

Supervised Navigation (SuperNav) is an option for Raveon Technology's *RavTrack* GPS tracking system. *RavTrack SuperNav* is a GPS tracking system for heavy equipment, that provides not only the common standard GPS tracking features, but many advanced features to improve operator safety, prevent accidents, enhance situation awareness for the operator and supervisor, and automate updating and distribution of safety information.



All heavy equipment GPS tracking systems provide basic features such as:

- **GPS Tracking of equipment at the supervisor's computer**
- **Reports of engine hours and distance traveled**
- **Theft and un-authorized use detection**

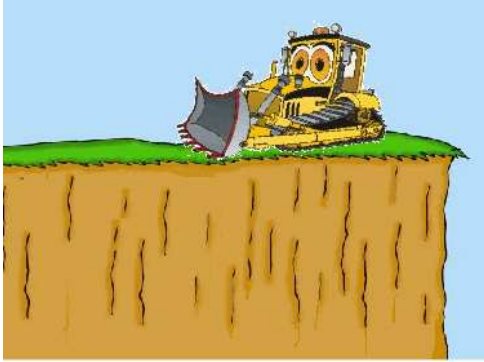
A **Supervised Navigation** system has all the standard GPS tracking features, along with a real-time two-way communications link between a supervisor station and the heavy equipment operator. The two-way **SuperNav** system has these added features:

- **Vehicle operators see a map of their work area with designated safe or unsafe zones created by the supervisor.**
- **The in-vehicle map is a living image – updated live from supervisor computer.**
- **Vehicle operators see a historical “trail” of where they have travelled.**
- **The vehicle may be equipped with visual and audible alerts, which trigger based upon zone boundaries.**
- **Supervisor computer “pushes” safety boundaries, fences, and points to the display in the cab of each vehicle.**
- **In-cab map changes are real-time, and stay synchronized to supervisor map.**
- **Optional slope indicator inclinometer shows the roll-pitch of the vehicle on-screen.**
- **No monthly fees because RavTrack SuperNav operates on UHF and VHF licensed radio channels.**
- **RavTrack SuperNav even works where there is no cell service.**

Supervised Navigation System Overview

Which would you prefer?

Standard GPS tracking



Supervised Navigation



In The Vehicle

In the cab of each vehicle, there is:

1. A tablet computer display which displays a map, the vehicle location, vehicle track, zones, direction of travel, roll-pitch, and the vehicle status.
2. An alert indicator light on the dash, with an override button.
3. An alert buzzer to audibly warn the operator of a critical alert.
4. An M7 GPS transponder that transmits real-time vehicle GPS location and receives messages from the Supervisor Station.

Tablet PC



M7 GPS Transponder



Alert Lamp/Button



Supervisor Station

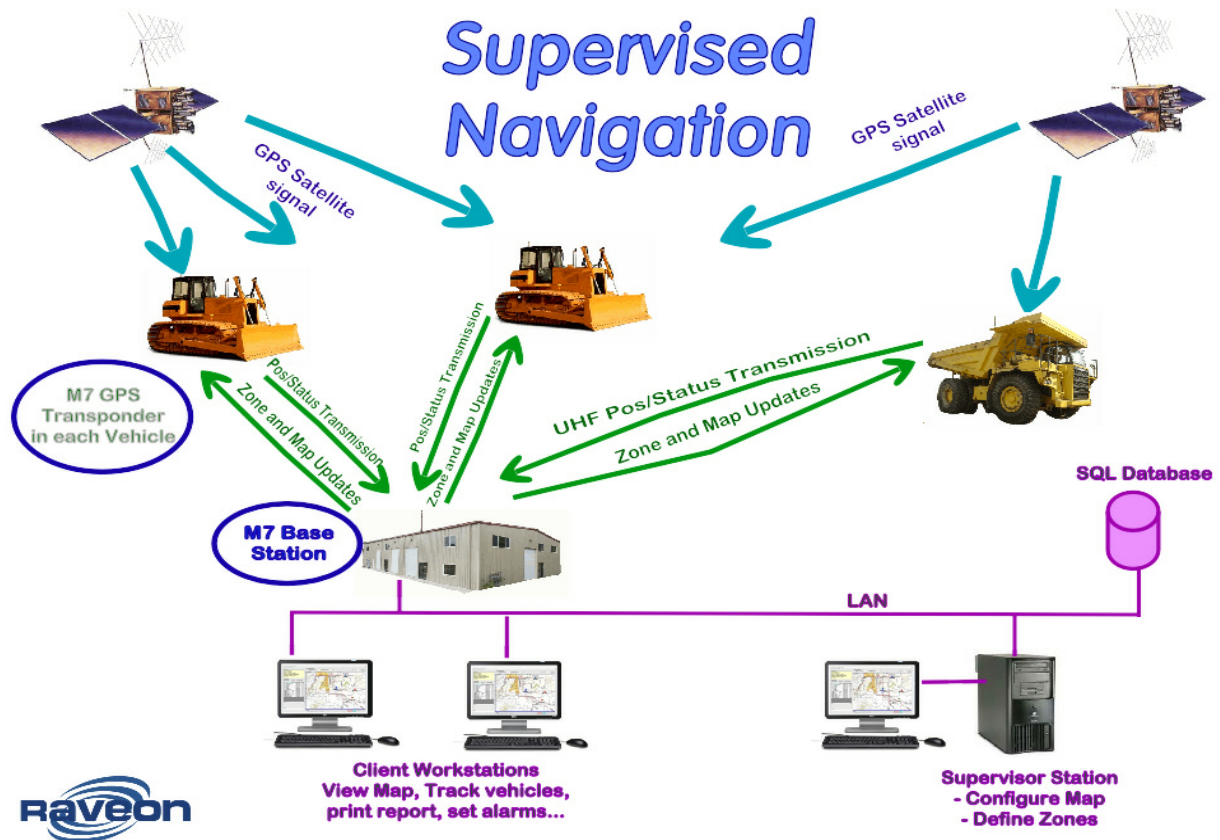
At least one computer in the system is configured as a “Supervisor Station”. It is used to monitor the fleet, update safety zones, print reports, and generate alert messages. The supervisor station(s) consist(s) of:

5. A Windows PC running Raveon’s **RavTrack PC** GPS tracking software.
6. A Raveon M7 series base station to receive GPS position reports from the vehicles, and transmit messages to the vehicles.
7. A base station antenna located in a place where it is within radio communication range of all vehicles in the fleet.

8. **SQL Server.** Microsoft SQL server must be running on the supervisor's computer, or be accessible via a local network.

How It Works

Each vehicle is in constant radio communications with the Supervisor Station. As the vehicles travel around, the supervisor can see on a map where they are and where they were. This is standard GPS tracking.



The **SuperNav** system by Raveon includes a PC in the cab of the vehicle. The vehicle can see on this display a site-map of where the is, the direction of travel, and a track of where it Knowing where the vehicle traveled can help operator visualize the the site better, and confidently return to the same place.

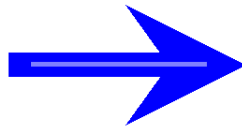
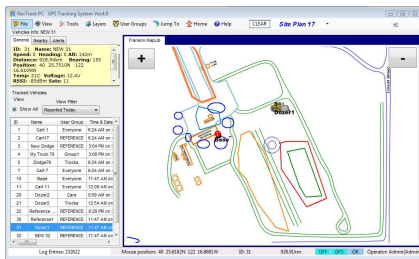


tablet operator vehicle traveled. the

On the display, the operator can also see the attitude of the vehicle. On-screen roll and pitch arrows show the operator the angle the vehicle is tilting. The in-cab tablet PC display is configured to trip audible and visual alarms if the roll or the pitch exceeds preset levels.

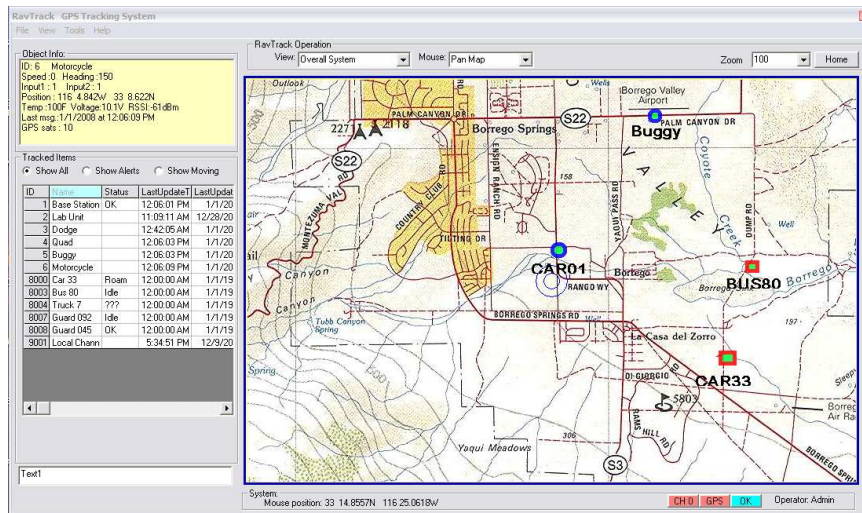
A push-button on the indicator lamp allows the operator to temporarily override the warnings when the vehicle needs to travel in an area where the warning tilt angles must be exceeded.

