

(19)



(11)

**EP 1 550 086 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:  
**12.12.2007 Bulletin 2007/50**

(51) Int Cl.:  
**G07B 15/00 (2006.01) G08G 3/00 (2006.01)**  
**B63B 22/02 (2006.01) B63B 22/24 (2006.01)**

(21) Application number: **03758685.6**

(86) International application number:  
**PCT/IT2003/000582**

(22) Date of filing: **29.09.2003**

(87) International publication number:  
**WO 2004/032064 (15.04.2004 Gazette 2004/16)**

**(54) SYSTEM FOR CONTROLLING AND MANAGING DOCKING IN A SEA AREA**

SYSTEM ZUM REGULIEREN UND VERWALTEN VON FESTMACHVORGÄNGEN IN EINEM SEEGEBIET

SYSTEME PERMETTANT DE COMMANDER ET DE GERER L'AMARRAGE DANS UNE ZONE DE MER

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR**

• **DE MASI, Ivano Tommaso,**  
**Italgest Inform. Tech. Spa**  
**73042 Casarano (IT)**

(30) Priority: **07.10.2002 IT RM20020507**

(74) Representative: **Iannone, Carlo Luigi et al**  
**Barzanò & Zanardo Roma S.p.A.**  
**Via Piemonte 26**  
**00187 Roma (IT)**

(43) Date of publication of application:  
**06.07.2005 Bulletin 2005/27**

(73) Proprietor: **Italgest Information Technology S.P.A.**  
**73042 Casarano (IT)**

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(72) Inventors:  
• **LOMBARDI, Valerio,**  
**Italgest Information Tech. Spa**  
**73042 Casarano (IT)**

**EP 1 550 086 B1**

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## Description

**[0001]** The present invention concerns a system for controlling and managing docking, the application of which is particularly advantageous for protected sea parks, which enables docking in specific sea areas in a non invasive way with respect to the sea environment, monitoring and managing docking itself in a reliable, simple, and effective way.

**[0002]** The present invention further concerns the elements, in particular an equipped buoy, usable in such a system for controlling and managing docking.

**[0003]** Although greatly important for the protection of the environment in highly valuable zones at risk of deterioration, the establishment of sea parks is generally received with deep distrust by local people and tourists, with particular reference to the users of pleasure crafts.

**[0004]** This is due to the fact that, in order to protect the environment, the administrative offices of the parks tend to limit the admissions to the most beautiful zones, making admissions difficult and often very expensive. Moreover, in these zones a tourist does not find particular protection measures, or services, or particular facilities.

**[0005]** The result is often a general dissatisfaction of both local populations, which observe a decrease in tourists, and pleasure craft users, which feel injured in their right of free navigation and of docking in the most beautiful places.

**[0006]** In fact, it is just the docking that creates the most diffused problems to the sea environment; in fact, even the sailboats, although generally having a lower environmental impact and being used by pleasure craft users with greater sense of respect for the sea, create damages to the bottom absolutely comparable with the ones caused by the motorboats.

**[0007]** It is therefore an object of the present invention to enable docking in specific sea areas, in particular sea parks, in a non invasive way with respect to the sea environment.

**[0008]** It is further object of the present invention also to enable controlling and managing docking in a reliable, simple, and effective way. From the prior art document EP 0945552 A1 a system for managing objects (fenders) in a sea area is known, which comprises the features of the preamble of the independent claim 1.

**[0009]** It is specific subject matter of this invention a system for controlling and managing docking in a sea area, comprising at least one control station and further comprising one or more fields, characterised in that said fields have one or more buoys and in that said buoys are equipped buoys apt to communicate with said at least one control station, each one of said equipped buoys comprising first radiocommunication means apt to communicate with second radiocommunication means with which said at least one control station is provided, each one of said equipped buoys further comprising, electronic means apt to transmit an interrogation signal for carrying out a passive radio frequency communication with at

least one transmitter-responder or transponder, in such a way that said at least one transponder, when interrogated, talks with the electronic means providing at least one identification code, the electronic means transmitting, through the first radiocommunication means, said at least one identification code to said at least one control station.

**[0010]** In particular, in such embodiment control and management of docking may be carried out at a local control station, for example provided with means for memorising and storing identification codes authorised to dock in a corresponding sea area having limited extension.

**[0011]** Instead, in the case when there are more docking zones, possibly even spread over more than one sea area, in which it is necessary to control and manage docking in a centralised and/or co-ordinated way, it is advantageous to have an operative centre receiving data and information coming from local control stations corresponding to the various docking zones to be controlled and managed.

**[0012]** In such cases, preferably according to the invention the system comprises an operative centre, said at least one control station of each buoy field comprising further communication means apt to communicate with the operative centre, said at least one control station being apt to send to this information related to the corresponding buoy field.

**[0013]** Always according to the invention, the electronic means may comprise an antenna housed in a structure of the equipped buoy, said at least one transponder having a housing having a shape apt to spatially arrange itself with respect to said structure of the antenna in such a way to achieve electromagnetic visibility conditions with the antenna itself.

**[0014]** Preferably according to the invention, the structure housing the antenna and the housing of the transponder have the shape of two corresponding rings.

**[0015]** Still according to the invention, the ring structure housing the antenna may be apt to receive a passing rope and may be provided with means detecting the presence of a rope, following the detection of the presence of a rope the electronic means transmitting said interrogation signal.

