DirectedPerception

Advanced and Innovative products for the control and positioning of sensors and precision instruments

Model PTU-DGPM

Geo-Pointing Module

Point, Locate, and Track via Lat/Lon Positions

Simplify System Integration, Add Intelligence

The Geo-Pointing Module (GPM) is an add-on module for Directed Perception pan-tilt units. It allows applications to point cameras, antennas, lasers, and other devices, using Latitude/Longitude coordinates in addition to pan-tilt angles. The GPM is a multi-function device that provides:

1. new pan-tilt commands to allow geo-pointing,
2. Ethernet/IP interface for geo-pointing and standard pan-tilt commands, and
3. a set of web pages for graphical configuration and control

Geo-coordinates of targets of interest are sent directly to the GPM-equipped Pan-Tilt Unit, and the unit is automatically aimed at that geo-coordinate. Streams of target coordinates can be sent to the unit allowing tracking/following of targets to keep them in the field-of-view. The Geo-Pointing Module accepts both geo-pointing and standard pan-tilt commands over TCP/IP using the built-in Ethernet port and is compatible with all Directed Perception pan-tilt units.

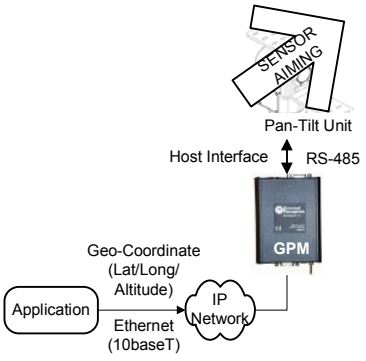
The GPM greatly simplifies system integration and improves system modularity and performance. New GPM-equipped pan-tilt units can be added to the system with little or no change to system logic. Peripheral sensors, such as ground radar, can directly command camera systems to focus on a target of interest. A stream of Geo-positions can be sent to the GPM to track an object of interest. Applications can communicate with the GPM over Ethernet (TCP/IP) eliminating the restrictions of serial connections. A built-in web-page interface allows for simple setup and configuration. An interactive landmark-based calibration utility is used to compute the Pan-Tilt's own position. Alternatively, GPS/orientation sensors can be integrated to automate calibration.

Key features include:

- Support for both traditional and Geo-coordinate commands
- Simple configuration using built-in web pages
- Streaming commands allow tracking a moving target

Applications

- Long-range surveillance
- Force protection
- Perimeter / border security
- Radar-based port monitoring systems
- Antenna positioning systems
- Satellite communications systems
- Laser ranging systems
- Automated video detection & tracking systems



890C Cowan Road Burlingame, California 94010 | Office 650-692-3900 | Fax 650-692-3930 | sales@DPerception.com | www.DPerception.com

Technical Specifications

Model PTU-DGPM

General Features

- Modular design
- Built-in Web/Ethernet Interface
- Compatible with all Directed Perception Pan-Tilt Units
- Simple setup and operation
- Geo-Pointing and Geo-Tracking functions
- Supports standard pan-tilt and Geo-pointing commands
- Single DC power input

System Operation

Commands are accepted over the built-in Ethernet/IP interface to the GPM. The GPM connects to the Pan-tilt unit (PTU) Host Interface (RS-485). Both standard pan-tilt pointing and configuration commands, as well as Geo-pointing commands can be sent to the GPM. Standard pan and tilt commands are passed directly on to the PTU. Geo-pointing commands are processed by the GPM to compute pan-tilt angle commands which are then issued to the attached PTU.

The GPM must be configured with the position of the pan-tilt unit in geo-coordinates (latitude, longitude, altitude, and 3D orientation). The latitude, longitude and altitude of the pan-tilt unit are entered manually using the GPM's web interface (e.g., using a hand-held GPS unit to measure the installed pan-tilt unit position).

The built-in calibration function computes the orientation of the pan-tilt in real-world coordinates using a set of user-provided landmarks. Landmark locations (lat, lon, alt) are entered through the web interface. The pan-tilt is then aimed at four or more landmarks and the system updates the pan-tilt's position estimate.

Once calibrated, the GPM can accept Geo-pointing commands and queries.

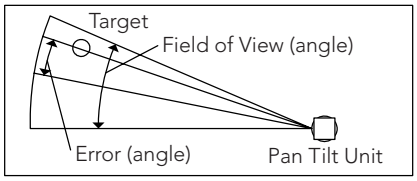
Web Interface

The GPM has a built-in web server and web pages allowing the user to:

- Configure and Control the Pan-Tilt Unit
- Configure and Calibrate the Geo-Pointing Module
- Manually Enter Geo-Pointing Commands

System Accuracy

Overall accuracy of the Geo-pointing commands depends on the pointing resolution of the PTU and accuracy of the initially provided geo-position and orientation of the PTU. For target standoff distances of greater than 1000m, angular error of the Geo-pointing will approximately equal error in the pan-tilt orientation. By using several well-spaced landmarks, and careful aiming during calibration, angular accuracy of Geo-pointing can approach the angular resolution of the PTU being used.



Geo-Pointing Commands

Query Pointing Position	Return geo-coordinate pointed at
Set Pointing Position	Points pan-tilt at given geo-coordinate
Query Calibrated Position	Return calibrated position of PTU
Query Landmark Locations	Return geo-coordinates of landmarks
Set Calibrated Landmark	Use given landmark for calibration
Calibrate	Perform calibration computation, update PTU position
Query Calibration quality	Return estimate of PTU position quality

IP Command Format

The GPM accepts pan-tilt commands (including Geo-pointing commands) over TCP/IP using HTTP get commands of the following form: "http://192.168.0.5/cmd?pp=2500".

Connections & Communications

Ethernet	RJ45 (10/100baseT)
Pan-Tilt	RS-485 Host Interface

Mechanical

Weight	1 lb
Dimensions	4.7" L x 1.35" H x 3.23" W

Power Requirements

Input Power	9-30VDC

Packaging & Environmental

Operating Temperature	0°C to 70°C (-40 °C to +85°C option)
Non-operating Temperature	0°C to 70°C (-40 °C to +85°C option)

One or more patents pending

Specifications subject to change without notice.

DirectedPerception

Advanced and Innovative products for the control and positioning of sensors and precision instruments

890C Cowan Road Burlingame, California 94010
Office 650-692-3900 | Fax 650-692-3930
sales@DPerception.com | www.DPerception.com

3/2008