Bandwidth is king

EVEN WHEN THEY'RE FAR OFFSHORE, BOAT OWNERS AND THEIR GUESTS EXPECT THE SAME QUALITY AND IMMEDIACY OF MEDIA DELIVERY AS THEY'RE ACCUSTOMED TO GETTING AT HOME. THAT MEANS HIGHER DATA SPEEDS AND GREATER BANDWIDTH CONNECTIVITY

WORDS: BOB GREENWOOD

WE CAN BE on a boat, hundreds of nautical miles from the nearest land and still be streaming and downloading movies, music, news media or accessing information or just catching up with friends online. In spite of being beyond the normal reach of mobile telephony and terrestrial internet, the connectivity is there thanks to fast broadband speeds via satellite communication networks accessed through onboard Wi-Fi by PCs and, increasingly these days, with tablets and iPads or by the latest 4G and 5G smart phones.

Recently, there has been a burgeoning of specialist marine AV providers and system integrators, some of whom have indicated to *IBI* that they are doing very good business. As well as being installed now almost invariably on new superyachts and also increasingly on production boatbuilding lines, there's also a strong aftermarket. AV systems are frequently being upgraded and new features and software can usually be installed without difficulty. Additionally, the maritime environment can take its toll on some AV equipment and some speakers' longevity can be shortened by a hard life at sea.

ONBOARD ENTERTAINMENT

Looking first at the audio side of AV, New Zealand brand Fusion has grown quickly in global markets and attracting a great deal of industry interest in recent years. In 2014 it was acquired by Garmin, but continues to operate as an autonomous business. Commenting on market trends, Chris Baird, Fusion Entertainment MD, points out that the development of Smartphones as a customer's sole source of entertainment content while aboard their boat, is driving Fusion to design appropriate products to suit and actually enhance that experience.

▲ **Veritais bespoke AV solutions**

"Dropping our Fusion-Link software into numerous brands of marine electronics has now made the multifunction display (MFD) the control centre for customers to access their music. The end-users are voting with their feet and our growth across the globe in 2016 is over 25% and this is after a similar growth in 2015."

Highlighting the importance of aftermarket sales, Baird says: "Fusion's growth is split 50/50 between new-boat builds and refits, but this can, of course, be different from country to country."

Also a major player in the marine AV sector is JL Audio, a company that claims to be the USA's leading marine audio manufacturer. Two years ago it broadened its sights to build new business in Europe by appointing JL Audio Marine Europe to handle distribution from the UK to the continent. Managing director Paul Baker, believes that it is now possible to bring to the boating consumer audio quality equivalent to a home-theatre experience.

> ***"Fusion's growth is split 50/50 between new boat builds and refits, but this can, of course, be different from country to country"***

"Key technical developments include new speaker and subwoofer materials that are better able to withstand the harsh marine environment and reproduce sound after several years of installation like the day the system was installed," he says, adding that the integration of audio into NMEA protocol has become a more recent trend. The acceptance of technology, Baker says, provides interesting opportunities. "Perhaps we will see within Europe at some stage the development of a system similar to the USA-based Sirius XM Radio, where radio reception works 200 miles offshore. If the demand is there then I am certain the solution providers will be there too."

He observes that there is a real appetite for both marine quality and premium audio systems in the yachting market at the moment, particularly in the high-end and superyacht sector, with more demand for bigger and better systems.

BUILT FOR MARINE ENVIRONMENT

As a result, Baker says, year-on-year growth for JL Audio Marine Europe has been positive. "The year 2016 to date is already showing a 270% increase over the same period last year,"he says, adding that significant new partnerships with builders such as Princess, Pascoe International, Wahoo, Stingher and Glider Yachts have helped the firm to develop the brand in Europe, and "the scope for growth remains high double-digit for the next three to five years as more boatbuilders begin to offer their customers the option for high-quality marine audio systems".

As there is a demand for high quality audio in European as well as US boating markets, there is also consumer wariness about products that don't meet that

standard, he believes. That's because, he says, "Many audio systems installed on boats do not last very long as they have not been specifically engineered to withstand the continuous exposure to salt water and UV rays". As a result, Baker claims, the speakers, sub woofers and amplifiers will only last on average about two to three years so will need to be replaced on a regular basis.

"We are finding that many owners are now upgrading to our systems, not only because they last much longer and sound amazing, but also because in the long run they are far more cost-effective," he says, adding that boatbuilders are now specifying high-quality audio systems as part of their standard build programme and existing boat owners are looking to upgrade what they already have. "The upgrade normally is centred on speaker replacement and the addition of an amplifier plus subwoofer," he explains.

HIGH-TECH DRIVES BOAT SALES

Boaters are also demanding an ever-increasing amount of multimedia content that needs a good broadband connection, no matter how far out to sea they are. Even though one could take a stack of music CDs aboard, these days that's vanishingly unlikely. More likely now, music buffs would preload content onto their mobile devices, but if they want to download or stream new content while at sea then satellite telemetry is almost certainly going to be involved.

As a leading provider of satellite communications antenna systems and services — having sold more than 200,000 mobile systems around the world — KVH has a strong handle on the yachting market. Sales and development manager Andrew Bush, claims that KVH, which pioneered the delivery of satellite television to the yachting market in the mid-1990s, is now doing the same with IP-MobileCast multicasting product.

"This solution is a breakthrough for providing multimedia content at sea, no matter where a yacht is located," he says. "It had previously been difficult, expensive, or even impossible to download a new movie at sea over a satellite connection because of the size of the movie file. With IP-MobileCast, new movies and TV episodes are sent via multicasting technology, which does not affect a yacht's broadband data plan."

Bush says the service is now attracting attention because it makes it possible for a yacht to receive much more content on a regular basis anywhere at sea than was previously possible. The content can be viewed on the yacht on any personal device, including smartphones and tablets, as well as on a TV screen or computer monitor.

