

SHIPS 2009

Made in Germany



ELBE

HANSA
International Maritime Journal

in co-operation with



Verband für Schiffbau
und Meerestechnik e.V.

HANSA Supplement February 2010

SHIP OF THE YEAR 2009



SWATH Ship »Elbe« by A & R

For the 28th time HANSA has selected the most interesting ship of the year. This prize is awarded to that particular newbuilding from a German shipyard that the HANSA editors consider the most innovative, technically interesting and from the production point of view most sophisticated vessel of the year just gone by.

Looking at the ships selected for this award in the last 28 years it can be stated that they represent the development of German shipbuilding over almost three decades. All in all, there were eleven cruise ships, five container vessels, four ferries, two research vessels, two reefers, two yachts and one naval craft. It can also be observed that over this period of time the individual ship types have become much more specialised: general cargo ships have developed into innovative container vessels, standard cargo or ro-ro ferries into modern con-ro or ro-pax ferries and the cruise ships of the youngest generation are highly sophisticated floating holiday resorts. And last but not least, the construction of mega-yachts has grown into a very significant field of German shipbuilding.

The winner of the »Ship of the year 2009« Award is the new 60 m SWATH-Pilot Station ship »Elbe« by A & R. This ship is representative of the SWATH design by A & R in the third generation. In commercial shipbuilding unconventional ships of smaller dimensions have found application in recent years. These ships were SWATH, originally invented with the purpose of reducing wave making resistance. The development of modern catamarans has overtaken the SWATH concept in this area. The SWATH ships on the other hand made it their aim to exploit their inherent potential extraordinary sea-keeping capabilities.

More than 100 years of shipbuilding experience

The shipyard Abeking & Rasmussen (A & R), situated on the banks of the river Weser, was founded in 1907. Over the decades, it has evolved to a state-of-the-art shipbuilding complex, currently consisting of five hangars for ships of up to 80 m in length, modern office buildings and an inner harbour. It is equipped with a synchrolift. There are environmentally friendly workshops housing high-performance facilities for producing conventional steel,

aluminium and non-magnetisable steel ships.

The century-old dream of the seafarers not to be exposed to the forces of the wind and the movement of the water during a sea passage now is much closer to coming true. It has always been the aim to enable people to work upright onboard vessels instead of crawling »on all fours«. Already quite some time ago systems were invented – particularly in connection with passenger ships – to reduce the rolling and pitching of the vessel's hull in rough seas: anti-roll tanks and fin stabilizers. These very complex and expensive devices – which are still always subject to physical laws and sometimes even deteriorate the vessel's behaviour – did, however, not really prove useful on ordinary ships. Thus normal vessels, especially smaller units, remain dangerous working places to seafarers and prevailing conditions on board can always impair the efficiency of seamen to perform their duties appropriately. A & R achieved a »quantum leap« when the yard introduced its state-of-the-art computer technology for the future, the SWATH concept. Even on board smaller vessels crews today can be provided with a stable platform.

The SWATH-Technology

The SWATH-Technology has been known in Germany since 1930 and was registered as patent. It is based on the knowledge that wave resistance declines when as much displacement as possible can be brought below. The lower resistance level is achieved by skilled overlapping of the wave profiles generated by the various displacement levels. This design underwent a consequent development by A&R according to the specific requirements of the customers. The Pilot Station ship mentioned above is also being called a »North Sea Hotel« owing to its outstanding characteristics at sea.

