Q&A Session: VTS on the horizon

Before the upcoming official launch of GeoVS' real-time 3D visualisation technology, Dr Rafal Goralski, Director of Technology recently joined us for a Q&A session on VTS. Addressing both the technological and human elements of this technology, Dr Goralski offered a detailed insight on VTS today and in the future.

During the last decade Vessel Traffic Services (VTS) technology has been constantly gaining in popularity. What do you believe has contributed to this growth?

Indeed, VTS systems are becoming increasingly more popular even with the smaller ports, and I think that there are multiple factors behind that progress.

One consideration is the natural technological improvement - the VTS systems are gradually becoming better: more reliable, with wider functionality, better radars and other sensors, higher quality of data presentation, more ergonomic user interfaces, better suited for the customers' and end-users' needs. New IMO standards such as AIS are enabling more detailed and reliable tracking of port traffic. The technology is maturing and standardising, years of development experience have their visible effect in the products.

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The second factor is the growing competition in the VTS market - and this is good news for the customers. Apart from the continued marketing efforts, which make the technology more widely known, it also contributes to the growing product quality and better focus on the customers' needs. It is a buyers' market now and it is not enough to offer a mediocre system any more. Each VTS manufacturer has to work as closely as possible with the customer and truly focus on satisfying his needs. The offering has to be of the highest quality. It also has to be more reasonably priced than even a few years ago.

The third and the most important factor of all is the genuine need for increased navigational safety in ports. Port managers know that safety has no price and is worth every investment. It is proven that investments in safety translate to more commercial traffic and are good for business. On the other hand it is hard to even assess what could be the cost (direct and indirect) of an environmental disaster, if for example an oil tanker crashed. Investment in a VTS system is like an insurance policy - despite its significant cost - a relatively small price to pay for preventing something really bad from happening.

As the technology is proven to offer real advantages here, more and more ports decide to embrace it, and it is good for everyone: ports, shipping operators, crews, environment, local people, and economy as a whole.

What is some of the technological progress you've seen over the last decade?

There were many technical improvements introduced during the last ten years. Apart from things such as improved networking capabilities (possibility to distribute the system and have multiple display stations deployed in different locations, or being operated remotely) use of web-based technology to present the navigational situation to the public, faster servers, bigger hard drives, better radar scanners, improved tracking algorithms, larger and much more ergonomic displays, there were two major improvements which - in my opinion - will have the biggest impact on the overall quality of VTS systems in the future.

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The first one is the introduction of Automatic Identification System (AIS) - a system of VHF transponders that are mandatory for all commercial craft, and allow very precise and reliable tracking of traffic even in bad weather or topographically difficult areas. AIS is fairly new, having been introduced in 2000 and coming into force in December 2004, and there are still some reservations against its reliability, because the position comes from the ship instruments which reliability may be questionable, unlike when a ship is tracked by a radar. But it is a great quality change, and it will improve further with more reliable transponders and more accurate satellite navigation systems such as Galileo or new versions of GPS. In all fairness part of the reservations is also due to the fact that not all manufacturers always interfaced with AIS perfectly, treating it as a secondary and inferior source of data for VTS operations. I am sure that the shift from radar to AIS has just started and will continue over the next years, and that both sources will be seen as equally important and complementary for many years to come.

The second one, which is just starting, is the emergence of 3D chart displays which offer a much more intuitive, ergonomic, precise and efficient way of presenting the navigational situation information to VTS operators. Research indicates that the use of 3D visualisation in navigation leads to even 80% reduction of human error and improves operational comfort and engagement of chart operators. Apart from that it enables completely new forms of operation: VTS operators are able to put themselves in position of any navigator, or a pilot, and understand their situation to a fuller degree. In my opinion it is a huge leap forward and it promotes a closer cooperation between VTS operators, pilots and navigators. And pilots with their high overload, pressure and difficult working conditions could benefit from some support from their land-based colleagues. Another benefit is that with the use of 3D visualisation that includes detailed seabed bathymetry VTS operators may observe the underwater clearance of any vessel and prevent groundings more easily. 3D charts also take the planning operations and incident investigation to a whole new level, but it is perhaps a different topic to be covered separately.

Despite this progress, there are still shortcomings in current VTS systems and caution about over-reliance on electronic aids within the industry. What advances in VTS can we expect to see in the future?

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As mentioned above, the gradual increase of confidence and reliance on the AIS as a reliable source of traffic information (not replacing, but complementing radar input,) and the introduction and wide adoption of 3D chart displays. Other improvements will include benefits from the incredible developments in wireless communication happening lately, which will enable better communication between pilot boats, Portable Pilot Units and VTS (pilot having constant access to all VTS data; VTS centre having a view of radar video from a pilot boat.)

We are also likely to see a wider adoption of FMCW radars and a slow shift from reliance on few large and expensive pulse radars into a more flexible and finely granulated architecture comprising of a mix of large and small radars (some of them portable) covering local shadow areas, or deployed on demand. The only way to address (very healthy) concerns about the over-reliance on the technology is provision of better training to VTS operators, preferably at sea, in pilot or navigator duties.

