AUVs and ROVs –
Global Market Prospects

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Our Business

History and Office Locations
• Established 1990
• Aberdeen, Canterbury, London, New York & Singapore

Activities & Service Lines
• Business strategy & advisory
• Commercial due-diligence
• Market research & analysis
• Published market studies

Large, Diversified Client Base
• 750 projects, >400 clients, >70 countries
• Leading global corporates
• Energy majors and their suppliers
• Investment banks & PE firms
• Government agencies

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Major AUV market growth forecast

The 4th edition of Douglas-Westwood’s World AUV Market Forecast 2012-2016 expects major market growth over the next five years. The size of the existing fleet of reportedly active vehicles, stands at 560 in 2012 (up from 390 in 2009) and Douglas-Westwood forecast this to rise to 930 by 2016.

Sectors of the AUV market are already rapidly maturing and the value of the technology is receiving widespread acceptance in applications such as deepwater seabed mapping for the oil & gas industry, in ocean research and mine countermeasures surveys. The sector is also evolving, with pre-commercial activity evident in oil & gas life-of-field and pipeline inspections, together with increasing use of low-logistics vehicles and those designed for shallower water and flexible deployment. In addition there are potentially significant developments in many areas such as civil hydrography programmes and for ultra-long endurance missions in both the ocean research and military sectors.

Awareness is growing with AUVs receiving increased media coverage since their involvement in the post-incident monitoring of the Macondo blow-out in the US Gulf of Mexico. In the search for the flight data recorders from Air France flight 447 of Brazil.

The World AUV Market Forecast 2012-2016 contains:

- Identification and discussion of key underlying drivers and their influence on the global AUV market by sector
- Forecast activity 2012 to 2016, segmented by region & sector
- Segmentation by demand for AUV units
- Segmentation by commercial, military & research sectors
- Review of developments in technology
- Review of commercial landscape
- Complementary Volume 2: Technology & Applications discussing the technology of underwater vehicles
- Prospects
- Technologies
- World Markets

Why buy the report?

The original report goes beyond a simple breakdown and forecast for the key AUV sectors and provides unique insight and analysis gained from Douglas-Westwood’s many years’ experience of tracking the industry and providing commercial advisory services to AUV sector investors, manufacturers and operators.

The World AUV Market Forecast 2012-2016 is essential for financial institutions, technology developers, manufacturers and distributors, agencies and organisations responsible for mapping and monitoring the marine environment, offshore construction and rig move/drilling companies, oil & gas companies and survey organisations wanting to better understand where and when to make investment decisions.

- 4th edition of the original industry report
- Created by experienced analysts with a business planning and decision making
- Assumes no previous reader knowledge of the subject area
- Information sourced from DW’s extensive in-house databases and consultation with AUV manufacturers
- Benefits from DW’s industry forecasting expertise
- Shortened over many years
- A concise, sector-by-sector format allows for targeted view of markets
- All data is presented clearly and accessibly.

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Strong growth in demand for ROV support of offshore operations is the result of increased activity in subsea development activity.

Although ROVs are used in many sectors ranging from academic research to military applications and salvage, the largest commercial user is the offshore oil and gas industry, where they have become an essential tool for deepwater operations. This was clearly demonstrated recently in the subsea work to cap the Macondo blow-out in the U.S. Gulf of Mexico.

In the primary offshore oil & gas activity sector a long period of high oil prices and strong deepwater activity has driven orders for offshore drilling rigs to numbers not seen for decades. These rigs, together with large numbers of subsea construction vessels coming into the market in the years ahead, will drive ROV demand to new highs.

A unique market forecast
In this report DW forecast the market for the operation of work-class ROVs. Our research shows that all of the fundamental market drivers of the ROV business are in a period of growth, which is likely to continue for the foreseeable future. This new report forecasts that total annual expenditure on ROV support of subsea operations is expected to grow from $971 million in 2010 to $1,497 million in 2015.

Strong growth in ROV operations expenditure forecast to continue in all regions outside the Middle East, with Africa set to remain the largest market, followed by Latin America and North America.

