Cartographer Encyclopedia Article

Cartographer

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Cartographer

A cartographer makes maps from information gathered during a survey. The mapping of an area begins by creating a network of points and measuring the distances and angles between them. The next step is to map all the details of the land, such as rivers and roads, between the accurately fixed points in the network. After measuring a baseline distance between two points, the cartographer measures the angles between the two points at the end of the baseline, and then measures a third point with electronic instruments that record how long it takes light or radio waves to travel between two points. The three points form a triangle, which allows the cartographer to calculate the length of the other two sides in a process called **triangulation**.

In addition to measuring the details of the land, cartographers also measure the heights of many points in the area that they are mapping. From a large number of these points, they can draw in the contours that show the relief of the land.

All of these techniques require knowledge of linear algebra, geometry, and trigonometry. Some of the linear algebra elements that are needed include knowledge of **determinants**, eigenvalues and **eigenvectors**, **quadratic forms**, and **generalized inverses**. Knowledge of geometry is necessary for measuring different shapes and sizes in the field, and then plotting and drawing those objects. The use of trigonometry is also necessary, including the **law of cosines** for sides and for angles.

See Also

Angles of Elevation and Depression; Global Positioning System; Maps and Mapmaking; Trigonometry.

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