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Information Paper

Manned Multi-Rotor craft

This information paper provides guidance to persons who wish to build a manned multi-rotor craft. Another name/term for these might be ***EVTOL*** – Electric Vertical Take-Off & Landing vehicles. Can one be an amateur-built experimental aircraft? What licence would you need?

1. INTRODUCTION:

CASA has known for some time that people are tinkering in their sheds with manned multi-rotor craft/drones, or wanting to import something ready to go from overseas. Things like these:

It wasn't until February 2020 that SAAA was first contacted by a builder, wanting to know if such a thing could be registered with SAAA. This leads us to the three basics things required to get into one of these type of craft: Aircraft Registration, Experimental Certificate, Pilot Licence.

Registration:
Firstly, SAAA does not register any aircraft, of any sort. CASA does. They are VH marked. Yes, you could probably register such a craft as an amateur-built experimental with CASA as there are no design limitations or specifications for an experimental aircraft.

- Could they be registered with RAAus? No – RAAus are fixed wing and microlight only, operating to exemptions via Civil Aviation Orders.
- Could they be registered with ASRA (Sport Rotorcraft)? No – ASRA are gyroplanes, operating to exemptions via Civil Aviation Orders.
- Are they Hovercraft? No, by definition, they are not.
- Are they "ground effect" vehicles? Some might be – most might be capable of flight well outside ground effect. Generally speaking, ground effect vehicles (craft not capable of altitudes of more than a metre or so) are outside the scope of CASA.

The definition of "aircraft" from Civil Aviation Act 1988 tends to support that:
"Aircraft" means any machine or craft that can derive support in the atmosphere from the reactions of the air, other than the reactions of the air against the earth's surface.

Experimental Certificates:
Would a home-made (not a commercially built ready-to-go) manned multi-rotor craft be eligible to receive an amateur-built experimental certificate? On the face of it – perhaps. For an amateur-built experimental aircraft, there are ***no*** design criteria to meet. You can build anything you like, out of anything you like, and power it with anything you like. So why not a manned multi-rotor? On the face of it, let's answer yes or okay to that one.

What's the catch? It would have to meet **all** of the same criteria as a regular experimental would – be it aeroplane of helicopter. VH markings, EXPERIMENTAL marking, placards, day VFR instrumentation (airspeed, altimeter, compass, clock), documentation, maintenance manuals, pilot operating handbook, become an entitled aircraft maintainer via the applicable CASA regulations and so on. It would have to undergo proper flight testing, and fly a specified minimum number of test hours, normally 40 with a non-certified engine (or motors). For something largely designed and built for mucking about in your back paddock (so to speak) – that sounds like a lot of phooey doesn't it? Well you're probably right, but the amateur-built experimental regulations are what they are, and when they were written well over 20 years ago now, manned multi-rotor craft didn't exist – nor did your hobby camera equipped radio controlled drone. The amateur-built experimental regulations do not directly cater for manned drones/EVTOL vehicles. Nor do they prevent them.

Pilot licence:
Here is where the real problem begins. You can't fly one on a Pilot Licence – Aeroplane, Helicopter or Gyroplane. It's not an aeroplane nor a helicopter nor a gyroplane. What licence do you need then? CASR Part 61 Regulations (Pilot licencing) mention a ***"powered lift"*** category of aircraft. CASR Vol 5 Definitions show that to be:
powered-lift aircraft means a power-driven heavier-than-air aircraft that derives its lift in flight:
(a) during vertical manoeuvring and low-speed flight - from:
    (i) the reaction of air on one or more normally power-driven rotors on substantially vertical axes; or
    (ii) engine thrust; and
(b) otherwise - chiefly from aerodynamic reactions on surfaces remaining fixed under given conditions of flight.

That all sounds like manned multi-rotor/EVTOL territory.

What's the catch? Can you actually get one of those licences?
Well…… who knows? Here are the CASA requirements for such a licence:

CASR 61.555 Aeronautical experience requirements for grant of private pilot licences—powered-lift aircraft category
(1) An applicant for a private pilot licence with the powered-lift aircraft category rating must have at least 40 hours of aeronautical experience that includes:
(a) at least 35 hours of flight time as a pilot; and
(b) at least 30 hours of flight time as pilot of a powered-lift aircraft or helicopter; and
(c) at least 20 hours of flight time as pilot of a powered-lift aircraft; and
(d) at least 10 hours of solo flight time in a powered-lift aircraft; and
(e) at least 5 hours of solo cross-country flight time in a powered-lift aircraft; and
(f) at least 2 hours of dual instrument time; and
(g) at least one hour of dual instrument flight time in a powered-lift aircraft.
(2) Any of the required aeronautical experience that is not completed as flight time as a pilot must be completed as:
(a) simulated flight time in an approved flight simulation training device for the purpose; or
(b) tethered flight time.
(3) The cross-country flight time required by paragraph (1)(e) must include a flight of at least 150 nautical miles during which a full-stop landing is made at each of 2 landing areas, other than the one from which the flight began.

SAAA has written to CASA requesting clarification on the EVTOL aircraft highlighting the urgency to address the issue as there are already EVTOL craft being shipped to Australia. SAAA has also made it known that SAAA is willing to work with CASA to develop and manage a system of procedures to allow for legal operation of these crafts.

Although SAAA don't know of any CASA approved simulators and if you were to import or develop one it takes a considerable time to get to certification. However there are already Electric Powered Aircraft that certain aspects of licensing can be gained from.

There are also EVTOL types close to Electric Powered Aircraft where it could be argued that an Electric endorsed Pilots License would be all the requirement needed to operate them.

What does CASA Sport Aviation have to say on the topic of manned multi-rotor craft?

As at January 2020:
"We get an enquiry of this type at least once a week. There are so many people looking to import something from overseas, or develop something in Australia. CASA has no category for the operation of this type of vehicle, additionally there is no pilot license/endorsement that covers operation of this type of aircraft. It is not covered by any Experimental category, including amateur built experimental. The ONLY avenue available for development/operation of such an aircraft would be via CASA issued exemptions. You can always point them to us at CASA Sport Aviation." ***sport@casa.gov.au***

We imagine that this topic will evolve over time. Stay tuned for edition 004 of this Information Paper as more info comes to hand.