Why purchase the World ROV Market Forecast 2011-2015?
- Geared to meet senior executives’ needs in business planning and decision making
- Assumes no previous reader knowledge of the subject area
- A concise, sector-by-sector format allows for targeted view of markets
- Analysis based on extensive in-house databases maintained by the DW team
- Benefit from DW’s industry forecasting expertise developed over many years
- All data is presented clearly and concisely

World ROV Market Forecast
This DW report provides a detailed forecast based on expert and proprietary data:
- Identification and discussion of key underlying drivers and defines their influence on the global work-class ROV market
- Historic and forecast activity 2000 to 2015, segmented by region & sector
- Segmentation by ROV type and market value
- Segmentation by drill support, construction support and IRM
- Detailed forecasts of ROV activities, including work requirements on subsea trees, umbilicals & risers, subsea processing, PSPO monitoring & reiterations, trunkline installation etc.

Technology & Applications
A detailed review of unmanned underwater vehicles, defining the respective roles of AUVs, ROVs, and UUVs, the technology involved and their applications is given in a separate Volume 2. This describes the development of the technology and gives many examples of the various types of ROVs, AUVs & UUVs. Individual sections discuss the fundamental technologies of positioning and obstacle avoidance; main vehicle components such as umbilical cables, testing, survey, sensors, controls and manipulation.

Part of an acclaimed series
The World ROV Market Forecast 2011-2015 is the latest in an acclaimed series of business studies, used by organizations in over 70 countries. These include major drilling companies, investment banks, OIMs, contractors, and government departments & agencies worldwide.

The Authors
Described as “top energy research group” by the Financial Times, energy business advisors Douglas-Westwood (a UK-based company) and the leading provider of energy consulting, research and commercial due diligence services. Since its formation in 1991, it has provided consultancy and information services to clients worldwide. With offices in London, Aberdeen, Houston, New York and Singapore, the firm acts as advisers to industry, commerce and government agencies.

Prospects
Technologies
World Markets

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From man to machine

Market drivers

Work class ROVs

AUVs

Conclusions
1950s University of Washington begins work on the ‘SPURV 1’ AUV

1980 Ifremer ‘Epaulard’ AUV operational
1983 SPAWAR ‘AUSS’ launched
1992 MIT Sea Grant AUV lab six ‘Odyssey’
1994 WHOI ABE first used
1996 ISE ‘Theseus’ FO cable under Arctic ice
1997 WHOI ‘REMUS’ AUV first mission
1997 Bluefin Robotics was founded
1998 ‘Autosub 1’ first scientific mission

2000 C&C Technologies & ‘HUGIN 3000’ in commercial operations
2012 technology trends

• Increased intelligence and on-board decision making
• Use of different unmanned vehicle types (AUV, ROV, EMDV, USV and UAV) to provide a complete remote solution for military
• Synthetic aperture sonar for MCM & REA but also in the commercial sector for pipeline inspection
• Increased integration of higher resolution side-scan sonar and sub-bottom profiling sonar on small AUVs
• Camera and lighting systems on commercial AUVs
• Intelligence enhancing systems for autonomous tracking of a pipeline
• Merging of low-power technology from gliders into powered AUVs to massively extend range whilst still retaining course-holding characteristics
• Move away from fuel cells and possibly towards energy sources those that utilise conventional diesel fuel
• Increased connectivity with AUVs whilst underwater
• Development of reliable autonomous docking, penetration-free recharging and wireless communication
From man to machine

**Market drivers**

Work class ROVs

AUVs

Conclusions
Three key markets

Market sectors

Offshore O&G

Defence

Research

Hydrography
Offshore oil & gas market drivers

- Growing offshore E&P programmes
- Deeper waters, remote and harsh environments (e.g. Arctic)
- Potential for life-of-field inspection solutions
- High costs of pipeline inspection using conventional systems
- Drives for efficiency and cost reduction with respect to vessel time
The problems of oil

- Global energy demand to double by 2030
- Growing oil demand, mainly from APac

- Spare oil production capacity collapse
  - Russian demand growth restricting exports
  - Have 8 of the top 11 oil companies peaked?
  - N Sea & Venezuelan production down

- Supplier instability reduces production
  - South Sudan -300,000 b/d
  - Libya -600,000 b/d
  - Syria -175,000 b/d
  - And Iran??

