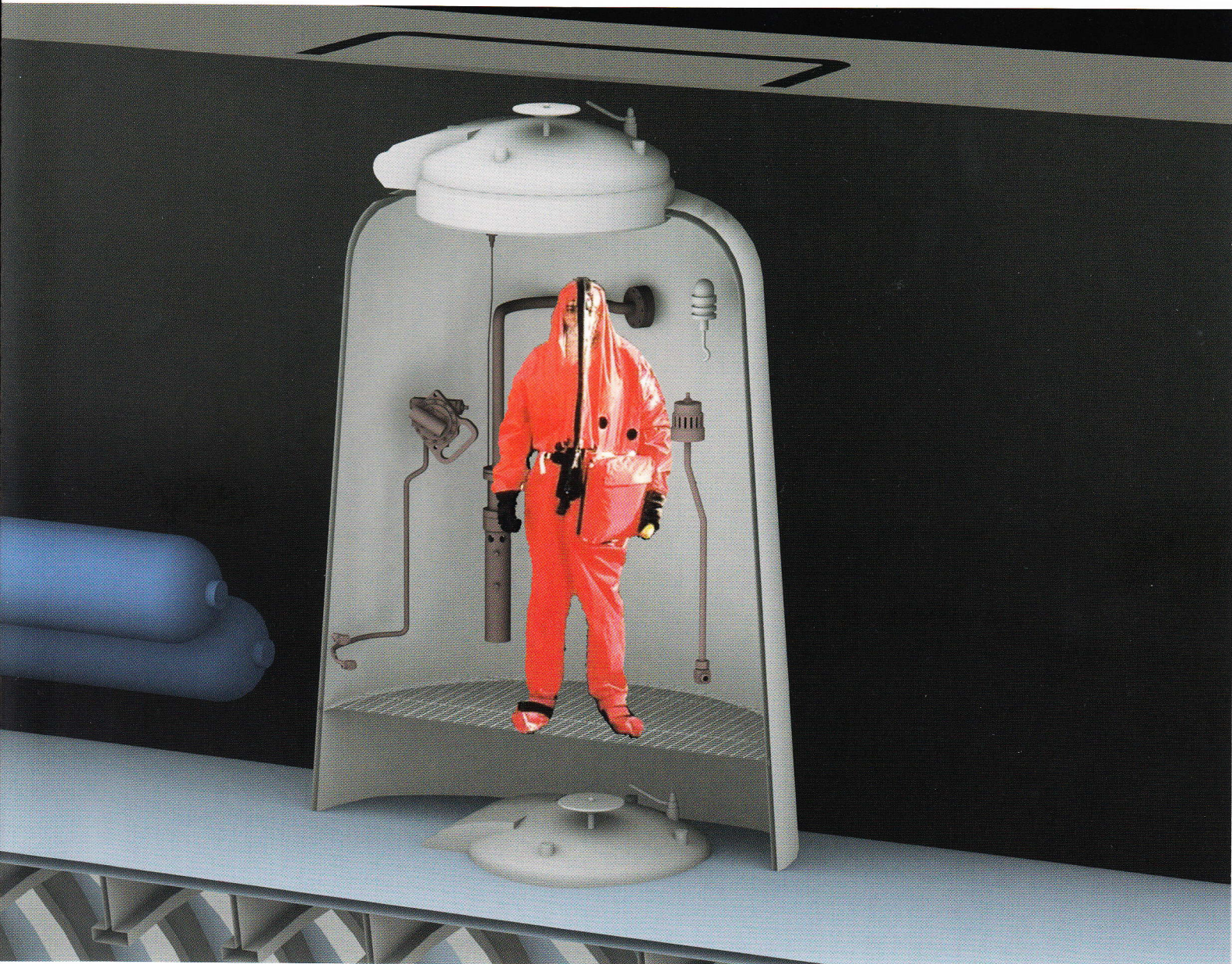


HABETaS®

An unrivalled rescue solution
for submariners



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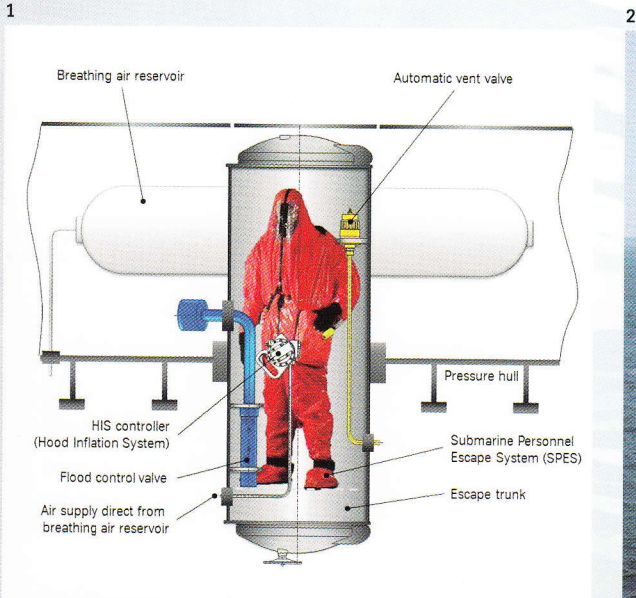
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Howaldtswerke-Deutsche Werft



ThyssenKrupp

Capable partners for success on the international market



1 HABETaS® system layout
2 HABETaS® equipped:
The Royal Netherlands Navy Walrus class submarines



The HABETaS® partners

HABETaS® stands for the initials of the three partners who originally started the development of this rescue system and the corresponding technology used: HDW AMITS BfA Escape Technology advanced SPES. Since 2004 Howaldtswerke-Deutsche Werft (HDW), a company of ThyssenKrupp Marine Systems, has acted as integrator of HABETaS® into the system „submarine“. The British company Advanced Marine Innovation Technology Subsea (AMITS) developed and builds the complex valve technology while Ballonfabrik Augsburg (BfA) has been in charge of the corresponding rescue suits.

