

Accurate navigation depended on being able to surface to fix the boat's position by taking celestial readings with a sextant. Unlike Allied practice, in U-boats navigation was the responsibility not of a commissioned officer but of a senior non-commissioned rating, the *Obersteuermann* or coxswain. Stormy weather with heavy cloud cover made it impossible to 'shoot the sun', and in heavy seas and strong currents boats could easily drift off course, opening wide gaps in a 'wolf pack's' grid of patrol lanes. (Deutsches U-Boot Museum)



of U-boats go into action, each submarine acts, as before, as a separate and individual unit....'

Such engagements against the same convoy, at the same time, by a number of submarine commanders acting individually, had clear disadvantages. Most obviously, valuable torpedoes might be wasted when more than one boat attacked the same vessel, and it was difficult to keep an accurate record of the results obtained by each boat.

Patrol/reporting lines

The move towards organized 'pack' attacks came with the introduction of patrol or reporting lines. Initially this would involve a group of boats patrolling in line abreast. The distance between the boats would theoretically be set at twice the distance of visibility from any boat's conning tower (about 8km or 5 miles from each), so that the mid-line of this roughly 10-mile gap between two adjacent boats would be at their limits of visibility. In this way it should be impossible for an Allied ship to pass through the gap between two boats without being spotted.

This patrol line would motor on the surface astride the anticipated course of the convoy at relatively slow speed, thus covering the whole area of ocean between the outer limits of visibility from the first and the last boat in the line. If a convoy was spotted and reported by any boat, all the boats in the patrol line could theoretically be vectored against it to cause the maximum losses. However, even when a good number of boats were employed, if the course of the convoy was incorrectly estimated or if it changed course, then even a large convoy could escape interception in the vast expanse of the North Atlantic.

There were also difficulties simply in maintaining the patrol line. In calm weather and good visibility it was relatively easy for each boat to maintain its