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(71) Applicant: **University of the Aegean**
81100 Mytilene (GR)

(72) Inventor: **Topouzelis, Konstantinos**
81100 Mytilene (GR)

(74) Representative: **Kouzelis, Dimitrios**
Intellex
45, Karneadou str.
10676 Athens (GR)

(54) **INFLATABLE FLOATING CALIBRATION MEANS**

(57) Inflatable floating calibration means (1) for calibrating a detection algorithm for detecting plastics in natural waters, in particular in the sea, by airborne and/or satellite means. The inflatable floating calibration means comprises a main structure (2), which comprises at least one inflatable chamber (5) and defines an inner space (8), and attaching means (3, 4) within the inner space (8).

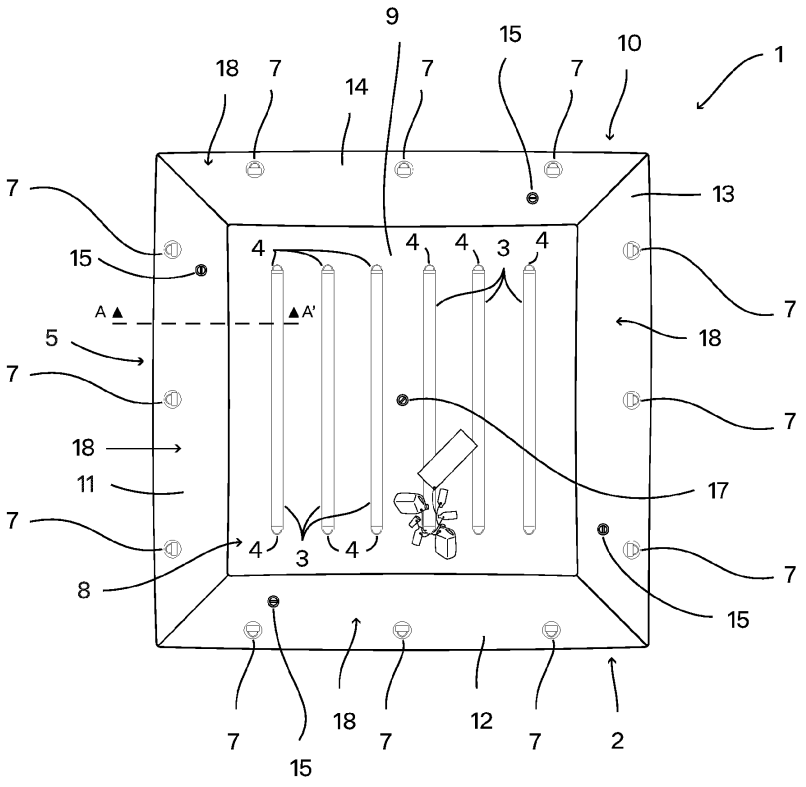

fig. 1

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Description

[0001] The present invention refers to a floating calibration means, in particular an inflatable floating calibration means, for calibrating a detection algorithm for detecting plastics in water, preferably natural waters, in particular in the sea, by airborne and/or satellite means.

[0002] Plastics floating in natural waters, in particular in the sea, are a major environmental problem. Several attempts have been made to create detecting algorithms using aerial or satellite imagery - also known as remote sensing algorithms - that can be used to automatically detect floating plastics. For testing these algorithms, the existence of plastics in the waters is required. Publications related to remote sensing algorithms have used cases where aggregation of plastics already existed in the sea, e.g. after a major running event, cases with presence of litter windrows or heavy polluted cases. However, these are scarce and random cases without any quality control.

[0003] For the purpose of a correct calibration, remote sensing algorithms require reference spectral signatures of plastics. These reference spectral signatures require reference targets with known spectral behavior. This means that proper calibration of the detection algorithms requires spectral signatures of plastic targets of fixed characteristics in water.

[0004] To date, calibrations are being performed by using self-constructed "plastic traps" that comprise a frame and an interior made of trapped plastic waste between nets. These handmade targets differ in size and material among different groups of researchers performing similar experiments, thereby not being able to provide a common basis for testing and comparing results derived by different detecting algorithms. In addition, trapping plastic waste between nets carries a risk of accident and the release of more plastic into the marine environment. Moreover, the used plastic traps are simple in-house structures with questionable safety and risk of being damaged or released and carried away by severe weather conditions. Lastly, the traps must be large enough, so that they can be detected by airborne and/or satellite means.

[0005] It is an object of the present invention to provide an improved floating calibration means for calibrating a detection algorithm for detecting plastics in natural waters, in particular in the sea, by airborne or satellite means.

[0006] In the following, a floating calibration means for calibrating a detection algorithm for detecting plastics in natural waters, in particular in the sea, by airborne and/or satellite means is disclosed, wherein the floating calibration means comprises a main structure defining an inner space, and attaching means within the inner space.

[0007] The attaching means are advantageously configured such, that plastics, in particular of various sizes and/or forms, and in particular also organic materials, can be attached to the main structure. Thus, plastics to be used for calibrating the detection algorithm can be securely attached to the main structure without the risk of being released to the water and thus resulting in water contamination or pollution. This is of great importance, as it should be borne in mind that, especially in the case of taking images of the plastics by satellite means, the floating calibration means will most probably have to remain in the water for several hours or days. Thus, providing the attaching means, by which the plastics can be attached to the main structure in a secure way, it can be achieved that the plastics will not accidentally be released to the water regardless of the weather conditions, e.g. even in the case of strong winds, wavy waters and currents.

[0008] The plastics that can be attached to the floating calibration means may for example comprise plastic packages, such as plastic bottles, and/or plastic films. For example, the plastics can be made of PET, HDPE, LDPE, PE, PP or other plastic materials.

[0009] The organic material that can be attached to the floating calibration means can for example include organic waste, such as wood or dead marine plants (eg. Posidonia Oceanica).

