



HUMANIZING THE DIGITAL EXPERIENCE

TDK Developers Conference 2018





**HUMANIZING THE
DIGITAL EXPERIENCE**

TDK Unifying Solutions Strategy

“Humanizing the Digital Experience”

TDK Developers Conference
September 17-18, 2018
Santa Clara Marriott



TDK at a Glance

TDK Corporation is a leading electronics company. Our focus is on information and communication technology, automotive, industrial and consumer electronics markets. TDK's comprehensive portfolio features passive components such as ceramic, aluminum electrolytic and film capacitors, magnetics, high-frequency, and piezo & protection devices.

Our product spectrum also includes sensors and sensor systems such as temperature and pressure, magnetic and MEMS sensors. In addition, TDK provides power supplies and energy devices, magnetic heads, and more. The portfolio is marketed under the product brands TDK, EPCOS, InvenSense, Micronas, Tronics and TDK-Lambda. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, North and South America.

Key info (fiscal year 2018, ending March 31)

Business	<ul style="list-style-type: none">● Passive components● Sensor application products● Magnetic application products● Film application products● Others
Headquarters	Tokyo, Japan
Sales	JPY 1,272 billion
Sites	More than 110 factories, R&D & sales offices in more than 30 countries
Employees	103,000

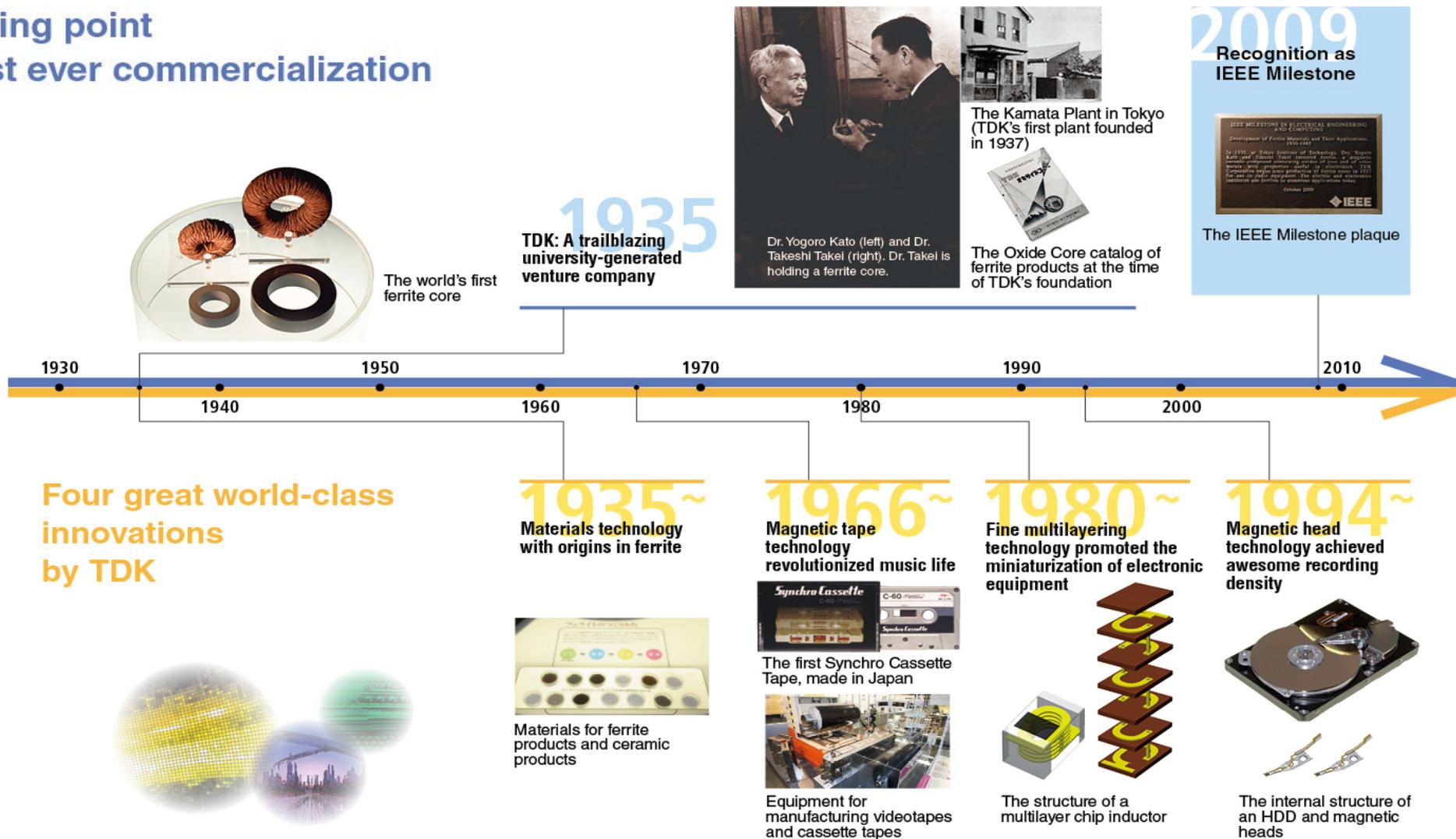
Major Milestones

1935	TDK (<i>Tokyo Denki Kagaku Kogyo = Tokyo Electric & Chemical Industries</i>) established in Japan to manufacture and commercialize ferrites
1986	SAE Magnetics acquired
2005	Amperex Technology Limited (ATL) acquired
2005	Lambda Power Group acquired
2007	Recording Media business sold
2008	EPCOS AG acquired
2016	Micronas Semiconductor Holding AG acquired
2017	TDK-Qualcomm HF joint venture RF360 started; cooperation with Qualcomm enhanced
2017	InvenSense, Inc. acquired
2018	Chirp acquired



TDK's Foundation & Innovation

TDK's starting point was the first ever commercialization of ferrite.