The HABETaS® development

The basic motivation behind HABETaS® was the development of a customer-oriented solution aiming to enlarge the well-established free ascent method towards greater depths while at the same time minimising the air consumption of the system and ensuring easy handling by the crew without the assistance of third parties. In addition a number of further integration considerations were realised. These include

- functionality of the system to a depth where even the lowest probability of survival exists
- high reliability of the system, which ensures operation of HABETaS® even with low delivery pressure of the breathing air system

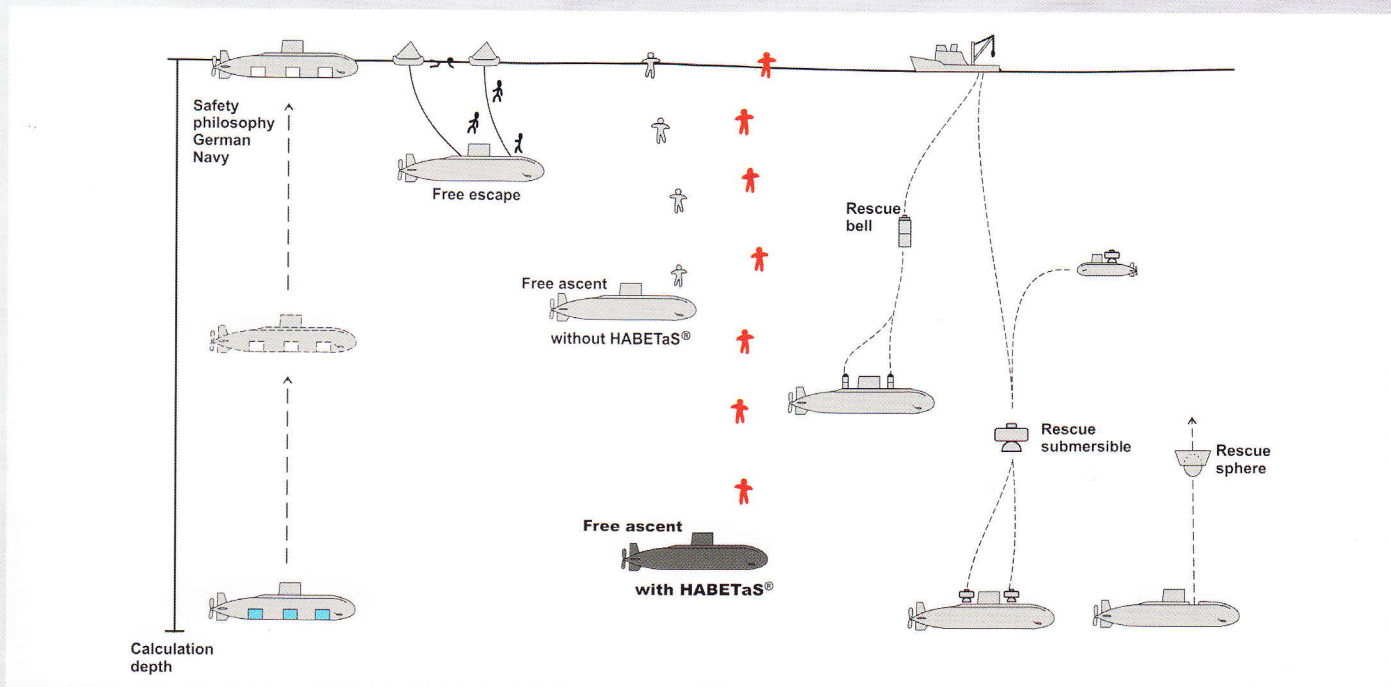
- optimisation of the compression process inside the escape trunk to reduce the risk of decompression sickness
- minimisation of the air consumption per escape procedure
- feasibility to equip submarine access trunks for up to two persons per escape operation
- provide enough air for a maximum escape buoyancy.