Another very unique feature of the **SuperNav** system is the synchronization of maps between the supervisor's computer and the displays in the cabs of the vehicles. When a zone is drawn on the Supervisor Station computer, within seconds the zone will appear on the in-cab displays of the fleet vehicles by synchronizing the Supervised Station map and the in-cab display map image. When the zone is modified on the screen of the Supervisor station, it is automatically updated on the in-cab displays. Synchronized zones allow the supervisor to remotely update the display in all of the vehicles as well as change the boundary areas where alerts and alarms are triggered.



RavTrack PC

RavTrack PC by Raveon is a Windows PC application for displaying, tracking, alarming, and logging the activity of Raveon's *GPS* Transponders. The Desktop "Pro" version is run at the Supervisor Station, and a "Tablet" version is run on a tablet PC in the cab of the vehicle.



This easy-to use computer application graphically shows the location and status of machines, dozers, cars, trucks, people, or anything equipped with *RavTrack* GPS Transponders.

RavTrack PC Software Features:

The features below are what make *RavTrack* the right choice for real-time tracking:

- 1) **Real-time** See where your vehicles are *NOW*, not a few minutes ago. Position and status updates are available every few seconds. No other GPS tracking system has as fast an update rate as *RavTrack*.
- 2) **In the Office or In the Field** Track your vehicles and assets at field offices, temporary work sites, remote locations, or in the office. *RavTrack* is a complete stand-alone tracking system. No server required. No Internet required. No cellular services or communications satellite required. A single PC and a Raveon RV-M7 GPS transponder is all that is required. The map on the display may be any graphics image, scanned map, or photo you choose.
- 3) **Live Update of Zones** (with the *SuperNav* Option) A supervisor may modify a zone on his/her computer screen and have it automatically be transmitted to the map displays in the vehicles. The zone can be a safety perimeter, a keep-out area, or a helpful reference.
- 4) **In-Cab Audible and Visual Alarms** (with the *SuperNav* Option) The display in the cab of the vehicle may be configured to trigger a visual alarm (light indicator) or an audible buzzer. The supervisor may remotely modify zones that trigger these alarms.
- 5) **Visualize your Operation** The displayed map can be your mine, or your construction site, or your park, or your Golf Course, or your city. See where people are, or should be. See where they aren't and should. *RavTrack PC* can show you your business in a way no voice system can. Zoom and switch between different maps with a click of the mouse.

- 6) **Geo-Fence monitoring** RavTrack PC users may create geo-fences on the map around areas like keep-out zones, off-limit areas, must-patrol areas, and environmentally sensitive areas, and then have the system alert when geo-fence rules are violated.
- 7) **Rich Reports** Many reports are built in, such as vehicle status, alarm reports, rule violations, daily, weekly, and monthly usage reports. *RavTrack PC* uses the powerful *Crystal Reports* report generator from Business Objects. You may customize the existing reports or create your own reports.
- 8) **One-Click status** Tracking is one thing *RavTrack* does well, but do you want to know status also? One-click on an icon on the map or click an entry in the tracked-object table, and the user can see complete vehicle status including location, distance, heading, velocity, I/O status, temperature, voltage, altitude, and radio signal strength.
- 9) **Custom Alerts** Knowledge is power, and *RavTrack PC* gives you the power over your moving assets. Know where they are, when they move, how long they are idle, or if they are miss-used. The *RavTrack PC* operator can be alerted to various transponder-specific events such as speeding, proximity to Points of Interest, zone violations, and digital input status. *RavTrack PC* has the most flexible and powerful rule monitoring engine in the industry.
- 10) **Database Driven** The information on all units being tracked can be stored in a SQL database. Users may use numerous SQL tools to create custom reports or interface with the data in real-time. An unlimited number of workstations may connect to the database so many users may monitor the activity of the system.
- 11) **Single or Multi-User** The software may be run in a single-user stand alone configuration on one PC, or operated in a multi-user configuration where multiple *RavTrack PC* users can monitor the system and create their own alarms.
- 12) **Log Replay** The user may select log entries to replay travel routes on the map or to show the past location and status information.
- 13) **Secure.** All position transmissions are encrypted, so that only radios with the same pass-key code can communicate. The *RavTrack PC* program is also administrator-rights protected, allowing a view-only user mode, or total-control for the administrator.

