# Seaeye Leopard

The High Power Compact Electric Work Class ROV

The Leopard is an exceptionally powerful electric work class vehicle with a minimal 20ft x 8ft LARS footprint. It is fitted with 11 thrusters to provide a forward thrust of over 500kgf, has a 240kg payload and is controlled by Saab Seaeye's intelligent control system.

A large open payload within the chassis allows flexible reconfiguration of the vehicle by installing combinations of specially designed tooling, survey and navigation sleds. A 1000kg through-frame lift and a wide range of tooling skids make the Leopard a versatile system capable of performing a range of work tasks in even the harshest of environments at depths of up to 3000m.
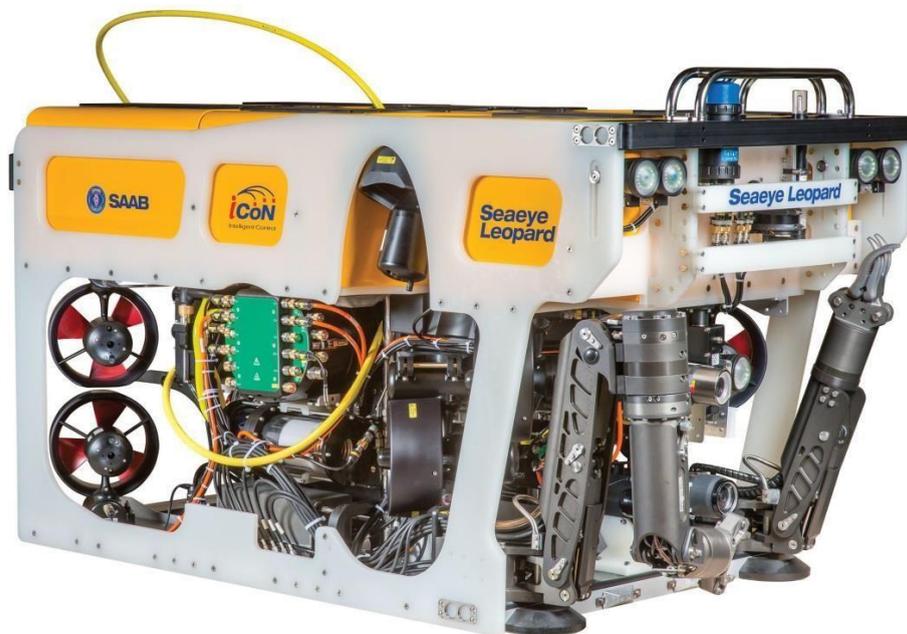
Advanced Control

Advanced vehicle autopilots for heading, depth, altitude, pitch and roll, and Station Keeping compliment Saab Seaeye's intelligent control system that allows the system to control, self- diagnose and log data from system devices.

Competitive

An electric vehicle with eleven powerful thrusters, a large payload and advanced control features give the Leopard a competitive edge over larger hydraulic vehicles.

Flexible

Designed for work at depths of 2000m or 3000 m and fitted with a wide range of survey sensors and heavy duty tooling options.

World leader in electric underwater robotics

System Overview

- The Leopard ROV is powered by a floor-standing high voltage, high frequency power supply unit. Additional power supplies are available for tooling and TMS options.

- The ROV can be fitted with Schilling Orion 7P + 4R Manipulators together with a compact Integrated Hydraulic Power Unit (IHPU) based circuit including a valve pack with seven bi-directional rate valves. Additionally, for typical intervention and work class tasks such as cutting, grinding, water jetting and dredging an auxiliary 3000VAC high power hydraulic work pack can be fitted.

- Surface control hardware includes touch screens running the graphical user interface (GUI) for vehicle power and control; system diagnostics including remote access for technical support; flight screen monitors that display data and video transmitted via Fibre Optic multiplexers and a CWDM, and a hand control unit for the ROV.

- Additional surface equipment options include TMS foot pedals for the optional TMS, tooling hand control units, video equipment and recording/eventing systems.

- Available as a free swimming ROV or in conjunction with a Type 8 Tether Management System (TMS) or a Top Hat TMS.

