AMERICAN SUPERYACHT FORUM 2008
24 - 27 June 2008 — Newport

Day 3 - 26 June 2008

New Technology Debate - The Captain's Domain

Cheryl Zimmerman / Ian Bowles	FarSounder
Hernando Giraldo	Great Circle Systems
Dan Mickelsen	InteliSea

Chairman—Martin Redmayne

Good afternoon. The home straight, as they call it. This afternoon's session—2 hours of technology and essentially *[sorry, Ted's learned—he's put his earphones above his ears now. Thump. Sorry Ted!!*)

The first hour's session is 3 different companies presenting 20minute technical presentations—well, as long as they need, in terms of 20 minutes—but it's allowing for a question and answer time in that 20 minutes. So you're aware of that. And following that, we're having a session on submersibles—with an interesting panel of guys who are looking to go beneath the waves rather than over the waves. So very interesting, contrasting, sessions and fairly interactive. Thank you very much. Starting with FarSounder?

Cheryl Zimmerman FarSounder

Good afternoon. We'd like to welcome you to the home State of FarSounder— we're very excited that American Superyacht Forum is here, and I'm going to try not to do anything on marketing, but in order to explain the technology obviously I have to give some examples of things, and I'll leave marketing till later tonight at the barbecue for Ian. We're doing this in two languages—one is Rhode Island English and the other—Ian is going to translate into British English for you! I want to explain about the 3D sonar technology. Basically, why do you need 3D sonar? Sonar has been around for a long time, but in order to do navigation using sonar, technology has never been advanced to the point of being a useful tool for surveys—for fish finders, it's been around for a long time. So I'm going to have to take a step back, mainly for all the attorneys, in this audience and explain the difference between 1, 2 and 3D sonar. And if you want to get more technical, I'll sort of go into the deeper technology as we go along and hopefully keep everybody awake after this lunch.

Now, 1D sonar, your typical echo sounder and depth sounders, show you on one ping what's under your vessel. Which is great for showing trends of how the bathymetry is going but it's not going to help you avoid the rock that's in front of you. It's not facing forward, it's not showing you how deep the rock is. Now 2D sonar has been used for a long time, mainly for finding submarines, that's one of the major areas that it started in. And that will show you where an obstacle is in order of the range and bearing, but it won't show you where it is in depth. Can your vessel go safely over this obstacle that's in front of you. The 2D sonar can't show you that. You can see a narrow beam, either vertically or horizontally. You can turn it. You can

generate a 3D view over time, like an MRI would do, but for navigation you need something in real time that's going to show you a whole picture in front of your vessel, giving you enough response time for the captain to know where to go. 3D sonar shows you where an obstacle is in range, bearing and in depth, so you can find where in the water column something is. It's like taking a flashlight under water, though it's not optical, and being able to see things in front of you. At this point, we go out to 440 metres in front of the boat and down 50 metres in a wide 90° field of view. So it's enough to give a surface ship navigation ability going forward, obviously not at the high speeds yet. I want to be able to show you the differences of just what the 2D versus the 3D is, so I put together this slide that can show you the differences. On the left hand side is a typical beam from 2D sonar with the data processed in 2 dimensions. It's showing you the soundings—how loud something is, with the red being the loudest sounds and the blue being the quietest. And most people are used to seeing this view, the fish finders and other navigation sonars, non navigation sonars. So you can see here, there's a trend—there are some loud soundings in the centre on an angle, and then there's also some over the side. And just what is that? Is it something on the bottom, is it something you have to worry about as you're going through? And you don't really know, you don't show anything about the depth in here. Now, this was taken off the point, actually round Narragansa Bay over at Davis Ville Port, and we went by boat, but we also had some divers in the water. And so we knew what the bathymetry looked like. You could see in the transit was a muddy area where some prop wash had made ridges on the bottom and that was what happened to be over to the left hand side. And in the centre was the pier at the end of Davis Ville. So on the right hand side is our 3D processing, which takes that same information, processes it in 3D and can show you in two different views what's there. Now, instead of a colour map to signal strength or loudness in this instance, it's colour map to depth. The red being the shallow dangerous areas. You could show it still to signal strength in 3D but here, there is a top down like a radar view. So we're trying to get feedback from the captains, in order to come up with an idea of how to display 3D information in a 2D world. And some day we'll have a hologram and everything will be 3D in front of us but for now we have a flat screen. So we have to show the 3D information in an easy to understand way in order to navigate. And on the bottom one, it's more like a video 3D view going through—people are used to video games and some people prefer that view, other people prefer a top down view looking more like a radar. But it's still 3D information collapsed onto the view.