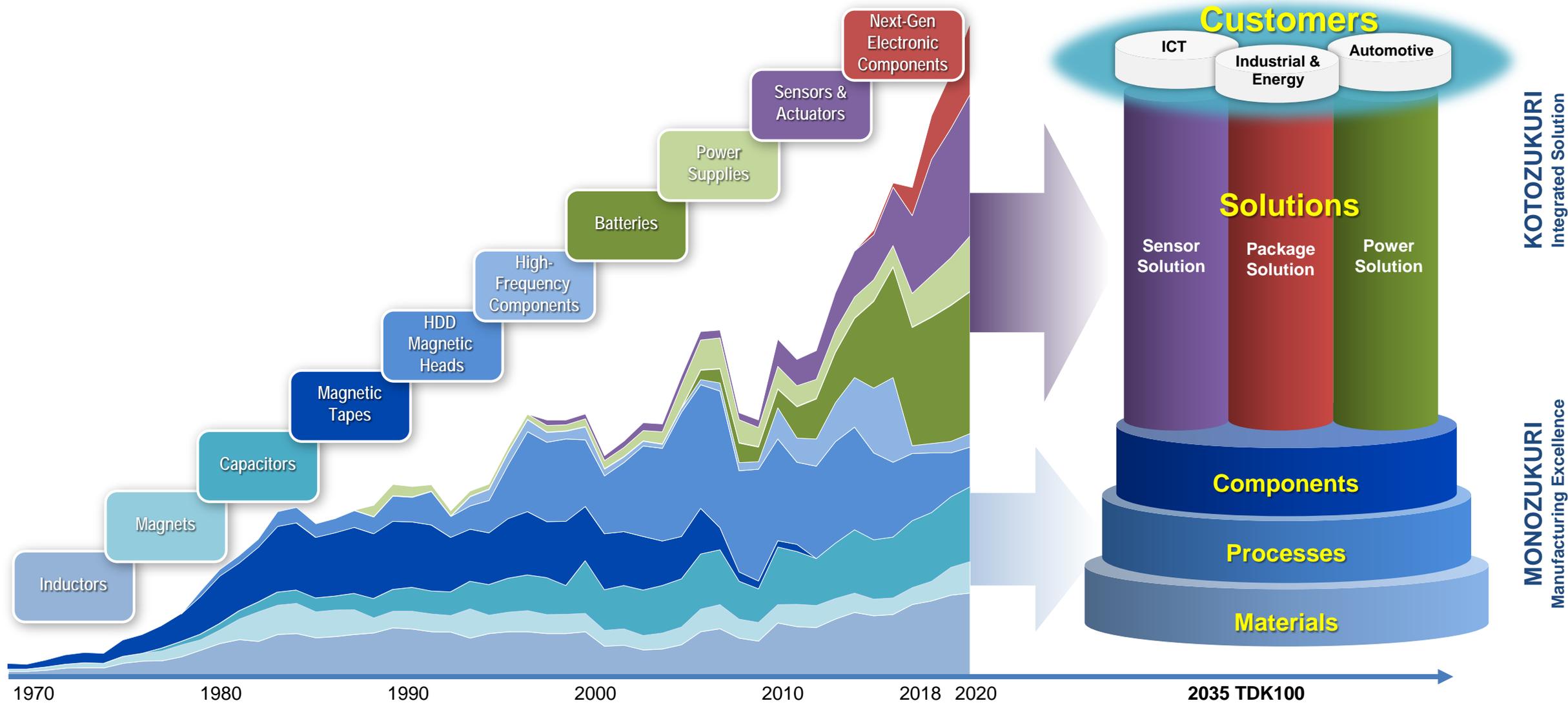


Four great world-class innovations by TDK





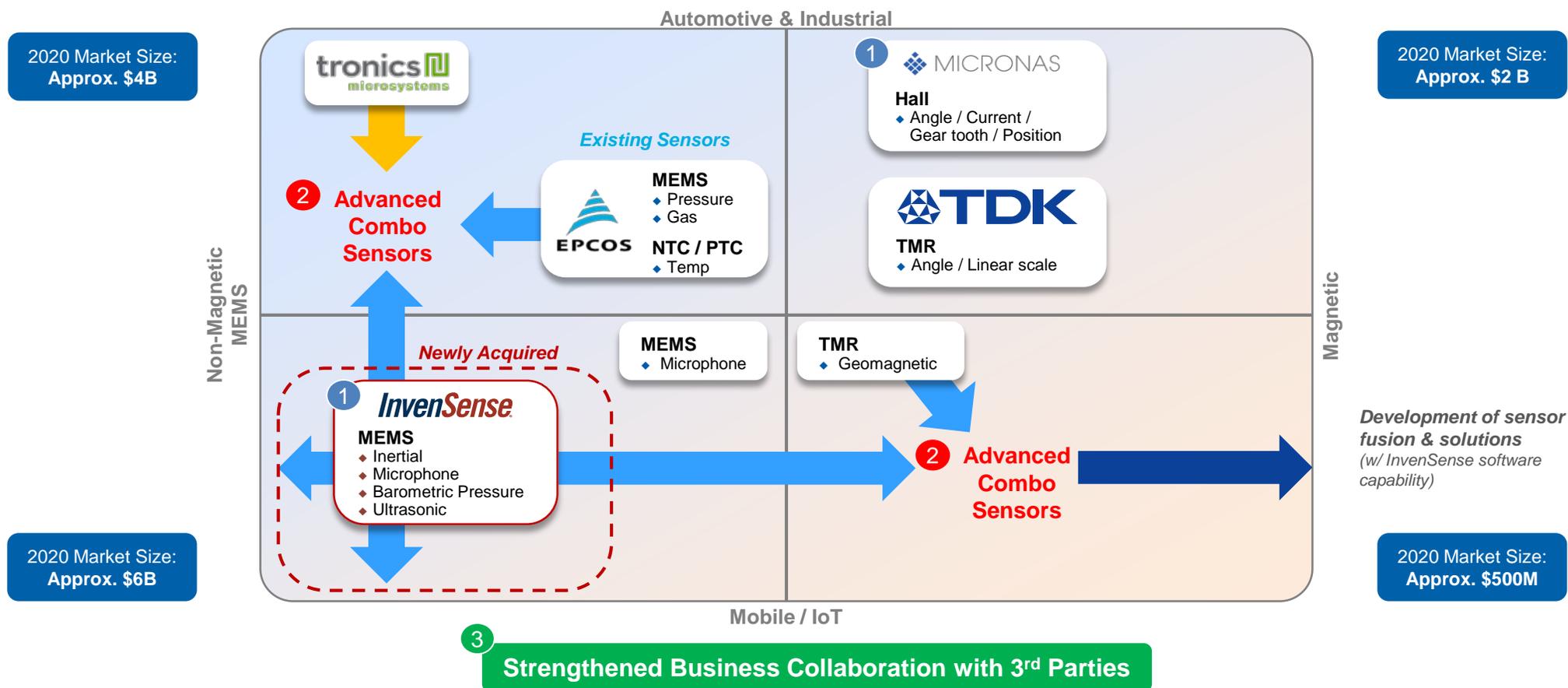
Toward the Next Generation





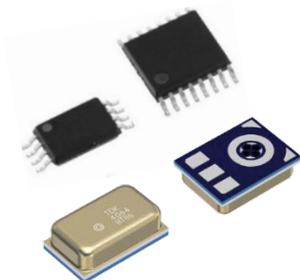
Initial TDK Sensor Strategy

- 1 Materialize Planned Customers' Projects
 - e.g. Inertial, Microphone Temperature, Pressure, Magnetic (TMR, Hall), MEMS
- 2 Expand portfolio with Multi-functional Sensors + Software. Introduce new solutions
 - e.g. Inertial, Fingerprint, Gas, Wearables > Combo Sensor/Module, Sensor Fusion
- 3 Accelerate Business Collaboration
 - e.g. Design wins





TDK's Sensor Product Portfolio



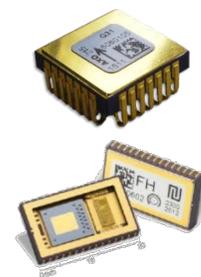
**TMR Angle
Sensors &
MEMS Microphones**



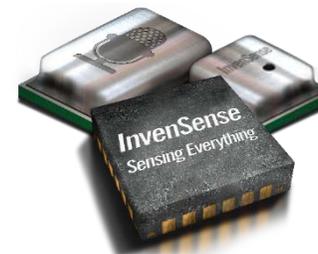
**Temperature
& Pressure
Sensors**



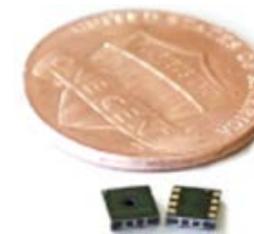
**Hall Sensors
& Embedded
Controllers**



**MEMS Inertial
Sensors &
Gyroscope**



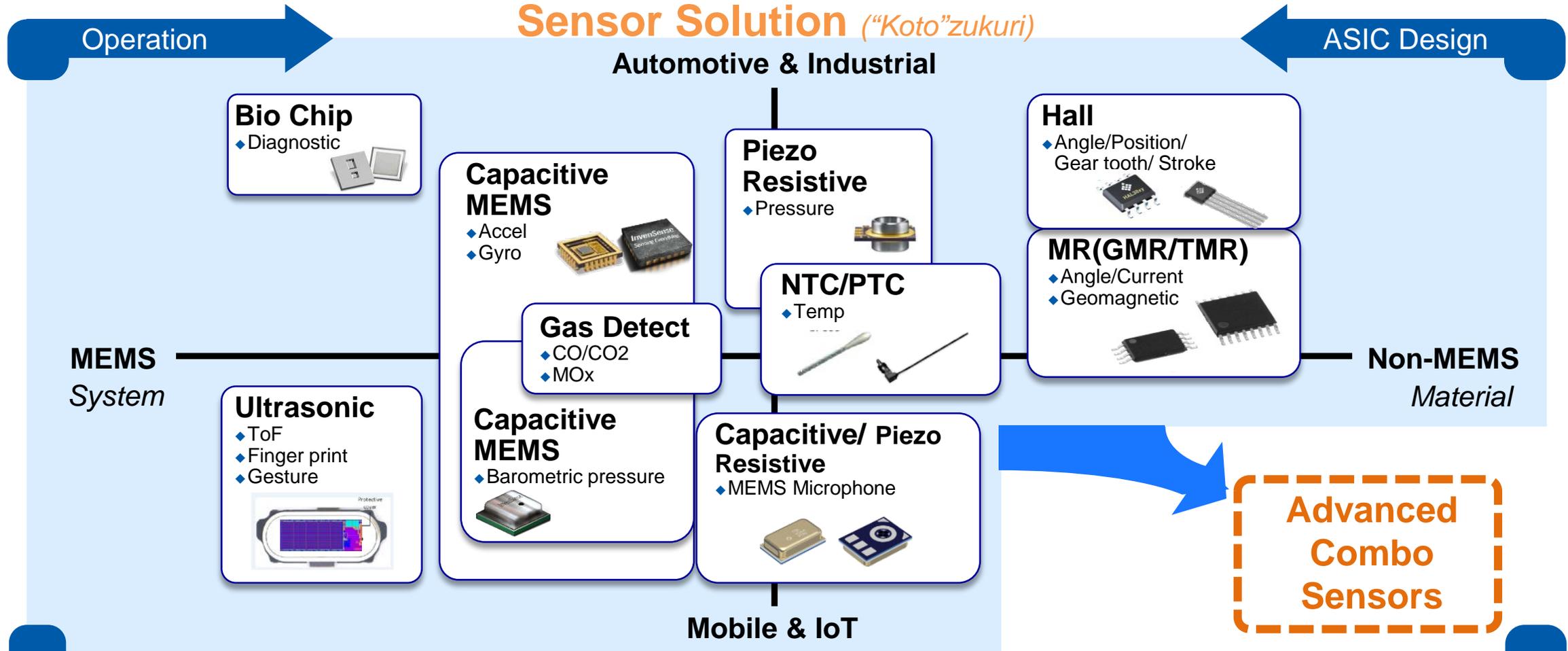
**MEMS Gyro/Accel
Microphones
Pressure Sensors**



