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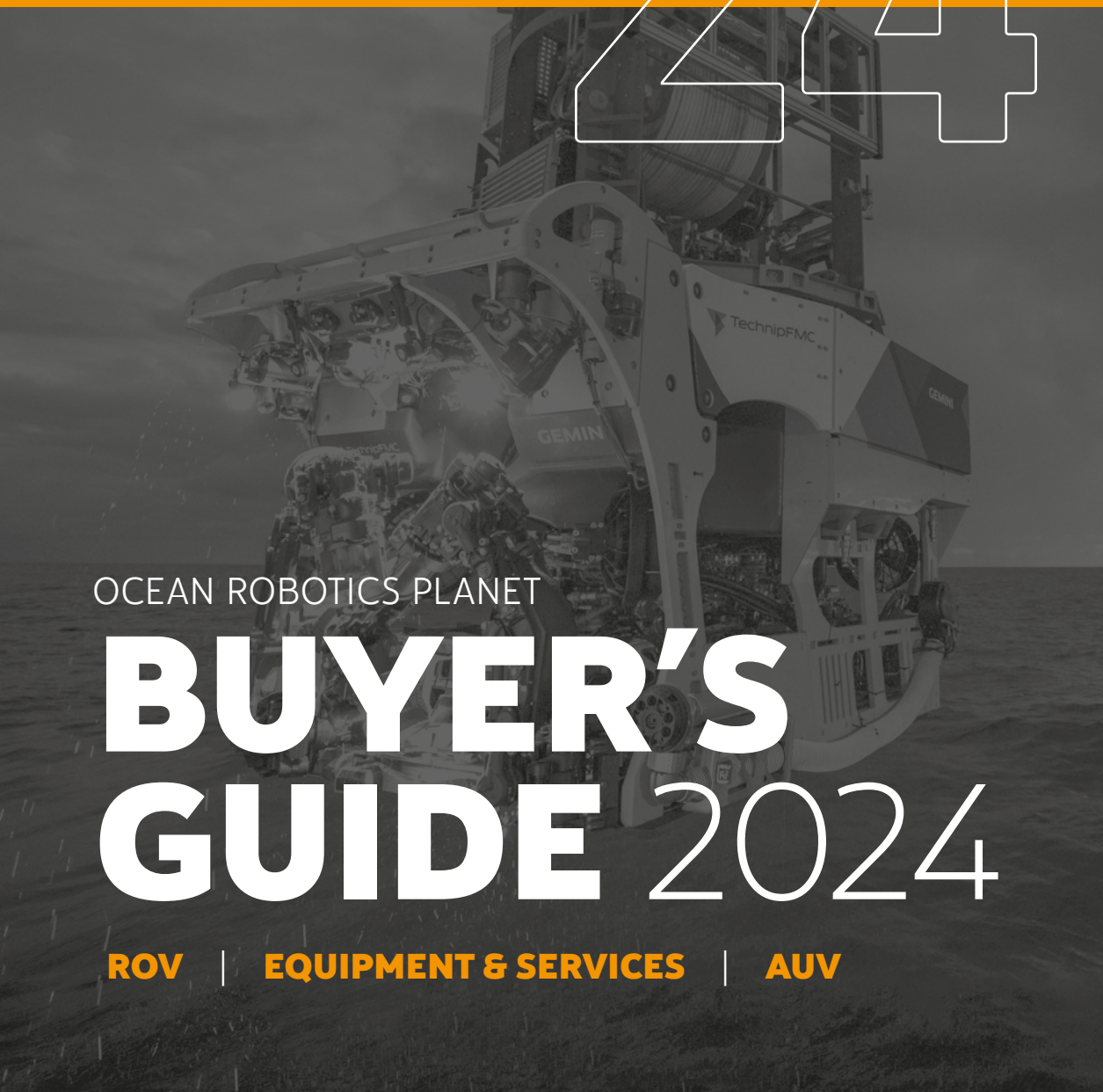
'24



OCEAN ROBOTICS PLANET

BUYER'S GUIDE 2024

ROV | EQUIPMENT & SERVICES | AUV

Precision navigation in the most challenging conditions

Unparalleled range and performance without compromise on size, weight and power.

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DVL500 Compact

nortekgroup.com

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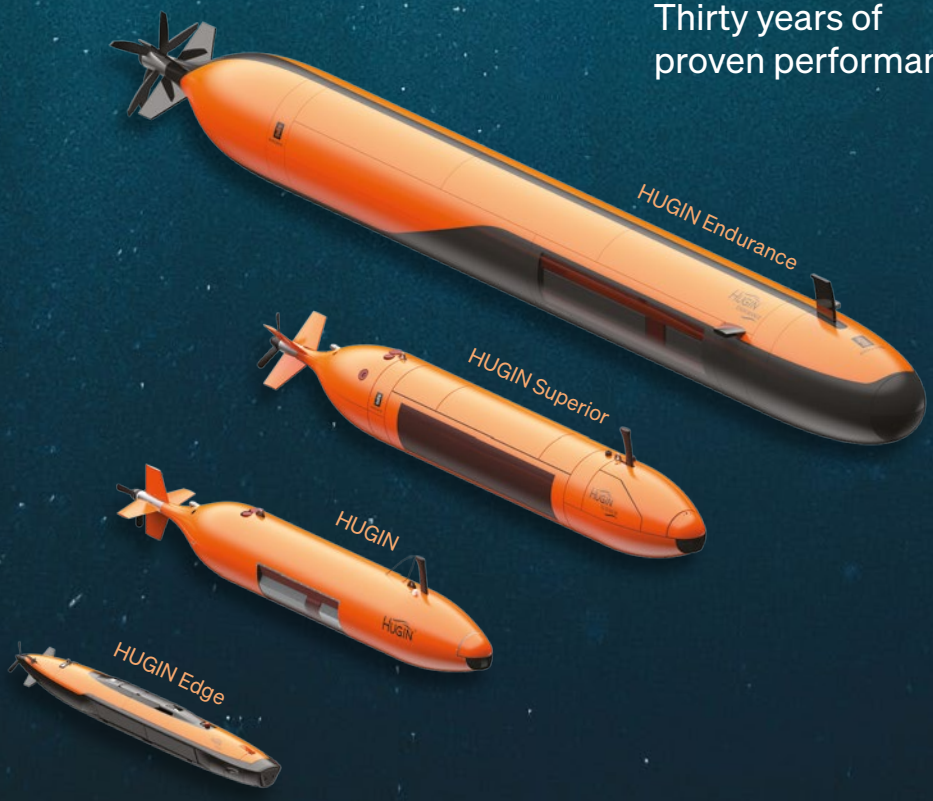
KONGSBERG

Kongsberg Discovery

HUGIN AUV's

Thirty years of
proven performance.



kongsberg.com/discovery

WELCOME TO OCEAN ROBOTICS PLANET BUYER'S GUIDE 2024!

Dear Ocean Robotics Enthusiast,

I'm delighted to welcome you to our newly published 2024 annual online Ocean Robotics Planet Buyer's Guide.

We opted for completely different content this year. This time round, we're focusing on underwater tools, and adding basic operational data for the active ROVs (Remotely Operated Vehicles) and AUVs (Autonomous Underwater Vehicles) as a handy, 24/7easily accessible reference tool for our busy clients.

We hope that these additional ROV and AUV sections will help people decide on the ROV/AUV types that they would like to acquire and provide a point of reference for them. In these additional sections we're not only providing images and links to the manufacturers' websites, but also including some key specifications to give a better feel for the vehicles themselves.

For the ROV section, these key specifications include the depth rating, power, dimensions, weight, and the payload capability. For the AUVs these key specifications include the depth rating, endurance, dimensions, weight, energy (battery capacity), and payload capability.

We've kept the ROV/AUV Equipment and Services Directory for the latest edition. However, we encourage you to check out the Contents Page in order to view all of the specialist companies, providing you with specific details of their offerings. I know they would welcome your enquiry and all the Directory entries link directly to specific webpages for more efficient navigation.

Please get in touch with us if you are the product owner and if any specification or information needs to be updated. Furthermore, if any of our readers have feedback on any part of this annual publication, your input is also very welcome.

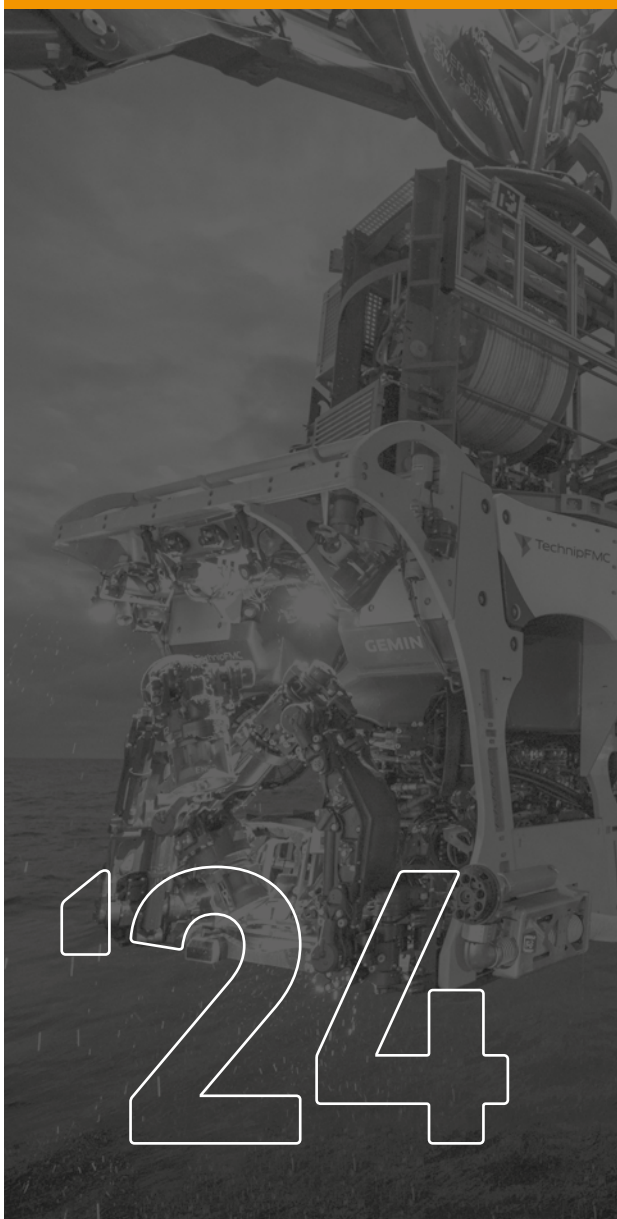
I hope you will enjoy using this new format Buyer's Guide, and that it will be an invaluable reference for all ocean robotics enthusiasts, just like our previous editions.

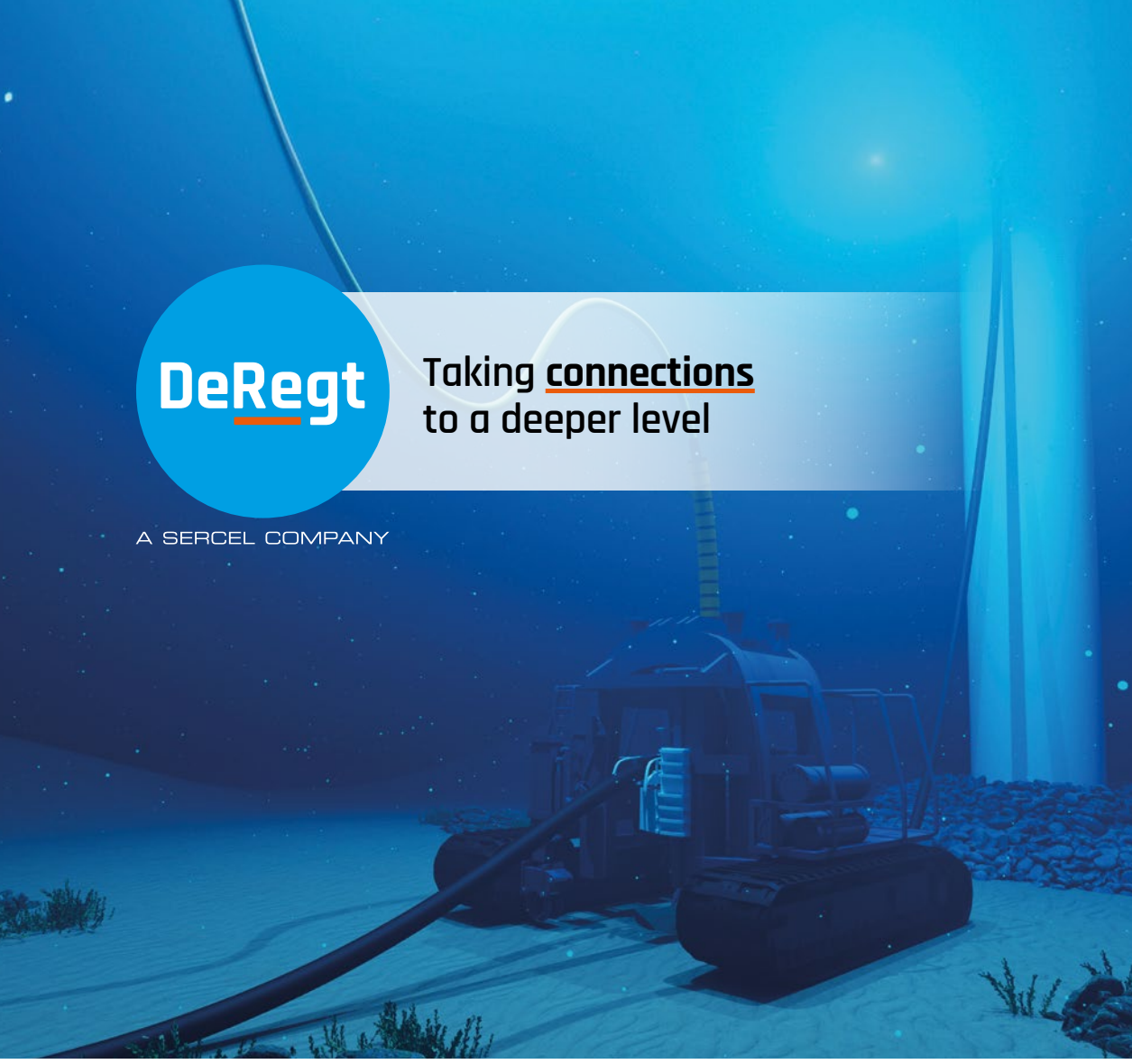
Best regards,

Richie Enzmann,
Editor-in-chief, Ocean Robotics Planet

ORPBuyersGuide@oceanroboticsplanet.com

My name is Richie Enzmann. Allow me to welcome you all to the latest issue of the Buyer's Guide!





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ROVS

AKVA GROUP | akvagroup.com

AKVA Group

SUB-FIGHTER 3000

Depth	300m
Power	3kW
Dimensions	1100mm(l) × 660mm(w) × 810mm(h)
Weight (in Air)	140kg
Payload	5kg-10kg

AKVA Group

SUB-FIGHTER 5500

Depth	1000m (standard)
Power	5.5kW
Dimensions	1260mm(l) × 720mm(w) × 820mm(h)
Weight (in Air)	285kg
Payload	15kg

AKVA Group

SUB-FIGHTER 10K

Depth	1000m (standard)
Power	10kW
Dimensions	1400mm(l) × 810mm(w) × 900mm(h)
Weight (in Air)	410kg
Payload	20kg

AKVA Group

SUB-FIGHTER 15K

Depth	1000m (standard)
Power	15kW
Dimensions	1620mm(l) × 910mm(w) × 980mm(h)
Weight (in Air)	550kg
Payload	20kg

AKVA GROUP | akvagroup.com

AKVA Group

SUB-FIGHTER 30K

Depth	1000m (standard)
Power	30kW
Dimensions	2400mm(l) × 1420mm(w) × 1040mm(h)
Weight (in Air)	1050kg
Payload	30kg-40kg

AKVA Group

SUB-FIGHTER 60K

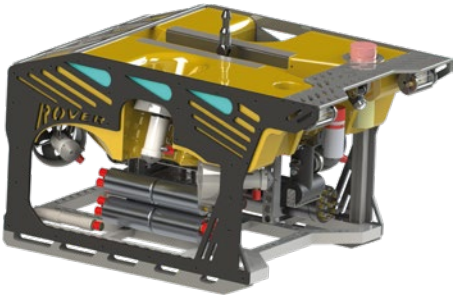
Depth	1000m (standard)
Power	60kW
Dimensions	2800mm(l) × 1710mm(w) × 1640mm(h)
Weight (in Air)	2235kg
Payload	50kg

ARGUS REMOTE SYSTEMS | argus-rs.no

Argus Remote Systems

ARGUS MINI

Depth	600m
Power	3kW
Dimensions	900mm(l) × 650mm(w) × 500mm(h)
Weight (in Air)	100kg
Payload	5kg

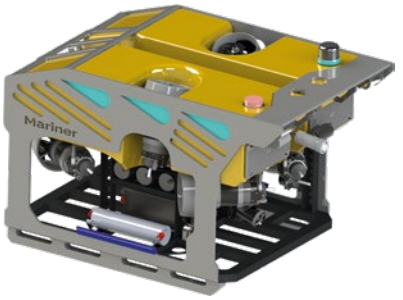


Argus Remote Systems

ARGUS ROVER

Depth	1000m
Power	10kW
Dimensions	1450mm(l) × 950mm(w) × 930mm(h)
Weight (in Air)	350kg
Payload	15kg

ARGUS REMOTE SYSTEMS | argus-rs.no



Argus Remote Systems

ARGUS MARINER

Depth	2000m (optional 6000m)
Power	20kW
Dimensions	1800mm(l) × 1180mm(w) × 1200mm(h)
Weight (in Air)	780kg
Payload	50kg (500kg through frame lift)

Argus Remote Systems

ARGUS MARINER XL

Depth	2000m (optional 6000m)
Power	60kW
Dimensions	2150mm(l) × 1350mm(w) × 1400mm(h)
Weight (in Air)	1500kg
Payload	75kg (500kg through frame lift)

Argus Remote Systems

ARGUS WORKER

Depth	3000m (optional 7000m)
Power	120kW
Dimensions	2500mm(l) × 1600mm(w) × 1700mm(h)
Weight (in Air)	3000kg
Payload	150kg (3000kg through frame lift)

Argus Remote Systems

ARGUS WORKER XL

Depth	6000m (optional 7000m)
Power	120kW
Dimensions	2500mm(l) × 1600mm(w) × 1700mm(h)
Weight (in Air)	4500kg
Payload	150kg (3000kg through frame lift)

ATLAS ELEKTRONIK | atlas-elektronik.com

Atlas Elektronik

SEAFOX

Depth	300m
Power	1200m range
Dimensions	1300mm(l) × 200mm(d) (390mm across fins)
Weight (in Air)	40kg
Payload	Warhead (MCM)

BLUE ROBOTICS | bluerobotics.com

Blue Robotics

BLUEROV2

Depth	100m (300m optional)
Power	18Ah (2h-6h)
Dimensions	457mm(l) × 338mm(w) × 254mm(h)
Weight (in Air)	12kg
Payload	Various Payloads

BLUELINK | blue-linked.com

BlueLink

SARBOT

Depth	100m (300m optional)
Power	1.2kW
Dimensions	457mm(l) × 575mm(w) × 254mm(h)
Weight (in Air)	13.5kg
Payload	Various Payloads

BLUEYE ROBOTICS | blueyerobotics.com

Blueye Robotics

BLUEYE PIONEER

Depth	150m
Power	2h/5h
Dimensions	data N/A
Weight (in Air)	9kg
Payload	Full HD Camera

Blueye Robotics

BLUEYE PRO

Depth	300m
Power	2h/5h
Dimensions	data N/A
Weight (in Air)	9kg
Payload	Full HD Camera

Blueye Robotics

BLUEYE X3

Depth	300m
Power	5h
Dimensions	data N/A
Weight (in Air)	9kg
Payload	Sonars, Sensors, Manipulator

Boxfish Robotics

BOXFISH ALPHA

Depth	300m
Power	500Wh (3-12h)
Dimensions	714mm(l) × 435mm(w) × 351mm(h)
Weight (in Air)	23kg
Payload	USBL, Sonar, Sensors

Boxfish Robotics

BOXFISH LUNA

Depth	500m (Optional 1000m)
Power	15h
Dimensions	714mm(l) × 435mm(w) × 351mm(h)
Weight (in Air)	25kg
Payload	Several Camera Options, USBL

Boxfish Robotics

BOXFISH ROV

Depth	500m (Optional 1000m)
Power	600Wh (4-15h)
Dimensions	714mm(l) × 435mm(w) × 351mm(h)
Weight (in Air)	32kg
Payload	Camera, USBL, Manipulator

CENTURION SUBSEA SERVICES

| centurionsubseaservices.com

Centurion Subsea Services

AUXROV

Depth	3000m
Power	300HP
Dimensions	2150mm(l) × 2150mm(w) × 1700mm(h)
Weight (in Air)	2700kg
Payload	30000kg

Centurion Subsea Services

MULTIROV

Depth	3000m
Power	150HP/300HP
Dimensions	3000mm(l) × 1900mm(w) × 2100mm(h)
Weight (in Air)	4500kg
Payload	250kg-300kg (20000kg through frame lift)

Centurion Subsea Services

TRACKROV

Depth	3000m
Power	100HP
Dimensions	3700mm(l) × 2700mm(w) × 2200mm(h)
Weight (in Air)	2500kg
Payload	1500kg

COPENHAGEN SUBSEA | copenhagensubsea.com

Copenhagen Subsea

GORILLA

Depth	600m
Power	10kW
Dimensions	1425mm(l) × 1025mm(w) × 800mm(h)
Weight (in Air)	350kg
Payload	70kg

Deepinfar

WHITESHARK

Depth	100m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	3.8kg
Payload	Camera & Lights

Deepinfar

HETUN

Depth	300m
Power	3kW
Dimensions	data N/A
Weight (in Air)	24kg-34kg
Payload	Various Options

Deepinfar

JIANGTUN

Depth	300m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	Various Options

Deepinfar

HAITUN

Depth	300m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	100kg-600kg
Payload	12.5kg-50kg

DEEP OCEAN ENGINEERING | deepocean.com

Deep Ocean Engineering

PHANTOM FIREFLY

Depth	46m
Power	data N/A
Dimensions	190mm(l) × 146mm(w) × 343mm(h)
Weight (in Air)	6.35kg
Payload	Various Options

Deep Ocean Engineering

PHANTOM P-150

Depth	53.3m
Power	data N/A
Dimensions	642.5mm(l) × 352.4mm(w) × 292.1mm(h)
Weight (in Air)	18kg
Payload	Various Options

Deep Ocean Engineering

PHANTOM T-SERIES

Depth	300m (500m optional)
Power	data N/A
Dimensions	889mm(l) × 559mm(w) × 406mm(h)
Weight (in Air)	39.5kg
Payload	Various Options

Deep Ocean Engineering

PHANTOM T5 DEFENDER

Depth	300m (500m optional)
Power	3.3kW
Dimensions	889mm(l) × 559mm(w) × 584mm(h)
Weight (in Air)	65.8kg
Payload	Various Options

Deep Ocean Engineering

PHANTOM L-SERIES

Depth	500m (800m optional)
Power	9kW
Dimensions	1066.8mm(l) × 800.1mm(w) × 571.5mm(h)
Weight (in Air)	97.5kg
Payload	Various Options

Deep Ocean Engineering

PHANTOM S-SERIES

Depth	1000m
Power	17kW-23kW
Dimensions	1360mm(l) × 860mm(w) × 740mm(h)
Weight (in Air)	158.8kg-176.3kg
Payload	Various Options

Deep Ocean Engineering

PHANTOM X-SERIES

Depth	850m
Power	120HP
Dimensions	2451mm(l) × 1420mm(w) × 1448mm(h)
Weight (in Air)	1200kg
Payload	Various Options

DEEP TREKKER | deeptrekker.com

Deep Trekker

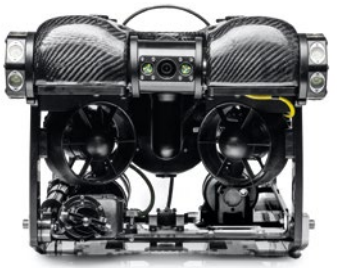
DTG3

Depth	200m
Power	Various Battery Options
Dimensions	279mm(l) × 325mm(w) × 258mm(h)
Weight (in Air)	8.5kg
Payload	Customizable

Deep Trekker

PHOTON

Depth	120m
Power	Various Battery Options
Dimensions	480.6mm(l) × 333.2mm(w) × 228mm(h)
Weight (in Air)	11.6kg
Payload	Customizable



Deep Trekker

PIVOT

Depth	305m
Power	3hrs
Dimensions	576mm(l) × 360mm(w) × 310mm(h)
Weight (in Air)	21.7kg
Payload	Customizable

Deep Trekker

REVOLUTION

Depth	305m
Power	3-6hrs
Dimensions	717mm(l) × 440mm(w) × 235mm(h)
Weight (in Air)	26kg
Payload	Customizable

DELAIR MARINE | delairmarine.com

Delair Marine

SEASAM

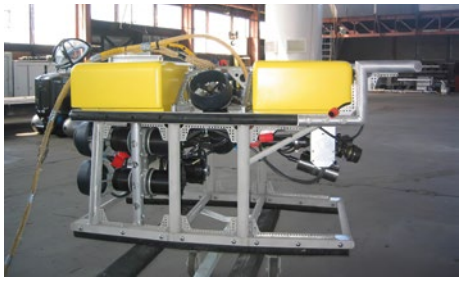
Depth	100m
Power	1.5h (battery)
Dimensions	550mm(l) × 450mm(w) × 230mm(h)
Weight (in Air)	9kg
Payload	2kg

Delair Marine

SEASAM HULLSCAN

Depth	100m
Power	1.5h (battery)
Dimensions	540mm(l) × 440mm(w) × 240mm(h)
Weight (in Air)	9kg
Payload	2kg

DOER MARINE | doermarine.com

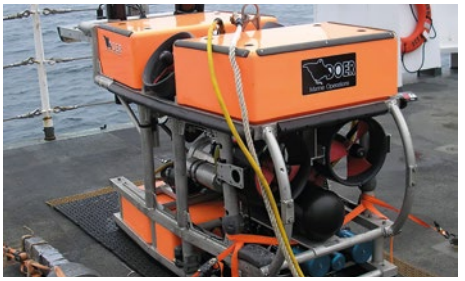


DOER Marine

SPECTRE

Depth	600m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	34kg

DOER MARINE | doermarine.com



DOER Marine

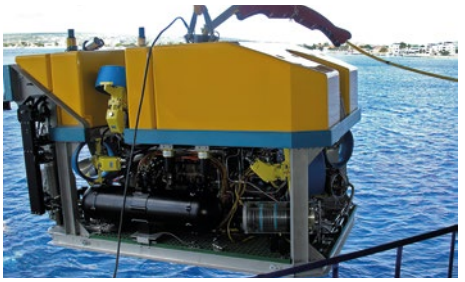
OCEAN EXPLORER

Depth	1000m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	data N/A

DOER Marine

H2000

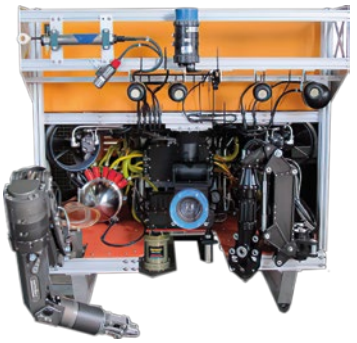
Depth	2000m
Power	18kW
Dimensions	1524mm(l) × 990mm(w) × 965mm(h)
Weight (in Air)	406kg
Payload	72.5kg



DOER Marine

H3000

Depth	3000m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	data N/A



DOER Marine

H6500

Depth	6500m
Power	25HP / 50HP / 75HP /100HP
Dimensions	2030mm(l) × 1400mm(w) × 1470mm(h)
Weight (in Air)	1225kg
Payload	50kg

DWTEK

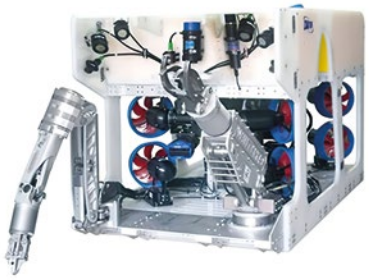
INVESTIGATOR-90 (I90)

Depth	1000m
Power	6kW
Dimensions	1100mm(l) × 700mm(w) × 490mm(h)
Weight (in Air)	120kg
Payload	27kg

DWTEK

INVESTIGATOR-90+ (I90+)

Depth	1000m
Power	6kW
Dimensions	1100mm(l) × 700mm(w) × 530mm(h)
Weight (in Air)	130kg
Payload	25kg



DWTEK

MONEW

Depth	1000m (3000 optional)
Power	43kW
Dimensions	2100mm(l) × 1300mm(w) × 1200mm(h)
Weight (in Air)	800kg
Payload	180kg

DWTEK

ROV CRAWLER

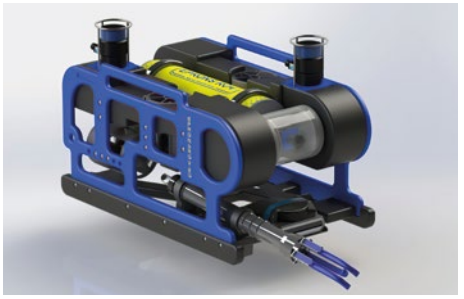
Depth	300m
Power	6kW
Dimensions	1300mm(l) × 1160mm(w) × 923mm(h)
Weight (in Air)	350kg
Payload	30kg

EPRONS | eprons.lv

EPRONS

ALPHAROV D150

Depth	150m
Power	0.8kW
Dimensions	380mm(l) × 320mm(w) × 300mm(h)
Weight (in Air)	8kg
Payload	3kg



EPRONS

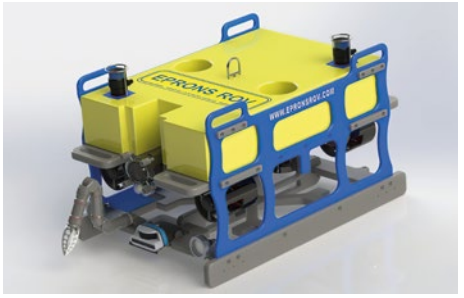
ALPHAROV PROF D200

Depth	200m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	data N/A

EPRONS

ALPHAROV PROF D300

Depth	300m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	data N/A



EPRONS

ALPHAROV PROF D500

Depth	500m
Power	3kW
Dimensions	950mm(l) × 600mm(w) × 530mm(h)
Weight (in Air)	68kg
Payload	Payload 15kg

Exail

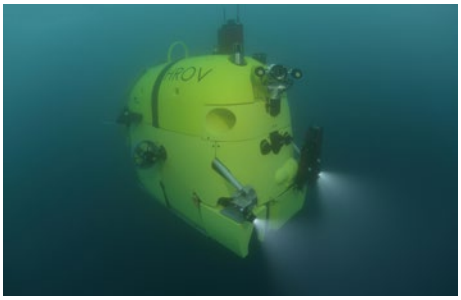
H300V

Depth	300m
Power	data N/A
Dimensions	840mm(l) × 530mm(w) × 600mm(h)
Weight (in Air)	70kg
Payload	15kg

Exail

H800

Depth	1000m
Power	data N/A
Dimensions	992mm(l) × 720mm(w) × 551mm(h)
Weight (in Air)	99kg
Payload	30kg



Exail

HROV

Depth	2500m
Power	data N/A
Dimensions	2800mm(l) × 1850mm(w) × 2300mm(h)
Weight (in Air)	1550kg-1780kg
Payload	210kg

Exail

R7

Depth	300m
Power	3kW
Dimensions	780mm(l) × 551mm(w) × 424mm(h)
Weight (in Air)	35kg
Payload	data N/A

EXAIL | exail.com

Exail

ROVINGBAT

Depth	100m
Power	3kW
Dimensions	1105mm(l) × 1085mm(w) × 646mm(h)
Weight (in Air)	135kg
Payload	data N/A

Exail

K-STER C

Depth	300m
Power	data N/A
Dimensions	1500mm(l) × 430mm(h)
Weight (in Air)	50kg
Payload	3kg

Exail

PAP MK6

Depth	300m
Power	data N/A
Dimensions	3100mm(l) × 1100mm(w) × 1200mm(h)
Weight (in Air)	600kg
Payload	data N/A

Exail

SEASCAN MK2

Depth	300m
Power	data N/A
Dimensions	1580mm(l) × 500mm(w) × 430mm(h)
Weight (in Air)	50kg
Payload	data N/A

The FET Perry® XLX EVO II represents the latest evolution in the highly successful Perry XL series. The XLX EVO II features significantly enhanced performance across the full range of demanding intervention and survey tasks without compromise to the outstanding reliability for which the XL series of vehicles is renowned throughout the world.
FET Subsea is the only provider of subsea Remotely Operated Vehicles with the experience of two major leading brands in the industry: Sub-Atlantic and Perry. From electric Observation-Class ROVs to large hydraulic Work-Class vehicles, FET has the solution.
Designed and built with the highest levels of technology, expertise and innovation, our products operate in the world's harshest environments and perform a variety of underwater tasks.

Additional Specifications

PERRY XLX EVO II – HEAVY-DUTY WORK CLASS ROV

Max. Depth	3000 m (4000 m option)
Max. Power	200 hp (150 kW)
Dimensions	(H/L/W) mm: 2105 / 3605 / 1905
Weight (in Air)	5300 kg
Payload	400 kg minimum

FET SUBSEA | f-e-t.com/subsea

FET Subsea

PERRY XLX-C COMPACT HEAVY-DUTY WORK CLASS ROV

Depth	3000 m (4000 m & 6000 m options)
Power	200 hp (150 kW)
Dimensions	(H/L/W) mm: 1900 / 2800 / 1700
Weight (in Air)	4200 kg
Payload	350 kg minimum

FET Subsea

COMANCHE LIGHT WORK CLASS ROV

Depth	2000 m (3000 m & 6000m options)
Power	47hp (35 kW)
Dimensions	(H/L/W) mm: 1250 / 2100 / 1300
Weight (in Air)	1130kg
Payload	285 kg

FET Subsea

SUPER MOHAWK OBSERVATION CLASS ROV

Depth	2000 m (3000 m option)
Power	17hp (12.5 kW)
Dimensions	(H/L/W) mm: 850 / 1400 / 900
Weight (in Air)	395kg
Payload	60 kg

FET Subsea

MOHICAN OBSERVATION CLASS ROV

Depth	2000 m (3000 m option)
Power	17hp (12.5 kW)
Dimensions	(H/L/W) mm: 800 / 1150 / 770
Weight (in Air)	340 kg
Payload	35 kg

FORSSEA ROBOTICS | forssea-robotics.fr

Forssea Robotics

ARGOS

Depth	500m (Optional 1000m)
Power	7kW
Dimensions	1100mm(l) × 790mm(w) × 684mm(h); 819mm(h) (INS+DVL Skid)
Weight (in Air)	170kg
Payload	20kg (60kg through frame lift)

Forssea Robotics

ATOLL

Depth	2000m (upgrade on demand)
Power	7kW
Dimensions	1056mm(l) × 1022mm(w) × 1200mm(h)
Weight (in Air)	245kg
Payload	40kg (1500kg frame safe working lift)

FUGRO | fugro.com

Fugro

FCV 3000

Depth	3000m
Power	200HP
Dimensions	3315mm(l) × 1760mm(w) × 1730mm(h)
Weight (in Air)	4200kg
Payload	400kg

Fugro

BLUE VOLTA

Depth	450m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	data N/A

HYDROMEA | hydromea.com

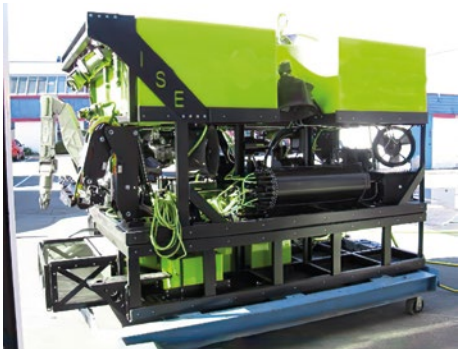
Hydromea

EXRAY

Depth	100m
Power	97Wh
Dimensions	580mm(l) × 380mm(w) × 130mm(h)
Weight (in Air)	9kg
Payload	Various Options

INTERNATIONAL SUBMARINE ENGINEERING

| ise.bc.ca



International Submarine Engineering

HYSUB

Depth	100m-6000m
Power	25HP-250HP
Dimensions	2500mm-3450mm(l) × 1000mm-2000mm(w) × 1000mm-2300mm(h)
Weight (in Air)	700kg-5700kg
Payload	100kg-200kg (500kg-1000kg through frame lift)

International Submarine Engineering

TRAILBLAZER

Depth	300m / 500m / 1500m
Power	25HP / 30HP / 50HP
Dimensions	2500mm(l) × 1000mm(w) × 1000mm(h)
Weight (in Air)	700kg
Payload	4 × 22kg

JW FISHERS | jwfishers.com

JW Fishers

SEAOTTER-2

Depth	150m
Power	600W
Dimensions	584mm(l) × 406mm(w) × 305mm(h)
Weight (in Air)	19.5kg
Payload	Various Options

JW Fishers

SEALION-2

Depth	300m
Power	900W
Dimensions	584mm(l) × 406mm(w) × 305mm(h)
Weight (in Air)	19.5kg
Payload	Various Options

KYSTDESIGN | kystdesign.no

Kystdesign

SUPPORTER

Depth	3000m (Optional 4-6000m)
Power	115kW/150HP
Dimensions	2750 (l) × 1700 (w) × 1650mm(h)
Weight (in Air)	3600kg
Payload	400kg (3000kg through frame lift)

Kystdesign

CONSTRUCTOR

Depth	2000m (Optional 6000m)
Power	160kW/220HP
Dimensions	3220(l) × 1700(w) × 1870mm(h)
Weight (in Air)	4600kg
Payload	400kg (3000kg through frame lift)

Kystdesign

SUPERIOR

Depth	3000m
Power	160kW/220HP
Dimensions	5570mm(l) × 2500mm(w) × 2184mm(h), (H=1280mm without skid)
Weight (in Air)	5000kg
Payload	660kg

Kystdesign

ZEEROV

Depth	TBA
Power	TBA
Dimensions	TBA
Weight (in Air)	TBA
Payload	TBA

L3HARRIS TECHNOLOGIES | l3harris.com

L3Harris Technologies

AGEOTEC SIRIO

Depth	300m
Power	3kW
Dimensions	590mm(l) × 560mm(w) × 450mm(h)
Weight (in Air)	40kg
Payload	10kg

L3Harris Technologies

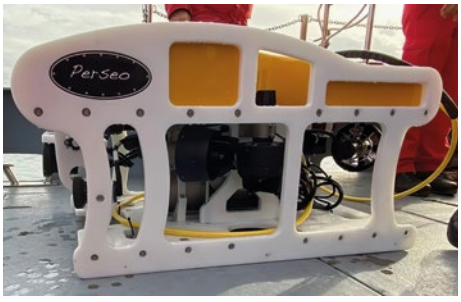
AGEOTEC ANTARES

Depth	400m
Power	3.3kW
Dimensions	900mm(l) × 458mm(w) × 570mm(h)
Weight (in Air)	56kg
Payload	14kg

L3Harris Technologies

AGEOTEC LYRA

Depth	300m
Power	3.3kW
Dimensions	750mm(l) × 600mm(w) × 530mm(h)
Weight (in Air)	60kg
Payload	22kg



L3Harris Technologies

AGEOTEC PERSEO

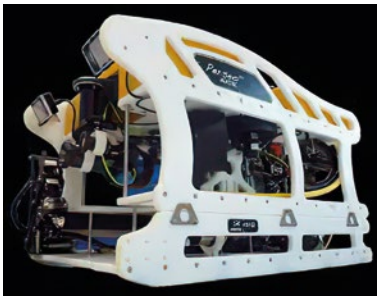
Depth	600m
Power	6kW
Dimensions	1100mm(l) × 710mm(w) × 857mm(h)
Weight (in Air)	120kg
Payload	25kg

L3HARRIS TECHNOLOGIES | l3harris.com

L3Harris Technologies

AGEOTEC PERSEO PLUS

Depth	1000m
Power	10kW
Dimensions	980mm(l) × 710mm(w) × 510mm(h)
Weight (in Air)	120kg
Payload	25kg



L3Harris Technologies

AGEOTEC PERSEO GTV

Depth	1500m
Power	15kW
Dimensions	1550mm(l) × 950mm(w) × 800mm(h)
Weight (in Air)	270kg
Payload	40kg

L3Harris Technologies

AGEOTEC PEGASO

Depth	2000m
Power	35kW
Dimensions	1800mm(l) × 1100mm(w) × 1300mm(h)
Weight (in Air)	600kg
Payload	150kg

MARINE IMAGING TECHNOLOGIES

| marineimagingtech.com

Marine Imaging Technologies

PIXEL

Depth	300m
Power	data N/A
Dimensions	1016mm(l) × 2438mm(w) × 838mm(h)
Weight (in Air)	127kg
Payload	Various Options

Marine Imaging Technologies

SEA ROVER

Depth	300m
Power	data N/A
Dimensions	813mm(l) × 660mm(w) × 686mm(h)
Weight (in Air)	63.5kg
Payload	Various Options

MARINER UNDERWATER ELECTRONICS

| mariner.gr

Mariner Underwater Electronics

MRM 230

Depth	150m
Power	1kW
Dimensions	520mm(l) × 330mm(w) × 280mm(h)
Weight (in Air)	14kg
Payload	Various Options

Mariner Underwater Electronics

IPPODAMUS

Depth	750m
Power	3.5kW
Dimensions	1050mm(l) × 5800mm(w) × 570mm(h)
Weight (in Air)	75kg
Payload	Various 15kg

MARISCOPE | mariscope.com

Mariscope

PEEWEE 100

Depth	100m
Power	1kW
Dimensions	580mm(l) × 375mm(w) × 260mm(h)
Weight (in Air)	17kg
Payload	Various Options

Mariscope

MS 2

Depth	300m
Power	2kW
Dimensions	510mm(l) × 400mm(w) × 340mm(h)
Weight (in Air)	23kg
Payload	Various Options

Mariscope

FO III

Depth	500m
Power	3kW
Dimensions	800mm(l) × 600mm(w) × 360mm(h)
Weight (in Air)	35kg-70kg
Payload	Various Options

Mariscope

DIAVOLO III

Depth	500m
Power	3kW
Dimensions	1000mm(l) × 600mm(w) × 360mm(h)
Weight (in Air)	45kg-90kg
Payload	60kg

Mariscope

FLUNDER

Depth	500m
Power	4kW
Dimensions	1200mm(l) × 800mm(w) × 340mm(h)
Weight (in Air)	60kg-120kg
Payload	Various Options

Mariscope

COMMANDER MK III

Depth	500m (1000m optional)
Power	6kW
Dimensions	1500mm(l) × 1000mm(w) × 500mm(h)
Weight (in Air)	80kg-150kg
Payload	Various Options

Mariscope

CHAMELEON

Depth	500m (1000m optional)
Power	15kW
Dimensions	1500mm(l) × 1000mm(w) × 800mm(h)
Weight (in Air)	100kg-350kg
Payload	Various Options

OCEANBOTICS

OCEANBOTICS | oceanbotics.com

Oceanbotics

SRV-8

Depth	305m (1000ft)
Power	13mAh (8h)
Dimensions	500mm(l) × 430mm(w) × 330mm(h)
Weight (in Air)	8.5kg
Payload	Camera, Sonar & Sensors

Oceanbotics

SRV-8X OPTIMUS

Depth	500m
Power	8h
Dimensions	640mm(l) × 510mm(w) × 430mm(h)
Weight (in Air)	25kg
Payload	Camera, Sonar & Sensors

Oceanbotics

SRV-8 MDV

Depth	500m
Power	8h
Dimensions	640mm(l) × 510mm(w) × 430mm(h)
Weight (in Air)	25kg
Payload	Camera, Sonar & Sensors

OCEANEERING INTERNATIONAL, INC.

| oceaneering.com

Oceaneering International, Inc.

