

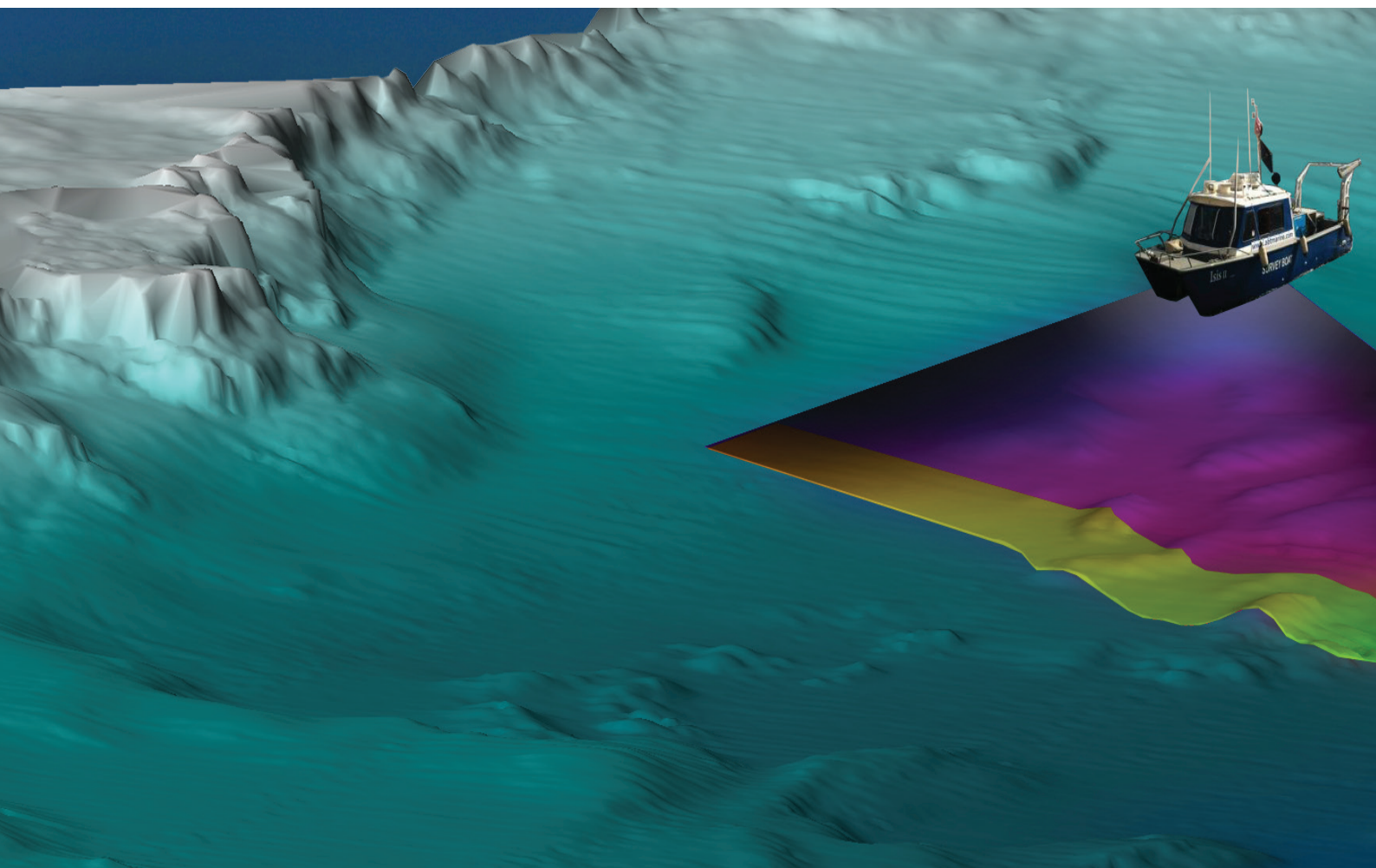


ABT Marine

Capability Statement



Excellence through Innovation and Quality



ABT Marine

Capability Statement

Created by AquaBioTech Group

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AquaBioTech Group

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www.abtmarine.com

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www.abtinnovia.com

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The **AquaBioTech Group** is an international aquaculture, fisheries and marine consultancy and engineering company with its headquarters strategically located in the centre of the Mediterranean, on the island of Malta, and with offices in five other countries. The location of **AquaBioTech Group** allows us to provide services to European partners, while keeping costs low. The network of **AquaBioTech Group** includes global clients in over fifty-five countries. Each department within the **AquaBioTech Group** has a specialised field of work, all related to aquatic sciences, engineering and technology. The **AquaBioTech Group** is primarily involved in aquaculture, fisheries, environmental and other marine/oceanographic projects.

