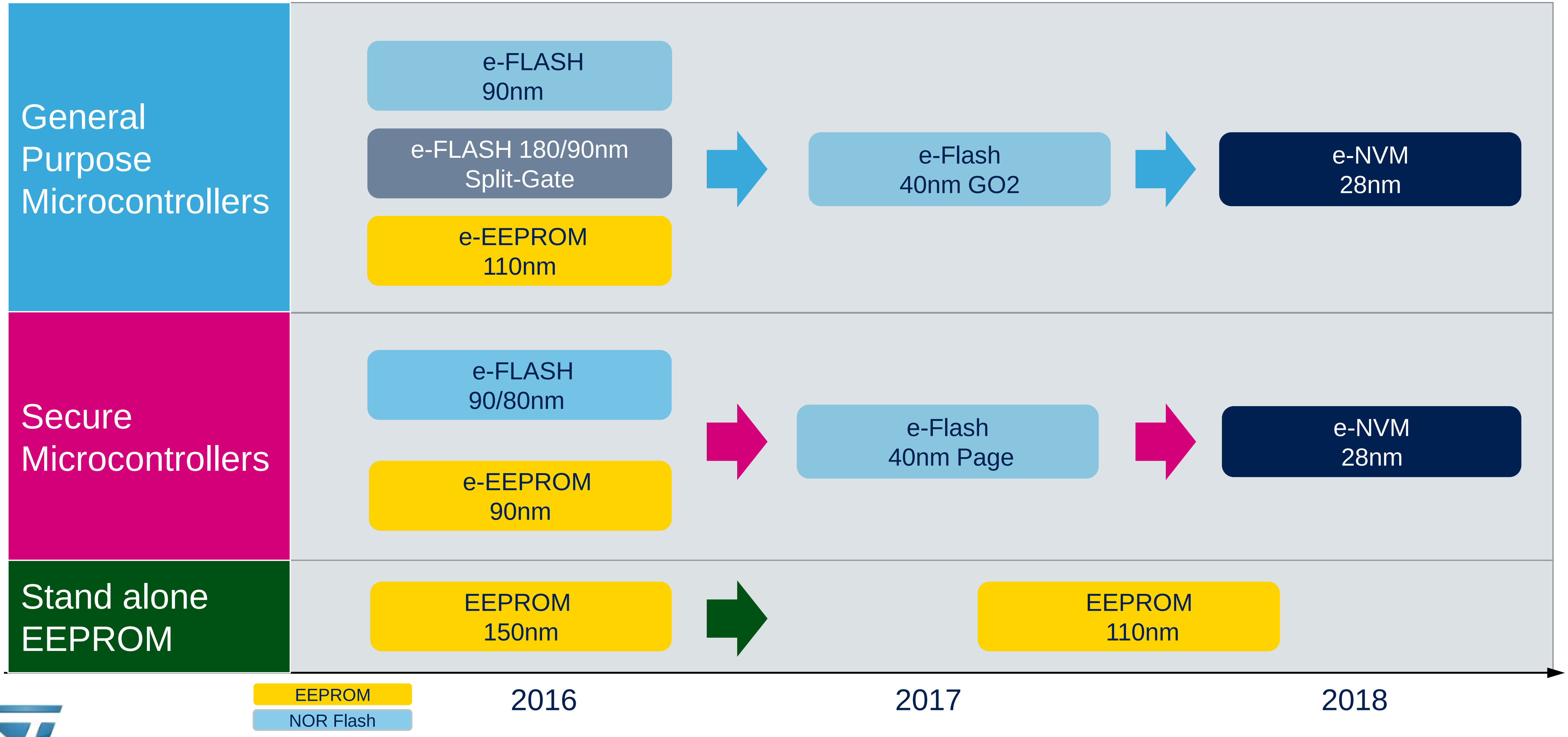
* Microcontrollers excluding Automotive

Source: IHS-Markit



Microcontrollers

NVM Technology Roadmap



General Purpose Microcontrollers

e-FLASH 90nm

e-FLASH 180/90nm Split-Gate

e-EEPROM 110nm

e-Flash 40nm GO2

e-NVM 28nm

Secure Microcontrollers

e-FLASH 90/80nm

e-EEPROM 90nm

e-Flash 40nm Page

e-NVM 28nm

Stand alone EEPROM

EEPROM 150nm

EEPROM 110nm

EEPROM

NOR Flash

2016

2017

2018

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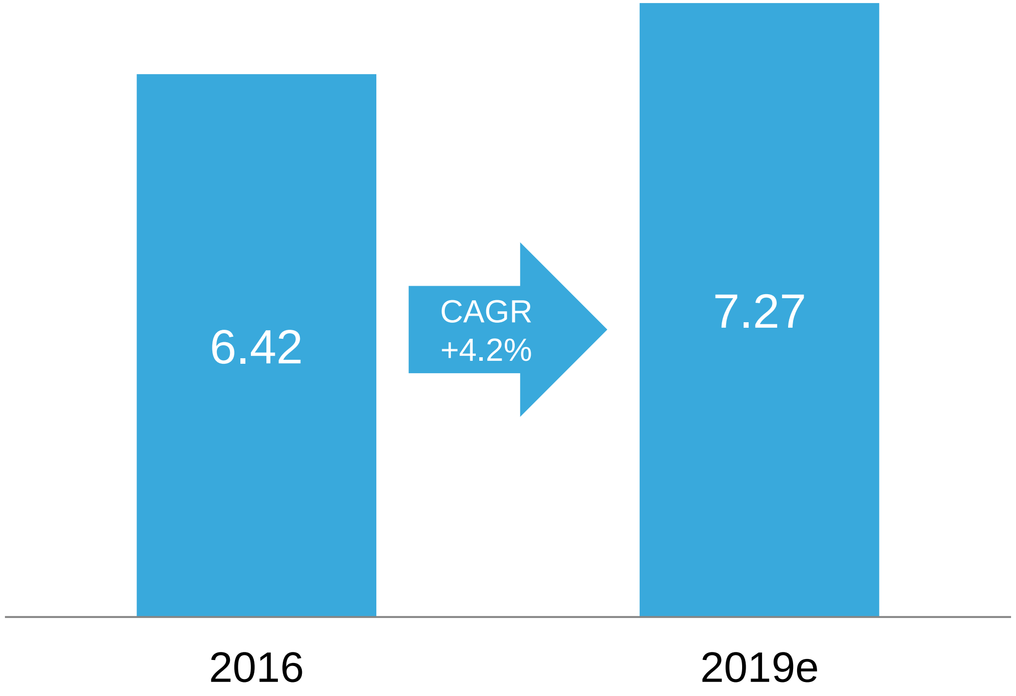
Broad STM32 Portfolio

Able to sustain the market growth

SAM GP MCUs* ($B)



- Addressing multi-application, multi-customer
- STM32 platform with added value

High Performance series

- Leading edge for MCU computing power
- Advanced peripherals
- More connectivity & security

Ultra Low Power series

- Optimized for wearables and portable devices
- Optimized functional modes
- Smaller form factor

Mainstream series

- Very strong adoption in mass market
- High runner families

Development tools

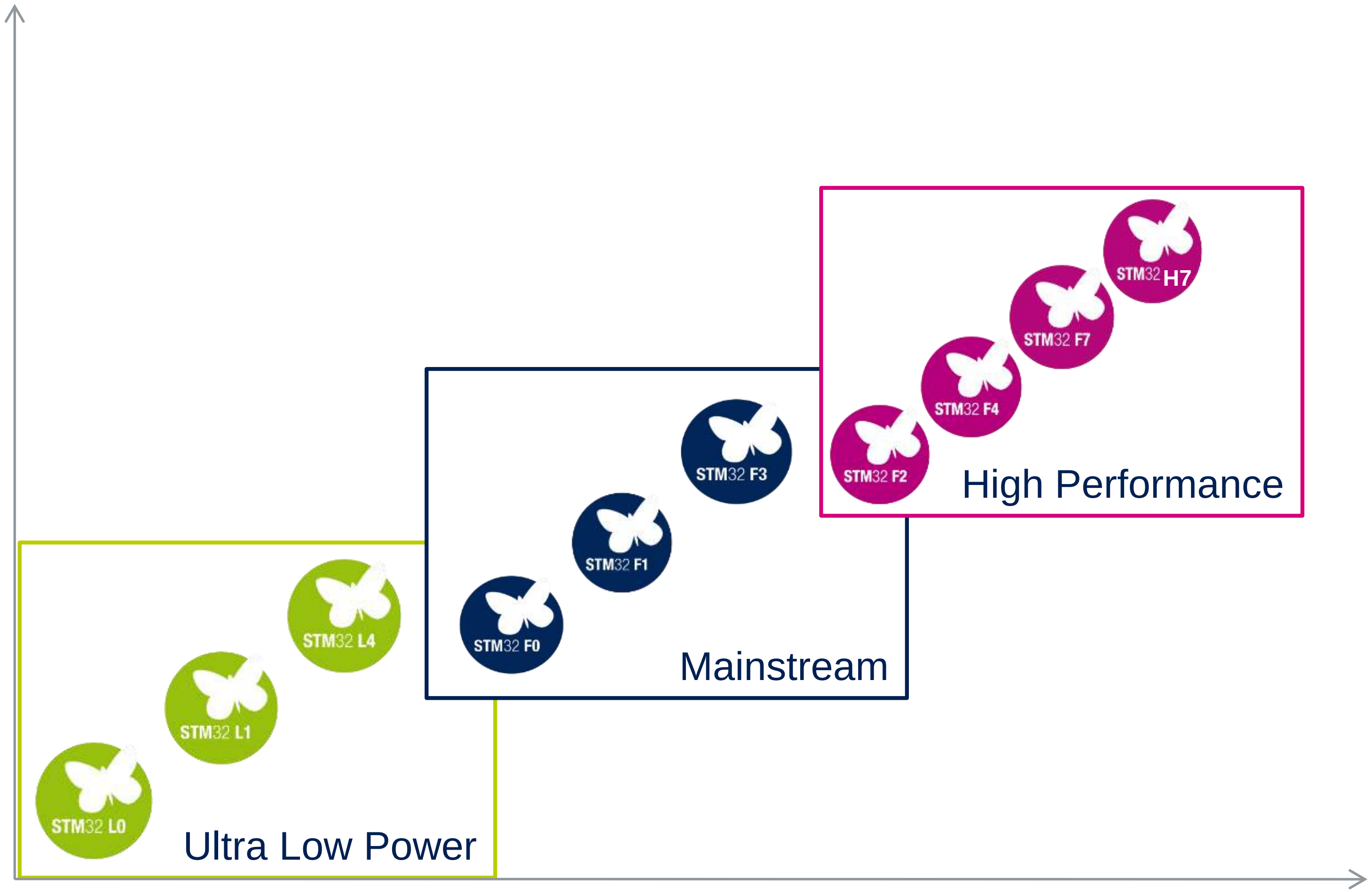
- Wide choice of development platform
- Wide technology partner network

STM32 is ARM® Cortex-M powered for best performance & power efficiency

* Excluding Automotive, source IHS-Markit

STM32

The brain of many applications



#3 WW MCU* Supplier (2016)

- Leadership on 32-bit platform*

Rich portfolio

- 10 series, 700 Part Numbers
- Performance range fitting all IoT needs

50K customers world-wide

- > 2.5 Billion units shipped
- 1 Billion units yearly run rate

Large success in many application markets

- ***consumer, automation, healthcare, Industrial, smartphone***

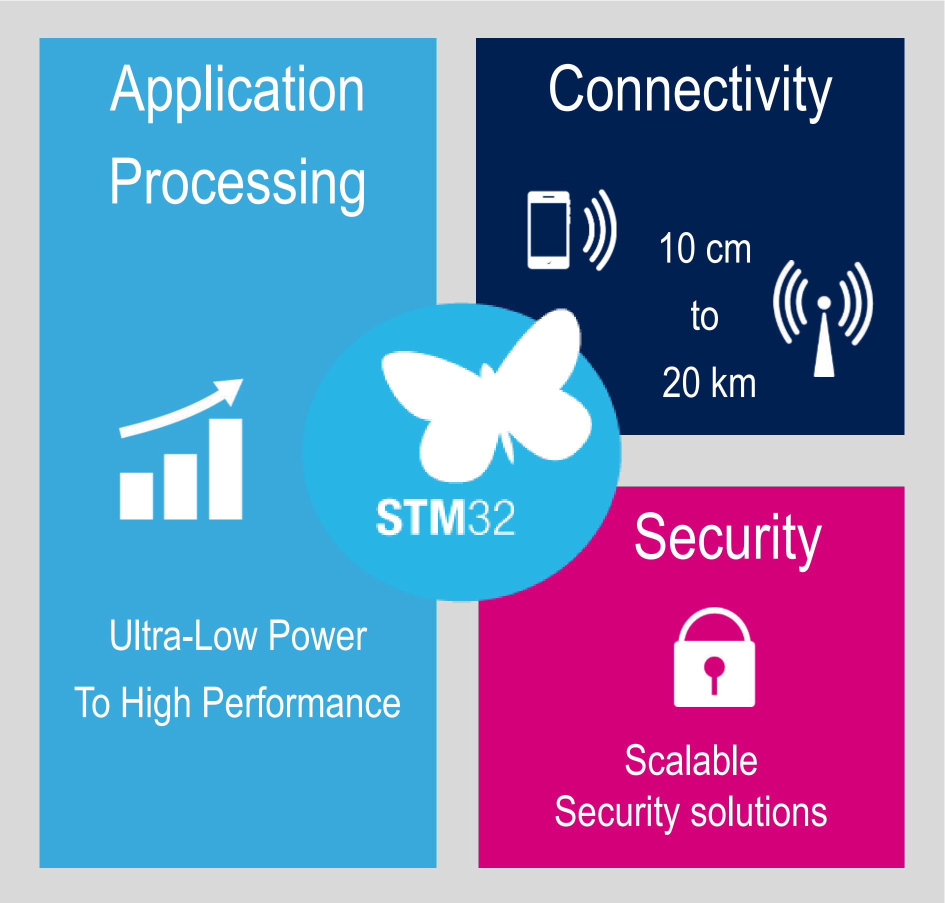
Strong presence in mass market

- Rich ecosystem to facilitate design-in & customer time to market

* Excluding Automotive, source IHS-Markit

STM32 Embedding Connectivity & Security

To address the IoT market



Smart Things

Smart Home & City

Smart Industry

Powering a broad range of connectivity solutions

From module to SOC, meeting requirements for time-to-market and volume

NFC

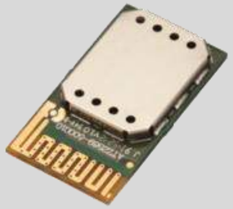
2.4GHz — Bluetooth SMART, THREAD

2.4/5GHz — Wi Fi

Sub-1GHz — LoRa, 6LoWPAN, SIGFOX, M-Bus wireless

Cellular — 4G LTE -M -NB-IOT, GSM

STM32

Module  Partners

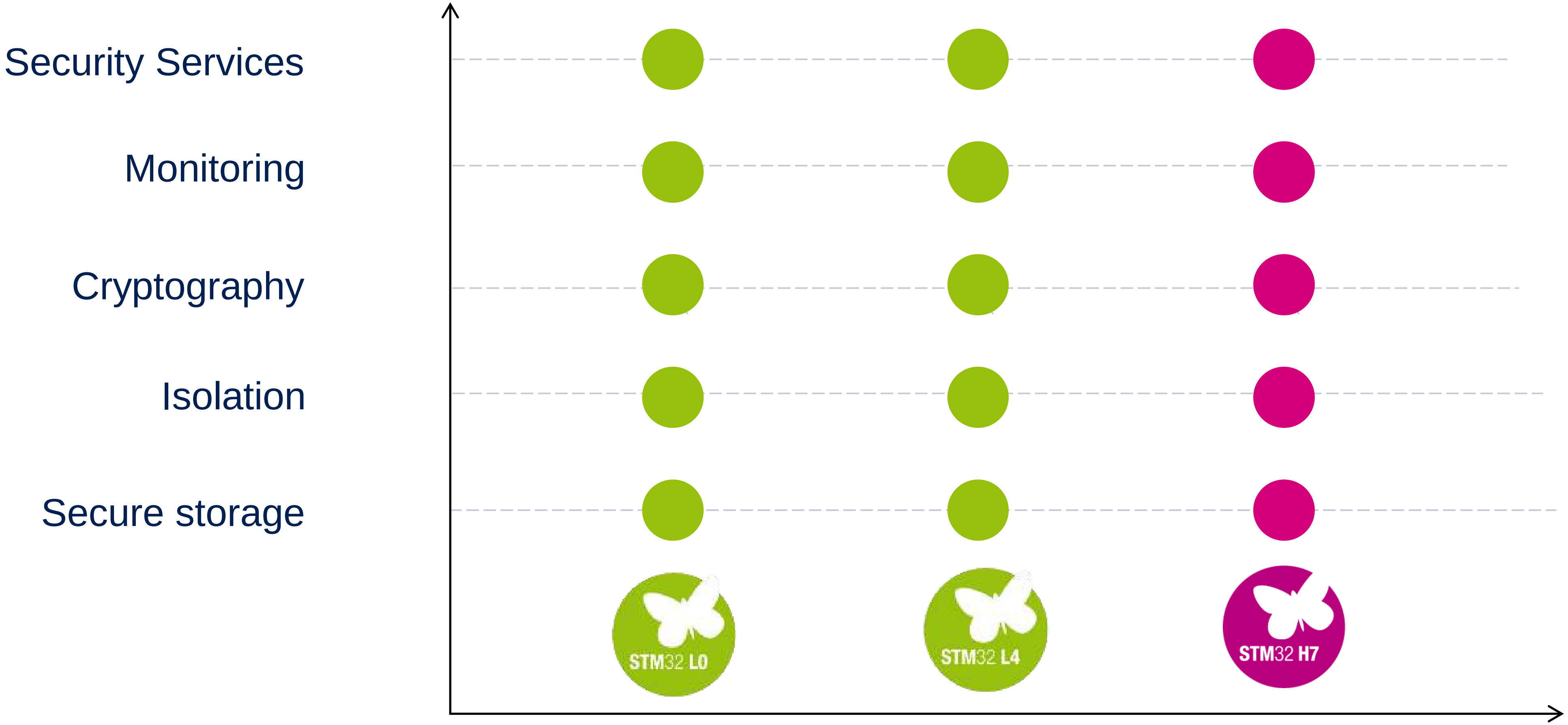
System In Package (SiP)  ST and/or Partners