This new interest is reflected in sales. Bush explains: "Boat sales are on an upswing, and so are sales of upgraded satellite television antenna systems and advanced satellite communications systems. People are increasingly reliant on broadband data and on being able to watch the movies and shows they want even on mobile devices. As they begin to want those things on the yacht too, they are buying advanced systems such as those made by KVH."

Bush also points out that there's good add-on business too. "Even if boaters are not changing their craft, they are making the yacht they have meet more of their digital needs by adding more services,

looking for faster connectivity, and subscribing to services delivering more content – news, sports, and so on – no matter where they are."

Sometimes, however, new and greater performance demands call for an update to an entirely new system.

LOW COST FUNCTIONALITY

Audiovisual entertainment equipment is also an important part of the marine electronics offering of UK manufacturer Digital Yacht, much of whose product portfolio is geared towards low-cost consumer devices which can be used to help make internet access afloat easy and affordable.

Nick Heyes, Digital Yacht CEO, points out that marine PCs continue to be important, not just for navigation but also for communication, web access and entertainment. The brand's latest offering in that line is its Aqua Compact Pro, a palm-sized PC preloaded with Windows 10. "There's no doubt that a dedicated chart plotter is ideal for use at the helm where it needs to be waterproof and compact," says Heyes, "but below decks, a PC can offer big screen performance at a very attractive price compared to a dedicated large screen multi-function displays."

A PC and chart plotting software can also be the only electronic navigation device, just integrated to the GPS and instruments via a simple NMEA interface. However, Heyes notes that "a PC offers more powerful functionality than a dedicated MFD with the ability to install software for lots of applications from navigation to entertainment, email communications, weather and internet connectivity, and they're also updateable as new applications become available".

> ***"Solutions are designed to seamlessly integrate to virtual software platform, requiring less hardware onboard"***

Heyes observes that equally television still enjoys mass popularity. "We have a new TV antenna (DTV100) which will be popular with OEMs looking for an easy and value solution," he claims, adding that the firm saw a nice spike in sales of this for the recent football World Cup.

Germany's CELLweaver delivers ultra-high bandwidth marine internet to the superyacht sector using aggregated

▲ KVH TracPhone VIP series

4G/3G connection. Sales director Wilko Darger, says this enables many features onboard yachts such as multiple live streaming.

"Higher-bandwidth internet connectivity allows usage of more standardised, consumer-grade components that rely on being always 'on' with regards to internet connectivity, as most content is cloud-based nowadays. In our age bandwidth is king!" Darger also notes that customers in the superyacht sector are continually upgrading their AV systems. This, he says, makes business very encouraging.

LIFESTYLE PRODUCTS

Choosing full AV system and making sure it works from input of data to output of content can require a good deal of planning and expert advice.

Some years ago system integrators arose as a new profession to assist. When it started out six years ago, Dutch company Oculus Technologies, which describes itself as an infotainment solutions and unique onboard interactive experiences specialist, worked on superyachts as a subcontractor to system integrators with its flagship product YachtEye. Now it works alongside them, dealing directly with yacht owners and reps.

Stefan Van Cleef, Oculus founder and creative director, believes that the biggest development in the marine AV sector lies not with technology itself, but how technical systems themselves are approached. He explains: "There are many more system integrators in the market and smaller installation companies continue to emerge. There is now much more direct communication between product manufacturers like ourselves and the yachts, shipyards and owners' teams."

Van Cleef agrees that technology itself continues to develop. "The developments most important and interesting to us relate to the rapidly evolving display technology and a significant move towards big data and user-centred content provision, which is making headway in the yachting market," he says.

The new growth area in marine AV is what Van Cleef describes as "technology lifestyle products", which blend information providing technology into the interior making it seamlessly accessible. And the products that are attracting particular consumer interest, he says, are transparent displays, holographic displays, mirror TVs and projection.

Van Cleef observes that AV on the whole has been growing and that superyacht owners are putting evermore importance and value on the AV systems onboard and they are taking a greater interest in their make-up, functionality and performance. "This has led to more overall investment in AV in relation to an entire new-build or refit, although pricing remains key," he says.

UK company Veritais also specialises in the provision of audiovisual entertainment, alongside web access, lighting and cabin environment control and surveillance. MD David Milner points out that while Veritais is not a product manufacturer, its strengths lie in sourcing the best products and integrating them to make operation as easy as possible. He explains: "We are seeing improvements in Wi-Fi connection and viewing/listening experiences on the big screen and onboard cinema rooms through the use of 4K ultra-high definition screens and more advanced connectivity products."

At the top end of the yachting market he sees continuing demand for high-budget audiovisual and security installations. He explains that large central video libraries, and the ability for an individual to play their own music collection from their own device, can all be integrated into controllable systems,

sourcing from content providers such as Sky and Netflix.

SYSTEMS INTEGRATION

Van Berge Henegouwen (VBH) is one of a number of Dutch companies that specialises in the provision of AV and other related electronically controlled technologies for superyachts.

Commenting on the latest softwate development, CEO Michiel Haverkorn van Rijsewijk says: "More and more apps are being created specifically for the yachting experience. Products such as VBH's Pivot control app open up a huge range of possibilities when it comes to addressing the needs of those spending time onboard yachts and the range of systems with they can interact. It also changes the way in which the yacht's and their crews are managed and maintained."

Systems integration, van Rijsewijk says, is critical to maximising the effectiveness of electronic control onboard. It is also crucial to security. He explains: "While one system is detecting a threat, a second is tracking it, a third one is recording movement, and the fourth one is raising an alert and changing the security level."

Personalisation, including AV preferences, is also part of the matrix and is supported by app development, which is another area of innovation that is gathering momentum.

VBH's 'LuxperienceLab' works with interior designers and owners to create bespoke installations to meet this need. One important tool here, he says, are LED-based display technologies that are now being used to deliver more than just content viewing. They can be overlaid on sections of the hull to deliver light shows and special effects, or create specific atmospheres to match the activities onboard. All in the process add to the enjoyment of the onboard experience.