**Ultrasonic
time-of-flight
distance measuring
sensors**



Moving Forward – Sensor Strategy



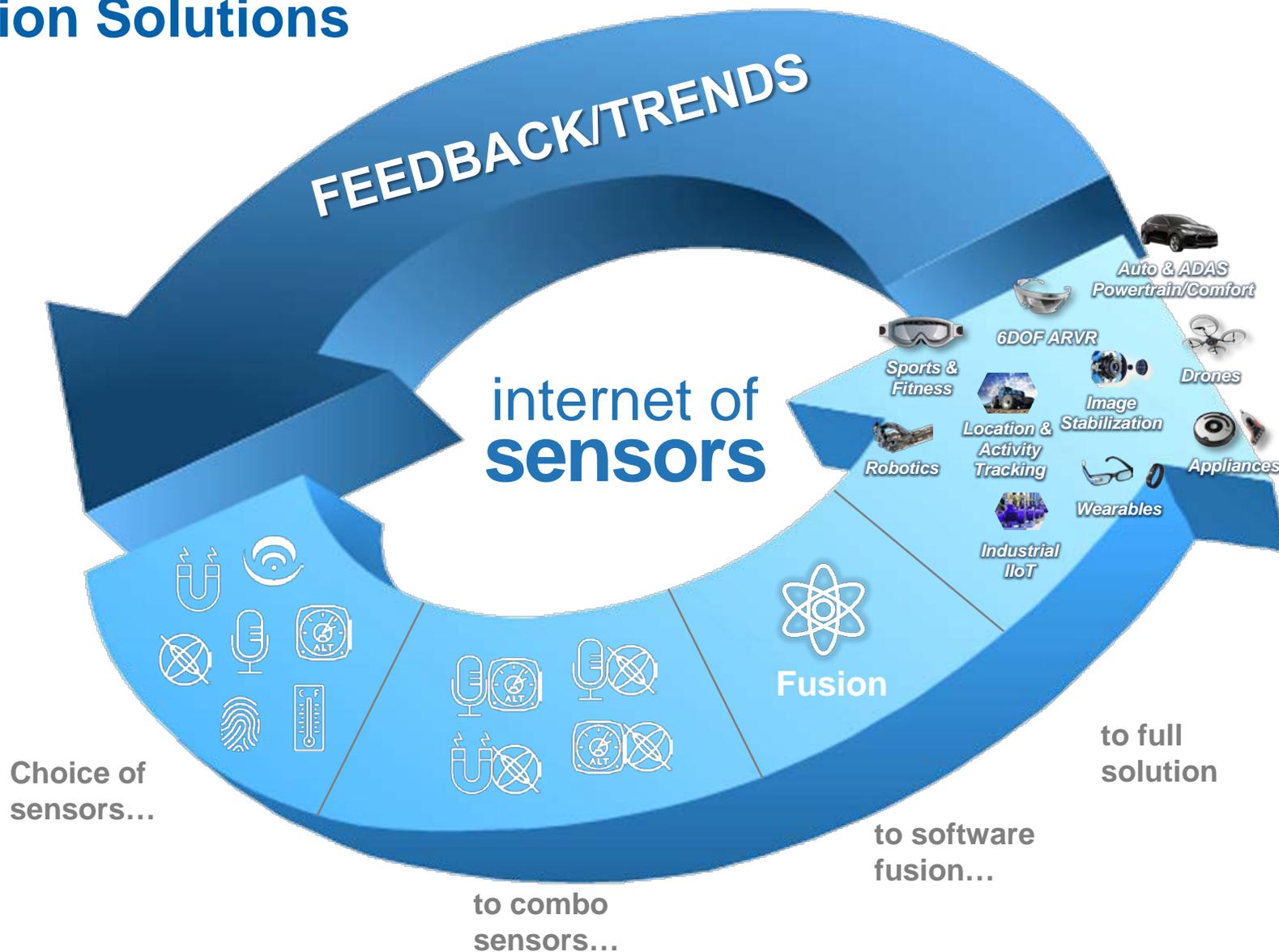
Strengthen business collaboration with ECO-partners



Leveraging Application Solutions



EPCOS
 MICRONAS
 tronics
 icsense
 InvenSense
 Chirp

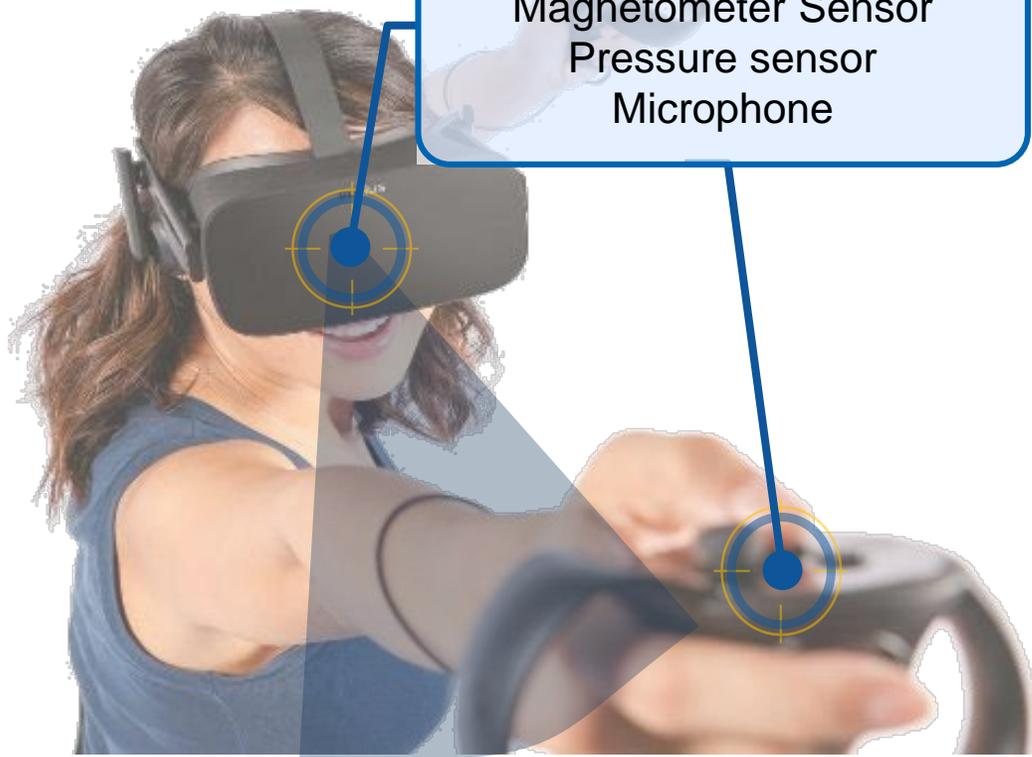




TDK Application Solution

AR/VR/MR

6 axis Accelerometer/Gyro
Ultrasonic(ToF/Fingerprint)
Magnetometer Sensor
Pressure sensor
Microphone



Robot Arms

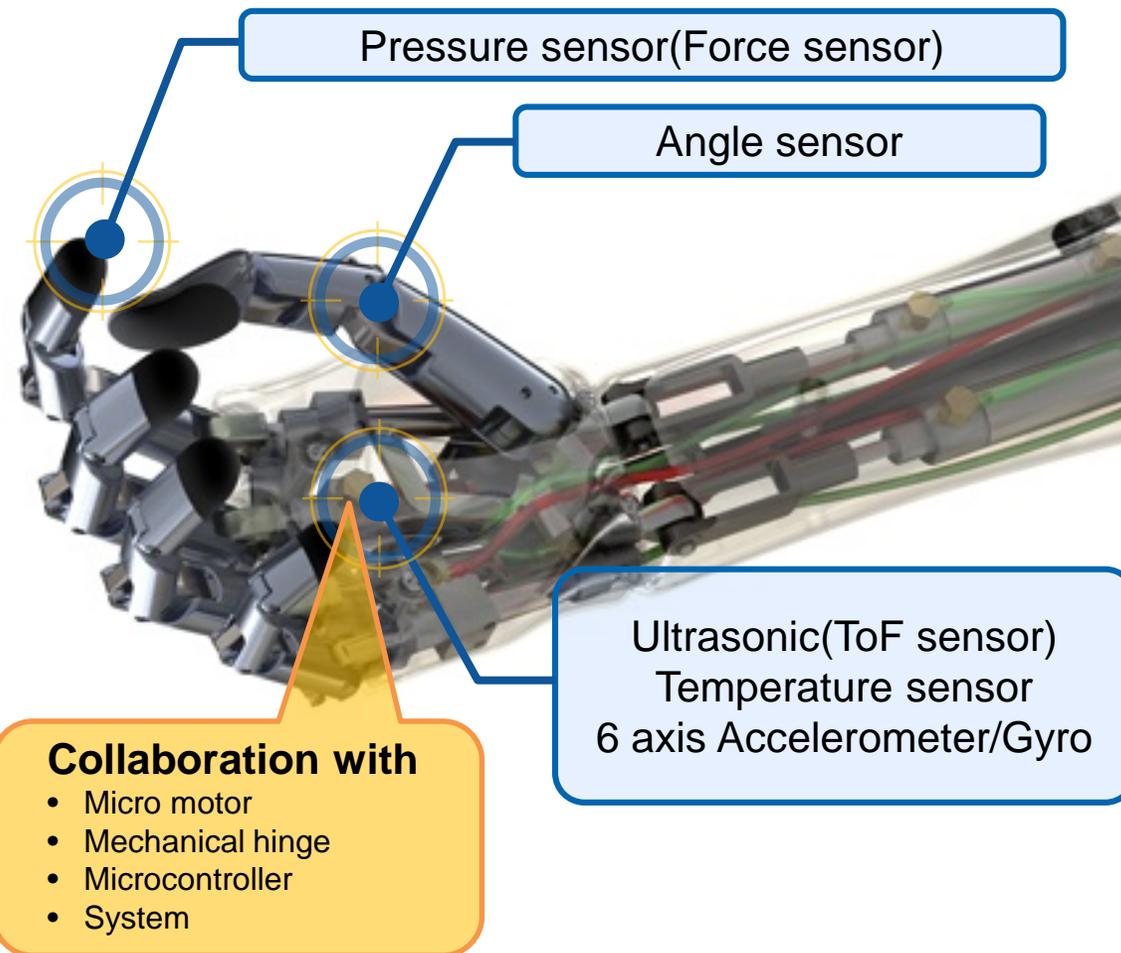
Pressure sensor(Force sensor)