[0010] Thus, the floating calibration means can be used for calibrating the detection algorithms for separately detecting floating plastics from floating organic material. In particular, it enables the fixing of plastic materials of various standards but also of organic waste for the collection of different spectral signatures.

[0011] The airborne means may preferably comprise an unmanned aerial vehicle such as a drone.

[0012] The main structure is advantageously formed such that it circumferentially surrounds/encloses the inner space.

[0013] Preferably, the floating calibration means is an inflatable floating calibration means, wherein the main structure has at least one inflatable chamber defining the previously mentioned inner space. This has the advantage that the inflatable floating calibration means can be easily deployed when needed but also stored in a compact way for a next experiment.

[0014] Preferably, a surface is attached to the main structure in a way that the inner space and the surface form a basin. This means in particular that an open "bowl" (the term "open" means in particular that the formed bowl is open from the top) is formed that results in a more stable structure of the calibration means and provides an enclosed space, in particular circumferentially enclosed space, for the plastics attached to the main structure.

[0015] Preferably, the surface is attached to a middle region of the main structure. This means that the surface is arranged at a distance from a bottom region/bottom surface of the main structure and at a distance from a top region/top surface of the main structure, in particular at the middle of a height of the main structure. In other words, the surface is preferably attached to the main structure between a bottom region/bottom surface of the main structure and a top region/top surface of the main

structure, in particular at the middle of a height of the main structure. This arrangement is advantageous, as the surface is not or at least most of the time not in contact with the water, what could in case of waves under bad weather conditions influence the stability of the floating calibration means and/or damage the surface.

[0016] The attaching means are preferably (directly) arranged on the surface attached to the main structure. The attaching means are advantageously connected to the surface.

[0017] Preferably, the at least one inflatable chamber comprises two or more inflatable compartments, which are independently (autonomously) inflatable from each other. This means that the two or more inflatable compartments, in particular its interior spaces, do not communicate with each other. Thus, the buoyancy of the inflatable floating calibration means can be ensured even if one of the compartments is punctured.

[0018] Preferably, two adjacent compartments are separated from each other by a dividing element. The dividing element is preferably made of PVC, in particular PVC tarpaulin.

[0019] The at least one inflatable chamber has a circular cross-section. The term "circular" may in particular also comprise slight deviations from the circular cross-section within the context of the present invention. This shape is advantageous for the buoyancy of the calibration means. When the at least one inflatable chamber comprises two or more inflatable compartments as mentioned above, it is preferred that each of the compartments has a circular cross-section.

[0020] The main structure and/or the surface are preferably made of plastic, in particular plastic film. In particular, the main structure and/or the surface is/are made of PVC, preferably PVC tarpaulin.

[0021] The main structure and/or the surface is/are preferably of white color. The reasons for choosing said color for the main structure and/or the surface are that this color is found in most plastics in the marine environment and provides a high contrast to the marine environment, what makes it easier to locate the floating calibration means when in natural waters, in particular the sea. However, it is also possible that another color is used for the main structure and/or the surface. In particular, it might be preferable that the main structure is of white color, while the surface is of another color (than white), so that this provides a high contrast background, in case white plastics are to be primarily attached to the surface by the attaching means.

[0022] It is noted that the color "white" preferably comprises not only the absolute white color (defined for example in the RGB color system with the values 255, 255, 255) but also minor deviations therefrom. These deviations can in particular be called white shades.

[0023] In particular, the white color may comprise any color that has in the RGB color system red, green and blue values of at least 245, preferably of at least 250 (with 255 being the maximum). For example, a color defined with the values 251, 246, 248 can in particular be understood as "white" within the context of the present invention.

[0024] The film of the main structure and/or the surface preferably has a thickness between 5 mm to 7 mm, in particular 6 mm. Thus, the floating calibration means is robust enough to withstand strong winds, currents and waves or punctures cause by materials floating in the water or animals.

[0025] Preferably, the calibration means comprises at least one mooring attachment. The at least one mooring attachment may be advantageously configured to provide an anchoring point for attaching an anchor or any other stabilization means to the calibration means and/or for anchoring the calibration e.g. to a buoy. Thus, the calibration means can be stabilized even under severe weather conditions.

[0026] The mooring attachment may be advantageously also configured to attach the calibration means to another calibration means for forming larger calibration means, in particular of special formations, e.g. linear formations of floating calibration means.

[0027] The at least one mooring attachment is preferably formed as an attachment ring.

[0028] The at least one mooring attachment preferably comprises a plurality of mooring attachments. The mooring attachments are preferably provided on one or more outer surfaces of the main structure (at least one inflatable chamber), in particular at predetermined distances in a longitudinal direction of the at least one inflatable chamber. The longitudinal direction particularly corresponds to the direction in which the at least one inflatable chamber extends. The provision of a plurality of mooring attachments may provide a greater stability of the floating calibration means and/or offer a greater flexibility in terms of the formation that can be made by attaching several calibration means to each other.

[0029] Preferably, the inflatable floating calibration means comprises at least one valve for inserting a gas, in particular air, into the at least one inflatable chamber. In the case of two or more inflatable compartments, each inflatable compartment is advantageously provided with at least one valve for inserting a gas, in particular air, into the inflatable compartment.

[0030] The inflatable floating calibration means preferably comprises at least one valve for inserting a liquid, in particular water, into the at least one inflatable chamber. In the case of two or more inflatable compartments, each inflatable compartment is advantageously provided with at least one valve for inserting a liquid, in particular water, into the inflatable compartment. Said at least one valve is advantageous for controlling the stability of the inflatable calibration means against strong winds, waves and currents by adjusting the amount of water inside the at least one inflatable chamber.

[0031] The at least one valve for inserting a gas, in particular air, into the at least one inflatable chamber, in particular to each of the compartments, is preferably pro-

vided in an upper area of the calibration means.