**[0016]** Furthermore according to the invention, each one of said equipped buoys may comprise a float, to which the structure housing the antenna is coupled, the interior of the float and of the structure housing the antenna being watertight, an autonomous electric power supply being housed within the float, which supply comprises at least one solar panel, housed in correspondence with at least one transparent portion of the float, connected to a power supply storage battery.

**[0017]** Always according to the invention, the float may be in plastic reinforced by fibber glass and/or polycarbonate.

**[0018]** Still according to the invention, the first radiocommunication means may be apt to communicate with

the second radiocommunication means according to the Wifi communication standard.

**[0019]** Furthermore according to the invention, said at least one control station may be housed in a mimetic structure, comprising at least one solar panel connected to a power supply storage battery.

**[0020]** Preferably according to the invention, the mimetic structure of said at least one control station is a watertight container in rock shape made of fibber glass and/or polycarbonate.

**[0021]** Always according to the invention, said at least one control station may comprise at least one camera for video taking the corresponding buoy field.

**[0022]** Still according to the invention, said at least one control station may be apt to send to the operative centre, in the embodiments where this is present, one or more images taken by said at least one camera.

**[0023]** Preferably according to the invention, said at least one transponder may be contained within a watertight shock-resistant floating plastic material moulded container.

**[0024]** Furthermore according to the invention, said at least one transponder may memorise said at least one identification code in encrypted form.

**[0025]** Always according to the invention, in the embodiments where the operative centre is present, said further communication means of said at least one control station may comprise at least one device of telephonic communication, via cable or GPRS, and/or at least one communication device through radio link for connecting to the operative centre.

**[0026]** Still according to the invention, the communication between said at least one control station and the operative centre may occur through protected Internet connection.

**[0027]** Furthermore according to the invention, the operative centre may comprise further communication means through cellular telephony via SMS (Short Message Service) messages. Similarly, in the embodiments where the operative centre is not present, said at least one control station may comprise further communication means through cellular telephony via SMS messages.

**[0028]** It is still specific subject matter of this invention an equipped buoy characterised in that it comprises first radiocommunication means apt to communicate with second radiocommunication means with which at least one control station is provided, in that it also comprises electronic means apt to transmit an interrogation signal for carrying out a passive radio frequency communication with at least one transponder, in such a way that said at least one transponder, when interrogated, talks with the electronic means providing at least one identification code, the electronic means transmitting, through the first radiocommunication means, said at least one identification code to said at least one control station, the equipped buoy being further characterised in that it is usable in a system for controlling and managing docking in a sea area as previously described.

**[0029]** The present invention will be now described, by way of illustration and not by way of limitation, according to its preferred embodiments, by particularly referring to the Figures of the enclosed drawings, in which:

Figure 1 schematically shows a portion of a preferred embodiment of the system according to the invention;

Figure 2 shows a schematic elevation view of an equipped buoy employed in the system of Figure 1; Figure 3 schematically shows a detail of the configuration of interaction between the transmitter-responder device, or transponder, associated to a boat, and the equipped buoy of Figure 2; and

Figure 4 schematically shows the local control station employed in the system of Figure 1.

**[0030]** In the following of the description same references will be used to indicate alike elements in the Figures.

**[0031]** The system developed by the inventors is an effective technical solution which is capable to reconcile both the needs of the sea parks, which have to protect the environment and obtain economic compensations from the visits of the pleasure craft users, and the needs of these, which wish to enjoy the sea environment having real services in exchange for the payment of an admission fee.

**[0032]** In particular, the system according to the invention comprises the creation of appropriate buoy fields enabling the controlled docking of boats with no need of anchoring in specific zones of a sea park. Such buoy fields, together with a prohibition of anchoring, assure the protection of the sea bottom, the possibility to issue a limited number of permission of staying at a park, determined by the number of available buoys, the economic gain for the management of the park, and the satisfaction of the pleasure craft users.

**[0033]** The system according to the invention is an automated system for monitoring and managing the buoys, so as to assure a total control of the buoy fields by the administrative office of a park, the collection of the admission fee and the repression of not authorised exploitations of services.

**[0034]** With reference to Figure 1, the preferred embodiment of the system according to the invention comprises a field having one or more equipped buoys 1, apt to communicate with a local control station 2, which in turn communicates with an operative centre 3. In particular, the local control station 2 may manage any number of buoys 1 distributed within the range of hundreds of meters, while the operative centre 3 may manage any number of local control stations 2.

**[0035]** As shown in Figure 2, an equipped buoy 1 employed in the preferred embodiment of the system according to the invention comprises a float 4, preferably made of plastic reinforced by fibber glass and/or polycarbonate, inside which it is housed an electronic unit 5 con-

nected to an antenna 6, preferably installed inside a ring placed on the top of the float 4. Through the antenna 6, the electronic unit 5, preferably provided with a micro-processor, continuously transmits an interrogation signal within the surrounding environment and it is apt to carry out a passive radio frequency communication with a transmitter-responder, or transponder, having no power supply.