I'll just give a couple of examples of where it can come in handy. In this instance, there's a breakwater and, above the water, it looks like it's one straight area and then, when you look below at the sonar, you can see that there's obstacles that are closer. There's just a simple view to show you how it can be useful—even if you had radar, if you had binoculars, you can see above the water, there still might be obstacles you can't see below you. Here's another example—it was actually in Rotterdam, if any of you have been there—of just showing how—I think our boat was out here, coming toward the shore, and we could see the one pier and then we could see the corner of this area as we were coming in also. So that's another view of some real data sets that we've had.

Now I'd like to take you another step into the technology. This is a typical flow of the processing. We send a sound out and again it's omni-directional—it goes out, we process it out to a quarter of a mile, 440 metres, and we receive it on multiple channels. It's a phased array, which is—this hardware technology has been around mainly in military use, mainly on torpedoes and other areas, so the phased array technology is at least 20 years old but we start doing more creative things behind it

and we had this designed specifically for us. So we have 100 channels on this particular one, bringing in the soundings. As our sound goes out, we'll hit the obstacles or the bottoms and the information comes back. And then, we have different analogue to digital conditioning cards and changing the information from sound into a digital signal. And then, it goes into a beam former, which is the typical point where sonar stops, and the display usually shows a beam former, which on the last slide you saw on the left hand side. That was a typical beam former view. But we do a 3D beam former, so we're doing much more high level algorithms with this information. Having hundreds of beams come at you if you can do it in 3 dimensions you have that much more information and data to be able to process. But again information overload is not going to help you, you need something that you can instantly look at on a crowded bridge and be able to see—can I go forward safely. So at this point, we extract the relevant information, which is what we call our target model algorithms, and we put in all our logic at that point, and extract the information that's important and we put aside information that's not going to help you navigate. And after that point, we display it on a 2D screen and we try to do it in a way that's helpful for navigation. Now I want to go into the target model information a little bit more. And this is where you can put as much sophistication as you want—if you were doing a mine detection sonar with this, you would be doing all the classification for a mine detection. There are a lot of algorithms that the military already use that, depending on their soundings, whether it's like this, or like this, they can know what type of mine it is. Maybe it's a Saudi mine, is this from another country, and these are where the algorithms and that stuff can be put in. Right after the beam former stage, and the target model. For navigation, it can be —is this the bottom, or is this an in-water obstacle, or is this just some clutter, fish going by. At this point, for navigation, you don't care what the obstacle is, if it's a large enough size. For military or diver detection, then you care about not only the location but you also want to know what it is. But for navigation, if it's large enough to hurt my yacht, you want to know about it, and you want to be able to go around that. This is also where you can put in information about pitch and roll—we don't put in yaw, on this particular product, because we feel it's important to have that information but for pitch and roll, when you're displaying it, you don't want the information to go up and down so we stabilise that up to 20° on the display. And I think that's important—we don't want to get everybody dizzy! And there's other information that can be put in there, when we extract all this 3 dimensional information. This is a typical system architecture—the transducer module—that has electronics behind it, as I was showing you, it changes it from analogue to digital and that's all within the blue transducer that you see. And then, from there it goes to a power module—that's where the signal and the transmit power comes from. And after that point, it's all Ethernet driven, so you could have multiple stations on a yacht, you could have one on a separate vessel—if you had a security vessel you could have the information go wireless to there, in case someone wants to know what's happening there. So it's just a simple view of what it looks like. OK. This is what the inside looks like—there's electronic PC104 cards and some other custom boards behind the array, and the top card in the picture, that's the phased array. The curved piece is a transmit and it's sending a sound out in all directions and the receive elements passively receive the information. Currently, our applications and the products that we have out now are for surface ship navigation. And they're for protecting your vessels—we've worked with some companies that have survey equipment, very expensive survey sonars but they lost survey sonars just by hitting rocks on the bottom as they're dragging them, so they use our sonar in order to protect their very expensive multi beam sonars. And in post-tsunami areas and post-Katrina, it becomes very important, when you're going on the rivers, when they've changed all the bathymetry, there's things in the water, there's anything from trees in the water and some parts of oil rigs, so things like that are very useful. If