ISURUS™ WORK CLASS ROV

Depth	10,000 ft / 3000 m (standard)
Power	2 × 85 hp
Dimensions	8.5 × 5.1 × 6.1 ft / 2.6 × 1.6 × 1.9 m
Weight (in Air)	7,500 lb / 3400 kg
Payload	500 lb / 227 kg

Oceaneering International, Inc.

eNOVUS™ WORK CLASS ROV

Depth	Up to 16,500 ft / 5,000 m
Power	235 hp / 175 kW (electric)
Dimensions	8.5 × 5 × 6 ft / 2.7 × 1.6 × 1.8 m
Weight (in Air)	7,500 lb / 3,400 kg
Payload	500 lb / 227 kg

Oceaneering International, Inc.

MAGNUM® PLUS HEAVY WORK CLASS ROV

Depth	10,000 ft / 3,000 m (standard) 13,000 ft / 4,000 m (optional)
Power	2 × 85 hp
Dimensions	8.5 × 5.1 × 6.1 ft / 2.6 × 1.6 × 1.9 m
Weight (in Air)	6,750 lb / 3,060 kg
Payload	500 lb / 227 kg

OCEANEERING®

OCEANEERING INTERNATIONAL, INC.

| oceaneering.com

Oceaneering International, Inc.

MILLENNIUM® PLUS HEAVY WORK CLASS ROV

Depth	10,000 ft / 3,000 m (standard) 13,000 ft / 4,000 m (optional)
Power	2 × 110 hp
Dimensions	10.8 × 5.5 × 6.3 ft / 3.3 × 1.7 × 1.9 m
Weight (in Air)	8,800 lb / 4,000 kg
Payload	500-1,000 lb / 227-455 kg (dependent on pumping configuration)

Oceaneering International, Inc.

NEXXUS HEAVY WORK CLASS ROV

Depth	10,000 ft / 3,000 m (standard) 13,000 ft / 4,000 m (optional)
Power	2 × 125 hp
Dimensions	10.9 × 5.6 × 6.3 ft / 3.2 × 1.7 × 1.9 m
Weight (in Air)	10,500 lb / 4,750 kg
Payload	1,000 lb / 455 kg

Outland Technology

ROV-500

Depth	100m
Power	1kW
Dimensions	510mm(l) × 310mm(w) × 270mm(h)
Weight (in Air)	9.5kg
Payload	1kg

Outland Technology

ROV-1000

Depth	300m
Power	4kW
Dimensions	660mm(l) × 380mm(w) × 270mm(h)
Weight (in Air)	17.7kg
Payload	2.3kg

Provider Outland Technology

ROV-2000

Depth	300m
Power	3.6kW
Dimensions	710mm(l) × 460mm(w) × 380mm(h)
Weight (in Air)	25kg
Payload	4.5kg

Outland Technology

ROV-2500

Depth	300m
Power	4kW
Dimensions	710mm(l) × 520mm(w) × 380mm(h)
Weight (in Air)	29.5kg
Payload	4.5kg

OUTLAND TECHNOLOGY | outlandtech.com

Outland Technology

ROV-3000

Depth	600m
Power	3.5kW
Dimensions	723mm(l) × 622mm(w) × 325mm(h)
Weight (in Air)	32kg
Payload	9kg

PELAGIC RESEARCH SERVICES | pelagic-services.com

Pelagic Research Services

ODYSSEUS 6K

Depth	6000m
Power	25HP
Dimensions	2490mm(l) × 1511mm(w) × 2242mm(h)
Weight (in Air)	2495kg
Payload	Various Options (907kg / 1814kg Through Frame Lift)

Poseidon Robotics

LANAI

Depth	400m
Power	0.6kW
Dimensions	559mm(l) × 356mm(w) × 305mm(h)
Weight (in Air)	14kg
Payload	2kg

Poseidon Robotics

LANAI PRO

Depth	400m (975m optional)
Power	1.5kW
Dimensions	559mm(l) × 356mm(w) × 305mm(h)
Weight (in Air)	14.7kg
Payload	2kg

Poseidon Robotics

MAUI

Depth	400m
Power	3kW
Dimensions	725mm(l) × 465mm(w) × 425mm(h)
Weight (in Air)	31kg
Payload	9.3kg

QYSEA | qysea.com

QYSEA

FIFISH E-GO

Depth	100m / 200m
Power	69.12Wh × 2
Dimensions	430mm(l) × 345mm(w) × 170mm(h)
Weight (in Air)	5.1kg
Payload	5kg

QYSEA

FIFISH PRO V6 PLUS

Depth	150m
Power	156Wh
Dimensions	383mm(l) × 331mm(w) × 158mm(h)
Weight (in Air)	5kg
Payload	5kg

QYSEA

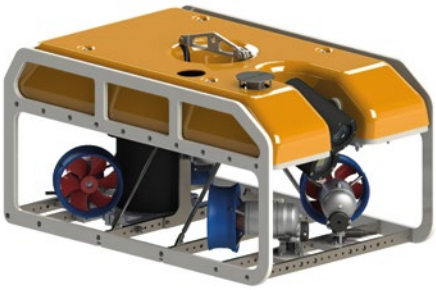
FIFISH PRO W6

Depth	350m
Power	388.8Wh
Dimensions	700mm(l) × 469mm(w) × 297mm(h)
Weight (in Air)	23kg
Payload	10kg

QYSEA

FIFISH X2

Depth	350m
Power	20kWh
Dimensions	1900mm(l) × 940mm(w) × 800mm(h)
Weight (in Air)	200kg
Payload	30kg



Rovotics

SHARK G1R

Depth	300m
Power	12kW
Dimensions	950mm(l) × 590mm(w) × 470mm(h)
Weight (in Air)	59kg
Payload	10kg

Rovotics

SHARK G2R

Depth	500m (1000m optional)
Power	12kW
Dimensions	1150mm(l) × 750mm(w) × 590mm(h)
Weight (in Air)	140kg
Payload	35kg

Rovotics

SHARK G3R

Depth	500m (1000m / 2000m / 3000m optional)
Power	18kW
Dimensions	1600mm(l) × 1080mm(w) × 885mm(h)
Weight (in Air)	350kg
Payload	100kg

Rovotics

SHARK G4R

Depth	500m (1000m / 2000m / 3000m optional)
Power	56kW (75HP)
Dimensions	2140mm(l) × 1350mm(w) × 1170mm(h)
Weight (in Air)	740kg
Payload	280kg

SAAB | saabseaeye.com

The professional portable underwater vehicle.

SAAB

SEAEYE FALCON & FALCON DR

Depth	300/1000msw
Thrust	42/25/13 kgf (Fwd/Lat/Vert)
Dimensions	1000mm × 600mm × 500mm
Weight (in Air)	60/100kg
Payload	14/15kg

The benchmark inspection and observation vehicle.

SAAB

SEAEYE TIGER

Depth	1000msw
Thrust	62/43/22 kgf (Fwd/Lat/Vert)
Dimensions	1030mm × 700mm × 590mm
Weight (in Air)	150kg
Payload	32kg

The offshore inspection vehicle with enhanced interface capability.

SAAB

SEAEYE LYNX

Depth	1500msw
Thrust	66/47/43 kgf (Fwd/Lat/Vert)
Dimensions	1230mm × 815mm × 605mm
Weight (in Air)	200kg
Payload	34kg

The shallow water inspection vehicle with outstanding current handling capability.

SAAB

SEAEYE COUGAR-XT COMPACT

Depth	300msw
Thrust	170/120/110 kgf (Fwd/Lat/Vert)
Dimensions	1300mm × 900mm × 784mm
Weight (in Air)	270kg
Payload	60kg

SAAB | saabseaeye.com

The high power & versatile, compact, light work vehicle.

SAAB

SEAEYE COUGAR-XTI

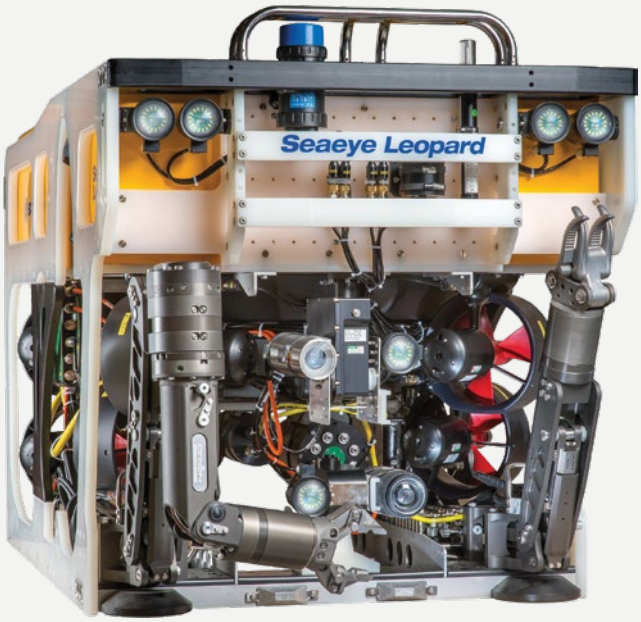
Depth	2000msw
Thrust	170/120/110 kgf (Fwd/Lat/Vert)
Dimensions	1515mm × 1000mm × 790mm
Weight (in Air)	435kg
Payload	80kg

The high current shallow water survey and light work vehicle.

SAAB

SEAEYE PANTHER-XT PLUS

Depth	1000msw
Thrust	340/170/105 kgf (Fwd/Lat/Vert)
Dimensions	2140mm × 1060mm × 1217mm
Weight (in Air)	800kg
Payload	150kg



The high power compact electric work class vehicle.

SAAB

SEAEYE LEOPARD

Depth	2/3000msw
Thrust	500/230/200 kgf (Fwd/Lat/Vert)
Dimensions	2150mm × 1160mm × 1204mm
Weight (in Air)	1200kg
Payload	205kg

The full work class vehicle, empowering eco-responsibility.

SAAB

SEAEYE EWROV

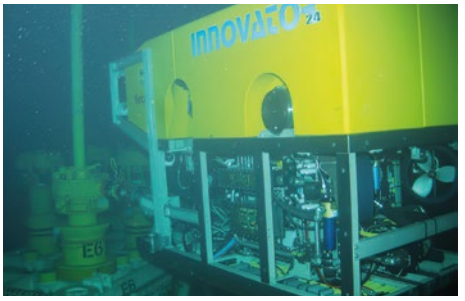
Depth	3000msw
Power	180kW
Thrust	>1200/1200/1200 kgf (Fwd/Lat/Vert)
Dimensions	2850mm × 1800mm × 1900mm
Weight (in Air)	3700kg
Payload	250 kg

SAIPEM | saipem.com

Saipem

INNOVATOR 150HP

Depth	3000m
Power	150HP
Dimensions	3150mm(l) × 1550mm(w) × 2000mm(h)
Weight (in Air)	3750kg
Payload	Various Options



Saipem

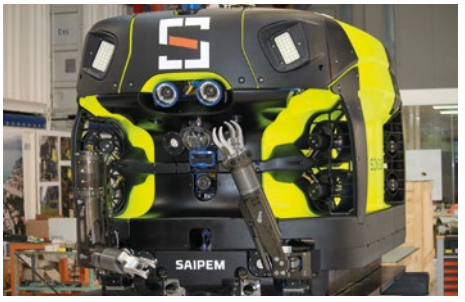
INNOVATOR 250HP

Depth	3500m
Power	250HP
Dimensions	3450mm(l) × 1630mm(w) × 2130mm(h)
Weight (in Air)	5020kg
Payload	Various Options

Saipem

INNOVATOR 2.0

Depth	3000m (4000m optional)
Power	210HP
Dimensions	3800mm(l) × 1850mm(w) × 2300mm(h)
Weight (in Air)	5500kg
Payload	Various Options



Saipem

HYDRONE-R

Depth	3000m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	Various Options

SAIPEM | saipem.com

Saipem

HYDRONE-W

Depth	3000m
Power	180kW
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	Various Options

SEADRONE | seadronepro.com

SeaDrone

SEADRONE PRO

Depth	125m
Power	3h (Battery)
Dimensions	306mm(l) × 306mm(w) × 320mm(h)
Weight (in Air)	10kg
Payload	Various Options

SeaDrone

MINI

Depth	300m
Power	0.4W
Dimensions	data N/A
Weight (in Air)	15kg
Payload	Various Options

SeaDrone

XROV

Depth	400m
Power	6kW
Dimensions	840mm(l) × 610mm(w) × 250mm(h)
Weight (in Air)	27kg
Payload	Various Options

SEAMOR MARINE | seamor.com

SEAMOR Marine

STEELHEAD

Depth	300m
Power	data N/A
Dimensions	502mm(l) × 384mm(w) × 373mm(h)
Weight (in Air)	21kg
Payload	Various Options

SEAMOR Marine

CHINOOK

Depth	300m (600m optional)
Power	data N/A
Dimensions	686mm(l) × 384mm(w) × 406mm(h)
Weight (in Air)	33kg
Payload	Various Options

SEAMOR Marine

MAKO

Depth	300m (600m optional)
Power	data N/A
Dimensions	840mm(l) × 635mm(w) × 674mm(h)
Weight (in Air)	72kg
Payload	14kg (22.5kg optional)

SEATRONICS (ACTEON) | acteon.com

Seatronics (Acteon)

VALOR

Depth	300m (1000m optional)
Power	10kW
Dimensions	860mm(l) × 600mm(w) × 550mm(h)
Weight (in Air)	86kg
Payload	21kg

SEATOOLS | seatools.com

Seatools

FLINTSTONE FALL PIPE ROV

Depth	2000m
Power	600kW
Dimensions	6300mm(l) × 3700mm(w) × 3900mm(h)
Weight (in Air)	data N/A
Payload	data N/A

Seatools

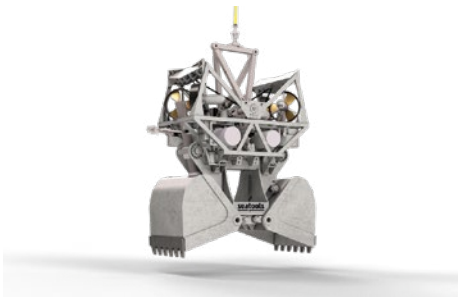
ROCKPIPER – FALL PIPE ROV

Depth	2000m
Power	320kW
Dimensions	7800mm(l) × 4200mm(w) × 3600mm(h)
Weight (in Air)	data N/A
Payload	data N/A

Seatools

ROHP ROV

Depth	300m
Power	100kW
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	2500kg



Seatools

GES-GRAB EXCAVATION SYSTEM

Depth	1000m
Power	2x200kW
Dimensions	6600mm(l) × 3300mm(w) × 9300mm(h)
Weight (in Air)	70MT
Payload	16m³ (Grab Volume)

SHARK MARINE TECHNOLOGIES

| sharkmarine.com

Shark Marine Technologies

BARRACUDA

Depth	300m (1000m optional)
Power	7.2kW
Dimensions	877mm(l) × 530mm(w) × 310mm(h)
Weight (in Air)	39kg
Payload	Various Options

Shark Marine Technologies

SEA-WOLF 5

Depth	600m
Power	7.2kW
Dimensions	977mm(l) × 737mm(w) × 559mm(h)
Weight (in Air)	95kg
Payload	18kg

SMD | smd.co.uk

SMD

ATOM

Depth	4000m
Power	75kW
Dimensions	2520mm(l) × 1500mm(w) × 1500mm(h)
Weight (in Air)	2000kg
Payload	150kg (1500kg through frame lift)

SMD

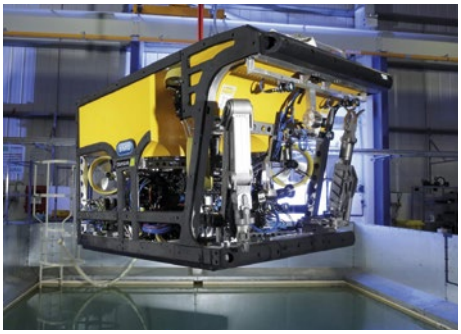
QUANTUM

Depth	4000m
Power	TBC
Dimensions	3680mm(l) × 2000mm(w) × 2000mm(h)
Weight (in Air)	5000kg
Payload	350kg (4000kg through frame lift)

SMD

QUANTUM-EV

Depth	3000m (4000m & 6000m optional)
Power	200kW (268HP)
Dimensions	3306mm(l) × 1800mm(w) × 1900mm(h)
Weight (in Air)	4050kg
Payload	400kg (4000kg through frame lift)



SMD

QUASAR

Depth	4000m
Power	TBC
Dimensions	3200mm(l) × 1800mm(w) × 1800mm(h)
Weight (in Air)	3500kg
Payload	250kg (3000kg through frame lift)

SRS FUSION | srsfusion.com

SRS

FUSION

Depth	300m
Power	data N/A
Dimensions	data N/A
Weight (in Air)	27.5kg
Payload	Customizable

SUBMERSIBLE SYSTEMS | ssirovs.com

Submersible Systems

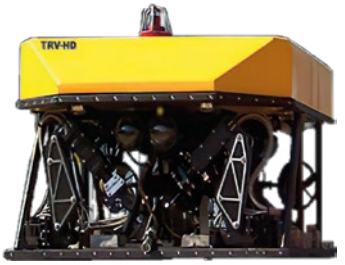
TRV-005

Depth	1000m
Power	25kW
Dimensions	1524mm(l) × 914mm(w) × 457mm(h)
Weight (in Air)	250kg
Payload	15kg

Submersible Systems

TRV-M

Depth	1000m
Power	25kW
Dimensions	1524mm(l) × 1219mm(w) × 610mm(h)
Weight (in Air)	426kg
Payload	27kg



Submersible Systems

TRV-HD

Depth	1000m
Power	25kW
Dimensions	1700mm(l) × 1384mm(w) × 914mm(h)
Weight (in Air)	794kg
Payload	136kg

Subsea Tech

TORTUGA ROV
INSPECTION CLASS ROV

Depth	500m
Power	10 kVA
Dimensions	L 996mm × W 430mm × H 461mm
Weight (in Air)	37.5 kg in air
Payload	10kg (wet weight)

Subsea Tech

MINI TORTUGA ROV
OBSERVATION CLASS ROV

Depth	300m
Power	3kW
Dimensions	L 672 mm × W 310 mm × H 381mm
Weight (in Air)	19kg in air
Payload	5kg (wet weight)

Subsea Tech

MINI TORTUGA XP4 ROV
OBSERVATION CLASS ROV

Depth	300m
Power	6 kW
Dimensions	L 672 mm × W 684 mm × H 500 mm
Weight (in Air)	43kg in air
Payload	10 kg (wet weight)

Subsea Tech

OBSERVER MINI-ROV
OBSERVATION CLASS ROV

Depth	150m
Power	220 VAC
Dimensions	L 490mm × l 270mm × H 210mm
Weight (in Air)	6.4kg in air
Payload	0.5kg (wet weight)

SUBSEA TECH | subsea-tech.com

Subsea Tech

GUARDIAN MINI-ROV OBSERVATION CLASS ROV

Depth	150m
Power	220 VAC
Dimensions	L 470mm × W 254mm × H 160mm
Weight (in Air)	4.5kg in air
Payload	0.5kg (wet weight)

TECHNIP FMC | technipfmc.com

TechnipFMC

SCHILLING ROBOTICS HEAVY DUTY (HD) ROV

Depth	3,000 m (9,843 fsw) or 4,000 m (13,123 fsw)
Power	150 HP + 36 HP (aux)
Dimensions	2.9 m × 1.7 m × 1.9 m
Weight (in Air)	3,600 kg
Payload	150 kg to 250 kg

TechnipFMC

SCHILLING ROBOTICS UHD-II ROV

Depth	3,000 m (9,843 fsw) or 4,000 m (13,123 fsw)
Power	200 HP + 54 HP (aux)
Dimensions	3.0 m × 1.9 m × 2.1 m
Weight (in Air)	5,000 kg
Payload	300 kg

TECHNIP FMC | technipfmc.com

TechnipFMC

SCHILLING ROBOTICS ULTRA HEAVY DUTY (UHD)-III ROV

Depth	3,000 m (9,843 fsw) or 4,000 m (13,123 fsw)
Power	250 HP + 150 HP (aux)
Dimensions	3.5 m × 1.9 m × 2.1 m
Weight (in Air)	5,600 kg
Payload	450 kg

TechnipFMC

SCHILLING ROBOTICS GEMINI ROV SYSTEM

Depth	3,000 m (9,843 fsw) or 4,000 m (13,123 fsw)
Power	250 HP + 150 HP (aux)
Dimensions	3.9 m × 2.5 m × 2.5 m (13 ft × 8 ft × 8 ft)
Weight (in Air)	5,900 kg (12,980 lbs)
Payload	30 kg (66 lbs)

TELEDYNE SEABOTIX | teledynemarine.com

Teledyne SeaBotix

VLBV300

Depth	300m
Power	3.3kW
Dimensions	625mm(l) × 390mm(w) × 390mm(h)
Weight (in Air)	18kg
Payload	Various Options

Teledyne SeaBotix

VLBV950

Depth	950m
Power	4.5kW
Dimensions	625mm(l) × 390mm(w) × 390mm(h)
Weight (in Air)	18kg
Payload	Various Options

VIDEORAY | videoray.com

HQ Location: 212 East High Street, Pottstown, PA 19464 **Regional Offices:** San Diego, CA | St. Petersburg, FL

Company Intro: VideoRay Mission Specialist Underwater Robotic Systems have redefined the "inspection class" category. Much more than underwater cameras, they are ready to perform critical jobs in the harshest environments. VideoRay systems deliver industry-leading power and manoeuvrability, enabling operations in currents up to four knots. The durable modular platform is built to handle heavy payloads and a wide array of sensors and tooling, reliably operating for hours, days, or even months at a time.

Contact: Margo Newcombe | margo.newcombe@videoray.com

VideoRay

MISSION SPECIALIST DEFENDER

Depth	1000m
Power	1-2.6kW
Dimensions	71.12cm(l) × 39.37cm(w) × 23.80cm(h)
Weight (in Air)	17.2kg
Payload	Customizable

The Mission Specialist Defender configuration is designed for more precise control of the vehicle position and orientation, heavier payloads, and demanding intervention, such as rendering unexploded ordnance safe or cleaning nets for offshore fish farms. With seven thrusters, the Defender can move in any direction, and maintain active pitch to face the vehicle in an upward or downward orientation. The addition of third-party control and navigation software from Greensea Systems makes the Defender a popular configuration for dangerous or heavy-duty missions.

VideoRay

MISSION SPECIALIST PRO 5

Depth	305m
Power	1-2.4kW
Dimensions	51.49cm(l) × 33.02cm(w) × 25.73cm(h)
Weight (in Air)	11.8kg
Payload	Customizable

The VideoRay Mission Specialist Pro 5 configuration is designed for speed and efficiency, weighing in at 10kg (22lb). The three-thruster system has a forward speed of over 4.4 knots and utilizes a system of interchangeable, modular components residing on a single, intelligent network. The Pro 5 ROV robot is designed to handle missions with size, space, weight, and deployment speed constraints, such as infrastructure inspections beyond the reach of divers, search & recovery, exploring the ocean floor up to 305m, and various others.

MISSION SPECIALIST

MISSION SUCCESS

When your mission must succeed the first time...and failure is not an option.

Depend on VideoRay Mission Specialist Technology.

VideoRay ROVs are one-made portable and made in the USA to deliver maximum performance and reliability when it matters most during challenging operations. And if things go sideways, we've got your back with exceptional, worldwide service and support to get you up and running fast.

Want to know more? Visit **www.videoray.com**

VideoRay

sales@videoray.com +1 610 458 3000


OCEANEERING®
Connecting What's Needed with What's Next™
SUSTAINABLE SOLUTIONS
We're engineering solutions for the future of energy. Our autonomous and remote technologies help solve critical challenges in some of the toughest environments around the world.
FREEDOM
Connect with what's next at oceaneering.com
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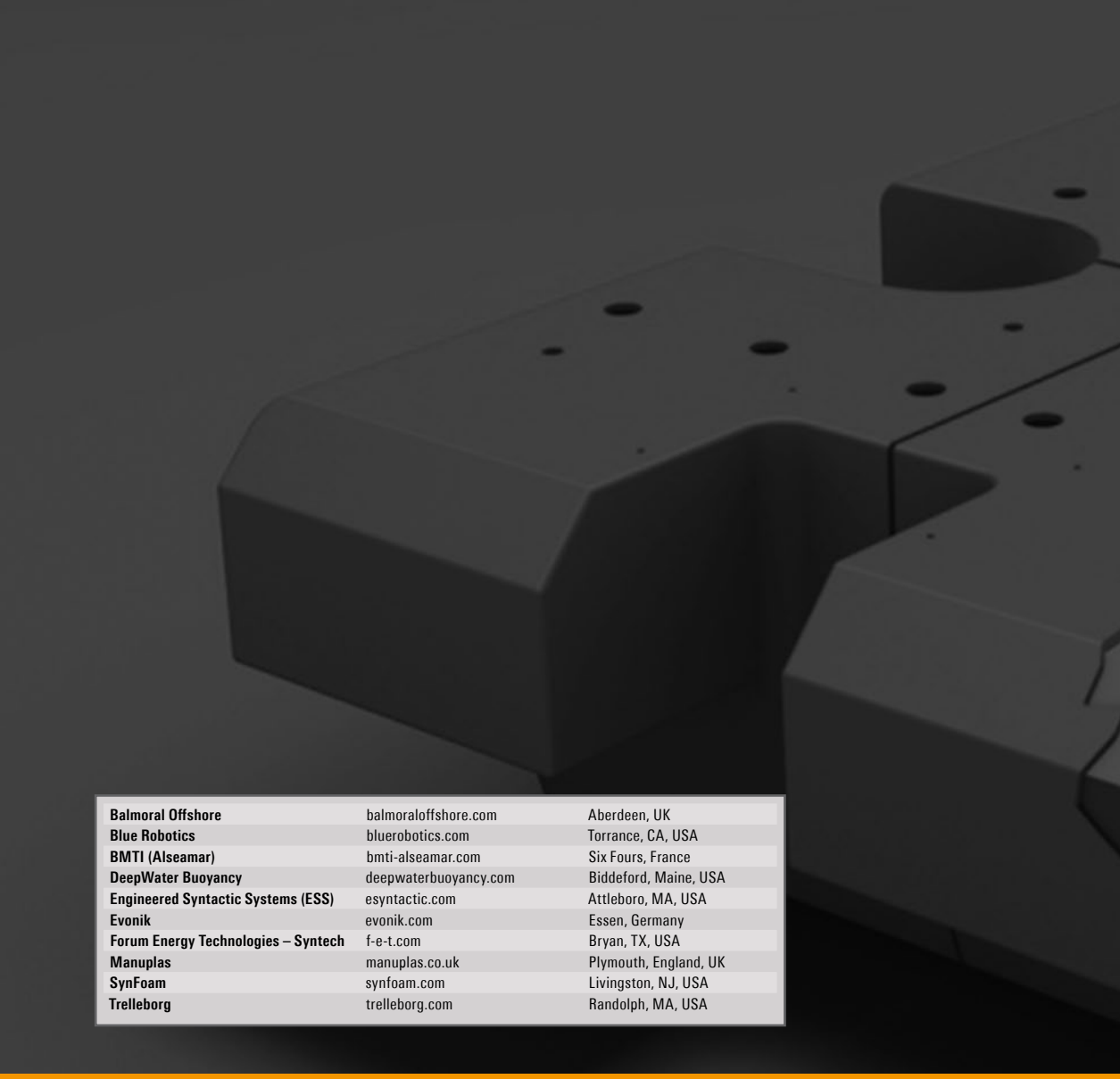
EQUIPMENT & SERVICES

II.



Balmoral Offshore	balmoraloffshore.com	Aberdeen, UK
Blue Robotics	bluerobotics.com	Torrance, CA, USA
BMTI (Alseamar)	bmti-alseamar.com	Six Fours, France
DeepWater Buoyancy	deepwaterbuoyancy.com	Biddeford, Maine, USA
Engineered Syntactic Systems (ESS)	esyntactic.com	Attleboro, MA, USA
Evonik	evonik.com	Essen, Germany
Forum Energy Technologies – Syntech	f-e-t.com	Bryan, TX, USA
Manuplas	manuplas.co.uk	Plymouth, England, UK
SynFoam	synfoam.com	Livingston, NJ, USA
Trelleborg	trelleborg.com	Randolph, MA, USA

NEXT » BUOYANCY

II.01.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

BUOYANCY

BALMORAL

HQ Location: Balmoral Park, Loirston, Aberdeen, AB12 3GY, United Kingdom
Regional Offices: Houston, TX, USA | Rio de Janiero, Brazil

Company Intro
Balmoral is a trusted partner to the global offshore energy sector.
We offer unrivalled technical expertise, a vast project track record, evidence-based buoyancy, protection and insulation product design, development and delivery. This, combined with an open approach to stakeholder engagement, ensures success.

balmoraloffshore.com

Contact
Gary Yeoman
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+44 (0) 1224 859000

ROV/AUV BUOYANCY
(TO 7,000MSW DEPTHS)

Composite Foam Systems: A "composite" buoyancy system refers to a syntactic foam comprising glass microspheres and macrospheres held together within an epoxy resin system to create a homogenous matrix. Composite buoyancy systems are cast using dedicated mould tooling providing repeatable consistent production and are therefore ideally suited in applications such as work class ROV's particularly on a multi-build requirement. Each component within any given Balmoral syntactic foam is individually rated for specific operating depths resulting in a strong, lightweight composite formulation. There is an overlap in the operating depth ranges which is caused by macro efficiency changes in design operating depths. This means that more efficient, lower density composites may generate improved uplift for a given volume as the operating depth increases. Composite buoyancy systems comprise an integrated shell to ensure maximum protection of the core material in the event of accidental impact.

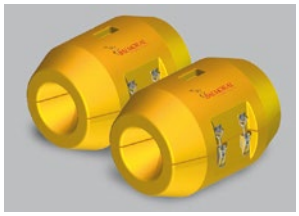
Pure Foam Systems: Pure foams offer many advantages over macrosphere composite foam systems including robustness, ease of repair and modification in the event of damage or design changes, and extremely low water ingress rates. It should be noted, however, that this is a premium product and is therefore typically selected for more demanding service conditions such as extreme operating depths and/or service criticality such as manned service. The "ultra-low density range" of pure syntactic foam is normally produced in pre-cast blocks. These blocks may be supplied for client assembly or can be factory assembled into finished buoyancy modules. The buoyancy performance of Balmoral's ultra-low density material is understood to be unique amongst ROV buoyancy foams in that the buoyancy does not progressively reduce due to hydrostatic compression as the ROV moves into deeper water. This is because the bulk modulus ie, the compressibility under hydrostatic pressure of the foams is marginally less than sea water.

PURE FOAM ULTRA-LOW DENSITY RANGE (LDF)	
Operating depth (ft/msw)	**Typical core density kg/m³**
6500 / 2000	385
9850 / 3000	401
13100 / 4000	435
16500 / 5000	479
23000 / 7000	519

FLEXLINK™ ARTICULATED UMBILICAL BUOYANCY

FlexLink™ was developed to meet the needs of large, tracked, trenching vehicles that operate on the sea bed. To prevent such vehicles damaging their control lines, FlexLink is installed at the tether point to provide a continuous, articulate buoyant section above the vehicle, thereby ensuring the umbilical remains out of the vehicle work zone at all times. FlexLink is used as a permanent installation which is designed to pass through the sheave wheels of launch and recovery systems (LARS). It is supplied for installation onto umbilicals ranging in size 25-75mm OD while the buoyancy can be specified to suit project requirements. Typical uplift ranges from 6-12kg/m in design operating depths of 0-6000msw.

UMBILICAL FLOTATION



BOE provides a range of floats to suit most control umbilicals. These floats comprise a pair of symmetrical half shells which are profiled to permit the line to flex within its specified bend radius. Each float is manufactured using a low density composite foam core covered in a high performance impact and abrasion resistant polyethylene shell. BOE's umbilical floats are hinged using two stainless steel latches. The floats are designed to grip the umbilical by means of a natural rubber internal grommet. Balmoral umbilical floats are designed to suit umbilical diameters ranging from 25-50mm OD. Umbilical floats can be supplied to suit larger diameter umbilicals if required.

UMBILICAL FLOAT VALUES		
Operating depth (msw)	**Weight in air (kg)**	**Nominal buoyancy (kg)**
1000	14.7	15.2
1500	15.9	14
2000	17.3	12.6
2500	18.1	11.8
3000	19.1	10.8

BALMORAL SUBSEA TEST CENTRE

Hydrostatic testing
23 test vessels: internal lengths from 1010-10400mm, testing to 96-700bar

Mechanical testing
A proprietary test rig performs load, axial, lateral, static, 3-point, compression, shear, dropped weight, swing arm and bend testing.

Submersion test tanks
Three tanks spanning 6600×2300mm-9000mm dia, 2200-4500mm depths

Development and test laboratories
Ultramodern facility offers chemical, thermal, hydrostatic and mechanical testing in a highly controlled scientific environment.

BUOYANCY REPAIR

It is vital that repair and refurbishment is carried out by fully qualified teams that understand the materials, procedures and environments to which marine buoyancy is exposed. It is vital that repair and refurbishment is carried out by fully qualified teams that understand the materials, procedures and environments to which marine buoyancy is exposed. Balmoral benefits from many years' design, manufacture and materials experience and has dedicated teams of experienced repair personnel travelling the world on a regular basis.

INDUSTRY REGISTRATIONS

ISO 9001:2015 ISO 45001:2018 FPAL Achilles 10040184

BASE MATERIALS LTD.

HQ Location: Unit 18 – 20 Ashville Way, Ashville Trading Estate, Whetsone, Leicester, LE8 6NU, UK

Company Intro

Base Materials is an expert in high-performance syntactic materials, supplying high-quality solutions to customers globally for more than 20 years. Our roots are in specialist composite tooling materials, where we're known for providing innovative technology and outstanding service for a wide range of industries.

Designed with customers in mind, our Subtec® buoyancy materials provide maximum uplift for a given volume, with some of the lowest-density materials available. We understand the need for high-performance, reliable solutions, especially when engineering buoyancy for manned applications.

Contact
Stephen Sloan
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+44 (0)116 286 5073
+44 (0) 7399 432292

base-materials.com

SUBTEC HIGH-PERFORMANCE, LOW-DENSITY SYNTACTIC BUOYANCY MATERIALS

Base Materials range of Subtec® subsea buoyancy materials is engineered for use in applications including remotely operated vehicles (ROV), autonomous underwater vehicles (AUV) and human-operated vehicles (HOV).

Comprising high-grade hollow glass microspheres and a novel thermoset polymer matrix, our low-density Subtec® buoyancy materials are formulated to produce ultra-high strength-to-weight characteristics with excellent water ingress resistance. This makes them the ideal solution for subsea applications including manned and unmanned vehicles.

From subsea intervention equipment to subsea defence platforms, military search and rescue vessels to oceanographic surveying, scientific research vehicles and more, we work collaboratively with customers, to deliver bespoke solutions that meet the specific demands of each application.

Subtec® subsea buoyancy materials are qualified for use in seawater depths down to 11,500 metres.

MODULES AND ASSEMBLIES

Finished buoyancy modules are manufactured to exact customer specifications and drawings at our purpose-built facility in the UK, with the option for the addition of a polyurethane (PU) protective coating for impact and abrasion resistance, aesthetic paint finishes and custom markings.

BLOCKS

Subtec® syntactic buoyancy materials are cast into standard block sizes (750mm x 500mm x 150mm) ready for use and shaping by your in-house team. Blocks can be bonded together and machined to create buoyancy modules to meet your application requirements.

- Low-density formulation for maximum uplift
- Densities range from 385 to 650 kg/m^3
- Range of materials qualified for use in seawater depths, from 2,000 to 11,500 metres
- Each grade is colour-coded to ensure depth rating matches within buoyancy modules
- Excellent water ingress resistance
- High-strength-to-weight materials

BUOYANCY RANGE SELECTOR CHART

SUBTEC®	2000	3000	4000	5000	6000	7000	11500
Colour	WHITE	PINK	VIOLET	ORANGE	BLUE	YELLOW	GREEN
Nominal density (Kg/m^3)	385	415	468	480	495	544	650
Maximum operational depth, MSW @ 4°C	2,000	3,000	4,000	5,000	6,000	7,000	11,500
Maximum operational pressure, psi @ 4°C	2,900	4,356	5,801	7,252	8,702	10,152	16,698
Hydrostatic crush pressure, psi @ 4°C	>5,300	>5,445	>7,350	>10,000	>12,200	>12,500	>20,000
Water absorption, (cyclic & static) % @ 4°C	< +2	< +2	< +2	< +2	< +2	< +2	< +2

BMTI (ALSEAMAR)

HQ Location: 117 rue d'Ollioules, 83140 Six Fours, France

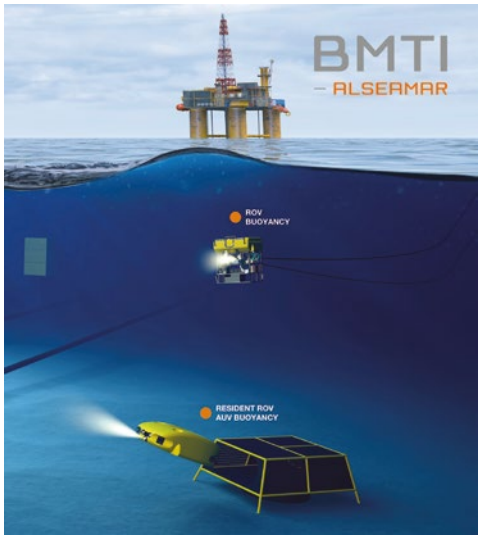
Company Intro
BMTI is a leading manufacturer of engineered pure syntactic foam subsea buoyancy products for the Oil & Gas, Oceanography and Defense industries. Using innovative and advanced own-formulation syntactic foam materials technology and manufacturing processes, BMTI® delivers optimal performance in subsea products for deepwater applications.
We offer the smartest buoyancy solutions: own formulations and associated manufacturing processes, testing throughout the production chain, low densities for maximum buoyancy, long-term operational performance, deepwater & very deepwater buoyancy.

