PROJECT DESCRIPTIONS

MOBILE WORKFORCE
CALL FOR COLLABORATION

15 May 2002

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Preface

In October 2001, the Infocomm Development Authority of Singapore (IDA) announced the Mobile Workforce Call for Collaboration (CFC). The Mobile Workforce CFC is the second in a series of CFCs conducted by IDA and it seeks to benefit Singapore enterprises through the innovative use of wireless solutions. The CFC invited industry to propose pilots in five areas of Personal Information Management (PIM), Supply Chain Management (SCM), Remote Monitoring, Sales Force Automation and Field Force Automation.

This document is a collection of the twenty awarded proposals under the auspices of the Mobile Workforce CFC. The current challenges, proposed pilot and the expected benefits for the enterprise are outlined in each description. The breadth of the pilots across thirteen sectors of the economy demonstrates that wireless solutions have the potential to bring significant benefits to the enterprise. Whether it is in improving productivity, enabling cost savings, or enhancing customer service, Singapore enterprises are already considering how best to leverage on wireless for their businesses.

IDA hopes that this document will be a useful reference for enterprises both in Singapore and overseas, in their efforts to re-invent and innovate with the use of wireless technologies. We would like to express our appreciation to the consortia that have contributed to this document and in the process participated in thought leadership in this area of mobile workforce solutions. IDA looks forward to inviting the awarded consortia and other companies to share their experiences with mobile workforce solutions, upon completion of the pilots.

Infocomm Development Authority of Singapore
Wired With Wireless Programme
May 2002

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Executive Summary

It is becoming increasingly clear that there are substantial benefits in providing employees with access to enterprise information while on the move.

Any sales-focused organisation, for example, knows that its sales force will likely spend more time outside the office than in the office. In the category of **Wireless Sales Force Automation**, companies ranging from multinational corporations (MNCs), such as the *Diethelm Keller Group of Companies, Philip Morris Singapore Pte. Ltd.* and *SUN Microsystems* to small and medium enterprises (SMEs) *Chee Fatt Co Pte Ltd, Kian Soon Hardware and Trading Pte Ltd* and *All-Wares Supply* will use wireless technologies to enable inventory updates to occur almost instantaneously; currently, the updates can take a few hours or one working day. There is also significant manpower savings expected as salesmen no longer have to personally go back to the office to update the system and staff in the office no longer need to do duplicate re-keying into the system. To provide even better customer service, *ERA Realty Network Pte Ltd.* will demonstrate the use of wireless devices to more efficiently shortlist potential properties based on customer requirements and to also allow download of picture images of properties to the devices, for the client's viewing.

Another category of wireless enterprise access is in the area of **Wireless Field Force Automation**. Such applications are especially relevant to companies in the area of facilities and equipment maintenance, shipbuilding, construction and logistics, where there is often a team of field technicians, engineers or supervisors who work on remote job-sites, and who require real-time access to technical and client information. *Nanyang Technological University's Office of Estate and Amenities (OEA)* and *PWD EMS Pte. Ltd.* will be freeing their field force from having to return to their office just to collect maintenance schedules or to print paper printouts of technical specs. The field force will soon be empowered with updated technical information and maintenance schedules while on the move, using their wireless device. *Ellipsiz Pte. Ltd* – whose clients rely on the company for timely service requests for equipment and spare parts, will use wireless technologies to greatly reduce the average response time to their customers. Also in this category, supervisors in *Sembawang Shipyard Pte. Ltd.* will be using WLAN to allow for real-time resource reporting of the number of workers and job code allocations to allow for more timely resource allocation on the vessels. Driving centre *Comfort Driving Centre Pte Ltd* has also found wireless technologies as a fit to their resource reporting challenges for assets such as the vehicles and items in the vehicles. The Comfort Driving Centre will also be using the wireless devices to replace the paper-based student driver report cards to enable better monitoring of student progress and customisation of student needs. In addition, *Transvert Scaffold &*

Engineering Pte Ltd will use GPRS technologies to allow their onsite operation executives to communicate with HQ and update the progress of the construction without having to re-enter the information back in the office. Last but not least, *Transnational Supply Chain Logistics Pte. Ltd*., will be providing a win-win situation to their employees and customers, by equipping their delivery vans and motorcycles with wireless devices to allow better feedback from headquarters to field personnel and vice versa, and to ensure the timely execution of all assignments

Closely related to Wireless Field Force Automation is the area of **Wireless Supply Chain Management (SCM)** solutions that will enable enterprises to improve the visibility of their supply chain. Logistics companies *Ameriod Logistics (S) Pte. Ltd. and YCH Group Pte. Ltd*., will be piloting wireless solutions for fleet management and delivery confirmation respectively. With the pilot, the YCH Group expects to improve in time to completion of job delivery by 25%. To eliminate double entry and consequently, errors in-flight meal orders, *Changi International Airport Services* will be using wireless technologies to allow airline duty managers to directly key passenger meal requests instead of having the requests sent to the CIAS control centre for manual re-keying. In the hospitality sector, *Raffles International Limited* will be using a combination of wireless-enabled PDAs and tablets to access an entire chain of hotel services, allowing their staff to deliver concierge, security, facility reservations in a highly efficient and innovative manner.

In the final category of **Wireless Remote Monitoring applications**, solutions unique to each of the sectors of semi-conductor, construction, buildings and facilities and the public service will be piloted. Compared to the current situation where employees have to be physically present to monitor dynamic data, the solutions will enable significant manpower savings by allowing employees to move freely around with their wireless device, and still get alerts when certain incidents are triggered. Surveying companies *Kiso Jiban Singapore Pte Ltd and Wisescan Engineering Services* will be piloting the use of remote monitoring units that will send urgent soil movement data to the user's mobile device, while non-critical data will be sent to an email address for historical tracking. *ST Assembly Services Ltd.* management and supervisors will bring their operations to a substantially higher service level by enabling the remote monitoring of real time status of their operations. In the building and facilities space, *PWD EMS* staff will not only be saving significant manpower, but also potentially enabling new business models by automating the task of recording metering information instantly and accurately. Leveraging on Multi-Media Messaging Service (MMS), the *Singapore Police Force* will innovatively enable alerts to be sent to security personnel on the move, when triggered by motion, fire or smoke.

Sector
Buildings and Facilities

Category
Field Force Automation

Companies in the Consortium

1. Keppel FMO Pte Ltd
2. Nanyang Technological University (Office of Estate and Amenities)
3. FOSPEX Pte Ltd
4. eMobile Pte Ltd

"It is expected that productivity will be improved and idling time reduced since field technicians will be able to retrieve and update information anywhere, anytime by connecting to a web-based application specific to their needs".

Project Title
m-Services in Facilities Management @ NTU

Profile of User Company(s)

1. Keppel FMO Pte Ltd

Keppel FMO is the leading service provider of integrated maintenance services for large-scale facilities including academic institutions, airports, healthcare institutions and commercial properties.

With attained economies of scale, it continuously seeks opportunities to exploit emerging technologies to improve workforce productivity and to accelerate service turnaround time. Keppel FMO will transform its work processes to become on-line, and reap compelling benefits by equipping its highly mobile workforce with PDAs and accessing a wireless enabled web application.

2. Nanyang Technological University (Office of Estate and Amenities)

Nanyang Technological University Office of Estate and Amenities (OEA) provides expert facility management services for the entire NTU-campus. Geographically spread over 200 hectares, NTU consists of more than 50 buildings including its schools, academic complexes, administration buildings, halls of residence and general facilities.

NTU OEA continuously promotes IT as a means to offer high-quality and effective maintenance services that support and enable a conducive learning and teaching environment for its students and staff.

Though NTU CITS (Center for IT Services), NTU owns and operates the largest WLAN 802.11b network in the region, hence allowing access to the Internet that is pervasive throughout the campus. This is in line with NTU CITS's mission to make learning, working and interacting more effective and enjoyable through innovative use of IT.

Challenges Faced

The facility maintenance business is highly field-oriented in nature and hence demands efficient communication channels to access and update critical information relating to repair and maintenance activities.

Information that is critical to the field technicians include details of customer service request, scheduled maintenance work checklist, availability of spare parts and equipment service history to aid fault diagnosis.

The field-oriented nature of facility maintenance work also means that enormous amount of paper-based documents are used to capture information on tasks performed at field. Manual data re-entry is usually required for report generation, and such practices slow down data turnaround and are prone to data entry errors.

Proposed Solution to be Piloted

The solution equips frontline maintenance technicians and response teams with handheld PDAs coupled with wireless connectivity to a web-based application.

The solution will leverage on the existing *eMMS* web-based applications offered through www.fospex.com on an ASP model. In addition, a custom-built PDA client application will be developed using J2ME.

Wireless access to the Internet will be through NTU's WLAN 802.11b and telco's GPRS networks. A wireless gateway server will also be developed to facilitate the synchronizing of data between PDAs and the database-server as well as to provide messaging services.

Facility maintenance tasks which encompasses work processes in the areas of call center management, service request response, assignment of scheduled preventive maintenance works and inventory control will be transformed and handled on-line through the Internet.