System On Chip (SoC)  ST

STM32

Embedding scalable security

Solutions for ultra-low power and high performance platforms



	STM32 L0	STM32 L4	STM32 H7
Security Services	●	●	●
Monitoring	●	●	●
Cryptography	●	●	●
Isolation	●	●	●
Secure storage	●	●	●

STM32 + Secure MCU

Covering all market needs

Connectivity

- 4G LTE -M -NB-IOT
- GSM
- LoRa
- SIGFOX One network A billion dreams
- LoWPAN
- M-Bus wireless
- Bluetooth
- Wi Fi
- Bluetooth SMART
- THREAD

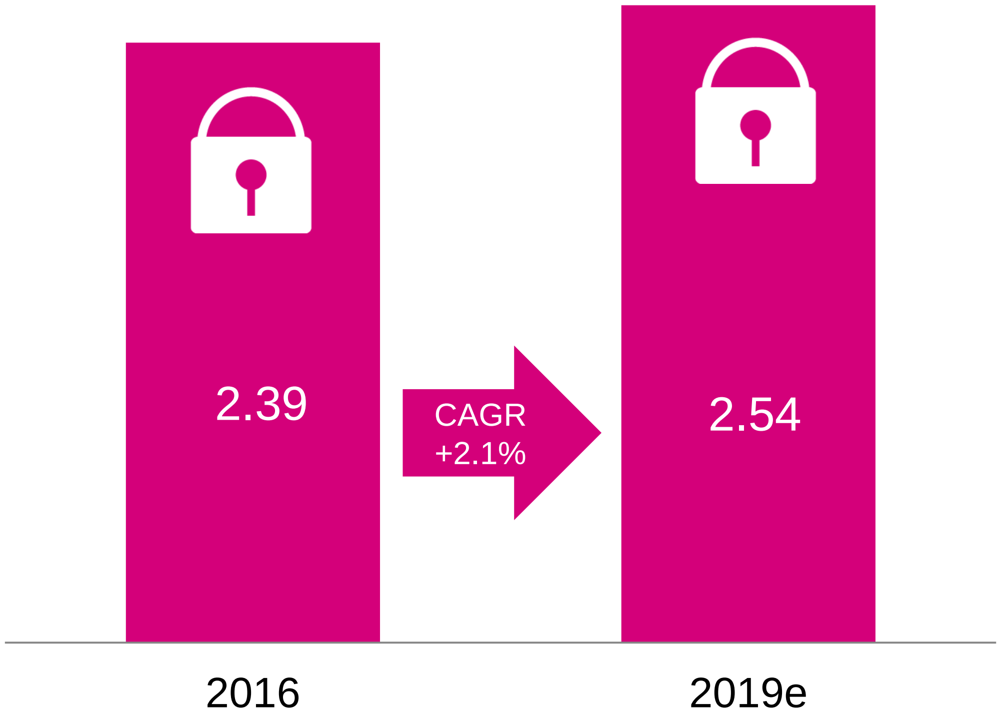
Security

- ST31/33/54 SE
- STM32 MCU ↔ STSAFE
- STM32 MCU
- STM32 MCU

Secure MCU Portfolio

Able to sustain the market growth

SAM Secure MCUs ($B)



- **Strong offer for Mobile** with ST33 Secure Element, ST21 NFC Controllers & ST54 Combined solution
- **Fulfilling IoT security needs** with STSAFE secure element family

NFC Connectivity

- One of the highest performance solutions in the market
- Patented technology
- Advanced power saving features
- Highest interoperability

Turn-key Solutions

- Addressing key security markets: IoT, M2M, banking, TPM, ..
- Common Criteria and EMVCo Certified HW & SW solutions
- Product customization and personalization services

State-of-the-art Security

- Highly secure, certified HW platforms
- High performance crypto accelerators
- Certified cryptographic libraries

Cost effective

- State-of-the-art embedded Flash process
- Advanced & optimized packaging

Source: WSTS

Secure MCU Applications

Smart Cards for
Banking, Transport, PayTV & ID

ST23 & ST31
Secure MCU
Certified according
to the standards

Secure Elements for
Internet of Things

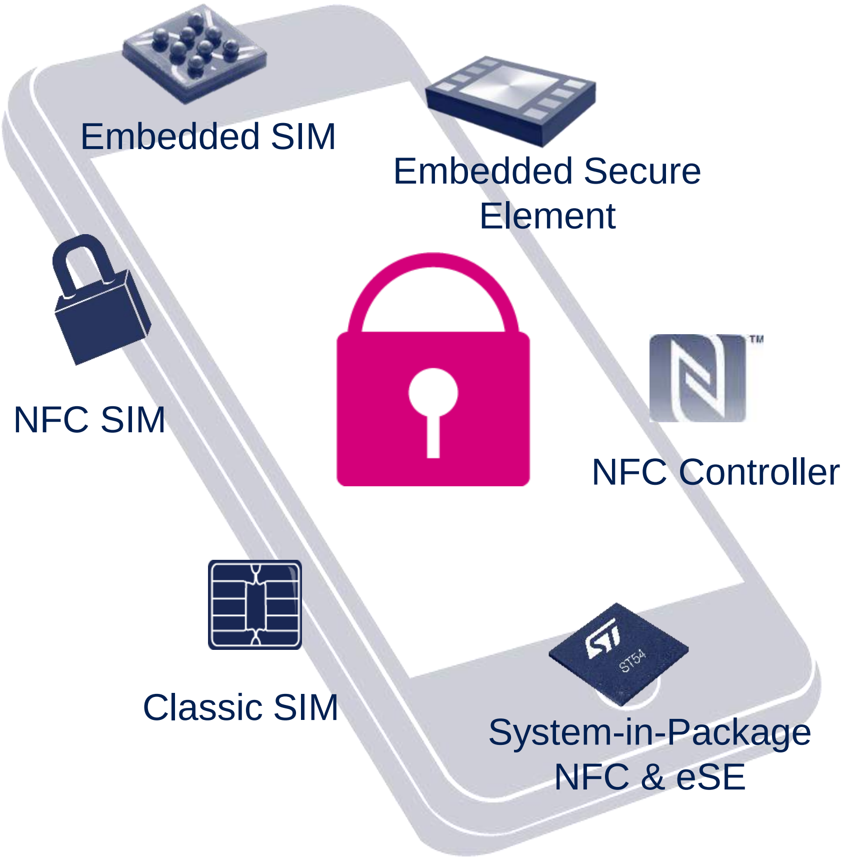
STSAFE family &
custom solutions for
security in IoT
connectivity

Secure Element & NFC controllers for
Mobile security, M2M, Automotive &
Wearables

ST33, ST54 & ST21NFC
Secure MCU
for mobile and wearables

NFC & Secure Solutions

A broad range of secure solutions for Mobile devices



Embedded SIM

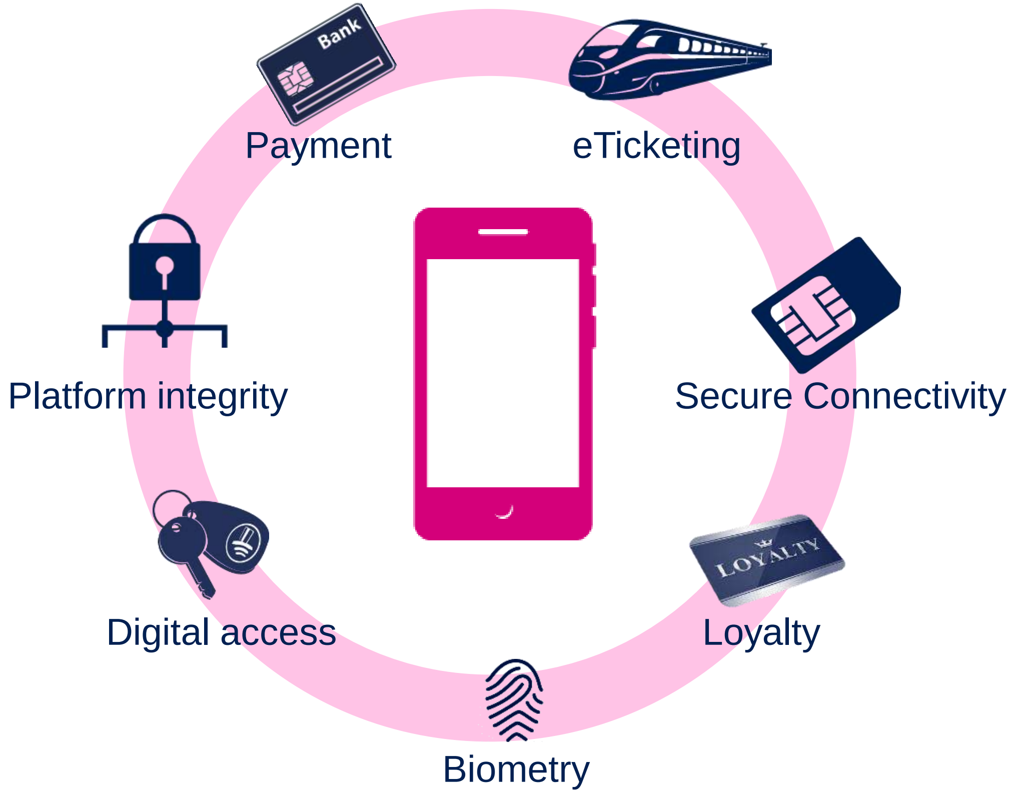
Embedded Secure Element

NFC SIM

NFC Controller

Classic SIM

System-in-Package NFC & eSE



Payment

eTicketing

Platform integrity

Secure Connectivity

Digital access

Loyalty

Biometry

NFC + Secure Element

State-of-the-art secure solution for mobile transactions

Application Processing

Payment
Transportation
Biometric authentication
Embedded SIM
Access Control

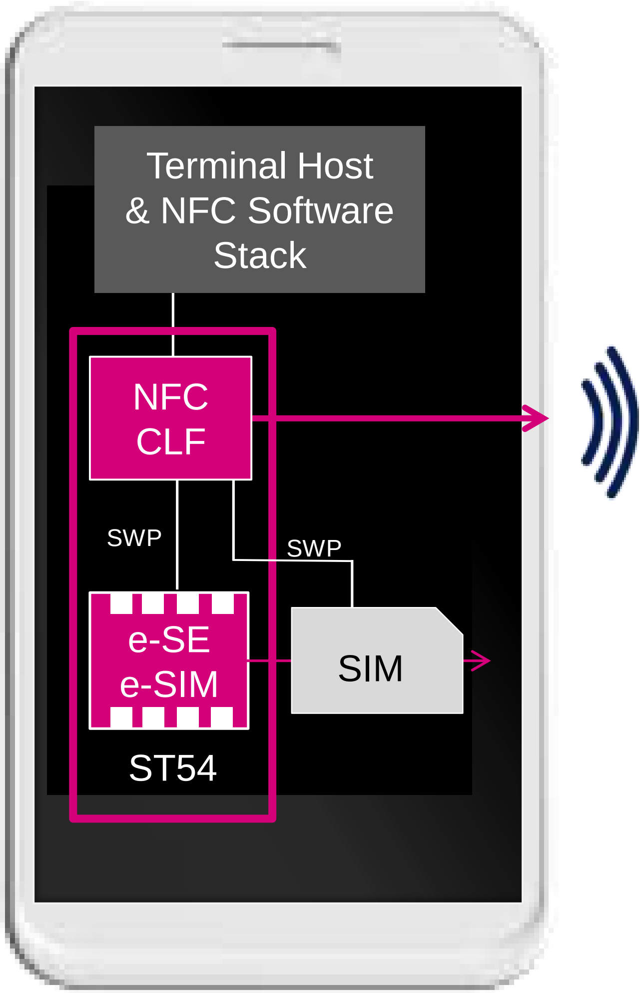
Connectivity

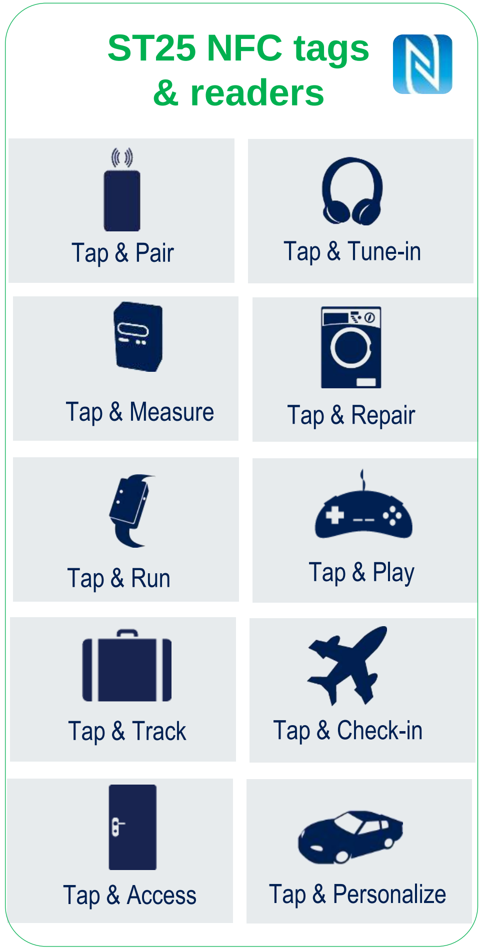
Boosted Near Field Communication Controller

ST54

Security

State-of-the-art Common Criteria and EMVCo certifications





RF EEPROM

STSAFE Secure Element Family

Complete solution for end-to-end secure IoT networks

- Authentication
- Secure communication & Secure data storage
- Platform Integrity
- Secure key provisioning service
- Seamless integration with GP MCU

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Products & Tools
to match IoT market needs

Smart Things

Ultra-low power
Processing power

Smart Home & City

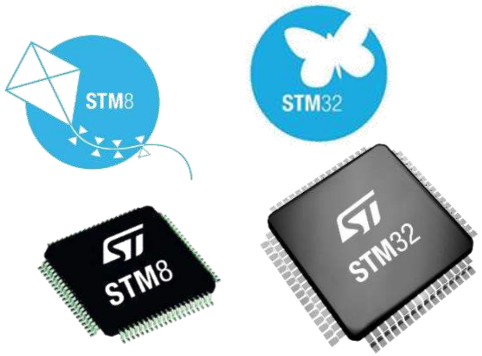
Short-range connectivity
Smart peripherals

Smart Industry

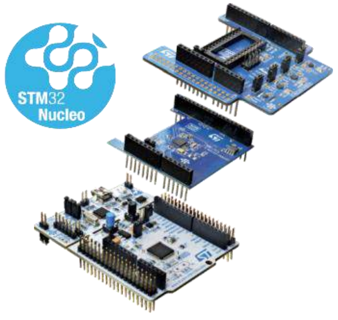
Security features and certification

ST Offer

Broad MCU offer



Accessible ecosystem for application development



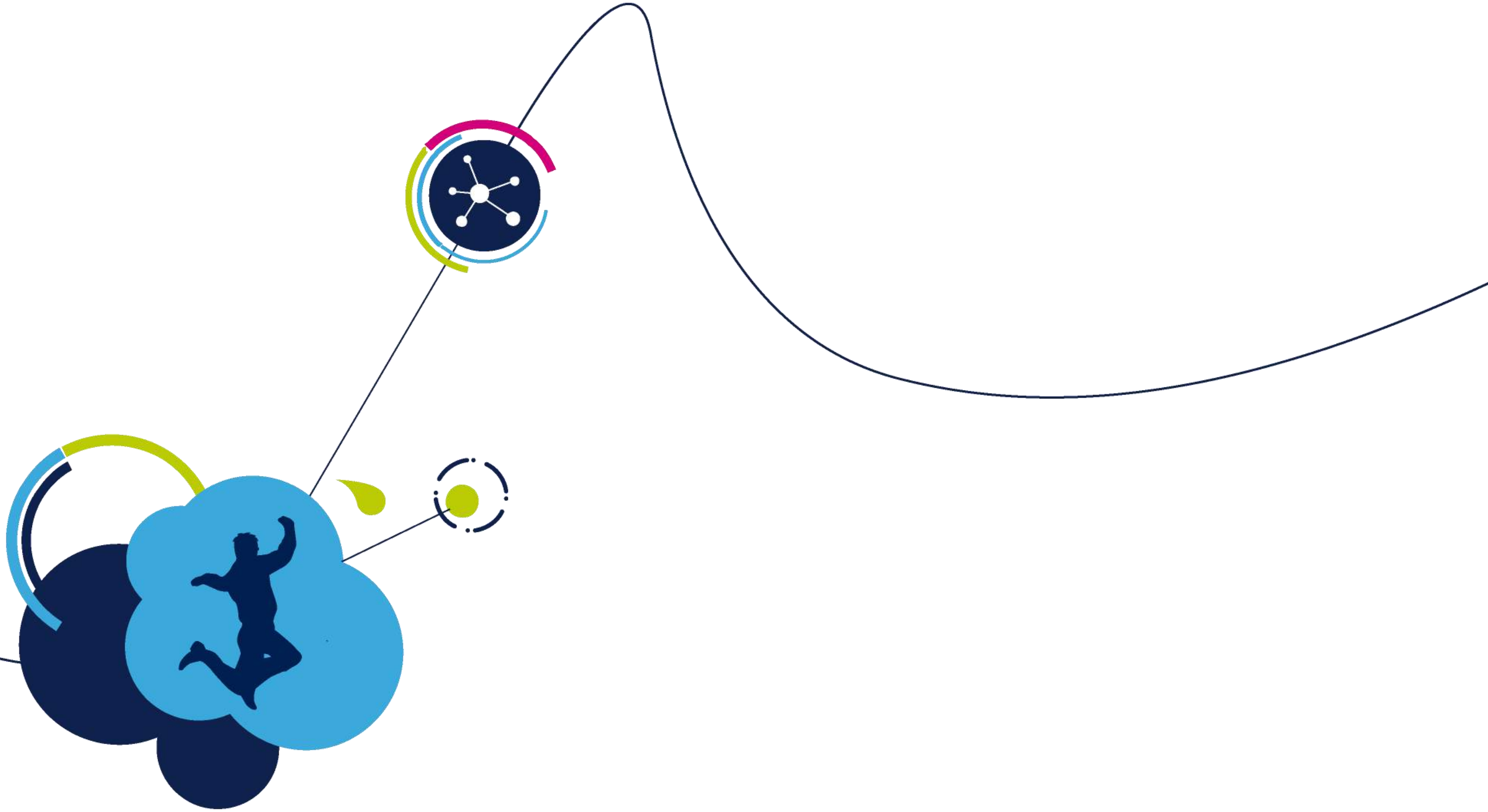
STM32 Nucleo development kits

STM32 Nucleo expansion boards for connectivity, sensing, actuating

Free SW platforms for all OSes

Educational Programs & MOOC

Secure MCU



Digital & Mixed ASIC’s

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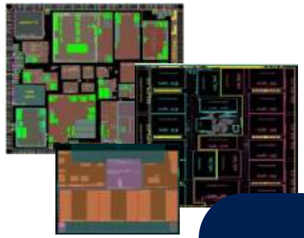
Digital and Mixed Processes ASICs