Angle sensor

Ultrasonic(ToF sensor)
Temperature sensor
6 axis Accelerometer/Gyro

Collaboration with

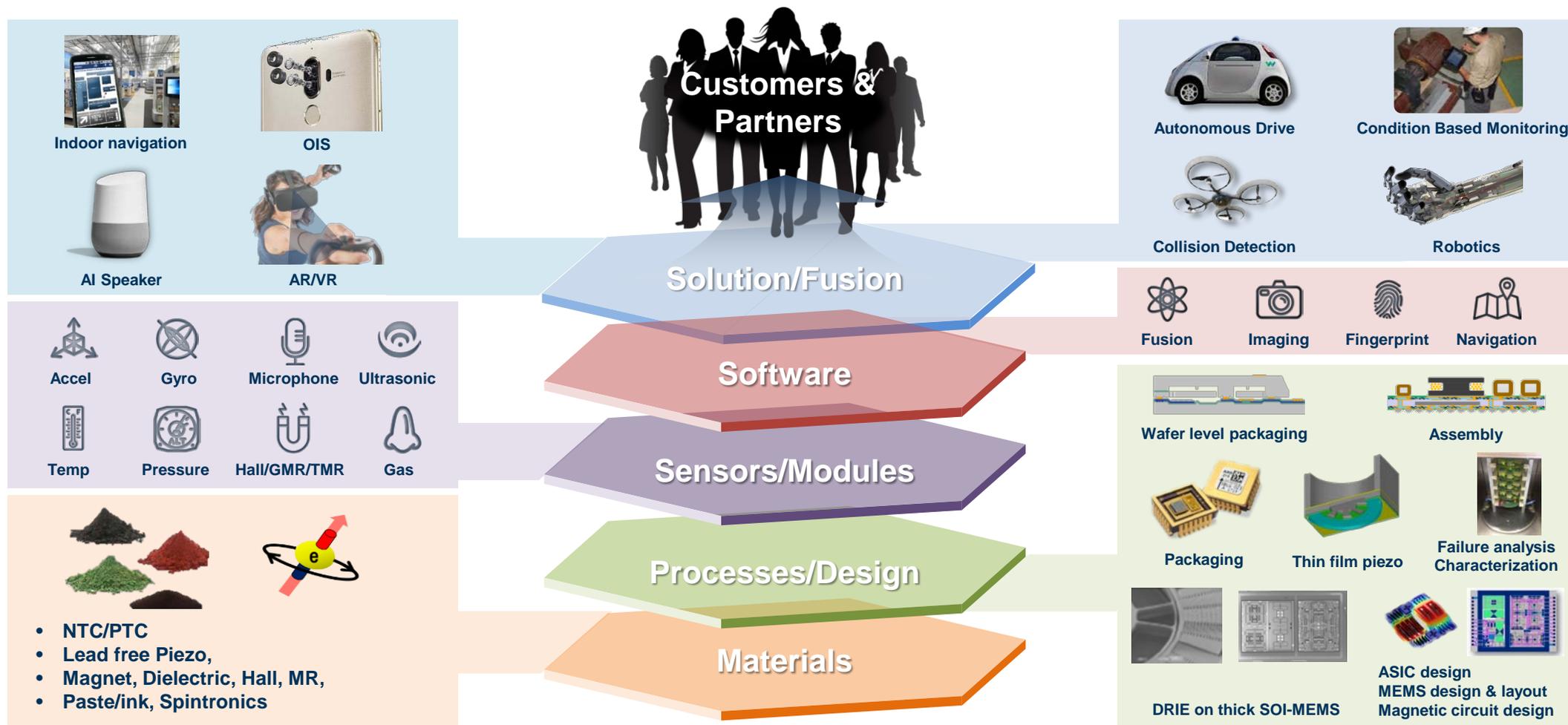
- Micro motor
- Mechanical hinge
- Microcontroller
- System





Summary:

TDK to be a World No.1 Sensor Solution Provider!



Contribute to culture and industry through Sensing Solutions

Thank You!