ABT Marine is part of the **AquaBioTech Group**. As an independent marine hydrographic survey firm, we offer a broad range of capabilities in shallow water marine surveying, construction support, and precise positioning and project management within the marine industry. Our expertise covers a wide range of disciplines relating to marine data acquisition. Our key areas of expertise include:

- Hydrographic and mooring surveys
- Hydrographic mapping and 3D modelling
- Seabed classification / ground discrimination surveys
- Subsea inspections (ROV's drop down camera systems)
- Side scan sonar, single and multibeam and interferometric sonar surveys
- Precise positioning
- Marine salvage surveys
- GIS and RS data analysis
- Ground truthing surveys and sea bottom investigations

Marine Construction

Bathymetric and Side Scan Sonar Surveys

Geophysical Investigations

Bottom Type Assessments

Baseline Studies

Sub-Bottom Profiling Surveys

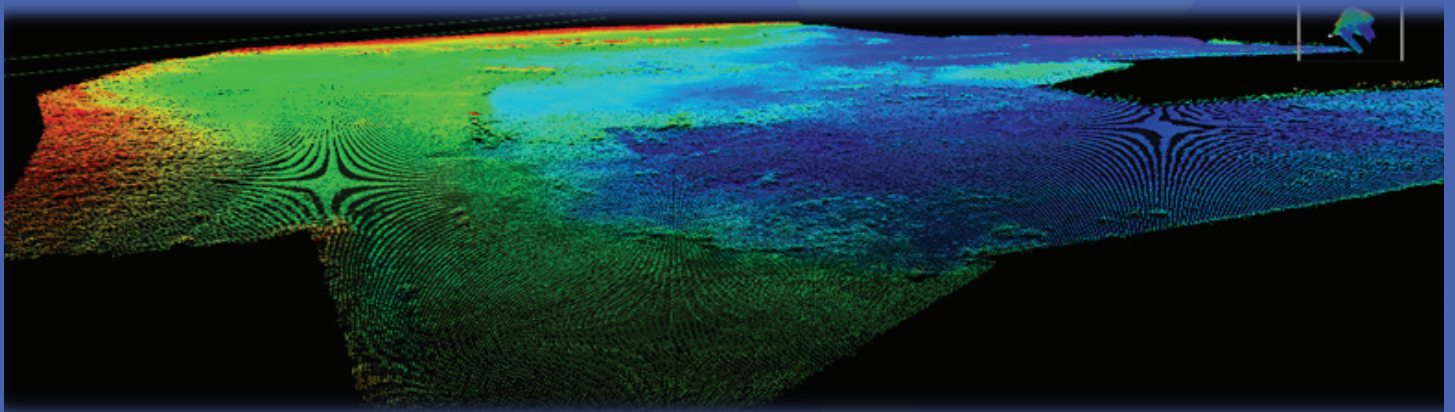
Marine Archaeology

Data Confirmation and Site Inspections

Search and Rescue

Support Services

**ABT
Marine**



ABT Marine is a relatively new division of the company, but nonetheless is established in the market and has undertaken assignments in the Mediterranean and Middle East. Projects undertaken include, but are not limited to:

- Marine survey for proposed offshore cage fish farms
- Seabed classification and bathymetric profiling in Yemen, Indian Ocean
- Bathymetric surveys for the University of Malta in the NW coast of Għawdex
- Offshore bathymetric mapping and classification for a potential wave-energy farm
- Coral mapping, seabed classification and bathymetric profiling in Saudi Arabia, Red Sea
- Marine bathymetric surveying of the entire coast of Malta Environment & Planning Authority
- Sub-bottom profiling for CNR-ISMAR (Italy) for geo-morphological studies into submarine landslides
- Sub-bottom profiling and bathymetry for Oil Tanking Malta as part of their land-reclamation studies
- Dredging support and bathymetry profiling for Transport Malta as part of their yearly Freeport surveys.
- Shipyard surveys, side-scan sonar, bathymetric and sub-bottom profiling, prior to the arrival of an FPSO platform

One of the largest assignments our company has undertaken in Malta related to the MEPA contract for the bathymetric mapping and grab-sampling of the entire Maltese coastline to one nautical mile or 300m depth. This competitive contract was awarded to our company as part of a consortium proposal whereby German partners performed terrestrial topographic LIDAR survey whilst our company undertook the marine surveys.

Future Expansions

The **AquaBioTech Group** is continuously obtaining new contracts, primarily but not limited to the growing aquaculture sector. Our offered services are being implemented in areas such as United Arab Emirates, East Africa and Kuwait. **ABT Marine** strives to offer additional services to complement **AquaBioTech Group's** diverse portfolio of products and services. Future expansions will include:

- Expand offshore testing capabilities
- Marine surveying courses (based in Malta)
- Risk assessments for fish cage installations
- Habitat modelling for fish restocking practices
- Pre and post fish cage installation survey inspections
- Assisting with marine survey department development in SMEs and research institutes

Marine Construction

By employing 3D bathymetric, side scan and sub-bottom profiling technologies, accurate depth, sea-bottom and sub-bottom representations of a geographic area can be acquired. Bathymetric data can be collected in efficient time frames to assist in the planning of marine construction projects, dredging works or subsea installations.

Geophysical Investigations

Side scan sonar is the industry-standard technology for detection of wreckages, obstructions and underwater objects. **ABT Marine** is capable of deploying its side scan sonar technology, which features effective working depths down to 300 metres. The acquired high image resolution aids in the detection of lost equipment, detached mooring structures, geological features and virtually any object laying on the seafloor. The data acquisition techniques can vary, but they generally employ a combination of side scan sonar and sub-bottom profiling to detect features both on the surface and below the seabed. 3D bathymetry can be used to discover undetected changes in the topography of the seafloor.