Expected Benefits

It is expected that productivity will be improved and idling time reduced since field technicians will be able to retrieve and update information anywhere, anytime by connecting to a web-based application specific to their needs.

Information that is critical to the field technicians includes details of customer service request, scheduled maintenance work checklist, availability of spare parts and equipment service history to aid repair diagnosis.

The wireless on-line solution will also help speed up problem resolution. This is achieved with field technicians having access to critical and relevant information at the point of interaction with the service requestors.

As a means to improve customer service, service requests captured at the call center can be 'pushed' to field technicians through messaging services, in real-time, hence improving response time.

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Sector
Buildings and Facilities

Category
Remote Monitoring

Companies in the Consortium
1. PWD EMS Pte. Ltd.
2. Keppel DigiHub Ltd

Partner/Provider
1. Laboratories for Information Technology

"The process of tracking the usage and billing of individual or group of customers also becomes simpler. Billing solutions also mean faster, and more accurate energy consumption information for each customer. Manpower, which was previously used for meter readings and billing services, can be re-deployed for cost savings".

Project Title
Wireless Remote Monitoring for Electrical meter Reading and Logging

Profile of User Company(s)

PWD EMS Pte. Ltd.
PWD EMS Pte Ltd is a leading facilities management company in Singapore. It is managing over 1,000 buildings and facilities covering 8 million sq. metres in Singapore and the region. Types of facilities and buildings range from commercial, educational, institutional, recreational, residential, hospitality and shopping complexes. PWD EMS provides a full spectrum of services, including facilities management consultancy, integrated facilities management services, project management, energy management, and environmental health management.

As a company focusing their growth both in market share and portfolio of services, PWD EMS seeks to strengthen and enlarge its core competencies. It aims to harness cutting-edge customer-centric technology like Computerised Integrated Facilities Management solutions, Intelligent Building Technology to enhance all area of its services, improve work process and increase efficiency and effectiveness.

PWD EMS aims to provide a strategic fit to the client's core business. This will create a synergetic relationship that will result in mutual gain to both.

Challenges Faced

Liberalisation of the energy market is a worldwide phenomenon. In Singapore the electricity market will be restructured. The liberalisation of the wholesale and retail market will open up potential new business areas for companies and professional firms to participate. The end result will be cheaper energy cost for Singapore companies, which will increase their competitiveness.

To prepare EMS for this new business potential, we are exploring new and sophisticated technology for data presentation, billing solutions and reliable communication. The thrust is to leverage upon intelligent and innovative metering system with built-in communication to provide a competitive end-service solution.

Proposed Solution to be Piloted

The proposed solution is to use the patented SmartEdge™ Technology, described below, as the core of the system. SmartEdge™ technology allows flexible, rapid deployment of interactive, location-based wireless applications in a cost-effective way.

The SmartEdge™ Device is a low cost embedded system, with a short-range wireless connection, such as Infrared or Bluetooth, as well as long-range wireless connection. It allows mobile phone and PDA users to download or upload information. The long-range wireless connection supports GSM data service and Ethernet.

The embedded system itself can store applications, as well as tamper-proof data. These applications are able to exchange information from remote servers to user devices, with the SmartEdge™ Device as an intelligent cache.

Mobile devices, such as Palm Pilots or iPaqs are able to interact with a SmartEdge™ enabled meters or *wMeter* to keep track of utility readings by using small footprint-software plugins. The plugins can be used to download information in an interactive user fashion, using either Infrared or Bluetooth communication. These plugins can be quickly downloaded from the device and automatically installed at the user mobile device.

Expected Benefits

The SmartEdge™ device, which is embedded into the *wMeter* simplifies and automates the task of recording metering information, by doing it remotely instead of manually. This meter utilises existing infrastructure, such as the existing GSM or public domain wireless networks. The customer benefits most from this embedded device on existing infrastructure.

The process of tracking the usage and billing of individual or a group of customers also becomes simpler. Billing solutions also mean faster, and more accurate energy consumption information for each customer. Manpower, which was previously used for meter readings and billing services, can be re-deployed for cost savings.

With these devices in place, landlords can capture load profiles of their buildings and use them as a bargaining tool for better energy prices. The proposed solution also assists in proactive diagnostics, which can predict maintenance problems from *wMeter* parameters. When equipment becomes faulty, it alerts the nearest service agent with the fault log message. Service personnel are able to diagnose the fault and take necessary action even before reaching the site.

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Sector
Building and Facilities

Category
Field Force Automation

Companies in the Consortium

1. PWD EMS Pte. Ltd.
2. Buildfolio Pte Ltd.
3. NETalk Pte Ltd.

"PWD EMS hopes to streamline and upgrade its processes to enable its workforce to operate more efficiently and effectively. The site staff will have easier access to information anywhere and anytime".

Project Title
PWD EMS Wireless Facility Management System

Profile of User Company

PWD EMS Pte. Ltd.
PWD EMS Pte Ltd is a leading facilities management company in Singapore. It is managing over 1,000 buildings and facilities covering 8 million m^2 in Singapore and the region. Types of facilities and buildings range from commercial, educational, institutional, recreational, residential, hospitality and shopping complexes. PWD EMS provides a full spectrum of services, including facilities management consultancy, integrated facilities management services, project management, energy management, and environmental health management.

As a company focusing their growth both in market share and portfolio of services, PWD EMS seeks to strengthen and enlarge its core competencies. It aims to harness cutting-edge customer-centric technology such as Computerised Integrated Facilities Management solutions, Intelligent Building Technology to enhance all area of its services, improve work process and increase efficiency and effectiveness.

PWD EMS aims to provide a strategic fit to the client's core business. This will create a synergetic relationship that will result in mutual gain to both.

Challenges Faced

In a fast moving, highly competitive environment, companies must constantly review their work process, to improve work throughput and minimize delays in customer response. Facilities Management is a typical example of this.

One problem common to a facilities management company is that the site maintenance staff also has to spend significant amount of time to retrieve and update facilities maintenance information in the office, sometimes, at the expense of customer response. To improve productivity, one of the approaches is to integrate information processing and work flow on-site. This will enable staff to execute jobs on-site and at the same time update or retrieve information from the back-end at the point of execution. This will be achieved through better connectivity so that staff could have an information-traveling companion.

Proposed Solution to be Piloted

This pilot project, called the Wireless Facility Management System, proposes to have site staff equipped with mobile user devices, namely a PDA, which are specially equipped with applications and hardware that allows direct communication back to the head office.

The Wireless Facility Management System consists of specially designed applications software. This applications software encompasses the following four work process modules:

- Wireless maintenance checklists
- Wireless scheduling and monitoring of contractors
- Wireless performance monitoring
- Wireless access control

Part of the pilot project is to investigate the feasibility and capability of the wireless technology. As such, all mobile user devices will be outfitted with GPRS -enabled devices for data and voice communication.

Expected Benefits

PWD EMS hopes to streamline and upgrade its processes to enable its workforce to operate more efficiently and effectively. The site staff will have easier access to information anywhere and anytime.

The Wireless Facility Management System will allow online and off-site data entry via PDA, which prompts seamless data transfer and reduces work duplication. Simultaneously, it updates the backend database thus allowing up-to-date decision-making. Furthermore, the wireless scheduling and monitoring of contractors enable tighter control and monitoring of contractor's works. Networking up the BMS of buildings also allows for real-time performance monitoring. Finally, the wireless access control module provides integration, with a third party access control system, to further enhance the functionality of the mobile user device.

In summary, the most important expected benefit is that the system creates an opportunity for PWD EMS to enhance the mobility, effectiveness and flexibility of its workforce.

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Project Title
Wireless Remote Field Monitoring Applied to Construction Industries

Profile of User Company(s)

1. Kiso Jiban Singapore Pte Ltd provides engineering consultancy and instrumentation monitoring services in geotechnical, foundation engineering services and earth sciences in this region. It is an established specialist engineering firm and involved in most major construction projects in Singapore and has a team of highly skilled professionals.

2. Wisescan Engineering Services Pte Ltd provides surveying services for tunnels, building structures and ground settlements since 1992. It is an established business player in this sector and has an extensive list of project experiences in Singapore.

Challenges Faced

Manual field monitoring is used in most construction sites. The construction activities of pilings, tunnellings, excavations, etc will induce vibrations and the soil movements are detrimental to existing structures. Hence, construction activities are required to be controlled and monitored so that the allowable design limits are not exceeded.

Traditionally the monitoring of the instruments is conducted manually. The frequency of monitoring depends on the criticality of the activities to the existing structures. At times continuous monitoring is required to ensure that the safety of the existing structures are maintained. Consequently, manpower utilisation becomes a challenge when several critical activities are conducted simultaneously. Data obtained has to be sent back to the office and manual keying into computer is necessary before processing can take place.

This manual system of data recording and processing is prone to human errors, besides being time consuming and expensive. In some critical operating structures like MRT tunnels, automatic data loggers are used. These loggers record sensor readings and lack front-end intelligence to process these readings into relevant structural and geotechnical information to alert the relevant people for immediate attention.

