Technical Bulletin

NEW!
Heavy Equipment Product Is Now Available

We are pleased to announce the new **Heavy Equipment Product** ("**HEP**"), the newest of our Specialized Application Kits, is now available. The HEP was designed specifically to meet the Asset Tracking needs of our customers with heavy equipment vehicles including earth movers, graders, backhoes, forklifts, etc. The HEP was designed to work on any such equipment that includes an engine, a battery, and a charging system. Unlike the Trailer Product ("TRP"), it does NOT include a solar cell or batteries of its own on which to operate. The HEP is also perfect for tracking other forms of moveable assets, such as large generators, compressors, HVAC systems, etc., as long as the asset includes some form of engine, battery, and charging system. The HEP can thus be used on a variety of assets, in particular where the TRP might not be suitable.

The purpose of the HEP is to allow the vehicle owner to know where their assets are, when they are moving, when they are in use, and when they are stationary. The HEP also provides a reliable maintenance window once each day for us to reach a unit for upgrades/changes.

These highly specialized units are designed to report their status and location autonomously throughout the work day and are **not** designed for "on demand" locating by the customer. There is workstation access to these units through FleetDirector eClient® software and customers may perform manual locates on these units, however, overuse of this capability can put the customer into overage.

This is how the HEP Monitors a Vehicle/Asset:

1. **IDLE MESSAGE**: When the asset/vehicle arrives after being carried by trailer to a new location (the vehicle/asset must be stationary for 15 minutes or more with no input activity) the unit will send an "**Idle**" message (Message 80) just once after 15 minutes.

2. **SLEEP MESSAGE/MODE**: Once the vehicle/asset remains stationary with all inputs [ignition and shock] inactive for 30 minutes or more, that unit will enter **Sleep Mode**. A "**Sleep Mode**" message (Message 71) will be sent to the system.

3. **IN-MOTION MESSAGE**: When the vehicle begins to move (> 300 meters) and if it continues to move, the unit will report that it is "**In Motion**" (Message 79) every 10 minutes.
    - When the vehicle/asset is moved more than 300 meters without the ignition being activated (such as when loaded on a trailer), the unit will send an "**In Motion**" message.
    - If the motion continues, the unit will report additional "**In Motion**" messages once every 10 minutes.

4. **IGNITION ON MESSAGE**: When the vehicle's ignition is turned on, an "**Ignition On**" message (Message 51) will be sent.

5. **ACTIVE MESSAGE**: While the ignition remains **On** the unit will send an "**Active**" message (Message 50) every 10 minutes.

6. **IGNITION OFF MESSAGE**: When the vehicle's ignition is turned off an "**Ignition Off**" message (Message 52) will be sent.

7. **HEARTBEAT MESSAGE**: Once a day at midnight the unit will send in a "**Heartbeat**" location message (Message 87) to confirm system health and vehicle/asset location.
   - The unit will send one 24-hour **Heartbeat** message at midnight every day.
   - In so doing, a "Maintenance Window" is opened for 20 minutes every morning between 12:00am and 12:20am, during which time the unit can be reached OTA for upgrades/changes.

Installation/Workstation Requirements:

The following must be present to use the HEP:

1. TM2 Hardware or better
2. 2.0.4 Firmware or better
3. Water resistant, dustproof enclosure
4. Outboard Shock Sensor (inside enclosure)
   * NOTE: Must be adjusted for EACH installation

5. Wiring including:
   a) Ground
   b) Constant Power
   c) Ignition Power
   d) Outboard Shock Sensor (pre-wired inside enclosure)
   e) Cellular and GPS antennae

6. Workstation Messages - (These messages must be set up on the workstation):

50 = Active	71 = Sleep
51 = Ignition On	79 = In Motion
52 = Ignition Off	80 = Idle
	87 = 24 Hour Heartbeat

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Sample Operating Scenario:

An example of a typical day with the HEP:
During the previous night the unit awakened itself long enough to send a "**Heartbeat**" Location message at midnight. For the next 20 minutes the unit was reachable for upgrades/ changes as needed.

In the morning the vehicle can be either:

a) *Moved via trailer to or from a job site*. If moved via trailer to/from a job site, where the vehicle's ignition is not activated, the shock sensor **must** be sensitive enough to detect the disturbance and awaken the unit.

b) *Started up and put into active use*. If the vehicle is started, the unit will awaken from **Sleep** mode, report "**Ignition On**", and begin reporting "**Active**" messages every 10 minutes.

f) *Left alone to remain asleep*. If left alone, the unit will remain asleep and deliver a "**Heartbeat**" location message every day at midnight.

Once the unit is awakened from **Sleep Mode** and in motion but with the ignition off, such as when carried on a trailer, the unit will report an "**In Motion**" message initially once the vehicle moves a distance of more than 300 meters, and then every 10 minutes if motion continues.

Once a vehicle that is **In Motion** comes to a stop for longer than 15 minutes, (with both ignition input and shock inactive) it will report that it is "**Idle**". The "**Idle**" message is sent only once until it is 'reset' by the vehicle moving again more than 5mph for 10 seconds.

If the vehicle is being operated, and the ignition switch is on (engine on) it will report "**Active**" messages every 10 minutes.

Once the ignition switch is turned off, the unit will report "**Ignition Off**".

Adjusting the Shock Sensor:

The HEP's functionality is highly dependent on the correct adjustment of the shock sensor. Adjustment can only be done once the enclosure is solidly mounted to the vehicle.

Two possibilities exist if the sensor is **not correctly** adjusted:

1. If the Sensor is **not sensitive enough**, the unit will not awaken from **Sleep** when it is moved with the ignition off (not activated), *i.e.*, when the vehicle is carried on a Trailer. The Customer will never know if the unit has been removed from the job site legally or illegally.
2. If the Sensor is **too sensitive** the unit could be prevented from entering **Sleep** Mode, and thus pull more current than expected, possibly leading to dead vehicle batteries.