

# SEEN & SAILED

*The Iver Huitfeldt class by Commodore (Ret.) Niels C. Borck*





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## *The Iver Huitfeldt class by Commodore (Ret.) Niels C. Borck*

The new frigates in the Iver Huitfeldt class are, in combination with the command ships in the Absalon class, credible and effective symbols and tools of a continuing active Danish Foreign and security policy. The history of Denmark has numerous examples of the significance of the Navy for the nation, and we have, as a leading global maritime player, a lot of tasks to tackle in this respect. Denmark now possesses five technically advanced and durable units (three frigates and two command ships), which together with the Navy's other ships will be capable of converting words into action on all seven seas. And when these frigates, hopefully before too long, are equipped with new, efficient, robust Navy helicopters and advanced missile systems, they will truly be second to none.

These are three large, beautiful, technically advanced, powerful, fast and smooth-sailing frigates which are now a part of the fleet. The price, seaworthiness and weapon sensor package are a triumph.

### First impressions

"First impressions are seldom entirely wrong," I thought, my eyes blinking in the Alistair McLeanish weather. Heavy raindrops came thundering in from the west like pearls on a string and lashed me brutally on the face. It was difficult to see anything at all in the pitch dark.

It was the end of 2011 and the first real Autumn storm rolled in over the country on precisely the evening when I was to embark on the Iver Huitfeldt frigate in Korsør.

Despite the increasing haze in the harbour area of the Naval station in Korsør, there was no mistaking the large grey ship anchored on the outermost edge of the harbour's north pier. The dim deck lighting provided only a blurred impression of the ship's contours, but the red lantern at the top of the front radar mast showed that the ship was anchored with the bow pointing out towards the Great Belt, ready to sail. And already halfway through a difficult journey, directly into the storm, it was clear to me that not just by Danish standards, but also in comparison with those we want to measure ourselves against, the new frigates are simply impressive, awe-inspiring and powerful to behold.

The "wow effect" is thus quite noticeable the first time one sees the new frigates. For most people, the impression will be immediate and powerful. The designers have clearly succeeded in creating beautiful, elegant and modern stealth lines in a harmonic whole, which also includes robust naval instruments.

"This is not the weather to be sending sailors to sea in," I thought as I walked the last 500 meters on foot out to the frigate, which was anchored on the north pier in the new section of the naval harbour in Korsør. Soaked through, I had come to the reason for my journey to Korsør. "They have certainly succeeded with regard to appearance," I thought, taking a firm grip on the jackstay whilst I caught my breath and prepared to pass the gangway at 30 m/sec next to the pier and thereby...across the gangway. "Moderate breeze, as our Norwegian friends would say, we will have to see how the ship manager manages to manoeuvre the frigate out into the Great Belt," I said quietly to myself.

It soon became apparent that the manager, Commander Kristian Haumann, was a wise and experienced sailor. Departure was delayed from 21:00 on the Sunday evening to 03:00 the following Monday morning, by which time the storm had, in accordance with manager's expectations and the DMI forecast, calmed a great deal.

### 6,500 tons and 42,000 hp

One deck lower than the Absalon class, slightly longer and broader and with a fighting weight of 6,500 tons, the frigate appears authoritative, with elegant, powerful and athletic forms. The bow's pronounced alignment is promising for high speed and also in rough seas. The frigate will undoubtedly manage well in the North Atlantic, west of the Isles of Scilly and Fastnet Rock, where corvettes and smaller units risk taking a battering in bad weather, but where adult frigates tumble comfortably with self confidence. Apart from the cannons, the facilities for a very comprehensive arsenal of weapons are discretely "hidden" on the weapons deck amidships, where an impressive selection of missiles can

be carried. Of particular interest is the Lockheed Martin multi-missile launcher, from which both Tomahawk cruise missiles and Standard missiles (strategic air defence) can be launched.

### The platform

The frigate is constructed with a view to attaining a low radar signature, low infrared radiation as well as a low radiation of underwater noise and low magnetic signature. These are all sensible measures, which provide good stealth values and which are characteristic of the design of the hull, superstructure and masts in modern warships. The frigate is divided into six hazard zones containing three main citadels, i.e. areas that can protect the crew against the effects of ABC weapons. The two aft citadels are further divided into two zones. All zones are equipped with separate filters which can function independently of one another. Between each zone and the citadels, ABC airlocks are located, allowing the crew to move around the ship and use the three cleaning stations whilst sailing in the contaminated area. All in all, the hazard protection appears to be particularly well thought out and functional. The tasks are controlled from the ship's engine room, from which all the hazard functions can be monitored and operated and from where the ship's hazard patrols can be directed and deployed.

The Damage Control System, which is a part of the IPMS, also provides the possibility of hazard monitoring via a laptop computer, which can be connected pretty much anywhere on the ship. The foundation of the design and implementation of the DCS had previously been developed in connection with the building of the flexible support ships ESBERN SNARE and ABSALON, where the Navy worked closely with Logimatic to develop the best technological and practical solution.

The helicopter deck is about the size of a detached house and together with the hangar facilities provides the opportunity for operating helicopters like the EH-101, which is used by the Air Force. But larger helicopters with weights of up to 20 tons can also land and launch from the deck. It is crucial that the ships are equipped with long-range, fast naval helicopters which can supplement the ship's own information gathering and where appropriate, act as advance weapon carriers. New helicopters are thus a very high priority on the Navy's acquisitions list.