Proposed Solution to be Piloted

Wireless communications presents a cost-effective transmission channel to alert urgent structural and soil movement information to the relevant people. To achieve this, the complete wireless remote monitoring system, including the installed field instrumentation sensors, wireless Remote Terminal Unit (RTU) and the transmission mode from the remote construction site to the end user mobile devices, must be optimized for speed and reliability.

The primary consideration for the pilot is system response speed and availability (up-time). Technology is a secondary consideration to the industry acceptance and success of the project. Also the information measured and received by the users must be reliable and accurate. The strength and reliability of any system depends on the weakest link in the chain of components. Only proven and tested instruments for structural and Geotechnical will be used for wider industrial acceptance. The wireless RTU will interface with these instruments, analyze the data into meaningful information and then transmit this information to user and the central server.

Expected Benefits

The wire-less system together with automation will reduce human errors in recording, speed up the data transfer to the site end-users and also allow the delivery of critical alert data to the mobile device of the relevant user on the move. The urgent data is delivered to the user's mobile device while the non-urgent data is emailed to the user for subsequent historical tracking.

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Sector
Construction

Category
Remote Monitoring

Companies in the Consortium

1. SysEng (S) Pte Ltd
2. Wisescan Engineering Services Pte Ltd
3. Kiso Jiban Singapore Pte Ltd

"The wireless system together with automation will reduce human errors in recording and speed up the data transfer to the site end users and also deliver critical alert data to the mobile device of the user on the move. The urgent data is delivered to his mobile device while the non-urgent data is emailed to the user for subsequent historical tracking".

Equipment for tunnel monitoring

Sector
Construction

Category
Field Force Automation

Companies in the Consortium
1. DCS Solutions Ltd
2. Transvert Scaffold & Engineering Pte Ltd

"The system will allow for project and resource management. It can be used to update project status and reporting work requests from site to HQ. Thus, it will facilitate better collaboration between HQ and construction sites".

Project Title
Wireless Workflow Resource Management System for Scaffolding

Profile of User Company(s)

Transvert Scaffold & Engineering Pte Ltd
Sales, setup and servicing on major types of metal scaffolding systems, namely Tube & Fitting, Frame and Modular Scaffolding (TSS).

Challenges Faced

Currently, there is a delay in communication workflow using wireless trunk repeaters as it takes over 20 minutes for workflow information to be reported back. Information is not sent back to office until next working day and time to deploy is always delayed by 2 to 3 days. In addition, there is replication of work and re-entering of information into backend system. Finally, there is also redundant work between the back office and site supervisor.

Proposed Solution to be Piloted

The system will allow for project and resource management. It can be used to update project status and reporting work requests from site to HQ. Thus, it will facilitate better collaboration between HQ and construction sites.

Onsite operation executives and project executives will be equipped with the following wireless devices - Symbol PPT 2734 or Compaq Ipaq with GPRS/SMS capability, to allow GPRS/ SMS communication between Site and HQ. The system will use WAP over GPRS with WAP-Push (SMS as Bearer technoogy). Alerts are sent via SMS using the WAP-Push protocol. The SMS contains links to retrieve data via WAP over GPRS. With this infrastructure, the workers will then be able to do onsite workflow status, inventory and checklist information update of site setup changes or status update/inspection.

Expected Benefits

1. Improvements in customer relationship management since information can be retrieved or sent back to headquarters for preparation of stock for just-in-time delivery;
2. Reduction of information loss and miscommunication of information through the walkie-talkie;
3. Reduced unnecessary overtime work due to poor co-ordination through telephone/trunk;
4. The system will also reduce the need to manually key in information when site supervisor returns back to the office; and
5. Better update of work in progress and reporting/billing to customers.

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Project Title
Wireless Sales Force Automation and Marketing Information System

Profile of User Company(s)

Diethelm Keller Group of Companies Singapore:
Diethelm Singapore Pte Ltd
Harpers Trading (S) Pte Ltd
Harpers Marketing Pte Ltd

Incorporated for well over 100 years in Singapore and the Asia Pacific Region, the Diethelm Keller group of companies in Singapore have become leaders in Sales, Marketing, Warehousing and Distribution for over 50 leading consumer and healthcare product brands.

The group's extensive nationwide distribution network covers over 90% of all channels in Singapore with more than 4,000 outlets comprising of supermarkets, mini-marts, Chinese medical halls, grocery stores, petrol marts, convenience stores, kiosks, pharmacies, department stores, hotels, restaurants, airlines, hospitals, electrical stores and specialty stores.

The group's aim is to get their Principals' products onto every store's shelf. Continuously, the group works with their Principals as business partners in developing marketing and sales strategies to achieve leadership position in the market.

The sales and distribution operation is supported by an up-to-date sophisticated on-line real time information system. It is designed to ensure smooth communication from order taking to delivery of the goods to the stores.

Challenges Faced

As market information becomes more easily accessible, customers become more demanding in their needs and wants. Most businesses have evolved from being product-centric to customer-focused. In order to stay competitive, sales people have to improve their responsiveness towards customers' needs in order to attract, reward and retain more customers.

Proposed Solution to be Piloted

SalesExpress empowers the group's business in moving to mobile commerce. Integrating with backend SAP system, the solution will allow remote login from PDA to check inventory status, customer outstanding debts, monitor credit limits and understand customer buying patterns. This will allow the group's salesmen to anticipate customer needs and wants, create sales and return orders.

Salesmen will carry their tasks on the field using a mobile computer (PDA) instead of the manual call card system.

Salesmen will visit the customers based on the routes planned by the Sales Managers and/or themselves.

For van-sales, the system will allow for invoicing, delivery, payment collection and inventory management.

The system can be operated in both off-line (batch update) and on-line (link direct to Host System) modes.

Expected Benefits

SalesExpress is expected to enable the sales people to operate at peak efficiency by reducing the time needed to log in sales. Back office can quickly consolidate customer orders from traveling sales people, resulting in more efficient sales management, better control of product movement, and at the same time improve logistics distribution.

Sector
Distribution and Sales

Category
Sales Force Automation

Companies in the Consortium
1. Harpers Trading (S) Pte Ltd
2. Harpers Marketing Pte Ltd
3. Diethelm Singapore Pte Ltd
4. Maya Systems Consultants Pte Ltd
5. Deloitte Consulting

"SalesExpress helps our sales people to operate at peak efficiency by reducing the time needed to log in sales. Back office can quickly consolidate customer orders from traveling sales people, resulting in more efficient sales management, better control of product movement, and at the same time improve logistic distribution".

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Project Title
Wireless Sales Force Automation

Sector
Distribution and Sales

Category
Sales Force Automation

Companies in the Consortium

1. Philip Morris Singapore Private Limited
2. IBM Singapore Private Limited
3. StarHub Singapore Private Limited

"The expected benefits of the proposed pilot will be shorter transaction time, improved customer service, productivity gains and cost savings for Philip Morris among other things".

Profile of User Company(s)

Philip Morris Singapore Private Limited

Philip Morris Singapore is a wholly owned subsidiary of FTR, SA. In Singapore, Philip Morris has a team of salesmen and supervisors serving a diverse retail universe of approximately 7000 customers ranging from hotels, supermarket chains to the small 'mom and pop' shops.

Challenges Faced

The challenges faced include:
1. Management of cash and cheque collections require extensive and unproductive manpower and resources.

2. Lack of online field sales information to support better decision-making and sales force management

Proposed Solution to be Piloted

The solution to be piloted will include equipping the sales force with GPRS-enabled terminals which will allow the following functions:
1. Wireless synchronisation of data between PDA and backoffice;
2. Acceptance of direct debit payments from retailers;
3. Enhanced messaging functions for the salesforce; and
4. Location based services

Expected Benefits

The expected benefits are the following:
1. Shorter transaction time
2. Improved customer service
3. Productivity Gains
4. Cost Savings
5. Improved risk management
6. Efficiencies in field force management
7. Minimal time lag in relaying data and messaging

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Sector
Education/Training

Category
Field Force Automation

Companies in the Consortium
1. Comfort Driving Centre Pte Ltd
2. IdealSoft Pte Ltd

"The pilot system will allow for better monitoring of student progress, greater customization of student needs among other things".

Project Title
Wireless Student Progress Management & Wireless Asset Tracking System

Profile of User Company(s)

Comfort Driving Centre Pte Ltd

A joint-venture company set up by the Comfort Group Ltd and the renowned Chofu Driving School of Japan, Comfort Driving Centre Pte Ltd (CDC) started operations in April 1996. Since then, it has estabilised its reputation as one of the leading driving centres in Singapore. This was possible through the driving centre's commitment and approach aimed at providing safe driving education to the public.

In April 1990, the driving centre was singled out by the International Labour Organization as one of the nine high-performance organizations worldwide for its focus on innovation, customer quality and differentiation. Today, it commands a large fleet of training vehicles and offers a wide range of high quality services such as the most advanced computerized simulator, interactive computer-based training and digital sensory timers to facilitate the trainees' effective learning process. The centre's comprehensive curriculum are also structured to enable the learners acquire not just technical knowledge, but fine judgement and a sense of social responsibility.