**[0036]** The transponder, schematically shown in Figure 3 with reference numeral 7, receive the energy necessary for its own operation directly from the antenna 6 and talks with the electronic unit 5 giving its own identification code. In other words, the electronic unit 5 is apt to carry out the recognition of transponders 7 and, consequently, to detect the mooring of a boat. The system according to the invention provides for giving to each pleasure craft user, who requests it, a corresponding transponder 7 programmed with boat and/or pleasure craft user identification data; these data are further memorised in the operative centre 3, where they may be associated to other data concerning, for instance, the type of service requested by the pleasure craft user to which the transponder 7 corresponds. The transponder 7 of the preferred embodiment of the system according to the invention is contained within a watertight shock-resistant floating plastic material moulded container which incorporates and protects it; its memory uniquely contains an encrypted code corresponding to its serial number, to which the data related to the user recorded and associated to the transponder itself are associated in the memory of the operative centre. The transponder 7 has a ring shape corresponding to the one of the antenna 6 of the equipped buoy 1, so that, once the mooring rope 13 is passed into the two corresponding rings, the transponder 7 is in electromagnetic visibility conditions with the antenna 6, preferably with the two corresponding rings in contact with each other. Preferably, the ring of the antenna 6 further includes detecting means, for example infrared photodiode and/or phototransistor devices, apt to detect the passage of a rope into the ring itself.

**[0037]** The association between the transponder 7 and the corresponding pleasure craft user (or the boat) enables, at the moment of docking, to verify the compliance with the administrative requirements, controlling the related credit, memorised in the operative centre. In particular, the transponders 7 are produced in large quantity and given to the users, together with an instruction sheet, after payment of a fee for the requested service, such as for instance the permission of staying at the park for a determined period, and a deposit fee, preferably equal to twice its cost, which is given back when the transponder 7 is returned; the user may also definitively keep it, by remotely activating the account when he intends to exploit the service.

**[0038]** Still with reference to Figure 2, the equipped buoy 1 still comprises a radio communication device 8, provided with a corresponding antenna 9, apt to grant the communication between buoy 1 and local control sta-

tion 2. Preferably, the radio communications between equipped buoy 1 and local control station 2 are based on the Wifi standard. The equipped buoy 1 is further provided with an autonomous power supply internal to the float 4, comprising a solar panel 10 and a storage battery 11. In particular, the solar panel 10 is advantageously placed in correspondence with a transparent portion of the float 4, preferably a window, which allows the external light to illuminate the sensitive area of the solar panel 10.

**[0039]** All the electronic components of the equipped buoy 1 are sealed within the float 4, which is watertight, so as not to suffer damages from the exposition to the brackish atmosphere.

**[0040]** The float 4 is kept in position through a sinker, not shown, resting on the bottom, to which it is hooked through a chain, not shown, coupled to an anchoring ring 12 placed at the bottom of the float 4.

**[0041]** With reference to Figure 4, it may be observed that the local control station 2 comprises a radiocommunication unit 14 apt to communicate with the equipped buoys 1 of the field that it controls. The unit 14, which is preferably a Wifi Access Point, is connected to a device 15 of outward, preferably telephonic, communication, via cable or GPRS, and/or (for example in the case when GPRS signal lacks) to a radio link for connecting to the operative centre 3.

**[0042]** The local station 2 is also provided with a camera 16 for video taking the buoy field, the image of which is displayed on the monitors of the operative centre 3, completed with information provided by the equipped buoys 1.

**[0043]** The local station 2 is preferably contained in a protective mimetic structure, for instance made of a watertight container in rock shape preferably made of fibber glass and/or polycarbonate, within which the electronic components and the power supply are housed, comprising at least one solar panel 17 and a storage battery 18. A control electronic unit 19 controls the operation of the local station 2.

**[0044]** The local station 2 is the link between the equipped buoys 1, with which it forms a wireless local area network or WLAN, and the operative centre 3, to which it transfers the data collected by the equipped buoys 1 and the images taken by the camera 16 aiming at the buoy field, in order to prove mooring infractions and/or to give evidences of illegal behaviours, such as forbidden anchoring or fishing. In particular, the information from the local control stations 2 reach the operative centre 3 preferably through Internet link with protected connection.

**[0045]** The operative centre 3 has a primary role in the system according to the invention. In fact, it is provided with means apt to program the transponders 7 given to the pleasure craft users. Moreover, in the operative centre 3 the state of the equipped buoys 1 of all the buoy fields spread over the park is controlled, for which it is provided a corresponding local control station 2. In fact, as already mentioned, the buoys 1 are capable to detect

the presence of the transponders 7 and mooring abuse, transmitting data to the corresponding local control station 2. This one provides the information, with the image of the buoy field taken by the camera 16 and transmits all to the operative centre 3. In particular, the image of the buoy field is displayed on monitors with which the operative centre 3 is provided, together with windows containing the information coming from the several equipped buoys 1 of the corresponding field, so as to give evidences of possible mooring abuses, even when the buoy device should be eluded, and to take punishing actions.

**[0046]** Preferably, the system according to the invention enables the extension of services which may be exploited by a user through SMS (Short Message Service) messages coming from a cellular telephone associated to the corresponding transponder 7; the system may further enable the warning of expiration of the pre-paid time, still through a SMS message sent to the same cellular telephone appropriately in advance. Such service will result particularly welcome to the pleasure craft users who would wish to stay more than they estimated, without leaving the mooring in order to get to the operative centre 3 for renewing the permission of staying.

**[0047]** Advantageously, in the operative centre 3 there are operators capable to interpret data and images, to have relationships with the users for distributing the transponders 7, for collecting the corresponding fees, and for solving management problems. In particular, the organisation may be represented by a classic configuration with Front Office and Back Office.

**[0048]** At the Front Office users are received, transponders 7 are programmed and handed, telephone calls and messages for requested service extension are received, possible complaints are processed.