### Impressively spacious

The command bridge is situated a deck lower than it is in the Absalon class with plenty of space and an impressive view making the space

wider and deeper than is the case in command ships. There is generally a lot of room on board. Passageways and ladders are regular and broad, which, in combination with the space between decks, provides an impression of a carefully considered, spacious and future-proofed concept. There are only a few hidden pipes and cables, everything appears simple, ordered and accessible. Doors and hatches are easy to operate, everything has its place and it is easy to find your way around the ship. It is wonderful working in an environment like this.

### Exit Odense Steel Shipyard

The frigates are the product of a superb collaboration between the Naval Material Command - now the Defence Acquisition and Logistics Organisation - and Odense Steel Shipyard (OSS). It is lamentable that OSS closed shortly after the first frigate was delivered in January 2012. This ends a long and glorious era in Danish industry and craftsmanship. The end – for now – of larger new builds in Denmark and one can ask oneself where the next ships for the fleet will be built. This development is made even more ridiculous by the fact that Denmark is one of the largest maritime nations in the world.

When I see the Peter Willemoes frigate anchored south of the Danish island of Anholt, at sunset on a quiet evening just before flag time, I have to admit that we will have to search far and wide, and probably also in vain, in the reference books to find a more beautiful warship. And perhaps also thereby a better memory of how Danish shipbuilding is capable of performing with due diligence as a guide and visionary professionals from the Navy and the industry in an effective collaboration.

### Frigate

*(From the French Frégate of unknown origin)*

Prior to making the trip to Korsør to board the Iver Huitfeldt, I had refreshed my memory for the definition of a frigate and found that a frigate is a light warship for surface operations. The term currently covers a wide variation in the size, with ship lengths of 85-140 m, tonnages of 1,300–1,700 t and crews of 90–300 men. The speed, range, armaments and other equipment also vary according to the different constructions.

Frigates normally have a top speed of around 30 knots and a range at cruising speed (around 18 knots) of 1,500-5,000 sea miles. Armaments and other equipment are relatively versatile and allow for monitoring,

early warning and action against submarines other surface ships, aircraft, and more recently, include ballistic missiles. As a rule, frigates can carry one or several helicopters and the Iver Huitfeldt class can also carry unmanned drones for remote detection.

The frigate ship type saw the light of day in the 1600s as a fully rigged warship with one closed battery deck. The frigate was originally designed to be a scout and signal repeater for the heavier and slower line ships, but developed quickly into a very useful unit for carrying out a series of missions.

During World War II the frigate was “resurrected” because in Great Britain an escort ship was developed for the protection of the transatlantic convoys, these were ships with a displacement of 1,000 to 1,500 tonnes, a speed of 15-20 knots and was equipped with sonar and depth charges for combating submarines. A warship of this kind would today be regarded as a corvette. The frigate has since developed into a more versatile and larger kind of ship, which can be equipped and armed with a view to carrying out a variety of tasks.

## Tasks

The new frigates are classed as air defence frigates, but are capable of taking on all naval missions that are usually given to ships the size of frigates. This means that a series of naval tasks in the security spectrum from peace to tension to war can be solved flexibly and efficiently and with a great deal of endurance. Which tasks the ships are actually assigned will depend on the current security policy assessments and needs. These could be both national and international maritime missions, including participation in joint military operations in a global framework.

More specifically, these are:

- › Monitoring of no-fly, no-sail zones and embargo missions
- › Command platform for teams
- › Maritime helicopter operations
- › Fire support for land operations
- › Escort missions and protection of civilian shipping

In addition there are a series of other classic maritime missions which include:

- › Sovereignty assertion and authority missions
- › Environmental monitoring
- › Intelligence gathering
- › Search and rescue operations
- › Training

## What about the others?

The new frigates compare comfortably to other modern frigates built by the nations that we usually collaborate with. And the comparisons are distinctly in favour of the Danish ships. Just look at the table on page 6. It is not just with regard to size, speed and weaponry but also price and construction time that we are close to a high number of maritime Michelin stars. Compare, for example, the Iver Huitfeldt class with the Norwegian frigates of the Fridtjof Nansen class. See the table on the next page.

## Many considerations taken

After just a few hours on board, visitors are filled with numerous positive impressions. It is first and foremost clear that many good and innovative considerations have been made. A great deal of credit must thus be given to the personnel of the fleet, who over a period of almost ten years have collaborated with Danish companies to create these unique new frigates. A myriad of details, large as well as small, have been thought into and implemented in rational and creative solutions. This thoughtfulness can be singled out as one of the primary reasons for the clear success of the frigate project from the start.

## The first trial journeys

It is a fact that the first trial journeys have fully lived up to expectations for the class of ship's basic qualities. In November the frigate PETER WILLEMOES took a trial journey over the Atlantic. Between San Juan, Puerto Rico to Ponta Delgado on the Azores, a distance of 2,400 sea miles, an impressive speed of around 27 knots was maintained. In addition, it should be mentioned that the various stages of the voyage were undertaken under very varied conditions. The wind strength varied from calm to 22-24 m/sec with the resulting wave heights from zero meters to around seven meters. The total distance sailed on the trial journey was 9,050 sea miles.

