



## Echo Surveyor - IV



The ultimate choice of instrument platform for deep sea and remote surveys

### Autonomous Underwater Vehicle (AUV)

Fugro's latest addition to their Autonomous Underwater Vehicles (AUV) fleet is the Echo Surveyor IV which is a "state of the art" Kongsberg Hugin 1000, specifically designed for high resolution and efficient survey operations in water depths down to 3000 metres. AUV's are the ultimate choice of instrument platform for deep sea and remote surveys. Placing survey sensors onboard an AUV means the geophysical measurements take place close to the seafloor, dramatically improving data resolution and accuracy.

### Engineering grade high resolution data

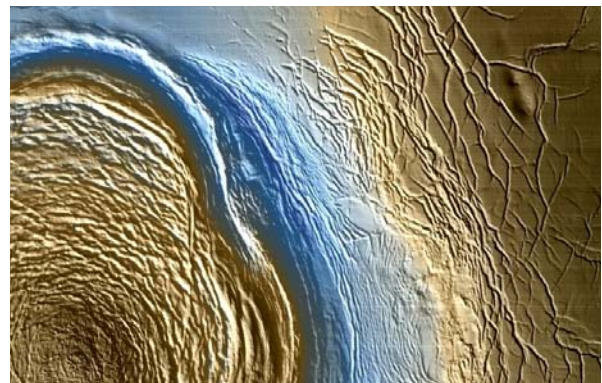
Echo Surveyor IV is the latest generation of Kongsberg Maritime Hugin 1000 depth rated to 3000m with a payload selected by Fugro to meet the demands of the offshore survey industry.

Fugro's fleet of Kongsberg Hugin AUV's are successfully proven in many deep water and often remote environments around the Globe. Use of such a proven survey platform and experience will provide enhanced productivity, continuity and reliability ensuring optimum adherence to project schedules.

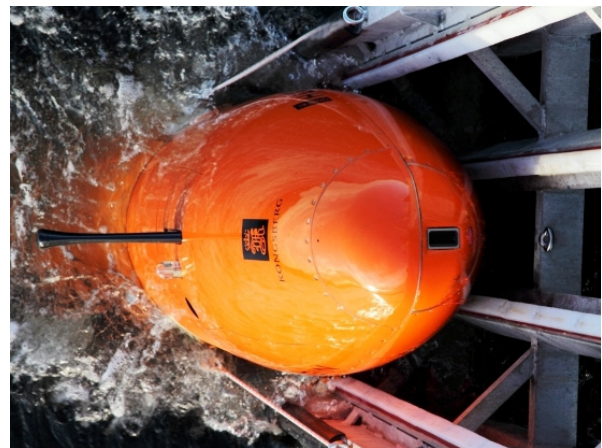
The Hugin 1000 is a modular design with improved obstacle avoidance and we offer our clients the option of two sub-bottom profilers that best suits the geology. The AUV also has a LED illuminated Digital stills camera to identify seabed features of interest.

Kongsberg Maritime's next generation multibeam echosounder the EM 2040 is now available with the Echo Surveyor IV. With improved resolution, this provides a substantial improvement from the EM 2000 used in deep-water HUGIN versions up to now.

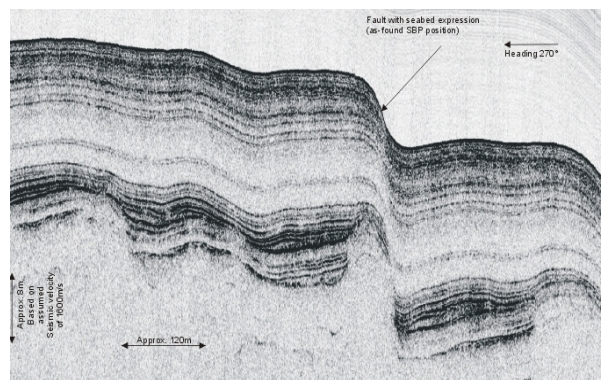
Fugro own and operate five deep water Echo class AUV's which are mobilised either from one of Fugro's dedicated fleet of international survey vessels or from 3rd party charter ship's.