To ensure a quality workforce dedicated to providing the best land transportation training services, the centre continues to upgrade, train and develop its people resources to meet the required standard of skills and knowledge. The centre's effort was recognized with the certification of the People Develops Standards in December 2000.

Challenges Faced

The driving centre's most challenging tasks, in view of the global uncertainties and knowledge-driven economy, is to enable sound business decisions that will allow the centre to maintain its competitiveness in industry. This means helping trainees to improve their learning processes while increasing their satisfaction and strengthening the centre's relative competitive position.

Key considerations:

1. Improvement to the centre's customer services and facilities to increase efficiency and the trainee's satisfaction.
2. Improvement to the quality of the centre's training methodology and syllabus to increase the trainee's learning curve.
3. Implementation of new solutions and technology to enhance the centre's operational and training efficiencies such as the Wireless System.
4. Continuous upgrading and training of the centre's instructors to keep abreast with new technology and improve on their skills and knowledge.

Proposed Solution to be Piloted

Wireless Student Progress Management System

1. Learner Lesson Progress Update – In a typical driving school environment, the centre would like to track individual learner's progress throughout their course so that suitable adjustments can be made to the course contents to allow the learners to complete the course at their own pace. This module to be piloted will keep track of individual learner's progress based on pre-setup syllabus contents and allows the instructor to update the learners' progress on the road.

2. Learner Trial Test Update – The purpose of the trial test is to allow the instructors a way to gauge the skills and confidence level of the learners in the handling of the vehicle. Instead of bringing along forms to mark the learner's results for the trial test, the instructors would bring along PDAs with them to mark down the learner's trial test results. After finishing the trial test, the results can be uploaded back to the server with a click of the button. This eliminates the duplicate manual entry of the learner's trial test result.

Wireless Asset Tracking System

The Wireless Asset Tracking System (WATS) is a module, which will integrate with the back-end Inventory module for managing the Asset Tracking

1. Asset Status Update **-** In a driving centre environment, the assets that need to be tracked are the vehicles as well as the items existing in the vehicle itself. Using the PDA, the instructor will be able to perform a quick check and tick off in the PDA against each item indicating the status (Lost or Found) for each item. This information can then be transmitted wirelessly back to the backend system where item replenishment can then be performed.

Expected Benefits

1) Improve Monitoring of Student Progress
The Wireless Student Progress Management system will allow instructors to wirelessly retrieve the student progress information anytime and anywhere without the need to manually retrieve the Student Record Card. This system not only eliminates the need for the Student Record Card, but also allows instructors to closely monitor individual student progress and tailor the training to individual needs.

2) Customisation of Course Curriculum for different demographics
Adoption of solution will allow the centre to adjust/tailor the course curriculum to cater to individual learner needs.

3) Planning of Test Capacity
The progress of learners in the various stage/modules will allow CDC to efficiently plan and forecast the test capacity requirements. This will improve the resource utilisation and at the same time reduce the student waiting time for the practical test date.

4) Monitoring the performance of instructors
With the monitoring of the Student Progress and Result, CDC will be better equipped with information on analysing the performance of instructors based on the progress and result of their student. As a result, CDC will have another avenue of rewarding the instructor based on student progress and results.

5) Fixed Asset Tagging & Tracking System
A PDA attached with Bar Code Scanner will be used to track assets wirelessly and bar code tag items and vehicles. This will reduce the manpower effort required to track the asset and allow the instructors to focus on training.

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Sector
Hospitality

Category
Supply Chain Management

Companies in the Consortium

1. National Computer Systems Pte Ltd.
2. Raffles International Limited

"Automated mobile applications will allow Raffles International workforce to be more effective and efficient in carrying out their daily tasks. The power of a mobile enabled hotel working and service environment provides Raffles International the opportunities for more creative and innovative services, to drive even higher value for its shareholders, guests and employees."

Project Title
Mobile Enabling Hospitality Suite

Profile of User Company(s)

Raffles International Limited
Raffles International Limited, formed in 1989, is the hotel management arm of Raffles Holdings Limited. Today, Raffles International is a name well respected in the industry for its standards of quality, award winning concepts and innovative approach towards hotel management. The expertise of Raffles International covers a full spectrum, from hotel pre-opening services, quality assurance to general management. The company's approach to each hotel is unique, innovative and market-driven. Raffles International manages hotels and resorts in 33 destinations across 6 continents.

At the heart of the service philosophy of Raffles International is a commitment to not just meeting, but regularly exceeding guests' expectations. Mobile enabling a suite of hospitality applications and services for the workforce, Raffles International's work environment will be truly enhanced.

Challenges Faced

Raffles International constantly seeks ways to enhance its outstanding guest services by giving staff effective and innovative tools that will assist them in their work. Some ways to provide better customer satisfaction include providing real-time information on the move, having a better response time, giving anticipative responses, eliminating lost calls, providing instant messaging services, reducing data entry time, ensuring proper follow up, expanding the reporting pool, relying on business intelligence on guest preferences or requests and bringing personalized services to the guest, anytime anywhere. These are all exciting challenges for Raffles International.

Proposed Solution to be Piloted

Using wireless technology, mobile infrastructure software and devices, the solution proposed covers many aspects of guest services and hotel operation workflow - from front desk activities, tourist information, booking of facility, in-room services, dining reservation, room inventory management to guest safety and hotel security. Hotel staff will be equipped with latest models of PDAs or tablets to access hotel property management system and specially designed application systems over 802.11b wireless LAN or GPRS network.

Sample scenarios:

Security & safety – instant video clip dispatch and emergency profiling
Sales – mobile on-line database access for room inventory and facility status
Concierge – real-time information for the guest in your "palm"
Ordering – from multimedia electronic menu to order taking, anytime anywhere
Housekeeping – instant job order on the move and guest preference collector

Expected Benefits

Automated mobile applications will allow the Raffles International workforce to be more effective and efficient in carrying out their daily tasks. The power of a mobile enabled hotel working and service environment will provide Raffles International with opportunities for more creative and innovative services, to drive even higher value for its shareholders, guests and employees.

The Raffles International Credo:

"A successful hotel is something beyond its location, its décor or its amenities. A successful hotel is a place where you are treated so well that you want to come back."

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Sector
Industrial

Category
Sales Force Automation

Companies in the Consortium
1. Zara Technology Pte Ltd
2. Chee Fatt Co Pte Ltd
3. Kian Soon Hardware and Trading Pte Ltd
4. All-Wares Supply
5. Palm Singapore Sales Pte Ltd

"The pilot companies will achieve shorter sales cycle time by improving supply chain visibility. This principal benefit arises because the sales team will no longer need to return to the office to re-key orders or even call back to verify inventory and pricing information".

Project Title
Development of Wireless Interface to SME Applications

Profile of User Companies

Chee Fatt Co Pte Ltd
Chee Fatt is a pioneer in the industrial tools market. Since the mid-70s the company has been a leading distributor of hand and power tools. Chee Fatt is the principal distributor of Stanley/Proto Tools (U.S.A) for the region. In all, it represents over 75 leading worldwide brands for the regional market. They are looking towards expanding their business into China.

Kian Soon Hardware and Trading Pte Ltd
Kian Soon is a leading distributor of high quality fasteners and is a supplier to OEM manufacturer. Its customers include leading technology companies and GLCs, amongst many others. The company has recognized the opportunities of China's entry into the WTO. As an SME, the company has taken bold steps by establishing a Joint Venture operation in China to take advantage of its economic growth and to be nearer to its customers. The Company has also established sales channels in Indonesia and the Philippines to reach out to new markets and customers.

All-Wares Supply.
All-Wares Supply is a general supplier of industrial products and services since 1981. Its product range includes hand, power and pneumatic tools, abrasive products, fasteners, security locks, safety and welding equipment and materials. It serves customers in different industries like ship builders, MNC, MSCT, breweries, ship chandlers, SAF, government statutory boards and the oil industry. It also exports to China and the Asia-Pacific region.

Challenges Faced

The business and operational problems faced by SMEs are multiple. SMEs want to establish a better and more effective collaborative supply chain relationship between manufacturers and their dealer networks in the region. They want to track sales, inventory and operations data, in addition to delivering quality products and services to their customers. This means that management need the ability to control and manage their own business networks and operations very efficiently through real-time data and the effective application of business rules within their own organizations.

Proposed Solution to be Piloted

The wireless technology used will be Bluetooth and GPRS together with Palm devices. The three groups that will have direct and immediate benefits are:

Enterprises:
Management will be able to monitor all business operations and processes. Management will know where the operational bottlenecks occur in their business. Any information or events that impact the business can be notified, monitored, checked and the necessary actions taken. Business processes are guided by business rules. The definition and maintenance of those business rules must be in the hands of those who best understand the business.

