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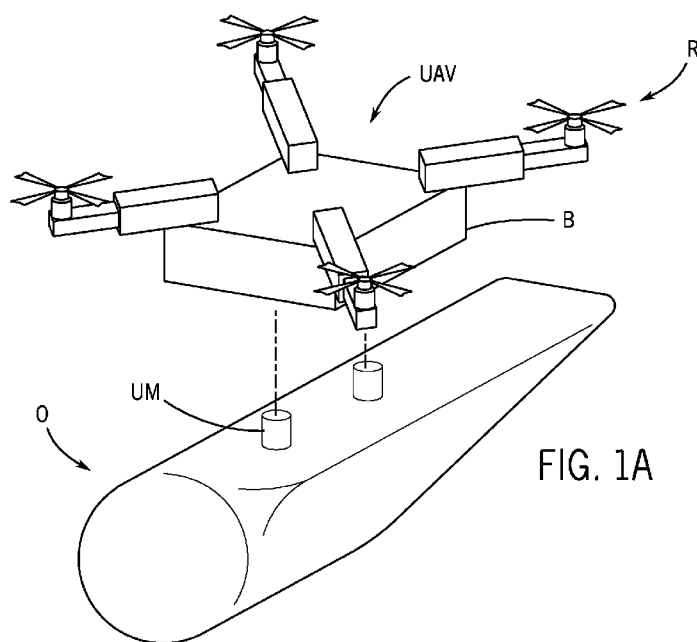
(54) **Title:** SYSTEM AND METHOD FOR PAYLOAD MANAGEMENT FOR UNMANNED AIRCRAFT

FIG. 1A

(57) **Abstract:** A system and method for payload management for an unmanned aircraft system is disclosed. The payload management system and method may comprise a containment system configured to contain payload carried by the UAV/aircraft. The UAV/aircraft may be configured to carry payload in an external pod as part of the containment system. The pod carried by the UAV/craft may be fillable/inflatable to contain payload and facilitate aerodynamic performance of the UAV/craft carrying payload (e.g. on a mission from originator to destination for delivery in operating conditions). Systems and methods may provide managing and monitoring for payload carried by UAV/aircraft (e.g. with instrumentation).



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SYSTEM AND METHOD FOR PAYLOAD MANAGEMENT FOR UNMANNED AIRCRAFT

5 [1] All subject matter of the Priority Application(s) and of any and all applications related to the Priority Applications by priority claims (directly or indirectly), including any priority claims made and subject matter incorporated by reference therein as of the filing date of the instant application, is incorporated herein by reference to the extent such subject matter is not inconsistent herewith.

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BACKGROUND

[2] It has become known to use unmanned aircraft (e.g. referred to as unmanned air/aerial vehicle (UAV) or “drone”) and unmanned aircraft systems (UAS) (e.g. including an operator/pilot at a remote location, etc.) for a variety of purposes in flight in various environments under various operating conditions. Such unmanned aircraft (UAV/craft or
15 UAV/drone craft) at present are provided in a variety of forms (shapes/sizes), types (e.g. winged craft, rotor-driven craft, etc.) with a variety of propulsion systems (e.g. engines, thrust-production, etc.), capabilities, carrying capacities, control systems, telemetry systems, robustness, range, etc.; such known UAV/drone craft at present perform in military, commercial, and recreational applications.

20 [3] At present, typical UAV/drone craft may be provided in a form smaller than typical manned aircraft and may typically lack certain functionality of typical commercial aircraft; some UAV/drone craft have relatively sophisticated control systems; some UAV/drone craft are operated by pilots at remote stations with data communications and instrumentation/feedback from the craft; other UAV/drone craft may have relatively simple
25 control systems (e.g. basic remote control by line of sight by the operator).

[4] One common form of UAV/craft or drone is configured with a base and a set of rotors (e.g. to provide lift/thrust for propulsion) as in a conventional helicopter. Another form of UAV/craft or drone is provided in a fixed wing configuration (with base or body) as to resemble a typical/conventional airplane; other UAV/craft may be configured in a modified form of existing aircraft. Various forms of UAV/craft have various similar arrangements and configurations to conventional aircraft.

[5] It is known to provide a UAV/craft for use in any of a wide variety of functions and operations including parcel/item delivery, monitoring/surveillance, data transmission/communications, hobby/entertainment, advertising/marketing, military purposes, etc. For example, UAV/craft are able to be used on missions that may comprise the delivery of payload from an originator to a destination (e.g. with payload carried by the UAV/craft in flight). Certain commercial enterprises have begun to explore the capability of using UAV/drone craft as part of a delivery vehicle fleet to deliver goods and parcels for customers.

[6] Differences in size/form, use and operation of UAV/drone craft allow for variations/differences in design configuration, use and operation that can be implemented to facilitate various specific functionality modifications and enhancements for UAV/drone craft. Differences in the use, operation, operational requirements and design of UAV/drone craft can facilitate differences in the manner of operation and accompanying systems and methods of operating UAV/craft and of supporting UAV/craft operation. For example, UAV/drone craft with light-weight space frames may provide improvement of energy efficiency in operation.

[7] In relevant respects the design, configuration, size and form and operation of UAV/drone craft are different (e.g. typically smaller) from typical commercial aircraft and may vary between types of UAV/drone craft; UAV/drone craft may be provided in various

forms, that range from relatively simple to relatively complex systems. As a set UAV/drone craft may vary in type, design/form, propulsion system configuration, size, primary purpose, airworthiness/robustness, controllability/telemetry, data communications and failure modes, etc. UAV/drone craft may be configured to perform functions for which a manned aircraft is generally not suitable or ideal (for various reasons) such as local/light parcel delivery, surveillance/monitoring, communications, military/government action, etc. UAV/drone craft may be designed and constructed to have widely varied capabilities useful for widely varied functions. Some UAV/drone craft may be designed as “expendable” or for finite/limited-time use; some UAV/drone craft may be designed for cost-efficiency and simplicity; other UAV/drone systems may be designed for lengthy useful lives in operation. (For an example, a typical use of a UAV/drone system may be used to carry an object such as a camera for video/photo surveillance.)

[8] It is known that (among other features) the aerodynamic form/shape of the UAV/craft will affect performance in flight. When the UAV/craft is carrying payload the composite aerodynamic form of the UAV/craft with payload will affect performance of the UAV/drone craft system (e.g. balance, mass properties, profile, inertia, drag coefficient, etc.). For example, a bulky load carried beneath/on a UAV/craft may create discernable mass effects and discernable aerodynamic drag which may affect performance (e.g. energy efficiency, range, speed, flight dynamics, balance, controllability, etc.).

[9] Improvement of the current state of the art of known UAV/craft carrying payload to function with improved performance would be advantageous. Improvement of systems and methods for payload management for UAV/craft would be advantageous. Improvement of UAV/aircraft carrying payload that could be configured with a containment system to contain payload and operated/managed to enhance range and performance (e.g. by improved aerodynamic form for contained/carried payload) would be advantageous.

SUMMARY

[10] It would be advantageous to provide a system and method for improved payload management for a UAV/craft carrying payload on a mission. It would also be advantageous to provide a payload management system and method with an improved containment system
5 for payload carried by the UAV/craft for delivery on a mission. It would further be advantageous to provide a system and method for operation and management of payload carried by a UAV/craft that could contain payload and facilitate aerodynamic performance of the UAV/craft with payload.

[11] The present invention generally relates to improvements to methods and systems for
10 payload management for a UAV/craft carrying payload on a mission including an improved containment system and method for items of payload carried by a UAV/craft to facilitate operation on a mission.

[12] The present invention relates to a payload management system for an unmanned aircraft system providing an aircraft to carry payload comprising at least one payload
15 segment on a mission from an originator by a transporter to a destination in operating conditions. The system comprises a carrier for payload configured to be carried by the aircraft and a containment system configured to contain payload. The containment system comprises an inflatable pod attachable to the carrier. The pod of the containment system is attached to the exterior of the aircraft.

20 [13] The present invention also relates to a payload management system for an unmanned aircraft system providing an aircraft to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions. The system comprises a carrier for payload configured to be carried by the aircraft and a containment system configured to contain payload. The containment system

comprises a fillable pod carried by the carrier at least partially exterior to the aircraft. The pod comprises at least one compartment for payload.

[14] The present invention further relates to a method of managing payload for an unmanned aircraft system providing an aircraft to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions. The method comprises the steps of providing payload in a carrier configured to be carried by the aircraft; providing a containment system for payload; and configuring the containment system by inflation before the mission. The containment system comprises a fillable pod at least partially exterior to the aircraft.

[15] The present invention further relates to a method of managing payload for an unmanned aircraft system providing an aircraft to carry payload on a mission from an originator by a transporter to a destination in operating conditions. The method comprises the steps of providing payload in a carrier configured to be carried by the aircraft; providing a containment system with the carrier for payload; and configuring the containment system by inflation during the mission. The containment system comprises an inflatable pod in an aerodynamic form carried at least partially exterior to the aircraft.

[16] The present invention further relates to a payload management system for an unmanned aircraft system to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions. The system comprises a carrier for payload to be carried by the aircraft and a containment system providing a pod for payload. The pod is provided in an at least partially inflatable form to provide containment for payload to be carried at least partially external to the aircraft.

[17] The present invention further relates to a method of payload management for an unmanned aircraft system to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions. The

method comprises the steps of providing a pod comprising at least one inflatable segment to contain payload; placing payload in the pod; associating the pod with the aircraft so that the payload can be carried by the aircraft on the mission; and at least partially inflating at least one inflatable segment of the pod.

- 5 **[18]** The foregoing summary is illustrative only and is not intended to be in any way limiting. In addition to the illustrative aspects, embodiments, and features described above, further aspects, embodiments, and features will become apparent by reference to the drawings and the following detailed description.

FIGURES

[19] FIGURES 1A and 1B are schematic perspective views of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

5 [20] FIGURES 1C and 1D are schematic side elevation views of a pod of a containment system for payload according to an exemplary embodiment.

[21] FIGURE 1E is a schematic perspective view of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

[22] FIGURE 1F is a schematic side elevation view of a pod of a containment system for
10 payload according to an exemplary embodiment.

[23] FIGURE 1G is a schematic perspective view of a pod for payload according to an exemplary embodiment.

[24] FIGURES 2A to 2C are schematic perspective views of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary
15 embodiment.

[25] FIGURES 2D to 2F are schematic side elevation views of aerodynamic control surfaces for a pod according to an exemplary embodiment.

[26] FIGURES 3A and 3B are schematic perspective views of pod for payload according to an exemplary embodiment.

20 [27] FIGURES 4A and 4B are schematic perspective views of providing a pod of a containment system for payload according to an exemplary embodiment.

[28] FIGURE 4C is a schematic side elevation view of a pod of a containment system for payload according to an exemplary embodiment.

[29] FIGURE 4D is a schematic perspective view of a pod of a containment system for
25 payload according to an exemplary embodiment.

[30] FIGURES 5A to 5D are schematic side elevation views of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

[31] FIGURE 5E is a schematic side elevation view of the pod of a containment system
5 for payload according to an exemplary embodiment.

[32] FIGURES 6A to 6D are schematic side elevation views of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

[33] FIGURE 6E is a schematic side elevation view of the pod of a containment system
10 for payload according to an exemplary embodiment.

[34] FIGURES 7A to 7D are schematic side elevation views of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

[35] FIGURES 8A and 8B are schematic side elevation views of an apparatus for
15 attachment for the containment system with carrier according to an exemplary embodiment.

[36] FIGURES 9A and 9B are schematic side elevation views of an apparatus for attachment for the containment system with carrier according to an exemplary embodiment.

[37] FIGURES 10A and 10B are schematic side elevation views of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary
20 embodiment.

[38] FIGURES 11A and 11B are schematic side elevation views of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

[39] FIGURE 12A is a schematic side elevation view of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

[40] FIGURE 12B is a schematic side elevation view of the pod of a containment system
5 for payload according to an exemplary embodiment.

[41] FIGURE 12C is a schematic side elevation view of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

[42] FIGURE 12D is a schematic side elevation view of the pod of a containment system
10 for payload according to an exemplary embodiment.

[43] FIGURES 12E to 12F are schematic side elevation views of an unmanned aircraft system with craft and pod of a containment system for payload according to an exemplary embodiment.

[44] FIGURES 13A to 13C are schematic side elevation views of a pod of a containment
15 system for payload according to an exemplary embodiment.

[45] FIGURES 14A and 14B are schematic perspective views of the pod of a containment system with payload for the system according to an exemplary embodiment.

[46] FIGURES 15A and 15B are schematic perspective views of the pod of a containment system with payload for the system according to an exemplary embodiment.

[47] FIGURES 16A to 16E are schematic elevation views of an apparatus providing the
20 pod of a containment system of the system according to an exemplary embodiment.

[48] FIGURES 17A and 17B are schematic perspective diagrams of an apparatus providing the pod of a containment system of the system according to an exemplary embodiment.

[49] FIGURES 18A to 18C are schematic side elevation views of the pod for the containment system for payload according to an exemplary embodiment.

[50] FIGURE 18D is a schematic perspective view of the pod for the containment system for payload according to an exemplary embodiment.

5 [51] FIGURES 19A to 19C are schematic side elevation views of an unmanned aircraft system with craft and pod of a containment system for payload for the system according to an exemplary embodiment.

[52] FIGURE 19D is a schematic perspective view of the pod for the system with payload according to an exemplary embodiment.

10 [53] FIGURES 20A to 20D are schematic side elevation views of an apparatus for the pod of the containment system for payload according to an exemplary embodiment.

[54] FIGURE 21 is a schematic diagram of an apparatus for the pod of the containment system for payload according to an exemplary embodiment.

15 [55] FIGURES 22A and 22B are schematic side elevation views of the apparatus for the pod of the containment system for payload according to an exemplary embodiment.

[56] FIGURES 22C and 22D are schematic side elevation views of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary embodiment.

20 [57] FIGURE 23 is a schematic perspective view of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary embodiment.

[58] FIGURE 24A is a schematic side elevation view of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary embodiment.

25 [59] FIGURES 24B and 24C are schematic front cross-section elevation views of the pod with payload according to an exemplary embodiment.

[60] FIGURES 24D and 24E are schematic side cross-section elevation views of the pod with payload according to an exemplary embodiment.

[61] FIGURES 25A and 25B are schematic side elevation views of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary
5 embodiment.

[62] FIGURES 25C and 25D are schematic side elevation views of the pod for containment system of the system according to an exemplary embodiment.

[63] FIGURES 25E through 25H are schematic perspective views of payload for a pod of the containment system according to an exemplary embodiment.

10 [64] FIGURE 25I to 25L are schematic side elevation views of the pod of the containment system according to an exemplary embodiment.

[65] FIGURES 25M and 25N are schematic perspective views of the pod of the containment system according to an exemplary embodiment.

[66] FIGURE 25O is a schematic side elevation view of an unmanned aircraft system
15 with craft and pod for containment system for payload according to an exemplary embodiment.

[67] FIGURE 26A is a schematic elevation view of an unmanned aircraft system with craft and pod of a payload management system with payload according to an exemplary embodiment.

20 [68] FIGURE 26B is a schematic top plan view of the pod of the system according to an exemplary embodiment.

[69] FIGURES 27A and 27B are schematic elevation views of an unmanned aircraft system with craft and pod for payload of the system according to an exemplary embodiment.

[70] FIGURES 28A and 28B are schematic elevation views of an unmanned aircraft
25 system with craft and pod for payload of the system according to an exemplary embodiment.

[71] FIGURE 29A is a schematic side elevation view of an unmanned aircraft system with craft and containment system for payload according to an exemplary embodiment.

[72] FIGURE 29B is a schematic rear elevation view of an unmanned aircraft system with craft and containment system for payload according to an exemplary embodiment.

5 [73] FIGURES 29C and 29D are schematic side elevation views of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary embodiment.

[74] FIGURES 30A to 30D are schematic side elevation views of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary
10 embodiment.

[75] FIGURES 31A to 31D are schematic side elevation views of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary embodiment.

[76] FIGURES 32A to 32C are schematic side elevation views of an unmanned aircraft
15 system with craft and pod for containment system for payload according to an exemplary embodiment.

[77] FIGURES 33A to 33C are schematic side elevation views of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary embodiment.

20 [78] FIGURES 34A to 34C are schematic side elevation views of an unmanned aircraft system with craft and pod for containment system for payload according to an exemplary embodiment.

[79] FIGURES 35A to 35B are schematic flow diagrams of method of payload management for a UAV/craft carrying payload according to an exemplary embodiment.

[80] FIGURES 36A to 36B are schematic flow diagrams of method of payload management for a UAV/craft carrying payload according to an exemplary embodiment.

[81] FIGURE 37A to 37C are schematic block diagrams of a payload management system for a UAV/craft carrying a payload according to an exemplary embodiment.

DESCRIPTION

[82] A system and method for payload management for an unmanned aircraft system is disclosed according to exemplary and alternative embodiments. According to an exemplary embodiment, the system is configured as a payload management system for an unmanned aircraft configured to operate in an airspace. The payload management system may comprise a containment system to contain payload carried by the UAV/craft. Systems and methods for payload management for an unmanned aircraft with a containment system for payload are disclosed according to an exemplary and alternative embodiments.

[83] Referring to FIGURES 1A-1B, 1E, 5A-5E, 6A-6E, 25A-25D, 30A-30D, 35A-35B, 36A-36B and 37A-37C, the UAV/craft with a payload management system is shown schematically and representationally according to exemplary embodiments (including with containment system comprising carrier/pod). According to exemplary embodiments, the payload management system and UAV/craft interact under management and control as indicated representationally and schematically in FIGURES 37A-37C. Methods of use and operation of UAV/craft and payload management system are shown representationally and schematically according to exemplary embodiments in FIGURES 35A-35B and 36A-36C.

Embodiments of Containment System (with Pod/Carrier)

[84] Referring to FIGURES 1A and 1B an aircraft UAV (UAV/craft) is shown schematically and representationally with a containment system comprising a pod O attachable to the aircraft according to an exemplary embodiment. See also FIGURES 37A-37C. The aircraft is shown schematically and representationally as an unmanned aircraft (e.g. of a type commonly referred to as UAV or UAS) of a generally conventional type (of any size/scale) that can be configured to carry a payload (e.g. in an attached or otherwise associated containment system providing a pod with carrier/container). According to an

exemplary embodiment, the UAV/UAS may be in any of a variety of forms (e.g. a form resembling an airplane, other fixed-wing craft, helicopter, rotating blade craft, jet/rocket craft, etc.).

[85] According to an exemplary embodiment, the pod O of the containment system is configured to contain payload L such as packages, containers, etc. (see e.g. FIGURES 1B/1E, 3B, 5B, 6B, 7B, 12B and 13B). As indicated schematically and representationally according to an exemplary embodiment in FIGURE 1A and other FIGURES, the pod may be provided in a form intended to achieve one or more purposes such as to enhance aerodynamic performance (e.g. reduce or adjust drag coefficient, provide lift, etc.), to protect payload from environmental effects (e.g. weather conditions), to insulate payload from external forces and effects, to protect payload integrity or contents in the event of a crash or impact, to facilitate handling and/or attachment (e.g. providing uniformity of management and attachment), to distribute or balance loads on the aircraft (e.g. reduce likelihood of load shifting, to allow even distribution of load in the pod O (e.g. individual loads within the pod, etc.). According to any exemplary embodiment, the pod will be configured (e.g. by originator, transporter, etc.) to achieve some or all of the purposes to some degree in use and/or operation including with the UAV/craft on a mission. See FIGURES 35A-35B and 36A-36B.

[86] As indicated schematically and representationally in FIGURES 1A, 1B and 1E, the containment system providing the pod O is configured to be attached to an aircraft UAV so that the payload L can be carried for or from an originator by a transporter to a destination (e.g. from one location to another location or between multiple locations on a route/mission such as for delivery/distribution of payload items). As indicated schematically and representationally, payload may comprise one or more payload items or segments having any of a variety of forms, shapes, mass/weight, fragility, etc.

[87] In FIGURE 1B according to an exemplary embodiment, pod O is shown schematically and representationally attached to an aircraft UAV and able to be carried containing payload (packages, containers, etc.) to a destination for delivery. See also FIGURES 1A, 1D and 1E. According to an exemplary embodiment, the UAV/craft is
5 shown schematically and representationally as in a helicopter form. See FIGURES 1A-1B, 1E, 2A-2C, 5A-5D, 6A-6D, 7A-7D, 10A-10B, 11A-11B, 12A, 12F, 19A-19C, 23, 24A 25A-25B, 27A-27B, 28A-28B, 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C and 34A-34C.

[88] Referring to FIGURES 1B and 1E, the pod O attached to the aircraft UAV is shown
10 schematically and representationally as providing enhanced aerodynamic performance and mass properties/balance and to facilitate control/coordination of the aircraft and pod combination (e.g. such that the UAV/craft with pod in combination provides an aerodynamic form and controllable structure). According to an exemplary embodiment, the pod provides a structure or shell to contain the payload (e.g. payload segments/items). See
15 FIGURES 1A-1B, 2A-2C, 7B-7D, 13A-13C and 15A-15B.

[89] According to an exemplary embodiment shown schematically and representationally in FIGURES 1A-1G, the pod O is attachable to the UAV/craft at attachment points provided by a carrier (shown as comprising posts/members UM). As indicated in the FIGURES, according to other exemplary embodiments, the pod may be attached to the UAV/craft
20 according to any of a wide variety of suitable carrier arrangements to facilitate the carrying of payload/cargo in an efficient and effective manner (including but not limited to any conventional/known arrangement for attachment or containment of payload to an aircraft such as a UAV/craft). See also FIGURES 8A-8B, 10A-10B, 11A-11B and 23. According to an exemplary embodiment of the payload management system, the containment system
25 is associated (e.g. by pod/fillable container) with the UAV/craft to be deployed to carry and

manage payload on the UAV/craft in flight on a mission by a transporter. See FIGURES 1A, 1E, 4A, 5A-5E, 6A-6E, 7A-7D, 10A-10B, 11A-11B, 19A-19D, 22C-22D, 23, 24A, 25A-25D, 27A-27B, 28A-28B, 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C, 34A-34C, 35A-35B and 36A-36B.

- 5 **[90]** As indicated schematically in FIGURES 1A to 1F, the pod O of the containment system may be an inflatable structure (e.g. fillable at inflation stems or tubes U) that may initially be uninflated/flat (see FIGURE 1C) and that can be loaded with cargo and inflated (see FIGURE 1D) to take an aerodynamic form (see FIGURES 1A-1B and 1E) and then be uninflated (e.g. after cargo has been carried to a destination/delivered) (see FIGURE 1F).
- 10 See also FIGURES 37B-37C. As indicated in FIGURE 1E, the pod O may include padded and/or inflatable segments shown as segments I (e.g. pre-inflated segments, supplemental segments or inflatable segments, etc.) that may be intended to secure/protect items of payload L (and that may also facilitate the pod taking a more rigid structural form such as indicated schematically at the nose of the pod). As indicated schematically, the segments
- 15 such as inflatable segments I within the pod O may be movable/removable and may be presented in a variety of shapes and forms and positions to conform to items of cargo, to fit with precision within the internal sections, to provide a defined shape to the pod, to create a space within the pod, etc. See for example FIGURES 1E and 1F. See also FIGURES 13B and 15B.
- 20 **[91]** As indicated, the pod of the containment system may be inflated/deflated before, during and/or after attachment to the UAV/craft (as configured). See for example FIGURES 1A, 1C, 1E and 1F. See also FIGURES 10A, 11A, 14A, 15A, 16A, 16C, 17A and 20A. According to an exemplary embodiment the UAV/craft may be provided with an internal system to inflate/fill the pod (see e.g. FIGURES 1A-1F, 25A-25B, 37C) or an external
- 25 system may be provided to fill/inflate the pod (see e.g. FIGURES 3A-3B, 5A-5E, 6A-6E,

10B, 12E, 18B, 25C-25D and 37B). Fill/inflation of the pod may be provided by a tube or stem (e.g. tube UM or tube U). See for example FIGURES 1A and 1C. According to an exemplary embodiment indicated schematically in FIGURES 5C, 6C, 18B, 25C-25D, 35A and 37B the fill/inflation system may be external to the containment system and UAV/craft
5 (e.g. to be used before flight). According to an exemplary embodiment indicated schematically in FIGURES 1A-1F, 25A-25B 35B, 36B and 37C the filling/inflation system may be on the UAV/craft (e.g. to be used before and/or during flight).

[92] Referring to FIGURE 1G, the pod O is shown schematically and representationally with features E (e.g. ripples on the surface according to the illustrated schematic
10 embodiment) intended to enhance aerodynamic performance of the pod (e.g. to facilitate airflow efficiency, to reduce drag effects, modify drag coefficient, etc.). See also FIGURES 4C-4D, 12A-12F, 16D-16E, 23 and 25A-25D.

[93] Referring to FIGURES 2A-2B, a pod O is shown according to an exemplary embodiment, (attached to an aircraft) provided with a space frame structure shown as wings
15 (e.g. aerodynamic structures) inflatable to deploy laterally from the side of the pod O; as shown schematically and representationally the structure (e.g. set of wings) is intended to facilitate the aerodynamic performance of the pod (e.g. when deployed from, attached to the aircraft, etc.). According to an exemplary embodiment, the configuration of the pod with space frame structures (e.g. wing or wings) can be adjusted to achieve particular
20 aerodynamic performance in particular circumstances such as to reduce, modify drag or facilitate lift and/or otherwise to maintain or enhance flight characteristics. As indicated, according to an exemplary embodiment shown schematically and representationally in FIGURES 2C and 2D-2F, aerodynamic structures shown as wings W (or other structures) on the pod can be configured with a mechanism/control system to be adjusted in orientation
25 (see also FIGURE 2C) before or during flight of the aircraft to enhance performance (e.g.

generally in coordination with flight control of the aircraft carrying the pod). According to an exemplary embodiment, the structures may comprise other forms and/or mechanisms providing surfaces or shapes to facilitate aerodynamic performance; as indicated schematically and representationally the structures may be wholly or partially inflatable, wholly or partially rigid, wholly or partially adjustable (or fixed/non-adjustable). See for example FIGURES 12A-12F (tail structure Z).

[94] Referring to FIGURES 3A through 3B and 4A through 4D, an arrangement configured to contain and protect the payload (e.g. package or container) in the pod O of the containment system is shown to an exemplary embodiment. As indicated schematically and representationally according to an exemplary embodiment in FIGURES 3A and 3B, the payload L is inserted into a mold (e.g. tool or fixture for compression or injection molding or etc.) and a molded material N can be filled or applied (e.g. injection molded around the form of the payload) to encapsulate the payload with the molded material. See FIGURES 3B and 4A. As indicated schematically and representationally according to an exemplary embodiment in FIGURE 4A, the payload encapsulated with the moldable/molded material N (e.g. an encapsulating foam or packing material such as urethane or other suitable material that has been filled or injected as a liquid and then is cured or solidified) can be attached as a unit to the aircraft for delivery (e.g. by member shown as an arm). After delivery the material encapsulation can be removed from the payload at the destination. See FIGURE 4B. As indicated schematically and representationally according to an exemplary embodiment in FIGURES 4C and 4D, the pod O may be formed (e.g. molded) in any of a wide variety of shapes including aerodynamic shapes and features (such as surface E) as to facilitate flight dynamic for the UAV/craft with pod (carrying payload L). According to an exemplary embodiment, the formed pod is attachable to the UAV/craft by a carrier such as

the structure UM or other carrier arrangement. See for example FIGURES 4A-4C, 8A-8B and 23.

[95] Referring to FIGURES 5A through 5E and 6A through 6C, arrangements for a pod O attachable to an aircraft are shown schematically and representationally according to an exemplary embodiment and alternative embodiments. According to an exemplary embodiment the containment system with the pod O may provide a carrier shown as body G formed of a structure such as from a flexible sheet or form configured to contain and carry a payload L (e.g. one payload segment or multiple payload segments such as containers and packages) as indicated in FIGURES 5B and 6B.

[96] Referring to FIGURES 5A through 5E, according to an exemplary embodiment deployment of the containment system with pod O is shown schematically and representationally, in sequence before cargo loading (FIGURE 5A) and during or after cargo loading (FIGURE 5B). According to an exemplary embodiment, the pod O can be inflated or filled with a gas or fluid (at an inlet/outlet, filler/valve, etc. shown as a tube/stem U) to provide a form or structure for containment and protection or enhancement for the payload L to be carried to the destination (see FIGURE 5C); at the destination the gas or fluid inflated fill F can be evacuated (see FIGURE 5D) and the pod O can be removed from the craft so that payload (e.g. containers or packages) can be removed (see FIGURE 5E). As indicated schematically and representationally in FIGURES 5A through 5E, according to an exemplary embodiment the system and method can be configured so that the pod can be loaded and then inflated prior to flight (e.g. by the originator/customer and/or by the transporter/carrier) or inflated during flight (e.g. to adjust flight dynamics, in anticipation of a risk to the payload or craft, upon sensing impact or fire, etc.). See FIGURES 35A-35B, 36A-36B and 37A-37C. See also FIGURES 25A to 25O.

[97] Referring to FIGURES 6A through 6C, according to an exemplary embodiment shown schematically and representationally, the pod O of the containment system provides a container C that can be inflated/filled (e.g. through a tube U). According to an exemplary embodiment, the inflated or filled material can be a foam or packing material F (e.g. a foam/plastic or protective material such as urethane or cushion/pad material or other compound used for packaging) encapsulating the payload L within the containing body G (e.g. formed by a flexible material) providing pod O. As indicated schematically and representationally in FIGURES 6C and 6D, the foam/packing material F can provide a form to the pod O (e.g. an aerodynamically advantaged shape or profile may provide a reduced drag coefficient or enhanced aerodynamic performance). See also FIGURES 4C-4D and 25M-25N. According to an exemplary embodiment as shown schematically in FIGURE 6E the encapsulated payload L can be removed from the craft UAV during a mission or after delivery. See also FIGURES 4B to 4D and 25A-25D.

[98] According to an exemplary embodiment indicated schematically in FIGURES 1A-1G, 2A-2F, 12A-12F, 25A-25D, 25L-25O, the pod O of the containment system (to carry payload L) may be configured to provide enhanced aerodynamic performance including (but not limited to) by taking an aerodynamic shape/form, providing surface effects, comprising aerodynamic control surfaces that may generate lift or manage aerodynamic torque, etc. The pod of the containment system may be shaped to enhance aerodynamic control and performance (e.g. reduce drag, generate/increase lift, facilitate control of aerodynamic torque/forces, etc.). For example, a pod may be inflated and/or deflated while being carried in flight by a UAV/craft to adjust aerodynamic effects/performance of the UAV/craft with pod (see FIGURES 25A-25B); control surfaces on the pod may be adjustable under operation of a control system while being carried in flight by a UAV/craft to adjust aerodynamic effects/performance of the UAV/craft with pod (see FIGURES 2B-2F, 12A-

12F, 35B, 36B and 37A-37C). According to an exemplary embodiment, inflatable cargo pod may be shaped to control aerodynamic performance/forces on the payload (and hence on the UAV/craft); aerodynamic performance may be to reduce drag to generate lift, etc. (as indicated schematically). The inflation or shape of the pod carried by the UAV/craft may be dynamically controlled during the flight (e.g. based on speed, conditions, etc). (According to an exemplary embodiment, surface of the pod may be dynamically rippled to reduce drag.) Inflation of cargo pod (or portion thereof) may act to attach the pod to the UAV/craft (e.g., inflating into a concave volume in UAV/craft hull, inflating around a knob or rail, etc.). See FIGURES 10A-10B and 11A-11B. An inflatable pod may have multiple compartments selectively inflated to match size/shape of cargo (e.g. not to hold cargo, but to match cargo size/shape). The inflation may be by a gas or a liquid (e.g. fill material); the fill material may be formulated to solidify into a foam. (Foam may be used to contain or protect the payload from impact or fire.) The fill/inflation of the pod may be performed by the customer or transporter or other provider (typically inflation may be performed by the transporter).

[99] Referring to FIGURES 7A to 7C a configuration for attachment of a payload to an aircraft UAV is shown schematically and representationally according to an exemplary embodiment. As shown in FIGURES 7B and 7C, a pod or shell O (e.g. section Ox and section Oy) may be attached and secured around the payload (e.g. containers or packages, see FIGURE 7A) and secured to protect the payload L after attachment to the craft during flight and delivery; at the destination the pod or shell O can be removed and the payload released from attachment and/or containment in the pod and aircraft for delivery. As shown according to an exemplary embodiment schematically and representationally in FIGURES 7A-7C, payload L is contained in a compartment T with carrier that can be configured within the pod O (e.g. section Ox and section Oy) attached to aircraft UAV at base B (e.g. by

connectors of any suitable type); pod O can be secured by a mechanism such as a latch (see FIGURES 8A-8B and 9A-9B) to retain sections of pod O around the compartment T. According to an exemplary embodiment as shown schematically in FIGURE 7D, the pod may be filled or inflated (e.g. through tube U) and may take an enlarged (e.g. inflated) form (e.g. sealed at interface of sections of cover). As indicated, the pod may be selectively
5 inflated to provide a form and/or structure to facilitate aerodynamic performance of the UAV/craft with pod. See also FIGURES 1A-1B and 4C-4D.

[100] Referring to FIGURES 8A-8B and 9A-9B, schematic diagrams of mechanisms for use with a pod O or craft UAV (e.g. as may comprise the carrier) are shown schematically
10 and representationally according to an exemplary embodiment. FIGURES 8A and 8B show in schematic, form a clasp and loop arrangement K as may be used to attach payload to an aircraft. See also FIGURE 7A. Referring to FIGURES 9A and 9B, a latch mechanism A may be used to attach sections of a pod or shell is shown in a clasped (see FIGURE 9B) and unclasped (see FIGURE 9A) arrangement (e.g. to secure and/or seal the compartment of the
15 pod). See also FIGURE 7C (indicating schematically the use of a mechanism to secure pod or shell sections).

[101] Referring to FIGURE 10A and 10B according to an alternative arrangement, a pod O of the containment system may be provided in a form that is fillable (e.g. bag, balloon, pouch, etc.); the fillable structure or form (e.g. bag) of pod may engage the UAV/craft with
20 a carrier mechanism or arrangement, shown schematically and representationally, as a neck and head arrangement X configured to fit within an accompanying receptacle or compartment T in or associated with the base B of the UAV/craft. According to an exemplary embodiment, as indicated in FIGURES 10A-10B, attachment of the pod to the aircraft can be achieved by inflating or filling the pod such that the head and neck section X
25 will expand to fill and fit within the receptacle T in the base B of the UAV/craft (aircraft).

Referring to FIGURES 11A and 11B, a mechanical arrangement M for securing the top P (e.g. cap, holder, projection, neck and head etc.) of a pod is shown schematically and representationally according to an exemplary embodiment; the mechanism/arrangement M comprises a set of movable members or arms (e.g. providing a catch or latch or trap at the

5 base of the aircraft) that tighten or engage around the neck of the pod once the head X is inserted into the receptacle T in the base of the aircraft. As indicated schematically and representationally according to an exemplary embodiment, the arrangement of a type shown in FIGURES 10A-10B and 11A-11B could be configured to provide for a payload/cargo drop (e.g. at a delivery location or in the event of a risk to the craft/payload) without stopping

10 or landing the UAV/craft (e.g. by releasing the pod from the compartment/receptacle by partially deflating or unlatching the pod). See for example FIGURES 10A-10B and 11A-11B.

[102] As indicated schematically and representationally according to an exemplary embodiment, the pod of the containment system with carrier is configured to carry payload

15 (shown schematically as a package or container in FIGURES 10A-10B and 11A-11B) and to be carried by the aircraft; as indicated schematically and representationally any of a wide variety of mechanisms and/or arrangements can be used to configure and carry payload. According to an exemplary embodiment and other/alternative embodiments of the apparatus, system and methods.

20 [103] Referring to FIGURES 12A-12F and 13A-13C as shown schematically and representationally according to an exemplary embodiment, a pod O of the containment system with carrier may comprise a multi-segment configuration providing a nose section Oa, a base Ob or body and a tail section Oc. As indicated in FIGURE 12B the base or body Ob of the pod O may be loaded with payload such as containers and packages L. The nose

25 section and tail section may then be secured to the base or body to form the complete pod

structure (e.g. by such as a fastener A, latch mechanism, etc. with a seal) and attached to the aircraft by a carrier to be carried for flight on the mission. As indicated in FIGURES 12A and 12C the tail section of pod O may provide a fixed or movable or reconfigurable fin or rudder (e.g. flight control surface Z) configured to assist or enhance aerodynamics performance of the pod and UAV/craft.

[104] As indicated schematically and representationally according to an exemplary embodiment in FIGURES 12D through 12F, the base Ob or body of the pod may be configured to carry payload such as containers and packages L and a fill F to provide protection for the payload; as indicated in FIGURE 12D the fill may comprise pads F or inserts (e.g. foam/packing segments) inserted between and around payload sections L (e.g. containers and packages); as shown in FIGURE 12E the protection may comprise a fill material F (e.g. foam fill) inserted into the base or body after it is loaded with the payload segments. As indicated schematically in FIGURE 12C according to an exemplary embodiment, the compartment T of the pod O may be filled wholly or partially with an inflated/padded or inflatable segment I. According to any preferred embodiment the fill or pad inserts will be configured to protect/secure and manage/contain payload in the base or body, for example to balance and distribute and maintain the spacing and position of payload within the base or body. As indicated schematically and representationally, the base or body can be loaded with payload contained in a manner to achieve an intended mass/load balance which is maintained by the fill/inserts during the flight/mission.

[105] According to an exemplary embodiment indicated schematically in FIGURES 1A-1G, 2A-2F, 12A-12F, 25A-25D, 25L-25O, the pod O of the containment system (to carry payload L) may be configured to provide enhanced aerodynamic performance including (but not limited to) by taking an aerodynamic shape/form, providing surface effects, comprising aerodynamic control surfaces that may generate lift or manage aerodynamic torque, etc. The

pod of the containment system may be shaped to enhance aerodynamic control and performance (e.g. reduce drag, generate/increase lift, facilitate control of aerodynamic torque/forces, etc.). For example, a pod may be inflated and/or deflated while being carried in flight by a UAV/craft to adjust aerodynamic effects/performance of the UAV/craft with pod (see FIGURES 25A-25B); control surfaces on the pod may be adjustable under operation of a control system while being carried in flight by a UAV/craft to adjust aerodynamic effects/performance of the UAV/craft with pod (see FIGURES 2B-2F, 12A-12F, 35B, 36B and 37A-37C). According to an exemplary embodiment, inflatable cargo pod may be shaped to control aerodynamic performance/forces on the payload (and hence on the UAV/craft); aerodynamic performance may be to reduce drag to generate lift, etc. (as indicated schematically). The inflation or shape of the pod carried by the UAV/craft may be dynamically controlled during the flight (e.g. based on speed, conditions, etc). (According to an exemplary embodiment, surface of the pod may be dynamically rippled to reduce drag.) Inflation of cargo pod (or portion thereof) may act to attach the pod to the UAV/craft (e.g., inflating into a concave volume in UAV/craft hull, inflating around a knob or rail, etc.). See FIGURES 10A-10B and 11A-11B. An inflatable pod may have multiple compartments selectively inflated to match size/shape of cargo (e.g. not to hold cargo, but to match cargo size/shape). The inflation may be by a gas or a liquid (e.g. fill material); the fill material may be formulated to solidify into a foam. (Foam may be used to contain or protect the payload from impact or fire.) The fill/inflation of the pod may be performed by the customer or transporter or other provider (typically inflation may be performed by the transporter).