[0032] The at least one valve for inserting a liquid, in particular water, into the at least one inflatable chamber, in particular to each of the compartments, is provided in a bottom area of the calibration means. This arrangement allows water to flow inside the at least one inflatable chamber, in particular to each of the compartments.

[0033] The bottom area of the calibration means is closer to the water surface than the upper area is to the water surface.

[0034] The floating calibration means preferably comprises at least one valve for inserting a liquid, in particular water, to the basin. Thus, the buoyancy of the floating calibration means can be regulated according to the current weather conditions during an experiment. Further, by providing water to the basin, plastics existence in the water column can be simulated.

[0035] Within the context of the present invention, a valve is in particular an openable and closable structure that is configured to allow the flow of a fluid (liquid or gas) therethrough in an opened state and to block the flow of fluid therethrough in a closed state.

[0036] The attaching means preferably comprises at least one attachment strip , in particular at least one hoop-and-loop fastener, and/or at least one binding ring. The at least one binding ring may preferably be arranged at an end of the at least one attachment strip.

[0037] The at least one attachment strip, in particular the at least one hoop-and-loop fastener, is advantageously formed such that plastic films, in particular films having a length of at least 0,5 m and/or a width of at least 0,5m, can be attached to the floating calibration means. The at least one binding ring is in particular intended for thicker plastic layers that can have retention notches or holes.

[0038] The at least one attachment strip preferably extends over at least 20%, preferably over at least 50%, of a dimension of the main structure and/or the inner space and/or the surface.

[0039] The at least one attachment strip may comprise one or more attaching strips. In case of a plurality of attachment strips, the attachment strips can preferably be arranged parallel to each other. The at least one attaching binding ring may comprise one or more binding rings.

[0040] The floating calibration means preferably covers an area of at least 9 m^2, preferably of at least 16 m^2, even more preferably of at least 25 m^2. Thus, the floating calibration means can be easily recognized by airborne and/or satellite sensors/means. However, the floating calibration means may have any size suitable for the purpose of calibrating a detection algorithm for detecting plastics in natural waters by aerial or satellite sensors/means. In particular, the area that the floating calibration means is the apparent area that the floating calibration means covers when viewed from the top. When the floating calibration means comprises the aforementioned surface, the area that the floating calibration means is in particular the actual area that the floating calibration means covers when viewed from the top.

[0041] The floating calibration means preferably comprises a satellite navigation system sensor. A satellite navigation system sensor is in particular a sensor that provides autonomous geospatial positioning by using a satellite navigation system. In particular, the satellite navigation system sensor can be a GPS sensor. Thus, the exact location of the floating calibration means can be detected/defined.

[0042] The present invention also refers to an arrangement that comprises at least two floating calibration means, in particular at least two inflatable floating calibration means, according to the previous description. The at least two floating calibration means are attached/connected to each other. The attachment/connection of the at least two calibration means can be in particular made by the at least one mooring attachment of each of the floating calibration means. This has the advantage a larger reference target can be achieved in a modular way. Thus, a larger area can be covered by the arrangement, what in turn has the advantage of an easier detection of the arrangement by the airborne and/or satellite means on one hand and a better overall stability of the floating calibration means in the water. It also provides an easy way to test more plastics, in particular of various sizes and/or forms, and in particular also organic materials, at the same time. The arrangement can also be described as an arrangement of floating calibration means within the context of the present invention. The at least two floating calibration means can be identical to or different from each other.

[0043] The present invention also refers to a method comprising the step of capturing an image of the previously described floating calibration means or of the previously described arrangement by airborne and/or satellite means. The image of the floating calibration means can be captured with or without plastics and/or organic materials being attached to the floating calibration means by the corresponding attaching means.

[0044] Advantageously, the airborne and/or satellite means may comprise at least one image capturing device. The image capturing device is preferably a multispectral or hyperspectral camera. It is possible that airborne and/or satellite means are provided with two or more image capturing devices, in particular of a different type. For example, the airborne and/or satellite means may comprise one multispectral and one hyperspectral camera.

[0045] The step of capturing an image of the previously described floating calibration means may advantageously be part of a calibration method of a detection algorithm for detecting plastics in natural waters, in particular in the sea, by airborne and/or satellite means. The calibration method may also comprise the steps: preprocessing of the captured image, applying a detection algorithm for detecting plastics in natural waters, in particular in the sea and validating the results obtained by the detection algorithm.

[0046] The preprocessing step may preferably comprise an atmospheric correction step and/or a sun glint correction step.

[0047] The detection algorithm preferably is an unmixing algorithm.

[0048] The detection algorithm is preferably configured such that the main contributors (i.e. plastics, natural objects, sea) of a spectral signal in a pixel of the captured image can be identified and quantified.

[0049] The validation step advantageously comprises the validation of the quantification of the contribution of the plastics in the spectral signal with the known spectral signature of the plastics.

[0050] The calibration of the detection algorithm is done in order for the algorithm to be able to distinguish the plastics from other natural floating materials like wood, sargassum, dead seagrass leaves, foam etc., based on properties of the electromagnetic spectrum, in particular based on the spectral signature of the plastics and the natural materials. "Spectral signature" is the variation of reflectance or emittance of a material with respect to wavelengths (i.e., reflectance/emittance as a function of wavelength).

[0051] Preferably, the at least one inflatable chamber is partially filled with a gas, in particular air, and partially with a liquid, in particular water, in order to control the buoyancy of the inflatable floating calibration means.

[0052] Preferably, the basin is filled with a liquid, in particular water, in order to control the buoyancy of the inflatable calibration means and/or simulate the existence of plastics in the water column.

