



Autonomous Underwater Vehicles: *Global Markets to 2022*

March 2018

B.L. Gupta

Report Code: IAS122A

Table of Contents

- Chapter 1: Introduction 1**
 - Study Goals and Objectives..... 1
 - Reasons for Doing This Study..... 1
 - Intended Audience..... 2
 - Scope of Report..... 2
 - Information Sources..... 3
 - Methodology..... 3
 - Geographic Breakdown..... 5
 - Analyst’s Credentials..... 10
 - Related BCC Research Report 10

- Chapter 2: Summary and Highlights..... 12**

- Chapter 3: Market and Technology Background 15**
 - Global AUV Market for Search and Salvage..... 16
 - Global AUV Market for Inspection, Maintenance and Repair of Offshore Oil and Gas Piping..... 18
 - Market: Regional Analysis..... 22
 - Global AUV Market for Military and Defense 22
 - Market: Regional Analysis..... 24
 - Global AUV Market for Hydrographic Survey 25
 - Role of Hydrographic Service 25
 - Global AUV Market for Scientific Research 28
 - Global AUV Market Related to Deep Sea Mining 29
 - Technology..... 31
 - Underwater Gliders 34
 - Configuration..... 37
 - Hull Material Options in AUV Construction 37
 - Propulsion Systems Used in AUVs..... 38
 - Power Options Used in AUVS 39
 - Computer Architecture Used in AUVs..... 39
 - Control Architecture Used in AUVS 40
 - Navigation Technology 41
 - Acoustic Modems Used in AUVs 42
 - Sensors Used in AUVs..... 43
 - Software Used in AUVs..... 43
 - Final Testing of AUV 44
 - Top Marine Contractors Using AUVs..... 46
 - Mergers and Acquisitions 48
 - Key Technology Trends in AUV Technology 49

- Chapter 4: Market Breakdown by Technology Type 51**
 - AUV Market..... 51

- Chapter 5: Market Breakdown by End User 70**
 - AUV Market by End User 70

- Chapter 6: Market Breakdown by Application 74**
 - AUV Market by Application..... 74
 - AUV Market Segments..... 76

AUV Market Subsegments	81
Chapter 7: Market Breakdown by Region	86
Global Regional Markets for AUVs.....	86
Chapter 8: Patent Review/New Developments	102
Overview	102
U.S. Patent Activity in AUVs by Assignee Country	102
U.S. Patents for AUVs	103
Chapter 9: Analysis of Market Opportunities	112
The Application of AUVs in Ice-covered Ocean Areas	112
AUV Market Opportunities	116
Chapter 10: Company Profiles	118
Appendix A: Glossary of Terms Related to AUVs.....	140
Appendix B: Organizations Associated with AUVs.....	144
About BCC Research	147
About BCC Research.....	148
BCC Membership	148
BCC Custom Research	148

