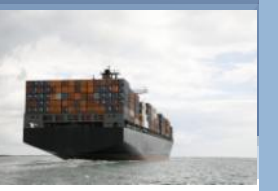
Newsletter - Automatic Sea Vision
07/2010

The third ASV eye





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Remember USS Cole!

Editorial


Photo Wikipédia

12 October 2000, Aden: **USS Cole, a US Navy**'s Arleigh Burke-class multi-role destroyer, was seriously damaged by the explosion of a small boat packed with explosives while at anchor off the Yemen coast. This resulted in the death of seventeen sailors and fifty more wounded, creating an enormous shock for American power and its carrier vessel battle group. One year before the terrible attacks in New York, two suicide terrorists using "a skiff stuffed with explosives like a missile" shook American supremacy on the world's oceans and simultaneously posed the problem of the safety of warships when at anchor. David versus Goliath. Nothing would ever be the same again. The images need no commentary. They leave us to reflect on the vulnerability of an ultra-sophisticated warship, powerfully armed, yet holed like a tin can by a ridiculously small boat armed with just two men. No comment!

Ten years layer, the project for the close-up self-protection of a vessel would come to life through Automatic Sea Vision. The objective of this RAPID (French acronym for support scheme for small and medium sized enterprises for dual innovation) initiative, known as **AUTOPROTECT ASV**, permits more effective short-range protection of a precious or semi-precious vessel facing an asymmetrical threat, that is to say a boat from between 5 and 15 metres, both at anchor and at sea. This project, which will be implemented jointly with our partners at the French Defence Procurement Agency (DGA), will enable us to continue with our R&D activities aimed at making the vision of our "*electronic eye*" a little sharper still for operational military purposes.

This 7th issue of *Troisième Œil* (third eye) is devoted to the needs of navies, and in particular the French Navy, in relation to the close-up protection of ships with the help of the French Naval Industry Group, GICAN. Because confidence in our system must be total and long-lasting in a complex and at times threatening maritime environment. And in particular because we never again wish to see another USS Cole ripped apart in front of the media, as the symbol of dreadful, costly negligence.

AUTOMATIC SEA VISION
First smart vision system at sea

Membre du Cluster Maritime Français

Membre du GICAN

Philippe Waquet
C.E.O.

Expert Report

"Threats at sea"
by Rear Admiral (Retd) Roger Levesque, consultant in maritime and port security)

The sea - a lawless place?

With globalization, we have witnessed a multiplication in maritime traffic. However, far from prying eyes, the sea is now more than ever a principal breeding ground for illegal activity, whether the goal is political, ideological, criminal or quite simply a matter of survival.

Until now, irregularities at sea have tended to be criminal in nature, as is evident from the present resurgence in piracy. The attacks against the *USS Cole* (2000), the oil tanker *Limburg* (2002) and petroleum installations in the Persian Gulf (2004/2006) nevertheless demonstrate that the possibility of terrorist acts on a large scale, possibly simultaneous, inside ports or against symbolic targets, cannot be excluded. Clandestine immigration, the human consequences of which are dramatic, has itself also assumed wholly worrying proportions.

For all these reasons, surveillance of their coasts and the protection of coastal and port installations, specifically involving the reinforcement of measures adopted under the ISPS code, have become a priority for a large number of countries.

War at sea has always had the objective of disrupting the adversary's economy. Naval battles were often nothing more than a means of achieving this objective. Merchant vessels were compelled to defend themselves and carried guns until quite recently. At the time, one spoke of arming a ship with good reason. Things have changed in this respect, fortunately, and the current law of the sea confers the right to use force on the high seas solely on warships (in other words, those which come under a nation State). The fact that certain countries choose to ignore the rules, in the main for their ships sailing under a flag of convenience, does not help the situation in terms of upholding the law and leads inevitably to an escalation of violence. A few elementary precautions remain necessary, however, for merchant ships navigating in danger zones.

The element of surprise

The first measure to be adopted in terms of both security and safety is to avoid being taken by surprise as far as possible. As we are taught in the best schools, you must "navigate ahead"; that is to say you must prepare your voyage by identifying any foreseeable dangers to the best of your ability, ranging from shoals to fishing activities, zones with heavy traffic and attacks by pirates. It also involves analysing information that is broadcast and updated at regular intervals. Finally, it requires you to have equipment at your disposal enabling you to be aware of the immediate environment of your ship with as much advance warning as possible.