[106] Referring to FIGURES 13A through 13C, a configuration of the containment system with a pod O providing an internal compartment C with multiple configurations of payload containment and/or securement is shown schematically. Configurations within the pod may

include apparatus S (e.g. carriers, shelves, walls, racks, slats, supports, attachments, hooks, hangers, etc. of a known/conventional type for storage) for support of payload L (e.g. packages and containers) in compartment C (e.g. enclosed within pod O). As indicated in FIGURE 13B, the base Ob or body and/or nose Oa and tail of the pod Oc of the containment
5 system may be configured to carry payload (e.g. in addition to the central base or body). As indicated in FIGURE 13B, according to an exemplary embodiment the nose and tail of the pod O may be hinged for attachment to the body and openable to expose compartments for loading with payload (and secured by a mechanism such as latch A). As indicated in FIGURE 13C, payload L may be loaded and distributed in any of a wide variety of
10 arrangements in compartment C to achieve balance and distribution and/or generally efficient carrying of payload in the pod O by the aircraft UAV when the pod O is attached for the aircraft UAV for delivery (e.g. load distribution/balancing); inflatable or padded segments or forms I may be used to secure/protect and manage/contain cargo items within the compartment of the pod during the mission of the UAV/craft.

15 [107] Referring to FIGURES 14A-14B and 15A-15B as shown schematically and representationally according to an alternative embodiment, a pod O of the containment system may contain a receptacle C into which a container such as payload item L may be inserted and carried; the pod with container can be attached to an aircraft and carried to the destination by the aircraft; at the destination the container inserted into the pod O before
20 flight may be removed from the pod O and delivered. As indicated schematically and representationally in FIGURES 14A and 14B, the pod O may be configured to carry/fit at least some portion of the cargo (e.g. partial containment); the pod may be at least partially inflatable (or fillable) into a form or structure (e.g. aerodynamic form). See also FIGURES 1A-1F. Referring to FIGURES 15A and 15B as shown schematically and representationally
25 according to an exemplary embodiment, a pod O may be configured with a removable

securable lid D or sealable cover for an opening through which containers and packages may be inserted in the pod structure to be carried by the containment system when attached with a carrier to the aircraft; as indicated schematically and representationally the lid may be removed while packages are inserted (or removed) (and filled or inflation is performed) and then attached/sealed for carrying flight to the destination for delivery. See FIGURE 15A. According to an exemplary embodiment, inflatable or padded segments or forms I may be used to secure and protect and maintain cargo items within the compartment of the pod during the mission of the UAV/craft. See FIGURE 15B.

[108] Referring to FIGURES 16A and 16B, 16C to 16E, 17A and 17B shown schematically and representationally according to an exemplary embodiment, a pod O of the containment system may comprise an inflatable apparatus/arrangement I intended to secure a payload such as a package in the pod for management, carrying and distribution. See also FIGURES 37B-37C. As shown in FIGURES 16A and 16B the pod O may comprise an inflatable segment I (or set of segments) and a base structure V (e.g. a carrier/frame); a gas or liquid foam fill F from a source or system may be used to inflate the segment I of the pod (e.g. through tube U) to secure the package in the pod. See FIGURE 16B. According to an alternative embodiment shown schematically in FIGURE 16C, the pod O may comprise an inflatable arrangement I that is inflated (e.g. with a fill F from a source or system) around the shape of the package L (e.g. to conform to the shape of the package). See also FIGURES 17A, 17B and 37B-37C. According to an exemplary embodiment shown schematically and representationally in FIGURES 16D-16E, the pod may be configured so that when filled with a fill F from a source or system the structure generally will take an aerodynamically-enhanced form or shape containing the payload L (e.g. items of cargo). According to an exemplary embodiment, the pod can then be attached to/carried by the aircraft.

[109] Referring to FIGURES 18A through 18D as shown schematically and representationally according to an exemplary embodiment (or according to an alternative embodiment), a pod O of the containment system with carrier for packages can be formed around payload or packages L (e.g. using a formable foam material). See also FIGURE 5 37B. As indicated schematically and representationally in FIGURE 18A, payload may be placed or position on a carrier base V or mold form; as indicated in FIGURES 18B and 18C, a foam fill or material F may be supplied from a source or system (e.g. injected) in the mold/carrier in and around the payload; as shown in FIGURE 18C the foam or fill may be allowed to set or cure to form a pod or carrier O for the payload; referring to FIGURE 18D 10 as shown schematically and representationally upon curing or setting the foam may form or provide at least partial encapsulation of packages in a formed pod arrangement that can be attached to an aircraft (after removal from the carrier or mold). See also FIGURE 23. As indicated schematically and representationally according to an exemplary embodiment in FIGURES 18A through 18D, the pod may provide attachment points M for attachment to 15 the aircraft (by a carrier with or without a carrier base).

[110] As indicated schematically and representationally in FIGURES 19A through 19D according to an exemplary embodiment, payload L (e.g. packages) loaded in a pod O may be provided further aerodynamic enhancement and/or containment protection by a lid or cover Oa over a carrier base or body Ob of the containment system; lid or cover may be 20 optionally used as needed to contain and protect and/or shield packages (or form a structural pod shape as indicated). A two-piece pod O comprising a base and lid or cover is shown in FIGURES 19B and 19C; the pod/carrier O (e.g. in combination) may take an aerodynamic form as designed and carried by the aircraft. See also FIGURE 23. As indicated, the interior of the pod O may be filled with a fluid or material to protect payload segments L during 25 transit on the mission/flight of the UAV/craft; as also indicated, the pod O when separated

from the UAV/craft (e.g. before/after delivery) may function as a multi-mode carrier for the payload segments L (e.g. detached and loaded into another vessel such as a van, truck, rail, car, ship, etc.). See also FIGURES 35A-35B, 36A-36B, 37A-37C. As shown schematically and representationally according to an exemplary embodiment in FIGURE 19D, the pod/carrier may be separated from the UAV/craft and filled/loaded with cargo by the originator and provided to the transporter for the mission then separated from the UAV/craft and unloaded at the destination.

[111] As indicated schematically in the FIGURES, according to an exemplary embodiment the UAV/craft will be designed to carry payload externally in the containment system (with pod). According to an exemplary embodiment, the pod of the containment system may comprise a cargo pod. The cargo pod may completely enclose the payload or may just extend around a portion of the payload. To reduce drag (e.g. drag coefficient), weather exposure, or enhance crash protection the containment system may embed payload within an inflatable cargo pod. The pod may be streamlined to reduce drag coefficient; the pod may be foam-filled for crash/handling protection. The pod may be supplied by the transporter operating the UAV/craft or by the customer (who might preload payload in the inflatable pod). The pod may attach to the UAV/craft via standardized load points. The pod may be pre-inflated or might be inflated by the UAV/craft after attachment (e.g. as an externally carried payload is attached in an inflatable cargo pod). According to an exemplary embodiment, the containment system comprises attachment to the carrier. The payload may attach to the UAV/craft directly or via attachment points on the cargo pod to be carried by the UAV/craft on a mission. The pod may provide nose-cone and tail-cone and base areas (as front and back and center areas for containing cargo). See for example FIGURES 12A-12F.

[112] Referring to FIGURES 20A through 20D as shown schematically and representationally according to an exemplary embodiment, a containment system may provide a multi-segment pod O comprising inflatable segments for payload L. As indicated schematically and representationally the pod O may comprise multiple separate inflatable segments that can be used to carry multiple corresponding payload segments (e.g. packages or containers C). As shown schematically and representationally according to an exemplary embodiment in FIGURES 20A-20D, the apparatus may be provided and/or configured in a variety of arrangements (e.g. to conform to the payload volume and configuration/quantity). As indicated schematically and representationally in FIGURES 20A-20D according to an exemplary embodiment, the set of pod segments may be inflated or filled (selectively) through a set of filler tube/stem U (e.g. filled with a gas or fluid, such as air, nitrogen, inert gas, etc.). See also FIGURES 1A-1F, 5C, 6C, 12E, 18B and 37B-37C. As shown in FIGURE 20B, to configure the containment system (e.g. selectively dependent upon the payload amount) one inflatable/fillable pod segment C is used; as shown in FIGURE 20C two inflatable/fillable pod segments are used; FIGURE 20D each of three inflatable/fillable pod segments C is indicated to be carrying a payload segment. FIGURE 20A indicates the empty inflatable/fillable pod (e.g. with no payload segments and uninflated). Referring to FIGURE 21, an opening (e.g. zipper or zip lock Q or equivalent air-tight seal) is shown schematically and representationally according to an exemplary embodiment; packages may be inserted into each segment of the pod selectively through the opening; upon delivery or destination payload segments may be removed through the opening.

[113] As shown schematically and representationally according to an exemplary embodiment in FIGURE 22A through 22D pod segments may be provided in multiple sizes (e.g. corresponding to various payload segment sizes). Referring to FIGURES 22C and 22D the inflatable pod segments can be configured to be carried by a UAV/craft (e.g. using any

suitable system/method for attachment); as indicated, the pod segments containing a payload segment may be inflated (and pod segments not in use may selectively be inflated or uninflated e.g. through tube/stem U). Compare FIGURES 22C (empty compartment) and 22D (each compartment loaded). See also FIGURES 35B, 36B and 37B-37C. As indicated
5 schematically in FIGURES 20A-20D and 22A-22D, according to an exemplary embodiment the containment system (with pod/carrier) could be provided with any of a number of (and size of) compartments to be used (e.g. filled/inflated as needed selectively) to carry payload on the UAV/craft.

[114] As indicated schematically and representationally in FIGURE 23, according to an
10 exemplary embodiment a variety of forms of pods/carriers may be provided by the containment system with a standard carrier attachment pattern to attach to an aircraft (e.g. regardless of variations in type or form). As indicated schematically and representationally, according to an exemplary embodiment pods/carriers may be provided in different shapes and of different forms and of different aerodynamic configurations/profiles to contain a
15 variety of sizes, types, forms, quantity, etc. of payload items. See for example pod Oi (disk-shaped), pod Oj (box-shaped), pod Ok (foam/pad material) and Ol (aerodynamic form at pod) shown schematically according to an exemplary embodiment in FIGURE 23. See also FIGURES 8A-8B. According to other exemplary embodiments other variations of form, shape, size, etc. of pod/carrier are possible as may be required to contain/carry any of a
20 variety of payload items of different types; according to an exemplary embodiment any suitable type of carrier/attachment arrangement may be used with the containment system providing the carrier/attachment function to the UAV/craft. See FIGURES 35A-35B, 36A-36B, 37A-37C.

[115] As indicated schematically and representationally according to an exemplary
25 embodiment in FIGURES 24A through 24E, the payload L (e.g. payload segments) may fit

within the container or compartment C provided by the pod O of the containment system and be managed/secured for flight with the aircraft UAV on a mission. See also for example FIGURES 8A-8B, 9A-9B and 23. According to an exemplary embodiment, the containment system may provide segments I in the pod to contain/secure payload carried by the UAV/craft. See FIGURES 24C and 24E. According to an exemplary embodiment indicated schematically in FIGURES 24A-24E, the pod segments may be configured to be deployed/inflated/deflated before/after or during flight or a mission. See FIGURES 35A-35B, 36A-36B and 37A-37C.

[116] Referring to FIGURES 25A through 25D, a pod configuration of the containment system attached/attachable to an aircraft (e.g. by a carrier) is shown schematically and representationally according to an exemplary embodiment. As indicated schematically and representationally, the pod may be configured to carry any of a wide variety of payload segments (shown schematically as packages/containers). As shown schematically in FIGURES 25A/B and 25C/D, the pod can be inflated to secure and/or protect the payload and/or for purposes of flight dynamics/aerodynamic performance (e.g. reduce drag-coefficient) of the UAV/craft. As indicated according to an exemplary embodiment schematically in FIGURES 25A/B (inflated/filled when placed on craft) and FIGURES 25C/D (inflated/filled before placed on craft) the pod can be configured before attached to the UAV/craft or during loading after attached to the craft (or during flight). As indicated schematically and representationally in FIGURES 25C-25D, the pod may be detached from the craft so that payload may be transported in the pod in a multi-modal route (e.g. by UAV/air, commercial/air, land/truck, rail, boat, etc.). See also FIGURES 1C-1F, 4C-4D, 5E, 6E, 13C, 14B, 15B, 19D, 20D, 22A, and 23.

[117] According to an exemplary embodiment shown schematically in FIGURES 25E to 25O, the containment system may be configured to provide an inflatable/fillable pod that

comprises payload L (e.g. a payload item or items, see e.g. FIGURE 25E) to be carried by a UAV/craft (see e.g. FIGURE 25O). As indicated schematically according to an exemplary embodiment, the pod O may comprise an inflatable bag or enclosure into which the payload segment L is placed; as indicated, the pod (e.g. unfilled/uninflated) may be

5 secured to or around the payload segment by a band or set of bands BD (e.g. a stretchable, elastomeric, tape, yieldable/tearable material, wrap, bind, etc.) shown as a tape/wrap (see FIGURES 25F and 25M-25N) and as an elastomeric band (see FIGURES 25G). According to an exemplary embodiment, the originator may package the payload in the pod and carry the pod with payload to the transporter in a wrap WR (see FIGURE 25H) or box/container

10 BX (see FIGURE 25I) by ground transport in a compact form/state (e.g. unfilled/uninflated and/or intended to be shielded from damage while in ground transport). As indicated schematically and representationally at and/or by the transporter (e.g. at a flight dispatch center such as an airport for UAV/craft or operations center) the pod O of the containment system can be filled/inflated with fill F (e.g. fluid such as a suitable gas) to take a form to

15 be carried by the UAV/craft. See FIGURES 25K-25L and 25M-25N (inflated to expand/rupture bands BD). According to an exemplary embodiment shown schematically, payload contained with the pod with carrier for attachment to the UAV/craft is prepared for transport by flight (e.g. on a mission for delivery to a destination). See FIGURE 25O. According to an exemplary embodiment, the pod may be configured with payload by an

20 originator. The pod may be configured for the transporter in an uninflated condition. The pod may be secured for transport to the transporter (e.g. in a band, by tape, by a fabric, by an elastomer, etc.). According to an exemplary embodiment, the pod is transported to the transporter in an uninflated condition with payload. The pod may be inflated with the band removed and/or when secured in the band; the band may stretch and/or rupture when the

25 pod is inflated. The band may comprise at least one of (a) tape; (b) tape strips; (c) tape

wrap; (d) fabric segments; (e) tearable material; (f) elastomeric material; (g) stretchable material. See for example FIGURES 25E to 25O. According to an exemplary embodiment, the pod of the containment system may comprise a plastic bag (e.g. an inflatable bag of an elastomeric material). According to an exemplary embodiment in use payload is sealed in
5 the pod; the pod is configured by inflation/deflation. (According to an exemplary embodiment, the pod is configured by at least partial inflation/deflation.) According to an exemplary embodiment, the containment system comprises a plurality of pods for payload attachable to the aircraft.

[118] Referring to FIGURES 26A/B, 27A/B and 28A/B as shown schematically and
10 representationally according to an exemplary embodiment, variations of load-carrying/load-balancing distribution and arrangement of payload segments in a containment system for carrying on UAV/craft may be configured and reconfigured (e.g. based on relative weight/mass, shape, etc. of payload segments). As indicated in FIGURES 26A/B, 27A/B and 28A/B schematically and representationally according to exemplary embodiments of
15 the containment system, single or multiple payload segments of payload L of multiple different shapes and forms may be carried by an aircraft UAV; as indicated schematically according to exemplary embodiments of the containment system, the payload segments of payload L may be arranged or configured in a variety of configurations/arrangements to be carried by the UAV/craft. See also for example FIGURES 1A-1G, 2A-2C, 4A-4D, 5A-5E,
20 6A-6E, 7A-7D, 10A-10B, 11A-11B, 12A-12G, 13A-13C, 14A-14B, 15A-15B, 16A-16E, 17A-17B, 18A-18D, 19A-19D, 20A-20D, 22A-22D, 23, 24A-24D, 25A-25D, 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C, 34A-34C and 37A-37C. As shown schematically and representationally in the FIGURES and according to an exemplary embodiment in FIGURES 28A-28B, the payload L carried by the UAV/craft may vary in profile and shape
25 (and also in mass/density, etc.). As indicated schematically and representationally in the

FIGURES according to an exemplary embodiment, the pod/carrier/body (O/G) of containment system configured to carry payload segments (L) may be provided in a variety of forms and structures to facilitate the safe and efficient carrying of cargo/payload of a variety of types (e.g. size, shape, mass, content, moment of inertia, etc.) for purposes of
5 payload management.

[119] Referring to FIGURES 29A through 34C as shown schematically and representationally according to an exemplary embodiment, a variety of pod O and sling/carrier configurations attachable to an aircraft to carry payload segments may be provided in a variety of forms, sizes and shapes for a variety of payload segments (e.g.
10 packages and containers) and with a variety of associated apparatus and systems. Compare for example FIGURES 28A and 28B.

[120] Referring to FIGURES 29A, 30A, 31A, 32A, 33A and 34A as shown schematically and representationally according to an exemplary embodiment, the pod segments (e.g. shown as segments Op and Oq and Or) of the containment system can be arranged in a wide
15 variety of configurations as needed for a mission/delivery and/or to optimize aerodynamic and/or flight efficiency considerations for the combined aircraft and pod arrangement. As shown schematically and representationally according to an exemplary embodiment, the system may be configured to provide for an inflation/fill system shown as comprising a nozzle J (e.g. inflation interface system) and inflatable/fillable segment arrangement I (e.g.
20 inflatable airbag, balloon, membrane, etc.) that can selectively be inflated and deflated with fill (F) from a source/system. See also FIGURES 37B-37C. As indicated schematically and representationally according to an exemplary embodiment, the inflatable airbag/balloon arrangement provided with the containment system can be used to secure and/or protect the payload carried by the UAV/craft. See for example FIGURES 5B-5C, 6B, 10A-10B, 16A-

16B, 17A-17B, 20A-20D, 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C and 34A-34C. See also FIGURES 35A-35B and 36A-36B.

[121] Referring to FIGURES 29A-29D, the UAV/craft is carrying a containment system for a set of payload segments having a variety of sizes; segment Op is large and segment Oq is intermediate and segment Or is small. As indicated, in flight payload segments Op, Oq, and Or may tend to move and/or shift under dynamic loading and inertia effects. As shown schematically according to an exemplary embodiment in FIGURES 29C and 29D a set of inflatable segments shown as airbags/balloons I provided with the containment system can be selectively inflated at a port shown as nozzle J (with fill (F) from a source/system) to protect/secure and contain/manage each payload segment carried on the UAV/craft during flight. See also FIGURES 35B, 36B and 37A-37C. (According to an exemplary embodiment, the inflatable segments are made of a strong puncture-resistant light weight elastomeric material.)

[122] Referring to FIGURES 30A-30D, the payload is carried in a containment system comprising a body carried below the UAV/craft shown schematically and representationally as a carrier/sling G and potentially subject to dynamic effects (e.g. moving, shifting, swinging, oscillating, etc.) during flight (which effects may cause variations of flight control dynamics or challenges for operation of the UAV/craft during takeoff/landing and flight on a mission). As shown schematically and representationally according to an exemplary embodiment, inflatable segments I are configured to be inflated (see FIGURE 30B) to contain/secure (see FIGURE 30C) and/or secure and protect (see FIGURE 30D) the payload segments L in the pod/body G carried by the UAV/craft. See also FIGURES 35B, 36B and 37A-37C. Referring to FIGURES 31A-31D, an arrangement of the UAV/craft is shown with two pods/slides G; inflatable segments I are configured to inflate (FIGURE 31B) and contain/secure (FIGURE 31C) and/or contain/secure and protect (FIGURE 31D) the

pods/payload segments during flight on the mission (e.g. from originator to delivery destination).

[123] Referring to FIGURES 32A to 32C, as shown schematically and representationally according to an exemplary embodiment, UAV/craft is carrying a containment system comprising payload segments L in a carrier shown as pod/body G; inflatable segments I may be activated (e.g. under control in operation and/or from the UAV/craft) to deploy as may be useful to provide protection for the payload (e.g. dynamic control). See also FIGURES 35B, 36B and 37A-37C. For example as indicated schematically in FIGURES 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C and 34A-34C, the inflatable segments of the containment system may be deployed for carrying certain types/shapes of cargo, at take-off and landing, when certain environmental conditions are encountered (e.g. storms, high winds, etc.), if the UAV/craft is at risk of crash or malfunction, instantaneously upon detection of impact (e.g. deployed using conventional technology such as an automotive airbag is deployed for driver/passenger), etc. operated by a control system with instrumentation (e.g. directed by an operator/transporter). See also FIGURES 35A-35B, 36A-36B and 37A-37B. As shown schematically the inflatable segment is configured to form/fit to contain/maintain and protect the pod/payload segment from impact forces. (As indicated, according to an exemplary embodiment the interior compartment of the pod/body may also be inflated/filled to protect the payload. See for example FIGURES 5C, 6C, 7D, 10B, 11B, 12C, 12E-12F, 13C, 14B, 15B, 24C and 25D.)

[124] Referring to FIGURES 33A to 33C and 34A to 34C, according to an exemplary embodiment of the containment system as shown schematically and representationally, the carrier shown as pod/body G for the containment system may be configured to carry one payload segment (FIGURES 33A-33C) or multiple payload segments (FIGURES 34A-34C) for a mission. According to an exemplary embodiment of the containment system, the

inflatable segment configuration in the pod/body for the containment system may be adjustable to fit and deploy (e.g. selectively) inflatable segments if the appropriate size/inflation and in the appropriate position/spacing (and of the appropriate number) to provide protection for the payload segments as arranged in the pod/body to be carried by the UAV/craft. See FIGURES 33A-33C and 34A-34C. See also FIGURES 35B, 36B and 37A-37C. As shown schematically and representationally in FIGURES 33A to 33C, a single segment of payload for the containment system may be secured to and within the interior of the pod/body by development of an arrangement of multiple inflatable segments (e.g. to maintain/contain/retain the payload segment adjust movement in the pod). As shown schematically and representationally in FIGURES 34A to 34C, a set of payload segments for the containment system may be secured to and within the interior of the pod/body by deployment of an arrangement of multiple inflatable segments (e.g. to retain the payload segments against movement in the pod).

[125] As indicated schematically and representationally according to an exemplary embodiment of the containment system in FIGURES 1A-1G, 2A-2C, 4A-4D, 5A-5E, 6A-6E, 7B-7D, 10A-10B, 11A-11B, 12A-12F, 13A-13C, 14A-14B, 15A-15B, 16A-16E, 17A-17B and 37A-37C the pod (O) and/or pod/carrier (G) of the containment system may be provided (e.g. for payload L) in any of a wide variety of arrangements, configurations and shapes/forms, sizes. See also FIGURES 18A-18D, 19A-19D, 20A-20D, 21, 22A-22D, 23, 24A-24E, 25A-25D, 26A-26B, 27A-27B, 28A-28B, 29A-29D, 31A-31D, 32A-32C, 33A-33C and 34A-34C.

Configuration/Use and Operation of Containment System (Pod/Carrier)

[126] According to an exemplary embodiment shown schematically indicated in FIGURES 35A-35B, 36A-36B and 37A-37B a payload management system (and method)

may be provided for an unmanned aircraft system to carry payload comprising at least one payload segment by a containment system (e.g. with carrier and/or pod) on a mission from an originator by a transporter to a destination in operating conditions. See for example FIGURES 1A-1B, 5A-5E, 6A-6E, 10A-10B, 18A-18D, 32A-32C, 33A-33C and 34A-34C.

- 5 The system may comprise a carrier for payload configured to be carried by the aircraft; according to an exemplary embodiment the system may comprise a containment system configured to contain payload. See for example FIGURES 1A-1F, 12A-12F and 18A-18D. According to an exemplary embodiment, the containment system may comprise an inflatable pod attachable to the aircraft by the carrier; the containment system for payload
- 10 may comprise a fillable/inflatable container at least partially within the carrier and/or external to the aircraft. See for example FIGURES 1A-1F, 5A-5E, 6A-6E, 7A-7D, 12A-12F, 16A-16E and 18A-18D. According to an exemplary embodiment, the carrier with containment system may comprise or create a pod for payload to be carried external to the aircraft. See for example FIGURES 1A-1B, 6A-6F and 18A-18D.
- 15 [127] According to an exemplary embodiment indicated schematically in FIGURES 35A-35B and 36A-36B, the containment system with carrier may be attached to the aircraft. See for example FIGURES 1A-1B, 5A-5E, 6A-6E, 19A-19D and 23. According to an exemplary embodiment, the payload management system may comprise a containment system with any of a variety of types/forms of carrier configured to contain payload. See
- 20 for example FIGURES 1A-1B, 5A-5E, 6A-6E, 18A-18D, 19A-19D, 22A-22D, 25A-25D and 33A-33C. The containment system may comprise a protection system configured to protect payload. See for example FIGURES 5A-5E, 6A-6E, 18A-18D, 19A-19D, 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C and 34A-34C.

[128] According to an exemplary embodiment shown schematically payload may comprise cargo; payload may comprise a payload unit or payload units. See for example FIGURES 26A-26B.

[129] According to an exemplary embodiment shown schematically, the pod may
5 comprise an external pod to the aircraft (see FIGURES 1A-1G, 4A-4D, 5A-5E, 6A-6E and 23) (or at least partially contained in the aircraft) (see FIGURES 10A-10B and 11A-11B). According to an exemplary embodiment shown schematically, the aircraft may provide a mounting structure and the pod may be coupled to the mounting structure. See FIGURE 23. According to an exemplary embodiment shown schematically, the pod/carrier may
10 comprise a frame and may provide a base and a cover or other formed structure. See for example FIGURES 16A-16E, 18A-18D and 19A-19D. According to an exemplary embodiment shown schematically, the carrier may comprise a pod providing a compartment. See for example FIGURES 1A-1E, 14A-14B, 15A-15B, 16A-16E, 20A-20D and 22A-22D. The pod/carrier may be formed with a compartment for payload (e.g. with a
15 payload unit). See FIGURES 6A-6E, 14A-14B, 16A-16E, 18A-18D and 20A-20D.

[130] According to an exemplary embodiment the carrier and/or containment system may be provided in an at least partially inflatable form to create a pod for payload to be carried by the aircraft. See FIGURES 1A-1F, 5A-5E, 7A-7D, 10A-10B, 11A-11B, 14A-14B, 16A-16E, 20A-20D, 22A-22D, 25A-25D and 33A-33C.

[131] According to an exemplary embodiment shown schematically, the container (e.g.
20 fillable/inflatable pod) may be inflated with a fluid (e.g. a fill/material comprising a liquid and/or gas from a source/system). See FIGURES 5A-5E and 6A-6E. See also FIGURES 10A-10B, 11A-11B, 12E, 18B, 35B, 36B and 37B-37C. According to an exemplary embodiment shown schematically, the containment system/pod may be fully inflatable. See
25 for example FIGURES 1A-1F. The form of the carrier may comprise an aerodynamic pod

and/or an inflatable pod. See for example FIGURES 1A-1F, 4A-4D, 14A-14B and 15A-15D.

[132] According to an exemplary embodiment shown schematically, the containment system may comprise containment of payload by using at least one of (a) foam elements; (b) fluid/foam-fill; (c) a fluid introduced adjacent to payload; (d) inflation with gas adjacent to payload; (e) inflatable segments. See for example FIGURES 4A-4D, 5A-5E, 6A-6E, 12E-12F, 18B-18D, 24A-24E, 25A-25D, 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C, 34A-34C. See also FIGURES 35A-35B, 36A-36B and 37A-37C.

[133] According to an exemplary embodiment shown schematically, the pod may comprise a plurality of inflatable sections or segments. See FIGURES 20A-20D and 22A-22D. According to an exemplary embodiment shown schematically, the pod may be inflated to form an inflatable pod by the originator or by the transporter before attachment to the aircraft. See FIGURES 1A-1F, 25A-25D, 35A-35B and 36A-36B. According to an exemplary embodiment the inflatable pod may be created after the pod/carrier is attached to the aircraft. According to an exemplary embodiment the pod may be inflatable during the mission and may be inflated during the mission and deflated at the destination. See FIGURES 1A-1E and 37B-37C. According to an exemplary embodiment the pod may be inflatable and deflatable in flight. See FIGURES 24A-24C and 25A-25B. See also FIGURES 30C-30D, 32B-32C, 33A-33C and 34A-34C.

[134] According to an exemplary embodiment the method of using/deploying the container/containment system (e.g. carrier with pod) may comprise the step of filling/inflating the container with a fluid such as gas and/or with a liquid (e.g. foam or fill from a source/system). See FIGURES 5A-5E and 6A-6E. See also FIGURES 35A-35B, 36A-36B and 37A-37C. According to an exemplary embodiment the fluid may comprise a gas; the pod/container may comprise a gas-inflated container. See FIGURES 1A-1F, 5A-

5E, 7A-7D and 10A-10B, 11A-11B, 14A-14B, 16A-16E, 20A-20E, 22A-22D and 25A-25B.

See also FIGURE 37B. The gas may comprise at least one of air from ambient atmosphere, air, inert gas, nitrogen, helium, etc. According to an exemplary embodiment the fluid (e.g. material) may be a foam provided to contain payload; the container may be a fluid/foam-filled container; the fluid may be a foam fill. See FIGURES 12E and 18B. According to an exemplary embodiment shown schematically, the method may also comprise the step of filling at least one segment of the containment system with a fluid (e.g. gas, liquid/foam). See FIGURES 35B and 36B.

[135] According to an exemplary embodiment the carrier with containment system (e.g. pod) may comprise a foam pod or a formed pod. See FIGURES 1A-1F and 4A-4D. According to an exemplary embodiment the pod may be formed by injection of a material (e.g. formed by injection of a foam). See FIGURES 5A-5E and 6A-6E. According to an exemplary embodiment the liquid may comprise a material configured to form a foam, such as urethane, a packing foam, a gel material. See FIGURES 12E and 18B. According to an exemplary embodiment the inflatable pod may be inflated with a foam that may comprise a liquid foam configured to cure into a solid form comprising a formed structure. See FIGURES 12F and 18D. The foam/material may form the formed structure (e.g. foam provided in an aerodynamic shape). See FIGURE 23. See for example FIGURES 4A-4D, 6A-6E, 12E-12F, 18A-18D and 23. According to an exemplary embodiment shown schematically, the foam/material at least partially encompasses each item of payload in the compartment. See FIGURES 4A-4D, 6C-6E, 12E-12F, 18A-18D and 23.

[136] According to an exemplary embodiment the fill/fluid (e.g. material filled) may be impact absorbing and/or fire retardant and/or rigid and/or semi-rigid; the fluid may solidify into a protective form or structure. See FIGURES 4A-4D, 6C-6E, 12E-12F, 18D and 23.

[137] According to an exemplary embodiment of the containment system, the pod may be inflated after items of payload are in the pod; for example may be inflated to a first inflated state before flight, inflated to a second inflated state during flight, in a third state (e.g. deflated) after the mission is completed. See FIGURES 1C, 1D and 1E. See also FIGURES 5 25A and 25B.

[138] According to an exemplary embodiment shown schematically, the pod may comprise a first drag coefficient in the first inflated state and a second drag coefficient in the second inflated state. See for example FIGURES 1B-1E, 6C-6D, 7C-7D, 19A-19B and 25A-25D.

10 [139] According to an exemplary embodiment shown schematically, the pod may be configured in a first size comprising a first volume in the first inflated state and a second size comprising a second volume in the second inflated state (e.g. the first size of the pod in the first inflated state is smaller than the second size of the pod in the second inflated state). See for example FIGURES 1D-1E, 20A-20D, 22A-22D and 25A-25B. See also FIGURES 15 35A-35B and 36A-36B.

[140] According to an exemplary embodiment a pod of the containment system may be dynamically adjusted in shape during the mission by inflation of the pod (see for example FIGURES 25A-25B) or by inflation of segments of the pod. (see for example FIGURES 20A-20D and 22A-22D). See also FIGURES 35A-35B, 36A-36B and 37A-37C. According 20 to an exemplary embodiment the pod may comprise a set of inflatable segments. See FIGURES 1C-1F and 22A-22D.

[141] According to an exemplary embodiment indicated schematically, inflating/filling of the pod with fill material/fluid may be controlled by a separate system, on the pod, by the aircraft (with fill from a source/system). See FIGURES 37A-37C.

[142] According to an exemplary embodiment shown schematically, the pod provides aerodynamic characteristics; aerodynamic characteristics of the pod can be adjusted by selective inflation and deflation of the pod. See FIGURES 1C-1F, 12B, 20A-20D, 22A-22D and 25A-25B. According to an exemplary embodiment shown schematically, the inflatable pod may comprise a shape configured to reduce aerodynamic drag. See FIGURES 1E, 1H, 4A, 4C-4D, 23 and 25A-25D. For example, the drag coefficient of the pod can be adjusted before the mission or during the mission (e.g. drag coefficient of the pod can be adjusted by selective inflation and deflation of the pod). See FIGURES 1D-1E and 25A-25B. The pod may comprise a shell or the pod may comprise a surface (which may comprise ripples providing enhanced aerodynamic performance). See FIGURE 1G.

[143] A method of managing payload may be provided for an unmanned aircraft system providing an aircraft to carry payload comprising at least one payload segment (e.g. associated with the UAV/craft to be loaded, carried, contained, managed, etc.) on a mission from an originator (e.g. source providing payload for delivery) by a transporter (e.g. operation of the UAV/craft carrying payload) to a destination (e.g. recipient of payload at a location) in operating conditions. See FIGURES 35A-35B and 36A-36B. The method may comprise the steps of (a) providing payload in a pod/carrier configured to be carried by the aircraft; (b) providing a containment system for payload; and (c) configuring the containment system by inflation and/or filling. See FIGURES 5A-5E, 6A-6E, 35A-35B and 36A-36B. The step of configuring the containment system may be performed before the mission and/or during the mission. See FIGURES 25A-25D, 33A-33C, 34A-34C, 35A-35B and 36A-36B.

[144] The method may comprise the steps of (a) providing a pod comprising at least one inflatable segment to contain payload; (b) placing payload in the pod; (c) associating the pod with the aircraft so that the payload can be carried by the aircraft on the mission; (d) at

least partially inflating at least one inflatable segment of the pod. See for example FIGURES 5A-5E and 6A-6E. The step of at least partially inflating at least one inflatable segment of the pod may be performed before flight and/or during flight. The step of at least partially inflating at least one inflatable segment of the pod may be performed to adjust the aerodynamic profile of the pod. See for example FIGURES 1A-1E and 25A-25D. The method may further comprise the step of deflating the pod. The step of deflating the pod may be performed during flight and/or after flight (e.g. during and/or after the mission).

[145] According to an exemplary embodiment, the step of providing the pod (e.g. to have associated payload to be managed) may be performed by the originator and/or by the transporter; the step of placing payload in the pod may be performed by the originator and/or by the transporter. According to an exemplary embodiment, the containment system may be configured (e.g. by the originator) prior to providing payload to the transporter for the mission and/or configured by the transporter prior to the mission. According to an exemplary embodiment, payload contained by the containment system is associated with the UAV/craft; the pod of the containment system associated with the UAV/craft is configured to carry payload for flight on the mission of the UAV/craft.

[146] According to an exemplary embodiment shown schematically, the originator may comprise the carrier; the originator may comprise a customer of the transporter. The customer may comprise the destination. According to an exemplary embodiment, the originator may comprise the transporter. According to an exemplary embodiment, the transporter may comprise an operator at the aircraft; the transporter may comprise ground crew for the aircraft. According to an exemplary embodiment, the containment system may be configured by the transporter after receipt of payload from the originator and/or deployed by the transporter prior to the mission.

[147] According to an exemplary embodiment shown schematically, the customer may comprise the destination of the mission. (According to an exemplary embodiment shown schematically, the step of providing payload in the container may be performed by an originator/customer and/or the step of receiving payload carried in the container may be performed by a customer/delivery site.)

[148] According to an exemplary embodiment, the containment system may comprise the system and/or a structure for the containment system. See for example FIGURES 5A-5E, 6A-6E, 16A-16B, 18A-18D and 19A-19D. The carrier may comprise at least one container and payload may be provided in a container of the carrier. See FIGURES 12B-12D, 13B-13C, 15A-15B, 19C-19D, 22A-22D, 24A-24E, 25A-25D and 32A-32C. A method step of providing payload in the container may comprise at least one of the steps of: (a) loading cargo in the container; (b) attaching cargo in the container; (c) positioning cargo in the container. See FIGURES 10A-10B, 11A-11B, 12A-12F, 13A-13C, 18A-18D, 33A-33C, 34A-34C, 35A-35B and 36A-36B. The method may also comprise the step of configuring payload for the mission. According to an exemplary embodiment, a method step of configuring payload for the mission may comprise at least one of: (a) securing payload in the carrier; (b) deploying the containment system for payload. See FIGURES 35A-35B.

[149] According to an exemplary embodiment shown schematically, the containment system for payload may be partially or completely maintained within the carrier for payload. See FIGURES 14A-14B and 15A-15B.

[150] Payload may comprise items of cargo (e.g. one or multiple items) to be transported on the mission (e.g. of one or multiple destinations and delivery points). According to an exemplary embodiment shown schematically, payload and/or items of cargo may comprise at least one segment. See for example FIGURES 14A-14B, 15A-15B, 16A-16E, 29A-29D, 30A-30D and 31A-31D.

- [151] According to an exemplary embodiment, the containment system may be deployed for at least one event (e.g. an event during the mission). According to an exemplary embodiment, the mission may comprise at least one event such as (a) takeoff of the aircraft; (b) flight of the aircraft on the mission; (c) landing of the aircraft during the mission; (d) landing of the aircraft at the end of the mission; (e) an identified condition during flight; (f) a hazard during flight; (g) a potential malfunction of the aircraft during flight; (h) an impact by payload; (i) an impact by the aircraft. The identified condition may comprise an environmental condition during the mission that is identified as a potential hazard to the aircraft. The identified condition may comprise at least one of (a) a forecast weather condition on the route of the aircraft for the mission; (b) an actual weather condition potentially affecting the mission. The identified condition may comprise an operating condition that is identified as a potential hazard to the aircraft, for example, at least one of (a) potential malfunction of a system of the aircraft; (b) a reduction of the airworthiness of the aircraft; (c) a malfunction of a system of the aircraft.
- [152] According to an exemplary embodiment, payload may comprise at least one payload segment and the containment system may be configured to provide containment of payload during at least one of (a) impact of the aircraft with an object; (b) effect of environmental conditions in flight; (c) effect of operating conditions in flight; (d) contact between a payload segment with another object; (e) heat; (f) fire; (g) exposure to environmental conditions. An environmental condition may comprise a weather condition. Operating conditions for a mission comprise at least one of: (a) environmental conditions; (b) loading of the carrier; (c) route of the mission; (d) flight speed for the mission. Containment of payload may comprise at least one of containment during: (a) operating conditions; (b) vibration; (c) oscillation; (d) environmental effects; (e) fire; (f) impact.

[153] According to an exemplary embodiment, the method may also comprise the step of configuring the aircraft with carrier for transit on the mission. The method may also comprise the step of configuring the aircraft with the carrier to reduce aerodynamic drag in flight. The method may also comprise the step of initiating the mission; the step of configuring payload for the mission may be performed before initiating the mission; the step of configuring payload for the mission may be performed after initiating the mission. The method may also comprise the step of performing the mission. The step of configuring (e.g. loading, filling, inflating, etc.) the container/carrier (e.g. pod) may be performed by a customer of the transporter (e.g. by an originator). The step of unloading (e.g. emptying, deflating, compacting the container/carrier (e.g. pod) may be performed at a destination upon completion or termination of the mission by the transporter; the step of unloading can be performed by a customer of the transporter. According to an exemplary embodiment, the container/pod may be deflated and/or reduced after the mission (see FIGURES 1A-1F) and transported back to a site where the pod/container and packing materials (if any) may be reused. See FIGURE 36B.

[154] According to an exemplary embodiment shown schematically, the method may also comprise the step of associating the carrier with the aircraft by attachment to the aircraft. The method may also comprise the step of associating the carrier with the aircraft by insertion of payload into the base of the aircraft. According to an exemplary embodiment shown schematically, the base may comprise a hull of the aircraft. See for example FIGURES 10A-10B and 11A-11B.

[155] According to an exemplary embodiment shown schematically, the aircraft may comprise a hull. See FIGURES 10A-10B and 11A-11B. The hull may comprise a concave volume and the fill of the container provides a volume securing the container to the aircraft

at the concave volume. See FIGURES 10A-10B and 11A-11B. According to an exemplary embodiment shown schematically, the hull may comprise a knob and/or a rail.