you're using electronic charts, the information there can give you the history of what the area looked like, but it doesn't give you a real up to date information and the charts aren't always accurate. 60% of them have information that's over 70 years old. Or even older, plus with bottoms changing so much you really need a real time information system. And we feel that's where this technology is very useful currently, and another area is the marine mammal strike mitigation issues—I know there's a lot of issues about military sonar and it is a problem, with low frequency military sonar and other sonars for the oil industry and they really have been harmful for whales and everyone is trying to come up with solutions for this now. A ship's strike is the largest killer of great whales—I know on the East Coast of the U.S., the West Coast and other parts of the world, and most of the whales would be living full lives if they weren't hit by ships. And it's not really great when you have a cruise ship go out and come back with a whale across the bulbous bow, which has happened many times. Sometimes the ships don't even know that they're bringing it back to port until they get there. And our technology is in a very environmentally friendly frequency range and has very little power. There's commercial echo sounders that have more energy put into the water than ours so we have worked with NOAA, the National Oceanographic and Atmospheric Administration, and with NMFS, the National Marine Fishery Services, and in some of our early work that was the impetus to start this technology, in order to save whales. There was one, there were a lot of whale strikes of the northern whale, and also another impetus was the Exxon Valdez. So we want to prevent oil spills. So the great whales and any of the larger whales that you're familiar with cannot hear this sonar at all. A dolphin can hear it, very, very quietly, to them it would sound like a baby dolphin, quiet—we've had environmental reviews and we don't make any impact on the environment. And that can be a discussion on another day or during the question and answer period too. We can get into that. But it's environmentally friendly and we're pretty proud of that. We feel—actually we've had people come to see our sonar on the same day from military, oil industry people and even Greenpeace and other environmentalists, and it's a technology that all these different factions can feel good about. So we're pretty proud of that. And we intend to keep any future products in an environmentally friendly frequency.

Just to show you a few installations and how it is—it's a solid state, it goes in the hull, it can be right on the stern, it can be on a refit or it can be on a new build, and there's a couple of examples here on superyachts. The bulbous bow is obviously an easy place—things you have to watch out for is where the anchor lines are—we have installation manuals that we work with the naval architects to come up with an appropriate type of installation for appropriate style of vessel. Here's some other ones, one of them they wanted just the cable to go through. They wanted the cylinder, almost like a torpedo cylinder, on the side, with a cable going through. This is probably not appropriate to many—these vessels are hydraulic, this has had some customers that wanted to be able to put it up when they're going at high speeds, these are on some survey vessels and just take it down when they're in shallow area. So we don't sell any hoist systems but it could be done, it can be deployed in different ways. So where is the 3D sonar going? Well I can tell you where our R&D is going. Right now, we're working with the Department of Commerce, we have a $2million contract over the next 3 years to come up with, to work toward not only a ¼ mile system but a 1-2 mile system for navigation obstacle avoidance. And also to bring the speed up to 35 knots and there's a lot of interesting challenges—my engineers are in 7th heaven, they've been working on this and are having great results and it's very exciting because this opens up a lot of avenues in the commercial and the superyacht and military applications and we've found it very interesting that we're working with the Department of Commerce—the militaries of

the world, as was mentioned I think yesterday or the day before, that they have to, sometimes they're forced to, use legacy systems. I've been down to D.C. where they said ‘well we'd love your stuff but we're using legacy systems for now’ because they have the spare parts, because it just takes them so long to change their mindset. But now I've given presentations to the Navy, they’ve purchased a system to do all this testing and evaluation and they really love it, and now they’ve brought the Army in so you know, things move slowly but the joint high speed vessel programme is one area.