Contact
Alexia Ballatore
aballatore@alseamar-alcen.com
+33 (0)4948 70777

bmti-alseamar.com

ROV / AUV / TRENCHER BUOYANCY

BMTI® offers a state-of-the-art ROV buoyancy manufacturing process to ensure the best possible quality. We select the best foam grade for you on the basis of your specifications (depth rating and uplift are generally required). We are different from other buoyancy providers because we have the largest range of off-the-shelf blocks, densities and grades, so we can quickly take care of any application. Buoyancy assemblies are then machined to the exact shape, before being finished with our own-formulation protective PUR and painting, including the positioning of inserts for which we offer premium strengths. We carry out quality controls and testing to a high standard throughout the manufacturing process, so as to guarantee the best product performance.

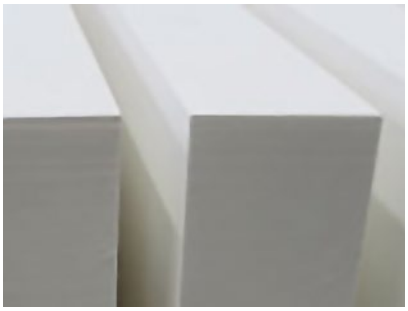


- BMTI® combines materials technology and design experience to manufacture highly sophisticated ROV/AUV buoyancy modules
- BMTI® offers the lowest pure syntactic foam densities on the market for depths from 1 000 to 12 000 m, for maximum vehicle buoyancy.
- BMTI® also has extensive experience in the positioning and incorporation of metal inserts, and in protective skins and coatings.
- BMTI® can provide both standard blocks (large size means limited bonding) or finished buoyancy modules.

HP GRADE FOR RESIDENT ROV/AUV

- Range of High-performance foam composed of epoxy matrix and glass microspheres, from 1000 to 6000m deep
- High performance mechanical properties versus density
- Very low water absorption for long term service
- A qualified product already tested by several customers

SYNTACTIC FOAM BLOCKS



Lightweight and strong: BMTI® syntactic foam blocks offer the best performance for all your buoyancy requirements, if you prefer to shape locally.
The blocks are ready to use for assembly or cut-to-fit applications and can also be bonded together to form larger structures.
We have an important stock policy, of various densities and depths, as to deliver quickly worldwide.
We offer the lowest variations of density tolerances to ensure maximum uplift.

LOW DENSITY GRADE (±15)

Reference	Depth rating (msw)	Average Density on a 1 m³ batch (kg/m³)	(lb/ft³)	Safety Factor (Instantaneous crush / pressure service)
LD2000	2000	420	26.2	1.48
LD3000 (rev 3)	3000	435	27.2	1.48
LD4000 (rev 2)	4000	460	28.7	1.33
LD5000 (rev 2)	5000	505	31.5	1.39
LD6000	6000	565	35.3	1.37
LD7000 (rev 2)	7000	575	35.9	1.30
LD10000	10000	715	44.6	>1.41
LD12000	12000	740	46.2	>1.5

VERY LOW DENSITY GRADE (±10)

Reference	Depth rating (msw)	Average Density on a 1m³ batch (kg/m³)	(lb/ft³)	Safety Factor (Instantaneous crush / pressure service)
VLD1000	1000	390	24.3	2.17
VLD2000	2000	400	25.0	1.39
VLD3000 (Rev2) 3000	425	26.5	1.48	1.48
VLD4000 (Rev2) 4000	448	28	1.33	1.33
VLD5000 (Rev2) 5000	495	30.9	1.39	1.39
VLD6000-33.4	6000	535	33.4	1.38
VLD7000-34	7000	545	34.0	1.29

HIGH PERFORMANCE GRADE (±5, ±10, ±15)

Reference	Depth rating (msw)	Average Density on a 1 m³ batch (kg/m³)	(lb/ft³)	Safety Factor (Instantaneous crush / pressure service)
HP1000	1000	380	23,7	2.57
HP2000	2000	395	24,7	1.88
HP3000-26	3000	418	26.0	1.65
HP4000-28.4 (rev2) / 27,5	4000	455 / 440	28,4 / 27,5	1.5 / 1,41
HP5000-32.5 / 30	5000	520 / 480	32,5	1.5
HP6000-34.6 / 33.1	6000	555 / 530	34.6 / 33.1	1.5

TRELLEBORG APPLIED TECHNOLOGIES

HQ Location: USA regional office: 24 Teed Drive, Randolph, MA 02368, USA

Company Intro

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative engineered solutions accelerate performance for customers in a sustainable way. Trelleborg Applied Technologies specializes in the development and production of polymers and syntactic foam. Our goal is to perform at every level to deliver innovative and reliable solutions that maximize business performance to meet our customers needs.

Remotely Operated Vehicle (ROV), Autonomous Underwater Vehicle (AUV) and Human Occupied Vehicle (HOV) Buoyancy Systems are being used at increasingly deeper water depths, creating the need for low density materials with high buoyancy and reduced volumes. We develop, design and manufacture these buoyancy systems to be used in oceanographic, marine and offshore applications. Trelleborg Applied Technologies is ISO 9001 certified.

USA Contact
Craig Chaffee
craig.chaffee@trelleborg.com
+1 774 719 1400

trelleborg.com/applied-technologies

ROV/AUV BUOYANCY

ECCOFLOAT® SYNTACTIC FOAM


Image courtesy of SMD Ltd

Trelleborg Applied Technologies manufactures a range of high performance, low density syntactic foam for deep sea buoyancy applications called Eccofloat®. These composite foams provide ultra-low densities by selecting only the highest specification hollow glass microspheres and combining them within a rigid, high strength resin system. The syntactic foam is typically cast into standard blocks with depth ranges from 1,000MSW (3,280FSW) to 11,500MSW (37,730FSW).

Oceanographers also depend on syntactic foams to suspend instrumentation in deep ocean studies. For these applications, the syntactic foam is used in either block form or custom molded shapes for installation in manned and unmanned submersibles, such as the legendary Alvin and Jason vehicles that were used to discover and explore the Titanic, along with achieving the world record for the deepest dive by a manned submersible by the Triton 36000/2 (DSV Limiting Factor).

Eccofloat® TG range of syntactic foams are lightweight for building manned and remote operating vehicles. The foams are also used to manufacture mine neutralization systems because of their zero magnetic and sea-water comparable acoustic signatures. Applications include hydroplanes, rudders, trim adjustment modules for submarines and specialized applications such as acoustic windows due to the material profile and ability to significantly improve sonar functions.

Eccofloat® EL range of syntactic foams have been the materials of choice for manufacturing manned and unmanned submersibles for years, with their range of densities and ability to withstand exposure to diesel fuels and hydraulic fluids.

Eccofloat® DG range of syntactic foams have been developed for less density critical applications, with excellent mechanical properties for structural applications.

Eccofloat® DS range of syntactic foams combine lightweight glass Eccospheres® with multifunctional epoxy resin to produce ultra-high strength-to-weight materials for high-performance, deep sea applications including manned and unmanned submersibles.

XLX-C ROV, Image courtesy of Forum Energy Technologies (UK) Ltd

RESIDENCY BUOYANCY

Trelleborg Applied Technologies manufactures a range of ultra-high performance, low density syntactic foams, specifically for ROV and AUV residency vehicle buoyancy applications. These composite foams provide very low densities by incorporating the highest specification hollow glass microspheres and combining with a rigid, high strength resin system.

Engineered to withstand long term immersion, our residency buoyancy solutions can withstand the constant hydrostatic conditions created by the challenge of residency applications. The unique polymer syntactic matrix provides superior resistance to compression ensuring consistent performance and stability.

SUBSEA SPHERICAL AND ELLIPSOIDAL BUOYS

Njord EB (Ellipsoidal Buoyancy) and Njord SB (Spherical Buoyancy) solutions, provide long term, stable buoyancy to arrays of underwater equipment. With a full line of buoyancy solutions ranging from 100 meters to 6,000-meter water depths, these buoys are available in numerous sizes and shapes to ensure successful deployment and recovery during mooring expeditions.

NANO BUOYS

Trelleborg Applied Technologies range of subsea modular buoys, called Njord NB (Nano Buoys), are suitable for subsea equipment installation, each buoy core varies in density to suit individual project water depth needs (assemblies are available at depth ratings from 1,000 to 6,000 MSW). The unique nesting design of the individual buoyancy elements enables them to quickly assemble into a rigid structure with a specific uplift. Nano buoys are manufactured from a low-density carbon fibre macrosphere and syntactic foam. The core is then encapsulated in a high-density polyethylene shell for impact and abrasion protection.

NEXT » CABLE AND PIPE TRACKERS
80 Teledyne TSS

II.02.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

CABLE AND PIPE TRACKERS

TELEDYNE TSS

TELEDYNE MARINE
Everywhereyoulook™

HQ Location: ABZ Business Park, International Avenue, Dyce, Aberdeen, AB21 0BH, United Kingdom

Company Intro

Teledyne Marine is an organization comprised of 23 leading surface and subsea technology brands assembled by Teledyne Technologies Inc. These technologies span oceanographic instruments; subsea and surface vehicles and navigation; imaging sonars, cameras and lights; and interconnect solutions. Collectively, Teledyne Marine is able to offer the widest breadth of technology in the industry.

Teledyne TSS, a brand of Teledyne Marine. is world leading in the design, manufacture, and support of marine products for applications including navigation, motion compensation, platform stabilisation, and subsea pipe and cable survey. Teledyne TSS has specialist sales and support worldwide through a comprehensive network of distributors and service providers.

Contact

tss@teledyne.com
Phone: +44 (0)1224 772345

teledynemarine.com/tss/

PRODUCTS

HYDROPACT 350 CABLE TRACKING SYSTEM

The ROV Mountable HydroPACT 350 Cable Tracking system uses the industry standard and proven tone injection technology to carry out submarine surveys by detecting and tracking tone-carrying cables to create real-time accurate depth of burial and positioning survey data. The measurement technology used also allows the system to operate out of water with no degradation in performance, range, or accuracy. The HydroPACT 350 is available as either 110VAC or 230VAC systems, rated at either 3000m or 6,000m.

HYDROPACT 440 PIPE & CABLE TRACKING SYSTEM

The ROV mountable world renown market leading HydroPACT 440 Pipe & Cable Tracking system uses industry standard and proven pulse induction technology to detect buried pipes, cables and UXO objects and creates real-time accurate depth of burial and positioning survey data. The measurement technology used also allows the system to operate out of water with no degradation in performance, range or accuracy. The HydroPACT 440 is available as either 110VAC or 230VAC systems, rated at either 3000m or 6,000m, or 24VDC system (rated 3000m only).

HYDROPACT DUALTRACK PIPE AND CABLE TRACKING SYSTEM

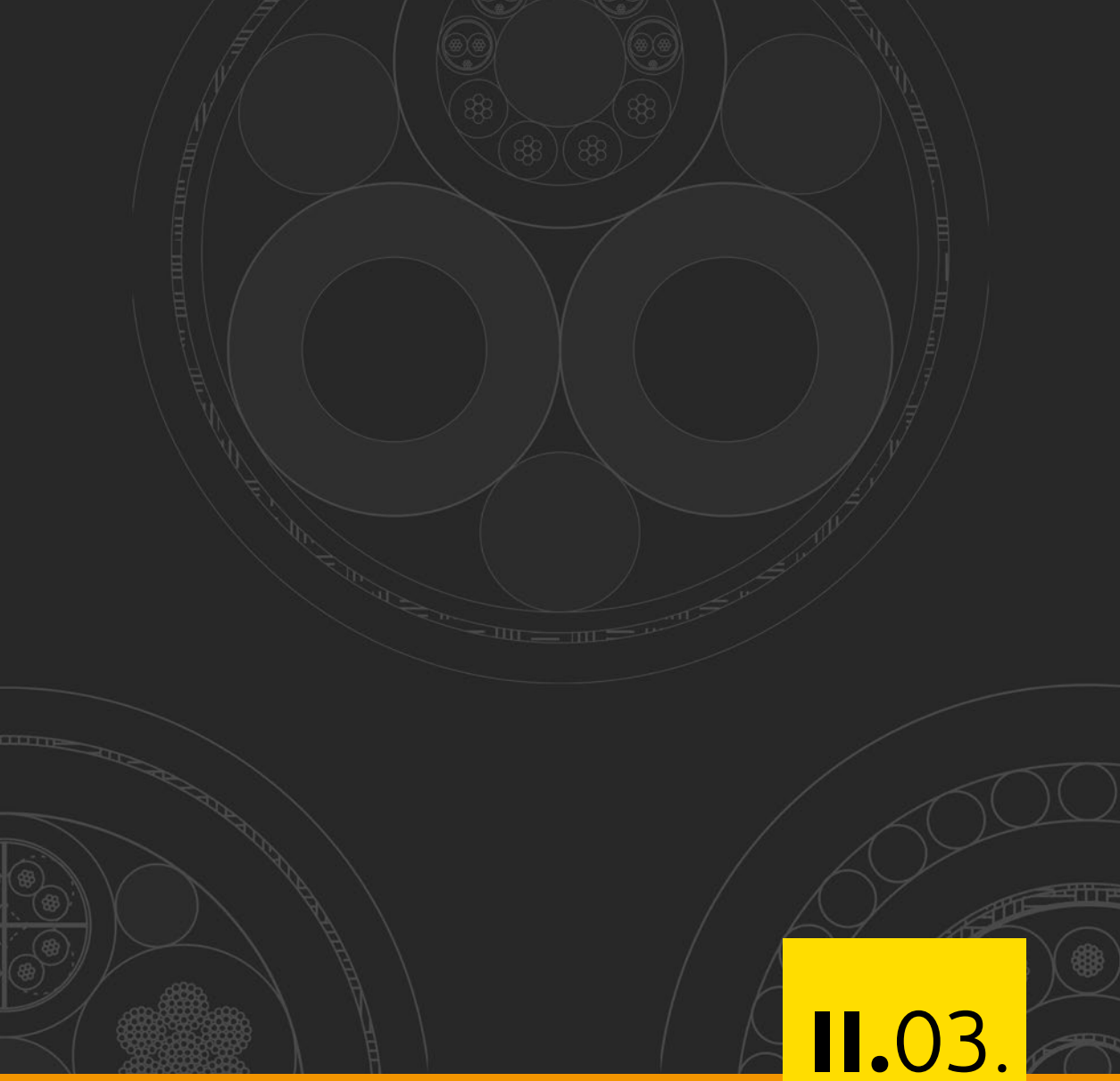
The ROV mountable HydroPACT Dualtrack system comprises of the HydroPACT 440 pulse induction system and 350 tone injection system to give the ultimate subsea pipe and cable detection and tracking capability, enabling the user to switch seamlessly between the two technology platforms to create real-time accurate depth of burial and positioning survey data. The HydroPACT Dualtrack is available as either 110VAC or 230VAC systems, rated at either 3000m or 6,000m.

HYDROPACT 660E PIPE & CABLE TRACKING

With HydroPACT 660E Teledyne Marine brings the world's smallest submarine, pulse induction pipe & cable tracker system to market. Built upon the already established, industry standard and world leading TSS HydroPACT 440 system. The HydroPACT 660E has a 60% smaller coil and single 24 Vdc, small subsea electronic pod, dramatically reducing the installed footprint and payload of the system while maintaining an operating range of greater than 85% of that of the significantly larger HydroPACT 440 system.

Cortland	cortlandcompany.com	Cortland, NY, USA
DeRegt Marine Cables	deregtcables.com	Krimpen aan de Lek, The Netherlands
Elmeridge Cables	elmeridge.com	Brighton, England, UK
Falmat Cables	falmat.com	Falmat, MA, USA
Hydro Group	hydrogroupplc.com	Aberdeen, Scotland, UK
JDR Cables	jdrcables.com	Hartlepool, England, UK
Nexans	nexans.com	Paris, France
NOVACAVI	novacavi.it	Milan, Italy
Oceaneering	oceaneering.com	Rosyth, Scotland, UK
Prysmian Group	prysmiangroup.com	Milan, Italy
Seanamic Group – Umbilicals International	umbilicals.com	Stafford, TX, USA
TE Connectivity – Rochester Cables	te.com	Schaffhausen, Switzerland

NEXT » CABLES, TETHERS & UMBILICALS



II.03.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

CABLES, TETHERS & UMBILICALS

DeRegt

A SERCEL COMPANY

Cable solutions that challenge the status quo

The race to reach greater depths is in full swing

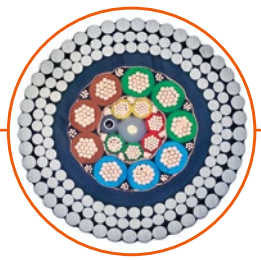
ROV manufacturers are continuously searching for new, innovative ways that will allow existing and new ROV models to dive deeper. As a supplier of ROV cables, we have an unrivalled understanding of the challenges facing ROV manufacturers. Interested in finding out how you, as an ROV manufacturer, can benefit from the latest cable technology?

Meet us
Zaag 2-4, 2931 LD Krimpen aan de Lek, The Netherlands
+31 180 66 88 52 | deregtcables.com

Connect
Stay tuned, keep in touch with DeRegt.
Scan the QR code and be the first to know about our updates.

Middle weight ROV class cable

- Two layer armour package
- High temperature resistant materials
- Optical fiber communication
- 4km waterdepth

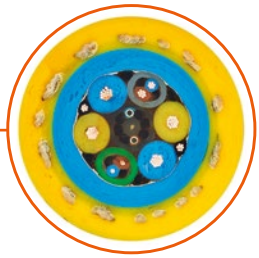


Fall pipe cable

- Triple layer high tensile steel
- Combination of High power, auxiliary power and communication
- Up to 3.5km waterdepth

Trenching umbilical

- High tensile steel package to support cable weight
- High power consumption – 1.5mW power
- Combination of main power, auxiliary and communication pairs
- 750 meter length



Lightweight tether cable

- Light weight design
- Aramid strength member
- Designed for deep water application

HYDRO GROUP

HQ Location: Hydro House, Claymore Avenue, Aberdeen Energy Park, Bridge of Don, AB23 8GW, Scotland, UK

Company Intro

With over 35 years of international experience, Hydro Group designs, manufactures and installs bespoke subsea electrical and optical connectivity solutions for use in harsh environments in the international oil and gas, defence and renewable energy sectors. Headquartered in Aberdeen, United Kingdom, Hydro Group 's regional subsidiaries Hydro Group Asia Pte and Hydro Group Systems, Inc offer support and aftersales service from Singapore and Florida, USA. A network of Hydro Group business partners are also on hand to support your product from initial quotation to final installation around the globe.

Contact

The Hydro Group Plc. sales team
sales@hydrogroup.plc.uk
+44 (0)1224 825 050

hydrogroupplc.com

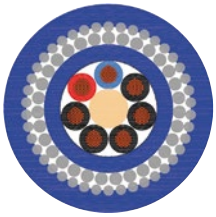
PRODUCTS

Hydro Group has over three decades of experience in the creation of bespoke and ex-stock cables, tethers and umbilicals and is certified to ISO 9001:2015 and 14001:2015 quality standards. The company is a proud recipient of the 2018 Queen's Award for Enterprise: International Trade, recognising the success of its exports around the world.
The Group's subsidiaries, Hydro Bond Engineering and Hydro Cable Systems, manufacture a wide range of subsea connectivity solutions including armoured cables, tow cables, fibre optic hybrid cables and ROV tethers. Over 6000 configurations of cable design are available, with a large choice of armour and sheath materials to choose from to suit your specific application.

ARMOURED CABLES

- Subsea armoured cables can withstand higher stresses with superior crush resistance, corrosion resistance and better cold impact bend performance, ideal for harsh underwater environments
- Hydro Group offers multi-core power and data cables with single layer, contra-helical and high tensile armouring
- Our in-house armouring facilities can include armoured wire sizes between 0.5 – 2.5mm diameters for cables up to 80mm in diameter. Minimum order quantities of 100 metres for cable products.
- Protection options include Aramid, Kevlar, Vectran, galvanised or stainless steel (including steel wire rope or steel wire armour)

WITHOUT OUTER SHEATHING
(CS 7200)



WITH SHEATHING
(CS 7040)

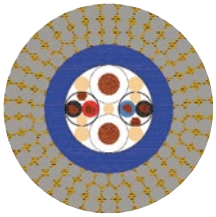
FIBRE OPTIC/HYBRID CABLES

- Our fibre optic cables can be supplied in multiple numbers within a gel-filled stainless steel tube, or as individual fibres within a jacket
- 9/125 Single mode, 50/125 and 62.5/125 Multimode Fibre Optics can be supplied as a standalone cable or as part of a bigger bundle

CS 6866

TOW CABLES

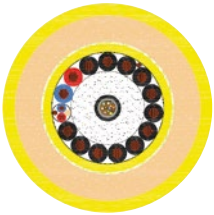
- Range of applications including in defence industry e.g. anti-submarine warfare and reconnaissance
- Experienced in creating heavy and light tow cables for several international defence forces
- Previous example of 600m long steel wire armour heavy tow body sonar cable with hairy fairing on the umbilical to increase coefficients while towed at 20 knots
- Extensive and gruelling testing process – example operational weight of 5 tons, pull weight 40 tons, destruction at 48 tons



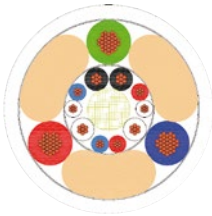
ARMOURED TOW CABLE (CS 7160)

ROV TETHERS

- A range of custom and ex-stock options available, providing extended operating range between ROV and operating base
- We can engineer neutral, negative or positive-buoyancy cables with fibre optic, strain-bearing braid and waterblocking capabilities (other options available)
- Illuminated tether offering with LED elements and Polyurethane (PU) sheath – ideal for inspection ROVs utilised in murky waters to avoid entanglement in limited visibility operations
- Durable cables provided with tough sheathing options to protect against abrasion and damage in harsh subsea environments



BOUYANT ROV TETHER (CS 6707)



ILLUMINATED ROV TETHER (CS 7171)

UMBILICALS

- Hydraulic umbilicals can include different components including thermoplastic hoses, medium voltage power cores, low voltage electrical power cables, electrical signal cables, fibre optic cables
- Bundled assemblies protected by layers of steel wire/Vectran armour and inner and outer sheaths of thermoplastic material, either as extrusions or helically-wrapped roving
- Electrical and Electro-Hydraulic umbilicals also available
- Neutral buoyancy increases safety for divers and machinery operating in close contact with umbilicals
- Hydro Group experienced in manufacturing hydraulic umbilical hose bundles for subsea diving, BOP control, topside control umbilicals and Intervention Workover Control Systems (IWOCS)ratings available upon request

UMBILICAL CABLE (CS 7237)

NOVACAVI

Cables for advanced technology

COMPANY INTRO

Italian privately owned company established in 1975. Specialist in custom cables design and manufacturing, NOVACAVI is involved in providing innovative specialty cables for a broad variety of underwater or water-based environments in high-tech applications.

HQ LOCATION
1 via Martiri di Cefalonia
Peschiera Borromeo-Milano
20068, Italy

CONTACT
Francesca Faverio
ff@novacavi.it
+39 02.5538321

WWW.NOVACAVI.IT

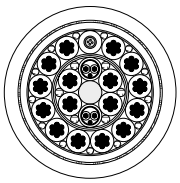
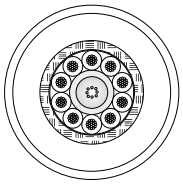
ISO 9001 certified design and production process since 1995.

AQUANCABLE®

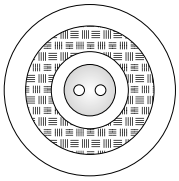
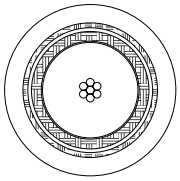
Cables for Underwater Technologies by NOVACAVI

NOVACAVI's custom-engineered cables for underwater technologies feasible on any conceivable configuration.

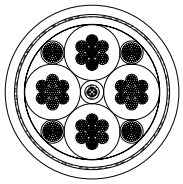
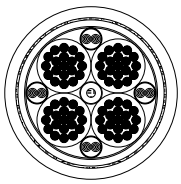
ROV tether cables

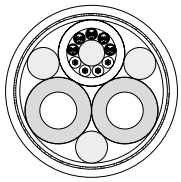
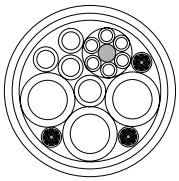
Underwater drones & robots cables

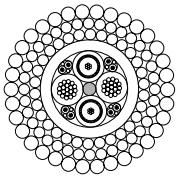
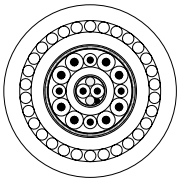
Fiber Optic subsea hybrid cables

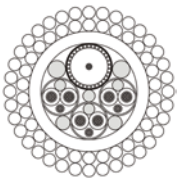
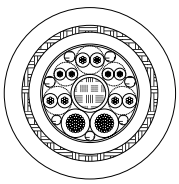
Umbilicals

Subsea armoured tow cables

Subsea detection and instrumentation cables

Contact NOVACAVI for custom requirements: **tech@novacavi.it** - **www.novacavi.it**

2G Robotics	2grobotics.com	Waterloo, ON, Canada
360Heros	360abyss.com	Olean, NY, USA
Arctic Rays	arcticrays.com	Groton, MA, USA
Battelle	battelle.org	Columbus, OH, USA
BIRNS	birns.com	Oxnard, CA, USA
Blue Robotics	bluerobotics.com	Torrance, CA, USA
Cathx Ocean Systems	cathxocean.com	Newhall, Ireland
Ciscrea	ciscrea.fr	Toulon, France
C-Tecnics	c-tecnics.com	Aberdeen, UK
DeepOcean Vision	deepoceanvision.com	Swansea, UK
Deepsea Power & Light	deepsea.com	San Diego, CA, USA
DWTEK	dwtek.com.tw	Taichung City, Taiwan
ECA Group	ecagroup.com	Toulon, France
GNOM	gnomrov.com	Moscow, Russia
Imenco	imenco.no	Aksdal, Norway
ISPTEL, Ida	isptel.com.pt	Perafita, Portugal
Kongsberg Maritime	kongsberg.com	Aberdeen, UK
Lighthouse	lighthouse-geo.com	Bologna, Italy
MacArtney	macartney.com	Esbjerg, Denmark
Marine Imaging Tech	marineimagingtech.com	North Falmouth, MA, USA
Novasub	novasub.com	Sleeuwijk, Netherlands
Ocean Imaging Systems	oceanimagingsystems.com	North Falmouth, MA, USA
Ocean Presence Technologies	oceanpresence.com	Santa Cruz, CA, USA
Ocean Tools	oceantools.co.uk	Aberdeen, UK
Outland Technology	outlandtech.com	Slidell, LA, USA
Remote Ocean Systems (ROS)	rosys.com	San Diego, CA, USA
Rolloos	rolloos.com	Capelle aan den IJssel, Netherlands
Rovtech Solutions	rovtechsolutions.co.uk	Barrow-in-Furness, UK
Seatronics	seatronics-group.com	Aberdeen, UK
Shark Marine	sharkmarine.com	St. Catharines, ON, Canada
SIDUS Solutions	sidus-solutions.com	San Diego, CA, USA
Sonavision	sonavision.co.uk	Aberdeen, UK
SubC Imaging	subcimaging.com	St John's, NL, Canada
Subsea Technology & Rentals (STR)	str-subsea.com	Great Yarmouth, UK
SULIS Subsea	sulissubsea.com	Mt.Pearl, NL, Canada
Teledyne – Bowtech	teledynemarine.com	Aberdeen, UK
Unique System	uniquegroup.com	Sharjah, UAE
UVS	uvs.com.au	Perth, Australia

NEXT » CAMERAS & LIGHTS

II.04.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

CAMERAS & LIGHTS

FORSSEA ROBOTICS

HQ and R&D Location: 130 rue de Lourmel, 75015 Paris, France
Workshops: 196 avenue des Eaux Blanches, 34200 Sète, France

Company Intro
FORSSEA was created in 2016 to cut down operating costs in the offshore energy markets. We believe our industries will evolve toward smaller unmanned vessels. We want to be part of this change bringing new subsea tools to the operators. Our philosophy is to create fully integrated robotics solution that combines cheap plug & play hardware, fit-for-purpose embedded intelligence and real-time supervision.
FORSSEA develops innovative subsea solutions for the offshore industries. Our first vehicle, ATOLL, is a subsea homing vehicle which can transfer power & data to deepsea infra-structures. Our patented technology enables a deployment from light offshore vessels to answer the cost-reduction need faced by our industry.

Contact
Gautier Dreyfus
sales@forssea-robotics.fr
+33 6 09 96 37 82

forssea-robotics.fr

SMART CAM – HD COMPUTER VISION GIGE CAMERA

- Computer Vision
- Plug & Play
- Artificial Intelligence
- 3D & Stereo Vision

The SMART CAM HD 2000 & 6000 designed by FORSSEA ROBOTICS is a fixed focus High Defintion Camera adapted for advanced subsea vision applications. The camera is ideal to equip ROV/AUV for underwater photogrammetry or stereo embedded vision. The focal length is easily adjustable to capture images at very close range. The camera comes fully calibrated with soft-ware lens distortion correction.

OBS CAM – INSPECTION & MONITORING IP CAMERA

- 30× Optical Zoom
- HD video
- TCP/IP Control
- Advanced Functionalities

The OBS CAM is a 4000m Titanium IP camera that provides HD video streaming over Ethernet at the lowest bandwidth, latency, and power. It is ideally suited for low and black light applications. OBS CAM comes with full HD 30x optical zoom with easy-to-use HTTP based control interface. Additional capabilities also available include integrated auto-focus and visibility enhancer. These fea-tures make the OBS CAM a perfect fit for inspection and remote monitoring applications.

NAV CAM SUBSEA & AIR – REAL-TIME INCLINATION & POSITION TRACKING

- Real-Time Embedded intelligence
- Survey Graded Optical Sensor
- Certified Lab Calibration
- Plug & Play with intertial navigation systems

NavCam is an all-in-one visual based navigation and control centre. NAV CAM features an embedded GPU integrated pressure sensor and Inertial Navigation System. NAV CAM is coming with V-LOC embedded software. V-LOC calculates your assets real-time coordinates thanks to open-source tags which are affixed to them. Our technology is embedded inside a calibrated camera which exists in both air and subsea versions for highly accurate marine surveys.

ARGOS – HYBRID LIGHT-INTERVENTION SMART ROV

- 30kg Payload (Survey Tooling Skid)
- Hybrid (Tether or Battery Powered)
- TCP/IP Real-Time Control
- All Electric ROV

ARGOS ROV embraces the latest advances in ROV technology that the industry has come to demand and expect from modern ROV design. ARGOS is compact in design and is primarily suited to inspection and light intervention tasks. The vehicle is powerful enough to perform maintenance and repair duties with use of the optional electric five function manipulator arm and tooling skid interfaces. The standard system has been designed and built to 500m depth rating, however the unique design of this ROV allows the vehicle to be extended up to 2000m with simple modifications.

ATOLL – AUTONOMOUS LIFTING ROV

- Quick-latching system
- Adapted to light vessels
- Go-To mode
- Visual Docking

ATOLL (patented system) is an observation ROV deployable from a light vessel. The system can perform a fully autonomous approach and docking based on embedded control algorithms. Once the link is obtained to the seabed target, ATOLL can either transfer power & data, or mechanically engage the target for recovery back to surface and valve manipulation.
ATOLL comes with dedicated LARS system or can be adapted to any LARS or crane system.

TELEDYNE BOWTECH

TELEDYNE MARINE
Everywhereyoulook™

HQ Location: ABZ Business Park, International Avenue, Dyce, Aberdeen, AB21 0BH, United Kingdom

Company Intro

Teledyne Marine is an organization comprised of 23 leading surface and subsea technology brands assembled by Teledyne Technologies Inc. These technologies span oceano- graphic instruments; subsea and surface vehicles and navigation; imaging sonars, cameras and lights; and interconnect solutions. Collectively, Teledyne Marine is able to offer the widest breadth of technology in the industry.

Teledyne Bowtech specialise in the manufacture and supply of subsea optical products & solutions including underwater cameras, LED Floodlights, emergency Flasher strobes and Laser pointers.

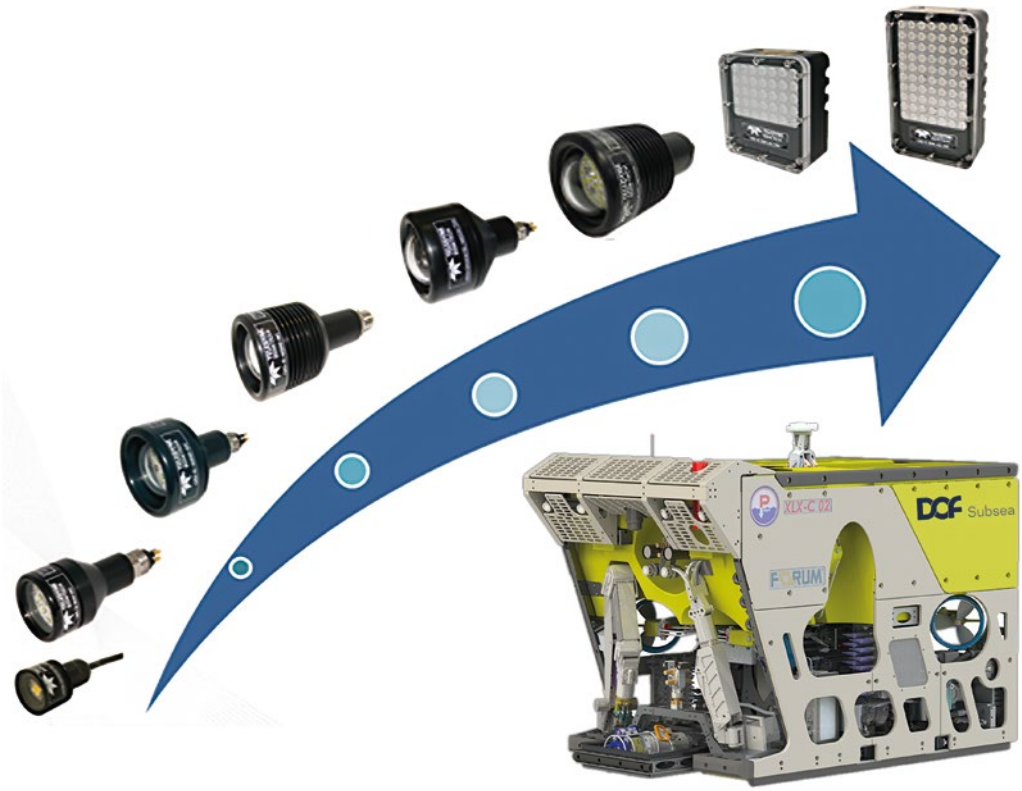
Contact
bowtech@teledyne.com
Phone: +44 (0)1224 772345

teledynemarine.com/bowtech/

PRODUCTS

BOWTECH SUBSEA LED FLOODLIGHTS

The Teledyne Bowtech LED floodlight range includes extremely powerful and rugged panel lights suitable for larger deep water work class ROVs, trenchers and tractors, emitting up to 20,000 lumen, down to much smaller 800 lumen traditional round lights suitable for observation class vehicles and divers etc. offered with a range of subsea connectors, controlling methods and power & Depth options. All our lights are housed in hard anodised aluminium offering an extremely robust, reliable, and hardwearing lighting solution for most subsea applications.



Floodlight Options

Depth Ratings
- 300m / 3000m / 6000m

Input Power
- 24Vdc / 120Vac / 230Vac /140Vdc / 280Vdc

Control Methods
- ON/OFF / 0-5Vdc / 0-10Vdc Analogue/ RS485

Lumen Output
- 800 to 20,000 lumens

PRODUCTS: BOWTECH SUBSEA CAMERAS

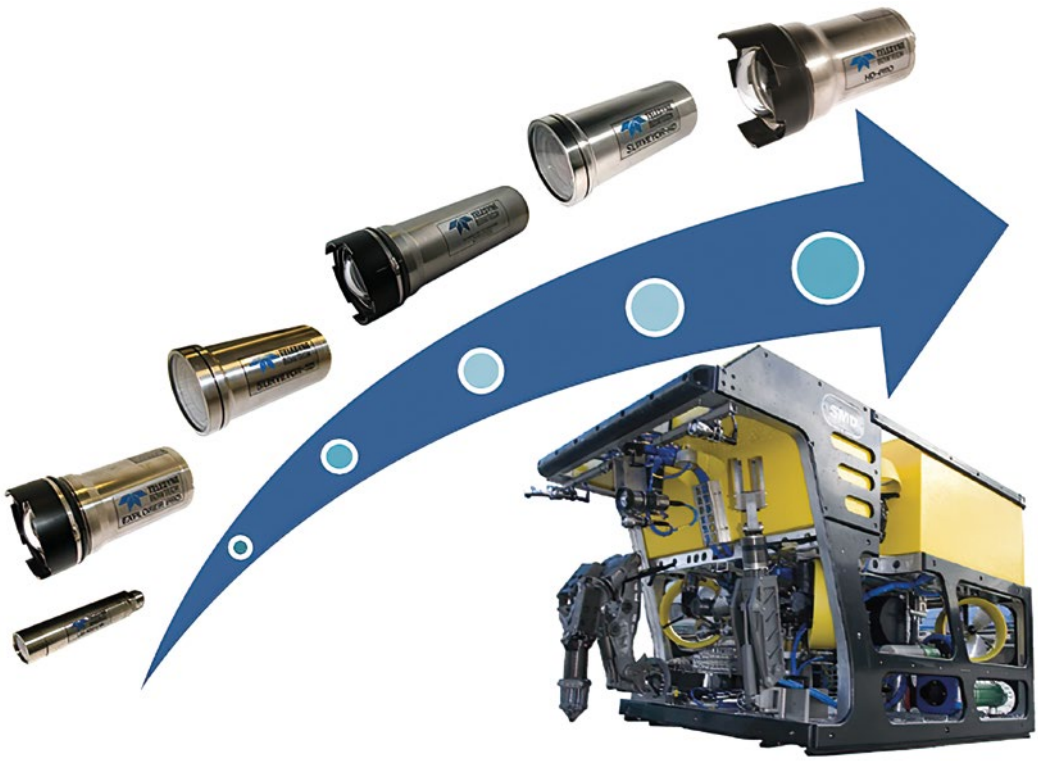
The Teledyne Bowtech Subsea camera range includes high resolution zoom cameras ideal for inspection and observations tasks, low light monochrome cameras for navigation purposes and minimum lighting conditions, and smaller fixed focus cameras for up-close tooling work, particularly on manipulator arms, as well as diver helmets & handhelds. Together our cameras are the eyes for pilots of anything from small observation class ROVs to larger work class ROVs, trenchers and tractors. Offered with traditional Standard Definition (SD) or full High Definition (HD), a choice of video outputs, and range of subsea connectors. All our cameras are housed in titanium and fitted with Sapphire or Fused Silica glass windows offering an extremely robust, reliable, and ultimate optical transmission and clarity camera solution for most subsea applications.