**[0049]** At the Back Office the information system is managed, electrical and mechanical maintenance of the components of the system is made, possible illegal behaviours are controlled, information are transmitted to authorities.

**[0050]** The operative centre 3 may take advantage of entering into agreements with cellular telephony companies, for making possible the recharge of the user accounts through SMS or e-mail.

**[0051]** The preferred embodiments have been above described and some modifications of this invention have been suggested, but it should be understood that those skilled in the art can make other variations and changes, without so departing from the related scope of protection, as defined by the following claims.

## Claims

1. System for controlling and managing docking in a sea area, comprising at least one control station (2) and further comprising one or more fields, **characterised in that** said fields have one or more buoys

and **in that** said buoys are equipped buoys (1) apt to communicate with said at least one control station (2), each one of said equipped buoys (1) comprising first radiocommunication means (8; 9) apt to communicate with second radiocommunication means (14) with which said at least one control station (2) is provided, each one of said equipped buoys (1) further comprising electronic means (5; 6) apt to transmit an interrogation signal for carrying out a passive radio frequency communication with at least one transmitter-responder or transponder (7), in such a way that said at least one transponder (7), when interrogated, talks with the electronic means (5; 6) providing at least one identification code, the electronic means (5; 6) transmitting, through the first radiocommunication means (8; 9), said at least one identification code to said at least one control station (2).

2. System according to claim 1, **characterised in that** it further comprises an operative centre (3), said at least one control station (2) of each buoy field comprising further communication means (15) apt to communicate with the operative centre (3), said at least one control station (2) being apt to send to this information related to the corresponding buoy field.

3. System according to claim 1 or 2, **characterised in that** the electronic means (5; 6) comprises an antenna (6) housed in a structure of the equipped buoy (1), said at least one transponder (7) having a housing having a shape apt to spatially arrange itself with respect to said structure of the antenna (6) in such a way to achieve electromagnetic visibility conditions with the antenna (6) itself.

4. System according to claim 3, **characterised in that** the structure housing the antenna (6) and the housing of the transponder (7) have the shape of two corresponding rings.

5. System according to claim 4, **characterised in that** the ring structure housing the antenna (6) is apt to receive a passing rope (13) and is provided with means detecting the presence of a rope (13), following the detection of the presence of a rope (13) the electronic means (5; 6) transmitting said interrogation signal.

6. System according to any one of the preceding claims 3 to 5, **characterised in that** each one of said equipped buoys (1) comprises a float (4), to which the structure housing the antenna (6) is coupled, the interior of the float (4) and of the structure housing the antenna (6) being watertight, an autonomous electric power supply (10; 11) being housed within the float (4), which supply comprises at least one solar panel (10), housed in correspondence with at

- least one transparent portion of the float (4), connected to a power supply storage battery (11).
7. System according to claim 6, **characterised in that** the float (4) is in plastic reinforced by fibber glass and/or polycarbonate. 5
  8. System according to any one of the preceding claims, **characterised in that** the first radiocommunication means (8; 9) is apt to communicate with the second radiocommunication means (14) according to the Wifi communication standard. 10
  9. System according to any one of the preceding claims, **characterised in that** said at least one control station (2) is housed in a mimetic structure, comprising at least one solar panel (17) connected to a power supply storage battery (18). 15
  10. System according to claim 9, **characterised in that** the mimetic structure of said at least one control station (2) is a watertight container in rock shape made of fibber glass and/or polycarbonate. 20
  11. System according to any one of the preceding claims, **characterised in that** said at least one control station (2) comprises at least one camera (16) for video taking the corresponding buoy field. 25
  12. System according to claim 11, when dependent on claim 2, **characterised in that** said at least one control station (2) is apt to send to the operative centre (3) one or more images taken by said at least one camera (16). 30
  13. System according to any one of the preceding claims, **characterised in that** said at least one transponder (7) is contained within a watertight shock-resistant floating plastic material moulded container. 35
  14. System according to any one of the preceding claims, **characterised in that** said at least one transponder (7) memorises said at least one identification code in encrypted form. 40
  15. System according to claim 2 or any one of claims 3 to 14, when dependent on claim 2, **characterised in that** said further communication means (15) of said at least one control station (2) comprises at least one device (15) of telephonic communication, via cable or GPRS, and/or at least one communication device (15) through radio link for connecting to the operative centre (3). 45
  16. System according to claim 15, **characterised in that** the communication between said at least one control station (2) and the operative centre (3) occurs 50

through protected Internet connection.

17. System according to claim 2 or any one of claims 3 to 16, when dependent on claim 2, **characterised in that** the operative centre (3) comprises further communication means through cellular telephony via SMS (Short Message Service) messages. 5
18. Equipped buoy (1) **characterised in that** it comprises first radiocommunication means (8; 9) apt to communicate with second radiocommunication means (14) with which at least one control station (2) is provided, **in that** it also comprises electronic means (5; 6) apt to transmit an interrogation signal for carrying out a passive radio frequency communication with at least one transponder (7), in such a way that said at least one transponder. (7), when interrogated, talks with the electronic means (5; 6) providing at least one identification code, the electronic means (5; 6) transmitting, through the first radiocommunication means (8; 9), said at least one identification code to said at least one control station (2), the equipped buoy (1) being further **characterised in that** it is usable in a system for controlling and managing docking in a sea area according to any one of the preceding claims 1-17. 10