The military is conscious of the fact that good preparations for operations will never cover all the actions of which the enemy is capable or the full range of environmental phenomena that may be encountered. On the other hand, these preparatory measures are indispensable if you are to adapt rapidly to circumstances. This adaptation will be all the easier if you have managed to protect yourself against the element of surprise. The tuna boats of the organization *Orthongel* are well aware of the fact. Attacked at daybreak by Somali pirates, they were able to detect them in their binoculars with sufficient advance warning to enable them to take the necessary protective measures and to dissuade the pirates from continuing with their attack. Yet when the Spanish tuna boat *Alakrana* was attacked at night – like the command and supply ship *Somme* – it did not see its attackers as they approached. This increasing boldness on the part of the pirates is of concern to the ships crossing the zone because they lack the necessary means to detect these small boats in the heavy swell of the Indian Ocean. The element of surprise still matters for the pirates, and it is precisely that which enables them to accomplish their perilous undertaking that involves climbing up the side of a ship travelling on a rough sea.

(continued)Expert Report


Photo Wikipédia

In conjunction with the use of preventive devices such as “barriers”, several minutes’ advance warning can permit the ship under attack to take measures to make boarding more difficult, or even impossible, without having to resort to the use of firearms. An automatic alarm system can thus initiate delaying strategies and the transmission of a message requesting assistance. Above all, it means the ship can increase its speed, turning onto a heading directly into the swell to make it more difficult for a small boat to approach, water canons can be activated and, as a last resort, the crew can take refuge in secure areas prepared in advance. These strategies will have an increasingly deterrent effect the earlier they are implemented and the better the crew is trained in their deployment. The attacker will give up in many cases simply because surprise is no longer a factor and he comes to realize that he is up against a determined and well-prepared defence.

Impenetrability of defence

In order for a reduction in the element of surprise to be possible, it is necessary to deploy several barriers as part of the overall defence system. Means of long-range detection are essential because they contribute greatly to “navigating ahead”. They provide considerable advance warning and therefore increase the possibilities for reaction. On the other hand, the detection of objects of modest size on a slightly rough sea remains problematical. Which watch officer has never discovered a small boat in proximity to his ship that had escaped all detection, remaining unseen by radar because the boat did not stand out sufficiently from the “sea clutter” for it to be seen on the scope or picked up by automatic detection, and not spotted visually because responsibility for the watch still resides with people and because people are fallible? Similarly, coastal or port surveillance today relies principally on visual observation, in nearby or obscured sectors, which calls for large numbers of observers if one wishes to achieve acceptable accuracy.

Faced with a market in which demand is increasing along with the level of threats, manufacturers are currently developing optimized systems for short-distance applications, both by day and by night and in all weathers, to supplement the means of long-distance detection. Whereas integration of information of the AIS type into these systems or its juxtaposition with other means of detection are relatively straightforward thanks to the prodigious power of computers, this still does not equate to automation. The development of this function – essentially because it permits a saving to be made in the number of people assigned to watch duties and compensates for human weaknesses – is a particularly difficult challenge to overcome, because it involves identifying the useful target on a surface in perpetual movement where every wave can produce an echo or a parasite alert. Furthermore, in systems derived from automatic terrestrial surveillance, the difficulty in automating the system increases exponentially with sea state.

The system proposed by ASV will have numerous applications because it is able to contribute not only to the fight against illegal activity, but equally to searching for people in the water, identifying buoys or obstacles to navigation and to facilitating the regulation of ports. Systems based on visual observation offer the advantage of possessing the capacity for identification and providing the watch officer of the watch with an instantaneous view of the detected object in the case of an automatically initiated alert. The information can also be displayed on different monitoring screens that are remote from one another.

Photo Wikipédia

It will be appreciated that this titanic struggle is far from over. Nevertheless, certain principles remain valid. The element of surprise is still sought by the assailant. It is up to the defender, however, to try to turn it to his advantage.

(Reproduced from an article published in Revue Maritime No 487)

Spotlight on

Technological advances for increased performance of maritime drones

Development of surface drones

"The word "drone" was first used in the United Kingdom in the 1930s as a derisive term to describe the remotely controlled devices used as target aircraft. Their noisy, slow and lazy flight resembled that of the bumblebee and ephemeral life." (1)

If we ignore the reference to bees, the use of the word "drone" to describe autonomous terrestrial, aerial, maritime surface or submarine vehicles or robots is in fact French. In the United Kingdom and more generally throughout the world, these autonomous pilotless moving objects are referred to as UAVs ("Unmanned Aerial Vehicles") or USVs ("Unmanned Surface Vehicles"), a notion which comes in a variety of forms for surface and submarine drones.

