19-3. Each telescopic actuators 22 can lock a position of its telescopic joint 20, or be in a free-float mode, allowing for passive movement of its telescopic joint 20 of the main boom 11. As the object handler 13 is closer to the far end 11e of the main boom 11 than the pedestal 10, the outer telescopic actuator 22-2 is in a locking mode, while the inner telescopic actuator 22-1 is in a free-float mode. This ensures minimal movement between the target area 5 and the object handler 13 when the object handler 13 is close to the floating vessel 2, facilitating the gripping and lifting of the battery pack 6 from the carousel 31. At the same time, the allowed passive movement of the inner telescopic joint 20-1 can compensate for movements of the floating vessel 2. In Fig. 2, the transport boom 12 comprises a rail and is connected to the main boom 11 by two couplings 15. The transport boom 12 is slidable relative to the main boom 11. One of the couplings 15 is a linear actuator 15a for the transport boom 12, configured for moving the transport boom 12 back and forth relative to the main boom 11. The linear actuator 15a is connected to the middle section 19-2, while the other coupling 15 is a slidable coupling 15b connecting the transport boom 12 with the outer section 19-3, ensuring that the transport boom 12 can move along the outer section 19-3 on the main boom 11. The object handler 13 is movable along the rail of the transport boom 12 and comprises an object handler actuator 23 for manipulating the position of the object handler 13 relative to the transport boom 12. In Fig. 2. The object handler 13 and the transport boom 12 are moving in a direction D1 towards the floating vessel 2. The actuators 22, 23 and 24 can comprise hydraulic cylinders or electrical actuators, such as linear actuators.

Fig. 3 shows the transport system 1 of Fig.1 in operation wherein the transport boom 12 and the object handler 13 are moved relative to the main boom 11 so that the object handler 13 is located above an empty battery pack 6 placed on the carousel 31 at the target area 5 on the floating vessel 2. The object handler 13 is configured with a locking system 26 configured for gripping and releasing a gripping interface 25 of the battery pack 6. The object handler 13 is lowered in a direction D2 so that the locking system 26 may be locked onto the gripping interface 25. The lowering and lifting of the object handler 13 can be controlled by, for example, a system comprising hydraulic cylinders or by a jacking system. As already mentioned in the introductory portion of the specification, in alternative embodiments, the object handler 13 is not lowered or lifted, but rather fixed in length, while the respective “floor” onto which the battery pack (object) 6 is standing or landing is adjustable in height, such that the object handler 13 only needs to grip or release the battery pack 6. The locking system 26 of the object handler 13 can comprise a mechanical gripper or a vacuum head for gripping the gripping interface 25.

One empty battery pack 6 has been swapped with a fully charged battery pack 6 and the operation can end, or the cycle can be repeated.

In a finishing step 111, the object handler 13 is moved towards the pedestal 10, the vertical support 14 is retracted, both sections 19 are retracted, the transport boom 12 is withdrawn inside a receiving part of the main boom 11, and the main boom 11 is rotated to a parked position as illustrated in Fig. 1.

For further transport of battery packs 6, the step 112 comprises the control system sending a signal to the carousel 31 to rotate in order to align the second empty battery pack 6 with the object handler 13. In the embodiment wherein 2 battery packs 6 are placed on the carousel 31, the carousel 31 must turn 180 degrees. The steps from 103 to 110 can be repeated until all the empty battery packs 6 have been switched with fully charged battery packs 6.

The person skilled in the art may easily find alternative solutions for the transport system. The invention covers all these variants as long as they are covered by the independent claim. No limitations are intended to the details of construction or design herein shown, other than as described in the claims below.

It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. Use of the verb "comprise" and its conjugations does not exclude the presence of elements or steps other than those stated in a claim. The article "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage. The invention may be implemented by means of hardware comprising several distinct elements, and by means of a suitably programmed computer. In the device claims enumerating several means, several of these means may be embodied by the same item of hardware.

# C l a i m s

1. Transport system (1) for transporting an object (6) back and forth between a storage area (4) and a target area (5), wherein the transport system (1) comprises:

- a pedestal (10) for being placed at one of the storage area (4) and the target area (5),
- a main boom (11) pivotably connected to the pedestal (10), wherein the main boom (11) has a far end (11e) that is configured for being supported by the other one of the storage area (4) and the target area (5) while allowing for at least one rotational degree of freedom between the main boom (11) and the other one of the storage area (4) and the target area (5), wherein a span of the main boom (11) is passively adjustable in length, wherein the main boom (11) is either telescopic or foldable, at least during a first operational mode of the transport system,
- a transport boom (12) being coupled with the main boom (11), the transport boom (12) extending in a horizontal direction from the storage area (4) to the target area (5), in operational use, and
- an object handler (13) movable along or moved by the transport boom (12) and being configured for handling the object (6) to be transported between the storage area (4) and the target area (5).

