

CASE STUDY

SELF-PROTECTION OF SHIPS

> 360° Passive Self-Protection of Ships with SPYNEL InfraRed

Asymmetric attacks of warships are becoming more and more frequent. Some of them can reach their target and are well-known by the general public like the Saudi frigate attacked by an unmanned bomb boat or a

U.S. Navy ship targeted by a missile from Yemen. The InfraRed Search and Track Solution from HGH is a novel, turnkey passive panoramic thermal detection system which can equip both new and upgraded ships.

> Background

New threat technologies along with the increasing sophistication in adversary tactics highlight the critical mission of anIRST to **guarantee very early warning and support proactive decisions**. Asymmetric threats, such as missiles, UAVs and small crafts can have destructive effects and reduce the operational capabilities of warships. To face an unwanted attack, they need to ensure a **self-protection area**.

InfraRed Search and Track Systems **enhance situational awareness of military vessels** by automatically detecting, tracking and classifying all threats in real-time coming from air and sea surface.

> Solution

- Automatic detection, tracking and classification of both air and surface targets
- 360° protection bubble with full surveillance capabilities up to the horizon
- Silent operation while keeping threat detection capabilities
- Easy integration with the combat management system of the ship



> Challenges

An effective countering attack relies on its early detection.IRST sensors ensure both short range and long-range surveillance, 24/7, in all weather conditions. **IRST systems complement radar technology** to overcome their limitations due to multipath, sea clutter, interference used by naval countermeasures and other phenomena. It often results in a lack of performance for detecting low air targets, fast maneuvering threats and for protecting the surroundings of the ship. As an active system, the radar can reveal the ship position to the enemy. For critical missions, the warship can **switch off their radars** and thanks to SPYNEL, the crew keeps efficient detection and tracking capabilities while operating in a **silent and stealthy mode**.

> Main challenges

- Automatic detection, tracking and classification of a large variety of threats simultaneously including stealthy and hyper veloce threats such as seaskimming missiles, low air targets and aircraft; asymmetric threats including small crafts, drone swarms, rhibs, periscopes and more unconventional objects such as floating obstacles
- Instantaneous transmission of alarms to the CMS for quick reaction
- Short- and long-range detection operational in open-sea, near the coast and at port
- Full 360° day-night situational awareness with no blind sector
- Video recording and playback

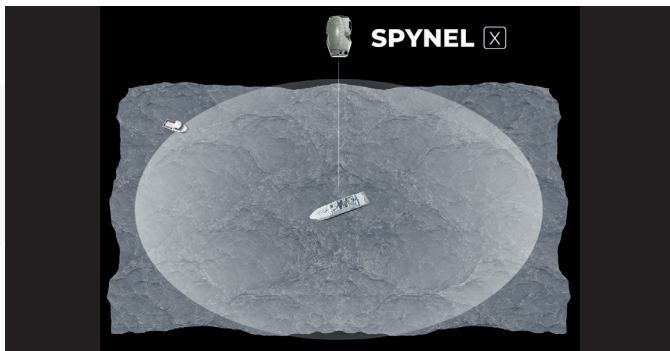
> Solution

SPYNEL IRST solution consists of a **set of two sea-proven SPYNEL-X thermal imaging cameras**, capturing real-time HD-360 video with a resolution up to 120 Mpix.

Designed for maritime environment, two SPYNEL-X sensor heads are **easily mounted** on the vessel's mast, to port and starboard, or bow and stern structure. Operating at high sea state thanks to an autonomous gyro-stabilized platform, SPYNEL IRST performs long range detection up to the horizon, with a **full panoramic surveillance** and a **wide elevation coverage without any blind sector**.

Depending on the mission of the warship, the command team can fine tune the tilt of the SPYNEL-X sensor head to secure the surroundings of the ship, by monitoring the sky or the sea surface.

Combining high quality image and large fields of view, SPYNEL IRST solution is suitable to **all operational missions and threats**.



Self-Protection: Detecting All Air and Surface Asymmetric Targets Very Early

SPYNEL IRST associated with Cyclope software is continuously monitoring the **warship self-protection zone** in order to detect, track and identify all approaching threats.

Sea proven video processing, advanced alarm management module, Artificial Intelligence for target classification, AIS/radar data fusion and continuous tracking of any possible threats over the entire field of view provide the command team an unparalleled **comprehensive situation awareness**.

With its real-time panoramic high resolution imaging, full 360-degree coverage and very low false alarm rate, SPYNEL IRST provides **unprecedented self-protection of the ship even during silent missions**.

Easy Integration into Combat Management System

Processed by Cyclope Hypervisor, the data of all threats automatically detected and tracked by both SPYNEL sensors are collected, fused and displayed on one single operator console. Cyclope Hypervisor can be easily integrated within the Combat Management System, for a **single control and monitoring environment**, allowing the command team to take quick decisions and actions.

Cyclope Hypervisor software is also offered by HGH as a **supervision software monitoring the SPYNEL IRST solution**. It provides real-time centralization of all threats detected by the two SPYNEL sensors as well as fusion of thermal tracks with radar and AIS data.

Easy Deployment

PShip crews needed to rely on simple, easy to use and low maintenance systems to ensure mission success. Designed as a set of independent sensors, SPYNEL IRST features:

- A robust design adapted to the harshest naval environment
- A modular design making it compatible with any type of warships whatever the tonnage is, for new vessels or mid-life upgrades (frigates, OPV, corvettes, ...)
- A turnkey design facilitating installation, on-site maintenance and minimizing integration costs

"Addressing the requirements of a modern navy, HGH makes the use of IRST technology accessible to all types of ships. SPYNEL IRST solution is a cost-effective and efficient early warning detection system for ship self-protection against conventional and asymmetrical threats", said Edouard Campana, Wide Area Surveillance BU Director.

> Conclusion

SPYNEL IRST is a turnkey, sea-proven panoramic warning solution **suitable to all naval missions**.

It combines 360-degree coverage, multi-target long-range automatic detection, tracking and classification for unprecedented warship protection. **Easily deployable and fully passive**, HGH's IRST solution can operate in stand-alone mode or be part of the CMS.



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