Marine Archaeology

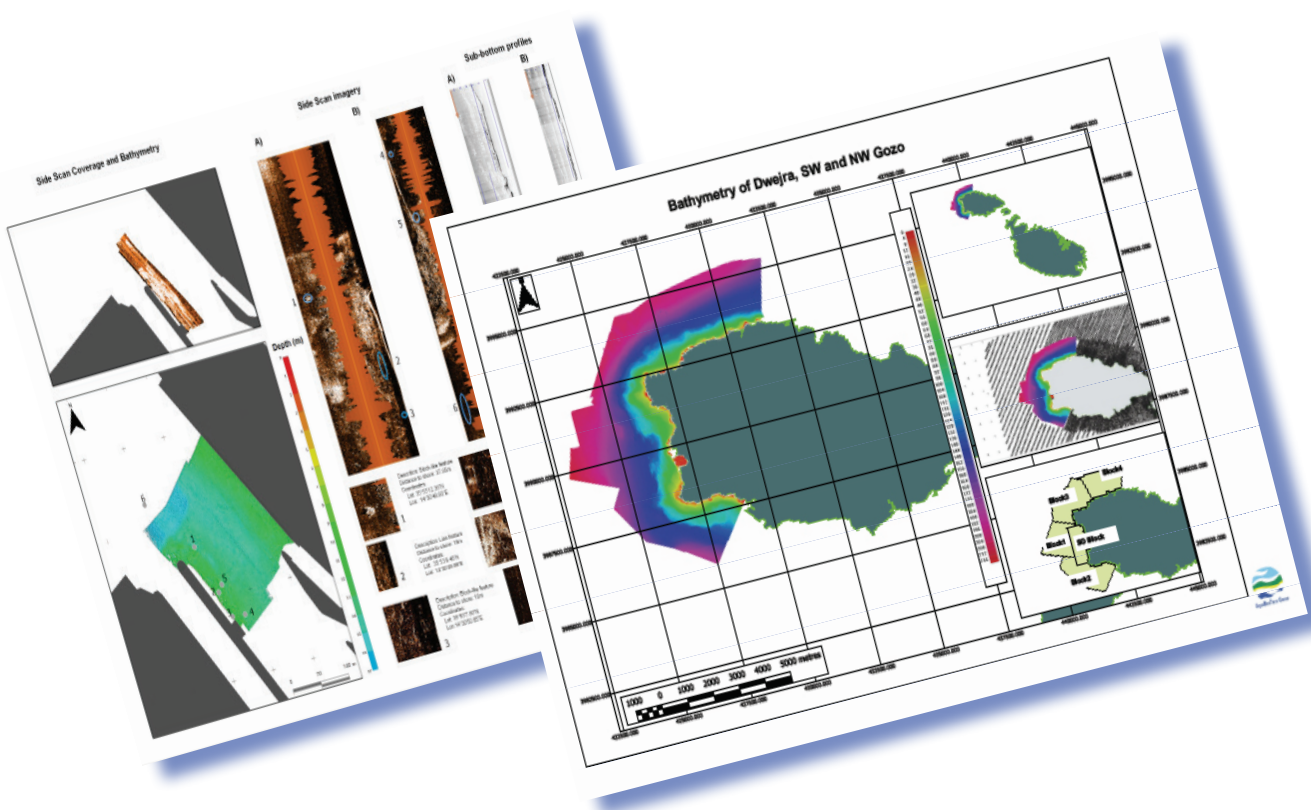
ABT Marine has been involved in many marine archaeology projects for governments and universities throughout Europe. Our marine survey technology and expertise can be used to locate wrecks as well as defining their dimensions, age, probable cargo and destination.

Baseline Studies

General baseline and environmental risk data can be acquired using the whole range of **ABT Marine's** solutions. Marine charting, detection of objects, habitat mapping, seabed classification and oceanographic sampling techniques can be used to bring together an updated snapshot of a determined

Search and Rescue

Side Scan and ROV technology can be deployed for search and rescue purpose. ROV can be used to investigate unattainable or risky places for divers. ROV can also use its manipulation jaw to pick up items, bodies or debris. Thanks to its accuracy, these sonars can be used to locate wrecks, bodies, black boxes and any kind of debris.