Market Segments Converging into Multi-Technology Integrated Solutions

Switching / Routing

Networking

IoT



Digital ASICs

Digital ASICs &
Mixed Technology ASIC
for Networking

RF Infrastructure

Optical Interconnect

Integrated
Networking
Solutions

4G/5G Base Stations

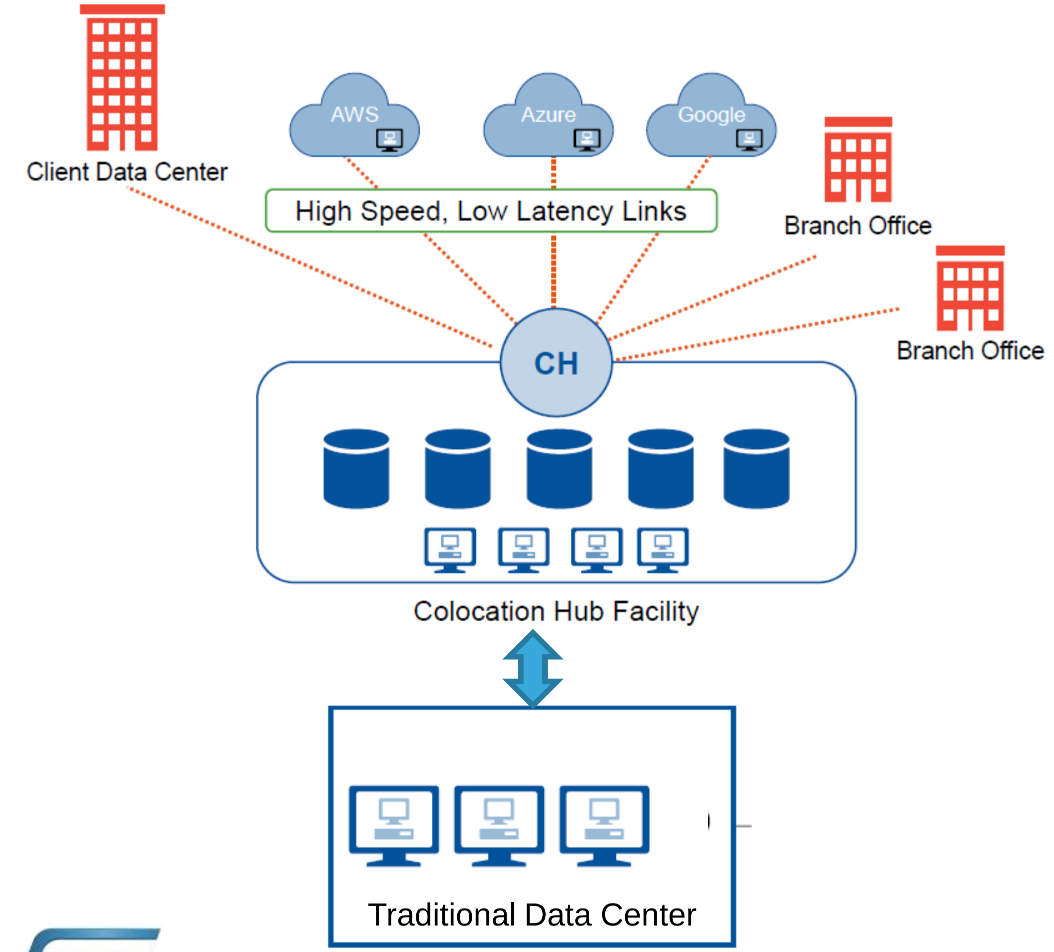
Telecom

Data Centers

Datacom

Networking Market Reshaping

Enterprises transition to Cloud Services → Most data traffic travels **within** the Data Centers



Traffic within Data Centers: 73.1%

Storage, production and development data, authentication

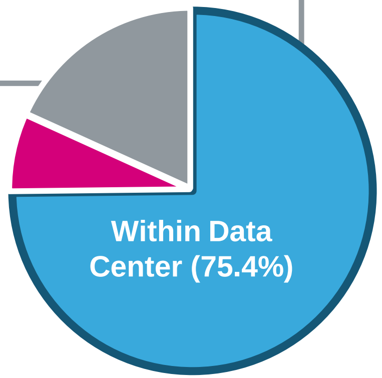
Traffic from Data Center to Data Center: 8.7%

Replication, CDN, inter-cloud links

Traffic fom Data Center to Users: 18.2%

Web, e-mail, VoD, …

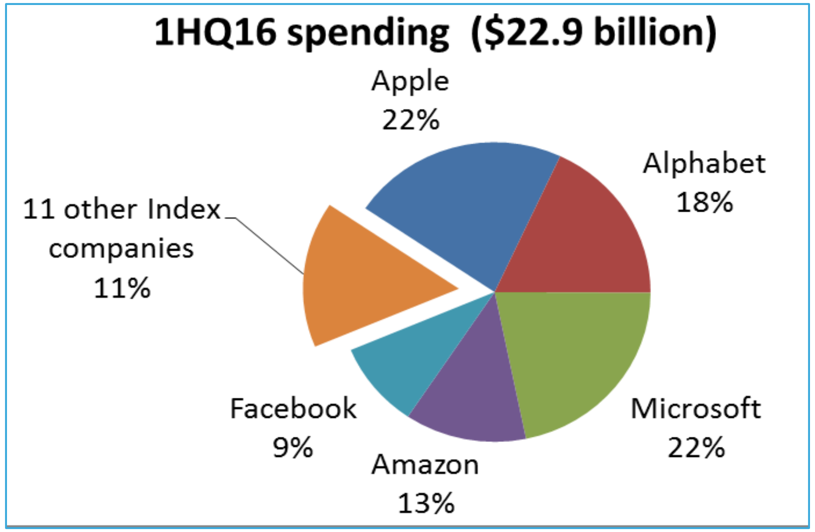
Source: Cisco Global Cloud index, 2014



ASIC in Networking Market

Creation of new infrastructure and increase in Tx-Rx volumes **to give stable growth** in next 5 years

Data Centers top spenders



ASIC design % split by application, evolution

Market	2015	2016	2017	2018	2019	2020
Total data processing	**29.1**	**28.8**	**28.6**	**28.4**	**28.3**	**28.1**
Data processing – storage	8.9	8.5	8.2	7.9	7.7	7.4
Data processing – compute	20.2	20.3	20.4	20.5	20.6	20.7
Total communication	**27.5**	**27.3**	**27.0**	**26.8**	**26.5**	**26.2**
Wired communication	18.7	18.5	18.3	18.1	17.9	17.7
Wireless communication	8.8	8.8	8.7	8.7	8.6	8.5
Consumer	24.1	24.3	24.5	24.7	24.9	25.1
Automotive	5.3	5.4	4.4	4.4	4.3	4.3
Military/Aerospace	4.5	4.5	4.4	4.4	4.3	4.3
Industrial/others	9.5	9.7	10.0	10.1	10.3	10.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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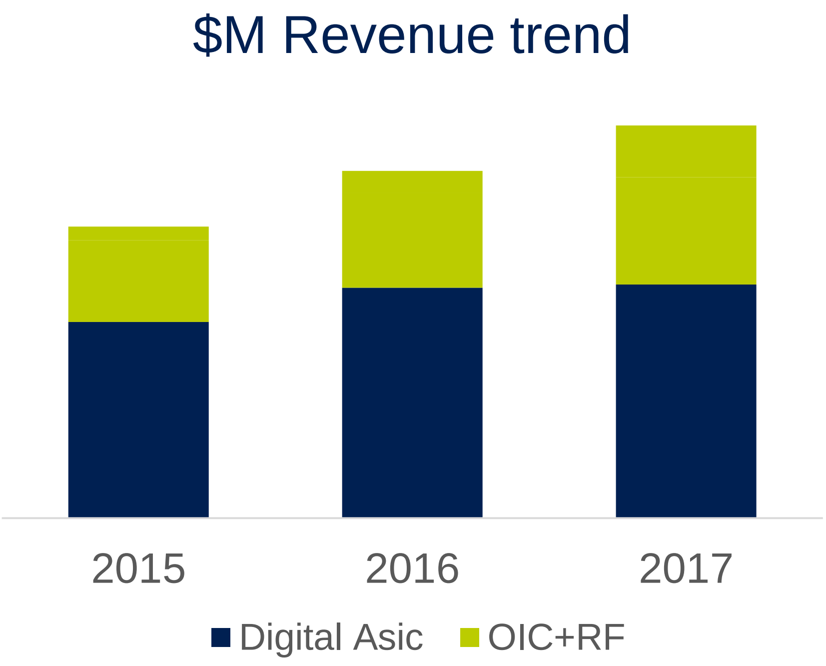
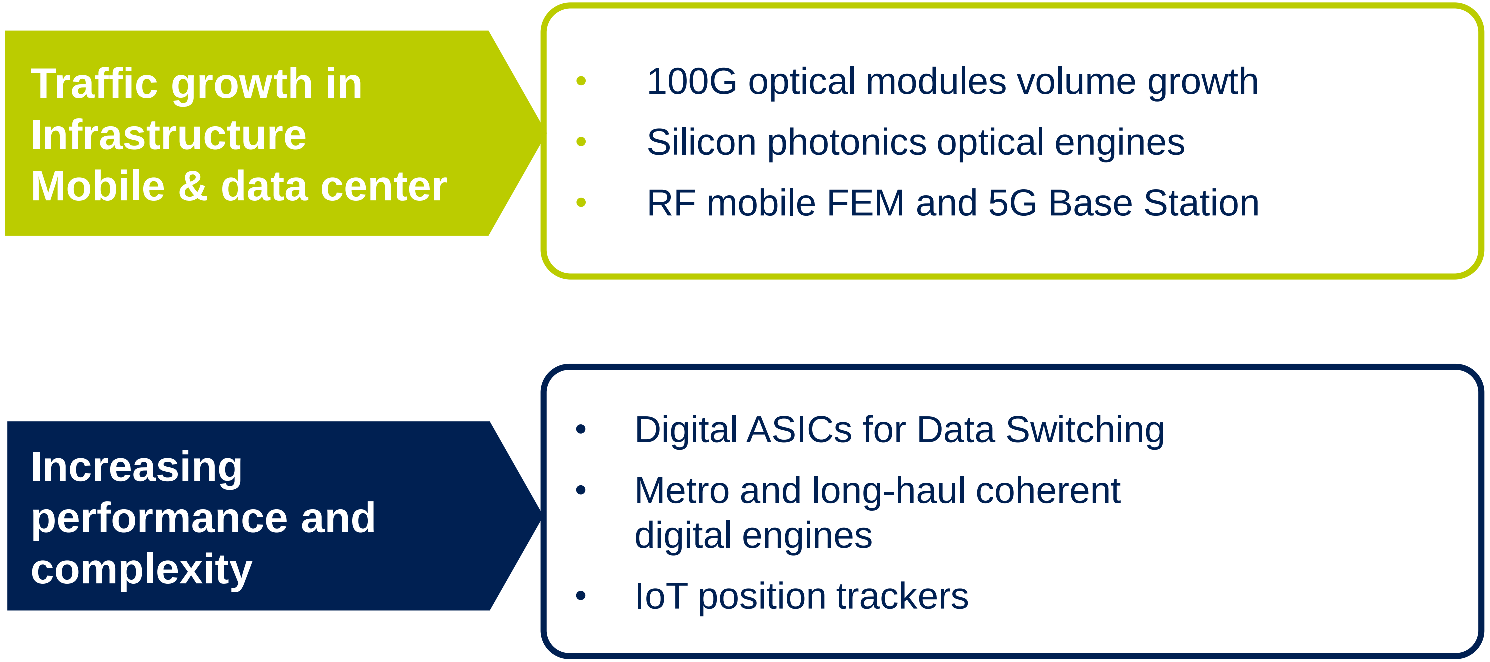
Revenue Growth Drivers

Solid revenue growth with increasing profitability





Traffic growth in Infrastructure Mobile & data center

- 100G optical modules volume growth
- Silicon photonics optical engines
- RF mobile FEM and 5G Base Station

Increasing performance and complexity

- Digital ASICs for Data Switching
- Metro and long-haul coherent digital engines
- IoT position trackers

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Technologies

Added Value Solution thanks to **Complete Range** of Silicon Solutions

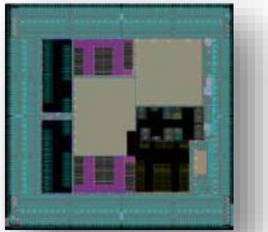
Foundry

	BiCMOS7/9	BiCMOS55	PIC25	28 FD-SOI	FinFET
Optical Interconnect	ASIC/COT	ASSP ASIC/COT	ASSP TurnKey		
RF Infrastructure	ASSP ASIC/COT	ASSP ASIC/COT			
Digital ASICs				ASIC	New ASIC platform

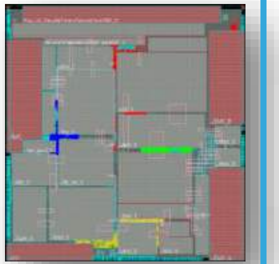
Digital ASICs Complexity

Same Die Size (200/4000mm2), Same Package, Higher Speed (Serial links)

Gates	up to 33M
Memories	up to 44M
Frequency	up to 450M
HS Links	up to 6G

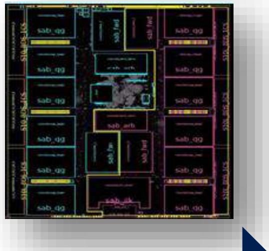


27Mgates/16Mbits
298 mm²
201 HSLinks

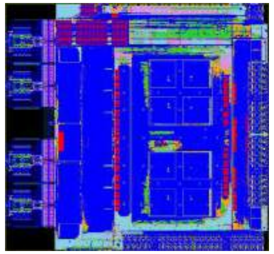


33Mgates/41Mbits
345 mm²
119 HSLinks

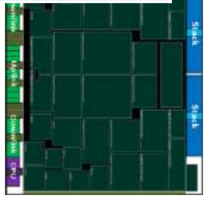
31Mgates/41Mbits
288 mm²
52 HSLinks
36Mbits eDRAM



Gates	up to 140M
Memories	up to 130M
Frequency	up to 765M
HS Links	up to 10G

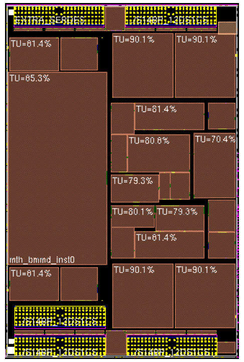


140Mgates/30Mbits
322 mm²
46 HSLinks

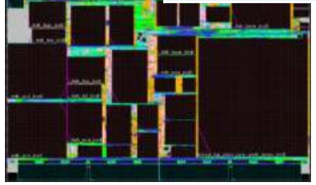


44Mgates/360Mbits
295 mm²
52 HSLinks

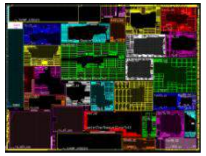
90Mgates/400Mbits
356 mm²
61 HSLinks



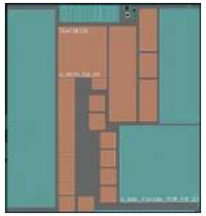
Gates	up to 325M
Memories	up to 150M
Frequency	up to 780M
HS Links	up to 28G



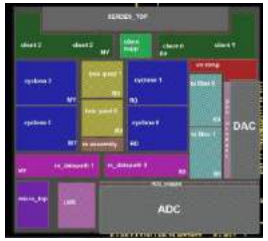
80Mgates/580Mbits
480 mm²
121 HSLinks



40Mgates/150Mbits
162 mm²
25 HSLinks



80Mgates/36Mbits
156 mm²
8 HSLinks



325Mgates/10Mbits
303 mm²
24 HSLinks

65nm

2008 **2009** **2010**

32nm

2011 **2012** **2013**

28nm

2014 **2015** **2016**

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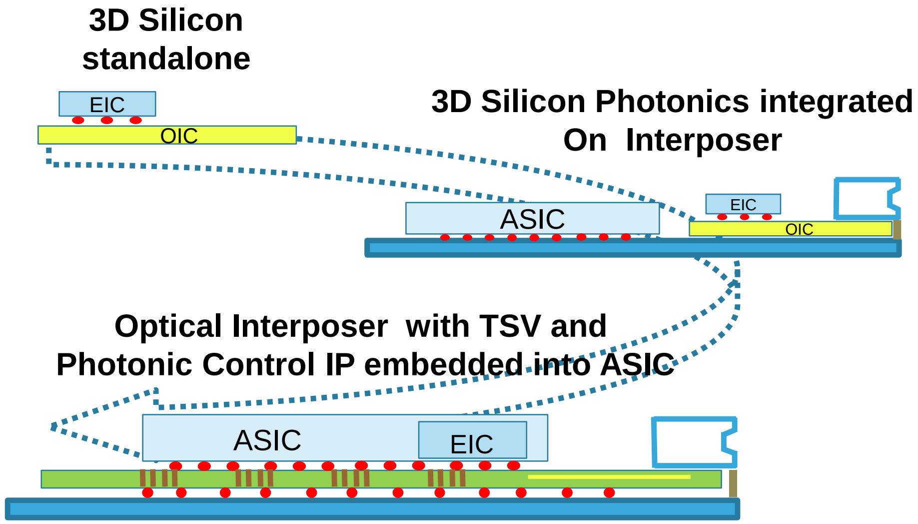
Pervasion of Optics