[156] According to an exemplary embodiment shown schematically, the form (e.g. shape/size) of the pod/container of the containment system may conform to payload shape and/or to payload size and/or to payload form. See FIGURES 3A-3B, 4A-4B and 17A-17B. The form may be configured stabilize payload in flight. See for example FIGURES 24A-24E and 25A-25D. According to an exemplary embodiment shown schematically, the step of associating the container with the aircraft may comprise creation of an aerodynamically configured combination of the carrier and the aircraft. See FIGURES 1B, 1E, 2A-2F, 5B-10 5D, 6B-6D, 7B-7D, 12A, 24A, 25A-25B and 32A-32C. According to an exemplary embodiment shown schematically, the carrier may comprise an aerodynamic body or form. See FIGURES 1G, 4C-4D, 12C, 16D-16E and 23.

[157] According to an exemplary embodiment shown schematically, the carrier may comprise a wing and/or set of wings. See FIGURES 2A-2F. According to an exemplary embodiment shown schematically, the wings may be adjustable. See FIGURES 2C-2F. According to an exemplary embodiment the aircraft may be configured to adjust the position of the wings of the container. According to an exemplary embodiment shown schematically, the wings are retractable and/or otherwise adjustable in flight. See FIGURES 2A-2F.

[158] According to an exemplary embodiment shown schematically, the pod encompasses payload (e.g. some or the entire payload) and/or encloses payload (e.g. some of the entire payload). See FIGURES 1C-1D. According to an exemplary embodiment shown schematically, the container may comprise a pod configured to at least one of (a) reduce aerodynamic drag when carried in flight by the aircraft; (b) shield contents of the container from weather exposure; (c) contain the contents (e.g. payload, payload/cargo items, etc.) of 25

the container during effects of impact. See for example FIGURE 23. According to an exemplary embodiment, the pod or container may be fillable/inflatable (e.g. with fill material supply (F) from a source) by an external system and/or by an integrated system with the aircraft (e.g. using a conventional inflation/filling system). See FIGURES 37B
5 (external) and 37C (internal). See also FIGURES 5C, 6C, 12E and 18B.

[159] According to an exemplary embodiment shown schematically, the container may comprise a plurality of separate segments and/or a plurality of compartments. See FIGURES 20A-20D and 22A-22D. Each compartment may be configured for a type of payload item, to match a size of payload item, to match a shape of payload item. According
10 to an exemplary embodiment shown schematically, each compartment may be configured to be separately loaded with payload and/or to be separately filled. See FIGURES 20A-20D and 22A-22D. The UAV/craft and/or the operator may provide a control system to inflate/deflate the pod/container. See FIGURE 37A-37B.

[160] According to an exemplary embodiment shown schematically, the compartment of
15 the container and/or pod may comprise a nose compartment and/or a base compartment and/or a tail compartment. See FIGURES 12A-12F and 13A-13C. According to an exemplary embodiment shown schematically, the pod may be inflatable at each compartment provided by the container. See FIGURES 1C-1F, 20A-20D and 22A-22D. See also FIGURES 35A-35B, 36A-36B and 37A-37C.

20 [161] According to an exemplary embodiment shown schematically, the container may be configured to reduce drag coefficient (e.g. provided a surface treatment/features and/or otherwise streamlined form). See FIGURES 1G, 4C-4D and 16E.

[162] According to an exemplary embodiment the container may be pre-loaded and attached to the aircraft. According to an exemplary embodiment the pod may be configured
25 by the operator. According to an exemplary embodiment the pod may be configured to

modify aerodynamic forces on the aircraft for flight during or before the mission. See FIGURES 2A-2F and 25A-25B.

[163] According to an exemplary embodiment the pod may be configured to generate lift for the aircraft (e.g. with a flight control surface and/or inflated with a lighter-than-air gas).

5 See FIGURE 2A-2D and 25A-25D. According to an exemplary embodiment, the pod may comprise a treated surface; the surface may be rippled to reduce aerodynamic drag forces; the treated surface may be configured to reduce drag forces at a transit speed. See for example FIGURES 1F and 4C-4D.

[164] According to an exemplary embodiment of the containment system the pod carried
10 by the aircraft attaches directly to the aircraft. As shown schematically, the aircraft provides attachment points for connecting to the pod; the pod provides attachment points for connecting to the aircraft. See FIGURES 1A, 1E, 8A-8B, 9A-9B, 10A-10B, 11A-11B, 23 and 37A-37C. FIGURE 37C is a schematic block diagram of an unmanned aircraft with fill/inflation system for interface with the payload management system according to an
15 exemplary embodiment.

[165] According to an exemplary embodiment as indicated schematically and representationally in FIGURES 5A-5D, 6A-6D and 37A-37C, the base (B) of the UAV/craft and/or the pod/carrier (O/G) of the containment system may be provided with an interface configured for the payload management system (e.g. to provide control/instrumentation,
20 etc.). See also FIGURES 35A-35B and 36A-36B. According to an exemplary embodiment as indicated schematically and representationally in FIGURES 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C, 34A-34C and 37A-37C, an interface system S of the payload management system may be provided at the interface of the UAV/craft and the containment system. See also FIGURES 35A-35B and 36A-36B. As indicated, the interface system
25 may be included with the UAV/craft (e.g. base) and/or with the containment system (e.g.

carrier/pod) and/or as a separate system/interface between the UAV/craft and the containment system to provide the functionality of the payload management system and method indicated in the FIGURES. See FIGURES 35A-35B, 36A-36B and 37A-37C. The interface system is shown integrated with UAV/craft and/or containment system in
5 FIGURES 1A-1B, 5A-5D and 6A-6D to provide a physical/functional interface (separate or shared/distributed); the interface system S is shown between UAV/craft to provide the containment system for payload in FIGURES 29A-29D, 30A-30D, 31A-31D, 32A-32C, 33A-33C and 34A-34C. According to an exemplary embodiment, the interface/system for the payload management system indicated in FIGURES 37A-37C may be implemented in
10 any suitable arrangement between the UAV/craft and the containment system.

[166] According to an exemplary embodiment, the aircraft and/or containment system may provide a control system and instrumentation to monitor the containment system/pod during the mission. See FIGURES 37A-37C. The control system may be configured to activate the containment system/pod (e.g. to inflate/deflate by associated mechanisms/systems and
15 otherwise to operate and configure the pod). The instrumentation system (as indicated schematically in FIGURES 37A-37C) may provide monitoring and communications for the containment system (e.g. including between the UAV/craft and the pod and with other data sources including the internet); instrumentation may include data acquisition/recording devices/systems such as status indicator, fault monitoring, impact sensors, accelerometers,
20 speedometers, altitude measurement, audio recording, video camera, weather/barometric measurement, wireless network access/data interchange, etc. According to an exemplary embodiment, the instrumentation and associated devices/systems will be integrated with other UAV/craft systems; the control system may be (wholly or partially) associated with the containment system/pod or connected (e.g. by data link) to the UAV/craft systems.
25 According to an exemplary embodiment, information (from instrumentation and other data

sources) is used by the system to determine configuration of the payload management system to contain/carry payload (e.g. including pre-mission and/or in-mission fill deployment of the pod/containment system). See FIGURES 25A-25D, 33A-33C, 34A-34C, 35A-35B, 36A-36B and 37A-37C.

5 [167] According to an exemplary embodiment as indicated schematically in FIGURES 37A-37C, the pod of the containment system may comprise indicia to provide information/data (e.g. to the UAV/craft, to data sources, over a network (such as the internet), to data storage, for a detector, for a control system, etc.). According to an exemplary embodiment, the pod of the containment system may be configured to provide
10 indicia; the indicia may be a marking on the pod (e.g. visually perceptible, marking, registration/identifier, marking identifier, human-readable indicator); the indicia may be machine-readable (e.g. a device, transmitter, tag, RFID tag, etc.). The indicia may comprise an identifier/identification, profile, registration, license, access code, other information, etc. as data. Data may be communicated and/or transmitted on a network (e.g. LAN local area
15 network, virtual private network, public network, internet, etc.). According to an exemplary embodiment, the indicia may comprise data as to pod configuration or status; data may indicate aerodynamic performance of the pod (e.g. lift, drag, aero-moment coefficients, area-coefficient products, forces/torques at a reference speed. etc.). Indicia (indicated schematically as identifier/marking ID) may comprise visually perceptible information (e.g.
20 a marking that is visible to a detector/machine, human, etc.); indicia may comprise machine-readable data or information (e.g. data transmission, RFID tag, etc.). See FIGURES 25O and 37A-37C. Indicia may comprise a data profile/identifier of the pod, ownership/operator information, configuration shape/form data, aerodynamic characteristics or form, etc.; indicia stored and/or transmitter or communicated as data may vary as the pod is
25 configured/reconfigured or otherwise in use. See FIGURES 35B and 36B.

[168] According to an exemplary embodiment, a method of payload management for an unmanned aircraft system to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions may comprise the steps of providing payload in a carrier configured to be carried by the aircraft; and providing a containment system for payload. See FIGURES 35A-35B and 36A-36B.

[169] According to an exemplary embodiment, the method may comprise the steps of providing a pod comprising at least one inflatable segment to contain payload; placing payload in the pod; associating the pod with the aircraft so that the payload can be carried by the aircraft on the mission; at least partially inflating at least one inflatable segment of the pod. See FIGURES 35A-35B and 36A-36B.

[170] According to an exemplary embodiment the pod may be loaded with payload (see e.g. FIGURES 25E-25H) and prepared/packaged (see e.g. FIGURES 25I-25J) and configured (filled/inflated) (see e.g. FIGURES 25K-25N) by an originator or intermediary or transporter (see FIGURE 25O). See also FIGURES 35A-35B and 36A-36B. According to an exemplary embodiment as shown in FIGURES 35A-35B and 36A-36B, the containment system with payload in/on the pod may be configured by or before presentation to the transporter that plans and initiates/operates the UAV/craft and carries/manages the pod in flight on a mission (e.g. to deliver payload to a destination). The pod may be configured by the originator as indicated in FIGURE 36A. See also FIGURES 25C to 25J. The pod may be configured by the transporter. See FIGURES 25A-25B. See also FIGURES 36B and 37B. According to an exemplary embodiment the pod may be reconditioned (e.g. emptied and deflated/unfilled) and recycled/reused in the operation of the payload management system. See FIGURE 36B.

[171] According to an exemplary embodiment, the containment system for payload may comprise a fillable/inflatable container providing a pod (e.g. cargo pod) at least partially

within providing payload in a carrier configured to be carried by the aircraft (e.g. exterior to the aircraft). See FIGURES 37A-37C. The method may comprise configuring the containment system by inflation before and/or during the mission; according to an exemplary embodiment, the method may also comprise the step of inflating at least one
5 segment of the containment system with a fluid (e.g. a gas or liquid) to contain payload segments in the pod. See FIGURES 35A-35B and 36A-36B.

Example Systems and UAV/Craft

[172] Example systems and technology that may be employed in the system and
10 UAV/craft according to an exemplary embodiment are indicated and shown representationally and schematically. As indicated any of a wide variety of suitable/other systems may be adapted/used in exemplary embodiments of the system, including the systems specifically shown and indicated and other known/present systems and/or commercially-available systems.

15 [173] According to any exemplary embodiment, the system indicated for example schematically in FIGURES 37A-37C could be used to implement the functions and features indicated in other FIGURES; as indicated, according to the various/other exemplary and alternative embodiments, any of a wide variety of other known and/or suitable systems (e.g. with associated payload systems, pods/containers, fill/inflation systems, attachment/carrier
20 interfaces, instrumentation/control, communications, etc.) may be used to implement the functionality of the system.

Incorporation of Present Technology/Systems

[174] The system and method according to exemplary and alternative embodiments may
25 be configured to integrate or operate with present known (and/or future) systems and

technology, for example, systems and technology (incorporated by reference) as disclosed in patent documents. Systems of a type/function known (and improvised upon by technology of the present application) are disclosed in U.S. Patent Application Publication No. 2010/0012769 A1 titled “Aerodynamic Integration of a Payload Container with a Vertical Take-Off and Landing Aircraft”; U.S. Patent Application Publication No. 2011/0084162 A1 titled “Autonomous Payload Parsing Management System and Structure for an Unmanned Aerial Vehicle”; U.S. Patent No. 5,730,564 titled “Cargo Load Supporting Air Bag having Inflation Indicated Means and Method of Determining Proper Inflation for Spaced Loads”; U.S. Patent No. 7,299,925 B1 titled “Flexible Payload Module with Inflatable Grippers” and U.S. Patent No. 7,059,566 B2 titled “Unmanned Aerial Vehicle for Logistical Delivery”.

Related Applications (Incorporation by Reference)

[175] The following commonly-owned (at present) U.S. patent applications are listed and incorporated by reference in the present application: (a) United States Patent Application No. 14/501,302, titled SYSTEM AND METHOD FOR ADMINISTRATION AND MANAGEMENT OF AN AIRSPACE FOR UNMANNED AIRCRAFT, naming R. Hyde et al. as inventors, filed September 30, 2014 (Docket No. 0712-035-002) is related to and incorporated by reference in the present application; (b) United States Patent Application No. 14/501,343, titled UNMANNED AIRCRAFT CONFIGURED FOR OPERATION IN A MANAGED AIRSPACE OF FLYWAY, naming R. Hyde et al. as inventors, filed September 30, 2014 (Docket No. 0712-035-003) is related to and incorporated by reference in the present application; (c) United States Patent Application No. 14/501,365, titled SYSTEM AND METHOD FOR OPERATION OF UNMANNED AIRCRAFT WITHIN A MANAGED AIRSPACE OR FLYWAY, naming R. Hyde et al. as inventors, filed

September 30, 2014 (Docket No. 0712-035-004) is related to and incorporated by reference in the present application; (d) United States Patent Application No. 14/546,487, titled SYSTEM AND METHOD FOR ADMINISTRATION AND MANAGEMENT OF AN AIRSPACE FOR UNMANNED AIRCRAFT, naming R. Hyde et al. as inventors, filed
5 November 18, 2014 (Docket No. 0712-035-002-C00001) is related to and incorporated by reference in the present application.

* * *

[176] It is important to note that the construction and arrangement of the elements of the
10 inventions as described in system and method and as shown in the figures above is illustrative only. Although some embodiments of the present inventions have been described in detail in this disclosure, those skilled in the art who review this disclosure will readily appreciate that many modifications are possible without materially departing from the novel teachings and advantages of the subject matter recited. Accordingly, all such
15 modifications are intended to be included within the scope of the present inventions. Other substitutions, modifications, changes and omissions may be made in the design, variations in the arrangement or sequence of process/method steps, operating conditions and arrangement of the preferred and other exemplary embodiments without departing from the spirit of the present inventions.

20 [177] It is important to note that the system and method of the present inventions can comprise conventional technology (e.g. aircraft design, construction, components, mechanisms, frames/systems, containers, materials, energy/power systems, monitoring/sensors, control systems, computing systems, telecommunication systems, networking technology, data storage, data transmission, data/file structures/formats,
25 systems/software, application programs, mobile device technology, etc.) or any other

applicable technology (present or future) that has the capability to perform the functions and processes/operations indicated in the FIGURES. All such technology is considered to be within the scope of the present inventions.

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* * *

[178] In the detailed description, reference is made to the accompanying drawings, which form a part hereof. In the drawings, similar symbols typically identify similar components, unless context dictates otherwise. The illustrative embodiments described in the detailed description, drawings, and claims are not meant to be limiting. Other embodiments may be
10 utilized, and other changes may be made, without departing from the spirit or scope of the subject matter presented here.

[179] Aspects of the subject matter described herein are set out in the following numbered clauses:

1. A payload management system for an unmanned aircraft system providing
15 an aircraft to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions comprising:

(a) a carrier for payload configured to be carried by the aircraft;

(b) a containment system configured to contain payload;

wherein the containment system comprises an inflatable pod attachable to the
20 carrier;

wherein the pod of the containment system is attached to the exterior of the aircraft.

2. The system of Clause 1 wherein the containment system for payload is attachable to the aircraft by the carrier so that payload contained in the pod of the
25 containment system can be carried by the aircraft.

3. The system of Clause 1 wherein payload comprises cargo to be transported on the mission.

4. The system of Clause 1 wherein cargo comprises at least one segment.

5. The system of Clause 1 wherein payload comprises one payload segment.

6. The system of Clause 1 wherein the containment system is configurable by the originator prior to providing payload to the transporter for the mission.
7. The system of Clause 1 wherein the containment system is configurable by the transporter prior to the mission.
- 5 8. The system of Clause 1 wherein the containment system is configurable by the transporter after receipt of payload from the originator.
9. The system of Clause 1 wherein the containment system is deployable by the transporter prior to the mission.
- 10 10. The system of Clause 1 wherein the containment system is deployable for at least one event.
11. The system of Clause 1 further comprising a control system configured to deploy the containment system.
12. The system of Clause 11 wherein the control system is associated with the aircraft.
- 15 13. The system of Clause 11 wherein the control system is operated by the transporter.
14. The system of Clause 1 wherein the mission comprises at least one event comprising at least one of (a) takeoff of the aircraft for the mission; (b) flight of the aircraft on the mission; (c) landing of the aircraft during the mission; (d) landing of the aircraft at the end of the mission; (e) an identified condition during flight; (f) a hazard during flight; (g) a potential malfunction of the aircraft during flight; (h) an impact by payload; (i) an impact by the aircraft.
- 20 15. The system of Clause 1 further comprising instrumentation to detect an event for the containment system.
- 25 16. The system of Clause 1 wherein instrumentation is associated with the aircraft.
17. The system of Clause 1 wherein instrumentation is associated with the pod.
18. The system of Clause 14 wherein the identified condition comprises an environmental condition during the mission that is identified as a potential hazard to the aircraft.
- 30 19. The system of Clause 18 wherein the environmental condition comprises a weather condition.

20. The system of Clause 18 wherein the identified condition comprises at least one of (a) a forecast weather condition on the route of the aircraft for the mission; (b) an actual weather condition potentially affecting the mission.

5 21. The system of Clause 14 wherein the identified condition comprises an operating condition that is identified as a potential hazard to the aircraft.

22. The system of Clause 21 wherein the identified condition comprises at least one of (a) potential malfunction of a system of the aircraft; (b) a reduction of the airworthiness of the aircraft; (c) a malfunction of a system of the aircraft.

10 23. The system of Clause 1 wherein payload comprises at least one payload segment and the containment system is configured to provide containment of payload during at least one of (a) impact of the aircraft with an object; (b) effect of environmental conditions in flight; (c) effect of operating conditions in flight; (d) contact between a payload segment with another object; (e) heat; (f) fire; (g) exposure to environmental conditions.

15 24. The system of Clause 23 wherein operating conditions comprise (a) environmental conditions; (b) flight conditions; (c) aircraft conditions; (d) payload conditions.

25. The system of Clause 1 wherein the carrier comprises attachment of the containment system to the aircraft.

20 26. The system of Clause 1 wherein the carrier comprises a structure providing attachment for the containment system.

27. The system of Clause 1 wherein the aircraft comprises the containment system when attached to the carrier.

25 28. The system of Clause 1 wherein the carrier comprises a container into which the pod of the containment system is formed.

29. The system of Clause 1 wherein the containment system is configured to be deployed within the carrier.

30. The system of Clause 1 wherein the containment system is at least partially removable from the carrier.

30 31. The system of Clause 1 wherein the carrier with containment system comprises at least one of (a) a pod; (b) a container; (c) a base; (d) an enclosure; (e) a shell; (f) a hanger; (g) a tray; (h) a sling; (i) an enclosed container; (j) a multi-modal container; (k) an inflatable container; (l) a plurality of carriers.

32. The system of Clause 1 wherein the carrier comprises at least one compartment.
33. The system of Clause 1 wherein the pod comprises a multi-compartment container.
- 5 34. The system of Clause 1 wherein the pod of the containment system comprises an inflatable segment.
35. The system of Clause 1 wherein the containment system comprises at least one inflatable segment.
36. The system of Clause 1 wherein deployment of the containment system
10 comprises inflation of an inflatable segment in a compartment of the carrier.
37. The system of Clause 1 wherein deployment of the containment system comprises fill of a fluid into a compartment of the carrier.
38. The system of Clause 37 wherein the compartment contains a payload segment of payload.
- 15 39. The system of Clause 1 wherein the containment system comprises the pod providing a compartment for fill to contain a payload segment and the carrier comprises a compartment for the pod with the payload segment.
40. The system of Clause 39 wherein the compartment for fill comprises a compartment for the payload segment.
- 20 41. The system of Clause 39 wherein the compartment for fill is adjacent the payload segment.
42. The system of Clause 40 wherein the compartment for fill is adjacent a compartment for the payload segment.
43. The system of Clause 39 wherein fill for the compartment of the
25 containment system comprises inflation with a fluid.
44. The system of Clause 43 wherein the fluid comprises a gas.
45. The system of Clause 44 wherein the gas comprises air.
46. The system of Clause 44 wherein the gas comprises an inert gas.
47. The system of Clause 44 wherein the gas comprises nitrogen.
- 30 48. The system of Clause 43 wherein the fluid comprises a liquid.
49. The system of Clause 43 wherein the fluid comprises a protective material.
50. The system of Clause 43 wherein the fluid comprises a fire retardant.
51. The system of Clause 43 wherein fluid comprises a foam.

52. The system of Clause 51 wherein the foam comprises a liquid foam agent.
53. The system of Clause 49 wherein the protective material comprises a foam agent.
54. The system of Clause 53 wherein the foam agent forms a foam segment.
- 5 55. The system of Clause 53 wherein the foam agent cures into a foam segment.
56. The system of Clause 51 wherein the foam encapsulates a payload segment.
57. The system of Clause 55 wherein the foam segment encapsulates a payload segment.
- 10 58. The system of Clause 51 wherein the foam solidifies in the carrier to provide containment for payload.
59. The system of Clause 51 wherein the foam solidifies in a mold to at least partially encapsulate a payload segment.
60. The system of Clause 51 wherein the foam comprises an encapsulated foam component.
- 15 61. The system of Clause 60 wherein encapsulated foam component comprises the carrier for the payload segment.
62. The system of Clause 54 wherein the carrier comprises the foam segment.
63. The system of Clause 54 wherein the foam segment comprises a pad.
- 20 64. The system of Clause 1 wherein the containment system comprises use of the pad to contain payload.
65. The system of Clause 1 wherein the containment system comprises use of a foam pad.
66. The system of Clause 1 wherein the containment system comprises at least one pad in a compartment of the carrier to contain payload.
- 25 67. The system of Clause 51 wherein the foam is deployed before flight on the mission.
68. The system of Clause 51 wherein the foam is deployed during the mission upon detection of the identified condition.
- 30 69. The method of Clause 51 wherein the foam is reusable.
70. The method of Clause 51 wherein the foam is recyclable.
71. The system of Clause 1 wherein the containment system comprises an airbag.

72. The system of Clause 1 wherein the containment system comprises at least one airbag segment.

73. The system of Clause 72 wherein the airbag segment is deployed before flight on the mission.

5 74. The system of Clause 72 wherein the airbag segment is deployed during the mission upon detection of the identified condition.

75. The system of Clause 71 wherein deployment of the airbag comprises inflation with at least one of (a) air; (b) a selected gas; (c) a fire-retardant; (d) an inert gas.

10 76. The system of Clause 1 wherein the aircraft comprises a base and the carrier for payload is the base of the aircraft.

77. The system of Clause 1 wherein the carrier is external to the aircraft.

78. The system of Clause 1 wherein the pod is streamlined to reduce drag coefficient.

15 79. The system of Clause 1 wherein the containment system is configured to reduce aerodynamic drag for the aircraft with carrier.

80. The system of Clause 1 wherein the containment system is configured to reduce weather exposure of payload.

81. The system of Clause 1 wherein the containment system is configured to enhance crash containment for payload.

20 82. The system of Clause 1 wherein the pod comprises a cargo pod to carry payload under the aircraft.

83. The system of Clause 1 wherein the pod comprises an inflatable cargo pod configured to take an aerodynamic form when inflated.

25 84. The system of Clause 82 wherein the containment system comprises the cargo pod.

85. The system of Clause 1 wherein deployment of the containment system comprises inflation of the pod for containment of payload.

86. The system of Clause 1 wherein the pod is configured to be foam-filled for containment of payload.

30 87. The system of Clause 85 wherein containment comprises crash containment.

88. The system of Clause 85 wherein containment comprises handling containment.

89. The system of Clause 1 wherein the pod is filled by the aircraft.
90. The system of Clause 1 wherein the pod is attachable to the aircraft.
91. The system of Clause 1 wherein the pod is attached to the aircraft for the mission and removed from the aircraft after the mission.
- 5 92. The system of Clause 1 wherein the pod has a surface providing an effect intended to facilitate aerodynamic performance.
93. The system of Clause 92 wherein the effect comprises ripples on the surface of the cargo pod.
94. The system of Clause 1 wherein the originator is a customer of a delivery
10 service provided by the transporter.
95. The system of Clause 1 wherein the originator loads payload in the pod.
96. The system of Clause 1 wherein the originator loads payload in the inflatable pod.
97. The system of Clause 1 wherein the pod is configured to be attached to the
15 aircraft at standardized points for the carrier.
98. The system of Clause 1 wherein the containment system comprises a pod configured to contain selected payload.
99. The system of Clause 1 wherein the inflatable pod is pre-inflated before the mission.
- 20 100. The system of Clause 1 wherein the inflatable pod is inflated after attachment to the aircraft.
101. The system of Clause 1 wherein the pod is shaped to control aerodynamic forces on the aircraft with payload.
102. The system of Clause 1 wherein the pod is shaped to reduce drag forces in
25 flight.
103. The system of Clause 1 wherein the pod is configured to facilitate flight control of the aircraft.
104. The system of Clause 103 wherein flight control comprises lift.
105. The system of Clause 1 wherein a shape of the pod may be dynamically
30 controlled during the flight.
106. The system of Clause 1 wherein a shape of the pod is controlled based on operating conditions.

107. The system of Clause 106 wherein operating conditions comprises flight speed of the aircraft.

108. The system of Clause 1 wherein deployment of the containment system may be dynamically controlled during flight by a control system.

5 109. The system of Clause 1 wherein deployment of the containment system comprises inflation of at least one inflatable segment for containment of payload.

110. The system of Clause 1 wherein deployment of the containment system comprises inflation of the pod.

10 111. The system of Clause 1 wherein deployment of the containment system is based on operating conditions.

112. The system of Clause 111 wherein operating conditions comprise flight speed of the aircraft.

113. The system of Clause 110 wherein inflation comprises inflation with a gas.

15 114. The system of Clause 110 wherein inflation is of at least one of (a) a liquid; (b) a gas; (c) an agent that solidifies into a foam; (d) an agent that solidified into a foam segment.

115. The system of Clause 114 wherein the foam is configured to provide containment of payload.

20 116. The system of Clause 110 wherein inflation may be performed by the customer.

117. The system of Clause 110 wherein inflation may be performed by a crew for the transporter.

118. The system of Clause 110 wherein inflation may be performed by the aircraft.

25 119. The system of Clause 1 wherein the pod is configured to completely enclose payload.

120. The system of Clause 1 wherein the pod is configured to partially enclose payload.

30 121. The system of Clause 1 wherein the pod is configured to extend around a portion of payload.

122. The system of Clause 1 wherein payload is attached directly to the aircraft as the carrier.

123. The system of Clause 1 wherein payload is attached to the aircraft at attachment points on the pod.
124. The system of Clause 1 wherein the aircraft comprises an attachment mechanism for the carrier.
- 5 125. The system of Clause 1 wherein the carrier comprises an attachment mechanism for the pod to the aircraft.
126. The system of Clause 1 wherein the aircraft comprises an attachment mechanism for the pod controlled by a control system of the containment system.
127. The system of Clause 1 wherein the aircraft provides a base for attachment
10 of the carrier of payload.
128. The system of Clause 1 wherein the aircraft provides a base for attachment of the carrier of payload with containment system.
129. The system of Clause 1 wherein the carrier comprises the pod.
130. The system of Clause 1 wherein the carrier with containment system
15 comprises the inflatable pod.
131. The system of Clause 1 wherein inflation of a portion of the pod attaches the pod to the aircraft.
132. The system of Clause 1 wherein inflation comprises inflating a volume of the pod in the aircraft.
- 20 133. The system of Clause 132 wherein the volume is a concave volume.
134. The system of Clause 132 wherein the volume is inflated around a structure in the base of the aircraft.
135. The system of Clause 134 wherein the structure comprises at least one of a knob or rail.
- 25 136. The system of Clause 1 wherein the pod comprises multiple compartments.
137. The system of Clause 1 wherein the pod comprises multiple compartments selectively inflated to match payload.
138. The system of Clause 137 wherein to match payload comprises to match at least one of (a) size of payload or (b) shape of payload.
- 30 139. The system of Clause 1 wherein the carrier comprises a base to carry payload segments.
140. The system of Clause 139 wherein the containment system is located in the base of the carrier.

141. The system of Clause 1 wherein the carrier comprises a nose and tail.
142. The system of Clause 141 wherein the nose is configured to carry payload segments.
143. The system of Clause 141 wherein the tail is configured to carry payload segments.
144. The system of Clause 141 wherein the nose is configured to provide the containment system.
145. The system of Clause 141 wherein the tail is configured to provide the containment system.
146. The system of Clause 141 wherein the containment system comprises inflatable segments from at least one of the nose and the base and a tail of the carrier.
147. The system of Clause 1 wherein the containment system comprises at least one inflatable balloon.
148. The system of Clause 147 wherein the inflatable balloon is configured to conform to payload shape.
149. The system of Clause 147 wherein the inflatable balloon is configured to retain payload position.
150. The system of Clause 147 wherein the inflatable balloon is configured to be deflated at delivery of payload.
151. The system of Clause 147 wherein the inflatable balloon comprises a plurality of inflatable balloon segments.
152. The system of Clause 1 wherein inflation of inflatable segments of the containment system is dynamically controlled during flight on the mission.
153. The system of Clause 1 wherein inflation of inflatable segments of the containment system is selectively controlled during flight on the mission.
154. The system of Clause 1 wherein payload segments are attachable within the carrier.
155. The system of Clause 1 wherein the pod is carried by the carrier.
156. The system of Clause 1 wherein the pod is operated by the transporter.
157. The system of Clause 1 further comprising a control system and instrumentation to operate the containment system.
158. The system of Clause 157 further comprising data sources for the control system.

159. The system of Clause 158 wherein data sources comprise data from instrumentation.
160. The system of Clause 158 wherein data sources comprise data from a network.
- 5 161. The system of Clause 160 wherein the network comprises the internet.
162. The system of Clause 158 wherein data sources provide data and/or events.
163. The system of Clause 158 wherein data sources provide data on operating conditions.
164. The system of Clause 1 further comprising inflatable segments for payload
10 containment exterior to the carrier.
165. The system of Clause 1 further comprising inflatable segments for payload containment interior to the pod.
166. The system of Clause 1 wherein the containment system comprises attachment to the carrier.
- 15 167. The system of Clause 1 wherein the pod is shaped to enhance aerodynamic control.
168. The system of Clause 1 wherein the pod is configured to increase lift.
169. The system of Clause 1 wherein the pod is configured to facilitate control of aerodynamic torque.
- 20 170. The system of Clause 1 wherein the pod is configured to provide indicia.
171. The system of Clause 170 wherein the indicia is a marking on the pod.
172. The system of Clause 170 wherein the indicia is on the pod.
173. The system of Clause 170 wherein the indicia is visually perceptible.
174. The system of Clause 170 wherein the indicia is human-readable.
- 25 175. The system of Clause 170 wherein the indicia is machine-readable.
176. The system of Clause 170 wherein the indicia comprises an identifier.
177. The system of Clause 170 wherein the indicia comprises data.
178. The system of Clause 177 wherein the data is transmitted on a network.
179. The system of Clause 177 wherein the indicia comprises data as to pod
30 configuration.
180. The system of Clause 177 wherein the data comprises data as to indicate pod aerodynamic performance.
181. The system of Clause 170 wherein the indicia comprises a device.

182. The system of Clause 181 wherein the device comprises a transmitter tag.
183. The system of Clause 1 wherein the pod is configured with payload by an originator.
184. The system of Clause 1 wherein the pod is configured for the transporter in
5 an uninflated condition.
185. The system of Clause 1 wherein the pod is secured for transport to the transporter for the mission.
186. The system of Clause 185 wherein the pod is secured in a band.
187. The system of Clause 185 wherein the pod is secured by a tape.
- 10 188. The system of Clause 185 wherein the pod is secured by a fabric.
189. The system of Clause 185 wherein the pod is secured by an elastomer.
190. The system of Clause 1 wherein the pod is transported to the transporter in an uninflated condition with payload.
191. The system of Clause 186 wherein the pod is inflated when secured in the
15 band.
192. The system of Clause 186 wherein the band stretches when the pod is inflated.
193. The system of Clause 186 wherein the band comprises at least one of (a) tape; (b) tape strips; (c) tape wrap; (d) fabric segments; (e) tearable material; (f)
20 elastomeric material; (g) stretchable material.
194. The system of Clause 1 wherein the pod comprises a plastic bag.
195. The system of Clause 1 wherein the pod comprises an inflatable bag.
196. The system of Clause 1 wherein the pod comprises an elastomeric material.
197. The system of Clause 1 wherein payload is sealed in the pod.
- 25 198. The system of Clause 1 wherein the pod is configured by inflation.
199. The system of Clause 1 wherein the pod is configured by deflation.
200. The system of Clause 1 wherein the pod is configured by at least partial inflation.
201. The system of Clause 1 wherein the pod is configured by at least partial
30 deflation.
202. The system of Clause 1 wherein the containment system comprises a plurality of pods for payload attachable to the aircraft.

203. A payload management system for an unmanned aircraft system providing an aircraft to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions comprising:

(a) a carrier for payload configured to be carried by the aircraft;

5 (b) a containment system configured to contain payload;

wherein the containment system comprises a fillable pod carried by the carrier at least partially exterior to the aircraft;

wherein the pod comprises at least one compartment for payload.

204. The system of Clause 203 wherein the pod comprises a container.

10 205. The system of Clause 203 wherein the fillable pod is an inflatable pod.

206. The system of Clause 203 wherein the fillable pod is a fluid-filled pod.

207. The system of Clause 203 wherein the fillable pod is a foam-filled pod.

208. The system of Clause 203 further comprising a control system is to control operation of the containment system.

15 209. The system of Clause 203 further comprising instrumentation to provide data for the control system.

210. The system of Clause 203 wherein the pod is completely exterior to the carrier for payload.

20 211. The system of Clause 203 wherein the pod comprises an aerodynamic form.

212. The system of Clause 203 wherein payload comprises cargo to be transported on the mission.

213. The system of Clause 203 wherein cargo comprises at least one segment.

25 214. The system of Clause 203 wherein payload comprises one payload segment.

215. The system of Clause 203 wherein the pod is configured by the originator prior to providing payload to the transporter for the mission.

216. The system of Clause 203 wherein the containment system is configured by the transporter prior to the mission.

30 217. The system of Clause 203 wherein the containment system is configured by the transporter after receipt of payload from the originator.

218. The system of Clause 203 wherein the containment system is deployed by the transporter prior to the mission.

219. The system of Clause 203 wherein the containment system comprises an inflatable segment.

220. The system of Clause 219 wherein the inflatable segment is exterior to the carrier for payload.

5 221. The system of Clause 203 wherein the containment system comprises at least one inflatable segment.

222. The system of Clause 203 wherein the containment system comprises a plurality of inflatable segments.

10 223. The system of Clause 203 wherein the containment system is exterior to payload segments.

224. The system of Clause 203 wherein the containment system comprises a shell for the carrier.

225. The system of Clause 203 wherein the containment system comprises an exterior shell for the carrier.

15 226. The system of Clause 203 wherein the containment system comprises an inflatable pad exterior to the carrier.

227. The system of Clause 203 wherein the containment system comprises an encapsulation of payload.

20 228. The system of Clause 203 wherein the containment system comprises a removable encapsulation component.

229. The system of Clause 203 wherein the containment system comprises a foam encapsulation component.

230. The system of Clause 203 wherein the containment system comprises an inflatable container for payload.

25 231. The system of Clause 203 wherein the containment system comprises the carrier.

232. The system of Clause 203 wherein the inflatable segment is deflatable.

233. The system of Clause 203 wherein the containment system provides a compartment to carry and contain payload.

30 234. The system of Clause 203 wherein the containment system is deployed from the aircraft.

235. The system of Clause 203 wherein the containment system is deployed on the carrier.

236. The system of Clause 203 wherein the containment system is deployed adjacent the carrier.
237. The system of Clause 203 wherein the containment system is deployed around the carrier.
- 5 238. The system of Clause 203 wherein the carrier comprises a base.
239. The system of Clause 203 wherein the containment system comprises a cover.
240. The system of Clause 239 wherein the cover is for the base of the carrier.
241. The system of Clause 203 wherein the containment system is attachable to
10 the aircraft.
242. The system of Clause 203 wherein the containment system further comprises features to reduce drag coefficient.
243. The system of Clause 203 wherein the containment system comprises an exterior cover.
- 15 244. The system of Clause 242 wherein the features are provided on an exterior cover of the containment system.
245. The system of Clause 203 wherein the containment system is deployed for at least one event.
246. The system of Clause 245 wherein the event is detected by instrumentation.
- 20 247. The system of Clause 246 wherein data sources for the instrumentation comprises recorded flight data.
248. The system of Clause 246 wherein instrumentation comprises of at least one of an accelerometer and a detector.
249. The system of Clause 248 wherein the detector comprises a camera.
- 25 250. The system of Clause 203 wherein the mission comprises at least one event comprising at least one of (a) takeoff of the aircraft; (b) flight of the aircraft on the mission; (c) landing of the aircraft during the mission; (d) landing of the aircraft at the end of the mission; (e) an identified condition during flight; (f) a hazard during flight; (g) a potential malfunction of the aircraft during flight; (h) an impact by payload; (i) an impact
30 by the aircraft.
251. The system of Clause 250 wherein the identified condition comprises an environmental condition during the mission that is identified as a potential hazard to the aircraft.

252. The system of Clause 251 wherein the environmental condition comprises a weather condition.

253. The system of Clause 250 wherein the identified condition comprises at least one of (a) a forecast weather condition on the route of the aircraft for the mission; (b)
5 an actual weather condition potentially affecting the mission.

254. The system of Clause 250 wherein the identified condition comprises an operating condition that is identified as a potential hazard to the aircraft.

255. The system of Clause 254 wherein the identified condition comprises at least one of (a) potential malfunction of a system of the aircraft; (b) a reduction of the
10 airworthiness of the aircraft; (c) a malfunction of a system of the aircraft.

256. The system of Clause 203 wherein payload comprises at least one payload segment and the containment system is configured to provide containment of payload during at least one of (a) impact of the aircraft with an object; (b) effect of environmental conditions in flight; (c) effect of operating conditions in flight; (d) contact between a
15 payload segments with another object; (e) heat; (f) fire; (g) exposure to environmental conditions.

257. The system of Clause 203 wherein the containment system comprises the carrier.

258. The system of Clause 203 wherein the carrier comprises a structure
20 providing carrying of the containment system.

259. The system of Clause 203 wherein the aircraft comprises the containment system.

260. The system of Clause 203 wherein the carrier comprises attachment points for the aircraft.

25 261. The system of Clause 203 wherein the containment system is configured to be deployed adjacent to the carrier.

262. The system of Clause 203 wherein the containment system is at least partially removable from the aircraft.

263. The system of Clause 203 wherein the containment system with carrier
30 comprises at least one of (a) a pod; (b) a container; (c) a base; (d) an enclosure; (e) a shell; (f) a hanger; (g) a tray; (h) a sling; (i) an enclosed container; (i) a multi-modal container; (j) an inflatable container; (k) a plurality of carriers.

