

ARCHIVED REPORT

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K-130 – Archived 4/2011

Outlook

- Last ship commissioned in May 2009
- No additional construction projected in order to concentrate on other programs of greater value
- No exports likely due to emphasis on MEKO-A100 for export market

Orientation

Description. Missile-carrying corvette.

Status. In service.

Sponsor. The Federal Office of Defense Technology and Procurement (BWB) in Germany, through the German Navy.

Total Produced. A total of five ships are in service.

Pennant List

<u>Number & Name</u>	<u>Builder</u>	<u>Launch Date</u>	<u>Commission Date</u>
F-260 <i>Braunschweig</i>	Blohm + Voss	4/2006	4/2008
F-261 <i>Magdeburg</i>	Lürssen	9/2006	9/2008
F-262 <i>Erfurt</i>	Nordseewerke	4/2007	4/2009
F-263 <i>Oldenburg</i>	Blohm + Voss	6/2007	4/2009
F-264 <i>Ludwigshafen</i>	Lürssen	9/2007	5/2009

Mission. The ship is designed for out-of-area operations, while providing sufficient firepower to fill the gap left by three retiring fast attack craft classes. They take part in all German naval missions, as well as in NATO and European Union crisis management operations.

Price Range. The BWB adopted a design-to-cost approach on the project, setting a price cap of DEM350 million (\$181 million) per ship. This approach attempts to keep costs under control by offering only broader functional specifications to contractors, who must present a number of alternative solutions.

Contractors

Prime

Blohm + Voss GmbH	http://www.blohmvoss.com , Hermann-Blohm-Strasse 3, PO Box 10 07 20, Hamburg, 20457 Germany, Tel: + 49 40 3119 0, Fax: + 49 40 3119 3383, Email: info@blohmvoss.com , Prime
Fr Lürssen Werft GmbH & Co KG	http://www.luerssen.de , Zum Alten Speicher 11, Bremen-Vegesack, 28759 Germany, Tel: + 49 421 660 40, Fax: + 49 421 660 4443, Email: info@luerssen.de , Prime

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ThyssenKrupp Marine Systems	http://www.thyssenkrupp-marinesystems.de , Hermann-Blohm-Strasse 3, PO Box 10 07 20, Hamburg, 20005 Germany, Tel: + 49 40 3119 1320, Fax: + 49 40 3119 3329, Prime
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Subcontractor