Source: Credit Suisse Global Commodities Research
The end of cheap oil?

- $111 Brent av. 2011 – up 13%
- Highest since 1860’s
- OECD inventories lowest since 2008

- High oil prices will drive increasing E&P spend
- But $150 could push the US into recession!

Annual Average Oil Prices (Brent)
Oil & Gas E&P spend forecasts grow

- Barclay’s $598bn E&P spend forecast in 2012, up 10%
- Many E&P co’s in ‘catch up mode’ on delayed projects
- Big focus on offshore, particularly deepwater
- North Sea decommissioning beginning
• Brazil’s pre-salt spend begins
• US GOM activity resuming
• Drilling $72bn (35%).
• Subsea processing emerging ($2.6 bn)
• Floating production build

Deepwater: $205 bn capex over next five years

Subsea production grows

Source: FMC Technologies

Subsea Hardware $135 bn

$20 bn in Subsea IRM

82 Subsea Ops Vessels Needed
Offshore ops & maint spend to see good growth

- >7,000 fixed & >200 floating platforms
- Five-year world spend to exceed $330 billion
- Plus demand for major modifications

Emerging opportunities – decommissioning

- e.g. UK; 260 platforms, 2.4 million t. steel, 5,000 wells
- Total spend to exceed $42 billion
- Wider impact as timing coincides with N Sea offshore windfarm build
Strong growth in offshore wind underway

- UK aiming to source 31% of electricity from renewables by 2020 (currently c. 9%)
- UK largest market but Germany to grow strongly
- Note Chinese activity

Trends: capacity, water depth & distance from shore all increasing

2015:  
Capex £10.6 bn  
Turbines 914

2010:  
Capex £3.1 bn  
Turbines 370

Source: Douglas-Westwood
• Defence industry faces budgetary cuts
• Literal zone operations
• Fleet reduction strategies promoting the use of multi-role platforms
• Integrated MCM systems, with a single command control interface
• Quieter submarine propulsion require new detection methodology
• Higher resolution sensors
• Widespread acceptance of unmanned technology
Research sector drivers

- Catastrophic events: the Macondo oil spill and the Japanese Tsunami bringing new focus and funding into marine science.
- Regional, national & international research ocean observation systems.
- Large-scale, long-term global issues such as climate change.
- Local, small-scale research activities.
- Desire for increased density and frequency of observations.
- Research needs in previously hard-to-reach areas such as under-ice that can only be met by unmanned systems.
Cross-sector drivers

- Demanning to reduce costs & increase safety
- Reducing the impact of high vessel costs
- Improving reliability of remote systems
- Advances in autonomous technology
- Increasing awareness & acceptance of unmanned systems
Focus of ROVs in oil & gas

Applications

AUVs in research & military
From man to machine
Market drivers
Work class ROVs
AUVs
Conclusions
A world fleet of 747 units operated by 21 major companies
Strong growth forecast for ROV operations

- ROV ops market to grow from $976 (2011) to $1,546 million
- Drilling to remain biggest sector
- Implies a need for an extra 221 units 2011-15

From man to machine

Market drivers

Work class ROVs

AUVs

Conclusions
• Numbers to triple in a decade
• Some 930 active units by in 2016
• USA to remain largest AUV sector player

Military & research AUVs to total 89%

- Strong linkages between military and research sectors
- Commercial application to grow but unit numbers small

From man to machine
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AUV conclusions

• A strong & growing market for AUV deliveries
• Military & research sectors to hold 89% of market (CAGR 12% & 8%)
• Commercial sector 11% market, but CAGR of 20%
• Emerging markets: Renewables, Site Survey, Life of Field, Rig Moves and Hydrography
• Long-term subsea operations such as LOF demand new technology
• Manufacturers: Kongsberg likely to dominate for some years.
• Companies with a large existing profile include Bluefin Robotics and ISE. Interesting developments in Cybernetix, Go Science & Subsea 7
• Strong growth in demand for work-class ROV operations
• Market expected to grow from $885 million to $1,546 in 2015
• ROV days for drilling support to grow at near 14% CAGR
• Construction support days growth of 6% CAGR.
• IRM activities to rise at 7%
• A further 221 units needed by 2011-2015
Thank you

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