264. The system of Clause 203 wherein the pod comprises at least one compartment.
265. The system of Clause 203 wherein the pod comprises a multi-compartment container.
- 5 266. The system of Clause 203 wherein the containment system comprises an inflatable segment.
267. The system of Clause 203 wherein the containment system comprises at least one inflatable segment.
268. The system of Clause 203 wherein the containment system comprises
10 inflation of an inflatable segment adjacent to a compartment of the carrier.
269. The system of Clause 203 wherein the containment system comprises fill of a fluid into a compartment adjacent to the carrier.
270. The system of Clause 203 wherein the compartment contains a payload segment of payload.
- 15 271. The system of Clause 203 wherein the containment system with pod comprises a compartment for fill and for a payload segment.
272. The system of Clause 271 wherein the compartment for fill comprises the compartment for payload.
273. The system of Clause 271 wherein the compartment for fill is adjacent to
20 the compartment for the payload segment.
274. The system of Clause 271 wherein the compartment for fill is filled under operation of a control system.
275. The system of Clause 203 wherein fill for a compartment of the containment system comprises fill with a fluid.
- 25 276. The system of Clause 275 wherein fill with a fluid comprises inflation with a fluid.
277. The system of Clause 275 wherein the fluid comprises a gas.
278. The system of Clause 277 wherein the gas comprises air.
279. The system of Clause 277 wherein the gas comprises an inert gas.
- 30 280. The system of Clause 277 wherein the gas comprises nitrogen.
281. The system of Clause 275 wherein the fluid comprises a liquid.
282. The system of Clause 275 wherein the fluid comprises a protective material.

283. The system of Clause 275 wherein the fluid comprises a fire retardant.
284. The system of Clause 275 wherein fluid comprises a foam.
285. The system of Clause 284 wherein the foam comprises a liquid foam agent.
286. The system of Clause 282 wherein the protective material comprises a foam
5 agent.
287. The system of Clause 285 wherein the foam agent forms a foam segment.
288. The system of Clause 286 wherein the foam agent cures into a foam
segment.
289. The system of Clause 284 wherein the foam encapsulates payload.
- 10 290. The system of Clause 284 wherein the foam solidifies to provide
containment for payload.
291. The system of Clause 284 wherein the foam comprises an encapsulated
foam component.
292. The system of Clause 291 wherein encapsulated foam component
15 comprises the carrier for the payload segment.
293. The system of Clause 203 wherein the containment system comprises use
of a pad to contain payload.
294. The system of Clause 203 wherein the containment system comprises use
of a foam pad.
- 20 295. The system of Clause 203 wherein the containment system comprises use
of an inflatable pad.
296. The system of Clause 203 wherein the containment system comprises at
least one pad adjacent to the carrier to contain payload.
297. The system of Clause 293 wherein the pad is deployed before flight on the
25 mission.
298. The system of Clause 293 wherein the pad is deployed during the mission
upon detection of the identified condition.
299. The method of Clause 293 wherein the pad is reusable.
300. The method of Clause 293 wherein the pad comprises a foam and is
30 recyclable.
301. The system of Clause 203 wherein the containment system comprises an
airbag.

302. The system of Clause 203 wherein the containment system comprises at least one airbag segment.

303. The system of Clause 301 wherein the airbag segment is deployed before flight on the mission.

5 304. The system of Clause 250 wherein an airbag segment is deployed during the mission upon detection of the identified condition.

305. The system of Clause 203 wherein instrumentation is configured to detect a condition for the containment system.

10 306. The system of Clause 203 wherein instrumentation provides data to a control system operating the containment system.

307. The system of Clause 301 wherein airbag deployment comprises inflation with at least one of (a) air; (b) a selected gas; (c) a fire-retardant; (d) an inert gas.

308. The system of Clause 203 wherein the aircraft comprises a base and the carrier for payload is attachable to the base of the aircraft.

15 309. The system of Clause 203 wherein the carrier is external to the aircraft.

310. The system of Clause 203 wherein the carrier is streamlined to reduce drag coefficient.

311. The system of Clause 203 wherein the containment system is configured to reduce aerodynamic drag for the aircraft with carrier.

20 312. The system of Clause 203 wherein the containment system provides protection for payload.

313. The system of Clause 203 wherein the containment system is configured to reduce weather exposure of payload.

25 314. The system of Clause 203 wherein the containment system comprises a protection system.

315. The system of Clause 203 wherein the containment system is configured to enhance crash containment for payload.

316. The system of Clause 203 wherein the fillable pod comprises a pod to carry payload.

30 317. The system of Clause 203 wherein the carrier carries the pod and payload is carried within the pod.

318. The system of Clause 203 wherein the carrier comprises the pod and the containment system comprises inflatable segments adjacent the pod.

319. The system of Clause 203 wherein the carrier and the containment system comprise a protection system.

320. The system of Clause 203 wherein the containment system comprises an inflatable pod for containment of payload.

5 321. The system of Clause 203 wherein the pod is configured to be foam-filled for containment of payload.

322. The system of Clause 320 wherein containment comprises crash containment.

10 323. The system of Clause 320 wherein containment comprises handling containment.

324. The system of Clause 203 wherein the pod is supplied by the transporter.

325. The system of Clause 203 wherein the pod is attachable to the aircraft.

326. The system of Clause 203 wherein the pod is attached to the aircraft for the mission and removed from the aircraft after the mission.

15 327. The system of Clause 203 wherein the pod has a surface providing an effect intended to facilitate aerodynamic performance.

328. The system of Clause 327 wherein the effect comprises ripples on the surface of the pod.

20 329. The system of Clause 203 wherein the originator is a customer of a delivery service provided by the transporter.

330. The system of Clause 203 wherein the originator loads payload in the pod.

331. The system of Clause 203 wherein the pod is configured to be attached to the aircraft at standardized points.

25 332. The system of Clause 203 wherein the pod comprises a selected pod corresponding selected payload type.

333. The system of Clause 203 wherein the fillable pod comprises an inflatable pod pre-inflated before the mission.

334. The system of Clause 203 wherein the fillable pod comprises an inflatable pod inflated after attachment to the aircraft.

30 335. The system of Clause 203 wherein the pod is shaped to control aerodynamic forces on the aircraft with payload.

336. The system of Clause 203 wherein the pod is shaped to reduce drag.

337. The system of Clause 203 wherein the pod is configured to facilitate flight control of the aircraft.

338. The system of Clause 337 wherein flight control comprises lift.

339. The system of Clause 203 wherein a shape of the pod may be dynamically
5 controlled during the flight.

340. The system of Clause 339 wherein the shape of the pod is controlled based on operating conditions.

341. The system of Clause 340 wherein operating conditions comprise flight speed of the aircraft.

10 342. The system of Clause 203 wherein deployment of the containment system may be dynamically controlled during flight.

343. The system of Clause 203 wherein deployment of the containment system comprises inflation of at least one inflatable segment for containment of payload.

344. The system of Clause 203 wherein deployment of the containment system
15 comprises inflation of the pod.

345. The system of Clause 203 wherein deployment of the containment system is based on operating conditions.

346. The system of Clause 345 wherein operating conditions comprise flight speed of the aircraft.

20 347. The system of Clause 344 wherein inflation comprises inflation with a gas.

348. The system of Clause 344 wherein inflation is provided by at least one of (a) a liquid; (b) a gas; (c) an agent that solidifies into a foam; (d) an agent that solidified into a foam segment.

349. The system of Clause 348 wherein the foam is configured to provide
25 containment of payload.

350. The system of Clause 344 wherein inflation may be performed by the customer.

351. The system of Clause 344 wherein inflation may be performed by a crew for the transporter.

30 352. The system of Clause 344 wherein inflation may be performed by the aircraft.

353. The system of Clause 203 wherein the pod is configured to completely enclose payload.

354. The system of Clause 203 wherein the pod is configured to partially enclose payload.

355. The system of Clause 203 wherein the pod is configured to extend around a portion of payload.

5 356. The system of Clause 203 wherein payload is attached directly to the aircraft as the carrier.

357. The system of Clause 203 wherein payload is attached to the aircraft at attachment points on the pod.

10 358. The system of Clause 203 wherein the aircraft comprises an attachment mechanism for the carrier.

359. The system of Clause 203 wherein the aircraft comprises an attachment mechanism for the pod.

360. The system of Clause 203 wherein the aircraft provides a base for attachment of the carrier of payload.

15 361. The system of Clause 203 wherein the aircraft provides a base for attachment of the carrier of payload with the containment system.

362. The system of Clause 203 wherein the carrier comprises the pod.

363. The system of Clause 203 wherein the carrier with the containment system comprises an inflatable segment adjacent the pod.

20 364. The system of Clause 203 wherein the pod comprises multiple compartments.

365. The system of Clause 203 wherein the carrier comprises a base to carry payload segments.

25 366. The system of Clause 203 wherein the containment system is located in a base of the aircraft.

367. The system of Clause 366 wherein the containment system comprises inflatable segments deployed from the base of the aircraft in operating conditions.

30 368. The system of Clause 367 wherein operating conditions comprise (a) environmental conditions; (b) flight conditions; (c) aircraft conditions; (d) payload conditions.

369. The system of Clause 203 wherein the containment system comprises at least one inflatable balloon.

370. The system of Clause 203 wherein the inflatable balloon is configured to conform to a carrier shape.

371. The system of Clause 203 wherein the inflatable balloon is configured to retain a payload position.

5 372. The system of Clause 369 wherein the inflatable balloon is configured to be deflated at delivery of payload.

373. The system of Clause 369 wherein the inflatable balloon comprises a plurality of inflatable balloon segments.

10 374. The system of Clause 203 wherein inflation of inflatable segments of the containment system is dynamically controlled during flight on the mission.

375. The system of Clause 203 wherein inflation of inflatable segments of the containment system is selectively controlled during flight on the mission.

376. The system of Clause 203 wherein payload segments are attachable within the carrier.

15 377. The system of Clause 203 further comprising inflatable segments for payload containment exterior to the carrier.

378. The system of Clause 203 further comprising inflatable segments for payload containment interior to the carrier.

20 379. A method of managing payload for an unmanned aircraft system providing an aircraft to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions comprising the steps of:

- (a) providing payload in a carrier configured to be carried by the aircraft;
- (b) providing a containment system with at least one container for payload;
- (c) configuring the containment system by inflation before the mission;

25 wherein the containment system comprises a fillable pod providing at least one container at least partially exterior to the aircraft.

380. The method of Clause 379 wherein the fillable pod is an inflatable pod.

381. The method of Clause 379 further comprising the step of operating the containment system.

30 382. The method of Clause 379 wherein instrumentation provides data sources for the containment system.

383. The method of Clause 379 wherein the containment system for payload is completely exterior to the carrier for payload.

384. The method of Clause 379 wherein configuring the containment system comprises configuring the pod to an aerodynamic form.
385. The method of Clause 384 wherein configuring the pod comprises filling the pod.
- 5 386. The method of Clause 384 wherein configuring the pod comprises inflating the pod.
387. The method of Clause 379 wherein payload comprises cargo to be transported on the mission.
388. The method of Clause 379 wherein cargo comprises at least one segment.
- 10 389. The method of Clause 379 wherein payload comprises one payload segment.
390. The method of Clause 379 wherein the containment system is configured by the transporter prior to the mission.
391. The method of Clause 379 wherein the containment system is configured
15 by the transporter after receipt of payload from the originator.
392. The method of Clause 379 wherein the containment system is deployed by the transporter prior to the mission.
393. The method of Clause 379 wherein the pod comprises a container.
394. The method of Clause 393 wherein the container is carried external to the
20 aircraft.
395. The method of Clause 393 wherein the containment system for the container comprises an inflatable segment.
396. The method of Clause 393 wherein the container is configured to at least one of (a) reduce aerodynamic drag when carried in flight by the aircraft; (b) shield
25 contents of the container from weather exposure; (c) contain the contents of the container during effects of impact.
397. The method of Clause 396 wherein the contents comprise payload.
398. The method of Clause 393 wherein the container is configured to reduce drag coefficient.
- 30 399. The method of Clause 393 wherein the container is streamlined.
400. The method of Clause 379 wherein the containment system comprises a compartment configured to be filled with a material.

401. The method of Clause 400 wherein the compartment of the containment system is a flexible compartment.
402. The method of Clause 379 wherein the flexible compartment comprises an elastomeric component.
- 5 403. The method of Clause 379 wherein the elastomeric component comprises a balloon.
404. The method of Clause 379 wherein the material is a foam provided to contain payload.
405. The method of Clause 379 wherein the material is a fluid.
- 10 406. The method of Clause 379 wherein the fluid is a gas.
407. The method of Clause 379 wherein the containment system comprises a gas-inflated segment.
408. The method of Clause 379 wherein the containment system comprises a foam-filled segment.
- 15 409. The method of Clause 379 wherein the carrier comprises a container.
410. The method of Clause 379 wherein the container is pre-loaded and attached to the aircraft.
411. The method of Clause 379 wherein the container comprises a plurality of separate segments.
- 20 412. The method of Clause 379 wherein the container comprises a plurality of compartments.
413. The method of Clause 379 wherein the container comprises a pod.
414. The method of Clause 379 wherein the pod is configured by the operator.
415. The method of Clause 379 wherein the pod is configured to modify
- 25 aerodynamic forces on the aircraft for flight.
416. The method of Clause 379 wherein the containment system is inflatable.
417. The method of Clause 379 wherein the containment system is inflated with a lighter-than-air gas.
418. The method of Clause 379 wherein the containment system is configured to
- 30 generate lift for the aircraft.
419. The method of Clause 379 wherein the pod comprises a surface.
420. The method of Clause 379 wherein the surface is rippled to reduce aerodynamic drag forces.

421. The method of Clause 379 wherein the surface is configured to reduce drag forces at a transit speed.
422. The method of Clause 379 wherein the pod encompasses payload.
423. The method of Clause 379 wherein the pod encompasses the entire
5 payload.
424. The method of Clause 379 wherein the pod encloses payload.
425. The method of Clause 379 wherein the pod encloses the entire payload.
426. The method of Clause 379 wherein the pod attaches directly to the aircraft.
427. The method of Clause 379 wherein the pod provides attachment points for
10 connecting to the aircraft.
428. The method of Clause 379 wherein the aircraft provides attachment points for connecting to the pod.
429. The method of Clause 379 wherein the aircraft provided deployment points for the containment system for the pod.
- 15 430. The method of Clause 379 wherein the pod comprises a plurality of compartments.
431. The method of Clause 379 wherein the originator comprises the carrier.
432. The method of Clause 379 wherein the originator comprises a customer of the carrier.
- 20 433. The method of Clause 379 wherein the carrier comprises an operator at the aircraft.
434. The method of Clause 379 wherein the carrier comprises ground crew for the aircraft.
435. The method of Clause 379 wherein the customer comprises the destination.
- 25 436. The method of Clause 379 wherein the carrier comprises at least one container and payload is provided in a container of the carrier.
437. The method of Clause 379 wherein providing payload in the container comprises at least one of: (a) loading cargo in the container; (b) attaching cargo in the container; (c) positioning cargo in the container.
- 30 438. The method of Clause 379 wherein further comprising the step of configuring payload for the mission.

439. The method of Clause 379 wherein configuring payload for the mission comprises at least one of: (a) securing payload in the carrier; (b) deploying the containment system for payload.

5 440. The method of Clause 379 wherein operating conditions for a mission comprise at least one of: (a) environmental conditions; (b) loading of the carrier; (c) route of the mission; (d) flight speed for the mission.

441. The method of Clause 379 wherein containment of payload comprises at least one of containment during: (a) operating conditions; (b) vibration; (c) oscillation; (d) environmental effects; (e) fire; (f) impact.

10 442. The method of Clause 379 further comprising the step of inflating at least one segment of the containment system with a fluid.

443. The method of Clause 442 wherein the fluid comprises a gas.

444. The method of Clause 379 further comprising the step of filling at least one segment of the containment system with a foam.

15 445. The method of Clause 379 wherein the originator comprises the transporter.

446. The method of Clause 379 wherein the originator comprises a customer of the transporter.

447. The method of Clause 379 wherein the transporter comprises an operator at the aircraft.

20 448. The method of Clause 379 wherein the transporter comprises ground crew for the aircraft.

449. The method of Clause 446 wherein the customer comprises the destination.

450. The method of Clause 446 wherein the step of providing payload in the container is performed by the customer.

25 451. The method of Clause 379 further comprising the step of configuring the aircraft with carrier for transit on the mission.

452. The method of Clause 379 further comprising the step of configuring the aircraft with the carrier to reduce aerodynamic drag in flight.

30 453. The method of Clause 379 further comprising the step of initiating the mission.

454. The method of Clause 379 wherein the step of configuring payload for the mission is performed before initiating the mission.

455. The method of Clause 379 wherein the step of configuring payload for the mission is performed after initiating the mission.
456. The method of Clause 379 further comprising the step of performing the mission.
- 5 457. The method of Clause 379 wherein the containment system comprises containment of payload by using at least one of (a) foam elements; (b) foam-fill; (c) a fluid introduced adjacent to payload; (d) inflation with gas adjacent to payload.
458. The method of Clause 457 wherein the fluid is a fill.
459. The method of Clause 457 wherein the fluid is a foam fill.
- 10 460. The method of Clause 458 wherein the fill is impact absorbing.
461. The method of Clause 457 wherein the fluid is fire retardant.
462. The method of Clause 457 wherein the fluid solidifies into a containment form.
463. The method of Clause 462 wherein the form conforms to carrier shape.
- 15 464. The method of Clause 462 wherein the form conforms to carrier size.
465. The method of Clause 462 wherein the form at least partially conforms to carrier form.
466. The method of Clause 462 wherein the form is configured stabilize payload in flight.
- 20 467. The method of Clause 379 further comprising the step of associating the carrier with the aircraft by attachment to the aircraft.
468. The method of Clause 379 wherein the aircraft comprises a base and further comprising the step of associating the carrier with the aircraft by insertion of payload into the base of the aircraft.
- 25 469. The method of Clause 468 wherein the base comprises a hull of the aircraft.
470. The method of Clause 467 wherein the step of associating the container with the aircraft comprises creation of an aerodynamically configured combination of the carrier and the aircraft.
471. The method of Clause 379 wherein the carrier comprises an aerodynamic
30 body.
472. The method of Clause 379 wherein the carrier comprises a wing.
473. The method of Clause 379 wherein the carrier comprises a set of wings.
474. The method of Clause 473 wherein the wings are adjustable.

475. The method of Clause 473 wherein the aircraft is configured to adjust the position of the wings of the container.
476. The method of Clause 473 wherein the wings are retractable.
477. The method of Clause 473 wherein the wings are adjustable in flight.
- 5 478. The method of Clause 459 wherein the foam is reusable.
479. The method of Clause 459 wherein the foam is recyclable.
480. The method of Clause 379 wherein the container comprises a surface.
481. The method of Clause 480 wherein the surface comprises a surface treatment.
- 10 482. The method of Clause 481 wherein the surface treatment comprises at least one of: (a) a shape of the surface; (b) a feature on the surface; (c) ripples on the surface.
483. The method of Clause 379 wherein the carrier with the containment system comprises an inflatable pod.
484. The method of Clause 379 wherein the container is configured for at least
15 one of (a) to reduce aerodynamic drag when carried in flight by the aircraft; (b) to shield contents of the container from weather exposure; (c) to contain the contents of the container during effects of impact.
485. The method of Clause 379 wherein payload comprises cargo to be transported on the mission.
- 20 486. The method of Clause 485 wherein cargo comprises at least one segment.
487. The method of Clause 379 wherein payload comprises at least one payload segment.
488. The method of Clause 379 wherein the containment system is configured by the transporter prior to the mission.
- 25 489. The method of Clause 379 wherein the containment system is configured by the transporter after receipt of payload from the originator.
490. The method of Clause 379 wherein the containment system is deployed by the transporter prior to the mission.
491. The method of Clause 379 wherein the containment system is deployed for
30 at least one event.
492. The method of Clause 379 wherein the mission comprises at least one event comprising at least one of (a) takeoff of the aircraft; (b) flight of the aircraft on the mission; (c) landing of the aircraft during the mission; (d) landing of the aircraft at the end

of the mission; (d) an identified condition during flight; (f) a hazard during flight; (g) a potential malfunction of the aircraft during flight; (h) an impact by payload; (i) an impact by the aircraft.

493. The method of Clause 492 wherein the identified condition comprises an environmental condition during the mission that is identified as a potential hazard to the aircraft.

494. The method of Clause 493 wherein the environmental condition comprises a weather condition.

495. The method of Clause 492 wherein the identified condition comprises at least one of (a) a forecast weather condition on the route of the aircraft for the mission; (b) an actual weather condition potentially affecting the mission.

496. The method of Clause 492 wherein the identified condition comprises an operating condition that is identified as a potential hazard to the aircraft.

497. The method of Clause 496 wherein the identified condition comprises at least one of (a) potential malfunction of a system of the aircraft; (b) a reduction of the airworthiness of the aircraft; (c) a malfunction of a system of the aircraft.

498. The method of Clause 379 wherein payload comprises at least one payload segment and the containment system is configured to provide containment of payload during at least one of (a) impact of the aircraft with an object; (b) effect of environmental conditions in flight; (c) effect of operating conditions in flight; (d) contact between a payload segment with another object; (e) heat; (f) fire; (g) exposure to environmental conditions.

499. The method of Clause 379 wherein the carrier comprises a structure providing the containment system.

500. The method of Clause 379 wherein the containment system comprises attachment to the carrier.

501. The method of Clause 379 wherein the pod is shaped to enhance aerodynamic control.

502. The method of Clause 379 wherein the pod is configured to increase lift.

503. The method of Clause 379 wherein the pod is configured to facilitate control of aerodynamic torque.

504. The method of Clause 379 wherein the pod is configured to provide indicia.

505. The method of Clause 504 wherein the indicia is a marking on the pod.

506. The method of Clause 504 wherein the indicia is on the pod.
507. The method of Clause 504 wherein the indicia is visually perceptible.
508. The method of Clause 504 wherein the indicia is human-readable.
509. The method of Clause 504 wherein the indicia is machine-readable.
- 5 510. The method of Clause 504 wherein the indicia comprises an identifier.
511. The method of Clause 504 wherein the indicia comprises data.
512. The method of Clause 511 wherein the data is transmitted on a network.
513. The method of Clause 504 wherein the indicia comprises data as to pod configuration.
- 10 514. The method of Clause 511 wherein the data comprises data as to indicate pod aerodynamic performance.
515. The method of Clause 504 wherein the indicia comprises a device.
516. The method of Clause 515 wherein the device comprises a transmitter tag.
517. The method of Clause 379 wherein the pod is configured with payload by
- 15 an originator.
518. The method of Clause 379 wherein the pod is configured for the transporter in an uninflated condition.
519. The method of Clause 379 wherein the pod is secured for transport to the transporter for the mission.
- 20 520. The method of Clause 519 wherein the pod is secured in a band.
521. The method of Clause 519 wherein the pod is secured by a tape.
522. The method of Clause 519 wherein the pod is secured by a fabric.
523. The method of Clause 519 wherein the pod is secured by an elastomer.
524. The method of Clause 379 wherein the pod is transported to the transporter
- 25 in an uninflated condition with payload.
525. The method of Clause 520 wherein the pod is inflated when secured in the band.
526. The method of Clause 520 wherein the band stretches when the pod is inflated.
- 30 527. The method of Clause 520 wherein the band comprises at least one of (a) tape; (b) tape strips; (c) tape wrap; (d) fabric segments; (e) tearable material; (f) elastomeric material; (g) stretchable material.
528. The method of Clause 379 wherein the pod comprises a plastic bag.

529. The method of Clause 379 wherein the pod comprises an inflatable bag.
530. The method of Clause 379 wherein the pod comprises an elastomeric material.
531. The method of Clause 379 wherein payload is sealed in the pod.
- 5 532. The method of Clause 379 wherein the pod is configured by inflation.
533. The method of Clause 379 wherein the pod is configured by deflation.
534. The method of Clause 379 wherein the pod is configured by at least partial inflation.
535. The method of Clause 379 wherein the pod is configured by at least partial
10 deflation.
536. The method of Clause 379 wherein the containment system comprises a plurality of pods for payload attachable to the aircraft.
537. A method of managing payload for an unmanned aircraft system providing an aircraft to carry payload on a mission from an originator by a transporter to a
15 destination in operating conditions comprising the steps of:
- (a) providing payload in a carrier configured to be carried by the aircraft;
 - (b) providing a containment system comprising at least one container with the carrier for payload;
 - (c) configuring the containment system by inflation during the mission;
- 20 wherein the containment system comprises an inflatable pod in an aerodynamic form carried at least partially exterior to the aircraft.
538. The method of Clause 537 wherein the pod comprises at least one container for payload.
539. The method of Clause 537 wherein the containment system comprises the
25 carrier attachable to the aircraft.
540. The method of Clause 537 wherein the pod for payload is completely exterior to the aircraft.
541. The method of Clause 537 wherein payload comprises cargo to be transported on the mission.
- 30 542. The method of Clause 537 wherein cargo comprises at least one segment.
543. The method of Clause 537 wherein payload comprises at least one payload segment.

544. The method of Clause 537 wherein the containment system is configured by the originator prior to providing payload to the transporter for the mission.

545. The method of Clause 537 wherein the containment system is configured by the transporter prior to the mission.

5 546. The method of Clause 537 wherein the containment system is configured by the transporter after receipt of payload from the originator.

547. The method of Clause 537 wherein the containment system is deployed by the transporter prior to the mission.

10 548. The method of Clause 537 wherein the containment system is deployed for at least one event.

549. The method of Clause 537 wherein the mission comprises at least one event comprising at least one of (a) takeoff of the aircraft; (b) flight of the aircraft on the mission; (c) landing of the aircraft during the mission; (d) landing of the aircraft at the end of the mission; (e) an identified condition during flight; (f) a hazard during flight; (g) a
15 potential malfunction of the aircraft during flight; (h) an impact by payload; (i) an impact by the aircraft.

550. The method of Clause 549 wherein the identified condition comprises an environmental condition during the mission that is identified as a potential hazard to the aircraft.

20 551. The method of Clause 550 wherein the environmental condition comprises a weather condition.

552. The method of Clause 549 wherein the identified condition comprises at least one of (a) a forecast weather condition on the route of the aircraft for the mission; (b) an actual weather condition potentially affecting the mission.

25 553. The method of Clause 549 wherein the identified condition comprises an operating condition that is identified as a potential hazard to the aircraft.

554. The method of Clause 553 wherein the identified condition comprises at least one of (a) potential malfunction of a system of the aircraft; (b) a reduction of the airworthiness of the aircraft; (c) a malfunction of a system of the aircraft.

30 555. The method of Clause 537 wherein payload comprises at least one payload segment and the containment system is configured to provide containment of payload during at least one of (a) impact of the aircraft with an object; (b) effect of environmental conditions in flight; (c) effect of operating conditions in flight; (d) contact between a

payload segment with another object; (e) heat; (f) fire; (g) exposure to environmental conditions.

556. The method of Clause 537 wherein the carrier comprises the containment system.

5 557. The method of Clause 537 wherein the carrier comprises a structure providing the containment system.

558. The method of Clause 537 wherein the carrier comprises at least one container and payload is provided in a container of the carrier.

10 559. The method of Clause 537 wherein providing payload in the container comprises at least one of: (a) loading cargo in the container; (b) attaching cargo in the container; (c) positioning cargo in the container.

560. The method of Clause 537 wherein further comprising the step of configuring payload for the mission.

15 561. The method of Clause 560 wherein configuring payload for the mission comprises at least one of: (a) securing payload in the carrier; (b) deploying the containment system for payload.

562. The method of Clause 537 wherein operating conditions for a mission comprise at least one of: (a) environmental conditions; (b) loading of the carrier; (c) route of the mission; (d) flight speed for the mission.

20 563. The method of Clause 537 wherein containment of payload comprises at least one of containment during: (a) operating conditions; (b) vibration; (c) oscillation; (d) environmental effects; (e) fire; (f) impact.

564. The method of Clause 537 wherein the carrier comprises a container and further comprising the step of inflating the container with a gas.

25 565. The method of Clause 537 further comprising the step of filling the container with a foam.

566. The method of Clause 537 wherein the originator comprises the transporter.

567. The method of Clause 537 wherein the originator comprises a customer of the transporter.

30 568. The method of Clause 537 wherein the transporter comprises an operator at the aircraft.

569. The method of Clause 537 wherein the transporter comprises ground crew for the aircraft.

570. The method of Clause 567 wherein the customer comprises the destination.
571. The method of Clause 537 wherein the step of providing payload in the container is performed by the customer.
572. The method of Clause 537 further comprising the step of configuring the
5 aircraft with carrier for transit on the mission.
573. The method of Clause 537 further comprising the step of configuring the aircraft with the carrier to reduce aerodynamic drag in flight.
574. The method of Clause 537 further comprising the step of initiating the mission.
- 10 575. The method of Clause 537 wherein the step of configuring payload for the mission is performed before initiating the mission.
576. The method of Clause 537 wherein the step of configuring payload for the mission is performed after initiating the mission.
577. The method of Clause 537 further comprising the step of performing the
15 mission.
578. The method of Clause 537 wherein the containment system comprises containment of payload by using at least one of (a) foam elements; (b) foam-fill; (c) a fluid introduced adjacent to payload; (d) inflation with gas adjacent to payload; (e) inflation with a fluid.
- 20 579. The method of Clause 578 wherein inflation is performed by the customer.
580. The method of Clause 578 wherein the fluid is a fill.
581. The method of Clause 578 wherein the fluid is a foam fill.
582. The method of Clause 580 wherein the fill is impact absorbing.
583. The method of Clause 578 wherein the fluid is fire retardant.
- 25 584. The method of Clause 578 wherein the fluid solidifies into a containment form.
585. The method of Clause 584 wherein the form conforms to payload shape.
586. The method of Clause 584 wherein the form conforms to payload size.
587. The method of Clause 584 wherein the form at least partially conforms to
30 payload form.
588. The method of Clause 584 wherein the form is configured stabilize payload in flight.

589. The method of Clause 537 wherein payload comprises a payload segment with a shape.

590. The method of Clause 589 wherein the form conforms to the shape of the payload segment.

5 591. The method of Clause 537 further comprising the step of associating the carrier with the aircraft by attachment to the aircraft.

592. The method of Clause 537 wherein the aircraft comprises a base and further comprising the step of associating the carrier with the aircraft by insertion of payload into the base of the aircraft.

10 593. The method of Clause 592 wherein the base comprises a hull of the aircraft.

594. The method of Clause 591 wherein the step of associating the container with the aircraft comprises creation of an aerodynamically configured combination of the carrier and the aircraft.

15 595. The method of Clause 537 wherein the carrier comprises an aerodynamic body.

596. The method of Clause 537 wherein the carrier comprises a wing.

597. The method of Clause 537 wherein the carrier comprises a set of wings.

598. The method of Clause 597 wherein the wings are adjustable.

20 599. The method of Clause 597 wherein the aircraft is configured to adjust the position of the wings of the container.

600. The method of Clause 597 wherein the wings are retractable.

601. The method of Clause 597 wherein the wings are adjustable in flight.

602. The method of Clause 581 wherein the foam is reusable.

603. The method of Clause 581 wherein the foam is recyclable.

25 604. The method of Clause 537 wherein the pod comprises a surface.

605. The method of Clause 604 wherein the surface comprises a surface treatment.

606. The method of Clause 605 wherein the surface treatment comprises at least one of: (a) a shape of the surface; (b) a feature on the surface; (c) ripples on the surface.

30 607. The method of Clause 537 wherein the container comprises an inflatable pod.

608. The method of Clause 607 wherein the pod is configured to at least one of (a) reduce aerodynamic drag when carried in flight by the aircraft; (b) shield contents of

the container from weather exposure; (c) contain the contents of the container during effects of impact.

609. The method of Clause 608 wherein the contents comprise payload.
610. The method of Clause 607 wherein the pod is configured to reduce drag
5 coefficient.
611. The method of Clause 607 wherein the pod is streamlined.
612. The method of Clause 537 wherein the container is configured to be filed with a material.
613. The method of Clause 612 wherein the material is a foam provided to
10 contain payload.
614. The method of Clause 612 wherein the material is a fluid.
615. The method of Clause 614 wherein the fluid is a gas.
616. The method of Clause 537 wherein the container is a gas-inflated container.
617. The method of Clause 537 wherein the container is a foam-filled container.
- 15 618. The method of Clause 537 wherein the container is pre-loaded and attached to the aircraft.
619. The method of Clause 537 wherein the container comprises a plurality of separate segments.
620. The method of Clause 537 wherein the container comprises a plurality of
20 compartments.
621. The method of Clause 537 wherein the pod comprises a container.
622. The method of Clause 537 wherein the pod is configured by the operator.
623. The method of Clause 537 wherein the pod is configured to modify aerodynamic forces on the aircraft for flight.
- 25 624. The method of Clause 537 wherein the pod is inflatable after loading with payload.
625. The method of Clause 537 wherein the pod is inflated with a lighter-than-air gas.
626. The method of Clause 537 wherein the pod is configured to generate lift for
30 the aircraft.
627. The method of Clause 537 wherein the pod comprises a surface.
628. The method of Clause 627 wherein the surface is rippled to reduce aerodynamic drag forces.

629. The method of Clause 627 wherein the surface is configured to reduce drag forces at a transit speed.
630. The method of Clause 537 wherein the pod encompasses payload.
631. The method of Clause 537 wherein the pod encompasses an entire payload.
- 5 632. The method of Clause 537 wherein the pod encloses payload.
633. The method of Clause 537 wherein the pod encloses an entire payload.
634. The method of Clause 537 wherein the pod attaches directly to the aircraft.
635. The method of Clause 537 wherein the pod provides attachment points for connecting to the aircraft.
- 10 636. The method of Clause 537 wherein the aircraft provides attachment points for connecting to the pod.
637. The method of Clause 537 wherein the pod comprises a plurality of compartments.
638. The method of Clause 637 wherein each compartment is configured for a
15 type of payload item.
639. The method of Clause 637 wherein each compartment is configured to match a size of payload item.
640. The method of Clause 637 wherein each compartment is configured to match a shape of payload item.
- 20 641. The method of Clause 637 wherein each compartment is configured to be separately loaded with payload.
642. The method of Clause 637 wherein each compartment is configured to be separately filled.
643. The method of Clause 537 wherein a compartment of the pod comprises a
25 nose compartment.
644. The method of Clause 537 wherein a compartment of the pod comprises a tail compartment.
645. The method of Clause 537 wherein the aircraft comprises a hull.
646. The method of Clause 645 wherein the hull comprises a concave volume
30 and the fill of the container provides a volume securing the container to the aircraft at the concave volume.
647. The method of Clause 646 wherein the fill comprises a fluid.
648. The method of Clause 646 wherein the fluid is air.

649. The method of Clause 646 wherein the fluid comprises a foam.
650. The method of Clause 649 wherein the foam solidifies into a semi-rigid form.
651. The method of Clause 646 wherein the hull comprises a knob.
- 5 652. The method of Clause 646 wherein the hull comprises a rail.
653. The method of Clause 651 wherein the fill conforms to the knob.
654. The method of Clause 652 wherein the fill conforms to the rail.
655. The method of Clause 537 wherein the originator comprises the carrier.
656. The method of Clause 537 wherein the originator comprises a customer of
- 10 the transporter.
657. The method of Clause 537 wherein the carrier comprises an operator at the aircraft.
658. The method of Clause 537 wherein the carrier comprises ground crew for the aircraft.
- 15 659. The method of Clause 656 wherein the customer comprises the destination.
660. The method of Clause 537 further comprising the step of inflating at least one segment of the containment system with a fluid.
661. The method of Clause 660 wherein the fluid comprises a gas.
662. The method of Clause 537 further comprising the step of filling at least one
- 20 segment of the containment system with a foam.
663. The method of Clause 537 wherein the containment system comprises a protection system for payload.
664. A payload management system for an unmanned aircraft system to carry payload comprising at least one payload segment on a mission from an originator by a
- 25 transporter to a destination in operating conditions comprising:
- a carrier for payload to be carried by the aircraft;
 - a containment system providing a pod comprising at least one container for payload;
- wherein the pod is provided in an at least partially inflatable form to provide
- 30 containment for payload to be carried at least partially external to the aircraft.
665. The system of Clause 664 the pod is configured to be selectively inflated and selectively deflated.

666. The system of Clause 664 wherein the form of the pod comprises an aerodynamic shape.
667. The system of Clause 664 wherein the pod comprises an aerodynamically-shaped pod.
- 5 668. The system of Clause 664 wherein the form of the pod comprises an inflatable pod.
669. The system of Clause 664 wherein the pod when inflated comprises an aerodynamic shape.
670. The system of Clause 664 wherein the pod comprises an inflatable
10 compartment.
671. The system of Clause 664 wherein the pod comprises at least one inflatable compartment.
672. The system of Clause 664 wherein the pod comprises a plurality of inflatable segments.
- 15 673. The system of Clause 664 wherein the pod comprises a plurality of selectively inflatable sections.
674. The system of Clause 664 wherein the pod comprises a plurality of selectively inflatable segments.
675. The system of Clause 664 wherein the pod is inflated to form an inflatable pod
20 before attachment to the aircraft.
676. The system of Clause 664 wherein the pod is inflated by the originator.
677. The system of Clause 664 wherein the pod is inflated by the transporter.
678. The system of Clause 664 wherein the pod is inflated during the mission.
679. The system of Clause 664 wherein the pod is inflatable during the mission.
- 25 680. The system of Clause 664 wherein the pod is deflatable during the mission.
681. The system of Clause 664 wherein the pod is deflated at the destination.
682. The system of Clause 664 wherein the pod is selectively inflatable and deflatable in flight.
683. The system of Clause 664 wherein the pod is inflatable with a gas.
- 30 684. The system of Clause 664 wherein the pod is inflatable with a foam.
685. The system of Clause 664 wherein the pod is fully inflatable.
686. The system of Clause 664 wherein the pod is fully deflatable.
687. The system of Clause 664 wherein the pod comprises an external shell.

688. The system of Clause 664 wherein the shell comprises attachable sections.

689. The system of Clause 664 wherein the pod is at least partially contained in the aircraft.

5 690. The system of Clause 664 wherein the aircraft provides a mounting structure and the pod is coupled to the mounting structure.

691. The system of Clause 664 wherein inflating of the pod is controlled by the aircraft.

692. The system of Clause 664 wherein the pod provides aerodynamic characteristics.

10 693. The system of Clause 692 wherein aerodynamic characteristics of the pod can be adjusted by selective inflation and deflation of the pod.

694. The system of Clause 692 wherein aerodynamic characteristics comprise a drag coefficient.

695. The system of Clause 664 wherein the pod provides a drag coefficient.

15 696. The system of Clause 695 wherein the drag coefficient of the pod can be adjusted before the mission.

697. The system of Clause 695 wherein the drag coefficient of the pod can be adjusted during the mission.

20 698. The system of Clause 695 wherein drag coefficient of the pod can be adjusted by selective inflation and deflation of the pod.

699. The system of Clause 664 wherein the pod comprises aerodynamically-shaped shell.

700. The system of Clause 664 wherein the pod comprises aerodynamic enhancing features.

25 701. The system of Clause 664 wherein the pod comprises a surface.

702. The system of Clause 701 wherein the surface comprises ripples.

703. The system of Clause 702 wherein the ripples comprise aerodynamic enhancing features.

30 704. The system of Clause 664 wherein the containment system comprises an inflatable pod configured to be carried external to the aircraft to provide an aerodynamic form for the aircraft.

705. The system of Clause 704 wherein the inflatable pod provides an aerodynamic enhancing form for the aircraft.

706. The system of Clause 704 wherein the inflatable pod comprises a shape configured to reduce aerodynamic drag of the aircraft.

707. The system of Clause 664 further comprising a protection system configured to protect payload.

5 708. The system of Clause 707 wherein the protection system is internal to the carrier.

709. The system of Clause 707 wherein the protection system is external to the carrier.

710. The system of Clause 664 wherein the carrier is attached to the aircraft.

10 711. The system of Clause 664 wherein the pod is configured to be inflated after the carrier is attached to the aircraft.

712. The system of Clause 664 wherein the payload comprises cargo.

713. The system of Clause 664 wherein the inflatable pod comprises an external pod attachable to the aircraft before the mission and detachable from the aircraft after the
15 mission.

714. The system of Clause 664 wherein the inflatable pod is inflated with a fluid.

715. The system of Clause 664 wherein the inflatable pod is inflated with a gas.

716. The system of Clause 664 wherein the containment system comprises attachment to the carrier.

20 717. The system of Clause 664 wherein the pod is shaped to enhance aerodynamic control.