The experiences gathered form the basis of the conclusion that this is

Comparison of 5 modern NATO frigates	Iver Huitfeldt Denmark	Daring England	Sachsen Germany	De Seven Provinciën Holland	Fridtjof Nansen Norway
Dimensions in meters, displacement in tons	L:138 W:19,8 D: 6,45 Depl: 6,645	L: 153 W: 21,2 D: 5,3 Depl: 7,350	L: 143 W: 17,4 D: 5,1 Depl: 5,600	L: 144 W: 18,8 D: 5,1 Depl: 6,050	L:132 W: 16,8 D:7,5 Depl: 5,300
Speed in knots	30	29	29	30	+25
Propulsion	Codad 32,800 kW	Electric 40,000 kW	Codag 38,300 kW	Codog 39,000 kW	Codag 28,200 kW
Endurance	9,000 sm-15 kn	7,000 sm-18 kn	4,000 sm-18 kn	5,000 sm-18 kn	4,500 sm-16 kn
Crew	101, max 165	187, max 225	App. 200	173, max 202	121, max 145
Missiles	MK 41 32 cells SM2 + TACTOM 16 Harpoon 24 ESSM	Sylver 48 cells Aster 15 + 30 8 Harpoon	MK 41 32 cells 24 SM2 + 32 ESSM 8 Harpoon 42 RAM	MK 41 40 cells 32 SM2 + 32 ESSM 8 Harpoon TACTOM	MK 41 8 cells 32 ESSM 8 Kgsberg SSM
Cannons	1x76/127 mm 1x76 mm 1x35 mm 1x76/127 mm 1x76 mm 1x35 mm	1x114 mm 2x30 mm 2x20 mm	1x76 mm 2x27 mm	1x127 mm 1x30 mm 2x20 mm	1x76 mm
Torpedo	6xMU90	None	6xMU90	4x MK32	Sting Ray Depth bombs
Helicopter	1xEH101	1xLynx	2xLynx	2xLynx	1xNH90
UAV	1	0	0	0	0
Cargo ISO con	4 x20'containers	0	0	0	0
Estimated price	DKK 2 billion				DKK 5 billion

a particularly directionally stable ship which stays on course without problems, even in rough seas from astern. Wave heights of 4-6 meters from different directions allow problem-free top speed of 27-28 knots. Rolling and pitching can be maintained within the expected and the powerful stabilisers function effectively without a significant reduction in speed. The ship is quiet in the water and there are only a few instances of the sea beating against the ship's "shoulder". The crew believes that the ship's manoeuvrability and running are exemplary and that the ship is comfortable to be on. This is obviously important for the stamina of the crew and the ship's attributes as a weapons and helicopter platform. Compared with the Absalon class, it is estimated that the ship's manoeuvrability is equivalent to, whilst seaworthiness and (of course) speed are superior to, that of command ships.

### **A system of systems with high redundancy**

For a fighting unit, the question of system redundancy is crucial and the new frigates live up to this fundamental technical and operative requirement to a high degree. The technological development that has characterised the Navy's new ships over the past 15-20 years corresponds quite well with the rapid development that civilian society has undergone. It should also be noted that the Navy has, in a number of areas, been technological leader in its efforts to create optimal, future-proofed solutions. This development took off with the building of 14 standard Flex 300 units and has been passed on to subsequent building programs in a targeted manner.

This development obviously has a great relevance for things like requirements in the training of personnel and adaptability, which can be quite extensive. This development involves a number of requirements for specific skills in personnel who man and operate the systems in the new frigates. In this context, it seems that the ships are, in many respects, groundbreaking and can in reality best be described as a main system consisting of a number of sub-systems which are connected to each other and integrated for the purposes of providing a plurality of specific, efficient functional areas. The so-called C-Flex system integrates the tactical systems comprising navigation, IT, communication, sensors and weapons and thereby comprise the functional area that makes the frigate capable of collecting data, communicating and if necessary, using the various weapons. The corresponding technical system (IPMS) likewise integrates the technical subsystems (electricity/cooling, propulsion and hazards) for a collective functional area which is a prerequisite for

C-FLEX to work and thereby for the frigate to be able to fight and use its weapons system. Of particular interest is that the IPMS is based on COTS (Commercial Off-The-Shelf) components, which ensure a great deal of flexibility in relation to maintenance and global access to spare parts.

### **No vibrations here...**

At 22 knots (on two motors) southbound in the Great Belt, I was really convinced of the ship platform's excellent capabilities. Despite a water depth of only 20 meters, there was no - or almost no vibrations to be felt in the stern. This is well done for a ship of 6,500 tons with two propellers and a draft of 6.5 meters. The helicopter deck seems as stable as the ground floor of a house and the sound of the large MTU diesel engines can only be felt as a soothing background music which completes the experience of "something that really functions". On the deck, close to the air intakes for the two engine rooms, the high frequency sound of the MTU's powerful turbos can be heard, symphonically mixing with the more herculean sound of the four muscular diesel engines. During changes in speed distinctive sound of the turbos kick in and this is truly a powerful sound. Inside the ship the sound level is low and in the living quarters the sound of the engines cannot be heard.

