# Watch leader

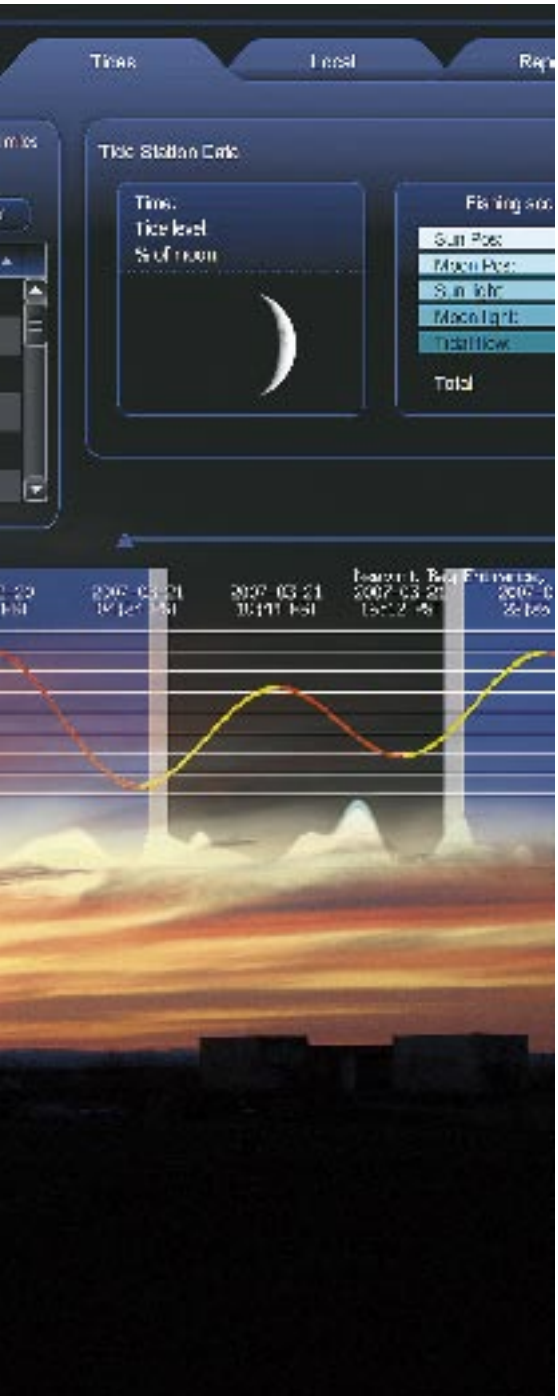
**US company InteliSea is turning heads with its new alarm, monitoring and control system. Bransom Bean headed to California to find out why.**

In an industry of superlatives, the idea that anything is extraordinary — particularly something as un-sexy as a new superyacht alarm, monitoring and control (AMC) system — actually sounds trite. But for a company that did not even exist two years ago to already have its AMC system adopted as standard fit by one of the industry's major builders, 'extraordinary' may just fit the bill.

Possibly even more extraordinary is the fact that the company's principals, despite being lifelong boating people, have no background in superyachts; but then they'll argue that's very probably been an advantage. But whichever way it is taken, it was a major coup for California-based InteliSea when Washington State-based Westport Yachts adopted its AMC system for all future vessels. The InteliSea system replaced what was known as 'VIC' or 'Vessel Information Control', Westport's own in-house system.

"We weren't particularly shopping for a new system," says Westport's chief engineer Tom Fox. "Paul Mickelson (InteliSea's founder) called on us... We listened to what he had to say and came to realise that this was the right group to take what we'd started to the next level... What InteliSea has developed is effectively VIC on steroids... We wanted something that would be simple and robust... Westport tries to improve its product continuously in all respects... You can't just keep on doing the same old thing... InteliSea fits our system panel for panel, size for size. So, for our installers, it's been a virtually seamless transition."

Dan Mickelsen, the founder's son and current InteliSea president, says his company's approach majors on common sense. "It's not about 'bells and whistles'; cramming lot's in doesn't necessarily solve




problems," he says. "We've designed our system first and foremost around usability, to the point where we expect crew training to take less than an hour!"

Both Mickelsens are system design specialists. In fact, Dan Mickelsen is a former journalist that went on to develop a career in information design — specialising in 'user interfaces'. And his father is now on the latest phase of a long career spanning software development, industrial automation and information design. Also Mickelsen senior is a pilot, whose other business currently happens to be in private jet charter.

## Information overload

Once upon a time superyachts were a lot simpler. Back in the pre-World War II 'Golden Age of Yachting', the most important monitoring system was the magnetic compass, a piece of yarn tied to the shroud and the 'seaman's eye' – good old fashioned stuff. Engines brought complication with the need to monitor pressures, flows and lubrication, but still the only detailed interface with the bridge was the engineer having lunch with the master or resorting to the 'voice tube' in emergencies.

The latter half of the 20th century saw technology not only make more information available — and in truly unmanageable quantities — but also it made displaying all that on the bridge a piece of cake. When added to electronic charts, AIS, radar, comms, air-conditioning, the entertainment system and so on, today's superyacht master could be forgiven for longing for that frayed and fool-proof piece of yarn.

