**Multinational Cooperation and its Benefits in the Field of Submarines**

Procuring, operating and maintaining submarines is very costly and requires a high level of expertise and proficiency. Facing reduced budgets and declining numbers of sailors a purely national approach is not sustainable. Furthermore, it leads directly to a decline in operational availability and level of proficiency within the submarine flotillas.

The way to mitigate these effects, to operate submarines efficiently, to keep the level of proficiency, and to even steepen the learning curve with regards to maintenance, Education and Training, Research and Development and operations multinational cooperation is the key.

Initiated by Germany in 2014 six countries – the Netherlands, Norway, Poland, Portugal, Italy and Germany – agreed on cooperating in those areas vital for operating submarines efficiently. These six countries operate half of the approximately sixty conventional submarines among NATO Member states thus combining experience, knowledge and capabilities of the vast majority of NATO Members operating conventional submarines.

The cooperation encompasses the areas of Education and Training, Research and Development, In-Service-Support, and Operations.

**Education and Training**: Courses are being offered amongst the Nations, trainers are being exchanged from the different training facilities, even units are offered to support certification of another nation’s crew or course. The Conventional Submarine Round Table was within a very short timeframe able to reinitiate a torpedo-firing-exercise. This year all members will participate, a very challenging scenario with several submarines, surface units and air-assets will help develop individual skills, operational procedures and gives an opportunity to conduct Research and Development in a life-scenario.

**Research and Development**: Submarine-related Research and Development is a complex and challenging area. It ranges from very technical questions (e.g. future batteries) to the environmental questions (e.g. salinity, water temperatures, sonar speeds). All participating nations conduct Research and Development with different focusses in many areas.

A coordination and exchange of information supports the idea of allocating national resources in a smart way and supports the aim or the Round Table to support national submarine flotillas.

**In-Service-Support**: Nations operate their submarines for thirty and more years. Based on the nature of such a system the maintenance is more complex, thus more costly than for surface ships. User Groups operating the same equipment, common spare part pools, or opening national maintenance resources for participating nations helps to reduce those costs.
Germany and Italy share a vast percentage of spare parts for their common submarines. This offers great benefits, e.g. exploit economies of scale based on higher amount of systems or raise operational availability due to coordination of high-value spare parts.
For the cooperation area of In-Service-Support a direct relation between degree of communality between systems and positive cost-effects applies.

**Operations**: The cooperation within this area is closely related to the field of Education and Training. Nevertheless the participating nations are establishing a common “Submarine Element Coordination/Submarine Advisory Team” and are aligning national certification standards as a basis for higher interoperability.