### **The well-being of the crew**

Some say that the devil is in the detail. In the new frigates they have thought of the smallest details, not just the technical details, but clearly also details that create the best possible framework for welfare and well-being on board. It is obviously important for the crew when the ships are deployed on global missions on the other side of the world and are away from home for perhaps a half or whole year. Ample space has been allocated to recreational activities, including a gym and sauna. The ship is equipped with a stylish laundry with a lot of large industrial washing machines, tumble dryers and other facilities for the care and cleaning of uniforms and other clothing. The quartermaster must not be expected to accept any excuses for "scarecrow" clothes.

### **The galleys, messes and accommodation**

Throughout the centuries it has held true that a crew functions best when hunger and thirst are held at bay. Hence the saying "An army (or navy) marches on its stomach" has been translated into a superb arrangement of galley, dining and provision store. This solution supports the obvious interpretation of the saying that seamen also need



# ESBERN SNARE

*Danish Flexible Combat Support Ship*





Logimatic Engineering A/S has delivered and installed an Integrated Platform Management System on both Danish Flexible Support Ships of the ABSALON Class.



the basics to attain greatness, not necessarily in weight, but rather in spirit and action.

Provisioning

Taking on board, storing and handling of the provisions takes place according to the same principles that we are familiar with in the Absalon class. Tasks are managed simply and easily with the aid of the ship's monorail crane, from the dock to the side-decks and via a spacious supply elevator further down in the spacious provisions load. When provisions need to be taken out, this is also handled via the elevator from the load to the galley.

If it is necessary to take extra provisions, including frozen goods on board, then more standard ISO containers can be taken on board. These can be placed in the cargo compartment aft under a hatch in the helo deck. The galley is close to being an exact copy of the efficient arrangement in the Absalon class and it has only been necessary to introduce a few minor improvements. In the mess area there is a buffet as well as messes for privates, sergeants and officers. In comparison to command ships the biggest change here is that the mess area for the private crew - in response to requests from the crew - is separate from the buffet area.

Lodging

The crew is accommodated in twin or four-man cabins, although the ship manager and any on-board force commanders occupy one-man cabins. As far as possible, people like divisional officers, who have a lot of paperwork and administration, should not have "lodgers" in their cabins. The ship has a total of 165 bunks distributed over three decks. Each cabin has its own bathroom and toilet and each cabin has access to the ship's "entertainment facilities", i.e. TV, radio etc. The design of the cabins has been kept timeless and simple, without appearing too spartan. In order not to use too much of the relatively scarce space in the individual cabins on cupboards, there are extra cupboards in the hallways of the residential areas. Here, the crew can store items of personal equipment that are not used as often, such as their parade uniforms, service coat, jacket/reefer and civilian clothes.

The construction phase

The construction of the three frigates is the Navy's largest acquisition to date and is part of the Danish Defence Agreement 2004-2009. The

frigates are a development of the design that the Navy and OSS developed together for the flexible support ships in the Absalon class. They have hereby attained a series of advantages, but the differences are clear. The frigates are expected to be completely equipped by 2013 and the installation and testing can thereby be declared complete.

The frigates are, as mentioned previously, a deck lower and cannot, as in the command ships with the so-called Flexdeck, carry a significant number of vehicles and other bulky cargo. In comparison to the Absalon class, the chimneys of the frigates have a modified design with a "bend" to prevent excessive heat to the large SMART-L radar antenna. Add to this that the frigate's helo hangar only has one port whilst the support ships have two ports. Finally, the frigates potential speed is greater and likewise their impact is greater in the form of the multi-missile launchers' ability to hold and fire long-range cruise and air defence missiles. This strategic weapon installation is not present on the support ships.

The Armed Force's principal workshops are at the time of writing in the military installation phase and draw on experiences from the Absalon class. The working process has been optimised by processes which include measuring out and drawing 140 km cables in "mock-ups", i.e. in a "wooden set" on land. Afterwards the cables are drawn on board at the same time as OSS and their contractors work on other tasks at the shipyard. This has resulted in a saving in time and resources. And the personnel who will subsequently be responsible for maintenance of the ships have also had an opportunity to amass valuable technical knowledge and skills.

Comparison Support ship / Frigate

The following table demonstrates the differences between the two types of vessels.

Data	Support ship	Frigate
Length m	137.6	138.7
Width m	19.5	19.8
Draft m	6.3	6.45
Fully loaded displacement tons	6,639	6,645
Engine power hp	20,000	42,000

Data	Support ship	Frigate
Speed knots	25	30
Crew ship	99	101
Crew ship + staff	168	165
Crew ship + staff + supplement	300	165
Endurance days/ nautical miles	28 / 9,000	28 / 9,000
Helicopter, number, medium weight	2	1
UAV, number		1

For the frigate crews it has been an advantage to be able to get a routine with periodically manning and sailing with the two command ships on long-term international missions. In terms of logistics and supply, endeavours have been made at economies of scale, although certain key equipment systems are different.