Commenting on sales in this sector, Van Rijsewijk observes that new-build activity remains well below it pre-crisis peak, but with the global superyacht fleet at an all-time high refit and maintenance has taken up the slack.

Another notable member of the enclave of Dutch companies specialising in AV technology is YachtCloud. Company founder Andre Klepper, agrees on that all the aforementioned developments have played a large part in the overall expectation of what onboard systems should now be delivering and are able to deliver. Such advances, he says, have resulted in companies needing to re-evaluate the technical infrastructure design to ensure that such developments can be supported both now and in the future. "This is why all of our solutions are designed to seamlessly integrate on this virtual software platform, requiring less hardware onboard and saving precious space," he says adding that accessibility and flexibility are key and the face of AV onboard as we have known it is having to change to support emerging developments.

Virtual experiences are growing in popularity and, certainly, in terms of gaming experiences. "There is also the demand for second screen services to be able to watch any content while mobile. Those attracting the greatest attention are apps, especially those providing media content services aimed at the consumer such as Spotify, Netflix and the tvOS platform of Apple," he observes.

For Tijssen Elektro, yet another specialist Dutch provider of custom AV systems, Eddy Huisman, summarises succinctly by saying that onboard AV "is not only growing in the quantity of projects, but also so is the complexity of systems."

Undoubtedly, at either end of the boating market growth is happening and it's driven by the speed of technical advance and product development. IBI

New products

A-Z OF LEADING GLOBAL AV SYSTEMS SPECIALISTS

FUSION

Over the past 18 months Fusion has recruited new engineers at the rate of one a month in order to ramp up further its product development which, the company promises, will result in new product releases over the next 12 months. Its latest launch is the RA-55 stereo, which is targeted at smaller trailerable boats and RIBs. Ultra-compact, this waterproof stereo is said to have excellent Bluetooth streaming capabilities. Also released in August this year is a new 24 Volt, 6-channel amplifier aimed at larger boats and designed to handle large audio loads.

September will see the world launch of yet another new Fusion product, the details of which had not been released as the issue went to press, but the company has said that this will open it up another, but unspecified and swiftly-growing marine market sector..

JL AUDIO

The JL Audio brand entered the European marketplace in 2014 when UK-based JL Audio Marine Europe were appointed European distributor. JL Audio Marine Europe has a central European warehouse located in Poole, Dorset, which ships throughout Europe to both OEMs and country distributors. It currently has distributors in Spain, Italy, Greece, the Netherlands, Poland, Croatia, Finland and Sweden and it has also established a network of core dealers that provides advice and, where required, product installation.

JL Audio latest product is the MediaMaster Audio source unit that is designed to integrate seamlessly into existing marine electronic systems.

Its MediaMaster 100s, an integrated marine audio system, is another recent new launch which completes the company's extensive line-up for the marine market.

All JL Audio marine products are purpose-built and engineered for the marine environment, and is claimed to offer an exceptionally high level of marine audio performance.

The MM100s is equipped with preamp-level audio circuits, which have been installed in an 8-channel unit with 4V RMS outputs to offer high quality

sound reproduction. These replace the typical chip amplifiers used in most marine source units used today and are designed for today's advanced media applications, offering a wide range of connectivity options for external devices, analogue auxiliary input for connection to a wide range of audio sources and an NMEA 2000-compliant CAN offers connectivity to compatible marine electronics.

KVH

Danish-American company KVH is a leading producer of mobile satellite communications antenna systems, satellite television antenna systems, broadband connectivity services and entertainment content delivery services for the yachting market, having designed, manufactured, and sold more than 200,000 mobile satellite antennas around the world.

Recently the company introduced its TracVision TV8, an 81cm diameter satellite TV antenna system designed to provide the tracking, reception, and extended coverage area needed for yachts calling at ports around the world. The TracVision TV8 is compatible with nearly all Ku-band satellite television programming services around the globe

Also new is IP-MobileCastTM for superyachts, a content delivery service that provides a wide selection of new release movies, favourite TV shows, daily news, sports highlights, music channels and more, all of them delivered anywhere at sea via KVH's satellite-based multicasting service.

At the heart of IP MobileCast lies its Superyacht Media Server, presenting hundreds of movies, TV episodes, and music tracks. This is compatible with any TracPhone VIP-series antenna for continual content updating in the background. The server can stream different programmes to each person onboard the yacht simultaneously. It supports free iOS and Android apps and the KVH set-top box for flat screen TV. Four swappable 1 TB hard drives are mounted in a RAID array for studio-quality data backup and protection.

Joining these is the mini-VSAT Broadband sm 2.0, the second generation of KVH's global connectivity service, which has been updated to deliver data at the network's highest speeds with lower price points.

OCULUS TECHNOLOGIES

Dutch firm Oculus Technologies specialises in infotainment systems and onboard interactive experiences. The YachtEye is its flagship infotainment product, but the company's extended portfolio include products which all incorporate its core capabilities of handling onboard data and, combining technology creatively to transform it into a 'journey' of information for guests that simultaneously informs and entertains.

Oculus has 56 systems on yachts from 35m to more than 150m and has recently extended its focus to the cruise liner market.

At METS 2015, the firm launched YachtEye 2.0. This new version of its flacgship product includes additional performance, technology and user features. Improvements to the

hardware and revisions to the graphic appearance have also been added. Its latest launch is TRiN, an interactive infotainment solution which combines transparent-screen technology with custom-made software to provide sophisticated interactive and cutting-edge user experiences. TRiN can be used for bespoke applications as well as in combination with other Oculus products such as YachtEyeTM and its 3D-engine room effect.