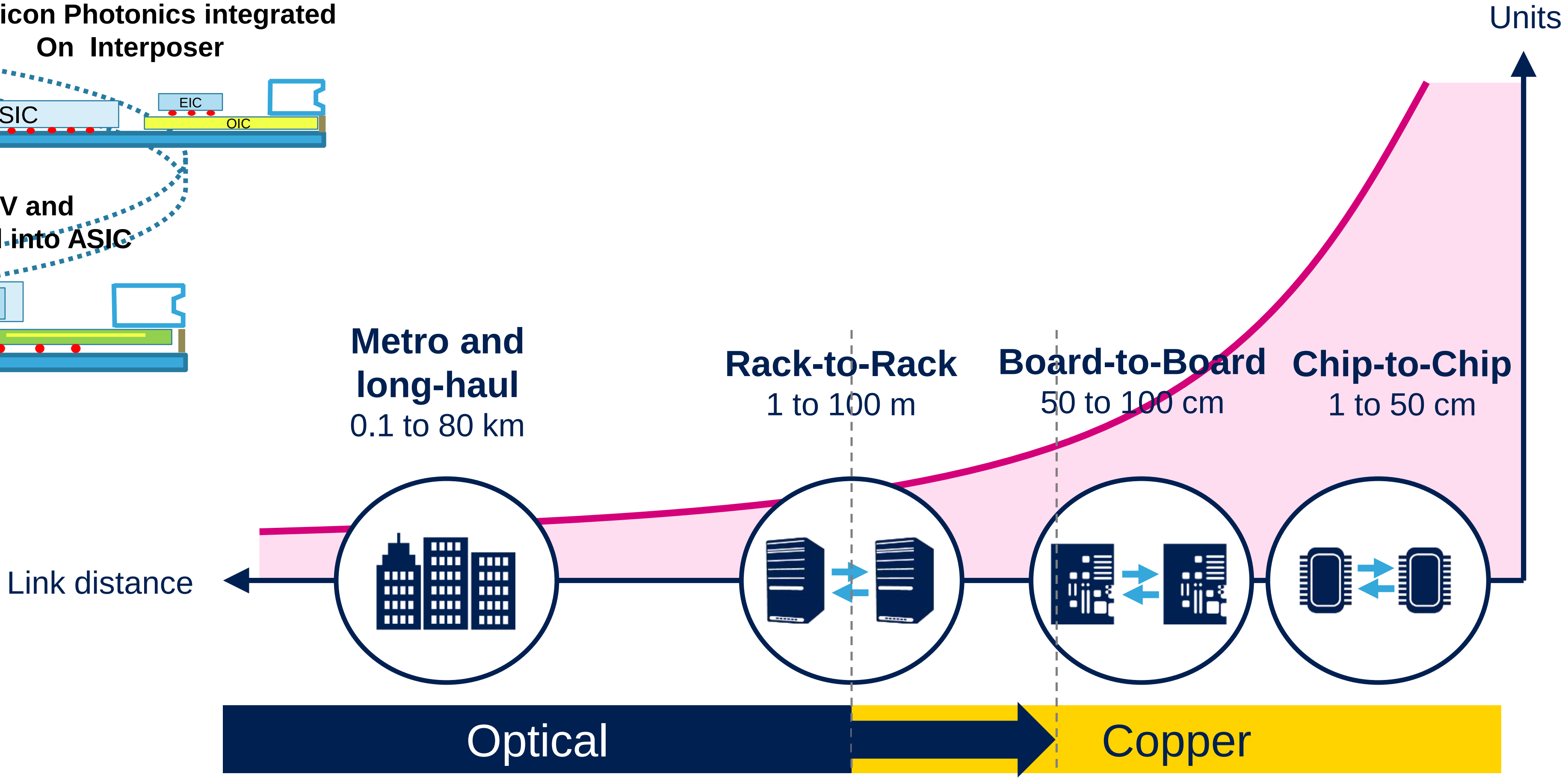
Driving High Speed Links from Long Haul to Switching-Board Integration and to Chip-to-Chip



3D Silicon standalone

3D Silicon Photonics integrated On Interposer

Optical Interposer with TSV and Photonic Control IP embedded into ASIC



Metro and long-haul
0.1 to 80 km

Rack-to-Rack
1 to 100 m

Board-to-Board
50 to 100 cm

Chip-to-Chip
1 to 50 cm

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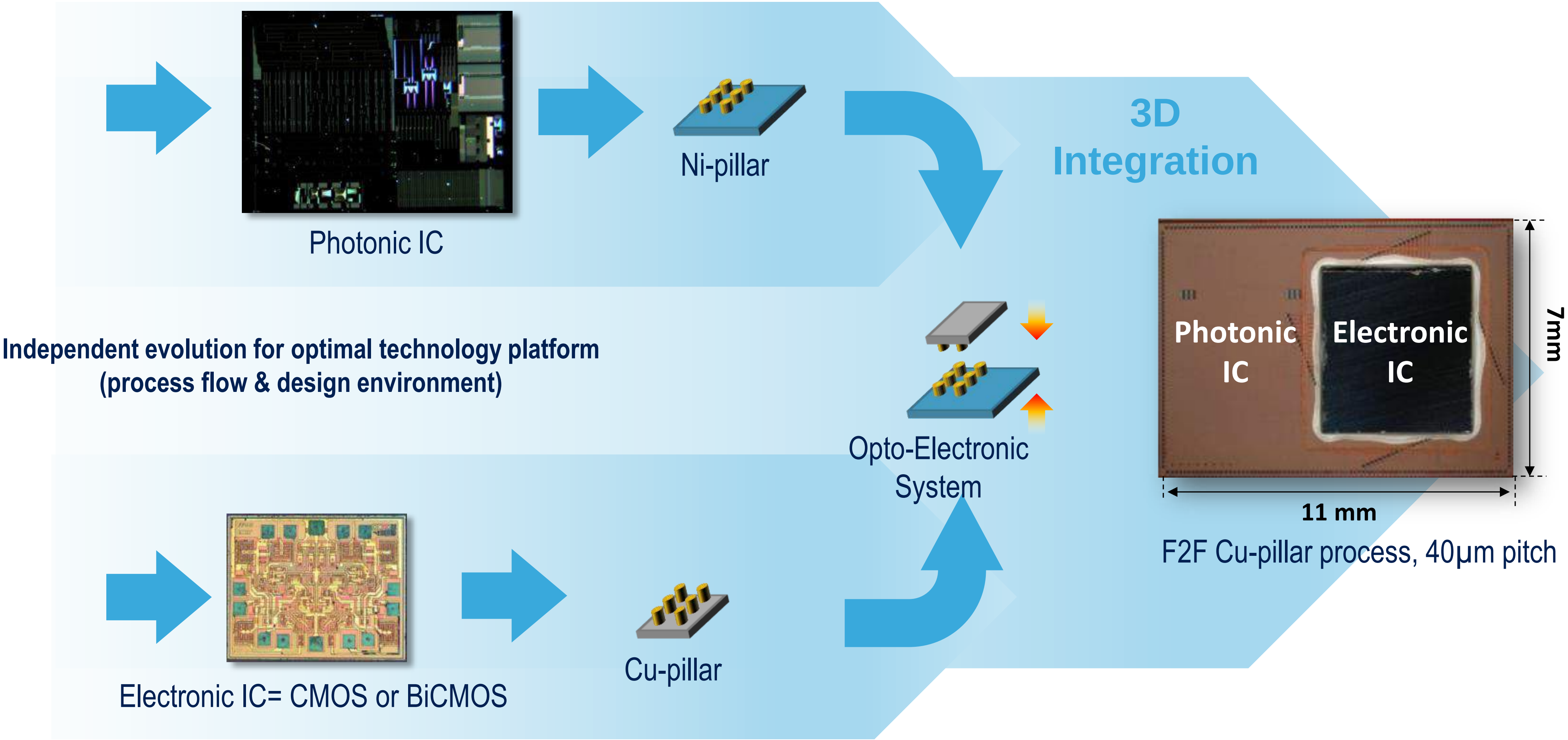
Opto Electronics Integration Strategy

Opto-Electronic System = Photonic IC + Electronic IC



Photonic IC

Ni-pillar

Independent evolution for optimal technology platform
(process flow & design environment)

Electronic IC= CMOS or BiCMOS

Cu-pillar

Opto-Electronic System

3D Integration

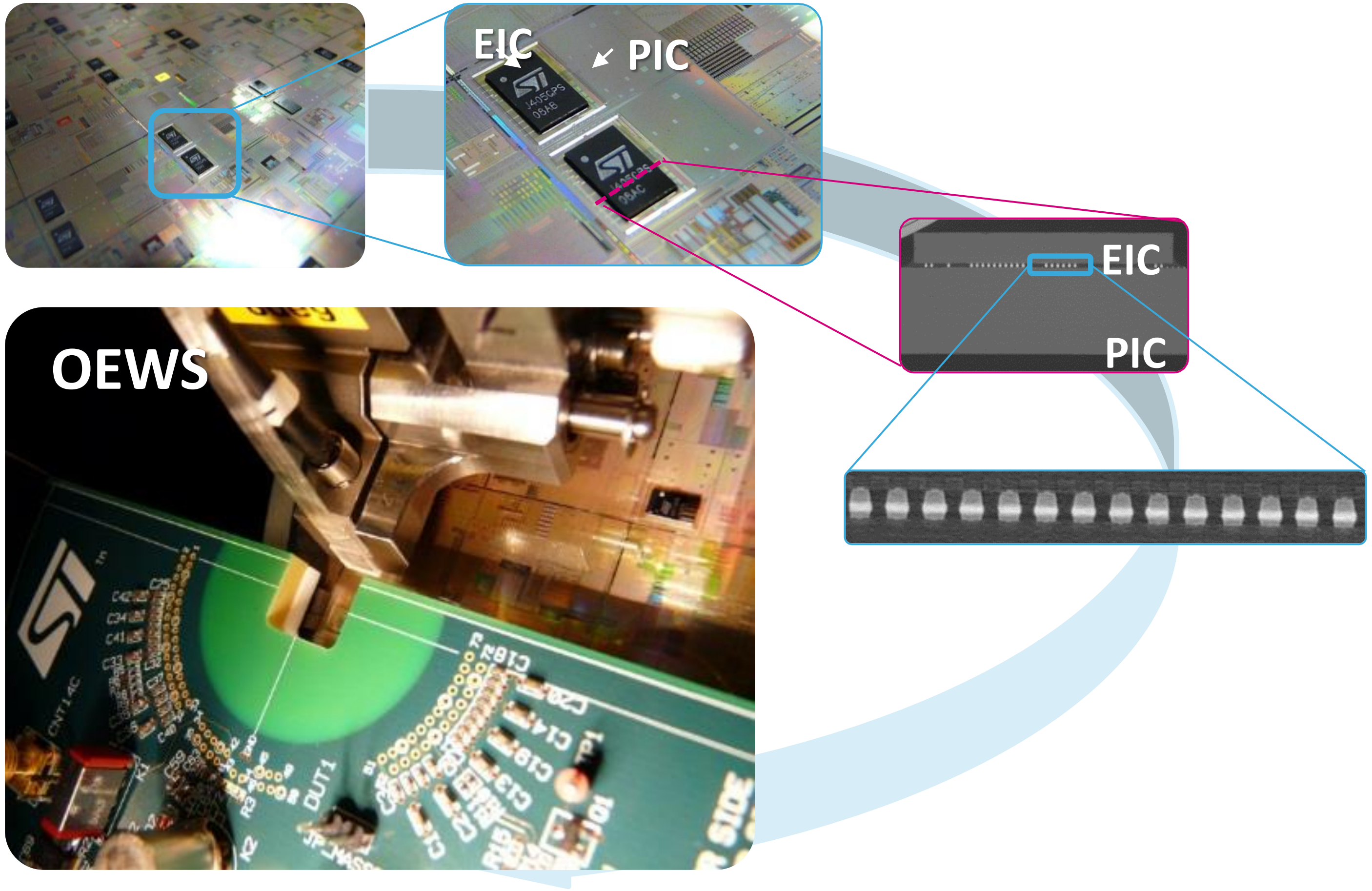
F2F Cu-pillar process, 40µm pitch

Opto-Electronic Testing Strategy

Photonics technology becoming mass production oriented

Optical Test
Optical fiber array head connected to laser instruments
Tunable CW laser source(s), driven by ATE test program
Power meters, triggered by ATE test program during test execution
Dynamic die alignment (x-y-z) through optical loop and proximity sensor
Optical tests integrated in the test program (EO std datalog output)

Electric Test
Cantilever “Half-Moon” probecard
Standard DC + Digital testing capability, without limitations vs EWS
Std probing including wafer mapping, load/unload, OCR, networking etc.
Special anti-vibration environment (modified ATE and specific prober solution)



Takeaways

- Positive outlook for General Purpose & Secure MCU, fueled by :
  - STM32 MCU proliferation addressing a very large number of applications,
  - Deployment of STM32 embedding connectivity and security features on high performance and ultra-low power platforms
  - Strong activity to enlarge development ecosystems to reinforce mass market adoption
  - Top-class NFC offer for mobile and IoT security thanks to very high performing ST21 NFC controller, ST33 and STSAFE secure element.
- Digital
  - ASIC & RF growth driven by increased spend in data center and mobile Infrastructure
  - Optical interconnect offer well positioned to grab opportunity of the extension of optical link from long haul to shorter link with larger TAM

Analog and MEMS Group (AMG)

Benedetto Vigna
EVP, General Manager, Analog and MEMS Group

Matteo Lo-Presti
General Manager, Analog Sub-Group, AMG

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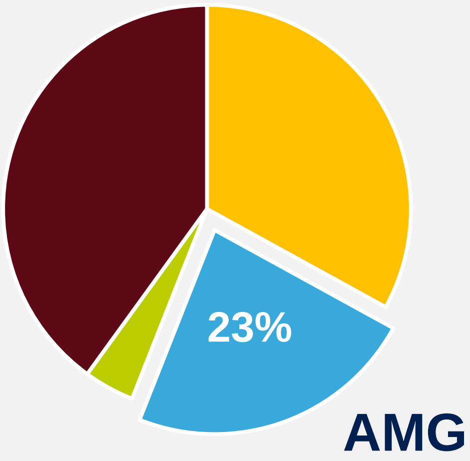
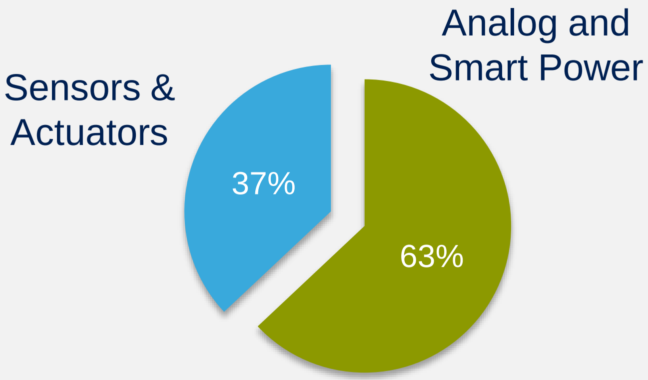
Analog and MEMS Group (AMG)

Contribution to ST revenues 2016





Portfolio

Sensors and Actuators

- Motion Sensors
- Environmental Sensors
- Microphones
- Actuators
- Sensor Hub & Sensor Fusion

Analog and Smart Power

Industrial

- Motion Control ICs
- Industrial Analog ASSP
- Energy Management ICs
- Digital Power Conversion ICs
- AC-DC Power Supply
- Lighting ICs

Custom Analog

- PMIC for Data Storage & Server
- Portable Power management

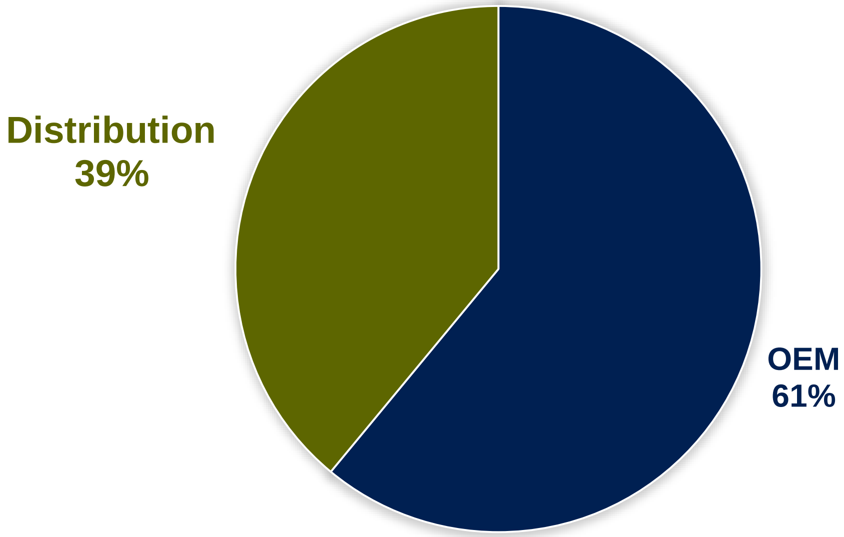
General Purpose Analog

- Analog Front-End
- RF ICs

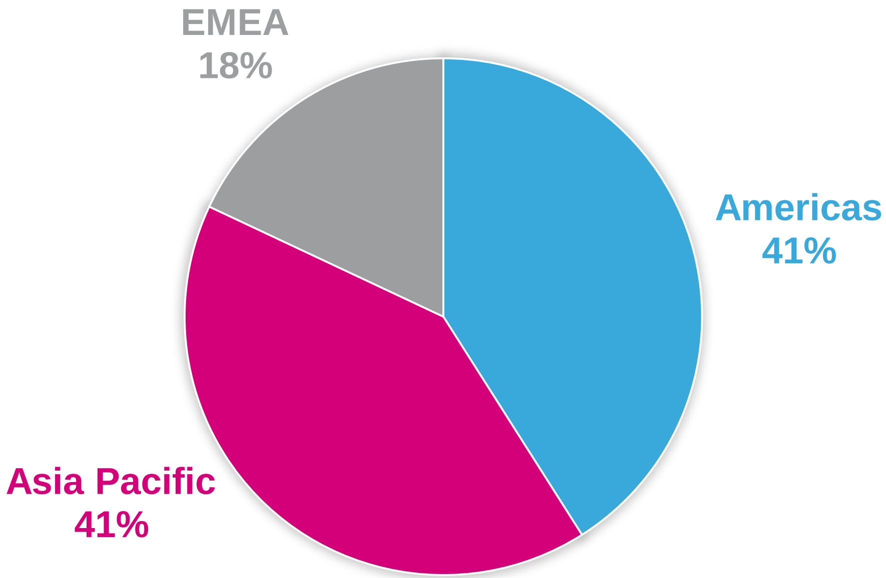
A Broad and Diversified Customer Base

Well balanced across customer types and markets

2016 Revenue by customer type



2016 Revenue by region of origin



23% of ST Revenues in 2016

- More than 5,200 available products
- Serving more than 64,000 customers

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Source: ST

AMG at a Glance

Leadership Areas

 # 1 in Analog ASIC

 # 1 Power Management IC for Data Storage

 # 1 in Power Line Modem for Smart Metering

 # 1 in AMOLED Display Power Supply

 # 1 in MEMS Sensors for Consumer and Mobile

 # 2 in MEMS Micro-Actuators

 # 2 in LED Driver ICs

Innovation driven

- **More than a quarter** of sales with products < 2 years old
- **116** new patents filed in 2016
- **290** patents granted in 2016
- **> 124** new silicon lines introduced in 2016