List of Tables

Summary Table: Global Market for AUVs, by Application, Through 2022 (\$ Millions)	13
Table 1 Search and Salvage Usage of AUVs, 2017	16
Table 2 Capabilities of AUVs Used in Search and Salvage	17
Table 3 AUV Model Options and a Use Case for Search and Salvage, 2017	18
Table 4 Usage of AUV for Integrity Inspection of Offshore Pipeline Assets	19
Table 5 AUVs Operated on Contract in the Offshore Oil and Gas Industry, 2017	20
Table 6 AUV Capabilities Required for Inspection Work for Offshore Oil and Gas Pipeline.....	21
Table 7 AUV Model Options and a Use Case for Offshore Oil and Gas Piping Inspection, 2017	22
Table 8 Use of AUVs for Military and Defense, 2017.....	23
Table 9 AUV Capabilities for Military and Defense, 2017	23
Table 10 AUV Model Options and a Use Case for Military and Defense, 2017	24
Table 11 AUV Capabilities Required for Hydrographic Survey, by Subsegment.....	26
Table 12 AUV Navigation Capabilities Required for Hydrographic Surveys, 2017	27
Table 13 Hydrographic Survey AUV Model Options and a Use Case, 2017	28
Table 14 AUV Capabilities Related to Scientific Research	28
Table 15 Scientific Research AUV Model Options and a Use Case	29
Table 16 Deep Sea Mining AUV Capabilities, 2017	31
Table 17 Deep Sea Mining AUV Model Options and a Use Case, 2017	31
Table 18 Vehicle Classes of AUVs According to the U.S. Navy Standard	32
Table 19 Popular AUV Models in Use, 2017	32
Table 20 Current Options for AUV Vehicle Shapes	37
Table 21 Current AUV Pressure Hull Material Options.....	38
Table 22 Computer Architecture Used in AUVs.....	40
Table 23 Control Architectures Used by AUVs.....	41
Table 24 Navigation Technology Options Currently Used in AUVs.....	41
Table 25 Deep Ocean Optical Mapping Options Used in AUVs	42
Table 26 Acoustic Modem Options Used in AUVs	42
Table 27 Software Options Used in AUVs	43
Table 28 Marine Contractors Using AUVs, 2017.....	46
Table 29 New Funding in Development of AUVs during 2013-2017	47
Table 30 Mergers and Acquisitions in the AUVs Industry, 2015-2017	48
Table 31 Key AUV Technology Trends, 2017	49
Table 32 Global Market for AUVs, by Type, Through 2022 (\$ Millions)	52
Table 33 Global Market Share for AUVs, by Type, 2016-2022 (%)	52
Table 34 Global Market of AUVs, by Product Type, Through 2022 (\$ Millions)	54
Table 35 Global Market Share for AUVs, by Product Type, 2016-2022 (%).....	54
Table 36 Global Market for AUVs, by Technology, Through 2022 (\$ Millions).....	56
Table 37 Global Market Share for AUVs, by Technology, 2016-2022 (%).....	56
Table 38 Global Market for AUVs for Asset Location in Search and Salvage, by Product Type, Through 2022 (\$ Millions)	58
Table 39 Global Market for AUVs for Marine Archaeology in Search and Salvage, by Product Type, Through 2022 (\$ Millions).....	58
Table 40 Global Market for AUVs for Inspection, Maintenance and Repair (Oil and Gas Pipelines), by Product Type, Through 2022 (\$ Millions).....	59
Table 41 Global Market for AUVs for Anti-Submarine Warfare in Military and Defense, by Product Type, Through 2022 (\$ Millions).....	59