#### Patentansprüche

1. System zum Steuern und Verwalten von Andocken in einem Seegebiet, umfassend mindestens eine Steuerungsstation (2) und ferner umfassend ein oder mehrere Felder, **dadurch gekennzeichnet, dass** die Felder eine oder mehrere Bojen aufweisen und dass die Bojen ausgestattete Bojen (1) sind, dazu ausgebildet, mit der mindestens einen Steuerungsstation (2) zu kommunizieren, wobei eine der ausgestatteten Bojen (1) ein erstes Funkkommunikationsmittel (8; 9) umfasst, dazu ausgebildet, mit zweiten Funkkommunikationsmitteln (14), mit denen die mindestens eine Steuerungsstation (2) versehen ist, zu kommunizieren, wobei eine der ausgestatteten Bojen (1) ferner elektronische Mittel (5; 6) umfasst, dazu ausgebildet, ein Abfragesignal zum Ausführen einer passiven Funkfrequenzkommunikation mit mindestens einer Übertrager-Antwort-Barke oder Transponder (7) auszuführen, in einer solchen Weise, dass mindestens ein Transponder (7), wenn er abgefragt wird, mit den elektronischen Mitteln (5; 6), die mindestens einen Identifizierungscode bereitstellen, spricht, wobei die elektronischen Mittel (5; 6) den mindestens einen Identifizierungscode an mindestens eine Steuerstation (2) über die ersten Funkkommunikationsmittel (8; 9) übertragen. 35
2. System nach Anspruch 1, **dadurch gekennzeichnet, dass** es ferner ein operatives Zentrum (3) um- 40

- fasst, wobei die mindestens eine Steuerungsstation (2) von jedem Bojenfeld weitere Kommunikationsmittel (15) umfasst, dazu ausgebildet, mit dem operativen Zentrum (3) zu kommunizieren, wobei die mindestens eine Steuerungsstation (2) dazu ausgebildet ist, zu dieser Information, die sich auf das entsprechende Bojenfeld bezieht, zu senden.
3. System nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die elektronischen Mittel (5; 6) eine in einem Aufbau der ausgestatteten Boje (1) untergebrachte Antenne (6) umfassen, wobei der mindestens eine Transponder (7) ein Gehäuse aufweist mit einer Form, die dazu ausgebildet ist, sich selbst räumlich in Bezug auf den Aufbau der Antenne (6), in einer solchen Weise, dass mit der Antenne (6) selbst elektromagnetische Sichtbarkeitsbedingungen erzielt werden, auszubilden.
  4. System nach Anspruch 3, **dadurch gekennzeichnet, dass** der die Antenne (6) aufnehmende Aufbau und das Gehäuse des Transponders (7) die Form von zwei korrespondierenden Ringen aufweisen.
  5. System nach Anspruch 4, **dadurch gekennzeichnet, dass** die die Antenne (6) aufnehmende Ringstruktur dazu ausgebildet ist, ein durchlaufendes Seil (13) aufzunehmen und mit Mitteln ausgestattet ist, die die Anwesenheit des Seils (13) detektieren und wobei nachfolgend auf die Detektion der Anwesenheit eines Seils (13) die elektronischen Mittel (5; 6) das Abfragesignal übertragen.
  6. System nach einem der vorhergehenden Ansprüche 3 bis 5, **dadurch gekennzeichnet, dass** jede einzelne der ausgestatteten Bojen (1) folgendes umfasst: einen Schwimmkörper (4), an dem die die Antenne (6) aufnehmende Struktur gekoppelt ist, wobei das Innere des Schwimmkörpers (4) und der die Antenne (6) aufnehmenden Aufbaus wasserdicht sind, ein autonomes elektrisches Netzteil (10; 11), das innerhalb des Schwimmkörpers (4) untergebracht ist, welches Netzteil mindestens ein Solarpaneel (10) umfasst, das in Übereinstimmung mit mindestens einem transparenten Bereich des Schwimmkörpers (4) untergebracht ist und mit einer Netzteil-Speicherbatterie (11) verbunden ist.
  7. System nach Anspruch 6, **dadurch gekennzeichnet, dass** der Schwimmkörper (4) aus Kunststoff, verstärkt durch Glasfaser und/oder Polycarbonat, ist.
  8. System nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste Funkkommunikationsmittel (8; 9) dazu ausgebildet ist, mit dem zweiten Funkkommunikationsmittel (14) nach dem Wifi Kommunikationsstandard zu kommunizieren.
  9. System nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die mindestens eine Steuerungsstation (2) in einem nachahmenden Aufbau untergebracht ist, der mindestens ein Solarpaneel (17), das mit einer Netzteil-Speicherbatterie (18) verbunden ist, umfasst.
  10. System nach Anspruch 9, **dadurch gekennzeichnet, dass** der nachahmende Aufbau der mindestens einen Steuerungsstation (2) ein wasserdichter Behälter in Form eines Felsgesteins, hergestellt aus Glasfaser und/oder Polycarbonat, ist.
  11. System nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die mindestens eine Steuerungsstation (2) mindestens eine Kamera (16) zum Video-Überwachen des entsprechenden Bojenfelds umfasst.
  12. System nach Anspruch 11, in seiner Abhängigkeit vom Anspruch 2, **dadurch gekennzeichnet, dass** die mindestens eine Steuerungsstation (2) dazu ausgebildet ist, ein oder mehrere durch die mindestens eine Kamera (16) aufgenommenen Bilder an das operative Zentrum (3) zu senden.
  13. System nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der mindestens eine Transponder (7) innerhalb eines wasserdichten, stoßfesten, treibenden, aus Plastikmaterial geformten Behälters enthalten ist.
  14. System nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der mindestens eine Transponder (7) den mindestens einen Identifizierungscode in verschlüsselter Form speichert.
  15. System nach Anspruch 2 oder einem der Ansprüche 3 bis 14, in ihrer Abhängigkeit von Anspruch 2, **dadurch gekennzeichnet, dass** die weiteren Kommunikationsmittel (15) der mindestens einen Steuerungsstation (2) mindestens eine Vorrichtung (15) für telefonische Kommunikation über Kabel oder GPRS und/oder mindestens eine Kommunikationsvorrichtung (15) über Funkverbindung zum Verbinden mit dem operativen Zentrum (3) umfassen.
  16. System nach Anspruch 15, **dadurch gekennzeichnet, dass** die Kommunikation zwischen der mindestens einen Steuerungsstation (2) und dem operativen Zentrum (3) durch eine geschützte Internet-Verbindung erfolgt.
  17. System nach Anspruch 2 oder einem der Ansprüche 3 bis 16 in ihrer Abhängigkeit von Anspruch 2, **da-**