Although aerial drones are the subject of numerous research projects all over the world, they are not alone, because surface drones and submarine drones also exist. With an architecture resembling that of rubber inflatable boat, these surface vehicles present fewer technological difficulties, and they are today used mainly for the surveillance of ports and roadsteads and for training military forces. Their light weight makes them capable of deployment from ships (on offensive, defensive or surveillance missions) or from naval bases (on surveillance missions). The available handling capacity limits their size to about 10 m, and they are able to communicate easily up to a range of about 15 km.

The French Navy and some manufacturers are currently involved in testing these surface drones with the aim of enabling their operation from ships. The latter also offer the advantage of being suitable for use with persons on board on commando missions, as with an ordinary rubber inflatable boat (in this case, the brain of the drone is simply removed from the structure).

RODEUR : SIREHNA USV can achieve different types of missions depending on its payload : identification, protection, surveillance

This dual use also permits a reduction in the number of rubber dinghys on the carrier (savings in space and cost).

Uses for drones

The development of international commerce, the exploitation of natural resources (fish, oil, etc.), the concentration of the world's population in coastal areas, the upsurge in terrorist threats, increased trafficking, etc., all require the surveillance of maritime areas to be enhanced.

In this context drones, whether aerial or surface, offer a true peak load capacity. Unaffected by fatigue and with an autonomous capability over long periods, they make it possible to increase one's presence significantly in a zone of operations.

This is an important plus point, in particular for monotonous reconnaissance or surveillance missions. Drones play a part in many areas such as anti-surface, anti-aerial and submarine combat measures, maritime protection, mine warfare and control of risks of collision. Civilian applications include traffic control, air search and rescue operations, gathering data for weather forecasts and the relaying of information.

As far as the autonomous, light and powerful surface drones are concerned, they can carry a lightweight radar and make it possible to release radio buoys, broadcast submarine eavesdropping or deploy a submerged sonar device in military intervention operations. They are also capable of carrying devices for the topographical plotting of contours in danger zones for the purpose of detecting mines or avoiding any obstacles to navigation.

Future technological developments

At the time of writing, there are no operational drones on the French market. On a global level, reference should be made to the Americans and the Israelis, who are the most advanced in this domain. However, drones look set to undergo significant expansion once the technologies have properly evolved, such are the advantages that they offer to navies in economic and operational terms as well as at human level out in the field of battle.

Our own ASV automatic system for observation, detection and alerting in a marine environment fits in perfectly with these future developments. It will make it possible to increase the potential for detecting and identifying of asymmetrical naval threats and accordingly to respond to the increasing need for maritime, civilian and military protection.

(1) Extract from article written by Admiral J. Petit (Retd) in the *Revue de l'électricité et de l'électronique (n°8)*

Installation of an ASV system for 360° surveillance during a ship's mission

In only two days, the Automatic Sea Vision team successfully completed the operational installation of the automatic detection and alert device for the maritime surveillance of the area surrounding a ship without disrupting its efficient running. The following is an account of this mission:

1st day: Port of Mayotte, 10:00. We embark on board a merchant ship. On the quay, men are swarming around the cranes as they load the equipment to be transported. There is no time to lose, since the ship must cast off at 18:00. Our objective: to install the ASV system and make sure that it is operational by 36 hours from now, when we reach our port of destination in the Comoros Islands.

No sooner have we embarked than we proceed to check the component parts of the device installed by the crew before our arrival. We route six network cables and four feed cables down towards the navigation bridge from all four corners of the roof of the upper bridge, where four groups of cameras with a total of twelve lenses are located.

After rapidly completing the positioning of the equipment, were are finally ready to switch on the system. The most important task is to correctly interface the onboard instruments, the GPS, the ship's Gyro compass and the VRU, a movement indicator which identifies pitching and rolling. Without disrupting the running of the ship, we carry out all the connections and start the phase of adjusting the cameras on the vessel.

It is 22:00, and we join the teams as they relax. The ASV detection system has been installed and interfaced with the navigation instruments. All that now remains is to make it totally operational.

2nd day: Get up at the crack of dawn. The approach of a supply tanker in the vast expanse of the Indian Ocean provides us with the opportunity to test the device and to fine-tune the observation system. At 18:00, a day and a half after getting under way, we complete the set-up and configuration of the software, the most complex phase of the operation.

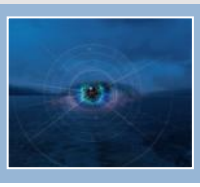
Everything must be perfectly adjusted in order for the ship to be capable of navigating ahead, i.e. it must have the necessary equipment to enable it to be aware of its environment with the greatest possible advance warning.

3rd day: Land in sight; there are many boats approaching all around us. The automatic detection and alert system is engaged and detects the various small boats that are present at the entrance to the port: fishing boats, merchant vessels, etc. The system is now delivering its full potential of effectiveness. We check it is functioning, but our mission is not yet accomplished. We now have to train the team so they know how the ASV system works and its various possible settings.