The sales force will be able to perform CRM services. They will have the ability to update customers, operations and management from the field. Immediate status updates on sales orders, inventory and delivery status, customer purchase information, etc, can be obtained in real-time.

Manufacturer Suppliers:
Suppliers will be able to check and replenish stock in their distribution channels. They will be able to establish closer collaboration with the network.

Customers:
Customers will be able to check and monitor status of documentation pertaining to them. They will be able to check delivery schedules, availability of products and access to product catalogs, etc.

Expected Benefits

With real-time wireless access to information these companies will be able to: reduce business costs and increase operational efficiency; improve and enhance customer service and relationships; improve information accessibility; simplify business transactions with customers, suppliers and partners; improve operational standards; increase competitive barriers; provide real-time information pertaining to customers and suppliers; access real-time operational and management information

The pilot companies will achieve shorter sales cycle time by improving supply chain visibility. This principal benefit arises because the sales team will no longer need to return to the office to re-key orders or even call back to verify inventory and pricing information.

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Sector
Infocomm

Category
Sales Force Automation

Companies in the Consortium

1. SUN Microsystems Pte Ltd
2. iGine Pte Ltd

"SUN and its partners will be able to increase productivity and efficiency by improving the overall sales management cycle. This can be achieved through shortening the customer purchase approval and reducing customer's query turnaround time by allowing wireless access to crucial sales information and process".

Project Title
"Wired with Wireless" Integrated Sales Cycle Management Project

Profile of User Company

SUN Microsystems Pte Ltd

SUN is the leading provider of industrial-strength hardware, software and services that make the Net work. SUN can be found in more than 170 countries and on the world wide web at http://www.sun.com

This project allows Sun to use wired and wireless technology to ensure complete customer satisfaction in the overall sales management process within SUN & its partner community. In a time when the customer has never been more discriminating and enlightened the race is on to provide the marketing, sales and service teams with the benefits that computer automation can offer.

Challenges Faced

Sun, working with its partners, need to control the complete marketing and sales pipeline process, from initial opportunity and lead to final close.

The key challenge is how to ensure total customer satisfaction and thus result in improved business to SUN and its partners. In addition, Sun needs to better harness the capabilities available to allow timely and accurate information to Sun and its partners to ensure complete visibility of the entire sales management cycle.

Proposed Solution to be Piloted

The Wired for Wireless pilot project introduces handheld wireless PDAs as a new touch point for information access and retrieval for the sales force in Sun and its partners. The pilot using iGine ChannelBiz software will deliver key sales applications such as order tracking and customer information, using both the web and mobile interfaces appropriately to fit into the usage style of the sales force. The pilot aims to provide the mobile sales force with extra convenience for submitting information as well as timely access to information during sales calls.

As for the technology used, it will be Hypertext Transfer Protocol (HTTP) over General Packet Radio Service (GPRS). The wireless device used would be the Handspring Treo 180.

Expected Benefits

SUN and its partners will be able to increase productivity and efficiency by improving the overall sales management cycle. This can be achieved through shortening the customer purchase approval and reducing customer's query turnaround time by allowing wireless access to crucial sales information and process.

Business can also be enhanced by allowing SUN and partners access to timely and accurate sales information. This can be achieved through the faster turnaround time to consolidate sales information within SUN and its partner community.

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Sector
Logistics

Category
Supply Chain Management

Companies in the Consortium
1. NEC Singapore Pte. Ltd.
2. Ameroid Logistics (S) Pte. Ltd.

"With the solution, delivery trucks will be able pick up and fulfill shipments on the move. In addition, last minute orders and job details, are dispatched to the right vehicle(s) that can best fulfill the job. Truck drivers are also able to communicate with Operation center for changes and updates of job status".

Project Title

eLogistics Job Dispatcher System

Profile of User Company(s)

Ameroid Logistics (S) Pte. Ltd.
Ameroid Logistics is currently the leading local logistics provider (excluding Government Linked Corporations), well reputed in the electronics industry for efficiency, competitiveness and delivery track-record. As a one-stop service provider, customers enjoy the added convenience and cost-saving benefits of door-to-door and airport-to-airport deliveries, chartered services as well as import, customs clearance and documentation services.

Challenges Faced

The current challenges faced are:
1. Communication problems with truck drivers on the move;
2. Urgent job orders and commitment to potential customers on fulfillment; and
3. Customers' claims over delivery delays, shipment clearance, discrepancy of work orders.

Proposed Solution to be Piloted

With the solution, delivery trucks will be able pick up and fulfill shipments on the move. In addition, last minute orders and job details, will be dispatched to the right vehicle(s) that can best fulfill the job. Truck drivers will also be able to communicate with Operations center for changes and updates of job status.

Wireless PDAs fitted with GPS devices are installed in each truck. These devices will be enabled with coordinated GIS vector maps for precise vehicle tracking.

Expected Benefits

The expected benefits are:
1. Reduced time taken to fulfill customers' job orders.
2. Increased efficiency and accuracy in accepting and committing to urgent job orders, respond to changes in job fulfillment on the ground.
3. Reduction in communication cost and operation handling and yet meet customers' satisfaction.
4. Accurate vehicle logs automatically of jobs fulfilled & routes traveled for proof of shipments.

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Sector
Logistics

Category
Supply Chain Management

Companies in the Consortium

1. Fujitsu Asia Pte Ltd
2. Y3 Technologies Pte Ltd
3. YCH Group Pte Ltd

"With this pilot, not only do we aim to achieve an improvement in productivity and efficiency, we also aim to empower the virtual supply chain to the very core of the fulfillment process, by making it accessible & secure via personal mobile devices, enabling and facilitating mass adoption."

Project Title
Electronic Proof of Delivery (ePOD) for Mobile Supply Chain Transactions

Profile of User Company(s)

YCH Group Pte Ltd
YCH Group is a leading homegrown Logistics and Supply Chain Management (SCM) company with extensive and integrated global supply chain networks in Asia, Europe & the Americas, managing diverse Manufacturing, Distribution Fulfillment and Reverse Logistics supply chain environments. YCH Group provides end-to-end Logistics & SCM services to many World Class Companies in 3 key industries, namely, the Electronics, Chemicals and Healthcare, and Fast Moving Consumer Goods industries. Some of these clients include Dell, Compaq, Motorola, Roche, Ciba, Dystar, YHS, Danone, Shell Select, among many others.

The pilot will be deployed into one of the most complex and sophisticated distribution & fulfillment environments/networks, managed by YCH, which covers extensively throughout Singapore, for a spectrum of highly visible and high velocity goods.

Challenges Faced

The Proof Of Delivery (POD) is a very important and binding document during the delivery process, which authenticates the fulfillment of any physical transaction. The POD triggers the financial settlement, closing the transaction loop.

Currently, the POD is a very document-intensive procedure that is only consolidated at the end of the day, when returned to the central collection centre for processing. Consolidation, processing, verification & validation of the POD documents, to generating and sending the invoice will take about **8** days. Often this process creates many opportunities for errors to occur, such as discrepancies due to lost or modified documents, that need to be rectified, which often takes time to investigate and resolve.

Proposed Solution to be Piloted

The ePOD for Mobile Supply Chain Transactions (ePOD) – consists of 2 main components, the Y3 Supply Chain Management (SCM) System and the Fujitsu Mobile ASP.

Fujitsu Mobile ASP Center consists of an advanced mobile application service platform, called the Service Delivery Architecture (SDA). The SDA extends the business processes from the SCM and any business backend systems to mobile application services.

Y3 Supply Chain Management System consists of mainly the ePOD server and the backend application servers, which support Warehouse and Inventory Management, Traffic Management, Distribution Management, and so on.

With ePOD, the delivery personnel are able to update the SCM system as delivery occurs. As the goods are delivered, the customer authenticates the Delivery Order (DO), via a mobile device of choice, which will then transmit the completed DO via the GPRS network, and the system will be updated instantly. This eliminates the waiting time for the hardcopy of the signed DO to be returned to the office at the end of the day and manually entered by data entry personnel. Hence, ePOD enables faster turnaround time for each delivery transaction and shortens the whole business process cycle.

In addition, when exceptions occur in the delivery, the delivery personnel can use the GPRS mobile phone to access the Delivery Order online and indicate the item(s), which is incorrect and specify the error. This enables the SCM system and the traffic management staff to take appropriate remedy action instantly thereby improve customer service and optimize the use of resources.

In this pilot project, a mobile phone with WAP over GPRS is used to deliver the ePOD mobile application services, which may eventually be accessible for customers to access with their own mobile phones.

Expected Benefits

With this pilot the company aims to achieve an improvement in information accuracy and timeliness via a reduction in Turn Around Time (TAT), thereby improving on the efficiency by at least 10%, between each start and end date of working delivery cycle to POD processing. The company also expects to improve in time to completion of job delivery by 25%. These are all due to the empowering "Live" transaction capabilities that remove the redundancies and duplicating processes inherent in a physical scenario. Where there are instances of discrepancy, information is also instantly fed back so that the Central Collection Centre can take immediate remedial actions and follow up with another shipment, thereby reducing waiting time for the customer, at the same time redirecting the original delivery to replenish other targets.