durch gekennzeichnet, dass das operative Zentrum (3) weitere Kommunikationsmittel durch Mobilfunktelefonie mittels SMS (Kurznachrichtendienst, Englisch: Short Message Service) Nachrichten umfasst.

18. Ausgestattete Boje (1), **dadurch gekennzeichnet, dass** sie umfasst: erste Funkkommunikationsmittel (8;9), dazu ausgebildet, mit zweiten Funkkommunikationsmitteln (14), mit denen mindestens eine Steuerungsstation (2) versehen ist, zu kommunizieren, **dadurch** dass sie ferner elektronische Mittel (5; 6) umfasst, dazu ausgebildet, ein Abfragesignal zum Ausführen einer passiven Funkfrequenzkommunikation mit mindestens einem Transponder (7) zu übertragen, in einer solchen Weise, dass der mindestens eine Transponder (7), wenn er abgefragt wird, mit den elektronischen Mitteln (5; 6) spricht und mindestens einen Identifizierungscode bereitstellt, wobei die elektronischen Mittel (5; 6) über die ersten Funkkommunikationsmittel (8; 9) den mindestens einen Identifizierungscode an die mindestens eine Steuerungsstation (2) übertragen, wobei die ausgestattete Boje (1) ferner **dadurch gekennzeichnet ist, dass** sie in einem System zum Steuern und Verwalten von Andocken in einem Seegebiet nach einem der vorhergehenden Ansprüche 1-17 einsetzbar ist.

## Revendications

1. Système de commande et de gestion d'un arrimage dans une zone maritime, comprenant au moins un poste de commande (2) et comprenant en outre une ou plusieurs zone(s), **caractérisé en ce que** lesdites zones possèdent une ou plusieurs bouée(s) et **en ce que** lesdites bouées sont des bouées équipées (1) capables de communiquer avec ledit poste de commande au moins (2), chacune desdites bouées équipées (1) comprenant un premier moyen de radiocommunication (8 ; 9) capable de communiquer avec un second moyen de radiocommunication (14) dont ledit poste de commande au moins (2) est muni, chacune desdites bouées équipées (1) comprenant en outre un moyen électronique (5 ; 6) capable de transmettre un signal d'interrogation afin d'effectuer une communication par fréquence radio passive avec au moins un émetteur/récepteur ou un transpondeur (7), de telle sorte que ledit transpondeur au moins (7), lorsqu'il est interrogé, parle avec le moyen électronique (5 ; 6) fournissant au moins un code d'identification, le moyen électronique (5 ; 6) transmettant, par le biais du premier moyen de radiocommunication (8 ; 9), ledit code d'identification au moins audit poste de commande au moins (2).
2. Système selon la revendication 1, **caractérisé en ce qu'il** comprend en outre un centre d'opérations (3), ledit poste de commande au moins (2) de chaque zone de bouées comprenant en outre un moyen de communication (15) capable de communiquer avec le centre d'opérations (3), ledit poste de commande au moins (2) étant capable d'envoyer à celui-ci des informations relatives à la zone de bouées correspondante.
3. Système selon la revendication 1 ou 2, **caractérisé en ce que** le moyen électronique (5 ; 6) comprend une antenne (6) logée dans une structure de la bouée équipée (1), ledit transpondeur au moins (7) ayant un logement ayant une forme capable de s'agencer spatialement par rapport à ladite structure de l'antenne (6) de façon à réaliser des conditions de visibilité électromagnétique avec l'antenne (6) elle-même.
4. Système selon la revendication 3, **caractérisé en ce que** la structure logeant l'antenne (6) et le logement du transpondeur (7) possèdent la forme de deux anneaux correspondants.
5. Système selon la revendication 4, **caractérisé en ce que** la structure en anneaux logeant l'antenne (6) est capable de recevoir un câble de passage (13) et est munie d'un moyen détectant la présence d'un câble (13), et, selon la détection de la présence d'un câble (13), le moyen électronique (5 ; 6) transmet ledit signal d'interrogation.
6. Système selon l'une quelconque des revendications précédentes 3 à 5, **caractérisé en ce que** chacune desdites bouées équipées (1) comprend un flotteur (4), auquel la structure logeant l'antenne (6) est couplée, l'intérieur du flotteur (4) et de la structure logeant l'antenne (6) étant étanche à l'eau, une alimentation électrique autonome (10 ; 11) étant logée dans le flotteur (4), ladite alimentation comprenant au moins un panneau solaire (10), logé en correspondance avec au moins une partie transparente du flotteur (4), relié à une batterie d'alimentation (11).
7. Système selon la revendication 6, **caractérisé en ce que** le flotteur (4) est en plastique renforcé par de la fibre de verre et/ou du polycarbonate.
8. Système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le premier moyen de radiocommunication (8 ; 9) est capable de communiquer avec le second moyen de radiocommunication (14) selon la norme de communication Wifi.
9. Système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit poste de commande au moins (2) est logé dans une structure



