# HABETaS®

## The submarine escape system for the future

a project of

HDW
Howaldtswerke-Deutsche Werft AG

bfa
See- und Luftausrüstung
Augsburg · Germany

amts
advanced marine innovation technology subsea ltd.

## The Consortium

AMITS, bfa and HDW have jointly decided to develop, test, certify and market a new Submarine Personnel Escape and Rescue System. The three companies have combined their technological strengths and design capabilities for the benefit of the **HABETaS®** (**HDW, Amits, Bfa Escape Technology advanced SPES**) project.
The consortium co-operates with the aim to realise a system making escapes from submarines from greater depths possible and to increase the escapees' safety during the rescue scenario.

## The Challenge

Submarine escape and rescue scenarios can generally be divided into the following categories:

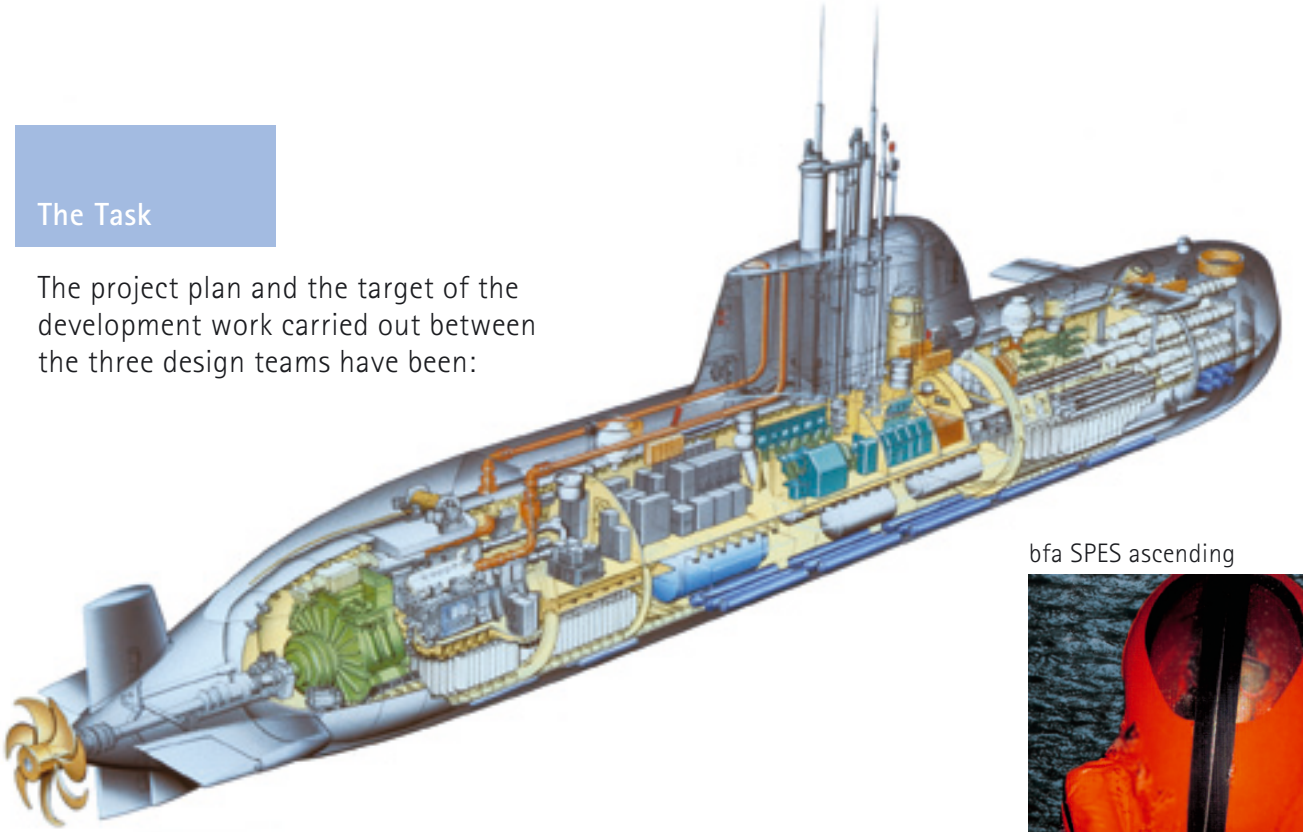
- Rescue performed from outside the crippled submarine and

- autonomous scenarios carried out by the submarine personnel without any assistance from third parties

