



INTERNET-BASED VESSEL TRACKING SYSTEM (I-VET)

2005 COMPUTERWORLD HONORS CASE STUDY

TRANSPORTATION

SINGAPORE MPA'S INTERNET-BASED VESSEL TRACKING SYSTEM (I-TRACK) CONVENIENTLY DELIVERS TRACKED VESSEL INFORMATION VIA THE INTERNET TO SHIPPING COMPANIES IN SINGAPORE'S MARITIME INDUSTRY, IMPROVING RESOURCE ALLOCATION, PLANNING, PROCESSES AND CUSTOMER SERVICE. [20055327]

A Search for New Horizons



SUMMARY

MPA's Internet-based Vessel Tracking System (I-TRACK) conveniently delivers tracked vessel information via the internet browser to shipping companies in Singapore's maritime industry. Port users are able to use this information in their resource allocation planning process and serve customers more efficiently, hence improving the services delivery in the maritime industry.

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APPLICATION

What is I-TRACK?

The Internet-based Vessel Tracking System (I-TRACK) developed by the Maritime and Port Authority of Singapore (MPA) is a user-friendly web-based system, which aims to provide real-time information of vessel positions in the Singapore port to the maritime industry. Since its launch, companies which provide ancillary port services, such as bunker suppliers, towage companies and ship chandlers, has rely heavily on this real-time information in their daily operational planning.

Before I-TRACK was introduced, these companies faced ample problems in their resource allocation planning process. For instance, it is extremely difficult for a company to deploy its fleet to service vessels, which are constantly on the move. Knowledge of their own resources was scare and cumbersome as it was dependent on manual radio reporting efforts. Many a times, they do not know even know the exact locations of their fleets. Under such circumstances, it is impossible to plan for the most efficient route to service as many vessels as possible within the shortest time.

Goal:

The goal of I-TRACK reflects a committed government intention to provide value-added information to shipping companies in the maritime industry facing this problem. The main goal of the I-TRACK is to provide real-time vessel information to help companies achieve greater efficiency, which therefore enhances the competitiveness of the local maritime industry. With the availability of such precise information, shipping companies can better plan for the shortest possible route to allocate their resources efficiently from one vessel to another, hence improving the timeliness of the overall service delivery.

Method:

The I-TRACK system was developed in-house following the rigorous Software Development Life Cycle model. The concept involves the periodic posting of tracked vessel information from MPA's sophisticated radar tracking system into a database. This then provides a snap-shot view of all the vessels in the port waters, which is presented visually on display maps via the internet browser. By using Internet browser as a delivery platform, what the users need is just a simple desktop PC to access the system anytime and anywhere.

Prior to the implementation, a pilot trial run that lasted for a few months was conducted with several maritime service providers. During the trial, feedback was gathered and various additional features were added for reasons of security. Today, the system is a fully functional service used largely by many shipping companies.

Achievements:

The system, which is accessible from the Internet, allows the shipping community to obtain value-added information at minimal cost. All they need is an internet browser to access the I-TRACK. In this way, companies do not have to invest in setting up expensive infrastructure to attain knowledge of their own fleets. Compared to the previous method of getting vessel information through radio relaying, this solution is more efficient and minimize manual efforts required. In addition, the quality of information attained is more timely, accurate and reliable.

More importantly, the real-time information acquired by shipping companies has enabled them to plan the resource allocation process more effectively. A fleet of vessel in a specific area can service nearby vessels within a shorter time frame, and cut down on unnecessary traveling. More efficient routes planned also implied tangible cost savings, as the cutting down on the amount of fuel consumed, leading to eventual business gains. In terms of safety aspects, the real-time information has allowed companies to reduce the waiting time fleets spend around dangerous navigation crossings, hence reducing the possibility of accidents occurring.

Other intangible benefits which comes along with this system include:

- improved organizational communication between MPA and shipping companies
- established good working relationships with companies in the private sector
- increased level of trust between MPA and shipping companies

BENEFITS

- Has your project helped those it was designed to help?

The I-TRACK was designed with a specific group of users in mind right from the beginning. It has enabled various marine service providers, eg the towage companies, ferry operators, bunker suppliers, ship chandlers, to improve their operational efficiency, increase overall productivity, and provide better customer service significantly

- In your opinion, how has it affected them?