Security projects, we'll talk about quickly. Diver detection is another area that we're working in. Because we work so well in shallow water, this technology is very appropriate for this. The next slide is the important one—this is a diver that, just to give you a scenario, there was a boat with a diver that picked up the diver, went across here, this is a little clutter, the wake from the boat, and they drove around here and came in toward the sonar transducer is up there—and the blue tracks are heading toward the transducer and red trails are going back, and then the diver jumped in the water and then moved, this is just a history trail of where the diver was. So this is an area we're doing research on, we're working with DHS and with the Navy on these things, and also internally, and hopefully I'll be able to show you some new stuff next year on that. So future applications are to integrate into other electronics on the bridge, and there's so many different things and ways that can be done with this. We'll have questions, and Ian can answer some questions too.

Martin

Thank you very much. Literally a couple of minutes of Q&A? Any questions on the FarSounder system?

Tork

How far are we away from 3D displays?

Cheryl

I know two companies, one in Massachusetts and one in upstate New York and there's a third one, I don’t know where it is, that are coming out with—you don’t need any special glasses or anything and they’ve done a lot of work on it. Their resolution was not good enough for us and for other applications in the past, but I've heard that they are improving that, so I think that will be really cool when we have a holodex.

Tork

Quite good for TVs too.

[From the floor]

How does your system compare with the Ferruno 3D system ?

Ian Bowles

I would say favourably. The Ferruno system is probably very good at what it was designed for, which is fish finding. And it was a 2 dimensional fish finding sonar. I think it's also searchlight, which is a kind of scanning sonar so it's just going round in a slow rotation. I believe that if you find somewhere of interest then you have to stop

and point it, so if you're going in a particular area—and that's been on the market for a long time, and I know it's been specified in many new building projects. We still come up against it all the time, people say 'oh, I've already got a forward looking sonar on my vessel' and when I ask them what it is, it's either Ferruno or Simrad, one of those searchlight fish finding products. We've taken the technology, as Cheryl pointed out, into forward looking 3dimensional purely for navigation, we don't claim to be a fish finder, and hopefully that's the difference between the two.

Martin

Thank you very much. Let's move on to Hernando.

Hernando Giraldo Great Circle Systems

Good afternoon. OK, we're here to talk about onboard technology. First, very briefly, a little bit about Great Circle Systems and why I'm here. Great Circle Systems has been in business for about 10 years, now providing specifically and exclusively technology solutions on board. And exclusively to the superyacht industry. So all of that begins with onboard network design, installation, implementation, management and support. We have a couple of products that we've developed specifically for the industry. One is called NAS 3000, and that is to manage onboard Internet connections and the second, which is the one I know that many of you know us for, is called Triton Administrator. That's our most mature product, it's been on the market for close to 10 years now and we're on many, many boats, and that is yacht management software. In addition to managing Internet communications, we provide, through partners, many of which are here in the room, onboard Internet solutions and we do provide email, website, intranet, and very important, the bottom one, remote support and administration—very important—very easy to manage, these systems, when you're on the dock, but once you leave that's where that remote support becomes critical. Overview of today's conversation—it's really to discuss what's happened in the last 12 months, I think was what we were asked to discuss. And the impact that has on what we do. So—it's been a great 12 months in terms of onboard Internet. There are new solutions, and the solutions that have been around are becoming more mature, and are getting better. The providers are working hard to keep up with demand. So the good news is, demand is increasing, and equally good news is the providers are working hard to launch new satellites and refine their current offerings. It could be argued that onboard broadband is now considered essential, particularly on the larger boats. It used to be—a couple of years ago we were having this conversation—it may have been a luxury. Now it's virtually a necessity. As good as recent developments have been, there still is not one solution that is perfect for all circumstances. So as a result of that, most larger boats have multiple forms of connecting to the Internet, and this increases complexity and causes challenges. Emphasis really has changed from managing relatively slow expensive Internet connections to optimising broadband that is fixed cost, but still needs to be optimised. Common Internet connections—and it's hard to call VSAT mature, but it's been around now. So these are the ones that have been around for some time. So there's the VSATS, the Fleet solutions, Marine OIFY, GSM, DSL—the last two or three are really legacy—a boat wouldn't contract for those services today. But many boats have them and so they need to be managed. Emerging solutions? These are ones that in the last 12 months or so have hit the market, many are VSAT, Fleet Broadband and BGAN is one as well. In addition to some new offerings in the GSM and cellular arenas. So these new emerging technologies are exciting, often smaller equipment, less expensive equipment, easier equipment to install and maintain. However, there are drawbacks to smaller equipment. And easier to install

and maintain equipment. So again, VSAT is under the mature column but the reality is it continues to evolve. And fortunately the providers are increasing the footprint, so it's a wider and wider coverage area and they're continuing to add value added features and benefits to their offering.

