



Kraken Completes Successful Sea Tests of KATFISH with Elbit Systems

Kraken's Active Towed Fish (KATFISH) To Be Deployed for Hunting Naval Mines, Underwater Improvised Explosive Devices, and Ultra High Definition Seabed Mapping

ST. JOHN'S, Newfoundland, Dec. 18, 2018 -- Kraken Robotics Inc. (TSX-V: PNG) (OTCQB: KRKNF) ("Kraken" or the "Company"), is pleased to announce that its wholly owned subsidiary, Kraken Robotic Systems Inc., has completed a series of successful sea tests of its KATFISH towed Synthetic Aperture Sonar system with Elbit Systems Ltd., a major international defence contractor based in Israel.

Elbit Systems has developed a state-of-the-art Unmanned Surface Vehicle (USV) named "Seagull". Seagull is a multi-mission USV platform boasting high autonomy levels and modular features, allowing it to be rapidly reconfigured for a wide array of missions – including anti-submarine warfare and mine countermeasures.

"Elbit Systems' Seagull USV is one of the most advanced ocean drones in the world," said Karl Kenny, Kraken's President and CEO. "With KATFISH integrated on Elbit's Seagull USV, the system can provide remotely operated, unmanned, end-to-end mine hunting operations. With KATFISH, these ocean drones can detect very small objects hidden on the seabed and enter confined spaces where underwater explosives are likely to be hidden. Since robotic systems can be remotely operated their use can remove people from very dangerous missions - in essence, taking the sailor out of the minefield. Kraken and Elbit are co-operating on a number of international contract pursuits for KATFISH integrated on the Seagull platform."

Some key objectives realized during the KATFISH tests included:

- Successful operations in sea states of 3 - 4
- Towing at 7+ knots in shallow 15m water with KATFISH survey depth of less than 6.5m
- Constant 3cm resolution imagery and 25cm bathymetric resolution, in real time
- Area coverage rates greater than 2.1 km² per hour
- 2-Sigma Target Position Error of less than 2.26m (95%)
- Remote command and control of KATFISH over low-bandwidth wireless link
- Compressed SAS imagery and bathymetry transmitted in real-time over low bandwidth wireless link
- Survey operations conducted by supervised autonomy from remote shore-based site
- Single operator launch and recovery of KATFISH payload in high sea states

Underwater Threats

The underwater defence market is evolving rapidly; responding to changing threats, tensions in the Middle East and Asia, economic and budgetary pressures and a growing trend by emerging navies to deploy asymmetrical weapons. As an example, today's diesel-electric submarines are quickly becoming one of the biggest threats to naval operations and the \$2 trillion commercial shipping industry.

Compounding the threat from stealthy submarines are the hazards posed to worldwide shipping from naval mines and underwater Improvised Explosive Devices (IEDs). A naval mine is a self-contained explosive device placed in water to damage or destroy ships or submarines. *Like roadside bombs on land, naval mines are a cheap way to undercut military force projection. Since World War II, mines have sunk or crippled 15 US Navy ships, more than all other weapons put together. Two naval mines crippled the \$1 billion USS Princeton, a US Navy guided missile cruiser, in the first Gulf War 25 years ago.*

There are an estimated 80,000 mines in the Baltic that were left over from the two World Wars. Some are still active. While their fuses are not operational, the explosive material is still there. If something happens to touch them, they can explode. As recently as 2005, one such mine killed three Dutch fishermen — a murderous reminder of how deadly mines can be, and for how long.

There is one big difference from World War II - the modern naval mine threat is much more sophisticated. Today, stealthy mines made of composite materials in sonar-deflecting shapes lurk amidst the clutter of the sea floor. There are buried mines covered by layers of sand, mud and silt. There are "rising mines" that wait in deep water for a ship to pass overhead, then ascend until they're within range to fire a torpedo. There are reports that China is working on an anti-aircraft mine that can detect a low-flying helicopter and launch a missile at it. *Iran is reported to own over 6,000 naval mines, North Korea has 50,000, China 100,000 or so and Russia is estimated to own over 250,000. There could be well over 500,000 naval mines in worldwide military inventories.*

For over a century, clearing mines has been a brutal, crude and close-up business. For over twenty years, leading navies have been increasingly investing in technologies to "keep the sailor out of the minefield" by deploying unmanned systems, both underwater and on the surface.

