crew facilities and engine funnels are combined. The interrupted line 7 illustrates the line of sight from the bridge to the water surface. Maritime regulations require a field of view to the sea surface forward of the bow of the container ship that starts at a distance d that is less than the lesser of two ship lengths or 500 m forward of the bow of the container ship. Since the height of the bridge cannot be increased without negative consequences, such as the inability to pass under road bridges or railroad bridges and other fixed constructions, it has been necessary to stow fewer tiers of containers in the forwardly located container bays, which can be clearly seen in Figs. 1 and 2.

The bridge of a ship is the room or platform from which the ship can be controlled or commanded. When a ship is underway the bridge is manned by an OOW (officer of the watch) aided usually by an AB (able seaman) acting as lookout. During critical manoeuvres the captain will be on the bridge supported, perhaps, by an OOW as an extra set of hands, an AB on the wheel and sometimes a pilot if required.

The bridge is located on its own superstructure for ships of the so-called twin island design as shown in Fig. 1 and the bridge is combined with the funnel(s) for the engine(s) in the so-called single island design as shown in Fig. 2. The length and space occupied by the superstructure of the bridge and the superstructure of the funnels or by the combined superstructure cannot be used for stowing containers.

SUMMARY

It is an object of the invention to provide a system that overcomes or at least reduces the problems indicated above.

The foregoing and other objects are achieved by the features of the independent claims. Further implementation forms are apparent from the dependent claims, the description and the figures.

According to a first aspect, there is provided a container ship configured for stowing a plurality of shipping containers above the open deck, said container ship comprising:

at least one optical sensor arranged to capture one or more images of a viewing field of view forward of the bow of the container ship, wherein at least a part of the viewing field of view is a blindspot which is not in direct line of sight from a bridge of the container ship; wherein the bridge is provided with: instruments for direction; instruments for engine; and at least one display coupled to said at least one optical sensor for real time reproduction of the one or more images including the blindspot captured by said at least one optical sensor; wherein the at least one optical sensor is arranged to provide a substantially 360° horizontal field of view around the container ship and a substantially 180° vertical view.

By providing a container ship with at least one optical sensor such a digital video camera arranged to capture a field of view that cannot be seen from the bridge, such as e.g. the area directly forward of the bow of the container ship and by displaying the images captured by the optical sensor on a display screen or the like on the bridge it becomes possible to locate the bridge at any desirable location in the container ship, even in a location where there is no outside view you to the outside, and allow the crew of the container ship to control/command the container ship from the bridge. Being able to place the bridge at any desired location on the container ship while still providing the required visual and possibly this information allows the flow area of the open deck to be used for stowing containers without the height of the containers stowed above deck being limited by a line of sight from a conventional bridge to the sea surface forward of the bow. These new possibilities allow a significant increase in the number of containers that can be stowed on a container ship of a given size.

In a first possible implementation form of the first aspect, the bridge is not provided with any windows that provide a view of the area ahead of the container ship.

In a second possible implementation form of the first aspect, the at least one optical sensor is arranged such that it provides a field of view to the sea surface forward of the bow of the container ship that starts at a distance that is less than the lesser of two ship lengths or 500 m forward of the container ship.

In a third possible implementation form of the first aspect, the said at least one optical sensor is arranged such that it provides a field of view to the sea surface forward of the bow of the container ship that starts at a distance that is less than the lesser of two ship lengths or 500 m forward of the bow to at least 10° on either side under all conditions of draught, trim and containers stowed on deck.

In a fourth possible implementation form of the first aspect, the at least one digital video camera is placed on the container ship such that the view of the at least one digital video camera to the area forward of the container ship is substantially unobstructed by any part of the container ship, and preferably not obstructed either by any containers stowed on the open deck of the container ship.

In a fifth possible implementation form of the first aspect, the container ship is configured for storage of shipping containers above the open deck arranged in a plurality of bays distributed over the length of the container ship, arranged in a plurality of rows distributed over the width of the container ship and arranged in a plurality of tiers in the direction of the height of the container ship, with the at least one optical sensor being arranged such that it provides for an unobstructed view of the area ahead of the container ship regardless of the number of tiers of shipping containers that are stowed in the most forwardly located bays.

In a sixth possible implementation form of the first aspect, the bridge is provided with a plurality of display screens that are arranged in a substantially circular or polygon arrangement for real time reproduction of the substantially 360° horizontal field of view to a crew member on the bridge inside the circular or polygon arrangement.

