mmVu® Synergizer

GNSS Deformation Monitoring Software

mmVu® Synergizer is a real-time GNSS deformation monitoring software which is built to process mixed baselines from both single-frequency GNSS receivers monitoring the deformation of objects and dual-frequency GNSS receivers monitoring the stability of the reference stations. The mmVu® Synergizer is equipped with GNT’s unique, proprietary dual-processor engines (TDD and DDC filters) and utilizes GNT’s parallel processing technology. It is one of the most advanced, sophisticated, reliable and affordable software that can process both single- and dual-frequency GNSS baseline data in real-time with high level of accuracy, and at the same time it can monitor the reference stations in a project site using global or public reference stations.

**Features**

The mmVu® Synergizer software is designed to enhance flexibility and scalability of GNSS monitoring applications and to satisfy requirements from various applications.

- Provides TDD and DDC solutions for both single- and dual-frequency GNSS receivers
- Supports the use of third party Continuously Operating Reference Stations (CORS) available within 100km of the project site
- Provides millimetre-level deformation detection and sub-mm trend monitoring
- Designed to overcome GNSS challenges such as multipath, ionospheric and tropospheric errors
- Archives solutions, observations, and server activity
- Supports structure specific coordinate system

![System Deployment Diagram](image)

- Built-in system Integrity Monitoring Services.
- Supports multiple input data formats from various GNSS receivers including RTCM version 3.1
- Supports Networked Transport of RTCM via Internet protocol (NTRIP)
- Possible to be integrated with other systems

**Application**

The mmVu® Synergizer is suitable for the projects where (single-frequency) monitored stations are located within short distance and (dual-frequency) reference stations need to be monitored as well. It fits most real-time deformation monitoring applications such as civil structures, localized natural features and industrial applications.

<table>
<thead>
<tr>
<th>Civil Structures</th>
<th>Bridges, Dams, Weirs, Dykes, Buildings, Towers, Breakwaters, Wind turbines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Features</td>
<td>Landslides, Ground subsidence</td>
</tr>
<tr>
<td>Industrial Applications</td>
<td>Construction sites, Mines, Railways, Roads, Tailings ponds</td>
</tr>
</tbody>
</table>

- Single-frequency GNSS monitored receivers are located at the structure of interest.
- A Dual-frequency local reference station is located outside of the structure.
- The position of local reference station is monitored using CORS or global reference stations.
mmVu® Synergizer Products

GNT offers three different types of mmVu® Synergizer products for customers to choose the right one that fits their monitoring needs.

**mmVu® Synergizer Basic**
- For small projects with up to 5 km monitored baseline length, and up to 50 km reference baseline length

**mmVu® Synergizer Plus**
- For projects having more monitored baselines with up to 10 km and up to 100 km reference baselines length

**mmVu® Synergizer Premium**
- A customized solution for projects with special requirements

### Performance

The mmVu® Synergizer delivers mm-level accuracy in real-time even in challenging GNSS environments.

### Capabilities

<table>
<thead>
<tr>
<th>License Options</th>
<th>mmVu® Synergizer Basic</th>
<th>mmVu® Synergizer Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter Type</td>
<td>TDD, DDC</td>
<td>TDD, DDC</td>
</tr>
<tr>
<td>Monitoring Application</td>
<td>Real-time, Static</td>
<td>Real-time, Static</td>
</tr>
<tr>
<td>Data Rate</td>
<td>Single-frequency</td>
<td>Up to 1 Hz</td>
</tr>
<tr>
<td></td>
<td>Dual-frequency</td>
<td>Up to 10 Hz</td>
</tr>
<tr>
<td>Baseline Length</td>
<td>Monitored</td>
<td>Up to 5 km</td>
</tr>
<tr>
<td></td>
<td>Reference</td>
<td>Up to 50 km</td>
</tr>
<tr>
<td>No. of Baseline</td>
<td>Monitored &amp; Reference</td>
<td>Up to 7 baselines</td>
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<tr>
<td></td>
<td></td>
<td>Up to 25 baselines</td>
</tr>
</tbody>
</table>

### Local Server Computer and GNSS stations

The mmVu® Synergizer can be integrated with customer’s existing system or operated as a stand-alone system. GNT offers GNT’s hardware solutions for customers who look for pre-configured hardware products.

The PS100 is a dedicated local server computer with mmVu® Synergizer preloaded and configured for individual applications.

The SGS100 single-frequency GNSS station is used to monitor locations of interest, and the DGS100 dual-frequency GNSS station serves as reference stations.