GeoVS' highly awaited 3D VTS will be officially launched at the UKHMA (UK Harbour Masters Association) Autumn Seminar on the 2 November 2011. Given its ongoing trials in the Port of Milford Haven, what are your expectations for this product?

Well, it is a bit awkward for me to comment on our system, but the only honest answer which I could give is that the expectations are exceptionally high, and this is for a number of good reasons. First of all, C-Vu delivers on the promise which I outlined when speaking about the 3D displays above. It is a cartographic 3D display, which means that it does not pretend to be highly photo-realistic like simulation-technology based products. Instead it is tailored for highly efficient and accurate presentation of important information, the way navigational charts are. It is very intuitive and easy to use, and can be used after 5 minutes of training. And it offers all that power and benefits: a full flexibility of views and perspectives, views linked to particular vessels, bridge perspectives, underwater analysis. It records traffic movements continuously for a number of years, and it is insanely easy and quick to retrieve and replay data for any particular day or moment within that time frame. It is a great support in real-time traffic monitoring as well as in incident analysis, planning, training, presentation of situations to non-expert audiences. It even has a fully automatic mode in which views stored as 'virtual CCTVs' change automatically in a pre-defined pattern, so it can replace a number of traditional display stations. And the presentations are based on official and legally approved S-57 ENC charts - these are not manually built models where the responsibility for potential charting errors is a serious consideration. Most importantly, C-Vu is compatible with and immediately enhances any existing VTS system, increasing the return on already purchased infrastructure. Honestly, I could go about it for hours, but instead let me just invite everyone to the event, which will be held at the Victory Services Club in London, or to our stand during the IHMA Congress in Cork, to see and test it themselves.

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Focusing on the human element, how has technical innovation in VTS impacted port operations? Given their difficult and highly important duties, how are VTS operators dealing with all this information?

There is no doubt that the progress has made the lives of VTS operators a bit easier and the navigation in ports a lot safer. However, VTS operators still work under a high pressure and have to juggle between multiple activities and responsibilities. They also have to switch between multiple disjointed systems: VTS, port management, Safe Sea Net, vessel registers, VHF communications, etc. It is not difficult to make a mistake and it takes a lot of effort to stay fully focused. Of course these people are exceptionally responsible and professional in their jobs, and they manage with their duties greatly. But they sure welcome every progress which makes their work easier.

What potential is there for VTS to manage the decline of nautical expertise?

One of the aspects is managing the decline in expertise of the navigators that bring their ships into the ports. VTS, pilotage, all these systems and schemes are introduced exactly to minimise this problem. The other aspect is the decline in expertise of people who come to the ports industry and apply for jobs as VTS operators. Less and less often these people have years of experience at sea under their

belts like it used to be in the past. We also often see younger VTS staff starting their duties. It is a challenge but a challenge which cannot be avoided, and an opportunity at the same time. A mix of experienced and younger operators may create a very productive environment. The times are changing and ports have to think about the future. One way to tackle the decline is training, and ports are usually excellent at providing it in accordance to IALA standards. The other way is by implementing technology to support the operators and navigators to the highest reasonable degree. That is why VTS systems and continued innovation and improvement in these areas are so important. But on the other hand we should remember that over reliance on technology is also a vulnerability and that is why training at sea, and perhaps in a role of a pilot or a navigator ideally should also be an important part of VTS operators training.

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How can ports match the investments made in their infrastructure, particularly in technology, with investments in human capital? Given your academic background and experience in working with government research facilities, what role can you see industry playing in attracting younger workforce generations?

I think that attracting younger workforce is a real challenge but also the most vital thing that ports and marine industry must face in order to grow. The trouble is that the marine industry is not very popular with younger generation of staff, people who love good entertainment and a healthy mix of responsibility and fun in their workplace, at the moment. With abundance of career choices not everyone finds the prospect of work on ships, being far from home for months, in very demanding working environment attractive. On the other hand ports are huge local employers that immensely benefit their local economies, at the time of a record high unemployment of youth, and perhaps it would be enough to make young people aware of these tempting alternatives, which are less demanding than work on sea-going vessels.

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I think that the industry needs to make young people attracted and fully informed about the career opportunities early on. Perhaps we need more marine-related undergraduate courses and vocational trainings to be offered to them? A closer link between the industry and universities could only help. And we do need to re-establish the ethos of a mariner and make these work places more attractive. The investments in human resources and training is a way to make ports and shipping more appealing to younger generations, and these have to be balanced with the spend on technology. However, investment in new and attractive technologies is also a good way to attract people who love living in the 21st century into the industry.

GeoVS' C-Vu® 3D VTS will be officially launched at the upcoming UKHMA Autumn Seminar at the Victory Services Club, London on Wednesday 02nd November 2011.
For more details visit: http://www.ukhma.org/events.php
Or contact: http://www.geovs.com/resources/press
Dr Rafal Goralski, PMP, Director of Technology, GeoVS will be delivering a talk on '**Technical innovation in VTS, pilotage and chart display systems as a way of improving safety and efficiency and mitigating the negative effects of the decline of nautical expertise in the ports industry'** at the upcoming IHMA Congress in Cork this May. GeoVS are also exhibiting at the Congress, so feel free to visit them at **Booth no. B11**

To view the list of exhibitors at the 8th IHMA Congress visit:
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