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# Ongoing Developments To SharpEye Radar

*Updates Continue to Enhance Maritime Situational Awareness Capability*

By Spike Hughes • Mark Bown

With a history dating back over 250 years, Kelvin Hughes is a world leader in the development, manufacture and supply of maritime navigation, surveillance and security radar systems. For instance, whether for naval ships, submarines, coast guard vessels or merchant ships, VTS, coastal surveillance, port security, or the protection of offshore infrastructure, Kelvin Hughes's SharpEye solid-state radar can provide an industry-leading level of maritime situational awareness with its advanced target detection capability.



Through the Doppler processing of the radar returns, SharpEye can identify objects with a low radar cross section (RCS), from semisubmersed objects to the smallest of water craft and other uncooperative radar targets that may pose an asymmetric threat, even in the most severe weather conditions.

Customizable waveforms can be configured for specific threats, such as drones, and to track low aerial targets, such as UAVs and helicopters.

Moreover, with no magnetron involved, SharpEye offers significant through-life cost benefits. Maintenance requirements are reduced to a minimum, and there is no need for any formally qualified radar engineers on board.

Kelvin Hughes continues to innovate and has recently introduced a number of new SharpEye product developments.

## SCV

SharpEye SCV (Small Craft Variant) offers all the benefits and features of an open-array SharpEye solid-state radar but in a smaller, lightweight radome package. Designed for use on RHIBs and small boats up to approximately 35 m, the SCV meets a specialist requirement for the earlier detection of contacts at greater range.

***SharpEye X-band Port VTS/Maritime Surveillance Radar. The SharpEye radar transceiver is mounted within the antenna-turning unit housing.***

Unlike leisure boat radomes and radars that can be limited in their situational awareness capability, the SCV features Doppler processing for clutter suppression to prevent rain and waves affecting the radar picture and can operate effectively in severe conditions.

## SxV

SharpEye SxV is a lightweight, radome-enclosed version of the X-band SharpEye radar. Located waterside and inland, its excellent detection performance, derived from its solid-state transceiver technology, provides users with an unrivalled, lightweight radar capability. The SxV weighs about 18 kg. Offering both long- and short-range threat detection, the SxV can detect small, slow-moving boats in adverse weather conditions, as well as targets ashore such as vehicles and people within designated areas of a port or



*The lightweight SharpEye SCV radome is a low-power version of the larger X-band SharpEye Doppler radar used on navy ships, which can be mounted on small RHIBs for police and special forces use.*

harbor. Simultaneous surveillance of waterborne and land-based areas provides an unprecedented level of security to marine and critical infrastructure.

In September 2015, working with Italian partners A.ST.I.M. S.r.l. and Fabio Fiorucci S.r.l., Kelvin Hughes supplied SharpEye SxV radar to provide complete surveillance coverage of the Goro lagoon, located about 80 km north-east of Bologna in the Adriatic Sea. Known for its multimillion-euro clam farming operations, the lagoon is an Exclusive Economic Zone (EEZ) requiring protection from poachers, illegal harvesting and other operations that threaten the habitat of the clams. Located on the shore and providing 360° coverage of the entire lagoon, the radar is combined with electro-optic cameras and monitored from a local control room.

SxV radar provides a highly cost-effective, wide-area surveillance capability.

#### **SharpEye Open Array X-Band Radar**

In another example, a SharpEye system has been in operation with the Maryland Natural Resources Police in the U.S. for a couple of years. Used to monitor oyster sanctuary waters in Chesapeake Bay, the system has made possible the arrest of two poachers within days of it being implemented and continues to provide surveillance and protection to the local waters.

#### **SMS**

Responding to the market need for a rapidly deployable, all-weather, port and harbor security radar and mul-

tiopioned electro-optical system, Kelvin Hughes utilized its SharpEye technology to develop the Single Mast Solution (SMS). Incorporating an SxV radar, the SMS is intended for multiple applications in areas of ports and harbors that would benefit from autonomous 360° surveillance, day or night in all weather conditions.

When the SharpEye SxV, as part of the SMS, is deployed with Kelvin Hughes's CxEye control and integration software, the user is able to gain full situational awareness by displaying radar and camera images on a laptop or touchscreen device. Designed for ease of use, CxEye georeferences radar tracks on a selection of mapping tools and combines tracking and track fusion from multiple sensors in a single touchscreen display, with fast "slew to cue" functionality. Situational awareness is built up using a "detect, recognize, identify and classify" methodology.

Equipped with a simple mounting interface, the SMS can be securely attached to any mast system—whether portable, vehicle-mounted or on a fixed structure. Integrated with a wide range of electro-optical sensors, including thermal imaging cameras, the SMS is ideally suited to a wide range of operational requirements.

Featuring a through-shaft unit, the SMS provides a 360° pan and tilt capability with no blind arcs, enabling sensors/cameras to be mounted on either side of the mechanism, with the SxV radar mounted directly above. Free from interference from any supporting structure, the SxV is in the optimum position to provide all-around coverage.

***“Naval vessels require much more from their radar than just navigation.”***

## **“SharpEye transmits a low-power, patented sequence of short-, medium- and long-range pulses.”**

### **Worldwide Naval Use**

Navies engaged in newbuilds, upgrade and life extension programs frequently insist that navigation and collision avoidance systems meet the same international type approval standards as those required under the IMO for any commercial oceangoing vessel. However, naval vessels require much more from their radar than just navigation, including detection in clutter, helicopter control, surface search and small target detection. In addition, they need a radar software display that can manage a situational awareness picture and provide tactical features to enable a response to asymmetric threats. Unlike many commercial marine shipping radar systems that can meet type approval but cannot provide the capabilities that a modern navy requires, SharpEye delivers both in a cost-effective upmast package—which explains why 25 of the world’s navies are now operating SharpEye radar on frigates, corvettes, offshore patrol vessels (OPVs) and landing helicopter docks.

Doubling as a navigation and collision avoidance system, providing tactical capability to the command, SharpEye radar technology meets the detection challenges of navies, coast guards and border agencies through a combination of radar techniques designed to provide the best performance in all conditions, while also allowing for optimization for specific detection needs.

SharpEye transmits a low-power, patented sequence of short-, medium- and long-range pulses. This enables the system to simultaneously provide multiple operators with the optimum picture regardless of the radar range scale they are using. The radar’s low power output also reduces the probability of detection by ESM equipment.

### **Further Developments**

Kelvin Hughes has a continual program of innovation and development to exploit both the increasing processing capacity becoming available and the reduction in component costs. This enables the company to bring technologies to market that were previously unaffordable in the navigation and surveillance markets.

In addition, ChartCo, part of the Kelvin Hughes Group and the world’s oldest and largest distributor of navigational data, nautical charts, marine technical publications and digital products, continues to expand its voyage compliance software products and services, in particular, PassageManager, a passage planning and chart management software platform. **ST**

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*Spike Hughes had a navigating career spanning 13 years in the Merchant and Royal Navies. In 1998, he joined Kelvin Hughes as area sales manager. In 2001, he became general manager of the Asia Pacific business, and he has held a board position as sales and marketing director since 2007.*



*Mark Bown is group marketing manager at Kelvin Hughes and has been with the company for five years, working across the group but with a key focus on developing the surveillance and security market channels. He has 20 years of experience working in the defense, oil and gas, and maritime industries.*