Incidentally the United States Air Force ran headlong into this problem in the early 1950s with the now venerable B-52 Stratofortress Bomber. Monitoring the unholy host of analogue gauges associated with its eight jet engines was beyond the capability of a single flight engineer. So the gauges were physically turned in the panel so, that when operating normally, they all pointed up, regardless of what the numbers were. The flight engineer of that bomber was then happy if all the needles pointed in the same direction.

"Everybody's system model should be aviation. The scan is everything," says Dan Mickelsen, referring to how pilots are trained not to fixate on any one instrument, but to adopt a systematic scan pattern, which thankfully also includes a heavy reliance on looking out the window; something incidentally the technological comfort blanket of a modern 'glass-bridge' doesn't exactly encourage.

'Cognitive tunneling' — the focusing on information in only certain areas of a display to the exclusion of information presented outside these areas — is a real hazard. A bad case of it can just as easy get aeroplanes crashed as superyachts sunk.

For superyachts, InteliSea has attacked the cognitive tunneling head-on from a usability standpoint. "Data, by itself or stacked in a pile somewhere, is useless unless you can see it and understand it," say Dan Mickelsen. "InteliSea came along to provide knowledge, not just information in an industry seemed stuck with a rather simplistic and momentary notion of data display... We capture vast amounts of generated data that would normally be lost when only in monitoring mode; and then we do something with it."

It is very useful approach, providing trend analyses of things like engine RPMs, speeds, helm states, sea states and fuel economy. Ironically even in the bad old days of steam, the engineers still monitored trends. Back then you would hear engineers say stuff like 'that bearing always runs warm; we just don't want it to get any warmer'.

## 'Mickey Mouse' interfaces

"We can monitor anything in the yacht that has or can have a sensor, everything from heat and cycles to G-forces, and even the water flow in a bait box," says Dan Mickelsen. "But that's the easy bit."

Being able to monitor hundreds of things is only the start. To be truly effective an AMC system needs to instantly convey the general condition of the vessel to a responsible body at a glance, not following precious seconds or even minutes of analysis.

The problem worsens because, unlike those gauges in the B52, most of today's gadgets are digital and, of course, the human brain is analogue! If you disagree, just look at the percentage of us with watches that have hands (yes, Mickey is analogue). The Gestalt theory confirms that our brains are holistic, parallel and quite analogue. That's why webmasters ask you to type in the squiggly numbers and blurred letters that you see floating on a virtual wave in the box on your laptop screen. A computer can't do that — well, not yet anyway.

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## Daryl Wakefield - president, Westport Shipyard

"After completion of Westport's first installation, the team from InteliSea more than lived up to their promise to deliver a newly developed ships monitoring system. The system provides everything that we require and more, all the while working within the Westport schedule at a competitive price."

**On demand trending; flood control; regional reported weather; local weather; tide data.**

So the goal of good user-interface design, or 'user-centred' design to resort to the jargon, is to make the user's interaction experience as simple and intuitive as possible. This is often quite subtle and invisible — almost an art form.

"We started by looking at the human mind and how it processes information and married that to common sense," says Dan Mickelsen, "To begin with the user interface should be pleasing to the eye; attractive works better than ugly, because we respond better and, therefore, perform better. That means we literally spent hours perfecting our look and feel."

Quite outside the world of superyachts, Adobe — yes that Adobe — named InteliSea as its 'site of the day' (www.adobe.com/showcase) and featured InteliSea at its annual corporate conference demonstrating what is possible in the future of designing user-system interfaces. Mickelsen says it's all because InteliSea follows a very simple formula, one common in consumer electronics: easy + understandable = usability.

## Go ahead, take it for a spin

On the bridge, InteliSea is a single dedicated full screen. The best way to get a feeling for what's behind that is to visit InteliSea's website at www.intelisea.com and try out the interactive demo.

You sign on with a user name and password, which calls up that user's preferences such as metric or imperial. InteliSea also offers translations into Latin, Cyrillic, Arabic, Greek and Japanese characters at the click of your mouse.

InteliSea's main menu reflects that the system is comprised of twelve screens: engines, electrical, tanks, flood control, security, lights, weather, sea state, anchoring, cameras, climate and library. If all is well, that's what you see, but the alarm screen is always standing by in the background.

## Raising the alarm

Of course, pretty pictures aside, central to any monitoring system is the alarm. The alarm condition is shown at the top left of every InteliSea screen. For this InteliSea follows a simple universal alarm sequence, which should be familiar to most car drivers — green, yellow and red traffic lights. Green is good, yellow means that something is about to change, and red is bad.

When there's a problem, the alarm screen takes over the full screen. Specific alerts are arranged vertically on the left in declining severity using the traffic lights. On-screen icons will access cameras that can provide live feeds for the area of the warning. Others go straight to relevant resolution tools like manuals or checklists — the aviation industry approach coming out again. On the right of the alarm screen is the yacht's GA (general arrangement) showing each level and the location of the alarm. So if you want to see what's going on at the scene of the alarm, just click on the 'Quick Look' camera icon and check out the pre-aimed CCTV.

