

# **Wireless Asset Management: Enabling Global Supply Chains**

**Brenda Lewis**

## Abstract

Wireless asset management encompasses all portable, but non-powered objects. Unlike its sister vertical market AVL (Automatic Vehicle Location), asset management has had to wait for long life batteries, low power chips and miniaturized radio transceivers..

Wireless Asset Management holds the promise of managing physical goods by a new set of flexible business processes , freeing up significant IT resources to address the bigger issue: recasting all business processes of the enterprise to support collaborative business.

Additional benefits include reducing the \$12 billion plus in annual losses in pilfered or misdirected cargo in the US each year, faster inventory turns, more rapid response to inventory outages , proactive service to owners of commercial HVAC, boilers, pumps, turbines and , not least, automated alerts and escalation when disaster strikes or units malfunction.

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Brenda Lewis is Principal of Transactions Marketing Inc., Greenwich, CT.

## **The Scope of the Market Opportunity**

In a privately commissioned study, Booz Allen estimated there are 160 million addressable assets in the world today.. By 2007, machines will out number human Internet users 4.5 to 1.0 . Wireless Asset management is the tracking and monitoring of both portable passive objects (inventory) and stationary passive objects (a gas turbine). The services and software to monitor and track these addressable assets will provide an unprecedented opportunity for business process transformation in the enterprise and a revenue generator for the mobile Internet.

## **Wireless Asset Management in Context**

The enterprise today is facing a difficult challenge: existing legacy systems are hierarchical in nature (think stovepipes), but operations are rapidly becoming (or are already) collaborative. There are an estimated 3 billion lines of COBOL still governing the operations of larger enterprises. Embedded in them and other legacy systems are the business rules and processes which have served the corporation well for 30 years but are no longer adequate to deal with multiple partnerships, trading exchanges and other synchronous methods of working which prevail today. EDI and newer e-commerce software deal in “pairs” of relationships; yet business relationships today are increasingly multi-lateral .

The most difficult processes to alter are those that support the demand or “buy” side of a corporation. This is because they deal in physical handling processes: goods are manufactured, shipped or warehoused. Added to the untenable legacy of embedded processes is yet another problem: an acute shortage of skilled IT personnel who understand the care and feeding of legacy systems, or –more important-know how to strip out the embedded, undocumented business rules. Now suppose there appeared on the horizon a set of technologies which would permit the management of the physical goods by a new set of (flexible) processes , freeing up significant IT resources to address the bigger issue: recasting the business processes of the enterprise to support collaborative business. Wireless Asset Management holds this promise.

## **New Technologies Underpin Wireless Asset Management**

Within the last 12 to 18 months significant developments have contributed to the potential for wireless asset management services and systems. They are:

- A prototype chip embedding barcodes in packaging (Bistatix)
- A chip which can sense changes in temperature, texture and chemical state (Graviton)
- Hybrid wireless devices which incorporate video cameras with GPS, Global Positioning System. (Sony, Handspring)
- Software which recognizes and interoperates with the 50-60 RFID (Radio Frequency Identification Device) tags in use in the market. (Pinpoint)
- Miniaturized GPS chipsets (SiRF Technologies)

These technologies are important because in concert they encompass existing inventory tracking techniques (RFIDs, barcodes) but extend them using the power of wireless systems. Unlike its long established sister vertical, AVL, Automatic Vehicle Location, wireless asset management is relatively new. Pre-dating GPS, AVL applications as far back as the 1970's (Exxon's LOGICS system, tracking its tanker fleet, for example) utilized VHF to communicate with ships at sea and in the early 1990's OMNITRACs used triangulation systems to get location data. AVL developed in advance of WAM because it could rely on the power source in the vehicle.

### **Benefits**

Wireless asset management will be quick to catch up. By pre-processing the streaming data from a stationary asset (for example, a commercial air conditioner or a remote drill rig), the enterprise achieves immediate quantifiable benefits:

1. the highly trained (salaried) human asset is now able to monitor more machines;
2. the pre-processed data may be passed to intranet-based software for graphical or tabular display.

