Mitsubishi Electric Mobile Mapping System – High-accuracy GPS Mobile Measuring Equipment

Main Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>MMS-X (GM6 335, 333, 332)</th>
<th>MMS-880R</th>
<th>MMS-830R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Laser scanner</td>
<td>2 standard lasers</td>
<td>2 standard lasers</td>
<td>2 standard lasers</td>
</tr>
<tr>
<td>Laser range</td>
<td>Can be acquired</td>
<td>Can be acquired</td>
<td>Can be acquired</td>
</tr>
<tr>
<td>Laser accuracy</td>
<td>27,100 points/sec</td>
<td>27,100 points/sec</td>
<td>27,100 points/sec</td>
</tr>
<tr>
<td>Laser range</td>
<td>Standard: 65m</td>
<td>Standard: 65m</td>
<td>Standard: 65m</td>
</tr>
<tr>
<td>Laser accuracy</td>
<td>Standard: 1cm (rms)</td>
<td>Standard: 1cm (rms)</td>
<td>Standard: 1cm (rms)</td>
</tr>
<tr>
<td>No. of standard lasers</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No. of pixels</td>
<td>90,000 images/unit (max.)</td>
<td>30,000 images/unit (max.)</td>
<td>30,000 images/unit (max.)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>12VDC, 900W or less</td>
<td>12VDC, 1200W or less</td>
<td>12VDC, 700W or less</td>
</tr>
<tr>
<td>Rated speed</td>
<td>40km/h</td>
<td>40km/h</td>
<td>40km/h</td>
</tr>
</tbody>
</table>

MMS-Viewer (Aisan Technology Co., Ltd.)

MMS-Viewer displays data captured by the MMS and provides a bird’s-eye view of the route and color point clouds captured, enabling all longitudinal and cross-sectional data focusing on vehicle position to be viewed on a single screen.

MMS-TRACER (Aisan Technology Co., Ltd.)

Use this software to superimpose laser clouds on camera images and trace road features for converting the data from 3D to 2D maps. Other options such as automatic extraction of white lines and curbstones are offered as well.

MMS Ortho-generator (Aisan Technology Co., Ltd.)

Use this software to create orthogonal position ortho images by performing a high-speed correction of the route image data and point cloud data captured by the MMS. The ortho images can be observed on a single screen in real time.

Eco Changes is the Mitsubishi Electric Group’s environmental statement, and expresses the Group’s stance on environmental management. Through a sustainable society.

For further details, please visit our website.

www.MitsubishiElectric.co.jp/pas/mms

Registered as a New Technology Information System (NETIS, #KK-090011) with the Ministry of Land, Infrastructure, Transportation and Tourism (Japan)
Consistently Accurate Measurement

Utilizing Mitsubishi Electric’s advanced position-estimation technologies developed through vast experience in systems for aviation and space and aviation

Highly Accurate Measurement

- 3D positional measurement with absolute accuracy to within 10cm
- A unit consisting of GPS antennas, inertial measurement units (IMUs), cameras and standard lasers is mounted on vehicle. When satellites are not visible to the GPS antennas, the positions of the road surface and movable features can be measured with an absolute accuracy of 10cm or less and a relative accuracy of 5cm or less.
- Under the same conditions as stated above but equipped with a long-range/high-density laser, the MMS-X320R can survey the area within 80m of the vehicle with an absolute accuracy of 10cm or less.
- Data collection accuracy is maintained even when driving at high speeds.
- The new standard laser can collect reflective luminance, and also point density can be increased, enabling the cross-sectional profile of the road to be depicted more accurately.
- Compliant with the “Manual for Creating Digital Topographical Map Data Using a Vehicle-based Mobile Measurement System (tentative name),” provided by the Geospatial Information Authority of Japan.

Long-range/High-density Laser Point Clouds

- The MMS-X320R is equipped with six high-definition, 5-megapixel cameras with wide viewing angles (horizontal: 120°, vertical: 64°) and four laser scanners to measure the road surface and movable features. Color data from camera images can be attached to the laser point clouds captured, coloring them. In addition, special lasers such as REDS and IR are supported.

User-friendly Operation

- Precise measurements can be taken even when the vehicle is in a tunnel or driving under an overpass. If satellites are not visible to the GPS antenna, the positions of landscape features (landmarks) measured using traditional surveying methods can be used to correct errors in the coordinate values measured using the MMS.
- In addition to displaying equipment status, GPS and route, the estimated error is shown on the monitor in graph form, simplifying survey monitoring and helping to ensure extremely accurate operation and data capture.
- Accuracy remains consistent even when driving long distances by utilizing GPS correction (i.e., Reference correction parameter (RCP) method) for surface correction parameters.
- The reference point auto switching function enables continuous measurement without having to be conscious of electronic reference points.
- Measurement data will be automatically converted into point cloud data by doing some very simple post-processing at your office.

Easy-to-use post-processing software

- Used to create image and road data near intersections and road network data from the highly accurate ortho-images

Road surface contours

- Can be used to create road network data and model the road surface contours of the road network data. The ortho-images can be used to measure road slope (lateral and vertical), flatness, and size of rut depth of road.

MMS data processing flow

- MMS processing software used:
  - MMS Line-up

Newly Added Features

- Can be operated at the front passenger seat by touch panel and wireless keyboard.
- Equipment downsized: rear seat can be used.
- In-wheel odometer adopted: no increase in vehicle width and contact with the curbsides, etc., is avoided.

Diverse Applications

- Used for creating computer graphics from actual laser point cloud data.
- Used for creating computer graphics from actual laser point cloud data.

Mitsubishi Electric’s Mobile Mapping System (MMS) consists of a vehicle-mounted GPS antenna, laser scanners, cameras and other equipment. This system enables the efficient acquisition of highly accurate 3D positional information such as buildings, road contours and other movable data while driving. The MMS has diverse applications including government-related public survey projects and infrastructure maintenance and management. Additionally, it can now be mounted on light vehicles, and even easier operation has been realized by reducing space requirements inside the vehicle.