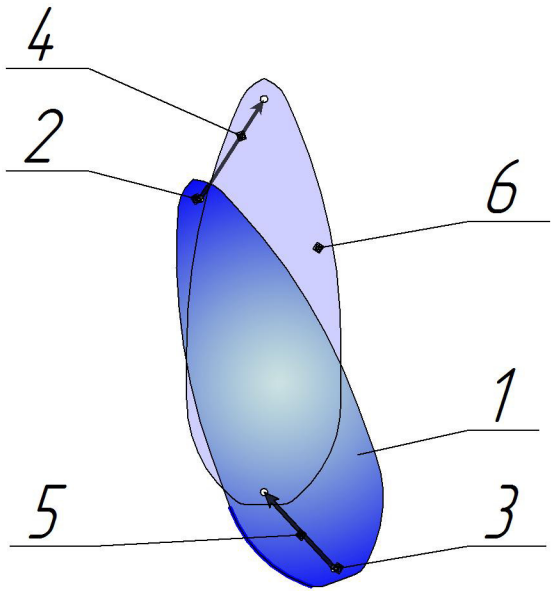
Indication of future provisions of ship hull

Name: Khadeev Ravil

State Research and Test Institute of Military Medicine, Moscow, Russia .

To simplify of the navigation, it is necessary that the person, who controls the vessel or other inert object, is able to know exactly the direction and speed of the development of the traffic, information about the future position of the hull on the surface or in space. The way of obtaining such information is described in the patent application 2016119838, 23.05.2016 in Russia. The operator can easily perform the exact actions by means of information on the future position of the managed object. Such information is needed when managing any inert object or process. The information on the rate of change allows to see - when the situation goes to a danger zone, allows to intervene in the management to prevent an emergency situation. It is essential that any automatic control system always uses the exact value of the derivative of a variable parameter. Without such information, the automatic device can not control. The human operator also uses the value, derived from the process of control. But he usually does it on the basis of approximate data, which he receives from visible speed of movement or otherwise guided by the experience of previous situations. This is possible to provide the operator with information about the future position of the ship hull, using the signal of the navigation system.

When the position of point on the surface is repeatedly measured, it is possible to obtain the velocity vector of its displacement. By distance and direction from the point of location at a given moment determine the future position. The selected scale will determine the time of its new position forecast. It is necessary to install two (or more) receivers of the navigation system, as shown in Figure 1, in remote locations on the hull of the ship. Explanation is on the attached figure. In the scheme denoted:



1.Hull location. 2 and 3. Arrangement of points on the hull of the vessel from the signal receivers of the navigation system. 4 and 5. Vectors of receivers speed of the navigation system on the surface. 6. Future position of the hull.

On the basis of the position of the sensors on the ship hull, the position of the hull on the surface can be built at a specific moment in time. A future situation is being built according to the future position of the sensors in relation to the surface. Figure 1 shows the future position of the ship hull, shown in dotted lines. By varying the scale of the velocity vector, it is possible to construct several different options of the future position of the vessel on the surface for this value of the movement speed of the receivers of the navigation signal. This is convenient to use for observation of the ship's movement on the surface. Thus, you can observe how the movement will develop for a situation where there are no control signals. After the control forces are turned on, the velocity vectors will change the values and the situation will change. Having sea charts you can control the vessel more accurately than an experienced pilot can do. Having information about the future position of the hull, relative to the berth, you can moor in very poor visibility. You can go through a complex channel, having enough time to manage, to correct the error. One look at the screen is enough to accurately determine the position of the ship's hull and its movement

To receive such information is very simple. You can install it as a small program on the personal computer.