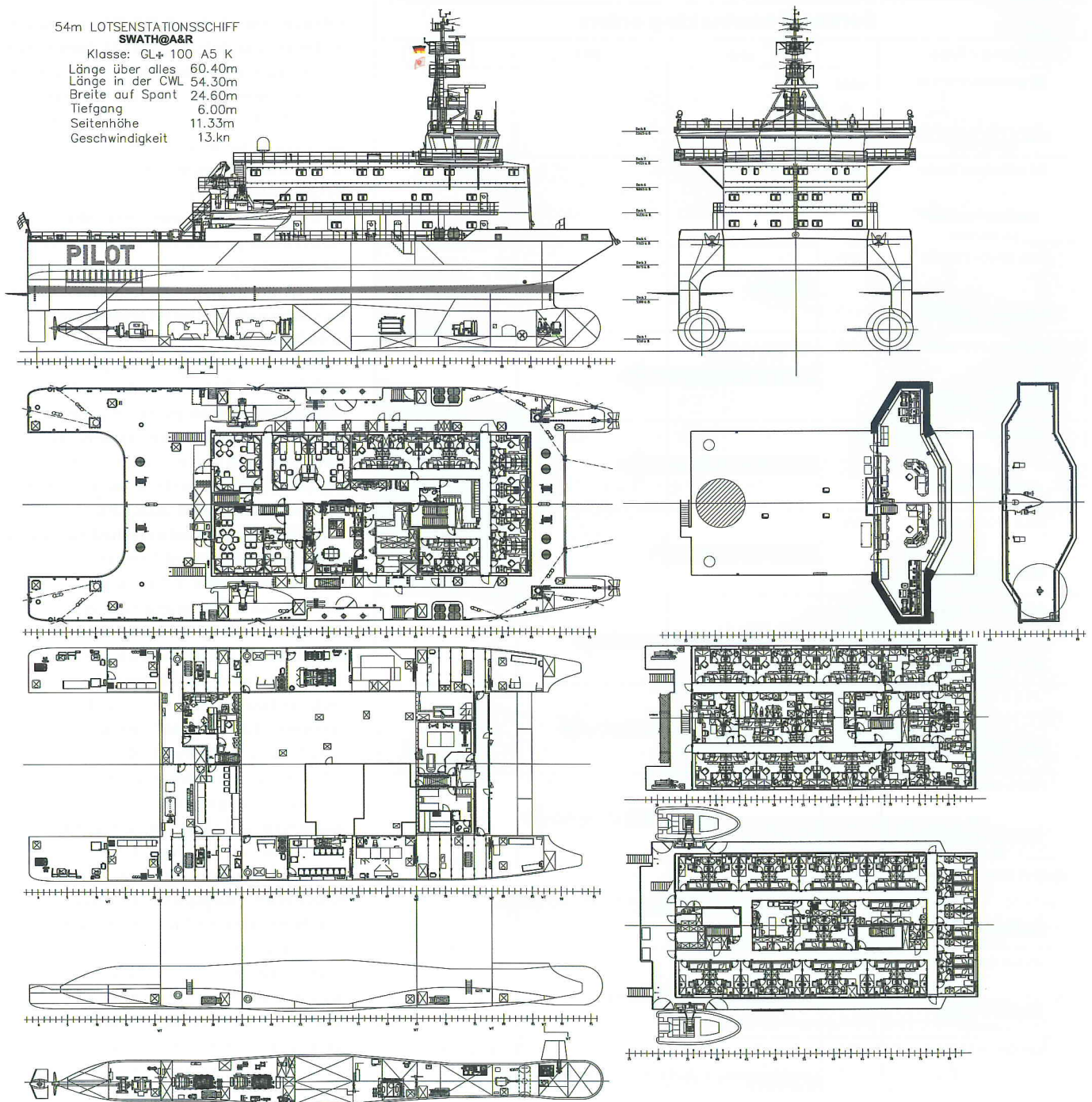
SWATH stands for Small Waterplane Area Twin Hull, an innovative hull concept for smooth service in rough seas. The buoyancy of a SWATH ship is provided by its submerged torpedo-like bodies, which are connected by single or twin struts to the upper platform. The cross-section at sea surface level is minimized and thus only a minimum of the ship is exposed to the lifting forces of the waves. The idea of SWATH was taken from the principle of semi-submersible offshore rigs which are designed to provide a working platform with minimized motions in open sea.

