

Leica TerrainMapper-2

Flexibility & Scalability



Pure Performance

Maximise data collection rates and reduce flying costs with a 2 MHz pulse rate waveform-based LiDAR and all-new 150 MP RGB and NIR cameras. Get all these advancements in a more compact sensor with integral data logging and enough data storage capacity to attack local and large regional jobs.



Outstanding Imagery

Capture natural colour (RGB) and colour-infrared (CIR) images during the same flight on the same storage media. The images provide twice the resolution of the previous generation imaging systems. Fly more hours per day thanks to exclusive mechanical forward-motion-compensation (FMC).



More Modularity

Growing your business? Expand your sensor capabilities by seamlessly adding four oblique cameras and upgrade your system to a CityMapper-2 configuration for urban mapping applications. Keep planning your flights and processing your data on the same workflows with no need to change your processing routines.

Leica TerrainMapper-2 product specifications

LEICA TERRAINMAPPER-2 POD

Consists of	
Nadir RGB camera	1 x Leica MFC150
Nadir NIR camera	1 x Leica MFC150-NIR, monochrome
LiDAR Unit	1 x Leica Hyperion2+
GNSS/IMU	Integrated NovAtel SPAN
Sensor controller/data logger	Integrated
Height / diameter	747 mm / 408 mm
Weight	48 kg
Min. system frame interval	0.6 sec
Designed for installation in Leica PAV100-HPH	

LEICA HYPERION2+ LIDAR UNIT ⁶

Laser wavelength	1,064 nm
Laser divergence	0.23 mrad (1/e ²) nominal
Pulse repetition frequency	Up to 2 MHz (height dependent)
Return pulses	<ul style="list-style-type: none"> • Programmable up to 15 returns, including intensity • Full waveform recording option at down-sampled rates • Real-time waveform analysis and pulse extraction • Multiple-Pulses-in-the-Air (MPIA): Up to 35 MPIA zones simultaneously • Ambiguity resolution for targets in multiple simultaneous MPIA zones • Gateless MPIA
Intensity digitisation	14 bits
Operation altitude¹	300 - 5,500 m AGL
Scanner pattern	Oblique scanning with options for constant point density or constant pulse rate
Scan speed	Programmable, 60-150 Hz (120-300 scans per second)
Field of view	20 - 40°
Min. vertical separation	0.5 m
Vertical accuracy^{2,3,4}	< 5 cm 1 σ
Horizontal accuracy^{2,3,4}	< 13 cm 1 σ

LEICA MFC150 / LEICA MFC150-NIR CAMERA HEAD

Sensor size (150MP)	14,192 x 10,640 pixels
Pixel size & type	3.76 μ m, BSI CMOS
Dynamic range	83 dB
Resolution A/D converter	14-bit
Data channel	14-bit proprietary compression
Motion compensation	Mechanical FMC
Spectral bands	
Leica MFC150 (Bayer pattern)	R (580 - 660 nm) G (480 - 590 nm) B (420 - 510 nm)
Leica MFC150-NIR	NIR (720 - 850 nm) (Monochrome)
Shutter	Max. speed 1/1000 sec Mechanical central shutter with up to 500,000 cycles Field exchangeable
Aperture	Automatically controlled aperture 7 half f-stop steps
Lens mount	Exchangeable lenses, positive mechanical connection

LENSES

RGB	Leica D69.70/4.0 with 71 mm focal length 41.2° FOV across track, 31.5° FOV along track
NIR	Leica D69.70/4.0-NIR with 71 mm focal length 41.2° FOV across track, 31.5° FOV along track
Flying height	944 m AGL @ 5 cm GSD

¹ Maximum operating altitude is specified for 90% detection at $\geq 10\%$ reflectivity (e.g., dry asphalt) and 100% laser output.

² Accuracy and point density stated is acquired @1,000 m AGL, 60 m/s aircraft speed.

³ The 1 σ value represents the 68% confidence interval. Typically, the RMSE value is equal to 1 standard deviation.

⁴ Stated vertical and horizontal accuracies after calibration and registration using Leica HxMap workflow and with an assumed GNSS position error of 4 cm

⁵ Data collection is based on typical project data rate.

⁶ 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.

INTEGRATED SENSOR CONTROL MODULE & DATA LOGGER

Sensor Controller	Controls all Camera Heads, LiDAR Unit and gyro-stabilised sensor mount; includes deeply coupled GNSS/IMU solution
Processor	64-bit WIN10, 16 GB RAM, 64 GB SSD, USB 3.0, SATA 3
Mass memory	Leica MM30 solid-state drive 7,680 GB each TerrainMapper-2 holds 2 MM30s
Mass memory weight	0.4 kg each, 2 required, removable and portable
Mass memory capacity⁵	Joint volume 15.36 TB, ≥ 15 h of data collection

INTEGRATED GNSS/IMU SYSTEM

IMU	SPAN CNU55-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
Additional features	Real-time deeply coupled solution for position and attitude at highest accuracies, fully integrated and embedded solution, no interfaces to 3 rd party needed
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 $\leq 0.005^\circ$, H $\leq 0.008^\circ$ Post-processed (experienced): R,P $\leq 0.003^\circ$, H $\leq 0.004^\circ$

PERIPHERALS

Sensor mount	Leica PAV100-HPH gyro-stabilised sensor mount for high-performance data acquisition, 42.4 kg
Operator console	Leica OC60 12.1" screen with 1024 x 768 resolution 3.9 kg
Pilot display	Leica PD60 6.3" screen with 1024 x 768 resolution, designed for cockpit mounting, 1.0 kg
Display stand	IS40-LW stand for Leica OC60 Operator Display, 3.2 kg

ENVIRONMENTAL

Pressure	Non-pressurised cabin up to ICAO 15,000 ft
Humidity	0% to 95% RH according to ISO7137 (non-condensing)
Operating temperature	-10°C to 35°C (-10°C after warm-up period)
Storage temperature	-40°C to 70°C

ELECTRICAL

Max. avg. power consumption of complete system	740 W / 28 VDC
Max. peak power consumption of complete system	940 W (< 60s) / 28 VDC
Fuse on aircraft power outlet	1 x 50 A recommended

SYSTEM WEIGHT

System installation	< 105 kg
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SOFTWARE

Mission planning	Leica MissionPro
Flight navigation & sensor operation	Leica FlightPro
GNSS/INS trajectory processing	NovAtel Inertial Explorer
Point cloud/image processing	Leica HxMap

STANDARDS

RTCA DO-160G, EUROCAE-14G, USA FCC Part 15, ISO7137, EN/IEC 60825-1:2014
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913617en – 10.20

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