Also, this authentication & validation procedure creates new opportunities of transaction empowerment as well as information management

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Sector
Logistics

Category
Field Force Automation

Companies in the Consortium
1. Transnational Supply Chain Logistics Pte Ltd
2. Compaq Computer Asia/ Pacific Pte Ltd
3. Geo Millenium System Pte Ltd
4. Wilco Telephony Systems Pte Ltd

"Transnational expects to improve the routing of its field personnel resulting in improved time scheduling and higher productivity per individual. Real time tracking will allow better monitoring of all assignments and permit enhanced detection, response and recovery of all service standard deviations".

Project Title
Wireless Logistics Tracking System

Profile of User Company

Transnational Supply Chain Logistics Pte Ltd

Transnational Supply Chain Logistics Pte Ltd provides innovative specialized logistics solutions incorporating consultancy, hardware, software and services for the banking industry and other niche markets. Often, the solutions require the company to operate efficiently under high time sensitivity and difficult operating conditions.

Challenges Faced

Due to the increasing expectations of customers, there is a need to enhance the system's capability to track the movements of its field personnel on a real time basis in order to be able to detect, respond and recover any service failures during the day. The system should detect immediately any service non-compliances and facilitate communication and co-ordination between the company, its field personnel and the customers.

Proposed Solution to be Piloted

Transnational's business requirement is to track its field personnel and ensure the timely execution of all assignments. The implementation of the pilot will enable Transnational to optimize the delivery schedules and better estimate the real cost of delivery.

The field personnel will be equipped with a PocketPC that will hold details of all assignments including their delivery run schedules, and delivery/pickup information, which is transmitted to the back end system using GPRS. The PocketPC is equipped with a Gismo wireless jacket that allows GPRS, GSM and WLAN (802.11b) which allows the position of any field personnel to be tracked by the controller. This information will be valuable in the event that the field personnel are delayed. The field personnel can also access location information using the GEO Millenium Road Pilot application.

The execution of each assignment would be monitored on a real time basis and the run schedule will be updated concurrently. This would allow the Company to readily identify gaps in schedules and increase productivity per routing.

Expected Benefits

Transnational expects to improve the routing of its field personnel resulting in improved time scheduling and higher productivity per individual. Real time tracking will allow better monitoring of all assignments and permit enhanced detection, response and recovery of all service standard deviations. This will enhance the company's ability to improve communication and co-ordination with its customers and field personnel on a dynamic basis.

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Trial site at the Singapore Police Force Cantonment Rd Complex

Sector
Public Service

Category
Remote Monitoring

Companies in the Consortium

1. Ericsson Telecommunications Pte Ltd
2. National Computer Systems Pte Ltd
3. CISCO Security Technology Pte Ltd
4. SingTel Mobile Pte Ltd
5. Trial User: Singapore Police Force

"The proposed MMS Remote Monitoring solution will allow users to monitor important sites even when they are on the move. This will help to reduce the need for on-site inspection and hence reduce operation cost".

Project Title
MMS Remote Monitoring Solution

Profile of User Company(s)

The MMS Remote Monitoring Solution is an advanced security solution that will benefit enterprises/ public sector with mobile workforce and has the need of monitoring premises with security interest. Singapore Police Force (SPF) is a good example of such organizations.

SPF plays a critical role in ensuring the safety and security of all residents in Singapore. One of the key strategic thrusts of SPF is to leverage on Infocomm Technology (ICT) to enhance its operational capability.

Over the years, SPF has put in place a network of ICT systems to support its frontline officers in dealing with multi-faceted issues. ICT is also being deployed pervasively in SPF to complement its operations, especially in the area of physical and information security after the Sept 11 incident.

Challenges Faced

Today, many companies have already deployed surveillance system. The surveillance cameras are usually connected to viewing monitors to observe the activity of the monitored area. However, if the staff is on the move, he will not have physical access to the viewing devices such as the monitor to view any security alerts.

Currently, there are technical solutions that support motion detection and trigger a SMS or pager alert to notify mobile users the possibility of a security breach. However, the text alert does not provide sufficient information to allow the mobile staff to assess the situation and take immediate action.

Much of SPF's operations are highly mobile. With so many of its forces constantly on the move, working away from police premises and vehicles, the deployment of wireless technology has to be second nature to SPF. Thus in this trial, SPF hopes to explore the MMS remote monitoring solution to protect one of its ICT facilities ie Computer Centre at Police Cantonment Complex.

Proposed Solution to be Piloted

In this project, the consortium will extend the remote monitoring notification method to make use of the Multimedia Messaging (MMS) technology, so that the mobile users will be able to view the images captured by surveillance cameras at his/her mobile phone.

The MMS remote monitoring solution will be implemented on Ericsson Telecommunications' MMS solution platform, and will be integrated with CISCO Security Technology's surveillance system and SPF's alarm system. National Computer Systems (NCS) will be responsible for the overall solution integration, while SingTel Mobile will provide GPRS network access and consultancy services to support the development of the solution.

The trial will be conducted at the Computer Centre located within Police Cantonment Complex. There will be 4 test scenarios:

1) <u>Intrusion Detection</u>
Motion Triggered MMS alert will be sent to trial user's mobile phone whenever there is attempt to trespass monitored area by intruders

2) <u>Alarm Alert</u>
MMS alert will be sent to trial user whenever there is any fire or smoke alarm. Through the MMS image received on user's mobile phone, the user can determine if it is a "false alarm".

3) <u>Regular Monitoring</u>
MMS Monitoring Alert will be sent to on-duty staff on a regular basis. This will replace routine patrolling.

4) User Trigger Monitoring
Trial user can request for MMS monitoring alert whenever he or she so desires.

Expected Benefits

The proposed MMS Remote Monitoring solution will allow users to monitor important sites even when they are on the move. This will help to reduce the need for on-site inspection and hence reduce operation cost.

Upon successful trial, SPF may consider deploying this remote monitoring solution in other SPF offices and premises to further enhance the security and efficiency of its operations.

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Sector
Real Estate

Category
Sales Force Automation

Companies in the Consortium
1. ERA Realty Network Pte Ltd
2. CET Technologies Pte Ltd
3. Airgateway Pte Ltd

"ERA hopes that the new system will enable its agents to access vital information on a timely basis, download picture image of properties available for sale or rental, thus effectively shortlisting potential properties for clients' viewing".

Project Title
Mobile Property Sales Management System

Profile of User Company(s)

ERA Realty Network Pte Ltd is one of the largest real estate company in Singapore with over 1,100 professional real estate specialists. Established in 1982, ERA is the first real estate company in Singapore to introduce and computerise exclusive listings and matching for its agents to access in a speedy and efficient manner. It's little wonder that it was awarded the National IT Award (Private Sector) in 1996

Last year, ERA made it possible for its agents to download listings on its website and LAN into their Palm PDA.

ERA is a forerunner in IT technology. ERA believes in embracing IT to the maximum to enhance the efficiency and productivity levels of all its agents.

ERA is now looking into implementing a new wireless system to allow agents privilege to do all essential functions effectively anywhere they may be - in the client's premises, in the car or even in a restaurant having lunch.

ERA hopes that the new system will enable its agents to access vital information on a timely basis, download picture image of properties available for sale or rental, thus effectively shortlisting potential properties for clients' viewing.

Challenges

The element of time has always been a crucial parameter in the measurement of any business engagement. A lapse in time to market or respond to an enquiry could potentially mean a loss of business opportunity.

In today's real estate environment, property professionals are struggling to juggle priorities in the matrix of time management. These professionals have to habitually travel back and forth to the office for constant updates of information on properties and customers, check their personal e-mails and complete administrative duties.

In addition, the throughput of these professionals has yet to be maximized as a lot time is usually spent in viewing properties with customers before sales transactions can be closed successfully.

The vision of ERA is to embark on a fully automated system whereby it could effectively resolve and address all the above challenges that are facing them today.

Proposed Solution to be Piloted

The proposed pilot project entails a total end-to-end solution in the domain of the wireless mobile space. This innovative solution would help to answer and cover key aspects of the sales force operations within the real estate environment.

The proposed mobile property sales management system provides a multi-modal wireless platform for **Property Sales Management, Electronic Submission, Sales Illustration & Sales Matching and Contact & Event Management**. These tools immensely enhance the mobility and productivity of the sales force by enabling them to efficiently manage their sales property information, real-time sales illustrations, personal information and schedules and customer relationship management.

Leveraging on the wireless technologies of WAP over GPRS, WLAN 802.11b and SMS, property sales professionals today are able to indulge in real-time interactive experience through their mobile phones (GPRS and GSM), PDA and the *state-of-the-art information appliance* – ***Ceteon*** for their day to day sales events.

In near future, STE intends to incorporate **Green Packet's NetMobile technology** into WLAN/GPRS hybrid services, thus enabling seamless roaming across GPRS and WLAN networks. This would inherently allow users to roam seamlessly using Ceteon 840 across hybrid network without dropping their on-line applications.