718. The system of Clause 664 wherein the pod is configured to increase lift.

719. The system of Clause 664 wherein the pod is configured to facilitate control of aerodynamic torque.

25 720. The system of Clause 664 wherein the pod is configured to provide indicia.

721. The system of Clause 720 wherein the indicia is a marking on the pod.

722. The system of Clause 720 wherein the indicia is on the pod.

723. The system of Clause 720 wherein the indicia is visually perceptible.

724. The system of Clause 720 wherein the indicia is human-readable.

30 725. The system of Clause 720 wherein the indicia is machine-readable.

726. The system of Clause 720 wherein the indicia comprises an identifier.

727. The system of Clause 720 wherein the indicia comprises data.

728. The system of Clause 727 wherein the data is transmitted on a network.

729. The system of Clause 727 wherein the indicia comprises data as to pod configuration.
730. The system of Clause 727 wherein the data comprises data as to indicate pod aerodynamic performance.
- 5 731. The system of Clause 720 wherein the indicia comprises a device.
732. The system of Clause 731 wherein the device comprises a transmitter tag.
733. The system of Clause 664 wherein the pod is configured with payload by an originator.
734. The system of Clause 664 wherein the pod is configured for the transporter
10 in an uninflated condition.
735. The system of Clause 664 wherein the pod is secured for transport to the transporter for the mission.
736. The system of Clause 735 wherein the pod is secured in a band.
737. The system of Clause 735 wherein the pod is secured by a tape.
- 15 738. The system of Clause 735 wherein the pod is secured by a fabric.
739. The system of Clause 735 wherein the pod is secured by an elastomer.
740. The system of Clause 664 wherein the pod is transported to the transporter in an uninflated condition with payload.
741. The system of Clause 736 wherein the pod is inflated when secured in the
20 band.
742. The system of Clause 736 wherein the band stretches when the pod is inflated.
743. The system of Clause 736 wherein the band comprises at least one of (a) tape; (b) tape strips; (c) tape wrap; (d) fabric segments; (e) tearable material; (f)
25 elastomeric material; (g) stretchable material.
744. The system of Clause 664 wherein the pod comprises a plastic bag.
745. The system of Clause 664 wherein the pod comprises an inflatable bag.
746. The system of Clause 664 wherein the pod comprises an elastomeric material.
- 30 747. The system of Clause 664 wherein payload is sealed in the pod.
748. The system of Clause 664 wherein the pod is configured by inflation.
749. The system of Clause 664 wherein the pod is configured by deflation.

750. The system of Clause 664 wherein the pod is configured by at least partial inflation.

751. The system of Clause 664 wherein the pod is configured by at least partial deflation.

5 752. The system of Clause 664 wherein the containment system comprises a plurality of pods for payload attachable to the aircraft.

753. The system of Clause 714 wherein the gas comprises at least one of:

- (a) air;
- (b) air from ambient atmosphere;
- 10 (c) inert gas;
- (d) nitrogen;
- (e) helium.

754. The system of Clause 664 wherein the inflatable pod is inflated with a liquid.

755. The system of Clause 664 wherein the liquid comprises a material configured
15 to form a foam.

756. The system of Clause 755 wherein the material comprises urethane.

757. The system of Clause 755 wherein the material comprises a packing foam.

758. The system of Clause 754 wherein the liquid comprises a gel material.

759. The system of Clause 664 wherein the inflatable pod is inflated with a foam.

20 760. The system of Clause 759 wherein the foam comprises a liquid foam configured to cure into a solid form comprising a formed structure.

761. The system of Clause 664 wherein the pod is inflated after items of payload are in the pod.

762. The system of Clause 664 wherein the pod is inflated to a first inflated state
25 before flight.

763. The system of Clause 762 wherein the pod is inflated to a second inflated state during flight.

764. The system of Clause 763 wherein the pod is in a third state after the mission is completed.

30 765. The system of Clause 762 wherein the pod comprises a first set of inflatable segments.

766. The system of Clause 762 wherein in the first inflated state the first set of inflatable segments is inflated.

767. The system of Clause 763 wherein in the second inflated state a second set of inflatable segments is inflated.

768. The system of Clause 767 wherein in the third inflated state the second set of inflatable segments is deflated.

5 769. The system of Clause 664 wherein the second set of inflatable segments comprises aerodynamic surfaces.

770. The system of Clause 769 wherein the surfaces comprise wings.

771. The system of Clause 762 wherein the pod is configured in a first size comprising a first volume in the first inflated state.

10 772. The system of Clause 763 wherein the pod is configured in a second size comprising a second volume in the second inflated state.

773. The system of Clause 771 wherein the first size of the pod in the first inflated state is smaller than the second size of the pod in the second inflated state.

15 774. The system of Clause 664 wherein the pod is dynamically adjusted in shape during the mission by inflation of the pod.

775. The system of Clause 664 wherein the pod is dynamically adjusted in shape during the mission by inflation of segments of the pod.

776. The system of Clause 762 wherein the pod further comprises a first drag coefficient in the first inflated state.

20 777. The system of Clause 763 wherein the pod further comprises a second drag coefficient in the second inflated state.

778. The system of Clause 664 wherein payload comprises a payload unit.

779. The system of Clause 664 wherein payload comprises payload units.

780. The system of Clause 664 wherein the carrier comprises a space frame.

25 781. The system of Clause 664 wherein the carrier comprises a base.

782. The system of Clause 664 wherein the carrier comprises a cover.

783. The system of Clause 664 wherein the carrier comprises a formed structure.

784. The system of Clause 664 wherein the carrier attaches payload to the aircraft.

785. The system of Clause 664 wherein the carrier attaches a payload unit.

30 786. The system of Clause 664 wherein the carrier attaches a pod providing a compartment.

787. The system of Clause 664 wherein the pod is formed with a payload unit.

788. The system of Clause 664 wherein the pod is formed with a compartment for payload.

789. The system of Clause 664 wherein the pod comprises a foam pod.

790. The system of Clause 664 wherein the pod comprises a formed pod.

5 791. The system of Clause 790 wherein the formed pod is formed by injection of a material.

792. The system of Clause 664 wherein the pod is formed by injection of a foam.

793. The system of Clause 792 wherein the foam forms a formed structure.

10 794. The system of Clause 792 wherein the foam provided in an aerodynamic shape.

795. The system of Clause 792 wherein the foam at least partially encompasses each item of payload.

796. The system of Clause 664 wherein the containment system comprises a protection system for payload.

15 797. The system of Clause 664 further comprising a control system for operation of the containment system.

798. The system of Clause 664 further comprising instrumentation providing data sources for the control system to operate the containment system.

799. The system of Clause 798 wherein data sources comprise a network.

20 800. The system of Clause 799 wherein the network comprises the internet.

801. A method of payload management for an unmanned aircraft system to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions comprising the steps of:

25 (a) providing a pod comprising at least one inflatable segment to contain payload;

(b) placing payload in the pod;

(c) associating the pod with the aircraft so that the payload can be carried by the aircraft on the mission;

(d) at least partially inflating at least one inflatable segment of the pod.

30 802. The method of Clause 801 wherein the step of at least partially inflating at least one inflatable segment of the pod is performed before flight.

803. The method of Clause 801 wherein the step of at least partially inflating at least one inflatable segment of the pod is performed during flight.

804. The method of Clause 801 wherein the step of at least partially inflating at least one inflatable segment of the pod is performed to adjust the aerodynamic profile of the pod.

5 805. The method of Clause 801 wherein the step of at least partially inflating at least one inflatable segment of the pod is performed during flight.

806. The method of Clause 801 further comprising the step of deflating the pod.

807. The method of Clause 806 wherein the step of deflating the pod is performed after flight.

10 808. The method of Clause 806 wherein the step of deflating the pod is performed during flight.

809. The method of Clause 801 wherein the step of providing the pod is performed by the originator.

810. The method of Clause 801 wherein the step of placing payload in the pod is performed by the originator.

15 811. The method of Clause 801 wherein the step of placing payload in the pod is performed by the transporter.

812. The method of Clause 801 wherein configuring the containment system comprises attachment of the pod to the carrier.

20 813. The method of Clause 801 wherein the pod is shaped to enhance aerodynamic control.

814. The method of Clause 801 wherein the pod is configured to increase lift.

815. The method of Clause 801 wherein the pod is configured to facilitate control of aerodynamic torque.

816. The method of Clause 801 wherein the pod is configured to provide indicia.

25 817. The method of Clause 816 wherein the indicia is a marking on the pod.

818. The method of Clause 816 wherein the indicia is on the pod.

819. The method of Clause 816 wherein the indicia is visually perceptible.

820. The method of Clause 816 wherein the indicia is human-readable.

821. The method of Clause 816 wherein the indicia is machine-readable.

30 822. The method of Clause 816 wherein the indicia comprises an identifier.

823. The method of Clause 816 wherein the indicia comprises data.

824. The method of Clause 823 wherein the data is transmitted on a network.

825. The method of Clause 816 wherein the indicia comprises data as to pod configuration.

826. The method of Clause 823 wherein the data comprises data as to indicate pod aerodynamic performance.

5 827. The method of Clause 816 wherein the indicia comprises a device.

828. The method of Clause 827 wherein the device comprises a transmitter tag.

829. The method of Clause 801 wherein the pod is configured with payload by an originator.

10 830. The method of Clause 801 wherein the pod is configured for the transporter in an uninflated condition.

831. The method of Clause 801 wherein the pod is secured for transport to the transporter for the mission.

832. The method of Clause 831 wherein the pod is secured in a band.

833. The method of Clause 831 wherein the pod is secured by a tape.

15 834. The method of Clause 831 wherein the pod is secured by a fabric.

835. The method of Clause 831 wherein the pod is secured by an elastomer.

836. The method of Clause 801 wherein the pod is transported to the transporter in an uninflated condition with payload.

20 837. The method of Clause 832 wherein the pod is inflated when secured in the band.

838. The method of Clause 832 wherein the band stretches when the pod is inflated.

839. The method of Clause 832 wherein the band comprises at least one of (a) tape; (b) tape strips; (c) tape wrap; (d) fabric segments; (e) tearable material; (f) elastomeric material; (g) stretchable material.

25 840. The method of Clause 801 wherein the pod comprises a plastic bag.

841. The method of Clause 801 wherein the pod comprises an inflatable bag.

842. The method of Clause 801 wherein the pod comprises an elastomeric material.

843. The method of Clause 801 wherein payload is sealed in the pod.

844. The method of Clause 801 wherein the pod is configured by inflation.

30 845. The method of Clause 801 wherein the pod is configured by deflation.

846. The method of Clause 801 wherein the pod is configured by at least partial inflation.

847. The method of Clause 801 wherein the pod is configured by at least partial deflation.

848. The method of Clause 801 wherein the containment system comprises a plurality of pods for payload attachable to the aircraft.

5

[180] While various aspects and embodiments have been disclosed herein, other aspects and embodiments will be apparent to those skilled in the art. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

CLAIMS

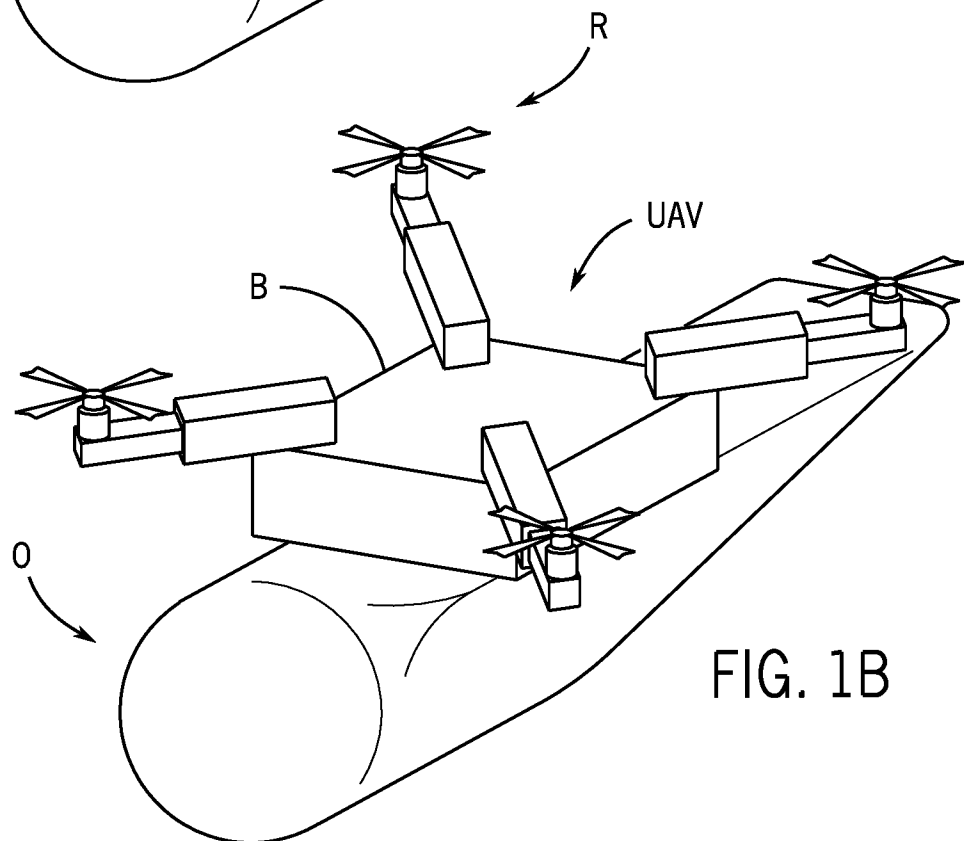
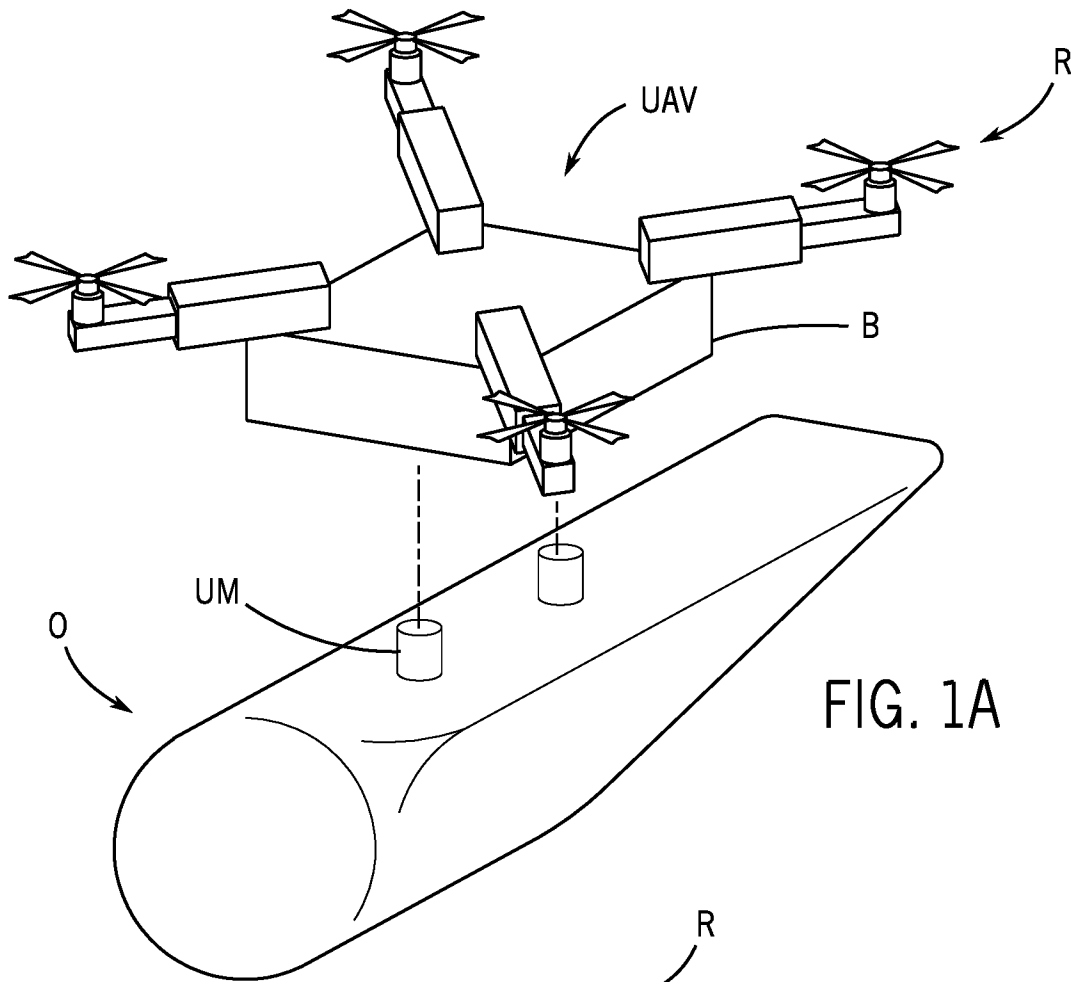
1. A payload management system for an unmanned aircraft system providing an aircraft to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions comprising:
 - 5 (a) a carrier for payload configured to be carried by the aircraft;
 - (b) a containment system configured to contain payload;wherein the containment system comprises an inflatable pod attachable to the carrier; wherein the pod of the containment system is attached to the exterior of the aircraft.
2. The system of Claim 1 wherein the containment system for payload is attachable
10 to the aircraft by the carrier so that payload contained in the pod of the containment system can be carried by the aircraft.
3. The system of Claim 1 wherein payload comprises cargo to be transported on the mission.
4. The system of Claim 1 wherein cargo comprises at least one segment.
- 15 5. The system of Claim 1 wherein payload comprises one payload segment.
6. The system of Claim 1 wherein the containment system is configurable by the originator prior to providing payload to the transporter for the mission.
7. The system of Claim 1 wherein the containment system is configurable by the transporter prior to the mission.
- 20 8. The system of Claim 1 wherein the containment system is configurable by the transporter after receipt of payload from the originator.
9. The system of Claim 1 wherein the containment system is deployable by the transporter prior to the mission.
10. The system of Claim 1 wherein the containment system is deployable for at least
25 one event.

11. The system of Claim 1 wherein the mission comprises at least one event comprising at least one of (a) takeoff of the aircraft for the mission; (b) flight of the aircraft on the mission; (c) landing of the aircraft during the mission; (d) landing of the aircraft at the end of the mission; (e) an identified condition during flight; (f) a hazard during flight; (g) a potential malfunction of the aircraft during flight; (h) an impact by payload; (i) an impact by the aircraft.
12. The system of Claim 1 wherein payload comprises at least one payload segment and the containment system is configured to provide containment of payload during at least one of (a) impact of the aircraft with an object; (b) effect of environmental conditions in flight; (c) effect of operating conditions in flight; (d) contact between a payload segment with another object; (e) heat; (f) fire; (g) exposure to environmental conditions.
13. A payload management system for an unmanned aircraft system providing an aircraft to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions comprising:
- (a) a carrier for payload configured to be carried by the aircraft;
- (b) a containment system configured to contain payload;
- wherein the containment system comprises a fillable pod carried by the carrier at least partially exterior to the aircraft;
- wherein the pod comprises at least one compartment for payload.
14. The system of Claim 13 wherein the pod comprises a container.
15. The system of Claim 13 wherein the fillable pod is an inflatable pod.
16. The system of Claim 13 wherein the fillable pod is a fluid-filled pod.
17. The system of Claim 13 wherein the fillable pod is a foam-filled pod.
18. The system of Claim 13 further comprising a control system is to control operation of the containment system.
19. The system of Claim 13 further comprising instrumentation to provide data for the control system.

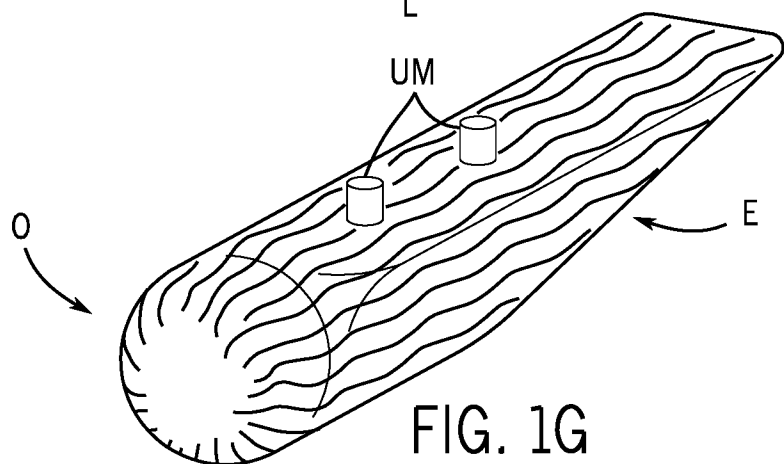
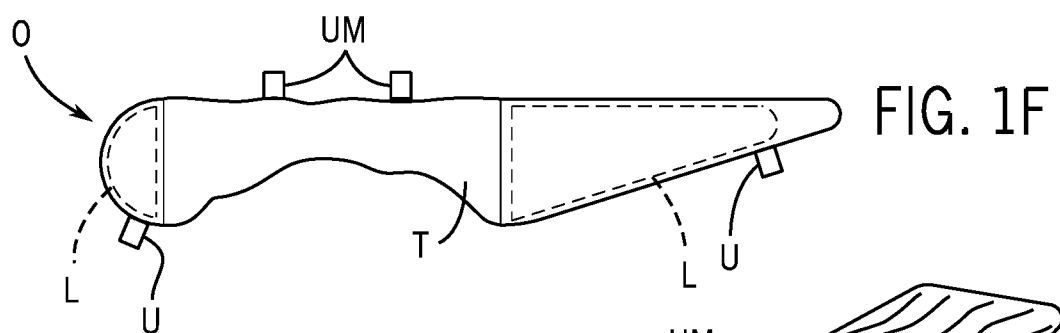
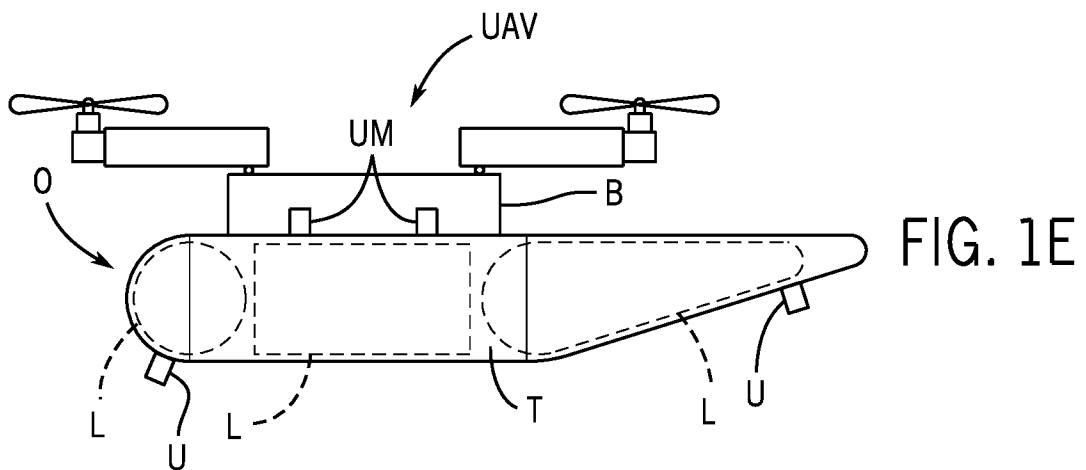
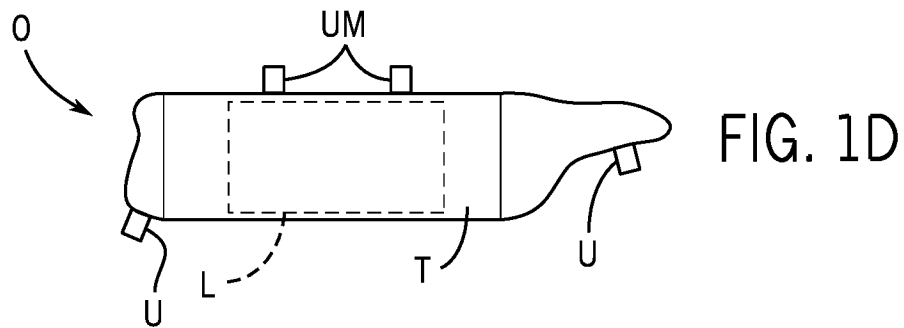
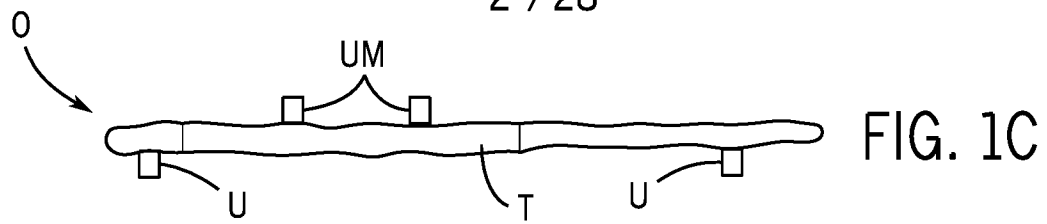
20. The system of Claim 13 wherein the pod is completely exterior to the carrier for payload.
21. The system of Claim 13 wherein the pod comprises an aerodynamic form.
22. The system of Claim 13 wherein payload comprises cargo to be transported on the mission.
23. A payload management system for an unmanned aircraft system to carry payload comprising at least one payload segment on a mission from an originator by a transporter to a destination in operating conditions comprising:
- a carrier for payload to be carried by the aircraft;
- 10 a containment system providing a pod comprising at least one container for payload;
- wherein the pod is provided in an at least partially inflatable form to provide containment for payload to be carried at least partially external to the aircraft.
24. The system of Claim 23 the pod is configured to be selectively inflated and selectively deflated.
25. The system of Claim 23 wherein the form of the pod comprises an aerodynamic shape.
26. The system of Claim 23 wherein the pod comprises an aerodynamically-shaped pod.
- 20 27. The system of Claim 23 wherein the form of the pod comprises an inflatable pod.
28. The system of Claim 23 wherein the pod when inflated comprises an aerodynamic shape.
29. The system of Claim 23 wherein the pod comprises an inflatable compartment.
- 25

30. The system of Claim 23 wherein the pod comprises at least one inflatable compartment.
31. The system of Claim 23 wherein the pod comprises a plurality of inflatable segments.
- 5 32. The system of Claim 23 wherein the pod comprises a plurality of selectively inflatable sections.
33. The system of Claim 23 wherein the pod comprises a plurality of selectively inflatable segments.
34. The system of Claim 23 wherein the pod is inflated to form an inflatable pod
- 10 before attachment to the aircraft.

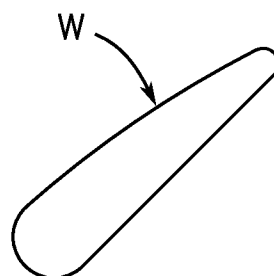
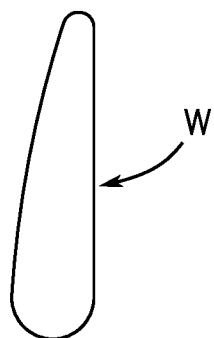
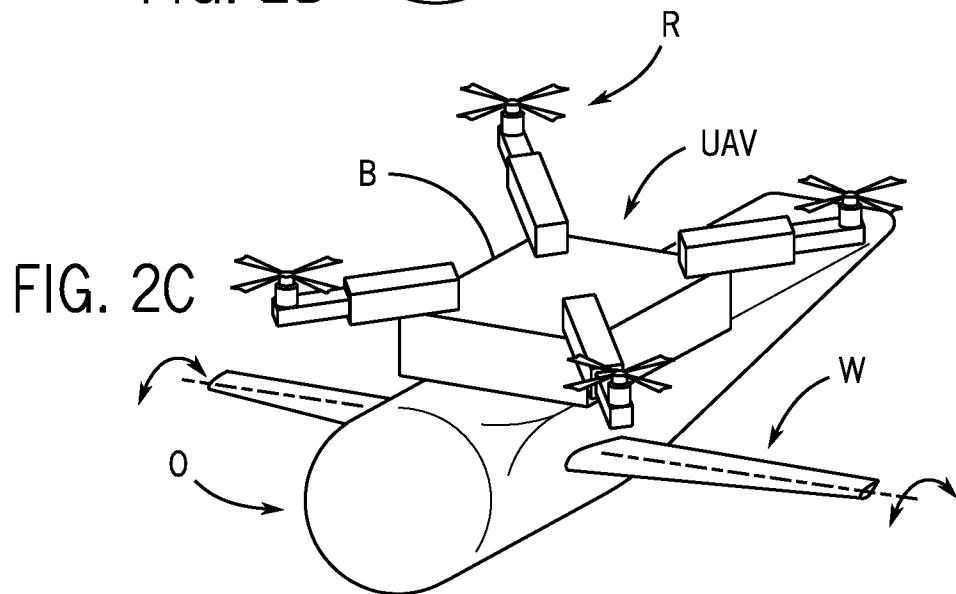
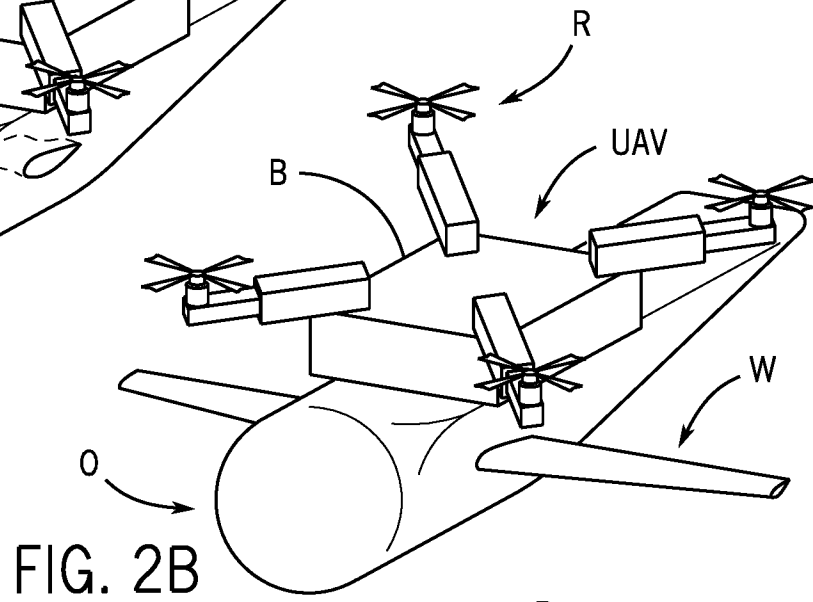
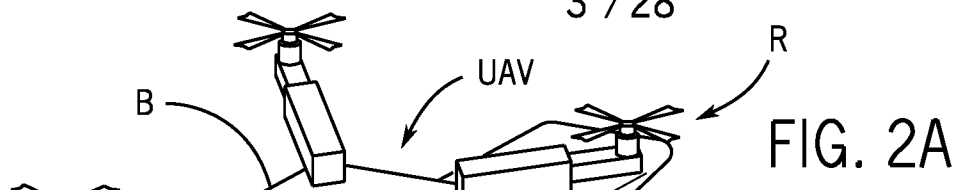
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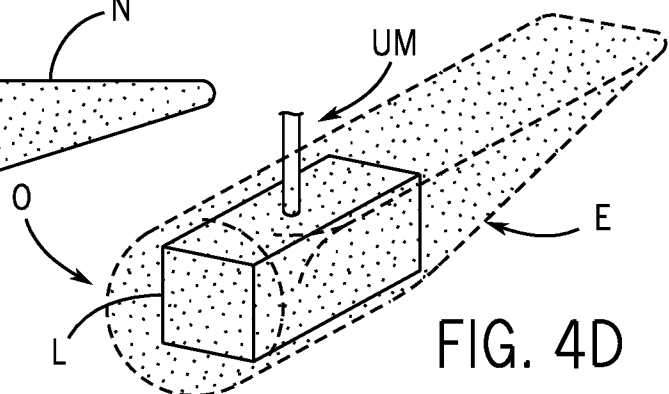
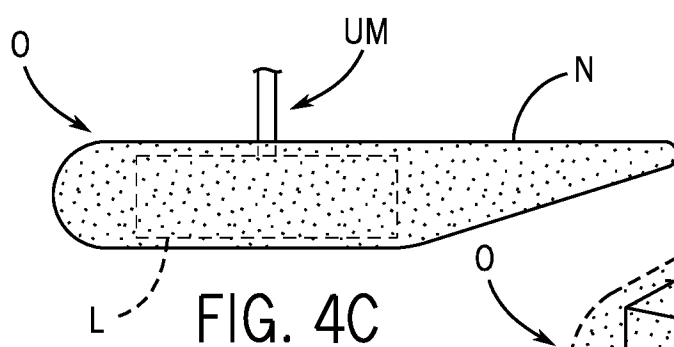
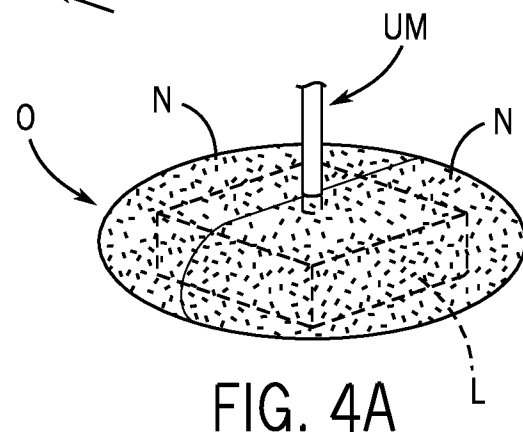
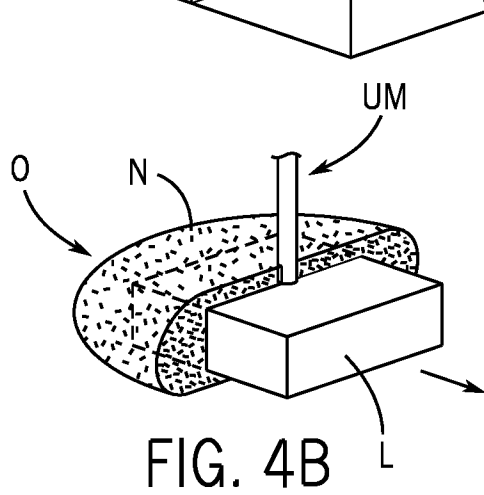
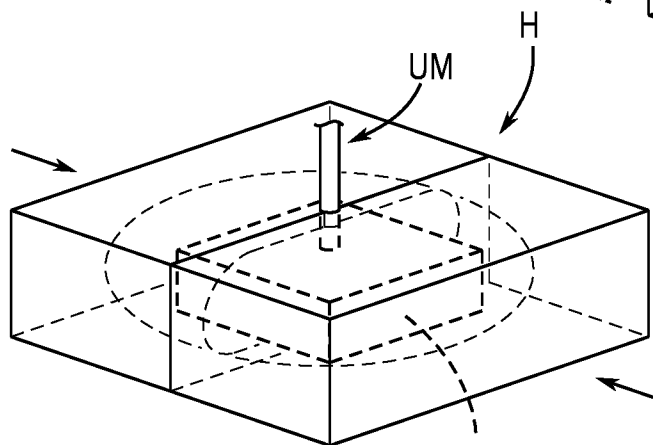
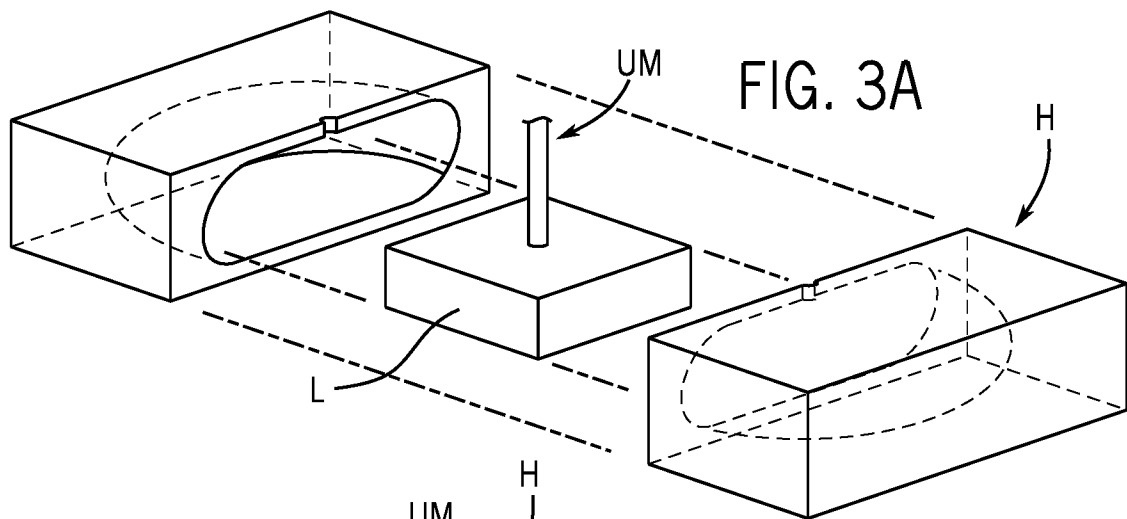
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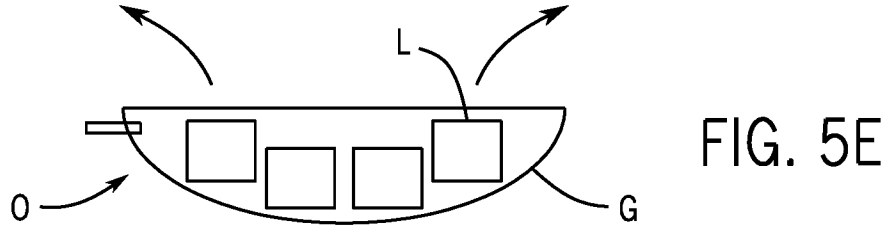
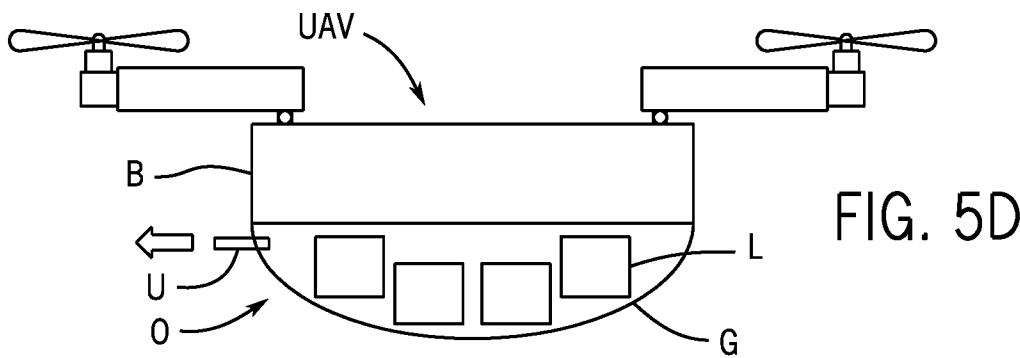
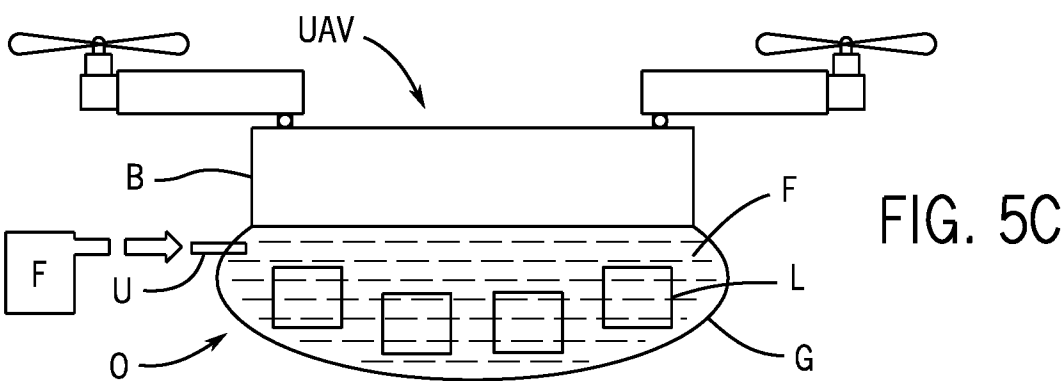
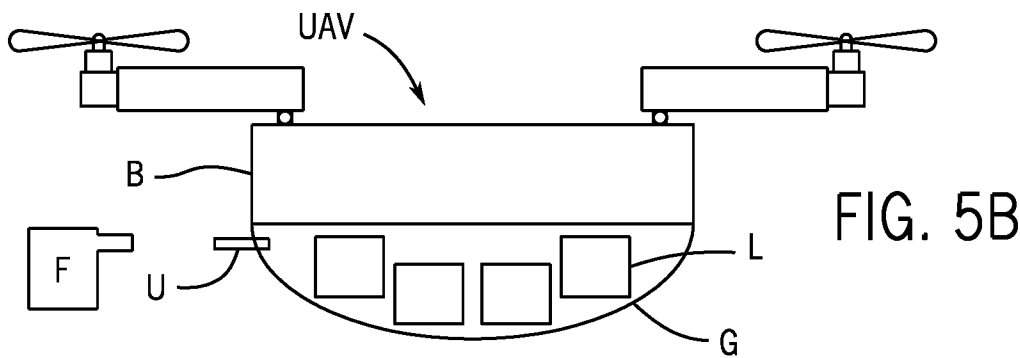
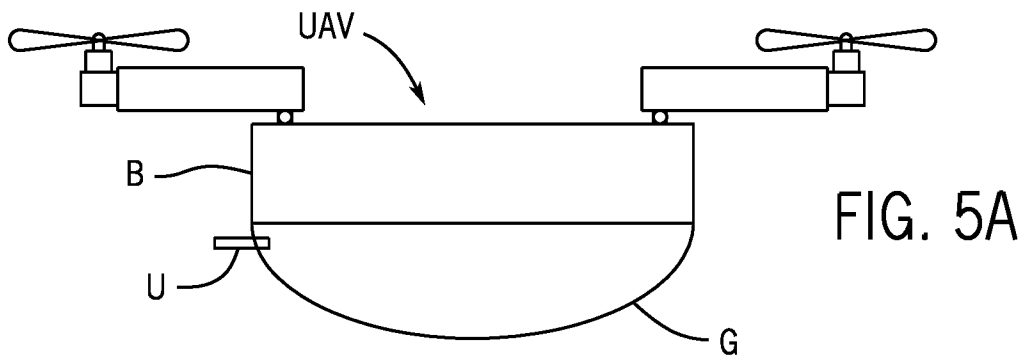