HABETaS®: NATO proven

The target-oriented development work has been successfully received on the international market: The Royal Netherlands Navy has now installed HABETaS® on board their Walrus class submarines.

Beside integration, the contract includes supply of the hardware as well as corresponding logistic measures.

The related test activities have been completed and integration of the systems on board is under way. Additionally the HABETaS® concept receives worldwide interest in a vast number of navies that operate submarines: further integration analyses have been performed for a large number of NATO partners as well as potential customers around the world. Beside the already proven submarine refit capability, the worldwide unique HABETaS® system will be incorporated into new HDW submarines.



Submarine safety and rescue scenarios

Safety first

Just like the aviation industry the German submarine industry puts maximum emphasis on the safety aspect of a submarine: therefore redundancy of important systems, equipment and components as well as high quality standards during design and construction of the boats ensure that the principle „safety before rescue“ is achieved. The safe operation of a submarine is moreover ensured by comprehensive training units ashore and at sea. In addition, if an emergency occurs, it is recommended to attempt to convert any kind of submerged accident into a surface scenario. Once the boat has been surfaced it is in general easier to repair the submarine or to obtain external assistance. Technologies for such kind of emergency surface operations are available.

Rescue requirements

Independent of the described safety philosophy many navies demand an adaptation of

their submarine to the rescue aspect. The crucial factor common to all the different rescue scenarios for the crew of a distressed submarine is time. The period during which the crew can survive on board is limited by the restricted amounts of oxygen and energy carried on board a submarine. Consequently the preferred option – where the submariners can decide independently of external rescue support when to leave the distressed submarine – is an autonomous rescue capability.

Personal rescue from the submerged submarine at depth

Therefore a personal rescue system is an ideal means to allow the crew of a disabled submarine to leave their boat in the unlikely event that it cannot be surfaced. This is where the HABETaS® system achieves its importance. While the more usually known free ascent operation is limited to depths of about 180 m, HABETaS®

enables this limit to be significantly increased. The limiting factor for rescue is no longer the rescue system itself but the human body.

The HABETaS® components

The HABETaS® system consists of:

- a submarine escape trunk
- a suitable breathing air reservoir on board the submarine
- the flood controller and automatic vent valves, which automatically optimises flooding and compression profiles for the respective escape depth
- the HIS Controller (Hood Inflation System), regulating the gas supply to the ascent hood and the escapee's lifejacket
- the SPES (Submarine Personnel Escape System) of the escapee, consisting of a lifejacket with an inflation connector, the ascent hood and high performance valves supplying the escapee with breathable air from the lifejacket stole.

The flexibility of the HABETaS® valves allows adaptation to submarine escape trunk volumes from 1 to 6 m³. Thus the system allows for the outfit of access trunks for the parallel escape of up to two persons. The HABETaS® components can be tailored to the particular submarine design in order to maximise the performance of the entire system.

Summary

The validity of the principle of „safety first“ during design, construction and operation of submarines still prevails. Independent of this principle the existing free ascent rescue envelope is significantly improved by means of the HABETaS® system. This allows submarine crews to independently leave a distressed submarine from depths far beyond 180 metres, setting a new standard in submarine rescue scenarios.

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