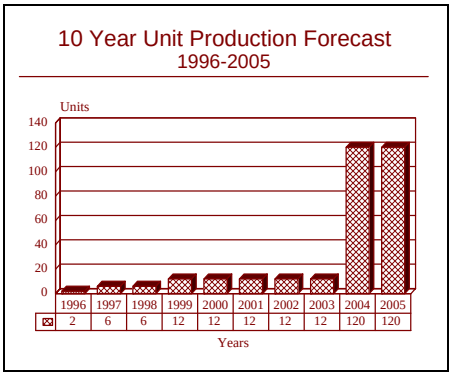
DM2A4 Torpedo - Archived 3/97

Outlook

- Limited pre-prototypes now being tested.
- Not likely to enter production until 2004.



Orientation

Description. Wire-guided dual-purpose torpedo for deployment on surface ships or submarines.

Sponsor

Bundesamt fur Wehrtechnik und Beschaffung (BWB)
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Contractors

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Licensee. No production licenses are known to have been granted.

Status. Engineering development

Total Produced. No production has started; pre-prototype concept evaluation torpedoes only have been produced.

Application. The DM2A4 torpedo is designed for deployment onboard the German Type 212 submarines and will provide both ASW and ASuW capability. The torpedo is also likely to equip German torpedo fast attack craft (FAC-T) and be supplied to the export market.

Price Range. Predictions of unit costs for a weapon that will not enter service for over a decade are very imprecise. However, our estimate, based on the comparable costs of other advanced heavyweight torpedoes, is that a price range of between US$2.5 and US$3.0 million can be expected.

Technical Data

Characteristics	Metric	US
Range:	20.000 m	10.8 nm
Speed:	93 km/h	50 kts
Maximum depth:	610 m	2,000 ft
Warhead size:	260 kg	572 lb

Dimensions	Metric	US
Length:	4,15 m	3.62 ft
Diameter:	533,4 mm	21 in

This homing system is supported by an inertial autopilot. This allows the torpedo to re-acquire its targets in case of a miss. The use of MIMIC circuitry is intended to reduce mean time between failures (MTBF) by curbing the number of individual circuit boards within the onboard electronics. The DM2A4 will have both magnetic proximity and impact fuzing and extensive BITE (built-in test equipment) technology.

The DM2A4 will incorporate an advanced, high-speed, high-endurance propulsion system. Options being examined for this include:

- An electrical propulsion system using a high-frequency permanent magnet (PM) motor based on the Compact Power Plant (CPP) originally developed for the Murene torpedo, or a low-frequency motor developed by GEC-Alsthom using aluminum-silver oxide batteries. It is to be noted that in some references, both of the above technologies are treated as one alternative — a PM motor with an aluminum-silver oxide battery.
- A Battelle thermodynamic (closed-cycle) engine based on the Wankel rotary principle, and
- A lithium heat exchanger-based Stored Chemical Energy Propellant System (SCEPS) developed by STN.

A turbine power source has also been mentioned, but the decision will probably favor an electric solution. The selected propulsion system will be used to drive a ducted counter-rotating fiberglass-reinforced pumpjet propulsor unit. This design, also adopted by recent British, US and Swedish designs, offers intrinsically quiet operation at high speeds.

Variants/Upgrades

There are no derivatives of the DM2A4 torpedo at this time. The name Seahake, previously believed to be associated with the DM2A4 program, is now known to be the designation for an export version of the DM2A3 torpedo, intended for non-NATO customers.

Program Review

Background. The German Navy's latest 533 mm torpedo is the Seehecht or DM2A3; this torpedo is manufactured by STN Atlas Elektronik, an amalgamation of the Marine Division of AEG Telefunken and the Marine Division of Messerschmitt-Bolkow-Blohm. In 1988 STN initiated a privately funded program aimed at developing a new export torpedo, using some of the technology developed for the DM2A3. By 1990 the deficiencies in the DM2A3 were becoming apparent and the German Navy issued a requirement for a follow-on weapon using the latest available technology.

The basis for the new torpedo was the privately funded project initiated by STN. This had involved the development of a new homing system, but retained the 260 kg warhead and the propulsion system of the older weapons. The DM2A4 requirement specified a significantly higher speed than the older torpedoes, and a reduced acoustic signature. This meant a new propulsion system would be required. At this point the DM2A4 had very little in common with its predecessors, and was effectively a new weapon.