Staffing overview

	O-Div*	V-Div*	T-Div*	F-Div*	Suppl. crew
Officers	8	2	6	2	
Sergents	3	3	3	4	
Privates	21	12	23	14	
	32	17	32	20	64

*\*O-DIV: Operational division. V-DIV: Weapons division. T-DIV: Engineering division. F-DI: Management division.*

Each frigate has berths for 165 people. This means that, in addition to the ship's core crew, there is space for a crew of 20-30 persons. In addition there are two helicopter crews and a number of UAV operators. Furthermore, the crew can include a Navy chaplain, ship doctor, marine lawyer, students / interns etc. They are not a part of the main crew, but sign on according to the mission and needs.

Well-equipped C3 package

The frigates are born with comprehensive C3 equipment. Command,

Control and Communication (C3) is, in a manner of speaking, the eyes and ears of the frigate and contains a sensor package consisting of:

- › Thales APAR multifunction radar
- › Thales SMART – L Early Warning radar
- › Furuno navigation radar
- › Helicopter approach radar
- › FLIR system Seastar Seafire III (infrared camera)
- › ATLAS ASO 94 hull mounted sonar
- › SAAB Ceros fire control system
- › EDO 3701 ESM system
- › Link 11 and 16
- › SATCOM

Weapons package

The ship is constructed with the Navy's flex-concept in mind. This means that most of the weapons and sensors are mounted in the familiar standard container, which will also be used flexibly in the Navy's units. Maintenance of the many containers takes place at the two naval bases in facilities furnished in connection with the building of the 14 units of the Flying fish class. This concept has thus demonstrated a great deal of sustainability and means that the a series of weapon systems from older units that are being phased out, can be readily reused and installed on the new ships.

The frigates' significant impact is contained in an impressive weapons package containing the following systems. Note that there is no final political decision regarding the purchase of missiles for the multi-missile launcher which can accommodate cruise missiles and air defence missiles. Additionally, possible later purchase and installation of a 127 mm machine cannon Mark 45 for each frigate. So far the frigates will be equipped with two 76 mm machine guns. The total weapons package includes the following:

- › Lockheed Martin multi-missile launcher (strategic capacity)
- › Boeing Harpoon Block II harpoon missiles
- › Raytheon Evolved Sea Sparrow surface-to-air missile
- › Oto Melara Super Rapid 76 mm Naval gun
- › Oerlikon Contraves Millenium 35 mm Naval Revolver Gun
- › Eurotorp MU90 lightweight anti-submarine torpedo

- › Terma 130 mm Decoy System
- › 12.7 mm heavy machine gun

### Command and Control

In the ship's operations room (the O-room) operational data and information is collected, presented and utilised, enabling the crew to make decisions regarding the use of the ship's weapons and sensors. The technological platform consists of the C-Flex system supplied by Terma A/S. Data collection, exchange of information and deployment of weapons takes place via this system, which contains the central work-flows - it is, in a manner of speaking, the ship's brain. The computer generates a three-dimensional image of the operating system on the frigate, both in the air, on the surface of the sea and underwater. The communication systems are also integrated in C-Flex and this means that the frigates can enter into network-based operations (NBO) with other national and international naval and air forces and land-based operational network clients such as deployed Danish army units. The C-Flex system is constructed with commercial (COTS) products which bring with them a number of attractive financial and logistical aspects.

### Machinery

The frigates are propelled by a total of four diesel main engines of the type MTU 8000 20V M70, which are placed two by two in their respective light, spacious and well-appointed engine rooms. Each pair operates a twistable propellor via a RENK reduction gear. With four engines and full throttle, the frigates can go an impressive 30 knots and can, as demonstrated on the test voyage, maintain a continual cruising speed of 27 knots. The latter is probably more important than the top speed, but all in all it is an extremely satisfying result. Altogether 44.000 solid horsepower from Friederichshafen is available and that seems to be ample.

The rudder installation consists of two Becker rudders aft and a bow thruster in the bow with a power of 900 kW. The ship is further equipped with a bilge keel and a set of active stabilisers where "the wings" can be pulled into the stabiliser room which is located midships between the two main engine rooms.

For electricity production the frigates are equipped with four generator sets consisting of Caterpillar engines and Leroy-Somer generators. They are installed in pairs in the separate auxiliary engine room in the

main engine room. Each pair consists of a CAT3512 and a CAT 3508 of respectively 1360 kW and 920kW and are equipped with a main panel which can supply sufficient energy for all systems to operate at full capacity. All important consumers are double supplied. The frigates are controlled and monitored via IPMS, an integrated platform management system supplied by Logimatic Engineering. The IPMS has been developed in close collaboration between the Navy and Logimatic and includes the newly developed Damage Management System which is a significant innovation in the Navy's ships.

The frigates are also equipped with a cooling and air-conditioning system which makes it possible to operate under tropical conditions. The system consists of three cooling units from which cold water is led around the ship in a separate pipe system and supplies cooling to the equipment room, the air defence systems and the air-conditioning centres.

### The Ship Manager's assessment

Before I disembarked after 48 hours in frigate heaven, there was time for a chat and a cup of coffee with the ship captain. It was obvious that Commander Captain Kristian Haumann was satisfied. "It is a fantastic ship, it sails extremely well and we have been given some formidable maritime and broadly applicable joint military capabilities." The manager also noted that the frigates had been developed in a close and exemplary collaboration between a series of civilian companies and a public institution - including Odense Steel Shipyard, Terma, Logimatic and Defence Acquisition and Logistics.