Bainbridge International	8, Flanders Park, Hedge End, Southampton, SO30 2FZ Hampshire, United Kingdom (Flame Retardant Protection Systems)
EADS Military Air Systems	http://www.eads.net , Rechliner Strasse, Manching, 85077 Germany, Tel: + 49 8459 81 05, Fax: + 49 8459 81 64085 (RIM-116 Missiles)
Electronic Data Systems (EDS)	http://www.eds.com/ , 5400 Legacy Dr, Plano, TX 75024 United States, Tel: + 1 (972) 604-6000 (Three Dimensional Design & Mfg Software)
Filtronic Components Ltd	Airedale House, Acorn Park, Shipley, BD17 7SW Bradford, United Kingdom (RF Components)
Gresham Power Electronics Ltd	http://www.greshampower.com , Telford Rd, Salisbury, SP2 7PH Wiltshire, United Kingdom, Tel: + 44 01722 413060, Fax: + 44 01722 413034, Email: enquiries@greshampower.com (Power Handling Systems)
Hagenuk Marinekommunikation GmbH	http://www.eads.com/hmk , Hamburger Chaussee 25, Flintbek, 24220 Germany, Tel: + 49 4347 714 0, Fax: + 49 4347 714 110 (Radio Communications)
L-3 Communications - ELAC-Nautik GmbH	http://www.elac-nautik.de , Neufeldtstrasse, Kiel, 24118 Germany, Tel: + 49 431 883 0, Fax: + 49 431 883 496, Email: marketing@elac-nautik.com (Echosounders)
Maag Gear Co Ltd, a Member of the FL Smidth Group	http://www.maag-gear.com , Hardstr 219, Zurich, CH 8023 Switzerland, Tel: + 41 01 2787878, Fax: + 41 01 2787880 (Load Gear Gearbox System)
Northrop Grumman LITEF GmbH	http://www.northropgrumman.litef.com , Loerracher Strasse 18, Freiburg, 79115 Germany, Tel: + 49 0761 4901 0, Fax: + 49 0761 4901 480 (Displays)
Oto Melara SpA	http://www.otomelara.it , Via Valdilocchi 15, La Spezia, 19136 Italy, Tel: + 39 0187 5811 11, Fax: + 39 0187 58266, Email: press-office@otomelara.it (76mm L62 Super Rapid)
Piller (UK) Ltd	Chesterton Ln, Cirencester, GL7 1YE United Kingdom, Tel: + 44 1285 657721, Fax: + 44 1285 654823 (Converter)
Rheinmetall Waffe Munition GmbH, Branch Mauser Oberndorf	http://www.rheinmetall-defence.com , Werkstrasse 2, Oberndorf am Neckar, 78727 Germany, Tel: + 49 7423 70 0, Fax: + 49 7423 70 670, Email: info-wm@rheinmetall-wm.com (MLG 27 Light Naval Gun System)
Saab Bofors Dynamics	http://www.saabgroup.com , Bofors industriområde, Karlskoga, 691 80 Sweden, Tel: + 46 586 810 00, Fax: + 46 586 857 00, Email: bofors@ynamics.saab.se (RBS15 Missiles)
Sener Ingenieria & Sistemas SA	http://www.sener.es , Severo Ochoa, 4, Parque Tecnológico de Madrid, TRES CANTOS (Madrid), 28760 Spain, Tel: + 34 91 807 7000, Fax: + 34 91 807 7201, Email: dep.ambiente@sener.es (Control System)
Thales Nederland BV	http://www.thalesgroup.com/netherlands , Haaksbergerstraat 49, Hengelo, 7554 PA Netherlands, Tel: + 31 74 2488111, Fax: + 31 74 2425936, Email: info@nl.thalesgroup.com (TRS-3D Radar)
Thordon Bearings	http://www.thordonbearings.com/ , 3225 Mainway, Burlington, L7M 1A6 Ontario, Canada, Tel: + 1 (905) 335-1440, Fax: + 1 (905) 335-4033 (Bearings)
TKMS Blohm + Voss Nordseewerke	http://www.thyssenkrupp-marinesystems.de , Zum Zungenkai, Emden, 26725 Germany, Tel: + 49 4921 85 0, Fax: + 49 4921 31 327, Email: info@tk-nswe.thyssenkrupp.com (Superstructure Modules)

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Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Length	89.1 m	292.3 ft
Beam	13.3 m	43.6 ft
Draft	3.2 m	10.5 ft
Displacement		
Full Load	1,840 tonnes	
Performance		
Speed	48 km/h	26 kt
Range	4,600 km at 28 km/h	2,500 nm at 15 kt
Endurance	7-10 days	
Crew	50 + 15 spare	
	<u>Type</u>	<u>Number</u>
Armament		
Guns	Oto Melara 76mm L62	1
	Mauser 27mm	2
Surface-to-Surface (Anti-Ship) Missiles	SAAB RBS15	4
Close-In Weapon System	RIM-116A	21x 2
UAV	Seamos VTOL drone	1
Electronics		
Radar		
Air/Surface Search	TRS-3D; C band	1
Surface Search	E/F-band	1
Fire Control	I/J-band	1
Countermeasures		
ESM	FI 1800 S; intercept	1
Decoys	MASS	2
Combat Data System	Link 11, Link 16	
Machinery		
Diesels	MTU 20V1163 TB93	2x 7.4 MW
Propellers	Controllable pitch, 2 shafts	2

Design Features. The initial 1995-1997 designs of the K-130 class showed them to be fairly traditional light frigates. The superstructure was characterized by a prominent tower mast with a combined mast and stack (mack) further aft. However, more recent illustrations indicate a stealthier design, with a stern characterized by a small landing platform for Seamos UAVs. The Northrop-Grumman Firescout and Sikorsky's Cypher have been suggested as alternatives to Seamos. This design has been further modified with an enlarged flight deck that can handle a helicopter up to 10 tonnes, such as the NH-90.

