Satellite Maritime Communication Technology for e-Learning

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Abstract

Singapore Maritime Academy (SMA) has formed a partnership with Sing Tel and Globe Wireless to leverage on each other's respective expertise so as to raise awareness and make developments in the field of satellite communications, in maritime situation.

Satellite broadband communication is getting cheaper and more accessible.
Sing Tel has launched its new Maritime VSAT (Very Small Aperture Terminals) service. This is an "always on" ship-shore satellite broadband connection.

Maritime VSAT lends itself for "anytime- anywhere" E-learning using interactive multimedia for officers on board ships, preparing for certificate of competency (COC) examinations. The COC course will be in the form of "Blended E-learning".

Blended E-learning is an approach for mixing face-to-face classes with online activities and lessons. Online distance learning will provide the necessary underpinning knowledge, thus enabling seafarers to study at sea during their off-duty periods.

SMA has made learning objects, emulators and electronic performance support systems to foster its E-learning endeavour, and have tested over satellite broadband.

When designed properly, blended eLearning can bring vitality to learning that one delivery method alone often cannot deliver. MVSAT will be the vehicle for distance learning on ships.

E-learning

Electronic learning or E-learning is a general term used to refer to computer-enhanced learning. It is used interchangeably in so many contexts that it is critical to be clear what one means when one speaks of E-learning. In many respects, it is commonly associated with the field of advanced learning technology (ALT), which deals with both the technologies and associated methodologies in learning using networked and/or multimedia technologies.

E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case the term Blended learning is commonly used. In SMA we are more inclined towards Blended learning.

Singapore Maritime Academy has a small unit SMA R&D Centre which is developing web based teaching materials that use combination of technologies.

Electronic Performance Support System (EPSS) is a computer-based system that improves ship staff productivity by providing on-the-job access to integrated information, advice, and learning experiences. It improves the staff performance by:

- Reducing the complexity of steps required to perform tasks
- Providing performance information an employee needs to perform a task
- Providing decision support that enables ship staff to identify corrective measures for particular problem e.g. during trouble shooting.

Educational emulators are animations produced for the specific purpose of fostering learning by imitating machinery or a system.
The popularity of using animations to help learners understand and remember information has greatly increased since the advent of powerful graphics-oriented computers. This technology allows animations to be produced much more easily and cheaply than in former years.

Previously, traditional animation required specialised labour-intensive techniques that were both time-consuming and expensive. In contrast, software is now available that makes it possible for individual educators to author their own animations.

Video screen capture often containing audio narration is useful for demonstrating software features and as help file in WBT and CBT.

Learning objects are self-contained piece of learning material with an associated learning objective, which could be of any size and in a range of media. Learning objects are capable of re-use by being combined together with other objects for different learning purposes.
Some of the types of information that may be included in a learning object are:
- Introduction
- Instructional Content
- Text
- HTML web pages
- Images
- Sound
- Video
- Glossary of Terms
- Terms
- Definition
- Quizzes and Assessments

SMA has developed variety of educational content using multiple technologies which are stored in the Blackboard learning management system of the institute. These include EPSS, emulators and learning objects.

SMA, a maritime education and training portal is necessary for SMA to reach out to its students and seafarers on board ships with its certificate of competency courses. Through e-learning platforms students are able to access course materials, tutorials; on-line assessments submit assignments and receive feedback. SMA's COC courses should be partly distance learning and partly face to face i.e blended learning.

MVSAT

The Maritime Very Small Aperture Terminals technology that is needed to achieve this contact for seagoing students is now available. It can provide a flexible, scaleable and cost effective method for delivering distance learning solutions and training materials using multimedia content and broadband transmission technologies. Multimedia distance learning is the convergence of broadcasting, Internet, computing and telecommunications technologies. It offers students the combination of text, pictures, video, voice and data providing them with "rich" interactive and intuitive content for effective learning.

To foster E-learning onboard ships using MVSAT broadband SMA has signed an MOU with SingTel and Globe Wireless.