HUMANIZING THE DIGITAL EXPERIENCE

TDK Developers Conference 2018





**HUMANIZING THE
DIGITAL EXPERIENCE**

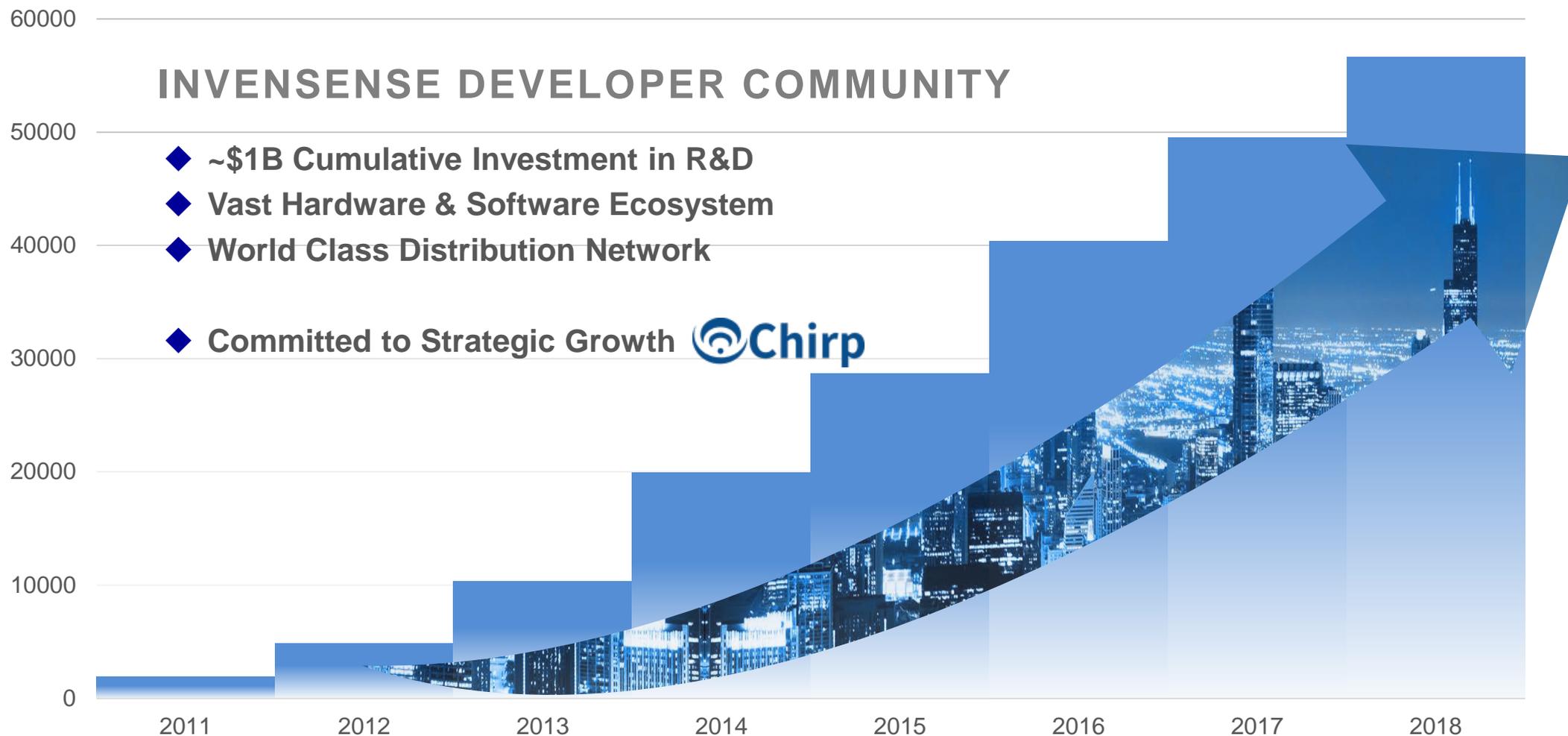
Smart Sensing at the Edge

Swarm of Sensors

TDK Developers Conference
September 17-18, 2018
Santa Clara Marriott



A Growing Vibrant Community



The Last Decade - Mobile Economy



OIS

AV

GPS Nav

Games

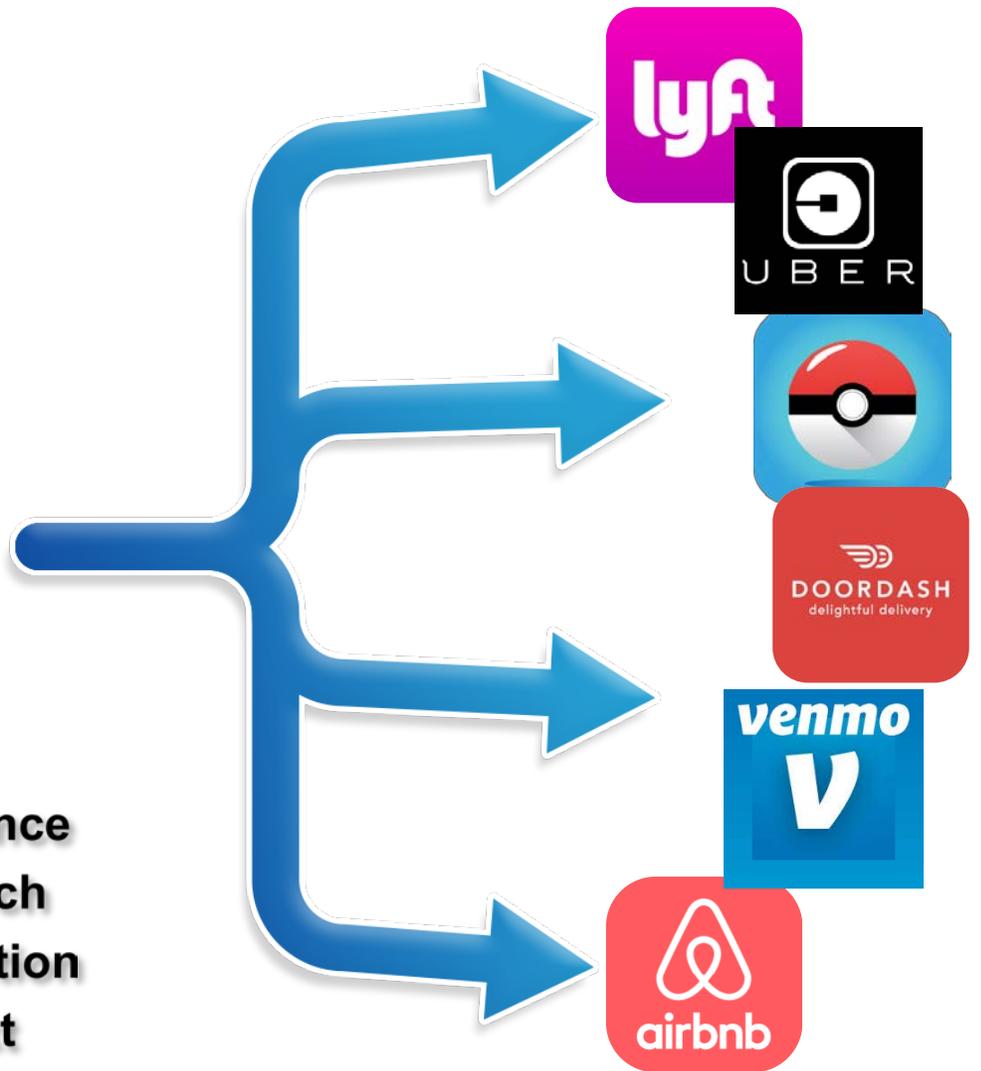
EIS



Authentication

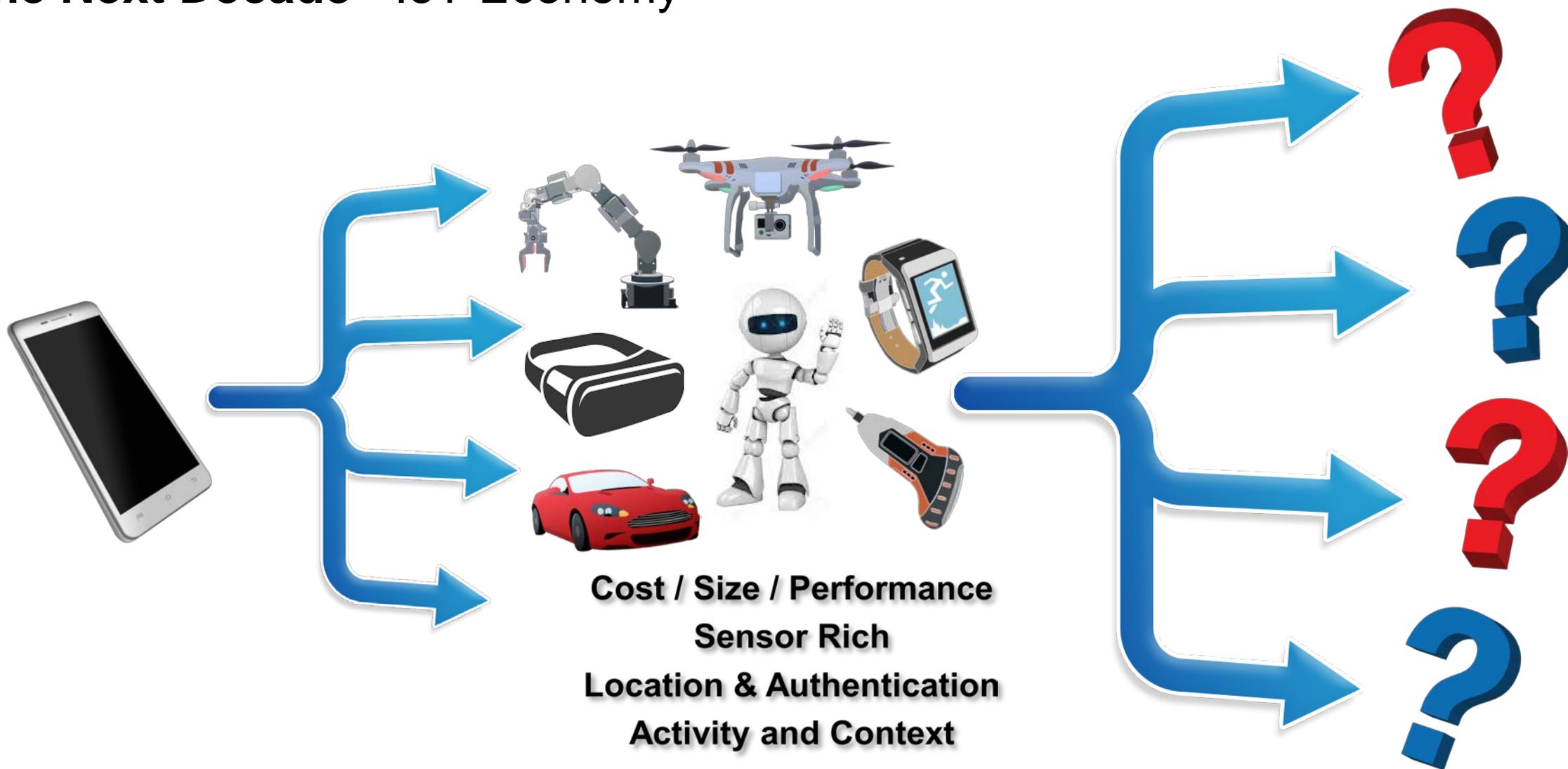
Location

Cost / Size / Performance
Media and Sensor Rich
Location & Authentication
Activity and Context



