STRATEGIES FOR GROWTH^{SM}

"CONSULTANTS TO THE SERVICES INDUSTRY"

The Evolution of Mobile/ Field Service Management Software Packages:

Why You Need One, How to Select One, and What It Needs to Do for You

A Special Executive White Paper Prepared for:

Nexterna™

Prepared by:

William K. Pollock
President
Strategies For Growth^{SM}
PO Box 1024
Westtown, PA
E-mail: wkp@s4growth.com
Website: www.s4growth.com

Table of Contents

1. Introduction and Background

A. Size of the Mobile/Field Service Segment

According to a recently published report by Forrester Research, there are currently "close to 50 million mobile workers" in North America. Forrester's definition of the mobile workforce includes field service technicians, employees of utilities and government, transportation workers, field sales representatives, order fulfillment/parcel delivery workers, and even taxi drivers, among others. Gartner reports an even higher number - 59.8 million mobile workers, but uses a slightly broader definition consisting of general executives, sales, transportation, construction, field service, healthcare, finance and education employees. In either case - 50 million, or 59.8 million - the reality is that there is an enormous need for wireless-based mobile workforce solutions.

In terms of market size and growth in the more narrowly-defined field service arena, Gartner estimates that there were about 650,000 field service wireless data users in the United States in 2002 - up some 30% from 500,000 only one year earlier. In fact, the firm projects this number to virtually triple during the first half of the decade, from 500,000 in 2001 to 1.5 million by 2005 - a CAGR of greater than 30%. As such, Gartner believes that the field service industry "continues to represent an enormous opportunity for applications and service vendors" (Figure 1).

Figure 1

The Number of Wireless Data Field Service Users in the U.S. Is Projected to Increase by 3 Times from 2001 through 2005.

Source: Gartner
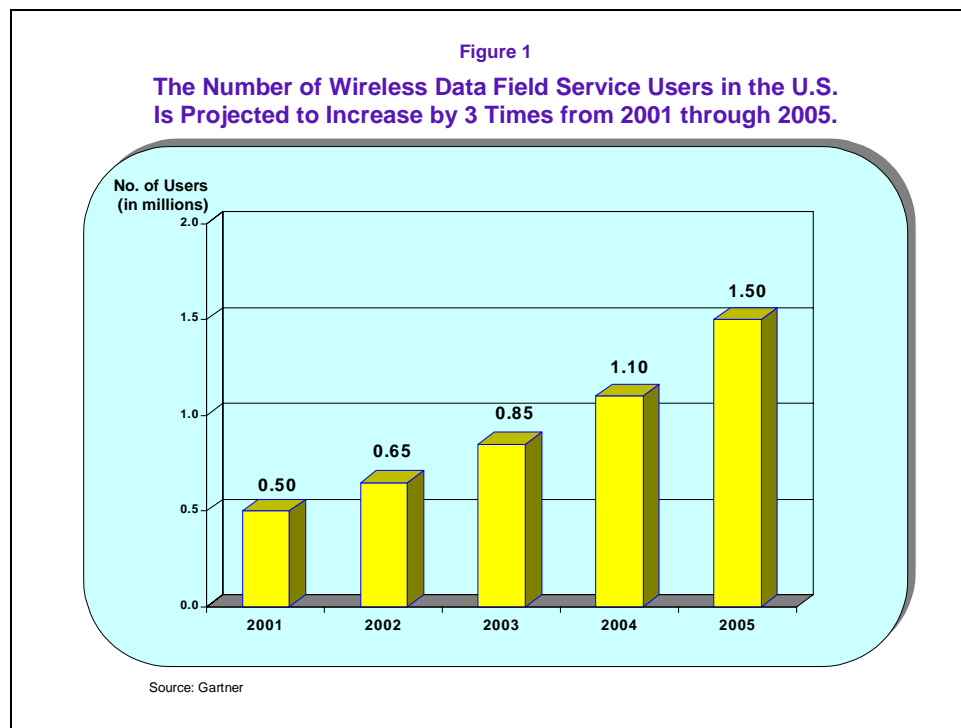
Gartner also projects that wireless location-based services, including applications designed to find the quickest and most accurate route to a particular location using maps, driving instructions and traffic reports, will be growing significantly. The analyst firm expects the number of wireless subscribers using business location-based applications to grow from only about "1,000 in 2001 to 2 million in 2005". We absolutely concur that real-time service management, based on wireless technology and utilizing GPS mapping, is no longer in its infancy - it is here now!

B.   Trends in the Mobile/Field Service Segment

Most industry analysts also agree that the growth prospects for the mobile/field service market base are strong for the foreseeable future. Among the key trends that are likely to drive this market over the next several years are the following:

- Growth prospects among the traditional field maintenance segments (i.e., high-tech IT, computer/office automation, etc.) remain strong, virtually across the board.
- New technology segments are entering the mobile/field services arena for the first time, many of which have never really participated in "traditional" field service activities (e.g., opto-electronics, photonics, laser-based systems, etc.).
- Historical, non-high-tech segments are also entering the world of "high-tech services technology" for the first time (e.g., former electro-mechanical equipment vendors).
- An increasing number of self-maintainers are establishing more sophisticated levels of internal mobile/field service and support capabilities.
- New non-repair-based mobile/field services segments are also proliferating (e.g., field sales, systems integration, business/professional services, consulting and training personnel), and present an attractive "add-on" base of potential hardware/ software/services users.
- Traditional local and regional services providers are now operating nationally and globally, requiring more sophisticated levels of service management system support.

As a result of these trends, not only are there more "slices" comprising the overall mobile/field services "pie", but the "pie" itself is growing significantly larger over time. All data suggest that the total base of potential mobile/field market users will continue to grow at a strong rate for the foreseeable future.

C.   Composition of the Mobile/Field Service Segment

We define the mobile/field service segment as consisting primarily of those services-based business organizations that utilize personnel to install, repair, maintain or otherwise service products, systems and/or equipment at the customer premises. The five traditional types of services organizations in the field maintenance and support market, and a brief description of each, are as follows:

Manufacturers/Original Equipment Manufacturers (OEM)

Manufacturers/OEMs are companies that manufacture high-tech electronic systems and equipment, and/or add value to other manufacturers' products. Many of these types of organizations also provide hardware/software maintenance and support services for their own products and, optionally, for other manufacturers' products. These are typically large manufacturer/service organizations ranging in size from several million to many billions of dollars in total annual revenues.

Independent Services Organizations (ISO)

Independent Service Organizations (ISO) are companies that do not manufacture any products, but provide services and support on other manufacturers' hardware and software. There are several major ISOs in the United States that have national services capabilities, but the U.S. market is also comprised of hundreds of smaller, regional ISOs that typically have few employees and annual revenues ranging from only US$100,000 to US$5 million. Professional services companies that directly provide some level of independent support are also included in this definition.

Systems Vendors

Systems vendors are companies that provide services and support on other manufacturers' hardware and software. These companies either perform the support directly or manage a subcontractor to perform the service for the customer.

Dealers/Resellers/VARs

Dealers/resellers/VARs include three principal classes of participants: traditional dealers and resellers; distributors; and value-added resellers (VARs) that provide independent services, typically on hardware and software resold by their respective organizations.

Fourth-Party Repair Companies

Fourth party repair companies provide depot repair, parts, and components to third-party maintainers (TPMs), resellers, and self-maintenance customers. Some also provide on-site/remote calibration and PM services.

Other historical and/or emerging types of mobile/field services segments, *not* generally included in the high-tech mobile/field service base, but that also represent attractive market targets to wireless-based service management system services providers, include:

- Electro-mechanical equipment maintenance and support
- Consumer home appliances (e.g., refrigerators, washers/dryers, satellite dishes, etc.)
- Commercial/residential utility services (e.g., gas, electric, water, oil, etc.)
- Electrical services (commercial, consumer, institutional)
- Plumbing services (commercial, consumer, institutional)
- Construction services (commercial, consumer, institutional)
- Transportation services maintenance (e.g., local/regional transit, freight, rail, etc.)
- Metrology/telemetry installation/calibration services
- Home-based healthcare
- Public safety (e.g., police, fire, etc.)
- Insurance/tax/real estate assessors
- Government/social services case workers
- Other non-IT and emerging segments

Any of these new/emerging segments may also realistically be included in the five major categories of mobile/field services providers listed above. Further, other specialized services segments that may not even have existed 10 years ago include those manufacturers/OEMs that produce segment-specific "boxes" that were merely shipped to customers in the past, but that now require a full complement of design and engineering, installation and implementation, maintenance and repair, preventive maintenance, calibration, help desk and educational services support (e.g., medical laser surgical instrumentation, opto-electric/photonics devices, etc.).

Although many of these types of organizations are relatively "new" to the services arena, they are finding - all too quickly - that they now require the same levels of mobile/field service support that the more "traditional" components of the field service segment require.

However, we prefer to view the services market in a somewhat more simplistic manner - that is, as a subsection, or component, of the much larger Customer Relationship Management (CRM) and Enterprise Resource Management (ERP) markets that encompass a wide range of front- and back-office processes - including field service, customer service, and after-sale service and support - in every major industry segment. These are typically the businesses that employ the highly skilled personnel who can provide the required levels of field service and customer support to their respective customers, including the manufacturer/OEMs and other services providers with either internal and/or external service organizations. They also include the third- and fourth-party maintainers, systems vendors, and dealers/resellers/VARs that provide complementary services and support to their own respective customers in the overall market.