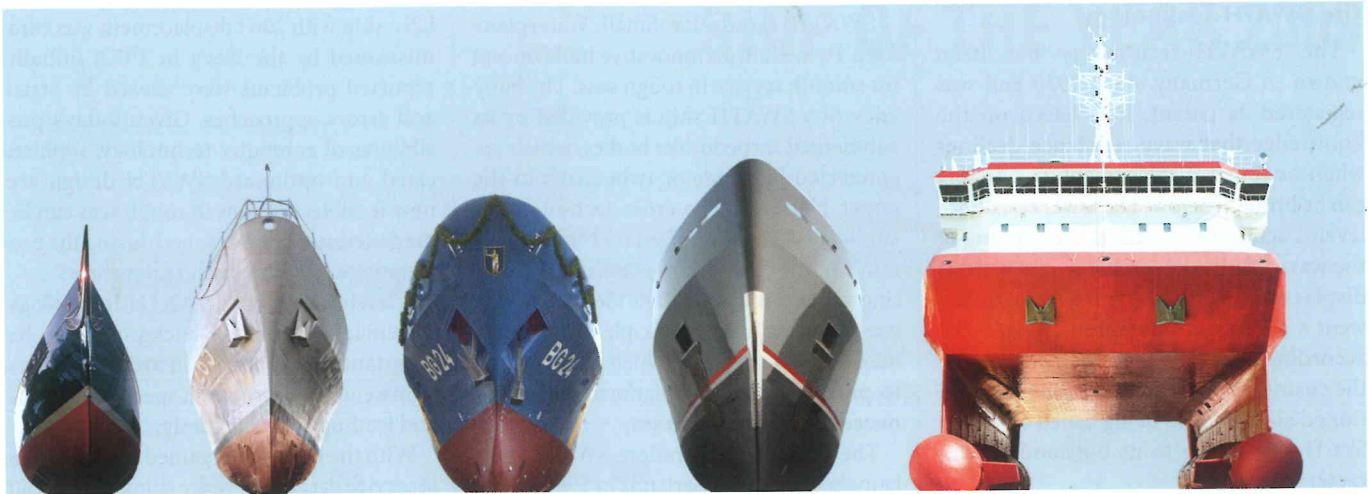
The first demonstration SWATH was launched in the Netherlands in 1968. In the

US a ship with 200 t displacement was commissioned by the Navy in 1972; initially reported problems were caused by »trial and error« approaches. Given today's possibilities of computer technology, sophisticated and optimized SWATH design are now feasible; motions in rough seas can be predicted and reliably tuned during the project phase – by those who know how!













A & R has developed SWATH Technology systematically on the background of its longstanding experience in hydrodynamics, lightweight construction, special materials and leading edge ship design.

With the know-how gained from full-scale service data of reference ships and special





Survey of newbuilding orders

Name / Type		2010	2011	2012
60 m SWATH-STATION  Deutschland	6484	→		
26 m Windpark Tender  Deutschland	6476	→		
60m SWATH-STATION  Deutschland	6485	→		
25,65 m Lotsentender  Deutschland	6495	→		
25,6 m Swath Tender  Belgien	6471	→		
25,6 m Coast-Guard  Lettland	6487	→		
25,6 m Swath Tender  Belgien	6472	→		
25,6 m Coast-Guard  Lettland	6488	→		
25,6 m Swath Tender  Belgien	6473	→		
25,65 m Swath Hydrographic  Estland	6494	→		
25,6 m Coast-Guard  Lettland	6491	→		
60m SWATH-STATION  Belgien	6474	→		

software tools today A & R is in a position to design and deliver SWATH ships reliable for tough everyday duty – a long-term valuable investment – under the brand name SWATH@A&R. Since 1994 the shipyard has been concentrating on the second generation and developed and built two pilot tenders which were delivered to their owners in 1999. Since then these ships have successfully proven the capability of the SWATH-design in service under deployment of the Cuxhaven Pilots' Association in the estuary of the Elbe river up to the island of Heligoland.

The technical designs of the pilot tenders slightly differ from each other, as the experience of the first ships was included in the construction of the new vessels. The description here below refers to the first SWATH@A&RShips »Döse« and »Duhnen« of the Cuxhaven pilot association.