Camera Options

Navigation
- Low light monochrome

Inspection
- Standard Definition Colour Zoom
- Full High Definition 1080p Zoom

Tooling & Diver
- Standard Definition Colour or Monochrome
- Analogue High Definition 1080i
- Full High Definition 1080p



BIRNS	birns.com	Oxnard, CA, USA
CRE	cre-marine.com	Aberdeen, Scotland, UK
DWTEK	dwtekmarine.com	Taiwan
Eaton – Burton	eaton.com	Cleveland, OH, USA
GISMA	gisma-connectors.de	Neumuenster, Germany
Glenair	glenair.com	Glendale, CA, USA
Hydro Group	hydrogroupplc.com	Aberdeen, Scotland, UK
Link Subsea	linksubsea.co.uk	Ulverston, England, UK
MacArtney – SubConn	macartney.com	Esbjerg, Denmark
Siemens – Tronic	siemens.com	Berlin, Germany
Subsea Supplies	subsea-supplies.co.uk	Aberdeen, Scotland, UK
TE Connectivity – Seacon	te.com	Schaffhausen, Switzerland
Teledyne – ODI	teledynemarine.com	Daytona Beach, FL, USA

NEXT » CONNECTORS & PENETRATORS

II.05.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

CONNECTORS & PENETRATORS

HYDRO GROUP

HQ Location: Hydro House, Claymore Avenue, Aberdeen Energy Park, Bridge of Don, AB23 8GW, Scotland, UK

Company Intro

With over 35 years of international experience, Hydro Group designs, manufactures and installs bespoke subsea electrical and optical connectivity solutions for use in harsh environments in the international oil and gas, defence and renewable energy sectors. Headquartered in Aberdeen, United Kingdom, Hydro Group's regional subsidiaries Hydro Group Asia Pte and Hydro Group Systems, Inc offer support and aftersales service from Singapore and Florida, USA. A network of Hydro Group business partners are also on hand to support your product from initial quotation to final installation around the globe.

Contact

The Hydro Group Plc. sales team
sales@hydrogroup.plc.uk
+44 (0)1224 825 050

hydrogroupplc.com

PRODUCTS

Hydro Group is a reliable provider of high-quality connectors and penetrators and is certified to ISO 9001:2015 and 14001:2015 quality standards. With products tailored to the exact demands of your project regardless of location, the company is a proud recipient of the 2018 Queen's Award for Enterprise: International Trade.

The Group's subsidiaries, Hydro Bond Engineering and Hydro Cable Systems, manufacture a wide range of subsea connectivity solutions including its durable range of HRS, HRM and HDM connectors. Hydro Group also manufactures manned and unmanned penetrators suited for electrical, coaxial, optical or hybrid applications.

HRS 105

HRS 305

HRS CONNECTORS

- Hydro Rubber Sealing (HRS) ideal for harsh subsea uses
- Underwater mateable; available in moulded or unmoulded configurations with up to 70 pins
- Rated up to 3.3kV, depth-rated to 2440 MSW
- Bulkhead, panel mount or cable mount options available

HDM 105

HDM 306

HDM CONNECTORS

- Hydro Deck Mate (HDM) are robust and designed for continuous mate/de-mate cycles
- Deck mateable, up to 110 pins density
- Rated to 6900 MSW and up to 3300 Volts RMS
- Ideal for fibre optic connectivity (Multimode 62.5/125 and 50/125, Single mode 9/125)
- Submarine Deck Mate (SDM) connectors available for defence applications upon request

HRM CONNECTORS

- Hydro Rubber Moulded (HRM) connectors are versatile and reliable
- Surface mateable, durable rubberised connectors with precision-engineered and reliable injection moulding fitment
- Offered with bulkhead, attachable, inline, dummy plug and overmould options
- Connectors available in Standard Circular, Micro Series and Low Profile connectivity
- Rated to 600 VDC (configuration dependent) and between 10 and 60 Amps/pin for SC configurations

HPS-21_TA

HPS-21-2

MANNED/UNMANNED PENETRATORS

- Penetrators are suited to applications including diving bell and deck decompression chamber systems
- Lloyd's Register-certified manned submersible electrical penetrators type approved for use at a depth of up to 650 MSW
- Broad operating window of -40°C to 60°C and working voltages of up to 500V
- Fully pressure-blocked with right-angled/in line designs and mono/bi-directional pressure design options
- Rated up to 3,000 Volts RMS, available in stainless steel, titanium, aluminium silicon bronze
- Current ratings up to 140 Amps with higher ratings available upon request

TELEDYNE IMPULSE-PDM

TELEDYNE MARINE
Everywhereyoulook™

HQ Location: 9855 Carroll Canyon Road, San Diego, CA 92131 USA

Regional Offices:

Europe: 4-6 Alton Business Center, Omega Park, Alton, Hampshire, England GU34 2YU
Phone: +44 (0) 1420 552200 E-mail: pdmsales@teledyne.com

China: Room1006,10th Floor, Century Link Tower One, No.1198 Century Avenue, Pudong District, Shanghai 200122, China. Phone: +(86-21) 6876 8038

Company Intro

Teledyne Marine offers the industry's largest selection of cables and connectors designed for harsh and marine environments. In addition to an extensive standard product offering, Teledyne Marine can design an interconnect system for nearly any application. We have expertise working with rugged materials, molding processes, and extensive qualification testing capabilities that ensure your equipment is operational the first time and every time you need it.

Contact
impulse@teledyne.com
+1 800 327 0971

teledynemarine.com/impulse/

PRODUCTS

ELECTRICAL DRY MATE CONNECTORS

Dry-mate connectors must be connected in air, prior to being submerged, and require the face to be clean and dry when doing so. Dry-mate connector designs are generally more compact than comparable wet-mate connector configurations, and a wide variety of options exist. Dry-mate connectors are the widest offering in the Teledyne Marine catalog, and can be ordered as electrical, optical, or hybrid configurations.

1 Net Series 1 Gigabit Ethernet

2 Dry matable connectors

3 IES5 Rubber Molded Metal Shell Connector

ELECTRICAL SPLASH MATE CONNECTORS

The splash-mate connector designation allows the connectors to be mated even when the faces are wet or otherwise contaminated. This capability is generally achieved by overmolding an elastomeric layer on the face of the connector. Splash-mate functionality is best used in applications where full wet-mate capability is not required, but the connections must be made on the deck of a ship, in the splash-zone, or in other areas where ensuring a clean, dry-mating interface is not practical

4 Splash Mate Series

ELECTRICAL WET MATE CONNECTORS

Wet-mate connectors are capable of being connected and disconnected while submerged. The most common family of wet-mate connectors in the Teledyne Marine catalog is the NautilusTM and Rolling Seal Hybrid offering of electrical and optical connectors, which are capable of operating at full ocean depth, thanks to their pressure-balanced, oil-filled design.

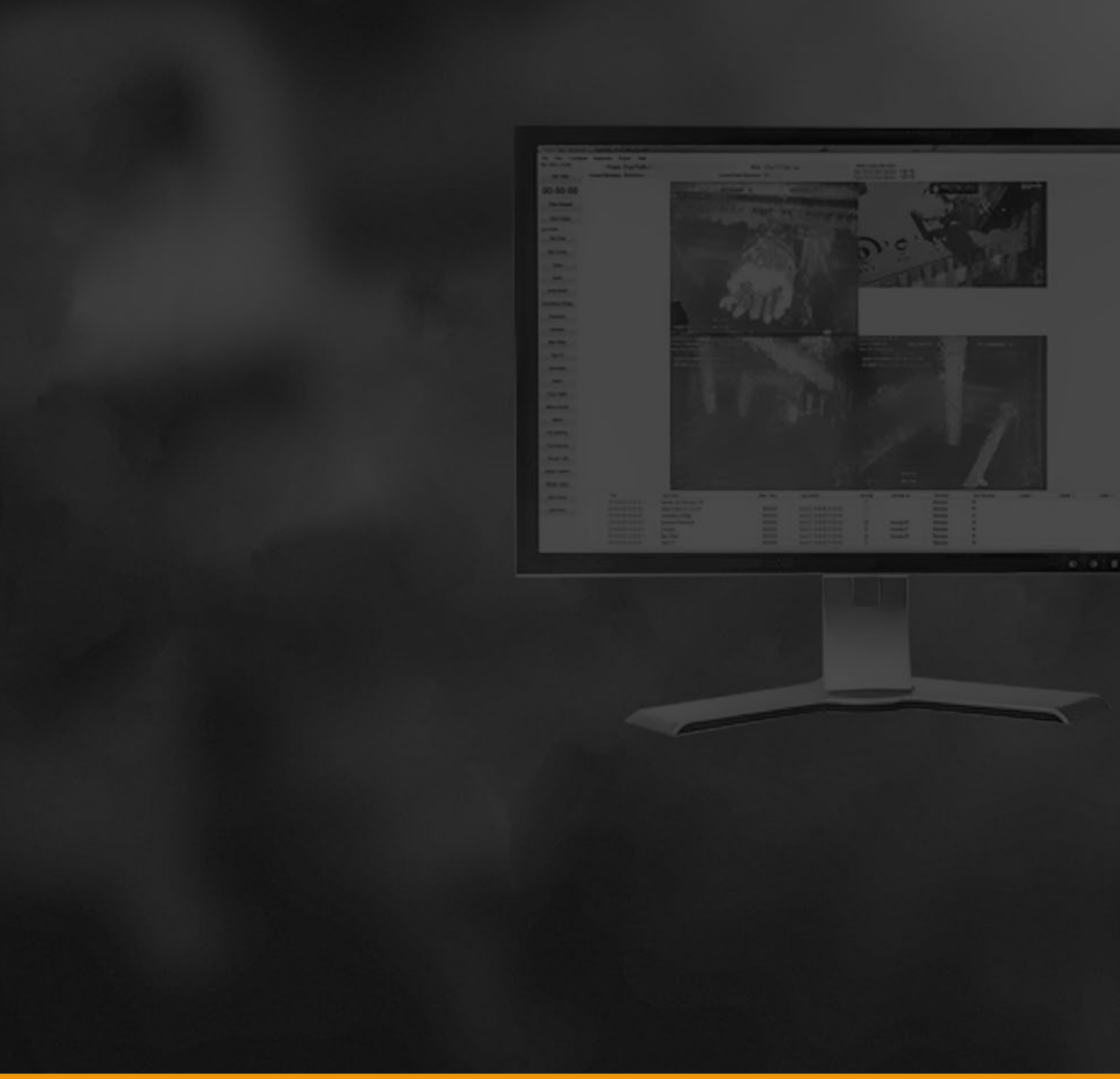
5 Wet matable connectors

OPTICAL/HYBRID DRY MATE CONNECTORS

Dry-mate, optical, and hybrid cost-effective solutions for marine instruments and vehicles. Custom-engineered encapsulation and molding of components for harsh environment subsea applications.

6 Omicron Fiber Optic Connector

7 Omega Fiber Optic Connector



NEXT » DIGITAL VIDEO RECORDING

II.06.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

DIGITAL VIDEO RECORDING

DIGITAL EDGE SUBSEA

HQ Location: Doubletree Court, Cavendish St, Ulverston, Cumbria, LA12 7AD, UK

Company Intro

Digital Edge Subsea supplies the Oil & Gas industry with our digital video recording inspection system, the EdgeDVR. Established more than 10 years ago, the Digital Edge Subsea product range has been developed with the end user as the main focus. We pride ourselves on how user friendly our product range is, whilst satisfying the requirements of our global clients. We now have over 500 systems offshore and have a large rental pool of over 80 units.

Digital Edge Subsea is known to have a broad understanding of the subsea industry. So when we combined that with our years of valuable client feedback, it's bound to have created something special. "Version 5" is the next generation of digital recording equipment. The new software and hardware, will keep the original mandate, of being easy, simple to use and most of all, reliable.

You can now choose from 3 levels of software: EdgeLite, Edge and EdgePro. And 3 levels of hardware: Standard Definition, High Definition and our first 4K system. The addition of a 4K(UHD) model is a reflection of the latest technology that is used on some of the most up to date ROV and diving systems worldwide.

In addition, this year also saw the launch of an industry first: the Edge DVR is now available on a laptop. Its storage is fully supported with a total capacity of 3TB on the 17" laptop that has all the capabilities of the original rack mounted system. AND there is a 4 channel HD recording capability.

Digital Edge is a trusted brand with a reputation for excellent tech support.

Contact info@digitaledgesubsea.com to see which dvr would suit you best.

Contact
John Scott
Operations Manager
john.scott@digitaledgesubsea.com
01229-206456

digitaledgesubsea.com

EDGE LITE – ENTRY LEVEL DVR

- 4 Channel Recording
- Online Video Clips and Photos
- 3 Hardware Models (SD,HD and 4K)
- 4 Serial Inputs
- 4 Channel Digital Overlay
- Multibeam Sonar Recording and control
- Offline Editor –
- Offline Video Clips and Photos
- Built-in Blackbox Recording
- Network Video Streaming
- Network Viewer
- Client Viewer
- Coabis, Nexen & Apollo Support

EDGE – STANDARD LEVEL DVR

- 4 Channel Recording
- Online Video Clips and Photos
- 3 Hardware Models (SD,HD and 4K)
- Automatic Dive, Photo, Video and Anomaly Logs
- User Configurable Eventing
- 4 Serial Inputs
- 4 Channel Digital Overlay
- Multibeam Sonar Recording and control
- Offline Editor –
- Offline Video Clips and Photos
- Offline Eventing
- Import/Export Workpack
- Built-in Blackbox Recording
- Network Video Streaming
- Network Viewer
- Client Viewer
- Coabis, Nexen & Apollo Support

EDGE PRO – ADVANCED LEVEL DVR

- 4 Channel Recording
- Online Video Clips and Photos
- 3 Hardware Models (SD,HD and 4K)
- Automatic Dive, Photo, Video and Anomaly Logs
- User Configurable Eventing
- 4 Serial Inputs
- 4 Channel Digital Overlay
- Multibeam Sonar Recording and control
- Offline Editor – Offline Video Clips and Photos
- Offline Eventing
- Import/Export Workpack
- Task Based Inspection Workpack
- Report Generation
- Built-in Blackbox Recording
- Network Video Streaming
- Network Viewer
- Client Viewer
- Coabis, Nexen & Apollo Support

HARDWARE

The 4U Rackmounted version has a total storage capacity of 12TB. The system has 3 removable hard drives, which store the survey data. The Windows 10 operating system is stored on a solid state hard drive for increased speed and reliability, with a second mirrored SSD for redundancy.
The laptop version has a total storage capacity of 3TB. The system has an external 2 TB SSD drive, which store the survey data. The Windows 10 operating system is stored on a 2× solid state hard drive (Raid) for increased speed and reliability.

FET VISUALSOFT

Location: Westhill, Aberdeen

Company Intro

At the forefront of innovation, FET VisualSoft is a leading provider of Digital Video and Data Acquisition and processing systems for underwater asset survey and inspection. Pioneers in introducing Digital Video to the offshore oil and gas industry, we continue to lead the way by bringing new digital video formats to the subsea market. This enables our customers to benefit from superior video quality with minimal data overhead, solidifying VisualSoft's position as a trailblazer in the industry.

As a trusted partner, VisualSoft has earned respect and recognition in the Subsea Construction, Survey, and Inspection sectors. We cater to the needs of contractors in these fields, as well as their clients who own and operate Subsea Assets that we help visualize.

Our dedicated team of software developers is committed to delivering cutting-edge, resilient, and user-centric products that enjoy global recognition among our diverse customer base. All our software offerings are accompanied by meticulously specified and configured hardware solutions. Additionally, our skilled installation engineers are available to support the deployment of these solutions on vessels and at office locations. VisualSoft distinguishes itself by providing 24/7 support and a variety of training courses tailored to meet our clients' specific needs.

Contact

Visualsoft.sales@f-e-t.com

f-e-t.com/VisualSoft

VISUALDVR

- 1, 2 or 4 channels available
- Supports Standard and High Definition
- Automated or user-managed video file copying
- Scalable video quality
- Compatible with Wood's Nexus Coabis / Aize integrity Elements
- H.264 & H.265 File Formats
- Online Event Logging
- Record to multiple media simultaneously
- Continuous 24-7 operation
- Open API for integration with 3rd party products
- User definable file size and time limits
- Built-in dynamic video overlay (see VisualOverlay)
- Build-in 3D Structure Inspection Module (see Visual 3D-Inspector)
- Advanced playback search features
- Rack mountable
- Video Streaming Output to VisualDVRNetworkPlayer

VISUALOVERLAY

- Built-in to VisualDVR
- Easy drag & drop configuration
- Multiple screens/pages
- Simple On/Off switching
- Survey data display
- Logos
- Configurable text
- Text or logo transparency
- Multiple serial or network inputs
- Offline overlay in VisualEdit

VISUALARCHIVE

- Automated file transfer from online to offline
- Automated backup to multiple devices and device types
- Tape backup function
- "Virtual Tape" file containers
- Exact copies to other disks
- Backup processed data
- Verify all backups
- Recover from backups
- Display all status
- Sort by time or KP

VISUALEDIT

- Synchronised Playback of all video & data
- Remote control interfaces for 3rd party products
- User configuration of all views
- Go to inspection events
- Go to dive log events
- Offline Overlay
- Import of data & video
- Export of data & video
- Support and Maintenance contract available
- Automatic creation of electronic reports
- 3D Display

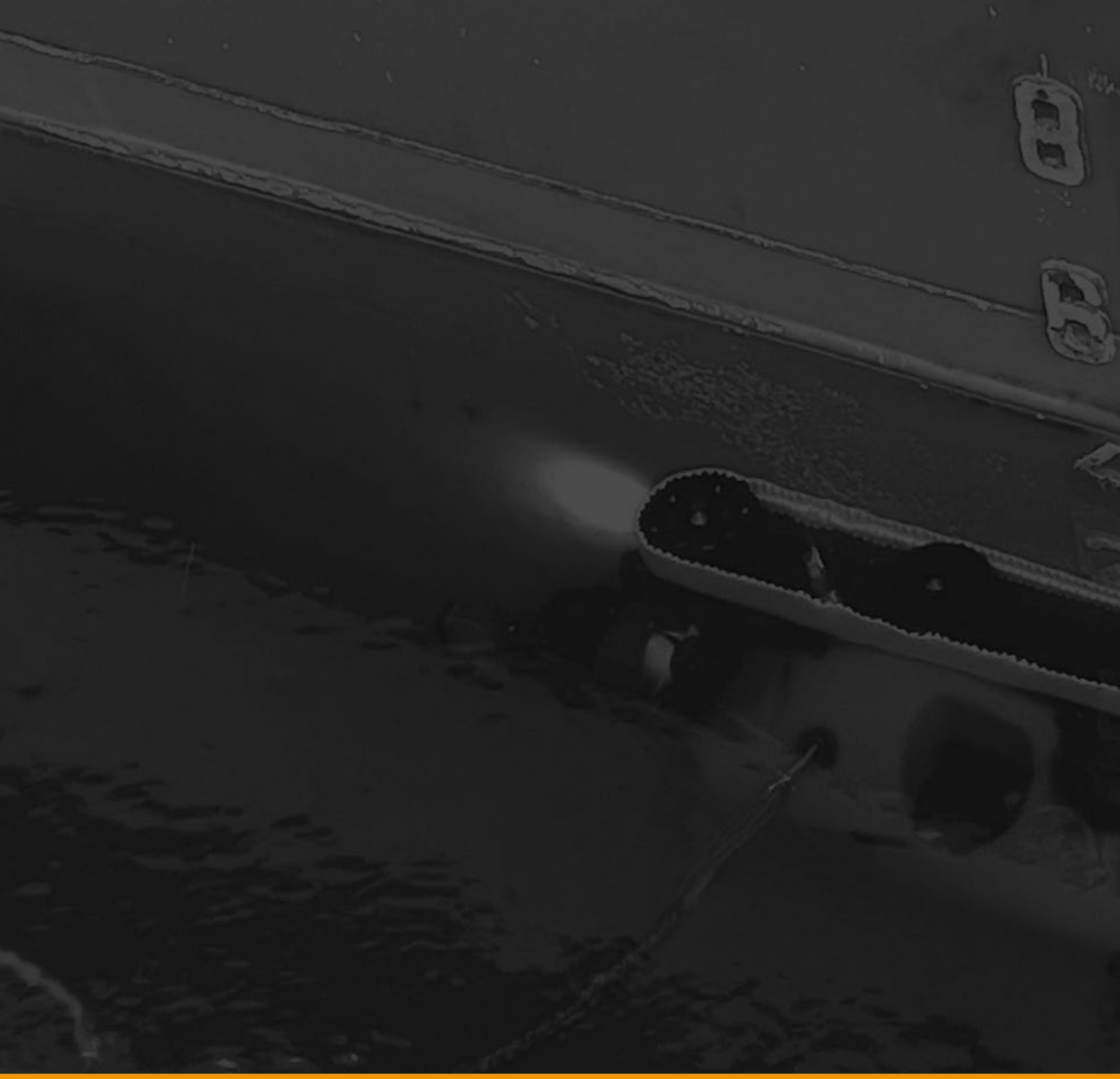
OTHER VISUALSOFT PRODUCTS

Visual3D-Inspector

VisualDataLogger

VisualEventLogger

VisualReview



NEXT » HULL CLEANING
110 EverClean

II.07.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

HULL CLEANING

GREENSEA IQ

Location: 10 East Main Street Richmond, VT 05477 USA
Regional Offices:
10 Cordage Park Circle, Suites 234-243, Plymouth, MA 02360 USA
4901 Morena Blvd., Unit 701, San Diego, CA 92117 USA
550 Gus Hipp Blvd., Unit 2, Rockledge, FL 32955

Company Intro
Greensea IQ is a dual-use technology company transitioning mature solutions developed for and by the defense industry into the commercial markets creating high impact.
Greensea IQ is uniquely positioned to capitalize on the growing Blue Economy that is being driven by the demands for scalable and persistent ocean protection, net-zero emissions in shipping, alternative energy sources from the ocean, and understanding change in the seas as our climate changes.
As a world leader in autonomous underwater robot technologies, we deliver these high impact solutions by embedding our dual-use technology based on the open architecture operating software OPENSEA to meet the growing demand for intelligent robotics across the entire spectrum of the maritime domain.

Contact
sales@greenseaiq.com
+1.802-434-6080

greenseaiq.com

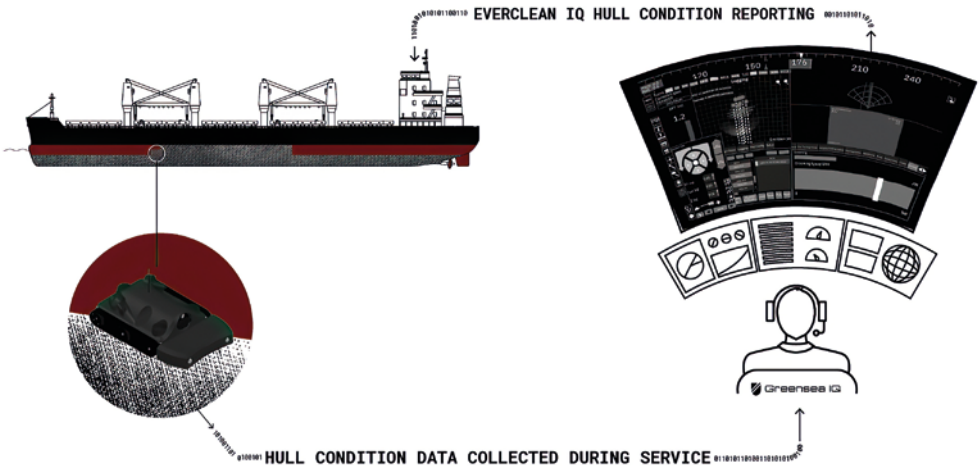
The EverClean Robotics-as-a-Service (RaaS) solution offers enhanced operational efficiencies, superior performance, and reduced environmental impact for maritime customers. Leveraging cutting-edge robotic technology and precise hull data collection. Through a monthly subscription EverClean ensures an always clean hull while delivering accurate ship hull condition data to guarantee the customer higher efficiency and a better performing ship.
EverClean robots carry out cleaning operations with unmatched precision, resulting in minimal repetition and accurate data collection to deliver a hull condition report after each service.
Their compact size allows them to be resident onboard or at a harbor, which provides a scalable and more cost-effective solution to maintain optimum efficiency, as well as reduces carbon emissions and lowers fuel costs. EverClean, and the concept of subscribing to a more efficient ship by maintaining an always clean hull that is validated and insured through a constant flow of data from the service, is the first complete offering of its kind and stands in stark contrast with the inherently harsher and larger manually operated and diver-assisted reactive systems currently being used.

EVERCLEAN DELIVERS VALUE

Fuel Savings
- On average, customers reduced fuel consumption by 6.4% following an EverClean service
- In 2022, customers averaged 90% 30-day ROIs

Carbon Reduction
- EverClean customers reduced emissions by 6.4%
- Significant financial savings potential for reducing emissions and receiving a passing CII rating

Maintenance
- Minimized dry dock intervals with intelligence-based planning
- Avoid heavy fouling and harsher cleaning methods while extending coating life with continuous maintenance



Fleet Readiness

- Extended range on single fueling (simplified logistics)
- Minimize downtime by improving maintenance decisions through collected EverClean IQ

Biosecurity

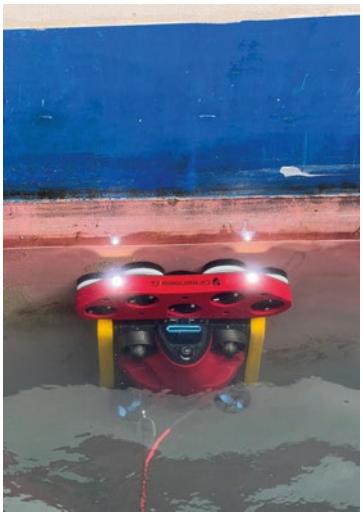
- By habitually removing slime, hard macrofouling is denied a biologically conducive place to settle and thrive
- EverClean's approach is backed by academic research

EVERCLEAN PERFORMANCE

Reducing fuel consumption is a direct and effective method for lowering emissions. Achieving fuel efficiency involves optimizing operations, particularly by ensuring the hull maintains optimal hydrodynamic efficiency. By systematically addressing biofouling and preventing its growth, EverClean establishes a consistent performance baseline. EverClean provides a customer portal, EverClean IQ, an online dashboard displaying cleaning and hull status data.This eliminates the need to sift through multiple data sources or wait for critical events to occur. Instead, it allows for the early identification of minor issues before they escalate into significant problems.

EVERCLEAN IQ

Understand the Impact of Maintaining an Always Clean Hull.
Delivered as part of the EverClean service, EverClean IQ is our groundbreaking data-reporting solution designed to assist commercial vessel owners in understanding the general health of their hulls using the data collected during routine EverClean services.
The EverClean IQ platform is continuously evolving, and users will be able to tailor their data sets collected during cleaning operations to their needs, providing a high level of change detection and informing accurate predictive analytics.
EverClean IQ reporting enables customers to make more accurate decisions about preventative maintenance and repairs, providing the data to target areas of concern as part of pre-dry-dock planning and post-dry-dock inspections—saving time and money.
EverClean IQ is being continuously updated as new data collection capabilities become available, providing richer, more detailed reports as the service evolves. Each iteration of our cloud-based data application moves us further ahead in providing the world's most comprehensive data set on ship hull fouling.



AES	engelement.com	Washington, DC, USA
Aleron Limited	aleronsubsea.com	Aberdeenshire, Scotland, UK
AME Offshore Solutions – AECOR	amepl.com.au	Perth, WA, Australia
ASV Global	asvglobal.com	Portchester, England, UK
ATRAC	atrac.net	Rio de Janeiro, Brazil
AX Tech	axtech.no	Molde, Norway
Caley – Seanamic	caley.co.uk	Glasgow, Scotland, UK
Detail Design	detaildesigninc.com	Houston, TX, USA
DGI	dgi-company.com	Leidschendam, Netherlands
Dynacon – Forum	dynacon.com	Bryan, TX, USA
Ferri	ferri-sa.es	Pontevedra, Spain
Gen Surv Robotics	gensurv.com	Bangkok, Thailand
Hawboldt	hawboldtind.com	Chester, NS, Canada
Henriksen	hhenriksen.com	Tønsberg, Norway
Hydramec	hydramec.com	Great Yarmouth, England, UK
Hydroid	hydroid.com	Pocasset, MA, USA
IHC	royalihc.com	Kinderdijk, Netherlands
International Submarine Engineering	ise.bc.ca	Port Coquitlam, BC, Canada
James Fisher and Sons Plc	james-fisher.com	Barrow-in-Furness, England, UK
Kongsberg	kongsberg.com	Kongsberg, Norway
Lawson Engineers	lawson-engineers.com	Carlisle, England, UK
Lidan Marine	lidanmarine.com	Lidköping, Sweden
MacGregor – Cargotec	macgregor.com	Helsinki, Finland
Ocean Scientific International	osil.com	Havant, England, UK
OceanWorks	oceanworks.com	Burnaby, BC, Canada
Okeanus	okeanus.com	Houma, LA, USA
Osbit	osbit.com	Northumberland, England, UK
PAG Offshore	pagoffshore.com	Dalian, China
Palfinger Marine	palfingermarine.com	Salzburg, Austria
Parkburn	parkburn.com	Hamilton, Scotland, UK
Pommec	pommec.com	Bergen op Zoom, Netherlands
Radoil – Reelpower	reelpowerog.com	Houston, TX, USA
Rapp Marine	rappmarine.com	Bodø, Norway
Rolls Royce Naval	rolls-royce.com	Bristol, England, UK
Ropos	ropos.com	North Saanich, BC, Canada
RS Aqua	rsaqua.co.uk	Alton, England, UK
Saab Seaeye	seaeye.com	Fareham, England, UK
Scantrol	scantrol.com	Bergen, Norway
Seaonics	seaonics.com	Aalesund, Norway
Seatec	n-seatec.com	Zierikzee, Netherlands
SeaView Systems	seaviewsystems.com	Dexter, MI, USA
SH Group	shgroup.dk	Svendborg, Denmark
SMD	smd.co.uk	Newcastle, England, UK
SMP Ltd	smp-ltd.com	Preston, England, UK
Sperre	sperre-as.com	Notodden, Norway
Subco	subcorentals.com	Great Yarmouth, England, UK
Subsea Innovation	subsea.co.uk	Darlington, England, UK
Svendborg Yacht Vaerft	syvas.dk	Svendborg, Denmark
Tech Safe Systems – Outreach	outreachltd.co.uk	Falkirk, Scotland, UK
Ulmatec	ulmatec.no	Hareid, Norway
West Marine	wmt.com.sg	Singapore
WT Industries	wt-ind.com	Houston, TX, USA

NEXT » LAUNCH & RECOVERY SYSTEMS (LARS)

II.08.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

LAUNCH & RECOVERY SYSTEMS (LARS)

DYNACON LAUNCH AND RECOVERY SYSTEMS

Location: Bryan, TX

Company Intro

Dynacon offers a comprehensive range of products essential for launch and recovery operations, encompassing multiple types of winches and A-Frames. Our specialized offering also includes heave compensation systems, ensuring a complete solution for our customers. We provide extensive support services, such as training, installation assistance, and after-sales support throughout the equipment's lifespan.

Dynacon Launch and Recovery Systems has a proven track record for both safety and efficiency. Our distinctive and reliable equipment not only enhances operational efficiency but also reduces installation and operating costs significantly.

Operated within our dedicated facility in Bryan, Texas, our production process covers every aspect, from in-house design and engineering to fabrication, assembly, and rigorous testing. Dynacon winches and handling systems can be customized and constructed to meet the certification requirements of renowned agencies such as the American Bureau of Shipping (ABS), Det Norske Veritas (DNV), Lloyd's Registry of Shipping, the U.S. Coast Guard, and other certifying bodies.

Contact

Dynacon.sales@f-e-t.com

f-e-t.com/dynacon

LAUNCH AND RECOVERY SYSTEMS (LARS)

ROV WINCH SYSTEMS

Dynacon provides specialized winch systems designed for Remotely Operated Vehicles (ROV) capable of operating at depths of up to 4,000 meters. Each ROV winch system is meticulously tailored to meet our customer's unique requirements. Customization options encompass different levelwind configurations, horsepower ratings, hazardous area specifications, and control systems. We possess the expertise to create a bespoke solution precisely tailored to your specific needs.

OCEANOGRAPHIC WINCHES

Dynacon offers a range of standard designs for electric, hydraulic, and electro-hydraulic winch systems tailored for coring, Conductivity Temperature and Depth (CTD), side scan sonar, and similar applications. We regularly manufacture variations of these standard designs and also create unique, custom solutions as per our clients' specific requirements. Our winch systems have been widely adopted by universities, military organizations, and commercial customers globally.

TRACTION WINCHES

Dynacon excels in the production of high-performance ultra deep-water traction winch systems. These advanced systems are integral components for deep-tow sonar, subbottom profiling, towed camera sleds, and deep-water search and salvage operations. Our winch systems come in diverse configurations, tailored to meet the specific needs and purposes of our customers.

A-FRAMES

Dynacon offers a wide range of A-Frames tailored for various applications, including Remotely Operated Vehicles, towed systems, and IWOCS support. Each A-Frame is engineered to match your specific requirements. Our self-erecting A-Frames ensure both safety and swift installation on vessels.
Additionally, we specialize in retrofitting and refurbishing existing A-Frames. Our expertise includes integrating Swing/Sway function capabilities, allowing us to upgrade your previously delivered A-Frames with this advanced functionality. Trust Dynacon for comprehensive solutions and innovative upgrades for your A-Frame needs.

HEAVE COMPENSATION SYSTEMS

Dynacon, under FET, produces a variety of Heave Compensation Systems designed to counter vessel motion and safeguard deployed packages, tailored to our clients' specific needs and applications. We provide three types of heave compensation control systems:

- **Passive Heave Compensation:** Equipped with manually adjustable controls.
- **Auto-Passive Heave Compensation:** Utilizes a monitoring package and control system to optimize its performance automatically.
- **Active Over Passive Heave Compensation:** Incorporates an electro-hydraulic power unit that actively supplements the auto-passive system.

ACTIVE HEAVE COMPENSATION

Benefits & Features of Active Heave Compensation:

- Test and tune in your factory or at the dockside – no tuning at sea
- Standardized solution, no vessel-specific programming – just configuration
- Integrated MRU – save costs, ensure long-term stability, with no requirement for recalibration
- Connect to vessel internet for free OTA assistance

In 2017 Dynacon and Scantrol signed a cooperation agreement and jointly developed a standardized AHC solution for Dynacon LARS systems. The AHC solution has a short lead time, is sold and integrated by Dynacon and is available for new and existing LARS systems.

HYDRAMEC OFFSHORE HYDRAULIC SYSTEMS

Location: Hanover House, Boundary Road, Great Yarmouth, Norfolk, NR31 0LY

Fabrication Department: James Court, Faraday Road, Gapton Hall Industrial Estate, Great Yarmouth, Norfolk, NR31 0NF

Company Intro
Hydramec Offshore began in 1990 as a small family business in Great Yarmouth. In our 30 years of business, we have become of the market leaders for Launch and Recovery Systems (LARS) across the globe, with 150 currently in operation. We design and build ROV LARS', Winches and Hydraulic Power Units, amongst many other products. Our team of engineers have a wealth of experience in all aspects of design, stress analysis and project management. We also specialize in bespoke marine handling equipment.

Contact
sales@hydramec.com
+44 (0) 1493 441000

hydramec.com

LAUNCH AND RECOVERY SYSTEMS (LARS)

Hydramec has been designing and building LARS for over 30 years and has a wealth of experience in the design, construction and installation of these systems. In addition, we can refurbish any LARS and carry out the necessary repairs to ensure they operate as if new. Our wide range of launch and recovery systems includes our standard LARS, crane LARS and many more. We also offer bespoke LARS to suit your specific requirements.

All components are stocked to reduce lead-times and are suited for long term ship/rig board operation, working in the most hostile and demanding offshore environments.

HH-262: FIXED OR TELE BOOM

Features:
- Hydramec self-contained LARS which is suitable for most ROV's
- HPU removable Winch has a variety of options, speeds & loads
- Base is built on 20ft shipping container footprint 5.5-ton max load
- Max line speed is of winch is 45m per minute at core – 96m per minute with AHC
- Tied down by twist locks or conventional welded brackets

HH-234: SCORPION LARS

Key Features:
- Hydraulic LARS split Standalone A-frame with 8m outreach
- Standalone winch with max line pull 5 ton at core
- Max line speed at 30 meters per minute at core Integrated HPU, AHC available

CRANE LARS: HH-74: FREE SWIMMING CRANE LARS + HH-50: CRANE LARS FOR TMS

Crane LARS' can be used on fixed installations or vessels of opportunity, they conform to freight container sizes. We have a range of sizes to suit different vessels. Field serviceable parts and components are used to make maintenance easy for use in the most demanding offshore environments or remote locations.

Key Features:

- Self-contained for free swimming ROVs
- Various sized winches, crane sizes, & safe working loads
- Docking device optional - Free standing to 300m excursion
- Available to suit TMS or free swim systems, safe area or Zone 2 also available

WINCHES

Hydramec offer a range of winches, varying in size. These include ROV free swimming tether winches, TMS based lift winches and slipring based umbilical winches for side scan sonar, geotechnics, seismic streamers, tugger and heavy lift winches. All winches can be hydraulically or electrically driven.

HH-84: STAND-ALONE WINCH

Features:

- Hydramec Standard winch
- Various safe working loads, speeds & capacities
- Built in self-contained lifting frame
- Complete with integrated HPU
- Lloyds approved

HH-225: UMBILICAL MANAGEMENT SYSTEM

Features:

- Small compact umbilical management systems
- Lightweight and robust
- Fully autonomous
- Weight is 780kg including 540m of umbilical cable
- Manufactured from aluminium and plastic
- DNV approved

HH-252: TETHER STORAGE WINCH

- Small lightweight winch Made for tether storage
- Electric winch controlled by handheld pendant
- Optional integrated level wind
- Different drums available i.e., Grooved shells
- Heavy duty options available: HH-272: Aluminium storage winch

Bespoke Equipment

Hydramec is well known for building bespoke systems. We are able to offer our design services to create a system with our client, which can then be built and installed by our team of engineers. Hydramec can supply a variety of bespoke marine equipment including LARS and winches and have designed one-off designs such as hammond grabs, vibrocorers's, moonpool systems and much more. Our design team and engineers will find a solution to your requirements.

LAWSON ENGINEERS, MECHANICAL HANDLING

LAWSONS
MECHANICAL HANDLING ENGINEERS

Location: Dalston, Carlisle, UK

Company Intro

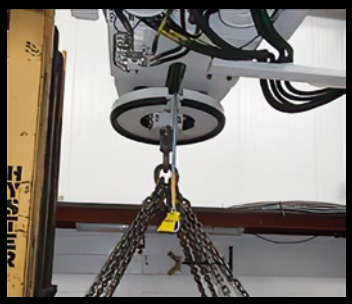
For over 40-years Lawsons have teamed with forward thinking companies in the ROV, AUV, Tool and Hard Suit Launch and Recovery market. We listen to customers to help deliver innovative solutions which enable them to stand out from the crowd and create new markets for their services. Our machines are widely known among ROV crews for their capability, longevity, robust simplicity and well-thought-out features. Wide ranging attributes cover depth, load, speed, weight, compactness and we provide features like Active Heave Compensation, Hazardous Area rating, automation, but we only sell you what you want. A diverse back-catalogue provides a starting point for something unique, an idea metamorphosed to a working product in the time it takes to buy a 'stock' gearbox.

Contact

enquiries@lawson-engineers.com

lawson-engineers.com

WE DO DIFFERENT









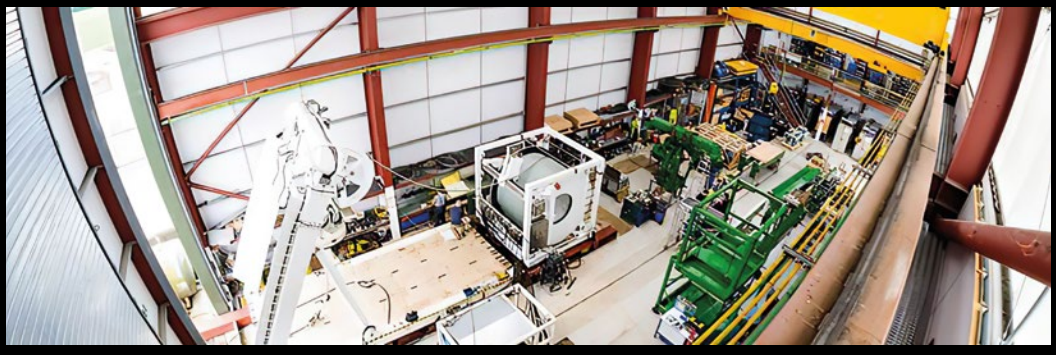
We can talk about all the things we've done but there are rather a lot ...
so we'd rather talk about what you want to do next!