Why should we discuss optimising onboard Internet communications? Is it not just good enough to have it? There's a few reasons for that, and I'd like to discuss a few examples. First one is switching Internet connections. It's great when your VSAT is working and you're moving around and everyone is happy and browsing, but we all know, boats move, and they often move outside that footprint, or they move under a shed, or there's a thunderstorm and that VSAT connection may not be as reliable during those periods. It is often a challenge for the crew to be able to switch back and forth between various connections. A typical scenario is the VSAT is connected to the network because it is not a metered connection, it's a fixed cost, the crew isn't as concerned about who's using it and when. That's not so for the Fleet connection, so often the Fleet is only connected to one machine and so when you switch back and forth the experience gets diminished for the owner, guests and even the crew. We've all heard horror stories of a newly installed Fleet 77 or something and 6 weeks later the owner gets a ridiculous bill. And by ridiculous, I don't meant hundreds of dollars, or thousands—but tens of thousands or into the hundreds of thousands of dollars. We're all complaining about the cost of gas, $5 - $6 a gallon. Those of you that are familiar with Fleet connections know those are $6 - $10 a minute. So sometimes, with these complex boats, a device unbeknown to anyone tries to connect to the Internet, and if it's on a network, some machine somewhere might be initiating a connection and creating a huge bill and you have nothing to show for it. At least, if you've spent $300,000 in gas, you went somewhere.

Lots and lots of Spam. As we all have the luxury, or necessity, of having onboard Internet, in comes Spam, and that needs to be managed. Regardless of whether you're on a metered connection or not. If you're not, you're sucking up bandwidth, that's degrading the experience of other users. You're also wasting time. If you're on a metered connection, you're spending money to download Spam. So it needs to be managed, to be taken care of. A few other reasons it's important to properly manage and optimise your onboard connection is, as these connections get better, faster, and more reliable, the expectations of owners and guests increase. We all walk into a Hyatt and it could be any Hyatt anywhere and it could be the luxury of—we sit down and there's a password where we log into the Internet and many of us have the ability to log into our own VPNs at work—very easy for us. The Hyatt has an IT individual or at least a consultant, and they're lucky that they have only one form of connecting to the Internet, they don't have to worry about switching back and forth. But the point is, the expectation. And that's the same expectation an owner or guest has when they walk on a boat, is that they want to log on to their corporate VPN. In order to do that, somebody needs to know how to create the infrastructure to allow that, support that, and enable that, amongst the various connections. Pretty easy to do it when you have one connection and you say 'OK, our VP does this, there's IP addresses, there's ports opened up'. But how do you do that when you have to toggle back and forth? And the owner doesn't care how you're connected to the Internet? Or that it's raining, or that you're under a shed? Or that you're out of a footprint? He doesn't care that he's spending $10 a minute. The reason he's spending it is so that he can access his VPN. Again, that goes to optimisation and there are solutions to do those things.

Back to just keeping the owner and charter guests happy—the same example I just gave. You want to walk on to the boat and not worry about it. And again, it gets more

and more complex. Now the owner's children or grandchildren or nephews want to play the Wii—why not, they're paying for the bandwidth. And why anybody would want to go onto a boat and play Wii, I don't know, but they do. And we know—we see the log reports. We see the usage reports. We know what they're doing. So again, you just have to have an infrastructure that supports that.

[From the floor]

The Wii is pretty fine!

Hernando

But so's the boat!!