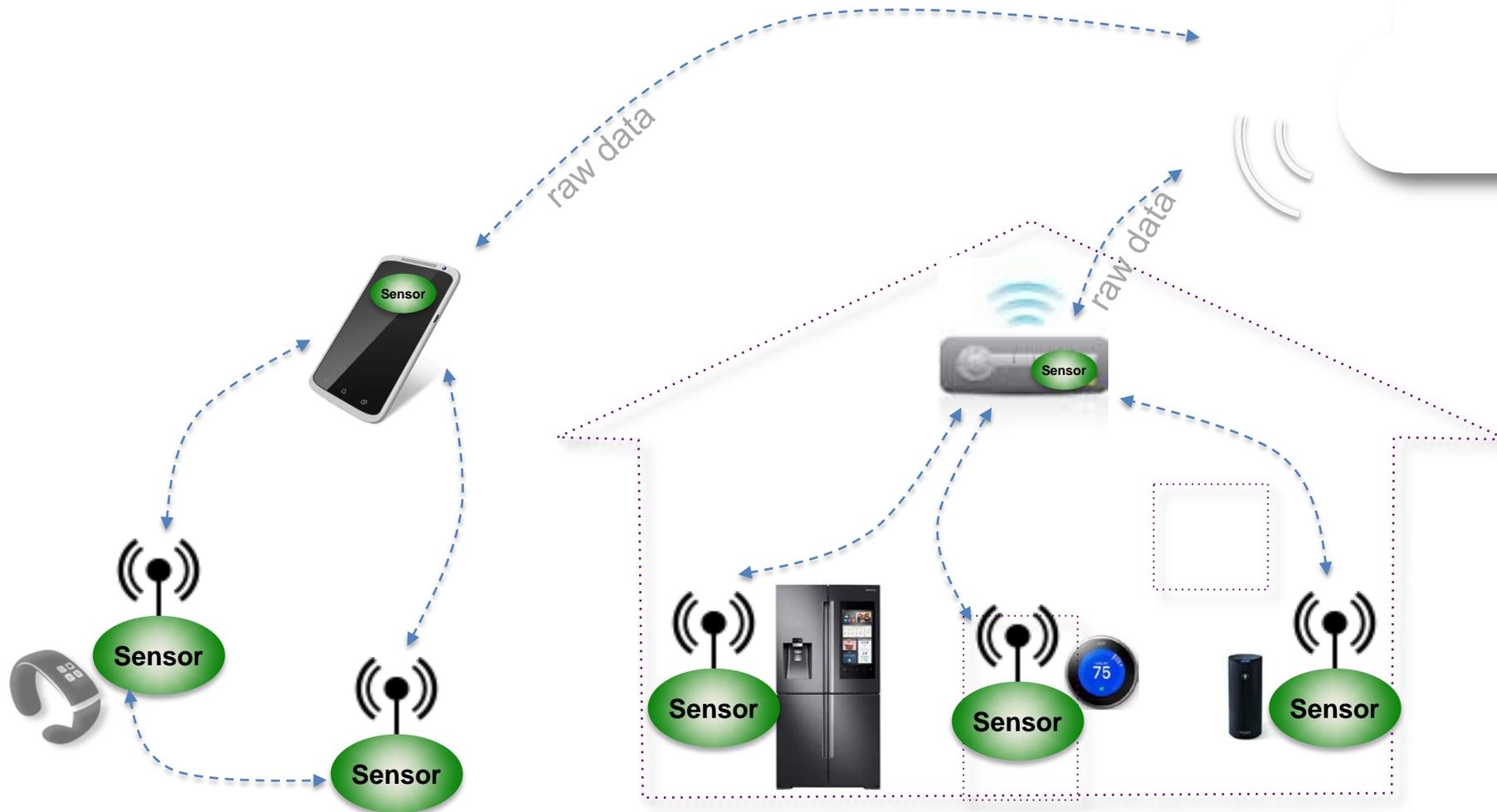


The Next Decade - IoT Economy



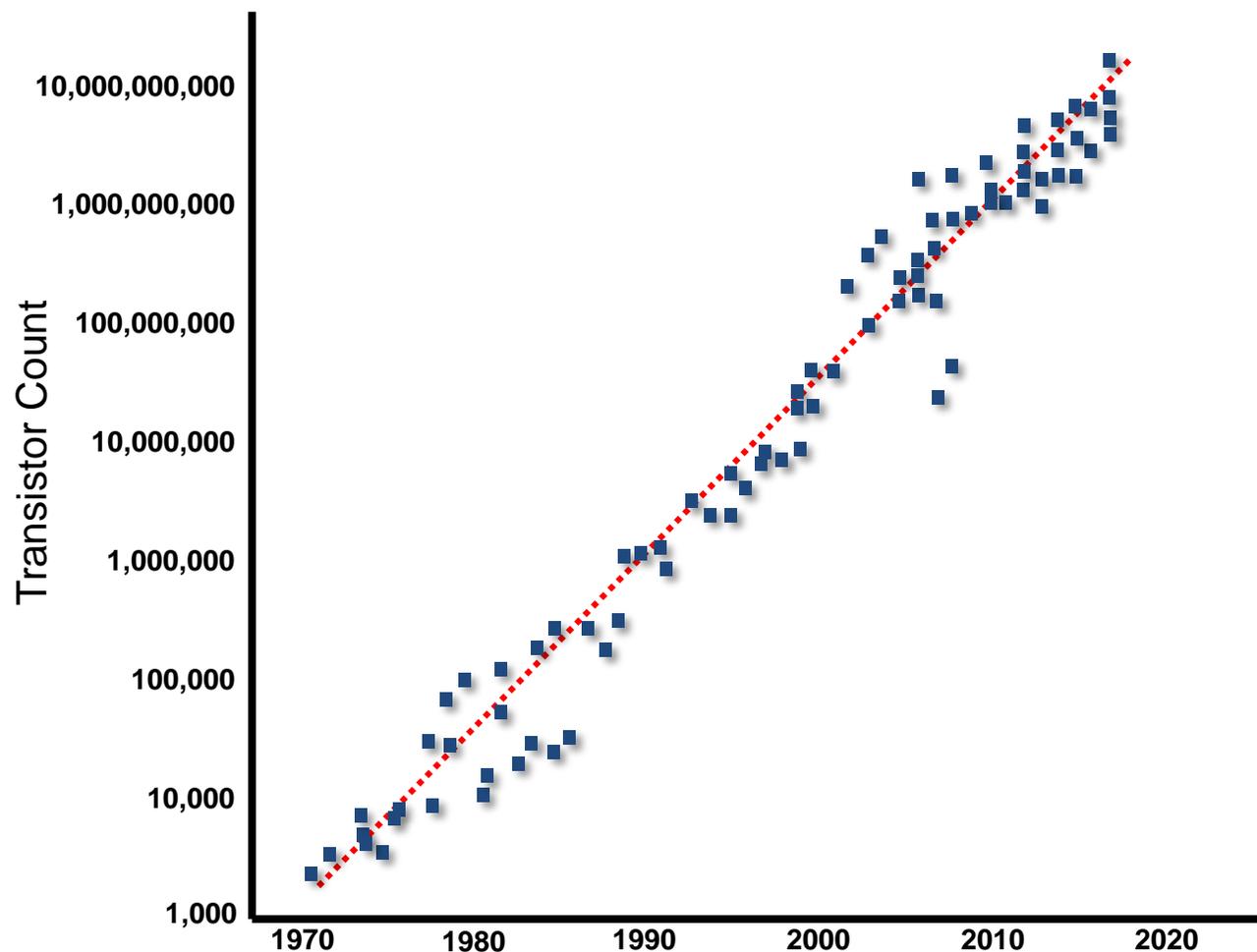


The Internet of Sensors - Learning in the Cloud





Technology Trends - Moore's Law vs. Bandwidth



Mobile Technology Trend – Learning at the Edge

Voice



<60MHz
<256MB
2G

Camera

Text



150-300MHz
1-2GB
2.5G

Data

Mail
Browse
Navigation



500-800MHz
4-8GB
3G

Smart