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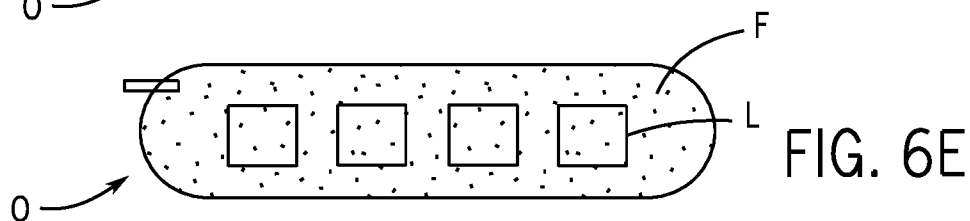
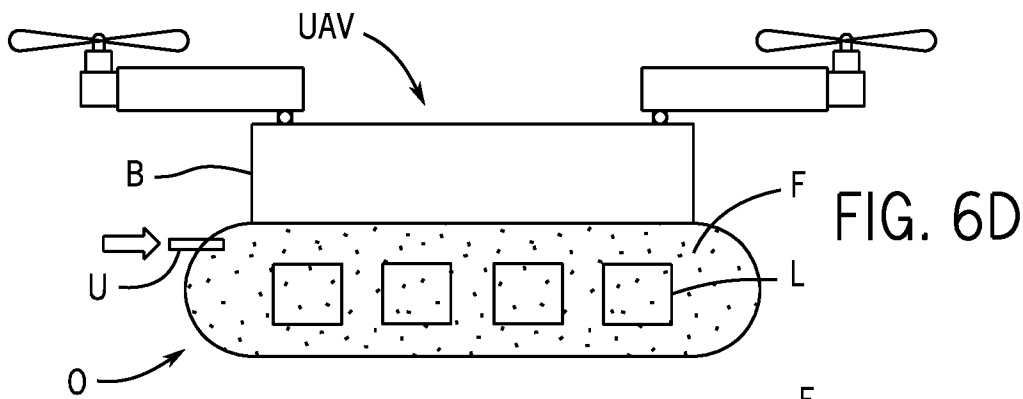
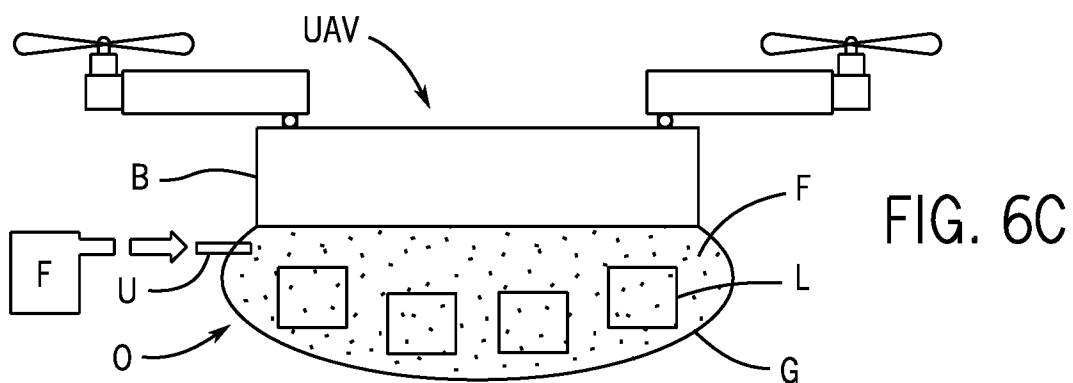
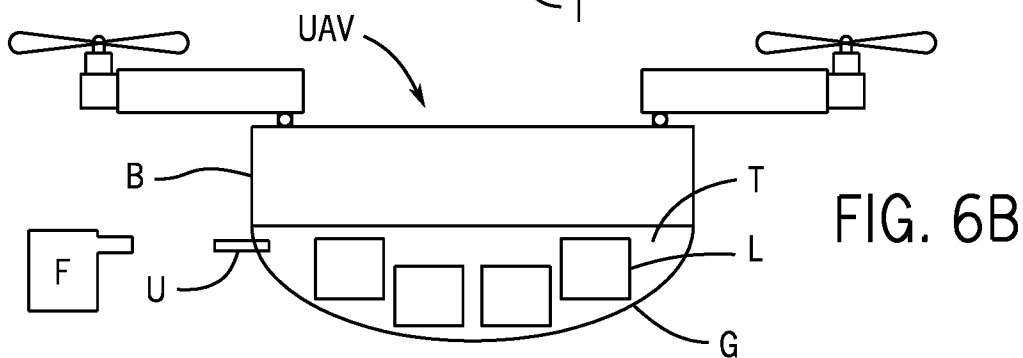
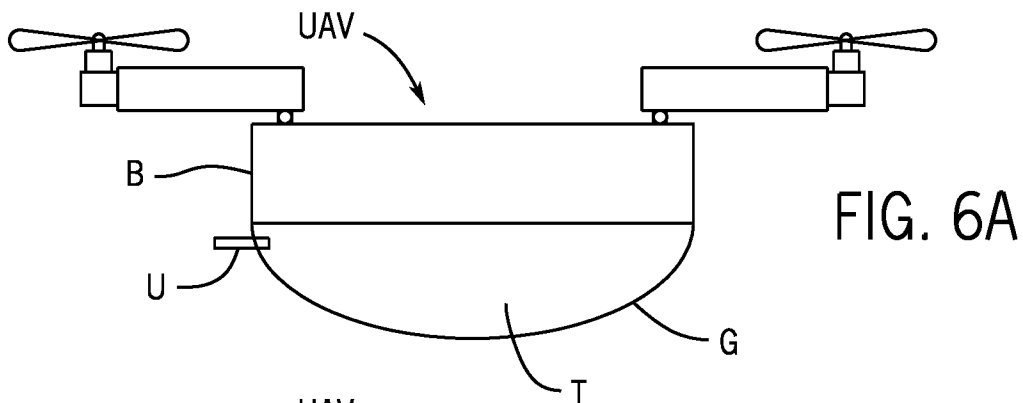


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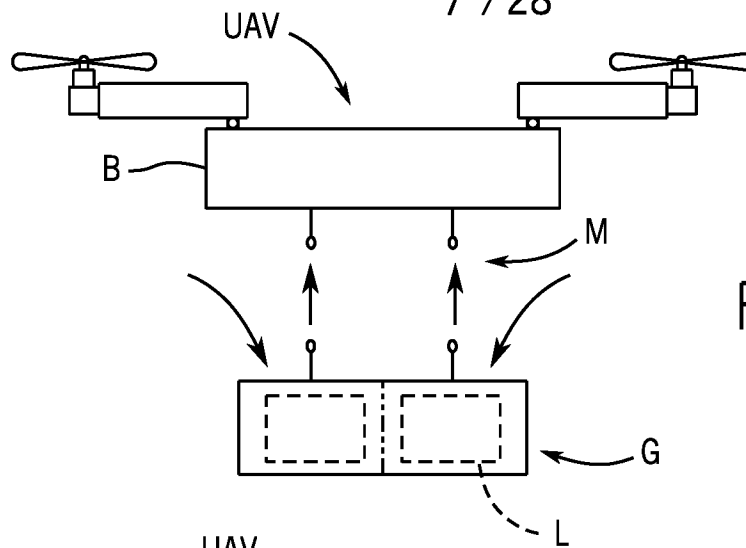


FIG. 7A

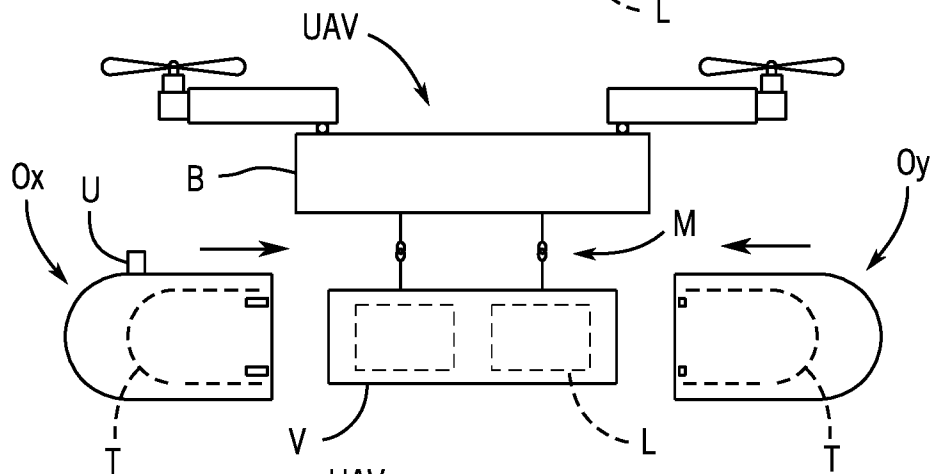


FIG. 7B

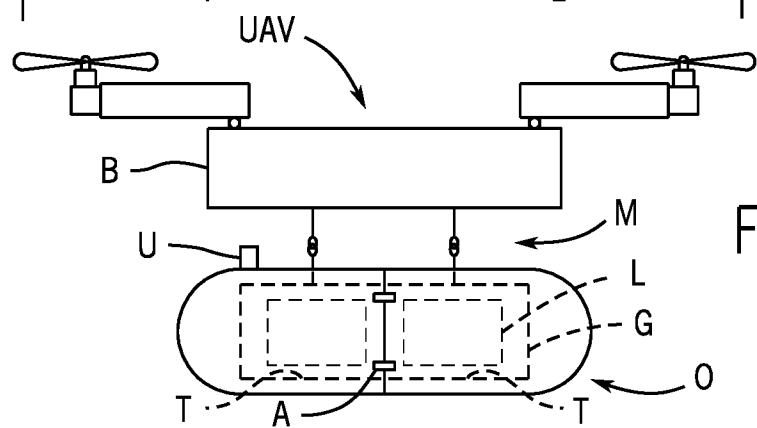


FIG. 7C

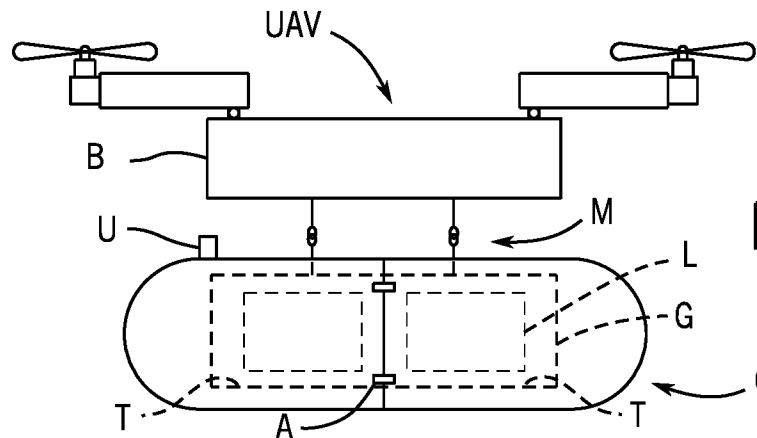
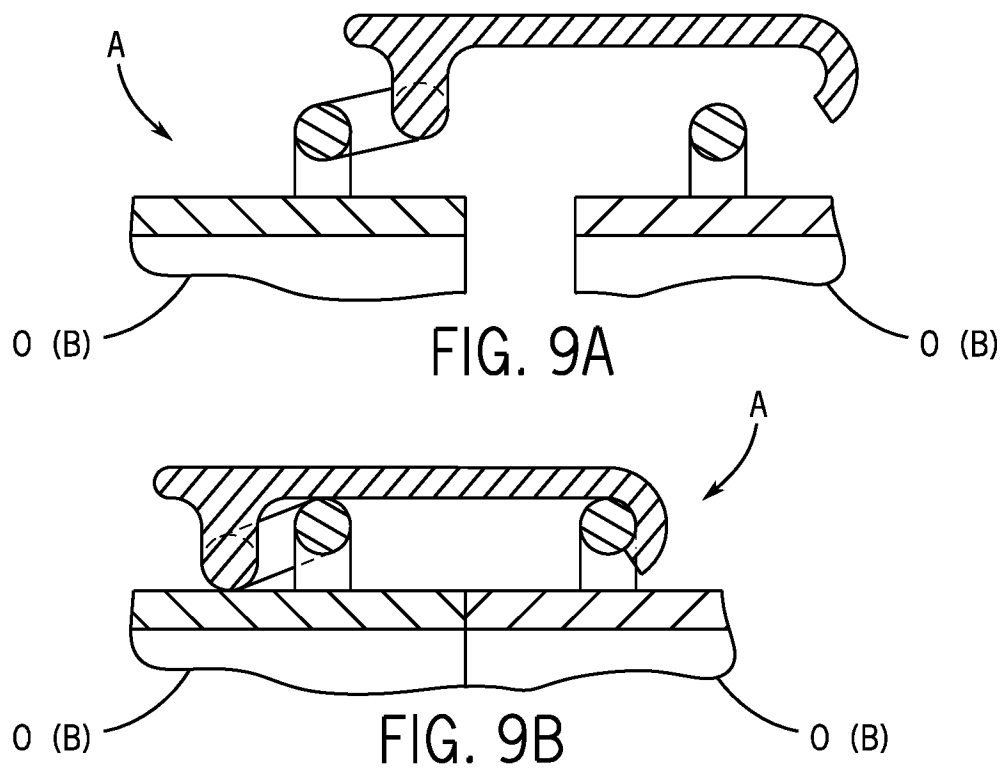
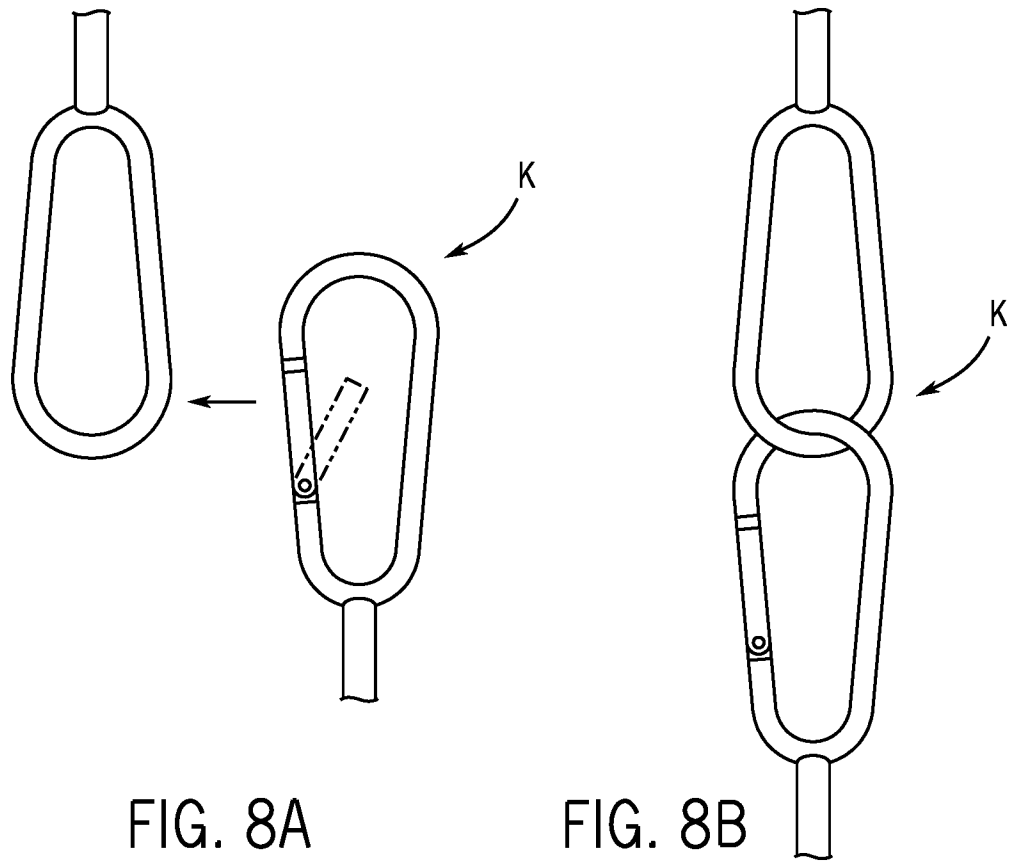
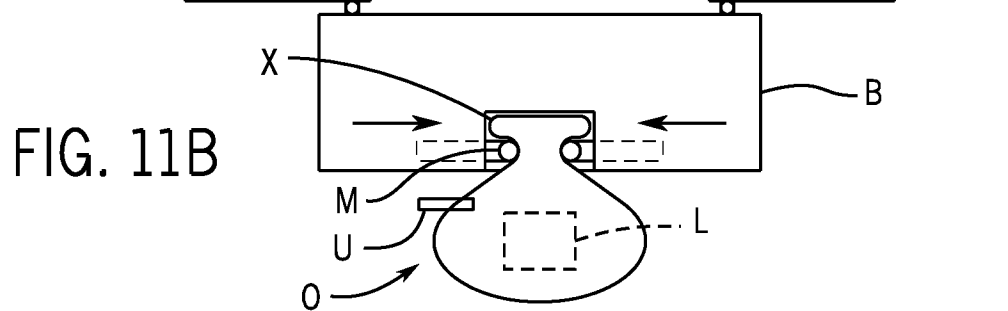
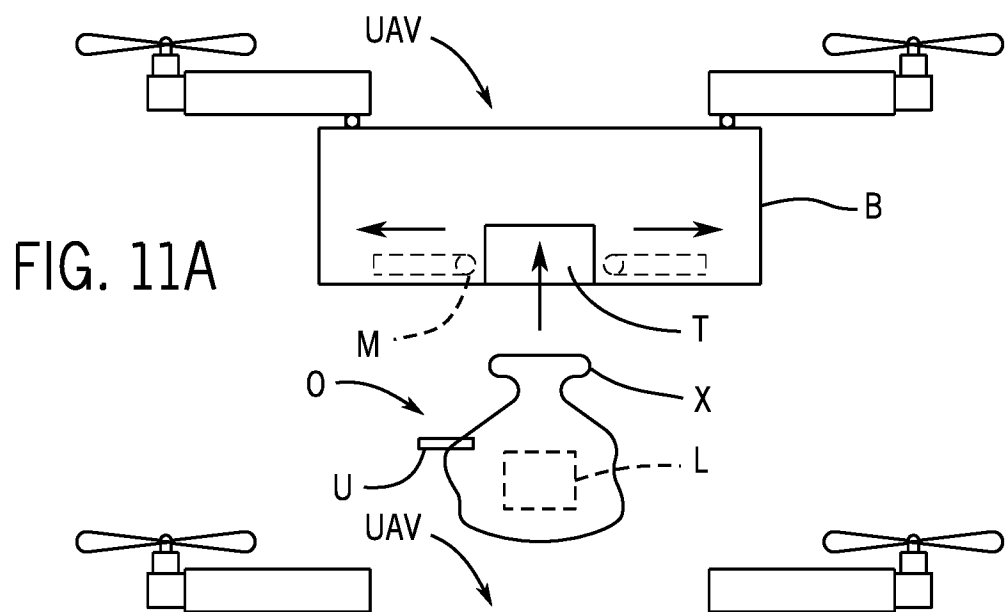
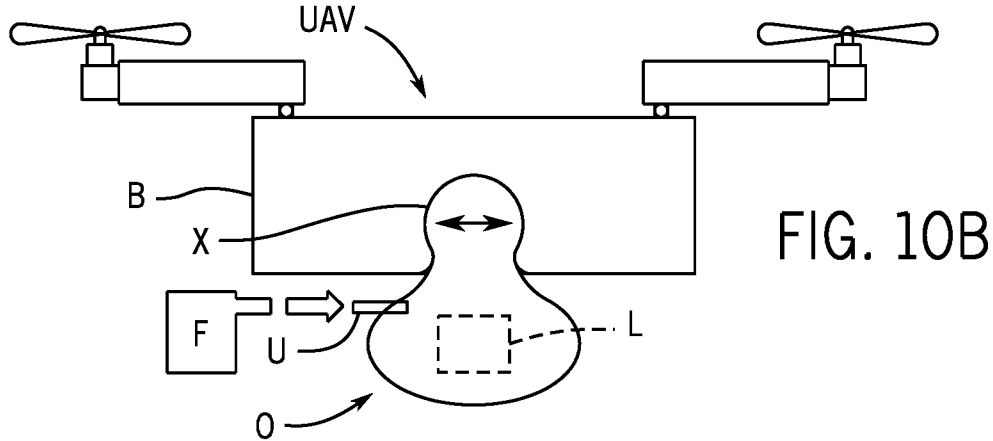
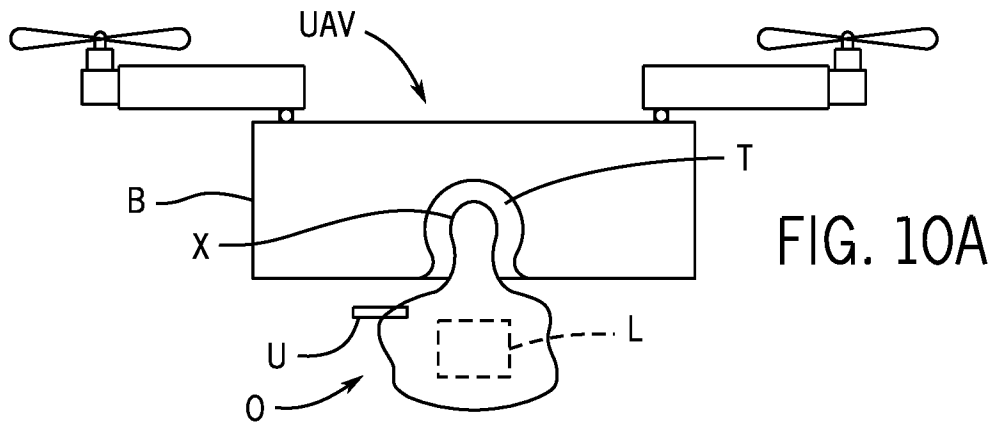


FIG. 7D

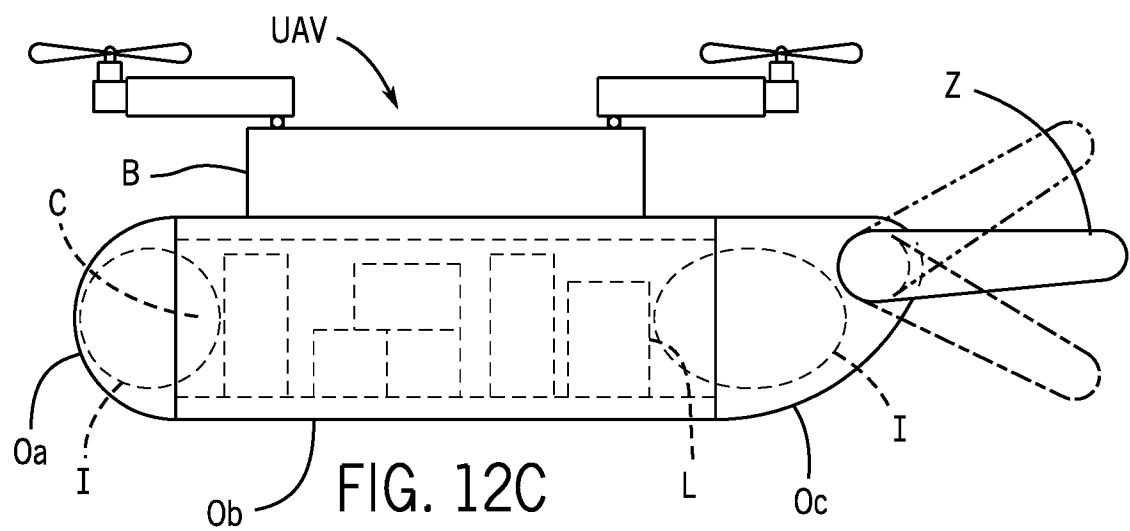
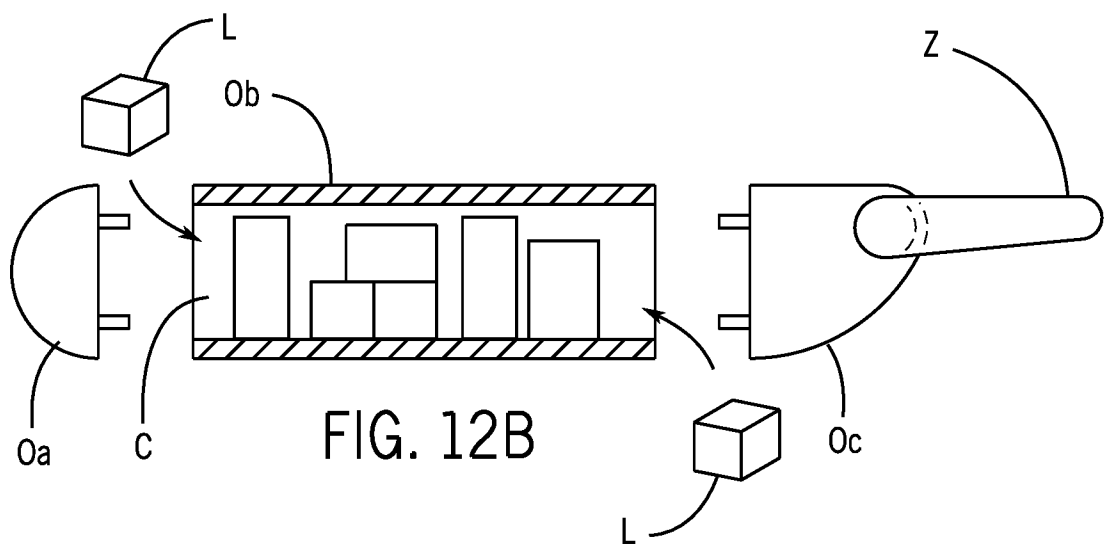
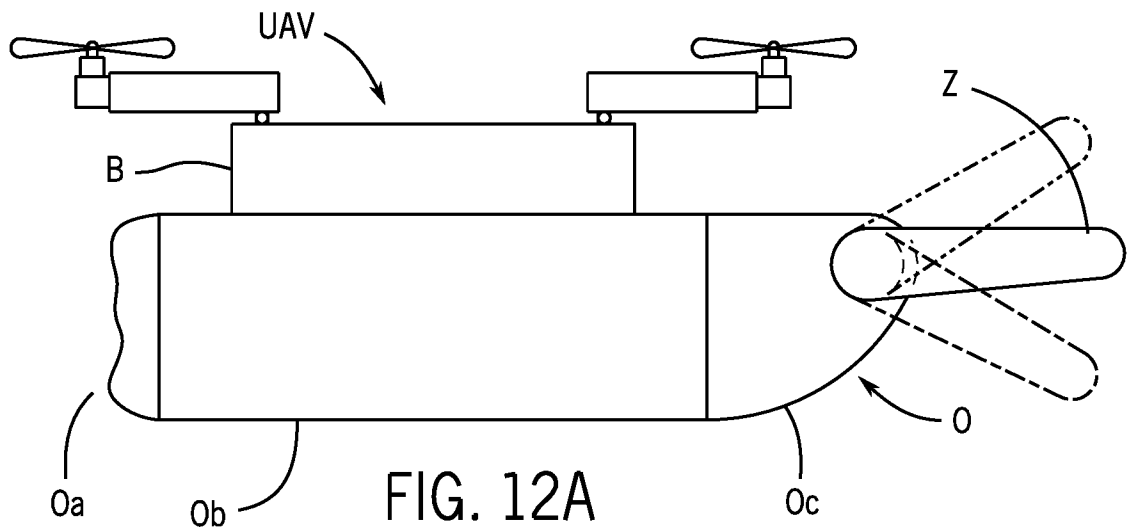
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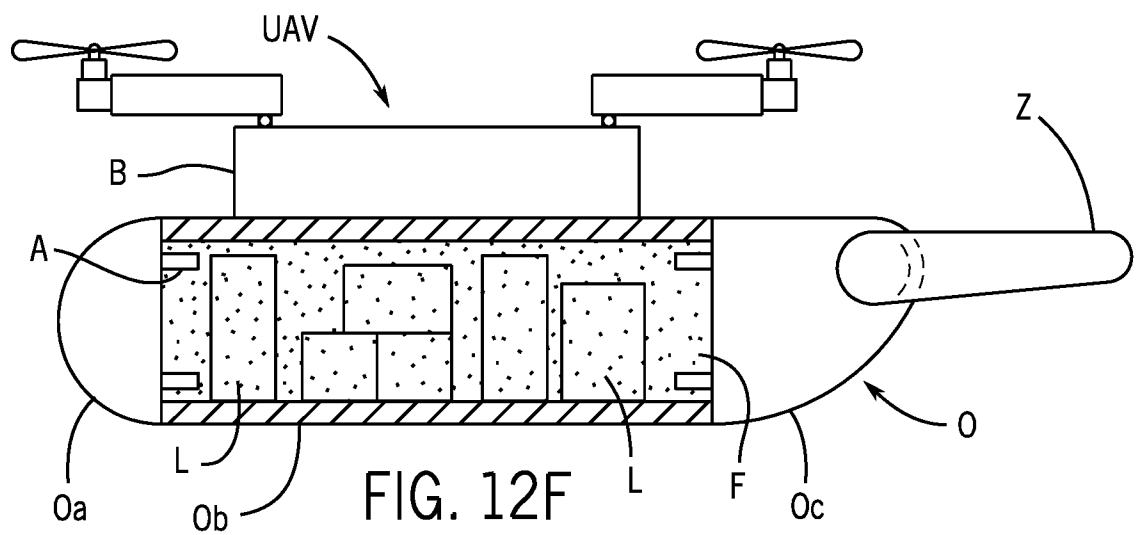
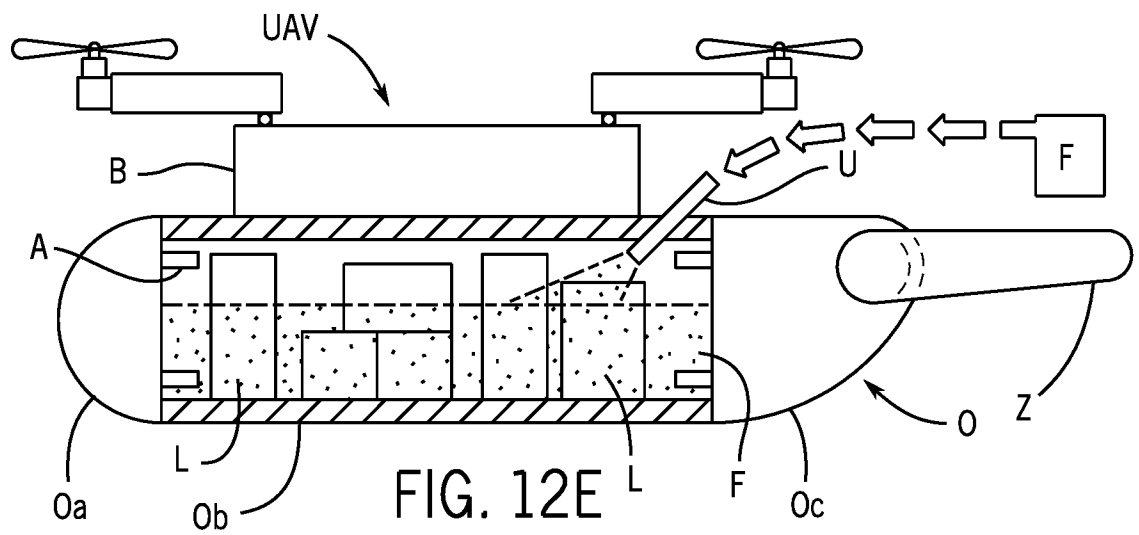
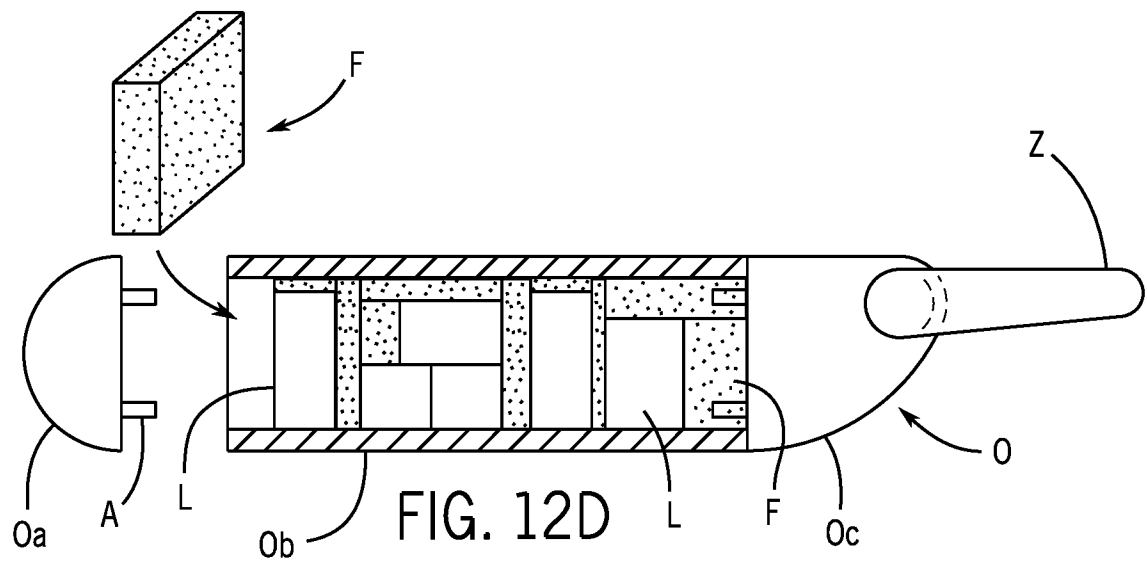


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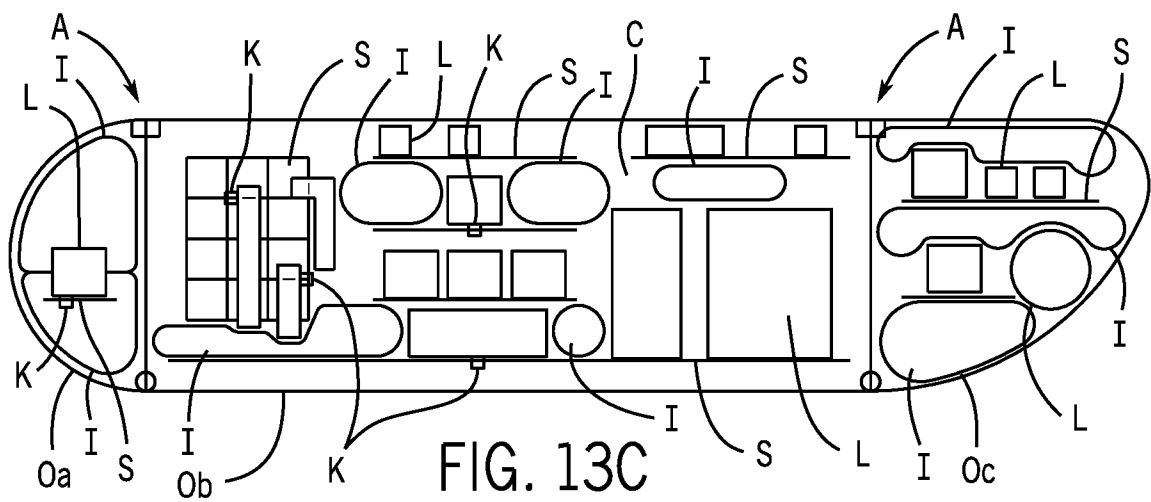
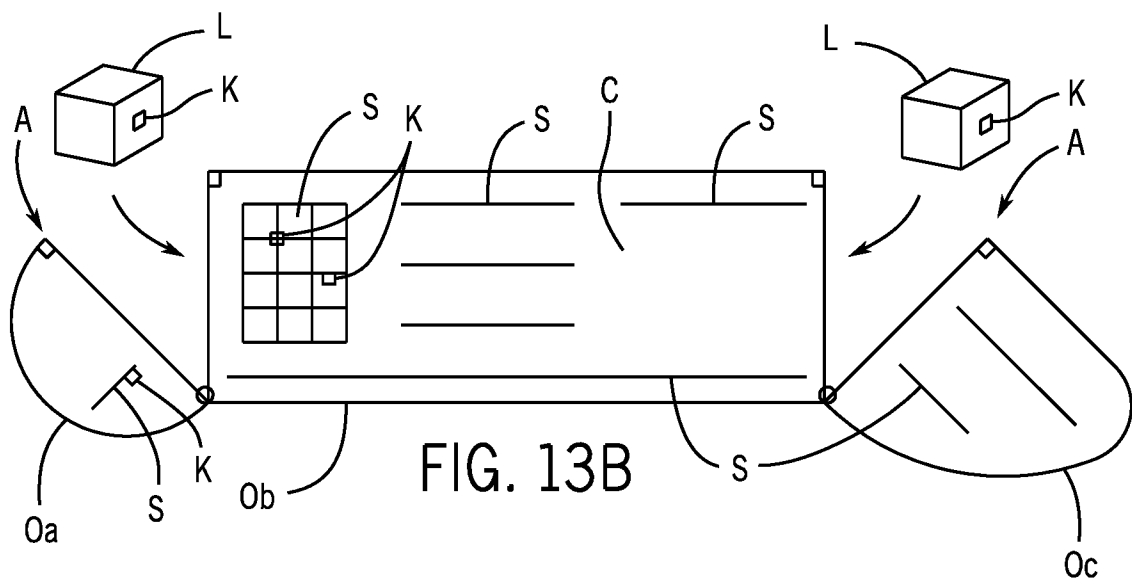
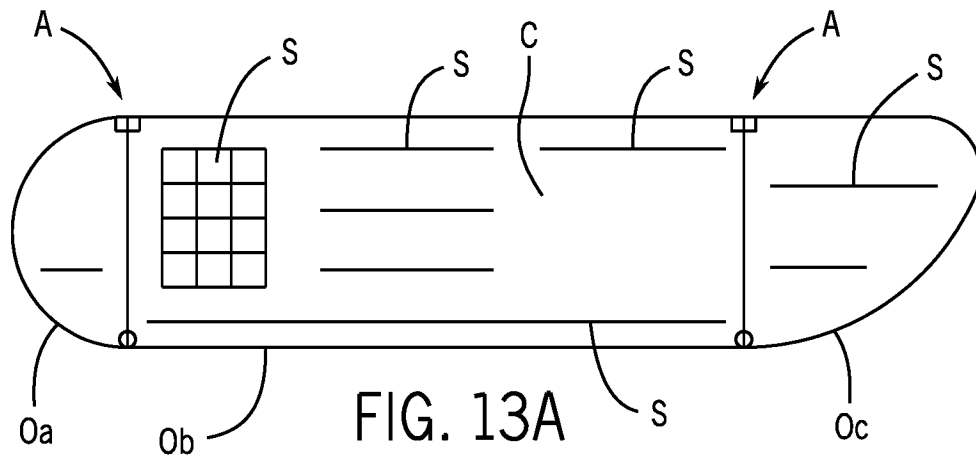