GPS Transponders

Raveon's M7 GPS transponders are used in each vehicle to transmit the GPS position to the Supervisor Station and receive messages from the Supervisor. Their unique TDMA protocol allows many vehicles to quickly transmit their position and have no interference between them.



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The M7 GPS transponder utilizes licensed VHF and UHF radio channels to communicate between the base and the vehicles. The system can track 8 vehicles with 2 second update rates or 40 vehicles with a 5 second update rate. Raveon has a service to assist you in getting a UHF or VHF radio channel assigned from the FCC.

The M7 has a built-in 5-watt radio modem, GPS receiver, and electronic tilt sensor. The tilt sensor option allows it to display vehicle roll-pitch on the in-cab computer display.

In-vehicle Displays

In the cab of the vehicle, connected to the M7 GPS transponder is a rugged touch-screen computer displaying a map of the site, the geofenced area(s), the location of the vehicle, a track of vehicle travel, and the location of the other on-site vehicles. Any standard tablet PC that will run Windows 7 will work for this application. Raveon recommends the Trimble Yuma display, as it is extremely rugged.



The in-vehicle computer runs a “tablet” version of *RavTrack PC*. *RavTrack PC* is very feature-rich ([click here](#) to see feature list). It provides the vehicle operator with:

- ***View of the site-map and his vehicle location at the site.***
- ***View of the geo-fenced zone or zones as defined by the supervisor.***
- ***Location of all other vehicles on-site that have Raveon GPS transponders on them.***
- ***Audible and visual alerts based upon preset rules related to geofences, speed, proximity, time, and days of the week.***
- ***Onscreen buttons to easily manage the display, clear tracks, and enable/disable alerts.***
- ***On-screen display of vehicle roll and pitch.***
- ***On-screen trail of “dots” showing the previous track driven.***

The display in the cab shows a map, the vehicle’s current location, the geofence, and any other tracked vehicles in the area.

Why SuperNav instead of Standard GPS tracking?

Operators of heavy equipment have a very challenging job to do, and standard GPS tracking does the heavy equipment operator little good. For example, how well does standard GPS tracking help prevent accidents with a bulldozer? *Not very.* The supervisor can see the accident, and replay it after it happens on a computer. But this does little to enhance bulldozer safety.

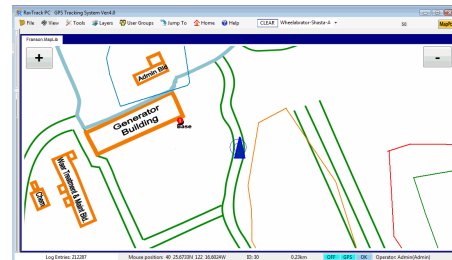
With *RavTrack's SuperNav* option, you get all standard GPS features, as well as many features that will improve construction safety, heavy equipment safety, prevent accidents, and alert the operator with boundary alerts. *SuperNav* helps prevent accidents by giving the operator a clear view of the situation, and warnings when dangerous conditions occur.

Any one of the *SuperNav* features can help the operator. Tilt sensors, zone alerts, GPS tracks, audible warnings. Each one will help the operator, but put them all together in one system, and your operator will be safer and more productive.

In-Cab Display of location

The operator can see exactly where the vehicle is, and which direction it is traveling in with relation to the site plan.

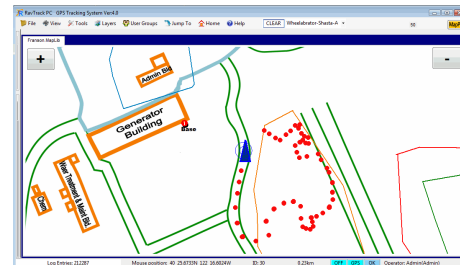
- **Knows where the vehicle is with relation to the site plan.**
- **Sees where the vehicle is with relation to safety zones and keep-out areas.**
- **Understands the direction of travel.**
- **Sees where the vehicle is with relation to other vehicles in the area.**



In-Cab Display of Travel

The operator can see exactly where the vehicle was. By seeing the location of previous travel, the operator