Don't know what to do next? Click to read the checklist for this alarm and the respective entries in the log.

Still having trouble visualising the situation? Click on the 'Alarm' icon and a CAD drawing of the alarm area appears.

Not even aboard your superyacht when the balloon goes up? InteliSea will send the same alarm to your PDA, laptop or mobile phone.

By the way, with InteliSea an alarm situation doesn't have to be simple, like suggesting something is 'Off' that should be 'On' or that a tank that is 'Empty' when it is supposed to be 'Full'. Using Boolean logic, if one pump comes on and then another, as a possible worsening trend, this can be an alarm condition with InteliSea, particularly if water usage is being compared with pump activity at the same time.

Several of the InteliSea screens have the option of conducting trend analyses — specifically the 'Electrical', 'Tanks' and 'Sea State' screens — as different real-time data are collected and logged. ▶▶ P26


## InteliSea at-a-glance

- Unit is comprised of 12 screens: Engines, electrical, tanks, flood control, security, lights, weather sea state, anchoring, cameras, climate and library.
- Metric or Imperial, InteliSea offers translations into Latin, Cyrillic, Arabic, Greek and Japanese characters.
- 24/7 support and online diagnosis.
- Quick Look icons and easy user interface.
- ABS approved.
- Uses industrial Ethernet and all of the software is data driven.

### Normal ops

Unlike some other AMCs, the InteliSea 'Engine' screen is not simply a jumble of dials reminiscent of that B52. The 'Electrical' screen is divided vertically with power sources on the left and busses on the right. A mouse click brings generators on line. Another click lines up the distribution.

The 'Lights' screen allows you to set times each day of the week for illuminating and extinguishing them, perfect for that sleepy watch stander who can't remember or be bothered to douse the anchor light at sunrise. Better still, InteliSea advises of conflicts — like having the anchor light illuminated with the steaming lights on as well. InteliSea will also advise if bulbs are burned out or if there's no electrical current to that circuit.

To provide info for its 'Weather' screen, InteliSea uses its own dedicated solid-state sonic-based weather sensor. But again, it's designed to be intuitive and user-friendly.

"We don't expect everyone to be a meteorologist," says Dan Mickelsen. Watching InteliSea's 'Sea State' screen is a recipe for virtual seasickness (don't mention greasy pork chops) as it very actively displays roll pitch and surge as well as G-forces vertically, transversely and horizontally using data from installed accelerometers. Here the trend feature accumulates data on the vessel's performance in various sea states.

The 'Library' screen puts all of the vessel's manuals from toaster to turbocharger at your finger tips, readable on the screen in the same form as the physical handbook. More importantly, it contains the log, which is much more than just the usual deck or engine log — it also automatically logs alarms, events such as 'lit off generator 2', periodics like the hourly temperature in the owner's accommodation, and system; for example someone opening the InteliSea sensor panel. It probably goes without saying that manual log entries can also be entered.

### The nitty gritty

"We wanted our system to be as off-the-shelf as possible," says Dan Mickelsen, "Everything is marine-grade." To be approved by class — and by the way it is ABS approved so far — DNV and Lloyds are in the pipeline — InteliSea has to be stratified into two halves, the Industrial or 'last-man-standing' and 'SCADA', short for 'supervisory control and data acquisition'.

InteliSea's industrial side has to be virtually bulletproof, and to this end it has been designed to be the last thing to fail. To ABS that meant InteliSea's engineers squeezing every last bit (excuse the pun) out of a tiny PLC CPU with all of 32Kb of memory using 'if-then' logic and having a 24V battery for back-up just in case.

InteliSea uses an industrial Ethernet and all of the software is data driven. The SCADA side uses a server-grade PC that accepts data from the Industrial infrastructure, as well as network devices and NEMA feeds.

Everything is doubly redundant and constantly diagnosing.

"We don't want the user to see error code 'xxx' and have to look up what that means," says Mickelsen, "Instead InteliSea says 'it's been checked, it's bad, here's how to fix it, here's where it is, and here's what's compromised'."

### Support from afar

InteliSea has recognised that 'superyacht' means help is not always just round the corner. "We realise that InteliSea users won't necessarily always have internet access," says Paul Mickelsen, "Our customers can be anywhere in the world, so we can't count on them having bandwidth."

Not surprising then, InteliSea offers support 24/7 and online diagnosis in addition to a five-year warranty. However, perhaps the best promise of support comes from the ethos of the young company itself.

"We're not trying to distinguish ourselves in the superyacht industry with an elegant presentation; coming from a retail management software background I follow a customer centric business model, establishing a value for the customer," says Paul Mickelsen. "We're not a technology business as such, we're about confidence and hospitality. To us the technology is about anything that doesn't quite work yet. And what we do must work — and work all the time."

Certainly with InteliSea's adoption by Westport Yachts, the company would now seem to be up and running.

"Until now it was a bit of a chicken and egg situation with potential customers saying to us 'come back when you've done your first yacht'," says Paul Mickelsen. "Well, now we have a whole fleet."

Too bad they didn't know anything about superyachts.