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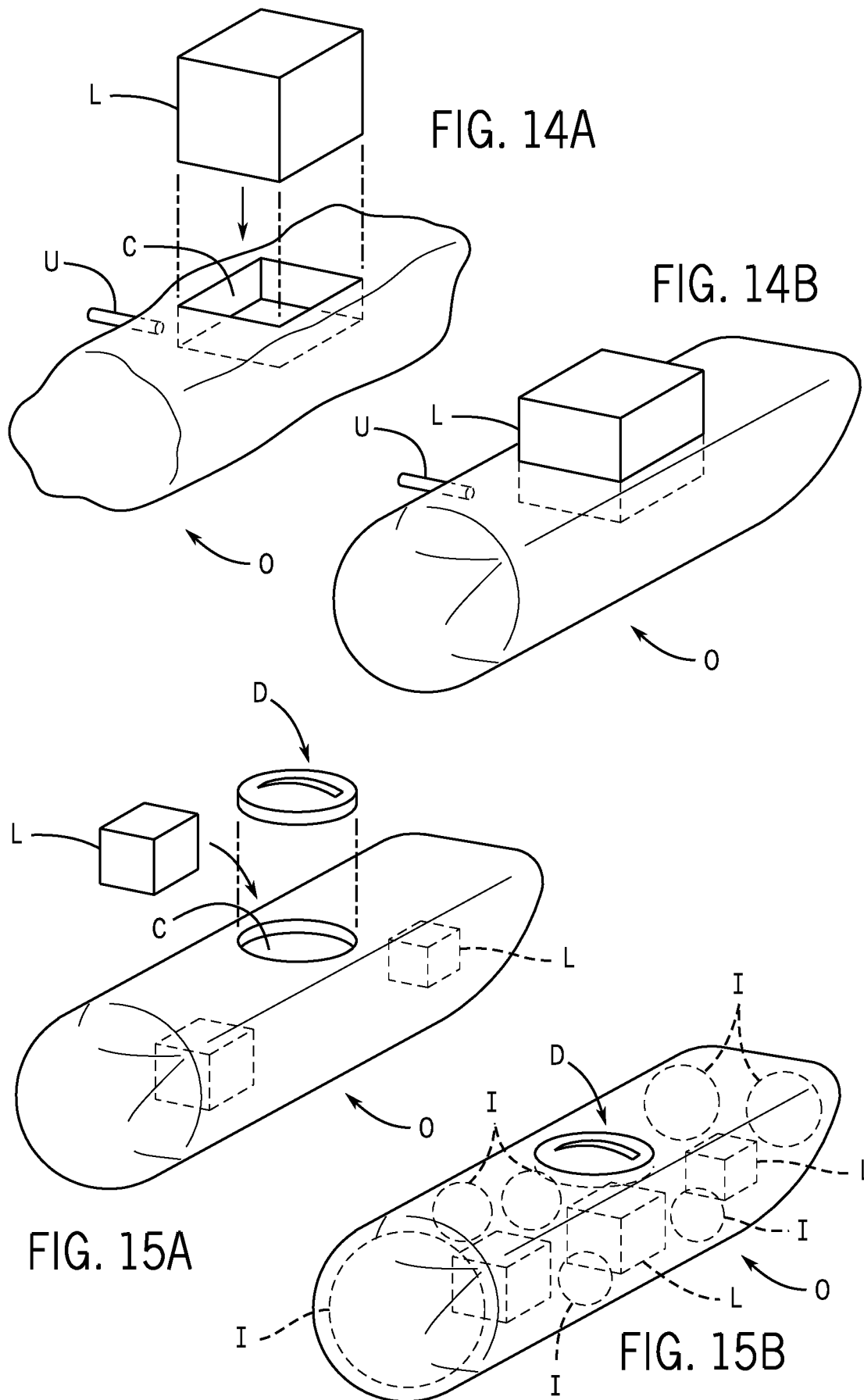




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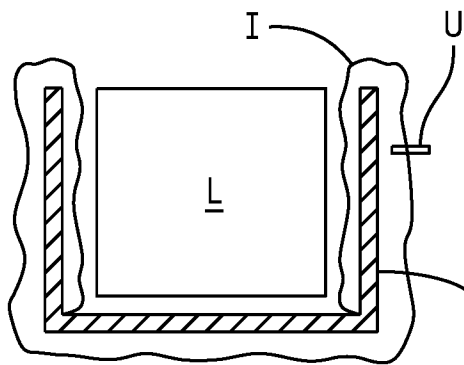


FIG. 16A

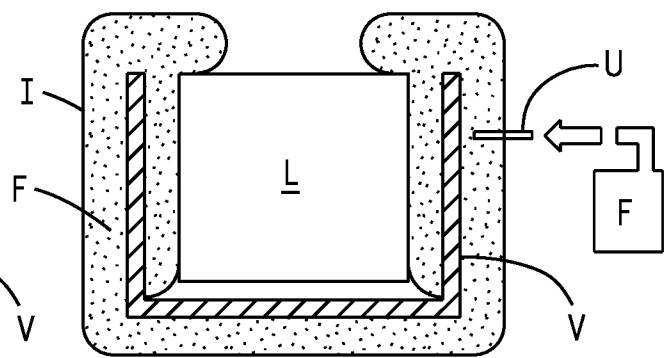


FIG. 16B

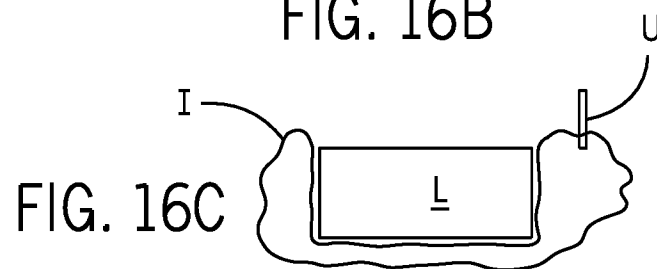


FIG. 16C

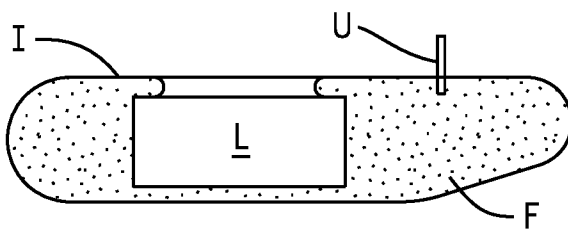


FIG. 16D

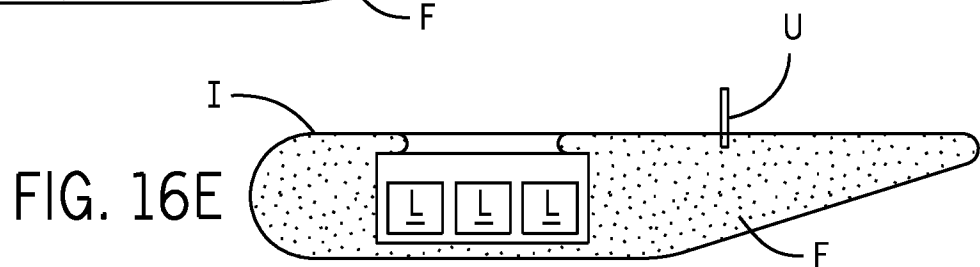


FIG. 16E

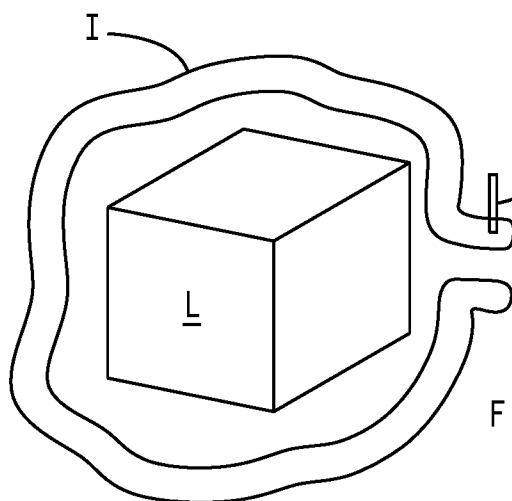


FIG. 17A

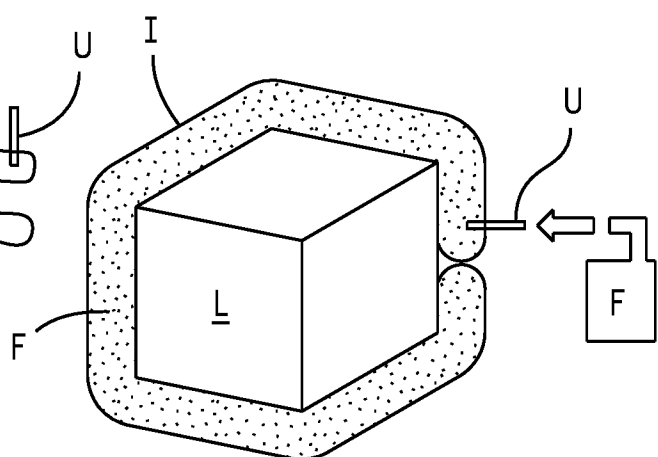


FIG. 17B

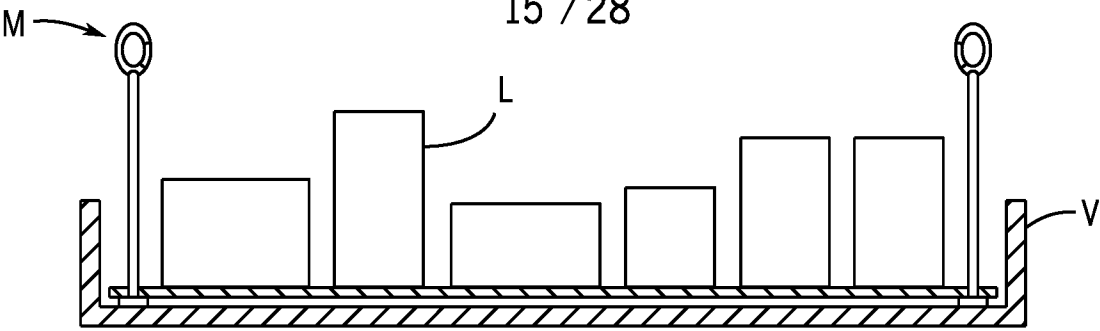


FIG. 18A

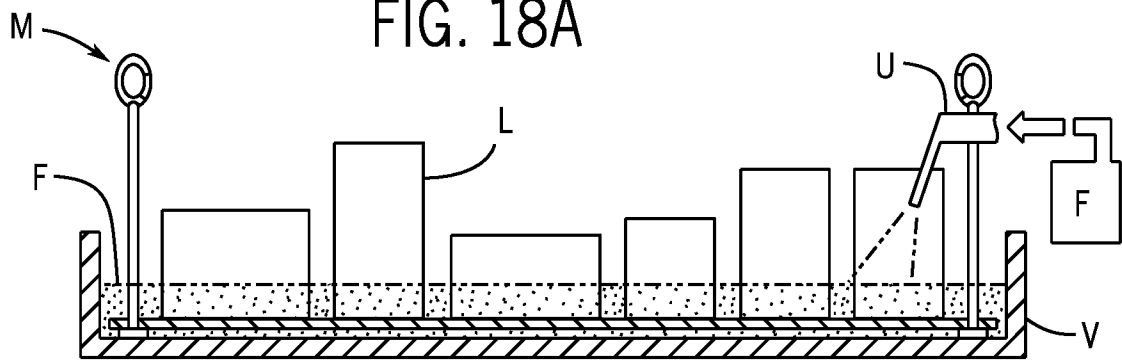


FIG. 18B

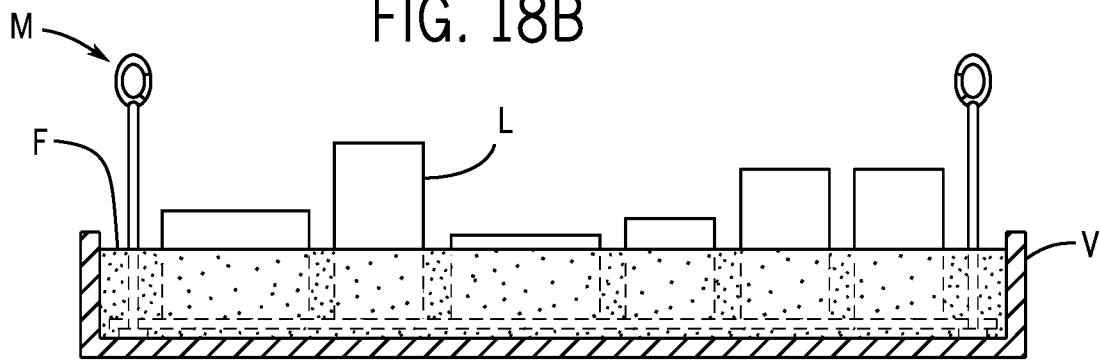


FIG. 18C

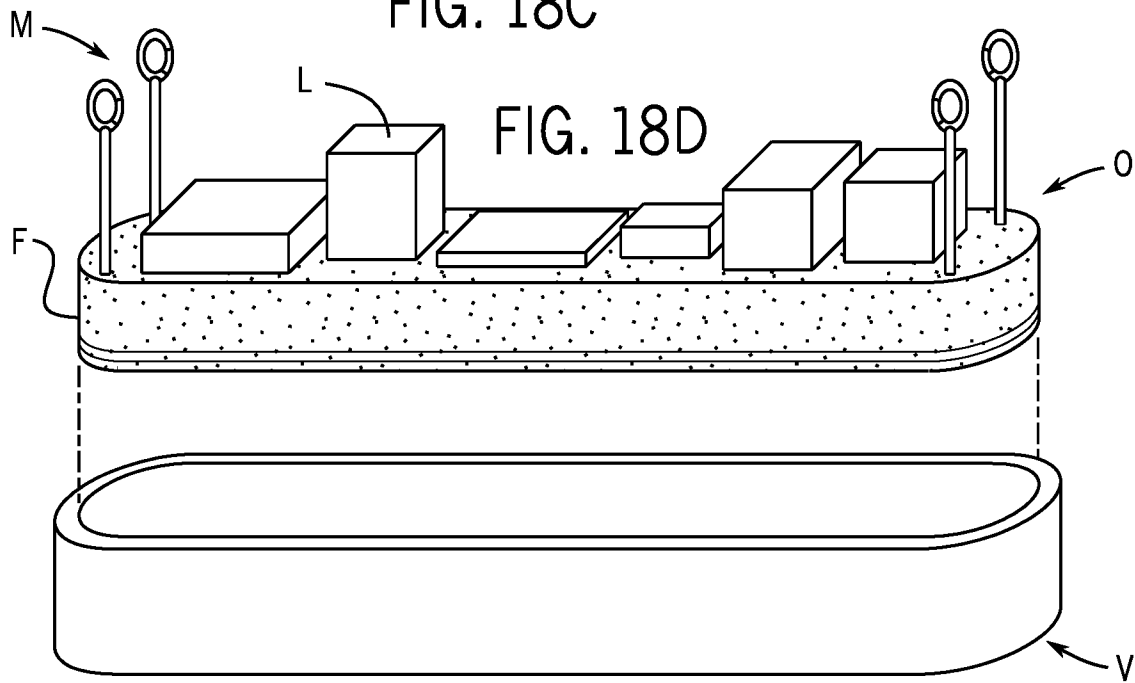


FIG. 18D

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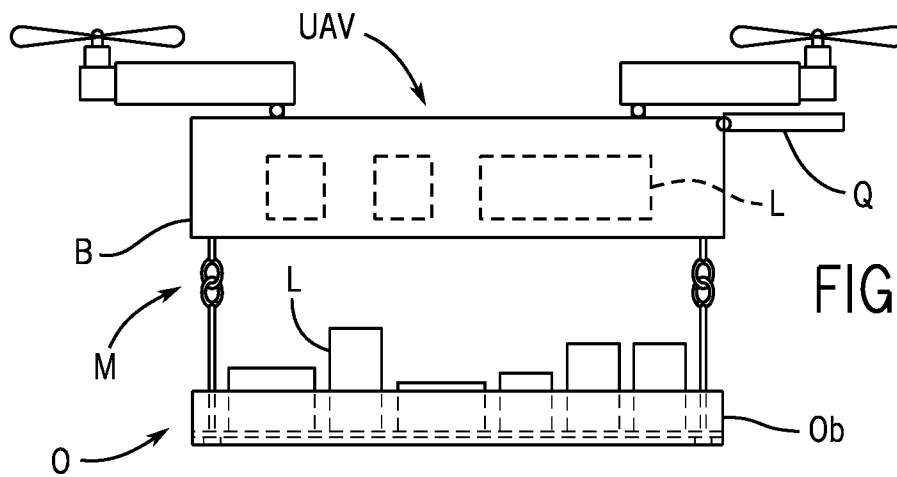


FIG. 19A

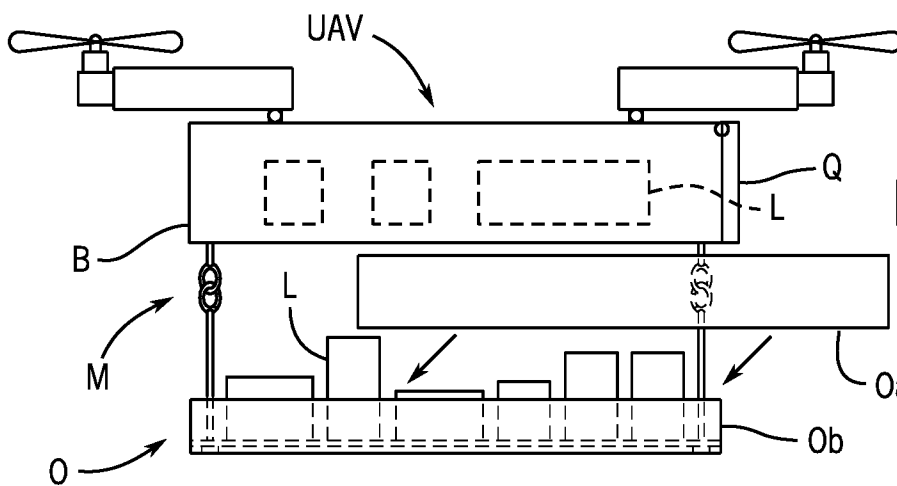


FIG. 19B

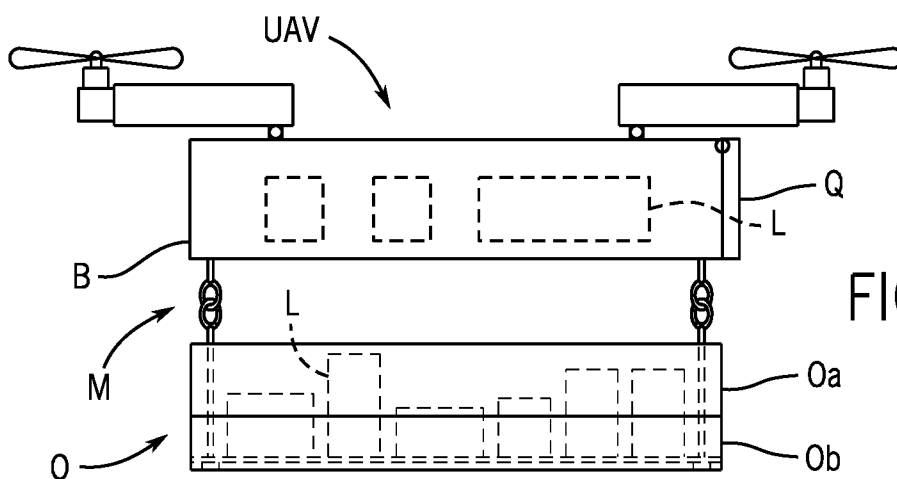


FIG. 19C

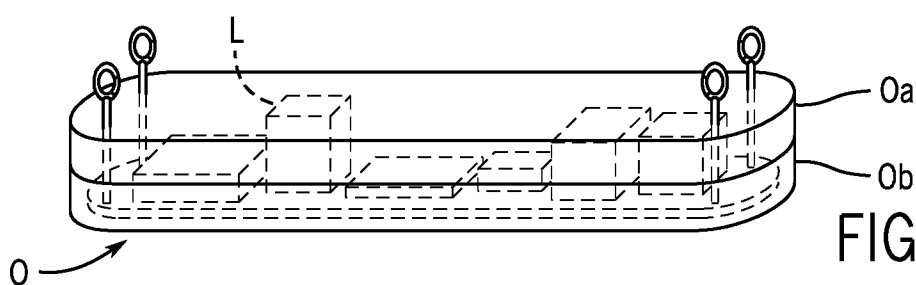


FIG. 19D

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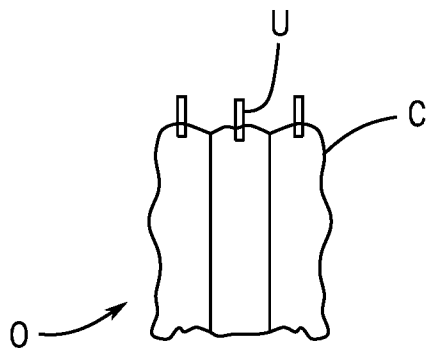


FIG. 20A

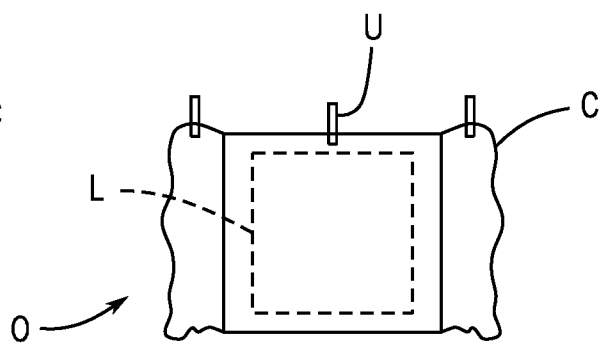


FIG. 20B

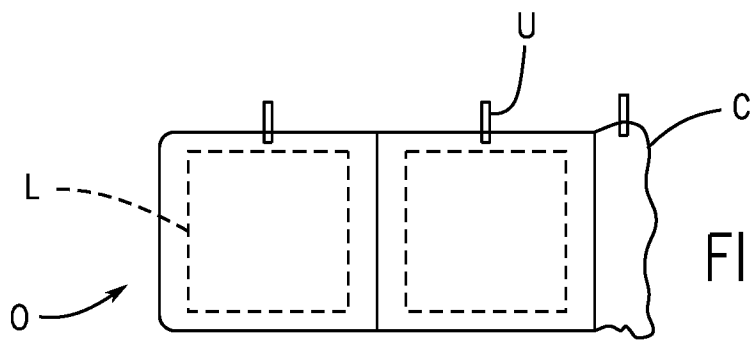


FIG. 20C

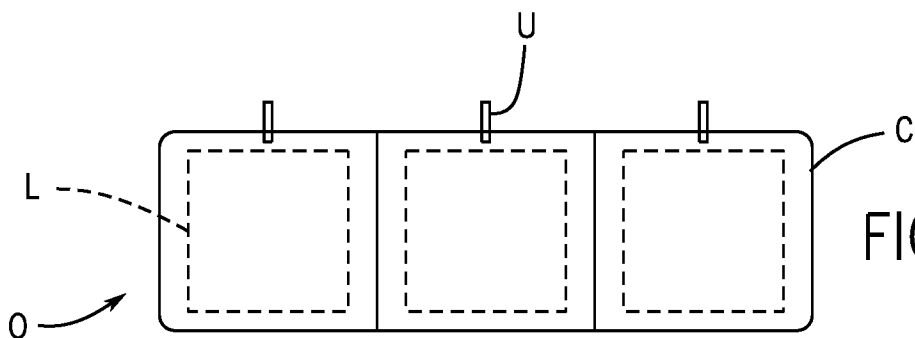


FIG. 20D

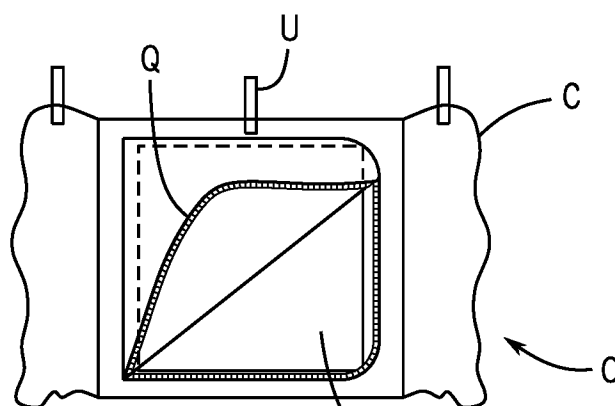


FIG. 21

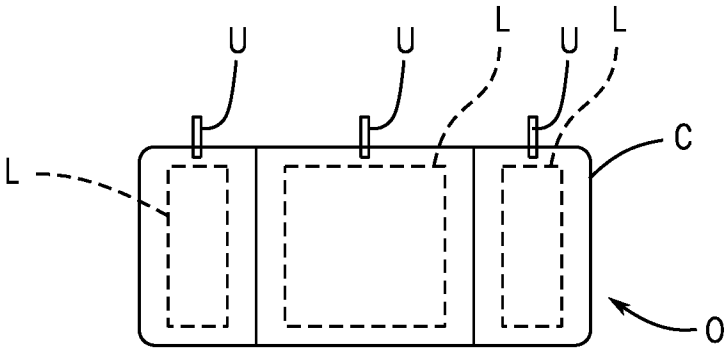


FIG. 22A

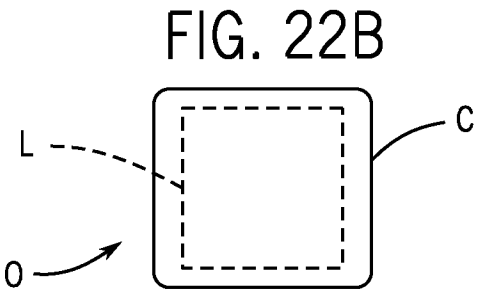


FIG. 22B

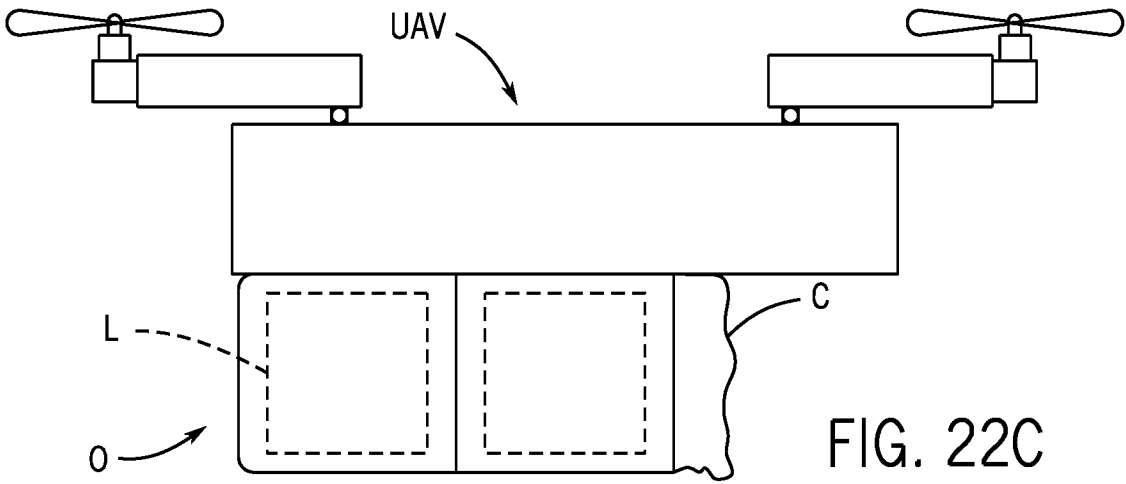


FIG. 22C

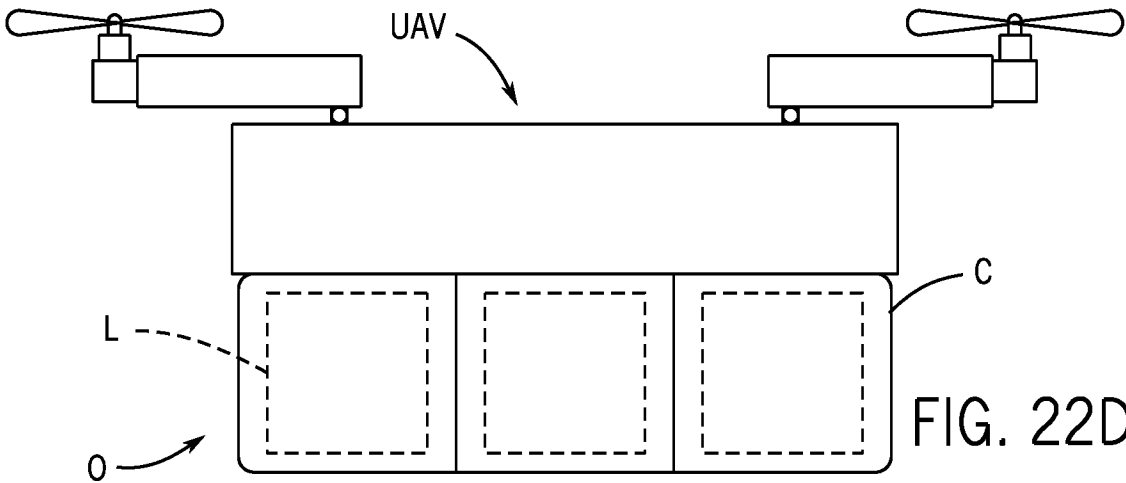
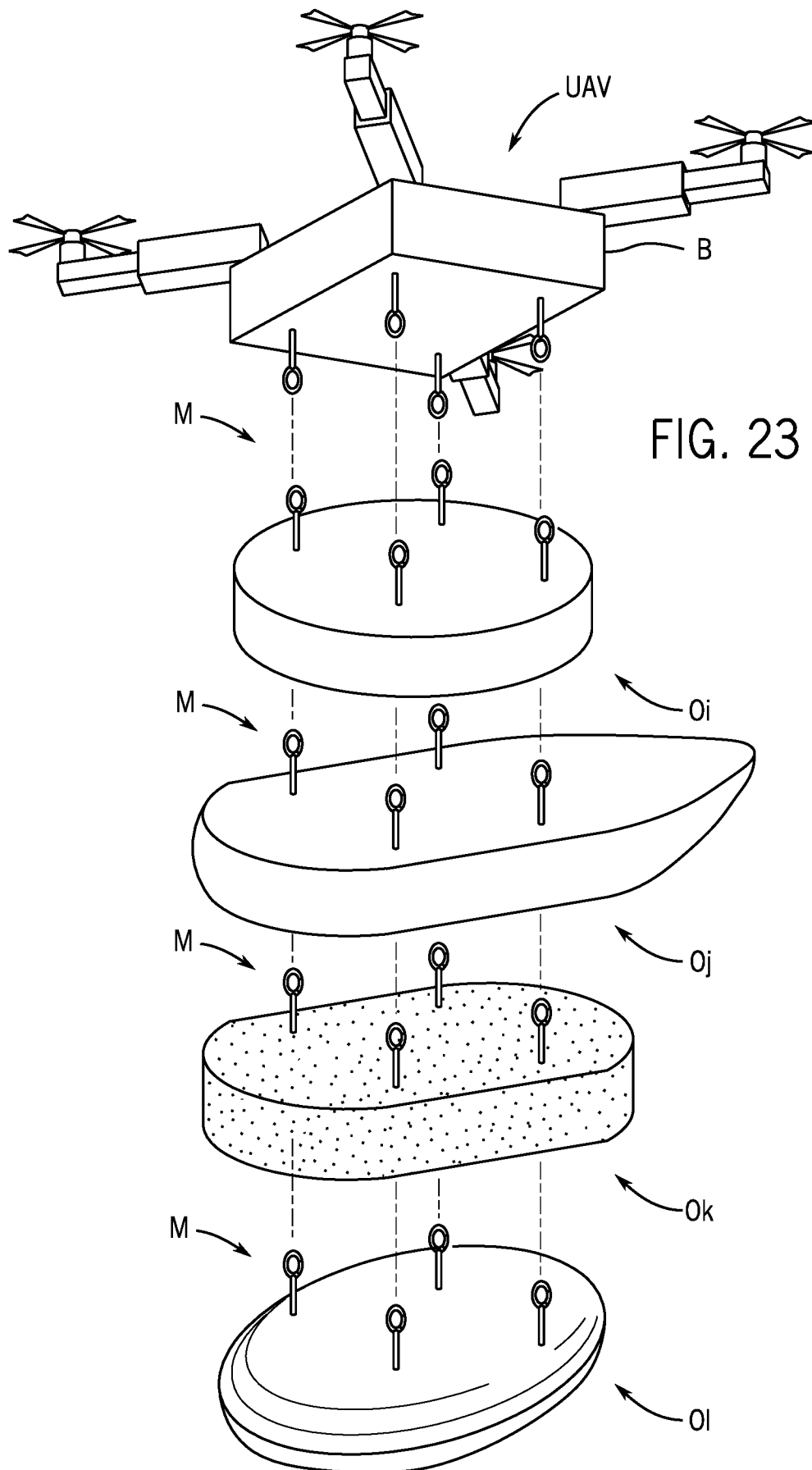


FIG. 22D

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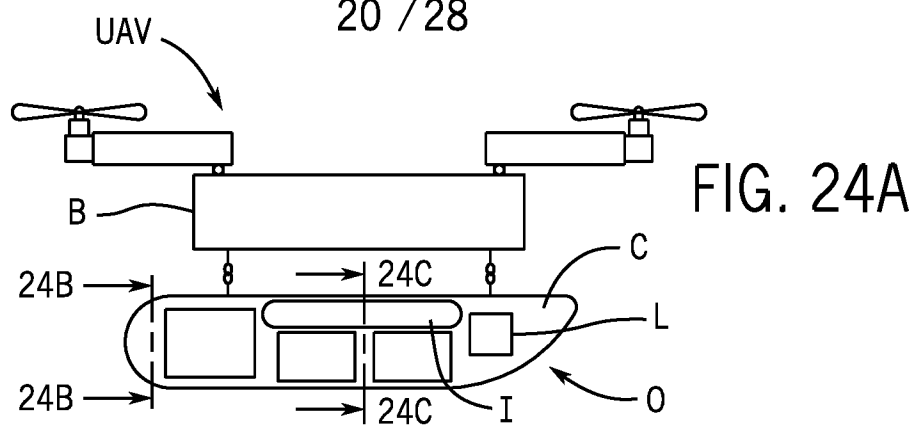


FIG. 24A

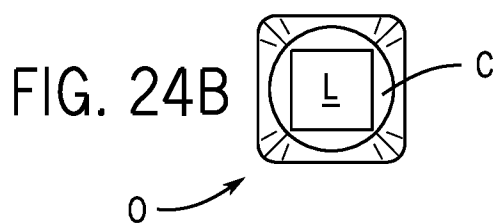


FIG. 24B

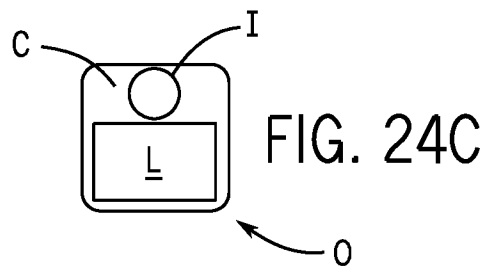


FIG. 24C

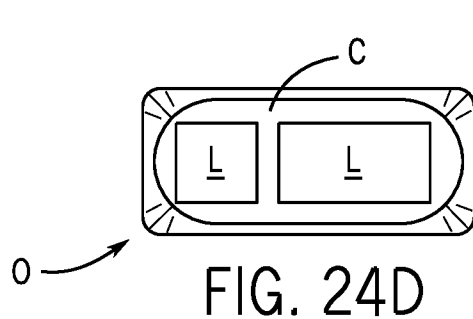


FIG. 24D

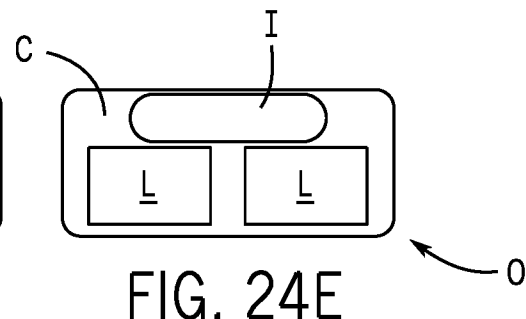


FIG. 24E

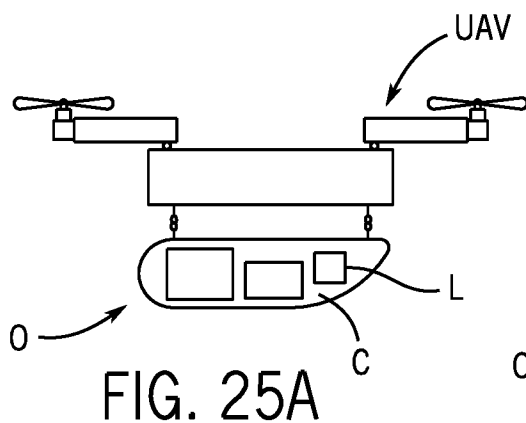


FIG. 25A

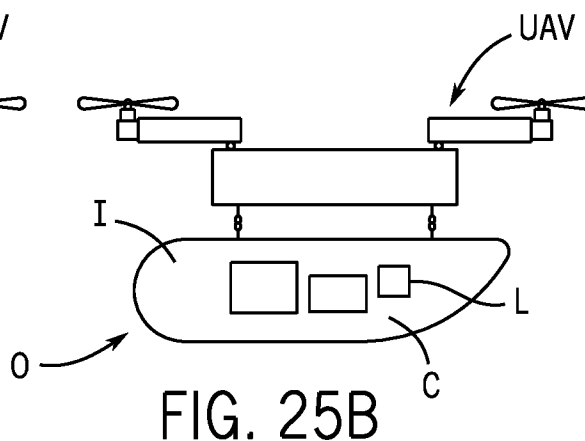


FIG. 25B

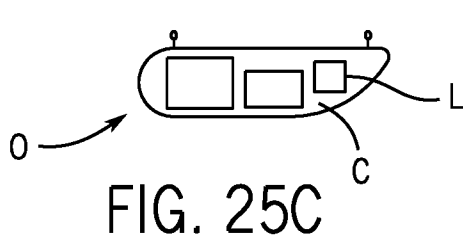


FIG. 25C

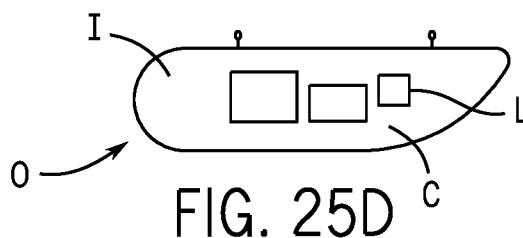


FIG. 25D

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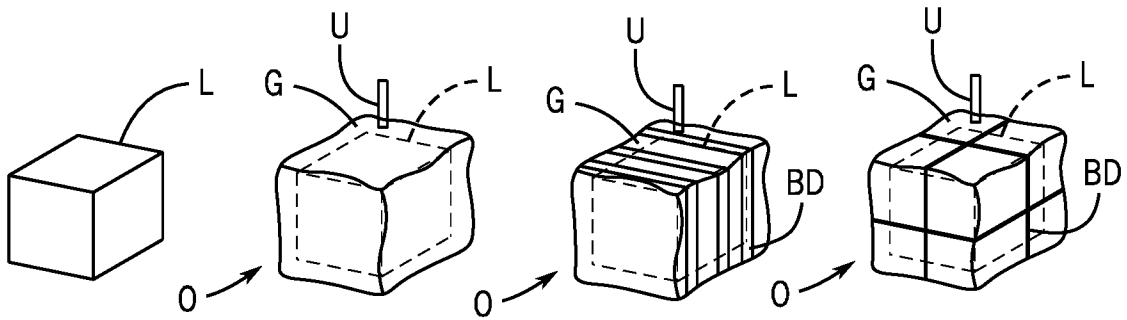