The manager spoke passionately about the ship's ability to handle even heavy seas and praised its manoeuvrability in connection with the port calls. There is thus seldom a need for tug assistance even with limited space. The short start/stop distance (from stationary to maximum speed and vice versa) and a small turning circle were also highlighted. The ship manager summarised the frigate's potential as very comprehensive and important as follows:

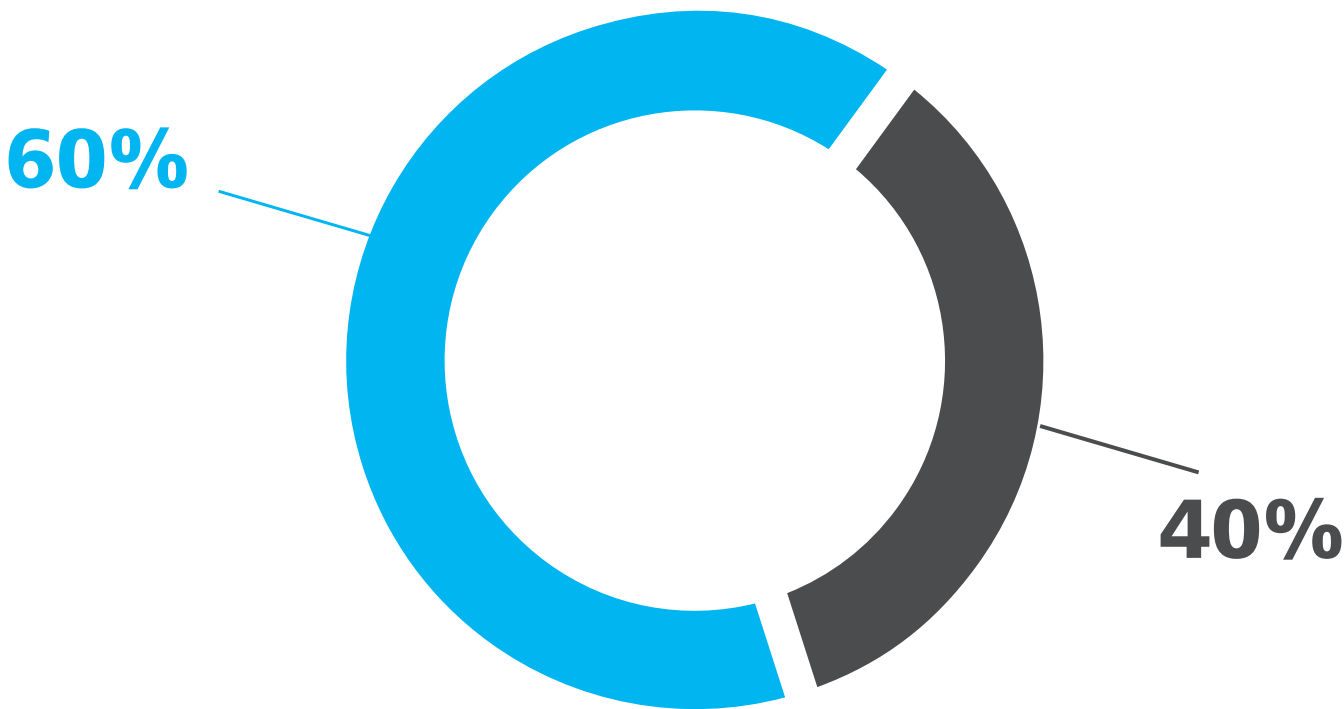
- › Good self-defence systems, active as well as passive
- › Large systems redundancy - resilience
- › Great endurance (distance + time at sea)
- › Capacity for air, surface as well as underwater warfare

- Excellent abilities in air monitoring / image building
- The multi-missile launcher has provided the frigate with the potential for area-air defence as well as defence against ballistic missiles

The coffee pot is empty, the biscuits have been eaten. It is time to say goodbye and say thanks and - true to tradition - allow the ship manager to say the last word: *"I dare say that the new Danish frigates can be characterised as the best and the cheapest. By that I mean that the frigates are amongst the best that have been built up until now anywhere*

*in the world, and when this is done with a budget that is significantly lower than those of other nations, then we can be pretty proud of ourselves and our new frigates in Denmark. There should thus be no doubt that Denmark has been given some capacities which, together with the support ships, ensure that the government and parliament have acquired some security measures that they have not previously had"* says Commander Kristian Haumann.

The ship manager is finding it difficult to stop rejoicing.



## Compared prices

In comparison to other NATO frigates the price of Iver Huitfeldt is significantly low. When comparing the estimated price of Iver Huitfeldt, to the estimated price of e.g. the Norwegian frigate Fritjof Nansen, it is a stunning 60% lower.

