1995 NOVA AWARD WINNER

Odyssey – Real-Time Position Measurement

Odyssey, also known as RtPM (Real-time Position Measurement), is a system used by a two person team to establish or collect 3D construction site position data in real-time. Odyssey provides fast, real-time, accurate, and human-error free field position measurements. Using 3D positioning data (e.g., X,Y,Z coordinates), Odyssey can construct a CAD model from an original plan, map, or photograph. Or it can locate the real-world position of objects already defined in a 3D CAD model to provide real-time construction site layout and object position in the field. It can construct accurate as-built drawings; locate or position items in the field to support construction, quality assurance, and inspections; support remote guidance of equipment (by knowing their position in space); and provide real-time performance measurement.

Odyssey provides 3D position measurement information over a 130 meter range, with millimeter accuracy and 5 measurements per second. It requires at least two infra-red laser transmitters and one receiver. Mounted on tripods, these transmitters are usually positioned in the field to maximize the area over which they have a direct line-of-sight with the receiver. Additional transmitters may be used to cover a larger area. A portable receiver, comprised of two optical lenses mounted on a rod, a computer mounted on the rod that serves as a data entry and retrieval system, and a battery, is positioned by one member of the two person team so that the cone-shaped tip of the rod touches the point in the field whose coordinates are to be established. A digital readout on the hand-held computer shows the 3D coordinates of the rodís end-point as it is moved, which provides continuous real-time feedback to the person moving the rod.

The second team member operates a portable computer that runs the 3D CAD software showing the site model. As the receiver rod is moved around the field, its position is tracked by a cross-hair cursor in the CAD program. This computer communicates with the receiver via wireless (RF) modems. Thus, the positioning information can also be transmitted to a remote CAD workstation located in the office. In a large-scale operation, any number of workers can operate receiver-rods independently and simultaneously from the same set of transmitters.

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