Winches, A-frames, pedestal or special cranes and hoists, cursors, tagging towers, gantries, docking heads, HPU, green hydraulic, electric, pneumatic, ATEx-IECex, remote control, Active Heave Compensation, AUV, ROV, TMS, Tool, Grab, free-swim, high speed, high load, auto, modular, containerised, turnkey, and always fully integrated ... LARS



SOIL MACHINE DYNAMICS LTD (SMD)

Location: Turbinia Works, Davy Bank, Wallsend, Newcastle upon Tyne, NE28 6UZ, United Kingdom
Other Locations: No. 321, Feizhou Road, Lingang New Town, Pudong, Shanghai, 201306, China

Company Intro
SMD is an advanced global designer and manufacturer of subsea remotely operated and autonomous power and control solutions. Operating across several technology areas, SMD specialises in subsea trenching, work class ROVs, submerged mining and vessel deck equipment, as well as providing a range of subsea components through the Curvetech brand. SMD Services offer the capability, resources and expertise to support clients in multiple operations; around the clock and on a global scale. SMD has a passion for excellence, backed by proven engineering expertise and outstanding global service over the last 50 years.

Contact
Matthew Woodward
Business Development Manager
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smd.co.uk

A-FRAMES

We supply a large range of fixed and mobile systems from 6Te to more than 300Te SWL. All our systems are tailored to our customers' requirements and are capable of handling vehicles, quadrants, scientific instruments, subsea modules and other tools. Our A-Frame systems can be suited to a variety of vessels such as PSV, survey, dive support, construction and specialised lay vessels. All our A-Frames are certified to Lloyds and DNV rules.

WINCHES

SMD have a long history in supplying a large range of both lifting umbilical winches and tow winches. We also offer bespoke electric winch solutions. Our lifting umbilical winches are capable of handling loads up to 25Te operating in up to sea-state 7. The umbilical cables are double armoured and operate at voltages from 3300 to 4500 volts. Lifting umbilical winches are primarily used to power Q-Trencher ROVs, such as the QT1400 and the QT600 and lightweight tractor systems.

DECK HYDRAULIC POWER UNITS

Our standard deck Hydraulic Power Units (HPUs) are manufactured to interface with SMD A-Frames and Umbilical Winches to minimise deck space, forming a complete equipment handling system. SMD standalone HPUs include dual motors for redundancy and a lightweight open frame design suitable for road transportation. All our HPU's are designed for easy integration with other SMD equipment and incorporate designs to enable long service life.

LAUNCH SOLUTIONS FOR WORK CLASS ROVS

SMD bring years of knowledge and experience to the design and manufacture of Launch and Recovery Systems (LARS) to offer a range of complete turnkey launch systems specifically designed for handling for work class ROVs, trenching and mining systems.

Our standard LARS are manufactured to interface with SMD's range of vehicles, minimising deck space to form a complete vehicle handling system but can be easily interfaced to other OEM vehicles. Designed for maximum reliability, all LARS systems are available with DNV or Lloyds Design Approval as standard and can be load tested at our in-house production facility according to both standards and IMCA if required. We perform full system electrical stack up tests and can carry out umbilical wind on under back tensions of up to 12Te and mechanical termination of the bullet to ensure maximum performance in field.

Optional features such as Electric Drive, AHC, Enhanced instrumentation and automation pack- ages, deck lighting, cameras and umbilical cooling/monitoring systems are available on request.

GENERAL FEATURES:

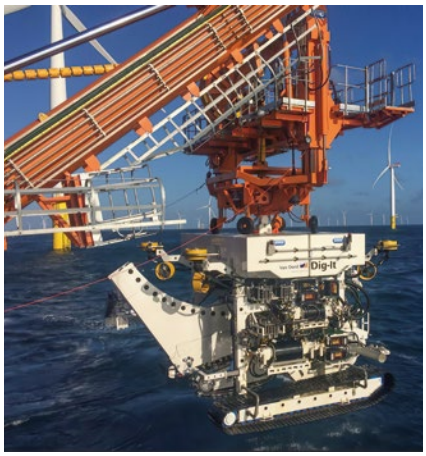
Standard 4Te, 6Te, 8Te, 12Te and 15Te SWL LARS available • Light weight designs • Up to sea state 6 • Road Transportable • Bunded skid bases • Suitable for a wide range of 3rd party ROV's, umbilicals & sliprings • Custom designs can be provided

A-FRAME FEATURES:

Self-erecting designs • Anti-crush mechanism • Integrated Docking Head • Pivoting sheave wheel • Umbilical length out sensor • Fail-safe docking head latch system • Outboard safety gates • Main gantry cylinders mounted in-line with legs to improve maintenance access

UMBILICAL WINCH FEATURES:

Dual control for remote or local operation • Closed-loop fleeting control with Manual / Automatic modes • Electric or Hydraulic Drive • Active Heave Compensation Operations • Adjustable fleeting box to allow different configurations of fleeting entry angles • Conventional (Transverse) or Axial Fleeting • Optional bolt-on grooved drum shells • Integrated crash frame with lift points • Fail-safe brake • Quick coupling hydraulic connections



LAUNCH SOLUTIONS FOR TRENCHING ROVS & TRACTORS

SMD offer the most comprehensive range of LARS solutions on the market for trenching ROVs and subsea tractors. They offer special features for handling heavy in air to light in water vehicles while protecting the umbilical cable always. SMD's Deck Equipment Sales team can advise on optimum deck layout and structural interface of equipment, ensuring that customers are supported every step of the way.

FEATURES:

- Wide and narrow angle A-Frame designs available.
- Integrated system controls for ease of operation.
- Axial or drum fleeting winch options to reduce deck space if required.
- Automated launch features with safety interlocks to prevent user error.
- Cursor launch systems with lift winches for heavier vehicles.
- Slack arm winch option to prevent umbilical snatch loads.
- Designed to Lloyds or DNV rules up to sea state 6.
- Passive heave compensation packages for landing over products on the seabed.

LAUNCH SOLUTIONS FOR PLOUGHS

SMD also offer LARS for plough systems for operation on multiple applications including fibre optic, power or pipeline installations. We have the ability in house to advise on deck layout to optimise ease of launch and recovery and ensure efficiency throughout the operation. Our sales team also offer vessel integration support and ship design consultancy to ensure that all LARS are designed to meet individual specifications.

FEATURES:

- Standard turnkey packages for fibre and power cable systems.
- Wide angle plough launch systems for launching / towing on the same wire.
- Stabilising Frames to suit a range of systems.
- Option to add quadrant handling functionality for power cable operations.
- Heave compensation systems for controlled subsea landing.
- Range of tow winches and over boarding sheaves.

Blueprint Lab	blueprintlab.com	St Peters, NSW, Australia
ECA Group	ecagroup.com	La Garde, France
Houston Mechatronics	houstonmechatronics.com	Houston, TX, USA
Hydro-Lek	hydro-lek.com	Fareham, Hampshire, UK
Imenco	imenco.no	Aksdal, Norway
Saab Seaeye	saabseaeye.com	Fareham, Hampshire, UK
TechnipFMC - Schilling Robotics	technipfmc.com/en/what-we-do/subsea/Robotics/manipulator-systems	Davis, CA, USA
Titanrob Technologies	titanrob.com	Nigran, Spain

NEXT » MANIPULATORS

II.09.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

MANIPULATORS

SARCOS TECHNOLOGY & ROBOTICS CORP.

HQ Location: 650 South 500 West, Suite 150, Salt Lake City, UT 84101, USA
Regional Offices: 4925 Harrison Street, Pittsburgh, PA 15201, USA

Company Intro
Sarcos Technology and Robotics Corporation (NASDAQ: STRC and STRCW) designs, develops, and manufactures a broad range of advanced mobile robotic systems, solutions, and software that redefine human possibilities and are designed to enable the safest most productive workforce in the world. Sarcos robotic systems operate in challenging, unstructured, industrial environments and include teleoperated robotic systems, a powered robotic exoskeleton, and software solutions that enable task autonomy. For more information, please visit www.sarcos.com and connect with us on LinkedIn at www.linkedin.com/company/sarcos.

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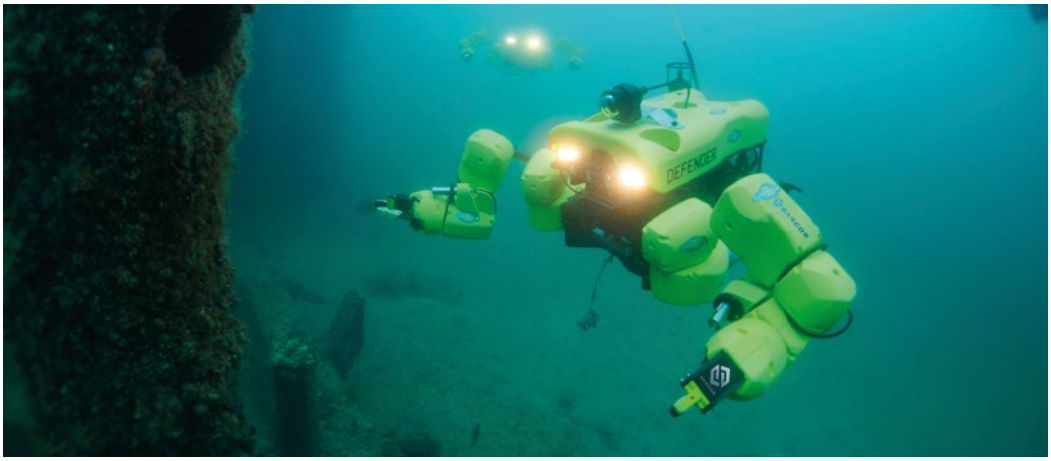
+1-801-456-9910

sarcos.com

PRECISION AND SAFETY IN UNDERWATER MANIPULATION



GUARDIAN® SEA CLASS UNDERWATER ROBOT

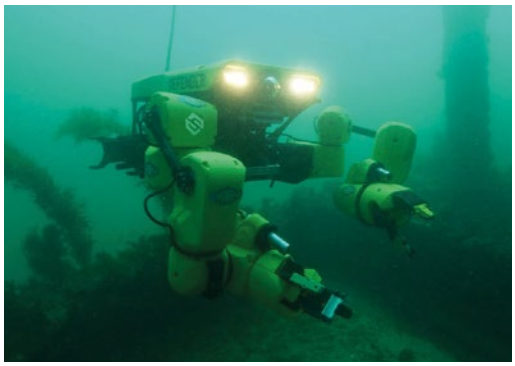
The Sarcos Guardian® Sea Class underwater robot is designed to provide human-like manipulation capabilities in complex and often dangerous underwater environments.

- Expands utility and scope for inspection-class remotely operated vehicles (ROVs) by enabling light-work capabilities, such as:
  - Rudder, prop, and shaft inspection and obstruction clearing
  - Surface cleaning (biofouling removal)
  - Cutting lines and cables, drilling, and affixing lift balloons during salvage missions
  - Damage inspection with light debris clearing
- Reduces the need to put divers into the water for inspection and light-work missions
- Can stay submerged at 300m working depth indefinitely
- Flexible, dual-armed system with 7-function manipulators enhances station-keeping while operating tools with precision and dexterity

- Integrated grippers with autonomous tool grasping capabilities enable use of multiple hand tools, manipulation of objects, and interaction with the environment
- Unique controller design enables easy teleoperation of the manipulators and underwater vehicle with optional autonomous and semi-autonomous control
- Lightweight, two-person portable design allows for ease of operation and deployment with minimal training requirements
- Modular design enables integration with existing inspection-class underwater vehicles

Features

- 1000m+ working depth capability, 300m standard
- Electronically driven, energy-saving system
- Lightweight, two-person portable design
- Dual-arm configuration featuring 7-function manipulators each (6 degrees of freedom (DoF) gripper per arm)
- Two-fingered grippers with autonomous, tool-grasping capabilities for quick tool changes
- HD camera equipped at end of each arm provides topside operator with real-time, first-look assessment capabilities and situational awareness of the workspace
- Neutral buoyancy improves ROV/manipulator balance and control
- Sealed, pressure-compensated design protects the electrical system from water ingress and contamination
- Multi-level corrosion management system



- Open architecture supports robot operating system (ROS/ROS2) communication protocols
- Designed to integrate with existing inspection-class ROVs
- Teleoperated control
- Autonomous and semi-autonomous capable (optional)
- Customizable payloads and end effectors

Industries & Applications

The Guardian Sea Class underwater manipulation robot is uniquely equipped to enhance diver relief and light-work tasks in challenging underwater conditions in a wide variety of industries, including:

- **Oil & Gas:** Offshore Oil & Gas platform inspection, maintenance & repair (IMR)
- **Energy:** Traditional, hydro, and offshore renewable power plant IMR
- **Shipyards & maritime:** Ship maintenance, underwater inspection in lieu of dry dock (UWILD), non-destructive testing (NDT) inspections
- **Ports, Harbors, Piers:** Port security, underwater contraband detection & inspection
- **Construction:** Underwater survey, welding, and IMR of bridges and infrastructure
- **Salvage & Emergency Response:** First-look assessment and prep
- **Defense:** Underwater discarded military munitions & unexploded ordnance

TECHNIP FMC – SCHILLING ROBOTICS LLC

HQ Location: (Corporate) TechnipFMC, 11740 Katy Freeway, Houston, Texas 77079, USA
TechnipFMC, Schilling Robotics, LLC, 201 Cousteau Place, Davis, California 95618, USA

Company Intro

Our Schilling Robotics legacy brand delivered its first manipulator system in 1986. Since then, we have delivered more than 3,000 systems. Our manipulators are deployed on nearly every work-class ROV in the world as well as other submersibles, including electric ROV's, and research and exploration submarines.

As subsea intervention tasks increase in complexity, our manipulator systems will continue to be at the forefront, providing the dexterity, strength and reliability to perform intricate tasks under water. ROV's and Submersibles operate in a global arena and to support our clients Schilling Robotics provides 24/7 helpline, email technical support, field support engineers plus offers comprehensive spares support through its online ordering portal enabling the customer to price, order and track its shipment through the customers own dedicated access portal. Whether help is needed on-site or offshore, our highly trained field support engineers are experienced in assisting customers.

Contact
Schilling.Sales@technipfmc.com

technipfmc.com/en/what-we-do/subsea/Robotics/manipulator-systems

FEATURED PRODUCTS & SERVICES

TITAN 4

The TITAN 4 has the dexterity and accuracy necessary to perform the fine movements needed for complex tasks. When this ability Is combined with the manipulator's reach (1,922mm). payload capacity (122kg at full extension), depth rating (up to 7,000msw), and large operating envelope, the TITAN 4 offers unparalleled performance in a wide range of subsea applications.

ATLAS 7R

The ATLAS 7R is a new class of heavy-duty, seven-function grabber that has been designed to lift heavy loads, while being lightweight and easy to control. With six degrees of freedom, a high lift capacity (250kg or 5501b at full extension), and a depth rating of 6,500msw, the ATLAS gives operators the freedom and strength to perform a wider range of heavy-duty Jobs in harsh
subsea environments.

CONAN 7P

The CONAN 7P is designed to perform demanding tasks and yet be economical to install, operate, and maintain. Its power, reach, and rugged construction make it the perfect choice for subsea manipulator applications that require a combination of heavy lifting and dexterity.

RIGMASTER

The RigMaster is a five-function, rate-controlled, heavy-lift grabber arm that can be mounted on a wide range of subsea ROVs. It is engineered for the strength needed to withstand the industry's harsh and repetitive needs day after day. The grabber arm can be used to grasp and lift heavy objects or to anchor the ROV by clamping the gripper around a structural member at the work site.

ORION 7P, 7R, OR 4R

The ORION's compact size, light weight, and excellent payload capacity make it the system of choice for light and medium work-class ROVs. The arm's structural segments are fabricated from hard-anodized extruded aluminium for strength and corrosion resistance. Deepwater tasks are no problem for these arms.

Options and Accessories

To support client's operational manipulator requirements Schilling Robotics offers:

- Multiple Gripper Configurations for the Various Manipulators
- Extended Depth Ratings (Subject to Manipulator)
- Dual Manipulator Configurations (Subject to Manipulator)
- Standard and Enhanced Spares Kits
- Maintenance and Repair Tool Kits

Blueprint Subsea	blueprintsubsea.com	Ulverston, England, UK
Coda Octopus	codaoctopus.com	Edinburgh, Scotland, UK
Echologger	echologger.com	Goyang-Si, South Korea
EvoLogics	evologics.de	Berlin, Germany
Exail	exail.com	Cedex, France
Imagenex	imagenex.com	Port Coquitlam, BC, Canada
Impact Subsea	impactsubsea.co.uk	Ellon, Scotland, UK
Kongsberg Maritime	km.kongsberg.com	Kongsberg, Norway
Kraken Robotics	krakenrobotics.com	St John's, NL, Canada
Norbit	norbit.com	Trondheim, Norway
Nortek	nortekgroup.com	Rud, Norway
Silicon Sensing	siliconsensing.com	Plymouth, England, UK
Sonardyne	sonardyne.com	Yateley, England, UK
Sonavision	sonavision.com	Aberdeen, Scotland, UK
Teledyne Marine	teledynemarine.com	Thousand Oaks, CA, USA
Tritech International	tritech.co.uk	Aberdeen, Scotland, UK
Valeport	valeport.co.uk	Devon, England, UK
Water Linked	waterlinked.com	Trondheim, Norway
WFS	wfs-tech.com	Livingston, Scotland, UK

NEXT » NAVIGATION, POSITIONING & SURVEY

II.10.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

NAVIGATION, POSITIONING & SURVEY

BLUEPRINT SUBSEA

HQ Location: The Clock Tower Business Centre, Low Wood, Ulverston, Cumbria, LA12 8LY, UK

Company Intro

Driven by innovation, Blueprint Subsea's leading range of compact, robust, intuitive and affordable underwater acoustic products have been meeting the rigorous demands of the global subsea, offshore and defence markets since 2006.

We specialise in two-dimensional imaging sonars, acoustic positioning beacons and diver navigation systems. Designed in-house and using advanced manufacturing techniques, we develop outstanding systems, without compromise.

Contact

Technical Sales – James Colebourn
Technical Sales – Cindy Mercier
enquiries@blueprintsubsea.com
+44 (0) 1539531536 (UK)

blueprintsubsea.com

PRODUCTS

STARFISH SIDESCAN SONARS

The StarFish range offers towed, hull-mounted and OEM systems that give exceptional image quality in a compact and rugged form factor. Specifically designed for shallow water survey work.

- Frequencies from 450kHz–1MHz, using CHIRP technology
- Up to a 200m swathe coverage
- Horizontal beam width as low as 0.3°
- Towed systems depth rated of 50m and OEM to 2000m
- Simple, intuitive operator software

StarFish Towed System

StarFish Hull-mounted System

StarFish OEM System

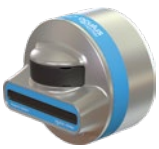
OCULUS MULTIBEAM IMAGING SONARS

The Oculus provides outstanding image quality across a variety of single and dual frequencies models. Available in 500m, 1000m and 4000m depth ratings, the Oculus is designed for use on small inspection-class ROVs through to large work-class platforms.

- Single and dual frequencies from 375kHz to 3.0MHz
- Operating ranges up to 200m
- Ultra-fast update rates of up to 40Hz
- Depth ratings of 500m, 1000m and 4000m
- Simple, intuitive operator software

Oculus M-Series System

Oculus MT-Series System



Oculus MD-Series System

SEATRAC USBL ACOUSTIC POSITIONING SYSTEMS

SeaTrac is a high accuracy USBL acoustic positioning system for real-time ROV, AUV and diver tracking. Underpinned by a robust signalling protocol, SeaTrac systems give reliable positioning data even in the most challenging of environments.

- Real-time ROV, AUV and diver location
- High accuracy positioning
- Track up to 14 in-water assets
- Bidirectional data exchange facility
- 1000m operating range
- Depth ratings of 300m and 2000m
- Simple, intuitive operator software

SeaTrac Standard System

SeaTrac Lightweight System

Designed, manufactured, and tested in-house in the UK's Lake District, we deliver high-quality, low-cost, innovative solutions. All products come with extensive technical support and comprehensive customer service.
Contact us now to discover more – enquiries@blueprintsubsea.com

Oculus Multibeam Imaging Sonars
High resolution imaging in turbid water for improved situational awareness and target identification. **Available in 375kHz to 3.0MHz. Depth rated to 500m, 1000m, or 4000m.**

oculus

www.blueprintsubsea.com
enquiries@blueprintsubsea.com

IMPACT SUBSEA LTD.

HQ Location: Silverfield House, Aberdeen Energy Park, Claymore Drive, Bridge of Don, Aberdeen, AB23 8GD, UK

Company Intro

We are a global provider of underwater sonar, altitude, attitude, depth, heading and temperature sensors. In addition, we also provide ultrasonic flooded member detection systems and a bespoke subsea pressure housing design service. We design, manufacture and support all our products directly and internationally through a global distributor network. We operate a UKAS certified ISO9001:2015 quality management system to ensure the highest level of quality in our sensor solutions. Want to know how we can help with your underwater sensor or system requirements? Contact us today to discuss further.

Contact
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Technical Sales - Asser Awaad
sales@impactsubsea.co.uk
+44 (0)1224 460850

impactsubsea.com

IMAGING & PROFILING SONAR

High performance imaging and profiling sonars provide exceptionally clear imagery and long range capability. Available in Titanium and with optional integrated Pitch & Roll, the ISS360 series is ideal for a large number of underwater imaging applications. The ISP360 series is a high-resolution profiling sonar suitable for profiling applications where high accuracy is required.

- World's Smallest Imaging Sonar
- No Slip Rings
- Optional Pitch & Roll
- Software to View, Log & Configure
- Depth Rated to 6,000 Meters
- CHIRP Acoustics
- 360° Field of Vision

ISS360
Imaging Sonar

ISS360HD
Imaging Sonar

ISP360 Profiling Sonar
(Early 2024)

UNDERWATER ALTITUDE & DISTANCE

The ISA500 series of underwater Altimeters & Echo Sounders provide exceptionally long-range measurement capability – in excess of 120 meters. In addition to this the ISA500 has a 1mm accuracy, allowing precision underwater distance measurements to be made.

- 120+ Meter Range
- Millimeter Accuracy
- Optional Heading, Pitch & Roll
- Software to View, Log & Configure
- Digital & Analogue Interfaces
- Emulate Any Device
- Multi Echo Output
- Optional Sonar Backscatter

ISA500 Titanium Altimeter
(Forward looking)

ISA500 Acetal Altimeter
(Forward looking)

ISA500 Acetal Altimeter
(Right angled)

DEPTH & TEMPERATURE

The ISD4000 is a compact, survey grade Depth & Temperature Sensor. Optionally, the unit can also be provided with an integrated Attitude and Heading Reference System (AHRS). This provides highly stable Heading, Pitch and Roll readings.

- 0.01%FS Depth. Optional 0.005%FS
- 0.1°C Temp. Optional 0.01°C
- Optional Heading, Pitch & Roll
- Emulate Any Device
- Digital Interfaces
- Survey Grade
- Robust & Compact Housing
- Software to View, Log & Configure

ISD4000 Titanium Depth Sensor

ISD4000 Acetal Depth Sensor

HEADING & MOTION

The ISM3D is a highly accurate underwater Attitude & Heading Reference System. The ISM3D utilises high grade MEMS based Accelerometers, Angular Rate Gyroscopes and Magnetometers all of which feed into an advanced fusion engine driven by a dual core micro-processor.

- ±1° Heading Accuracy
- ±0.07° Pitch & Roll Accuracy
- Software to View, Log & Configure
- Depth Rated to 6,000 Meters
- Robust & Compact Housing
- Emulate Any Device
- Digital Interfaces
- Immune to Magnetic Interference

ISM3D Titanium AHRS

ISM3D Acetal AHRS

FLOODED MEMBER DETECTION

The ISFMD system provides the latest in underwater ultrasonic Flooded Member Detection technology. Utilising an ultrasonic probe with a broadband composite transducer together with an advanced digital ultrasonic engine ensures the highest level of accuracy and reliability in readings.

- Ultrasonic FMD System
- Visualise Acoustic Returns
- Automatic Report Generation
- ROV or Diver Operated
- No Radioactive Sources

SEAVIEW SOFTWARE

seaView is an easy to use software package comprised of multiple apps for viewing, logging, calibrating & configuring all Impact Subsea sensors. Additional Apps within seaView allow specific tasks to be undertaken, such as Flooded Member Detection.

- View Live Data
- Log Data to CSV File
- Connect to Multiple Sensors
- Configure & Calibrate Sensors
- Conduct Flooded Member Detection

EXAIL

HQ Location: 34 rue de la Croix de Fer, CS 70121, 78105, Saint-Germain-en-Laye, Cedex, France
Regional Offices: Glover Pavilion, Campus 3 Aberdeen Innovation Park Balgownie Drive, Bridge of Don, Aberdeen, AB22 8GW, United Kingdom
11 Erie Drive, 01760 Natick, MA, USA

Company Intro

Exail is a global high-tech company specializing in the design and manufacturing of advanced marine, photonics and autonomy technologies. The group in-house expertise includes innovative systems and solutions devoted to inertial navigation, subsea positioning, underwater imaging, as well as shipbuilding and test & simulation. Exail technologies support Civil and Defense customers in carrying out their sea, land and space operations with maximum safety, efficiency and reliability. Employing a workforce of 750 people worldwide, Exail conducts its business in over 60 countries.

exail.com

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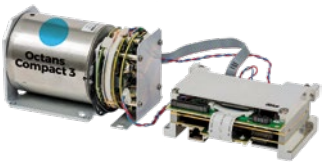
+1 888 600 7573

Based on the Fiber-Optic Gyroscope (FOG) technology, Exail offers a complete range of Attitude and Heading Reference Systems (AHRS) and Inertial Navigation Systems (INS). This technology ensures unrivaled performance, robustness and maintenance-free systems. Thanks to this advanced expertise, over 80% of the subsea vehicles used in the Energy industry are equipped with Exail navigation systems.



Octans Nano OEM
Compact OEM navigation-grade AHRS

Octans Nano
Navigation-grade AHRS

Octans Subsea
Survey-grade AHRS

SUBSEA ATTITUDE HEADING REFERENCE SYSTEMS (AHRS)

	Octans Nano OEM	Octans Nano	Octans Subsea
Measurement	Heading, roll, and pitch	Heading, roll, pitch, and heave	Position, heading, attitude, speed and depth
Depth rating	N/A (embedded)	4 000 m	3 000 m
Heading accuracy	0,5 deg secant latitude	0,5 deg secant latitude	0,1 deg secant latitude
Roll and pitch accuracy	0,1 deg	0,1 deg	0,01 deg

SUBSEA INERTIAL NAVIGATION SYSTEMS (INS)

Rovins Nano
Compact navigation-grade INS

Rovins
Survey-grade INS

Phins Subsea
High performance deep-water survey-grade INS

Phins Compact Series
Compact OEM survey-grade and navigation-grade INS

	Rovins Nano	Rovins	Phins Subsea	Phins Compact Series
Measurement	Position, heading, attitude,speed, depth, and heave	Position, heading, attitude,speed, depth, and heave	Position, heading, attitude,speed, depth, and heave	Position, heading, attitude,speed, depth, and heave
Depth rating	6 000m	3 000m	6 000m	
Heading accuracy	0.1 deg secant latitude	0.04 deg secant latitude	0.01 deg secant latitude	0.15 to 0.01 deg secant latitude
Position with DVL	0.04% of the traveled distance	0.02% of the traveled distance	0.01% of the traveled distance	0.04% to 0.01% of the traveled distance
Optional aiding sensor	USBL, LBL, DVL, GNSS, Sparse Array (with Ramses LBL transceiver)			

Exail partners with DVL manufacturers Nortek and Teledyne RD Instruments to offer advanced INS/DVL tight-coupling solutions. They combine the best navigation technologies available today and offer scalable plug & play solutions which performance and characteristics can be best suited to the user's needs.

	Rovins Nano	Rovins	Phins Subsea
DVL-aided optimal performance in typical condition	0.04% of the traveled distance	0.02% of the traveled distance	0.01% of the traveled distance
DVL-aided straight-line performance	0.2% of the traveled distance	0.1% of the traveled distance	0.05% of the traveled distance

EXAIL

HQ Location: 34 rue de la Croix de Fer, CS 70121, 78105, Saint-Germain-en-Laye, Cedex, France
Regional Offices: Glover Pavilion, Campus 3 Aberdeen Innovation Park Balgownie Drive, Bridge of Don, Aberdeen, AB22 8GW, United Kingdom
11 Erie Drive, 01760 Natick, MA, USA

Company Intro
Exail is a global high-tech company specializing in the design and manufacturing of advanced marine, photonics and autonomy technologies. The group in-house expertise includes innovative systems and solutions devoted to inertial navigation, subsea positioning, underwater imaging, as well as shipbuilding and test & simulation. Exail technologies support Civil and Defense customers in carrying out their sea, land and space operations with maximum safety, efficiency and reliability. Employing a workforce of 750 people worldwide, Exail conducts its business in over 60 countries.

exail.com

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ACOUSTIC TRANSPONDERS

OCEANO LF

Exail provides a wide range of low frequency (LF) transponders to operate with Posidonia. Standard product range includes transponder and responder modes, internal batteries, and recoverable (RT) or expendable (ET) configuration. Optional configurations are available for many applications.

CANOPUS

Canopus is the new intelligent seabed transponder providing the most advanced LBL capabilities to Exail positioning and navigation solutions. Used either in sparse array mode, with Ramses transceiver and Exail INS, or in full LBL mode depending on the requirements of the operation area, Canopus provides the highest positioning accuracy with the added advantage of reducing the number of transponders required.

	Oceano LF	Canopus
Depth rating	6 000m	4 000m (6 000m in option)
Positioning system	Posidonia	Gaps Series, Ramses
Operating frequency	8-16 kHz	20-32 kHz
Batteries life	250 000 tonal or 55 000 wideband pings @ 20°C (Alkaline) Standby: 70 months (Alkaline) 560 000 tonal or 120 000 wideband pings @ 20°C (Lithium) Standby: 110 months (Lithium)	1 600 000 wideband pings @ 20°C (Alkaline) Standby: 70 months (Alkaline) 2 800 000 wideband pings @ 20°C (Lithium) Standby: 110 months (Lithium)
Telecommand unit	Through TT801 Deck Set unit or Posidonia system	Through Ramses or Gaps Series systems

ACOUSTIC TRANCEIVERS

GAPS SERIES

Gaps Series is a range of Ultra Short Baseline (USBL) positioning and communication systems which combines a USBL antenna and a fiber-optic gyroscope (FOG) within the same housing. Its unique 3D acoustic array enables tracking and communication from the deep sea to extremely shallow water, even at angles above horizontal.

POSIDONIA

Posidonia is an Ultra-Short Baseline (USBL) acoustic positioning system dedicated to highly accurate and ultra–long range tracking of subsea vehicles. It offers enhanced performances with an electronic cabinet (USBL-Box) including the most recent Exail acoustic signal processing capabilities and full compatibility with Ramses Synthetic Baseline Positioning System (ASBL).

RAMSES

Ramses is an Acoustic Synthetic Baseline positioning system (ASBL) designed to make LBL and sparse-LBL subsea navigation simple. Tightly coupled with Exail Inertial Navigation System (INS), it delivers extreme precision and robustness using a greatly reduced number of transponders compared to usual LBL systems. Available in a medium frequency version compatible with Gaps, Ramses is a key part of Exail inertial-acoustic solutions for subsea positioning.

	Gaps M5	Gaps M7	Posidonia	Ramses
Baseline type	USBL	USBL	USBL	LBL
Range (typical)	995m	4 000m	10 000m	4 000m
Position accuracy	0.5% of slant range	0.06% of slant range	0.1%	< 0.10m
Antenna aperture	200 deg	200 deg	70 deg	N.A.
Operating frequency	20-30 kHz (MF)	20-30 kHz (MF)	8-18 kHz	18-36 kHz
Integrated INS	Yes	Yes	No	No

KONGSBERG

HQ Location: Kirkegårdsveien 45, NO-3616 Kongsberg, Norway

Company Intro
Kongsberg Maritime is a global marine technology company providing innovative and reliable technology solutions for all marine industry sectors including merchant, offshore, subsea and naval. Headquartered in Kongsberg, Norway, the company has manufacturing, sales and service facilities in 20 countries.
Kongsberg Maritime systems for vessels cover all aspects of marine automation, safety, maneuvering, navigation, and dynamic positioning. Subsea solutions include single and multibeam echo sounders, sonars, AUV and USV, underwater navigation and communication systems.

Contact
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+1 888 464 1598

km.kongsberg.com

MULTIBEAM SONARS

M3 SONAR®

The innovative design of the M3 Sonar uses two sets of complementary transducers which allow it to generate both imaging and bathymetric data with the same head. Unique to the M3 Sonar is the patented eIQ mode of operation that generates multibeam images with unprecedented clarity.

- Up to 500 m and 4000 m water depth
- Portable, cost effective and light weight sonar
- Generates imaging and bathymetric datasets from one sonar head
- Produces single-beam image quality with the speed of multibeam sonar
- Provides GeoTIFF output and creates real-time mosaic using third-party software
- Compliant to IHO Special Order & 1A
- Uses Linear FM, CW and Doppler pulses

FLEXVIEW SONAR

The Flexview is designed specifically for small observation class ROVs where compact size and light weight are key selection criteria. Delivering superior image quality and coverage, the Flexview sonar reduces the time it takes to search for and locate targets.

- Frequency range: 950 kHz – 1.4 MHz
- Ideally suited for small observation class ROVs
- Distortion-free images at a high update rate
- 200m coverage over a 140° sector, reducing the time it takes to search for and locate targets
- Removable transducer for rapid field replacement
- User-friendly interface
- Low-profile wet mateable connector
- Applications: site inspection, underwater construction support, marine engineering, underwater science, search and recovery, and environmental monitoring

SCANNING SONAR

CLARISCAN

Clariscan is Kongsberg's latest innovation in domed sonar technology. Clariscan combines the Company's wide-bandwidth composite transducer with a patented acoustic lens to provide unprecedented image clarity from a domed sonar head.

- Patented acoustic lens technology
- Improved image resolution and sharpness
- Up to 4000 m operating depth
- Applications: obstacle avoidance, pipeline survey, target detection and underwater construction support

ALTIMETERS

Kongsberg's underwater altimeters are primarily used to measure the altitude (height) of an object above the seafloor and are also suited to various other applications including positioning, berthing and below surface monitoring.

- Robust design
- Easily configurable analog/digital outputs
- Three depth ratings: 3000 m, 6000 m and 11,000 m
- Applications: ROV/AUV altitude, obstacle avoidance, positioning and below surface monitoring

KRAKEN ROBOTIC SYSTEMS, INC.

HQ Location: 189 Glencoe Drive, Mount Pearl, NL A1N 6P6, Canada

Company Intro

Kraken Robotics Inc. is a marine technology company engaged in the design, development, and marketing of advanced sonar and acoustic velocity sensors for Unmanned Underwater Vehicles for military and commercial applications. We are recognized as world-leading innovators of Synthetic Aperture Sonar (SAS) – a revolutionary underwater imaging technology providing ultra-high-resolution imagery at superior coverage rates which dramatically improves seabed surveys.

Contact
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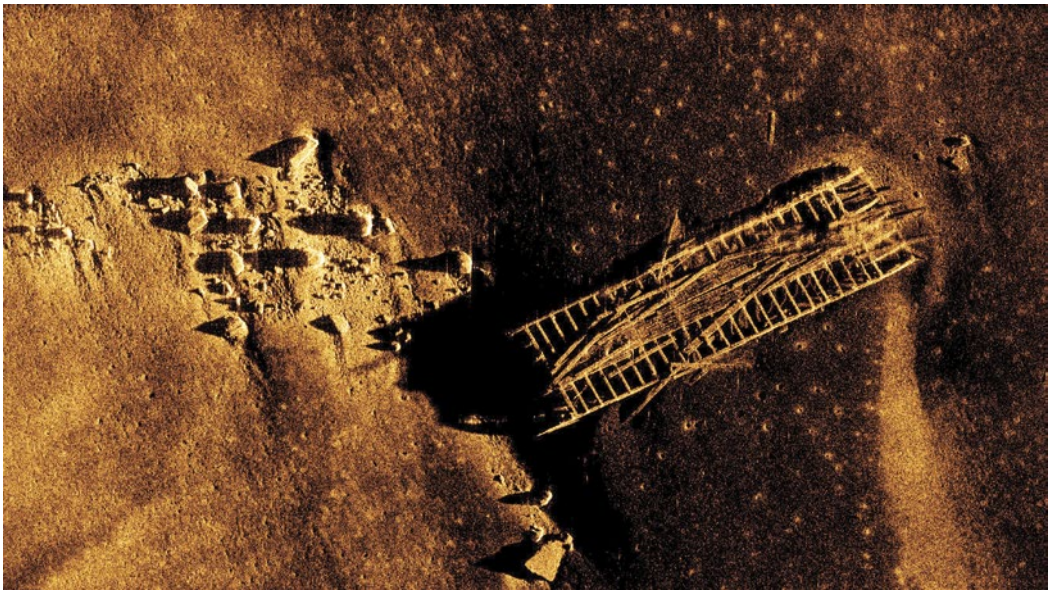
krakenrobotics.com

PRODUCTS

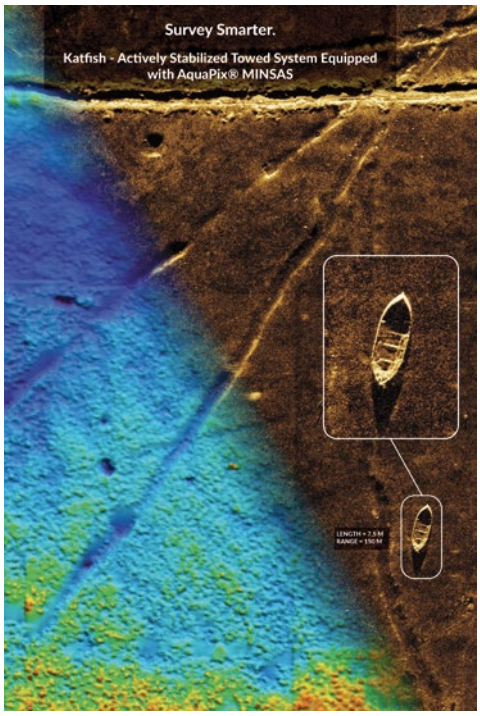
Kraken's AquaPix® is an off the shelf configurable Interferometric Synthetic Aperture Sonar (SAS) which replaces high-end sidescan systems at an affordable price while delivering significantly higher resolution and classification performance to ranges far in excess of those achievable with a sidescan. . AquaPix® is capable of providing detailed seabed images with a constant resolution better than 3cm x 3cm out to a range of 300m from each side of an underwater vehicle (600m swath). It also produces 3D bathymetric data with a resolution better than 25cm x 25cm out to full range while delivering very high depth accuracy, in compliance with IHO S44 special order requirements.

There are two variants in the AquaPix product family:

- MINSAS which uses a subset of the InSAS array elements re-packaged to make a product that is smaller and lighter.
- Kraken's Man-Portable Light Weight payload (MINSAS 60 LW) is designed to retrofit and integrate seamlessly with existing Man-Portable UUVs with diameters from 7.5 to 9 inches.



A novel SAS gap filler can be added to the MINSAS to maximize SAS area coverage rate. MINSAS provides a compact and power efficient payload for AUVs or towed platforms from 6" diameter upwards. The table on the right shows the typical speed, range and Area Coverage Rate (ACR) in km2/hr achievable with the standard AquaPix® modular arrays.

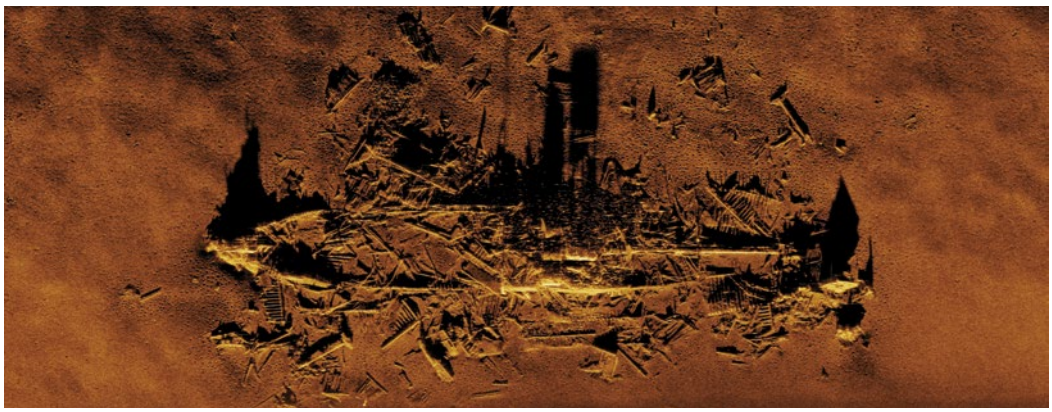


AquaPix® is delivered with Kraken's SAS image processing software. The processing software – called INSIGHT – has been developed in house and is validated against the processing and AUV data sets from NATO's Undersea Research Center (now known as NATO CMRE). INSIGHT runs on a standard PC GPU card at up to five times real time and outputs geo-referenced SAS image tiles in XTF format. Other formats are also supported. The processing runs either on a desktop machine or embedded in a real time processing pod.