FIG. 25E

FIG. 25F

FIG. 25G

FIG. 25H

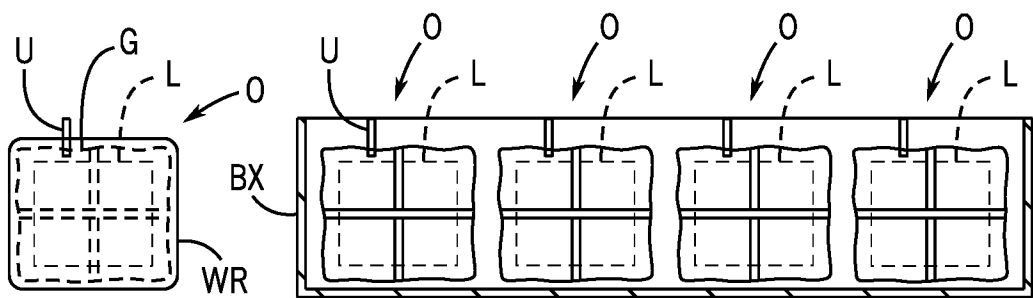


FIG. 25I

FIG. 25J

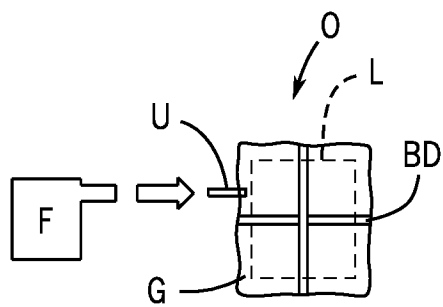


FIG. 25K

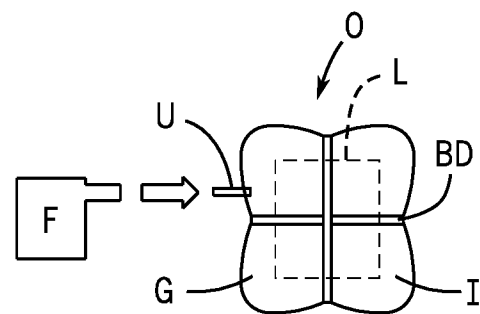


FIG. 25L

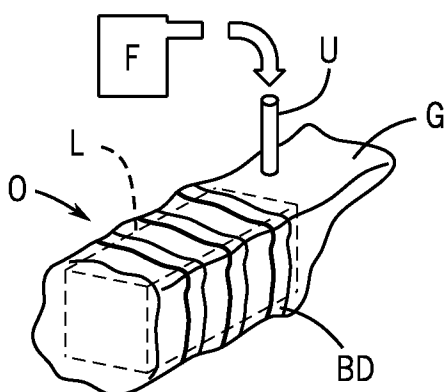


FIG. 25M

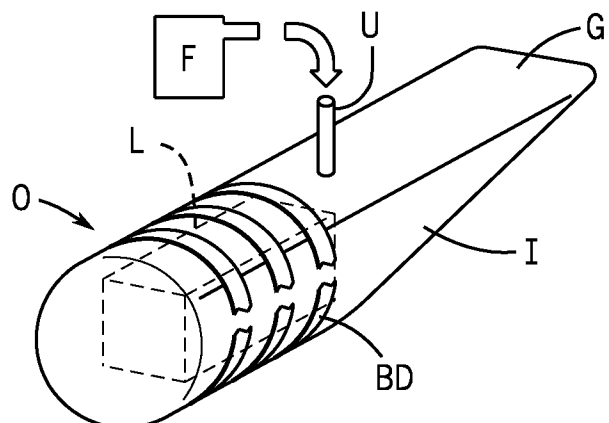
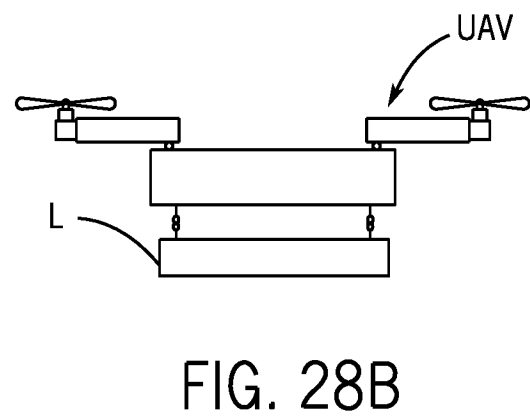
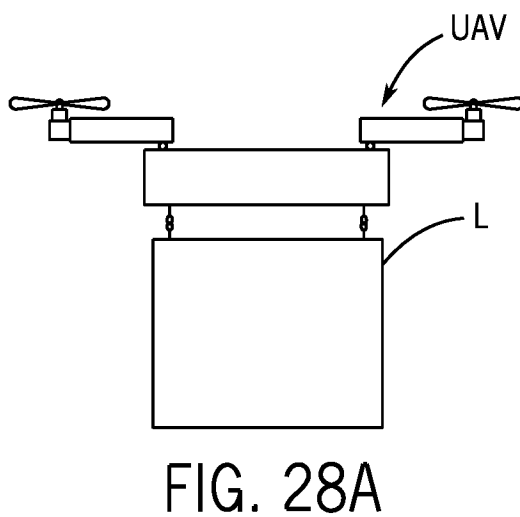
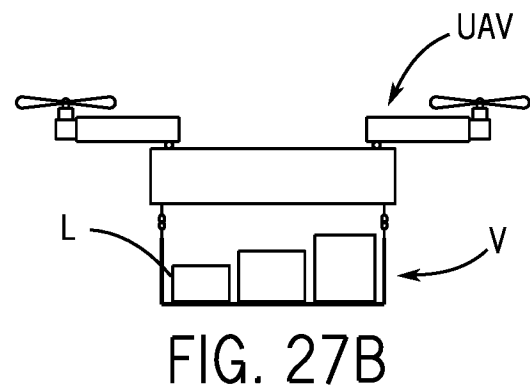
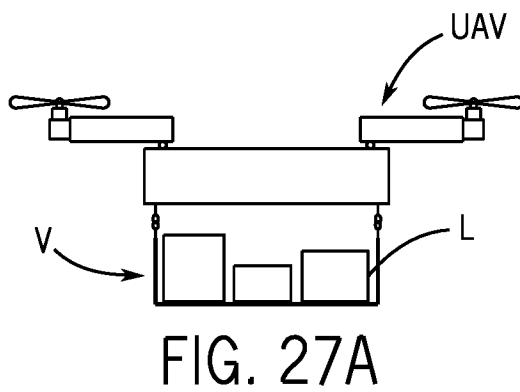
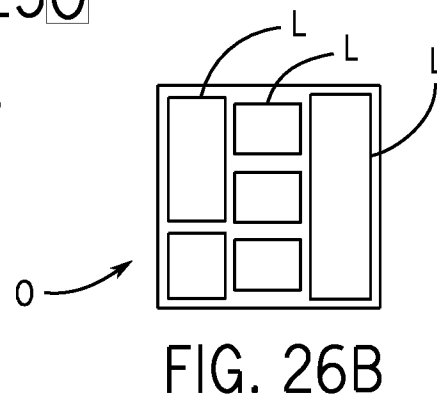
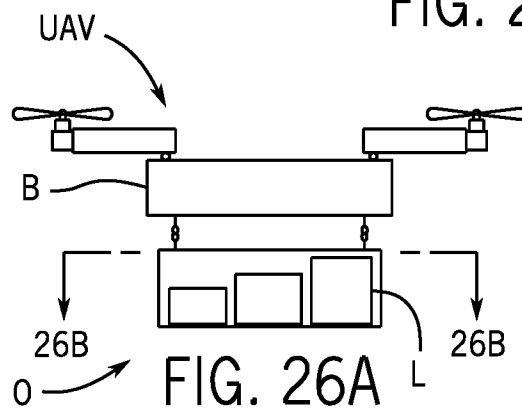
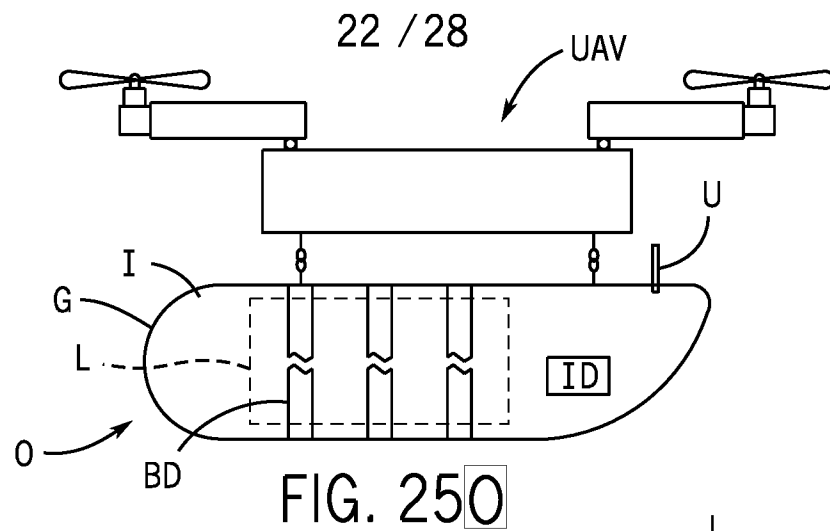


FIG. 25N



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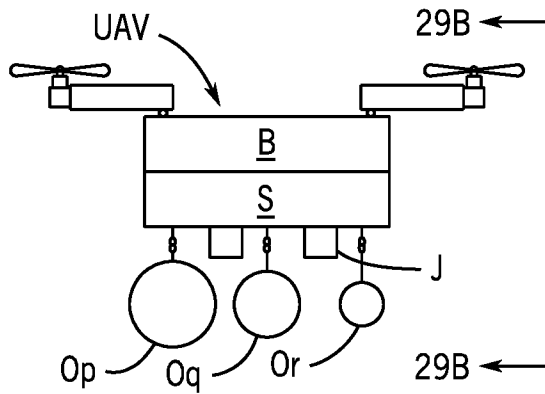


FIG. 29A

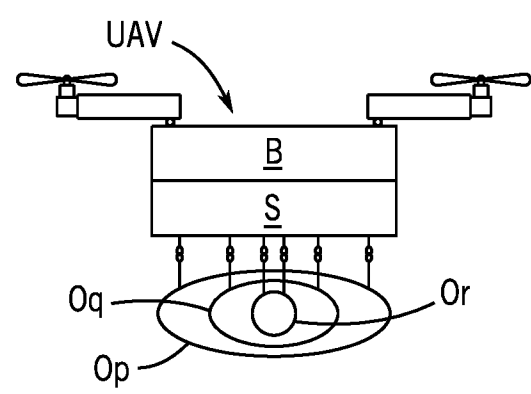


FIG. 29B

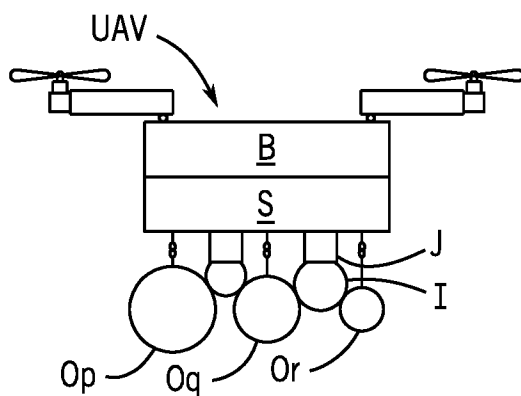


FIG. 29C

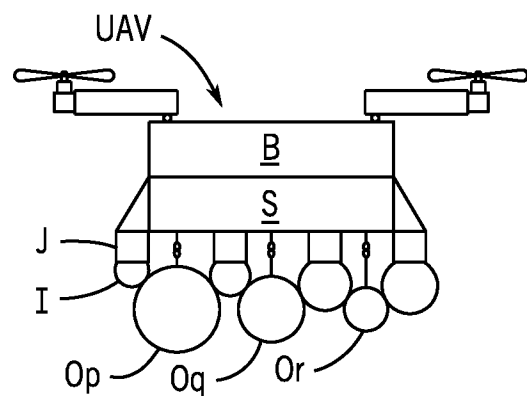


FIG. 29D

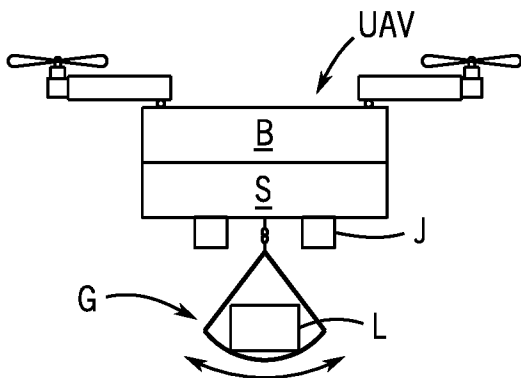


FIG. 30A

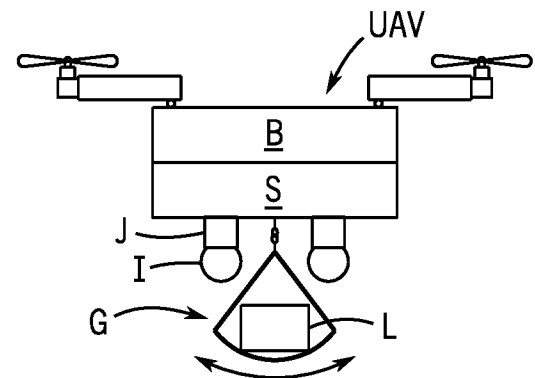


FIG. 30B

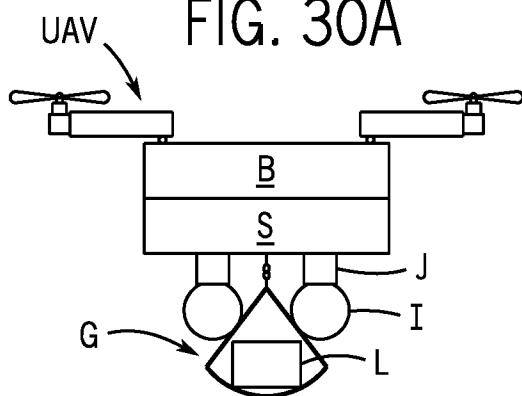


FIG. 30C

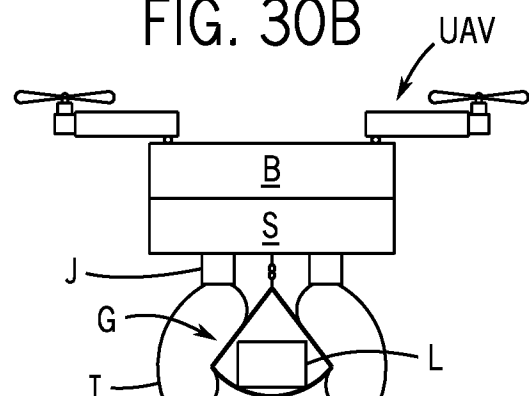


FIG. 30D

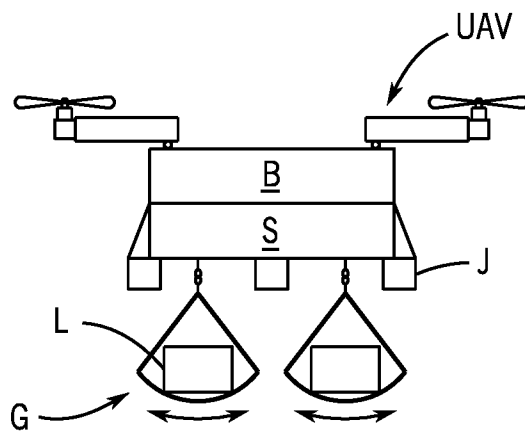


FIG. 31A

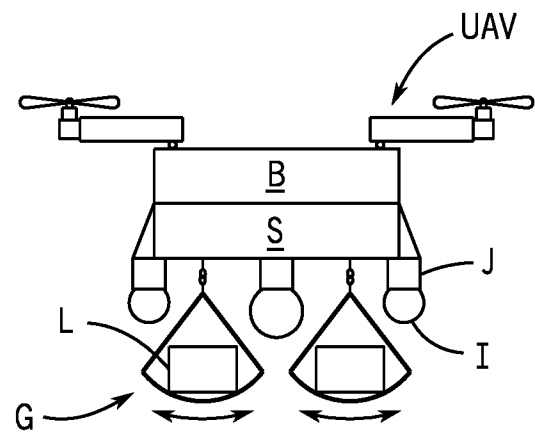


FIG. 31B

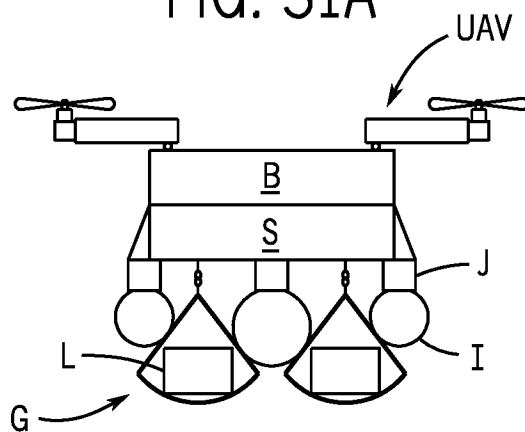


FIG. 31C

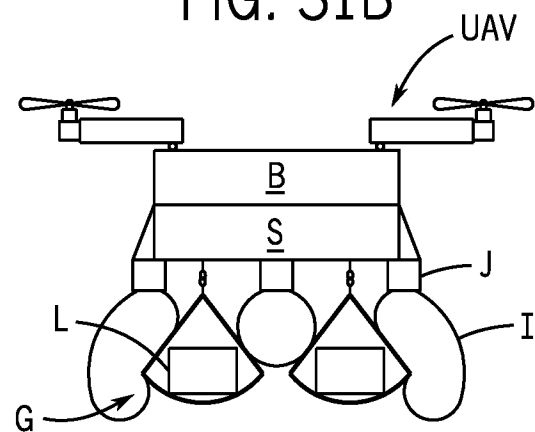


FIG. 31D

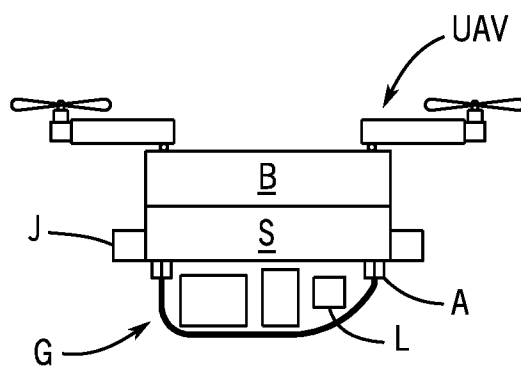


FIG. 32A

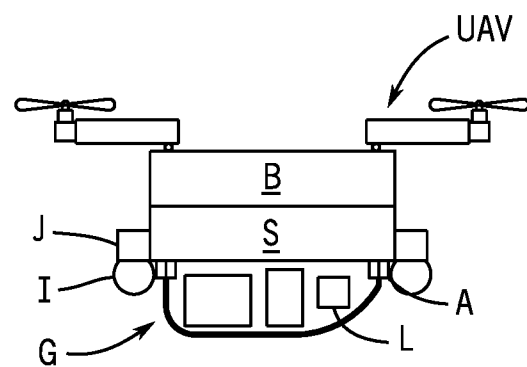


FIG. 32B

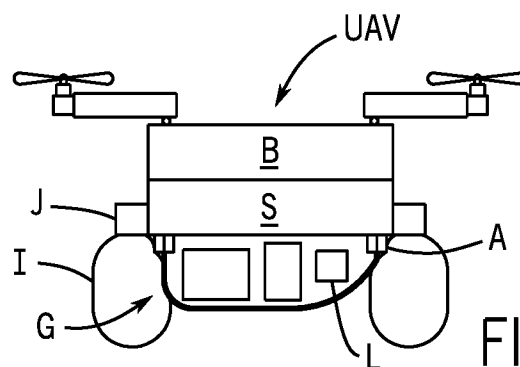


FIG. 32C

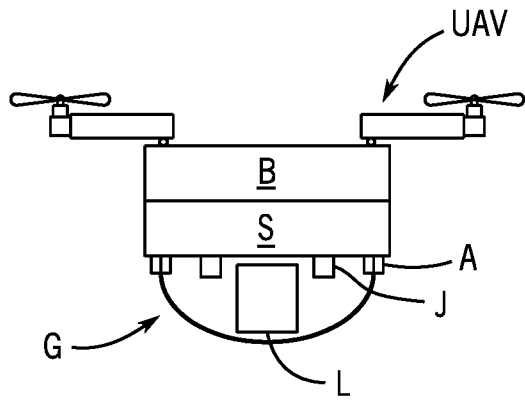


FIG. 33A

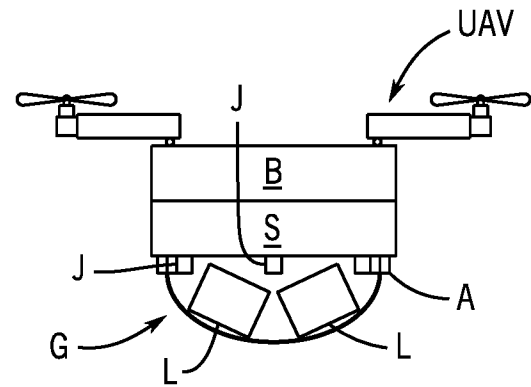


FIG. 34A

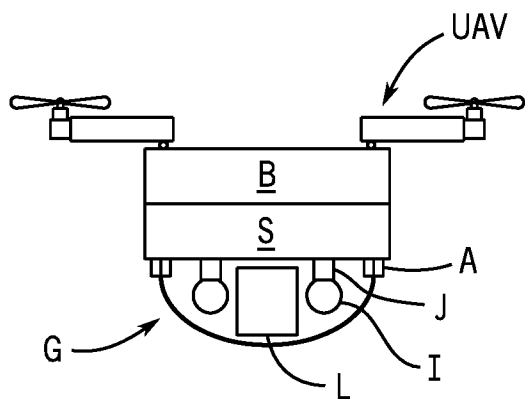


FIG. 33B

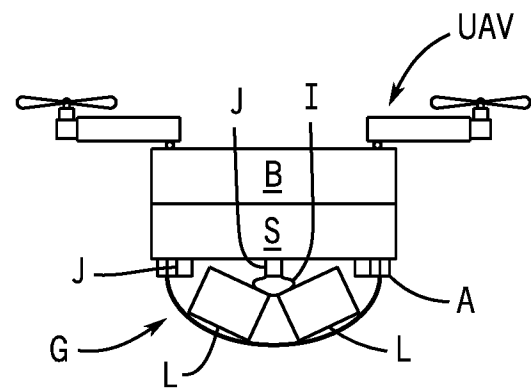


FIG. 34B

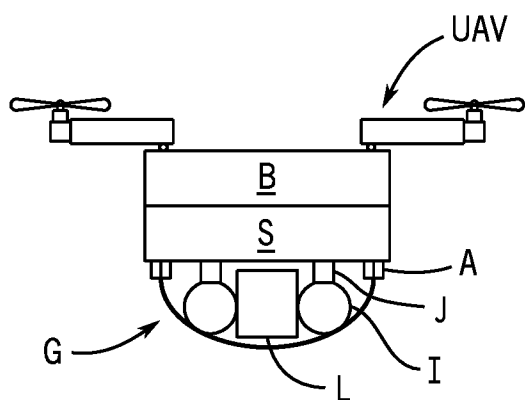


FIG. 33C

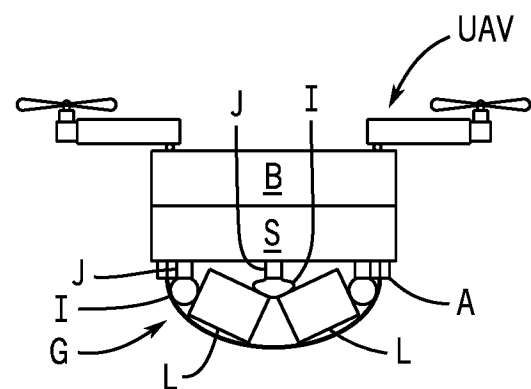


FIG. 34C

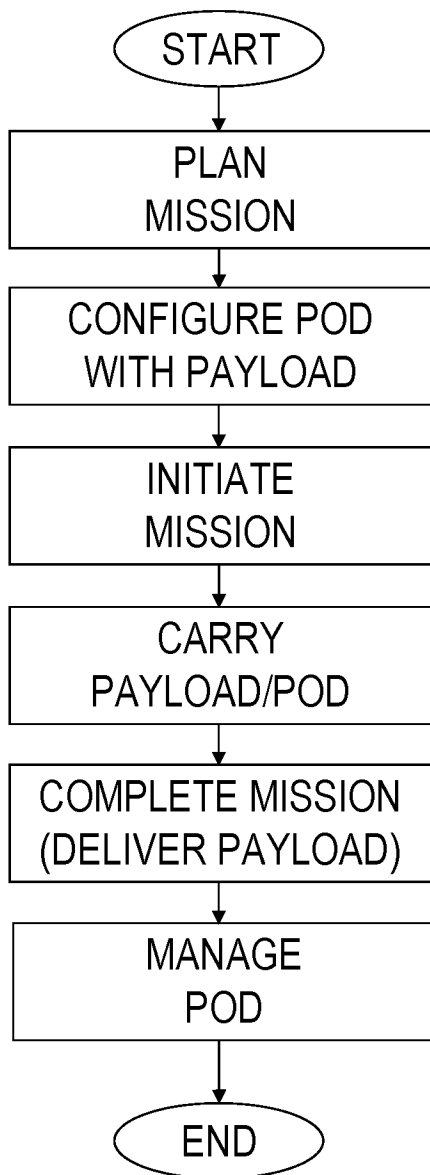


FIG. 35A

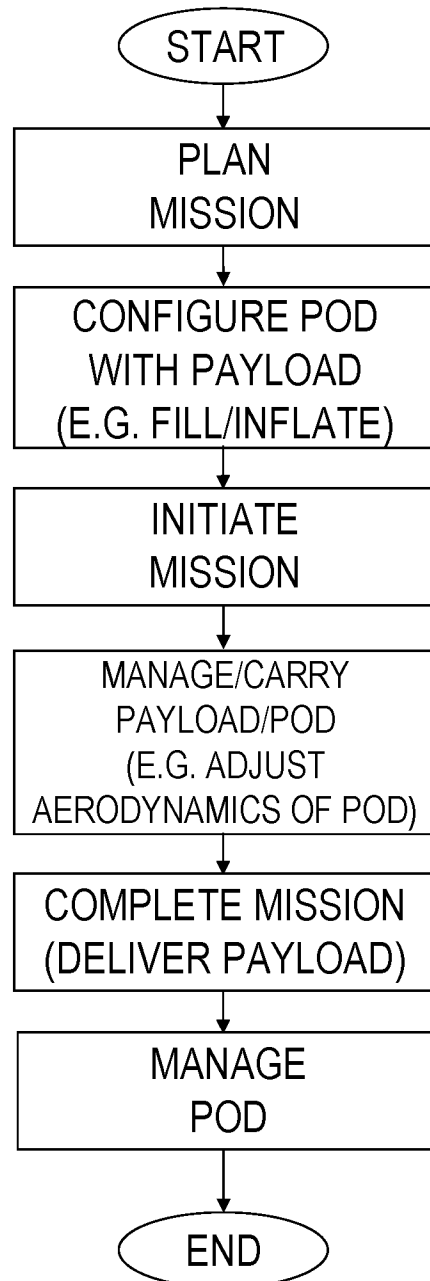


FIG. 35B

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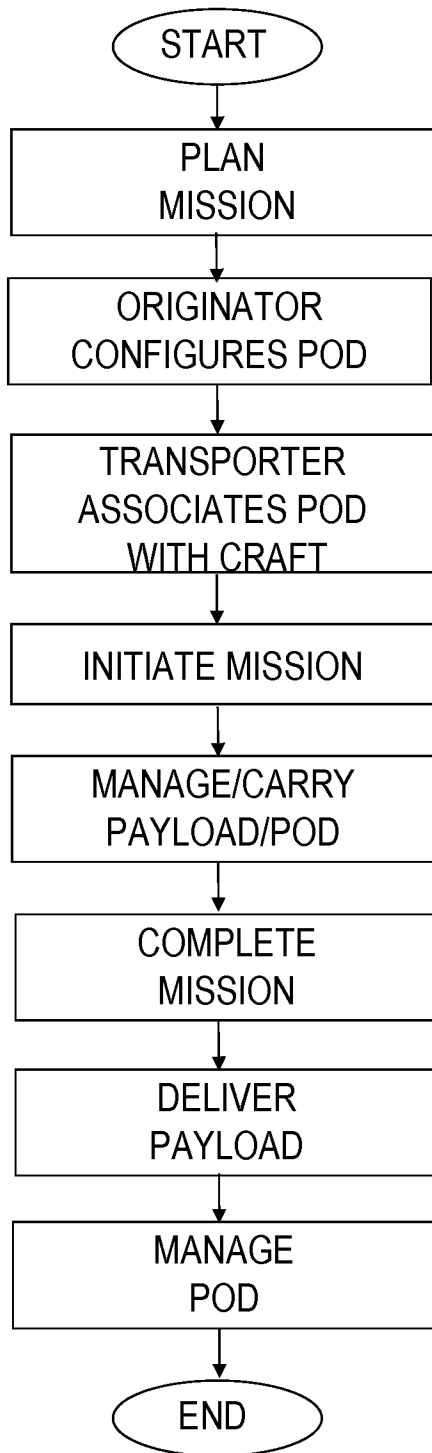


FIG. 36A

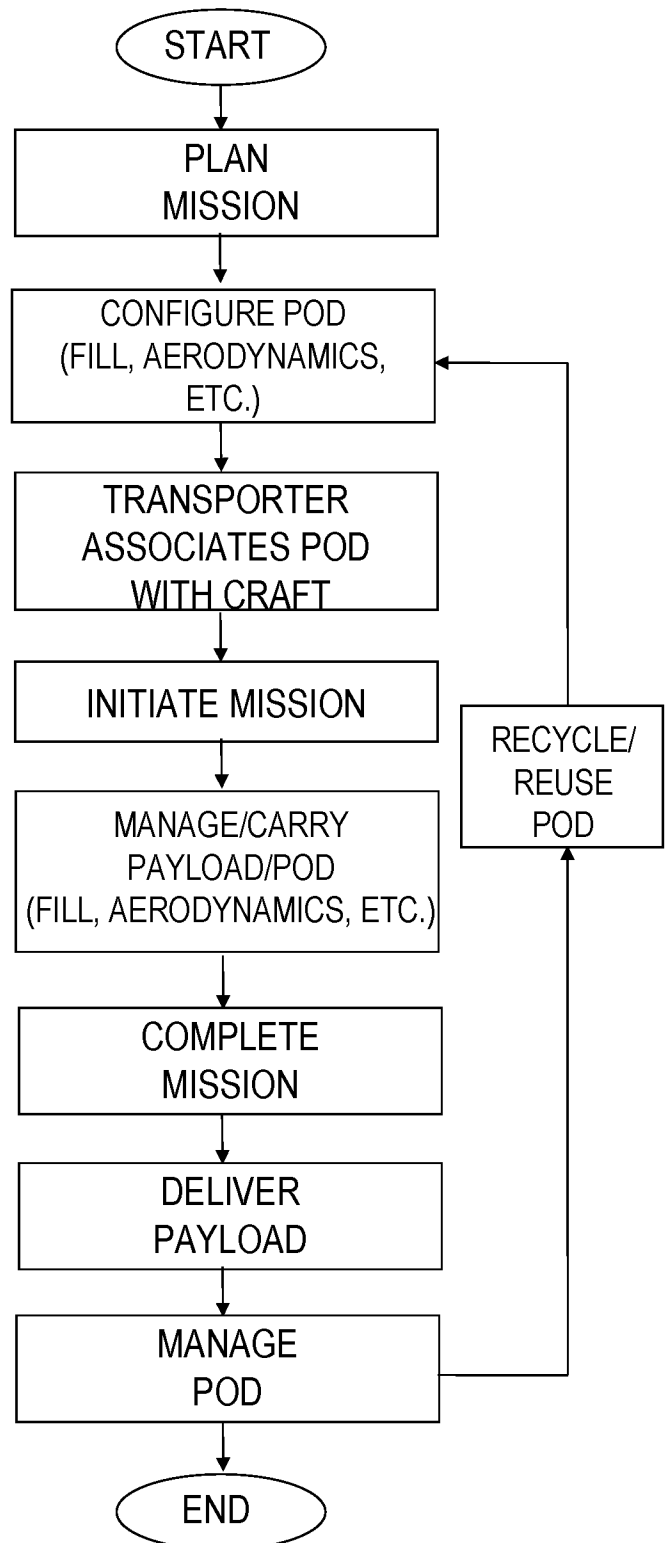


FIG. 36B

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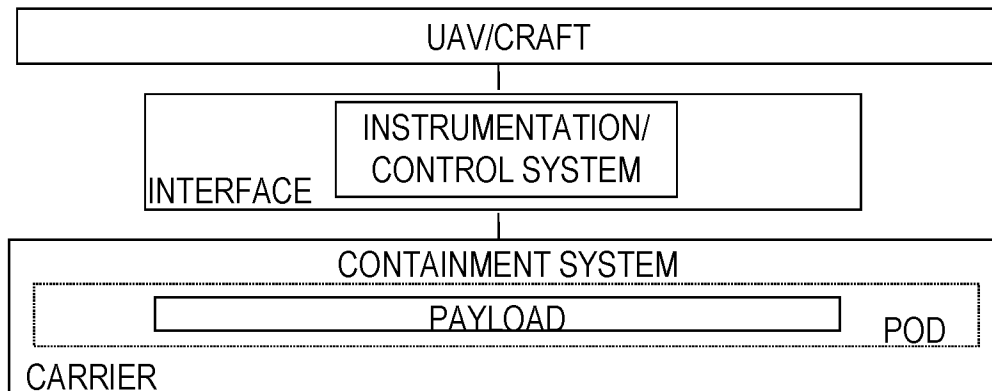


FIG. 37A

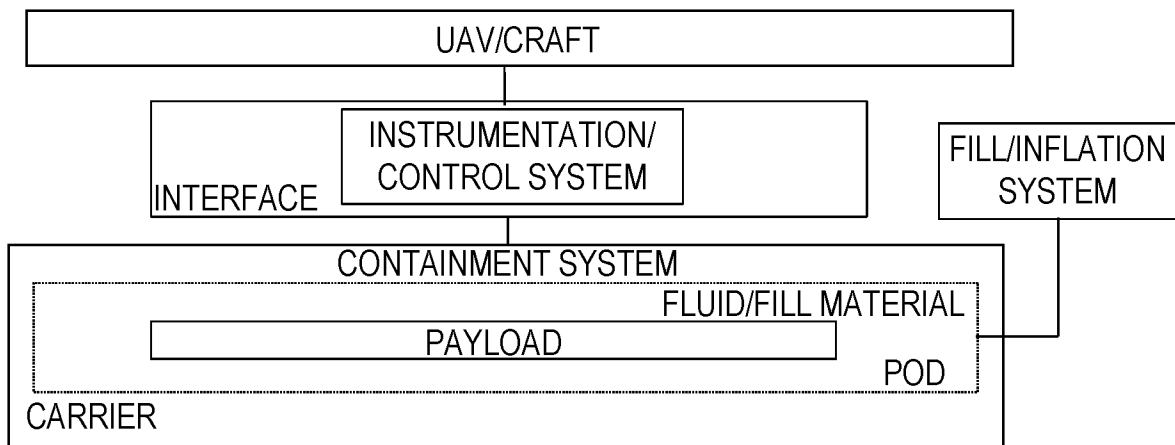


FIG. 37B

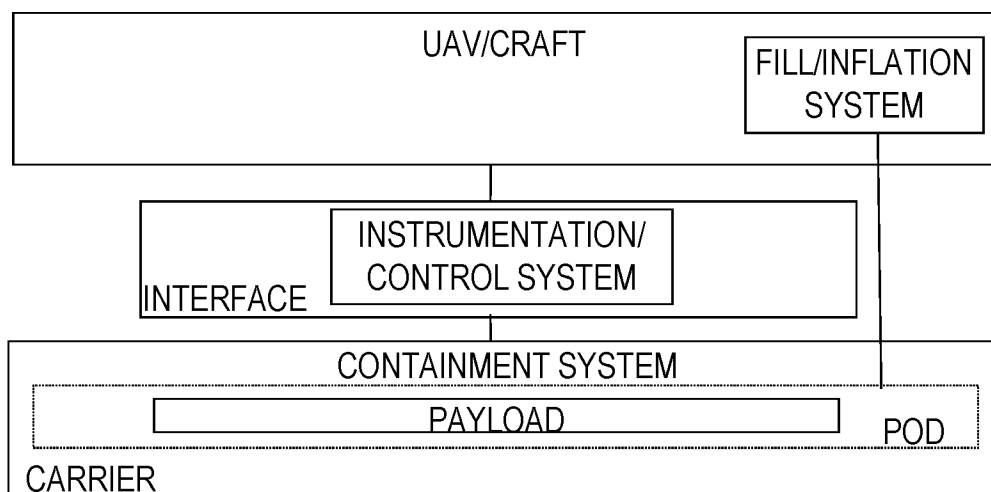


FIG. 37C

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/013124**A. CLASSIFICATION OF SUBJECT MATTER****B64D 1/02(2006.01)i, B64C 39/02(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B64D 1/02; B64C 29/00; B64F 1/32; B64C 39/02; G01M 1/12; B64D 1/12; B64C 1/22; A45C 7/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & keywords: drone, unmanned, payload, deliver, inflatable, pod, and aerodynamic

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2015-0158587 A1 (GOOGLE INC.) 11 June 2015 See paragraphs [0020]-[0027], [0060] and figures 1A-1B.	1-34
Y	US 4164970 A (JORDAN, CHARLES P.) 21 August 1979 See column 1, line 62 - column 2, line 10 and figures 1, 5, 7.	1-34
Y	US 2010-0012769 A1 (ALBER et al.) 21 January 2010 See paragraphs [0035], [0043] and figures 1A, 3B, 8A-8B.	21, 25-26, 28
A	US 2015-0175276 A1 (KOSTER, KENNETH LEE) 25 June 2015 See paragraph [0015] and figure 1.	1-34
A	US 2011-0084162 A1 (GOOSSEN et al.) 14 April 2011 See paragraphs [0029]-[0031] and figure 2.	1-34



Further documents are listed in the continuation of Box C.



See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

29 May 2017 (29.05.2017)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea



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Authorized officer

HWANG, Chan Yoon

Telephone No. +82-42-481-3347



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2017/013124

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 4164970 A	21/08/1979	None	
US 2010-0012769 A1	21/01/2010	EP 2046637 A2 EP 2046637 A4 EP 2046637 B1 US 8876057 B2 WO 2008-085547 A2 WO 2008-085547 A3	15/04/2009 17/04/2013 04/06/2014 04/11/2014 17/07/2008 06/11/2008
US 2015-0175276 A1	25/06/2015	None	
US 2011-0084162 A1	14/04/2011	None	