

DCPA is the distance between the own vessel and the point where the own vessel and target vessel are expected to be closest to each other based on the current course and speed.

The problem to get DCPA is that both ships are moving.

We can solve this problem using relative velocity.

As we can see from above figure, we can think that ship1 is stop and ship 2 is moving with the reference velocity to the ship1.

If then, DCPA is represented as the distance from the position of ship1 to the line with direction of relative speed.

The relative speed is calculated as

From this, we can get the formula as following.

, where (*X*, *Y*) denotes the coordinates corresponding to the relative position of ship 1 from ship 2, is the relative velocity and , are the components of .