The hardware design addresses the need to be able to operate in highly cathodic environments and over a range of water temperatures and depths and can be configured for the diverse applications that are anticipated. The versatility of the system is possible through the use of 1:3 ceramic array modules which can be used to create the required array length and use of the latest generation low power compact electronics.

The table represents the typical area coverage rate (ACR) of AquaPix® MINSAS at 3 cm resolution based on speed and array length.

Speed		MINSAS 60			MINSAS 120		
Knots	m/s	Range meters (per side)	ACR w/o Gap Filler km²/hr	ACR w/ Gap Filler km²/hr	Range meters (per side)	ACR w/o Gap Filler km²/hr	ACR w/ Gap Filler km²/hr
3.00	1.54	118	0.9	1.31	220	1.71	2.44
3.50	1.80	100	0.9	1.30	208	1.88	2.69
4.00	2.06	87	0.91	1.29	181	1.88	2.68
4.50	2.32	77	0.90	1.29	160	1.87	2.66
5.00	2.57	69	0.90	1.28	143	1.86	2.65
8.00	4.12	42	0.87	1.24	87	1.80	2.57



NORTEK

HQ Location: Vangkroken 2, 1351 Rud, Norway

Company Intro
Nortek designs, develops and produces acoustic underwater sensors that are used to measure motion in our marine environment.
These sensors include Acoustic Doppler Current Profilers (ADCPs), which measure currents and waves, and Doppler Velocity Logs (DVLs), aids to navigation for subsea vehicles which provide velocity information using acoustics.

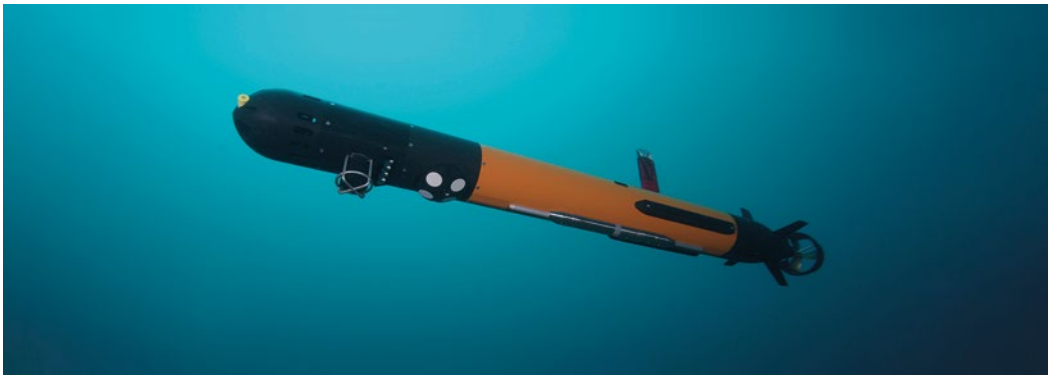
Contact
www.nortekgroup.com/contact

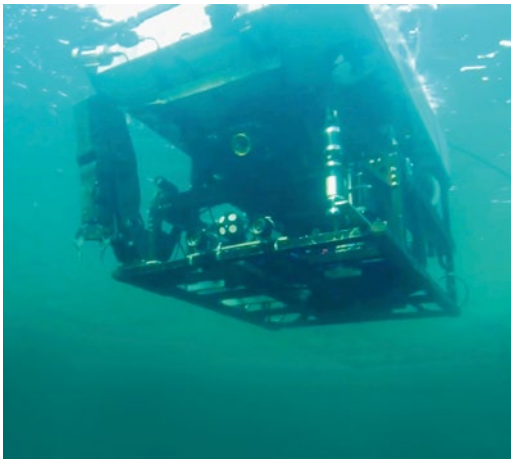
nortekgroup.com

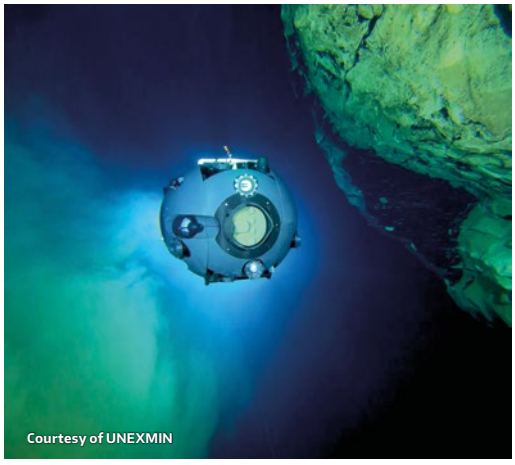
PRODUCTS

Explore Nortek's comprehensive range of navigation products. Whether you are operating shallow-water AUVs or piloting ROVs at depth, our Doppler Velocity Logs (DVLs) are essential to subsea vehicle navigation systems. Often paired with inertial sensors like AHRS or INS, our DVLs ensure precise and reliable navigation tailored to your needs.

Highlights:
- Exceptional bottom track performance at ranges up to 375m
- Water track feature provides velocity backup in case of bottom going out of range
- Current profiling capabilities inform safe operations
- Equipped for easy integration with leading INS systems







Courtesy of UNEXMIN

SHALLOW WATER DVLS

Designed for applications up to 300 m, our lightweight shallow-water DVLs provide exceptional range and reliability for subsea vehicles of all sizes.

	DVL1000 – 300 m	DVL500 – 300 m	DVL500 Compact – 300 m	DVL333 – 300 m
Long-term accuracy	±0.1% / ±0.1 cm/s	±0.1% / ±0.1 cm/s	±0.1% / ±0.1 cm/s	±0.1% / ±0.1 cm/s
Minimum altitude	0.2 m	0.3 m	0.1 m	0.3 m
Maximum altitude	75 m	200 m	175 m	375 m
Current profiles	30 m	70 m	70 m	100 m

DEEP WATER DVLS

The deep-water version of our DVL enables vehicles to carry out missions of long duration at depths of up to 6000 m without sacrificing performance.

	DVL1000 – 6000 m	DVL500 – 6000 m	DVL500 Compact – 6000 m	DVL333 – 6000 m
Long-term accuracy	±0.1% / ±0.1 cm/s	±0.1% / ±0.1 cm/s	±0.1% / ±0.1 cm/s	±0.1% / ±0.1 cm/s
Minimum altitude	0.2 m	0.3 m	0.1 m	0.3 m
Maximum altitude	75 m	200 m	175 m	375 m
Current profiles	30 m	70 m	70 m	100 m

FULL NAVIGATION SOLUTION FOR SMALL VEHICLES

The Nucleus1000 expands the technological capabilities of small AUVs and ROVs by offering an integrated AHRS or optional INS in a compact package.

	Nucleus1000
Long-term accuracy	>1.01% (license-free), <0.3% (export-controlled)
Minimum altitude	0.1 m
Maximum altitude	50 m
Depth rating	300m
Current profiles	30 m

TELEDYNE BLUEVIEW

HQ Location:
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Company Intro
Teledyne Marine is an organization comprised of 23 leading surface and subsea technology brands assembled by Teledyne Technologies Inc. These technologies span oceanographic instruments; subsea and surface vehicles and navigation; imaging sonars, cameras and lights; and interconnect solutions. Collectively, Teledyne Marine is able to offer the widest breadth of technology in the industry.
Teledyne BlueView is a brand of Teledyne Marine. The Teledyne BlueView sonars are worldwide leading in 2D imaging and 3D scanning sonar technology. The advanced sonar systems are currently deployed on AUVs, ROVs, surface vessels, fixed positions, portable platforms, and have been adopted by leading manufacturers and service providers to support mission-critical operations.

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PRODUCTS

TELEDYNE BLUEVIEW 2D IMAGING SONAR SYSTEMS

Teledyne BlueView 2D imaging sonar systems deliver real-time, high-resolution video-like imagery, even in very low and zero-visibility conditions. In clear water conditions, situational awareness is significantly increased beyond the optically imaged scene. Fast update rates, high acoustic frequencies, compact size, and industry-leading target tracking make our products the preferred choice in leading-edge multibeam sonar. With the widest range of models available, we offer you the most choices in field-of-view, range, and depth. Teledyne BlueView makes using your 2D Multibeam Imaging Sonar easy with “plug-and-go” operation and multiple deployment options, including: ROV Systems, Diver Hand-Held Systems, Boat-Mounted Systems, AUV Systems, Portable Tripod Systems, Fixed Position Systems.

All Teledyne BlueView 2D multibeam imaging sonar systems include ProViewer® operating software, accessories, and a one-year warranty. We also offer an advanced Software Development Kit (SDK) that enables access to raw data files and sonar controls to make integration into complex monitoring systems easy.

BLUEVIEW M900 S MK2

Frequency	Max Range
900kHz	100m (328ft)
Depth Rating	**Size**
1000m	L: 192mm (7.56 inch) W: Ø101.6mm (4 inch)

BLUEVIEW M900 D MK2

Frequency	Max Range
900kHz	100m (328ft)
Depth Rating	**Size**
6000m	L: 253mm (9.96 inch) W: Ø127mm (5 inch)

BLUEVIEW M450 S MK2

Frequency	Max Range
450kHz	300m (984ft)
Depth Rating	**Size**
1000m	L: 203.4mm (8.0 inch) W: 195.6mm (7.7inch)

BLUEVIEW M450 D6-MK2

Frequency	Max Range
450kHz	300m (984ft)
Depth Rating	**Size**
6000m	L: 253.7mm (10 inch) W: 195.6mm (7.7inch)

BLUEVIEW M900-2250-130 S MK2

Frequency	Max Range
900kHz- 2250kHz	100m (328ft), 10m (33ft)
Depth Rating	**Size**
1000m	L: 206.4mm (8.12 inch) W: 127mm (5 inch)

- Unique dual frequency combination
- Wide 130° field of view
- Leading data quality
- Compact and low power
- Capture sonar video and position data

BLUEVIEW M900-2250-130 D6-MK2

Frequency	Max Range
900kHz- 2250kHz	100m (328ft), 10m (33ft)
Depth Rating	**Size**
6000m	L: 261.3mm (10.29 inch) W: Ø127 (5inch)

BLUEVIEW M900-2250-S 130/45-MK2

Frequency	Max Range
900 kHz- 2250kHz	100m (328ft), 10m (33ft)
Depth Rating	**Size**
1000m	L: 223 mm (8.8 inch) W: Ø127mm (5inch)

- Dual frequency combination with Wide 130° and 45° field of view

TELEDYNE MARINE

TELEDYNE MARINE
Everywhereyoulook™

HQ Location: Teledyne Benthos, 49 Edgerton Drive, N. Falmouth, MA 02556

Company Intro
Teledyne Benthos designs and manufactures rugged and reliable oceanographic instrumentation and sensor solutions for marine environments. Teledyne Benthos product lines include acoustic communications, acoustic recovery and acoustic positioning technology.

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teledynemarine.com/Benthos

PRODUCTS

TELEDYNE BENTHOS ACOUSTIC MODEMS

Teledyne Benthos Underwater Acoustic Modems are used worldwide in subsea applications to transmit data wirelessly through the water. Wireless transmission significantly reduces the cost, complexity, and risk associated with traditional underwater cables and connectors, and allows for endless versatility and extended ranges. Acoustic modems can be used in any number of scenarios to effectively transmit data or commands to/from a subsea asset to the surface or between subsea assets.

What sets Teledyne Benthos Acoustic Modems apart?

- Reliable, robust, proven long distance communications
- Flexible housing designs to fit virtually any deployment configuration
- Optional features such as high-capacity data logging, in band acoustic recording, arbitrary waveform play, dual serial port available and GNSS /Nav
- Transducer options including omnidirectional and directional, both integrated and remote versions
- Teledyne Benthos proven acoustic modem processing technology can also be found in our acoustic positioning and recovery product lines, greatly expanding the capabilities, value and versatility of these systems.
- All modems are compatible with the new Janus interoperability standard

FULL LINE OF A-COMMS SOLUTIONS

From the tiny Ultra Compact Modem (UCM) to the deep-water ATM-960 Series Modems, Teledyne Marine offers a full suite of proven acoustic modems available in a wide array of frequencies, depth ratings and configurations. From the surface to the seafloor, self-contained or OEM, highly reliable a-comms are within your reach.

UCM-900 Series
Smallest Benthos modem available

CM-900 Series
Value-priced compact modem

ATM-910 Series
Shallow-water acoustic modems, battery or external power

ATM-920 Series
Mid-water acoustic modems, battery or external power

ATM-960 Series
Deep-water acoustic modems, battery or external power

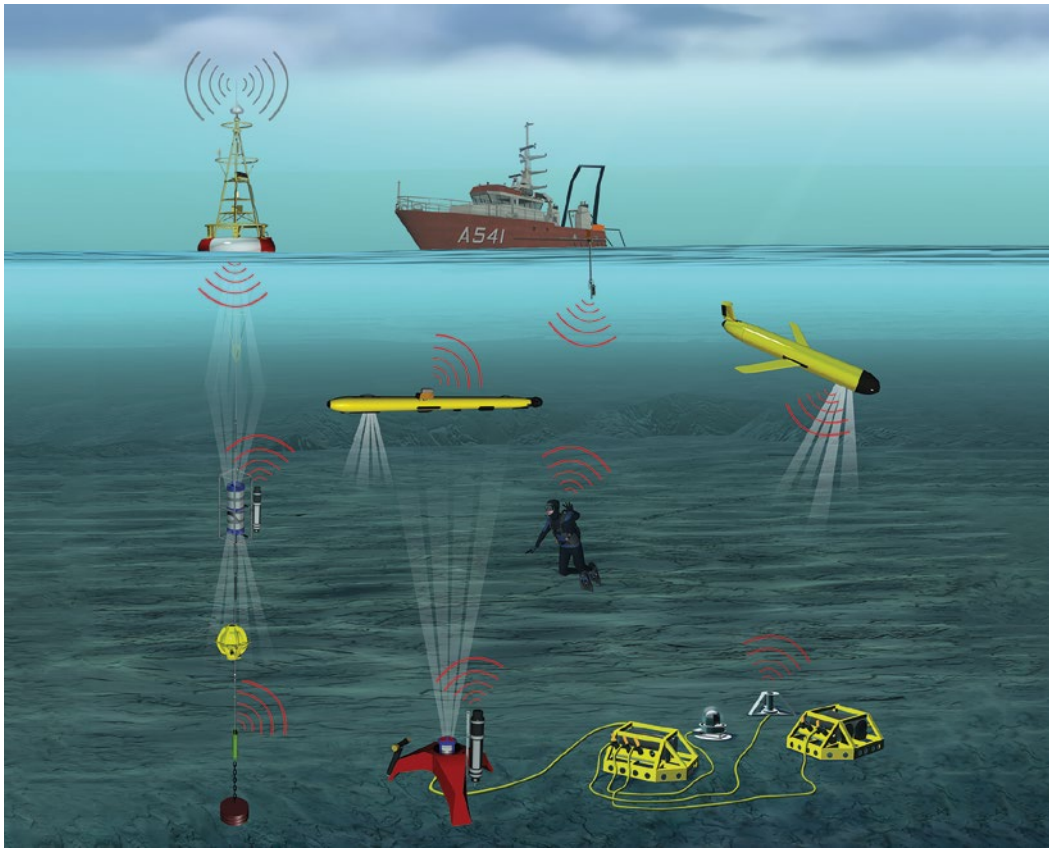
ATM-903 Series
OEM modem board set with transducer

UNIVERSAL TOPSIDE (UTS)

The UTS-9500 is the result of a focused engineering effort to devise the ideal topside unit for any level of user. From novice to the seasoned pro, the UTS delivers a user-friendly interface with powerful, intuitive, communication, command and control features to enhance the user experience and ensure you remain in control of your operations at all times. This highly versatile UTS can communicate with Teledyne Benthos' full line of acoustic modems, releases and positioning products.

ALL-IN-ONE: RANGE, BEARING, AND DATA COMMUNICATION

Teledyne Benthos DAT (Directional Acoustic Transponder) is an extension of the modem family which automatically estimates the azimuthal and vertical arrival angles of a message sent by a remote modem. This allows the system to work as a "modified" ultra-short baseline (USBL), utilizing a broadband component of a message to form estimates of arrival angle(s) to deliver bearing as well as the range info that's provided by all of our modem-based products. The DAT's can be deployed from the surface or onboard subsea assets via self-contained or OEM configurations.



TELEDYNE RD INSTRUMENTS

TELEDYNE MARINE
Everywhereyoulook™

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China: Teledyne RD Technology, Room1006, 10th Floor, Century Link Tower One, No.1198 Century Avenue, Pudong District, Shanghai 200122, China. Phone: +86 21 6867 1428

Company Intro

With nearly 40,000 Doppler products delivered worldwide, Teledyne RD Instruments is the industry's leading manufacturer of Acoustic Doppler Current Profilers (ADCPs) for current profiling and wave measurement applications; and Doppler Velocity Logs (DVLs) for precision underwater navigation applications.

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PRODUCTS

DOPPLER VELOCITY LOGS (DLVS)

Teledyne RD Instruments navigation product line provides a wide range of precision Doppler navigation solutions for academic, commercial and defense applications. RDI's Doppler velocity logs (DVLs) are the world-wide standard for commercial, military and academic applications alike. Explore our wide range of DVLs that continue to lead the way as the industry standard.

What sets Teledyne RDI's DVLs apart?

- Unparalleled experience – over 5,000 DVLs delivered worldwide
- Highly accurate, precise and reliable data
- Broadband Doppler processing
- Patented phased array technology
- Deepest rated and longest range systems available
- Largest span of bottom tracking ranges
- Built-in data quality control
- System health monitoring
- 24/7 service & support
- Complimentary Teledyne products for one stop shopping

WAYFINDER DVL

At just 10 cm × 10 cm × 7 cm, the Wayfinder DVL is by far the smallest and lowest cost DVL Teledyne has ever designed, making it ideally suited for today's micro ROVs. Wayfinder literally puts subsea navigation in the palm of your hand.

KEY SPECS	
Frequency (kHz)	600 khz
Bottom Track Range (m)	60m
Operational Depth Rating (m)	200 m
Weight in Water (kg)	.51 kg

PATHFINDER DVL

Teledyne RD Instruments' Pathfinder Doppler Velocity Log (DVL) is small in size and huge on value! Utilizing Teledyne RDI's proven, industry-leading phased-array technology, the Pathfinder DVL provides an array of advanced internal algorithms and features you'd typically expect to find only in higher-end solutions. With up to 500 m of bottom tracking, in up to 6000 m of water, the Pathfinder delivers a solid, value-priced solution for vehicles ranging from small inspection class ROVs to large diameter AUVs.

	FREQUENCY	300 KHZ (OEM ONLY)
Max Bottom Tracking Range	89 m (up to 150 m optional)	275 m (up to 500 m optional)
Min Bottom Tracking Range	Min BT Range – 0.15m	Min BT Range – .3 m
Operational Depth Rating	SC – 300 m, 500 m; OEM – 300 m, 1,000 m and 6,000 m	1,000 m
Weight in Water (kg)	Contact Teledyne RDI for weights and dims for your specific configuration.	

TASMAN DVL

Since its introduction in 2019, the Tasman DVL has replaced the Workhorse Navigator as the gold standard for subsea navigation around the globe.
With bottom tracking ranges from 0.15 m to 420 m, in up to 6,000M water depths, the Tasman is a cutting-edge, value-priced solution for vehicles ranging from small ROVs to large diameter AUVs. Key advancements include, field-swappable phased array transducers, system health monitoring/leak detection, ethernet compatibility, and the ability to upgrade to collect ADCP data.

FREQUENCY (KHZ)	600 KHZ	300 KHZ
Bottom Track Range (m)	up to 160m with XRT option	up to 500m with XRT option
Operational Depth Rating (m)	6,000m	6,000m
Weight in Water (kg)	4.4 kg	4.4 kg

PIONEER & SAVS DVL

Teledyne RD Instruments' Pioneer and SAVS DVLs are designed to provide precision velocity data at ranges of 500 m to 6000m above the seafloor. This extended range makes RDI DVLs ideally suited for aiding navigation systems onboard small, medium, and large platforms where the ability to transition from the deep waters of the open oceans to the shallow environments of the littoral zone is a critical enabler. The Small Aperture Velocity Sensor (SAVS) is the industry's longest range DVL for truly full ocean range depth detection, yet, as the name implies, the phased array design and proprietary RDI technology enable this range from a relatively small-sized, single transducer.

FREQUENCY (KHZ)	150 KHZ PIONEER	SAVS
Bottom Track Range (m)	up to 800m with XRT option	6000m
Operational Depth Rating (m)	1,000 / 6,000m	2000m
Weight in Water (kg)	Contact Teledyne RDI for weights and dims for your specific configuration	

TELEDYNE TSS

HQ Location: ABZ Business Park, International Avenue,
Dyce, Aberdeen, AB21 0BH, United Kingdom

Company Intro

Teledyne Marine is an organization comprised of 23 leading surface and subsea technology brands assembled by Teledyne Technologies Inc. These technologies span oceanographic instruments; subsea and surface vehicles and navigation; imaging sonars, cameras and lights; and interconnect solutions. Collectively, Teledyne Marine is able to offer the widest breadth of technology in the industry.

Teledyne TSS, a brand of Teledyne Marine. is world leading in the design, manufacture, and support of marine products for applications including navigation, motion compensation, platform stabilisation, and subsea pipe and cable survey. Teledyne TSS has specialist sales and support worldwide through a comprehensive network of distributors and service providers.

Contact
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teledynemarine.com/tss/

PRODUCTS

SUBSEA NAVIGATION SYSTEMS

The TOGS next generation range of highly accurate and reliable subsea navigation products are built on core TSS fibre optic gyro (FOG) technology with significant improvements in efficiency and functionality, including a fast initial alignment settle time of only 10 minutes giving less downtime and allowing for more operational time.

The range comprises of 3 main models, TOGS (AHRS), TOGSINS (INS) and TOGSNAV (INS & integral DVL) housed in high grade titanium with Impulse connectors, rated for either 4000m or 6000m depths. There are also several models with optional Burton or Seacon connectors.

There are also additional upgrade options available including an external IPS sensor and mounting kit, external DVL adaptor brackets and various cable options, designed to make the installation of the TOGS range flexible and easy for both fitting to new or older models of ROVs.

- 3 Heading performance options; 0.1¬¬°, 0.3° and 0.5° sec. Lat.
- Depth rated to either 4000m or 6000m
- Large range of outputs to suit a wide range of applications
- External coupling; IPS/DVL/GPS/USBL/LBL

- Highly accurate Inertial Navigation System (TOGSINS & TOGSNAV)
- TOGSNAV only – a choice of 600kHz or 300kHz DVL

APPLICATION	TOGS 1/3/5	TOGSINS 1/3/5	TOGSNAV 1/3/5
Offshore Construction	✓	✓	✓
Hydrography		✓	✓
Sonar stabilisation	✓	✓	✓
Military specialist systems		✓	✓
ROV Work Class Navigation	✓	✓	✓
ROV Survey work		✓	✓
ROV Station keeping		✓	✓

PRODUCT SPECIFICATIONS

Depth rating	4000m & 6000m		4000m Only
Dynamic Heading (secant latitude RMS)	0.1° / 0.3° / 0.5°		
Static Heading (secant latitude RMS)	0.1° / 0.3° / 0.5°		
Inertial Navigation Performance		✓	✓
Roll and Pitch (RMS)	0.01° / 0.05°		
Heave	5cm or 5% / 5cm or 5% (delayed)		
Alignment / Settle Time	10 minutes		
Power Consumption	16W – 14W		20 – 31W
Dimensions	157mm (Ø) × 280.5mm (h) / 182mm (Ø) × 306mm (h)		182mm (Ø) × 428mm (h) / 182mm (Ø) × 436mm (h)
Weight in Air	10.2kg – 14.5kg		16.9kg – 18.6kg
Weight in Water	5.4kg – 7.2kg		7.7kg – 8.7kg
Operating Temperature	-20°C to +55°C		

TRITECH INTERNATIONAL

Headquarters, Sales & Support HQ Location: Peregrine Road, Westhill Business Park, Westhill, Aberdeenshire, AB32 6JL, Scotland, UK
Design & Manufacture & Service: Oubas Hill, Next Ness Lane, Ulverston, Cumbria, England. LA12 7LB, UK
US Sales & Support: 1323 Price Plaza Drive, Katy, Texas 77449, USA

Company Intro
Tritech International Limited [Tritech], a Moog Inc. company is a high-technology business dedicated to providing the most reliable imaging and ancillary equipment for use in underwater applications.
Tritech operates in many professional underwater markets, including; Defence, Energy, Engineering, Survey and Underwater Vehicles and remains an industry leader in the provision of sensors and tools for ROVs and AUVs, a reputation achieved from over 25 years of delivering expertise through key products.

Contact
sales@tritech.co.uk
+44 (0)1224 744111

tritech.co.uk

MECHANICAL SCANNING SONARS:

Tritech's range of mechanical imaging sonars comprises the Super SeaKing DST, Super SeaPrince DST, SeaKing Hammerhead and Micron sonar. All products in the SeaKing and SeaPrince family can be run simultaneously on the ARCNET communication link, using the same processor and display; such as Tritech's Surface Control Unit (SCU) or a customer supplied PC or laptop.

SUPER SEAKING (WORK CLASS ROV)

Tritech's Super SeaKing sonar is the ultimate mechanical scanning sonar. Utilising Digital Sonar Technology (DST) composite transducer and Compressed High Intensity Radar Pulse (CHIRP) technology, the Tritech Super SeaKing offers exceptional clarity and resolution as a dual frequency mechanical scanning sonar. The Super SeaKing Sonar is the industry-standard obstacle avoidance sonar for larger ROVs and is so popular it can be found fitted to work-class ROV fleets around the world. The Super SeaKing Sonar hosts two mechanically scanned imaging sonars in a single subsea pressure housing: a 325 kHz CHIRP sonar with a true operational range of up to 300 metres for long range target recognition and a 650 kHz CHIRP sonar for ultra-high definition images, other frequency options are available on request.

SUPER SEAPRINCE (WORK CLASS ROV)

The Super SeaPrince has been developed from the industry-standard Super SeaKing sonar. The Super SeaPrince utilises the same Digital Sonar Technology (DST) composite transducer and Compressed High Intensity Radar Pulse (CHIRP) technology, offering exceptional clarity and resolution as a dual frequency mechanical scanning sonar. Built to the highest quality standards, with a hard boot to protect the transducer, the Super SeaPrince is specifically designed for deployment on observation and light work-class ROVs.

SEAKING HAMMERHEAD (360°)

The SeaKing Hammerhead is at the forefront of sonar technology, offering high resolution, 360° mechanical scanning imaging. Utilising a wide transducer aperture, the SeaKing Hammerhead has a very fine mechanical step size and proven Digital Sonar Technology (DST), for outstanding image quality. The operational range of the SeaKing Hammerhead is increased with two frequencies; a high chirped 935 kHz frequency to enable high-resolution imagery and a second chirped frequency, 675 kHz to allow for long range capability. The unit also has an integrated three axis compass, to allow the sonar image bearing to be continually displayed and updated.

MICRON

The Micron Sonar is the smallest digital CHIRP sonar in the world and is ideal for use by small ROVs, as a first-rate obstacle avoidance sonar in miniature form. CHIRP technology dramatically improves the range resolution compared with conventional scanning sonars – it is a feature normally associated with much larger, more expensive systems. The sonar has a standard auxiliary port to allow it to interface with other Tritech sensors.

MULTIBEAM SONARS:

GEMINI 720IS

Tritech's Gemini 720is multibeam imaging sonar provides users with real-time, crisp imagery for applications including obstacle avoidance, target detection and close-range inspection. With a 120 degree field of view, 20 degree vertical beam width (10 degree downward tilt) and a fast update rate of 30Hz, the Gemini 720is sonar is ideal for poor visibility environments. The Gemini 720is features a 720 kHz operating frequency and an integrated sound velocity sensor to assist in providing the sharpest image possible, with accurate ranging. . The Gemini 720is utilises Ethernet or VDSL communication allowing it to be installed on most installations. The sonar's compact size means that it can also be deployed using a pole-mount assembly (customer supplied).

GEMINI 720IK

Tritech's Gemini 720ik multibeam imaging sonar provides users with real-time, crisp imagery at the same performance level as the Gemini 720is but in a smaller shallower rated configuration. A real-time, high frequency imaging solution, the Gemini 720ik operates at 720kHz and combined with Tritech's advanced processing electronics, it produces images of outstanding clarity, benefitting from 512 beams which results in a 0.25° effective angular resolution. The Gemini 720ik has been developed specifically for shallow water operations with low power consumption and Compressed High Intensity Radar Pulse (CHIRP) processing for greater definition at long range. The product also has an integrated Velocity of Sound (VoS) sensor to ensure extremely accurate imaging and measurement.

GEMINI NBI

The Gemini NBI offers a narrow vertical beam and 130° swath. The Gemini NBI produces an acoustic image, cutting through the water with a narrow acoustic beam and at the high refresh rate users can expect from the Gemini range of multibeam sonars. Based on the proven design of the Gemini 720i, the Gemini NBI uses a 1° vertical beam instead of the 20° vertical beam found on the 720i. This reduced beam width allows the user to more precisely identify the position of the acoustic targets than is possible with a wide beam imaging sonar which is commonly used for obstacle avoidance operations. Operating at 620kHz the Gemini NBI is able to produce images with 10mm range resolution while the 0.5° horizontal angular resolution results in an extremely sharp sonar image. Where monitoring your position relative to a known target is the objective and not general obstacle avoidance, then the Gemini NBI can help guide you safely to the desired target. The multibeam transducer design used for the Gemini NBI results in a 130° sector scan width and advanced technology allows update rates as high as 30 scans per second. With wide angle imaging and a high refresh rate the user is able to quickly and effectively manoeuvre to a target in poor visibility conditions. Depth rated to 4000m and manufactured from titanium, the Gemini NBI has been designed to work in the harshest of environments such as those typically found in subsea mining and excavation.

NEXT » OCEANOGRAPHIC SENSORS
156 Valeport

II.11.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

OCEANOGRAPHIC SENSORS

VALEPORT

HQ Location: Valeport Limited, St. Peters Quay, Totnes, Devon, TQ9 5EW, United Kingdom

Company Intro

Valeport has more than 50 years' experience designing and manufacturing instrumentation for oceanographic and hydrographic communities. We provide leading-edge marine sensing and monitoring solutions to a worldwide customer base, including the environmental, energy, construction, dredging, civil engineering, and scientific research sectors.

Contact
sales@valeport.co.uk
+44 1803 869292

valeport.co.uk

FEATURED PRODUCTS

BATHY2

Designed to deliver precision bathymetric data from ROVs/AUVs, this robust new integrated sensor suite generates density corrected depth data up to 6000m. It uses state-of-the art sensors to generate precision depth and height information.

MINIIPS2

This smart underwater pressure sensor with accuracy to 0.01% FS, offers a cost-effective solution to vehicle pilots who require highly accurate depth information in real-time.

UVSVX

Designed for underwater vehicles where space is at a premium, the compact uvSVX features Valeport's 'Time of Flight' technology that delivers SVP with calculated salinity and density data.

MINIIPS1

The miniIPS1 is an evolutionary upgrade over the miniIPS, presenting industry proven functionality that is equally reliable and trusted. The miniIPS1 now benefits from improved power consumption, isolated power and comms.

PRESSURE SENSORS

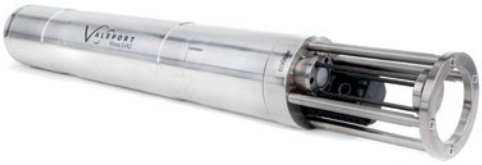
The Bathy2, miniIPS2 and uvSVX all feature Valeport's unique interchangeable pressure module that allows users to change pressure transducers for maximising operational specific depth requirements. The innovative pressure module, with integral calibration, can be easily changed whilst in the field without opening the instrument and is available in 10, 20, 30, 50, 100, 200, 300, 400 and 600 Bar variants.

MINISVS

miniSVS uses digital 'Time of Flight' technology to provide the lowest noise, highest accuracy, best resolution sound velocity data available. Small size and a choice of sensor lengths down to just 25mm make the sensor suitable for a variety of applications, and the optional pressure or temperature sensor adds versatility.

MIDAS SVX2

Some users need the superior Sound Velocity data from an SVP with the Salinity and Density data from a CTD. The unique MIDAS SVX2 combines both technologies to give the best of both worlds.



VA500 ALTIMETER

The VA500 altimeter delivers a new approach to the problem of underwater positioning. State of the art signal processing offers unrivalled range and performance from a 500kHz transducer. With the option of integrating a high accuracy pressure sensor (0.01%), as used in the miniIPS, this becomes an unbeatable compact and robust package.

FLUOROMETERS

Offered as standard in a 6000m depth rated, titanium housing the Hyperion Fluorometer has a wide range (9-28V DC) isolated power supply, data output up to 16Hz and RS232, RS485 and Modbus communications. Ideal as a standalone sensor for ROV/AUV integration or as part of a multi-sensor array and data logger.

NEXT » PHOTOGRAMMETRY & 3D SCANNING
160 Subsea Tech

II.12.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

PHOTOGRAMMETRY & 3D SCANNING

SUBSEA TECH

HQ Location: 167, plage de l'Estaque, 13016 Marseille, France

Company Intro
Subsea Tech is an engineering company specializing in the design, manufacture, sale and operation of marine and underwater robotic systems, including USVs and ROVs. Its products range includes ROVs weighing from 7 to 45 kg and USVs measuring from 1.7 to 6.8 metres. In addition, Subsea Tech offers site services for the civil inspection of structures such as dams, tunnels, canals and harbour facilities.

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subsea-tech.com

PRODUCTS

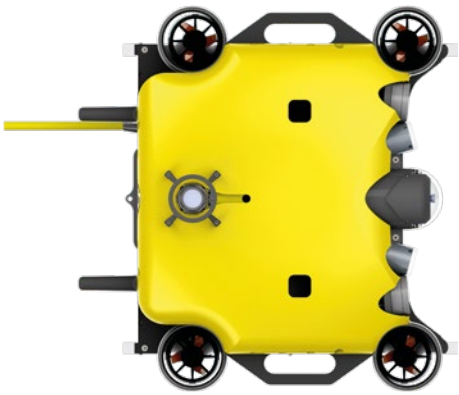
Mini Tortuga Hydro is an inspection class ROV based on the Mini Tortuga XP4 model and specially adapted to house the IVM Hydro300 photogrammetry sensor. With both roll and tilt control ensuring an ideal sensor attitude and a Gigabit data transfer though a single mode fibre umbilical to optimize the Hydro300 operation, the Mini Tortuga Hydro is from far the most compact solution on the market (43 kg) for sub-millimetric 3D modelling.
For chain inspection, metrology works, damages evaluation or more generally 3D modelling of complex subsea infrastructure, the Hydro300 combined to the Mini Tortuga offers the latest developments in the field of ultra-high accuracy photogrammetry.
Both the ROV and the photogrammetry sensor are accessible to non-expert operators and can be utilised after just a 2 days training on site or at our facilities.

TECHNICAL SPECIFICATIONS

ROV	
Max. Depth	300 m
ROV dimensions	L 672 mm x W 684 mm x H 500 mm
ROV weight	43 kg in air
Max. ROV speed	3 knots
PROPULSION AND POWER SUPPLY	
Thrusters	Horizontal thrusters: 4 × 5.5 kgf , with manually adjustable orientation. Vertical thrusters: 4 × 5.5 kgf. Propellers of 80 mm
Power supply	230Vac – 20 amps (mains or generator)
UMBILICAL	
Cable	300m (9.5mm neutral / 8mm sinking), breaking strength 500kg
Communication	Gigabit fiber optics

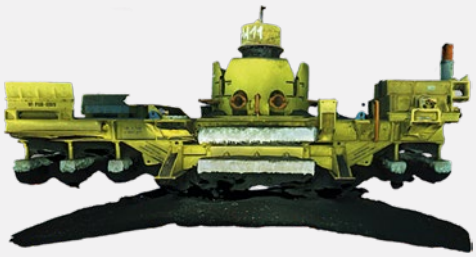
SYSTEM CONTROL	
Control	Console integrated in a waterproof case 634mm x 505mm x 220 mm
Display	2 screens 21"+17", interchangeable for video, sonar, navigation and other sensors
Controls	2 multi-function joysticks and preset buttons

HYDRO 300	
Max. Depth	300 m
Dimensions	226 × 338 × 288 mm
Weight	11.2 kg in air / 2.2 kg in water
Material	Aluminium
Power	48VDC 150W
Data	1Gb/s Ethernet
Resolution	24M pixel
Field of view (V/H)	63° / 79°
Lighting (Lumen)	75 000
Embedded storage	2Tb



3D RECONSTRUCTION

Chain



Well Head

Quay

NEXT » ROBOTIC SYSTEMS

164 GreensealQ

II.13.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

ROBOTIC SYSTEMS

GREENSEA IQ

HQ Location: 10 East Main Street Richmond, VT 05477 USA
Regional Offices:
10 Cordage Park Circle, Suites 234-243, Plymouth, MA 02360 USA
4901 Morena Blvd., Unit 701, San Diego, CA 92117 USA
550 Gus Hipp Blvd., Unit 2, Rockledge, FL 32955

Company Intro
Greensea IQ is a dual-use technology company transitioning mature solutions developed for and by the defense industry into the commercial markets creating high impact.
Greensea IQ is uniquely positioned to capitalize on the growing Blue Economy that is being driven by the demands for scalable and persistent ocean protection, net-zero emissions in shipping, alternative energy sources from the ocean, and understanding change in the seas as our climate changes.
As a world leader in autonomous underwater robot technologies, we deliver these high impact solutions by embedding our dual-use technology based on the open architecture operating software OPENSEA to meet the growing demand for intelligent robotics across the entire spectrum of the maritime domain.

Contact
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+1.802-434-6080

greenseaiq.com

Greensea IQ provides intelligent robotic systems for use in subsea applications for military, maritime, and offshore energy industries. Built on OPENSEA, Greensea IQ delivers flexible and scalable platforms and systems capable of delivering advanced capabilities to the field — quickly, replacing outdated or more dangerous methods of operating in marine environments.

BAYONET AUGVS

Bayonet Autonomous Underwater Ground Vehicles (AUGVs) seamlessly transition from the open water, to the surf zone, and on to the shore. These AUGVs are configurable platforms that are able to scale to meet specific payload, operational, or environmental requirements.

Key Features

Easy to Launch: All Bayonet vehicles can be driven from beach to subsea. The can also be launched by dropping or lowering off of a vessel.
Large Payload Capacity: Each Bayonet vehicle can carry more than ½ its weight in additional payloads. The largest, Bayonet 350 can carry nearly 160 additional kilos.
Multiple Operator Modes: Bayonet vehicles can be controlled manually using a tether or RF link buoy or they can be completely autonomous.

Bayonet 250 during inspection for beach erosion


Bayonet 250 during UXO search.

Designed for versatility, Bayonet AUGVs are highly adaptable autonomous platforms able to support robust payloads, and capable of executing various missions and tasks in challenging marine environments where traditional ROVs, AUVs, or USVs may face limitations. They serve as reliable tools for operators seeking a stable platform in harsh marine conditions.
Available in three sizes – 150, 250, and 350 – these vehicles cater to different needs. The 150 is the most portable and is useful for smaller payloads and lighter conditions, the 250 is able to handle harsher conditions and more extensive payloads, while the 350 tackles the heaviest payloads and toughest conditions.
With a low profile and high stability, Bayonet AUGVs can navigate the surf zone, even in up to 6 ft high waves, ensuring mission completion independent of sea state and weather, allowing for more operational days.
Featuring low domestic power draw, these vehicles can maintain station for up to 100 days for tidal or current observations, aided by a sink gauge that prevents scouring. The system can be programmed to collect tidal data using a pressure sensor and then execute a survey mission before recovery.

With a standard range of 10 miles submerged and 24 miles dry, operating at a speed of 1.5 knots ensures high sounding density. The vehicles offer three single-operator modes: autonomous, tethered, or RF link buoy.