As such, we see the industry as being divided into the following three primary categories of services organizations (Figure 2):

- *Field maintenance and repair service* - including both routine and emergency services associated with products and systems at a customer's site;
- *Professional services* - including software support, consulting and systems integration; and
- *Logistics and other services* - including logistics (both inventory and business), depot repair and project management.

Figure 2
The Industry Is Divided into Three Primary
Categories of Services Organizations.

© 2003 *Strategies For Growth*^{SM}
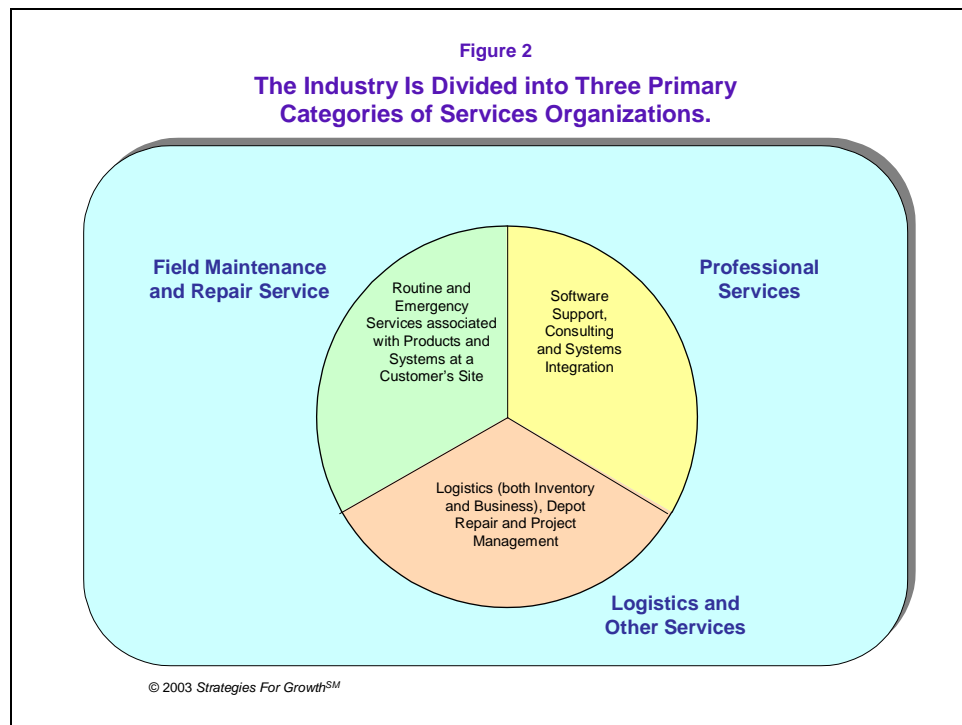
2.   Evolution of Tools to Help Optimize Field Service Management Functions

A.   Evolution of Service Management Systems (SMS)

In addition to running their respective services operations, services organizations must also be able to run their businesses - as businesses! AMR Research reports that most companies in the segment separate their service business processes into the four "macro-categories" of:

- Sales and Marketing
- Customer Support
- Logistics and Operations
- Product and Configuration Management

In total, these four categories may employ up to 18 individual business processes, generally comprised of:

- Channel Management
- Customer Care Management
- Customer Diagnostics
- Customer Intelligence
- Demand Visibility
- Dispatch and Scheduling
- Inventory/Parts Planning
- Logistics
- Order Management
- Order Promising/Availability
- Pricing/Contract Management
- Product Defect Management
- Product Genealogy
- Product/Catalog Management
- Service Order Management
- Technical Documentation
- Vertical Market Integration
- Warranty/Claims Management

AMR Research believes that the success of any services operation can best be measured in terms of mapping the inherent risks associated with operating each of these processes against the potential "reward" in terms such as customer satisfaction, operational efficiency or the like. On the basis of conducting numerous analyses in this area, AMR has concluded that while "tactical automation can cut costs by 5% to 15% within specific operations; strategic automation can improve margins by 25% and gain 60% in share." According to the research firm, examples of tactical automation include such areas as warranty and claims management, product/catalog management, technical documentation, customer case management, and logistics; while examples of strategic automation include customer intelligence and analysis, inventory and parts planning, customer diagnostics, pricing/contract management, vendor-managed inventory, and product genealogy or configuration.

Thus, AMR has successfully proven the case that the services segment is complex, consisting of numerous categories of service business categories and processes; that each of these processes contribute - one way or another - both to customer satisfaction and the bottom line; and that there are great potential benefits associated with both the strategic and tactical automation that can be implemented through one or more of the currently available service management systems packages.

However, there are so many different types of service management systems - either already in use, available for sale, or in development - that to describe any one category in general would be of little use. By following the evolution of these systems in a somewhat chronological order, we gain a more clear perspective of where the industry came from, where it stands today, and - all things being equal - where it is headed.

The four major classifications of service management systems in use today are:
- Internally-Developed, or Home-Grown, Systems
- Commercially-Available Service Management Packages
- Sophisticated/Customized Service Management Packages
- Real-Time Service Management Software Supported by Enabling Technology

Internally-Developed, or Home-Grown, Systems
Historically, many in-house services organizations cultivated their own "home-grown" service capabilities. In fact, it is not unusual to find some manufacturer/OEMs with fairly high revenues still being run on a home-grown system. These systems generally provided tactical operational support for a limited set of services functions - typically restricted to call handling and dispatch, order entry, and inventory control. Few of these original systems offered any type of value-added functionality, such as consulting, implementation and training services. However, supporting and maintaining a home-grown system can be quite costly and time consuming and by the late 1970's many of these original home-grown systems had begun to be replaced by proprietary software products being offered by any number of newly-created, start-up software organizations.

Commercially-Available Service Management Packages
Over the years SMS (Service Management Software) packages have greatly matured and now offer users much greater options with respect to a total service management solution. Today, there are a large number of packaged software products that can be used as "off the shelf" solutions. However, while some organizations may settle for a software solution that follows the 80/20 rule (i.e., the software performs 80% of the functionality, at about 20% of the cost), in actuality, there are few products available today that can meet anything more than a 60/40 rule - or even less!

Sophisticated/Customized Service Management Packages
The most sophisticated service management packages in use today are typically those that have developed and evolved over a long period of time from either an initial home-grown solution, or have been heavily customized from an otherwise commercially-available package. These customized solutions, in turn, may have either been developed internally through a painstaking process involving in-house consultants and developers; through the use of outside developers, consultants and applications designers; or by the software vendors themselves. In any case, these types of highly sophisticated and customized packages typically represent one-of-a-kind solutions, and are generally available nowhere else in the marketplace.

Real-Time Service Management Software Supported by Enabling Technology

Real-time service management software represents an extension of any of these other historical types of packages. However, the key differentiator for this type of solution is the ability to use state-of-the-art technology to make all of the required functionality work in a real-time mode - essentially doing everything that the other types of packages can do - but in real time, rather than on a batch, delayed, or bundled basis. Examples of this type of functionality include real-time scheduling, real-time contract management, and real-time asset tracking. Furthermore, real-time functionality is dependent not only on the state-of-the-art technology embedded in the hardware and software itself, but also on the communications devices that are used by field personnel, such as handhelds, PDAs and other personal communications devices.

B.   Why Neither ERP nor CRM Offer a Total Service Management Solution

While many may argue that everything a services organization needs to operate is already available from any number of commercially-available Service Management Systems (SMS), Customer Relationship Management (CRM) or Enterprise Resource Planning (ERP) packages, this is not necessarily the case. In fact, today's services organizations - more than ever - need to rely on much more than just service management systems to run their businesses (Figure 3).

Figure 3

Today's Services Organizations Rely on More than Just Service Management Systems (SMS) to Run their Businesses.

ERP	Enterprise Resource Planning System
CRM	Customer Relationship Management System
CSS	Customer Service and Support System
FSMS	Field Service Management System
SCM	Supply Chain Management System
MWM	Mobile Workforce Management System
KBS	Knowledge Based Systems

© 2003 Hands-on Management Consultants, Inc.

Many of the most commonly available service management systems packages offer only those modules/applications required to run a services *operation* - but not necessarily a services *business*. That is, they may offer everything that is needed with respect to call handling and dispatch, order entry, parts and inventory, and the like, but *not* the modules that support general business processes such as accounts payable/receivable, human resources, budget planning, and general business management. Although there are numerous SMS packages commercially available, none provide all of the elements required to totally run the services business.

For example, with respect to ERP packages, AMR Research notes that "ERP systems were originally designed for the production side of the business, not for the service side." As such, while some of the "biggest" and "best" of the ERP offerings available today may appear to offer virtually all of the modules and applications required to run a business, they may not always be directly relevant to the services segment (i.e., they may offer everything that is needed to run a *business*, but still leave some gaps with respect to offering everything needed to run a *services operation*).

CRM, despite representing a step in the right direction in terms of the ability to provide a business with a "roadmap" of how to transform itself into a customer-focused organization, also leaves many gaps with respect to supporting some of the basic processes that are unique to the services segment. While CRM typically provides a more focused set of "best-in-breed" functionality and applications for the business, it too may leave some gaps with respect to addressing the unique needs of the services organization.

