EXTERNAL CONTAINMENT APPARATUS FOR UNMANNED AERIAL VEHICLE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Application No. 16/108,043, filed on August 21, 2018, the contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] This disclosure relates generally to the field of unmanned aerial vehicles.

BACKGROUND INFORMATION

[0003] An unmanned vehicle, which may also be referred to as an autonomous vehicle, is a vehicle capable of travel without a physically-present human operator. An unmanned vehicle may operate in a remote-control mode, in an autonomous mode, or in a partially autonomous mode.

[0004] When an unmanned vehicle operates in a remote-control mode, a pilot or driver than is at a remote location can control the unmanned vehicle via commands that are sent to the unmanned vehicle via a wireless link. When the unmanned vehicle operates in autonomous mode, the unmanned vehicle typically moves based on pre-programmed navigation waypoints, dynamic automation systems, or a combination of these. Further, some unmanned vehicles can operate in both a remote-control mode and an autonomous mode, and in some instance may do so simultaneously. For instance, a remote pilot or driver may wish to leave navigation to an autonomous system while manually performing another task, such as operating a mechanical system for picking up objects, as an example.

[0005] Various types of unmanned vehicles exist for various different environments. For instance, unmanned vehicles exist for operation in the air, on the ground, underwater, and in space. Unmanned aerial vehicles (UAVs) or drones are becoming more popular in general. Designs that improve the efficiency and suitability of UAVs for commercial use will expand their mission capabilities.

SUMMARY OF INVENTION

[0005a] According to a first aspect of the present invention, there is provided a system for transporting a payload, comprising:

an unmanned aerial vehicle (UAV) including a payload coupling apparatus; and

a containment apparatus having an aerodynamic shape and including first and second openings, the containment apparatus located external to the UAV and attached to an underside of the UAV,

wherein the payload coupling apparatus passes through the first and second openings of the containment apparatus to couple with the payload, and the payload passes through the second opening to be positioned inside or outside the containment apparatus.

[0005b] According to a second aspect of the present invention, there is provided a payload containment apparatus comprising:

an aerodynamic exterior;

a hollow interior; and

first and second openings included at the aerodynamic exterior, wherein the aerodynamic exterior selectively attaches to an unmanned aerial vehicle (UAV), and

wherein a payload coupling apparatus included in the UAV passes through the first and second openings of the containment apparatus to couple with a payload, and the payload passes through the second opening to be positioned inside or outside the hollow interior.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Non-limiting and non-exhaustive embodiments of the invention are described with reference to the following figures, wherein like reference numerals refer to

5