

# Leica TerrainMapper

## Highest accuracy for regional mapping projects



### Leading performance

With 2 MHz pulse repetition frequency and sensitive collection optics, Leica TerrainMapper increases data collection rate versus flying height, allowing you to fly larger swaths for any given point density. Achieve more efficient flight planning and even point distribution for flying heights from 300 - 5,500 m AGL with up to 35 pulses in the air and with no range gate limitations.



### Fastest data delivery

As part of the Leica RealTerrain solution, TerrainMapper uses Leica HxMap to process raw data. The high-performance, multisensor workflow features the industry's fastest data throughput and allows processing of LiDAR and imaging data using an intuitive user interface with all the tools you need for calibration, colourisation, quality assurance, project reporting and product generation.



### New level of accuracy

TerrainMapper reflects the continued evolution of the Leica ALS sensor series, the most trusted linear mode LiDAR in the world. The new system delivers USGS LiDAR quality Level 0 data at flying heights up to 2 km, higher than ever before. Delivering 5 cm accuracy at greater flying heights allows high collection efficiencies, even in complex and changing terrain.

# Leica TerrainMapper product specifications

## POD

Hosts the TerrainMapper LiDAR and optional nadir camera	
<b>IMU</b>	SPAN CNU55-H, no export license required US ECCN 7A994
<b>Height / diameter</b>	747 mm / 408 mm
<b>Weight</b>	37 - 41 kg complete (depending on configuration)
Designed for installation in Leica PAV100 and optional Leica PodLifter	

## LIDAR UNIT

<b>Laser wavelength</b>	1,064 nm
<b>Laser divergence</b>	0.25 mrad (1/e <sup>2</sup> )
<b>Pulse repetition frequency</b>	Up to 2,000 kHz
<b>Return pulses</b>	Programmable up to 15 returns, including intensity, pulse width, area under curve and skewness waveform attributes Full waveform recording option at down-sampled rates Real time waveform analysis and pulse extraction Multiple Pulses in the Air (MPIA): Up to 35 pulses simultaneously Ambiguity resolution over multiple MPIA zones
<b>Intensity digitisation</b>	14 bits
<b>Operation altitude <sup>1</sup></b>	300 - 5,500 m AGL
<b>Scanner pattern</b>	Oblique scan with even point distribution Other options available
<b>Scan speed</b>	Programmable up to 150 Hz (9,000 RPM), 300 scan lines per second
<b>Field of view</b>	20 - 40°
<b>Swath width</b>	Up to 70% of flight altitude
<b>Ranging accuracy <sup>2, 3, 4</sup></b>	< 1 cm RMS
<b>Vertical accuracy <sup>2, 3, 5</sup></b>	< 5 cm 1 $\sigma$
<b>Horizontal accuracy <sup>2, 3, 5</sup></b>	< 13 cm 1 $\sigma$
<b>Dimensions L x W x H</b>	252 x 190 x 485 mm
<b>Weight</b>	13.5 kg

## CAMERA HEAD LEICA RCD30 CH82 (OPTIONAL)

<b>CCD size (80MP)</b>	10,320 x 7,752 pixels
<b>Pixel size (80MP)</b>	5.2 $\mu$ m
<b>Dynamic range of CCD</b>	73 dB
<b>Resolution A/D converter</b>	14-bit
<b>Data channel</b>	16-bit lossless compressed
<b>Maximum frame rate</b>	1.25 sec
<b>Motion compensation</b>	Mechanical, bi-directional
<b>Spectral range</b>	RGB and NIR (780-880 nm), co-registered
<b>Viewing angle</b>	Nadir
<b>Weight (w/o lens)</b>	3.1 kg
<b>Height / diameter</b>	168 mm / 128 mm
<b>Optics</b>	Leica NAT-D-80 mm 35.9° FOV across track, 27.4° FOV along track Leica NAG-D 50 mm 53.8° FOV across track, 41.8° FOV along track
<b>Optics weight / height</b>	0.5 kg / 46 mm
<b>Shutter</b>	Central shutter, 1/50 - 1/1000 sec, user replaceable (>200,000 frames)
<b>Aperture</b>	Automatically controlled aperture 80 mm lens 50 mm lens
<b>Lens mount</b>	Precise bayonet connection, automated electrical connection, stabilised connection mechanics