AMR Research suggests that "users must pursue two strategies simultaneously: Integration and best-in-breed functionality to address key processes linked to sales, customer satisfaction, and high-cost areas, such as inventory and field personnel." AMR goes on to say that "integration is critical because the strategic opportunities for the business require cross-functional integration to coordinate data and processes across product development, customer support, supply chain, and sales and marketing."

For these reasons, while ERP and CRM are both important initiatives for most businesses to implement, they do not always fulfill the total needs of services organizations - that is, that neither the 80/20 nor 60/40 rules may apply in this particular segment. AMR concludes that "even with a very successful ERP implementation, many of the key business improvement opportunities are outside the scope of ERP vendor products. In many cases, leading ERP vendors in the services world are adding more advanced capabilities linked to service and support, sales and marketing, supply chain, and product information, but they inevitably trail leading best-in-breed vendors, forcing the business to constrain business strategy based on the limits of the technology." The same things may also be said with respect to many of the commercially-available CRM packages today, although to a somewhat lesser extent.

C. What to Look for in a Mobile/Field Service Management System Package

Although the definition of best-in-breed functionality differs greatly from segment to segment, Leo A.P. Moerkens, President of Hands-on Management Consultants, Inc., has identified the following as being among the most common criteria/features:

- ***Real-time operation and communication.*** This requires real-time system access to every person in the organization through the use of mobile devices, Web-based access, or some combination of the two. The software that is ultimately selected will need to be developed with the end user in mind, and must be highly customizable to meet the specific requirements of both the organization and the individuals who work for it. The incorporation of voice activation and recognition technologies will also serve as a differentiator.

- *Flexible and secure customer interface.* The trend is toward customer self-help and eService in an effort to reduce cost and increase customer satisfaction. This requires the integration of knowledge-based systems in the front-end business applications. The next level will be interfacing to help-desk via chat and/or IP Voice, possibly in the future combined with video.
- *Workflow and performance monitoring-based dispatch functions.* This requires scheduling and dispatching tools, which will allow dispatchers to proactively manage their business process. Visual tools (e.g., dispatch boards and views that are integrated with maps, real-time location, and the integration of all data required to make the best dispatching decisions) combined with the appropriate drill-down techniques will also be necessary to allow dispatchers to be as effective as possible in their function, along with the ability to handle larger groups of people.
- *Real-time transactions, both in the office environment and in the field.* This is necessary to respond quickly to customer requirements, manage the processes in a real-time and proactive mode, and to keep investments in inventory down while maximizing parts availability.
- *Business rules flexibility.* This is also necessary to easily implement and configure the systems to specific customer needs. This includes screen changes to support workflows and create user-friendly interface to the end-users. However, it also applies to the functionality necessary for automating transactions that may currently require manual intervention.
- *Field technician functionality that combines all the administrative tasks and integrates them into one application.* The most common tasks are activity tracking, time tracking, and expense tracking. These functions, combined with data communication, and in place of voice communication, will increase the efficiency of the field technician and drive costs down while increasing information accuracy and speed of billing. Empowered by real-time, wireless data communications, more functions can be automated directly from the field, such as call closure reporting; automatic parts replenishment following parts usage; and electronic signature capture for immediate customer billing; etc.

In many respects, it can be argued that there have been few significant changes in field service management systems offerings over the past 10 years. All of the basic functionality, such as call handling and dispatch, order entry, and inventory/logistics, that have characterized the industry since the first home-grown capabilities were created decades ago, still serve as the "core" components of virtually every service management system package available on the market today. However, one thing remains clear - despite the ongoing introduction of new "modules" of functionality, there are few packages available today that have successfully integrated all of their functionality into a single, total solution package. What most of today's service management system offerings seem to be missing, is the ability to integrate all of these otherwise disparate functions into a single, cohesive, total service management solution (Figure 4).

Figure 4

Today's Field Service Packages Must Provide the Functionality Required to Integrate Multiple Business Processes.

FSMS — Field Service Management System
MWM — Mobile Workforce Management System
KBS — Knowledge Based Systems

© 2003 Hands-on Management Consultants, Inc.
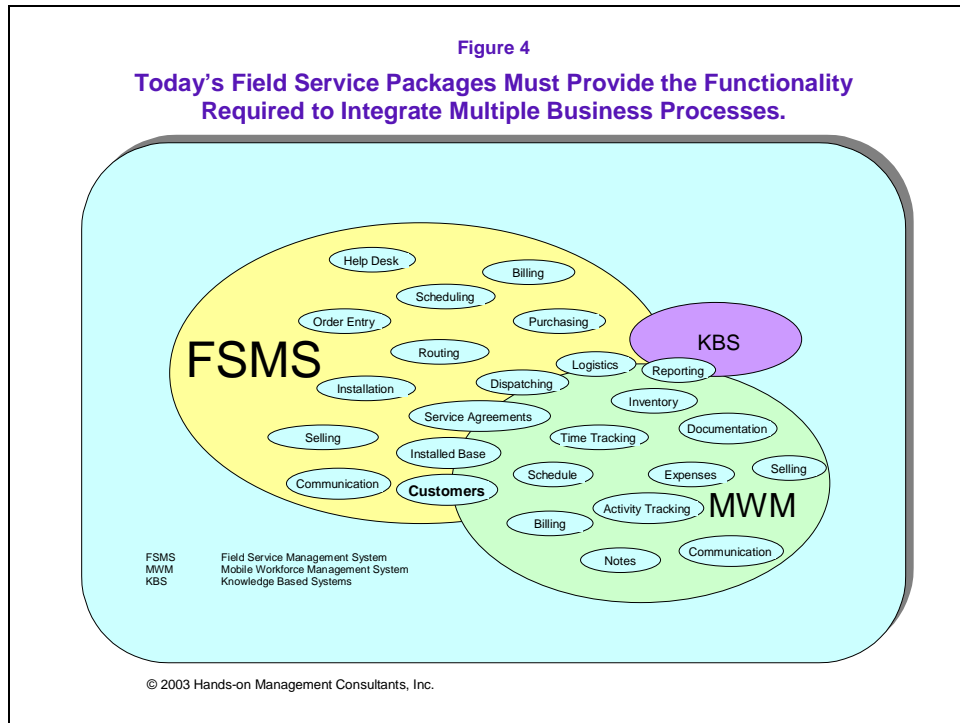
We view the traditional components of a Mobile/Field Service Management System package as typically being organized in the following fashion:

- Call handling, knowledge base, and service call prevention
- Field service planning, scheduling and control
- Optimized dispatch, including integrated mapping and GPS tracking
- Logistic/Inventory management
- Project management
- Depot repair processes
- Contract administration and preventive maintenance processes
- Asset management with equipment history
- Wireless functionality - mobile devices
- Web functionality
- Operations and management reports
- Accounting/Financial supports with integration to accounting/ERP packages
- Planning and forecasting functionality

However, according to Hands-on Management Consultants, there are many other specific areas of functionality that may also ultimately define the right package for any given services organization, including:

Office Functions/Information

Customer File Maintenance
Customer information usually originates from the organization's CRM, contact management and/or financial systems, and the interface to these systems is critical for obtaining a steady flow of up-to-date, accurate and synchronized information.

Installed Base Maintenance

In the ideal situation, this information comes from the Sales side of the business (i.e., based on shipments), although in a great many cases, additional detail about the specific configuration and the serial numbers may also be required. The best systems have functionality in place (based on indicators) that update the installed base records automatically when a specific part is used during a service call. In some segments (e.g., medical/healthcare) government regulations require a history at the part level (e.g. movement from inventory to installed base, back into repair, back into inventory etc.).

Service Agreements Administration

The service agreements administration requires an interface with installed base (e.g., complete coverage, partial coverage, maximum cost, usage formula, etc.), billing, and call handling to determine entitlement based on activities and time; and parts usage to determine billable parts. Depending on the particular market segment, this can be a very complicated process. The best systems typically have tremendous flexibility to configure service agreements based on configuration, activities, time, and usage.

The current trend in the market is toward more customization of the agreements offerings, which requires an increased flexibility in systems capabilities. The best systems we have seen allow users to create custom templates for service agreements and apply and link them easily to the installed base and invoicing module. This reduces the maintenance task, especially for those organizations with a large customer base.

Order Entry

The order entry function depends heavily on the characteristics of the market and the sophistication of the customer and company, as well as the complexity of the equipment and/or software. Especially in the software support world, customer-driven front-end functionality is very well developed to reduce and contain the cost of support and increase customer satisfaction. These principles are increasingly being applied to other segments of the industry as well with the more complex, software-driven companies typically leading the front. The current range is from a complete manual interface to a customer-controlled interface where the creation of a work-order is an escalation step.

Scheduling

As with order entry, scheduling is heavily dependent on the type of industry and varies from straightforward account responsibility to complicated scheduling and routing to meet specific customer/contractual requirements. Increasingly, scheduling incorporates real-time location functionality (enabled by GPS mapping) to assist in making the most efficient dispatch decisions. Our experience has shown that in a high call volume environment, where companies handle between 6 and 8 calls per technician, per day, the scheduling, often combined with routing software to reduce travel time, is more a science, combined with a little art; while in a highly technical environment, where technicians handle only between 1 and 3 calls per day, it is more an art, combined with a little science. Usually scheduling is driven by the reaction time to the customer, mostly described and committed to in service agreements.

