New Defence and Attack Weapon for Submarines

IDAS Missile Successfully Launched under Water for the First Time

Marcus Bredick

Already in November 2006 it was possible to successfully launch a first prototype from ashore and subsequently two additional ones from an underwater testbed of the Bundeswehr Technical Center for Ships and Naval Weapons in the Bay of Melsdorf/Germany. Since then, the IDAS consortium, consisting of two German companies, the Howaldtswerke Deutsche Werft (HDW) and Diehl BGT Defence (40 percent shares each) with participation of the Norwegian Kongsberg Defence & Aerospace (20 percent), has been working on particularly the complex underwater launch function. The missile itself is made by Diehl whereas HDW is responsible for the integration into the respective submarine system and torpedo tubes. The development of the control system of IDAS and its integration into the combat direction system (CDS) is the responsibility of Kongsberg.

IDAS Missile. Pictures: Bjoern Wilke

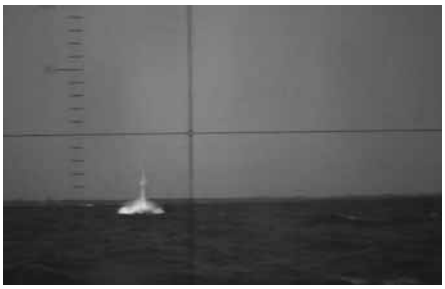
Almost nine months earlier than planned another important milestone was reached in the development of the IDAS (Interactive Defence and Attack System for Submarines) with the first launch from a submerged submarine on 28 May 2008. The 212A class submarine "U 33" served as a trial platform for the test conducted off the Bay of Eckernfoerde/Germany. After the inertial system of the missile was calibrated by means of the navigation system of the submarine, the missile was launched from the torpedo tube. Shortly after that it broke through the water surface. IDAS climbed then to a predetermined altitude and passed over to a controlled flight status just as planned. Unlike the subsequent operational employment, the test was finished in a gliding flight. During the total time of flight, the missile was linked with the submarine via optical wave-guides, which transmitted the data and images of a video camera. With the test launch it was demonstrated and proven that IDAS can be employed from a submerged submarine.

Loading with Missile.

First designs for IDAS were originally based on an analysis of the various threats posed to German submarines by different ASW components in the Baltic Sea during the Cold War. The findings of that study revealed that there was no chance of combating especially helicopters operating in the antisubmarine role. Due to their high mobility, the possibility for flexible and quick use of the onboard dipping sonar in different depths and the simultaneous option for attacking the submarine with onboard antisubmarine torpedoes (and/or those of a second helicopter) they represented a real big danger. With IDAS, submerged submarines are to receive in future for the first time a self-Defence weapon against this threat from the air. Moreover, the missile is also suited for offensive attacks against smaller ships and coastal targets. With that, relatively small submarines outgrow the role of a covertly acting reconnaissance vessel hitherto assigned to them in asymmetric warfare and are becoming a weapon platform that must be taken seriously in littoral crisis scenarios.