MM Mail
Browse
Navigation
Apps



1-1.5GHz Dual
16-64GB
4G

Cloud AI

Context Aware
Sensor Hub



2GHz+ Multicore
128GB+
4G+

Edge AI

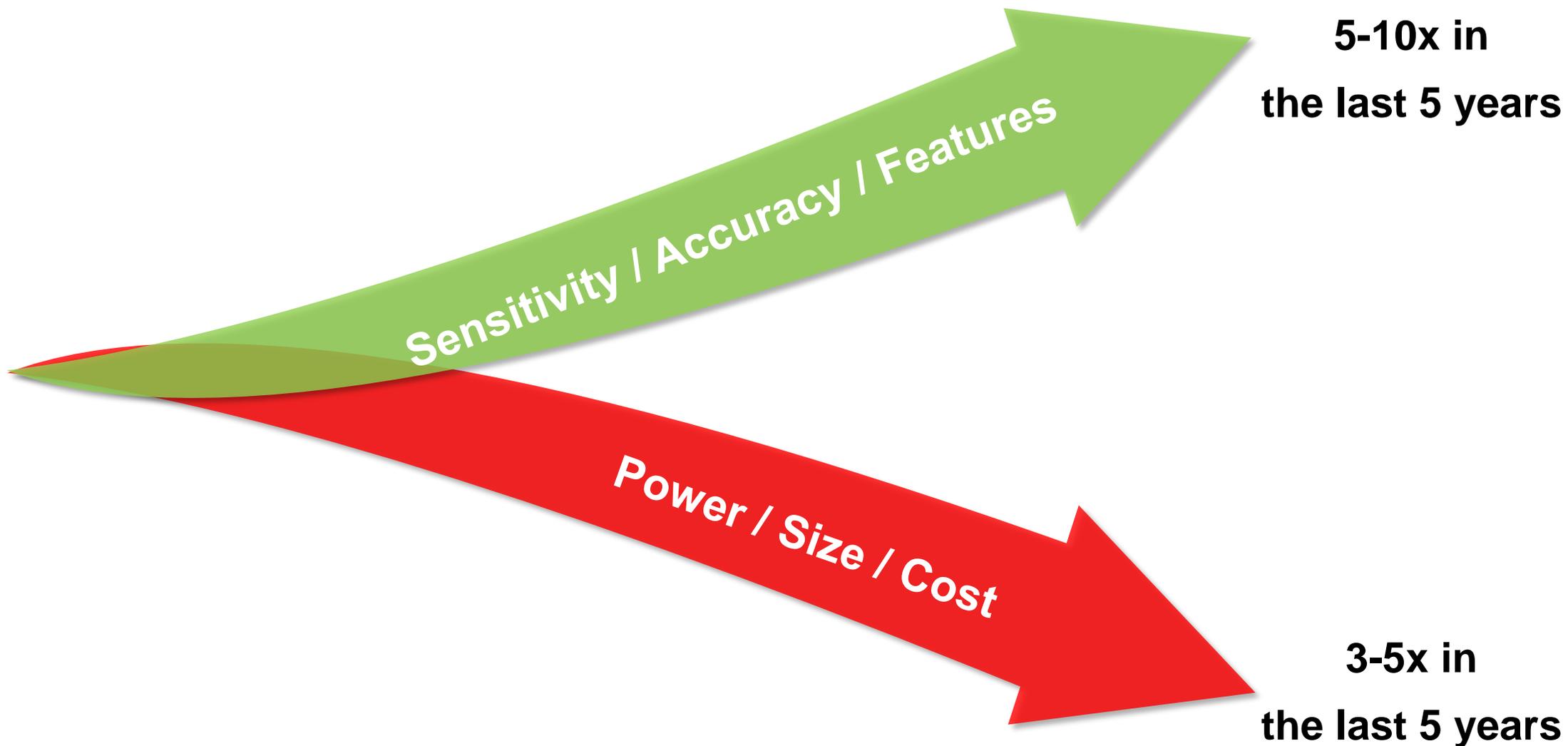
Mobile Server
Secure
Private



3GHz+ 8-core
256GB+
5G

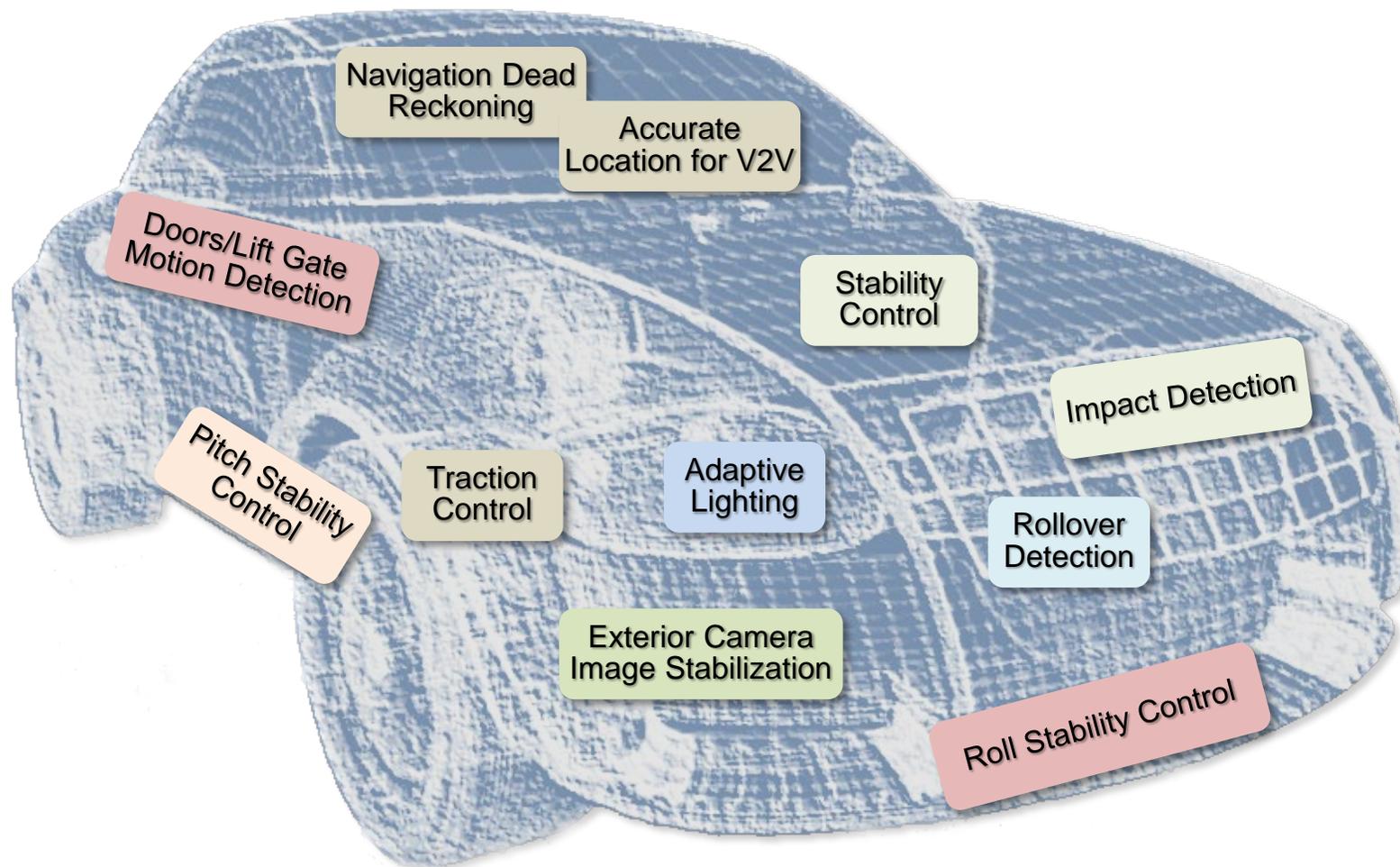


Sensor Trend - Higher Performance and Features



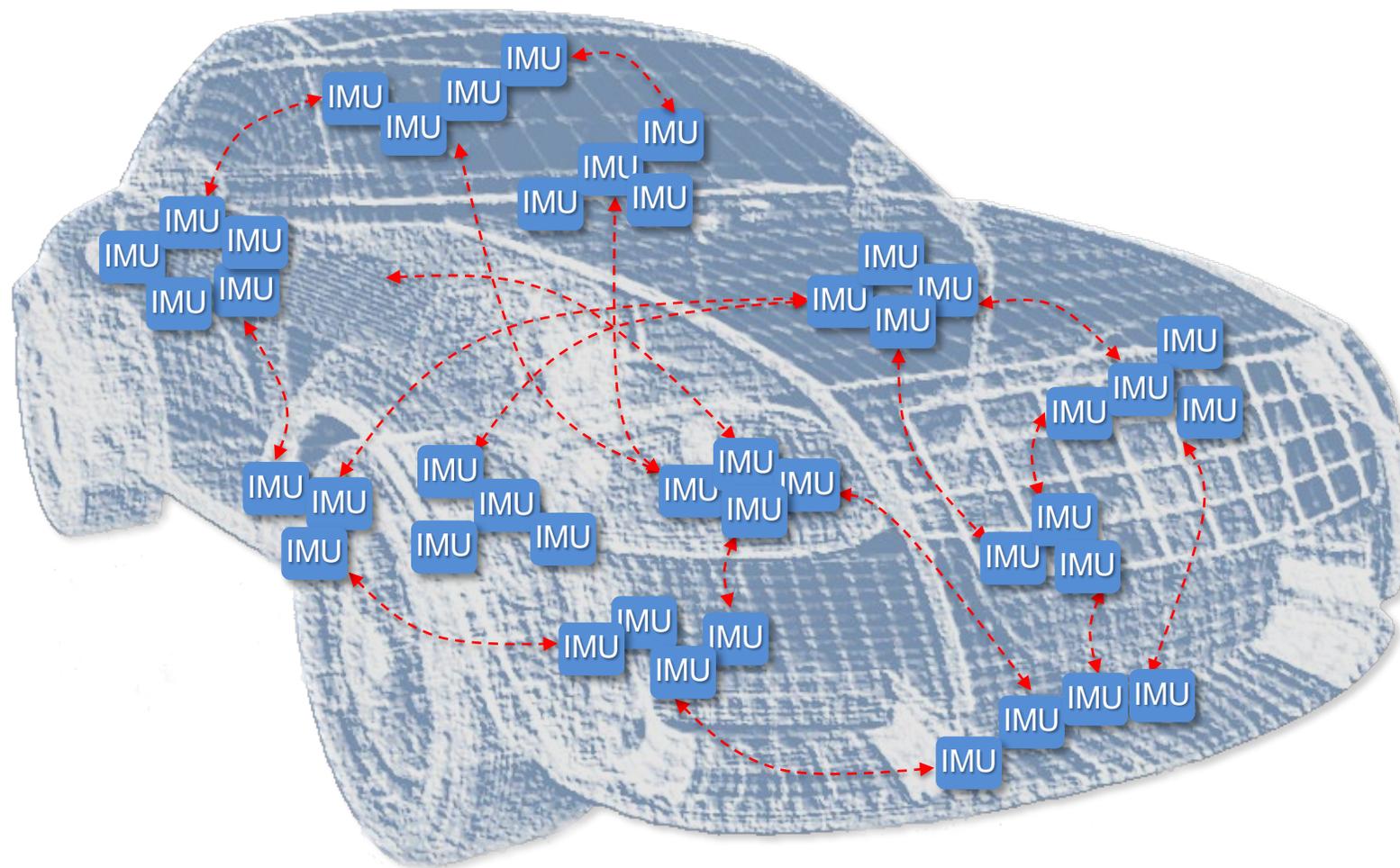


Multi-Motion Detection – Swarm of IMUs