The vessels, also entirely made of aluminium, have a length of 25.65 m, a beam of 14.26 m, a draught 2.7 m and a displacement of 125 t. The propulsion plant is diesel-electric and operates according to the electric shaft principle, with energy generation provided in the area of the main deck via two plants with MTU diesel engines of type 12V 2000 M70, each developing 788 kW. The two torpedo floats accommodate the electric drive engines, which are run with changing speeds and act via a gearbox on the shaft with fixed pitch propeller. The very course-stable and extremely manoeuvrable ships reach a top speed of 18 knots. The pilot tenders have a crew of two persons and can take up to eight pilots. They are designed for an average wave height of 3.5 m. However, they also allow pilot transfers with maximum wave heights of 5 m. A computer-controlled fin stabilisation keeps the ship horizontal. Heelings can be generated via a fast ballast system. Transfer operations are thus also possible on vessels with low freeboard.

A transfer up to 6 m above the sea is feasible. The SWATH@A&R pilot tenders have the Germanischer Lloyd classification GL \boxplus 100 A5 OC 3 Pilot Tender.

The SWATH@A&R pilot station ship »Elbe« (today »Hanse«) was commissioned a year later, in August 2000. Unlike the tenders, the SWATH@A&R pilot stations have a steel structure with 49.90 m length, a beam of 22.55 m, a draught of 5.90 m and a displacement of 1,480 t, designed as an all-electric ship. The »Hanse« was equipped with four diesel generators with engines of type MTU 8V 396 TE 54 with a propulsion output of 2,00 kW, installed in pairs in the floats, as they are electrically driven engines. They each develop 1,000 kW to drive the shaft with a fixed propeller, providing a top speed of 14 knots. The bunker capacity is also designed for supplying the pilot tenders.

The main objective of the design was to achieve an optimal form of the torpedo-shaped floats that provides minimum resistance and simultaneously retain the required seaworthiness. An intelligent propulsion system was integrated on the all-electric ship. Its basic design had non-active steering fins installed on the floats with no increase of resistance. During tests it turned out that compared with a conventional ship the 25 m SWATH-design showed entirely superior characteristics. Under conditions of wind force 7-9 (in squalls up to 9) and waves up to 4.3 m the twin-hull construction remained in vertical acceleration below 0.2 g, and rolling was below 5°. The fast displacement ships of the SWATH type show a lesser wave making drag for $F_n > 0.3$. For another design variant of the 25 m SWATH tender the resistance in actual dimensions shows that for the higher speed of 20 kn and Froude number of 0.65 the resistance compares very favourably to a monohull.

The tested and economic SWATH pilot tenders and pilot station ships have meanwhile been in operation for many years. With their sea-keeping capacity they are capable of maintaining their velocity of 18 kn when transferring personnel to the



Gyro Based Ship Stabilization and Ride Control



iMAR supports all your naval stabilization & control tasks from design to delivery, all Made in St. Ingbert / Germany

www.imar.de

sales@imar-navigation.de

Picture: iMAR's iSSMC, controlling SWATH Helgoland of German Customs

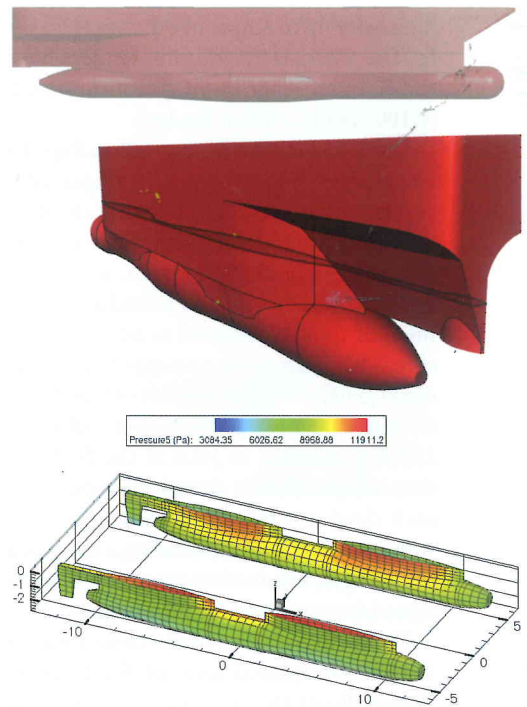


- MatLab based ship motion dynamics & control analysis
- Hydraulic or electric power requirements spec. support for flaps, trim-tabs, T-foils, fins, rudders
- Support of model testing with gyro systems in the Ship Model Basin (e.g. HSVA uses iMAR gyro systems as reference) and dynamics analysis / shipbuilder support
- Delivery of application specific iSSMC systems (bridge panel, gyro, GPS, actuator control), all "Made in Germany"



