Claims

1. A method for automatically maneuvering a marine vessel to a targeted location, the method comprising:

generating, using data received from a GPS unit, a mapping of an environment of the marine vessel, comprising generating a multi-dimensional array of measurements by applying a sensor fusion algorithm to the data received from the GPS unit and optical feed data from a vision ranging system;

identifying, based on the mapping, the targeted location;

receiving, by a processor control unit, information representing the targeted location;

engaging, at the processor control unit, a propulsion system of the marine vessel to automatically maneuver the marine vessel to the targeted location adjacent to the external object, comprising:

identifying a position of the marine vessel, comprising sensing, using at least one transducer, a position of the marine vessel relative to at least one obstacle;

calculating, at the processor control unit, a collision-free path of travel of the marine vessel, incorporating the position of the marine vessel relative to the at least one obstacle; and

engaging the propulsion system of the marine vessel to drive the marine vessel toward the targeted location in the collision-free path of travel.

2. The method of claim 1, further comprising:

automatically stopping the marine vessel at a location adjacent to an external object.

3. The method of claim 2, wherein engaging the propulsion system of the marine vessel to drive the marine vessel toward the targeted location in the collision-free path of travel comprises:

detecting the at least one obstacle;

in response to detecting the at least one obstacle, reducing a velocity of the marine vessel.

4. The method of claim 2, further comprising:

maintaining the marine vessel at the location adjacent to the external object.

5. The method of claim 4, wherein the location adjacent to the external object comprises a location at a pre-selected distance from the external object, and wherein maintaining the marine vessel at the location adjacent to the external object comprises maintaining the marine vessel at the pre-selected distance from the external object.

6. The method of claim 1, wherein identifying the position of the marine vessel further comprises:

obtaining additional data from the GPS unit; and

identifying the position of the marine vessel based on:

a position, sensed using the at least one transducer, of the marine vessel relative to the at least one obstacle; and

the additional data obtained from the GPS unit.

7. The method of claim 1, wherein engaging the propulsion system of the marine vessel to automatically maneuver the marine vessel toward the targeted location further comprises, at the processor control unit, automatically compensating for lateral movement of the marine vessel by controlling a plurality of actuators, in the propulsion system of the marine vessel, which engage a main drive to maintain the marine vessel in the collision-free path of travel toward the targeted location.

8. The method of claim 1, wherein sensing the position of the marine vessel relative to the at least one obstacle comprises using a plurality of transducers to detect and transmit a set of distance information between the marine vessel and the at least one obstacle.

9. The method of claim 8, wherein the set of distance information provides feedback to the processor control unit to enable a plurality of thrusters, in conjunction with a main drive system on the marine vessel, to drive the marine vessel in a sideways, fore, and aft direction toward the targeted location in a controlled path of travel.

10. The method of claim 1, wherein sensing the position of the marine vessel relative to the at least one obstacle comprises:

sensing, using the at least one transducer, the at least one obstacle, to generate obstacle-related data; and

transmitting information representing the obstacle-related data to the processor control unit; and

memorizing, using the processor control unit, the obstacle-related data.

11. The method of claim 10, further comprising:

utilizing the obstacle-related data during movement of the marine vessel.

12. The method of claim 1, wherein the targeted location comprises a targeted location adjacent to an external object, and wherein engaging the propulsion system of the marine vessel comprises engaging the propulsion system of the marine vessel to drive the marine vessel toward the targeted location adjacent to the external object.

13. The method of claim 12, wherein engaging the propulsion system of the marine vessel comprises engaging the propulsion system of the marine vessel to drive the marine vessel toward the targeted location adjacent to the external object.

14. The method of claim 2, wherein automatically maneuvering the marine vessel to the targeted location comprises:

at the processor control unit, receiving, from the at least one transducer, updates to a position of the marine vessel relative to the external object; and

automatically maneuvering the marine vessel to the targeted location based on the updates to the position of the marine vessel relative to the external object.

15. The method of claim 1, wherein engaging the propulsion system comprises determining, by the processor control unit, a required directional force to allocate to the propulsion system of the marine vessel, based upon a current location of the marine vessel relative to the targeted location.