3. automatic alerts make be triggered without human intervention., increasing the speed with which an anomaly in the data may be spotted and analyzed.
4. in the event there is no response from the human operator , alerts may automatically be escalated via page, email or cell phone
5. the total cost of ownership is low and IRR high.,

### **Vulnerability of Supply Chain**

With just-in-time inventory and extensive outsourcing greatly extending the supply chain, asset monitoring and control has become increasingly important to the enterprise. Location-based inventory management is moving away from on-premises applications to both hybrid and wide area network solutions. On-premises systems allow location of parts, packages, pallets, instruments, containers and other assets within the confines of real estate controlled by a corporation and its suppliers. Typical installations include factory floors, railheads, marshalling yards, warehouses, container terminals, truck stops, etc.

Traditionally, these systems have used infrared spectrum and the RFIDs (radio frequency identification devices) were each proprietary. Today, however, smart tags, RFIDs and even bar codes are increasingly enabled for two-way communication, so that instead of waiting to be scanned, the transponder equipped device can send a location, which can then be captured , transmitted via the Internet and displayed on a web-based tracking system. Several companies have tackled the integration issues related to the 60 odd types of RFIDs and are offering systems which can identify signals from multiple types of "tagged" devices, a prerequisite for wide area tracking. Also promising for the future is Motorola's recently announced passive Bistatix chip, which will be incorporated in "smart" packaging materials manufactured by International Paper. The chips will contain programmable routing information and other data well beyond traditional bar codes and downstream might be unified with GPS for continuous wide area tracking.

For today, Pinpoint Systems of Bedford, MA has developed a patented "indoor" GPS -like real time asset management system it calls Local Positioning System™. Unlike infrared systems and bar codes that require the asset to be "in view,"

Pinpoint can report positions of tagged objects up to 250 feet away from the antenna. Nortel Networks Wireless Development Centre is using this system to track digital signal processors, spectrum analyzers and other high value instrumentation over its 6 labs in Calgary. Developed from pseudo noise research by the US Department of Defense, unlike older systems, Pinpoint's is designed with open APIs to corporate networks. It can be paired with off-premises GPS-powered tracking systems for continuous inventory location beyond company-controlled premises.

Cost-effective wide area asset tracking services are part of the reason tracking revenues are estimated by Strategy Analytics to reach \$2 billion in location service revenues in North America and \$1.8 billion in Western Europe by 2005. Wide area asset management applications utilizing GPS (Global Positioning System, a worldwide network of 24 satellites transmitting location data, owned and operated by the US Government) have been available since the mid-1980s. Primarily used for fleet management, these proprietary systems have typically involved heavy, power-hungry, purpose built units attached to trailers, containers and railcars. The units relay not just location data to a central office, but perform a vital array of functions, including monitoring container temperature (especially for refrigerated or "reefer" units), arming trailer door locks and reporting engine operating condition. Such systems are now being supplanted by IP based services which use standard two-way devices to report the location of the asset, monitor its condition and provide data via the Internet to the company's own systems. Companies like Notifact, CSI Wireless, Televoke and Terion/Dolphin Software Services are providing asset management services via the mobile Internet today.

### **Pot of Gold: Asset Tracking**

Inventory management stops today at the shipping dock, If there is a pot of gold for location services providers, it lies not in AVL, but in WAM. Cargo losses amount to \$12 billion annually in the US alone. These losses result when cargo is removed from the pallets, containers, trucks and railcars which are today the assets being tracked. The goods are stolen or diverted outside the controlled premises of supply chain partners, often by insiders who carefully reseal the containers. In discussion with a 20 year Fedex veteran in April 2000, this author learned that even cargo containers (in this case shaped to fit Fedex's own planes) are being stolen. The problem is so pronounced in Europe that the European Union has funded TRACAR, a consortium of truckers, rail companies, shipping lines, satellite operators, tracking service providers and RFID manufacturers, all

developing a massive, inter-modal end-to-end system incorporating GPS, GSM, satellite and VHF radios. TRACAR is in pilot stage and has required significant investment in passive (powerless) ground-embedded devices triggering a GPS location transmission to central base stations in Denmark as a railcar or truck passes over them. There, location data is converted into tracking information and is available to authorized users via the Internet. The system is awkward, expensive and unlikely to be replicated outside the EU.

**Summary : Starting Close to Home**

Unsure whether WAM can work for your enterprise? A great place to test the premise is with your own mobile work force. One of the most often reported theft items is laptops, along with lesser numbers of PDAs, 2 way pagers and cell phones. Try a pilot using these very portable assets. Don't wait for broadband to implement WAM. Whether telemetry services for stationary asset monitoring or RFID/GPS hybrid, tap the power of the mobile Internet and begin to transform the process of managing your physical assets.