



# FASTRAK

THE FAST AND EASY DIGITAL TRACKER

## THE INDUSTRY STANDARD

The most accurate electromagnetic motion tracking system available, FASTRAK® is the perfect solution for accurately computing position and orientation through space. With real-time, six-degrees-of-freedom tracking and virtually no latency, this award-winning system is ideal for head, hand, and instrument tracking, as well as biomedical motion and limb rotation, graphic and cursor control, stereotaxic localization, telerobotics, digitizing, and pointing. FASTRAK has been the workhorse of the industry since its introduction.

## ▶ FEATURES

### ▶ Real Time

Virtually no latency. Digital Signal Processing (DSP) technology provides 4ms latency updated at 120 Hz. Data is transmitted via RS-232 to the host at up to 115.2 K Baud.

### ▶ Improved Accuracy and Resolution

Accuracy of 0.03 inches RMS with a resolution of 0.0002 inches per inch makes this the most precise device of its kind.

### ▶ Range

Standard operational range is 4 to 6 feet; 10 foot range is obtainable. The optional TX4 or Long Ranger® transmitters allow significantly longer ranges of operation.

### ▶ Multiple Receiver Operation

Permits measurement of up to 4 receivers on a single system and up to 16 receivers at a time, utilizing four synchronized systems.

### ▶ Reliable

The pioneer of 3D position/orientation measuring devices, in business since 1970. Real-time self-calibration ensures the unit never needs adjustment.

### ▶ Multiple Output Formats

Position in Cartesian coordinates (inches or centimeters); orientation in direction cosines, Euler angles, or quaternions.

## Two Solutions in One

FASTRAK is a 3D digitizer and a quad receiver motion tracker, making it perfect for a wide range of applications requiring high resolution, accuracy, and range. By computing the position and orientation of a small receiver as it moves through space, it provides dynamic, real-time measurements of position (X, Y, and Z Cartesian coordinates) and orientation (azimuth, elevation, and roll).

## Up to 16 Receivers

With a single transmitter, FASTRAK accepts data from up to four receivers. And with no change in the update rate, you can connect up to four systems, allowing you to measure multiple points simultaneously. Because FASTRAK uses patented low-frequency magnetic transducing technology, there's no need to maintain a clear line-of-sight between receivers and transmitters.

## A/C Magnetics

Quiet and stable, the system is essentially unaffected by facility power grids. Update rates are always maintained, as A/C magnetics offer the best signal-to-noise ratios and incorporate sophisticated digital signal processing capabilities. In addition, adaptive filtering is available as a standard feature.

## ▶ APPLICATIONS

### ▶ Biomechanical Analysis

When using four FASTRAK systems simultaneously, you can collect real-time relative movement data for gait and limb analysis. Perfect for tracking leg, knee, joint, spinal, or shoulder rotational movement.

### ▶ Virtual Reality

From the beginning, Polhemus 3SPACE® systems have been the top choice for VR head and body tracking. FASTRAK does it all in real time.

### ▶ Head Mounted Displays

Because FASTRAK virtually eliminates latency it is the highest quality, cost-effective solution for military, VR, and simulation applications.

### ▶ Graphics

Easily changes and controls the lighting of computer generated images in real time, with the ability to move objects on screen without the loss of environmental changes (i.e., lighting and shadowing).

### ▶ Stereotaxic Localization

Mounted on any non-metallic object (such as a robotic prosthesis), the receiver determines its position and orientation.

### ▶ Dimensional Archiving

Collect the actual dimensions of artifacts, archaeological items, museum sculptures, and other items.

### ▶ Anatomical Measurements

Compile databases of anatomical features, body volumes, joint relationships, and body contours.

# FASTRAK

## TECHNICAL SUMMARY



### COMPONENTS

The FASTRAK system includes a System Electronics Unit (SEU), a power supply, one receiver, and one transmitter. You can easily expand the system's capabilities by adding up to three additional receivers.

- ▶ **System Electronics Unit**  
Contains the hardware and software necessary to generate and sense the magnetic fields, compute position and orientation, and interface with the host computer via an RS-232 and USB.

- ▶ **Transmitter**  
The transmitter contains electromagnetic coils enclosed in a molded plastic shell that emit the magnetic fields. The transmitter is the system's reference frame for receiver measurements.

- ▶ **Receiver**  
The receiver contains electromagnetic coils enclosed in a molded plastic shell that detect the magnetic fields emitted by the transmitter. A lightweight cube, the receiver's position and orientation is precisely measured as it is moved. The receiver is completely passive, having no active voltage applied to it.

### SPECIFICATIONS

- ▶ **Position Coverage**  
The system will provide the specified performance when the receivers are within 30 inches of the transmitter. Operation over a range of up to 10 feet is possible with slightly reduced performance.

- ▶ **Latency**  
4 milliseconds

- ▶ **Update Rate**  
120 updates/second divided by the number of receivers

- ▶ **Interface**  
RS-232 with selectable baud rates up to 115.2 K (optional RS-442)

- ▶ **Static Accuracy**  
0.03 inches RMS for the X, Y, or Z position; 0.15° RMS for receiver orientation

- ▶ **Resolution**  
0.0002 inches per inch of transmitter and receiver separation; 0.025° orientation

- ▶ **Range**  
Up to 5 feet with standard TX2 transmitter; additional ranges possible with optional transmitters

- ▶ **Multiple Systems**  
Multiple systems can be cascaded with no change in update rate.

- ▶ **CRT**  
Provided by means of an external cable sensor. An optional external cable sensor provides synchronization of CRT to eliminate noise.

- ▶ **Angular Coverage**  
The receivers are all-attitude with no limits.

- ▶ **Operating Environment**  
Large metallic objects, such as desks or cabinets, located near the transmitter or receiver, may adversely affect the performance of the system.

- ▶ **Operating Temperature**  
10°C to 40°C at a relative humidity of 10% to 95%, noncondensing

- ▶ **Physical Characteristics**  
SEU - 11.0" L x 11.4" W x 3.6" H  
Power Supply - 7.0" L x 3.7" W x 2.2" H  
Transmitter - 2.3" L x 2.2" W x 2.2" H  
Receiver - 0.9" L x 1.1" W x 0.6" H

- ▶ **Power Requirements**  
25 W, 90-250 VAC, 38-65 Hz

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The systems are not certified for medical or bio-medical use. Any reference to medical or bio-medical use are examples of what medical companies have done with the systems after obtaining all necessary or appropriate medical certifications. The end user/OEM must comply with all pertinent FDS/CE and all other regulatory requirements.

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