In a seventh possible implementation form of the first aspect,

said bridge is provided with a display arrangement with a plurality of screens arranged on a semi-sphere covering said bridge.

In an eighth possible implementation form of the first aspect, the container ship is provided with a plurality of microphones arranged for capturing sound around the container ship and wherein the bridge is provided with acoustical transducers for real time reproduction of the sound captured by the microphones.

In a ninth possible implementation form of the first aspect, the container ship is provided with a plurality of microphones arranged for directional capturing of sound around the container ship wherein the bridge is provided with acoustical transducers for real time reproduction of the directional sound captured by the microphones in a way that allows a crew member on the bridge to determine from which direction the recorded sound came.

In a tenth possible implementation form of the first aspect, the container ship is provided with sound processing equipment coupled to the microphones and configured to determine the distance to the source of sound captured with the microphones, the bridge preferably being provided with an instrument or display screen to indicate the distance to the source of sound.

In a eleventh possible implementation form of the first aspect, the container ship is provided with a maneuvering console, the maneuvering console preferably comprising one or more of the following instruments: a steering wheel for controlling the rudder; handles for controlling the engine power; an indicator for the propeller speed; an indicator for the direction of rotation of the propeller; an indicator of the rudder angle; an indicator of the speed of the container ship; and a compass.

In a twelfth possible implementation form of the first aspect, the bridge is located below the open deck.

In a thirteenth possible implementation form of the first aspect, the container ship is configured for stowing shipping containers above the open deck up to a predetermined maximum height, and wherein the bridge is located below the predetermined maximum height.

In a fourteenth possible implementation form of the first aspect, the container ship is configured for stowage of containers up to a maximum number of tiers above the open deck, resulting in the predetermined maximum height.

In a fifteenth possible implementation form of the first aspect, the at least one optical sensor is a digital video camera, preferably a 3D video camera, such as a dual video camera or a stereo video camera, and wherein said at least one display screen is preferably configured to display 3D video according to a second aspect, there is provided a method of commanding a container ship, the method comprising providing a real-time view of the area ahead of the container ship on a display screen on a bridge of the container ship and issuing directional and/or engine control commands from the bridge.

In a sixteenth possible implementation form of the first aspect, the container ship is provided with a radar for detecting the wave systems ahead of the container ship.

In a seventeenth possible implementation form of the first aspect, the at least one optical sensor is a digital video camera for generating an image stream.

According to a second aspect, there is provided a method of commanding a container ship, said method comprising providing a real-time view of an area ahead of said container ship captured with at least one optical sensor arranged to provide a substantially 360° horizontal field of view around the container ship, and a substantially 180° vertical view, on at least one display screen on a bridge of said container ship, wherein at least a part of the area is a blindspot which is not in direct line of sight from the bridge; and issuing directional and/or engine control commands from said bridge.

In a first possible implementation form of the second aspect, the method comprises a crew member on the bridge observing the display screen and a crew member issuing the directional and/or engine control commands from the bridge.

In a second possible implementation form of the second aspect, the bridge is not provided with any windows that allow a crew member on the bridge a view of the area ahead of the container ship.

In a third possible implementation form of the second aspect, the method comprises capturing the substantially 360° horizontal view around the container ship, and the substantially 180° vertical view, and reproducing the captured substantially 360° horizontal view, and the substantially 180° vertical view, on a display screen or array of display screens surrounding an area of the bridge, the area of the bridge preferably being provided with a maneuvering console.

In a fourth possible implementation form of the second aspect, the method comprises capturing sound around the container ship and reproducing the captured sound with at least one acoustical transducer on the bridge.

In a fifth possible implementation form of the second aspect, the sound is captured directionally, preferably 360° horizontal around the container ship, and wherein the captured sound is reproduced through a plurality of spatially distributed acoustic transducers on the bridge such that a crew member on the bridge can determine from which direction the recorded sound came.

In a sixth possible implementation form of the second aspect, the method comprises capturing video with depth information of the area ahead of the bow of the container ship and displaying the captured video with depth information in 3D on said at least one display screen on said bridge.

These and other aspects will be apparent from the embodiment(s) described below.