RNAV3

Greensea IQ and STIDD Systems, Inc., renowned for the widely-used Diver Propulsion Device (DPD), have joined forces to create the RNAV3. This compact navigation and mission management tool caters specifically to combat divers.

Key Features

Mission Success Priority: Designed to be as easy to use as possible when in stressful dive scenarios – "grip and go".
Integrated into DPD: The RNAV3 is integrated into the STIDD DPD providing navigation and control as well as autonomy.
Highly Accurate Navigation: RNAV3 has highly accurate (0.5%dt CEP-50) aided Inertial Navigation System (INS) installed.

Understanding the importance of operational input, Greensea IQ's team, including former experienced combat divers, has spent years engaging with combat divers for feedback. The goal has always been to ensure that our system was easy to use and helped execute successful and safe missions.

The RNAV3 integrates with STIDD's Diver Propulsion Device (DPD) to provide navigation and control. By leveraging supervised autonomy, combat divers can offload navigation and vehicle operation to the DPD, enhancing safety and productivity. The addition of OM2 (optionally manned) enables fully unmanned transit to or from predetermined locations for INFIL/EXFIL.

The RNAV3 allows for pre-planned or on-the-fly mission creation and updates. Control is facilitated through thumb knobs and finger triggers, ensuring the diver's hands remain on the hand grips for monitoring system status, alarms, progress to a destination, or rerouting the vehicle.

Further enhancements include a fully integrated acoustic communications system, enabling team members to send and receive messages during operations. Divers can transmit encrypted messages, share data, or direct team members to waypoints, using pre-programmed or customized messages for mission-critical updates.

OPENSEA EDGE

OPENSEA Edge is a technology framework that moves processing resources to the robot allowing for advanced human-on-the-loop autonomous behaviors. This helps to facilitate tetherless command and control. OPENSEA Edge provides a solution for remote, long range command and control of a subsea vehicle. In September 2023 OPENSEA Edge was used as part of the first successful demonstration of a tetherless ROV EOD and mine countermeasures.

SPECIFICATIONS	150	250	350
Dimensions	111.8 × 91.4 × 25.4 cm	121.9 × 121.9 × 38.1 cm	182.9 × 152.4 × 45.7 cm
Open Deck Space	66.0 × 30.5 cm	66.0 × 30.5 cm	152.4 × 71.1 cm
Weight (with Batteries)	131.5 kg	176.9 kg	272.2 kg
Duration	~6 hrs	~6 hrs	~4 hrs
Range (Dry/Wet)	6/8 nm	6/8 nm	4/6 nm
Deck Capacity	90.7 kg	113.4 Kg	158.8 kg
Navigation Positioning	Greensea IQ INSpect GS4		
Command and Control Software	OPENSEA, optional Greensea IQ User Interface Software: Workspace, Professional Workspace, or EOD Workspace		

Key Features

Modular Solution: OPENSEA Edge is a modular, hardware-agnostic autonomy solution.
Components: The system is based on two NVIDIA edge processors and a Gigabit Ethernet network architecture, providing subsea connector interfaces for various sensors and communications.
Objective-Based Autonomy: OPENSEA Edge incorporates new technologies for objective-based autonomy, perception system integration, and low-bandwidth communications.

OPENSEA Edge seamlessly combines the capabilities of OPENSEA with an edge computing package. It serves as an accessible solution for system integrators or developers aiming for full subsea and untethered autonomy. The system's tried-and-true navigation, vehicle control, and autonomy solutions, along with enhanced features, can be easily integrated into different vehicle systems for diverse applications.

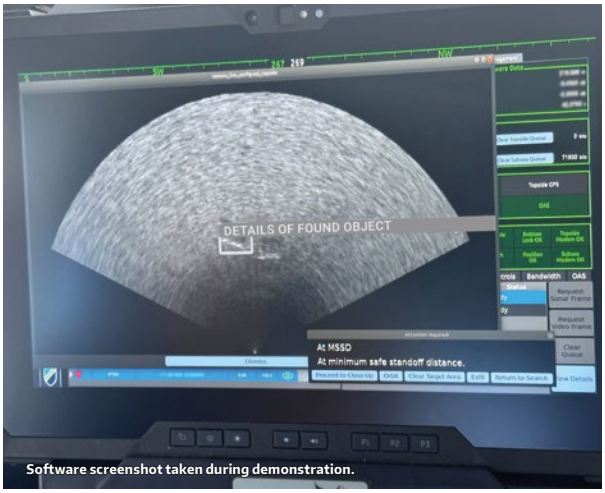
Edge Computing in ROVs
Edge computing places computational processes as close to the data source as possible. In the context of ocean robots, it means processing sensor data on the robot itself rather than with the operator. For Remotely Operated Vehicles (ROVs) with requirements for persistence and long-range deployments, edge processing is crucial. OPENSEA Edge, with its hardware integration, empowers ROVs to make decisions on the edge, enhancing redundancy, failure mitigation, and autonomy.

Benefits of OPENSEA Edge

Reduced Dependency on Tether: OPENSEA Edge reduces the need for high-bandwidth tethers between the operator and the robot. Instead, situational awareness and instructions can be efficiently communicated using low-bandwidth and high-latency links, such as acoustic and satellite connections.
Increased Autonomy: With data processing, navigation, and control on the vehicle, OPENSEA Edge enables decision-making on the edge. This supports redundancy, failure mitigation, and the integration of new autonomy levels.
Versatile Application: OPENSEA Edge's modular and vehicle-agnostic autonomy solution facilitates future requirements for uncrewed operations, extended reach, and residency, making it suitable for manufacturers, service providers, and system integrators.

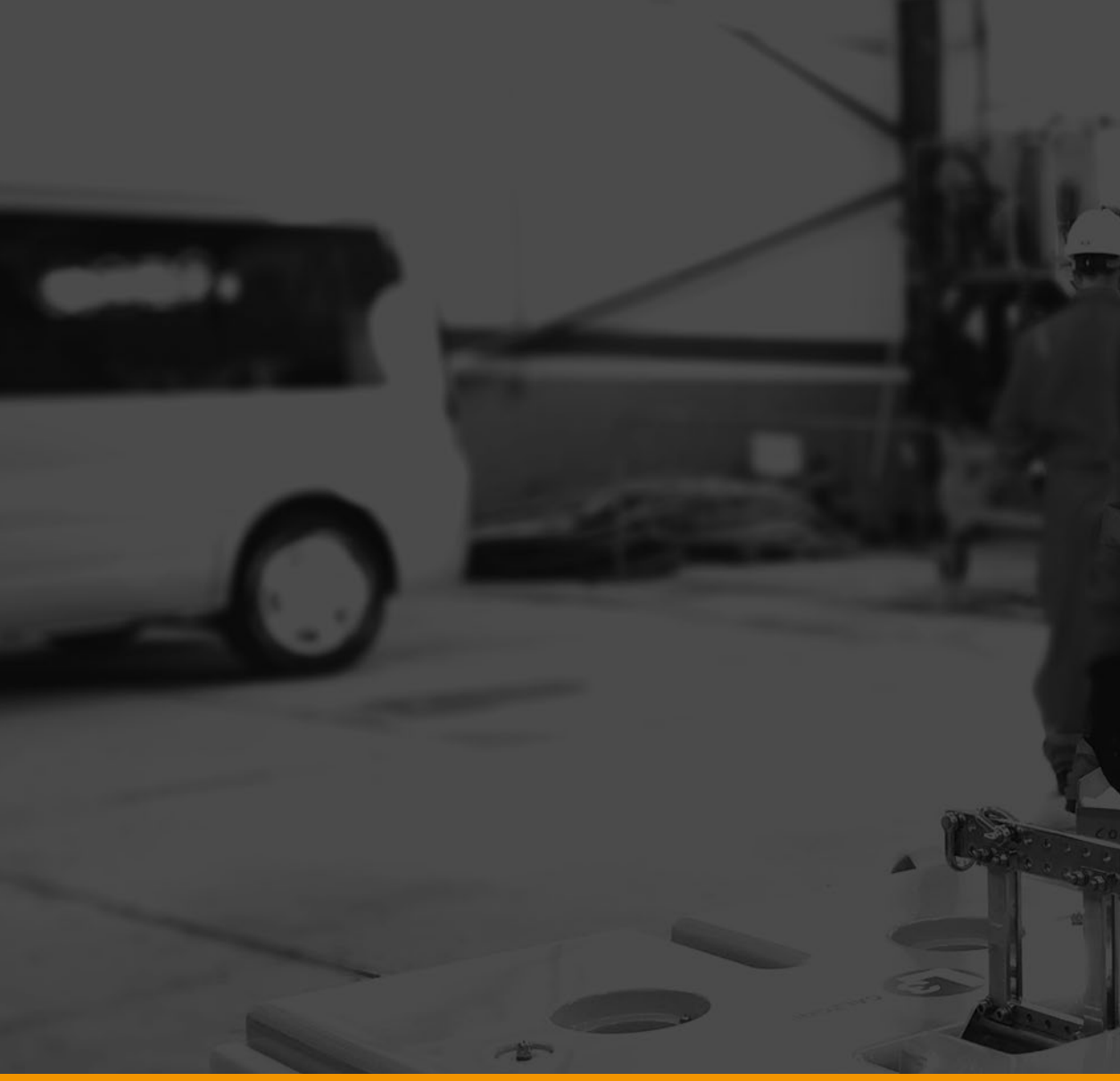
OPENSEA Edge Details
OPENSEA Edge is the most powerful software stack for offshore robotics and can add field-of-the-future to existing fleets.

Features
- Platform agnostic
- Provides open architecture platform OPENSEA
- Provides over-the-horizon command and control
- Provides advance autonomy capabilities
- Room for other commercial off-the-shelf AI and ML engines



Software screenshot taken during demonstration.


First ever demonstration of tetherless ROV being used for EOD Missions with OPENSEA Edge visible at surface.



NEXT » ROV PILOT TRAINING

II.14.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

ROV PILOT TRAINING

QSTAR S.L.U

HQ Location: Port Forum, Carrer de La Pau 12, 08930, Sant Adria de Besos, Barcelona, Spain
Regional Offices: Calle Sao Paulo 17, 35008 Las Palmas de Gran Canaria, Canary Islands, Spain

Company Intro

QSTAR Internationally leading ROV Training Centre, provides high quality and realistic training, receiving trainees from all over the world. The updated training program is built on (though not limited to) IMCA guidelines. This has meant that our trainers can provide real-world knowledge and skills for students in compliance with the actual requirements of today's ROV industry. This is in addition to expertise in other rising sectors such as Windfarms, Oil & Gas, Search & Rescue, Military and Police, Marine Research, Marine Archaeology, Subsea Operations, and Aquaculture.

Besides being able to provide the highest quality training, we provide real working conditions on board an active work vessel and quay. This allows students to experience and have the opportunity to work as part of a real ROV team. This provides the best training assessment for a newly qualified ROV Pilot technician. QSTAR offers the locations, human technical resources and the experience accumulated over 15 years in services for the maritime industry and training of personnel with the most advanced facilities and environment.

Contact

rovtraining@qstar.es
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+34 936 338 627
+34 616 604 778

rovtrainingcentre.com

CORPORATE ON-SITE ROV TRAINING

Course duration: Under request

Languages: English or Spanish.

In addition to providing high quality training courses, QSTAR specialises in supplying on site and corporate training. We also offer training for ROV personnel from different companies worldwide by performing specific on-site training, tailored to the company's individual needs and providing the best assessment following the IMCA guidelines. Furthermore, QSTAR Marine and Subsea Solutions división have been undertaking ROV installation and commissioning projects internationally, from both offshore vessels and onshore operating bases.

QSTAR offers the locations, human technical resources and the experience accumulated over 15 years in services for the maritime industry and training of personnel. We have the most advanced facilities and the environment in order to carry out the specific technical training for the subsea industry and others sectors.

ROV PILOT TECH. GRADE II

Course duration: 120 hours in 3 weeks.

Languages: English or Spanish.

Course Content: Built upon the IMCA guidelines (IMCA C005) document R004. The Commercial ROV Pilot Tech II course delivers training on all the Industry standard competencies and goes further with additional technical training modules. The Course content is in line with guidance documents IMCA R002, R004, R010. Practical training are developed in our faciliies, quay and on-boad a Multipurpose ROV Vessel, performing real operations found in the industry and in Onshore & Offshore Waters.

ROV PILOT TECH. PREMIUM

Course duration: 280 hours in 7 weeks.

Languages: English or Spanish.

Course Content: Built upon the IMCA guidelines (IMCA C005) document R004. The Commercial ROV Pilot Tech II Premium course delivers training on all the Industry standard competencies and goes further with additional technical competencies modules. Also includes additional training in Hydraulics / Electrical / Sonar / 7 function hydraulic Manipulator. The Course content is in line with guidance documents IMCA R002, R004, R010 This is our most complete training program including additional modules like Fiber Optic, Electricity, Electronic and Hydraulic, all of these focussed in the ROVs, its maintenance and repair. Practical training are developed in our facilities, quay and onboard our Multipurpose ROV Vessel, performing real operations found in the industry and in Onshore & Offshore Waters.

WORKCLASS ROV MAINTENANCE & REPAIRS

Course duration: 80 hours.

Languages: English or Spanish.

Course Content: WCROV Maintenance & Repairs: This course consists of a theoretical part about Workclass ROVs, their operation and maintenance as well as a practical part that consists of performing various tasks of maintenance and repairs of Workclass ROVs. A Workclass ROV will be used for the practical module. In addition we will complement the training with 7 functions hydraulic manipulators and with practical piloting with a VMax Proffesional ROV simulator with different models and scenarios.

SKILLTRADE B.V.

HQ Location: Schoolstraat 174, 2252 CN, Voorschoten, The Netherlands

Company Intro
Skilltrade specializes in hydrographic training and courses for the hydrographic survey, dredging and offshore construction industry since 2000. Courses and training developed by people who gained their experience in the field and taught by those same individuals. The heart of the company is that the skills its people possess can be traded or exchanged with others, thus improving their hydrographic knowledge and understanding.
Skilltrade provides courses and training in three areas by combining theoretical with field experience material:
1. Hydrographic Survey Category B course
2. Short courses, introductory and general courses in hydrography
3. E-learning courses
Skilltrade aims to answer your training needs. The various existing modules provide a starting point for almost all company specific courses, allowing for specific requirements to be included.
Furthermore, Skilltrade also publishes the Handbook of Offshore Surveying, a 3 volume encompassing series, unmissable for the modern day hydrographer.

Contact
info@skilltrade.nl
+31 71 561 13 65

skilltrade.nl

HYDROGRAPHIC SURVEY CATEGORY B COURSE

Course duration: 30 weeks **Languages:** English.
Course Content: A full Hydrographic Survey curriculum encompassing all basic and essential competencies of the Hydrographic Surveyor as defined by the FIG/IMO/ICA International Advisory Board on Standards of Competence for Hydrographic Surveyors for a Category B Course. The course has been officially recognised as such on the 1st July 2008 and received continued recognition (in accordance with the Standards of Competence for Hydrographic Surveyors FIG/IHO/ICA S-5, Edition 11.1.0, December 2014) in 2016. We offer an intense course, a 13 week course in IJmuiden (including 1 week Safety training) preceded by a 13 weeks e-learning programme. The course is fully intertwined with visits, workshops and guest lecturers from companies that support the curriculum. The course is concluded with a 4 week on the job Field Training Project.

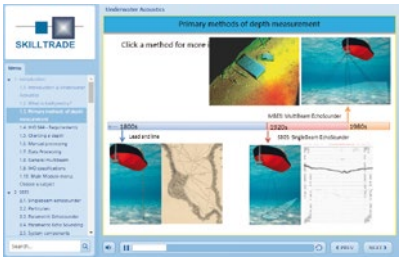
TEMPORARILY ADJUSTED CURRICULUM: As the development of the COVID-19 pandemic is still unpredictable, we saw no realistic possibility to deliver traditional on-site teaching this year. With approval of the IBSC all lessons that can be delivered on-line will therefore be taught using digital formats for the upcoming 25th class. This means that instead of 13 weeks, the student only has to come to the Netherlands for 4 weeks (for workshops, practical assignments, and exams).

INTRODUCTION TO HYDROGRAPHY

Course duration: 2 days **Languages:** English or Dutch.
Location: any desired location, also via online lessons
Course Content: This 2-day course is intended for people who received no formal hydrographic training but who do work or want to work in this field. The course provides inter alia a thorough basic knowledge for functionaries who frequently work with hydrographic recording and processing software and/or functionaries who frequently work together with hydrographers.
The course is not only intended for the operational staff but can also provide the management team with valuable insights into the subject matter. The following subjects are dealt with:

- **Geodesy:** Ellipsoid, Geoid, Projections such as RD, Datum transformation, vertical datums and reference planes such as NAP
- **Positioning:** Basic knowledge, GPS, DGPS, RTK, Underwater positioning
- **Bathymetry:** General, Single beam, Multibeam
- **Other systems:** Side Scan Sonar, Sub Bottom Profiler, Sound velocity meter, Land surveyor's equipment.
- **Quality assurance:** DGPS Accuracy, Error detection, Statistics
- **Tide:** Theory, Observations, Predictions

E-LEARNING



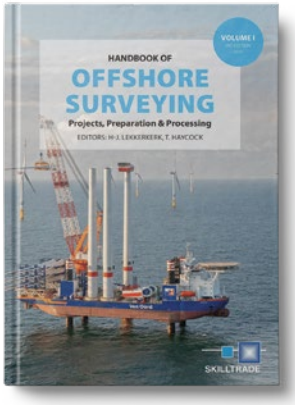
Course duration: 30-50 hours per module
Languages: English.
Course Content: Skilltrade has developed several interactive e-learning courses that can be followed by anybody interested in the subject at hand. These modules are also part of the Hydrographic Survey Category B Course. We offer the following e-learning courses:

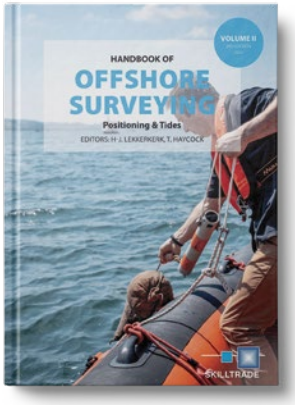
- Mathematics
- Physics
- Underwater acoustics
- Bathymetric systems
- Landsurveying
- GNSS operations
- Coordinate Reference Systems
- Positioning

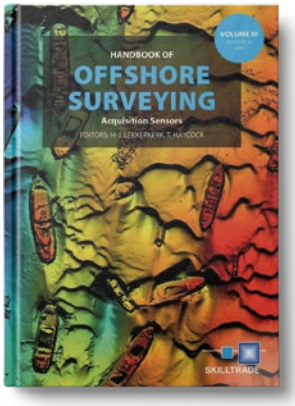
These modules can be accessed on your desktop computer, but also offline through an App on your mobile device. Each module is accompanied by background material; an extract from the Handbook of Offshore surveying. A lecturer is available for questions / tutoring via e-mail. Each e-learning lecture is accompanied by an interactive assessment.

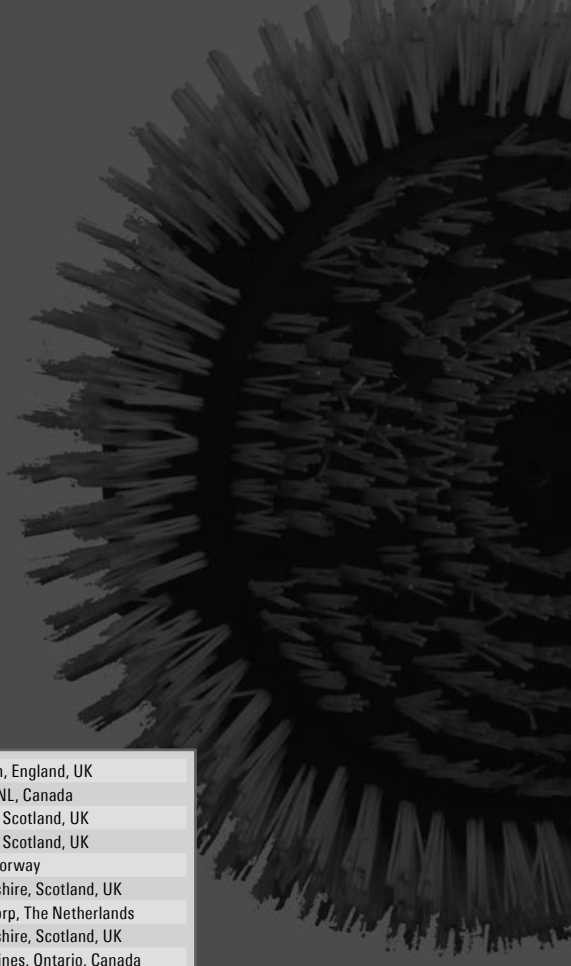
HANDBOOK OF OFFSHORE SURVEYING

Skilltrade also publishes the Handbook of Offshore Surveying, a 3 volume encompassing series, unmissable for the modern-day hydrographer.
For more info, visit our online bookstore: www.skilltrade.nl/bookstore







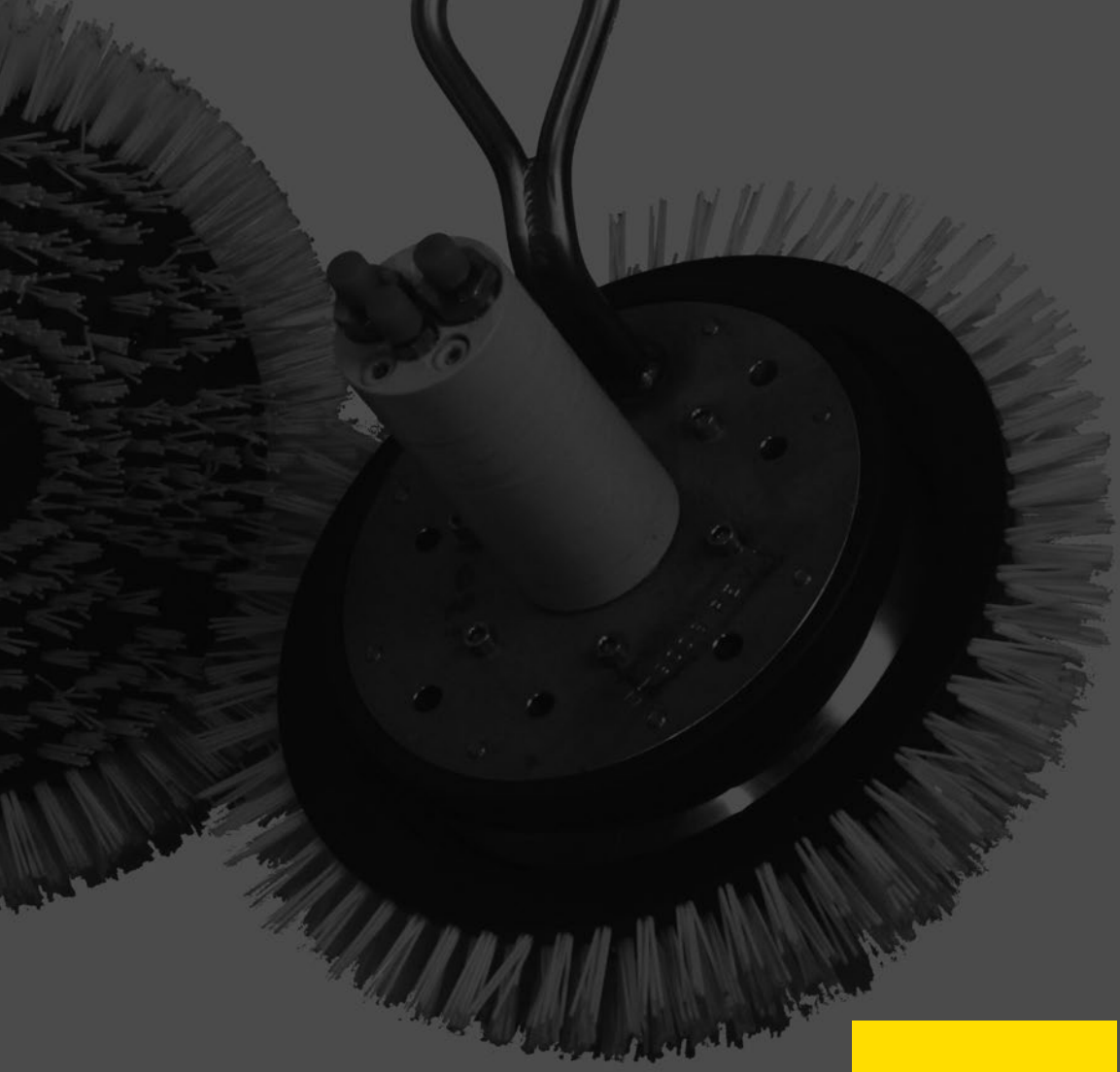


Allspeeds	allspeeds.co.uk	Accrington, England, UK
Frontier Subsea	frontiersubsea.com	Paradise, NL, Canada
J2 Subsea	j2subsea.com	Aberdeen, Scotland, UK
Macfarlane Technology	macfarlanetechnology.com	Aberdeen, Scotland, UK
Miko Marine	mikomarine.com	Lysaker, Norway
Aleron Limited	aleron-group.com	Aberdeenshire, Scotland, UK
Seatools	seatools.com	Numansdorp, The Netherlands
SengS – Pryme Group	sengs.org.uk	Aberdeenshire, Scotland, UK
Shark Marine	sharkmarine.com	St. Catharines, Ontario, Canada
Subsea Americas	subseaamericas.com	Berwick, LA, USA
Subsea Tooling Services	subseatoolingservices.com	Aberdeenshire, Scotland, UK
The Blueprint Lab	theblueprintlabs.com	Sydney, NSW, Australia
ToolTec	tooltecltd.co.uk	Aberdeenshire, Scotland, UK
Utility ROV	utrov.com	Fife, Scotland, UK
Zetechtics	zetechtics.com	Amotherby, England, UK
WeSubsea	wesubsea.no	Kristiansund, Norway

NEXT » ROV TOOLING

176 Centurion Subsea Services

178 FET SUBSEA



II.15.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

ROV TOOLING

CENTURION SUBSEA SERVICES

HQ Location: Centurion Subsea Services, Unit B, Kintore Business Park, Aberdeenshire, AB51 0YQ, United Kingdom

Company Intro

Centurion Subsea Services delivers high-quality products and services to the energy, renewables, decommissioning and subsea construction industries. Our culture is one of customer centred, solution-driven designs, based on sound engineering principles. This includes the continued development of cutting-edge, shallow water, ROV technology and the stocking of a range of ready-to-ship surface, diver and ROV tooling packages.

At Centurion Subsea Services we provide our clients with a fully integrated service, designed to support their needs with increasingly complex subsea operations. Our bespoke packaged solutions are second-to-none, offering customers everything from reliable deck tooling to tailored ROV solutions, meeting even the toughest subsea challenges. With decades of combined experience behind us, we have the knowledge, personnel, equipment and dedication to support delivery of your subsea projects to the highest of standards, ensuring we add value to your projects effectively, efficiently and sustainably.

Centurion, a global leader in the supply of rentals and services to the energy, infrastructure, power, environmental and renewable industries, operates globally from 13 countries, with 93 operational bases and 3200+ employees.

Contact

Gary McConnell
garymcconnell@centurionsubseaservices.com
+44 (0) 1467 424060

centurionsubseaservices.com

17” ROTARY SAW – CUTTING / GRINDING & DRILLING TOOLING

The CSS 17” Rotary Cutter uses strong steel jaws to securely clamp on to various structures and cut material from 10 inches and up to 17 inches in diameter, (although larger cuts can be accommodated with some minor modifications).

The jaws are driven by two linear actuators and are adjustable over three different positions depending on the diameter of cut. These adjustments ensure that the cutter clamps onto and centralises the target material accurately, with a bolt on guide to aid the cutting of 10” – 14” materials. The main body of the cutter is made up from lightweight aluminium with the drive motor mounted on a sliding platform to extend and retract the blade position.

MANIPULATOR MOUNTED ROV SAW & DIAMOND WIRE SAW – CUTTING / GRINDING & DRILLING TOOLING

The CSS Manipulator Mounted ROV Saw, (supporting either 14” or 16” Tungsten Carbide blades), and Manipulator Mounted Diamond Wire Saw are lightweight, efficient, and easily deployed cutting options. Either tool can be mounted onto a Rigmaster manipulator utilising the wrist bolts for quick installation.

During subsea cutting operations, the manipulator jaws are used to secure the ROV, and tool, to the target and once secured the tool cutting motor can be enabled. The pilot will then control a feed actuator, feeding the cutter through the target material.

CAT S80 SHEAR CUTTER – CUTTING / GRINDING & DRILLING TOOLING

The CAT S80 Shears can deliver up to 800te of cutting force and boast an impressive jaw opening distance of 620mm. They are suited to cutting a variety of flexible and rigid products and can be configured for topside or subsea operations.

Subject to a maximum working pressure of 350 bar with a flow rate up to 200 lpm the S80 shears can be configured for ROV or diver use and can be delivered with all required topside equipment, such as HPUs, hose reels/ spoolers etc. upon request.

M.O.L.E. – MATTRESS ORIENTATION, LIFTING & EXTRACTION – CRANE DEPLOYED, LIFTING & RECOVERY TOOLING

The CSS Mattress Orientation, Lifting and Extraction (M.O.L.E) tool has been designed to safely orientate and/or recover subsea concrete mattresses to deck during decommissioning activities.

Deployed by either the vessel crane and guided and monitored by the ROV, or via the Centurion Subsea Services AuxROV system, this tool ensures as much contact with the mattress area as possible minimising the risk of dropped objects should the mattress not be wholly intact. The tool has 32 contact points over the four rakes used.

11KW TO 125KW HPUS – TOPSIDE & BACK DECK EQUIPMENT

Our suite of operator friendly surface equipment comes in a various shapes and sizes, from Hydraulic Power Units (HPU) to Overboarding Chutes and from Powered Reels to Hydraulic Grabs.

HPUs can be provided ranging from 11kW up to 125kW, diesel or electric, with Zoned options also available. We stock powered reels that are designed to accept hose, umbilical, or cable, with drums that can be split/divided to accommodate various bundles simultaneously. Our deployment chutes and sheaves are designed with a wide range of product and load characteristics in mind, with both smooth and roller versions on hand.

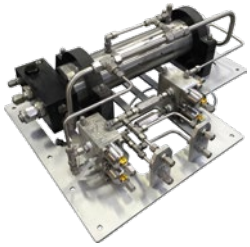
BOP SHUTDOWN SYSTEM – IHPU, DWP & FLUID INJECTION

Our Blow Out Preventer Shutdown System (BOP-SS) has been specifically designed to provide high flow and pressure to shut down a BOP in under 45 seconds, as set out by API standard 53.

The BOP-SS operates the BOP's Blind Shear Rams with a maximum pressure of 345 Bar at 100 L/min. Pressure is built up in two separate stages, allowing effective, safe sealing of the well bore. The system is designed to be run from a 150Hp vehicle and can run on either water-based glycol, mineral oil or sea water and has been designed to run directly from the ROV main system with absolutely Zero cross contamination, allowing for maximum power input from ROV.

ISOLATED HYDRAULIC POWER UNIT – IHPU, DWP & FLUID INJECTION

The Isolated Hydraulic Power Unit (IHPU) is a versatile tool that can be used for numerous subsea applications including Operating BOP Tooling, Transferring Media and Pressure Testing.



The output pressure is directly proportional to the output pressure. This allows the output to be adjusted from 0 – 10,000 psi (~690 Bar). The pump can be connected to any subsea reservoir by the suction port and is available in 6,000 PSI, 10,000 PSI and 12,000 PSI versions.

FET SUBSEA

Location: Bryan, Texas
Kirkbymoorside, North Yorkshire

Company Intro
FET's subsea tools are meticulously crafted with a focus on user-friendliness and suitability for specific tasks. Our in-house engineering team covers essential disciplines such as electronics, hydraulics, and mechanical design. This interdisciplinary expertise results in cutting-edge tooling solutions for the subsea industry.
We offer the most extensive selection of standard subsea and ROV tooling in the market. With a global after-sales support network, our service centers are strategically located in Houston, Brazil, Singapore, and Aberdeen. Our approach integrates office-based technical assistance with on-site field technicians, enabling FET to deliver comprehensive support services to our clients worldwide.
Additionally, FET offers a comprehensive range of high-quality subsea tooling as part of our rental program. Whether you're involved in offshore oil and gas exploration, marine research, or underwater inspections, our tooling rental suite is your one-stop solution for all your ROV tooling requirements.

Contact
UK Sales: Spares.uk@f-e-t.com
US Sales: Spares.us@f-e-t.com
Rentals: rentals.uk@f-e-t.com

f-e-t.com/rov-tooling

STANDARD AND CUSTOM-DESIGNED SUBSEA TOOLING FOR ANY APPLICATION

TORQUE TOOLS & ACCESSORIES

FET stands at the forefront in torque tool offering, producing interfaces in ISO 13628-8 and API 17H standards. Our torque tools, ranging from Class 7 at 25,000ft lbs to Class 1 at 50ft lbs, are engineered for robust service, ensuring consistent, accurate torque and speed delivery. Available with torque feedback options and compatible control manifolds, our tools excel in diverse applications, enhancing efficiency and safety in underwater operations. Precision-engineered and highly durable, our suite empowers your team to tackle complex tasks with confidence, setting new benchmarks in subsea engineering excellence.

PUMPING & INJECTION SYSTEMS

Engineered for the most demanding underwater tasks, FET Subsea's Pumping and Injection systems deliver unparalleled performance and reliability. Whether it's high-pressure pumping, fluid injection, or specialized tooling operations, our technology ensures optimal efficiency and safety. Designed to withstand harsh subsea conditions, our systems empower ROVs to execute intricate tasks with ease. Operators can rely on our cutting-edge solutions for accurate fluid delivery, chemical injection, and tool deployment, even in the deepest and most challenging subsea environments.

DREDGING & JETTING TOOLS

From precision dredging to high-pressure jetting, our tools guarantee exceptional functionality and dependability. Designed for challenging underwater environments, they ensure effective sediment removal, debris clearance, and trenching, enabling seamless subsea construction and maintenance activities. With these advanced tools, remotely operated vehicles (ROVs) can handle complex dredging and jetting tasks with ease and accuracy.

CUTTERS & GRINDERS

FET offers a suite of advanced Cutters and Grinders designed for Remotely Operated Vehicles (ROVs). Engineered for durability and ease-of-use, these tools empower ROV operators to tackle underwater tasks with unmatched efficiency. With advanced technology and ergonomic designs, our suite of tools ensures seamless operation in challenging environments, making it the ideal choice for underwater maintenance, salvage operations, and research endeavors.

HOT STABS

FET Hot Stabs ensure seamless connections in challenging underwater environments. Our portfolio of hot stabs guarantee swift and secure interfacing between remotely operated vehicles (ROVs) and subsea equipment. With cutting-edge technology and rigorous testing, our Hot Stabs uphold the highest industry standards, providing operators with confidence in critical subsea missions.

LOT / LAOT

FET offers a variety of tools designed for diverse linear actuator override tool interfaces. These interfaces encompass ISO 13628-8 Type A, ISO 13628-8 Type C, interface adapters to type B, and customized two-lug interface adapters. These tools are capable of handling loads up to 120 tonnes and typically consist of two parts: the Locking Head and the Actuator. A range of strokes are available to suit specific applications.

FET SUBSEA ALSO OFFERS THE FOLLOWING SUBSEA TOOLING SOLUTIONS

Cleaning Tools

Docking Beam and Docking Latches

Subsea Displays and Flow Meter Systems

Skid Assemblies

Blue Robotics	bluerobotics.com	Torrance, CA, USA
Copenhagen Subsea	copenhagensubsea.com	Copenhagen, Denmark
DWTEK	dwtekmarine.com	Taiwan
Forum Energy Technologies – Sub Atlantic	f-e-t.com	Aberdeen, Scotland, UK
Hydromea	hydromea.com	Lausanne, Switzerland
Lian Innovative	lianinno.com	Shenzhen, China
Marine Propulsion Solutions	marinepropulsionsolutions.com	Batam, Indonesia
maxon motor	maxonmotor.com	Sexau, Germany
SMD – Curvetech	smd.co.uk	Newcastle, England, UK
Tecnadyne	tecnadyne.com	San Diego, CA, USA

NEXT » THRUSTERS & PROPULSION

182 FET Sub-Atlantic

II.16.

COMPONENT SUPPLIERS AND EQUIPMENT MANUFACTURERS

THRUSTERS & PROPULSION

FET SUB-ATLANTIC

Location: Bryan, Texas
Kirkbymoorside, North Yorkshire

Company Intro
FET's Sub-Atlantic thrusters epitomize engineering excellence. Designed for unmatched power and durability, our thrusters serve as the driving force behind demanding underwater missions. Within FET's Sub-Atlantic product line, a comprehensive array of thrusters is available, encompassing hydraulic and electric variants in both brushless DC and brushless AC types. With a steadfast dedication to excellence, our Sub-Atlantic thrusters are tailored to cater to a wide spectrum of needs globally, addressing the diverse requirements of underwater exploration and research. When unique challenges arise, FET excels in providing bespoke thrusters, making FET the ultimate partner for all underwater propulsion needs.

Contact
UK Sales: Spares.uk@f-e-t.com
US Sales: Spares.us@f-e-t.com

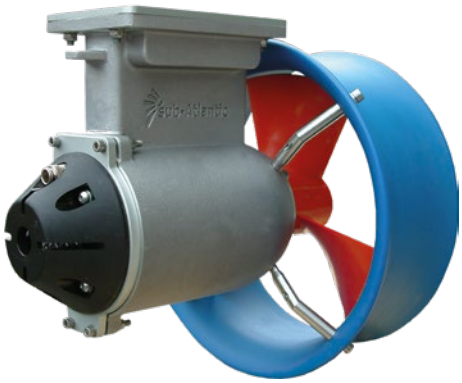
f-e-t.com/subsea/hardware-tooling-and-components/components/

THRUSTERS

HYDRAULIC THRUSTERS

FET's Sub-Atlantic hydraulic thrusters are the propulsion of choice for ROVs and cable burial/maintenance vehicles. Thriving in challenging environments, these thrusters have established a reputation for their reliability, efficiency, and exceptional performance.
Sub-Atlantic hydraulic thrusters are renowned for their robust yet lightweight construction and advanced ceramic shaft sealing system. These thrusters have closely matched equal forward/reverse thrust and efficiency. Rigorous thruster performance testing, overseen by DNV, guarantees that your system design functions precisely as anticipated. Additionally, the thrusters offer versatility by accommodating various motor displacement sizes for any of the four standard thruster diameters, thanks to the common motor/thruster interface. This feature proves invaluable when accurately aligning with specific vehicle hydraulic system parameters.

BRUSHLESS DC ELECTRIC THRUSTERS



FET's Sub-Atlantic product line offers a comprehensive selection of brushless DC thrusters. Integrating the revolutionary Statorshield™ Technology, this innovative system ensures continuous thruster operation even in the face of shaft seal failures and subsequent flooding. By preventing damage to the winding or electronic components, this advanced technology guarantees the thruster's functionality in challenging underwater conditions. With this cutting-edge feature, Sub-Atlantic thrusters are the optimal choice for professionals in the marine industry, ensuring seamless operations and peace of mind.
The three standard thruster diameters provide bollard thrusts of up to 100 kgf (220 lbf). The thrusters' integral electronic drives are oil-filled and pressure compensated, allowing seamless operation at depths of up to 3000 meters (10,000 feet). For versatility, the thrusters are available in different voltages and with both analogue and digital control.

BRUSHLESS AC ELECTRIC THRUSTERS

FET's Sub-Atlantic brushless electric AC thrusters, featured in our highly successful Mohawk and Super Mohawk ROVs, come in two diameters producing up to powerful 45 kgf (100 lbs) thrust.

Built with rugged construction to withstand challenging conditions, these thrusters are renowned for their reliability. With a high thrust output, operating at 440 Volt AC 50/60 Hz, these thrusters are direct drive, eliminating the need for a gearbox.
Sub-Atlantic Brushless AC Thrusters are proportionally controlled by an external drive electronics board tailored to fit inside a one atmosphere electronics bottle with a minimum inside diameter of 166 mm (6.5 inches). The thrusters themselves are oil compensated and rated for full ocean depth, making them the epitome of performance, reliability, and durability.