Expected Benefits

The benefits of the proposed wireless system are as follows:

- Increases property agent's competency and productivity in efficient scheduling of customer meetings, making sales presentation, enabling immediate submission of customers' applications and real-time access to personal information anytime, anywhere.

- Substantial savings in property sales management, maintenance and support including costs of obtaining, collating and disseminating timely product information, business and customer profile information to meet specific sales needs of property agents. Greater savings translating to greater revenues.

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Project Title
Wireless Semiconductor Manufacturing – STATS.

Profile of User Company(s)

ST Assembly Test Services (STATS) is a leading provider of full turnkey semiconductor test and assembly services to fabless companies, integrated device manufacturers and wafer foundries worldwide. It has a proven leadership in mixed signal testing, focusing on wireless communications, broadband access, networking / fiber optics and high-end digital consumer markets.

Challenges Faced

Key challenges faced by operators, managers and maintenance crew in this sector, where investments and downtime costs are high, are:

1. The need to manage multiple workstations and tracking information between machines within the fab/multiple fabs.

2. Importance of tracking equipment and work-in-progress (WIP) round the clock to make critical production decisions.

3. High risk of errors by operators who move from machine to machine. Operators often have to move across the fab in order to input data (recorded manually) into workstations. Errors in data entry within the fab would result in errors in production and subsequently downtime.

4. The need to provide STATS customers, with more accurate information about the WIP status of their devices under production.

5. To stay ahead of the competitive market, especially during difficult times, with the use of advanced technology to improve productivity and be a market leader.

Proposed Solution for Pilot Run

The solution will include three modules namely, **iQlook, iQmove and iQknow**.

The **iQlook** allows supervisors and managers to view the real time status of shop floor equipment with colour-coded icons. It will have drill-down capability for users to get status of equipment at various levels like plant (STATS), sub-area (Test, Assembly), and specific operation (Wirebond). Users can access the latest status while in regular morning meetings or anywhere else in the facility.

The **iQmove** aids operators in performing their daily tracking of WIP while on the move. Functions like job start, job end, data collection, holding and releasing jobs can be performed by an operator standing next to the machine rather than having to walk up to a common desktop away from the machine. This also ensures that the WIP data is more accurate, leading to better understanding of cycle time. A barcode reader attached to Compaq iPAQ pocket PC will capture the bar-coded lot identifier from the lot traveler and send the information to the backend MES (Manufacturing Execution System). Collecting data while standing next to equipment eliminates double entry and reduces errors in the data.

The mini reporting **iQknow** gives managers and engineers up-to-date report from an online database wherever they are, be it in a meeting room within STATS, via GPRS at a customer site or even from home.

This solution will deploy the wireless LAN 802.11b for users within the facility and GPRS for access from outside the premises. With Wilco's wireless LAN (WLAN), GPRS-combined jacket, the facility can use the iPAQ for both GPRS and WLAN access to backend systems without switching interface cards. The web-based user interface will use Microsoft IIS® and ASP to communicate with the Promis® MES.

A pilot will be carried out in the wire bonding area and will be extended to other work areas.

Sector
Semiconductor

Category
Remote Monitoring

Companies in the Consortium

1. ST Assembly Test Services Ltd.
2. Compaq Computer Asia Pte Ltd.
3. Wilco Telephony Systems Pte Ltd.

"The pilot is expected to help us save room space, and allow accurate tracking of work in progress among other benefits".

Expected Benefits

The expected benefits are:
1. Potential to reduce the number of PCs in clean room – saves costly clean room real estate.
2. More effective control of equipment utilization with real time status.
3. Accurate WIP tracking provides precise cycle time reports.
4. Reduced errors in data entry leads to more accurate “binning”.
5. Improved decision with availability of real time reports anywhere, any time.
6. Mobile access and better throughput of operators lead to higher productivity.

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Project Title
Wireless Platform for Service and Maintenance Management

Sector
Semiconductor

Category
Field Force Automation

Companies in the Consortium
1. Ellipsiz Pte Ltd
2. AirGateway Pte Ltd
3. SUN Microsystems Pte Ltd

"It is envisaged that the new system will reduce the average time taken to answer customer queries on the availability on parts and to book the delivery schedule. Time taken to deliver ex-stock parts and services and to generate quotations will also be reduced significantly."

Profile of User Company(s)

The Ellipsiz Group is a leading engineering and advanced packaging solutions provider to the semiconductor industry in Asia. The holding company, Ellipsiz Ltd., was listed on SGX in July 2000. Among its engineering solutions are the sale and support of semiconductor equipment and chemicals, turnkey failure analysis laboratories, and total chemicals management (TCM). It also offers advanced packaging services such as wafer bumping and System-in-Package manufacturing.

The Group has operations in Singapore, Malaysia, Taiwan, China and the USA. More information on the Group is posted on its website at www.ellipsiz.com.

Challenges Faced

Ellipsiz integrates, distributes and supports highly-specialized equipment and systems to wafer fabrication plants and other semiconductor manufacturers, which operate on a 24X7 basis. Downtime would incur tens of thousands of dollars in losses for these manufacturers.

Hence, customer requests for equipment, services and spare parts require immediate response from Ellipsiz engineers.

Proposed Pilot Solution

mMaintain™ uses SMS and WAP technology to equip sales/service engineers with the necessary information to respond to customers more immediately.

It will provide management and service engineers with timely access to information on customers, equipment type, warranty and service or work order pricing. These will be transmitted to sales engineers to generate quotations for work orders, and help them make quick and informed decisions.

Engineers will also be able to make enquiries on parts availability and customer credit line, view past quotations, trigger SAP reports to be sent via e-mail and approve purchase requisitions.

It is envisaged that the new system will reduce the average time taken to answer customer queries on the availability on parts and to book the delivery schedule. Time taken to deliver ex-stock parts and services and to generate quotations will also be reduced significantly.

Expected Benefits

The key benefits of the proposed mMaintain™ wireless system are:

1. Shorter response time to customers requiring prompt service and replacement of vital equipment and spare parts;

2. Improved task performance and co-ordination leveraging on mobile technologies that provides instant connectivity and interactivity with the enterprise backend system, and which matches the needs of different users in the organisation;

3. Open system and scalable technology to add on new mobile services, and connectivity to new enterprise backend applications.

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Sector
Shipyard

Category
Field Force Automation

Companies in the Consortium
1. Sembawang Shipyard Pte Ltd.
2. Compaq Computer Asia Pte. Ltd.

"It is envisaged that a wireless solution would (among other things), allow for the real-time reporting of the workforce (sub-contractor and yard workmen) data such as number of workers, job code allocations etc. The consolidated view across all vessels in the shipyard would allow for more informed and timely decisions on deployment of the workforce to meet the needs of the dynamic work environment".

Project Title
Wireless Labour Tracking System

Profile of User Company(s)

Sembawang Shipyard Pte. Ltd
Established in 1968, Sembawang Shipyard is a world-class shipyard offering a combination of facilities and expertise for ship-repair and conversion. Serving a worldwide clientele from more than 35 countries, more than 200 vessels are repaired or converted annually. Amongst their clientele are leading ship owners in tanker, chemical, oil and gas and offshore trades. The shipyard also has exclusive alliances e.g. Shell International Trading and Shipping Limited, BP Shipping, Jo Tankers AS and Teekay Marine (Australia).

The shipyard deploys a direct workforce complemented by marine sub-contractors for shiprepair and conversion activities. These will involve major production trades such as steel fabrication and fittings, pipe work, blasting and painting, etc.

Challenges Faced

Being a labour intensive industry, deployment of workmen onboard vessels are closely monitored and verified. Typically, 3000 to 5000 workmen enters the shipyard daily. As such, supervision of the work and verification of skill sets deployed onboard the ships and workshops are important. One aspect of the management of these workmen is the availability of 'real-time' intelligence of actual number of tradesmen onboard for purpose of monitoring the skill sets distribution and legality of the workmen. Optimum deployment of the workmen of various skills and trades is key to the management of the labour cost, deployment of trade manpower and manning of the various projects.

The current system of labour tracking involves the use of job sheets, which is filled by the supervisor at the end of the day and submitted to the production department's administrative staff. These data are then manually entered into the enterprise's back-end system. Though adequate for payroll and normal deployment purposes, there are benefits if the speed of these data into the system can be made timelier, to create the necessary 'deployment intelligence' for a full overview of the various manpower demands across all vessels. This will allow the production manager to assess the dynamic planning requirements. Current deployment intelligence is gathered from the input of the various supervisors and production managers from the ground, where cross or re-deployment decisions are made. Bringing such data entry and recording from the administrative staff to the front line in real time, will allow for this deployment data to be transformed into near real time information to be captured for useful analysis and processing.

Having the manpower data in the database will also allow for various checks to be carried out e.g. legality status, skill sets suitability and qualifications. As per manpower regulations, all workers must have suitable work-permits and safety-training certifications to be allowed to work in the shipyard. There is a marine industry-wide Marine Resource Information System (MaRIS) that allows for the verification the worker identities captured at gate-entry. This system in conjunction with the wireless labour tracking system, can reconcile both numbers and identities of the workforce deployed onboard each ship with this gate entry information.