Construction of a SWATH torpedo

Photo /Graphics: A&R



»Ship of the Year« 1982–2009			
Year	Type of ship	Name	Building yard
1982	Polar supply/research	Polarstern	HDW/WWN
1983	Reefer vessel (»Ship of the future« components)	Helene Jacob	Flender Werft
1984	Railway wagon ferry	Railship I	SSW
1985	Container vessel (»Ship of the future«)	Norasia Susan	HDW
1986	Cruise ship	Homeric	Meyer Werft
1987	Conversion cruise ship	Queen Elizabeth I	Lloyd Werft
1988	Post-Panamax cont. v.	President Truman	HDW
1989	Yacht-cruiser	Seabourn Spirit	SSW
1990	Mega-Yacht	Lady Moura	Blohm + Voss
1991	Mega-Yacht	Eco	Blohm + Voss
1992	Container vessel	DSR Baltic	Bremer Vulkan
1993	Baltic Sea ferry	Silja Europa	Meyer Werft
1994	Open-top cont. v.	Norasia Fribourg	HDW
1995	Cruise ship	Century	Meyer Werft
1996	Cruise ship	Costa Victoria	BV/Lloyd Werft
1997	General cargo ship	Cathrin Oldendorff	FSG
1998	Cruise ship	Superstar Leo	Meyer Werft
1999	Reefer container ship	Dole Chile	HDW
2000	Fast cruise ship	Olympic Voyager	Blohm + Voss
2001	Cruise ship	Radiance of the Seas	Meyer Werft
2002	Frigate	Sachsen	Blohm + Voss
2003	Freight ferry	Tor Magnolia	FSG
2004	Navy research ship	Planet	NSWE
2005	Cruise ship	Pride of America	Lloyd Werft
2006	Con-Ro ferry	Pauline	FSG
2007	Cruise ship	AIDAdiva	Meyer Werft
2008	Cruise ship	Celebrity Solstice	Meyer Werft
2009	SWATH Pilot vessel	Elbe	A & R

seagoing vessels at 10–12 kn compared with 6 kn of conventional tenders and ensures a rapid succession of pilot attendance. Furthermore they do not have to navigate into the lee of the ocean-going vessel but can continue operations even under weather conditions with west-north-westerly winds at Beaufort force 9 and up to hurricane strength with southern or easterly winds in the Elbe river estuary. This does not only save time but also an expensive and (still) dangerous pilot transfer by helicopter.

These obvious advantages triggered follow-up orders from other pilot associations. Two more tenders entered service in the Weser estuary in 2004 and for the river Ems in December 2006. Another two pilot station ships are going to be commissioned in 2010. In 2005 and 2006 A & R delivered two pilot tenders to the Netherlands Loodswezen. The decision for the SWATH technology was based on the good operational experience of the German pilots: The Elbe Pilot Association operates in the North Sea off Cuxha-