16. The method of claim 1, wherein generating the mapping comprises generating the mapping using the data received from the GPS unit and data received from at least one unit other than the GPS unit, and applying a sensor fusion algorithm to the data received from the GPS unit and the data received from the at least one unit other than the GPS unit to generate the mapping.

17. The method of claim 16, wherein the at least one unit other than the GPS unit comprises a vision ranging system, and wherein the data received from the at least one unit other than the GPS unit comprises data received over an optical feed from the vision ranging system.

18. The method of claim 16, wherein the at least one unit other than the GPS unit comprises a infrared vision system, and wherein the data received from the at least one unit other than the GPS unit comprises data received over an optical feed from the infrared vision system.

19. The method of claim 16, wherein the at least one unit other than the GPS unit comprises a high precision inertial measurement unit (IMU), and wherein the data received from the at least one unit other than the GPS unit comprises data received over an optical feed from the high precision inertial measurement unit (IMU).

20. The method of claim 1, wherein automatically maneuvering the marine vessel to the targeted location comprises:

receiving updates to a location of the marine vessel;

responding to the updates to the location of the marine vessel by controlling the propulsion system of the marine vessel to maintain the collision-free path of travel of the marine vessel to the targeted location.

21. The method of claim 20, wherein receiving the updates to the location of the marine vessel comprises receiving the updates to the location of the marine vessel from the GPS unit.

22. The method of claim 20, wherein receiving the updates to the location of the marine vessel comprises receiving the updates to the location of the marine vessel from a photographic vision system.

23. The method of claim 20, wherein receiving the updates to the location of the marine vessel comprises receiving the updates to the location of the marine vessel from a high precision inertial measurement unit (IMU).

24. A system for automatically maneuvering a marine vessel to a targeted location, the system comprising a processor control unit adapted to perform a method, the method comprising:

generating, using data received from a GPS unit, a mapping of an environment of the marine vessel, comprising generating a multi-dimensional array of measurements by applying a sensor fusion algorithm to the data received from the GPS unit and optical feed data from a vision ranging system;

identifying, based on the mapping, the targeted location;

receiving information representing the targeted location;

engaging a propulsion system of the marine vessel to automatically maneuver the marine vessel to the targeted location, comprising:

identifying a position of the marine vessel, comprising controlling at least one transducer to sense a position of the marine vessel relative to at least one obstacle;

calculating a collision-free path of travel of the marine vessel, incorporating the position of the marine vessel relative to the at least one obstacle; and

engaging the propulsion system of the marine vessel to drive the marine vessel toward the targeted location in the collision-free path of travel.

25. The system of claim 24, wherein the method further comprising:
automatically stopping the marine vessel at a location adjacent to an external object.

26. The system of claim 25, wherein the method further comprises:
maintaining the marine vessel at the location adjacent to the external object.

27. The system of claim 24, wherein identifying the position of the marine vessel further comprises:

obtaining additional data from the GPS unit; and

identifying the position of the marine vessel based on:

a position, sensed using the at least one transducer, of the marine vessel relative to the at least one obstacle; and

the additional data obtained from the GPS unit.

28. The system of claim 24, wherein sensing the position of the marine vessel relative to the at least one obstacle comprises:

sensing, using the at least one transducer, the at least one obstacle, to generate obstacle-related data; and

transmitting information representing the obstacle-related data to the processor control unit;

memorizing, using the processor control unit, the obstacle-related data;

utilizing the obstacle-related data during movement of the marine vessel.

29. The system of claim 28, wherein the targeted location comprises a targeted location adjacent to an external object, and wherein engaging the propulsion system of the marine vessel comprises engaging the propulsion system of the marine vessel to drive the marine vessel toward the targeted location adjacent to the external object.

30. The system of claim 24, wherein generating the mapping comprises generating the mapping using the data received from the GPS unit and data received from at least one unit other than the GPS unit,

and applying a sensor fusion algorithm to the data received from the GPS unit and the data received from the at least one unit other than the GPS unit to generate the mapping.