



True to type

Thinking about importing a new aircraft design from overseas? Or designing and manufacturing a new aircraft? In both cases there are certain processes you have to follow to get the aircraft certificated to Australian safety standards.

Mel Dunn

YOU'RE planning to expand your operations with some new aircraft. You've had some discussions with a couple of overseas manufacturers and they're enthusiastic – naturally – then somebody mentions that you better make sure you get the new aircraft certificated by CASA, otherwise you will be unable to use them in Australia.

The need to certificate aircraft is a routine process performed by all national airworthiness authorities throughout the world.

Aircraft certification involves CASA assessing an aircraft type against safety design standards, which culminates in the issue of a

certificate of airworthiness (CofA) for individual aircraft. Type certification is a part of the process of aircraft certification, which leads to the issue of a type certificate or equivalent document. This is necessary before individual Certificates of Airworthiness can be issued.

The safety design standards vary from aircraft type to aircraft type depending on the size of the aircraft and the way it will be used. Regular public transport (RPT) aircraft, like those used by the major airlines, are required to meet the most stringent international safety standards. The safety standards are less strict for the smaller general aviation-type aircraft, as they are for agricultural aircraft, and quite

minimal for the “low end” of the market, like ultra lights and amateur-built aircraft.

Automatic acceptance: All the major aircraft manufacturing countries have their own national airworthiness authority (like Australia's CASA). Each of these authorities administers the type certification process for any aircraft designed and built within their own country, assessing them against aircraft safety design standards based on the broad standards of the International Civil Aviation Organization (ICAO).

These standards are often expanded to suit local conditions, or to address special requirements perceived by a particular national



airworthiness authority to be necessary, based on their particular experience. Based on knowledge of the capability and competence of particular authorities, and knowing the design standards used are compatible with recognised international safety standards, CASA has approved the automatic acceptance of the type certificates issued by the national airworthiness authorities of the following seven countries: Canada, New Zealand, France, Netherlands, UK, USA, and Germany.

This has streamlined the acceptance by CASA of aircraft from some overseas sources. For example, let's assume that you are a regional operator seeking a new medium sized

passenger jet aircraft from an overseas source. If you choose an aircraft originating from one of the countries mentioned above, and it has already been type certificated by that country, then the process is quite straightforward.

All you need to do is apply to CASA for a Type Acceptance Certificate for the aircraft concerned and ensure that you have all the necessary support for continuing airworthiness control of your aircraft and for the issue of the individual Certificates of Airworthiness for each aircraft.

This process was used by Kendell Airlines in their choice of the Bombardier-manufactured Canadair Regional Jet CRJ200-ER for their

regional operations.

However, if you choose an aircraft that originates from a country that is not recognised by CASA, the process is likely to be somewhat more complicated. This is because of the necessity for CASA to be assured that the aircraft concerned meets the applicable airworthiness standards and that all the support necessary for continuing airworthiness control is available and acceptable. This may require extensive investigation and liaison with the relevant national airworthiness authority and the aircraft manufacturer.

This can be very time consuming and costly. This can be particularly so for aircraft from

countries of non-English speaking origins and/or where little is known of the basic design standards used for assessment of aircraft or, indeed, how the particular national airworthiness authority undertakes such assessments.

Of course, there are some Australian designs which might suit your purposes. While within Australia no airline-size aircraft has yet been designed and produced (and probably will not in the foreseeable future) considerable expertise has been demonstrated in the "lower end" of the market.

Design from scratch: Designing an aircraft from scratch is a complex exercise, requiring considerable effort and access to engineering

// While there are a few hurdles, it's not a steeplechase. A little effort to familiarise yourself with the processes, including early consultation with CASA engineering support groups, will streamline the task. //

and aeronautical expert advice before you can obtain the necessary certification and be able to fly. Nevertheless, it can and has been done. The process involves:

- Prescribing appropriate aircraft safety design standards and requirements (usually a recognised standard like the US Federal Aviation Regulation [FAR] Part 23, which is the one applicable to light aircraft).
- Ensuring the product design is proven to meet the safety design standards, through competent and adequate ground tests, engineering analysis and flight tests.
- Checking that the test articles when manufactured conform to the design requirements.
- Ensuring that the flight manual and associated operating aspects are satisfactory.
- Acceptance of the maintenance manual and approval of the airworthiness limitations section of the maintenance manual (if applicable).
- As part of production certificate require-

ments, ensuring that satisfactory arrangements are in place for continuing airworthiness control, defect reporting, and supply of service documents.