Broad product portfolio

- High-End Analog
- Efficient power management solutions for IoT
- Reliable and low power wired and wireless connectivity
- Ultra low power and high accuracy sensors

Established worldwide ecosystem for mass market

- Strong system **know-how** to support a global **customer base**
- **> 400** evaluation boards and associated development tools
- **> 15,000** software downloads in the last 6 months

Source: WSTS, IHS-Markit, ST

May 2016: What we said

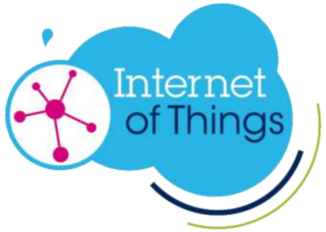
AMG Turnaround Strategy

Key Objective

Revenue growth and mid to high single digit operating margin in mid term

Actions

- **MEMS sensors and micro actuators – Maintain volumes while diversifying**
  - Maintain volumes on consumer MEMS (motion, microphones and environmental)
  - Expand in Automotive (motion and microphones) and industrial MEMS (motion and environmental)
  - Grow in Piezo micro-actuators
- **General purpose Analog – Grow market share**
  - Additional Sales & Marketing initiatives with aggressive goals targeting the mass market
  - New dedicated organization to increase focus
- **Dedicated Analog products - focus on Smart Meter solutions, Power Management ICs and AMOLED**



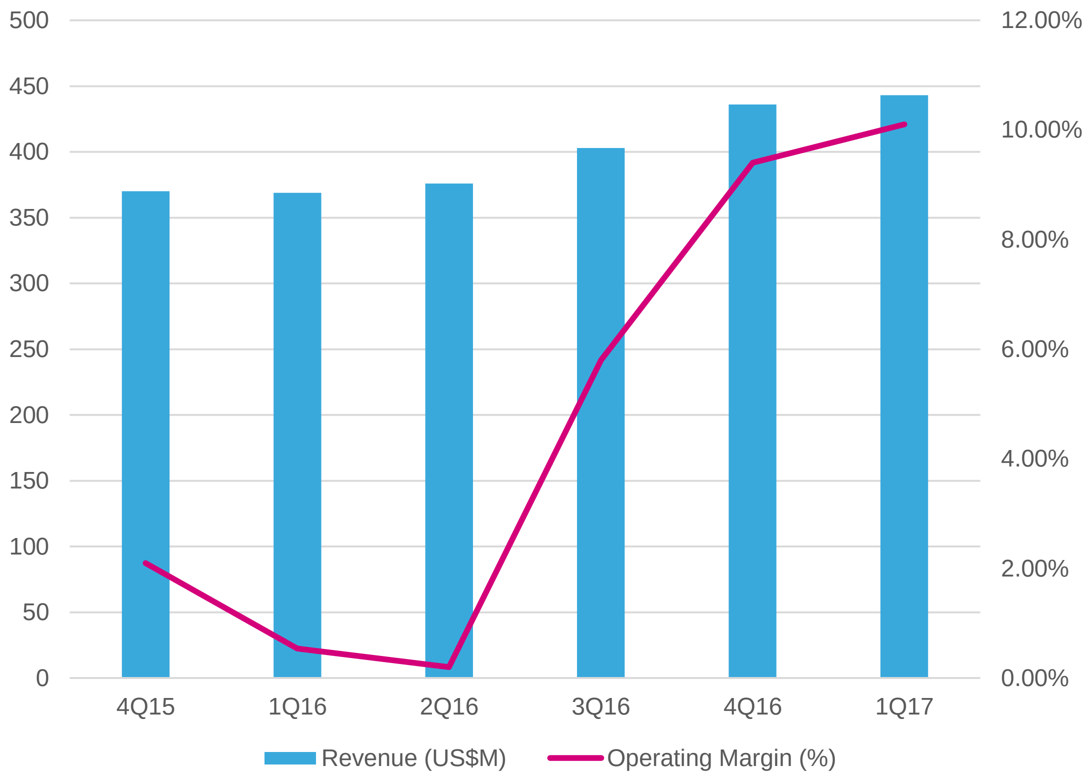
Smart Industry	Smart City
Smart Home	Smart Things

May 2017: What we Did

AMG Dynamics in 2016

Major Achievements 2016

- ✓ Reshaped motion MEMS product portfolio
- ✓ Continued traction in piezo micro-actuators
- ✓ Strong growth and key design wins in industrial & automotive
- ✓ Volume sales for low-power RF connectivity in IoT
- ✓ Customer base diversification
- ✓ Gained market share in General Purpose Analog
- ✓ Gained market share in PMIC for data storage (>70%)
- ✓ Volume ramp up in Power Line Modem for Smart Meters
- ✓ Major design wins in AMOLED, Power Management ICs & Sensors for Smart Phones



AMG in Q1 17

Revenues = $443M   Operating Margin = 10.1%

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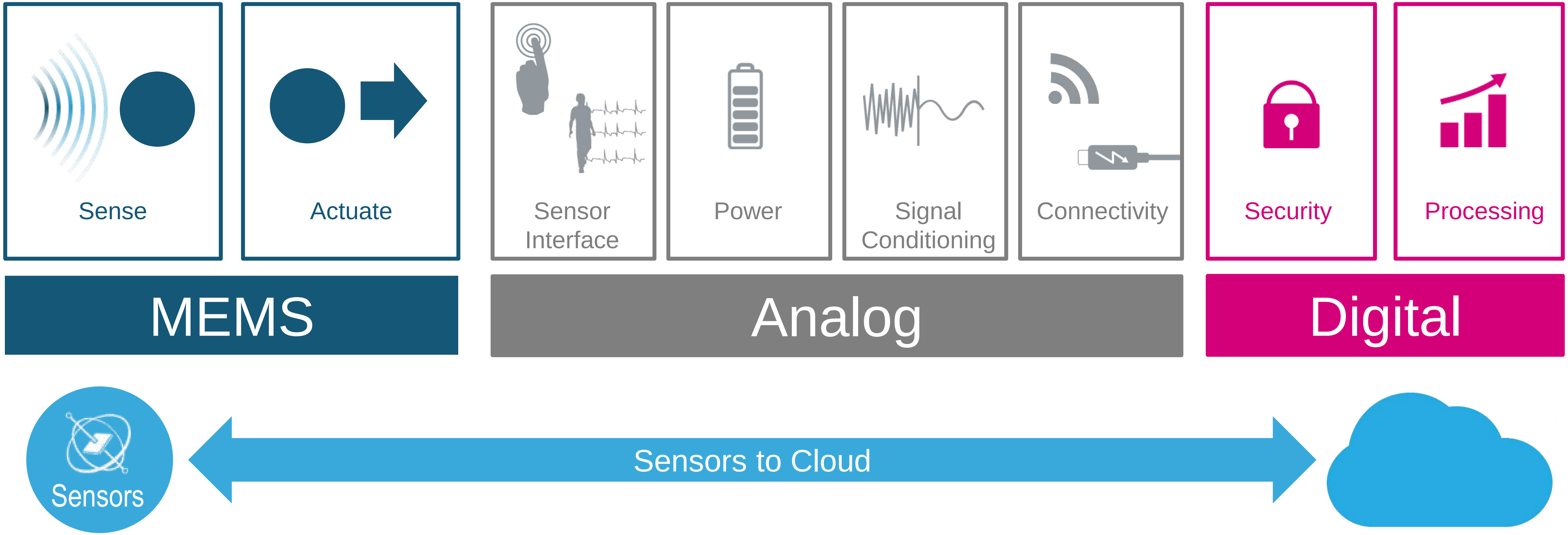
MEMS and Analog Empower the IoT



Sense

Actuate

Sensor Interface

Power

Signal Conditioning

Connectivity

Security

Processing

MEMS

Analog

Digital

Sensors

Sensors to Cloud

Today only a tiny portion of the sensory data that would be useful is captured, stored and analyzed

…and even smaller part of that is used to carry out actions through actuators

Application Strategic Focus

IoT applications are changing the way we work and live by saving time and resources, and opening new opportunities for growth, innovation and knowledge creation

Smart Industry

Smart Home & City

Smart Things

Smart Industry

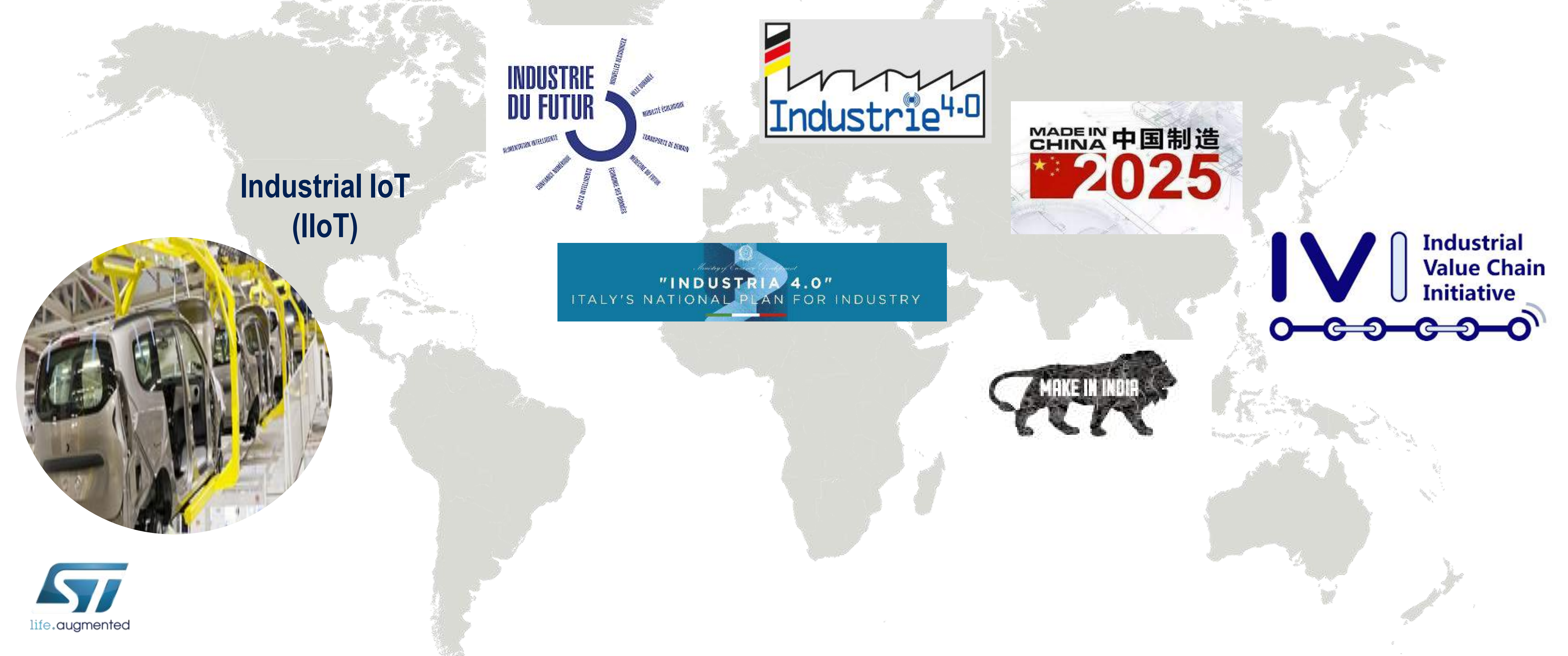
Enabling smarter, safer and more efficient factories and workplaces

Smart Industry

- Factories that produce in a more efficient manner
- More flexibility and customization possibilities in the supply chain
- More sustainable production with less waste and less energy used
- Safer working environments for people
- Better man-machine cooperation in the work place
- Optimized usage of machines and tools

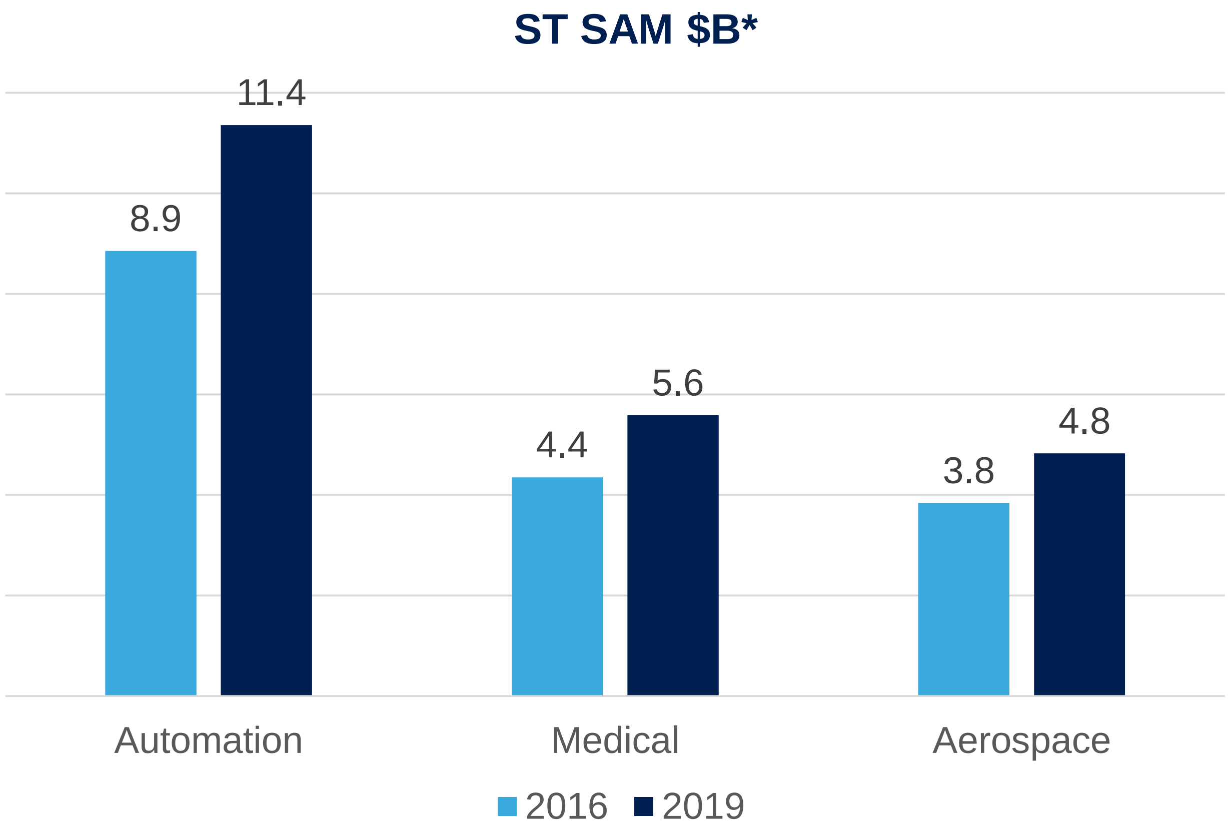
Smart Industry Worldwide

A worldwide wave of innovation boosting market growth



Industrial IoT (IIoT)

Smart Industry



1 out of 2
Programmable logic controllers use ST smart power devices

> 1 Billion
I/O channels in factories with ST drivers and protections

1 out of 3
Motion control solutions use ST power management devices

4 out of 5
Motion control solutions are protected by ST

> 500 Million
Low voltage motors driven by ST smart power solutions

+50%
YoY shipment growth of MEMS for industrial

*Source: IHS-Markit

Smart Industry

Analog & Sensors for Smart Industry

Power Conversion

Sensors & Actuators

Motor Control & Actuation

Connectivity & Communication

Analog & Signal Conditioning

Motor Control & Actuation

Motor Drivers	Motor drivers SiP with MCU	Galvanic isolated ICs	Safety integrity level ICs
Gate drivers	High density power drivers	ASICs with embedded diagnostics	Intelligent Power switches

- A **broad portfolio** covering an extensive range of voltage and current ratings
- All the functions needed to drive motors **efficiently** and with the highest **accuracy**
- Robustness and reliability thanks **embedded intelligence** and **diagnostics**
- **On-chip galvanic isolation** and **safety-integrity-level** requirements to meet the most stringent industrial regulations

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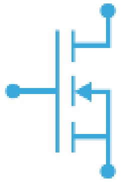
STSPIN32 Family

From analog to digital motor control

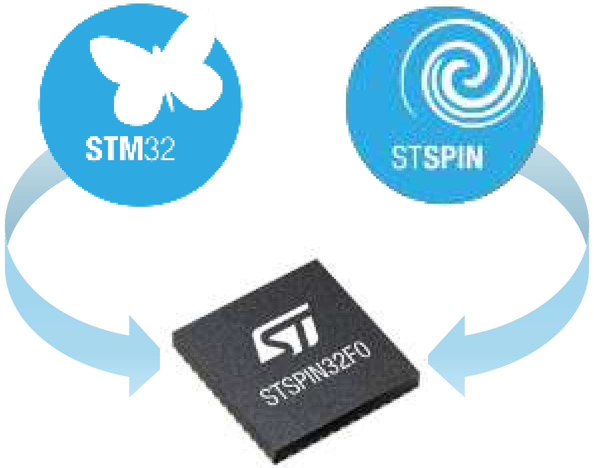


Power Transistors

Motor Control

Microcontroller

Power and Simplicity in Intelligent Motion-Control Device for Smart Industry and High-End Consumer Electronics



- Highly integrated system-in-package 7mm x 7mm
- Powerful ST ecosystem comprising tools and software including motor-control algorithms