Multi-Motion Detection – Swarm of Connected IMUs



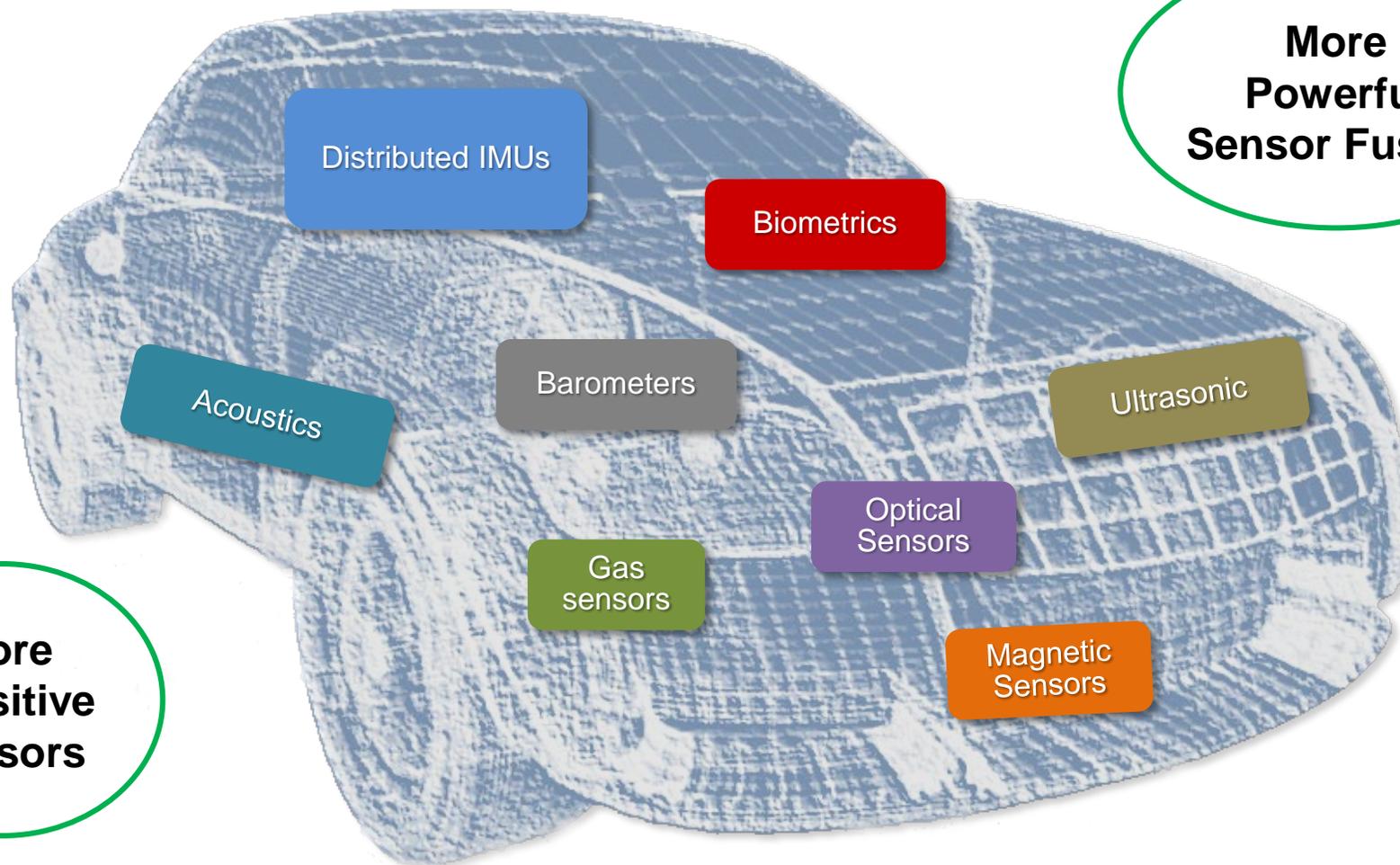


Multi-Motion Detection – Swarm of Sensors

Edge AI

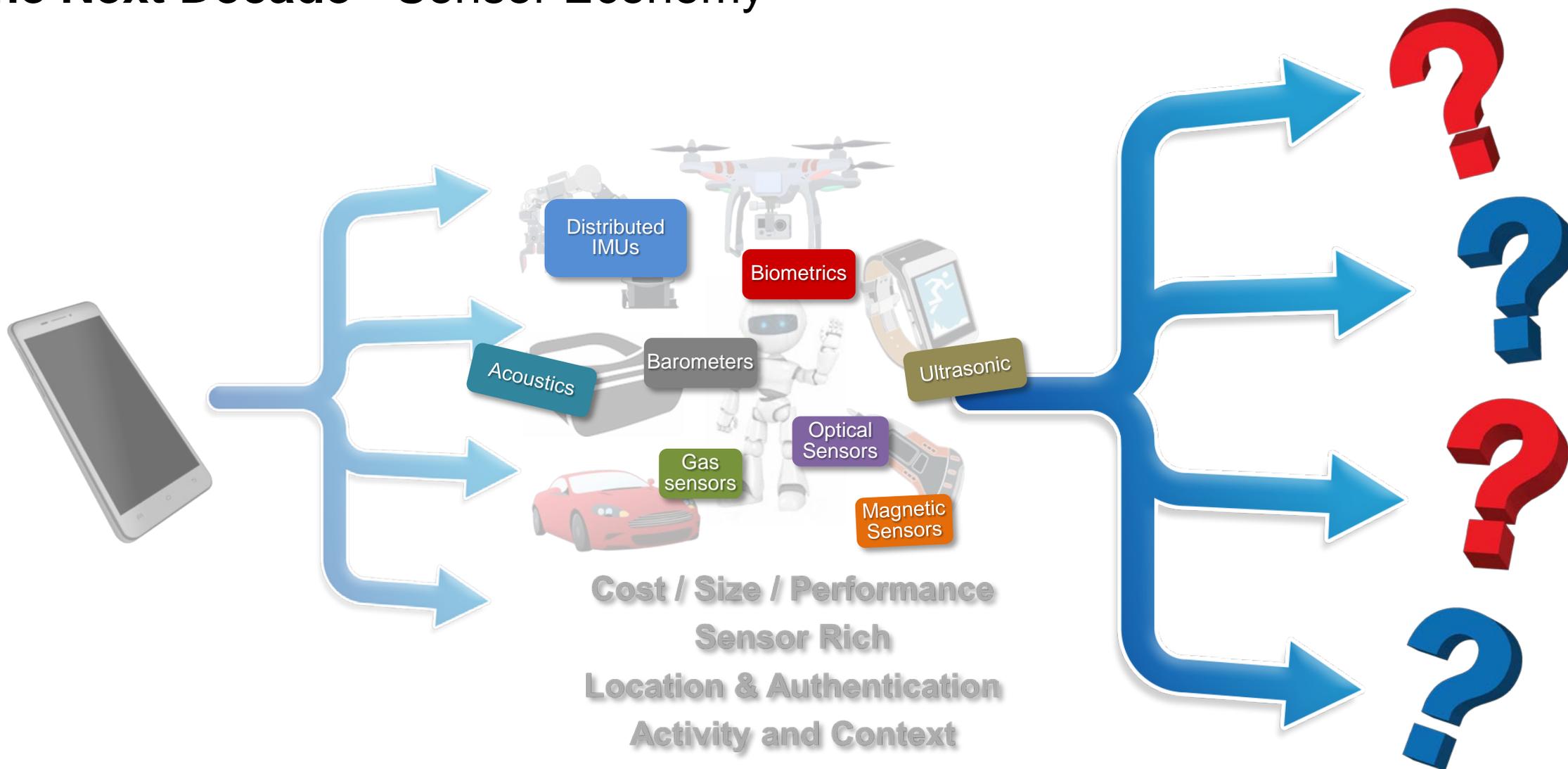
More Powerful Sensor Fusion

More Sensitive Sensors



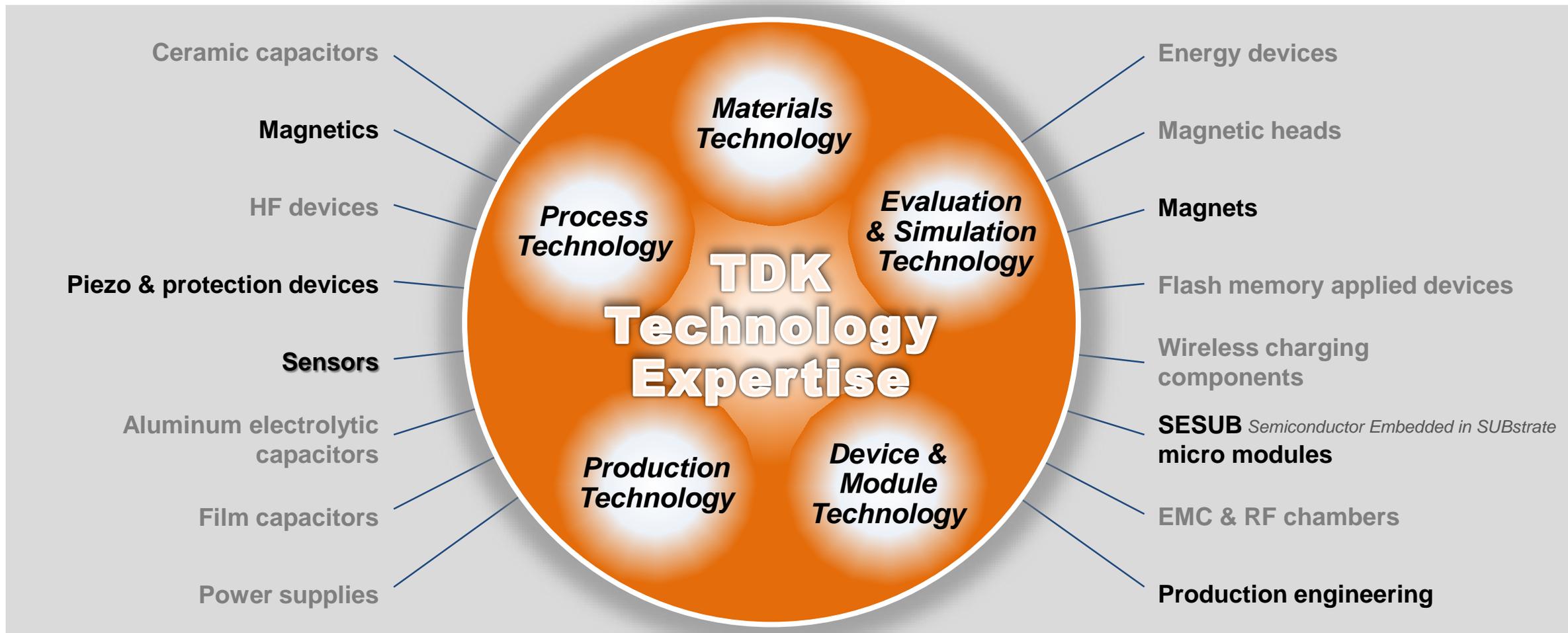


The Next Decade - Sensor Economy





TDK – The Materials Technology Company



Thank You!