A very important last point. More and more services out there are Internet aware. So that influence of having Internet on board has allowed many of the companies here to develop new products to innovate, to have new solutions. I've met many of you here. But now, back to why a boat is not *dependent* on it. Many of these applications are dependent on it. Our own Triton Administrator application—the market has the mandate that we build additional modules and create modules for on-shore support and reports. All of these things are dependent on the Internet. And I know there are many other applications out there that are dependent on the Internet. Again, the point is you need to properly manage those connections. Very briefly, why Internet needs to be managed—again, having the highest possible availability, depending on where you are and when you're there; managing that cost versus bandwidth. You need to have a tool that enables you to easily do that. Controlling access—there are some users you want on the Internet, there are some crew who should have access to the Internet, some maybe that shouldn't. And the captain needs to be able to manage that easily. We go on many boats where, when the boat goes out on charter they simply unplug a cable—they go to the switch and unplug—this is the WAP in the crew mess. This is how I control that. That's great, it solves your problem but it creates other problems. We've discussed recently the importance of having stable crew—Internet is very important to the crew, and a happy crew has access to the Internet. So it's important to have a balance and there are tools that allow you to manage that where you can see if anyone is abusing it—and often it's not a crew member. But the captain will say 'well, our connection is slow, it must be the crew'—we unplug them and not having the tools to understand where their bandwidth is going leads to that type of decision. And it may be a crew member but now you're penalising them all, when you can simply control one device, one laptop or one computer or one iPod or whatever it is, is probably a better solution. Preventing unwanted auto-dialling—that's again very important, where you don't want a device going out there and finding a metered connection and creating big bills. Reliable email access— important to the crew, important to the captain for properly managing his business, and being able to communicate. So managing email across various forms of communication once again becomes challenging. Again, that example where many boats have VSAT connected to the network but not Fleet, when they're on Fleet then suddenly they have one machine collecting all the email and then when they're back on the network, their network email doesn't see those emails that were sent and received, and there's all kinds of problems. So it's important to be able to manage that. And again, something that's relatively new—is the ability to manage bandwidth allocation amongst users and services. So that's some of the newer solutions to some of these problems. Why optimise the Internet? Again, we discussed some of these things, protect against viruses, and Spam, usage tracking, very important particularly on charter boats—some boats bill for Internet, and often

that’s challenging because you don’t get the bill from your provider until weeks later so you have to kind of backtrack and track guests down and they’ve already paid their bill, they're not interested in more bills. If you have a tool that can track it, and create a bill instantly, as hotels do, it's a nice benefit. And important, with all these connections, is the ability to have technical support. Again, often the boat doesn’t know what's wrong. They just know that the experience isn't what they wanted it to be. The owner isn't happy. It's important to have a centralised place of being able to identify bandwidth usage and understand if it's the provider, if it's the equipment, or it could be your network. You may be getting great bandwidth onto the boat but the network isn't properly designed and so the experience again isn't what it should be.

We'll talk in a little bit more detail of bandwidth management. Very important. As boats now, more and more, do have fixed dedicated bandwidth, the expectation has grown in terms of the user experience. But often that expectation is not met, and it's important to be able to manage that so that the expectations can be met, and so often that involves, for example, allowing owners and/or guests to have the majority of the bandwidth, and controlling that. And saying when the owners are on board or guests are on board, they will get 80% of the bandwidth. The crew, you guys will fend with the other 20%. Maybe the captain gets added to that owner group if his business is mission critical. But it can be done by user, by groups, it's very important to do all these things. You can also control—you can set quotas. You can say ‘OK, we're not going to do it by percentage but you're allowed X number of megabits per day, week, month’, whatever it is. It's important to be able to allow specific applications back to services that need Internet access. It's important to say when my weather wants to go out and update, it will get the bandwidth it requires. I don’t care who's on board. Or some other mission critical service. And you can create these things so that again, those things get their updates, get whatever is required. Surprisingly, we have a solution for this! Imagine that.

We have a product called NAS3000—and it is a device—it's a combination of hardware and software, which all of your various forms of Internet connection will go through this device and this device will manage all of the things we've discussed. I'll show you one screen only—of the interface—and the point here being it's easy to use. That’s the critical point. It is easy to use for that captain or designated person aboard to manage these things. He will very easily be able to set permissions by device, MAC address, IP address, or user. Or groups of users. So he'll be able to—and the permissions—there's any number of variables in terms of the type of connection that’s being used at that time of day, the amount of bandwidth etc.

