

CBRN Armada

Cdr. Bartoleme Canovas, Chief of Damage Control & NBC School and Lt. Cdr. Emilio Requejo, NBC Specialist, outline the Spanish naval capability for CBRN defence

Since March 2003, Spanish maritime forces have played a particularly important role in escorting ships through the Straits of Gibraltar to help control possible WMD traffic and prevent terrorist attacks. Recent world events demonstrate that forward-deployed naval forces are constantly at risk even in today's relatively peaceful world. Although many characteristics of these missions are essentially the same as those of earlier Spanish navy missions in terms of the equipment used and activities involved, the nature of the threat is different and the spectrum of risk scenarios is broad, so it required the adoption of innovative approaches to CBRN defence and environmental and industrial hazard (EIH) management.

During the last few years, the Spanish Navy (SPN) has been working hard to get a notable advance in the field of CBRN-D and to minimise vulnerabilities, adapting equipment and procedures to Nato operational requirements and even, in some aspects, going beyond these. It formulated recommendations for improving preparedness and operational capabilities in the near as well as far term. The first area highlighted is the incorporation of these aspects into the design specifications of new ships,

mainly linked to acquisition of the highest technology equipment. An important part of the crew's readiness is having appropriate personal protective equipment so, to this end, ensembles (garments, gloves and overboots) have been renewed.

The medical aspects of NBC operations aboard have been studied in detail. SPN is looking for imaginative solutions to the sample collection problem, including the legal and forensic requirements related to this process. Contamination control has received special attention because of its operational impact. Many efforts have been concentrated on maritime interdiction operations (MIO) to solve the special equipment problem required in this critical scenario. And the last area highlighted is focused on developing and conducting innovative, multi-level training for navy personnel, addressing all aspects of CBRN defence relating to naval scenarios.

Central detection

Several changes have been introduced in our ships' design in order to get a better chemical and radiological detection. In the next new ship, the systems include the chemical agent monitoring system, which consists of more than ten unit detectors housed

inside the ship and which sample outside air through the bulkhead to detect a wide range of chemical warfare agents, including nerve, vesicant, choking and cyanogens. They also include one control unit to which the detection units will be networked to monitor the air outside as well as inside. The control unit is in serial communication with the ship's onboard management system for the presentation of the information and the centralised monitoring of the system, and it installed the software to manage this network as well as being compatible with integration of CBRN sensors with the warning and reporting software (NBC-ANALYSIS). It operates without any maintenance during mission or for extended periods of up to one year.

Fitted nuclear point, transit and water activity detection systems are also included. The fitted nuclear point detection system is based on the RADIAC Low Level Radiation (LLR) military marine-grade GM tube-based detector. In view of the vessel shape, size and intended missions the decks are equipped with several detectors, providing a complete coverage for both irradiation and contamination risks and covering the requirements of outdoor "basic detectors" and "transit detectors". To provide survey inside the vessel,

YOU'D BE SURPRISED WHERE YOU FIND US

You'll find us as a leading player in CBRN technologies.

Thales provides security solutions to nations, regions, institutions and corporations. Thales designs and delivers matched open-architecture components allowing the analysis of intelligence and risks, thus enabling guarding borders and airspace and protecting critical civil and economic infrastructures.

That's where you find Thales.

Thales is a leading international electronics and systems group, working for defence, aerospace and security markets worldwide. We support government agencies and major corporations with comprehensive management services.

The group's civil and military businesses develop in parallel, to serve a single objective: the security of people, property and nations.

**The rose has its own protection.
The world has Thales.**

Visit our website for further information.



THALES

The world is safer with Thales

www.thalesgroup.com/security-services

inside and outside the citadel, and allow prediction of personnel dose integration, "basic detectors" are deployed in all strategic areas of the ship.

Water activity detectors provide early detection, and alarm when the vessel enters a contaminated body of seawater. These detectors are located inside the vessel in selected suitable areas at sea level; they monitor water activity at the prow and seawater intakes in the engine compartments on pipes. The probes are connected on a network through junction boxes. These connection boxes also make provision for the connection, interface and power supply of dosimeter readers to the control unit computer console.

The remote connection of ratemeters to the control unit computer console several advantages and application possibilities. Ratemeters could be used as additional dose rate measurement probes as, without breaking the CBRN-tightness of the different compartments, it is possible to upload all the data collected by the ratemeter to the control unit computer console, including during contamination or decontamination checks, making them available to the responsible person in a time-effective way.

Boarding teams

The Spanish boarding teams are well trained and properly equipped to face the security risks posed by potentially belligerent crews, but now we want them to be trained and equipped to face the invisible enemy (toxic atmospheres or CBRN agents). The experience that SPN has accrued in Active Endeavour proliferation security initiative (PSI) exercises and other MIO has given us the necessary criteria to select specialised capabilities or equipment to enhance mission performance.

Requirements and considerations for Boarding Teams (BT) equipment include the following:

- Tasks may take less time than in a typical CBRN environment, so there is limited protective time for garments; it translates into high comfort due to low weight and limited thermal isolation.
- For safety reasons, the protective suit will be a lightweight one which can be combined with a life vest.
- CBRN monitors operating continuously in real-time to provide local warning alarm for individuals or

small groups during inspection of compartments.

