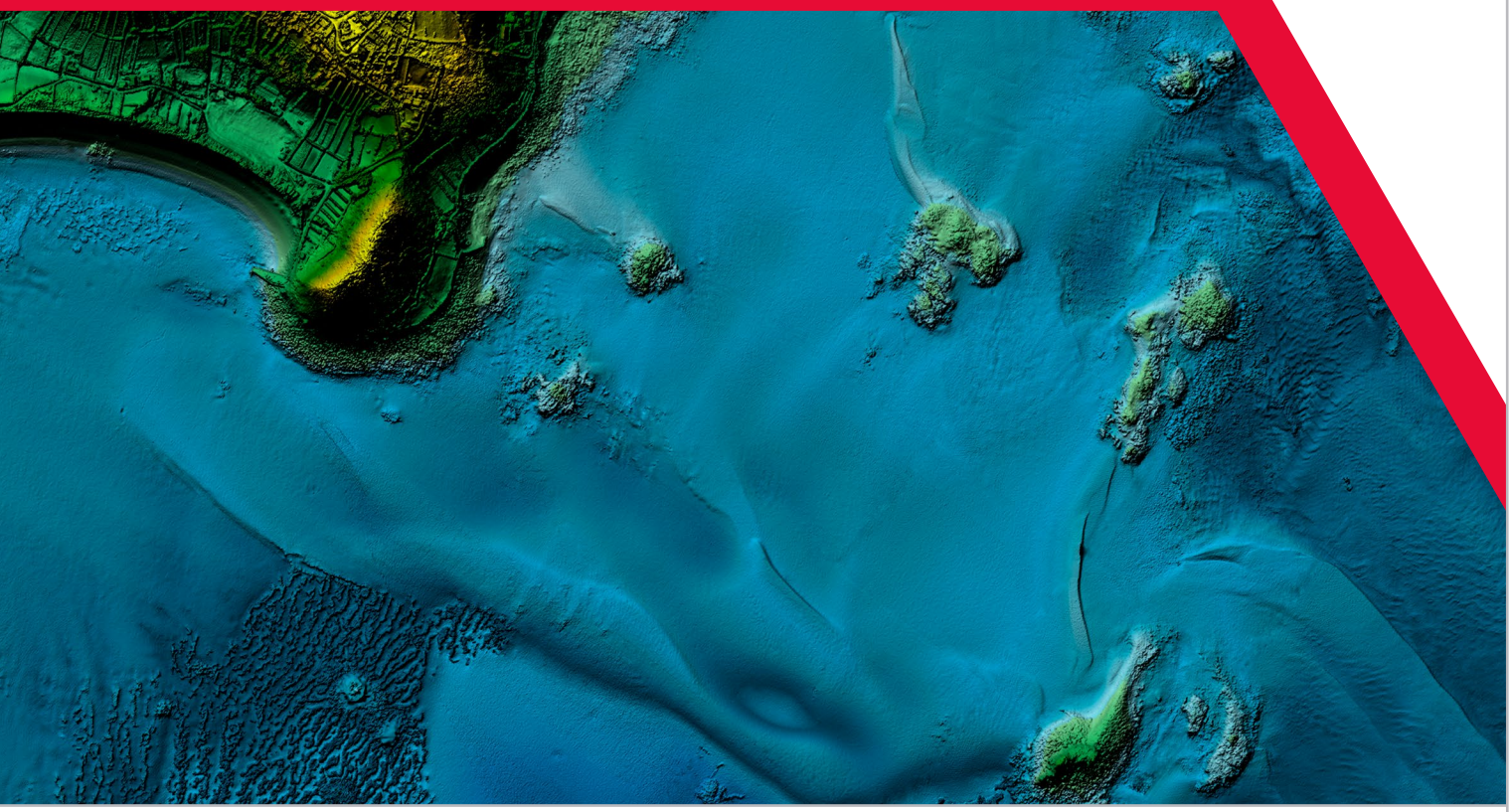
Leica GEOSYSTEMS



Leica CoastalMapper

Superior bathymetric efficiency

Increased efficiency for river & coastal mapping

The Leica CoastalMapper, a new-generation airborne bathymetric LiDAR system, features a groundbreaking sensor that boosts productivity by 250%. This enhancement significantly reduces flight costs, project time, and carbon footprint, allowing for more projects and increased revenue.