Starting to summarise now—benefits for owners? And that’s why we do all this, it's to control costs and again, that is by not allowing those metered connections to get out of control, and optimising their experience. Again, we can't lose sight of why they do what they do, and part of that is being able to have a pleasant experience when they want to, connecting to the Internet or gathering their information. So that experience needs to be optimised. In some cases, again for those boats that charter, reports and billing are important, and this entire solution can pay for itself very quickly. By properly doing that. And eliminate waste and unwanted costs. Access to corporate VPNs, we've discussed. Benefits for crew—again, very important. They are a client. They are key to this industry and to keeping owners happy. This makes it easier to do these things. Again, somebody, ultimately a crew member, is responsible for the onboard experience of the owner and so the easier we make this for them, the better for them and the better for that experience. As we've discussed, boats move. And as you move from area to area, phone numbers change, log-in usernames and passwords change, IP addresses that you need to connect to, change. All these

things change and you don’t want to be fumbling around to get the right information when that owner wants to get online. So this device manages all that. So you put it in once, in a controlled environment, and then as you cruise around, the device manages all that for you. Back to email. It's important to have a central place where that email can be used and you can send and receive email even if you don’t have a connection, it'll hold it and send it when you do have a connection. If you're on a metered connection, it'll strip out attachments or Spam so you're not wasting bandwidth and time. Just more benefits—again we've discussed many of these. But the troubleshooting utility is a critical one, again back to when there is a problem, there needs to be an easy way to determine what it is and fix it instead of again, with multiple connections you're dealing with multiple vendors, and that’s not a fun game with people pointing fingers at each other. So if there's a central place where accurate information exists, it helps to isolate, identify and resolve issues. And that goes hand in hand with remote support and administration. And our clients click on a button and they get that remote support and administration. That’s it. Thank you everybody.

Martin

Thank you very much, Hernando. 30 seconds of questions! We have a question, thank you.

[From the floor]

I just want to know the price of the NSA 3000 and how that interacts with the different broadband vendors, if each broadband vendor has a standardised installation on a yacht how do you interact with that?

Hernando

OK. The first question is easier. The price—it depends. The box has a price, anywhere between $5,000-$10,000. Because it's a server, it can perform many other functions, which would add to the cost. It could be a file server, email server, exchange server, so on boats that don’t have an existing formal network, this can become that. It increases the cost—for boats that have a well deployed, properly managed, and implemented network, it's on the lower end of that, because all you need is a communications control functions. So again, ballpark—anywhere between $5,000-$10,000 and then, there's services associated with installing, configuring, and supporting that. Your second question—about how we interact with the various providers—I'm not sure I understand.

[From the floor]

Well, each broadband provider has a certain standardised installation. And not every owner wants to perhaps purchase the NAS 3000, so do you come after market to integrate all these different technologies on board?

Hernando

Well, we interact with our customers at different stages, sometimes we're on board as the boat's being built, sometimes it's afterwards. Sometimes, we work with many of the communications providers, we're partners with many of them to provide some of these forms of communication. How we interact with them—they all terminate somewhere. And that’s the point where we take over. So there's an RJ45 or a serial

cable or a DSL modem of some sort where their connection comes in, they can test it, it's after the below deck equipment. At that point, we take it over. So I don't know if that answers your question?

[From the floor]

Yes, that's fine.

Martin

One more question there? We're going to run out of time, Dan, sorry mate.

Patrick Quigley Thomason Yacht Partners

I'm a captain, and my question is in regards to the young, or newly developed, smaller, broadband services. Is there one that you see as a leader, a product that is the most reliable?

Hernando

That all depends. I mean the answer to that is, there is no one size fits all. It depends on the size of your vessel. Your cruising patterns. By smaller, there are limitations. The coverage area is smaller, by definition, because the equipment is smaller. So it would depend on your circumstances. And there is no one answer to that unfortunately. I'm happy to discuss with you, and I'm happy to introduce you to my partners, some of which are in the room, where we can discuss your specific application and come up with the best solution. I doubt it'll be one solution, which will solve all your problems.

Martin

OK. Thank you very much indeed. Dan? I will give you the full 20 minutes, don't worry.

Dan Mickelsen InteliSea

No, no, 5 minutes is fine Martin. I'd actually like to start with a quick question for Martin. In Amsterdam at the Global Superyacht Forum—lunchtime, cocktails. What's wrong with America? It makes these after-lunch sessions just smoother.

Martin

I'm sorry, Dan.