Table 42 Global Market for AUVs Used in for Intelligence, Surveillance and Reconnaissance, by Product Type, Through 2022 (\$ Millions)	60
Table 43 Global Market for AUVs for Mine Countermeasure, by Product Type, Through 2022 (\$ Millions)	60
Table 44 Global Market for AUVs Used for Force Protection, by Product Type, Through 2022 (\$ Millions)	61
Table 45 Global Market for AUVs for Explosion Protection, by Product Type, Through 2022 (\$ Millions) ..	61
Table 46 Global Market for AUVs Used for Beach Surveying, by Product Type, Through 2022 (\$ Millions)	62
Table 47 Global Market for AUVs Used for Cable Deployment, by Product Type, Through 2022 (\$ Millions)	62
Table 48 Global Market for AUVs Used for Cable Routing, by Product Type, Through 2022 (\$ Millions)..	63
Table 49 Global Market for AUVs Used for Coastal Mapping, by Product Type, Through 2022 (\$ Millions)	63
Table 50 Global Market for AUVs Used for Freshwater Surveying, by Product Type, Through 2022 (\$ Millions)	64
Table 51 Global Market for AUVs Used for Geophysical Surveying, by Product Type, Through 2022 (\$ Millions)	64
Table 52 Global Market for AUVs for Harbor and Port Security, by Product Type, Through 2022 (\$ Millions)	65
Table 53 Global Market for AUVs Used for Hull Inspection, by Product Type, Through 2022 (\$ Millions) ..	65
Table 54 Global Market for AUVs Used for Mineral Surveying, by Product Type, Through 2022 (\$ Millions)	66
Table 55 Global Market for AUVs Used for Oceanography, by Product Type, Through 2022 (\$ Millions) ..	66
Table 56 Global Market for AUVs Used for Oil and Gas Exploration, by Product Type, Through 2022 (\$ Millions)	67
Table 57 Global Market for AUVs Used in Scientific Research, by Product Type, Through 2022 (\$ Millions)	67
Table 58 Global Market for AUVs Used in Deep Mining, by Product Type, Through 2022 (\$ Millions)	68
Table 59 Global Market for AUVs, by End User, Through 2022 (\$ Millions).....	71
Table 60 Global Market Share for AUVs, by End User, 2016-2022 (%).....	71
Table 61 Global Market for AUVs, by Application, Through 2022 (\$ Millions).....	75
Table 62 Global Market Share for AUVs, by Application, 2016-2022 (%).....	75
Table 63 Global Market for AUVs, by Application, Through 2022 (\$ Millions).....	77
Table 64 Global Market Share for AUVs, by Application, 2016-2022 (%).....	77
Table 65 Global Market for AUVs, by Application, Through 2022 (\$ Millions).....	79
Table 66 Global Market Share for AUVs, by Application, 2016-2022 (%).....	79
Table 67 Global Market for AUVs in Search and Salvage, by Subsegment, Through 2022 (\$ Millions)	81
Table 68 Global Market for AUVs in Military and Defense, by Subsegment, Through 2022 (\$ Millions)...	81
Table 69 Global Market for AUVs in Hydrographic Surveying, by Subsegment, Through 2022 (\$ Millions)	82
Table 70 Global Market Share for AUVs in Hydrographic Survey, by Subsegment, 2016-2022 (%).....	82
Table 71 Global Market for AUVs, by Region, Through 2022 (\$ Millions)	86
Table 72 Global Market Share for AUVs, by Region, 2016-2022 (%).....	86
Table 73 Global Market for AUVs Used in Search and Salvage, by Region, Through 2022 (\$ Millions)	88
Table 74 Global Market Share for AUVs Used in Search and Salvage, by Region, 2016-2022 (%)	88
Table 75 Global Market for AUVs Used for Asset Location in Search and Salvage, by Region, Through 2022 (\$ Millions)	89
Table 76 Global Market for AUVs Used for Marine Archaeology in Search and Salvage, by Region, Through 2022 (\$ Millions).....	89

Table 77 Global Market for AUVs Used in Inspection, Maintenance and Repair of Offshore Oil and Gas Pipelines, by Region, Through 2022 (\$ Millions).....	90
Table 78 Global Market for AUVs Used in Oceanography, by Region, Through 2022 (\$ Millions).....	90
Table 79 Global Market Share for AUVs Used in Military and Defense, by Region, 2016-2022 (%)	91
Table 80 Global Market for AUVs Used in Antisubmarine Warfare in Military and Defense, by Region, Through 2022 (\$ Millions).....	91
Table 81 Global Market for AUVs Used in Intelligence, Surveillance and Reconnaissance in Military and Defense, by Region, Through 2022 (\$ Millions).....	92
Table 82 Global Market for AUVs Used for Mine Countermeasures in Military and Defense, by Region, Through 2022 (\$ Millions).....	92
Table 83 Global Market for AUVs Used in Force Protection in Military and Defense, by Region, Through 2022 (\$ Millions)	93
Table 84 Global Market for AUVs Used in Explosion Protection in Military and Defense, by Region, Through 2022 (\$ Millions).....	93
Table 85 Global Market for AUVs Used in Hydrographic Surveys, by Region, Through 2022 (\$ Millions) .	94
Table 86 Global Market for AUVs Used in Beach Surveying, by Region, Through 2022 (\$ Millions).....	94
Table 87 Global Market for AUVs Used in Cable Deployment, by Region, Through 2022 (\$ Millions)	95
Table 88 Global Market for AUVs Used in Cable Routing, by Region, Through 2022 (\$ Millions).....	95
Table 89 Global Market for AUVs Used in Coastal Mapping, by Region, Through 2022 (\$ Millions)	96
Table 90 Global Market for AUVs Used in Freshwater Surveying, by Region, Through 2022 (\$ Millions) .	96
Table 91 Global Market for AUVs Used in Geophysical Surveying, by Region, Through 2022 (\$ Millions)	97
Table 92 Global Market for AUVs Used in Harbor and Port Security, by Region, Through 2022 (\$ Millions)	97
Table 93 Global Market for AUVs Used in Hull Inspection, by Region, Through 2022 (\$ Millions)	98
Table 94 Global Market for AUVs Used in Mineral Surveying, by Region, Through 2022 (\$ Millions)	98
Table 95 Global Market for AUVs Used in Oceanography, by Region, Through 2022 (\$ Millions).....	99
Table 96 Global Market for AUVs Used in Oil and Gas Exploration, by Region, Through 2022 (\$ Millions)	99
Table 97 Global Market for AUVs Used in Scientific Research, by Region, Through 2022 (\$ Millions)....	100
Table 98 Global Market for AUVs Used in Deep Mining, by Region, Through 2022 (\$ Millions)	100
Table 99 U.S. Autonomous Underwater Vehicle Patents, by Assignee Country, January 2013–August 2017	102
Table 100 U.S. Autonomous Underwater Vehicle Patent Holders, January 2013–August 2017.....	103
Table 101 Key Factors Responsible for Driving the Market for AUVs, 2017.....	114
Table 102 Agencies Responsible for Creating the Market for AUVs, 2017.....	115
Table 103 Terms Used in Conjunction with AUVs.....	140
Table 104 Organizations Associated with AUVs, 2017	144