VERITAIS

Veritais specialises in four main product categories – audiovisual entertainment and web access, lighting control, room/cabin control and surveillance – seamlessly integrating any or all of these areas into a single, functional and intuitive system. Veritais is not tied to any single product manufacturer and so aims to bring the best of breed into all areas of their systems and installations.

Each installation is a bespoke project taking into account environmental and functional demands. The company also covers all aspects of service from initial design to after sales support. The company specialises in superyacht installations but also handles smaller yacht, high-end residential and commercial property installations as well.

For premium yachts Veritais installs 4K Ultra HD TVs which deliver four times as much detail as current generation 1080p Full HD screens for finer detail, greater texture and photographic smoothness.

DIGITAL YACHT

British electronic navigation and onboard AV systems producer Digital Yacht extensively uses PC technology to produce affordable onboard entertainment and information systems for the boating market. Production is located in the UK and USA while application software is produced in China. The company's latest AV products are the DTV100 marine TV antenna and the Aqua Compact Pro PC.

Priced in the UK at a relatively modest £125 excluding VAT, the DTV100 is specifically designed for new digital terrestrial transmissions. Being omni-directional, it doesn't require special aligning. It will also provide a feed for digital and FM stereo radio, news, entertainment, films, weather and sport.

Digital Yacht's new Aqua Compact Pro PC is small enough to fit in the palm of an adult's hand, yet it packs in a powerful 5th generation Intel Core i3 processor for the latest 3D charting and HD navigation programs. Being a PC, it can also be used for entertainment and communication applications but, unlike most laptops, this one is ruggedized for marine use.

Aqua Compact Pro has 8GB RAM and its preloaded with the Windows 10 operating system. It operates on a direct 12V DC power supply and has built-in 801.11AC Wi-Fi, ethernet and Bluetooth connectivity, dual video out (mini HDMI and Displayport with HD5500 graphics for displaying up to 4K.

CELLWEAVER

German company CELLweaver is a market leader in the delivery of ultra-high bandwidth marine internet using aggregated 4G /3G mobile telephony to provide many AV features onboard yachts, including live streaming.

CELLweaver RX is the company's new auto-gain control amplifier/range extender. It more than triples operational range off-shore to more than 20nm.

VBH

Van Berge Henegouwen (VBH) specialises in integrating living technology onboard superyachts to provide entertainment, IT, security, control and communications. Its LuxperienceLab design label creates bespoke creative installations and experiences that merge art and technology.

Two new VBH offerings are Pivot and Pulse. Pivot is an app which gives full control of the onboard audiovisual and cabin control systems via current-generation iOS devices. Features include personalisation, access to content libraries, and Beacon technology that allows media content to follow a user as he/she moves around the yacht.

Pulse is a new content delivery platform which allows users to enjoy the full range of audiovisual content, stored and streaming, available aboard the yacht. The platform grows as the owner's requirements change. It comes ready to accept new services, applications and other media sources as they become available.

YACHTCLOUD

Dutch firm YachtCloud specialises in delivering products and professional services developed for the specific needs of the yachting and superyacht markets. The products it develops are used on yachts worldwide and are related to technical and/or entertainment systems.

YachtCloud introduced Omniyon and CrewBoard in the past 12 months. The first is its flagship audiovisual entertainment system. Omniyon is a uniform and scalable entertainment experience with synchronized content and a consistent control interface across multiple devices and locations. It provides access to movies, music, TV channels, TV series, radio, onboard information and in-cabin comfort control, while enabling the user to collect and select their own favourite audio and video content both on board and offshore, anytime, anywhere.

CrewBoard is a digital presence record system that enables the crew to sign in and out of the yacht digitally and is the digital-age equivalent to the onboard whiteboard. It provides quick, easy and mobile access to an overview of which personnel are onboard at any given time.

YachtCloud has announced a 'free to download' app version of this product which will work as a stand alone solution or can be integrated to the CrewBoard Server to provide advanced features and integration to additional onboard systems such as the security system.

TIJSSEN ELEKTRO

With more than 40 years' active service in high-end yacht sector, Tijssen Elektro is a strong, stable and key turnkey supplier to boatbuilders. The Dutch firm provides all electrical engineering for alarm, control and monitoring systems. Its signature product is the MPA system for power distribution, navigation, communication and Audio/Video systems. In its workshop the staff will set-up the entire system for software updates and control of the programming. Thereafter, the owners representative and/or project leader of the shipyard will perform a factory approved test prior to installation, before its engineers install and commission the systems onboard. Once a yacht is handed over, Tijssen aftersales department will take care of any subsequent crew requests. IBI

Innovation driving the market

NOTHING MOVES AS FAST THESE DAYS AND WITH SUCH WIDE EFFECT AS THE SPEED OF TECHNICAL DEVELOPMENT IN ELECTRONIC COMMUNICATION. AND THAT APPLIES JUST AS MUCH TO MARINE NAVIGATION AS IT IS DOES IN ANY OTHER WALK OF LIFE

WORDS: BOB GREENWOOD

▲ **Garmin Fantom radar with Doppler effect use Motionscope technology to highlight threats**

IF THERE'S ONE product sector of the boating market that far outstrips any other in terms of speed of absorption of new technologies and rate of innovation it must surely be that of electronic navigation and communication. This is the David Bowie of the boating sector. Over decades it has reinvented itself many times and has continually innovated at a pace that at times has been breathtaking. Along the way it has brought in and developed technologies for seagoing from GPS chartplotting, solid-state digital radar and high-definition sonar to AIS, broadband connectivity, smartphone interactivity and infrared night vision, while integrating them all for access via interactive Multi-Function Displays.

CONTINUED INNOVATION

In the process the marine electronics industry has always been able to create demand for new products and upgrades. This is particularly evident in the wider production cruiser market, which has sustained it even during lean times for new-boat sales when many owners prefer to hold onto their boats and spend their disposable income on improving, rather than changing them.