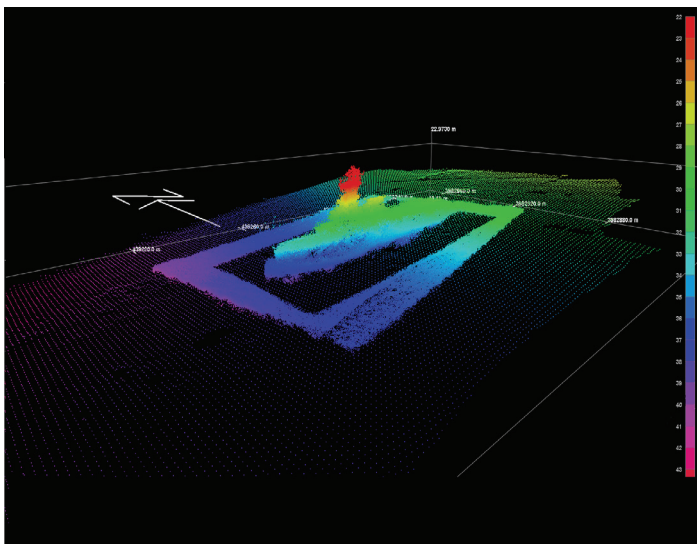


Bathymetric and Side Scan Sonar Surveys

ABT Marine is able to offer fully comprehensive seabed mapping composed of Bathymetric and Side Scan surveying, down to depths of 300 metres. Bathymetric data shows an accurate, color-coded depiction of seabed elevation that can be presented in 2D or 3D according to the nature of works or requirements of the client. This technique is ideal when accurate depth profile information is necessary to support marine construction, aquaculture sea cage installations, and environmental assessments, dredging works, wind farm locations selection and many other marine activities. Side Scan Sonar data provides a flat, monochromatic, picture-like representation of the surveyed area. Side Scan data alone does not represent bathymetry (depth), but its image resolution allows for detailed examinations of the seabed where obstructions, wreckages, debris, boulders, cables, habitats or any other feature must be identified.

Bottom Type Assessments

In addition to seabed mapping, **ABT Marine** can provide ground discrimination/benthic mapping. Our technology can be applied to provide accurate geographically referenced data on benthic characteristics. This technology can be used as a stand-alone application or in conjunction with bathymetric/side scan surveys.



Sub-Bottom Profiling Surveys

Additional sub-bottom type assessments can be performed by sub-bottom profilers. Powerful, low frequency echo-sounding devices can be used to obtain information of the upper layers of the ocean bottom, down to 40 meters.

Support Services

In addition to our hydrographic services, **ABT Marine** offers a range of solutions to complement data acquisition activities. Data post-processing, data quality control and GIS modelling can be performed in-house while support surveys employing precise positioning, ecosystem samplings and SCUBA/ROV investigations can be used to confirm previously acquired data in the field.



Marine Service Areas

- Seabed bathymetric services
- Marine construction support
- Sediment classification sampling
- Baseline environmental monitoring
- Aquaculture site pre-installation surveys

Water and sediment quality studies

Measurement and analysis of seawater, freshwater physical and chemical quality including biotic and abiotic parameters such as temperature, salinity, density, dissolved oxygen, pH, turbidity, color, Secchi transparency, nitrites, nitrates, phosphates and sulfides as main quality parameters that affect certain human activities as aquaculture development including site selection studies, using spectrophotometry. Sediment quality and properties analysis including granulometry and pollution.

Lagoon studies

Lagoons are special and sensitive coastal ecosystems. They serve as wintering areas of migratory species (mainly birds) and nesting areas of protected species. At the same time, most of these water bodies are exploited for fisheries and aquaculture and they receive strong pressure from other economic activities such as agriculture and livestock (pollution from chemicals and by-products), uncontrolled tourism, illegal hunting and more. Lagoons also offer important ecosystem services that need to be preserved and enhanced such as carbon sequestration, protection from flooding and storms and biodiversity. Services offered include lagoon management plans, lagoon engineering, water and sediment quality analysis, measurements, and telemetry applications for on-line and real time monitoring of quality.



Marine Spatial Planning and MSFD

Services include the study of the effects of spatial planning and Marine Strategy Framework Directive (MSFD) on coastal and marine economic activities and their conflicts. The quantification of negative externalities of economic activities (coastal and marine) as the result of the application of MSFD policies at the national and regional (Mediterranean) levels. **AquaBioTech Group** offers its collaboration in projects which focus on the collection and measurement of raw data required for the national MSFD reporting and establishment of GES.

Stakeholder management and participation

Stakeholder assessment and identification per project requirement and needs. Stakeholder surveys using structured questionnaires and statistical stratification techniques. Stakeholder categorization and stakeholder expectation assessment using CHAIN analysis. Stakeholder participation methodology applications and organisation of workshops and roundtables.

Marine litter surveys

Study of the distribution and quantification of main litter categories on the sea bottom, through commercial fishing activities using trawls, the coast, by visual analysis of plots, and the water column, by special towed net samplers.



Integrated Coastal Zone Management studies

Holistic management studies of the human economic activities, which compete for space and resources along the coastal zone including fisheries, aquaculture, tourism, industry, primary land production (agriculture, livestock), urbanisation and protected areas and ecosystems. Identification and quantification of ecosystem services as coastal exploited resources and their preservation and conservation in favour of the local inhabitants and their economic activities. Conflict management and resolution studies between coastal human activities including coastal engineering and site selection of activities. Establishment, study and management of Marine and Freshwater Coastal Protected Areas. Data collection and estimation of integrated coastal zone management indicators based on the DEDUCE and PEGASO factsheets with knowledge on more than 300 indicators that have been proposed until today. Analysis of natural phenomena and the effects of climate change on the coast and the coastal economic activities.

The new Common Fisheries Policy: sustainability in depth

What?

- MSY**
Maximum Sustainable Yield is the best possible objective for renewable and profitable fisheries, harvesting the maximum amount of fish on a long term basis.
- Regionalisation**
Natural resources and the socioeconomic fabric vary greatly from one place to another. A balanced representation of local stakeholders knows best how to apply EU rules in their respective areas.
- Fisheries science**
Scientific advice is the basis for good policy making, setting fishing opportunities according to the state and productivity of fish stocks.
- Multiannual plans**
Contain the goals and tools for fish stock management and the roadmap to achieving the objectives in a sustainable and inclusive way.

