Why service robots boom worldwide

IFR Press Conference, 11 October 2017
Brussels
International Federation of Robotics
Representing the global robotics industry

- Robotics turnover 2016: $40 billion
- More than 50 members:
  - National robot associations
  - R&D institutes
  - Robot suppliers
  - Integrators
- Sponsor of the International Symposium on Robotics (ISR)
- Co-sponsor of the IERA Award
- Primary resource for worldwide data on use of robotics – IFR Statistical Department
Speakers on the panel

Martin Hägele
Chairman IFR Service Robot Group
Head of Robot and Assistive Systems
Fraunhofer IPA, Stuttgart, Germany

Gudrun Litzenberger
IFR General Secretary
Frankfurt
Gudrun Litzenberger

Global Service Robot Market up to 2020
What is a service robot?

Industrial Robots

Service Robots

Professional Use

Personal/domestic

Industrial environments

Non-industrial environments

Picture source: Goldbeck, KUKA AG, Bosch Bonirob, Hetwin, SMP Robotics, Omron, International Submarine Engineering, Robert Bosch Hausgeräte, Wonder Workshop
Professional service robots: significant growth

2016: almost 60,000 units, +24%

Forecast 2017: +17% -almost 79,000 units

Forecast 2018 -2020: about 400,000 units
20% to 25% on average per year
### Main drivers: logistic systems

<table>
<thead>
<tr>
<th>Year</th>
<th>Logistic</th>
<th>Defence</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>189.7</td>
<td>25.4</td>
<td>27.8</td>
</tr>
<tr>
<td>2016</td>
<td>37.0</td>
<td>19.0</td>
<td>-</td>
</tr>
<tr>
<td>2017*</td>
<td>-</td>
<td>46.7</td>
<td>7.1</td>
</tr>
<tr>
<td>2018*-2020*</td>
<td>-</td>
<td>11.6</td>
<td>6.0</td>
</tr>
<tr>
<td>2017*</td>
<td>-</td>
<td>11.1</td>
<td>6.6</td>
</tr>
</tbody>
</table>

*forecast

Source: World Robotics 2017
Public relation robots and exoskeletons on the rise

Service robots for professional use. All other applications - 1 -
Units sales 2015 and 2016, forecast 2017* and 2018*-2020*

Source: World Robotics 2017
Good prospects for cleaning robots

Service robots for professional use. All other applications - 2 -
Units sales 2015 and 2016, forecast 2017* and 2018*-2020*

Cleaning	Inspection	Mobile platforms	Underwater	Rescue /security	All others

2015: 0.7	0.4	0.5	0.5	0.1	0.2
2016: 0.5	0.3	0.3	0.0	0.0	0.1
2017*:	0.1
2018*-2020*:	1.5

*forecast

Source: World Robotics 2017
Professional service robots: increasing turnover

2016: 4.7 US$bn, +2%

Forecast 2017: +12% - 5.2 US$bn

20% to 25% on average per year
Medical robots: most valuable

Service robots for professional use in main applications. Estimated values 2015 and 2016, forecast 2017*, 2018*-2020*

Source: World Robotics 2017

*forecast
Public relation robots: significant increase of turnover

Service robots for professional use. All others
Estimated value 2015 and 2016, forecast 2017*, 2018*-2020*

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017*</th>
<th>2018*-2020*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public relation</td>
<td>147</td>
<td>119</td>
<td>53</td>
<td>4,492</td>
</tr>
<tr>
<td>Exoskeletons</td>
<td>283</td>
<td>59</td>
<td>41</td>
<td>23</td>
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<tr>
<td>All others</td>
<td>506</td>
<td>135</td>
<td>112</td>
<td>131</td>
</tr>
</tbody>
</table>

*forecast

Source: World Robotics 2017
Professional service robots: more than 50% from the Americas

Service robots for professional use
Unit sales 2015 and 2016 by region of origin

<table>
<thead>
<tr>
<th>Region</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>32.5</td>
<td>25.9</td>
</tr>
<tr>
<td>Europe</td>
<td>15.9</td>
<td>15.6</td>
</tr>
<tr>
<td>Asia/Australia</td>
<td>11.3</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Source: World Robotics 2017
Personal/domestic robots on the rise

Service robots for personal/domestic use. Unit sales 2015 and 2016 by region of origin.

- **Americas**: 2016 - 2,979, 2015 - 2,402
- **Asia/Australia**: 2016 - 2,766, 2015 - 2,213
- **Europe**: 2016 - 991, 2015 - 816

Source: World Robotics 2017
Martin Hägele

- Dynamics of the service robotics industry
- Technological enablers
Number of service robot manufacturers of all types by region of origin (N=699)

Number of service robot manufacturers of all types (professional and personal/domestic use) by region of origin

- EU, 243
- CH, IL, NO, 50
- North America, 242
- Asia, 134
- Others, 30

Source: World Robotics 2017
Europe fares well in service robot start-up creation

Number of service robot manufacturers (professional and personal/domestic use) by country of origin

Criteria for Start-Up:
- Product/prototype on the market
- Business max 5 years of age
29% share of start-ups

Source: World Robotics 2017
European strongholds in service robotics suppliers: logistics, field, inspection/maintenance, construction

Number of service robot manufacturers by application areas (professional use) and by region of origin

- Europe
- North America
- Asia

Source: World Robotics 2017
75% of European service robot suppliers are SMEs

Business sizes of service robots of all types in numbers of employees
(by region of origin)

Source: World Robotics 2017
Start-up examples (I):
Service robotics in agriculture

- Fresh fruit picking robot
- Platform for vineyard maintenance
- Robotic weeder for vegetable farms

FF Robotics (Israel)  WALL-YE (France)  Naïo Technologies (France)

Source: FF Robotics, WALL-YE, Naïo Technologies
Start-up examples (II):
Service robots in public-relations

Unity Robotics (D)  Bots and us (UK)  Promobot (RU)

Source: Unity Robotics, Bots and us, Promobot
Start-up examples (III):
Service robots in logistics

Mobile Industrial Robots MiR (DK)  Fetch Robotics (USA)  Robotnik (ES)

Source: MiR, Fetch Robotics, Robotnik
Creating a European Eco-System in robotics

- **Robotic key-technologies**: perception, human-machine-interaction, mechatronics, safety, …
- **Software**: Major cost-/performance factor in service robotics, 30+% cost share
- **Supply industry** for robotics key-components, software (computer vision, motion control, mobile navigation etc.) emerges
- **Open Source Software** systems hugely popular; e.g. >2/3 of all service robot suppliers use Robot Operating System ROS (and other OSS)
- With **€700M in funding from EU 2014 – 2020**, **SPARC** is the largest civilian-funded robotics innovation initiative in the world.
Thank you!

Contact:
Gudrun Litzenberger
International Federation of Robotics IFR
c/o VDMA Robotics+Automation
60528 Frankfurt Main, Germany
Email: gl@ifr.org
Phone: +49 69 6603 1502
Internet: https://ifr.org/