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GROUND-BASED LASER SCANNING TECHNOLOGY

Ground-based laser scanning is a new technology available to photogrammetrists, geodesists and surveyors for rapid and extremely dense spatial data capture. Shooting is performed from ground objects or from the ground in discrete mode (with rearrangement of the device). Besides, the method can be used indoors and outdoors (in tunnels, caves, etc.). Ground-based laser scanning is ideal for complex structures and indoor surveys [1].

Ground-based laser scanning technology is used to obtain detailed 3D models of objects, facade plans, topographic plans of the area at a scale of 1: 500. Ground-based laser scanner allows you to shoot objects up to 0.5-2 cm with an accuracy of 0.5-5 mm [2, 4].

Ground-based laser scanning can be performed at any time of the day. Productivity - from 1000-4000 square meters. m during the survey of facades at a scale of 1:50 to 4-20 hectares during the survey of topographic plans at a scale of 1: 500 [1].

The disadvantage of this method is low productivity [4].

Using the method of ground-based laser scanning contributes to solving such problems as [1]:

1. creation of high-precision three-dimensional models of industrial facilities for inclusion in corporate management systems;
2. construction and control;

3. operational monitoring of particularly important objects;
4. calculation of displaced soil volumes, slope movements, etc.

The advantages of using this technology are [1, 3]:

1. By collecting millions of points, positions and dimensions can be calculated to locate features and determine sizes and shapes with very high accuracy—typically 2mm-4mm for each measurement point.

2. 3D coordinates are captured from any exposed surface, even in areas with poor lighting.

3. Laser scanners can operate in complete darkness or bright sunlight.

4. Laser scanners can capture measurements up to 300 yards, making work interruptions and facility downtime unnecessary.

5. The data produced from the scan can be used to create virtual models which can be referenced for unexpected questions or future new projects, minimizing return trips to the site.

6. Laser scanning allows for lower cost as-builts, less site visits, more accurate as-built drawings, and reduced facility downtime to highlight a few.

To sum it all up, ground-based laser scanning technology promises to be an indispensable tool for work in photogrammetry and geodesy, in particular for building topographic maps of areas, as well as scanning objects with further obtaining their three-dimensional models.

References

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