Disruptive performance & flexibility

The system captures one million bathymetric and two million topographic points per second, covering 190 km² per hour with RGB imaging at 5 cm GSD. The Leica helicopter pod enables surveys of complex, high-relief, mountainous coastlines and rivers.

Advanced seamless workflow

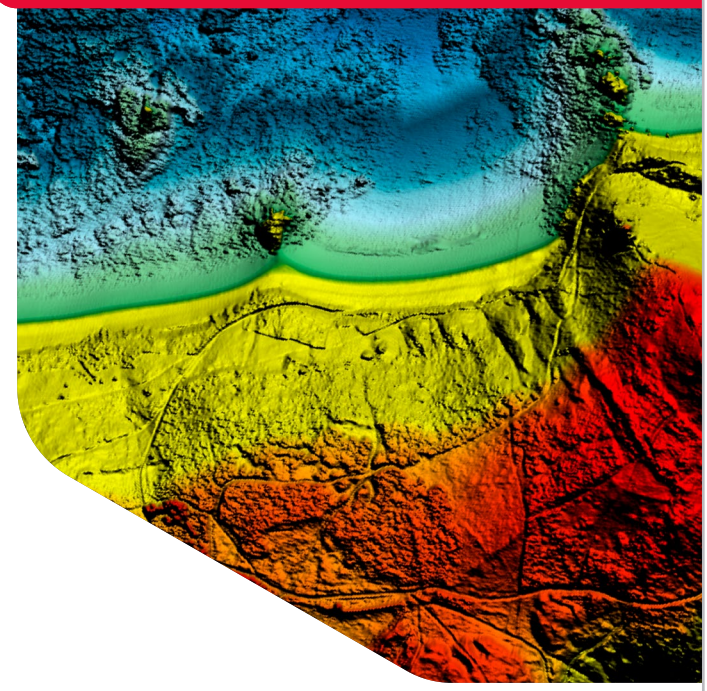
Leica Geosystems workflow processing suites provide full waveform analysis, automatic calibration, refraction correction and data classification to extract maximum detail. It includes comprehensive data QC tools for measurement, point density and statistical analysis.

HEXAGON

Leica CoastalMapper

Sensor head	
Consists of	1 x Theia bathymetric LiDAR unit 1 x Hyperion3 topographic LiDAR unit 1 x MFC250 RGB Camera, 45 mm lens 1 x MFC150 NIR Camera, 45 mm lens 1 x IMU class 5, 500 Hz
Dimensions (l/w/h)	Length: 660 mm Width: 590 mm Height: 640 mm Diameter in mount: 410 mm Depth under assembling surface: 392 mm
Weight	80 kg
Typical data resolution [1, 2]	Bathymetric data: 4 – 10 points / m^2 Topographic data: 10 – 20 points / m^2 RGB image: 4 – 5.5 cm GSD Typical swath width bathymetry: up to 800 m
Bathymetric LiDAR	
Laser wavelength [8]	515 nm / 1,030 nm (synchronised and co-aligned pulses)
Laser divergence	2.3 mrad (1/e^2)
Bathymetric capture [2]	500 – 1,000 kHz
Depth penetration [1, 3, 7]	$K_d * D_{max} = 3.5$
Return Type	Bathymetric full waveform capture (programable number of returns per pulse)
Operating altitude	600 – 900 m AGL, nominal for bathymetric collection (other altitudes are feasible)
FOV	50° (fixed)
Scan pattern	Circular
Scan speed	Up to 84 Hz (168 scans / s)
Elevation accuracy [3, 5, 6, 7]	IHO special order
Horizontal accuracy [3, 5, 6, 7]	IHO special order
Real-time processing / visualisation	Integrated
Laser classification [8]	Class 4
Water refraction correction	Automatic integrated in workflow
Topographic LiDAR	
Laser wavelength [8]	1,064 nm
Laser divergence	0.17 mrad (1/e^2)
Topographic capture	Up to 2,000 kHz (altitude dependent)
Operating altitude [9]	300 m – 6,000 m AGL
FOV	10° – 60° programmable
Scanner pattern	Circular 10° – 60° FOV Elliptical 10° x 60° FOV Skew Ellipse 10° x 60° FOV
Scanner speed	33 – 166 Hz, programmable 66 – 333 scans per second
Return type	• Programmable up to 15 returns per pulse at all pulse rates, including intensity (14 bit digitisation) • Gateless Multiple Pulses in the Air (MPIA) • Waveform recording for each return • Waveform attributes for each return
Minimum vertical separation	0.5 m
Vertical accuracy [10, 11, 12]	< 5 cm (1 σ)
Horizontal accuracy [10, 11, 12]	< 13 cm (1 σ)
Laser classification [8]	Class 4