Routing

Routing is mainly used in a high-volume environment like utilities, communications, etc. The advantage is that the routing system will create the optimal route to minimize travel time and optimize efficiency. Most companies use add-on packages that are on the

market to accomplish this if they are focused in these market segments. GPS mapping has been a boon to this component of mobile/field service management systems.

Dispatching

The dispatching function is the interface to the field technician. In smaller organizations this function is combined with the planning function and is responsible for the routing of the work and balancing of the workload to ensure that the customer requirements are being met.

The best systems in the market have the capability to route the calls and associated information (i.e., history) from one person to another and, at the same time, allocate inventory to the call and ship via the logistics function (i.e., parts and/or kits). This requires a seamless link between the dispatching functionality and the logistics functionality. At the same time, dispatchers need an overview of the available resources and scheduled workload per resource. This requires the same tools as discussed in the scheduling segment.

Installation Planning

The installation planning also varies by market segment and is directly related to the complexity of the installation. In the consumer environment, the availability of the equipment drives the planning, in which case the add-ons and additional parts are packaged and the resources are planned and scheduled. For this reason, there needs to be an interface with the logistics function and/or purchasing module.

The other extreme is a complicated project that might also require design, purchasing, site readiness and government agency inspections; software development; cabling; etc. In these cases it might require a combination of internal and external resources that need to be purchased and invoiced. The latter case requires a full functional project management tool, which is usually outside the scope of basic service management systems.

Help Desk

The Help Desk function is increasingly being implemented in companies as a part of the field service operation. In companies with more complicated technical equipment, knowledge-based tools have been developed to reduce the need for education and increase the efficiency of the processes. This can be manifested at different levels, depending on the complexity:

- Electronic documentation, which allows easy and fast access to information, for example, to identify parts, etc.
- Decision trees, which allow a structural approach to diagnosing the problem in the shortest possible time.
- Case-based reasoning techniques, reflecting a more complicated approach for more complex environments.
- Fuzzy logic (i.e., a formal mathematical process that identifies modes of reasoning that are approximate rather than exact). (The notion of possibility, unlike probability, lends itself to the representation of "vague" and "fuzzy" concepts and expressions that are common in verbal communication and spoken language. The use of fuzzy logic to express uncertainty provides additional robustness to reasoning mechanisms, such as the help desk function).

Except for the simple decision tree functionality, most systems today use add-on modules to provide for the more complicated functionality, mainly on the basis of cost and the complexity of the system.

Reporting

The reporting of activities and transactions is necessary to feed the following functions:

- *Financial, for billing, post-calculations and cost tracking/allocation.* Some of this information has to be real-time (e.g., to support distributed billing), while other information can be delayed.
- *Operational, for process control and management.* Most of the information has to be real-time to be able to escalate and manage the service processes. Status information about calls, parts and shipment information, also needs to be real-time in order to manage the customer relation.
- *Analysis, to assess processes and drive process improvement, inventory investments and customer satisfaction.* The real-time information needs to be accessible via computer screens and be updated on a continuous basis while the other information should be accessed via easy-to-use reporting engines. Most organizations want to be able to download directly into applications like Microsoft Excel for analysis and modeling.

Logistics

A field service application requires full-blown logistics functionality. Depending on the individual company, this typically has to be linked to the ERP system and, nowadays, also to the Supply Chain Management system. A strong interface also needs to be made to the financial systems for proper inventory valuation and transaction tracking.

The principal elements of the logistics functionality are:

- Forecasting of the anticipated parts needs.
- Planning for where to locate the spare parts to ensure that lead-time requirements are met.
- Purchasing, to buy (internally or externally) the parts necessary to maintain the proper inventory levels.
- Warehousing, not only of tiered, or echeloned, locations, but also to track real-time inventory in the technicians trunk.
- Replenishment, or auto-replenishment functionality to push inventory into the pipeline.
- Parts ordering for emergencies when the part is not available at the front-line location.
- Returns handling, for repair or evaluation.
- Depot repair.
- Inventory control.

Purchasing

Depending on the overall systems environment, purchasing functionality might be needed for material and services. Most companies require a direct link between the cost of the purchased goods and services to the billing side of the business. Depending on the business practice, these costs might be absorbed on an overall project, passed through at cost, or passed through with an uplift. In any case it requires functionality to link together.

Selling

The selling function has the following components:

- Service agreements, requiring a quote capability based on the types of agreements, combined with flexible pricing.
- Parts functionality, required to quote and sell parts.
- Accessories functionality, to sell add-on accessories or consumables based on price lists and/or catalogues.
- T&M functionality, to quote and sell after receipt of a P/O.

Billing

The billing is a result of the selling function and the trend is toward more and more flexibility for service agreements and projects. This function also needs to be interfaced to the organization's financial systems. In many situations, invoices need to be created real-time and in the field, which requires additional functionality.

Communication

The emerging technology and integration between computer technology and communications opens new avenues to improve the business processes, increase customer satisfaction and lower costs. Real-time, wireless data communications will enable companies to instantly link its office functions with the mobile workforce. This will speed up the process, improve the responsiveness of the organization, increase the accuracy of information, and improve the overall speed of the transactions. The new technologies with hand-held devices from PDAs to tablets and voice recognition, combined with wireless communication, will make it practical in the field to start automating most of the tasks, thus eliminating paper and manual transactions and operate in a real-time mode.

Field Functions/Information

Maintaining the Schedule

Field technicians have always maintained their schedules. Based on the information received from the schedulers/dispatcher via the phone, lists with scheduled PMs, etc., they have successfully been able to balance their activities. But, it has traditionally been, and still is in most cases, a manual effort. However, with the emerging technology and integration between computers and communications, many companies see the opportunity to link the office functionality to hand-held devices in the field. The two-way communication possibilities allow the interactivity between the field and office functions to send and update scheduling information without having to look for a hard-wired phone or using a cell phone. The result is a more effective and efficient communication channel and increased transaction speed. This is a new feature that is only now becoming available in leading service management system solutions.

Activity Tracking

All activities in the field need to be tracked and this function has also historically been done manually, or independently by the technician in the field. However, by integrating activity tracking directly into a front-end application, it can be transferred real-time to the FSS and update the office functionality. It also allows for a complete overview of all activities, *versus* the activities only related to calls, which allows organizations to perform a better analysis of time spent and efficiency of the mobile workforce.

Time Tracking

Time tracking is related to activity tracking and much of what has been said there applies to time tracking as well. In addition, most companies require time reporting *via* time sheets to determine overtime, link the data directly to payroll, track the efficient use of time, etc. By integrating this into the front-end application, one entry allows the information to be distributed to multiple modules, thereby reducing the paperwork and streamlining the business process.

Expenses

By building expenses into the front-end application, a single entry can be linked to multiple parts of the office system, and without additional effort and paperwork.

Inventory

The inventory function for the field technician needs to have the following functionality:

- Trunk inventory tracking, linked to billing, and automatically subtracted from the available inventory.
- Parts ordering, linked to the main module, with real-time status of availability and the ability to create an order based on priority need.
- Automatic replenishment based on usage of parts at a periodic interval set by the business rules.

Reporting

Based on the tracking of activities, time tracking, expenses and parts used, reporting needs to be easy and automated. This requires a virtual Field Service Report that must be completed with the appropriate technical information.

Billing

Depending on the business requirements, real-time field billing (incorporating electronic signature capture) might be necessary to invoice for service, parts and or consumables and accessories. The technology will allow for a real-time link to the main system for billing, and to synchronize information.

Notes

Based on our experience, every technician has his/her little notebook with important information about customers, parts, equipment, calibration, etc. This functionality should also be built into the front-end application to accommodate the service techs.

Documentation

Documentation is an issue in every field service environment from parts list, to drawings, to calibration information, etc. Some integration of documentation needs to be possible through the field communications devices, although the limitation of the screens and resolution might still be a limiting factor in many cases.

Communication

As stated earlier, the integration between computers and communication technology will change the way we communicate. There will be a shift from voice communication to data communication *via* wireless devices. This requires a communication interface (i.e., server) that can handle the required channels/carriers, based on each customer's specific requirements.

Customer Information

The field technician needs real-time access to customer information and, possibly, directions for how to get there. The technology is currently available to quickly retrieve that information primarily from internal customer information systems, integrated with GPS mapping functionality. These technologies will also allow for the easy updating of customer information from the field application to improve overall information accuracy with minimal effort.

Installed Base Information

Installed base and configuration information also need to be real-time accessible to the field technician, and will need to be updated automatically. Also updates from the field need to be possible to improve the accuracy of information (e.g., equipment moved to other locations, etc.) The field technician will also need real-time access to equipment history information (i.e., failures, parts usage, etc).

Service Agreement Information

The field service technician needs real-time access to service agreement information to determine entitlement, set up billing, etc.

Selling

Depending on the business requirements, field technicians need access to catalog and pricing information to be able to sell consumables and accessories to customers while they are on-site. The information needs to be delivered in real time to ensure accurate billing.