Proposed Solution to be Piloted

The proposed system will allow for the project's job-related data from the enterprise system to be downloaded from the server to the iPAQ wirelessly, by the supervisor onboard the vessels or in the workshops. The iPAQ comes with a jacket with a bar code scanner and wireless LAN card. With this device, the supervisor will then scan the identification bar codes of the workmen deployed for this job. Subsequent re-connection to the server will allow for this deployment information to be uploaded to the server database. The hand-held device can also be used to call up necessary information regarding the workmen e.g. legality status and skill sets reports. The deployment information will then be processed and put forth as proper deployment intelligence in the form of an intuitive user interface for the planners and decision makers.

To enable the Pocket PC to communicate with the enterprise back end it is proposed to install IEEE 802.11b wireless LAN. The wireless LAN utilizes Wireless Bridge that enables high-speed long-range outdoor links through the strategic placements of antennas across the shipyard.

Expected Benefits

It is envisaged that a wireless solution would improve the current situation by:

1. Allowing for the real-time reporting of workforce (sub-contractor and yard workmen) data such as number of workers, job code allocations etc. The consolidated view across all vessels in the shipyard would allow for more informed and timely decisions on deployment of the workforce to meet the needs of the dynamic work environment.

2. Integration of the wireless solution with the enterprise back-end would alleviate the follow-on administrative work from the manual system. This is seen as the biggest area for costs savings and frees up the administrative staff to more value-add work.

3. Automated matching of workers man-hours charged to the respective job numbers to enhance the efficacy of the back-end process.

4. Tracking the information within the back-end to yield manpower deployment trends, cost etc. This would allow for better estimation of manpower requirements, sub-contracting costs, patterns of manpower deployment etc

5. Creating potential spin-offs in terms of Safety Management, Mobile references, Equipment tracking, etc. due to this gathering and processing of deployment intelligence.

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Sector
Transport (Airport Ground Services)

Category
Supply Chain Management

Companies in the Consortium

1. Changi International Airport Services Pte Ltd
2. KPMG Consulting Pte Ltd

"Ultimately, this is expected to reduce processing time and costs on inflight meal orders, namely communication and paper costs via walkie-talkie/phone/telex between airlines and CIAS, as well as potential errors and disputes arising from the inflight meal order process".

Project Title
Wireless Self-Service In-flight Meal Order for Changi International Airport Services

Profile of User Company

Changi International Airport Services

CIAS is one of two ground-handling agents at Changi Airport, responsible for providing various ground handling services to different airlines at Terminals One and Two. These ground handling services range from passenger boarding, baggage and cargo handling, food catering, to airport security services. Most of the work of CIAS staff is operational in nature. Mobile enabling the workforce therefore becomes of primary importance. These workers can include passenger service agents, gate and apron staff, security officers, catering staff as well as other ground and flight handling staff, etc.

Challenges Faced

Currently, in-flight meal orders by airline duty managers are communicated via telex, fax, walkie-talkie or telephone to control centre. CIAS control staff will then enter the orders manually (by flight and passenger travel class) into the catering sub-system called Orders & Production System.
Some problems with the current scenario are: -

- Necessity for CIAS control centre staff to process inflight meal orders from airline duty managers, instead of being done by airlines themselves through self-service;
- Potential disputes between airlines and CIAS, which means airlines may dispute the in-flight meal orders processed by the CIAS control centre and, subsequently, payments. These disputes can be substantially reduced through a self-service.
- Insufficient control centre staff to handle concurrent and multiple in-flight meal order requests by different airlines
- New in-flight meals introduced for an airline, class, or flight may be known to the airlines and to CIAS Catering, but not to CIAS Control Centre.

Proposed Solution to be Piloted

With a wireless solution, data will be captured directly by the airline duty managers into the CIAS Catering System based on a self-service. The mobile solution allows airlines to display lists of meals available, and to perform some basic validation of in-flight meal requests with the back end CIAS catering system. For example,, ordering meals versus availability before being accepted and updated into the backend system.

The wireless application, riding on Singtel's GPRS network, is running on Oracle 9iASWE application platform which provides the interface to CIAS's back end catering server on Adabas database. Airline managers and CIAS flight dispatchers will be accessing and capturing the data via the new HP Jornada 928s with built-in GPRS connectivity. CIAS Flight dispatchers will also be using the wearable Oneil mobile printers for online printing of meal delivery receipts for airline crews.

Expected Benefits

Ultimately, this is expected to reduce processing time and costs on in-flight meal orders, namely communication and paper costs between airlines and CIAS, as well as potential errors and disputes arising from the in-flight meal order process.

The self-service process also represents a significant step forward in enabling concurrent/multiple meal order processing by different airline customers.

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Annex - Projects by Sectors and Category

	Sales Force Automation	Field Force Automation	Supply Chain Management	Remote Monitoring
Buildings and Facilities		**m-Services in Facilities Management @ NTU**[*Keppel FMO Pte Ltd, Nanyang Technological University-Office of Estate and Amenities, FOSPEX Pte Ltd, eMobile Pte Ltd*] **PWD EMS Wireless Facility Management System** *[PWD EMS Pte. Ltd, Buildfolio Pte Ltd., NETalk Pte Ltd]*		**Wireless Remote Monitoring for Electrical meter Reading and Logging** [*PWD EMS Pte. Ltd. Keppel DigiHub Ltd*]
Construction		**Wireless Workflow Resource Management System for Scaffolding** *[DCS Solutions Ltd, Transvert Scaffold & Engineering Pte Ltd]*		**Wireless Remote Field Monitoring Applied to Construction Industries** *[SysEng (S) Pte Ltd., Wisescan Engineering Services Pte Ltd., Kiso Jiban Singapore Pte Ltd]*
Distribution and Sales	**Wireless Sales Force Automation and Marketing Information System** [*Harpers Trading (S) Pte Ltd, Harpers Marketing Pte Ltd, Diethelm Singapore Pte Ltd, Maya Systems Consultants Pte Ltd., Deloitte Consulting]* **Wireless Sales Force Automation** *[Philip Morris Singapore Private Limited, IBM Singapore Private Limited, StarHub Singapore Private Limited]*			
Education/Training		**Wireless Student Progress Management & Wireless Asset Tracking System** *[Comfort Driving Centre Pte Ltd, IdealSoft Pte Ltd]*		

	Sales Force Automation	Field Force Automation	Supply Chain Management	Remote Monitoring
Hospitality			**Mobile Enabling Hospitality Suite** *[National Computer Systems Pte Ltd., Raffles International Limited]*	
Industrial/Electrical	**Development of Wireless Interface to SME applications** *[Zara Technology Pte Ltd, Chee Fatt Co Pte Ltd, Kian Soon Hardware and Trading Pte Ltd, All-Wares Supply, Palm Singapore Sales Pte Ltd]*			
Infocomm	**"Wired with Wireless" Integrated Sales Cycle Management Project** *[SUN Microsystems Pte Ltd, iGine Pte Ltd]*			
Logistics		**Wireless Logistics Tracking System** *[Transnational Supply Chain Logistics Pte Ltd, Compaq Computer Asia/ Pacific Pte Ltd, Geo Millenium System Pte Ltd, Wilco Telephony Systems Pte Ltd]*	**eLogistics Job Dispatcher System** *[NEC Singapore Pte. Ltd., Ameroid Logistics (S) Pte. Ltd.]* **Electronic Proof of Delivery (ePOD) for Mobile Supply Chain Transactions** *[Fujitsu Asia Pte Ltd, Y3 Technologies Pte Ltd, YCH Group Pte Ltd]*	
Public Service				**MMS Remote Monitoring Solution** *[Ericsson Telecommunications Pte Ltd, National Computer Systems Pte Ltd, CISCO Security Technology Pte Ltd , SingTel Mobile Pte Ltd, Singapore Police Force]*
Real Estate	**Mobile Property Sales Management System** *[ERA Realty Network Pte Ltd, CET Technologies Pte Ltd, Airgateway Pte Ltd]*			
Semi-conductor		**Wireless Platform for Service and Maintenance Management**		**Wireless Semiconductor Manufacturing – STATS** *[ST*

	Sales Force Automation	Field Force Automation	Supply Chain Management	Remote Monitoring
		[Ellipsiz Pte Ltd, AirGateway Pte Ltd., SUN Microsystems Pte Ltd]		*Assembly Test Services Ltd., Compaq Computer Asia Pte Ltd., Wilco Telephony Systems Pte Ltd.]*
Shipyard		**Wireless Labour Tracking System** *[Sembawang Shipyard Pte Ltd.,Compaq Computer Asia Pte. Ltd.]*		
Transport (Air Ground Services)			**Wireless Self-Service In-flight Meal Order for Changi International Airport Services** *[Changi International Airport Services Pte Ltd, KPMG Consulting Pte Ltd]*	