Dan

Yeah, thank you. Let me throw a number out at you. I had a big, long speech, probably ¼ hour, ¾ hour, I don't know. I threw most of that away. Over 90% of marine accidents can be applied to human error. So if we look historically, way back to the past, what's going on on the bridge? Obviously, the only thing that hasn't changed on the bridge since day one when we set out upon the water is the human. And I would say that today's captain is as rich as Croesus with data and technology. But if it's not done right, it doesn't make him more effective. If we still have over 90% of marine incidents blameable on the people, then what we've got to do is take a look at our technology and how we're doing it. Let me give you a quick example—and I'll

just start up my slides here please. Oh, oh. Let's read what this says… ‘Quit to reformat’. Shall we continue to quit the reformat or just quit the quit reformat. Let's do that. Reformatting. I am done now. Thank you. The point here, with these two little screens, which aren't actually reformatting Martin's machine, is that we work in a world of technology every single day and I see things like this all the time. ‘Quit the quit reformat’. We have to take a step back. The model today is, the crew or the human, adapts to the technology. We've got to turn that on its head and say the technology adapts to the human. Now if we move on, please? Somewhat surprisingly, I've taken a snapshot from our system as well. What this is demonstrating is 22 gauges. 22 gauges on one screen. This is just one screen of many, many screens available to any captain. And the point here is, you want to be able to know in a one-second glance whether you're OK or not OK. So how you design those 22 gauges is what really counts. I'm going to give you a second here. OK, how many people can tell me how many critical issues you had? Two. Two people can tell me you had two critical issues. Two of you are still awake. Again, the point. You’ve got 22 gauges of data and what you really want to know is, is everything OK or is everything not OK. That’s what technology's got to do today. And we have reached a point in technology where basically we can stop. We can take a breath. And we say the captain's got all the gadgets imaginable, more gadgets are coming, but let's do them the right way. Let's make sure that the captain is looking outside his ship more than he's looking inside his ship. This idea comes from the aviation world where penalty for failure is pretty high. You’ve got to fly the airplane by looking outside. Your instruments, and there's a ton of data in the cockpit of an airplane, your instruments are part of a 3-second scan. If you can't look at your technology on the bridge in a second or two, and know that you're OK, you're going to tunnel in and you're going to lose sight of what you're supposed to be doing, which is safely, efficiently, and enjoyably, experiencing the ocean. So all this data, what it's got to be, is understandable, consistent and effective. You’ve got to be able to look at any system aboard the yacht, and immediately, at a glance, understand what it's telling you. You’ve got to be able to look from system to system and have a consistent idea of how the data on one system relates to data on another system. And finally, you’ve got to be able to do something with that data once you get it. And this is where the integrated bridge systems and things like that today, we're still struggling, because we may not interface with them the same way each time as we saw in the Windows screens, things may not be clear. I was so pleased to listen to my co-panellists up here talking about—the FarSounder people being very aware of information overload, and the easy-to-use implements of the Great Circle system. These are the kinds of things we have to do with new technology. Where we are today allows us, like I said, to take that pause, and really attack that. And we've got improved processors, we've got improved database technology, we've got better integration technology so the industrial layer can talk to the server layer, can talk to the display layer. We've got better display technology. All these things, we can put together, into effective human-centric technology. We, as a technology industry, when we're dealing on the bridge, need to set a goal to get that number below 90% for marine accidents related to human error. Way below. I could talk about all the great things that are coming to bridge systems, the use of RFID, tender tracking, AIS systems, all being integrated into your monitoring or control and management systems, or your radar displays or what have you. But really, what the idea is, as a technology company, it's our responsibility to make technology for people and not technology for boats. Thank you.

Martin

Dan, thank you very much indeed. Panel, thank you very much. Any questions from the floor for that one?

Tork

How many alarms were there?

Dan

There were two. The red ones!!

Tork

Well, obviously, yes.

Martin

How intuitive. Panel, thank you very much indeed.

The next session is going to be the submersibles session—can my panellists do a quick change and can Lisa come and do her stuff? I'm going to hand over to my dive buddy to chair this session, because I've got to make two phone calls. So Tork is going to chair a subject dear to his heart. He's dived with one of these guys, and I think it'll be an interesting session. Thank you.