

3-D Optical Radar

FEATURES

- **Compatible with Stereo from NuVision and StereoGraphics**
- **Real-Time 3-D Measurements**
- **Automatic Search and Track**
- **Passive Targets**
- **Sub-millimeter Resolution**
- **Large Track Volume**
- **Invisible, Eye Safe Operation**
- **No Adjustments or Alignment**
- **Plug and Play**
- **Cost Effective**

APPLICATIONS

- **Head Tracking Stereo Displays**
- **Desktop Virtual Reality Systems**
- **Industrial Automation**
- **Telepresence**



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The DynaSight™ Sensor



The DynaSight is a compact, self-contained sensor that measures the instantaneous three dimensional position of a passive target. The sensor uses embedded signal processing to automatically acquire and track the target in uncontrolled environments.

A central application involves tracking the human head for use with advanced interactive displays. To cue the sensor, an adhesive-backed disposable target, weighing less than ten milligrams, is placed on the stereo glasses. The wireless target does not obscure vision or interfere with activities.

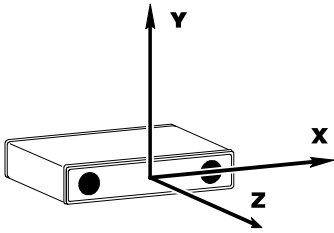
People are conditioned by everyday experience to expect that head movements will result in changes to the visual perspective. Small changes in head position and orientation are often employed to provide spatial context and reveal obscured details. The *dynamic perspective display* is a technique for emulating this intuitive behavior on a computer graphics system. In such application, the perspective for displayed graphics is adapted in real-time to be geometrically appropriate for the instantaneous positions of the viewer's eyes.

When dynamic perspective is combined with stereoscopic viewing, the result is a realtime hologram-like display that provides a *virtual window* into a computer generated environment. Dynamic perspective eliminates the perceived image warping associated with static stereoscopic displays. An additional benefit of using the head to tune the perspective is that the hands are free to edit or control the object being displayed.

In industrial and laboratory settings, the sensor can track factory containers or robot end effectors. Optional laser designation allows 3-D digitization to arbitrary points on non-cooperative objects.

With the optional Active Target Adapter, the DynaSight can perform interleaved 3-D tracking for up to four tethered targets. This provides multi-target and six-degree-of-freedom (6-DOF) measurements for special applications, such as helmet tracking.

Technical Specifications



Measurements are reported in a simple Cartesian coordinate system.



DynaSight Integrates optics, signal processing and communications.

Size:	18.6 x 14.5 x 3.9 cm (7.3 x 5.7 x 1.5 in)
Operating Wave Band:	Near Infrared
Field of Regard:	75° Azimuth x 75° Elevation
Measurement Update Rate:	65 Hz Maximum for Passive Targets 65 Hz Maximum for Active Targets
Measurement Latency:	9 to 28 milliseconds (Operating mode dependent)
Lock-on Delay:	0.3 Second Typical
Operating Range:	0.1 to 1.5 meters for 7 mm Passive Target 0.3 to 4 meters for 25 mm Passive Target 0.6 to 5 meters for 50 mm Passive Target Up to 12 meters for Active Targets
Measurement Resolution:	0.1 mm Cross Range Typical* 0.4 mm Down Range Typical*
Absolute Accuracy:	2 mm Cross Range Typical* 8 mm Down Range Typical*
Power Requirements:	14V AC @ .7 amp (Wall Transformer For 115V AC Supplied)
Electrical Interface:	Dual RS-232C With DB-9 Connectors (Cable and DB-25 adapter are Supplied)
Default Data Format:	8 Bytes per Measurement Update X, Y, Z in 16-bit Two's Complement Format 0.05 mm per Least Significant Bit
Options and Accessories:	International Power Option High Gain Passive Targets Omni-directional Passive Targets Active Target Adapter Active Target Arrays

*Measurement parameters are RMS values and are quoted for 7 mm target at 80 cm range under normal florescent room lights. Values will vary with operating range and target diameter, and to some extent with ambient illumination and target position in the field of regard. Measurement resolutions of 0.05 mm in three axes are achieved at 40 cm range, and resolution is significantly reduced at range extremes.

Three-dimensional measurements are reported in a Cartesian coordinate system with origin at the DynaSight sensor. The DynaSight sensor can be adapted to a wide variety of video display monitors. Threaded inserts are provided on the base of the sensor so that mounting accessories can be developed for unusual installations.



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