August 2021

Drone Adapted to Human Carriage

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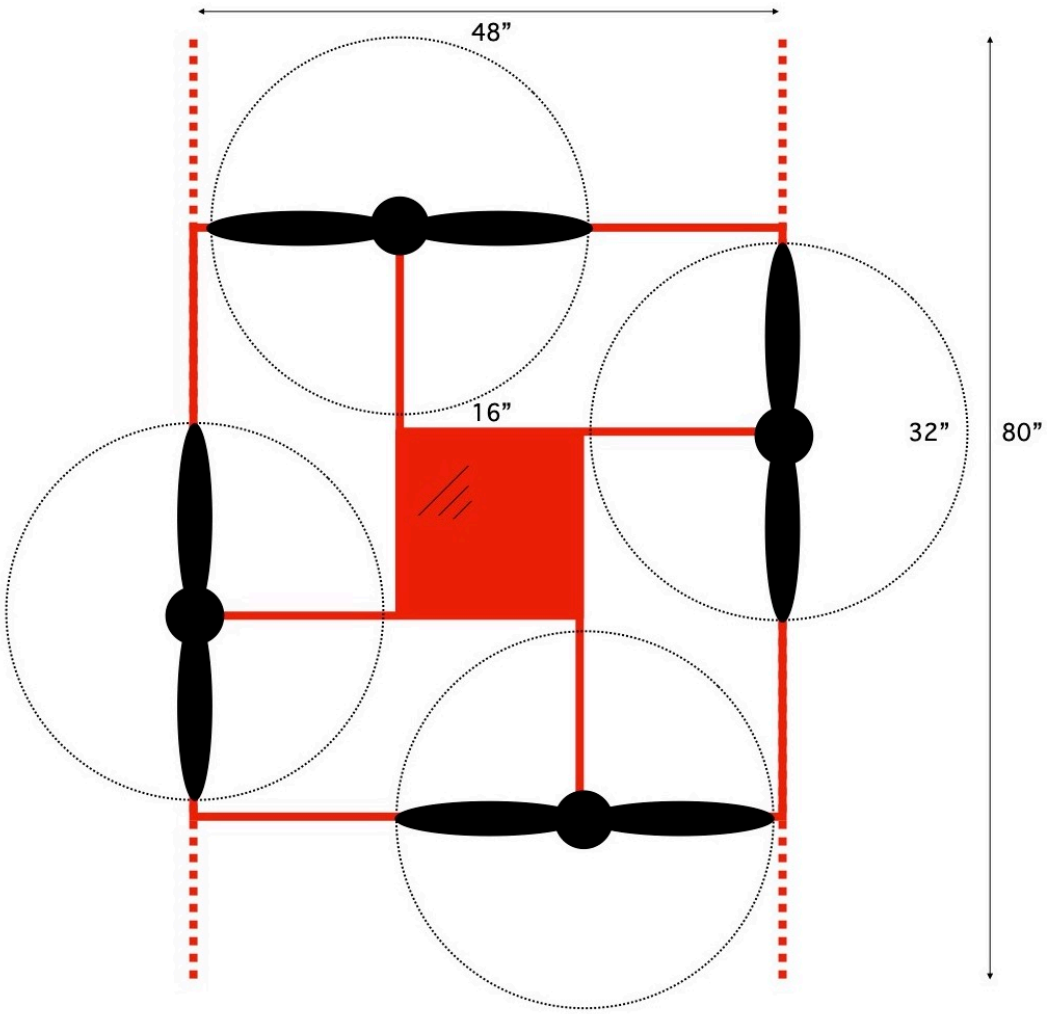
Background

The shape of quadcopters ~ the most ubiquitous type of drone ~ evolved at the earliest stages of development at the smallest scale, when injection-moulded chassis were easily able to be distended bodily to form a ‘wing-box’ of sorts in which to integrate most of the components and to add structural depth. Nonetheless neither the ‘X’ nor ‘H’ configuration forms an ideal basis for supporting an upright passenger, for example, stood in a booth.

Subsequent to the introduction of electric drones, European patent EP3140191B1 would describe a body whose planform would appear as four identical spars abutted around the mid-point of each other so that they could be secured as four-pronged layout secured by square plates top and bottom which coincide with the void formed by the arrangement of those spars. The arrangement is independently outlined in patent no. WO2019158943 as it appears also in Lego at https://www.youtube.com/watch?v=wUVvQk7XLd4&t=129s

Nonetheless though the outline has been scaled in a practical form able to lift a passenger and formulated around the content of the WIPO patent above, the outline is not ideal for mass-production, delivery, storage and transportation. In particular it lacks the symmetry that enables it to be stored easily when out of use, and fitted with skids of a conventional type that orient the pilot-operator or passenger in much the same way.



Description

The disclosure presents a means by which large quadcopter are furnished with motors and still support a pilot-operator or passenger standing upright in the middle. The embodiment appearing here in planform provides a compact and structurally-sound outline, while at the same time distributing both the payload and thrust moment around an ideal centre-point.

At the same time it provides a suitable basis upon which to mount for example a waist-high enclosure coincident with its centre-section, besides a pair of conventional skids by way of undercarriage (shown in pecked lines). At the same time the propellers, whilst at rest, are ideally positioned for protection in a stowed condition or else to minimise drag. In this format they also enable the airframe to be trailered to and from deployments.

Looking at diagram ~ which could be considered a half-scale iteration of an adult-carrying iteration ~ inch-square tubular alloy of one-sixteenth thickness or a carbon-fiber section is joined around the perimeter by standard reinforced plastic tube-connectors to create an outline of some 50” outside dimension in support of 32” propellers mounted upon motors fixed at the four T-junctions.

These junctions form abutments for the pre-existing arrangement of four cantilever arms described above. In order to provide a solid base, the same gauge of tubing is used herein and the central void formed by the arms is filled with core foam and secured by plates to top and bottom.

Meanwhile the corners of the square outline formed by the arrangement comprise three-way tube-connectors so that one prong of these extends downward, whereupon it might support a leg to which either castors are affixed or conventional helicopter types of skids. In those cases where the accommodation booth is extended above head-height, much the same arrangement of cantilevers, power-units and propellers provides fail-safe redundancy while at the same time the existing airframe is easily adapted to large dimensions wherein eight propeller-disks might be accommodated, by a further four incorporated in-between.

Conclusion

Although the appearance of conventional model drones is readily recognisable, there are few universal outlines for the pursuit of people-carrying drones or eVTOL manifestations. The disclosure provides a means of producing large-scale multicopters in a flat-pack type of assembly easier to manufacture, ship and deploy than pre-existing projects in the field. Significantly too, no specialised tooling or jigs are required for its construction, which can be undertaken using DIY methods and means suitable to garage or workshop.