UNMANNED AERIAL VEHICLE HOUSING

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on U.S. Application No. 16/434,570, filed June 7, 2019, which claims the benefit of U.S. Provisional Application No. 62/685,166, filed June 14, 2018, which are hereby incorporated by reference in their entirety.

BACKGROUND

[0002] The current disclosure relates to different housing structures for unmanned aerial vehicles ("UAVs"). UAVs may be powered by rechargeable batteries. When UAVs are not in use they may be stored and the rechargeable batteries may be recharged. Further, UAVs may need waystations to recharge in the middle of longer flights or may need shelter from inclement weather.

SUMMARY OF INVENTION

[0002a] According to a first aspect of the present invention, there is provided a modular housing structure for housing a plurality of unmanned aerial vehicles (UAVs), comprising:

a plurality of modular housing sections configured to hold a plurality of UAVs, the plurality of modular housing sections vertically stackable, each one of the modular housing sections including:

a landing pad sized to land a given UAV of the UAVs, the landing pad mechanically actuated to extend from an interior of a given modular housing section to receive and deploy the given UAV and withdraw into the interior ~~to shelter the given UAV from weather~~, ~~and~~

charging electronics disposed in or on the landing pad and configured to charge the given UAV,

wherein the modular housing structure supports a scalable number of the UAVs based on a number of the modular housing sections vertically stacked on each other at a time~~.~~; and

wherein a first portion of the modular housing sections actuate the landing pad out a first side of the modular housing structure and a second portion of the modular housing sections actuate the landing pad out a second side of the modular housing structure different from the first side.

[0002b] ~~According to a second aspect of the present invention, t~~There is provided a modular housing structure for housing a plurality of unmanned aerial vehicles (UAVs), comprising:

a plurality of housing segments, wherein individual housing segments of the plurality of housing segments are shaped to mechanically join together to define an interior of the modular housing structure, wherein the individual housing segments have a common structural shape that repeats when assembled to form the modular housing structure; and

a plurality of landing pads positioned within the housing segments, each of the landing pads sized to physically support and charge a corresponding one of the UAVs,

wherein a first housing segment of the housing segments includes an ingress point shaped to allow passage of the UAVs in or out of the modular housing structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Non-limiting and non-exhaustive embodiments of the invention are described with reference to the following figures, wherein like reference numerals refer to like parts throughout the various views unless otherwise specified. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles being described.

[0004] FIG. 1 illustrates a housing structure with a telescoping roof, in accordance with an embodiment of the disclosure.

[0005] FIG. 2 illustrates a housing structure with a retractable (roll-up) cover, in accordance with an embodiment of the disclosure.

[0006] FIG. 3 illustrates a housing structure with a fold down roof, in accordance with an embodiment of the disclosure.

[0007] FIGs. 4A-4C illustrate a modular housing structure, in accordance with embodiments of the disclosure.

[0008] FIGs. 5A-E illustrate a modular housing structure, in accordance with an embodiment of the disclosure.

[0009] FIGs. 6A-1 to 6A-4, 6B-1 to 6B-4, and 6C illustrate several examples of single-aircraft housing structures, in accordance with embodiments of the disclosure.

CLAIMS

~~What is claimed is:~~

~~1. A modular housing structure for housing a plurality of unmanned aerial vehicles (UAVs), comprising:~~

~~a plurality of modular housing sections configured to hold a plurality of UAVs, the plurality of modular housing sections vertically stackable, each one of the modular housing sections including:~~

~~a landing pad sized to land a given UAV of the UAVs, the landing pad mechanically actuated to extend from an interior of a given modular housing section to receive and deploy the given UAV and withdraw into the interior to shelter the given UAV from weather, and~~

~~charging electronics disposed in or on the landing pad and configured to charge the given UAV,~~

~~wherein the modular housing structure supports a scalable number of the UAVs based on a number of the modular housing sections vertically stacked on each other at a time.~~

~~2. The modular housing structure of claim 1, wherein one of the modular housing sections includes first and second landing pads.~~

~~3. The modular housing structure of claim 2, wherein the first landing pad and the second landing pad are mechanically actuated separately.~~

~~4. The modular housing structure of claim 2, wherein the first landing pad and the second landing pad are connected such that the first landing pad and the second landing pad are mechanically actuated together, wherein the first landing pad and the second landing pad are connected side by side in a first direction, and wherein the first landing pad and the second landing pad are mechanically actuated in a direction perpendicular to the first direction.~~

~~5. The modular housing structure of claim 1, wherein a first portion of the modular housing sections actuate the landing pad out a first side of the modular housing structure and a second portion of the modular housing sections actuate the landing pad out a second side of the modular housing structure different from the first side.~~

6. The modular housing structure of claim 1, wherein each of the modular housing sections further comprises:

a plurality of navigational aids disposed about the landing pad to assist the UAVs when landing on the landing pad.

7. The modular housing structure of claim 1, further comprising:

a climate controller disposed within the modular housing structure, the climate controller including a fan to force air around the UAVs stored within the plurality of modular housing sections.

