



iTrack

PRECISE NAVIGATION CONTROL SYSTEM

HIGH PERFORMANCE AD-HOC POSITIONING & NAVIGATION CONTROL SYSTEM



The Precise Navigation and Control System provides combined position information and navigation control for unmanned autonomous vehicle systems. The system has a self-configuration procedure, and interfaces seamlessly with most drive-by-wire platforms.

Features:

- ◆ Ad-hoc precise autonomous navigation and control for theater, manufacturing and material handling.
- ◆ Complete stand-alone position tracking system without the need for GPS input.
- ◆ Full self-configuration and calibration in several minutes.
- ◆ 2D and 3D tracking capability
- ◆ Minimum of 3 beacons in range for 2D tracking
- ◆ Easy-to-use graphical user interface
- ◆ Application tailored ASCII interface protocol for user-defined applications.
- ◆ User configurable preference for accuracy vs. Conversion time.
- ◆ Can augment existing positioning systems. E.g. which use GPS or Laser.
- ◆ Convenient motion tracking feedback with visual (multi-color LEDs) and audio cues.

The Precise Navigation and Control System is a high performance position tracking and vehicle control system for vehicle guidance applications where centimeter-accurate positioning in space is required. The system utilizes discrete RF-based range measurement technology from Time Domain Corporation, in combination with three-dimensional motion capture sensors including accelerometers, gyroscopic sensors, electronic compass, etc. The system is highly robust against RF multipath error, making it the system of choice for indoor or cluttered environments. With the ability to detect line-of-sight measurements, the system can further optimize performance, matching accuracy that would normally require laser-based position tracking installations.

The technology is optimized for tracking motion through space, with additional motion information inputs from the moving target object through the drive-by-wire interface (e.g. CAN).

The TNS-400 includes a number of beacons—dependent on the operating area of the application—and one or more vehicle control modules. The beacons can be deployed on stand-alone tripods (available as a system option) or can be mounted in the operating environment. The system calibrates and configures fully automatically, eliminating the need for tedious measurements

and data entry. This prevents potential human error and allows for the average user to deploy the system in matter of minutes.

The NM-400 tracking module includes the onboard motion sensors and the processing power to compute the position tracking information. There is no need for a central computer, wireless network, or additional cables to operate the system. The NM-400 communicates the tracking data through a USB interface or through wireless LAN 802.11. The system has the ability to track and navigate vehicles relative to any desired reference frame in the operating environment.

iTrack provides a Graphical User Interface software GeoPathMaker™ to operate the system and conduct most tracking operations. The system is compliant with the Raynok™ Theater Motion Management system (Niscon, Inc). The intuitive ASCII-based interface protocol allows for easy implementation of any user host application is desired.

Applications for guided vehicles provide the benefit of labor savings, in addition to repeatability,



robustness, and accuracy. In most cases, customers will experience a return on investment within the first 12 months of operation. In addition to these cost savings, the system also provides the benefit of multi-dimensional control. Omni-directional vehicle platforms (like in the photo on the right) are not intuitive to be controlled by human operators, since the drivers will typically align the vehicle in the driving direction. The TNS-400 allows for the user to optimize paths and trajectories for best performance and maneuvering in the available operating space.

In order to further optimize performance for the user's specific needs, the iTrack team will assist the customer in defining performance specifications and requirements. We will then provide engineering support to develop an application-specific Software Integration Package (SIP), which guarantees that the system meets the client's needs.

iTrack's commitment to satisfied customers includes continued assistance and support, at any desired level. Our long-term warranty and service packages guarantee that the technology remains up to date and at top performance.

The technology is protected under patents 8010133, 7403783 and 7403783, and applications 20110313716, 20080234930 and WO/2005/081012A1.



Specifications:

◆ Robotic Module weight	1.5 lbs
◆ Personnel Tracking Module weight	0.25 lbs (ex. Battery)
◆ Beacon weight	5 lbs
◆ Power consumption	1 W
◆ Robotic Module size	5" x 5" x 2.5"
◆ Personnel Tracking size	2.25" x 3.75" x 0.5"
◆ Beacon size	7.25" x 4.75" x 2.25"
◆ Update rate	20 Hz
◆ Horizontal accuracy	± 4"
◆ Vertical accuracy	± 1'
◆ Directional accuracy	± 5 deg
◆ Frequency of Operation	6.1—6.6 GHz
◆ Temperature range	-40—70 °C
◆ Operator Interface	Windows XP or Vista

Benefits:

- ◆ Accurate real-time position measurement without the need for measuring tape.
- ◆ Ability to track first responders in a hostile environment without the need for existing infra-structure or elaborate system setup.
- ◆ Replacement of personnel by autonomous robotic systems for certain tasks that are too complicated to control manually through an operator control interface, that are mundane and repetitive, that require fast and precise vehicle positioning, or that are hazardous.
- ◆ Semi-autonomous operation for tele-operated robots. For example: 1) autonomously bringing a robot to and from a stand-off vehicle checkpoint; 2) autonomously tracking a manually driven trajectory back to the operator location.
- ◆ Situational awareness within the commanding vehicles. I.e. the crew of a Striker vehicle can track precise relative location of dismounted warriors and autonomous robots to the vehicle.
- ◆ Marking and tracking reference locations on randomly orientated objects in the tracking space.

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