Driving mechatronic evolution

Smart Home & City

Making Home & Cities Smarter

Smart City

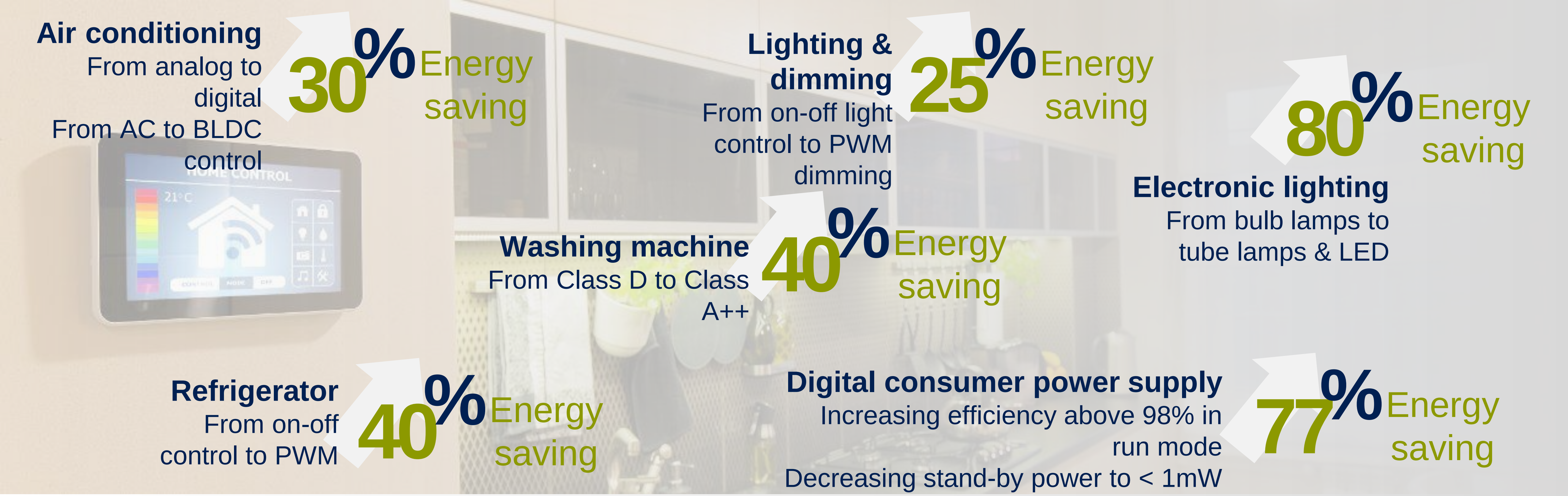
- Smart city infrastructure to improve traffic and municipal services
- Smart Grid
- Intelligent, adaptive street lighting
- Smart buildings
- Smart Driving

Smart Home

- Smart control of heating, air conditioning, appliances, locks and alarms
- Smart meters to connect homes to the smart grid
- More energy efficiency, convenience, comfort and security

Smart Home & City

An innovation trend driven by energy saving, connectivity and remote control - boosting market growth



Air conditioning
From analog to digital
From AC to BLDC control

30% Energy saving

Lighting & dimming
From on-off light control to PWM dimming

25% Energy saving

80% Energy saving

Electronic lighting
From bulb lamps to tube lamps & LED

Washing machine
From Class D to Class A++

40% Energy saving

Refrigerator
From on-off control to PWM

40% Energy saving

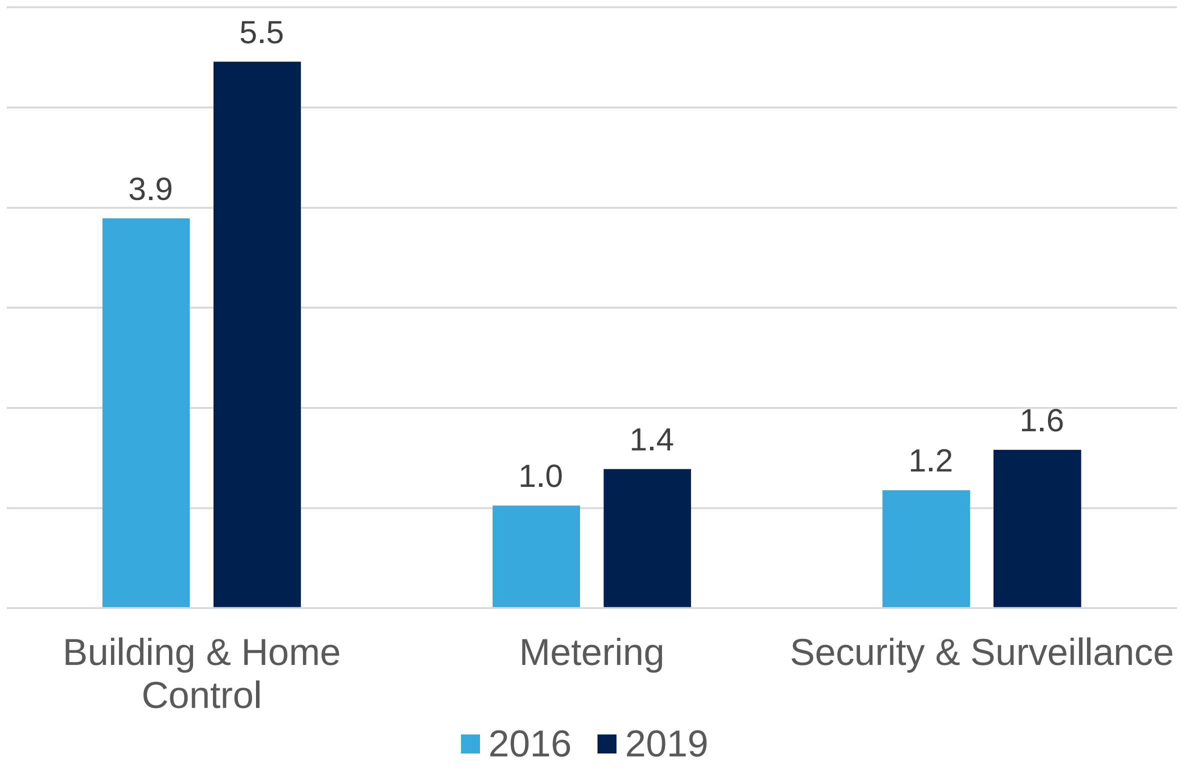
Digital consumer power supply
Increasing efficiency above 98% in run mode
Decreasing stand-by power to < 1mW

77% Energy saving

Semiconductors are key to reducing power consumption
with an estimated impact of up to 27% average energy savings from now to 2030

Smart Home & City

ST SAM $B*



>65 Million
Smart meters are equipped with ST powerline connectivity solutions

> 120 Million
LED lighting solutions shipped

200 Million
home appliances motors driven by ST smart drives

> 90%
of major home appliance makers use ST power conversion ICs

2.5 Billion
power factor correctors (PFC) shipped

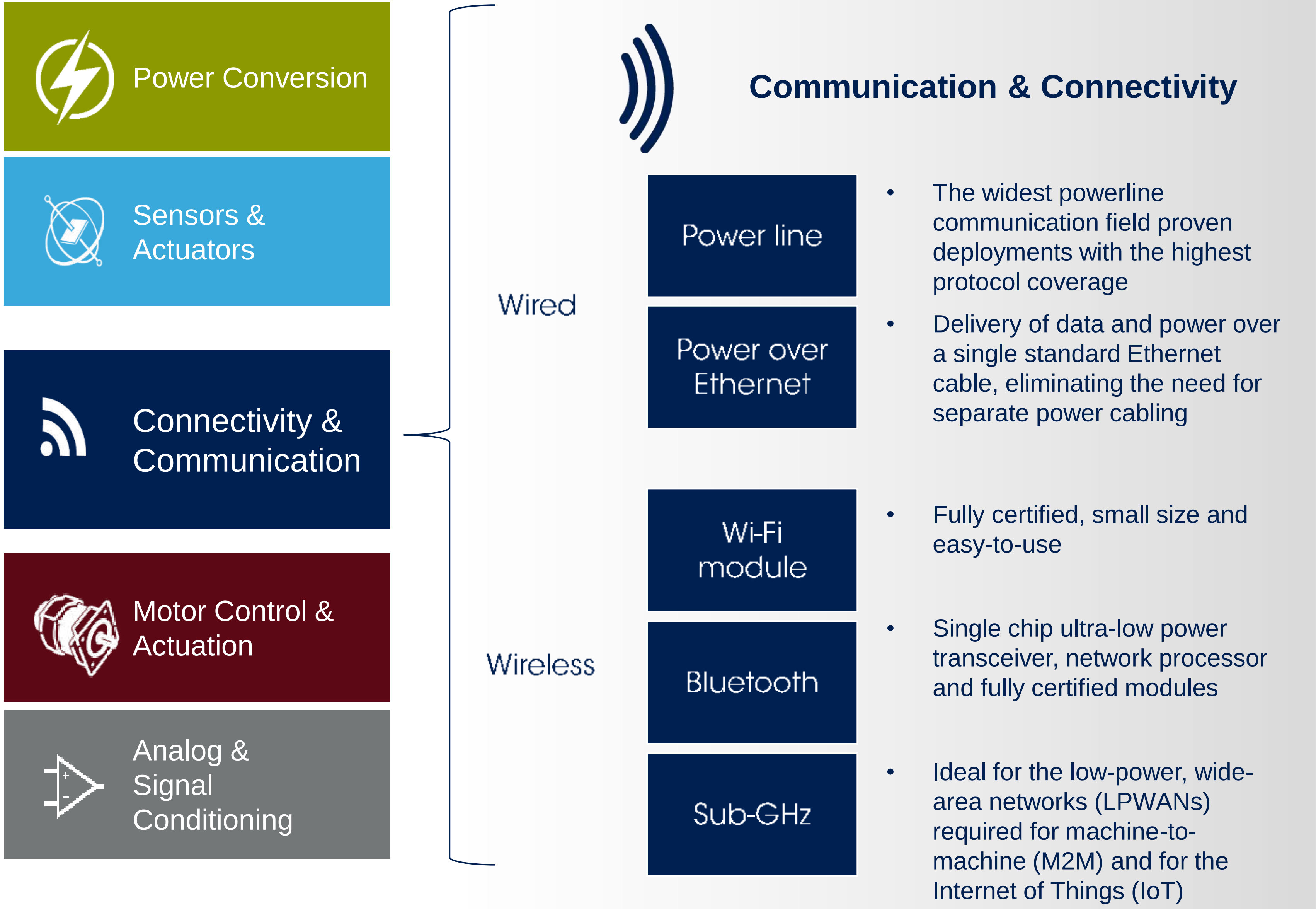
2.9 Billion
ST power supply controllers equipping Smart Homes & Cities

1 out of 3
automotive non-safety applications use ST motion MEMS

*Source: IHS-Markit

Smart Home & City

Analog & Sensors for Smart Home & City



- Power Conversion
- Sensors & Actuators
- Connectivity & Communication
- Motor Control & Actuation
- Analog & Signal Conditioning

Communication & Connectivity

Wired	Power line	The widest powerline communication field proven deployments with the highest protocol coverage
	Power over Ethernet	Delivery of data and power over a single standard Ethernet cable, eliminating the need for separate power cabling
Wireless	Wi-Fi module	Fully certified, small size and easy-to-use
	Bluetooth	Single chip ultra-low power transceiver, network processor and fully certified modules
	Sub-GHz	Ideal for the low-power, wide-area networks (LPWANs) required for machine-to-machine (M2M) and for the Internet of Things (IoT)

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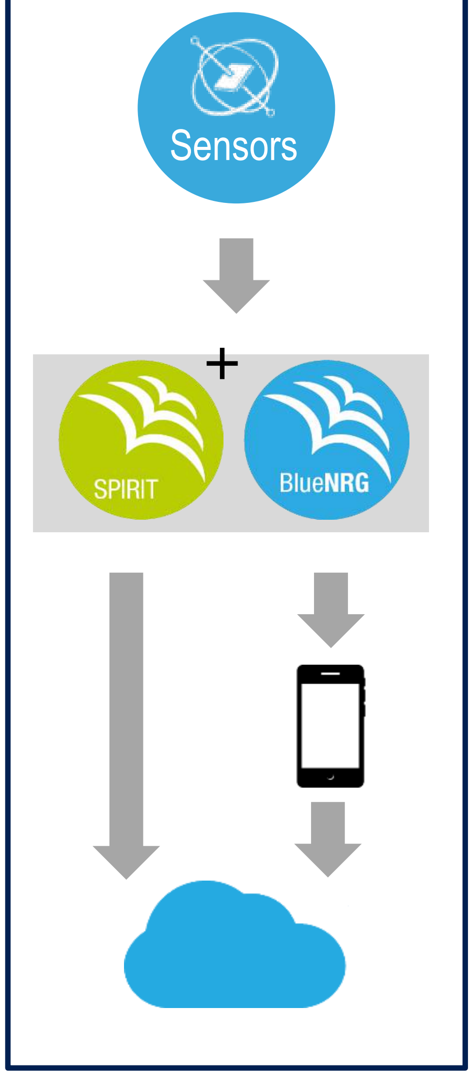
Connectivity for Smart Home & City

Wireless



Bluetooth & Sub-1GHz

BlueNRG Family

Ultra Low Power ARM-Based Bluetooth Processors

SPIRIT Family
Sub-1GHz Radio Transceivers

sigfox M-Bus wireless
6LoWPAN

Wired

Powerline

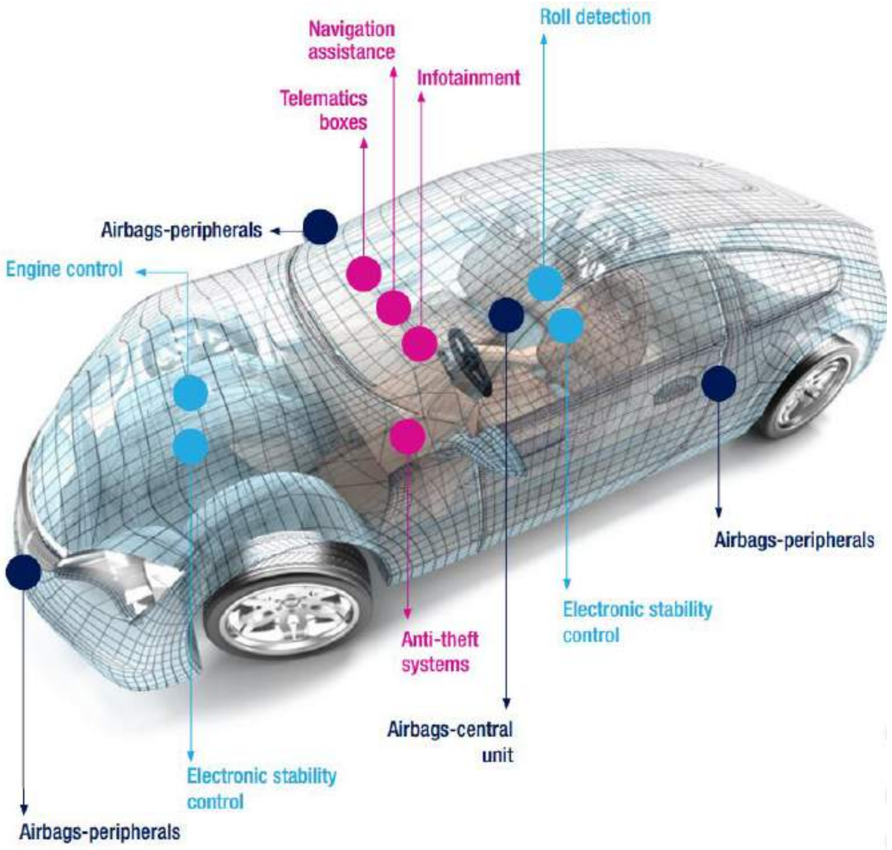
Unique flexible, scalable and future-proof platform enabling smart cities, buildings and homes

Sensors for Smart Driving

Navigation & Telematics

6-axis inertial module
for navigation assistance

Medium-g accelerometer
for telematics boxes



Safety

Hi-g accelerometers
for airbag applications

Gyroscopes
for vehicle dynamics applications

Smart Things

Making Every Thing Smarter

A Smart Thing …

- Understands the environment
- Manages data and transforms it into information
- Connects to the world
- Protects your data
- Is energy efficient

Smart Things

The rise of human-centric innovation

The Internet of Things is making the individual part of a network

Pervading every sector of daily life with intelligent objects that adapt their behavior to our personalities and needs

Bringing together technology, information and infrastructure to create value for society

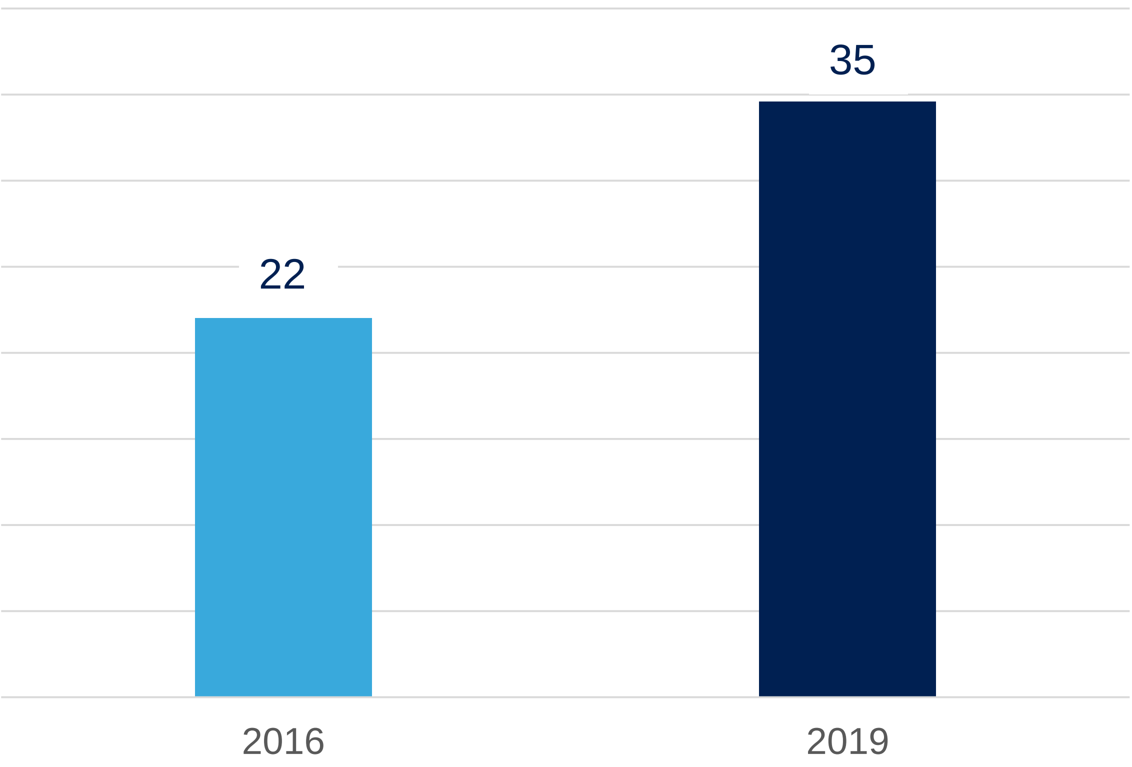
35 Billion
connected devices by 2019

>50
Organizations and alliances working on standards for IoT

< 1 out of 1000
Things that could be connected to the internet, currently are

Smart Things

Billion units installed base
Internet Connected Devices*



>12 Billion
ST MEMS sensors and actuators shipped

> 180 Million
FingerTip Touchscreen Controllers powering Smartphones

> 3 Billion
General Purpose Analog devices shipped in 2016 for IoT

> 650 Million
AMOLED Drivers shipped

*Source: ABI Research, excluding connected cars

Analog & Sensors for Smart Things

- Power Conversion
- Sensors & Actuators
- Connectivity & Communication
- Motor Control & Actuation
- Analog & Signal Conditioning