Knowledge-based Systems

Depending on the business environment, field technicians need access to knowledge-based systems to assist them in the diagnosis process and increase their efficiency. At the present time, these applications usually require a notebook, but with the storage capacity of many of the new devices that are now entering the market, new possibilities are being created to incorporate this functionality into other portable devices, as well.

3. What is Coming Next – and How Much of It is Actually Here Now?

A. Current Trends in Real-Time Field Services

The services industry is evolving rapidly, and is likely to continue to do so - even more rapidly - over the next several years. New technologies will proliferate, new applications will become available, and new software will be sold to support them. That is why it is so critical to choose *absolutely* the most appropriate mobile/field service management software, with the most effective modules and applications, and from the right vendor with the best after-sale customer and technical support capabilities.

Recently, Gartner reported that field service applications have been a "bastion of wireless success and value" with wireless data initiatives often showing "positive ROI within nine months". Further, they expect this market to "continue to grow in users and functionality" throughout the foreseeable future. According to Gartner, while historical applications have focused on areas such as job scheduling and dispatch, the introduction of newer technologies have also provided additional value by increasing the number of calls that can be made "via more efficient dispatch, rapid rescheduling for rush or emergency jobs and notification when jobs are complete".

Gartner goes on to say that "With increased bandwidth and the introduction of location-enhanced services, the field service market will continue to experience high growth in revenue and users. New applications that report and route techs based on current location, coupled with the ability to send image and diagnostic/schematic files directly to the field will open up a new wave of adoption within the field service user base."

This is exactly where we believe the market differentiates one vendor's mobile/field service management package from all of the others. Ultimately, the most successful packages are likely to be those powered by the new technologies and applications such as wireless, real-time service management based on a combined foundation of real-time scheduling with GPS mapping, contract management, asset tracking, mobile communications, and service order closure.

Gartner strongly believes that "data exchange between field technicians, the enterprise and its customers is critical to the success of field service automation (FSA) initiatives". The analyst company explains that "the exchange of information electronically eliminates paperwork and associated errors, boosts field service personnel productivity and better enables the enterprise to keep its customers satisfied", but also warns that services managers must address the issue of whether wireless connections for data exchange are appropriate on a project-by-project basis, factoring required levels of connectivity into each cost-justifying equation as well. In any case, Gartner agrees that nearly all of the required technology is already here - but that the specific components of cost-justification may still vary greatly from one prospective user to another.

Gartner also believes that an organization can most easily cost-justify its wireless mobile/field service management system on the basis of matching "time criticality" against "data impact". The company defines time criticality as "the delay between the capture or creation of the data and its application to the appropriate business decision". Its definition of data impact refers to "the importance placed upon that data to meet enterprise business objectives and maintain a high level of customer satisfaction".

As an example, Gartner suggests that "the timely delivery of dispatched service call orders from the dispatch center to the field service technician could make the difference between a satisfied or dissatisfied customer and higher or lower service delivery costs. In a case in which real-time wireless connections for service call dispatch are important, both the time criticality of the data and the data impact are high."

Currently, we believe there are five trends that are strongly influencing the mobile/field service market:

1. Service management software is now being developed to handle the entire service business, and not just small tactical areas.
2. Communications technology is promising to greatly improve the efficiency, flexibility and performance of service organizations.
3. The web has made universal access a requirement for software.
4. Organizations are attempting to limit customization of software and for the first time the software industry has the ability to make products far more configurable.
5. Integration/interoperability between different software packages - the transfer of information between applications - has been made much easier because of XML.

Once again, it is clear that the technology is here to address the needs of real-time service for field service organizations. However, the problem has been to find the one software package that has been able to successfully integrate all of the relevant technologies into a single, practical, cost-effective solution.

B.   What Is Real-Time Service, and Why Do Field Organizations Need It?

Services organizations are what keep businesses up-and-running. Equipment doesn't run by itself - people make it run. But when the equipment isn't running the way it should be, that is when services organizations need to step in make it all happen. We believe that every business's service operation is comprised of a "collection of moving parts" - including service personnel, the call center, and the installed base of systems and equipment - and that all of these components need to be working together in order to solve customers' problems.

Thus, it only makes sense that since system failures occur in real time, that system "fixes" should also occur in real time. This is the principal rationale behind what most industry analysts have seen as the market's need for wireless-based, real-time service management.

One of the first companies we saw that provided a complete real-time service solution was Nexterna, Inc. Their Nexterna Clearview system allows field service technicians to work together in real time with the central office by integrating a complete, web-based field service management application with GPS tracking and wireless, mobile communications systems. Nexterna, a wholly-owned subsidiary of Union Pacific Corporation, has more than a decade of experience developing wireless fleet and service management systems for mobile resource management. Their experience shows that a real-time wireless solution allows service organizations to more effectively manage their respective technicians' skill sets and current locations, parts availability, and customer SLA requirements, while at the same time, improving overall productivity, reducing operating costs, and most important of all - increasing customer satisfaction.

As a result, we believe that the market's expectations for immediate access to important data and information are also rising. Customers are increasingly being exposed to the availability of current, accurate and immediate information from a growing number of their vendors. For example, companies like FedEx and UPS have been providing access to real-time shipment tracking for some time now, and an increasing number of customer call centers are now providing callers with their place in line as well as an estimate of how many minutes will transpire until a customer service rep takes their call. With real-time data access already being provided by so many different types of vendors, we believe that the market now expects the same levels of support from all of their vendors - especially from their field service and support providers.

For most technical service organizations, serving customers is the ultimate measure of performance, where operational excellence brings improved customer satisfaction and loyalty, as well as a genuine competitive edge. Even the best-performing service organizations will require real-time service functionality in order to survive - and thrive - in an increasingly fast-moving and demanding market environment.

This need is further manifested in the various types of questions that virtually every services manager asks over time, including:
- Are our service techs armed with the complete contract and SLA information they require *before* they start a job?
- Are we able to dispatch responsibly to meet immediate customer demands?
- Is our inventory being effectively managed?
- Are our jobs getting billed the same day they are completed?
- How close to 100% is our operational machine running, and how can we get closer to that level?

Addressing all of these questions is a formidable task for any services manager, and may ultimately be impossible to answer without having the appropriate tools at your disposal. As such, we believe that a wireless, real-time service management system is the only solution that provides a services organization with the power to integrate all of its "moving parts"; focus all of its resources; and run a leaner, more efficient and responsive operation.

However, making the organization work as efficiently as possible remains a constant challenge for most businesses. This is why we also believe that services organizations need a complete mobile/field service management application that is also seamlessly integrated with a mobile communication system based on GPS mapping. By utilizing a wireless, real-time service management system with GPS mapping capability, services organizations can greatly simplify their field service logistics. They can also gain wireless access to contracts and SLAs; technician and vehicle locations; invoices; even inventory - anywhere, anytime. Wireless, real-time service management systems are what services organizations need to manage leaner, stronger, more durable and resilient operations.

Nexterna has identified a basic set of business drivers that it believes may serve as the primary areas of focus in the development of every wireless, real-time service management solution. These business drivers, or objectives, generally include:

- Reduced operating costs and improved cash flow
- Increased operational efficiency
- Improved productivity of field service personnel
- Improved customer service and loyalty
- Better inventory management
- Improved tracking and visibility

More specifically, each of these drivers consists of its own potential areas of improvement that can provide the user organization with a multitude of benefits that can be manifested in a great many ways. According to Nexterna, the six principal areas of improvement, and the individual components that comprise them, are listed below:

Reduced Operating Costs and Improved Cash Flow
- Reduced number of callbacks
- Reduced use of vehicles on non-service related activities
- Minimized time between work completion and invoicing

Increased Operational Efficiency
- Increased service order completions
- Improved resource utilization through more efficient dispatching
- Better communication with field workforce
- More accurate record-keeping
- Automation of simple, yet time-consuming tasks

Improved Productivity of Field Service Personnel
- More efficient scheduling and routing
- Reduced wait time for contact, contract, or parts information
- Reduced paperwork

Improved Customer Service and Loyalty
- Quicker response time
- Increased number of calls completed on the first visit
- Decreased billing disputes

Better Inventory Management
- Reduced inventory levels
- Improved re-order program
- Higher inventory availability