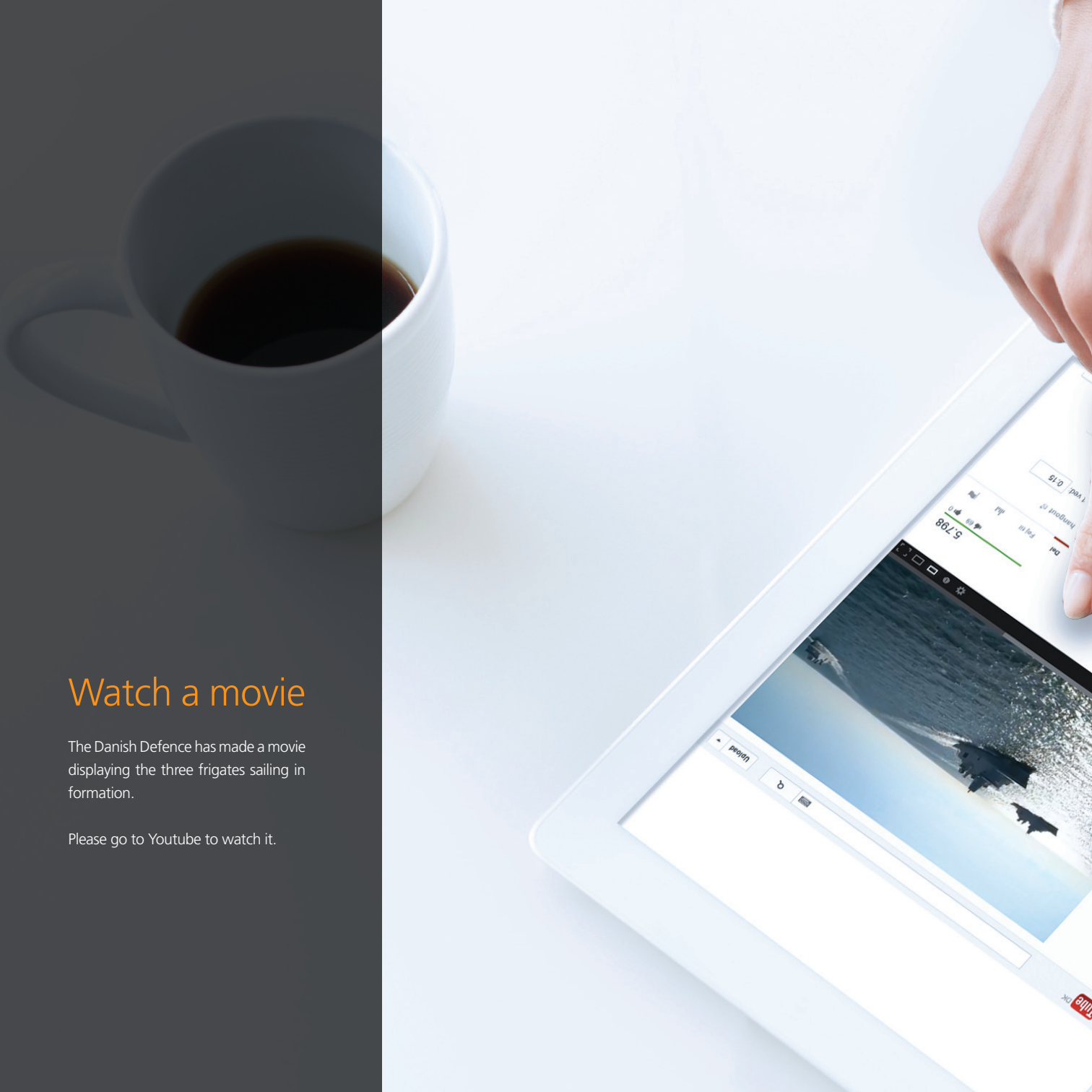
For other technical comparisons please view the table on page 6.



## Watch a movie

The Danish Defence has made a movie displaying the three frigates sailing in formation.

Please go to Youtube to watch it.





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# Flexibel Support Ships

## CLIENT

### Royal Danish Navy

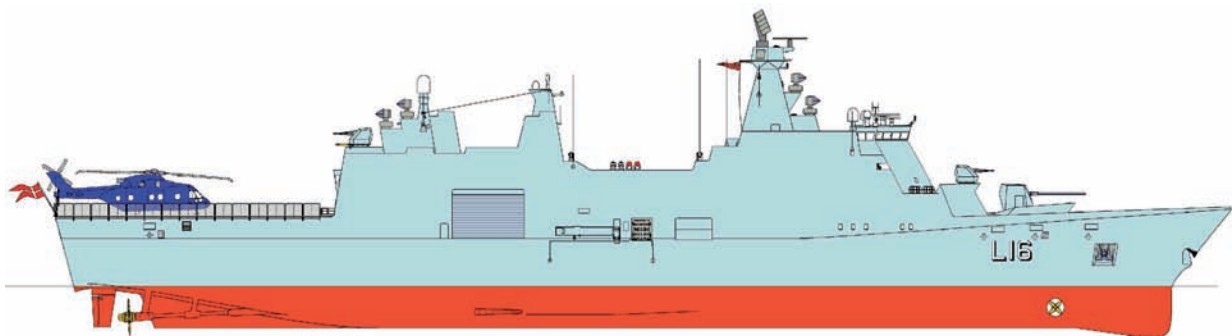
The two Danish Support Ships Absalon and Esbern Snare operates as a command platform for land, air and naval forces. Furthermore the main tasks are: transport of personnel and material, military hospital ship or minelaying.

## PROJECT

Logimatic Engineering A/S has delivered and installed an Integrated Platform Management System on both Danish Flexible Support Ships of the ABSALON Class.