Sensors & Actuators

Motion MEMS	MEMS Actuators	Environmental Sensors

- Industry Leading range of of MEMS Motion Sensors from 3 to 9-axis solution including OIS
- Portfolio of actuation technologies powering innovative partner solutions
- Best-in-class pressure sensors

Analog

AMOLED Display Power	Touch Screen controller	General Purpose Analog
Wireless Charging	Fast Charging Solutions	Specialized Analog

- Solutions for smartphone touch screen control and power supply
- Charging solutions for wireless charging and fast charging
- Broad range of general purpose and specialized analog solutions

Solutions for every Application

Environmental & Body Monitoring

Activity Tracking

Wireless Charging

Connectivity

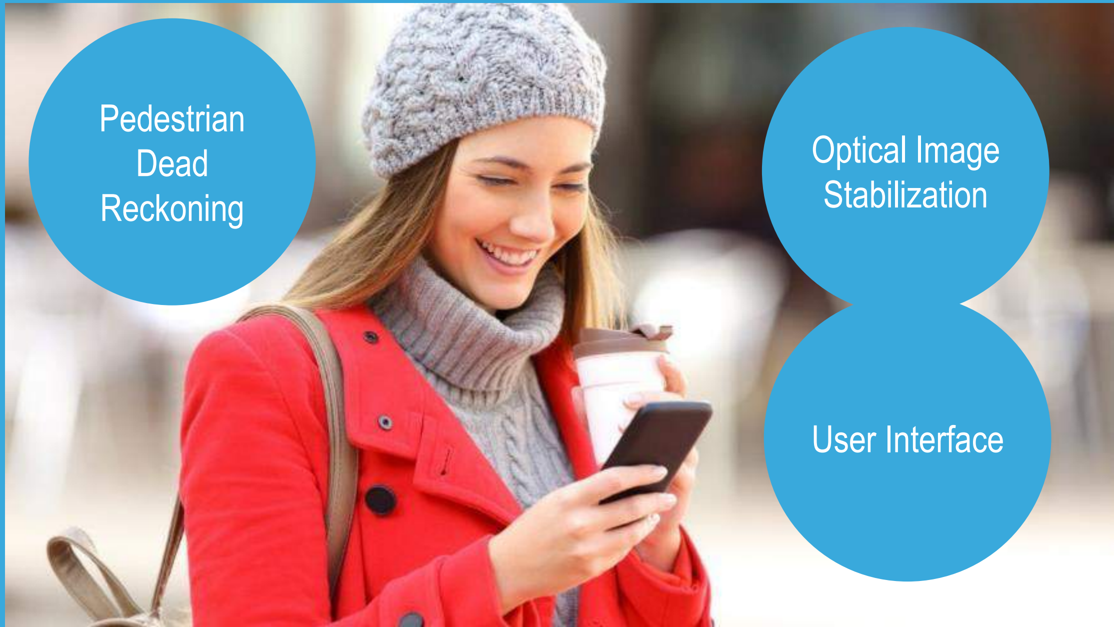
Contextual Awareness

Flight Control

Electronic Speed Control

Motion & Environmental Monitoring

Connectivity



Pedestrian Dead Reckoning

Optical Image Stabilization

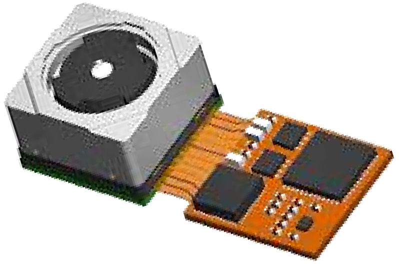
User Interface

Top Selling MEMS Products

OPTICAL IMAGE STABILIZATION GYROSCOPE

L2G2IS

High performance and accuracy (ZRL ±5 [dps], phase delay 5 [deg]@ 20 Hz).



ACCELEROMETER & GYROSCOPE 6-AXIS IMU

LSM6DSM

Low power, low noise combo unit for User Interface and Image Stabilization.

ULTRA LOW POWER ACCELEROMETER

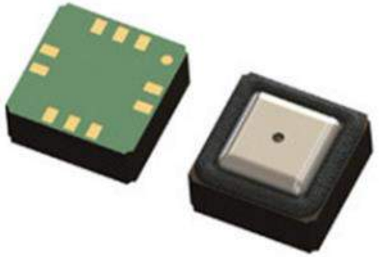
LIS2DW12

Ultra low power accelerometer with embedded FiFo for wearable applications.

HIGH ACCURACY PRESSURE SENSOR

LPS22HB / LPS35HW

Compact high performance and stability, low power, water resistant pressure sensor.



ACCELEROMETER & MAGNETOMETER

LSM303

Compact accelerometer and compass unit with pedometer capabilities.

Expanding Customer Base

HUAWEI

P10 / P10 Plus

P9 / P9 Plus

Mate 9 / 9 Pro

Mate S

Honor Magic

Honor V8

Honor 5X

Mi Mix

Mi 5

Redmi Note 3

Mi Note 2

VIVO

X6 /X6 Plus

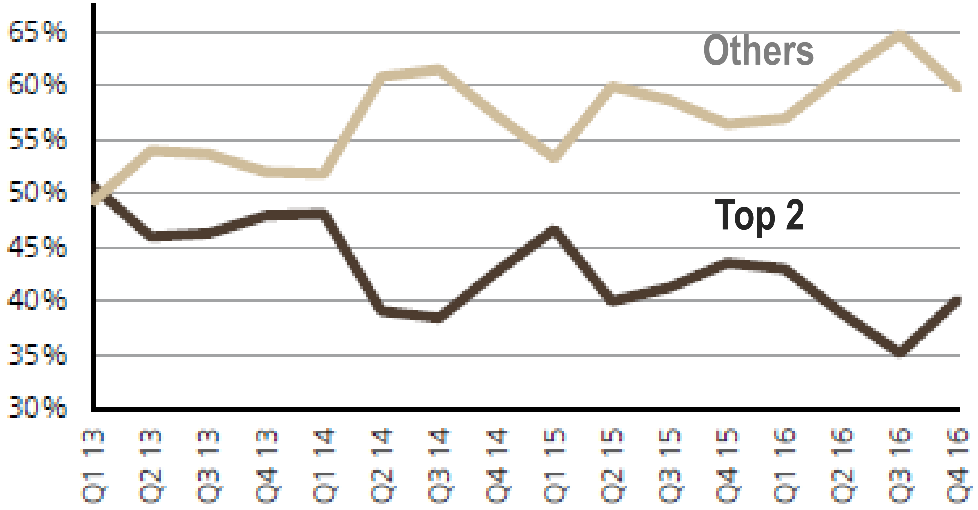
Xplay 5

lenovo

Moto Z Force

Moto G4 Plus

Smartphone volume market share



oppo

R9 Plus

R9s

R7 Plus

R7s

MEIZU 魅族

Pro 6s

Pro 6 Plus

GIONEE

Elife S8

Source: UBSe

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Smart Things

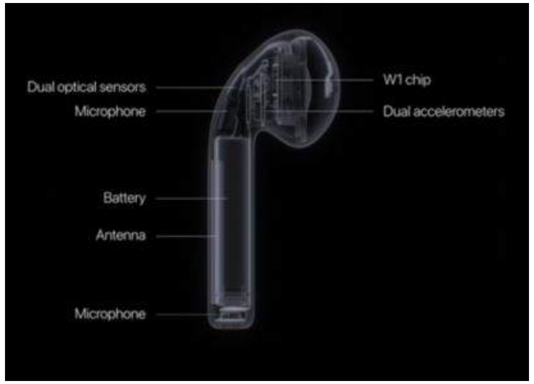
Analog & MEMS

Powering leading consumer devices

Sensing

Connectivity

Signal Conditioning & Protection



Sensing

www.techinsights.com/about-techinsights/overview/blog/airpods-airpods-and-the-W1-wireless-SoC-squeezing-innovative-technology-inside-very-small-packages/

Sensing

Touchscreen Controller

Samsung Galaxy S8/S8+

Sensing

Touchscreen Controller

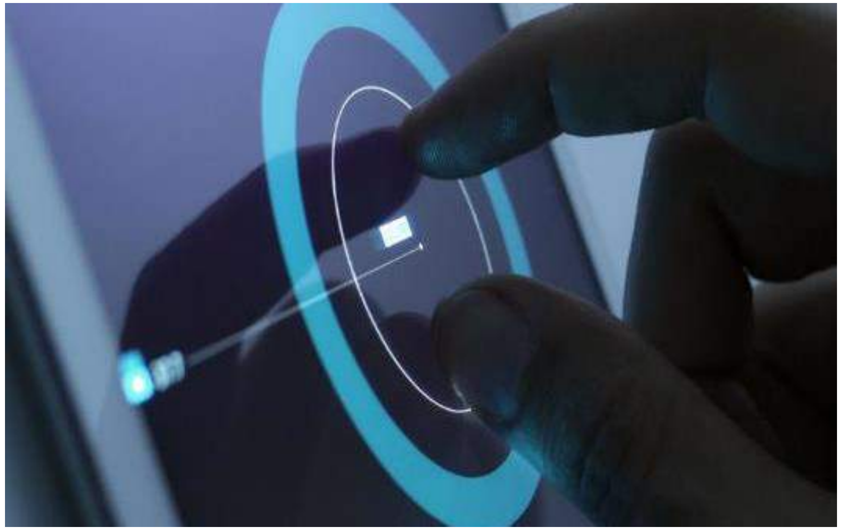
Signal Conditioning & Protection

iPhone 7

Sensing

http://www.systemplus.fr/reverse-costing-reports/apple-iphone-7-plus-mems-microphones/

Analog for Smart Things



FingerTip Smart Touch Screen controller
Low latency, Low power

AMOLED Display PMIC

General Purpose Analog
Signal conditioning and power management

Multi Mode Qi/Airfuel Wireless Power
Bi-directional - Receiver & Transmitter

Magnetic Resonance
In partnership with WiTricity™

Charging Solutions
USB Type-C and Power Delivery, Fast Charge

Partnership in MEMS and Analog

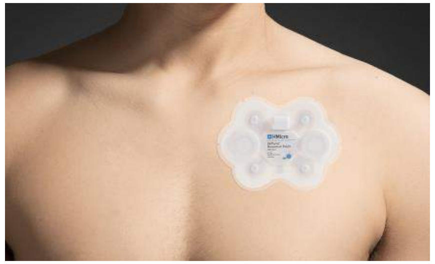
Analog Partnerships

Magnetic Resonance Wireless Charging

WiTricity

Low Power Wi-Fi

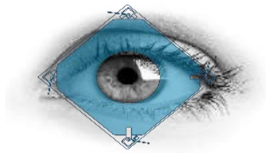
HMicro
Sense More



Actuator Partnerships

Piezo Autofocus

poLight



Ultrasound Ranging

Chirp

Micro-mirror Projection

MicroVision

MEMS Loudspeaker

USOUND

Winning With Major Accounts

Smart Things

- SAMSUNG
- Google
- Microsoft
- fitbit
- mi
- lenovo
- HUAWEI
- GiONEE
- MEIZU 魅族
- oppo
- WD Western Digital
- hp
- Seagate

Smart Home & Smart City

- PHILIPS
- DELTA
- GREE
- EMERSON
- enel
- Whirlpool
- Landis+Gyr
- B/S/H/
- CISCO

Smart Industry

- SIEMENS
- BOSCH
- PHOENIX CONTACT
- Schneider Electric
- ARTESYN EMBEDDED TECHNOLOGIES
- ABB
- Nidec

Deep, long-term relationships, strong innovation pipeline with timely new product development execution, solid system and application know-how & support

AMG for Mass Market

A great opportunity to grow, with stable demand thanks to multiple market segments and higher margins

A complete product portfolio

- Power Conversion
- Analog & Signal Conditioning
- Motor Control & Actuation
- Connectivity & Communication
- Sensors & Actuators

A comprehensive ecosystem with hardware & software

To address a variety of applications

A unique position to win in the mass market

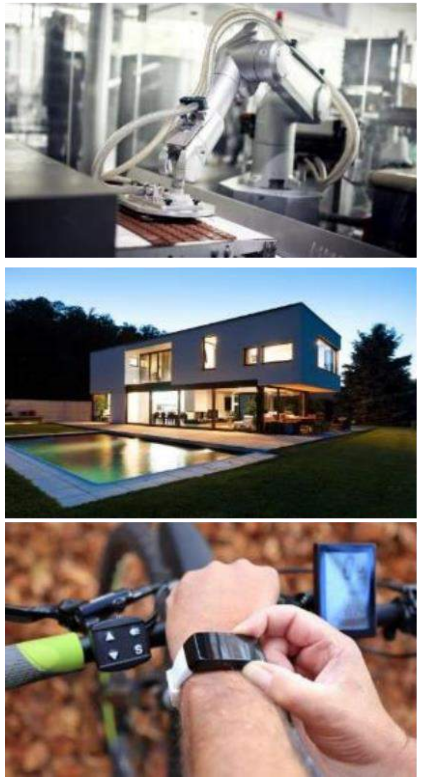
- A broad portfolio products to seed the market with solutions
- A wide range of platforms and reference designs (SW and HW)
- Supporting design environment with documentation, selectors, design and simulation tools
- Partnership with third parties

Internet of Things

2017 AMG Strategy

Key Objective

Revenue growth and low teens operating margin in H2 2017



Smart Industry

Smart Home & City

Smart Things

Actions

- **MEMS sensors and micro actuators – Maintain volumes while diversifying**
  - Maintain volumes on consumer MEMS
  - Expand in Automotive and industrial MEMS
  - Grow in Piezo micro-actuators
- **General purpose Analog – Grow market share**
  - Additional Sales & Marketing initiatives with aggressive goals targeting the mass market
  - Enlarging the product portfolio for High End Analog and Connectivity
  - Customer base expansion
- **Dedicated Analog products focus on:**
  - Smart Meter solutions
  - Power Management ICs for wired and wireless battery charger
  - Digital Power & Motion Control
  - AMOLED Display Power Management IC products

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Takeaways

Internet of Things

Smart Industry

Smart Home & City

Smart Things

- Enriching our sensor portfolio to address automotive and industrial markets, while maintaining leadership in consumer markets
- Visible diversification strategy results along two axes
  - Growing customer base
  - Expanded product family (Charging, Motion Control, Wireless and Wired connectivity)
- Well positioned to ride the next MEMS wave of micro-actuators
- Boosting sales of industrial and analog products in the mass market.
- Well set to seize upside opportunities in Analog & MEMS in IoT with:
  - New products
  - Worldwide partnerships

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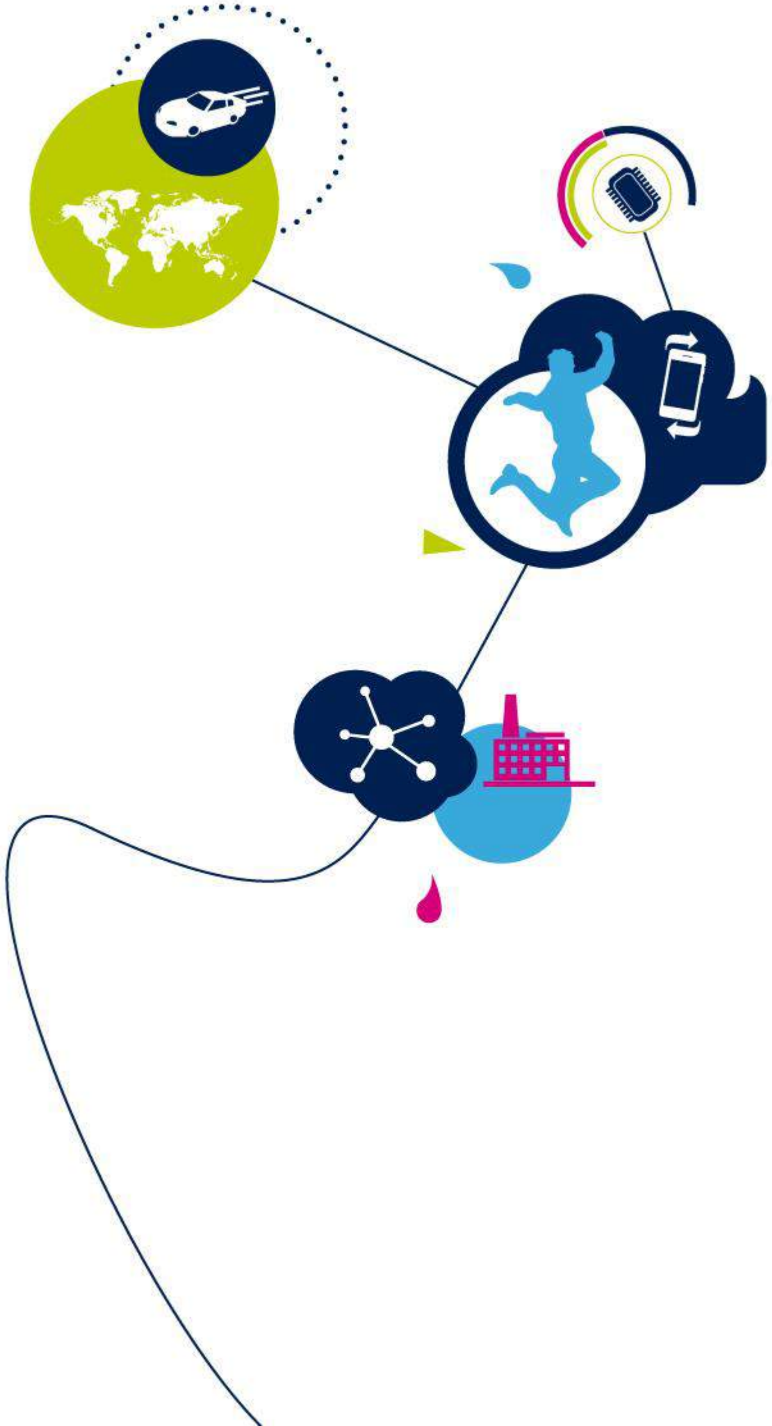
Imaging Division