Improved Tracking and Visibility
- Electronic service orders ensure accuracy
- Improved vehicle, inventory, and technician location capability
- Real-Time status updates
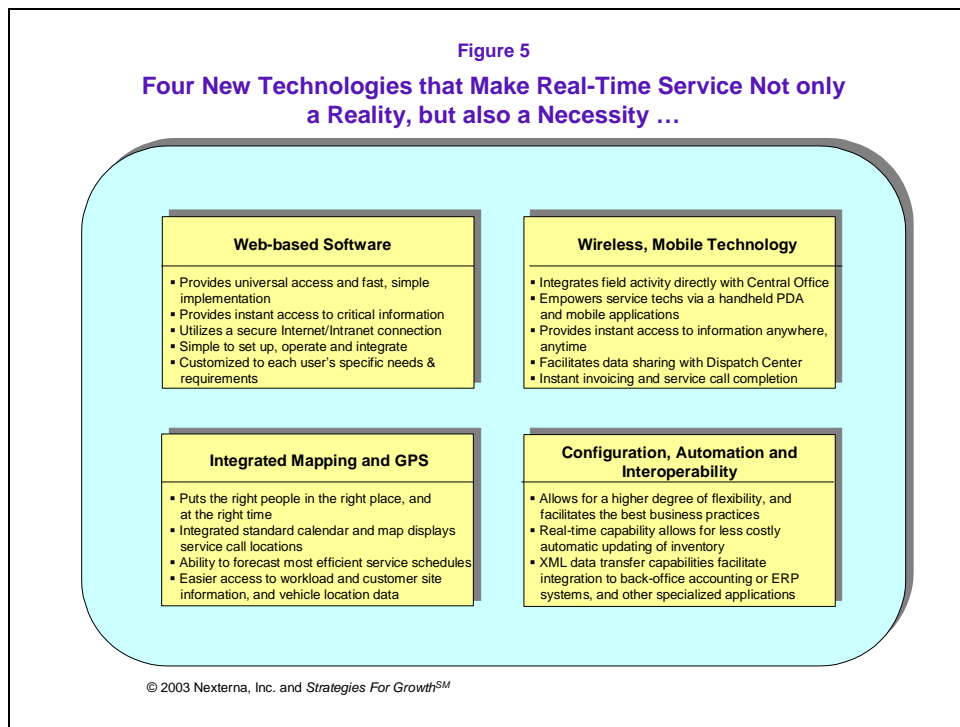- Customers can initiate and check call status online

Based on our client research conducted over the past several years, we also believe these drivers to represent the real justification for why wireless, real-time service management solutions, powered by GPS mapping functionality, are required in today's increasingly demanding marketplace.

C.   What Are the Technologies that Power Real-Time Service?

Nexterna also identifies four principal technologies that power real-time service capabilities in today's marketplace. They are:

- Web-based software
- Wireless, mobile technology
- Integrated mapping and GPS
- Configuration, automation and interoperability

According to the company, the advancement of technology has made the ability to provide real-time service not only a reality, but also a necessity, in today's services-oriented environment. To prove its case, the company cites the following recent technological advancements (Figure 5):

Figure 5

Four New Technologies that Make Real-Time Service Not only a Reality, but also a Necessity …

Web-based Software
- Provides universal access and fast, simple implementation
- Provides instant access to critical information
- Utilizes a secure Internet/Intranet connection
- Simple to set up, operate and integrate
- Customized to each user's specific needs & requirements

Wireless, Mobile Technology
- Integrates field activity directly with Central Office
- Empowers service techs via a handheld PDA and mobile applications
- Provides instant access to information anywhere, anytime
- Facilitates data sharing with Dispatch Center
- Instant invoicing and service call completion

Integrated Mapping and GPS
- Puts the right people in the right place, and at the right time
- Integrated standard calendar and map displays service call locations
- Ability to forecast most efficient service schedules
- Easier access to workload and customer site information, and vehicle location data

Configuration, Automation and Interoperability
- Allows for a higher degree of flexibility, and facilitates the best business practices
- Real-time capability allows for less costly automatic updating of inventory
- XML data transfer capabilities facilitate integration to back-office accounting or ERP systems, and other specialized applications

© 2003 Nexterna, Inc. and *Strategies For Growth*[SM]

- *Web-based software* provides universal access from any computer with Internet access. Customers can initiate and monitor service calls, and search a knowledge base for self-help; technicians can update the system directly and immediately; remote offices can use the same system with no additional technology hardware/infrastructure investment.
- *Wireless, mobile technology* allows field technicians to work together in real-time with the central office. They can receive and accept electronic service orders, and directly access customer, contract, history, and inventory information.

- *Integrated mapping and GPS* allows dispatchers to view a specific customer site on a map alongside the location of the nearest technicians. For each technician, the correlating skill set, schedule, job status, and on-hand inventory is available. This enables the dispatcher to assign the right technician that can complete the call quickly, on the first visit.
- *Configuration, Automation and Interoperability* of applications today allow for a high degree of flexibility, ensuring the software facilitates the best business practices. The integration of various service components can automate simple, but time consuming tasks such as using service order completions to update inventory information. In addition, with XML data transfer capabilities, integration to back-office accounting or ERP systems, or to other specialized applications, becomes relatively simple.

Each of these technologies is now readily available, although not always fully integrated into every vendor's wireless, mobile/field service solution packages. The question is no longer whether Web, wireless and GPS technologies work, but rather how they can best help improve the quality, responsiveness and efficiency of service delivery.

D.   What Are the Real Benefits of Real-Time Service?

The benefits of real-time services management are many, both for the organization's service personnel, as well as the customers they support. Through the use of wireless, real-time service management systems, the organization's service personnel gain the ability to:

- Access information anywhere, anytime using a wireless handheld device;
- Instantly view service level, equipment warranty, and contract information;
- Capture signatures, enter labor and travel times, record cause/repair codes, and allocate parts;
- Close and bill service orders themselves; and
- Minimize travel time between calls by using a live, graphical site map to determine proximity.

However, just as importantly, the organization's service customers can also:

- Take an active role in their own customer service;
- Electronically initiate service requests and monitor call status; and
- Get immediate answers to their service questions online.

This, in turn, enables the service organization to:

- Manage its service and sales operations with one tool from a single source;
- Coordinate the actions of its service people, call center, and entire back office - continuously and seamlessly;
- Give its service people and customers web-access to vital service information;
- Use integrated mapping dispatch to route more efficiently;
- Track the technician time and parts associated with each service call or contract;
- Set the stage for controlled inventory to help keep costs down;
- Facilitate the streamlined flow of information between and among dispatch, finance, purchasing, and inventory;
- Ensure that customer service level commitments are being met; and
- Review comprehensive reports to get a clear picture of the operation's profitability.

Wireless, real-time mobile/field service management systems, incorporating Web-based software, wireless data communications, and GPS mapping functionality, provide a "win-win" situation with identifiable and measurable results at all levels within the services organization. From management, to staff, to service techs in the field, and to the customers themselves - all parties can easily understand how the system will be of value to their day-to-day business operations.

Other benefits realized by users of wireless, mobile/field service management solutions include:

- Improved service response to customer needs by enabling dispatchers to communicate in virtual real-time with technicians in the field
- Completion of more calls on the first visit by giving field technicians access to technical data and inventory information on site (e.g., up-to-the-minute and historical services activity information)
- Increased technician productivity through more efficient job scheduling and prioritization
- Improved billing cycle by automatically initiating an invoice as soon as a job is completed
- More time for field representatives to call on additional customers
- Expedited order processing at the distribution center
- Reduced operating costs
- Ability of service engineers to order parts directly from the field
- Use of point-of-sale (POS) devices to collect payments for services rendered on-site
- Ability to locate a services engineer's exact location through global positioning systems
- Elimination of unnecessary paperwork, and the need to carry product manuals, customer lists, etc.

4. Leading the Way - a Wireless, Real-Time Success Story (Case Study)

A. Patterson Dental Supply, Inc.

In April 2002, Patterson Dental Company entered into an agreement with Nexterna, the Omaha, Nebraska-based provider of wireless Mobile Resource Management (MRM) solutions, to deploy the company's Clearview service management system. Patterson is a US$1.2 billion distributor of dental and veterinary products serving the North American dental supply and companion-pet veterinarian supply markets.

As Patterson's largest business, Patterson Dental Supply provides a virtually complete range of consumable dental products, clinical and laboratory equipment, and value-added services to dentists, dental laboratories, institutions and other healthcare providers throughout North America. At the time of the announcement, Patterson Dental Supply, which has historically been growing significantly faster than its market, had the largest direct sales force in the industry, totaling over 1,100 sales representatives and equipment/software specialists serving the United States and Canada.

The agreement called for the implementation of the Nexterna Clearview system for Patterson Dental's service organization and for their 650 service technicians in field offices throughout the United States. The Clearview system was chosen on the basis that it is "a complete field service management application that is seamlessly integrated with mobile communication capabilities".

"We selected Nexterna for two primary reasons," said Lynn Askew, Vice President of Management Information Systems for Patterson Dental. "First, the wireless capabilities of the system and Nexterna's experience deploying and supporting wireless applications were important to us. Second, the functionality of the application itself met our business requirements, specifically vehicle location capabilities, driver-dispatch communications, contract and inventory management, work-order completion, and automated service order dispatch."

The Nexterna Clearview application is web-based and includes in-depth modules for service order management, sales order management, optimized dispatch, contracts and preventative maintenance, and logistics and reverse logistics. It will allow Patterson Dental to streamline its service operations, focus resources and improve profits by integrating all the components of their service management business.

"The number one goal for the implementation of Nexterna Clearview is better customer service," said Greg Gerding, National Technical Service Manager for Patterson Dental. "This system will allow us to complete more calls on the first trip, and respond to doctors' requests faster. We will be able to dispatch the person with the right skills and the right part, right away."

The Nexterna Clearview system includes back-office and mobile service management applications, wireless data connectivity, and real-time GPS vehicle location. The specific solution provided to Patterson Dental Company also includes rugged mobile computing devices supplied by Itronix, and wireless communications units supplied by Wireless Matrix. Nexterna also recommended inventory planning and forecasting software for service parts from Servigistics, Inc. to satisfy Patterson Dental's specialized inventory

requirements, as Nexterna Clearview's web-based architecture also accommodates third-party applications.

