**Submission to Netherlands Parliament Round Table on Submarine Capability**

Military forces are used to either inform a decision or to create the conditions for a decision. In the former case discretion is key so that in gathering the information it is not in some way deliberately altered by those being observed. In the latter case military force is used to either persuade an actor to take a course of action, or to dissuade an actor from taking a course of action. In both cases the reasons to change behaviour is that the perceived loss outweighs the potential gain. The submarine is a powerful asymmetric weapon in this regard. The presence – or alleged presence – of one platform requires a disproportionately large array of expensive and sophisticated assets to attempt to locate and track the submerged platform. This has made the submarine the platform of choice for those seeking to deny access to a location or an area, and explains the logic behind the growing submarine acquisition programmes in Asia. The submarine is paradoxically one of the best platforms to prosecute anti-submarine warfare (ASW) because it is less vulnerable, has greater persistence, a heavier weapon payload and operates in the same environment as its potential adversaries. Thus as we advance into an uncertain future a small number of manned submarines are still able to provide discrete high value intelligence, a powerful deterrent effect, or through a mix of land attack options – such as missiles and Special Forces – and heavy weight maritime weapons an ability to create conditions for success on operations that may require the use of force.

The comprehensive submission produced by the Netherlands Minister of Defence setting out a vision for the Netherlands Submarine Service comprehensively summarises the roles that submarines perform, other than that of nuclear deterrence. It notes there are some roles that the current Netherlands submarine force is not capable of performing such as deploying land attack missiles or engaging airborne forces, and that these may be designed into the next generation of submarine. A paradox of modern military forces is that at the level of weapons and sensors equipment is developing at a very rapid rate, but at the platform level development is much slower. For naval platforms hull lives are of the order of 30-40 years, whereas weapons and sensors are on shorter cycles with new systems being introduced on an almost continuous basis, some with relatively short operational lives. Designing in sufficient power, cooling, and open architecture interfaces are becoming critical elements in the design phase of any platform to “future proof” the platform so it can be affordably upgraded. Submarines are complex integrated platforms with the additional problem of designing in the necessary flexibility within the constraints of a narrow tube. The vision for the future Dutch submarine force recognises this as a critical issue that needs to be designed in at this stage of the programme. In this regard selecting the most appropriate partners to avoid being overly constrained will be of the utmost importance. The platform is in a sense the outer wrapper for the capabilities that will be employed over the next 30-40 years.

There are still large areas of the ocean that are relatively unknown as evidenced by the loss of the Malaysian airliner – MH 370 - in the southern Indian Ocean. The search for the lost aircraft have highlighted the current technological limits and bounds to our knowledge of the ocean floor. The undersea environment is the harshest encountered by man. Pressure, the corrosive nature of sea water, and the impermeability of the ocean to electromagnetic radiation make this both a physical and a technical challenge. New technologies such as unmanned underwater vehicles (UUVs) and other robotic systems are having an effect on submarine operations, but there are significant technical challenges to the successful deployment and employment of these vehicles, both now and into the future. These challenges are related to our current understanding of laws of physics. Unless there is a revolutionary scientific breakthrough sound will remain the primary means of detection and sensing for submarine vehicles, and the physics of sound will act as a continued constraint. The impermeability of sea water to electro-magnetic radiation is one of the most critical constraints as it limits the ability to exploit modern network technologies that have proliferated in other aspect of human endeavour. As a result, I believe, manned submarines will continue to be key if a nation wishes to successfully employ the ocean to protect and promote its interests.

There has been a sharp shift in the balance of submarine forces since the end of the Cold War; submarine numbers in the Euro-Atlantic area have declined largely through the scrapping of small coastal submarines (SSCs). This decline in the Euro-Atlantic submarine numbers has been balanced by the building of new submarines in the Asia-Pacific region. These submarines are being purchased by countries new to submarine operating such as Singapore, Malaysia and Vietnam, as well as those – such as China, India and Pakistan - who are greatly expanding their current programmes. A critical issue for the new submarine operating nations has been the very high costs of entering the complex business of submarine operating. Procuring hardware is relatively straight forward but building a capability requires the development of a skilled work force to maintain, sustain, operate and employ these complex military platforms. An asset the Netherlands vision modestly does not speak to its possession of well trained and operationally experienced people. This is a significant asset that once lost would prove to be highly costly, if not impossible, to recover. In military doctrine combat power is seen as the product of three components, physical, moral and conceptual. On the balance sheet of national capability the Netherlands Submarine Force represents a significant asset in terms of the moral and conceptual components, however, with the aging of the Walrus Class the physical component will need renewal if these valuable assets are to be retained.