

# OPTIMIZING COMMUNICATIONS AT SEA PIECES OF THE PUZZLE

BY STEVE ZUBER

Bandwidth – warships just can't get enough of it! The communications demands for voice, video and data continue to grow exponentially in complex, multi-platform and multi-nation operations. The challenge is daunting – how to optimize the limited communications capability on board a ship to support a myriad of communications needs?

Fortunately, Ottawa based Rockwell Collins Canada, has the answer to part of the puzzle: the SubNet Relay (SNR) protocol. Rockwell Collins developed this protocol to provide a virtual IP-network at-sea over HF, VHF or UHF radio links. This innovative technology is now in NATO Standardization Agreement 4961 called Mobile Ad Hoc Relay Line of Sight IP Networking, used by the Royal Canadian Navy (RCN), the US Navy (USN) and many other NATO countries. Going a technological step further, the Rockwell Collins Canada team led the design and development of the next-generation Wideband HF capability in its Ottawa facility. The Wideband HF radio (RT-2200A) provides its users with reliable, high-quality voice and high-speed data communications capability with very low operating costs compared to satellite communications (SATCOM).

How does a ship at sea communicate with the multitude of radio types and their unique waveform requirements without a bank of special-purpose hardware for each requirement? The answer is the software-defined radio. Rockwell Collins led the market entry with its ubiquitous multi-mode, multi-band (ARC-210) radio.

The ARC-210 radio brings several operational benefits to aircraft and shipboard installations. First, the navy can acquire a common software-defined radio for all of its V/UHF voice, data, tactical data-link (TDL) and UHF SATCOM communications requirements. This provides significant reductions in life cycle cost through common logistics support. Second, the programmable feature allows operators to load the approved waveform for the operational mission.. This powerful feature enables interoperability with US and coalition forces. Establishing communications with aircraft, other nations' ships, land forces ashore and national



Zuber says SHINCOM is integral to information flow on Halifax Class ship

headquarters becomes a matter of obtaining the authorized waveform. Rockwell Collins' systems have embedded US and coalition-approved waveforms assigned according to the operational mission.

Another piece of the puzzle is how to control, switch and optimize the multiple radio frequency (RF) channels that must operate simultaneously. This drives the need to manage the RF allocations to specific channels while preventing any cross-talk between channels. Solving this problem takes a management tool that creates communications circuits for each specific function to define RF channel separation, transmission modes, cryptographic modes and antenna allocations. All of this is captured in a Communications Plan or COMPLAN, which forms a key part of the overall Communications Control and Management System (CCMS). This is the comms integrator's toolset to bring together external (EXCOM) and internal communications (INTCOM) systems to operate as a centrally-managed system.

Enter the DRS Technologies Canada's Centaurus™ CCMS, a software management toolset designed for the Halifax Class frigates and targeted at supporting the Canadian Surface Combatant (CSC). DRS has over 30 years experience in supporting shipboard warship communications in Canada, the US and other close allies. The DRS expertise in real-world communications management

is borne out by the extensive features embedded in Centaurus. Also Ottawa based, DRS has the know-how and data rights to manage and tailor Centaurus for CSC requirements, today and tomorrow.

The final puzzle piece is how to connect operators on-board the ship to radio circuits according to user privileges and operational priorities. The DRS Shipboard Integrated Communications System (SHINCOM) solves the problem. SHINCOM is a sophisticated secure shipboard communications system and is the system of choice for the RCN, the USN and others. SHINCOM combines red (classified) and black (unclassified) voice circuits into a single switch and voice terminal eliminating the need for separate switches. The company has also developed other digital signal processing techniques to convert noisy analog voice into high-quality digitized sound, eliminate background white noise and project theatre-quality 3-D sound into the operator headset. The DRS "Two Ears – Four Voices®" feature allows operators to discern more clearly four or eight simultaneous voice channels in the headset.

But, the system is more than a better way for naval operators to talk. Now in its fifth generation, SHINCOM is integral to information flows aboard ship. DRS converts technologies developed by the commercial voice and data networking companies into Military Off-the-Shelf systems, at a significant cost saving, while increasing switching capacity and retaining critical red/black separation. Today's SHINCOM offers tremendous capacity including voice, wideband audio (e.g. sonar audio), network data and high-speed serial data.

Warship communications needs are best served by a fully integrated internal and external comms system. DRS and Rockwell Collins bring their leading-edge, proven products and systems engineering expertise with a CCMS management toolset for modern warships. Both of these Canadian companies can support the CSC communications system over the life of the ship – adapting new radio technology, new waveforms and new doctrine without impacting operational serviceability. With DRS and Rockwell Collins comms, a ship can move anywhere with full interoperability. Their pedigree and technology mean both companies are well-positioned to meet the needs of Canada's new warship! ■

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