## IPMS SERVICES

- › Integrated ship control system
- › Alarm system
- › Extension alarm system
- › Propulsion control system
- › Power management system
- › Damage management system
- › Light control system
- › Camera display (CCTV)
- › Load computer



L 16 - ABSALON / L 17 - ESBERN SNARE

# Her Danish Majesty's Yacht

## CLIENT

### Royal Danish Navy

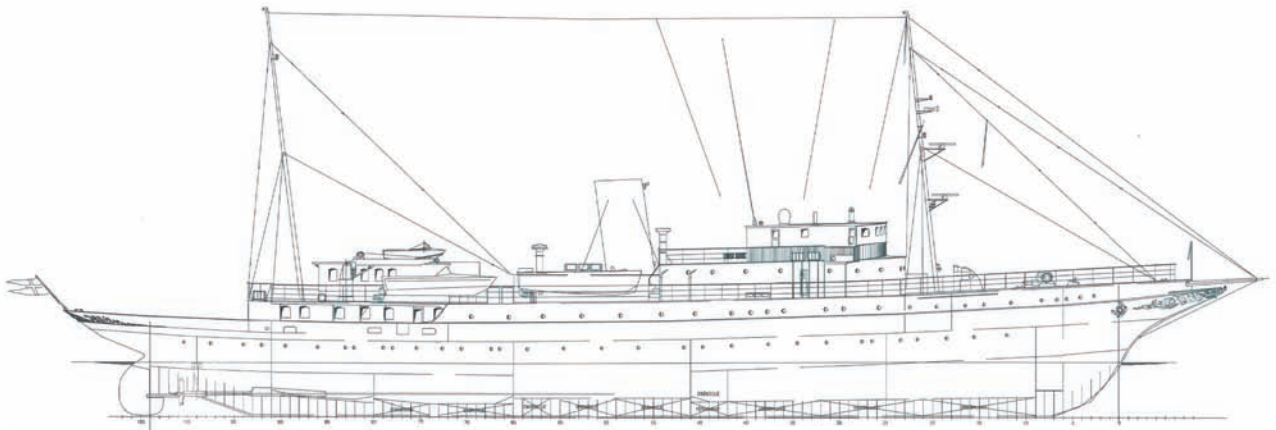
HDMY Dannebrog is the official and private residence for HM The Queen, HRH the Prince Consort and members of the Royal Family when they are on official visits overseas and on summer cruises in Danish waters.

## PROJECT

Logimatic Engineering A/S has delivered and installed Integrated Control and Alarm System on the Royal Danish Yacht Dannebrog.

## IPMS SERVICES

- › Integrated ship control system
- › Alarm system
- › Extension alarm system
- › Camera display (CCTV)



A 540 - DANNEBROG

# Glossary

DCS	› Damage Control System
IPMS	› Integrated Platform Management System
DMI	› Danish Meteorological Institute
ABC	› Danish abbreviation for nuclear, bacteriological and chemical weapons
OSS	› Odense Steel Shipyard
CODAD	› Combined Diesel and Diesel
CODOG	› Combined Diesel or Gas
TACTOM	› Tactical Tomahawk (cruisemissile)
ESM	› Electronic support measures
UAV	› Unmanned aerial vehicle
ABSL	› Absalon class
SF	› Standard Flex
C-FLEX	› Command og Control system
ISO	› International organisation for standardization
SMART-L	› Signal Multibeam Acquisition Radar for Targeting – Long range
FLIR	› Forward looking infrared (camera)



# IPMS from Logimatic Engineering A/S

Logimatic has developed an Integrated Platform Management System for The Royal Danish Navy's Flexible Support Vessels and Frigates.

The type approved Integrated Platform Management System (IPMS) for navy ships is based on commercial off-the-shelf (COTS) products and can be supported worldwide.

The system consists of a number of processing units (PLCs) distributed around the ship, and a number of operator stations located in the Engine Control Room and on the Bridge.

All operator stations can display any IPMS mimic, so the ship platform can be controlled completely either from ECR or the Bridge.

In essence, IPMS may be used for control and monitoring of virtually all equipment on-board a warship, excluding the combat related weapons/sensors and the ship's communication and navigation equipment.

For further information about the IPMS from Logimatic please refer to our IPMS brochure.

## Other services

With decades of experience in delivering automation solutions for the global maritime industry, Logimatic is the obvious choice when you are searching for an automation partner.

Our professional staff has through several projects obtained unique know-how within maritime automation solutions as well as maritime design of larger systems.

We have vast experience with significant automation projects and we are system integrator in all phases of a project:

- › Project management
- › Design and specification
- › Software
- › Hardware
- › Installation and implementation
- › Documentation
- › Quality control
- › Training
- › Service

## About Logimatic

Logimatic is an engineering and software company which develops, sells, implements and supports in-house developed software and automation solutions. The solutions address many different types of companies – from private to public and from service to production. Usually, consultancy and services are integrated parts of the total delivery and we are often project managers during system integrations and development of customised solutions.

We integrate knowledge and technology and thus supply value-creating solutions to our customers. Solutions which optimize the processes and workflows of the individual customer and thereby enable them to take a leading position in the increasingly competitive markets.