MVSAT, is always on ship shore satellite broadband communications, is getting cheaper and more accessible. The world's largest shipping fleets are deploying portal systems to enable their vessels to collaborate with onshore offices as if they were branches in a land based organization.

MVSAT also comes with the following value-added solutions:
- **E-surveillance**. Shipping companies can have live view of the ship operations and more importantly the better ability to cope with emergency needs such as tele-medicine as the internet functionality is now unlimited access and always on.
- **Cost-effective voice solution**. Shipping companies who have been used to paying high charges for voice calling can now expect substantial cost saving through SingTel MVSAT SIP solution.
- **GSM-at-Sea**. The solution enable the shipping companies to get connected effortlessly through the familiar GSM roaming service now onboard the ships.
- **SingTel World Conference**. A value added service that extend the conference call capabilities from the land-line to the vessels at minimal setup cost
- **Tele-medicine**. The broadband connectivity allows dedicated allocated bandwidth to the remote vessel when emergency situation arise.

SMA has successfully tested access to its Blackboard learning system and its E-Learning software discussed earlier via MVSAT at 128 KB/sec broad band speed.

Innovation Hub

Under the agreement SMA and SingTel will establish an innovation hub. This shall take the form of a simulated maritime environment comprising SingTel's satellite communication facilities, Globe Wireless' software and SMA's maritime expertise in the maritime industry.

SMA's students shall be able to utilize the Innovation Hub to be trained on all aspects of advanced maritime communication. The training curriculum for SMA shall incorporate, where possible, all aspects of the Innovation Hub's various technologies and Information technology solutions with the intention of exposing students to the vast potential of such technologies. This is expected to far exceed the traditional areas of voice and data communication, encompassing remote surveillance transformation applications for example in the field of tele-medicine.

The Innovation Hub shall also be a showcase to promote and enhance awareness amongst key members of the maritime community as to the potential of employing such advanced communication technologies for maritime use, with a view to significantly improving productivity and safety.

In addition, the Innovation Hub shall also serve as a laboratory for the outsourcing of testing, research and developmental projects to SP.

The Innovation Hub will also incorporate, develop and utilize the following technologies for maritime use:

(a)   e-Learning beamed via satellite for the benefit of the public, in particular all members of the maritime community;

(b)   e-Forms used for commerce, administration between ship and shore in the areas of requisitions, accounts and human resource;

(c)   Carriage of News, emails;

(d)   Remote surveillance technology - a video camera on a ship which can be remotely controlled from shore and the camera's pictures can be viewed on a computer at shore. (If a camera can be controlled from shore, the machineries and equipment can also be controlled from shore.);

(e)   Ship data telemetry monitoring (speed, ECDIS, fuel consumption and other related ship data) beamed from the ship and received in shore module;

(f)   Voice Over Internet Protocol (VOIP) communication equipment and operation between ship and shore;

SingTel has innovated the world's first 1.5meter stabilized antenna for Maritime VSAT (MVSAT) service. This MVSAT service is a comprehensive solution that provides IP-based broadband services such as Email, IP Client support, web surfing , VOIP, E-surveillance and GSM to maritime vessels plying the shipping lanes in the Asia-Pacific region.

With this innovation, smaller vessels can enjoy the following broadband services, improving crew morale and ship management :

- Communications applications (File sharing, VPN connectivity, etc)

- Fleet Management applications (Real time information exchange of routes, troubleshooting and weather information)

- Vessels management applications (Real time troubleshooting, medical support and cargo information exchange)

These benefits will increase service reliability and operational efficiency. It will also lead to better recruitment and retention of crew.

Satellite communication course

SMA and SingTel are also developing maritime satellite communication system course to raise awareness amongst students undertaking maritime studies. This course will enable ship's officers to make effective use of satellite communication technology.

Summary
Singapore Maritime Academy (SMA) has formed a partnership with Sing Tel and Globe Wireless to promote awareness through satellite communication course and establishing an innovation hub to demonstrate the communication technology. MVSAT technology will also be the vehicle to advance distance learning onboard ships.