Companies in the boat electronics industry report that the past couple of years have been positive. This has been in the face of continuingly uncertain boating market growth, notably in southern Europe, and slow growth in the BRIC markets that had started to show great promise seven or eight years ago.

Raymarine, one of the largest and best-known global brands in recreational boating market — now owned by the FLIR thermal imaging group — did not provide its input for this review, but FLIR's latest financial statement indicates a 6% gain in Q2 sales for its maritime business segment, which includes Raymarine. Compared with the same quarter of 2015, this year they grew to US$50.5 million.

Overall, the group shows that while the backlog for firm orders for delivery within the next 12 months to be 3% up for the latest quarter, profitability showed a dip below historic trends partly owing to higher costs in its instruments and security segments, but does not break out figures for the maritime group.

Garmin, also a worldwide leader in marine electronics with a broad array of integrated navigation instruments and one of Raymarine's key competitors, was more willing to comment. "Garmin's marine business unit has seen significant growth over the past few years, much of which has been driven by emerging technologies," says Carly Hysell, PR/media relations manager. "We believe that the industry as a whole has seen an uptick as of late, and marine electronics are no different. Just look at how many new products (and boat models) are announced at tradeshows across the world each year – it's definitely an exciting time to be in this industry and

we don't believe it's going to slow down anytime soon."

Hysell notes that in the past, when the technology wasn't changing so rapidly, it might have been true that boaters weren't upgrading as often. Now, however, that the technology changes and advances so quickly, people are more likely to upgrade because they want the latest and greatest system available.

"That said," she adds, "we also strive to keep our units current with continuous software updates that add new features and performance upgrades at no charge to the customer".

SYSTEMS INTEGRATION

Although Garmin is continually developing new products across a broad range, there are two areas where R&D work has been intense recently. The company, in common with others in the sector, has reworked two technologies that are among the oldest in electronic navigation: radar and sonar.

Regarding radar, Garmin and others have applied the Doppler effect in order to enable objects that are moving either towards or away from the scanning vessel to be more easily identified. "The incorporation of Doppler technology into marine radars provides a safer experience," says Carly Hysell.

New radars, including Garmin's Fantom series, she says, use Motionscope technology to highlight targets moving toward or away from the radar in real colour so that mariners can more easily identify potential threats.

As for echo sounding, Garming has taken that a step further with the introduction of Panoptix all-seeing sonar technology in the past year or so, which shows sonar in real time, instead of the history the boat has already passed over. "Seeing fish swimming around your boat in real time, or to see how the fish react to your bait, has made Panoptix a true game-changer and our customers and dealers agree," Hysell says. "Since we first announced this technology, it's been remarkable to see how we've brought live sonar to such a broad range of customers in various applications."

Furuno, a pioneer in the development of fishfinder and marine radar technology since the late 1940s, has also recently taken small-boat radar to a higher level with its new Target Analyzer technology using the Doppler effect. Atsushi Takagi, a vice general manager for product planning and marketing with the Japanese company, claims a world-first for this technology which he says "clearly presents dangerous targets that are approaching own vessel in a different colour for easy and instant recognition."

He observes that the recreational boating market is year-by-year running faster and is more technology-oriented, which is why Furuno is "making substantial R&D investments every year in order to meet customers expectation and demands".

Takagi believes the technology leap is so big and important that it is offering new values to customers, the like of which have never been experienced before. A major part of that leap forward, he notes, is recent advances in systems networking. Takagi points out that navigational products are networked on open-platform architecture with Wi-Fi connection, uploading/downloading data to and from users' own devices such as a smart phones and tablets with access to cloud services.

> ***"The technology leap is so big that it is offering new values to customers, the like of which have never been experienced before"***

"Data sharing service among users is becoming reality and vital in the recreational market. Many customers are paying attention to such additional services and value for their decision-making to select products onboard," Takagi says adding that this has been an interesting and challenging time in the electronic navigation sector. "All the products onboard, not only navigational products but engine, lighting, automation and AV, now need to be networked for seamless operation," he notes.

Leif Ottosson, president and CEO of marine electronics giant Navico, agrees that the accelerating pace of systems integration to create what he describes as 'smart boats' is the most interesting development in navigation today. "While integration and connectivity are not new," he points out, "advancement in technology as well as universal

▲ **Navico's Simrad StructrureScan display with EVO2 navigation system**

connectivity is now more than just a concept. It's quickly becoming a reality for a wide range of vessels."

Navico is pushing hard in this direction with its brands Simrad, Lowrance and B&G brands. Ottosson believes that "improved integration and connectivity is the next step in the marriage of boats and marine electronics".

SMART BOATING

"Boats will become aware," he continues. "Everything from GPS and position data to telematics and engine data will be integrated for a smoother boating experience, from before you get to the marina to when you are on the water, to reviewing your latest boating trip when you get back home, all controlled and integrated from the display."

This extremely useful information will become accessible to the boater anywhere, from 'the cloud'. Smart, connected boats that make boating safer, more fun and easy is the ultimate goal. Navico's recent launch of its GoFree brand is aimed at driving development of cloud-based digital solutions and apps across its product range and underlines this commitment.

Ottosson observes that until relatively recently boat operators used to control only limited functionalities from their displays (sonar, radar, charting, and so on). In some cases specific displays were dedicated to each function. Today, however, Navico enables boat operators to combine functionalities on customised displays and incorporate more and more boating data through the display to get the whole picture - not just what's around the boat, but what's in the boat and how the boat is operating. "Our recently announced relationship with Naviop (an Italian provider and designer of monitoring and control systems) is a key example of how many electronics companies are partnering to provide greater, integrated services to the market."

Ottosson points out that this commitment to integration and innovation has enabled Navico to achieve double-digit growth year-on-year, as well as a continued increase in market share. "The key is innovation," he says. "We are compelled to bring innovative, new products and technologies to the market, and that award-winning innovation drives growth."