In mid-1991, Germany, France and Italy signed a tripartite Memorandum of Understanding (MoU) for the development of a new heavyweight torpedo to replace the DM2A3, the A-184 and the F-17 mod 2. This MoU envisaged the new German DM2A4 as being the basis for development, and retaining the German guidance system. The warhead assembly is to be provided by Italy. An industrial study group comprising STN, DCN St Tropez and Whitehead Motofides was formed to initiate a joint feasibility study on alternative engine technologies. This study was due to terminate in mid-1994, and a decision was expected by about mid-1995; but a verification of this outcome was not available at presstime.

The first test firings of pre-prototype DM2A4 torpedoes were conducted in November 1992. These used a test-bed hybrid with the new guidance system installed in existing torpedo bodies. Since history has shown that the majority of problems are likely to be experienced with the homing system, this has the virtue of identifying problem areas at the earliest opportunity. This also has the merit of opening the possibility of selling the new homing head as an upgrade package for older weapons.

In April 1993, STN-Atlas Elektronik revealed that they had settled on the design of the propeller unit for the DM2A4. The conventional counter-rotating propellers of

the DM2A3 were to be replaced by a pumpjet assembly in which counter-rotating blades made from FRP on an epoxy base would rotate within a shrouded duct. This design solution has also been adopted for the Swedish Tp-62 and British Spearfish torpedoes.

Originally, the DM2A4 was to have entered service in 1998. As a result of the operation of the tripartite MoU, this date has since been delayed until 2003. An 18-month project definition phase was scheduled to commence in mid-1995. However, a slow-down in funding has delayed the planned IOC until 2004, according to sources in Germany.

Funding

The DM2A4 program is being funded by the BWB.

Analysis. The DM2A4 torpedo is a good example of a familiar situation in the European defense industry. It is an upgrade program so extensive that a new weapon has been developed. The DM2A4 has little in common with the preceding DM2 family of torpedoes. It is a much more formidable prospect and is likely to become an important factor on the export market.

The DM2A4 will enter service at a time when the majority of ASW operations will be conducted in green water, where the stress will be on stealth and covert attack modes. By then the prospect of engaging very fast, deep-running Russian submarines will have faded even further. The rivals to the DM2A4, the British Spearfish and US Mk.48 ADCAP, are torpedoes with internal combustion engines. They are faster than the projected performance of DM2A4, but the price to pay is a reduced degree of stealth.

The tripartite MoU has given the DM2A4 a running start. The product is likely to be ordered by France, Germany and Italy, with additional orders from Norway, Denmark, Spain, Portugal and the Netherlands. Effectively the DM2A4 market will be that for the two major suppliers of export submarines, Germany and

France, combined. A further DM2A4 advantage is that it is substantially smaller than its British and US rivals, easing the problems of firing it from the small submarines favored by non-NATO clients.

The Forecast International analysis of the likely size of the world torpedo market suggests that the total production of torpedoes to equip submarines ordered during the 1990s will probably be around 3,000 weapons. This is in light of reports of substantial excess inventories of torpedoes with the US Navy as well as other navies around the world. Of these 3,000 units, many are likely to be absorbed by existing weapons; the balance will go to Mark 48 and Spearfish, as well as the Swedish Tp-62. We estimate that about 30 percent of these orders will be awarded to the DM2A4 torpedo, probably totalling some 900 weapons. This production run will extend well beyond the end of the forecast period.

Recent Contracts

No contractual information is currently available.

Timetable

	1988	Development began
	1990	Program announced
	1991	Tripartite development MoU signed
Nov	1992	First DM2A4 test shots fired
	1995	Definitive propulsion system was to be selected
	2004	DM2A4 to enter service

Worldwide Distribution

No torpedoes are in service. Initial users will be Germany, Italy and France.

Forecast Rationale

The following forecast is based on very limited production of DM2A4 pre-prototypes for test shots until 1996. This will increase substantially in the period 1997-2003 as genuine prototype torpedoes are trialed. The entry-to-service date of 2004 will most likely be met; the development schedule specified for this program is realistic. Production will escalate quickly in the far term as orders from users of German and French-built submarines flow in.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

		High Confidence Level			Good Confidence Level			Speculative					
Designation	Application	thru 95	96	97	98	99	00	01	02	03	04	05	Total 96-05
DM2A4	SSK (VARIOUS)	8	2	6	6	12	12	12	12	12	120	120	314
Total Production		8	2	6	6	12	12	12	12	12	120	120	314