High Resolution Bathymetric Data



Echo Surveyor IV

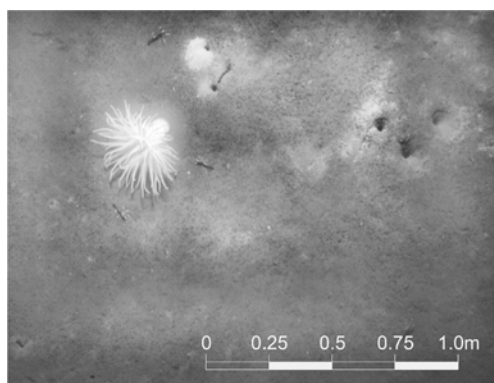


Sub-bottom Profiler Data

# Echo Surveyor IV

## Echo Surveyor IV capabilities:

- Latest lithium polymer battery
- 50+ hour battery duration
- Nominal survey speed 3.6 knots
- Inertial Navigation System
- Standard payload comprises:
  - Multibeam echosounder
  - Sidescan sonar
  - Sub-bottom profiler
  - CTD profiler
  - Digital camera
- Typically survey operations:
  - Deep water field developments
  - Site surveys
  - Pipeline and cable routes
  - Regional mapping
  - Environmental habitat mapping



*Echo Surveyor environmental imagery*

The camera system may be used for environmental purposes to assess the characteristics of benthic communities and habitats, such as deep water coral reefs and chemosynthetic communities, in addition to ascertaining the presence of sensitive species or biotopes. The high resolution stills enable scientists to zoom into the photograph without a significant deterioration in photograph quality and permits identification of specimens to species level.

## Technical Specifications

### Physical Data

Length	7.2 m
Weight (air)	1860 kg
Diameter	0.75 m
Depth	3000 m
Speed	2-6 kts (nominal 3.6kts)
Hull Material	Carbon fibre reinforced syntactic foam

### Power System

Battery	Lithium Polymer
Battery Capacity	45 kWh (50+hrs approx)
Propulsion	Smart Motor, Rudders & Propellor

### Acoustic Navigation System

Aided Inertial Navigation System	HiPAP 501 SSBL
Inertial Measurement Unit (IMU)	Honeywell 9900
Depth Pressure Sensor	Paroscientific Digiquartz
Doppler Velocity Log (DVL) + ADCP	RDI Workhorse Navigator WHN-300

### Acoustic Communication

Command Link	Kongsberg 24 to 28 kHz, 55 bps
ACL Transducers	TP324, TP331
Data Link	LinkQuest 13.5 to 22.5 kHz, 4250 bps
DCL Transducers	UWM4010
Emergency Link	Kongsberg 25 to 25.6 khz, 10 bps

### Surface Communication

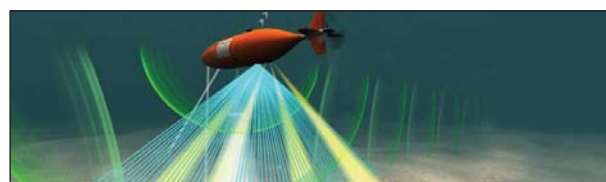
Radio Frequency Link	UHF SX450, 458 MHz
Satellite Link	Iridium Datalink

### Control Sensors

CTD	Falmouth FSI 2" Micro CTD
Avoidance Sonar	Mesotech 675 kHz
Altimeter Height	Mesotech 200 kHz

### Payload Sensors

Multibeam Echo Sounder	Kongsberg EM2040 140 degrees coverage Frequency 200 - 400 kHz
Side Scan Sonar	Edgetech Full Spectrum Sidescan Sonar Simultaneous Frequency 120 & 410 kHz
Sub-Bottom Profiler	DW106 (1-6 kHz) or DW216 (2-16 kHz)
Digital Stills Camera	Kongsberg LED illuminated digital stills camera



Information may be subject to change without prior notice

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