- ROV rated up to 3000m fitted with eight horizontal and three vertical SM9 thrusters supplied with 500 Volts DC, an electronics pod with fibre optic multiplexers and a CWDM, up to ten LED lights on four channels, cameras, a depth sensor, and a compass pod with integrated Magneto-resistive compass, accelerometers and gyros with pitch and roll outputs for vehicle auto heading, depth, pitch and roll. Auto altitude is available as an option when an altimeter is fitted. Station Keeping with nudge controls is available as an option when a compatible DVL and/or INS is fitted.

- Standard vehicle interfaces include connections for up to six composite cameras, fifteen auxiliaries including six Gb Ethernet channels on a dedicated 2.5G link, high power 24VDC and 48VDC interfaces supporting the latest advanced survey and imaging equipment, a copper signal core for CP reference, and trigger interfaces supporting Responder Transponders, PPS and timing of Acoustic devices. A spare fibre and CWDM fibre wavelengths provide options for survey multiplexer bottles and HD/UHD/4K video cameras.

- 110VAC equipment is supported through an optional subsea 350W output pure sine wave Inverter pod powered from a dedicated 24VDC interface on the ROV Epod, or a 2kW output Transformer pod powered from a surface 3kV 50/60Hz Tooling Supply.

- The surface video architecture is based on modern digital HD/UHD broadcast standards and includes a 20x20 SD/HD/UHD video switcher and 8x8 HDMI switcher (with control through the iCON touchscreen GUI) and a single channel HD Pilot Video Overlay.

- Video options include up to six Subsea Composite Video interfaces, two HD-SDI Video over Coax interfaces, surface decoders for IP Video cameras, HD/4K monitors and display splitters, and SD/HD/4K digital video recorders and overlays.

- An optional Onshore Piloting remote operator station enables robust over-the-horizon control and piloting of the ROV and TMS.

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SAAB

Technical Specifications

General

System Power Requirements	3-phase, 380-480 VAC 50/60Hz 216 kVA Typical 2k Full System including TMS, Cabin and LARS
Depth Rating	2000m and 3000m options
Dimensions (LxWxH)	2150 mm x 1160 mm x 1254 mm
Standard Launch Weight	Approximately 1200 kg
Payload (Base / Std)	2000m: 240 kg / 140 kg 3000m: 215 kg / 115 kg

Mechanical

Safe Working Load	2500 kg @ Sea State 6
Through Frame Lift	1000 kg @ Sea State 6 through 4x skid docking receptacles

Performance

*Subject to Umbilical Length

Forward Speed	> 3.6 knots
Lateral Speed	1.9 knots
Vertical Speed	1.8 knots
Thrust Forward	500 kgf
Thrust Lateral	230 kgf
Thrust Vertical	200 kgf

Standard Instruments

Pan and Tilt	24VDC, 35 Nm Torque
Lighting	6x 24VDC LED Lamps, Dimmable Daylight White 3520 Lumens
Depth Sensor	300 Bar, +/-0.01% FS accuracy
AHRS	Magneto-resistive Yaw, 1.0° Typical Pitch/Roll 0.2-0.4° static, 0.5-2.0° dyn
Altimeter (option)	500 kHz, 0.3–50m range, 1mm resolution

Hydraulic Tooling

DC IHPU Manipulator Hydraulic System Option: 210 Bar 6 L/min, Valve Pack with 7x Bi-directional Rate Control Valves

Auxiliary 15kW 3kV 60Hz Tooling Sled Option: 210 Bar 45 L/min

Options for other Valve Packs (General station, Torque Tool control etc.)

Video and Electrical Interfaces

Data Link	Single Mode Fibre with CWDM Spare Fibre at ROV JB for Survey/Video
Video Camera Interfaces	- 4x 24VDC SD Composite + Zoom/Focus + RS-232 - Fibre interface for HD/UHD/4K SDI - Multiple Gb Ethernet for IP Video - Option: 6x 24VDC SD Composite - Option: 2x 24VDC HD-SDI Coax
Sensor Interfaces	- 3x 24VDC Core Sensors (serial/GbE) - 7x 24VDC 5A + RS-232 (1x with Responder Trig) - 5x 24VDC 5A + 10/100/1000BASE-T + RS-232 (1x with PPS + Trig) - 1x 24VDC 20A + 48VDC 10A + 10/100/1000BASE-T + RS-232 + PPS + 2x Trig - 1x 24VDC 20A + RS-232 for optional 110VAC inverter pod - CP Interface - All power outputs have configurable soft fusing up to 6A with remote galvanic isolation + LIM monitoring - 19x RS-232/485 fully isolated data channels + 2x Trig - Dedicated 2.5G Ethernet link with VLAN option for client interfaces
Light Interfaces	5x 24VDC Interfaces supporting up to 10x Seaeye LED Lamps on 4x Channels
110VAC	- Optional 350W Inverter Pod - Optional 2kW Transformer Pod