> ***"We are compelled to bring new products and technologies to the market, and that innovation drives growth"***

DATA ON DEMAND

In a mature market, boaters are continuing to upgrade their electronics suite," Ottosson adds, "but you have to give them a reason to change. Innovation is the key to making this happen. Our recent advancements in technology including, Halo Radar, StructureScan 3D, wireless connectivity and integrated systems are just a few examples of the way we keep consumers and dealers excited about marine electronics and the reason they purchase our latest offerings."

Full systems control and integration has been the order of the day in the superyacht sector for some while now. For over 40 years Dutch company Tijssen Elektro has specialised in designing, producing, installing and commissioning navigation, communication and audio visual systems for large custom yachts.

Robbert-Jan Ras, Tijssen's general manager for NavCom, points out that in this segment of the leisure marine market owners are less inclined to make radical changes to their integrated navigation systems. Changes, he observes, are generally more incremental and accommodated by a control system that is designed for flexibility.

"We see more integration between different systems with the result of a very easy to control system," he says. "Our slogan 'Keep it simple' is always very well accepted by users. If everything works properly and we offer them good support, they haven't got the need to upgrade often."

Even so, technical improvement is always ongoing. Integration continues between systems with NMEA 2000 protocol and networks. Demand is on for dual ECDIS systems for paperless navigation as well as for data via 4G internet and also for 5G to increase internet speeds and greater possibilities to manage data and the combinations between, for example, V-Sat and Wi-Fi.

"We also see trends for widescreens on bridges, V-Sat communication via KA band and at airtime there is demand for flexible contracts," he notes.

Tijssen Elektro is just one example of how, in a market sector such as marine electronics where technology is advancing as breakneck speed and on many levels simultaneously, small innovative and ➡

▲ **Tijssen Elektro provided a control and monitoring solution to Heesen's *Amore Mio***

agile specialist enterprises can find space to grow alongside giants such as Navico, Garmin and Raymarine.

Another such company is the UK's Digital Yacht. Nick Heyes, Digital Yacht CEO, claims that it's biggest transformation is the introduction of iKommunicate, which brings the 'internet of things' to boats thanks to a new industry-wide interfacing standard called Signal K.

The development was innovative as the company used the Kickstarter platform in late 2015 to gather early adopters and turn an idea into a product in a very short time scale.

The iKommunicate gateway is designed to work with any legacy or modern navigation system using NMEA 0183 and NMEA 2000 connectivity and allows existing and new systems to take advantage of next-generation interfacing. Boatbuilders, for example, will also be able to use it for logging and data analysis of onboard systems.

Also new is Digital Yacht's Sonar Server, which is a wireless interface sending depth data to the charting app developed by Italian electronic cartography company Navionics. It allows real-time recording and displays bathymetric information as well as improving charts through crowd-sourced data.

Heyes says this has been another good year of growth for Digital Yacht, boosted by these and other marine electronics innovations and thanks to US and new developing markets. "We now export to over 100 countries. Europe had been flat, but we're now seeing increased sales there due to the new low value of the British pound," he adds.

Digital Yacht's interaction with the Navionics cartography highlights the symbiotic benefits of today's marine electronics sector. On the electronic chartplotting side, Navionics helped to revolutionise the way people navigate today, claiming to having brought the first GPS plotter to market as early as 1984 and continues to be a leader in this technology.

> ***"Mobile adds more power to the plotter and with plotter embedding Wi-Fi capability, this has reached a further stage"***

MOBILE APPS

Giuseppe Carnevali, Navionics founder and president, sees mobile applications, crowd sourcing and Wi-Fi as three technological trends that are happening in the global electronics industry which have unquestionably made their way to the boating world. "We were able to leverage and anticipate this in order to create specific products that cater to the emerging Location Based Services trend."

Carnevali also notes that developing more and more in the yachting market is the combination of mobile and plotter use. "Boaters can now have a seamless experience, on and off the boat, conducting searches, planning cruises, checking marine weather and so on, anytime and anywhere. Mobile adds more power to the plotter and with plotter embedding Wi-Fi capability, this has reached a further stage."

An example of this, says Carnevali, is the Navionics Plotter Sync. "Raymarine Wi-Fi plotter owners can transfer routes and markers, upload sonar logs for enhanced SonarChart and update their eligible plotter card through this feature embedded in the Navionics Boating app," he explains. Such innovation, he says, has brought business in its wake. "There has been good market traction and steady demand. There has been great evolution towards digital/Wi-Fi technology as supports for navigation and fishing. More opportunities have presented themselves to be more efficient when boating and to fish smarter thanks to electronics."

Mobile apps, particularly when integrated with Wi-Fi plotters, Carnevali says, just make boating more fun. "Many people found that with a minor investment they could get a completely new and better boating experience. Boating electronics come at a small price compared to the cost of owning and operating a boat. On the water, serious boaters want the best chance for success in fishing or racing, or simple goal of relaxation achieved with peace of mind. That is where the latest generations of charts and simplified user interfaces come into play. This is essential to improve safety and assure pleasant navigation."

As a producer of ancillary navigational equipment Scanstrut, based in the UK, has successfully surfed the wave of marine electronics for 30 years. Its speciality is installation solutions. "The rise of the use of electronic charting software is a major development in our market," comments managing director Tom Reed. "When combined with our phones and tablets, this allows the use on board of familiar, everyday technology that we already use in business or at home," he adds.

Reed claims that the user interface is so

well understood by boaters that plotting a course or selecting an anchorage is becoming simple and easy. “This removes a barrier to entering the boating market of new or less experienced boaters,” he says.

BOATING COMMUNITY

Commenting on the challenges that new technology brings to manufacturer, Reed says: “There will always be a need for specialist marine electronics, but boating can be seen as a technical pastime and as an industry we need to do everything we can to encourage new boaters to take it up. Take a look at the auto industry. They have recognised that this is what their customers want and are racing towards full integration of smart phones into the car.”