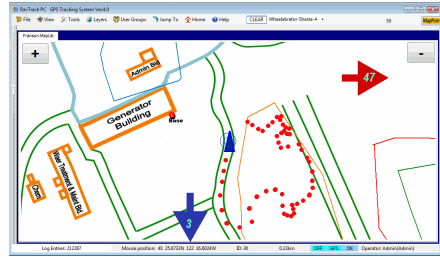
- **Knows where the vehicle previously went.**
- **Can better travel in a straight line.**
- **Can stay within boundaries drawn on the map by the Supervisor System**
- **Understand the safety of a path previously taken.**



In-Cab Inclinometer

Along with knowing their precise on-site location route of travel, the operator can see the roll or pitch of the vehicle. With this, the operator can

- **Quickly see the current tilt of the vehicle.**
- **Determine if a route of travel is safe or unsafe.**
- **Determine a safe speed for the present conditions.**
- **Be automatically cautioned by an audible alert and flashing lamp if a pre-set critical angle is exceeded.**



OR

In-Cab Alerts

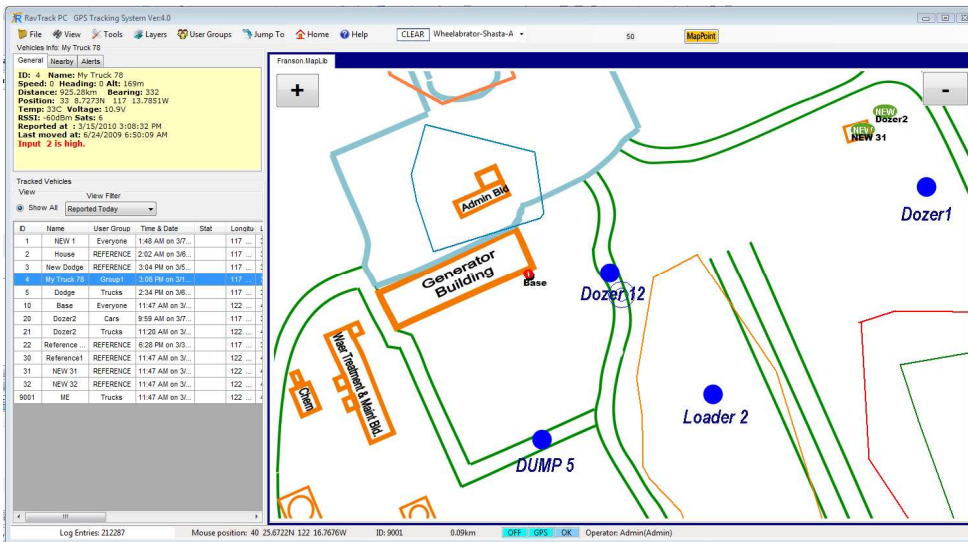
The display computer in the cab of the vehicle can also sound an external alert. The alert is comprised of a warning lamp and a buzzer. It has two-stages, a warning alert and a Critical alert.

- **Slow blink a warning light if the vehicle approaches a safety zone.**
- **Fast blink an alert light if the vehicle breaches a safety zone**
- **Chirp a warning buzzer if the vehicle approaches a safety zone.**
- **Sound an alert buzzer if the vehicle breaches a safety zone**
- **Supervisor may adjust warning zones remotely from the Supervisor Station**



Supervisor-Updates of Maps and Safety Zones

The Supervisor System can see the location of all tracked vehicles, and update the displays in the vehicle automatically and remotely using the Raveon wireless modem installed in the vehicles.



- **Knows where all the vehicles are and where they traveled.**

- **Can draw zones on the Supervisor Station's map.**
- **Designate certain zones to be automatically synchronized with the in-cab vehicle displays.**
- **Can receive visual, audible, email, and SMS alerts when there are infractions to rules.**
- **RavTrack PC has the most powerful and flexible GPS tracking rule engine in the industry, so the supervisor can create specific rules for most any situation.**

More Information

Raveon's **SuperNav** system is designed for use at sites where all vehicles work within a defined area that can be covered with VHF or UHF radio. Open pit mines, construction sites, trash dumps, quarries, industrial plants, and power plants are ideal areas to use Supervised Navigation. UHF and VHF radio communication is limited to 2-30 miles depending upon the terrain and type of system installed, so **SuperNav** is not suitable for nation-wide or even state-wide deployment unless you have a facility at each site where the system will operate.

For more information about Supervised Navigation, please contact Raveon at sales@raveon.com.

For More Information

For more information about this or any other Raveon product, 1-760-727-8004 or visit us a www.ravtrack.com.



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