



Future Surface Combatants in the Royal Swedish Navy

by Rear Admiral Anders Grenstad

Anders Grenstad is Chief of Staff of the Royal Swedish Navy. In this article he looks at the capabilities of surface combatants in the Royal Swedish Navy and discusses present and future requirements.

The need for naval force capabilities is directly related to a country's economical, political and military situation.

Economical development is dependent on security in the maritime arena, and in the littorals the economic significance is paramount since it is there that the sea lines of communication emanate and terminate. In our global economy the lines of communication over the seas represent enormous monetary values. In the EU, 90% of the external trade is dependent on transportation by keel, and inside the EU the corresponding amount is 40%. From a historical perspective the maritime arena has always been important politically, connecting people, countries and continents, and there is no sign that this will change in the future. On the contrary, more of the world's population now seems to be concentrated in cities close to the seas. Militarily, the free seas provide the ability to transport large volumes of materiel and personnel without conflicting with other nations' territories, and the ability to operate over great distances during long periods of time carrying large volumes of supplies.

Countries that have a navy are obliged to make some course decisions. You can grasp the entire maritime dimension and build yourself a navy that fulfils all tasks, or you can specialise in some areas and depend on others in certain areas. Sweden, with no alliances, has always had to strive to be independent, and therefore developing our Navy to fit the current threat has been natural. Historically, our Navy was designed to counter a threat from an invasion over the sea with a large volume of surface



Stealth is a very important part of the Visby corvette concept [Peter Nilsson, Kockums AB]

attack crafts, supported by submarines, air force strike components and a heavy coastal artillery. As today we no longer see this scenario, but instead need to support crisis management in an international context, we have adjusted our course for the future.

Multi-functionality and Flexibility

The complexity of war at sea is best defined by a ship's external battle in three dimensions – in the air, on the surface and below the surface, the last comprising both anti-submarine warfare (ASW) and mine-counter-mine (MCM) operations.

You cannot exert control of the sea without taking all three dimensions into consideration.

The traditional strength of naval forces is that they can be mobilised quickly and, once on station, can carry out missions continuously and for an extended period. To do this, they must control the entire marine theatre. Multi-mission capability of a platform is here essential, and furthermore cost efficient, and multi-functionality and flexibility give multi-mission capability.

The Swedish Defence Forces have a long and proud tradition in the development and deployment of naval vessels that, although relatively small, pack a powerful punch. The cost of developing modern defence materiel is skyrocketing – and at an accelerating rate. This said, the ability to deploy modern defence materiel is essential if a nation is to maintain any credibility in its declared ambition to participate across the entire operational scale, from peace and crisis to warfare. The battlefield of the future will be a very dangerous place, especially if your forces lack the appropriate equipment, adequate training and a well-developed strategic concept for the deployment of combat units. The key point for a nation like Sweden regarding acquisition of naval assets in general, and especially of surface combatants, is the fact that we have a limited defence budget. This means that it is not possible for us to have single-purpose ships, but must aim at having surface combatants that simultaneously are able to carry out missions in all the earlier mentioned dimensions.

We have already taken the first steps in ordering the Visby corvette, which is capable of handling threats in all dimensions. Its multi-mission capability and the fact that it can be deployed to exert varying degrees of force, depending on the circumstances, guarantees the Visby corvettes a vital future role.

Security Policy Picture

Stable development in our geographical region is important to Sweden's future security; we also have an international responsibility to participate in ensuring that this stability can be maintained. Sweden must therefore be able to promote its security interests both in regional terms (the Baltic and the North Sea) as well as beyond, in co-operation with the European Union.

To carry out their task continuously and for an extended period, the Visby corvettes must control the entire marine theatre, not only on and below the surface, but in the skies above too – multi-mission capability when on station is important, including stealth ability as and when required.

'The self-defence capability and, through that, survivability, along with stealth properties, weapons and countermeasure systems, are vital'

The introduction of the new corvettes will give the Swedish Navy much greater power and further increase the deployment potential of Swedish naval units. Right from the start, the vessels are being equipped to ensure smooth communication with other units of the total defence force operating in the marine theatre, whether this means the air force, the coastguard, the emergency and rescue services, customs, police or merchant shipping. The Visby corvettes will be able to operate as the core of a command, control and communications network during extended naval missions.

Multi-mission capability and flexibility add considerably to modern contingency response capability. The Visby system's advanced interoperability, for networking with other systems, makes it particularly relevant to modern strategic thinking. And flexible units have a better chance of responding to new threats and missions. This can be invaluable, since nobody can predict how a specific crisis may develop. The greater technological complexity of the Visby corvettes naturally places additional demands on the crews. This in turn places new and greater demands on the naval training organisation.