10 YEARS OF OCEAN ROBOTICS PLANET

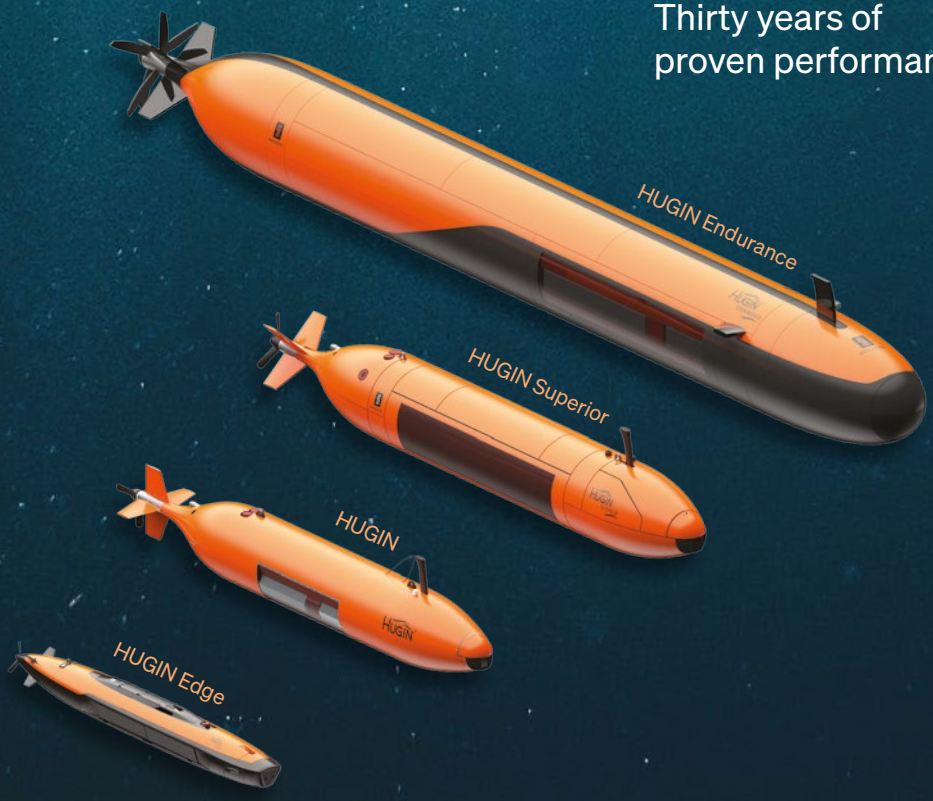
SIGN UP TO STAY INFORMED ABOUT THE MARINE & UNDERWATER ROBOTICS INDUSTRY.

KONGSBERG

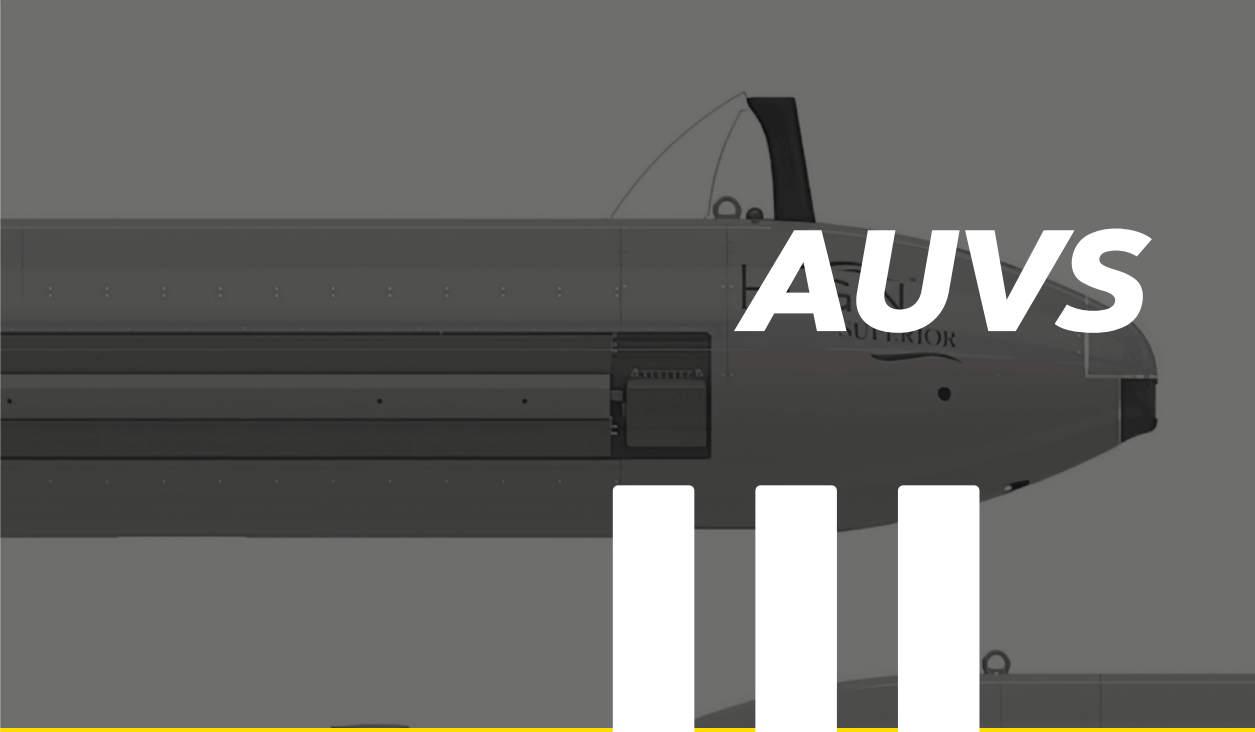
Kongsberg Discovery

HUGIN AUV's

Thirty years of
proven performance.



kongsberg.com/discovery



AUVS

III.

ADVANCED NAVIGATION | advancednavigation.com

Advanced Navigation

HYDRUS

Depth	3000m
Power	3h @ 4kts (9km)
Dimensions	470mm(l) × 260mm(w) × 260mm(h)
Weight (in Air)	6.7kg
Energy	data N/A
Payload	Video & Lighting

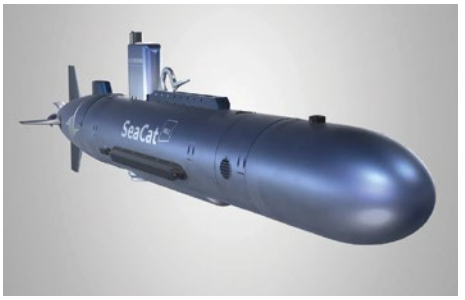
ANDURIL | anduril.com

Anduril

ANDURIL DIVE LD

Depth	6000m
Endurance	10 days (580km)
Dimensions	5800mm(l) × 1200mm(d)
Weight (in Air)	2720kg
Energy	data N/A
Payload	Variety of Sensors

ATLAS ELEKTRONIK | atlas-elektronik.com



Atlas Elektronik

SEACAT

Depth	600m
Endurance	10h @ 3kts (optional 20h @ 3kts)
Dimensions	2500-3500mm(l) × 576mm(w) × 670mm(h)
Weight (in Air)	130-220kg
Payload	SwapHead, Various Sonars/Sensors

BOXFISH ROBOTICS | boxfishrobotics.com

Boxfish Robotics

ARV-i

Depth	300m (Optional 1000m)
Endurance	3-10h
Dimensions	data N/A
Weight (in Air)	24kg
Energy	data N/A
Payload	Underwater Charging, Variety of Sensors

Boxfish Robotics

BOXFISH AUV

Depth	500m (Optional 1000m)
Power	3-12h
Dimensions	data N/A
Weight (in Air)	data N/A
Energy	600Wh
Payload	Variety of Sensors

CELLULA ROBOTICS | cellula.com

Cellula Robotics

SOLUS-XR

Depth	300m (1000m & 3000m available)
Endurance	45+days @ 3kts (5000km)
Dimensions	12000mm(l) × 1700mm(w) × 1700mm (h)
Weight (in Air)	10,000 kg
Energy	1000 kWh
Payload	2× 2500L

Cellula Robotics

SOLUS-LR

Depth	3000m
Endurance	360h @ 3kts (2000km)
Dimensions	8500mm(l) × 1000mm(d)
Weight (in Air)	3700kg
Energy	250kWh
Payload	Various Modules & Sensors

Cellula Robotics

SOLUS-MR

Depth	1000m (3000m and 6000m Optional)
Endurance	115h @ 4kts (600km)
Dimensions	7300mm(l) × 1000mm(d)
Weight (in Air)	2400kg
Energy	80kWh
Payload	Various Modules & Sensors

Cellula Robotics

SOLUS-LITE

Depth	3000m
Endurance	5h @ 3kts (25km)
Dimensions	5600mm(l) × 1000mm(d)
Weight (in Air)	1400kg
Energy	4.5kWh
Payload	1500L

DEEPINFAR | deepinfar.com

Deepinfar

ORANGE SHARK (MULTI-TYPE AUV)

Depth	100m-3000m
Endurance	data N/A
Dimensions	data N/A(l) × 150mm-680mm(d)
Weight (in Air)	15kg-1500kg
Energy	data N/A
Payload	Various

ECOSUB ROBOTICS | ecosub.uk

EcoSub Robotics

ECOSUBμ5

Depth	500m	***Weight (in Air)***	4kg
Endurance	10h	***Energy***	data N/A
Dimensions	925mm(l) × 111mm(d)	***Payload***	Single Payload

EcoSub Robotics

ECOSUBM5

Depth	500m	***Weight (in Air)***	12kg
Endurance	18h	***Energy***	data N/A
Dimensions	1000mm(l) × 146mm(d)	***Payload***	Various Payloads

EcoSub Robotics

ECOSUBM25

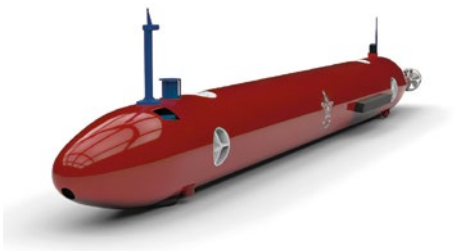
Depth	2500m	***Weight (in Air)***	12kg
Endurance	18h	***Energy***	data N/A
Dimensions	1000mm(l) × 146mm(d)	***Payload***	Various Payloads

EDGELAB | edgelab.eu

Edgelab

U TRACKER

Depth	350m
Endurance	8h
Dimensions	2100mm(l) × 120mm(d)
Weight (in Air)	20kg
Energy	data N/A
Payload	Various



Edgelab

U MAPPER

Depth	300m
Endurance	8h
Dimensions	3500mm(l) × 320mm(d)
Weight (in Air)	180kg
Energy	data N/A
Payload	Various

Edgelab

AMOGH

Depth	1000m
Endurance	22h (5kts)
Dimensions	5700mm(l) × 700mm(d)
Weight (in Air)	1000kg
Energy	data N/A
Payload	Various

Edgelab

U LITE

Depth	500m
Endurance	data N/A
Dimensions	1700mm(l) × 200mm(d)
Weight (in Air)	30kg
Energy	data N/A
Payload	Various

EDGELAB | edgelab.eu

Edgelab

U MICRO

Depth	200m
Endurance	4h
Dimensions	1000mm(l) × 120mm(d)
Weight (in Air)	10kg
Energy	data N/A
Payload	Various

EVOLOGICS | evologics.de

EvoLogics

QUADROIN

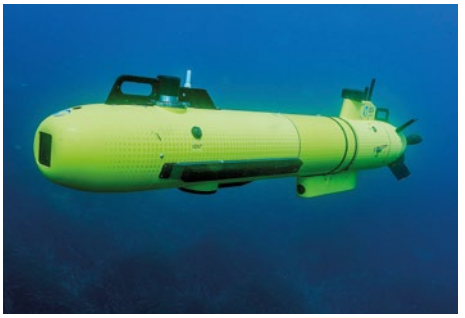
Depth	150m
Endurance	10h
Dimensions	1082mm(l) × 293mm(d)
Weight (in Air)	25kg
Energy	1kWh
Payload	3kg

EvoLogics

POGGY

Depth	data N/A
Power	data N/A
Dimensions	data N/A
Weight (in Air)	data N/A
Payload	data N/A

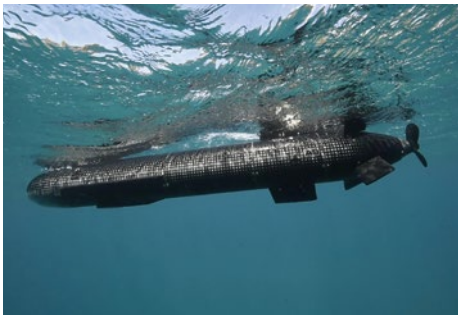
EXAIL | exail.com



Exail

A9-E

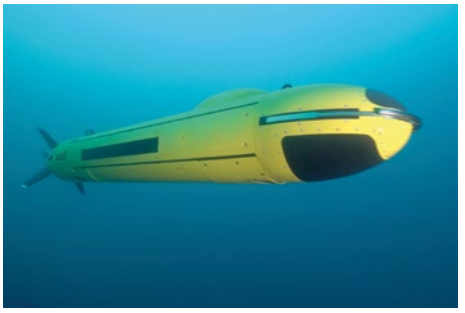
Depth	200m
Endurance	20h
Dimensions	2000mm-2500mm(l) × 230mm(d)
Weight (in Air)	70-100kg
Energy	2.1kWh or 4.2kWh
Payload	Various Sensors



Exalla

A9-M

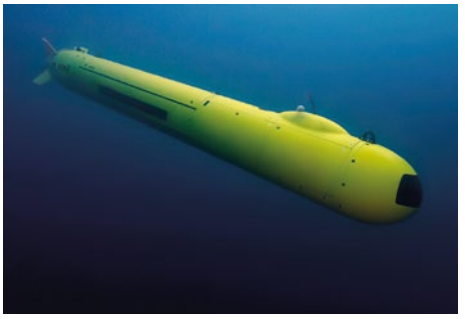
Depth	300m
Endurance	20h
Dimensions	data N/A
Weight (in Air)	data N/A
Energy	data N/A
Payload	Various Sensors



Exail

A18-M

Depth	300m
Endurance	24h
Dimensions	4500mm(l) × 465mm(d)
Weight (in Air)	442kg
Energy	10.9kWh
Payload	Various Sensors



Exail

A18-D

Depth	3000m
Endurance	24h
Dimensions	4500mm-5500mm(l) × 500mm(d)
Weight (in Air)	500-690kg
Energy	14.4kWh
Payload	Various Sensors

Graal Tech

X-300

Depth	300m
Endurance	14h
Dimensions	2222mm(l) × 155mm(d)
Weight (in Air)	29kg
Energy	1.2kWh
Payload	Various Options

Graal Tech

X-300 EXPLORER

Depth	300m
Endurance	12h
Dimensions	2100mm(l)
Weight (in Air)	25kg
Energy	1.2kWh
Payload	Various Options

Graal Tech

X-300 MCM

Depth	300m
Endurance	8-10h
Dimensions	1700mm(l) × 155mm(d)
Weight (in Air)	20kg
Energy	1.2kWh
Payload	MCM

Graal Tech

R-300

Depth	300m
Endurance	12h
Dimensions	2044mm(l)
Weight (in Air)	180kg
Energy	3.2kWh
Payload	60kg

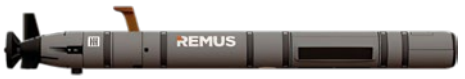
HII | hii.com

REMUS 100

Depth	100m
Endurance	10h
Dimensions	1850mm(l) × 190mm(d)
Weight (in Air)	38.6kg
Energy	1.5kWh
Payload	Various Options

REMUS 300

Depth	305m
Endurance	10h / 20h / 30h
Dimensions	2030mm(l) / 2390mm(l) / 2640mm(l) × 190mm(d)
Weight (in Air)	48.5kg / 58.5kg / 70.3kg
Energy	1.5kWh / 3kWh / 4.5kWh
Payload	Various Options



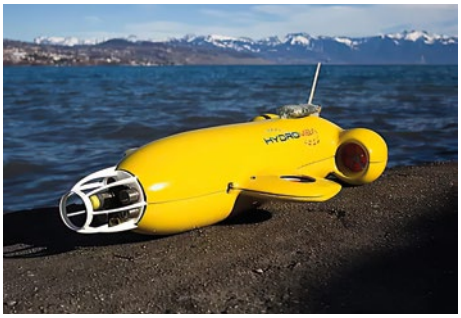
REMUS 620

Depth	600m
Endurance	42h / 80h / 110h
Dimensions	3100mm(l) / 3900mm(l) / 4800mm(l) × 324mm(d)
Weight (in Air)	210kg / 279kg / 347kg
Energy	9.6kWh / 19.3kWh / 28.9kWh
Payload	Various Options

REMUS 6000

Depth	6000m
Endurance	25h (3kt)
Dimensions	5200mm(l) × 800mm(d)
Weight (in Air)	1630kg
Energy	17.55kWh
Payload	Various Options

HYDROMEA | hydromea.com

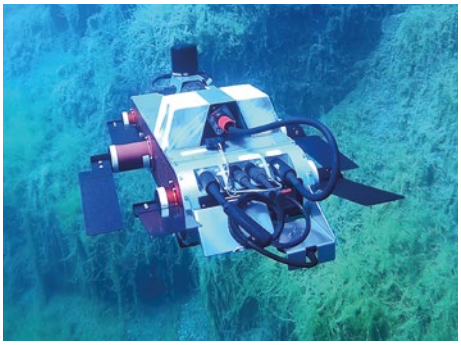


Hydromea

VERTEX

Depth	300m
Endurance	8h
Dimensions	700mm(l) × 190mm(d)
Weight (in Air)	6.7kg
Energy	160Wh
Payload	1L

INDEPENDENT ROBOTICS | independentrobotics.com



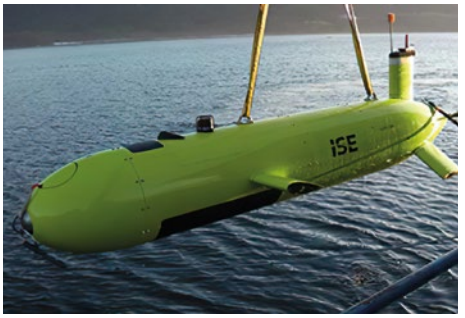
Independent Robotics

AQUA2

Depth	35m
Endurance	data N/A
Dimensions	640mm(l) × 440mm(w) × 130mm(h)
Weight (in Air)	16.5kg
Energy	data N/A
Payload	Various Options

INTERNATIONAL SUBMARINE ENGINEERING (ISE)

| ise.bc.ca



ISE

EXPLORER

Depth	3000m / 6000m
Endurance	24-85h
Dimensions	4500mm-7500mm(l) × 740mm(d)
Weight (in Air)	620-1700kg
Energy	18kWh-48kWh
Payload	Various Options

ISE

THESEUS

Depth	1000m
Endurance	60h (4kt)
Dimensions	10700mm(l) × 1270mm(d)
Weight (in Air)	8600kg
Energy	600kWh
Payload	550kg (dry) / 1910kg (wet)

IQUA ROBOTICS | iquarobotics.com

IQUA Robotics

GIRONA 500

Depth	500m
Endurance	6h @ 2kts
Dimensions	1500mm(l) × 1000mm(w) × 1000mm(h)
Weight (in Air)	140kg
Energy	2.9kWh
Payload	35L

IQUA Robotics

SPARUS II

Depth	200m
Endurance	8-10h @ 3kts
Dimensions	1600mm(l) × 460mm(w) × 230mm(h)
Weight (in Air)	52kg
Energy	1.9kWh
Payload	8L

JAIA ROBOTICS | jaia.tech

Jaia Robotics

JAIABOT

Depth	100m
Endurance	11km (7 mi)
Dimensions	960mm(l) × 70mm(d)
Weight (in Air)	3kg
Energy	data N/A
Payload	Various Options

KAWASAKI HEAVY INDUSTRIES | global.kawasaki.com

Kawasaki Heavy Industries

SPICE

Depth	3000m
Endurance	data N/A
Dimensions	5600mm(l) × 1400mm(w) × 1100mm(h)
Weight (in Air)	2500kg
Energy	data N/A
Payload	Various Options

KONGSBERG (EELUME) | eelume.com

Kongsberg (Eelume)

EELUME – EELY500

Depth	500m
Endurance	data N/A
Dimensions	2500mm(l) × 200mm/490mm(d)
Weight (in Air)	70kg
Energy	data N/A
Payload	Various Options

KONGSBERG | kongsberg.com

Kongsberg

HUGIN AUV

Depth	3,000 m or 4,500 m or 6,000 m
Endurance	24-72 h with all sensors operating
Dimensions	L= 5.2 m – 6.4 m × D=0.75 m
Weight (in Air)	1,000 kg - 1,550 kg
Energy	24 kWh power packs
Payload	HISAS & EM2040

Kongsberg

HUGIN EDGE AUV

Depth	1,000 m
Endurance	24 h @ 4 knots, 85% payload usage
Dimensions	L= 4 m × D=0.35 m
Weight (in Air)	300 kg
Energy	data N/A
Payload	Sidescan, Magnetometer

Kongsberg

HUGIN ENDURANCE AUV

Depth	6,000 m
Endurance	up to 15 days / mission ranges up to 2,200 km (1,200 nm)
Dimensions	L= 10 m × D=1.2 m
Weight (in Air)	–
Energy	–
Payload	HISAS & EM2040

Kongsberg

HUGIN SUPERIOR AUV

Depth	6,000 m
Endurance	72 h [52h] @ 3 [4] knots
Dimensions	L= 6.6 m × D=0.875 m
Weight (in Air)	2,200 kg
Energy	62.5 kWh
Payload	HISAS & EM2040

L3HARRIS TECHNOLOGIES | l3harris.com

L3Harris Technologies

IVER3

Depth	100m (200m Optional)
Endurance	8h-14h
Dimensions	1880mm-2160mm(l) × 148mm(d)
Weight (in Air)	26.8kg-38.6kg
Energy	800Wh
Payload	Various Options

L3Harris Technologies

IVER3 EP12 & EP16

Depth	100m (200m Optional)
Endurance	8h-14h
Dimensions	1880mm-2160mm+(l) × 148mm(d)
Weight (in Air)	26.8kg-38.6kg+
Energy	800Wh
Payload	Various Options

L3Harris Technologies

IVER4 580

Depth	300m
Endurance	6h (NiMH) / 18h (Li-Ion)
Dimensions	2000mm(l) × 150mm(d)
Weight (in Air)	104kg
Energy	780Wh
Payload	Various Options

L3Harris Technologies

IVER4 900

Depth	300m
Endurance	20h (NiMH) / 40h (Li-Ion)
Dimensions	2500mm(l) × 229mm(d)
Weight (in Air)	104kg
Energy	2kWh (NiMH) / 4kWh (Li-Ion)
Payload	Various Options

LOCKHEED MARTIN | lockheedmartin.com

Lockheed Martin

MARLIN

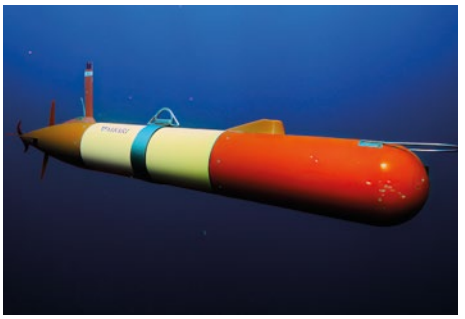
Depth	300m
Endurance	18h
Dimensions	3048mm(l)
Weight (in Air)	data N/A
Energy	data N/A
Payload	Various Options

MONTEREY BAY AQUARIUM RESEARCH INSTITUTE (MBARI) | mbari.org

Monterey Bay Aquarium Research Institute (MBARI)

DORADO

Depth	6000m
Endurance	19h
Dimensions	5300mm(l) × 530mm(d)
Weight (in Air)	690kg
Energy	10kWh +(n × 5kWh)
Payload	Various Options



Monterey Bay Aquarium Research Institute (MBARI)

LRAUV (TETHYS)

Depth	1500m
Endurance	740h
Dimensions	2000mm(l) × 300mm(d)
Weight (in Air)	110kg
Energy	data N/A
Payload	Various Options

NATIONAL OCEANOGRAPHIC CENTRE (NOC)

| noc.ac.uk

National Oceanographic Centre (NOC)

AUTOSUB

Depth	6000m
Endurance	data N/A
Dimensions	6000mm(l)
Weight (in Air)	2000kg
Energy	data N/A
Payload	Various Options

National Oceanographic Centre (NOC)

AUTOSUB LR (ALR6000)

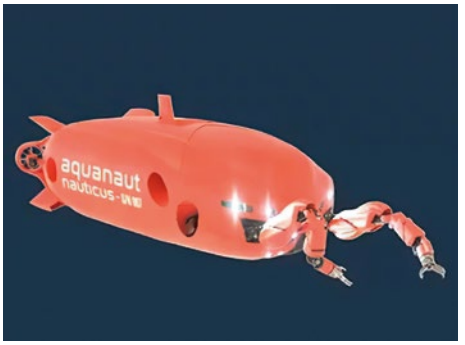
Depth	6000m
Endurance	740h (1700km)
Dimensions	3700mm(l) × 2080mm(w) × 1750mm(h) × 800mm(d)
Weight (in Air)	600kg (dry), 1200kg (flooded)
Energy	data N/A
Payload	Various Options

National Oceanographic Centre (NOC)

AUTOSUB LR (ALR1500)

Depth	1500m
Endurance	2220h (5500km)
Dimensions	3700mm(l) × 2080mm(w) × 1750mm(h) × 800mm(d)
Weight (in Air)	600kg (dry), 1200kg (flooded)
Energy	data N/A
Payload	Various Options

NAUTICUS ROBOTICS
| nauticusrobotics.com

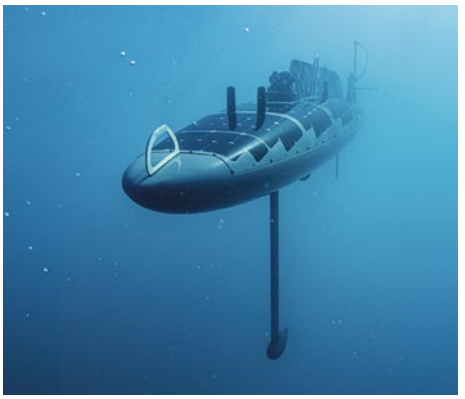


Nauticus Robotics

AQUANAUT

Depth	3000m
Endurance	30h-70h (250km)
Dimensions	4820mm(l) × 2030mm(w) × 1710mm(h)
Weight (in Air)	4200kg
Energy	101.1kWh
Payload	90kg

OCEAN AERO | oceanaero.com

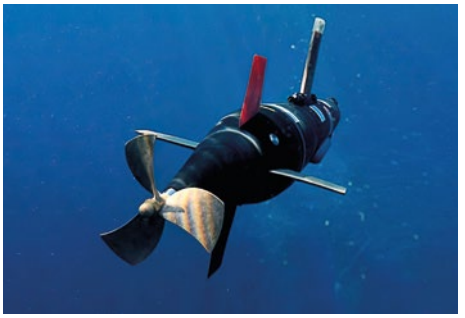


Ocean Aero

TRITON AUSV

Depth	100m
Power	14-30days (surface) and 8+ days (subsurface)
Dimensions	4400mm(l) × 800mm(w) × 3000mm(h)(top) + 1500mm(h) (keel bottom)
Weight (in Air)	350kg
Energy	4kWh (470W solar panel)
Payload	22.7kg (body) & 11.3kg (wing)

OCEANSCAN MST | oceanscan-mst.com



OceanScan MST

LAUV

Depth	100m
Endurance	8h (3kt)
Dimensions	1150mm-2300mm(l) × 150mm(d)
Weight (in Air)	15kg-35kg
Energy	data N/A
Payload	Various Options

QINETIQ | qinetiq.com

QinetiQ

SEASCOUT

Depth	200m
Endurance	30h (3kt) / 5h (8kt) / 0.5h (12kt)
Dimensions	686mm(l)
Weight (in Air)	7.26kg
Energy	1170Wh (Primary: LiFeS2) + 360Wh (Rechargeable: Li-Ion)
Payload	Various Options

RTSYS | rtsys.eu

RTSYS

COMET-300

Depth	300m
Endurance	20h (12h @ 4kts)
Dimensions	1900mm(l) × 150mm(d) × 332mm(h)
Weight (in Air)	32kg
Energy	data N/A
Payload	Camera & Various Sensors

RTSYS

NEMOSENS

Depth	300m
Endurance	>10h @ 2-6kts
Dimensions	895mm(l) × 124mm(d) × 183mm(h)
Weight (in Air)	8.5kg
Energy	data N/A
Payload	Camera, Lighting & Sensors

SAAB | saab.com

SAAB

SAAB SABERTOOTH

Depth	3000 msw
Endurance	80km at 2kts
Dimensions	4094mm × 1350mm × 670mm
Weight (in Air)	1400 kg
Energy	30 kWh
Payload	various survey sensors & tools

SEABER | seaber.fr

Seaber

YUCO

Depth	300m
Endurance	6h-10h
Dimensions	1000mm(l) × 120mm(d)
Weight (in Air)	8kg
Energy	data N/A
Payload	Various Options

Seaber

MARVEL

Depth	300m
Endurance	8h
Dimensions	data N/A
Weight (in Air)	data N/A
Energy	data N/A
Payload	Various Options

SAIPEM | saipem.com

Saipem

TORPEDO

Depth	300m
Endurance	12h (@ 2kt)
Dimensions	data N/A
Weight (in Air)	data N/A
Energy	data N/A
Payload	Various Options

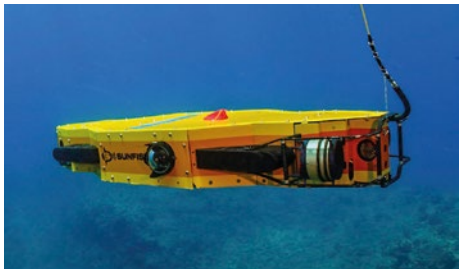
SUBSEA TECH | subsea-tech.com

Subsea Tech

TORPEDO

Depth	50m
Endurance	5000m
Dimensions	1424mm(l) × 310mm(w) × 310mm(h)
Weight (in Air)	30kg
Energy	data N/A
Payload	Various Options

SUNFISH | sunfishinc.com



Sunfish

SUNFISH AUV

Depth	200m (Optional 1000m)
Endurance	12hrs
Dimensions	1610mm(l) × 470mm(w) × 200mm(h)
Weight (in Air)	60kg
Payload	Various

TELEDYNE | teledynemarine.com

Teledyne

GAVIA

Depth	1000m (Optional 500m)
Endurance	7-8h @ 3kts (configuration dependent)
Dimensions	2200-4500mm(l) × 200mm(d)
Weight (in Air)	64-130kg
Payload	Field-changeable Modules, Various Sonars/Sensors

The GAVIA AUV is a proven, low logistics, modular survey platform capable of delivering high quality data while operating from vessels of opportunity or from the shore.
The Gavia's modularity makes it easily reconfigurable in the field depending on mission requirements. A single Gavia base system with navigation is capable of being configured for a variety of survey applications for commercial, scientific and military users with the addition of payload modules or additional battery modules for longer duration missions.

Additional Specifications

NAVIGATION
The Gavia AUV combines a high-accuracy survey-grade INS with 600 kHz Teledyne RD Instruments DVL aiding for navigation. Further positioning accuracy can be maintained over longer duration deployments by utilizing Teledyne Benthos or leading 3rd party Long / Ultra Short Baseline (USBL or LBL)

KEY FEATURES
- Greatest depth rating in its class – rated to 1000m
- Compact, optimized for overnight shipping
- Modular construction, maximum flexibility
- High-accuracy survey-grade INS navigation with USBL and LBL aiding (non-ITAR configurations available)
- Chart-based graphical user interface

BENEFITS
- 2-man portable/deployable
- Operations from vessels of opportunity
- Wide array of additional sensors available
- No installation or calibration of peripherals required
- Over the horizon communications through Iridium

CUSTOMIZABLE PAYLOAD
- Wide range of sensor options including
- Synthetic Aperture Sonar (SAS)
- Multibeam (RESON T20),
- SSS (including interferometric options)
- Camera,
- SBP
- Custom payloads
- **Autonomy software:** ATR, Caris Onboard and compatibility with leading 3rd party software packages

TELEDYNE | teledynemarine.com

Teledyne

OSPREY

Depth	2000m (Optional 1000m)
Endurance	24h @ 3.5kts (configuration dependant)
Dimensions	5000mm(l) × 324mm(d)
Weight (in Air)	400kg
Energy	7.1kWh per module (up to 3 battery modules can be used)
Payload	4,4 kWh Lithium Ion per module (up to 3 battery modules can be used)

The Osprey AUV builds upon the Gavia the world's first truly 4,4 kWh Lithium Ion per module (up to 3 battery modules can be used) and modular AUV. Added features include an efficient rim drive thruster, external data pod, increased capacity battery modules, science bay, obstacle avoidance and forward looking sonar nose, and customizable payloads.
The Osprey also has an optional Attitude, Depth, & Heading (ADH) module for operations in complex and high current environments based on the successful buoyancy engine of the Slocum Glider coupled with a fin controller. Combined with a Synthetic Aperture Sonar, the Osprey elevates itself over the competition for data quality and consistency.

MODULARITY
The Osprey is fully modular and inherits Gavia, field proven QuickLock Mechanism. A base vehicle consists of five module types: Propulsion, Control, Battery, Payload and Nose. Additional modues can easily be added to bring mission specific capabilites. Each module is portable and easily transportable via airfreight or other methods.

NAVIGATION
The Osprey AUV combines a high-accuracy survey-grade INS with Teledyne RD Instruments DVL aiding for underwater navigation. Multiple DVL options are available providing bottom lock up to 850 meters. Further positioning accuracy can be maintained over longer duration deployments by utilizing Ultra Short Baseline (USBL) or ranging to bottom-moored Long Baseline (LBL) transponders (optional).

AUTONOMY
Whether MOOS-IvP or ROS, we have you covered! Mission planning tools allow the Osprey AUV to hand over control to customize the job-to-be-done.

KEY FEATURES
- QuickLock Mechanism
- Modularity
- Navigation
- Autonomy
- Customizable Payload

BENEFITS
- Rapid vehicle assembly/disassembly, and service
- Modules are portable, discoverable when connected, and extendable
- Customizable to include multiple optional sensors

CUSTOMIZABLE PAYLOAD
The vehicle can be customized to include multiple optional sensors including,
- Synthetic Aperture Sonar (SAS)
- Multi-Beam Echo Sounder (MBES)
- Side scan sonar (SSS)
- Sub bottom profiler (SBP)
- High resolution camera, laser scanning, and strobes

TELEDYNE | teledynemarine.com

HIGH RESOLUTION SURVEY FOR DEEP SEA APPLICATIONS

The SEARAPTOR™ is a survey grade deep water autonomous underwater vehicle (AUV) designed to operate at abyssal depths. A wide range of sensors allow the SeaRaptor™ to complete several types of missions including: broad area search with side-scan sonar, Synthetic-Aperture Sonar (SAS), hydrographic survey with multibeam and sub bottom profiler, and high resolution inspection survey with camera and acoustic sonar. These surveys support a variety of applications, such as search and recovery, salvage, exploration, construction support, marine archaeology, and oceanography. Modularity – The vehicle offers several payload ports that provide serial communication, Ethernet, and power. These ports can be used for field swappable sensors. In addition, removable batteries and data storage enable rapid turn-around to maximize operating time.

Teledyne

SEARAPTOR

Depth	6000m (3000m optional)
Endurance	24h-9days @ 3-4kts (>1000km)
Dimensions	5500-8000mm(l)
Weight (in Air)	1600kg (configuration dependent)
Energy	13-92kWh (configuration dependent)
Payload	Various Sonars/Imaging, scientific and customised

KEY FEATURES

- Depth rated to 3000m & 6000m
- Modular payload ports
- Wide range of available sensor integrations
- Custom sensor integrations available
- Equipped with all necessary navigation sensors and support for acoustic aiding

BENEFITS

- SeaRaptor offers several payload ports that provide serial communication, Ethernet, and power, allowing for field swappable sensors
- Redundant emergency systems provide extra recovery options both below the water and on the surface
- Software is based on the proven software used for over a decade with the standard Gavia AUV

PAYLOAD SENSORS

The vehicle can be customized to include other sensors in addition to the standard payload listed:

- Teledyne Benthos Sub bottom profiler (SBP)
- Teledyne RESON Multi-Beam Echo Sounder (MBES)
- EdgeTech dual frequency side scan sonar (SSS)
- CathX high resolution camera, laser scanning, and strobes
- Teledyne Rd Instruments Conductivity Temperature Depth sensor (CTD)
- Teledyne BlueView forward looking sonar for advanced obstacke avoidance
- Kraken MinSAS system

EMERGENCY SYSTEMS

The vehicle is equipped with multiple safety systems, providing improved redundancy by including multiple devices both for recovery underwater and on the surface.

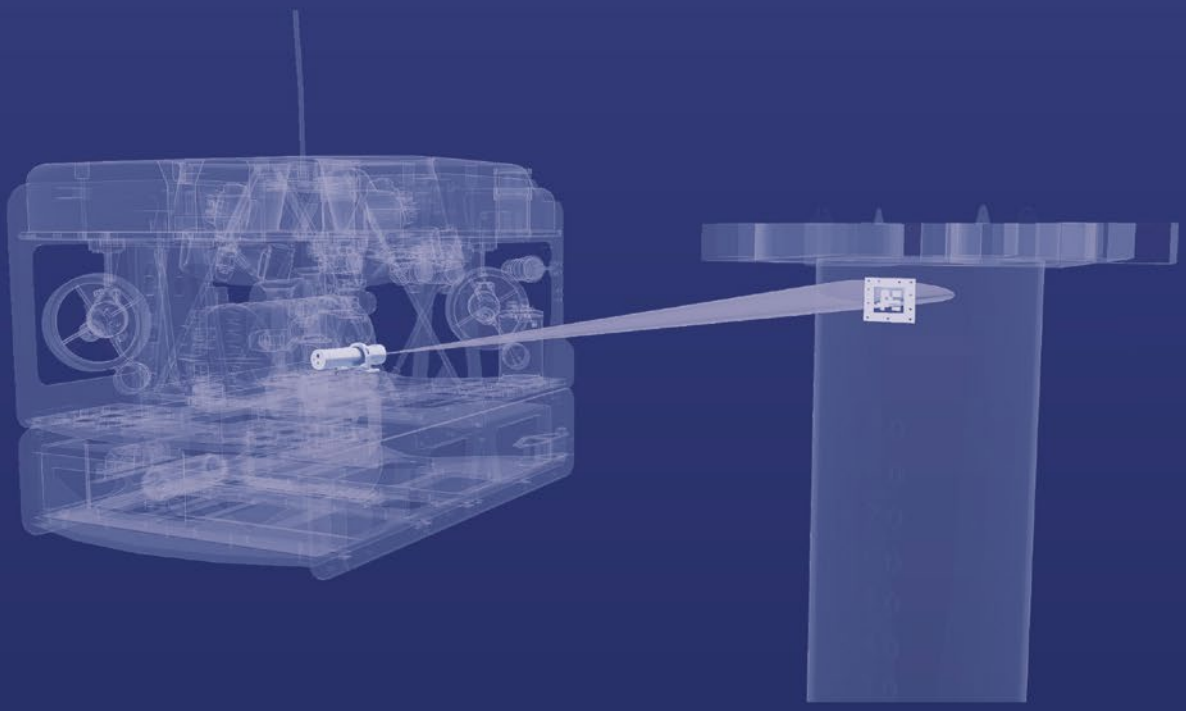
- Acoustic pinger
- Acoustic drop weight release
- Satellite locator beacon
- Radio Frequency (RF) beacon

NAVIGATION

The vehicle is equipped with all the necessary navigation sensors and support for acoustic aiding required for accurate deep water navigation.

- Inertial navigation system (0.1% DT accuracy)
- Doppler Velocity Log (DVL) and depth sensor
- Global Navigation Satellite System (GNSS)
- Positioning accuracy can be maintained over longer duration deployments by utilizing Ultra Short Baseline (USBL) or ranging to bottom-moored Long Baseline (LBL) transponders (optional)

Inclination Monitoring Has Never Been So Easy



Ready-to-use & Service Free Technology for Marine Construction

V-LOC calculates your assets real-time coordinates thanks to open-source tags which are affixed to them. Our technology is embedded inside a calibrated camera which exists in both air and subsea versions for highly accurate marine surveys.

FORSSEA ROBOTICS

GREENER, FASTER, SAFER

DRIX MULTI-MISSION UNCREWED SURFACE VESSEL

Faster and better data gathering

- Reduced carbon footprint
- Unrivaled platform stability and data gathering
- Remote-controlled and supervised autonomous operations
- From coastal to offshore environments

exail