The success of the ARGE K-130 consortium in winning the contract for the K-130 class confirmed that the design draws heavily on the MEKO-A100. Artist illustrations show the design will emphasize signature reduction, including a tumblehome hull, uninterrupted side panel surfaces, appropriate angles to reduce radar cross-section, few hatches and windows, covered

antennas and sensors, and low radar cross-section (RCS) gun mounts. The hull and superstructure are designed to form an integrated X shape in order to reduce radar cross-section to a minimum.

Other signature-reduction provisions include cooling facilities for the exhaust gases (wherein water is injected into the exhaust piping, thereby reducing the temperature of the exhaust to less than 150°C). In addition, nozzles installed along the sidewall near the lateral exhaust ports above the waterline can be used to generate a water spray-screen. Sound insulation reduces the acoustic signature of the engines in order to meet the prequalifications for the installation of a torpedo defense system. Finally, magnetic signatures are eliminated with the use of a magnetic environment survey (MES) system, which provides active cancellation of the ship's ferromagnetic field.

The displacement of the ship has grown from the originally planned 1,400 tons to 1,650 tons. The hull

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length was increased from its original 83.5 meters to 92 meters before settling at its current level of 88 meters (albeit with a wider hull form). The bow is marked by a prominent and extensive bulb that should cause interesting challenges when maneuvering in confined waters.

The powertrain consists of two diesels driving two shafts. The total output is 20,400 shp.

The initial drawings suggested a preferred armament of two 76mm L62 Oto Melara guns, one on the foredeck and the other aft on the UAV hangar roof. The armament has since been changed to a single 76mm gun on the forecastle, while two 27mm Mauser guns have been added on the sides of the superstructure. The 76mm guns will be recycled from stricken fast attack craft.

The long-range component of the missile armament consists of four RBS15s; the RBS15 is the standard long-range anti-ship missile of the German Navy. Close-in air defense will be provided by two sets of RIM-116 Rolling Airframe Missile (RAM) launchers. These will be in lieu of a gun-based system such as Goalkeeper or Phalanx. A torpedo defense system is to be added starting in 2008; it will employ adjuncts to the sonar array and a launcher mounted in place of the after

RAM launcher, which will be moved to a higher location.

The combat management system is expected to be based on software modules to be used on the much larger F-124 frigate. Not only will this result in increased compatibility within the Fleet, but it should save money and reduce the risks inherent in integrating all-new systems.

Operational Characteristics. Operationally, the K-130 class is expected to replace the German Navy's Type 143B Albatross and Gepard class and Type 148 Tiger class fast-strike craft.

One of the main missions of the ship will be to provide the German Navy with a vessel suited for U.N. peacekeeping and other out-of-area operations. Such operations require a greater and much more rounded capability than found with the older FAC-M. The ships need to exhibit high maneuverability and low signature characteristics for operation in the littoral regions. On the other hand, their seagoing and seakeeping capabilities should be substantially enhanced in order to permit longer duration deployments in distant theaters of operations. The primary tasks of the Seamos unmanned aerial drone are comprehensive maritime reconnaissance and target acquisition.



K-130 Corvette

Source: German Navy

Variants/Upgrades

MEKO-A100. The K-130 class is a derivative of the MEKO-A100 design family specifically built to meet the German Navy's current requirements. Other variants

of the MEKO-A100 are optimized for specific customer requirements (the MEKO-A family of frigates is covered in a separate report in Tab C).

Program Review

Background. By the end of the 1980s, the German fast attack craft fleet, based on the S-148 Tiger class built between 1972 and 1975, the S-143 Albatros class built in 1976 and 1977, and the S-143A Gepard class built between 1982 and 1984 (a total of 40 FACs), was showing its age. Plans to replace the older classes and upgrade the S-143A class were being finalized by 1991. They were, however, challenged by the results of the Second Gulf War – in particular, the Battle of the Bubiyan Channel, where the Iraqi fast attack craft flotilla was destroyed by Coalition aircraft and helicopters.

The End of the FAC

The Battle of the Bubiyan Channel proved what naval analysts had asserted for years – that the combat capability of the missile-armed FAC had been grossly overstated and that craft of this type could not be used as frontline combatants without incurring almost suicidal risks. Although the FAC community in Germany vehemently opposed this conclusion, the German Navy shelved plans to build new fast attack craft and decided instead to procure a new class of corvette. These would be in the 1,500-ton bracket and provide the rounded naval capability lacking in the FAC. Building corvettes of this type would also allow operations further removed from German home waters, in particular naval support of multinational peacekeeping missions. This new class of corvette was designated the K-130 class. A decision was made to build 15 K-130s to replace the 40 FAC-M vessels.