How?

- Rules**
Because fishing is an activity that exploits common natural resources, it needs to be regulated to safeguard fair access, sustainability and profitability for all.
 - Total Allowable Catches
 - Fishing licenses
 - Boat capacity management
 - Reducing environmental impact
 - Minimum fish and mesh sizes
 - Design and use of gears
 - Closed areas or seasons
- Discards**
The landing obligation (to be gradually introduced from 2015 to 2019), prohibits this wasteful practice and will provide more accurate data on real catches, and will be a driver for more selectivity and better planning.
- Targeted funding**
For low impact, small scale local fleets, important for employment, marine stewardship and holding together the coastal communities.
- Aquaculture**
With wild fish no longer able to supply the world population, sustainable aquaculture is called to meet the growing demand for seafood.
- Control**
Good management relies on awareness, compliance and enforcement. Sufficient and reliable data must be collected, managed and supplied by Member States.

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Common Fishery Policy Studies

Participation in CFP supporting LOT contracts. Effects of CFP policies and resulting regulations on the national and regional (Mediterranean) commercial and sport fisheries, aquaculture and processing sectors. Effects of national policies and legislation on the fisheries and aquaculture sectors. Topics include fisheries and aquaculture production, aquaculture site selection, fishery product processing quality, consumer product quality and fishing fleet management. In addition, the services offered include conflict studied and resolution among fishing fleet and métier segments, conflicts between commercial and sport fishermen and conflicts between commercial fisheries and aquaculture.



SWATHplus

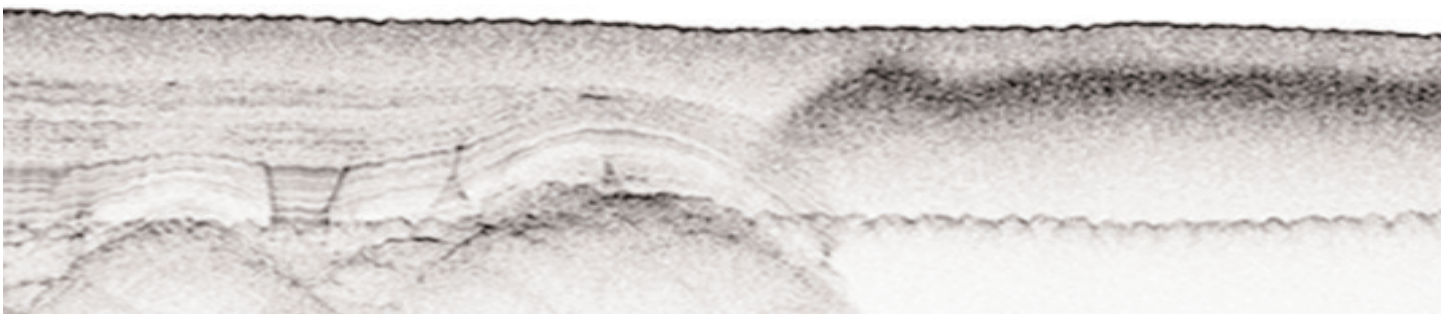
The SWATHplus is a sonar system for surveying underwater surfaces, providing high-density bathymetric data and seafloor imagery. The SWATHplus sonar system produces 3D digital terrain models and side scan imagery. Being IHO-S44 capable, this interferometric sonar comes with dual 117 KHz transducers that offer a depth range of 300 metres and maximum horizontal ranges of 600 metres depending on depth and weather conditions. The system works in real time with its own post-processing software to output bathymetry, reflectivity files, plot files, processed files and semi-raw files in a number of industry standard formats compatible with mainstream GIS and hydrographic software applications.

SHIPMOTION SMC-108

The SWATHplus is a sonar system for surveying underwater surfaces, providing high-density bathymetric data and seafloor imagery. The SWATHplus sonar system produces 3D digital terrain models and side scan imagery. Being IHO-S44 capable, this interferometric sonar comes with dual 117 KHz transducers that offer a depth range of 300 metres and maximum horizontal ranges of 600 metres depending on depth and weather conditions. The system works in real time with its own post-processing software to output bathymetry, reflectivity files, plot files, processed files and semi-raw files in a number of industry standard formats compatible with mainstream GIS and hydrographic software applications.

EDGETECH 3100

Sub-bottom profiling systems identify and measure various marine sediment layers that exist below the sediment/water interface. These acoustic systems use a technique that is similar to single beam echo sounders. Sub-bottom profiling systems can be useful for characterising benthic habitats since they provide information about sub-surface sediment structure. No other acoustic technique provides this type of information and only physical sampling via drilled cores will allow for characterisation of subsurface structures. Under proper conditions, a sub-bottom profiler can read down to 300 metres below the seabed, which is considerably deeper than cores can penetrate.



