



Rolls-Royce

## The NATO Submarine Rescue System

### NSRS



#### Introduction

NSRS is jointly owned by France, Norway and the UK and consists of two sub-systems that can be mobilised independently of each other. Intervention is a smaller sub-system focused around the Intervention Remotely Operated Vehicle (IROV) that can be rapidly mobilised to a distressed submarine (DISSUB) in order to prepare the site for the Rescue System, and to provide life support. The Rescue System is larger and consists of a free-swimming manned submersible, a Portable Launch and Recovery System (PLARS), a Transfer Under Pressure (TUP) decompression system and other associated support equipment.



*The Intervention System onboard ARGONAUTE*

#### Worldwide Capability

NSRS is available to be deployed anywhere in the world. As such, all equipment is fully road and air transportable to the necessary port, whereupon it shall be embarked upon the selected Mothership (MOSHIP) before being deployed. Different aircraft and ships may be available at any particular time and location, thus the equipment is designed to maximise the use of any potential aircraft and MOSHIPs

#### Intervention System

The Intervention system is an independent system that is likely to be deployed first. The IROV is supported with a dedicated A-Frame Launch and Recovery system, winch and umbilical, control cabin, navigation and tracking equipment and power generation equipment. The IROV shall be required to perform DISSUB location, rescue site preparation (including debris removal and radiation detection) and provide Emergency Life Saving Stores (ELSS) to the DISSUB such as food, water, atmosphere control equipment and medical supplies.



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### **Rescue system**

The main Rescue System is used to recover the crew from the stricken submarine. A free-swimming Submarine Rescue Vehicle (SRV) is able to dive as deep as 610m, locate, and mate with the distressed submarine. Following pressure equalisation, up to 15 rescues can be transferred into the rescue vehicle including patients on stretchers, before the SRV returns to the surface.



*Submarine Rescue Vehicle launching from HARSTAD*

Once recovered to the ship, the SRV deck-cradle manoeuvres the vehicle to mate with the Transfer Under Pressure (TUP) decompression facility allowing the transfer and safe decompression of pressurised crew members, whilst the SRV performs further recovery dives.

### **Submarine Rescue Vehicle (SRV)**

The SRV is approximately 9m long and weighs 30 tonnes. The 3 man crew consists of a pilot, co-pilot and rescue chamber operator. The SRV rescue chamber can be pressurised to 6 bar to allow the complete transfer under pressure of rescues from the submarine through to the decompression facility. Communications are achieved using an advanced array of equipment including an underwater telephone, underwater modem and a lightweight fibre-optic umbilical. Using ZEBRA batteries, the vehicle is able to sustain

continuous dive cycles with only minimal charging between missions.

### **Portable Launch and Recovery System (PLARS)**

The SRV is required to be safely launched and recovered in conditions with significant wave heights of 5m, approximately Sea State 6. This necessitates the provision of the dedicated launch and recovery system.



*Portable Launch and Recovery System*

This 100t A frame has a safe working load of 30t and is fitted with a range of heave compensated winches and motion dampers to allow safe operations in extremely onerous conditions. The PLARS has also been designed to allow the safe recovery of the rescue vehicle without requiring swimmers to assist in attaching the lift rope in high sea states. This unique capability uses guideropes, sub sea operations and a latching catcher unit, to maximise the safety of all personnel.





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## **Transfer Under Pressure Decompression Facility**

The Transfer Under Pressure system has two identical decompression chambers able to hold a total of 72 rescued crew members, and a combination of adjoining chambers allowing rescuees to be transferred from the SRV to the compartments whilst under pressure up to 6 bar.



*Transfer Under Pressure Control Room*

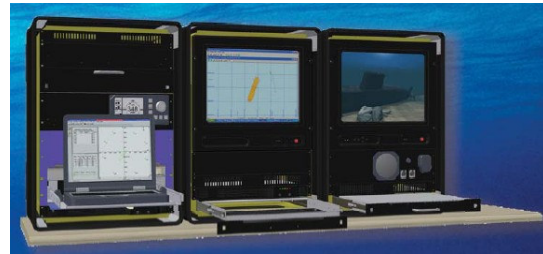
Various supporting modules including Oxygen transport modules, workshop, control cabin and environmental control are required to allow the system to operate, with a total weight of approximately 120 tonnes. Two portable 2-man decompression chambers allow the removal and treatment of individual patients, together with an attendant.



*Two Man Portable Chamber*

## **Portable Navigation, Tracking and Communication System (PNTCS)**

The PNTCS, housed within a 10' ISO container has the necessary equipment for tracking the NSRS underwater assets and for underwater communications with the SRV and the DISSUB. Using a portable acoustic positioning system and deployment system, the rescue team can locate and navigate between the primary assets including the Rescue Vehicle, ROV, DISSUB and the MOSHIP. The container is also equipped with SATCOM, VHF, UHF, underwater telephone, underwater modems and interfaces directly with the SRV via the lightweight Fibre-Optic umbilical.



*Portable Navigation, Tracking and Communication System*

## **Support equipment**

A wide variety of additional support equipment may be deployed to support the operation. This could include a dedicated power generation system, a sophisticated RIB with its own davit, medical supplies, SOLAS equipment, protective clothing and a wide variety of tools and spares.

## **Operational Crew**

The British, Norwegian and French navies will provide overall command and control personnel. They will also provide the necessary medical staff, TUP operators and divers/swimmers. Rolls-Royce will provide the core rescue team to operate and manage the equipment. Various specialist sub-contractors in key areas such as ROV pilots and mobilisation assistance will support them.





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