[0053] These and further details, advantages and features of the present invention will be described based on embodiments of the invention and by taking reference to the accompanying figures. Identical or equivalent elements and elements which act identically or equivalently are denoted with the same reference signs. Not in each case of their occurrence a detailed description of the elements and components is repeated.

Figure 1 shows a schematic top view of a floating calibration means according to a first embodiment of the present invention.

Figure 2 shows a schematic perspective view of the floating calibration means according to the first embodiment of the invention.

Figure 3 shows a further schematic perspective view of the floating calibration means according to the first embodiment of the invention.

Figure 4 shows a cross-section of a part of the floating calibration means according to the first embodiment of the invention.

Figure 5 shows a schematic simplified top view of an arrangement of a plurality of floating calibration means according to a second embodiment of the invention.

[0054] In the following, a floating calibration means 1 for calibrating a detection algorithm for detecting plastics in natural waters, in particular in the sea, by airborne and/or satellite means according to a first embodiment of the present invention is described in detail with reference to figures 1 to 4.

[0055] As can be seen from the figures, the floating calibration means 1 comprises a main structure 2 defining an inner space 8 and a surface 9. The main structure 2 is formed such that it circumferentially surrounds the inner space 8. The surface 9 is attached to the main structure 2 in a way that the inner space 8 and the surface 9 form a basin 10. In particular, the surface 9 is arranged at the middle of a height 50 of the main structure 2, as shown in figure 4. The height 50 is for example 0,6 m.

[0056] The floating calibration means 1 further comprises attaching means 3, 4 within the inner space 8, in particular arranged on and directly connected to the surface 9. The attaching means 3, 4 comprise a plurality of attachment strips 3 and a plurality of binding rings 4. The attachment strips 3 are in particular configured for attaching plastic films to the surface 9. Preferably, the attachment strips 3 are formed as hoop-and-loop fasteners. Preferably, the attachment strips 3 are arranged parallel to each other and each advantageously extend over 80% of a corresponding length of the surface 9 and/or the main structure 2.

[0057] The binding rings 4 are formed and arranged such that each binding ring 3 is arranged at and attached to an end of an attachment strip 3. As can be seen from the figures, two binding rings 4 are provided for each attachment strip 3. The binding rings 4 are in particular configured for attaching thicker plastic layers that can have retention notches or holes to the surface 9. In figure 1, some exemplary plastics are shown in an attached state by the attaching means 3, 4.

[0058] The floating calibration means 1 advantageously comprises a satellite navigation system sensor, in particular a GPS sensor. Thus, the exact location of the floating calibration means 1 can be detected/defined.

[0059] For being able to flow in the water, the main structure 2 of the floating calibration means 1 comprises an inflatable chamber 5. The inflatable chamber 15 is defined by a plurality, in the present embodiment four, inflatable compartments 11, 12, 13, 14, of circular cross-section, which are independently inflatable from each other. The cross-section of the inflatable compartments 11 to 14 may however be of any other shape.

[0060] To this end, adjacent (neighboring) compartments are separated from each other by a diving element 6, as shown in figures 3 and 4. It is noted that for the sake of a better overview only the dividing element 6, which divides the compartments denoted with the reference signs 11 and 12, is shown in figure 3. However, it is apparent that, in the present embodiment, four diving ele-

ments 6 are provided in the floating calibration means 1 in order to separate the four compartments 11 to 14 from each other.

[0061] For inflating the compartments 11 to 14, each of the compartments 11 to 14 is provided with a valve 15, through which a gas, in particular air, can be inserted in the compartments 11 to 14. Furthermore, each of the compartments 11 to 14 is provided with a valve 16 for inserting a liquid, in particular water, into the at least one inflatable chamber 5. In figures 2 to 4 the valve 16 in the compartment 11 is shown. In figures 2 and 3 the corresponding valve 16 in the compartment 12 is shown. The provision of the valves 15 and 16 is advantageous as the buoyancy of the floating calibration means 1 can thereby be adjusted by adjusting the amount of air and water inside each of the compartments 11 to 14.

[0062] The valves 15 are preferably arranged in an upper area of the floating compartments 11 to 14, whereas the valves 16 are preferably arranged in a bottom area of the floating compartments 11 to 14.

[0063] For achieving the same effect, i.e. for controlling the buoyancy of the floating calibration means 1, but also for simulating the existence of plastics in water, the floating calibration means 1 is further provided with a valve 17, through which a liquid, in particular water, can be inserted to the basin 10. In particular, the valve 17 is provided in the surface 9.

[0064] The inflatable chamber 5, in particular each of the inflatable compartments 11 to 14, and the surface 9 are made of a plastic film, in particular of white color. The film of the inflatable compartments 11 to 14 and the surface 9 preferably has a thickness between 5 mm to 7 mm, in particular 6 mm, and is preferably made of PVC tarpaulin, which is highly durable.

[0065] It is noted that the above mentioned corresponding length of the surface 9 and/the main structure 2 with regard to the attachment strips 3 is parallel to the direction, in which the compartments 11, 13 extend. It is further noted that the height 50 of the main structure 2 corresponds to a height of the inflatable chamber 5.

[0066] Referring back to figures 1 to 3, it can be seen that the floating calibration means 1 comprises a plurality of mooring attachments 7. In particular, a plurality, in the present embodiment three, mooring attachments 7 is provided on an outer surface 18 of each of the compartments 11 to 14. It can further be seen from said figures that the corresponding mooring attachments 7 are arranged at predetermined distances in a longitudinal (extending) direction of a corresponding inflatable compartment 11 to 14. These mooring attachments 7 can be used for joining together two or more floating calibration means 1 according to the present invention and/or anchoring the floating calibration means 1 to a stabilization means.

[0067] For enabling an easy detection of the floating calibrations means 1 by airborne and/or satellite means, the floating calibration means 1 preferably covers an area of at least 9 m^2, more preferably of at least 16 m^2, even more preferably of at least 25 m^2.