Jean-Marc Chery

Chief Operating Officer



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Imaging Division

A global division within STMicroelectronics

- Pioneer in CMOS light sensing & micro optics
- World-wide operations & go-to-market
- High-expertise team of people with >80% in R&D

An integrated semiconductor technology player

- A solid Imaging semiconductor business partner
- Billions of units produced since 1999
- Leveraging ST world-class manufacturing capabilities

Investing in imaging applications & technologies

- Silicon, sensor, optics, hardware & software image processing
- Advanced R&D and ecosystem partnership programs
- Innovation across imaging growing markets

Providing differentiated
Smart Optical Sense & Illumination
solutions

Imaging Strategy

Provide differentiated **Smart Optical Sense & Illumination** solutions

Proprietary Technologies

Advanced pixel & Silicon process

Optical package/module & Imaging system expertise

Differentiated Offering

Time-of-Flight & Specialized Image Sensors

Proximity – Ranging
Gesture – Depth map

Differentiated pixels, Visible & IR,
High Dynamic Range &
Flicker Free Imaging

Fast Growing Applications

- Autofocus & Camera Assist
- 3D Sensing
- Flicker-free Image Sensors
- LiDAR

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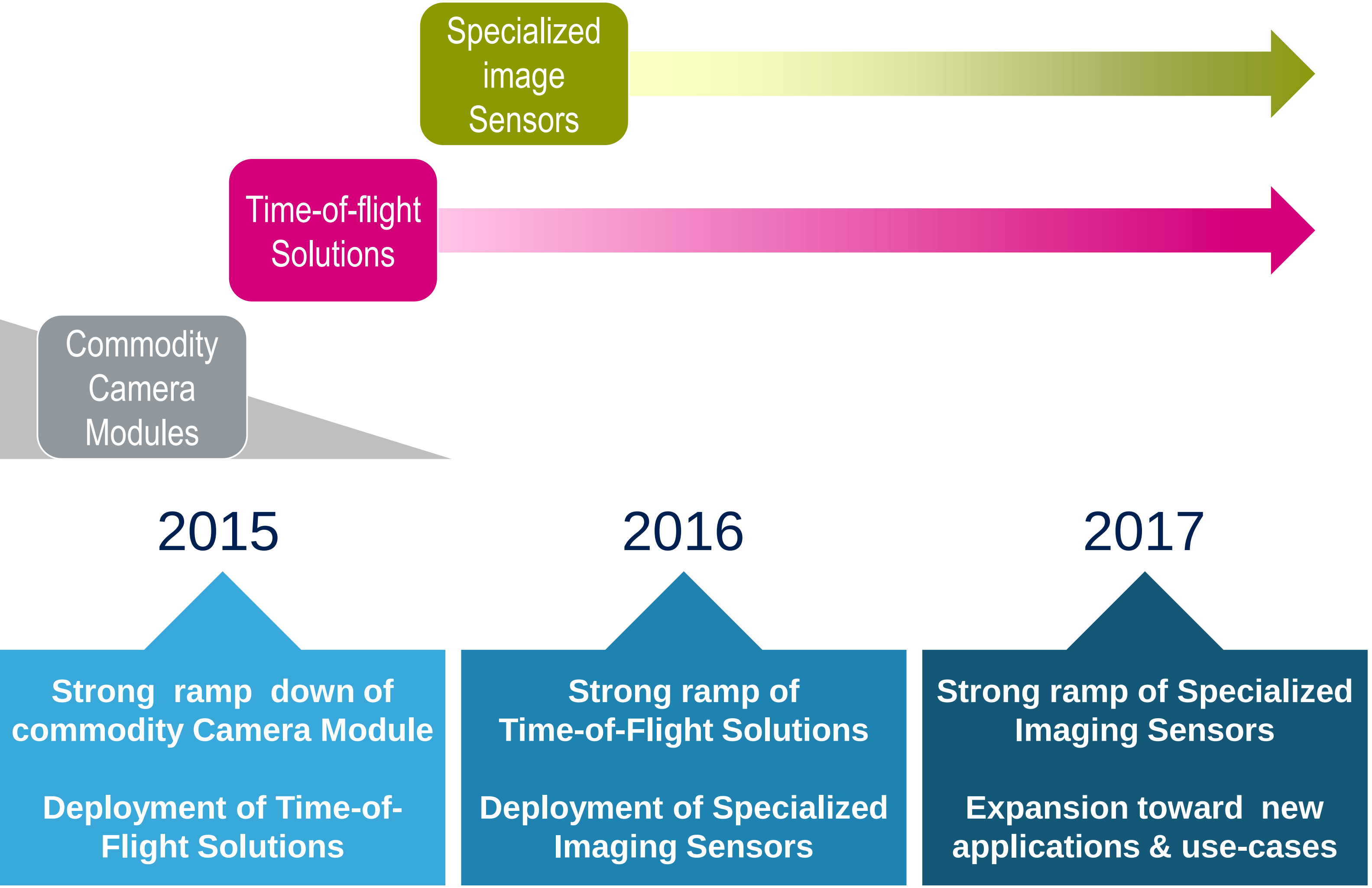
Imaging Revenues



Specialized image Sensors

Time-of-flight Solutions

Commodity Camera Modules

2015

Strong ramp down of commodity Camera Module

Deployment of Time-of-Flight Solutions

2016

Strong ramp of Time-of-Flight Solutions

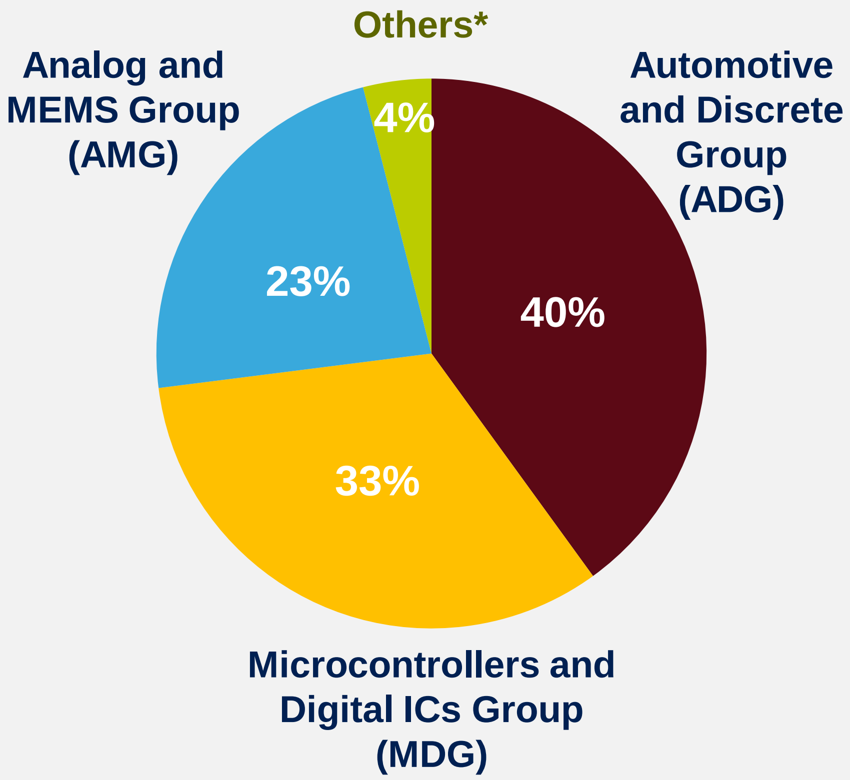
Deployment of Specialized Imaging Sensors

2017

Strong ramp of Specialized Imaging Sensors

Expansion toward new applications & use-cases

Contribution to ST revenues FY2016

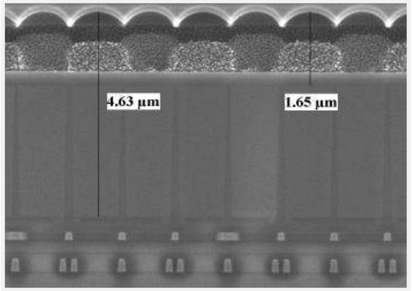


* Others includes Imaging Product Division

ST Imaging Key Assets

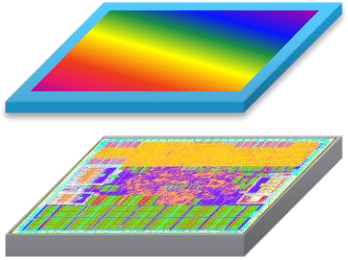
Imaging system expertise

- Full optical system know-how
- Image sensors
- Imaging algorithms



Imager silicon process

- Front and Back-Side Illumination
- Deep Trench Isolation
- Low optical stack



Low power architecture

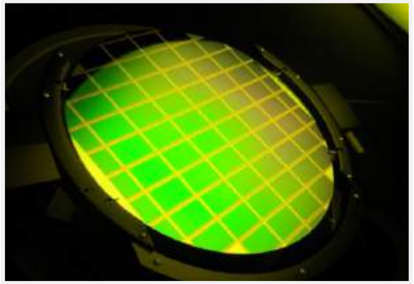
- ST proprietary architecture
- Image processing IPs
- 3D stack

Innovative pixel design

- Rolling & Global shutter
- High Dynamic Range
- High Quantum Efficiency

SPAD-based Time-of-Flight

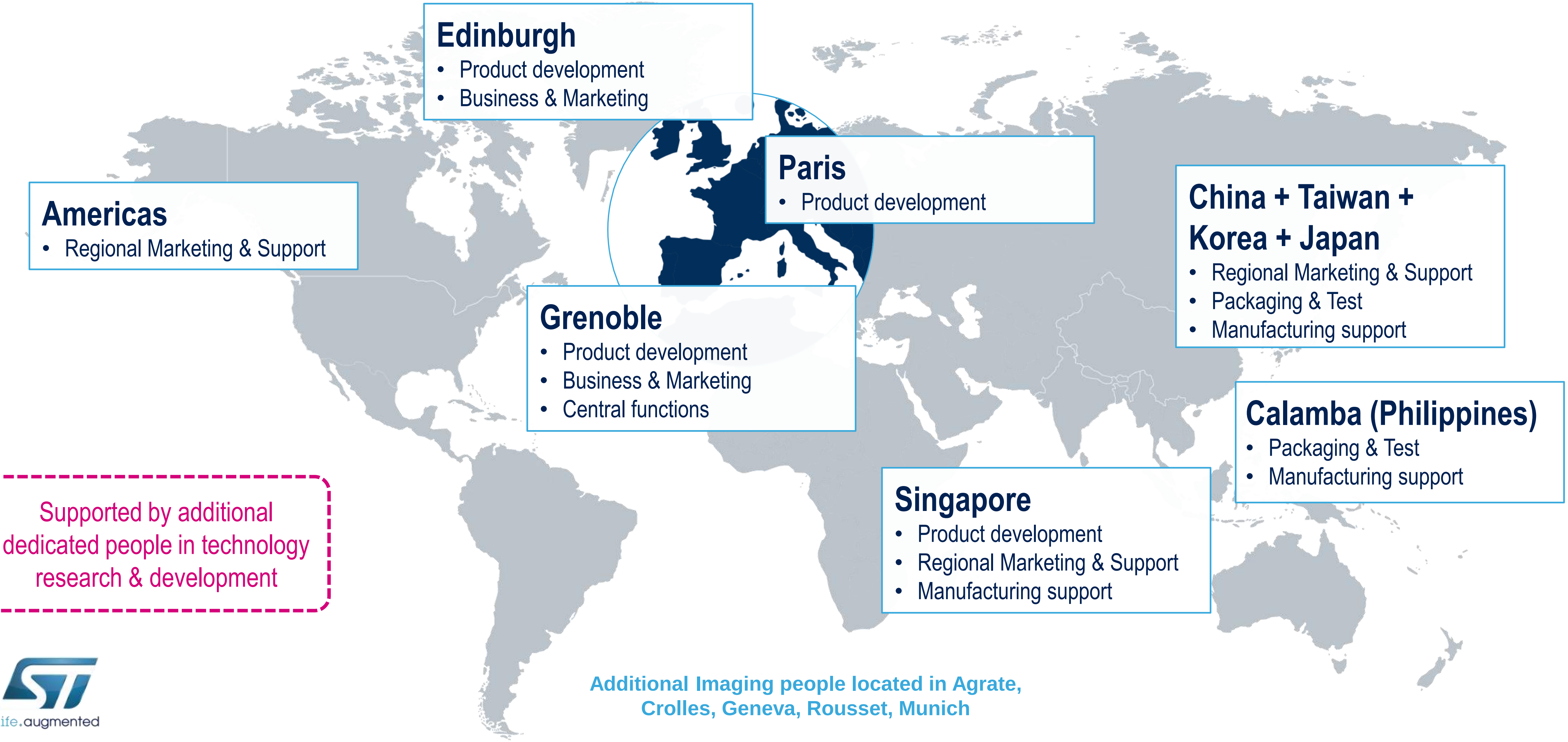
- ST proprietary technology
- Complete integrated solution
- High performance & low power



Large sensors stitching

- 8” and 12’’ wafers
- Ultra large pixels
- High-precision performance

Imaging - Who We Are



Edinburgh
- Product development
- Business & Marketing

Americas
- Regional Marketing & Support

Paris
- Product development

China + Taiwan + Korea + Japan
- Regional Marketing & Support
- Packaging & Test
- Manufacturing support

Grenoble
- Product development
- Business & Marketing
- Central functions

Calamba (Philippines)
- Packaging & Test
- Manufacturing support

Singapore
- Product development
- Regional Marketing & Support
- Manufacturing support

Supported by additional dedicated people in technology research & development

Additional Imaging people located in Agrate, Crolles, Geneva, Rousset, Munich

ST Pioneer and Leader
in Time-of-Flight

ST is #1 Worldwide Time-of-Flight sensor supplier

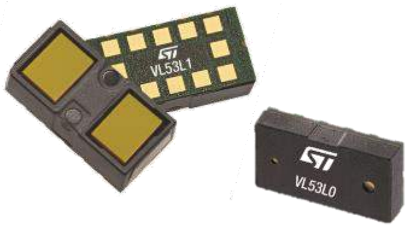
Flight Sense

3 Generations
of all-in-one ToF solution deployed since 4 years

VL53L1
3rd generation F**light**Sense™

- Multi-target detection
- Programmable multi-zone capability
- Cover-glass crosstalk immunity

>15 OEMs
Over 70 phones with ST's F**light**Sense™ technology



>17000
Evaluation kits deployed

>250 Million
ToF units shipped. Mastering end-to-end supply chain

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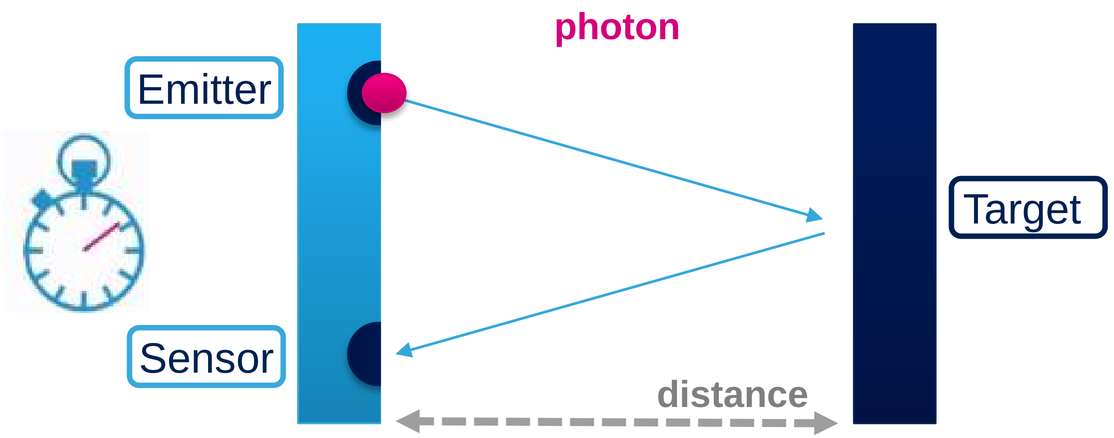
FlightSense™
… making light work

Time-of-Flight Principle



Measured distance = Photon travel time / 2 x Speed of light

1cm round-trip takes 67ps

- ST proprietary **Flight**Sense™ technology
- True distance measurement
- Fast and low power
- Truly invisible 940nm illumination

Applications with FlightSense™

… making light work

Today

Camera Assist

Ranging & Proximity

Presence, User Detect

Tomorrow

Gesture

Depth Map & AR/VR

LiDAR

Smart Automotive Camera Solutions

Transforming Driver Assistance

Sensing & Viewing Camera
Front-Facing View
Rear & Surround View
eMirror

In-Cabin Optical Sense
Driver monitor
Gesture control
Occupancy Detection

LiDAR
Autonomous Driving
through Sensor Fusion

- Leading high-performance HDR & Flicker Free solution
- Leveraging IP, know-how and supply chain expertize from high-volume consumer
- Supply security through In-house manufacturing
- Proprietary silicon technologies

Takeaways

- World leader in Time-of-Flight integrated solutions
- Developing & deploying specialized & differentiating imaging solutions
  thanks to ST proprietary technology portfolio
- Establish market leadership through close cooperation with key players across the many segments where Imaging is present
- Anticipate step function revenue growth in H2 2017

Providing differentiated
Smart Optical Sense & Illumination
solutions

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