Airborne LiDAR Bathymetry

Utilising a sophisticated laser sensor fitted to an aircraft, the Fugro LADS Mk 3 ALB system accurately measures water depth and collects supporting data over both the marine and coastal zone environments. An environmentally friendly design enables the system to operate from a wide range of aircraft, including small turbo props or rotary winged aircraft.

The system has been designed for safe, high speed and cost effective surveys of clean, shallow coastal areas in depths up to 80 metres. Accurate to IHO Order 1a and 1b, data is collected using a 1.5 kHz laser with an efficient swath width up to 585 metres. Fugro has designed the system to enable the coastal zone to be surveyed faster and more cost effectively with the collection of high quality data across a wide range of environmental conditions. Leading edge developments in shallow water performance, seabed reflectivity, target detection, operating altitudes and hyperspectral imagery are also key functionalities implemented within the Fugro LADS Mk 3 ALB system. Deliverables include digital depth and topographic data, digital models, spatial products, seabed relative reflectivity, LiDAR seabed classes, hyperspectral imagery and georeferenced digital mosaic imagery.

Leader in ALB Technology

Fugro designs, builds and operates the world’s most accurate and cost effective ALB systems and is recognised as the industry leader in the development and application of bathymetric LiDAR technology. Continuous development of Airborne LiDAR Bathymetry technology by Fugro ensures that emerging customer requirements are met. Fugro’s in-house hardware, software, electronics, mechanical and optics engineers provide continuous system improvements and fast response to problem solving.

No other company in the world has as long a history of providing high resolution hydrographic survey, bathymetric systems and seabed mapping services to both industry and government.
Airborne LiDAR Bathymetry is internationally proven as being among the fastest, most cost efficient solutions for safe and accurate charting and bathymetric surveys in shallow water, complex coastal zones and riverine environments.

The Fugro LADS Mk 3 system can be used for the following applications:

- Collection of data for the production of nautical charts to International Hydrographic Organisation (IHO) standards.
- Support of safe, cost-effective offshore oil and gas exploration and field development.
- Support for marine and coastal engineering.
- Support for Coastal Zone Management including the ecological management of fragile coastal zones, climate change adaption and tsunami modelling programs.
- Accurate delineation and mapping of baselines in support of EEZ and territorial sea claims (UNCLOS).

**Technical Specifications**

**Survey Configuration**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser Rate</td>
<td>1.5 kHz</td>
</tr>
<tr>
<td>Depth Range</td>
<td>0 - 80 m dependant on water clarity</td>
</tr>
<tr>
<td>Topographic Range</td>
<td>0 - 50 m above sea level</td>
</tr>
<tr>
<td>Operating Altitude</td>
<td>1200 - 3000 ft</td>
</tr>
<tr>
<td>Aircraft Speed</td>
<td>125 - 175 knots</td>
</tr>
<tr>
<td>Scan Pattern</td>
<td>Rectilinear</td>
</tr>
</tbody>
</table>

**Sounding Density and Swath Width**

- 2 x 2 m: 79 m (125 kts)
- 2.5 x 2.5 m: 126 m (125 kts)
- 3 x 3 m: 153 m (148 kts)
- 4 x 4 m: 288 m (140 kts)
- 5 x 5 m: 360 m (175 kts)
- 6 x 5 m: 430 m (175 kts)
- 8 x 5 m: 585 m (175 kts)

Note: Sounding density and swath width independent of operating height and water depth.

**Survey Accuracy**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td>IHO Order 1 (&lt; 0.5 m, 95% Confidence)*</td>
</tr>
<tr>
<td>Horizontal</td>
<td>IHO Order 1 (&lt; 5.0 m, 95% Confidence)*</td>
</tr>
<tr>
<td>Object Detection</td>
<td>IHO Order 1a (dependant on water clarity and sounding density)*</td>
</tr>
</tbody>
</table>

* IHO, SP44, Standards for Hydrographic Surveys, April 2008

**System Configuration**

Airborne System: Sensor Platform
- Equipment Cabinet
- Cooling Unit
- Pilot Display

Operator Interface: Laptop

Operational Capability: Full day or night operation (VFR, IFR)
- 1 operator (observer optional)
- 1 or 2 pilot capable

Power Requirements: 70 A (system) + 35 A (air conditioner) at 28 VDC

**Laser Classification**

- Green (532nm): Diode Pumped Nd:Yag
- Power: Nominal 5 mJ beneath aircraft

**Positioning Systems**

Type: Applanix POS AV 610
- Fugro OmniSTAR WADGPS
- Modes: WADGPS, DGPS and KGPS

**Digital Camera**

Type: Redlake® Mega Plus II High Speed, 2MP

**Hyperspectral Camera**

Type: HySpex VNIR-1600

**Relative Reflectivity**

Scaled 8 bit value representing reflectance of seabed for each valid sounding

**Note:** Specifications subject to change without notice