[0068] The inflatable floating calibration means 1 according to the invention has the advantage that it may be used as a reference plastic target on water surface in order to prototype the plastics reflectance from remote sensing sensors (aerial or satellite sensors). In addition, it may act as a prototype for standardization of the experiments in multiple areas, in different sea conditions and in different viewing angles. The remote observations using the floating calibration means 1 of the present invention will be more accurate and precise and could be used as calibration and validation targets for marine litter detection algorithms. It further has the ability, when provided with the different previously described valves 17, to adjust the amount of water that it will contain in its basin 10, i.e. it has the ability to contain different amounts of water. This ability is advantageous as the floating calibration means 1 may thus not only provide a secure attachment of different plastics but also simulate the presence of plastics in the water column without the risk of an accidental release of the plastics into the sea. Additionally, the water inside the basin 10 serves as a floating anchor for the inversion and makes the floating calibration means 1 resistant to winds and currents.

[0069] Figure 5 refers to an arrangement 20 according to a second embodiment of the present invention.

[0070] The arrangement 20 comprises a plurality of the previously described inflatable floating calibration means 1, which are attached/connected to each other. In the present case, six identical inflatable floating calibrations means 1 form the arrangement 20. However, the number of the inflatable floating calibrations means 1 in the arrangement 20 may vary. Further, it is possible that the inflatable floating calibration means 1 are not identically formed in view of any or all of the aspects previously described with reference to the inflatable floating calibration means 1. In particular, the inflatable floating calibration means 1 may have different shapes from each other.

[0071] Each of the inflatable floating calibration means 1 is attached to its (one or more) neighboring inflatable floating calibration means 1 via its plurality of mooring attachments 7 and the corresponding plurality of mooring attachments 7 of its neighboring inflatable floating calibration means 1.

[0072] Both the inflatable floating calibration means 1 according to the first embodiment and the arrangement 20 according to the second embodiment can be placed on the water, after plastics and/or organic material are attached to inflatable floating calibration means 1. Then, an image of the inflatable floating calibration means 1 or the arrangement 20, respectively, can be captured by at least one image capturing device of the airborne and/or satellite means. The at least one capturing device may comprise a multispectral or hyperspectral camera. The captured image can be then used for the calibration of a detection algorithm for detecting plastics in natural waters.

[0073] Apart from the description above, reference is explicitly made to the figures 1 to 5 in view of the disclo-

sure.

Claims

1. An inflatable floating calibration means (1) for calibrating a detection algorithm for detecting plastics in natural waters, in particular in the sea, by airborne and/or satellite means, comprising:

   • a main structure (2), which comprises at least one inflatable chamber (5) and defines an inner space (8), and
   • attaching means (3, 4) within the inner space (8).

2. The inflatable floating calibration means (1) according to claim 1, wherein a surface (9) is attached to the main structure (2) in a way that the inner space (8) and the surface (9) form a basin (10), wherein the attaching means (3, 4) is preferably arranged on the surface (9).

3. The inflatable floating calibration means (1) according to any of the preceding claims, wherein the at least one inflatable chamber (5) comprises two or more inflatable compartments (11, 12, 13, 14), which are independently inflatable from each other.

4. The inflatable floating calibration means (1) according to any of the preceding claims, wherein the at least one inflatable chamber (5) has a substantially circular cross-section.

5. The inflatable floating calibration means (1) according to any of the preceding claims, wherein the main structure (2) and/or the surface (9) is/are made of plastic, in particular plastic film, and/or wherein the main structure (2) and/or the surface (9) is preferably of white color.

6. The inflatable floating calibration means (1) according to claim 5, wherein the film of the main structure (2) and/or the surface (9) has a thickness between 5 mm to 7 mm, in particular 6 mm.

7. The inflatable floating calibration means (1) according to any of the preceding claims, further comprising at least one mooring attachment (7).

8. The inflatable floating calibration means (1) according to claim 7, wherein the at least one mooring attachment (7) comprises a plurality of mooring attachments (7), which are preferably provided on one or more outer surfaces of the main structure (2), in particular at predetermined distances in a longitudinal direction of the at least one inflatable chamber (5).

9. The inflatable floating calibration means (1) according to any of the preceding claims, further comprising at least one valve (15) for inserting a gas, in particular air, into the at least one inflatable chamber (5).

10. The inflatable floating calibration means (1) according to any of the preceding claims, further comprising at least one valve (16) for inserting a liquid, in particular water, into the at least one inflatable chamber (5) and/or at least one valve (17) for inserting a liquid, in particular water, to the basin (10).

11. The inflatable floating calibration means (1) according to any of the preceding claims, wherein the attaching means (3, 4) comprise at least one attachment strip (3), which is preferably formed as one hoop-and-loop fastener, and/or at least one binding ring (4).

12. The inflatable floating calibration means (1) according to any of the preceding claims, wherein the inflatable floating calibration means (1) covers an area of at least 9 m^2, preferably of at least 16 m^2, even more preferably of at least 25 m^2.

13. An arrangement (20) comprising at least two inflatable floating calibration means (1) according to claims 1 to 12, wherein the at least two inflatable floating calibration means (1) are attached to each other, in particular via the corresponding mooring attachments (7) of the at least two inflatable floating calibration means (1).

14. A method comprising a step of capturing an image of an inflatable floating calibration means (1) according to any of the claims 1 to 12 or of the at least two inflatable floating calibrations means of the arrangement according to claim 13, in particular for calibrating a detection algorithm for detecting plastics in natural waters, in particular the sea, by airborne or satellite means.

15. The method according to claim 14, wherein the at least one inflatable chamber (5) is partially filled with a gas, in particular air, and partially with a liquid, in particular water, and/or wherein the basin (10) is filled with water.