More broadly, he says that Scanstrut is seeing increased functionality from onboard electronics such as chart plotters and radar that integrate into the daily experience of the boater in both a push and pull way. Boaters can review mooring options as they enter the harbour, request an engineer and even find a restaurant via their electronics. “We are also seeing live reporting on actual data gathered while on the water. For example, live depth recordings are being logged by the end user and ultimately uploaded to update charting software. This ‘community’ input from active boaters is a really exciting trend and one that will continue.”

There’s no doubt about the essential role of marine electronics has in the overall enjoyment of boating. As long as this sector continues to forge ahead in its quest to introduce and integrate new technologies, there’s no reason to suppose it will not continue gathering pace. IBI

▲ **Digital Yacht’s WL70R provides onboard Wi-Fi Internet access**

> *“More opportunities have presented to be more efficient when boating and to fish smarter thanks to electronics”*

Cutting-edge technology for smarter boating

A-Z OF LEADING GLOBAL MANUFACTURERS OF NAVIGATION GEAR AND ELECTRONIC EQUIPMENT

▲ **Garmin fishfinder echoMap-CHIRP**

GARMIN

Marine is one of five primary business units of US electronic location products manufacturer Garmin. In addition to marine, it also serves the automotive, aviation, fitness and outdoor recreation markets. A global leader in marine electronics, its portfolio includes some of the industry's most sophisticated chartplotters and touchscreen multifunction displays, sonar technology, high-definition radar, autopilots, high- resolution mapping and sailing instrumentation. Fusion, a leading supplier of integrated marine audio equipment, is also owned by Garmin.

Dynamic and vertically integrated company, Garmin is set up to change and adjust to meet market needs quickly. Because it serves several business segments, it's able to leverage and adapt technologies across the markets when necessary.

Garmin usually introduces multiple new marine products every year. New launches during the past two years include: GPSMAP 8400/8600, a completely networked, large-format multifunction display (MFD); Fantom, a Doppler-effect radar; echoMAP CHIRP, a new series of budget chartplotter/sonar combination units; and Striker, a new range of CHIRP-technology fishfinders.

Garmin's GPSMAP 8400/8600 uses 17-, 22- or 24-inch screens with full HD in-plane switching (IPS) touch-screens and what Garmin claims as the highest resolution on the market. The display Includes a high-performance processor that provides the company's fastest map drawing yet. Multiple screens can be installed either flush or flat-mounted edge-to-edge to create a glass helm look. Presets are provided for sonar, radar, cameras, media and digital switching that can be independent or incorporated into SmartMode station controls.

Its GMR Fantom is a 40W solid-state radar that uses a 6ft antenna (a 4ft array is also available) and has MotionScope technology. This uses the Doppler effect to detect and highlight moving targets to avoid collisions. Features include an Auto Bird Gain setting to help identify flocks of birds feeding at the water's surface and help signal the location of game fish.

Pulse Expansion, another feature, maximizes target size to help differentiate real targets from noise. Dynamic Auto Gain and Sea Filter settings automatically adjust to the surroundings for optimal performance in all conditions. Dual radar support provides redundancy and ability for each display unit on the boat to select data from one of two different radar sources.

MARPA setting enables tracking of 10 targets simultaneously with in-close to 72nm detection ranging .

The echoMAP CHIRP chartplotter/sonar combination units have built-in CHIRP traditional sonar and CHIRP DownVü and SideVü, and are claimed to be the clearest scanning sonar on the water. With preloaded cartography for inland or coastal waters, the new echoMAP CHIRP series offers support for Garmin Panoptix transducers, and all units come standard with Garmin QuickdrawTM Contours, a new software feature that lets mariners instantly create personalised HD fishing maps with 1ft contours on any body of water. The units have NMEA 2000 compatibility and can also receive information from sensors, engines, autopilots and more.

Like previous echoMAP models, the CHIRP series is available in bright, sunlight readable 4-inch, 5-inch, 7-inch and 9-inch colour displays with an intuitive, keyed interface. All models are equipped with a built-in, high-sensitivity 5Hz GPS antennas.

Striker series fishfinders have CHIRP traditional sonar and CHIRP DownVü and SideVü technology that come standard with a built-in high-sensitivity GPS receiver. Fishermen will now have the ability to not only see fish and structure below the boat, but also to mark hot fishing locations and get back to them. Striker fishfinders have bright, sunlight readable 3.5-inch, 5-inch or 7-inch colour displays.

FURUNO

Japan's Furuno Electric Co is said to have introduced the world's first practical sonar fishfinder in 1948, following that a decade later with early radars for marine vessels. Both remain company core technologies to this day.

Furuno's latest radar is its solid-state digital DRS4D-NXT model. This has pulse compression with the company's proprietary Target Analyzer and Fast Target Tracking features and is claimed to be the world's first radar to use Doppler technology. Objects that are moving at speed towards the user and are on a potential collision course are highlighted in red, while those that are➡

moving away or are stationary show up in green. Red echoes change in intensity according to their speed of approach.

Also incorporated in the new radar is RezBoost beam sharpening technology. At maximum setting this focuses resolution to the equivalent of a 2-degree beam so that the user can see targets in more detail and with less clutter and even pick out small and highly detailed targets such as dinghies and kayaks.

NAVICO

Navico, globally one of the largest players in the recreational and commercial marine electronics market, has a history of large investment in new marine electronics technologies. The rate of investment now looks set to continue following the announcement in July this year that Goldman Sachs Merchant Banking Division has partnered with Altor Fund IV to acquire the Navico business from previous owner the Altor 2003 Fund.

▲ **Furuno DRS4D-NXT Doppler radar**

Over the past two years Navico has introduced a slew of new products that include HALO Pulse Compression Radar technology, StructureScan 3D imaging technology for fish finding, ForwardScan sonar for safe navigation, and B&G sailing chartplotters for ocean racing.