The team must be capable of identifying any problems and correcting certain parameters unaided. This highly intuitive system is easy to comprehend. Our training took less than an hour and was supplemented with specific information to facilitate support and maintenance operations for the equipment.

17:00: Our mission is complete, and it has been a success. We say goodbye to the crew, with whom we have shared some special moments, and then settle the remaining formalities with the local authorities. We return to our base in anticipation of our next mission…

A view of our system



1 ASV DEMONSTRATES ITS CAPABILITIES ON THE BANKS OF THE SEINE

On 18 February, more than 180 people attended a series of demonstrations of the automatic detection and alert capabilities of the ASV system on the Île Monsieur in Sèvres. Under the watchful eye of the audience, made up in part by representatives of the Ministry of Defence, a number of attempts at intrusion were carried out with the help of the Société Nationale de Sauvetage en Mer (French volunteer life-saving association, SNSM) and the company Sagem Défense Sécurité, which has designed a new generation of infrared cameras. Guests included Admiral Forissier, Chief of Staff of the French Navy, and several members of the military staff accompanying Francis Vallat, President of the Institut Français de la Mer (French Institute of the Sea) and the Cluster Maritime Français (French Maritime Cluster), who were able to observe just what this innovation, developed in response to the surveillance and detection needs of port, off-shore and naval installations, could do. The entire ASV team involved wishes to thank all those participants who helped to make this event a real success.

Admiral Forissier and F. Vallat

2 OUR NEW ADDRESS: 65, RUE DE LA GARENNE, SÈVRES (92 310)

Our company moved to Sèvres on 7 May. We now have new and more spacious premises to accommodate a larger team. Today, this innovative small/medium enterprise has 18 employees, compared with only 10 a year ago. This unprecedented growth demonstrates the mounting interest, among maritime professionals with their ongoing concern for security and safety, in this new technology, which promotes preventive action as a way to react more effectively to any threats.

3 LE HAVRE MERCHANT MARINE SCHOOL: A TEST FACILITY FOR THE ASV SYSTEM

Since December 2009, Le Havre Merchant Marine School has been letting us use its roof to carry out tests on the performance of our automatic visual observation device. From this strategic position, the ASV system equipped with a rotating infrared camera provides permanent observation of the channel, both by day and by night. Any locally made recordings are processed from our base in outer Paris. These exercises in real time enable us to observe the detection, processing and transmission capabilities of the system in any part of the world!

4 ASV EXPANDS IN EUROPE AND NORTH AMERICA

In early 2010, ASV opened an office in Bloxham, England, managed by Bruce MacPherson. A former engineer with the British Army, Bruce MacPherson graduated from the Royal School of Military Engineering in 1984. With more than 20 years' experience in commercial relations development, he is a specialist in high-performance calculation systems, and real-time control and communication systems for the defence, telecommunications, security and energy industries in the United States, Europe and the Middle East. He is a member of the Institute of Sales and Marketing Management, and he is also a qualified coach certified by the International Rugby Board. Outside Europe, ASV is also entering the North American and Canadian market under the leadership of Alain Marchildon based in Montreal.

5 ASV TO SAVE LIVES AT SEA

On 11 May ASV attended the second Maritime Forum along with the Société Nationale de Sauvetage en Mer (French volunteer life-saving association, SNSM). The theme of the event was safety at sea, which gave ASV the opportunity to demonstrate its search and rescue system, developed in partnership with the life-saving association, both at the 'new technologies' stand and as part of a workshop addressing how new technologies can best be used to protect those at sea.

6 ASV ON THE FUTURE OF BORDER PROTECTION

On 24 and 25 May, in Warsaw, the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (FRONTEX) brought together numerous players in the field of maritime surveillance to debate the future of border controls. The idea behind this event, one day of which focused on European coastguards, was to encourage communication between users and manufacturers on the subject of technological innovations in the operational capabilities of border control and protection. This was the ideal opportunity for ASV to unveil, to the 1000 or more coastguards present in particular, its automatic system for the detection of objects with the aim of giving advance warning of threats or risks associated with activities at sea or originating at sea. FRONTEX itself is based in Warsaw and is responsible for coordinating the activities of customs officers in maintaining the security of borders between Member States of the EU. FRONTEX has been operational since 3 October 2005, celebrating its fifth anniversary this year.

7 SAVE THE DATE !

SEA TECH WEEK BREST · FRANCE

7 - 10 sept. 2010 SMM

MARITIMA

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AUTOMATIC SEA VISION
First smart vision system at sea

The third eye
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