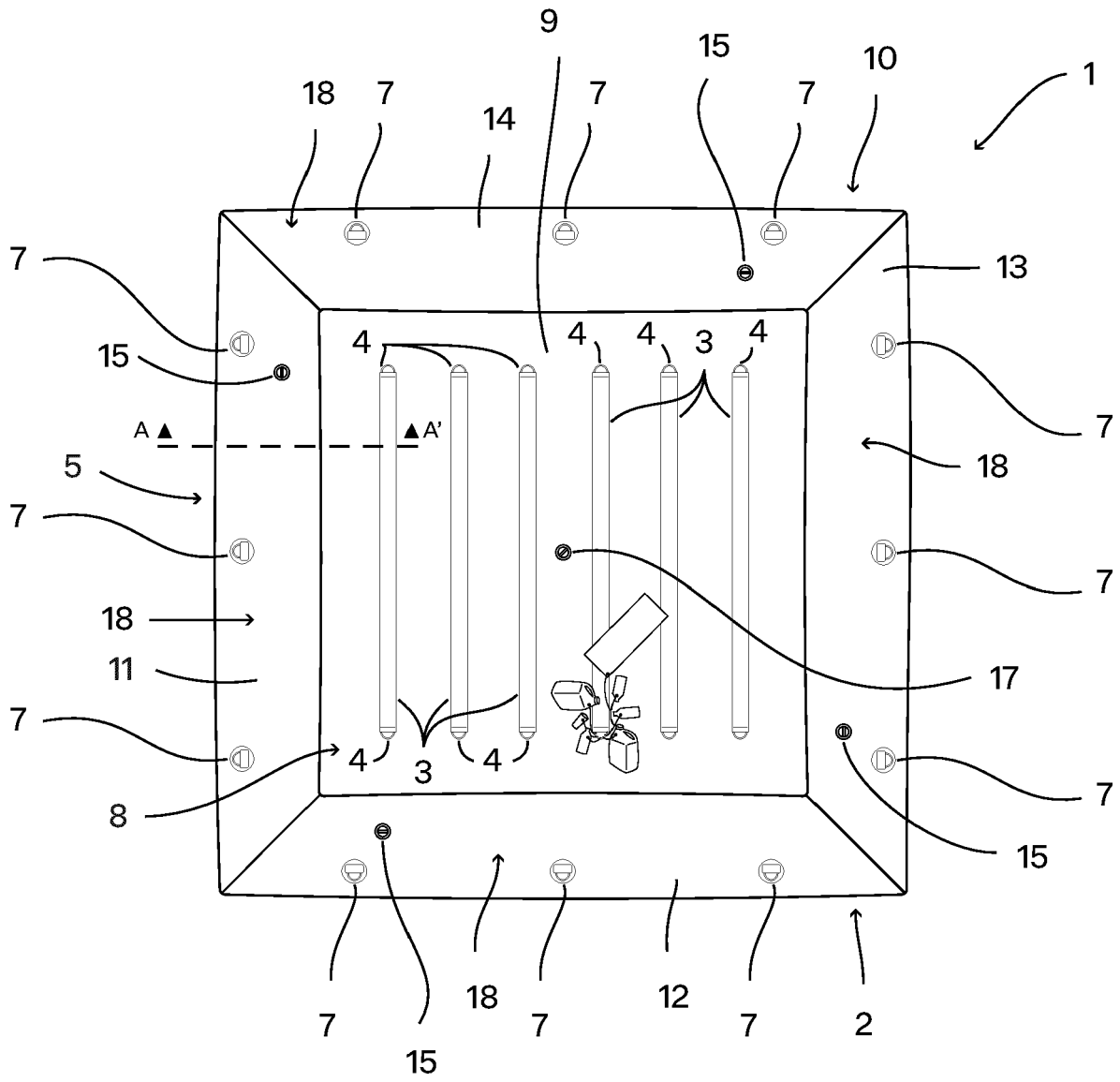

fig. 1

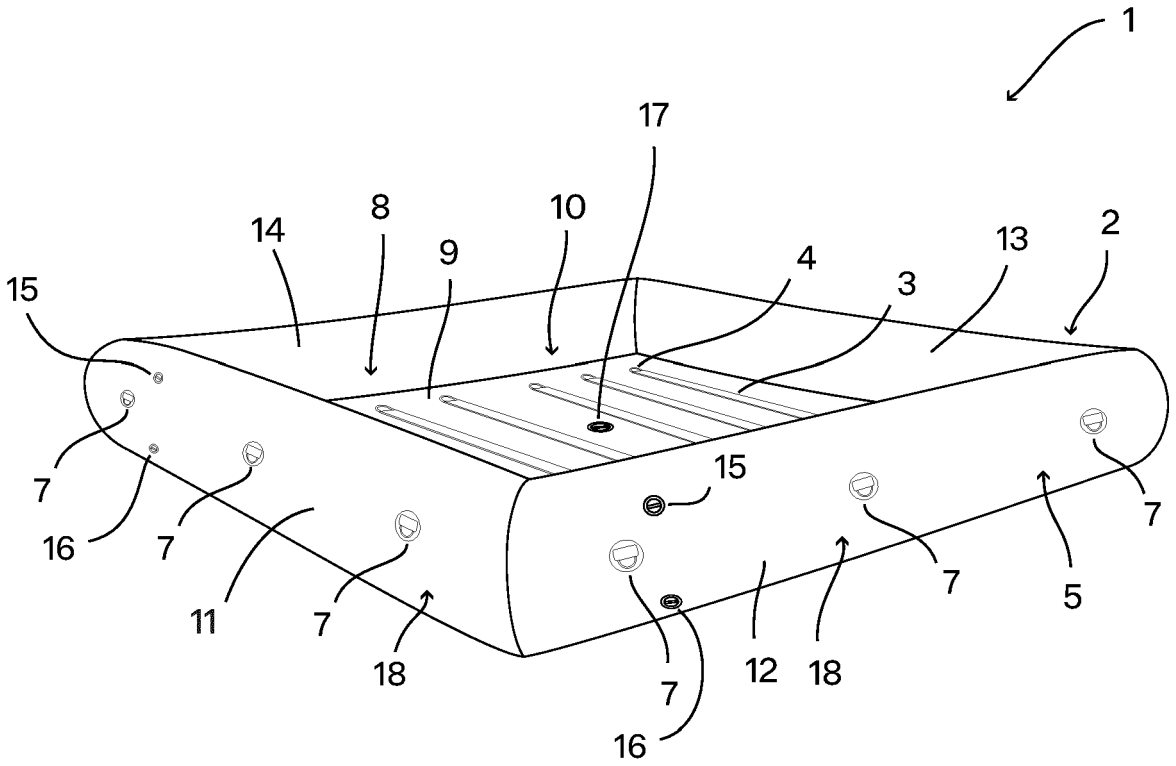

fig. 2

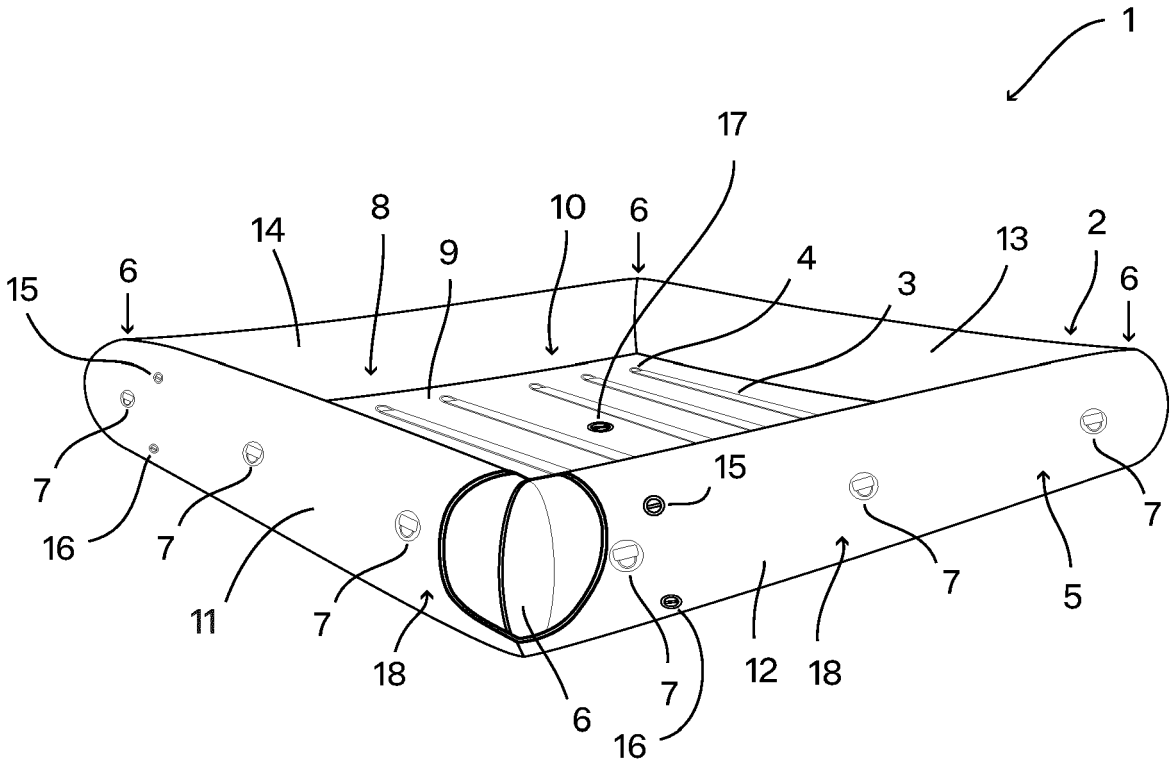

fig. 3

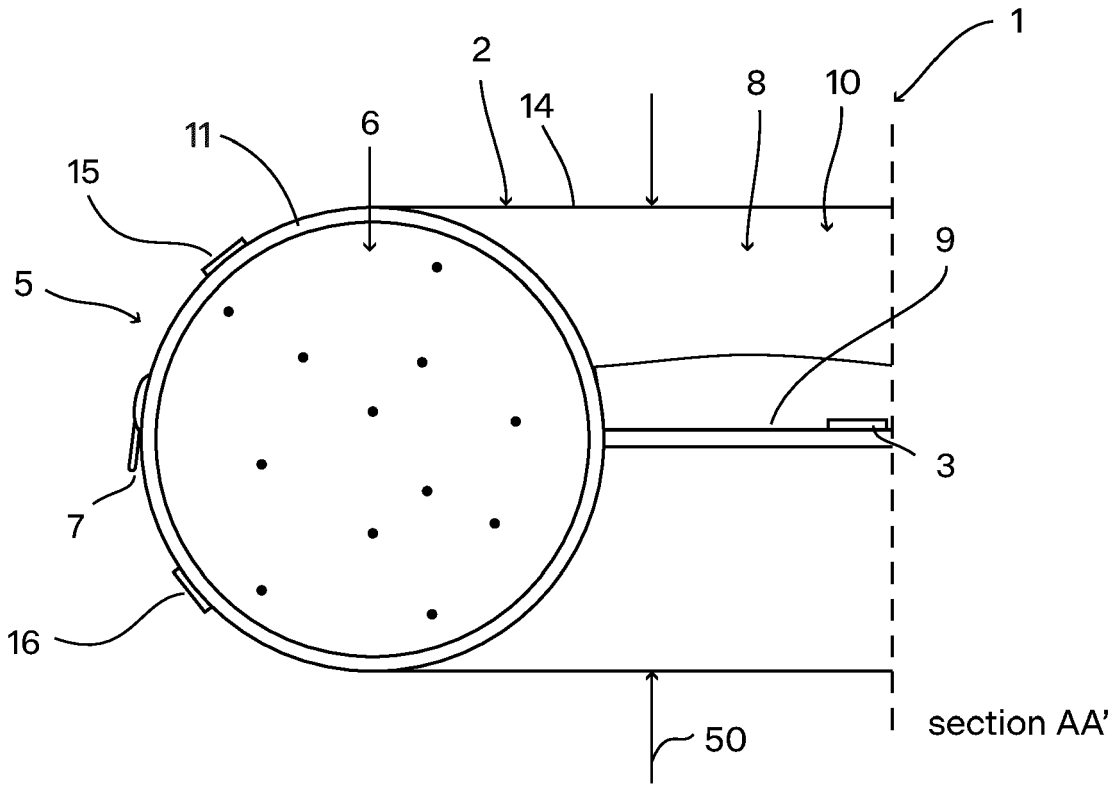

fig. 4

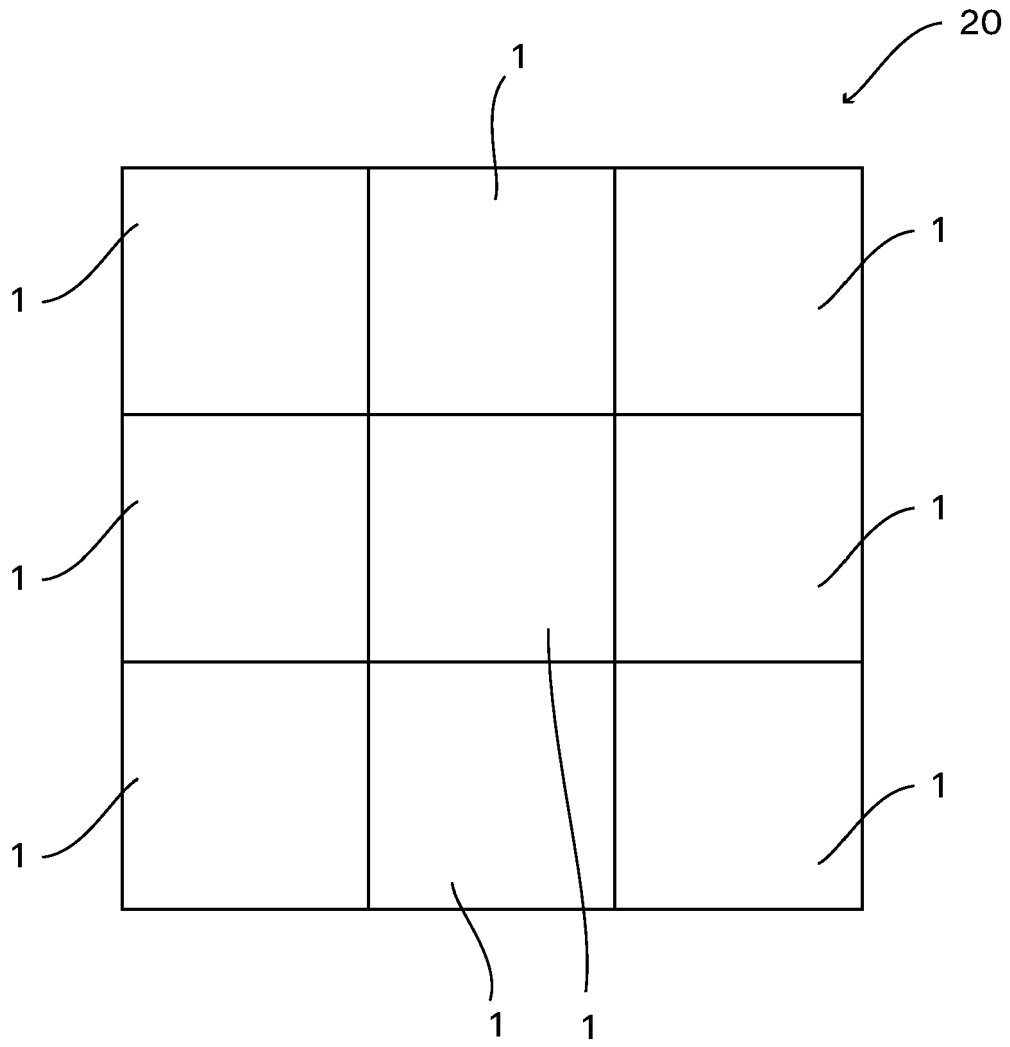

fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 21 18 5837

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GODDIJN-MURPHY LONNEKE ET AL: "Proof of concept for a model of light reflectance of plastics floating on natural waters", MARINE POLLUTION BULLETIN, OXFORD, GB, vol. 135, 1 September 2018 (2018-09-01), pages 1145-1157, XP085496298, ISSN: 0025-326X, DOI: 10.1016/J.MARPOLBUL.2018.08.044 * the whole document *	1-15	INV. B63B7/08 H04N17/00
A	US 10 165 264 B1 (PRATT PATRICIA D [US]) 25 December 2018 (2018-12-25) * abstract * * figures *	1-15	
X	US 456 621 A (C.A.L. KÖPCKE) 28 July 1891 (1891-07-28) * the whole document *	1-15	
X	AU 55616 80 A (STAPLETON P R; ASMUSSEN C K; CRAIN W A T) 28 August 1980 (1980-08-28) * the whole document *	1-15	TECHNICAL FIELDS SEARCHED (IPC) B63C B63B H04N

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 January 2022	Gardel, Antony

CATEGORY OF CITED DOCUMENTS

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06-01-2022

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