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SHIELDED MULTIFPURPOSE MULTI-ROTOR COMPACT UNMANNED HELICOPTER

FIELD OF THE INVENTION

5 The invention relates to compact unmanned helicopters with multiple rotors. The particular concerns of this invention are to add a protective shield to the helicopter and to allow fast and easy change of application components and accessories, so that the compact unmanned helicopter may switch its role or application within minutes.

BACKGROUND OF THE INVENTION

10 Currently, compact unmanned helicopters have a frame with multiple rotors mounted on top of the extreme end of each arm of the frame. Regardless of the size, weight, or number of blades, such design exposes the rotor blades which, when colliding with objects during operations, causes damages to the blades. If the frame collides with objects, damages could also result in other components of the compact unmanned helicopters (the control board, for example). If the rotor blades were to collide with human body, injuries resulting in cuts and
15 bleeding may occur. This makes compact unmanned helicopters expensive to use, as user must invest in several units to practice manoeuvring skills before putting it into practical use. Further, he risks injury during practices and operations.

Another issue with current compact unmanned helicopters is that each unit as a whole serves a specific purpose, and changing the functionality often means building a new unit.
20 For example, compact unmanned helicopters used for delivery of packages may not easily convert into a vehicle for surveillance purposes, as it will take time and much effort to remove the carrier for carrying goods and replace with a surveillance camera, which would usually require more precise installations and adjustments for the camera to function effectively.

25 Taking these into consideration, the current invention adds protective shield to compact unmanned helicopters, and adds mechanisms on the shield so that application specific components and accessories may be easily replaced to serve new purposes and functionalities.

STATEMENTS OF INVENTION

30 A compact unmanned helicopter according to the present invention comprises of a frame, which consists of arms extending out from the centre of the frame, and the length from each end point of the frame to the centre is equal in length. At the below each arm, a rotor is

mounted downward for the purpose of manoeuvring as well as supporting the overall weight of the entire helicopter. These are enclosed in 2 halves of mesh casing. The shape of each half of the casing is a semi-circular dome similar to that of a shallow bowl. The top half of the protective mesh shield is fastened to the frame and is removable for the purpose of easy
5 maintenance. The bottom half of the protective mesh shield is fastened to the top half of the protective mesh shield and is removable. Above the centre of the frame, an opening is made to the mesh casing. Below the opening is where the control board sits, and it is further protected by a shield on top. The entire top half of the casing is fastened to the end points of the frame. This top half of the casing is known as the core compartment. The bottom half of
10 the casing is fastened to the top half of the casing. On or below the bottom half of the casing is application components and accessories such as camera, video recording device, sensors, other detection devices, or stations for mounting payloads. This bottom half of the casing, together with the application components and accessories, is known as the application compartment. The panel on which or below which the application components and
15 accessories are mounted is known as application station.

Although the application components and accessories can be mounted and removed from the application station, certain devices requiring adjustments at the point of mounting may preferably remain fixed to the casing. It is therefore desirable to either replace the entire application compartment or replace the application station, rather than replacing the
20 application component or accessory alone, as accessories such as cameras may require adjustments to render usefulness. The two compartments together provide protection over the operations components of the helicopter, minimizing possible damage should it collide with objects. They also provide protection to the human operator from possible cuts from the blades of the rotors. Finally, the compartments serve to shield the operations components in
25 the event a crash landing occurs.

DESCRIPTION OF THE DRAWINGS

Figure 1 is the top view of the Shielded Multipurpose Multi-Rotor Compact Unmanned Helicopter.

Figure 2 is the front view of the Shielded Multipurpose Multi-Rotor Compact Unmanned
30 Helicopter.

Figure 3 is the perspective view from bottom side of Shielded Multipurpose Multi-Rotor Compact Unmanned Helicopter.

DESCRIPTION OF PREFERRED EMBODIMENTS

The drawing in Figure 2 shows a compact unmanned helicopter with two semi-circular dome shaped protective mesh shields **2a** and **2b**. The top protective mesh shield is fastened to the frame, while the bottom protective mesh shield is fastened to the top protective mesh shield. At the centre of the top protective mesh shield, shown in Figure 3, is a protective shield **5** under which the control board will sit. The rotors **1a**, **1b**, **1c**, **1d** shown in Figure 1 are attached below the frame's arms. A smaller semi-circular dome shaped protective shield protects the control board at the top centre of the core compartment.

The bottom semi-circular dome shaped protective mesh shield is fastened to the top mesh shield. On and below this bottom protective mesh shield are the application stations **4a** and **4b (directly behind 4a)** shown in Figure 3 for mounting application components and accessories and payload carriers.

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CLAIMS

- 5 1. A compact unmanned helicopter with multiple rotors, each rotor installed below the supporting frame which has arms with equal length from each endpoint to the centre of the frame.
2. A compact unmanned helicopter as claimed in claim 1, and having protective mesh casing above and below, each in the shape of a shallow bowl.
- 10 3. A compact unmanned helicopter as claimed in claim 2, with the top protective mesh casing fastened to the frame, and is removable for the purposes of easy maintenance.
4. A compact unmanned helicopter as claimed in any of the claims 2 to 3, with the bottom protective mesh casing fastened to the top protective mesh casing, and is removable for the purposes of easy maintenance.
- 15 5. A compact unmanned helicopter as claimed in any of the claims 2 to 4, with control board mounted on top of the centre of the frame below the opening of the top mesh casing, and with an additional protective shield over it.
6. A compact unmanned helicopter as claimed in any of the claims 2 to 5, with application components and accessories such as camera, detection devices, and / or
- 20 6. A compact unmanned helicopter as claimed in any of the claims 2 to 5, with application components and accessories such as camera, detection devices, and / or payload carrier mounted on and / or below the bottom protective mesh casing.
7. A compact unmanned helicopter as claimed in any of the claims 2 to 6 wherein the bottom protective mesh casing together with the application components and accessories are easily replaceable as a whole to suit the changes in purpose of operations.
- 25 8. A compact unmanned helicopter as claimed in any of the claims 2 to 7 wherein the application station is easily replaceable to suit the changes in purpose of operations.