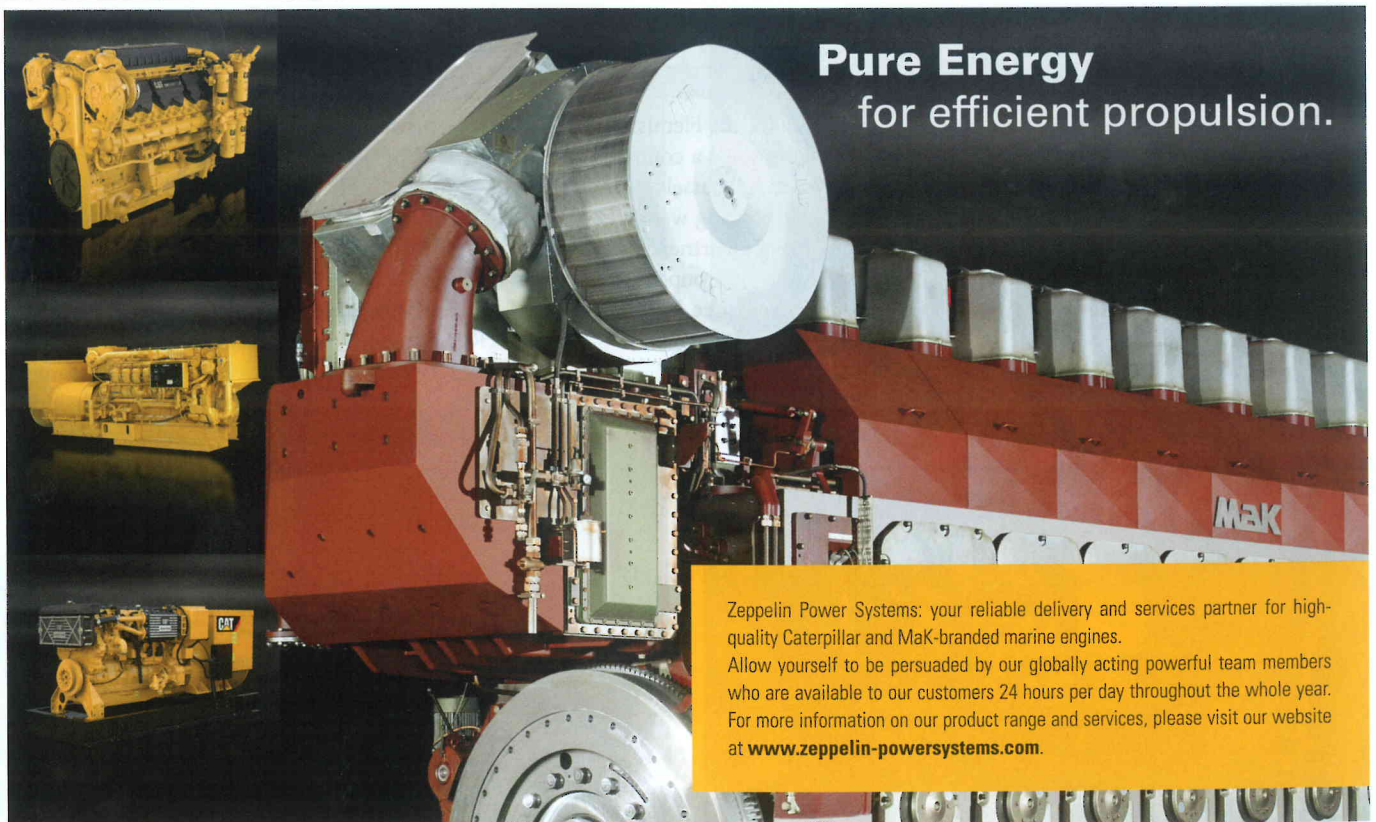


Station vessels

Photo: A&R

Worldwide building list of SWATH vessels

Year	Name	Service	Builder	Designer	Struts	L [m]	B [m]	Draft [m]	Displ. [t]	Power [kW]	Speed [kts]	
1	1969	Duplus	work	Boele	Stenger	1	47,0	17,08	5,49	1450	1250	8,0
2	1973	Kaimalino	work	USCG C	NOSC	2	26,8	14,32	4,65	190	3212	25,0
3	1977	Marine Ace	experimental	Mitsui	Mitsui	1	12,4	6,50	1,55		298	17,3
4	1979	Seagull 1	pass/ferry	Mitsui	Mitsui	1	35,9	17,10	3,15	348	5912	25,0
5	1980	Kotozaki	Oceanographic	Mitsui	Mitsui	1	27,0	12,50	3,40	236	2794	20,5
6	1981	Ohtori	Oceanographic	Mitsubishi	Mitsubishi	1	27,0	12,50	3,40	240	3800	20,6
7	1981	Betsy (ex Suave Lino)	America's Cup Tender	SWATH Ocean	SWATH Ocean	1	19,2	9,10	2,13	53	634	18,0
8	1984	Kaiyo	Oceanographic	Mitsui	Mitsui	1	60,0	28,00	6,30	400	8440	14,0
9	1984	Charwin	work	Augustine	Trawle	1	24,4	11,20	2,75	196	730	10,0
10	1985	Halcyon	work/dive	RMI	Luedeke	1	11,0	22,87	11,59	57	1020	21,0
11	1985	Marine Wave	yacht	Mitsui	Mitsui	1	15,3	6,10	1,59		404	18,2
12	1987	Sun Marina	yacht	Mitsui	Mitsui	1	15,3	6,40	1,59	190	441	20,5
13	1987	Chubasco	yacht	James B	SWATH Ocean	1	21,9	9,40	3,05	79	1119	20,0
14	1988	Navatek I	pass/exc	Thomps	Oec	2	40,0	16,46	3,66	365	1971	16,0