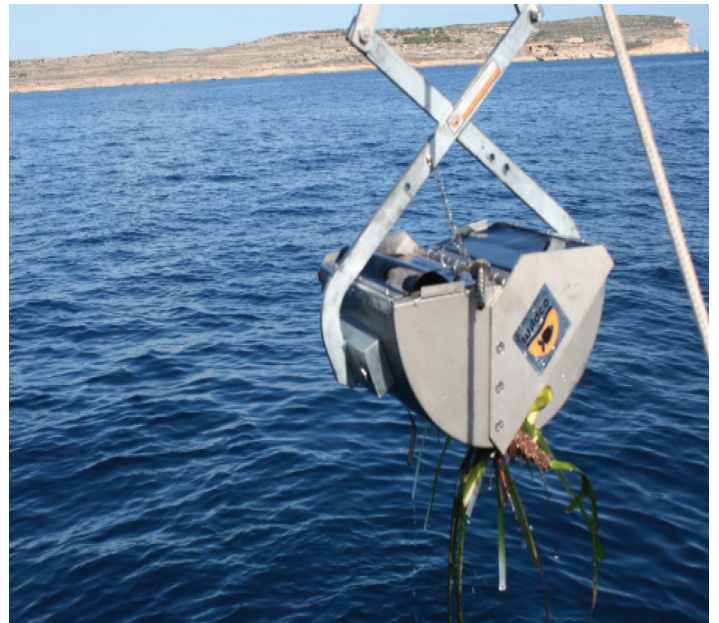
VALEPORT MINI SVP

Sound velocity compensation data will be acquired using a Valeport Mini SV sound velocity profiler. Considered as being the world's most accurate sound velocity probe, the Rapid SV probe operates with an almost instantaneous response time providing the highest quality sound profiles.



VAN VEEN PONAR SEDIMENT GRAB

For the benthic sampling a Van Veen type self-triggering sampler will be used that uses a spring-loaded pin which releases when the grab makes impact with the seabed. The sampler is able to take clean samples with minimal lateral losses and is ideally suited for the substrate area we will be sampling. The stainless steel SS316 construction ensures that proper cleaning can be performed on the grab prior to each sample. Once the samples have been collected, they can be sieved to identify benthic animals of varying sizes and to determine the sediment grain size distribution of the seabed.



ABT Marine has a number of marine survey/research vessels available enabling us to cover all types of shallow-water and offshore surveys. All of our vessels are capable of good cruising speeds for rapid deployment and economical survey speeds for good fuel efficiency. Accommodation is available on one of the offshore vessels and all the necessary gear for deployment and recovery of sensing equipment. A work area at the stern provides space for easy deployment of all types of equipment and direct access to the interior where the topside units and laptops are located.

Suitable Uses of the Vessels:

- Swathe surveys
- Magnetometer investigations
- Hydrographic survey support
- Metocean equipment deployment
- ROV inspections (recoveries, filming)
- Environmental studies (trawling, benthic)
- Geophysical surveys (pinger, boomer, SPB)
- Resource Recovery
- Positioning services
- Seabed classification
- Bathymetric mapping
- Sidescan sonar surveys
- Marine Heritage / Archaeological Services

Deep Trekker ROV

AquaBioTech Group houses a mini Deep Trekker ROV. This new addition to the marine surveying department allows our qualified staff to perform various underwater observations at ease. The Deep Trekker ROV can be used in a variety of sectors including: aquaculture monitoring and net inspections, marine biodiversity and salvage surveys, and water and sediment sample collection. The ROV is fitted with 330° range of view camera, auxiliary lighting, a two-function grabber arm and four vector thrusters to enhance lateral movement. The unit is connected to a topside hand-held control module. This system is very portable and has a small footprint, making it easy to mobilise and incorporate into any project if needed.





MV "SAHARA Z III"

Characteristics

Principal Features:

- Vessel Type: Rigid Inflatable Boat
- Length Overall: 7.3m
- Vessel use: Survey / Research / Supply

Navigational Equipment

- Furuno colour echo sounder
- Garmin GPS with integrated AIS

Registration:

- Port of Registry: Valletta, Malta
- Official Number: 9307
- Gross: 2.67 tons
- Built: 2004

Accommodation:

- Passengers: 5
- Crew: 1



MV "WILFRED"

Characteristics

Principal Features

- Vessel Type: Glass Fiber
- Vessel use: Survey / Research / Supply
- Length Overall: 11 m

Navigational Equipment

- Simrad radar
- Robertson Autopilot
- Furuno colour echo sounder
- Garmin GPS with integrated AIS

Registration:

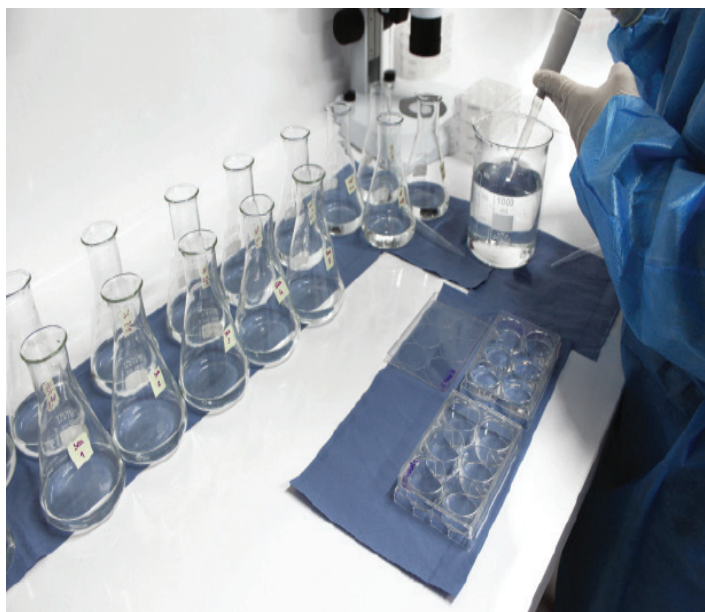
- Port of Registry: Valletta, Malta
- Official Number: 11682
- Gross: 14.11 tons
- Built: 2001

