Sensors for Drones & Robots

2016 report sample
WHO SHOULD BE INTERESTED IN THIS REPORT?

Sensor manufacturers and vendors:
- Evaluate market potential of future technologies and products for new applicative markets
- Screen potential new suppliers for introducing new disruptive technologies
- Monitor and benchmark your competitor's advancements

Robotic Companies:
- Spot new technologies and define diversification strategies
- Position your company in the ecosystem

Technology suppliers:
- Understand the strategy of top robotic players

Equipment & material manufacturers:
- Understand the ecosystem dynamics
- Understand the differentiated value of your products and technologies in this market
- Identify new business opportunities and prospects

Electronic manufacturer & original equipment makers:
- Evaluate the benefits of using these new technologies in your end system
- Screen and select new sensor suppliers

Financial & strategic investors:
- Understand the potential of technologies and markets
- Get the list of key emerging companies and start-ups
• From 2015 to 2021 the drones and robots market will grow from $27B to $46B with an expected +9.4% CAGR 2015-2021. Most (64%) of these revenues are generated by industrial robots.

• From 2015 to 2021 sensors for drones and robots will grow from $351M to $709M with an expected +12.4% CAGR 2015-2021. Most (74%) of these revenues will be captured by optical sensors.

• Revenue growth of sensors outperforms revenue growth of robots showing growing need for robotic sensing.

• There is no specific market driving revenue growth for sensors as revenues are spread across a large variety of applications. The first applications in terms of revenue being military drones, and the second is agriculture robots.
WAVES OF INNOVATION HAVE HAD THEIR BENEFIT

Robots & Drones
Each wave of innovation brings significant productivity improvements, robots are part of this (next?) movement

Are we entering the 4th industrial revolution?

The speed of technology change increases with time

Robots
Space travel
Ambient Intelligence
Agile processes

4th industrial revolution?

1800
1900
1975
2025

1st industrial revolution
2nd industrial revolution
3rd industrial revolution

Steam engine
Trains
Gas
Weaving machines

Petroleum engine
Cars
Electricity
Assembly line

Computers
Jet airlines
Microelectronics
Quality processes

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MEMS & SENSORS: BEYOND THE HUMAN SENSES...

Mems & sensors are enabling the robotic revolution

- **Vision**
  - CMOS Image Sensors
  - IR sensors
  - Micromirrors

- **Position**
  - Inertial devices & e-Compass
  - Micromirrors

- **Sound**
  - Microphones

- **Speech**
  - Micspeakers

- **Vision Focus**
  - CMOS Image Sensors
  - IR sensors
  - Micromirrors

- **Pressure**
  - Inertial devices & e-Compass
  - Micromirrors

- **Smell**
  - Gas & Odor sensors

- **Taste**
  - Humidity & Temperature sensors

- **Touch**
  - Force & Haptic sensors

- **Communication**
  - Oscillators, tuners & filters & switches
  - Gas & Odor sensors

- **Electrical**
  - Electrode sensors

Robot by Eset

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CONVERGENCES LEADING TO THE ROBOTIC REVOLUTION

Why now?

• Smartphones helped develop advanced microelectronic technologies at low cost

• Internet is providing communication / cloud computing infrastructure coupled with high demand for connected devices

• Autonomous vehicles R&D allow for high priced technology testbeds fueled by car brand search for differentiation

Smartphone
- Computing & Sensor platform
- Huge annual volume (>1Bu)
- Quick innovation cycle (<1Y)

Computing

Connectivity

Sensing

Automotive
- Century old concept experiencing huge transformations / going Electric, Autonomous, Shared
- ASP remains high (~$10k)

Internet
- Global connectivity
- From Computers (0.5Bu), to Mobile (2Bu), to Things (>)
- Cloud computing
Defense and manufacturing have been the traditional drones & robot markets.

Within 5 years the new robotic markets will grow from 14% to 28% of the global drones & robot market share.

These new markets will represent 2 times the share of the defense market, and half the share of the industrial market which will only represent 56%.

Drones & robots market breakdown 2015-2021

2015
$27B

2021
$46B

Industry 64%
Defence 18%
Consumer 8%
Commercial 4%
Transport 0%
Medical 3%
Security 3%

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CROSS SEGMENTATION

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DRONES & ROBOTS REVENUE FORECAST 2010-2021
by application (in $M)

Civilian usage of drones and robots is rising in revenues

Transport, Commercial and security segments are enjoying the best growth rates

The overall growth rate in drones and robots market revenue is +9.4% CAGR\textsubscript{2015-2021}
SENSORS & ROBOTS HAVE A BRIGHT FUTURE

Availability of sensors is an enabler to the robotics revolution

Technology

Advanced sensing technology
Replication of human senses
Basic sensing technology

Acceleration: The speed of technology change doubles every technology shift

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