When it was launched in May last year, the Simrad HALO Pulse Compression Radar range was claimed to be the world's first high-performance solid-state, open-array radar system with pulse compression technology, suitable for recreational and light marine markets. It combines the advantages of Broadband Radar (introduced by Simrad Yachting in 2009) and traditional pulse radar to provide navigational visibility as close as 20ft, with pulse radar's short-range blind spot while offering long-range performance up to 72nm. Beam sharpening provides heightened target resolution.

HALO can also operate in dual pulse and Broadband mode without signal loss so that two distance ranges can be monitored simultaneously with independent display controls. This dual MARPA target tracking enables up to 20 targets to be tracked, displaying the closest point of approach and time to closest point of approach for each.

Simrad StructureScan 3D allows boaters to easily see fish, underwater structure and bottom contours in a three-dimensional display on NSS and NSO evo2 navigational systems. Its 3D imaging quickly scans underwater terrain to create high-resolution, 180-degree super-wide, three-dimensional views – in depths to 300ft and as far as 600ft port and starboard.

ForwardScan imaging, along with Simrad TotalScan, StructureScan HD and DownScan Imaging are embodied in the Simrad GO7 XSE stand-alone combined marine chartplotter/fishfinder. While StructureScan, using HD and CHIRP technology, provides detailed images of what's below the boat, ForwardScan scans the underwater topography ahead in two dimensions, thus helping to avoid upcoming underwater obstructions and to identify possible anchorages to aim for.

For sailors and ocean racers, the B&G Vulcan range of chartplotters have multi-touch and pinch-to-zoom touch screens. They're now available with 5- or 7-inch screens and provide integration with other onboard instruments in order to use its SailSteer and Sailing Time displays. Built-in Wi-Fi enables users to keep up to date with the latest sailing apps and services.

TIJSSEN ELEKTRO

For more than 40 years Dutch company Tijssen Elektro has been a strong and stable turnkey supplier to superyacht builders providing all electrical engineering for alarms controls and monitoring with its signature MPA system, along with power distribution, navigation and communication, and audio video systems.

In its workshop the company sets up entire systems for software updates and programming control. That's followed by FAT (Factory Approved) testing by owners' representatives and then installation and commissioning by Tijssen engineers, while the company's aftersales department will take care of crew requests when a yacht is handed over.

Recently the company has adopted a more active business approach to the major shipyards in the Netherlands and abroad. Increasingly refit work is now being carried in collaboration with the company's Consortium partners E3 Systems, located in Palma (Mallorca) and Aage Hempel in Spain.

DIGITAL YACHT

Digital Yacht's technology encompasses positioning and heading sensors, wireless navigation and communication and onboard networks and control systems. The company also claims to offer the fullest range of AIS transponders in the boating market. Its products are

▲ **iKommunicate by Digital Yachts**

designed, developed and manufactured in southern England and Boston in the US and it also has a software facility in Shanghai, China.

Much of Digital Yacht's product offering is centred around low-cost consumer devices such as iPhones and tablets, PCs and MACs which the company believes can help make legacy systems compete with the latest in dedicated marine electronic products at a fraction of the cost to make internet access afloat easy and affordable.

In the past year the company launched iKommunicate, which introduces the 'internet of things' to boating, networking everyday objects by enabling them to transfer data using Signal K, a new industry-wide interfacing standard.

The iKommunicate gateway will work with any legacy or modern navigation system with NMEA 0183 and NMEA 2000 connectivity, allowing existing and new systems to take advantage of next-generation interfacing. Target markets

include boatbuilders, who will be able to use the product for logging and data analysis of onboard systems.

At METS 2015 Digital Yacht received a DAME Nomination for its Sonar Server, a wireless interface that sends depth data to the widely-used Navionics charting app to allow real-time recording, bathymetric displays and chart updates through crowd-sourced depth data.

NAVIONICS

Italian electronic charting company Navionics is claimed by its founder and president, Giuseppe Carnevali, to have brought the first GPS chartplotter to the boating market back in 1984.

Over the past 30 years the company has remained at the forefront of innovation in this field, pioneering breakthroughs in both the way maps are made and the way they are used.

Crowdsourcing, community edits, SonarChart and Dock-to-dock Autorouting are examples of the most recent innovations developed by Navionics. Today, three out of four marine navigation devices support Navionics charts.

Over the past 12 months the company has launched two award-winning products, Dock-to-dock Autorouting and

▲ **Navionics Sonar Chart Live**

SonarChartTM Live.

Dock-to-dock Autorouting is claimed to be unique in boat navigation as it quickly calculates a detailed route even through narrow passages and channels based on chart data and navigation aids. This feature works on iPhone, iPad and Raymarine plotters.

SonarChartTM Live allows users to create new, personal 1ft/0.5 m HD bathymetry maps that display in real time while navigating. This works on both Apple and Android mobile devices in

▲ **Waterproof Dual USB charge socket**

combination with all sonar or plotters. It can also be used on Raymarine displays.

SCANSTRUT

UK company Scanstrut claims global market leadership in the design and manufacture of installation products for marine electronics. It offers a wide range of off-the-shelf products that are designed to enable the use of electronics in the tough marine environment. From waterproof cables seals to large satcom antenna mounts, the Scanstrut is the most comprehensive range of its type on the market.

In the past year Scanstrut has focused on further developing its in-house design skills to enable it to develop new products that best cope with challenges presented by the marine environment of salt, humidity, high temperature ranges, vibration and shock loads. Recently the company was awarded a patent for its unique seal system for smart phone enclosures.

With the increasing use of smart phones and tablets onboard that can run charting software, Scanstrut has introduced new products to assist their use. These include its Lifedge waterproof cases and the new Rokk Mini range of mounts, both focused on smart phones, tablets, action cameras and fish finders.

More recently, and to complete the system, Scanstrut has introduced a universal, fully waterproof USB socket that provides constant charge to these power-hungry devices. IBI