- mimétique, comprenant au moins un panneau solaire (17) relié à une batterie d'alimentation (18).
10. Système selon la revendication 9, **caractérisé en ce que** la structure mimétique dudit poste de commande au moins (2) est un conteneur étanche à l'eau en forme de rocher, constitué de fibre de verre et/ou de polycarbonate. 5
11. Système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit poste de commande au moins (2) comprend au moins une caméra (16) permettant de filmer la zone de bouées correspondante. 10
12. Système selon la revendication 11, lorsqu'elle dépend de la revendication 2, **caractérisé en ce que** ledit poste de commande au moins (2) est capable d'envoyer au centre d'opérations (3) une ou plusieurs image(s) prise(s) par ladite caméra au moins (16). 20
13. Système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit transpondeur au moins (7) est contenu dans un conteneur moulé en matériau plastique flottant, résistant aux chocs et étanche à l'eau. 25
14. Système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit transpondeur au moins (7) mémorise ledit code d'identification au moins sous forme cryptée. 30
15. Système selon la revendication 2 ou l'une quelconque des revendications 3 à 14, lorsqu'elles dépendent de la revendication 2, **caractérisé en ce que** ledit autre moyen de communication (15) dudit poste de commande au moins (2) comprend au moins un dispositif (15) de communication téléphonique, via un câble ou GPRS, et/ou au moins un dispositif de communication (15) par liaison radio permettant un raccordement au centre d'opérations (3). 35  
40
16. Système selon la revendication 15, **caractérisé en ce que** la communication entre ledit poste de commande au moins (2) et le centre d'opérations (3) a lieu par une connexion Internet protégée. 45
17. Système selon la revendication 2 ou l'une quelconque des revendications 3 à 16, lorsqu'elles dépendent de la revendication 2, **caractérisé en ce que** le centre d'opérations (3) comprend un autre moyen de communication par téléphonie cellulaire, via des messages SMS (service de messages courts). 50
18. Bouée équipée (1) **caractérisée en ce qu'elle** comprend un premier moyen de radiocommunication (8 ; 9) capable de communiquer avec un second moyen 55

de radiocommunication (14) dont le poste de commande au moins (2) est muni, **en ce qu'elle** comprend également un moyen électronique (5 ; 6) capable de transmettre un signal d'interrogation permettant d'effectuer une communication par fréquence radio passive avec au moins un transpondeur (7), de telle sorte que ledit transpondeur au moins (7), lorsqu'il est interrogé, parle avec le moyen électronique (5 ; 6) fournissant au moins un code d'identification, le moyen électronique (5 ; 6) transmettant, par le premier moyen de radiocommunication (8 ; 9), ledit code d'identification au moins audit poste de commande au moins (2), la bouée équipée (1) étant en outre **caractérisée en ce qu'elle** est utilisable dans un système de commande et de gestion d'un arrimage dans une zone maritime selon l'une quelconque des revendications 1 à 17.

