Leica CityMapper-2
More information, smarter decisions

Performance Booster
Leica CityMapper-2 succeeds the well-trusted CityMapper hybrid airborne sensor. With twice the image resolution and performance, the new system collects six 150 MP RGB & NIR images every 0.9 seconds. Together with the new 2 MHz pulse rate LiDAR, this sensor breaks all conventional barriers of urban mapping.

Outstanding Accuracy
CityMapper-2, available with three different flying height configurations, combines high-resolution nadir and oblique images with high accuracy LiDAR of < 5 cm. The newly developed cameras with customised low-distortion lenses can deliver 2 cm GSD at high flying speeds thanks to mechanical forward-motion-compensation (FMC).

Highest Throughput
The Leica HxMap post-processing workflow moves into a new generation together with CityMapper-2. Edge computing creates fully calibrated high quality image data for rapid QC and the LiDAR data undergoes discrete return extraction from the full waveform data for fast processing results. Both are stored to allow ultimate flexibility.

- when it has to be right
Leica CityMapper-2 product specifications

**LEICA CITYMAPPER-2 POD**
Consists of:
- Nadir RGB camera
- Nadir NIR camera
- Oblique RGB camera
- LiDAR Unit
- GNSS/IMU
- Sensor controller/data logger

- 1 x Leica MFC150
- 1 x Leica MFC150-NIR, monochrome
- 4 x Leica MFC150, viewing angle 45°
- 1 x Leica Hyperion2+
- Integrated NovAtel SPAN

- Height / diameter: 747 mm / 408 mm
- Weight: 58 kg
- Max. system frame rate: 0.9 sec

Designed for installation in Leica PAV100-HPH with Leica Pod Lifter HL.

**LEICA CITYMAPPER-2 VERSIONS**

**Leica CityMapper-2L**

- **Nadir lenses**
  - RGB: Leica D69.70/4.0 with 71 mm focal length
  - NIR: Leica D69.70/4.0-NIR with 71 mm focal length

- **Oblique RGB lenses**
  - Left/Right: Leica D69.112/4.0 with 112 mm focal length
  - Forward/Backward: Leica D69.112/4.0 with 112 mm focal length

- **RGB : NIR resolution**: 1 : 1.0
- **Nadir : Oblique focal length ratio**: 1 : 1.6
- **Flying height**: 940 m AGL @ 5 cm GSD

**Leica CityMapper-2S**

- **Nadir lenses**
  - RGB: Leica D69.112/4.0 with 112 mm focal length
  - NIR: Leica D69.70/4.0-NIR with 71 mm focal length

- **Oblique RGB lenses**
  - Left/Right: Leica D69.146/4.8 with 146 mm focal length
  - Forward/Backward: Leica D69.146/4.8 with 146 mm focal length

- **RGB : NIR resolution**: 1 : 1.6
- **Nadir : Oblique focal length ratio**: 1 : 1.3
- **Flying height**: 1500 m AGL @ 5 cm GSD

**Leica CityMapper-2H**

- **Nadir lenses**
  - RGB: Leica D69.146/4.8 with 146 mm focal length
  - NIR: Leica D69.70/4.0-NIR with 71 mm focal length

- **Oblique RGB lenses**
  - Left/Right: Leica D69.189/5.6 with 189 mm focal length
  - Forward/Backward: Leica D69.189/5.6 with 189 mm focal length

- **RGB : NIR resolution**: 1 : 2.1
- **Nadir : Oblique focal length ratio**: 1 : 1.3
- **Flying height**: 1900 m AGL @ 5 cm GSD

**LEICA MFC150 / LEICA MFC150-NIR CAMERA HEAD**

- **Sensor size (150MP)**: 14,192 x 10,640 pixels
- **Pixel size & type**: 3.76 um, 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)
  - Leica MFC150-NIR
- **Shutter**: Max. speed 1/1000 sec
- **Aperture**: Automatically controlled aperture 7 half f-stop steps
- **Lens mount**: Exchangeable lenses, positive mechanical connection

**LEICA HYPERION2+ LIDAR UNIT**

- **Laser wavelength**: 1,064 nm
- **Laser divergence**: 0.23 mrad (1/e²) nominal
- **Pulse repetition frequency**: Up to 2 MHz (height dependent)

**Return pulses**
- 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 altitude**: 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**: < 5 cm 1σ
- **Horizontal accuracy**: < 13 cm 1σ

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### ELECTRICAL

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. avg. power consumption of complete system</td>
<td>780 W / 28 VDC</td>
</tr>
<tr>
<td>Max. peak power consumption of complete system</td>
<td>1,010 W (&lt;60s) / 28 VDC</td>
</tr>
<tr>
<td>Fuse on aircraft power outlet</td>
<td>1 x 50 A recommended</td>
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</tbody>
</table>

### SYSTEM WEIGHT

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>System installation without Pod Lifter</td>
<td>&lt;113 kg</td>
</tr>
<tr>
<td>System installation with Pod Lifter</td>
<td>&lt;132 kg</td>
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</tbody>
</table>

### SOFTWARE

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission planning</td>
<td>Leica MissionPro</td>
</tr>
<tr>
<td>Flight navigation &amp; sensor operation</td>
<td>Leica FlightPro</td>
</tr>
<tr>
<td>GNSS/INS trajectory processing</td>
<td>NovAtel Inertial Explorer</td>
</tr>
<tr>
<td>Point cloud/image processing</td>
<td>Leica HxMap</td>
</tr>
</tbody>
</table>

### STANDARDS


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1. Maximum operating altitude is specified for 90% detection at ≥10% reflectivity (e.g., dry asphalt) and 100% laser output.
2. Accuracy and point density stated is acquired at 91,000 m AGL, 60 m/s aircraft speed.
3. The $\sigma$ 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.
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