Imaging specification (RGB + NIR) Technology	
Resolution	RGB: 19,200 x 12,800 pixel (250 MP) NIR: 14,192 x 10,640 pixel (150 MP)
RGB / NIR ratio	1:1.4
FOV	60°
Sensor type	BSI CMOS
Dynamic range	81 dB
A/D conversion	14 bit
Motion compensation	Mechanical forward-motion-compensation (FMC)
Min frame rate	0.7 s
Spectral bands	R (580 – 660 nm) G (480 – 590 nm) B (420 – 510 nm) NIR (720 – 850 nm, monochrome)
Shutter type	Mechanical central shutter, designed for up to 500,000 cycles, field exchangeable
Real-time processing	• Data compression • Georeferenced thumbnails in flight visualisation and post-flight quality control
Integrated GNSS/IMU system	
IMU	SPAN CNUS5-H, Class 5, 500 Hz, FOG no export license required US ECCN 7A994
GNSS	NovAtel SPAN OEM7, 555 channel multi constellation receiver with 10 Hz GNSS data rate
GNSS receiver	Antenna DC supply from the system: 5.0 V maximum 200 mA Combined gain (antenna gain and all losses in the signal path): 20 ... 40 dB
Additional feature	Real-time deeply coupled solution for position and attitude at the highest accuracies, fully integrated and embedded solution
Position RMS DGNSS	Post-processed (specification): X,Y ≤ 3-5 cm, Z ≤ 5-7 cm Post processed (typical): X,Y ≤ 2-3 cm, Z ≤ 3-5 cm
Attitude RMS	Post-processed (specification): R,P ≤ 0.005°, H ≤ 0.008° Post-processed (experienced): R,P ≤ 0.003°, H ≤ 0.004°
Laser cooler	
Liquid bathymetric laser cooler	Integrated in sensor head
Sensor control unit	
Dimensions (L/W/H)	640 / 310 / 620 mm
Weight	40 kg
Peripherals	
Mass memory [13]	Leica MM60 solid state drive, 15,360 GB, 0.4 kg removable and portable Six MM60 required, recording time about 5 hours
Operator console	Dual Leica OC61 12.1“ screen 3.9 kg
Pilot display	Leica PD61 6.3“ screen 1.0 kg
Display stand	IS40 stand for dual Leica OC61 operator consoles 3.2 kg
Sensor mount	Leica PAV200 gyro-stabilised sensor mount for high-performance data acquisition, 36.0 kg compensation range: roll -7° to 7°, pitch -8° to 6°, drift -30° to 30°
Environmental	
Pressure	Non-pressurised cabin up to ICAO 25,000 ft
Humidity	0% to 95% RH according to ISO 7137 (non-condensing)
Operating temperature	0°C to 35°C
Storage temperature	-20°C to 50°C