Visby-Class Corvettes – the Littoral Surface Combatant of the Future Today

The capabilities described earlier have been developed even further for the

Visby corvettes through increased multi-functionality and automation designed for the littoral environment. When all of the Visby corvettes are fully operational, at the end of this decade, they will be able to conduct all types of tasks from peacetime crisis to missions under full warfighting conditions. The corvettes are equipped to conduct a variety of missions and tasks such as: participation in embargo operations and protecting sea lines of communication; conducting anti-surface warfare (ASuW), ASW, anti-air warfare (AAW); and MCM operations. The increased multi-functionality is also shown in the ship's ability to operate a light helicopter – the Agusta 109. The self-defence capability and, through that, survivability, along with stealth properties, weapons and countermeasure systems, are vital parts of the ship's multi-functional capability.

The stealth properties are a very important part of the Visby concept, providing so many distinct advantages for stealth operations in the littorals. However, in order to gain the full advantage of stealth, you must optimise your signatures and emitted signals in every dimension. The following signatures, together with adaptation of emitted signals, have as a consequence been reduced in order to create a protective signature shell: infra-red, optical, hydro-acoustic, magnetic and, of course, radar cross section. The benefits gained by reducing the signatures include:

- Increased performance of own sensors, due to a better signal-to-noise ratio.
- Increased effectiveness for countermeasures.
- An active/passive choice which will make it possible for the Commanding Officer on board to adapt rapidly to different situations and scenarios.
- A complete avoidance of detection by use of the full stealth potential together with good tactical sense.

The Visby corvette with its versatility, multi-functionality and its stealth properties is, in a sense, the Littoral Surface Combatant of the future here today.

The Benefits of Stealth

Stealth technology dramatically increases survivability in surface combat. But it is just as important that the technology provides opportunities for active response, enabling

extremely effective implementation of mission assignments. A stealth vessel can acquire a good idea of the situation at sea without being detected until late in the game, thereby gaining a crucial time advantage compared to the other players. This time advantage can be utilised in several ways, depending on circumstances. In a crisis scenario, which might involve large numbers of airborne and naval units, the time advantage can be utilised to build up a truly accurate picture of the situation.

This enhances the ability to discriminate friend from foe and thereby also reduces the risk of hits from friendly fire. In situations where there is some uncertainty about the opponent's intentions, you can avoid being the first to shoot, since stealth technology offers a substantial chance of surviving an attack without actually being struck. With its low signatures, a stealth vessel can operate with restraint in marine situations that might otherwise become more critical. In the most extreme case, in a straightforward duel with an opponent where there is no doubt that weapons will be deployed, the time advantage can be used offensively.

In other situations, the vessel may want to be seen – to say: 'Look, here we are – so don't try anything'. For example, if the ship's commander wants to become highly visible on radar, he can hoist a radar reflector on a special mast that can be raised and lowered and thereby temporarily eliminate the vessel's stealth status within radar range. Should a threat develop while in this situation, the commander simply lowers his mast again, and the vessel's stealth status is

instantly restored.

It is, though, essential to have in mind that the stealth concept comprises everything that serves to minimise signatures and signals, either to enhance the vessel's own countermeasures and sensors or to make detection and identification by an opponent more difficult.

Future Systems – the Modular Multi-Function Corvette

At the start of the next decade the Swedish Navy's fleet of surface warfare ships will consist mainly of Visby corvettes. This class of ship will therefore constitute the main core of the corvette fleet. With this as a background, studies have been made to determine the capabilities that need to be developed to complement the Visby corvettes' capabilities after 2020, when our older corvettes need to be replaced. The idea for this new class of ship, the Modular Multi-Function Corvette, is based on Sweden's will to participate in, and contribute to, resolving international crises, with a continued focus on a littoral capability. The new class will have the ability to operate globally in, and if necessary outside, the littoral zone. This will require a very good sea-keeping capability together with increased endurance. Other requirements proposed point out the need for further development of the previously mentioned multi-functionality. Furthermore, we must develop the handling and use of autonomous vehicles, such as the UAV and AUV, in order to cover and operate in multiple areas at the same time or in a larger area than the ship's own sensors are able to cover.

The new concept consists of a ship made up of modules where the ship itself has a command support capability, a wide range of sensors, a capability for basic ASW and developed survivability, including the ability to withstand direct hits from guns and other weapons. Furthermore, the ship will be able to receive helicopters up to the size of the NH90, a helicopter type now under delivery to the Swedish Armed Forces. The ship will also have the ability to handle her own helicopter and UAVs. As already mentioned, the ship is modular and will be able to fit modules for capabilities such as surface-to-surface missiles (SSM), surface-to-air missiles (SAM), extended ASW and MCM supported by AUVs.

With this taken into consideration the new ship will be larger than the Visby corvette. The plans for modularity will enable each ship to be fitted for the specific capabilities demanded by each particular mission. It will be possible to take onboard more than one module of the same type if, for example, there is a specific need for a SAM air defence capability. It is also possible to take onboard different modules in order to be truly multi-functional for a rapid switch of task in the area of operations. This modularity will probably become even more important over time, making it possible to fit new modules with completely new capabilities without having the ship itself rebuilt. In this way the ship's adaptability increases considerably with the flexibility to take on differing tasks, not only for particular missions, but also throughout the ship's whole life cycle. ■

The modular multi-function corvette of the future [Peter Nilsson, Kockums AB]

