

Marine

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Workboat Communications Evolve to Meet Myriad Missions



Choosing next generation communication systems for professional marine operations can be a daunting task. Not to worry, MarineNews provides a primer.

By John Haynes

Over the past decade we have come to expect fast, seamless global communications from a single device that fits in our pocket. The age of the smart phone and tablet enables multiple voices talking in a conference call and real time transfer of data, ranging from documents to photos and videos.

In the modern bridge, most crew members have a GPS in their pocket which can identify where that person is on the planet. For the traveling mariner, communication devices such as the iPhone or iPad can be loaded with 'navigation' apps. However, there are distinct differences between having vast amounts of data and knowing where you are in real time, to actually navigating and passage planning.

A challenge when the marine sector moved from paper charts to digital charting was too much complexity plus a lack of uniform menus, commands and controls across different navigation systems. Commercial objectives drive innovation in design, but the danger of 'feature creep' can be adding functions to an electronic device for no reason. On a dark and stormy night, or at high speeds, a navigation system that delivers the minimum amount of relevant and clearly presented information should be the design and usability objective. How the navigator or captain transmits information externally and onboard to various crew members from engine room to deck crew can also be critical.

Image above: Marine Alutech Watercat M18 AMC is the Finnish Navy's new U700-class amphibious assault craft.



Credit: Savox Communications

Marine Communications Evolve & Adapt

The traditional system for external marine communication is VHF radio. Combined transmitters and receivers operate on standard international frequencies or channels. Aerials mounted high can give a 'ship to ship' VHF range of over 50 nautical miles. Range between small boats with low aerials can be less than 5 nautical miles in certain conditions. This limited range of VHF is a benefit in crowded waters as it reduces the overlap of radio traffic between small vessels. A vessel in distress wants other vessels in range to come to their assistance, as they will often be first on the scene in areas where there is limited rescue coverage.

Mariners on small craft are still trained in VHF techniques with focus on the mayday distress call. Digital Selective Calling (DSC) capability allows a distress signal to

be sent with a single press button on the radio which can be integrated with onboard GPS to transmit position. There is now a strong link between GPS and communication as the digitally generated location is expected to be more accurate than human error interpreting a position or confusion from spoken words and numbers in a voice only distress call.

However, in day-to-day communications, voice is still used. A simplex system only allows communication in one direction at a time while a duplex system allows each person to speak simultaneously and hear each other at the same time. A two-way system is like talking on the telephone. Headsets combine speakers and microphones which can also be incorporated into helmets. On professional vessels headsets should have industrial grade hardware that resists corrosion and be engineered for comfort. For the marine environment, a headset usually wraps around the back of the wearer's head so that when leaning over to handle a line or look down a ladder climb, the headset does not fall into the water or onto the deck. Grabbing for a falling headset can be fatal if the operator needs both hands for their task. Hands free microphones can also offer safety benefits.

Wind, wave and engine noise combine to make communicating among crew members difficult. High volume and poor quality communications can result in misunderstood radio messages, accelerated crew fatigue and slow reaction times. Many marine operations need to listen clearly to military, police, fire and emergency VHF transmissions, but due to external noise, radio calls can be missed or have to be repeated. If communication among crew members requires shouting it can create a situation where work and safety messages are subject to interpretation errors. By turning the radio volume up crews can be subjected to short term ringing in the ears and long term hearing damage. The latest low noise or noise cancelling systems are designed to give high quality communication combined with hearing protection.

Slowmovingworkboatsarewell servedbycommunications that have evolved from industrial land based systems. However, as small boat operations increase both operating speeds and demands on crews, the next generation of maritime communications may be using technology that has been developed for military and security applications. As the expectations for communications performance grows, it is worth considering how military and security roles are driving changes and improvements in the systems.

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– Suzanne Coop, Business Development Manager for Drumgrange

‘Milspec’ quality is becoming an industry norm for portable electronics in harsh marine environments. Next generation systems may have a ‘net’ function with other types of communication, including the ability to transmit data to or upload images from mobile units. Various systems designed for military and security applications could improve safety and efficiency for the offshore sector, renewable energy, wind farms, fish farming, aquaculture, survey and scientific work. The main difference between military and civilian for some communication systems may simply be the use of encryption.

Solutions Abound for a Changing Workplace

UK based-Drumgrange has developed the Diamond intercom & radio combiner system as a digital system for use on RHIBs, high-speed craft and small vessels. The compact system is designed as a combined communications solution for military, coast guard and commercial open boat applications. The Diamond system provides voice connectivity between users and on-board radios. It also integrates existing boat alarms, for example engine warning alarm, to support boat and crew safety.

Suzanne Coop, Business Development Manager for



A member of the amphibious arm of the Finnish Navy, a Finnish Coastal Jaeger, equipped with IMP headset and PCU.

Credit: Savox Communications

WIRELESS/ON BOARD COMMUNICATIONS

Drumgrange told MarineNews in November, “The Diamond system was developed to stringent end-user requirements for operations in harsh maritime environments. The system balances intuitive functionality and ease of use with a robust, low-maintenance design. In high tempo operations the system enables crew members to have independent access to both secure and non-secure communication networks, uninterrupted hands free intercom facilities and full control of voice-activated comms.”