Approval for this program was initially granted in the fall of 1995. A work group was then assigned to review the tactical and technical requirements, and how the new ship would actually fit into the German Navy's future fleet composition. Progress was slow, however. The design was initially to be completed by the end of 1996, but that date slipped because of the drawn-out definition process and funding constraints.

Corporate Alignments Redrawn

Invitations to Tender were accepted at the end of 1998. Two competing industrial consortia bid for the contract: a group made up of Blohm + Voss, Fr Lürssen Werft, Thyssen Nordseewerke (TNSW), and DASA (DaimlerChrysler Aerospace) competed against the

team of Howaldtswerke and STN Atlas Elektronik. These teamings showed a realignment of corporate alliances, as the consortia ARGE F123 and ARGE F124, based around Blohm + Voss, TNSW, and HDW, had dominated past building programs. The new teaming for the K-130 also meant that STN was competing directly against DASA's Ulm division, with both intending to become major players in the naval systems integration sector.

Dornier GmbH was contracted by the Federal Office of Defense Technology and Procurement (BWB) in the fall of 1998 to develop the Seamos unmanned reconnaissance and location (target acquisition) system for naval applications. It was specifically stated that the platform would be the K-130. Test flights were announced as part of the plan, to be carried out off Friedrichshafen and on the North Sea coast. One of the modifications being tested was the installation of a more powerful Allison 250 C20 engine for the drone, perhaps suggesting longer operating ranges in the future. The vehicle will use the K-130 aft landing platform.

Blohm + Voss Triumphant

Throughout 1999, the project remained in final definition phase. BWB then began evaluating the bids of the two competing teams. The final selection in favor of the Blohm + Voss consortia was made in August 2000.

In April 2001, the Saab Bofors Dynamics RBS15 anti-ship missile was selected for installation on the class. In January 2002, the construction order for the first batch of five K-130 class light frigates was placed with the ARGE consortium. The ships are expected to be procured in three batches of five. At that time, the first ship was expected to enter service in 2005, and the last to be commissioned around 2015. However, financial pressures on the German defense budget quickly impacted the K-130 program, delaying construction of the first group enough to push delivery out to 2007-2008. At the same time, speculation started to spread that the second and third batches of K-130 class ships would not be ordered, restricting construction to five ships.

By early 2003, there were doubts as to the availability of the proposed Polyphem missiles, and the option of

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replacing them with a land-attack version of the RBS15 was being evaluated. This would mean the provision of additional RBS15 missile stowage. In July 2003, Germany withdrew from the Polyphem missile program. Alternatives now being considered for the land attack role on the K-130 class include modified derivatives of the Exocet MM40, additional RBS15s, or the Harpoon air-to-surface missile.

On December 3, 2004, the keel-laying ceremony for the first component of the lead ship of the K-130 corvette took place in Emden. At that time, it was revealed that the vessel would carry the name *Braunschweig*, and be delivered to the German Navy in 2007. The rest of the class also took the names of German regional cities, thus placing them firmly into the frigate category. This was confirmed when their pennant numbers showed them to be listed in the F class, rather than the K-numbers applied to previous corvettes, or the P-numbers applied to fast attack craft.

Following its delivery in April 2007, the *Braunschweig* commenced sea trials. Although formal results have not been released, it has been reported that the ship did not meet design top speed on trials. In response, the Navy reportedly elected to accept a lower top speed in exchange for the yard adding bow thrusters to all ships at no cost to the Navy. However, other reports claim that the *Braunschweig* achieved neither its design speed nor maneuverability targets during trials and that the Navy considered the maneuverability problems to be more important than issues of speed. The need for bow thrusters was demonstrated in an incident during its transit of the Kiel Canal, where *Braunschweig* was pressed against the canal bank by side winds.

The installation of bow thrusters and some other remedial work delayed the commissioning of the class by approximately five months. The last ship of the class was commissioned in May 2009.