8. The modular housing structure of claim 7, wherein the modular housing sections each include airflow openings to allow the air to flow between the modular housing sections from the fan.

9. The modular housing structure of claim 8, wherein the airflow openings are disposed peripherally around the landing pad of each of the modular housing sections.

10. The modular housing structure of claim 8, wherein the landing pad includes a grate or a mesh and the airflow openings are defined by the grate or the mesh in the landing pad.

11. A modular housing structure for housing a plurality of unmanned aerial vehicles (UAVs), comprising:

a plurality of housing segments, wherein individual housing segments of the plurality of housing segments are shaped to mechanically join together to define an interior of the modular housing structure, wherein the individual housing segments have a common structural shape that repeats when assembled to form the modular housing structure; and

a plurality of landing pads positioned within the housing segments, each of the landing pads sized to physically support and charge a corresponding one of the UAVs,

wherein a first housing segment of the housing segments includes an ingress point shaped to allow passage of the UAVs in or out of the modular housing structure.

12. The modular housing structure of claim 11, wherein each of the housing segments are foldable into a substantially flat configuration.

~~13. The modular housing structure of claim 11, wherein the first housing segment includes an endcap structure shaped to enclose an end of the modular housing structure, the endcap structure including the ingress point.~~

~~14. The modular housing structure of claim 11, wherein each of the individual housing segments includes the ingress point, and wherein the ingress points of the individual housing segments join to form a larger ingress point.~~

~~15. The modular housing structure of claim 14, wherein the larger ingress point extends down a center of a roof of the modular housing structure.~~

~~16. The modular housing structure of claim 11, wherein the first housing segment includes first navigational aids positioned proximate to the ingress point and configured to enable the UAVs to access first information for guiding the UAVs to pass through the ingress point.~~

~~17. The modular housing structure of claim 16 further comprising:~~

~~second navigational aids smaller than the first navigational aids positioned proximate to the landing pads and configured to enable the UAVs to access second information for guiding the UAVs onto the landing pads once the UAVs are flying within the modular housing structure.~~

~~18. The modular housing structure of claim 17, wherein the first navigational aids and the second navigational aids are fiducial markers.~~

~~19. The modular housing structure of claim 11, wherein a second housing segment of the plurality of housing segments includes a third navigational aid on the interior of the modular housing structure, the third navigational aid configured to enable the UAVs to access third information for indicating to the UAVs a relative physical position of the second housing segment from amongst the plurality of housing segments to aid navigation to a given landing pad.~~

~~20. The modular housing structure of claim 11, wherein the plurality of landing pads are organized into multiple levels of landing pads such that some landing pads are vertically above others of the landing pads.~~

~~21. The modular housing structure of claim 20, wherein the plurality of landing pads includes a center row of the landing pads disposed below an access corridor extending down the interior of the modular housing structure, wherein the center row of the landing pads is not covered by other landing pads, wherein the access corridor connects to the ingress point and extends past all of the landing pads.~~

1. A modular housing structure for housing a plurality of unmanned aerial vehicles (UAVs), comprising:

a plurality of modular housing sections configured to hold a plurality of UAVs, the plurality of modular housing sections vertically stackable, each one of the modular housing sections including:

a landing pad sized to land a given UAV of the UAVs, the landing pad mechanically actuated to extend from an interior of a given modular housing section to receive and deploy the given UAV and withdraw into the interior,

charging electronics disposed in or on the landing pad and configured to charge the given UAV,

wherein the modular housing structure supports a scalable number of the UAVs based on a number of the modular housing sections vertically stacked on each other at a time; and

wherein a first portion of the modular housing sections actuate the landing pad out a first side of the modular housing structure and a second portion of the modular housing sections actuate the landing pad out a second side of the modular housing structure different from the first side.

2. The modular housing structure of claim 1, wherein one of the modular housing sections includes first and second landing pads.

3. The modular housing structure of claim 2, wherein the first landing pad and the second landing pad are mechanically actuated separately.

4. The modular housing structure of claim 2, wherein the first landing pad and the second landing pad are connected such that the first landing pad and the second landing pad are mechanically actuated together, wherein the first landing pad and the second landing pad are connected side by side in a first direction, and wherein the first landing pad and the second landing pad are mechanically actuated in a direction perpendicular to the first direction.

5. The modular housing structure of claim 1, wherein each of the modular housing sections further comprises:

a plurality of navigational aids disposed about the landing pad to assist the UAVs when landing on the landing pad.

6. The modular housing structure of claim 1, further comprising:

a climate controller disposed within the modular housing structure, the climate controller including a fan to force air around the UAVs stored within the plurality of modular housing sections.

7. The modular housing structure of claim 6, wherein the modular housing sections each include airflow openings to allow the air to flow between the modular housing sections from the fan.

8. The modular housing structure of claim 7, wherein the airflow openings are disposed peripherally around the landing pad of each of the modular housing sections.

9. The modular housing structure of claim 7, wherein the landing pad includes a grate or a mesh and the airflow openings are defined by the grate or the mesh in the landing pad.