The Missile

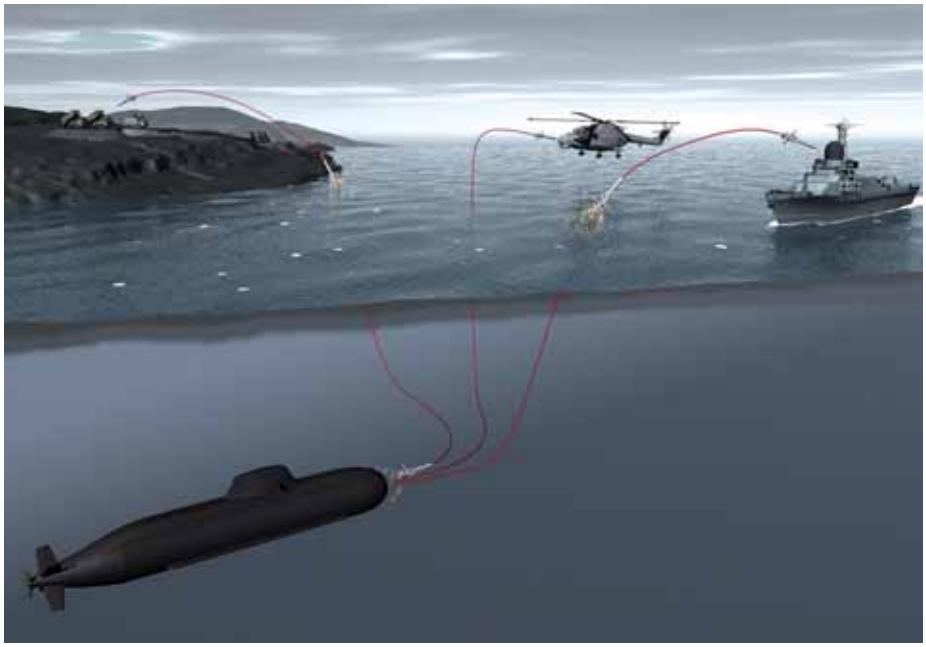
With a length of about 2.5 m, IDAS is still a bit shorter than the AIM-9L Sidewinder missile which is also produced under license by the Diehl company. The single-stage solid propellant rocket engine propels the missile continuously both during the short time under water and in the air. The optical infrared sensor mounted under a glass dome at the tip of the missile stems from the IRIS-T air-to-air missile developed by Diehl for, inter alia, the Tornado and EUROFIGHTER aircraft of the Air Force. The weight of the warhead is about 20 kg. During the total duration of its employment until the impact on the target there is a bi-directional data connection between submarine and missile via an optical fiber link.



Breakthrough the Water Sur

The System

As the first missile worldwide, IDAS cruises under water without an additional protective shell. This feature reduces considerably the space requirement of the system and allows the multiple flooding of the torpedo tube. The thus achieved relatively small size allows up to four missiles to be placed in one standard torpedo tube. They are loaded and carried along at sea in so-called launching containers, which have the dimension of a DM2A4 heavyweight torpedo and therefore have very similar handling characteristics. Integrated in these containers is a hydraulic system, which allows the individual launch of each individual missile. Analogous to the number of available torpedo tubes, a submarine is capable of carrying along several filled launching containers; this allows arranging the armament with torpedoes and missiles flexibly, depending on task and mission scenario. In addition the launching containers and the missile contained therein, the IDAS overall system consists of the missile control computer and an interface box, which provides for the connection to the CDS of the sub.



Outline of Possibilities for Employing the Missile.

Operating Sequence

After the decision of the submarine commander to engage an enemy, the respective target data are transferred onto the missile, the torpedo tube flooded and the muzzle doors opened. The impulse launch of the missile is affected by the hydraulics integrated in the launching container. When the IDAS has left the torpedo tube and finished the enabling run the wings are unfolded and the solid propellant rocket engine is fired. After a few seconds, the missile heads upwards, breaks through the water surface and passes into controlled flight. As soon as the seeker head acquires the target, the missile directs itself independently to the target. During the whole flight, images delivered from an infrared camera installed at the front end of the missile as well as other data are digitally transmitted to the submarine via an optical fiber link. The operator aboard the sub is thus given the possibility to monitor the attack process live from the missile camera's view and, if necessary, to interfere by taking corrective control. With that it is possible to optimize the point of impact even after the launch, to change the target or, in case of an inadvertent attack on own or friendly units, to trigger the self-destruction mechanism.

Data Link

The continuous data link between missile and the launching submarine is a prominent feature of IDAS and a unique one up to now. As with the heavyweight DM2A4 torpedo, a linking via optical wave guides (parallel multiple fiber) was resorted to here as well. It offers diverse advantages such as a lightweight, minimal interference susceptibility to electromagnetic radiation, and simultaneous bi-directional data traffic. The optical wave-guides used do not differ very much from the ones utilized e.g. by Telekom. In order to better withstand the high strains, coils were integrated in both the launching container and the missile, which are unwound simultaneously. The Kiel-based Autoflug Company is responsible for the coil winding and the sheathing of the wire.

With the IDAS missile, the commander of a submarine is given for the first time the possibility of self-Defence against typical ASW threats as probably from 2014 on. But since the submarine reveals with the launching of the missile its biggest advantage, the covert operation, this can be a last option only. For this reason, the possibility of engaging small-scale coastal targets without exposing submarine and crew to great risks might therefore be also of particular interest to the Navy. ■

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