## CAMERA & LIDAR CONTROLLER CC43

<b>CC43</b>	Controls all camera heads and LiDAR unit, includes deeply coupled GNSS/IMU solution	
<b>Weight (without MM30)</b>	6.1 kg	
<b>Dimensions L x W x H</b>	300 x 260 x 140 mm	
<b>Processor</b>	64bit Win10, 16GB RAM, 64GB SSD, USB 2.0, SATA	
<b>Mass memory</b>	Leica MM30 solid state drive 2,400 GB CC43 holds up to 2 MM30s	
<b>Mass memory weight</b>	0.5 kg each, 2 required, removable and portable	
<b>Mass memory capacity</b>	Joint volume 4.8 TB, >5 h of typical data collection	

## PERIPHERALS

<b>Sensor mount</b>	Leica PAV100 gyro-stabilised mount for high-performance data acquisition, 38 kg 673 x 532 x 168 mm
<b>Pod lifter (optional)</b>	Leica PodLifter to lift up the entire Leica TerrainMapper pod for takeoff and landing, 20 kg
<b>Operator display</b>	Leica OC60 12.1" screen with 1024 x 768 resolution, designed for installation with Interface Stand IS40, 5.0 kg
<b>Pilot display</b>	Leica PD60 6.3" screen with 1024 x 768 resolution, designed for cockpit mounting, 1.0 kg
<b>IS40 stand</b>	Pedestal for OC60, 5.5 kg

## ENVIRONMENTAL

<b>Pressure</b>	Non-pressurised cabin up to ICAO 15,000 ft
<b>Humidity</b>	0% to 95% RH according ISO7137 (non-condensing)
<b>Operating temperature</b>	-10 °C to 40 °C
<b>Storage temperature</b>	-40 °C to 70 °C

## ELECTRICAL

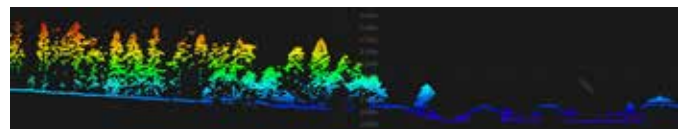
<b>Max. power consumption of complete system</b>	700 W / 28 VDC
<b>Max. peak power consumption of complete system</b>	1,000 W (<60s) / 28 VDC
<b>Fuse on aircraft power outlet</b>	1 x 50A

## SOFTWARE

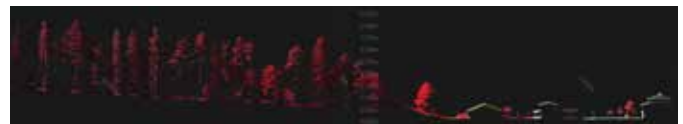
<b>Mission planning</b>	Leica MissionPro
<b>Flight navigation &amp; sensor operation</b>	Leica FlightPro
<b>Trajectory processing</b>	Inertial Explorer
<b>Point cloud/image processing</b>	Leica HxMap

## STANDARDS

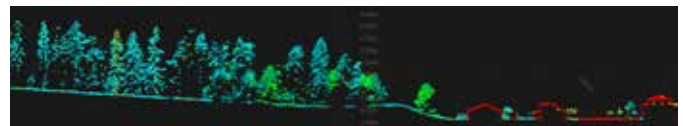
RTCA DO-160G, EUROCAE-14G, USA FCC Part 15



Elevation point cloud



CRI point cloud



NDVI point cloud

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

<sup>2</sup> Accuracy and point density stated in the table is acquired @1,000 m AGL, 60 m/s aircraft speed

<sup>3</sup> The 1 $\sigma$  value represents the 68% confidence interval. Typically, the RMSE value is equal to 1 standard deviation

<sup>4</sup> Ranging accuracy here refers to the measurement accuracy of LiDAR in lab environment, not including GNSS/IMU error

<sup>5</sup> Vertical and horizontal accuracy estimation here are made based on the integrated SPAN system and a GPS error of 4 cm

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.

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- when it has to be right