15	1989	Bay Queen		Mitsui	Mitsui	1	18,0	6,80	1,60	39	690	20,0
16	1989	Seagull 2	pass/ferry	Mitsui	Mitsui	1	39,4	15,56	3,26	350	7825	27,5
17	1989	Bay Queen		SWATH Ocean	SWATH Ocean	1	20,4	9,76	2,59	78	1588	24,0
18	1989	F. Creed	Oceanographic	SWATH Ocean	SWATH Ocean	1	20,4	9,75	2,90	81	1588	24,0
19	1990	Patria	pass/terry	FBM	FBM	1	36,6	13,12	2,71	183	4022	30,0
20	1990	Diana		Mitsui	Mitsui	1	20,7	6,71	1,59		544	19,0
21	1990	Stormulk	passenger	Norsk Sisumaran	Norsk Sisumaran	1	11,4	6,40		6,5	iveco 8061 srm 27	20,0
22	1991	Bay Star		Mitsui	Mitsui	1	19,4	6,80	1,60	50	690	20,0
23	1991	Hibiki	military	Mitsui	Mitsui	1	27,1	6,31	2,74		2201	11,0
24	1991	Victorious	T-Agos-19	McDerm	Navsea	1	71,0	28,50	7,54	3400	1168	10,5
25		Victorious 2	T-Agos	McDerm	Navsea	1	71,0	28,50	7,54	3400		10,5
26		Victorious 3	T-Agos		Navsea	1	71,0	28,50	7,54	3400		10,5



Pure Energy
for efficient propulsion.

Zeppelin Power Systems: your reliable delivery and services partner for high-quality Caterpillar and MaK-branded marine engines. Allow yourself to be persuaded by our globally acting powerful team members who are available to our customers 24 hours per day throughout the whole year. For more information on our product range and services, please visit our website at www.zeppelin-powersystems.com.