Countering the Underwater Threat

Kraken's KATFISH is an actively controlled, intelligent towfish platform used to generate real-time ultra-high definition seabed imagery and maps for a variety of military and commercial applications. Kraken's products are primarily targeted to the rapidly growing Unmanned Maritime Systems drone market which is primarily comprised of Unmanned Underwater Vehicles (UUVs) and Unmanned Surface Vehicles (USVs).

Until recently, conventional side scan sonars have been the leading technology for detailed mapping and imaging of the seafloor. However, Kraken's advanced sonar technology called Miniature Interferometric Synthetic Aperture Sonar (MINSAS) is now commercially available and is especially well-suited for military mine hunting missions. MINSAS delivers ultra-high seabed image resolution (3 cm), simultaneously co-registered 3D bathymetry, and superior area coverage rates. The ability to generate centimetre-scale sonar resolution in all three dimensions has the potential to provide significant improvements in the detection, classification and identification of small seabed objects such as underwater mines and IEDs.

From a platform perspective, towed sonar systems have the benefit of acquiring sonar data to operators at high speed and in real-time. This is a critical feature for mine-hunting operations to enable the earliest possible identification and classification of underwater threats. Onboard processing enables real-time analysis of sonar data, significantly reducing post mission analysis time.

Actively controlled towfish provide a superior platform for seabed survey, particularly when using Synthetic Aperture Sonar. An actively controlled towfish can compensate for input disturbances, greatly improving the towed platform stability and the overall image quality. In addition, intelligently controlled active towfish can control their depth and altitude using intelligent bottom following and bottom avoidance routines.

Placing a survey sensor - such as Kraken's Miniature Synthetic Aperture Sonar - closer to the seafloor will result in the acquisition of much higher resolution data. When the sensor is integrated to a high speed, intelligently stabilized towed platform such as KATFISH, better quality data is acquired at a faster rate, thus improving efficiency and lowering both operational and data acquisition costs. KATFISH provides the highest resolution seabed pixels at the lowest cost compared to any other competing survey sonar platform.

ABOUT KRAKEN ROBOTICS INC.

Kraken Robotics Inc. (TSX.V:PNG) (OTCQB: KRKNF) is a marine technology company that is dedicated to the production and sale of software-centric sensors and underwater robotic systems. The company is headquartered in St. John's, Newfoundland with offices in Dartmouth, Nova Scotia; Toronto, Ontario; Bremen, Germany; and Fairfax, Virginia. Kraken is ranked as a Top 100 marine technology company by Marine Technology Reporter. For more information, please visit www.krakenrobotics.com, www.krakenrobotik.de, www.krakenpower.de. Find us on social media on Twitter (@krakenrobotics), Facebook (@krakenroboticsinc) and LinkedIn.

ABOUT ELBIT SYSTEMS

Elbit Systems Ltd. (NASDAQ: ESLT) is an international high technology company engaged in a wide range of defense, homeland security and commercial programs throughout the world. The Company, which includes Elbit Systems and its subsidiaries, operates in the areas of aerospace, land and naval systems, command, control, communications, computers, intelligence surveillance and reconnaissance ("C4ISR"), unmanned aircraft systems, advanced electro-optics, electro-optic space systems, EW suites, signal intelligence systems, data links and communications systems, radios and cyber-based systems. The Company also focuses on the upgrading of existing platforms, developing new technologies for defense, homeland security and commercial applications and providing a range of support services, including training and simulation systems. For additional information, visit: www.elbitsystems.com, follow us on Twitter or visit our official YouTube Channel.

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