The intercom & radio combiner system can accommodate any radio and user combination with up to eight radios and eight users as a basic system. Key features include user-specific VOX sensitivity control and users have the ability to personalize voice-activated comms at any time. The ergonomic design is for single hand operation during high-speed transits at sea. The system is ruggedized for land and maritime use, waterproof to minimum IP67 and will work with most headset configurations, including binaural headsets which enable users to have a different communications input through each ear.

Intercom systems can use hard wired or wireless equipment for onboard communication between crew members. There may be a master control on the system or individuals can select what they want to hear.

Some systems allow operators to listen to external radio and comms transmissions while listening to onboard crew conversations. Safety benefits of onboard intercoms include situational awareness on the vessel and commands that do not have to be repeated in demanding marine environments. Whether a Superyacht or a commercial vessel, docking maneuvers put high pressure on crew communication as the risk of injuring a crew member or damaging the ship is high. This is no time for a radio battery to go flat or a microphone to fail.

Separately, the Drumgrange Maritime Interdiction Operating System (MIOS) is designed to expand operational capability for patrol and boarding operations. MIOS incorporates automated navigation, position tracking, video and data links between a command vessel and deployable remote assets, including interdiction craft and boarding parties. The MIOS C3 system was developed by Drumgrange using MOTS (Military Off The Shelf) software and hardware. Specialist features include hands-free voice comms, an integrated comms helmet, portable computer, digital scanner and camera, secure digital imaging, hazardous gas detectors, position and track data.

Coop adds, “This marine C3 system provides the

command team, interdiction craft and boarding party with simultaneous, instant updates of asset location and the developing tactical situation.”

Still another system offered by UK-based Ultra Electronics – Graytronics Marine Communications & Intercom System – is designed to provide clear audio under extreme conditions for civil forces and in military applications. Intercoms used in an open marine environment suffer from background noise from engines and wind turbulence around the microphone. To overcome this noise, Ultra Electronics has designed speech processors which modify the audio signal and allow only specified frequencies to pass through, greatly reducing noise and increasing speech clarity.

Bede O’Neill, Business Development Manager at Ultra Electronics explains, “Graytronics communication and intercom systems enable multiple radios, secure and non-secure, to be integrated with crew intercoms and marine safety helmets. A typical system comprises master control box with connections for radio operators, crew intercoms and one to six radios. The wireless option enables the crew to maintain communications while remote from the wired intercom, a necessity when performing Search and Rescue operations. Fully backwards compatible with existing installations, Graytronics Wireless delivers a key system enhancement with minimal disruption to installed systems.”

Other system options include integration with waterproof loud hailer, waterproof loudspeaker, waterproof radio fist microphone and waterproof mobile telephone module. Notably, Ultra CCS Graytronics Communications systems are fitted on the U.S. Coast Guard’s new Long Range Interceptor-II Cutter Boats.

Patrol vessels are used increasingly around the world to protect large areas of water and coastline. The ship’s boat is then launched to board a suspect craft. Visit, Board, Search, Seizure (VBSS) are maritime boarding actions that range from counter-narcotics and anti-piracy to conducting immigration, customs, safety and fisheries to other compliance inspections. Boarding team communications is part of C3 (Command Control Communication) that enables VBSS and military teams to board other vessels with the option to talk ‘radio to radio’ or to a wider network, including the boarding team boat crew and mother vessel.

Luxembourg-based SAVOX Communications Group also has operations in Finland, Germany, France, the UK, the US, Canada and China. The SAVOX IMP Mobile Platform is designed to deliver clear, reliable and robust

RHIB crew with DIAMOND intercom and radio communications system.



Credit: Drumgrange

communications for military, SAR, law enforcement and professional missions. SAVOX IMP offers a lightweight Ethernet based digital solution where the man is the communication interface. Configurable and scalable the system can be configured for small crews or large vessels. The programmable software enables integration of intercom, radio and high speed data transfer.

The SAVOX user interface or Personal Control Unit (PCU) is a lightweight and ergonomic voice prompted unit providing control of intercom functions and instant access to two tactical radios. The PCU can be operated with one hand whilst wearing gloves, even when moving at speed in rough sea states. The IMP has an adaptive VOX algorithm allowing high quality voice operated communication on open boats whilst travelling at high speeds.

At the core of IMP is a digital 100Mb Ethernet backbone. This data highway provides high capacity voice and data distribution using Ethernet protocols. It allows integration with navigation aids, engine management systems and video data which can be distributed to key user positions for complete command and control of the vessel. "SAVOX IMP is user configurable and has no system master, meaning quick and easy set up," adds Mikael Westerlund, SVP Global Marketing at SAVOX Communications.

Every workboat needs effective communications for a rapidly changing menu of mission sets. Without a doubt, matching the right system to the right mission has become more than just a nice vessel upgrade. Today's increasingly sophisticated workboats therefore come with a host of 'comms' options. Which one is right for you? That depends on your mission. And for every workboat mission, there is a communications solution to match.



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