Year	Name	Service	Builder	Designer	Struts	L [m]	B [m]	Draft [m]	Displ. [t]	Power [kW]	Speed [kts]
27	Victorious 4	T-Agos	Tampa	Navsea	1	71,0	28,50	7,54	3400		10,5
28	1991 Pursuit	work/camera	SWATH Ocean	SWATH Ocean	1	11,0	5,00	1,00	13	571	30,0
29	1992 Cloud X	pass/ferry	NBBB	SWATH Ocean	1	37,5	18,70	3,44	340	5740	27,0
30	1992 Houston Pilots ?	work/pilot	SWATH Ocean	SWATH Ocean	1	20,4	11,28	2,30	78	1426	23,0
31	1992 Western Flyer	Oceanographi	SWATH Ocean	SWATH Ocean	1	34,7			400		12,5
32	1992 Radisson Diamond	pass/cruise	Rauma	Waertsilä	1	131,0	32,00	8,00	12000	15300	12,5
33	1993 Seashadow	Experimental	Lockheed Martin	Lockheed Martin	1 slanted	49,9	20,78	4,42	570	1500	15,0
34	1994 Navatek II	pass/exc	Honolulu	Lockheed, Navatek	2 slanted	25,0	11,60	2,70	90	1320	22,5
35	1995 Global Pioneer	work/dive	Global	BSM	2	61,0	21,34				
36	1995 FBM	pass/ferry	FBM	FBM	1	36,6	13,00	2,70	200	1915	27,0
37	1995 FBM	pass/ferry	FBM	FBM	1	36,6	13,00	2,70	200	1915	27,0
38	1995 Cosmos		Mitsui	Mitsui	1	29,2	11,30	2,35	140	2240	24,0
39	1997 SLICE	Experimental	Pacific Marine	Lockheed, Navatek	2	31,7	16,80	4,27	183	5120	30,0
40	1999 Suncruz IV	pass/casino	Leevac m	DeJong	1	48,8	19,81	4,57		1401	10,0
41	1999 Stillwater River	crewboat	Eastern Shipb.	ACMA	1	36,4	13,31	3,48	292	6770	29,0
42	1999 Döse	work/pilot	A&R	Oec/A&R	2	25,6	13,00	2,70	129	1580	18,0
43	1999 Duhnen	work/pilot	A&R	Oec/A&R	2	25,6	13,00	2,70	129	1580	18,0
44	2000 Elbe	pilot/station	A&R	Oec/A&R	1	49,9	22,00	5,90	1482	2720	14,0
45	2002 Kilo Moana	Navy/Research	Atlantic Marine	Lockheed, G. Perla	1	56,5	26,80	7,60	2558	3640	15,0
46	2003 CNOOC		CNOOC		1						
47	2004 Prinses Maxima	pass/ferry	Damen	BMT Nigel Gee	1	37,7	17,17	4,20	400	3120	16,5
48	2004 Prins Willem-A.	pass/ferry	Damen	BMT Nigel Gee	1	37,7	17,17	4,20	400	3120	16,5
49	2004 Bayou City	work/pilot	SWATH Ocean	SWATH Ocean	1	21,9	13,10	3,66		3000	20,5
50	2004 Wangeroog	work/pilot	A&R	A&R	2	25,6	13,00	2,70	132	1580	18,0
51	2004 Explorer	Experimental	A&R	A&R	2	25,6	13,00	2,70	132	1580	16,0
52	2005 Planet	Navy/Research	NSWE	MTG/NSWE	1	73,0	27,20	6,80	3500	4160	15,0
53	2005 Cetus	work/pilot	A&R	A&R	2	25,6	13,00	2,70	132	1580	18,0
54	2005 Perseus	work/pilot	A&R	A&R	2	25,6	13,00	2,70	132	1580	18,0
55	2005 Quest	research			Hyswas/1						
56	Qatari					72					
57	2006 Lider/Tenaz	crewboat	FBM	Lockheed Martin	2						
58	2008 Silver Cloud	private	A&R	A&R	2	40,5	17,8	4,1	600	1640	14,0
59	2009 Helgoland	Zoll	Nordseewerke	Nordseewerke		49,0	19,0				20,0
60	2009 Borkum	Zoll	Nordseewerke	Nordseewerke		49,0	19,0				
61	2010 Elbe	work/pilot	A&R	A&R	1	60,4	24,6	6,00	1800	2400	13,0
62	2010 BARD	Windpark	A&R	A&R	2	25,6	13,00	2,70	132	1580	18,0

ven 25 m SWATH@A&R Pilot Tender and a 50 m SWATH@A&R Pilot Station Ship since 1999. These vessels perform their duty in a tough workboat application all the year round – under all weather conditions. Since these ten years pilot operations became safer and more cost efficient. This reference is confirmed by the Dutch pilots who operate one of their 25 m SWATH@A&R Pilot Tender on the river Scheldt.

In May, 2009, the Flemish Prime Minister Kris Peeters signed a contract for a new Pilotage System in Brussels for the Flemish sea ports. The financing was achieved through a Public Private Partnership under the auspices of the Dexia group. Abeking & Rasmussen will deliver three 25 m SWATH@A&R Pilot Tender and one 60 m SWATH@A&R Pilot Station Ship in 2011 and 2012. In 2008 A&R applied the successful SWATH principle even when building a mega-yacht for a

private owner. »Silver Cloud« is the first and up to now only yacht of her very special kind (see HANSA 8/2009, page 16–20).

The SWATH@A&R technology of Abeking & Rasmussen was chosen from a worldwide competition. Including these new Pilot Vessels, Abeking & Rasmussen has meanwhile delivered or contracted twenty SWATH vessels for customers worldwide, which prove their leadership in this sophisticated technology. GF



Engine room of a pilot vessel

Photo: A&R



Station vessel and pilot tender

Photo: A&R