Surface Equipment

Standard Surface Video	- Digital SD/HD/UHD/4K SDI based - 20x20 SD/HD/UHD Video Switcher + 8x8 HDMI Switcher through GUI - Single Channel HD Pilot Overlay - Options for additional 22"/32"/43" HD/UHD Monitors, Multiview, IP Video Decoding and Transcoding
Onshore Piloting (option)	Remote operator station option for onshore piloting

Power Supply Units

ROV PSU	39kVA Output, 3000VAC 3ph 800Hz
TMS PSU (option)	5kVA Output, 3000VAC 3ph 50/60Hz
Tooling PSU (option)	30kVA Output, 3000VAC 3ph 50/60Hz

*Performance reduces by approximately 5% per 1000m of main lift cable length, with available power shared across the vehicle axis.

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Options, Tools and Accessories

High resolution SD and HD coaxial cameras, colour and monochrome / low light, fixed and zoom / focus

Auxiliary 15kW 3kV 3ph 60Hz Hydraulic HPU Sled: 210 Bar @ 45 L/min for tooling, cleaning, jetting and dredging

HD and UHD/4K fibre cameras

Water Jetting and cavitation blasting for cleaning operations (requires 3ph hydraulic tooling supply)

HD IP Cameras and decoders

FlexiClean Cleaning Tool for cleaning of underwater structures (requires 3ph hydraulic tooling supply)

Altimeter for measuring the height of the vehicle above the sea floor. Auto Altitude option available

38mm Hydraulic Anvil Cutter for cutting wire rope and similar cables (requires hydraulic supply)

Scanning Sonar and surface equipment options

230mm Rotary Grinder for cutting, grinding and cleaning (requires 3ph hydraulic tooling supply)

Multi Beam Imaging Sonar and surface equipment options

Pipeline and cable survey skids for TSS 440 detection systems and camera boom arms - various camera and LED light options

DVL and inertial navigation systems including fibre optic gyros, sound velocity profilers and depth sensors

Side Scan Sonar and Sub-Bottom Profiler Survey skids

Dual Multi Beam Echo Sounder (MBES) options fitted to forward frame

SLAM, LIDAR and Photo-Mosaic Survey Systems, with surface 3D visualisation and post-processing options

Three-phase 3000VAC 5kVA and 30kVA power supply units for TMS equipped systems and Tooling

General purpose and tooling basket skids for deploying tools and equipment

Schilling Orion 7P and 4R manipulator arm options with hydraulic system including DC iHPU, valve pack, and pressure compensator

Fibre Optic Survey Multiplexer Systems

Laser options for video survey

Battery-operated Xenon emergency strobe used (MBES) fitted to forward frame to locate the ROV

Cathode Potential Probes (contact or proximity options), Ultrasonic Thickness and Flooded Member Detection systems

Acoustic tracking systems and beacons for calculating the position of the ROV

Other options are available on request.

Deployment Systems and Control Cabins

Tether Management System (TMS) Type 8 with a fibre optic tether for the deployment of the vehicle at working depth and also providing protection.

Top Hat Tether Management System with 350m capacity of 20mm tether, fitted with latch status and line out sensors. Options include depth and current sensors, and additional downward looking light and camera.

A-Frame Safe Area Launch and Recovery System (LARS) with 1100, 2200, or 3300 m winch capacities. A Zone II upgrade option is available. Optional folding platform for additional work space, and tugger winch for Garage TMS systems.

Safe Area 20ft split Control Cabin with a Pilot Control section and a separate high voltage PSU section. Fitted with electric power distribution panels, lighting, air conditioning, heating and 19 inch racks. A Zone II upgrade option is available.