Accommodation:

- Berths: 4
- Seating Capacity: 12

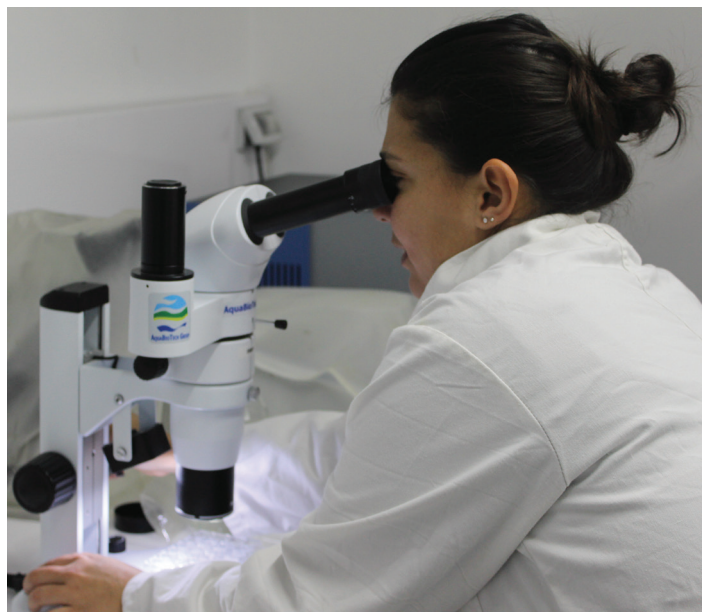
Internal Analysis and Practices

- Tagging
- Histology
- Microbiology
- Spielberg test
- Digital imaging
- Vaccine residue
- General Biometry
- Optical microscopy
- Elastomer and PITs
- Examination via gross necropsy
- Physiological / Biochemical parameters



With Partner Laboratories and Research Centres

- HPLC
- ELISA
- RT PCR
- Sediment analysis
- Off flavouring / MIB
- Viral isolation and cell culture
- Enzymatic activity at tissue level
- Protein expression in specific tissue
- Proximate composition of whole body or target organs

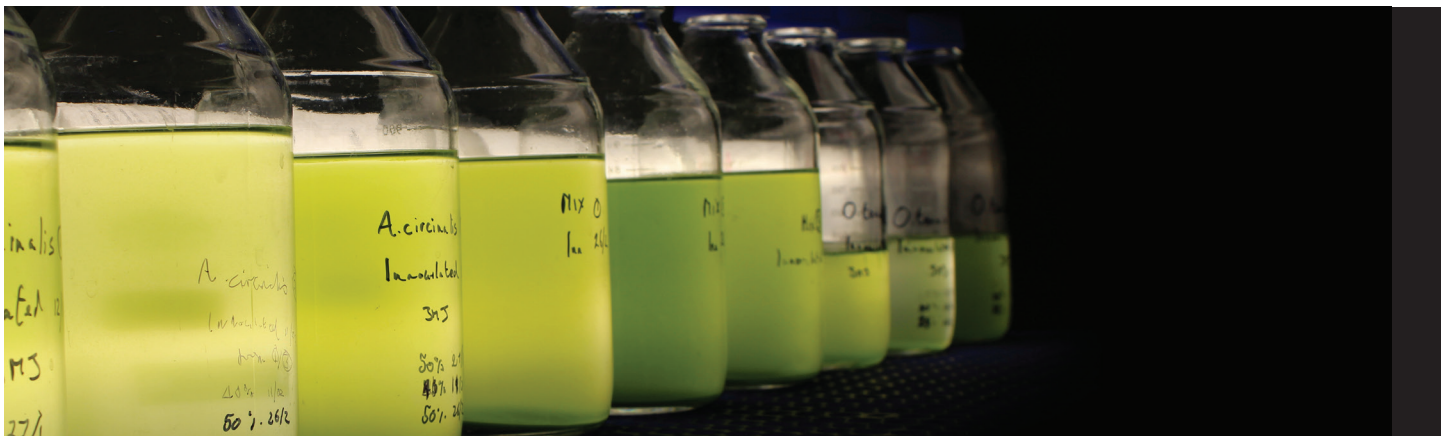


The **AquaBioTech Group** is actively involved in research and academic activities at both National and European level, either in collaboration with local universities and public bodies or as part of larger consortia which takes part in Europe's main research schemes.

In Malta: Collaboration with the University of Malta performing oceanographic work such as ROV surveys, seabed mapping and sampling work.

EU: Active involvement in collaborative research projects and other initiatives. Currently **AquaBioTech Group** is actively involved in 2 running FP7 and 3 Horizon 2020 projects whilst many more have been completed.

International: The **AquaBioTech Group** collaborates at an international level with various stakeholders under the MarTERA, PRIMA Initiative (ERA-NETs), JPI Ocean, Eureka-Eurostars Programme and other initiatives focusing on research, business and technology co-operation.