Funding

The program was originally expected to include up to 15 corvettes, but cutbacks in defense spending have significantly impacted these production plans. The original intention to build the whole class in two groups – a batch of seven, followed by another eight – was replaced by a revised scheme that broke the total into three batches of five. The financing of product development has been borne chiefly by the prospective contractor teams. Government funding is expected to recoup at least part of the investment outlays. Subsequently, the latter two batches of corvettes have been abandoned, and construction will remain limited to five hulls.

Contracts/Orders & Options

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
ARGE K-130 Team	N/A	Mid-1998 – Project definition contract.
HDW-Projektgruppe K-130	N/A	Mid-1998 – Project definition contract.
Dornier	N/A	Fall 1998 – Development of the Seamos unmanned drone system for K-130.
ARGE K-130 Team	N/A	Jun 2000 – Detail design contract for the K-130.
Saab Bofors Dynamics	69.4	Apr 2001 – Order for RBS15 missiles to equip K-130.
ARGE K-130 Team	N/A	Jan 2002 – Order for first five K-130 class corvettes.
EDS	10.0	Jan 2003 – Product life-cycle management software.
MAAG Gear	N/A	Mar 2003 – Main gears.
STN Atlas	N/A	Aug 2003 – Electrical systems.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Fall	1995	Approval for program (tactical concept) granted by German government
End	1996	Tentative date for design completion
Jan	1998	Definitive tactical/technical requirements approved for the first batch of five
End	1998	Invitations to Tender accepted
Nov	1999	Funding decision made
Jan	2000	Industry bids received, evaluation begun
Aug	2000	Blohm + Voss selected as prime contractor
Jan	2004	First steel cut
	2008	Four of five ships completed
May	2009	Last-of-class completed

Worldwide Distribution/Inventories

Germany. Five ships are in service with the German Navy.

Forecast Rationale

With the last of the five members of the class delivered in January 2009, the K-130 class program is now close to the end of its short production career. The German Navy has made it clear that as far as it is concerned, this class is now a done deal, and no further ships of this type will be built. Any exports of ships in this size bracket will go to the MEKO-A100. Thus, it is most unlikely that any additional K-130 class ships will be built. A null forecast is thus recorded for this class.

With only five ships completed out of a planned total of 15, it is apparent that the K-130 program declined significantly under German naval planning. The question that has to be asked is why did this program fail to achieve the success its promoters hoped for? The most valuable conclusion to be drawn from this quite simply is that the K-130 class consisted of the wrong ships at the wrong time. In this respect, they share much the same problems as the equally disappointing Swedish Visby class.

In a general sense, the *Braunschweig* and her sisters are a response to the rapid decline in military credibility of the missile-armed fast attack craft that started in the late 1980s and picked up steam throughout the next decade. These craft accumulated a great deal of support when they first hit the international naval market in the early to mid-1970s and, in common with many other niche products, they quickly acquired a clique of determined supporters. Despite growing appreciation for the shortcomings of these craft, particularly their extreme vulnerability to air attack, restriction to coastal waters,

and dependence upon shore-based command and control systems, these supporters continued with their dedication to the concept when the first-generation fast attack craft came due for replacement.

The K-130 class was a direct result of the efforts of FAC-M supporters to overcome the shortcomings of their favored concept. The lack of air defense was partially solved by the addition of anti-aircraft missiles, the command control problems by providing an on-board battle management system and facilities for operating a helicopter. The problem was, by the time all of this had been achieved, the resulting ship was a frigate – which of course confirmed the opinions of the FAC-M critics. The K-130 was not a fast attack craft with its problems solved. It was a frigate compromised by inadequate size.

Timing was also very bad. Conceived in the dying days of the Cold War, by the time the K-130 entered service, the world had changed completely. The prospect of heavy fighting against Russian forces in the Baltic had vanished and, instead, the emphasis was on peacekeeping and equivalent missions far abroad. The K-130 was fundamentally unsuited for these tasks. Emphasis shifted to the new F-125 class frigates that were specifically intended for such missions.

Only one question really remains now concerning the K-130 class: since its role in the German Navy is nebulous and its value doubtful, will these craft see only a short period of service before being sold off to a country that is better placed to use them?

K-130

Ten-Year Outlook

With all the ships of this class delivered and no orders outstanding, no additional construction is expected; the forecast chart has therefore been deleted.

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