A MANOEUVRABLE GANGWAY AND A METHOD OF MANOEUVRING A GANGWAY

The invention relates to a control system and a method for manoeuvring an elongated element projecting in a pivotable manner from a foundation and being arranged to position a projecting end portion relative to a landing place remote from the foundation, the manoeuvring being provided by means of one or more actuators connected to the control system. The use of an image processor for generating control parameters for a control system for positioning a projecting end portion of an elongated element, which projects in a pivotable manner from a foundation, relative to a landing place remote from the foundation is described as well.

When manoeuvring an elongated element, for example a gangway, which is pivotably supported, at one end portion, on a foundation and has an opposite, freely projecting end portion which is to be accurately positioned relative to a remotely positioned area, and the element is placed on a movable base, typically a vessel which is affected by wave motion and wind forces, or, possibly, the element is placed on a fixed base and the projecting end portion is to be positioned relative to a movable base, or both the foundation and the remote area are movable, it is necessary to control the outer end of the element for the outer end portion of the element to be positioned correctly. For a gangway which is used to make it possible for personnel to move between a vessel and an adjacent structure, for example an oil- or gas-field installation or an offshore wind turbine, it is important for the outer end portion of the gangway to be landed in the right place relative to anchoring points and stationary walkways on the structure, among other things.

The manoeuvring of such projecting elements is done, by and large, by rotating them around a vertical axis and a horizontal axis at the foundation. Besides, the projecting element may be telescopic or possibly include several horizontal rotary joints, which make it possible to fold the projecting element. The different movements are controlled by hydraulic actuators, for example, such as hydraulic cylinders and hydraulic motors. In their simplest form, the control references are the visual observation of the distance of the outer end portion to the landing place. The drawback of the prior art is that the references are inaccurate because of, among other things, the landing place not being recognizable, and the control signals are adapted to an insufficient degree to the development of the reference variables, that is to say the speed of motion of the outer end portion is

C l a i m s

1. A manoeuvrable gangway (1) provided with a control system (16) arranged for manoeuvring said gangway (1) which projects in a pivotal manner from a foundation (13) and comprising a projecting end portion (12) arranged to be positioned at a landing place (2) remote from the foundation (13), the manoeuvring being provided by means of one or more actuators (14) and a drive connected to the control system (16), wherein

the projecting end portion (12) is provided with at least one camera (31, 32) which is arranged to image a camera-readable pattern (22) arranged at the landing place (2) when said end portion (12) is near said landing place (2);

the at least one camera (31, 32) is connected in a signal-communicating manner to an image processor (161); and

the image processor (161) is arranged to determine the position of the at least one camera (31, 32) relative to the pattern (22) by image analysis and to convert the image information into control parameters for the control system (16) to position the projecting end portion (12) relative to the landing place (2) by controlling one or more of said actuators (14),

c h a r a c t e r i z e d i n that

the projecting end portion (12) includes a landing gear (15) being at least partially inside the field of view (36) of the at least one camera (31, 32).

2. The gangway (1) according to claim 1, wherein the projecting end portion (12) is provided with at least two cameras (31, 32) which are arranged in a spaced-apart manner and are unidirectional and have coinciding camera planes (33, 33').

3. The gangway (1) according to claim 1, wherein landing gear (15) arranged to be securable to structures at the landing place (2) when the gangway (1) has landed in a preferred position at the landing place (2).

4. The gangway (1) according to claim 1, wherein landing gear (15) is pivotal attached to the projecting end portion (12) of the gangway (1).

5. A method of manoeuvring a gangway (1) which projects in a pivotal manner from a foundation (13) and comprises a projecting end portion (12) which is arranged to be positioned at a landing place (2) remote from the foundation (3), the method including the steps of

- manoeuvring the gangway (1) by means of several actuators (14) connected to a drive and to a control system (16),
- providing the landing place (2) with a camera-readable pattern (22);
- providing the projecting end portion (12) with at least one camera (31, 32) which

is arranged to image the pattern (22) when said end portion (12) is near the landing place (2);

- connecting the at least one camera (31, 32) in a signal-communicating manner to an image processor (161);
- by an image analysis in the image processor (161), determining the position of the at least one camera (31, 32) relative to the pattern (22) and converting the image information into control parameters for the control system (16);

c h a r a c t e r i z e d i n that the method includes the further steps:

- positioning the projecting end portion (12) relative to the landing place (2); and
- securing the landing gear (15) to structures at the landing place (2),.

6. The method according to claim 5, wherein the method includes the further step:

- continuously updating the control parameters.

7. The method according to claim 5, wherein the method includes the further step:

- performing a landing of the projecting end portion (12), or a landing gear (15) pivotal suspended from the projecting end portion (12), at the landing place (2), automatically by a continuous updating of the control parameters for the control system (16).

8. Use of an image processor (161) for generating control parameters for a control system (16) for positioning a projecting end portion (12) of a gangway (1), which projects in a pivotable manner from a foundation, (13) relative to a landing place (2) remote from the foundation (13).