As part of its sustained commitment to increase training and educational opportunities in themes related to marine biology and ecology, the **AquaBioTech Group** offers a number of short, intensive, hands-on courses in the marine sciences.

Marine Biology Course

A stimulating three (3) day course organised by the **AquaBioTech Group** in Malta, including lectures on marine biology, the underwater life and the formation of the Mediterranean Sea led by Prof. Alan Deidun. SCUBA diving and snorkelling sessions with PADI certified instructors and marine biologists are also part of this course.



Antifouling Training Course

AquaBioTech Group organized a training course on antifouling testing and aquaculture consisting of both practical and theoretical elements. Lectures were given on the fundamentals of antifouling testing (mechanisms of common biocides, antifouling testing models, major marine habitats, etc.) and aquaculture (general overview, obstacles, biofouling in aquaculture, recent trends, etc.). Practical antifouling tests were executed in **AquaBioTech Group's** laboratories on anti-macrofouling bioassays, chlorophyll analysis via spectrophotometry and biomass determination. Participants were able to visit the **AquaBioTech Group** field test sites and perform semi-quantitative assessment of fouling communities on coatings for the shipping and aquaculture industry.



Marine Surveying Introductory Course

AquaBioTech Group hosts an interactive 4 day course which offers an introduction to marine surveying and the various tasks involved. The course will be comprised of classroom theory and in-field equipment deployment experiences to offer the best hands-on experience. During the classroom sessions, the students will learn about the various sectors of marine surveying, ranging from habitat mapping and offshore constructions to coastal geological surveys. The field component will incorporate the applications marine surveying used in Malta's marine environment.



The facilities at **AquaBioTech Group** offer a unique experience for undergraduates and post-graduate students to gain valuable exposure to the aquaculture and aquatic research industry. The **AquaBioTech Group** encourages such prospects to undertake training sessions to advance their practical and hands-on skills. Many of the past students that have undertaken placements within the various companies of **AquaBioTech Group** have linked their training to EU or state funded training sessions. Training placements range from 3 to 12 months.

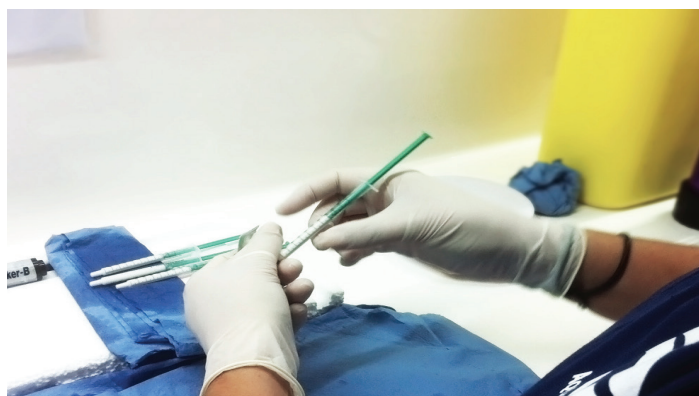
AquaBioTech Group offers placements ranging from 3 to 12 months within the four entities:

ABT Innovia offers research services to support the development of vaccines, functional feeds, alternative protein sources, culture technologies and production techniques with a wide range of commercially important species under any combination of culture conditions in our fully licensed and bio-secure R&D facilities.

ABT Aquaculture has developed a number of highly efficient and cost effective Recirculating Aquaculture Systems (RAS). These can be applied to hatcheries, broodstock, aquatic research and on-growing operations. Our highly sustainable approach incorporates aquaponics and hydroponic systems. We constantly strive to be at the forefront of our industry by testing and developing innovative technologies.

ABT Marine provides a range of services including marine surveying, construction support and mapping/GIS. The techniques we employ include bathymetric and side scan sonar surveys, bottom type assessments, sub-bottom assessments, data confirmation and site inspections using both remote sensing and underwater video techniques.

ABT Aquatics main areas of work undertaken range from initial feasibility studies, outline planning with concept development, architectural & structural design with engineering, filtration and Life Support System (LSS) development, through to livestock supply, management support and turnkey operations.



The **AquaBioTech Group** provides ample opportunity for students and trainees to develop skills and know-how in the various fields of activity in which it operates: fish rearing, aquaculture engineering, water chemistry, fish health and nutrition, toxicology, marketing, project management, business development etc.

We have been receiving an increasing number of trainees over the years, coming from all over the

world and contributing to, and enriching our international dimension. We are familiar with the EU framework and the Erasmus+ program, and are ready to provide the necessary help regarding the administrative and scholarship requirements.

We look forward to welcoming all applicants that wish to enhance their CV with a new, significant and professional experience for a duration of between 3-12 months.



Rodolfo Villalobos
Costa Rica



Tanya Ribakoff
United States



Marie-Teresa Grobler
Zimbabwe



Imen Bouhlel
Morocco



Day Thanh Pham
Vietnam



Lucie Toque
France



Nelli Varsányi
Hungary



Sergio A. Gayoso
Spain

Canada

USA

Mexico

Colombia

Venezuela

Costa Rica

Brazil

Portugal

Norway

UK

Ireland

Germany

The Netherlands

France

Italy

Spain

Russia

Poland

Hungary

Slovenia

Moldova

Bulgaria

Turkey

Vietnam

Greece

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