Investigations and careful studies of accident reports show that in most cases it was not possible after an incident to bring the distressed submarine back to the surface to allow the survivors to disembark, and provide sufficient time to complete the rescue. Therefore, submarine personnel escape scenarios using an integrated system of air locks – so called escape chambers –, onboard gas supplies and rescue devices, provide the greatest potential for the crew to quickly leave the hostile environment and survive the accident. Such systems have been available since the early fifties and have since then been installed on submarines operated by many navies world-wide. These systems have, until today, been limited to a maximum escape depth of 180 metres and very often have been installed as an assembly of individual components. They have not been designed as a complete system in order to optimise the performance of the composition. The result very often were restrictions of the maximum escape depth to even less than 180 metres, and at the same time, high gas consumption during the flooding and compression phase of the air lock.
Therefore, in some cases, there was not even enough gas available for the complete crew to escape from relatively shallow depths.
All of these problems have been addressed, technically and physiologically, by the consortium and have properly been investigated in order to find the optimum solution to maximise the number of escapes irrespective of the depth.

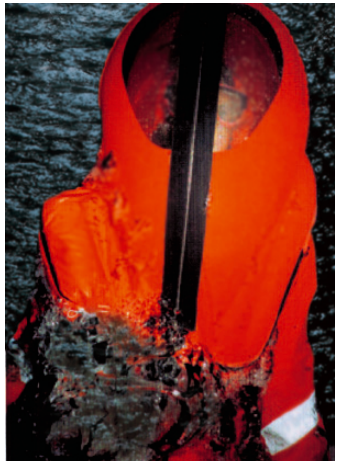
## The Task

The project plan and the target of the development work carried out between the three design teams have been:



HDW Submarine Class 214

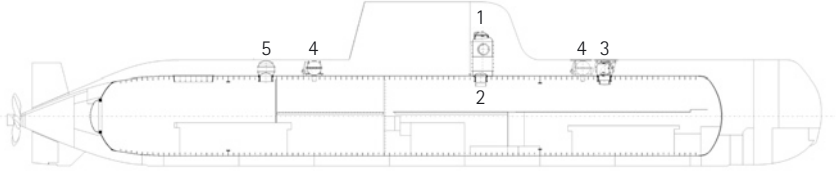
bfa SPES ascending



- Creation of a technical solution to make individual escapes from submarines possible from any depth
- Reduction of gas consumption per escapee to an absolute minimum in order to maximise the number of escapees, using a given gas reservoir
- No energy source other than compressed gas
- No electronically or hydraulically driven components
- Maximum buoyancy guaranteed in the escape device, when compression is complete, to minimise the time used for the ascent to the surface
- Reduction of the time used for flooding and compressing the air lock to an absolute minimum, which can be endured by the escapee

## The Name

As a result of the research and the design work **HABETaS®** was born. The name **HABETaS®** reflects the initials of the three partner companies involved and the words "Escape Technology advanced SPES", with SPES in turn standing for "Submarine Personnel Escape System". The sound of the new system's name HABETaS implies that a user of **HABETaS®**, having to leave the submarine, shall safely return to his natural Habitat.




Escape and Rescue Facilities

1 Access trunk
2 Air trap
3 Single escape chamber
4 Livesaving equipment container
5 Aft battery trunk

## The System

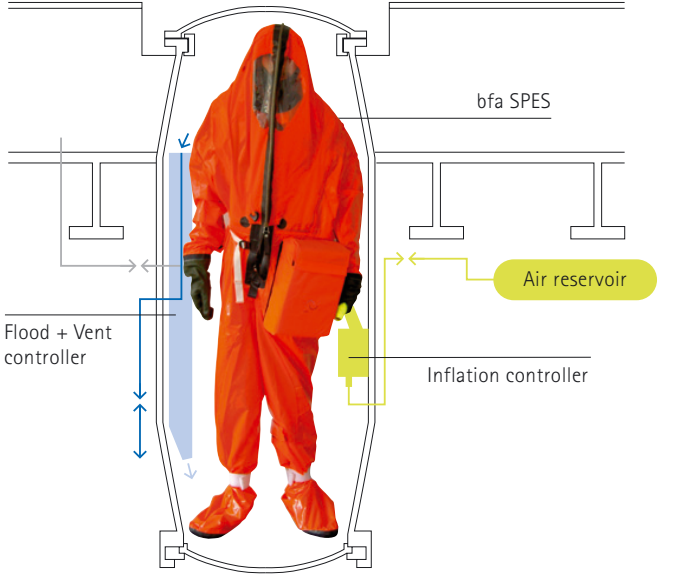
The **HABETaS®** system consists of the following components which have been jointly designed and fine tuned to work as a complete system, rather than separate individual components:

- An optimised Escape Chamber for a minimum of one person

- A Flood and Vent Controller optimising the flood and compression profiles for the individual escape depth, in order to minimise the gas consumption per escapee and reduce the physical burden on the escapee during these processes

- An inflation controller regulating the gas supply to the escapee's lifejacket and ascent hood, directly from the gas banks, always at a pressure just above the actual pressure inside the air lock

- A new bfa SPES submarine personnel escape system, consisting of a lifejacket with an inflation connector, an ascent hood and two high performance relief valves permanently supplying the escapee with fresh breathable gas from the lifejacket's stole

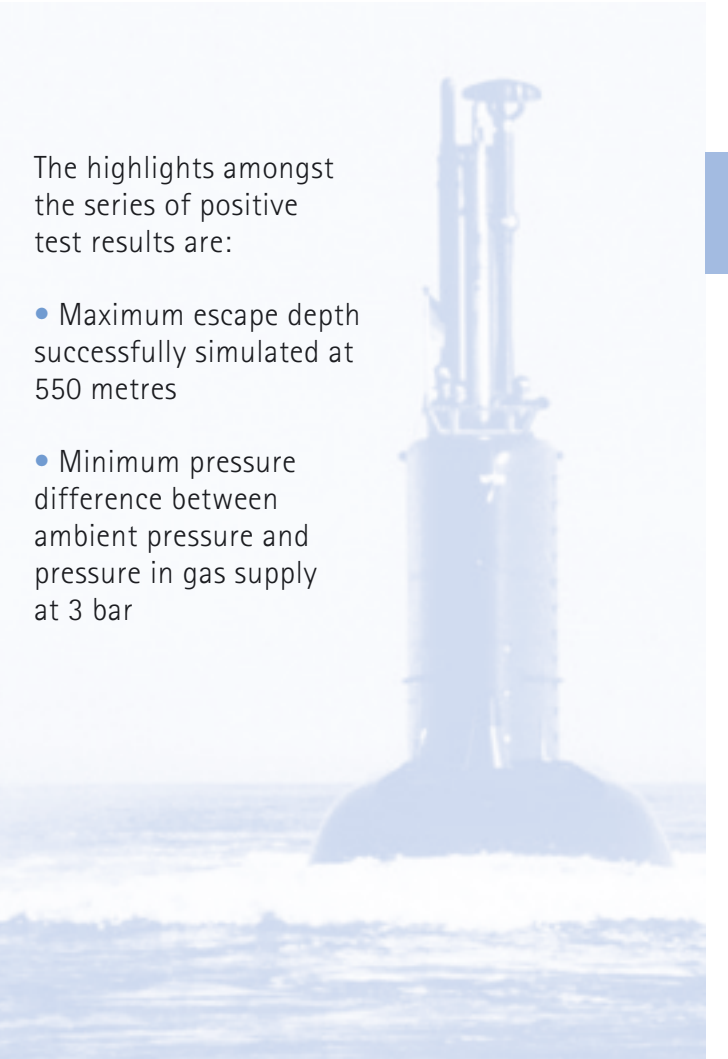


## The Performance

The **HABETaS®** system and its components are subject to an extensive development and test programme. The programme includes testing in simulators, in submarine escape training centres and in test rigs replicating the types of escape chambers installed onboard modern submarines. The test conditions cover the full depth range from very shallow escape runs to extremely deep runs. Testing is being carried out to cover the conditions from high supply pressures in the reservoirs down to runs at supply pressures just above ambient pressure, which simulate the escape of the very last survivor. The test programme, which started with unmanned testing before progressing towards manned tests is being instrumented, witnessed and documented by QinetiQ Alverstoke, the test institute having the greatest experience in submarine escape technology in the world.

The highlights amongst the series of positive test results are:

- Maximum escape depth successfully simulated at 550 metres
- Minimum pressure difference between ambient pressure and pressure in gas supply at 3 bar



## The Availability

**HABETaS®** can technically be installed onboard every new and retrofitted to any existing submarine. For a retrofit, the existence of an airlock – which can be used as an escape chamber – and an onboard gas supply, is advantageous but not necessarily required.

# HABETaS®

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