- Potential hazards a boarding team may encounter aboard merchant vessels are not only warfare agents, but also toxic industrial chemicals (TICs) or LLR, so more sensitive and reliable field detection equipment is necessary.
- Detectors with the capability to record measurements for future analysis.
- This type of mission requires them to climb aboard vessels wearing an extra weight of gear – ballistic/survival vest, helmet – so lightweight equipment attached to a uniform ("hands free") is mandatory.
- To avoid the psychological hostility of the CBRN environment from the vessel's crew, equipment will be discreet; detectors can also be operated while they are inside a carrying pouch and with silent alarms (vibration, earphone).

Sample collection

In modern day conflicts, we need to detect objectively the presence of radiological, chemical or biological agents; sampling and analysis are potentially tools in investigations into alleged use of CBRN weapons. There is a need to operationally identify hazards and to forensically confirm unequivocally the use of these agents in order to support timely decisions by leaders in response to threat actions. In view of the relevance of the forensic requirements and its impact in sampling practices, Spanish Navy is adapting the national operational procedures, according to NATO publications, and we are also adding better equipment for this kind of mission. As a result of this initiative, our teams have available a new sampling kit.

The kit is a self-contained backpack with enough supplies to take six solid, liquid, and/or wipe chemical samples, six biological samples, six radiological samples and three explosives samples. All tools and consumables are conveniently packaged for ease of access and single use, and also it is possible restock the kit when any of the modules, tools and/or consumables has been expended. Each backpack is identified with a serial number for tracking purposes. This kit is also available with non-cleaned and non-sterile items for training.



Boarding party! ©Spanish Navy

Improving other areas

The Navy has already outfitted all ships and crews with new equipment: two-piece overgarments based on Saratoga technology, with optimal balance of high protection and low heat stress; lightweight overboots (ALO) with no lace closure; a kit for the disposal of contaminated material at decontamination stations (DS) or contamination control areas (CCA), that includes a shielded container for the treatment of radioactive waste which looks like a covered metal bucket; two high density polyethylene containers for CB waste (colour coding, permanently sealable, stackable); four gasproof sacks and two chemical-tested sealing tape rolls.

We have selected Eurolite NBC barrier film for several items: a coverall for decon tasks which increased mobility and flexibility; gasproof sacks for contaminated material with a quick self-adhesive closure system; casualty bags and nursing bags for transportation of casualties through contaminated areas or contaminated personnel through clear areas; a nursing bag is used with a blower and it allows medical treatment by six special accesses with integrated gloves. In general, protective covers are used to prevent deck loads such as ropes,

cargo, boats, aircraft and vehicles from becoming contaminated; this kit cover is a film roll whose size and weight (15x1.5metres) allows for easy transport and crew can cover more than one load by cutting pieces from the roll and sealing them with tape.

Decontamination of all sensitive equipment and aircraft/vehicle interiors during shipboard operations without affecting service life or operation is risky at this moment, after an assessment of the efficacy and feasibility of proposed decontamination technologies. We use a thermal fogger (electrical) for decon of external amphibious vehicles and compartments (DS and CCA) aboard, however. A portable decontamination station is also available; it could also be temporarily deployed in a port or naval base outside the entrance to a healthcare facility or vessel that includes showers and dressing areas.

Training

Multilevel training has been introduced into the SPN in an effort to break up the "specialist syndrome"; this means it is essential that everyone aboard – and not only the specialist – know CBRN and play a role in the ship's

defence. They should therefore be thoroughly familiar with every type of material and procedure according their tasks. Another aim of this type of training is to adopt Nato standards of proficiency; individuals receive initial NBC defence training on entering a naval career and, thereafter, the ship's commander makes the designation of selected personnel who require knowledge appropriate to their rank or operational role and additional training beyond the scope of individual standards. SPN has established four different courses (excluding specialist grade): survival, operational, complementary and command; and newly developed manuals are available for each level that include a multimedia CD-ROM.

All ship's personnel carry out regular training in individual and collective CBRN defence procedures both afloat and at learning centres. Exercises are performed using all resources available, as realistically as possible; using vessels, rigid hull boats (RHIB) and equipment. This task has a double purpose: on one hand to train, and on the other to take lessons learned for developing and improving procedures.

Next steps

A possible target for our future personal protection is aimed at improving respiratory devices. Specifically, this protection would target a next generation mask with dual filters and a circuit self-contained compressed air breathing apparatus (SCBA) for CBRN environments. Key parameters for the new mask are: greater protection factor, faceseal with high levels of protection and comfort, fogging mitigation, sweat reduction, unobstructed and undistorted forward vision and improved drinking system. The filter canister has to be designed to meet the Nato criteria for protection against all known chemical and biological warfare agents in aerosol, liquid and vapour form, and also it has to provide protection against a range of TICs. Chemical, biological, radiological or nuclear agents can penetrate or permeate through the SCBA's manufacturing materials, so the model to purchase has to meet new NIOSH standard requirements. Cylinder interoperability is another important concept for CBRN agent approved SCBA; the number of cylinders onboard is limited and at a large-scale incidents it is critical to provide air resources for firefighting and damage control teams.

The second priority is that SPN has some capability for biological detection. Some equipment and technology have been examined over a long period because we want confidence in the system before fitting them aboard SPN vessels. SPN is looking to upgrade its decontamination solutions, including for skin decon products which are more effective but less hazardous to the user and the environment than standard decon solutions that are in the current inventory. We will continue to exploit new technologies arising from the CBRN research community and use them in applied research for our ships.

At present, it is considered that SPN has reached the level of the most advanced navies within CBRN-D through its acquisition of high-tech systems and equipment, its development of adequate procedures, an excellent training program and especially the fact that we succeeded in motivating navy personnel to go on improving.