# CONTENTS

**CONTENTS** ..... I

**I SERVICE ROBOTS** ..... 1

I.1 Introduction ..... 1
I.2 Service robots: definition and classification ..... 2
I.2.1 Preliminary definition ..... 2
I.2.2 Classification of service robots by application areas ..... 2
I.3 Cost-benefit-considerations in a nutshell ..... 5

**II DISTRIBUTION OF SERVICE ROBOTS** ..... 8

II.1 Service robots for professional use, stock of installations up to the end of 2008 ..... 9
II.2 Service robots for personal use, stock of installations up to the end of 2008 ..... 10
II.3 Projections for the period 2009 - 2012: Service robots for professional use ..... 11
II.4 Projections for the period 2009 - 2012: Service robots for personal and domestic use 11

**III MAJOR APPLICATION AREAS FOR SERVICE ROBOTS** ..... 15

III.1 Introduction ..... 15

III.2 Service robots for professional use ..... 17
III.2.1 Field robotics ..... 18
III.2.2 Professional cleaning ..... 26
III.2.3 Inspection and maintenance systems ..... 32
III.2.4 Construction and demolition ..... 36
III.2.5 Logistic systems ..... 43
III.2.6 Medical robotics ..... 47
III.2.7 Defence, rescue & security applications ..... 53
III.2.8 Underwater systems ..... 62
III.2.9 Mobile platforms in general use ..... 64
III.2.10 Robot arms in general use ..... 66
III.2.11 Public-relations ..... 67

III.3 Service robots for personal/domestic use ..... 69
III.3.1 Domestic tasks ..... 70
III.3.2 Entertainment robots, including toy robots and hobby systems ..... 76
III.3.3 Handicap assistance ..... 81
III.3.4 Automated personal transportation ..... 84
III.3.5 Home security and surveillance ..... 85
III.3.6 Humanoid robots ..... 86
Table III.1 Inventory of service robot manufacturers by application areas ..... 88

**IV SERVICE ROBOTICS TECHNOLOGY AND RESEARCH ROADMAPS** 109

IV.1 Summary of the Strategic Search Agenda for robotics in Europe ..... 110
By: Anne Wendel, EUnited Robotics, Belgium.....
IV.2 The Japanese technological Strategy Roadmap in Robot Technology ..... 118
By: Hideo Setoya, Manufacturing Science and Technology Center, Japan

**V CASE STUDY: Start-ups** ..... 122

**V.1** Bluebotics - Mobile robots at your service ..... 123
By: Nicola Tomatis, Bluebotics S.A., Switzerland

**V.2** Friendly Robotics - from vision to a mature company ..... 126
By: Udi Peless, Friendly Robotics, Israel

**VI THE 2009 IERA AWARD: Robot Suit HAI®** (Hybrid Assistive Limbs®) ..... 128

**VII SELECTED RESEARCH LAB PROFILES**

VII.1 Robotics in Denmark ..... 134
VII.2 The Danish centres of robotics R & D ..... 138