The I-TRACK provides shipping companies with a birds-eye view of real-time positions of their crafts at any time. This has helped them in optimizing the deployment of their resources. As a result, the companies are able to do more value-added jobs, instead of having to invest much time and effort in tracking their vessels. Also, with better planning and deployment of resources, the specific routes of their crafts can be further optimized to service as many vessels as possible and this has translated into cost-savings in terms of fuel consumption, and cut down on unnecessary traveling. In addition, with the knowledge of such real-time information, companies can offer more reliable service to their customers as crafts can be deployed to service vessels more promptly.

- What new advantage or opportunity does your project provide to people?

With the availability of real-time time vessel information, there is an opportunity for the I-TRACK to be further enhanced to automate the process of scheduling and deploying crafts to service vessels. Currently, the planning and deployment is being done manually with different planners adopting their own resource allocation strategy, based on their personal experiences. The possibility of an automated scheduler can help these shipping companies achieve more consistency and transparency in the deployment of resources. In addition, with the business rules and deployment strategy being captured into the system, new planning recruits can be trained more easily than before.

- Has your project fundamentally changed how tasks are performed?

The task of monitoring and tracking of crafts have been changed radically from having to establish constant radio communications with craft masters at seas, to acquiring real-time information conveniently through an internet browser. Furthermore, the process of resource allocation planning is fundamentally changed from random haphazard route scheduling dependent on the planner's experience to a more organized and optimized manner.

With the availability of such accurate and timely vessel information, marine service providers are able to better react to the rapid changes in the environment in a proactive manner. For instance, any changes in vessel arrival times, can be handled by rescheduling resources easily and swiftly. Previously, the response to these changes had been slow and reactive due to lack of real-time vessel information. This ultimately contributes to better customer service and effective management.

- How might that change unfold?

Historically, maritime traffic in Singapore rises yearly, with increasingly larger sized vessel calling the port. The turn-around time of vessels is also greatly shortened, with the vessel's port stay being as short as 8 hours. This put demands on the services catering to the needs of the vessel while she is in port to be carried out expeditiously, as every extra hour spend in port amounts to cost increase to the vessel operator.

The efficient operational procedures of the marine service providers become detrimental in maintaining Singapore's position as a premier shipping hub. With the availability of information from the I-TRACK, service providers are empowered to deliver the expected service more efficiently than before, and this helps in maintaining the Singapore's competitive edge in the maritime industry.

- Does your work define new challenges for society? If so, please describe what you believe they may be.

The introduction of the I-TRACK will challenge the shipping community to effectively capitalize on this new type of information to better serve customers and manage their operations. They will have to rethink on the possibility of innovative uses of this information by capitalizing on information technology, so as to make their companies excel in their fields.

IMPORTANCE

- How did information technology contribute to this project?

The I-TRACK relied mainly on information technology, to serve the local shipping community. Without which, timely and precise information cannot be delivered conveniently to the users.

- Why was information technology particularly important to it?

The use of information technology (IT) has enabled critical information to be delivered to port service providers in a cost-effective manner via the internet browser. In addition, the nature of IT has enabled vessel information to be made available anytime and anywhere. This is especially crucial as the nature of the maritime industry is high in mobility and any information has to be relayed as soon as possible to achieve productivity gains.

- In your opinion, have you developed a technology that may lead to new ways of communicating or processing information?

In the past, real-time positioning information of vessels captured by sophisticated marine radar systems is used solely by MPA to facilitate regulatory goals. With the implementation of I-TRACK, part of the information is being made available to commercial shipping companies to aid them in their service delivery. This technology used to process vessel positioning information is innovative and unique. Specifically, the implementation involves extracting information from the radar systems, processing and finally transforming them into the format that is suitable for commercial use.

- Describe any new technologies used and/or cite innovative uses of existing technology. For example, did you find new ways to use existing technology to create new benefits for society? Or, did you define a problem and develop new technology to solve it?

MPA has combined existing technologies to create value-adding services for the Singapore maritime industry. The uniqueness of I-TRACK is attributed to the innovative combination of both the internet technology as well as the Electronic Navigational Charts (ENC) to deliver real-time information to users. The ENC is an established system that displays the graphical layout of Singapore's port, with precise details such as sea-

lanes, anchorages, critical reference points and traffic separation scheme. MPA has used its radar systems to acquire precise vessel positions and display the locations of vessels on top of the ENC chart. Furthermore, this rich information is then made available to the shipping community via the internet browser.

ORIGINALITY

- What are the exceptional aspects of your project?

There are three exceptional aspects of the I-TRACK.

Firstly, it provides rich information to the shipping community in a cost-effective manner, and eliminates the need for them to own expensive tracking equipment to attain information they need in their businesses. This is done by capitalizing on existing infrastructure owned by MPA.