BRIEF DESCRIPTION OF THE DRAWINGS

CLAIMS

1. A container ship configured for stowing a plurality of shipping containers above the open deck, said container ship comprising:

at least one optical sensor arranged to capture one or more images of a viewing field of view forward of the bow of the container ship wherein at least a part of the viewing field of view is a blindspot which is not in direct line of sight from a bridge of the container ship;

wherein the bridge is provided with:

instruments for direction;

instruments for engine; and

at least one display coupled to said at least one optical sensor for real time reproduction of the one or more images including the blindspot captured by said at least one optical sensor;

wherein the at least one optical sensor is arranged to provide a substantially 360° horizontal field of view around the container ship and a substantially 180° vertical view.

2. A container ship according to claim 1, wherein said at least one optical sensor is arranged such that it provides a field of view to the sea surface forward of the bow of the container ship that starts at a distance that is less than the lesser of two ship lengths or 500 m forward of the container ship.

3. A container ship according to claim 2, wherein said at least one optical sensor is arranged such that it provides a field of view to the sea surface forward of the bow of the container ship that starts at a distance that is less than the lesser of two ship lengths or 500 m forward of the bow to at least 10° on either side under all conditions of draught, trim and containers stowed on deck.

4. A container ship according to any one of claims 1 to 3, wherein said at least one optical sensor is placed on the container ship such that the view of the at least one optical sensor of the area forward of the container ship is substantially unobstructed by any part of the container ship, and preferably not obstructed either by any containers stowed on the open deck of said container ship.

5. A container ship according to any one of claims 1 to 4, wherein said container ship is configured for storage of shipping containers above the open deck arranged in a plurality of bays distributed over the length of the container ship, arranged in a plurality of rows distributed over the width of the container ship and arranged in a plurality of tiers in the direction of the height of the container ship, with said at least one optical sensor being arranged such that it provides for an unobstructed view of the area ahead of the container ship regardless of the number of tiers of shipping containers that are stowed in the most forwardly located bays.

6. A container ship according to any one of claims 1 to 5, said bridge being provided with a plurality of display screens that are arranged in a substantially circular or polygon arrangement for real time reproduction of said substantially 360° horizontal field of view to a crew member on said bridge inside said circular or polygon arrangement.

7. A container ship according to any one of claims 1 to 6, wherein said bridge is provided with a display arrangement with a plurality of screens arranged on a semi-sphere covering said bridge.

8. A container ship according to any one of claims 1 to 7, provided with a plurality of microphones arranged for capturing sound around the container ship and wherein said bridge is provided with acoustical transducers for real time reproduction of the sound captured by said microphones.

9. A container ship according to any one of claims 1 to 8, provided with a plurality of microphones arranged for directional capturing of sound around the container ship wherein said bridge is provided with acoustical transducers for real time reproduction of the directional sound captured by said microphones in a way that allows a crew member on said bridge to determine from which direction the recorded sound came.

10. A container ship according to claim 8 or 9, further provided with sound processing equipment coupled to said microphones and configured to determine the distance to the source of sound captured with said microphones, said bridge preferably being provided with an instrument or display screen to indicate the distance to said source of sound.

11. A container ship according to any one of claims 1 to 10, provided with a maneuvering console, said maneuvering console preferably comprising one or more of the following instruments: a steering wheel for controlling the rudder; handles for controlling the main engine power or load; an indicator for the propeller speed; an indicator of the rudder angle; an indicator of the speed of the container ship; and a compass.

12. A container ship according to any of the preceding claims wherein the at least one optical sensor is a digital video camera for generating an image stream.

13. A method of commanding a container ship, said method comprising:

providing a real-time view, of an area ahead of said container ship captured with at least one optical sensor arranged to provide a substantially 360° horizontal field of view around the container ship, and a substantially 180° vertical view, on at least one a display screen on a bridge of said container ship,

wherein at least a part of the area is a blindspot which is not in direct line of sight from the bridge; and

issuing directional and/or engine control commands from said bridge.

14. A method according to claim 13, comprising capturing the substantially 360° horizontal view around the container ship, and the substantially 180° vertical view, and reproducing the captured substantially 360° horizontal view, and the substantially 180° vertical view, on a display screen or array of display screens surrounding an area of said bridge, said area of the bridge preferably being provided with a maneuvering console.

15. A method according to claim 13 or 14, comprising capturing sound around said container ship and reproducing said captured sound with at least one acoustical transducer on said bridge.