According to Askew, there are three principal parts to the Nexterna-powered system:
- The main application,
- A GPS module, and
- A wireless handheld computer.

In an interview originally published in **Field Force Automation**, Askew stated that, "The main application performs scheduling, service order entry, parts management and resource management of the skill sets and geographies of our technicians. It handles the entire back office as well, generating invoices and interfacing with our accounts receivable and other business systems.

"The GPS system works through a Wireless Matrix Mobile Base Station installed in each of our service vans. It uses one of two terrestrial networks - and switches to satellite if necessary. The location of each van is reported and displayed on a map for us every 10 minutes or on request. Knowing where the trucks are improves our dispatching and allows us to monitor the productivity of our technicians.

"Finally, we will outfit each technician with an Itronix Fex21 handheld computer. In the morning they'll plug into a landline from their homes and download all their service orders for the day. They'll also receive a complete inventory of equipment and repair history for each service order. During the day they can sync wirelessly from their vans to send completed orders and invoices. At the end of the day they'll perform a landline download."

According to Askew, "We started with the GPS capabilities because that was where we had an immediate need. Then we implemented the main application." Before the end of 2002, Patterson had planned to deploy the handheld computers with the mobile application.

Patterson has also realized significant benefits from its new wireless, real-time solution, according to Askew: "The GPS is already helping us in several ways. When we receive a service call we can type in an address and get a map showing every service person within a given number of miles, enabling us to dispatch more efficiently. It also provides what we call a bread-crumb trail. At the end of the day we can isolate a particular time and see where each van was; or we can pick a truck and follow it throughout the day.

"The main application has helped us schedule the right technicians and efficiently give them their service orders with complete contract and account contact information. When the service is complete, the service order is closed in the system and billing occurs within hours. We also have better parts inventory visibility. We can dispatch technicians with the right parts, transfer parts between inventory locations and more efficiently order parts from vendors. It keeps our general ledger up to date in near real-time. Invoicing is a same-day process, which is an incredible improvement for us as well as for our customers.

"It will improve procedures for the technicians as well. They will start their workday from home with what we call their 'start of day' routine, uploading their service orders and customer history for the day. The system also allows technicians to enter lunch, van maintenance and other non-service-related activities into their schedule, so there is a complete view of their commitments for the day. As they complete each service call, there's a screen to be reviewed by the doctor that lists everything completed, including labor, and the doctor signs the screen on the spot. The doctor can request the bill to be faxed, e-mailed or mailed. Then the technicians go back to their vans, put the handhelds in the cradles and wirelessly sync with the office. Their fully completed service orders with billing information are uploaded to the system and any schedule changes are updated. If the doctor requests fax or e-mail, they receive the invoice within hours. No more cell phones and paperwork. Finally, 'end of day' is when the technicians upload all their information and notes from their homes via a landline."

Ultimately, Patterson expects to recoup its costs through an increased number of completed service calls per week; improved billing timeliness and accuracy; and reduced expenses, including overtime. In 2002, the company had 650 service vans, so just the savings in gas and maintenance alone from optimizing its dispatch processes was expected to be significant - as well as the increase the useful life of the vans.

"The Nexterna Clearview system is a single package that enables mobile technicians to work together in real-time with the central office," said Michael Hedge, Senior Vice President of Field Services for Nexterna. "Nexterna brought together best-in-class vendor partners, Servigistics, Itronix, and Wireless Matrix, to provide a complete, integrated solution to meet Patterson Dental Company's business objectives."

The Nexterna Clearview service management application uses proven business logic used by field service companies. The software functionality is specifically geared for companies that service equipment in the medical/scientific, information technology, plant automation, building equipment, and telecommunications market segments.

5. Selecting and Implementing the Right Wireless, Real-Time Solution

A. The Selection Process

Only a decade or two ago the software products used to support services organizations were generally very complex, highly customized, and very expensive. However, the impact of rapidly advancing technology, ubiquity of applications, and increased competition has resulted in making many of these software offerings virtually commodity-like in terms of availability and cost, while others have remained fairly complex, sophisticated and expensive. However, the currently available mobile/field service management software offerings still represent a fairly "mixed bag" of offerings, and any prospective user of these offerings must be extremely careful that the selected package meets its specific application needs and requirements

Further, the market is much more complex and competitive now than it was just ten years ago, and users are much more sophisticated and discriminating in their choices of vendors. Key factors such as adaptability, flexibility, and quality of ongoing customer support have become paramount for most users in their selection of a suitable software vendor. Today, users not only "buy" the software; they "buy" the vendor as well. As such, today's mobile/field service software "purchases" are also heavily dependent on the vendor's:

- **Ability to match the solution to the customer's specific needs**, based on a full understanding of not only what the software can do, but also how the customer plans to use it to run its services applications;
- **Design and engineering capabilities**, or the ability to tailor or customize the software to meet the specific needs and requirements of customers and provide them with practical business solutions;
- **Installation and implementation support**, or the ability to get the software up and running in a timely manner while minimizing the degree to which business operations are disrupted during the implementation process;
- **Technical support**, or the capability to provide both start-up and continuing, real-time technical assistance, as required, to assure that application downtime is minimized and the software is being used to its fullest degree of effectiveness and efficiency;
- **Training and documentation**, or the ability to assist the customer in its ability to use the full functionality and capabilities of the software;
- **Customer service**, or the ability to provide continuing assistance and support to assure that the customer is kept at high levels of satisfaction;
- **Technology**, or the state-of-the-art of the software, its components, features and user applications;
- **Communications**, or the way in which the vendor keeps its customers up-to-date with respect to new technologies, applications, upgrades and support offerings;
- **Partnerships and alliances**, or the ability to provide additional, *"value-added"*, support capabilities through various partnerships and alliances with other complementary business vendors; and
- **Business management**, or the way in which the vendor conducts its business and deals with its customers.

Gone are the days where a vendor could simply "throw people" at a hardware or software problem in order to "fix" it. Vendors now must deal more with "fixing the customer" rather than merely "fixing the product." And this requires more than just people resources. First and foremost, it requires the sales and marketing expertise to ensure that the *solution is matched to the customer's specific needs*. For many, this represents the user's introduction to the vendor and, as such, is a critical point for making a good first impression.

Without the ability of the vendor to *design and engineer* the software offering specifically to the needs and requirements of the user, there will be little chance of making the sale. *Installation and implementation support* are also critical elements of concern that become important well before the actual implementation takes place. Most users look for implementation support that is of minimal disruption to their day-to-day business activities.

Technical support is the common thread that links the vendor with the customer throughout the entire lifecycle of the system usage. It represents the support lifeline between the vendor and user, and is one of the most visible elements of any vendor-customer relationship.

Training and documentation are also important; particularly for those customers that hope to be prepared to perform impromptu troubleshooting should the situation arise. Many users look for vendors who are not afraid to empower their customers with the ability to "partner" with them in terms of "sharing" overall system support (e.g., via web-based self-support, etc.).

The cornerstone of all vendor-customer relationships is *customer service*. Without good customer service, even a superior software product would have difficulty in capturing a significant share of the market. While technology is an area that generates much publicity and press, in most cases users are not really buying the technology; they are buying solutions. Still, it is important to be perceived as applying technology directly to the needs, requirements and solutions of the marketplace.

Without proper *communications*, users typically feel like they have simply bought a software package "off the rack", without any appreciable degree of after-sales support. Customers look for vendors that provide them with continuous updates, announcements and other information to keep them current with the software they are using.

Today, many vendors have also entered into *partnerships and alliances* with "complementary" partners that provide "value-added" products and services to support a "full suite" of business applications and solutions to the end user.

Finally, the item that makes it all gel; *business management*. When a user "buys" a software vendor, it is not only "buying" the product, it is "buying" all of the items listed above, including the ability of the vendor to manage its own business affairs in a manner that is commensurate with the way in which its customers want to be treated themselves. Users do not want to get involved with vendors that cannot manage their own business affairs. This also addresses such other important items such as the vendor's financial stability and its perceived market position as either a leader or a follower.