Electrical	
Max continuous current	80 A (78 A worst case 25 V and 35°C)
Maximum voltage ripple [Vpp]	4.0 (1 kHz to 15 kHz)
Reverse polarity protection	On power input from aircraft
Overvoltage protection	On power input from aircraft power up to 70 VDC
Max continuous power consumption of complete system	2,000 W / 28 +- 3 V
Max peak power consumption	2,240 W (<60 s) / 28 +- 3 V
Fuse on aircraft power recommended	2 x 40 A (Single supply 1 x 80 A)
System weight	
Total system installation	180 kg
Software	
Mission planning	Leica MissionPro
Flight navigation and sensor operation	Leica FlightPro
Flight bathymetry operation	Leica TOC
GNSS / IMU processing	Novatel Inertial Explorer
Topographic point cloud / image processing	Leica HxMap
Bathymetric full waveform processing	Leica HxMap / Leica LiDAR Survey Studio
Standards	
RTCA DO-160G, EUROCAE-14G, USA FCC Part 15, ISO 7137, EN/IEC 60825-1:2014, IHO S-44 Ed 6.0	
Export control	
Subject to European export regulations EU 2021/821, classifications - 6A008.j.3 (Hardware) - 6D002 (Software)	

[1] Assumed typical bathymetric flight cases 600 m to 900 m AGL flight altitude, 65 m/s flight speed.

[2] Using Leica Geosystems' proprietary 4X technology.

[3] Preliminary at 600 m AGL, system settings optimised for depth penetration. K_d is the water down-dwelling diffuse attenuation coefficient. Formula valid for $0.1 < K_d < 0.4$, even though data can be captured in significant more turbid water up to approximately $K_d = 1.0$.

[4] In Leica Geosystems test lab environment towards flat target.

[5] Stated vertical and horizontal accuracies after calibration and registration using Leica Geosystems workflow and with an assumed GNSS position error of 4 cm. Post-processed data with GPS reference station within 30 km and under good satellite coverage conditions. Wind speed < 5 m/s. Sea-state 3.

[6] Referenced to IHO S-44 Ed 6.0 specification. Transformation errors between ellipsoid and chart datum (not measured by the system) assumed neglectable.

[7] Sea-bed and sea-bed object diffuse reflection assumed = 15%

[8] Visible and Invisible laser radiation, avoid eye or skin exposure to direct or scattered radiation. Class 4 laser product in accordance with EN/IEC 60825-1:2014. For US market: Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed3 as described in Laser Notice no 56, dated 8th of May, 2019.

[9] Maximum operating altitude is specified for 90% detection at 20% reflectivity (e.g., old dry asphalt), target larger than laser footprint, 100% laser output at 60 degrees FOV.

[10] Accuracy stated is acquired @1,000 m AGL, max. FOV and, 150 knots aircraft speed.

[11] The standard deviation σ represents the 68% confidence interval. Typically, the RMSE value represents 1 σ.

[12] Stated vertical and horisontal accuracies after calibration and registration using Leica HxMap workflow and with an assumed GNSS position error of 4 cm.

[13] Data collection is based on typical image and LiDAR recording modes.

[14] General note on usage of port glass: Leica Geosystems does not guarantee Leica CoastalMapper operation/performance with a port glass installed under the sensor. For operation with port glass a special investigation is needed, where special requirements of port glass coating are defined, the geometry between sensor and port glass is evaluated and restrictions of use cases for sensor are defined, in order to minimise interference between the sensor and port glass.

Leica
GEOSYSTEMS

With more than 200 years of history, Leica Geosystems, part of Hexagon, is the trusted supplier of premium sensors, software, and services. Delivering value every day to professionals in surveying, construction, infrastructure, mining, mapping, and other geospatial content-dependent industries, Leica Geosystems leads the industry with innovative solutions to empower our autonomous future.

Learn more at leica-geosystems.com

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 24,800 employees in 50 countries and net sales of approximately 5.4bn EUR.

Learn more at hexagon.com

Illustrations, descriptions and technical data are not binding.
1021137 en – 02.26

© 2026 Hexagon AB and/or its subsidiaries and affiliates.
Leica Geosystems is part of Hexagon. All rights reserved.

HEXAGON