Secondly, I-TRACK has a user-friendly interface even though complicated information such as charting data is involved. Information is presented graphically, yet the system is optimized to suit deployment over the internet. Users can get the information they need with just a few mouse clicks quickly.

Thirdly, the system provides value added services without compromising on security issues. Throughout the development of the project, MPA has assured that security factors were taken into considerations, such as the confidentiality of information, possibility of data misuse, and the extent of information disclosure. This is especially crucial in our times of uncertainty.

- Is it original? How? Is it the first, the only, the best or the most effective application of its kind?

The system is original and this service is the first of its kind to be introduced in the south-east asia region. Other than Singapore, there is no other nearby ports providing services similar to MPA.

- How did your project evolve? What is its background?

MPA has always been proactive in recognizing the needs of the local shipping community. Through regular interactions with the industry, MPA realized that an important area to help shipping companies would be to provide real-time information to them thereby increasing their business productivities. As a result, a project team was formed to oversee the development of the project. Following that, several companies were invited to participate in the pilot trial run. Regular meetings were held with these users to attain their feedbacks and improvements were made in the final version of the I-TRACK. The success of the project could not have been possible without heavy user involvement in the design stage, and working closely with the private sector to understand their business needs.

SUCCESS

- Has your project achieved or exceeded its goals?

Yes. The project initial trial with the selected maritime service providers, including towage companies, ferry operators and bunker suppliers were well received with favourable feedback.

- Is it fully operational?

Yes. The I-TRACK is fully operational with a second version due for release in Jan 2005.

- How many people benefit from it? If possible, include an example of how the project has benefited a specific individual, enterprise or organization. Please include personal quotes from individuals who have directly benefited from your work.

There were total 7 industry players engaged in our pilot trial. All have indicated favorably the usefulness of the tool and benefited in productivity gains in meeting the needs of their customers and managing their fleet.

- How quickly has your targeted audience of users embraced your innovation? Or, how rapidly do you predict

they will?

We are planning the release of the new version of I-TRACK with enhanced features and user-friendliness interface. Existing trial users have indicated continued interest in the system and would continue with the system while new users are expected to start using the system in Mar 2005 after we have carried out active marketing. We expect that by Dec 2005, more than 200 users will be using the system.

- Describe future plans for the project.

As the pilot trial of the I-TRACK ends, a promotional launch of the new version of I-TRACK is scheduled for early next year. Continued enhancements in terms of user interface and functionalities would be undertaken with feedback from users. Possible new features include allowing the user of I-TRACK to send and receive electronic messages to and from the craft masters, and automatic scheduler to optimize the deployment of crafts.

DIFFICULTY

- What were the most important obstacles that had to be overcome in order for your work to be successful? Technical problems? Resources? Expertise? Organizational problems?

Technical Problems:

The technology used for visualization and graphical representation as display accessible via internet is one main technical problem which have to be resolved. This is further complicated by the fact that the base map (chart) of the sea – shore profiles changes very dynamically in Singapore. To maintain accurate representation of shorelines, we have to depend on digitized charts (Singapore Electronic Navigational Chart using IHO S57 edition 3 standard) produced by our Hydrographic Department, and hence have to overcome the compatibility issues between the chart source and the visualization tool. At the same time, the visualization objects produced must be light-weighted enough for quick loading to browsers on dial-up (limited to 56 kbps) connections.

Resources:

There was no resource problem faced. Funding and manpower were catered for under MPA's in-house budget. In fact, MPA's recognizes the importance of the industry in leveraging on IT and have introduced various funding schemes for Singapore's local maritime industry in enhancing their IT capabilities.

Expertise:

We did face the lack of expertise related to the graphical and visualization deployment of charts and symbol representation on the internet browser. This was overcome by engaging external resources capable to deliver the user interface. Internal data extraction, processing and filtering were however carried out by in-house expertise.

Organisation:

There were no major obstacle from the organization. MPA's management had been very supportive of the project and have given guidance and direction on policy and security considerations related to the project.

- Often the most innovative projects encounter the greatest resistance when they are originally proposed. If you had to fight for approval and/or funding, it would be useful to include a summary of the objections you faced and how you overcame them.

No. The MPA management had in place an IT Steering Committee which oversees the approval on the initiation of major and innovative IT projects. The committee had been supportive and given directions on policy and security matters related to the project. Funding were from internal budgets and cost of use of the I-VET during the trial period were fully funded by the organization. The fully operational I-TRACK system is charged, based on cost recovery and not revenue generation.

• Did you encounter any unanticipated challenges?

No.