List of Figures

Summary Figure: Global Market for AUVs, by Application, 2016-2022 (\$ Millions)	13
Figure 1 Global Market Share for AUVs, by Type, 2017 and 2022 (%)	53
Figure 2 Global Market Share for AUVs, by Product Type, 2017 and 2022 (%).....	55
Figure 3 Global Market Share for AUVs, by Technology, 2017 and 2022 (%).....	57
Figure 4 Global Market Share for AUVs, by End User, 2017 and 2022 (%).....	72
Figure 5 Global Market Share for AUVs, by Application, 2017 and 2022 (%).....	76
Figure 6 Global Market Share for AUVs, by Application, 2017 and 2022 (%).....	78
Figure 7 Global Market Share for AUVs, by Application, 2017 and 2022 (%).....	80
Figure 8 Global Market Share for AUVs in Hydrographic Survey, by Subsegment, 2017 and 2022 (%).....	84
Figure 9 Global Market Share for AUVs, by Region, 2017 and 2022 (%)	87



About BCC Research

About BCC Research

With our unparalleled 45-year history, BCC Research provides comprehensive analysis of global market sizing, forecasting and industry intelligence, covering markets where advances in science and technology are improving the quality, standard and sustainability of businesses, economies and lives.

BCC Membership

From market sizing and forecasts, to opportunity assessments and competitive analyses, our ever-expanding library gives you the data, insights and intelligence required to ensure your project is a success. Members benefit from ongoing, unlimited access to the category or collections of their choice, and most membership packages pay for themselves within two to three reports being accessed.

Did you buy this report? You may qualify to apply your purchase price towards a full membership. Call 866/285-7215 or E-mail info@bccresearch.com to request a demo.

BCC Custom Research

Our experts provide custom research projects to those working to identify new markets, introduce new products, validate existing market share, analyze competition and assess the potential for products to impact existing markets. With impressive academic credentials and broad and deep knowledge of global industrial markets, our independent analysts and consultants develop the facts, figures, analysis and assessments to inform the decisions that will move your company ahead. Confidential inquiries to: custom@bccresearch.com or 781/205-2429.

DISCLAIMER

The information developed in this report is intended to be as reliable as possible at the time of publication and is of a professional nature. This information does not constitute managerial, legal or accounting advice, nor should it be considered as a corporate policy guide, laboratory manual or an endorsement of any product, as much of the information is speculative in nature. BCC Research and the author assume no responsibility for any loss or damage that might result from reliance on the reported information or from its use.

ISBN: 978-1-62296-641-7
March 2018