

# Leica Chiroptera 4X

## Introducing high-resolution for shallow water survey



### Major productivity gain

With the 4X bathymetric product line, Leica Geosystems introduces an innovative high-resolution technology, increasing the point density by factor four compared to previous versions. The Leica Chiroptera 4X offers unrivalled bathymetric point density and depth penetration at the same accuracy, same turbid water performance and with increased sensitivity, offering a productivity gain of >50%.



### Efficient coastal survey

Superior topographic nearshore bathymetric data acquisition coupled with the imagery of the Leica RCD30 camera make Leica Chiroptera 4X the world's leading coastal and inland water surveying sensor and a smart investment to enter the hydrography market. Leica Chiroptera 4X manages a wide range of land or sea projects, keeping asset utilisation and ROI high.



### Highly accurate results

Capture data efficiently in areas slow and hazardous to map using multibeam sonar. Efficient and cost-effective nearshore data collection in difficult or turbid waters is possible using the Leica Chiroptera 4X. Capture data at depths of down to 30 metres with a 300 m wide swath in minutes. Its superior penetration and high accuracy make this system a fast and reliable performer.

[leica-geosystems.com](http://leica-geosystems.com)



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# Leica Chiroptera 4X product specifications

## LASER CHARACTERISATION

|                                              |                                                                         |
|----------------------------------------------|-------------------------------------------------------------------------|
| <b>Bathymetric capability</b>                | 140,000 points/second green, digital full waveform capture              |
| <b>Topographic capability</b>                | Up to 500,000 points/second infrared                                    |
| <b>Operation altitude</b>                    | Bathymetry 400 – 600 m AGL<br>Topography up to 1,600 m AGL              |
| <b>Depth range <sup>1</sup></b>              | $D_{max} = 2.7/k$                                                       |
| <b>Scanner pattern</b>                       | Oblique scanner                                                         |
| <b>Field of view</b>                         | ±14° front/back, ±20° left/right                                        |
| <b>Swath width</b>                           | 70 % of AGL                                                             |
| <b>Point density <sup>2</sup></b>            | Bathymetry: >5 pts/m <sup>2</sup><br>Topography: >10 pts/m <sup>2</sup> |
| <b>Bathymetric accuracy <sup>2,3</sup></b>   | Elevation accuracy: 0.15 m (2σ)                                         |
| <b>Topographic accuracy <sup>2,3,4</sup></b> | Elevation accuracy: 5 cm (1σ)<br>Horizontal accuracy: 15 cm (1σ)        |

## OPTICAL CHARACTERISATION

|                                                    |                                                              |
|----------------------------------------------------|--------------------------------------------------------------|
| <b>Q/A camera</b>                                  | 5 MP, 2,448 x 2,050 pixels, 1 frame per second (fps), RGB    |
| <b>Leica RCD30 medium format camera (optional)</b> | 80 MP, 10,320 x 7,752 pixels, 1 frame per second (fps), RGBN |

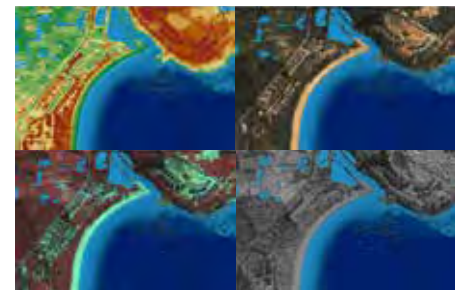
## PHYSICAL & OPERATION INTERFACE

|                                        |                                                                                                                       |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>GNSS/IMU</b>                        | Novatel SPAN with LCI-100c IMU (non-export restricted)                                                                |
| <b>Mission planning</b>                | Leica MissionPro                                                                                                      |
| <b>Flight navigation</b>               | Leica FlightPro                                                                                                       |
| <b>Post-processing</b>                 | Novatel Inertial Explorer – GNSS/IMU processing software<br>Leica LiDAR Survey Studio<br>Leica HxMap image processing |
| <b>Storage capacity</b>                | > 1 sortie recording in ruggedised removable SSD                                                                      |
| <b>Sensor stabilisation (optional)</b> | Leica PAV100 gyro-stabilised sensor mount                                                                             |
| <b>Operation temperature</b>           | 0 °C to +35 °C                                                                                                        |
| <b>Storage temperature</b>             | -10 °C to +50 °C                                                                                                      |
| <b>Power consumption</b>               | 30A @ 28 V DC                                                                                                         |
| <b>Internal battery module</b>         | Battery supports GNSS/IMU unit operation up to 30 min without external power                                          |



## Leica LiDAR Survey Studio (LSS)

The Leica LiDAR Survey Studio (LSS) provides a highly efficient, integrated and automated end-to-end bathymetric LiDAR processing workflow for the Leica Chiroptera 4X and HawkEye 4X. The intuitive user interface offers automatic calibration, registration and refraction correction, full waveform processing, four band LiDAR colourisation, quality control and data export. Manage projects, analyse data, detect water air and land interfaces with maximum efficiency. All topographic, bathymetric and RGBN point cloud data can be viewed with any standard formats and measuring functions that are expected of a professional software.



Point cloud in elevation, RGB, CIR and NIR view

<sup>1</sup> k is the diffuse attenuation coefficient. Depth penetration formula is valid for the diffuse attenuation coefficient in the interval  $0.1 < k < 0.3$ , but data is normally captured for  $k < 1.0$ . Depth penetration is subject to several other parameters aside from the diffuse attenuation coefficient k. For this specification normal sea-state and 15% sea-bed reflectance has been assumed.

<sup>2</sup> Accuracy and point density stated in the table is acquired @400 m AGL, 60 m/s aircraft speed

<sup>3</sup> The 2σ value represents the 95% confidence interval, the 1σ value represents the 68% confidence interval. Typically, the RMSE value is equal to 1σ accuracy value, or half of 2σ accuracy value.

<sup>4</sup> GNSS/IMU error of < 4 cm has been assumed

Visible and invisible laser radiation, avoid eye or skin exposure to direct or scattered radiation. Class 4 Laser Product in accordance with EN/IEC 60825-1:2007.

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