This is really a simplified statement of the approach that a foreign national airworthiness authority would take in assessing one of its own country designs. In other words, the approach taken by CASA is designed to be consistent with international practices.

A designer needs to liaise closely with CASA during the design and approval process, not only to facilitate the type certification process, but also to ensure that the availability of support data and documentation is sufficient. This is very useful in the event that a designer wishes to seek certification by an overseas national airworthiness authority as has been done in some cases. Unfortunately, at this stage, the "automatic acceptance" process, which is a feature of Australia's rules, does not operate as fluently in the reverse sense.

Once a type certificate is obtained, processes need to be put in place to ensure that any production models of the type conform with the original approved design. This facilitates the issue of individual Certificates of Airworthiness.

Gippsland Aeronautics, with its GA-200 & 200C Fatman aircraft, has successfully undertaken the Australian design approach and has achieved overseas certification in its particular design category, as has Eagle Aircraft with its Eagle 150.

Whether you decide to buy an overseas aircraft (new or used), or a local design, it will have to be certificated as meeting defined design rules. You will also need processes in place to ensure its continuing airworthiness. While there are a few hurdles, it's not a steeplechase. A little effort to familiarise yourself with the processes, including early consultation with CASA engineering support groups, will streamline the task.

For further information on the type certification and certificate of airworthiness processes see CASA Advisory Circulars AC 21.1(0) through AC 21.30(0), and related regulations mentioned in those circulars.

Mel Dunn is a former CAA Head of Airworthiness. He is now a private aviation and safety consultant.

Kendell Airlines CRJ200-ER

The Bombardier Canadair Regional Jet CRJ200-ER is a 50-passenger twin-jet aircraft designed to full airline FAR 25 standards. It has been specifically designed for regional markets like Kendell's, allowing such operators to grow undeveloped hubs and to reach smaller markets from mature hubs. The aircraft is fully FMS and GPS equipped. In ideal conditions it can operate from field lengths of 1,600m or less, has a range around 3,000km and can cruise at in excess of 460kt at a maximum altitude of 41,000ft. Its maximum take-off weight is 23,133kg.

Kendell Airlines has ordered 12 CRJ200-ER aircraft to service their regional market. A total of seven aircraft have been delivered so far, the first in September 1999, and the aircraft are now in service. The remaining aircraft are expected to be delivered progressively until the last in May 2001.

The aircraft is a typical example of the type of aircraft accepted under the automatic acceptance of Type Certificates' of certain countries. The company applied for a CASA Type Acceptance Certificate in February 1999 and, at that time, provided the required limited amount of evidence in support of the application. (CAR 21.29A refers.) Kendell advises that the automatic acceptance procedure that followed was relatively easy, exemplified by the aircraft delivery schedule commencing very soon after application.

Gippsland Aeronautics GA-200 & 200C Fatman

The precursor to the GA-200C Fatman was a two-seat version of the Piper PA25-235 Pawnee aircraft. It is now a totally new Australian design and has been certificated by CASA in the restricted category for agricultural purposes. Gippsland Aeronautics

Different strokes

has since obtained restricted (agricultural) category certification in the USA, New Zealand, Canada, Brazil and China. Total sales are about 50 to date with approximately 50 per cent for export (including nine to China, seven to New Zealand and five to South Africa).

Gippsland Aeronautics is also designing, constructing and in the process of obtaining type certification for the GA 8 Airvan, a small general aviation utility transport aircraft. This aircraft is designed to the normal category light aircraft design standard, FAR 23. The first production aircraft has a provisional certificate of airworthiness, and the GA 8 aircraft type has a provisional type certificate. The certification process is expected to be completed during 2000. This aircraft is now in the process of being assessed against the relevant standards by CASA specialists.

Eagle 150

The Eagle 150 is a single engine, two-seater aircraft featuring a low wing, fixed-gear, clear bubble canopy and distinguished by both its forward wing configuration and the innovative use of composite materials throughout the fuselage. Its maximum take-off weight is only 650kg.

The Eagle 150 has been designed to JAR-VLA (very light aircraft) standards and has been certificated within Australia to those standards. At the beginning of 1999 the Eagle obtained USA FAA certification to those standards and it has since been certificated in Malaysia, Thailand and New Zealand. In each case the relevant national airworthiness authority undertook an independent assessment against the JAR-VLA standards. There is considerable interest in this light, general aviation utility aircraft, both within Australia and overseas, as demonstrated by secured sales of 34 aircraft to date and target sales of 50 during the year 2000.



Kendell Airlines CRJ200-ER



Gippsland Aeronautics GA-200C Fatman



Eagle 150