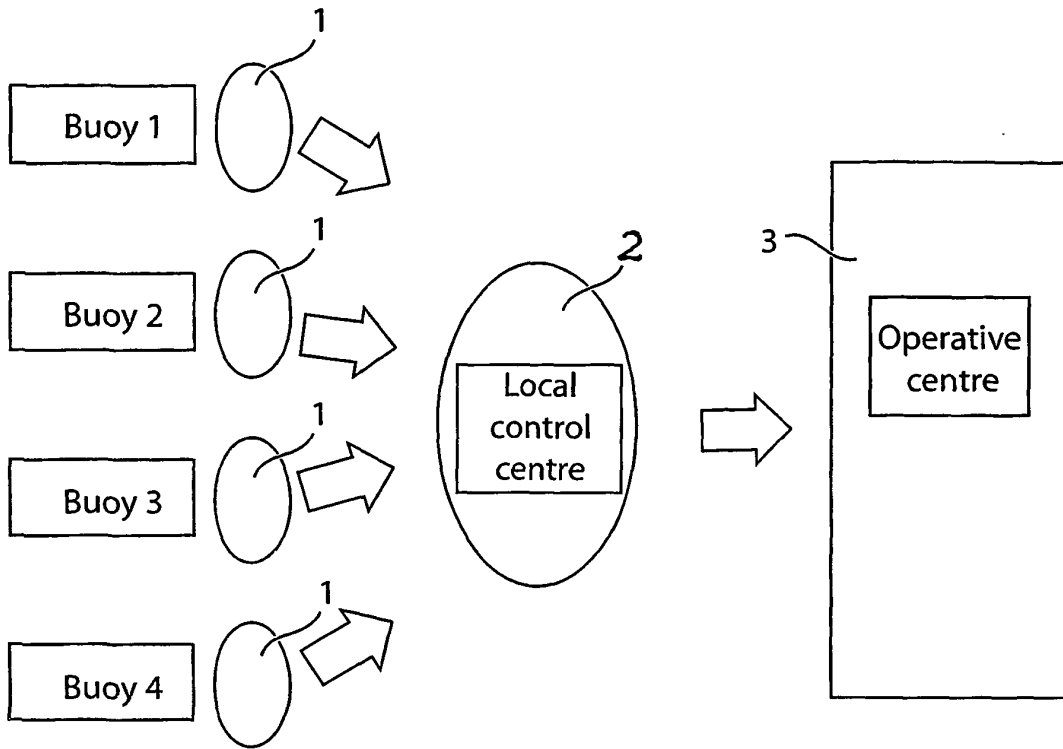


Fig. 1

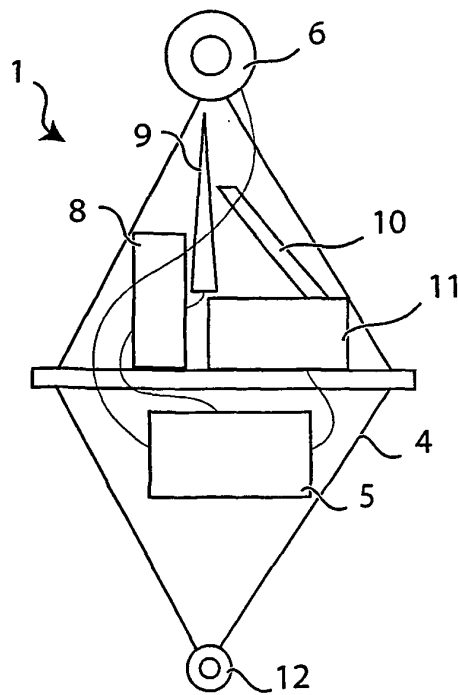


Fig. 2

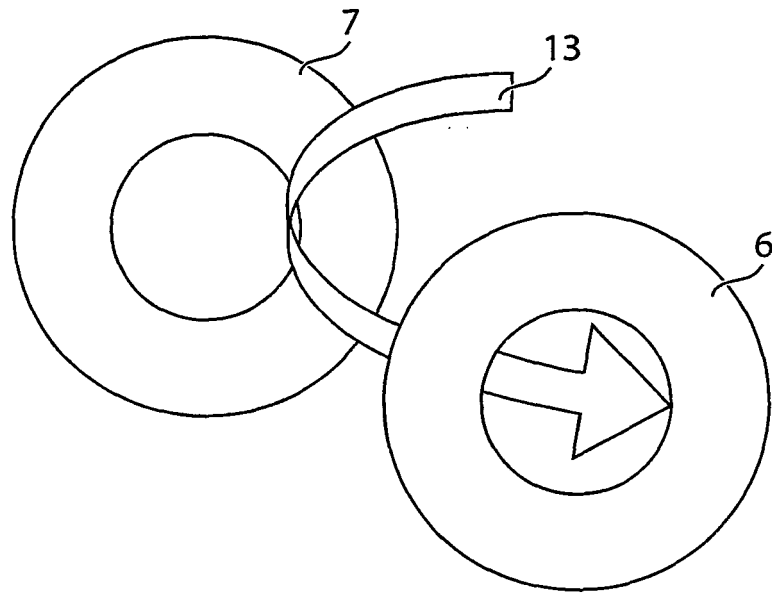


Fig. 3

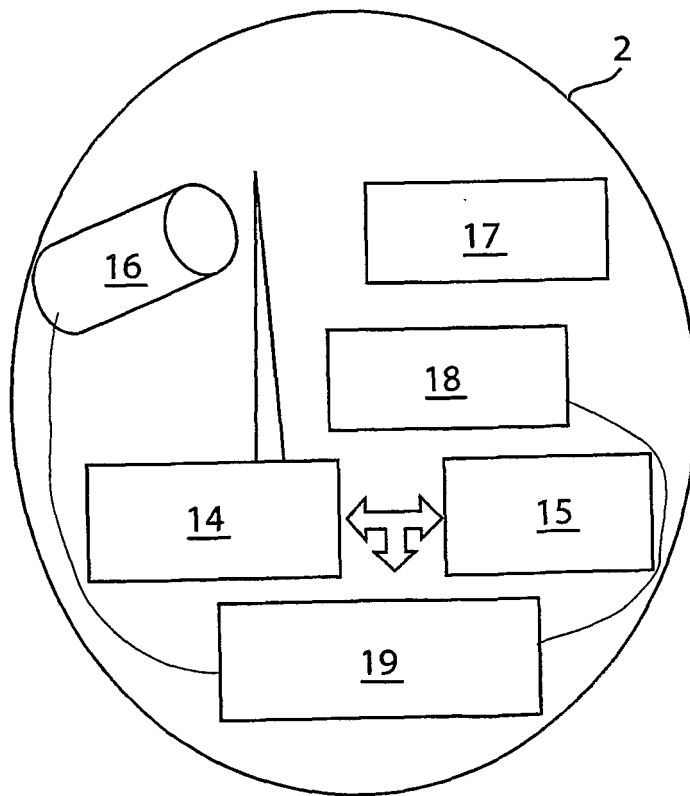


Fig. 4

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- EP 0945552 A1 [0008]