Many of the leading software vendors have recognized that by sharing all of their capabilities and resources with their customers, it becomes a "win-win" situation for all parties. It is primarily through this user-vendor partnership that full support for new software releases can ultimately be provided.
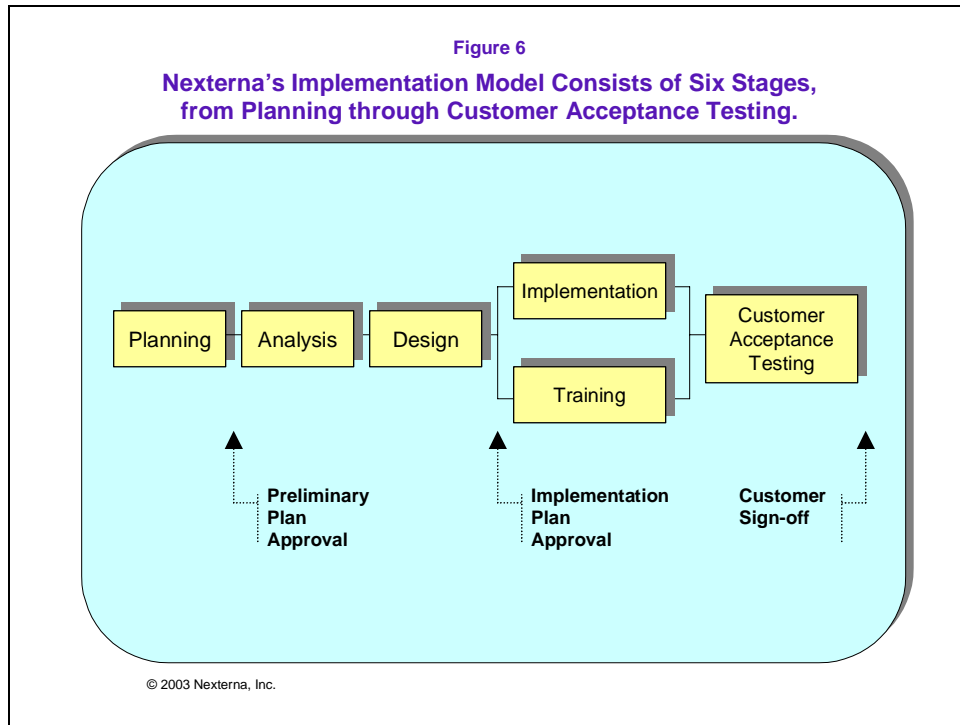
B. The Implementation Process

In today's economy, a two-year return-on-investment (ROI) is generally unacceptable. More often than not, businesses require a 12-month ROI before they can justify a major expenditure - plus, many also want to see (or at least understand) some of the benefits upfront. Management will also need to make certain that the benefits attained from implementing the system are directly related to the organization's primary "business drivers" (i.e., reduced operating costs and improved cash flow; increased operational efficiency; improved productivity of field service personnel; improved customer service and loyalty; better inventory management; improved tracking and visibility; etc.). For many, making this link is a primary determinant for success.

Many organizations also look for "low hanging fruit" in association with their major expenditures. For some, building a GPS capability first - before rolling out a fully-integrated system - may be instrumental in gaining initial system approval, based on the realization of at least some of the benefits within an early timeframe. A succession of other "low hanging fruit", or short-term benefits, can also be implemented on a staggered basis in order to set the stage for ongoing positive reception and a full complement of internal "buy-in" throughout the duration of the total implementation.

However, the success of any mobile/field service management system implementation will be dependent on meeting the customer's total expectations. Solution providers like Nexterna utilize a formal approach that begins with the careful management of a pre-defined scope of work that allows it to deliver a fully implemented solution on time, on budget, and consistent with a plan tailored to the customer's specific needs. Critical assumptions, such as the time required of the customer's personnel to participate in the implementation, are also defined to further ensure that all of the responsibilities associated with a successful implementation are clearly defined and understood.

Nexterna's implementation approach is based upon its experience in providing integrated customer solutions within the mobile/field services segment. The activities in each phase are associated with specific project deliverables that tie back to the defined scope of work. The company essentially uses a six-stage model for implementation, as illustrated in Figure 6.

Figure 6
Nexterna's Implementation Model Consists of Six Stages,
from Planning through Customer Acceptance Testing.

© 2003 Nexterna, Inc.

Stage 1: Planning
A preliminary plan is required to successfully implement and configure the appropriate customer-driven solution. The plan must ensure that all activities are enumerated, defined, and completed in accordance with the customer's expectations. The recommended plan must also be validated by experienced consultants.

Key planning activities include the:

- Assignment of the implementation project team.
- Development of key project milestones and deliverables.
- Development of a preliminary implementation plan.
- Conducting the project kick-off meeting.
- Assessment of the migration from the current process to the new solution.

The primary outcomes from this stage of the implementation are the development of a preliminary implementation plan, the establishment of clearly defined and articulated project milestones and deliverables, and a formal deliverables plan.

Stage 2: Analysis
The second stage of the implementation process focuses on the analysis of the customer's business processes, the assessment of the current environment, and the definition of the functional requirements at a level sufficient to assist in the development of a final implementation plan and design specifications. The analysis must ensure that all of the key customer-specific business requirements have been captured for system design, and that the current environment has been completely documented to adequately plan for implementation.

The principal activities that must be performed as part of this stage include the:

- Analysis of the business processes and procedures, and development of workflows.

- Definition of detailed business/functional requirements.
- Classification of business processes into functional groupings.
- Mapping of processes to the planned mobile/field service solution, and the identification and definition of exceptions.
- Assessment of the technical environment.

The primary outcomes from this stage are the detailed process and workflow analyses, a requirements definition and exception analysis, and the technical assessment.

Stage 3: System Design

The system/design stage involves the development/confirmation of the hardware, software, conversion, integration, and reporting solutions consistent with the desired mobile/field service product functionality; and the finalization of the customer-specific requirements. The system design must be developed to meet or exceed all of the customer-specific requirements, and the implementation plan must capture all components of the recommended analysis and design.

The principal activities of the system/design stage include the:

- Definition of table configuration requirements.
- Definition of external interface requirements.
- Definition of data conversion requirements.
- Definition of custom reporting requirements.
- Documentation of additions of scope to statement of work.
- Confirmation of mobile hardware components.
- Definition/confirmation of hardware and communications requirements.

The primary outcomes from the system/design stage are the system functional and technical specifications; interface, conversion, and reporting requirements; and a finalized implementation plan.

Stage 4: Implementation

The implementation stage requires the delineation of the complete project plan implementation tasks within scheduled timeframes, including coordination of all required vendor and customer resources. This is to ensure that there will be only minimized customer operational impact during the course of the implementation process, through the application of project management experience. This stage must also ensure full implementation compliance with the specified system design.

The principal activities of the implementation stage include the:

- Installation and configuration of the server and workstation software.
- Completion of the required software module configuration, including database tables.
- Completion of the required system integration.
- Completion of the specified conversions and report development.
- Conducting comprehensive system testing.
- Initiating the required communication service.
- Installation and configuration of the mobile tracking and service order hardware components.

The primary outcomes from the implementation stage are a fully configured and implemented system, completed integration with third party systems, and a documented system test.

Stage 5: Training

Training also represents a critical stage of the implementation process. It should include the development of focused materials and sessions required to train the customer's end-users and internal support personnel through a formal program that addresses all phases of product use, features and functions. Successful training will result in the facilitation of the end-user "buy-in" of the implemented solution that will ultimately result in modifications to the existing business processes. It will also ensure that the prospective end users gain sufficient system familiarity - up-front - to apply the new system to their respective daily operations.

The principal activities of the training stage include the:

- Development of the courseware.
- Development of the training schedules.
- System administrator training.
- System user training.
- Documentation of training issues for review and resolution.

The primary outcomes from the implementation stage are a training plan; training schedule; and training tools including courseware, manuals, and presentations.

Stage 6: Customer Acceptance Testing

The customer acceptance testing stage involves conducting comprehensive customer testing comparing product implementation to defined requirements, and receiving customer approval of the implemented solution. Successful completion of this stage will ensure that the system meets the customer's pre-defined business objectives, and that the implementation itself is complete and ready for operational use, including customer support.

The principal activities of the customer acceptance testing stage include the:

- Development of the acceptance test plan.
- Hardware and software customer acceptance testing.
- Completion of the "Go Live" checklist.
- Wireless communication customer acceptance testing.
- Initiation of the ongoing maintenance plan.
- Receipt of the customer sign-off on the completed system installation.

The primary outcomes from the customer acceptance testing stage are the acceptance test plan, maintenance initiation confirmation, and acceptance test report and sign-off.

An implementation plan specific to each customer project should be developed as an initial task of any project process. Vendor project management must also validate the project plan with client management prior to initiating any additional work.

6.   Summary and Conclusions

A.   The Wireless, Real-Time Services Management Value Proposition

The most effective wireless, real-time mobile/field service management packages available today are those that also embody:

- Customer web access
- Wireless mobile communication system
- GPS location tracking and integrated mapping for optimized dispatch

Thus, the value proposition is clear - and universal - across all areas of the user organization:

- ***For services management*** - it provides a set of configurable tools that are required to run a successful services business;
- ***For field service professionals*** - it provides immediate access to valuable information;
- ***For the organization's service customers*** - it provides the ability to initiate service requests and monitor call status directly from the Web;
- ***For the logistics organization*** - it sets the stage for controlled inventory that helps keep costs down; and
- ***For the back office*** - it facilitates the streamlined flow of information between and among dispatch, finance, purchasing, and inventory.

Each of these functional area-based value propositions is further supported by a large array of enterprisewide strategic and tactical benefits, all built on a platform of wireless, real-time service management technology, and supported by GPS mapping capabilities. The technologies that can enable real-time service are already here, and the market need is evident. However, since there are only a limited number of commercially-available packages currently on the market to support this functionality in a real-time basis, prospective users must be diligent in their quest to find the right package that meets all of their specific needs.

_____

*William K. Pollock is president of **Strategies For Growth**^{SM}, a consulting firm specializing in strategic, marketing and business planning; market research and customer/market surveys; customer satisfaction measurement and tracking; services marketing; and Customer Relationship Management (CRM). He may be reached by telephone at 610-399-9717, or via e-mail at wkp@s4growth.com. For additional information on this subject, please refer to the companion article published in the March/April 2003 issue of the Association For Services Management International's (AFSMI) **Sbusiness** magazine, accessible to AFSMI members at www.afsmi.org.*