2. The transport system (1) according to claim 1, wherein the transport boom (12) is movably mounted to the main boom (11), optionally further comprising at least two couplings (15) between the transport boom (12) and the main boom (11), wherein at least one of the couplings (15) is configured for actuating the transport boom (12) for adapting a position of the transport boom (12) relative to the main boom (11).

3. The transport system (1) according to any one of the preceding claims, wherein the far end (11e) of the main boom (11) comprises a vertical support (14) for resting on the other one of the storage area (4) and the target area (5), optionally wherein the vertical support (14) is extendable in length.

4. The transport system (1) according to any one of the preceding claims, wherein the main boom (11) comprises a first sub-boom and a second sub-boom pivotable connected to the first sub-boom for allowing the adjustment of the span of the main boom (11), optionally wherein the main boom (11) is foldable, for instance in a vertical direction or a horizontal direction.

5. The transport system (1) according to any one of claim 1 to 3, wherein the main boom (11) comprises at least one telescopic joint (20) for allowing the adjustment of the span of the main boom (11), optionally wherein the main boom (11) comprises at least two telescopic joints (20) for allowing the adjustment of the span of the main boom (11), optionally wherein the movement of each of the two telescopic joints (20) is controlled by an actuator (22), optionally wherein each actuator (22) has a locking mode, wherein said actuator (22) is stiff for locking the position of its respective telescopic joint (20), and a free-float mode, wherein said actuator (22) can freely extend or contract for allowing for the passive adjustment of the length of the span of the main boom (11).

6. The transport system (1) according to any one of the preceding claims, the transport system (1) comprising an object handler actuator (23) for manipulating the position of the object handler (13) relative to the transport boom (12).

7. The transport system (1) according to any one of the preceding claims, wherein a length of the object handler (13) is adjustable for facilitating picking up or releasing of the object (6).

8. The transport system (1) according to any one of the preceding claims, wherein the object handler (13) is configured for gripping or releasing a gripping interface (25) of the object (6), optionally wherein the object handler (13) comprises a mechanical gripper for gripping the gripping interface (25) of the object (6), alternatively wherein the object handler (13) comprises a vacuum head for gripping the gripping interface (25) of the object (6).

9. The transport system (1) according to any one of the preceding claims, wherein the object handler (13) is controllably rotatable for manipulating the orientation of the object (6) when suspended from the object handler (13).

10. The transport system (1) according to any one of the preceding claims, the transport system (1) further comprising a transport apparatus (30, 31, 60) at the storage area (4) for receiving the object (6) and moving it within reach of the object handler (13) or outside the reach of the object handler (13), optionally wherein the transport apparatus (30, 31, 60) is selected from a group consisting of: a platform, a rotatable carousel, a movable platform, a conveyor belt, a vehicle, a robot storage facility, a fork-lift, a crane, and a rack-and-pinion system.

11. The transport system (1) according to any one of the preceding claims, the transport system (1) further comprising a further transport apparatus (30, 31, 60) at the target area (5) for receiving the object (6) and moving it within reach of the object handler (13) or outside of reaching of the object handler (13), optionally wherein the further transport apparatus (30, 31, 60) is selected from a group consisting of: a platform, a rotatable carousel, a movable platform, a conveyor belt, a vehicle, a robot storage facility, a fork-lift, a crane, and a rack-and-pinion system.

12. The transport system (1) according to any one of the preceding claims, wherein the one of the storage area (4) and the target area (5) is placed on a floating vessel (2) or floating platform, optionally wherein the other one of the storage area (4) and the target area (5) is placed on a further floating vessel or floating platform, eliminating the need for tidal and/or loading condition adjustments.

13. The transport system (1) according to any one of claims 10 or 11 to 12 in as far as directly or indirectly dependent on claim 10, wherein the transport apparatus (30) is adjustable in height to accommodate for tidal changes and/or loading condition of one of the storage area (4) or the target area (5).

14. The transport system (1) according to any one of claims 11 or 12 to 13 in as far as directly or indirectly dependent on claim 11, wherein the further transport apparatus (31) is adjustable in height to accommodate for tidal changes and/or loading condition of one of the storage area (4) or the target area (5).

15. The transport system (1) according to any one of the preceding claims, wherein the other one of the storage area (4) and the target area (5) comprises a support (32) configured for receiving the end (11e) of the main boom (11) or the vertical support (14) of the main boom (11).