Challenging ATC

I dispute the conclusion that pilots should not challenge an Air Traffic Control instruction based solely on TCAS traffic information ("Wrong Way", *Flight Safety Australia*, July-August).

The separation of aircraft is not solely a controller's responsibility (CAR 163A – Responsibility of flight crew to see and avoid aircraft). A pilot should follow ATC instructions and not manoeuvre solely by reference to a TCAS traffic display. However a pilot in receipt of information (no matter how imperfect or ambiguous) is obliged to resolve any doubt he may have regarding the safety of his/her aircraft (CAR 224 – Pilot in command).

If this requires a pilot to "challenge" an ATC instruction, then that is what must be done. Modern pilot training includes advice on resolving ambiguity, threats and errors using all resources available to break the link in a chain of events that may lead to an incident or accident.

It is the law that pilots comply with ATC instructions, however this is provided the pilot believes it safe to do so (CAR 100 – Compliance with ATC clearances).

Pilots and ATC have a joint responsibility to ensure the safe separation of aircraft. Pilots "challenging" an ATC instruction on the basis of conflicting information have averted aircraft collisions. If you were a passenger on board an aircraft and the pilot had an instrument showing a potential conflict, would you expect him/her to challenge or question ATC?

B.Young, Vic

Pilots are entitled to challenge an ATC instruction, but they should have a valid reason for doing so. However, a traffic advisory (TA), taken in isolation, does not provide a pilot with sufficient information on which to base safe separation and to challenge an ATC instruction solely on the basis of a TA could possibly make the situation worse.

This is exactly what happened in the second event mentioned in the article: The B747 pilot challenged the controller based solely on his incorrect interpretation of the traffic display. While his initial query "Confirm 30 degrees left?" was perhaps understandable, the pilot's subsequent argument against the instruction – made 30 seconds later – was unjustified. His comment, "If we turn 30 degrees left we will be aiming towards another aircraft at our level", and the notification that the crew would be filing a report because "… you sent us straight [towards] the aircraft", demonstrates a complete misunderstanding of what the traffic display was showing the flight crew.

TCAS is a last line of defence against a failure of the Air Traffic Control system and, if used correctly, it will ensure that a collision is averted. It was never intended to be used as a traffic management system, nor as a means of providing normal ATC separation. As the article says: "Some flight crew are tempted to make their own assessment

based on the TCAS display, and to manoeuvre ahead of ATC instructions. This can be dangerous as the TCAS II traffic display is easy to misinterpret. That is because the display gives you only partial information, has limited accuracy, and is based upon a moving reference."

A traffic advisory should be used only for the purpose for which it was designed – to provide the flight crew with assistance in visual acquisition and to alert them to the possibility of a subsequent resolution advisory (RA) being issued. The point of the article was to underscore the danger of manoeuvring in response to a traffic advisory and to emphasise that a TA does not necessarily indicate a potential conflict.

– Mike Adams, head, flying operations, air transport operations group, CASA; chairman of the ICAO operations panel

Lightning strike

The article, "Bolt from the blue", was of considerable interest (*Flight Safety Australia,* July-August). I have been struck by lightning some 10-15 times while airborne. The last time was in a B727, descending for visual approach to Beirut.

The previous incident was on climb out of Dusseldorf in a Caravell-3. Cloud was continuous from about 2000 ft to 10,000 ft with no turbulence. The lightning strike occurred at about 7000 ft. Having arrived at Dusseldorf an hour before with a descent from clear conditions down into widespread continuous strataform flat-topped cloud, free of turbulence, we had not thought it necessary to use airborne radar for departure.

Visibility from the cockpit of the Caravelle-3 was so bad that we could not see the aircraft's

wing tips.

On September 4, 1963, Swissair lost about 70 persons when a Caravelle-3 went in at Durrenasche, some 10 minutes after takeoff from Zurich. Control cables in the Caravelle-3 ran right out to all flight control surfaces, terminating at the servodynes that acuated the surfaces; without hydraulic pressure the servodynes were useless.

I am sure the designers of fly-by-wire aircraft have developed robust protection against lightning strikes. But a direct lightning strike will also induce currents that could make all computers unserviceable, and possibly fuse wires in the light control circuits. Blank screens and fused electrics would not be corrected by current from the "drop out" electric generator.

Perhaps the newer fly-by-wire aircraft should be capable of full reversion to manual control.

-Bob Birch, Yinnar South, Vic

In theory the avionics systems of an aircraft – including computers – are designed and tested to withstand substantial induced currents and to continue functioning.

The protection devices built into the equipment are designed to "breakdown" and conduct the surge current away from the device, allowing the computer to return to normal operation in a timely manner. However, if repairs are not done correctly, or

a strike was not reported, then there is potential for further damage to be done.

In large aircraft there is a design requirement for triple redundant systems for critical areas, such as the fly-by-wire system. The chances of these systems all suffering major damage from a lightning strike is extremely remote, as long as all designed protection is in good order.

There is no right or wrong answer as there is no evidence that lightning has caused a fly-by-wire aircraft to suffer sufficient damage as to be uncontrollable. The downside of an emergency mechanical system is the weight penalty this imposes. Any back-up mechanical system is also vulnerable to damage from a ligtning strike. Readers should note that Bob Birche's experience reinforces the advantages of radar use in IMC.

– Lance Thorogood, airworthiness specialist, CASA

Is GA in fatal decline?

Your article on the state of general aviation (Flight Safety Australia, July-August) advises that the Bureau of Transport and Regional Economics has found the following:

Private operations

- 2 per cent fall in total private flying hours.
- 52 per cent increase in sports flying.
- 20 per cent fall in private business and recreational flying.
- 116 per cent increase in home-built flying.
- 131 per cent increase in rotary wing.
- 45 per cent increase in hang gliders.

Commercial operations

- 3 per cent increase in total hours.
- 9 per cent increase in charter hours.
- 0.2 per cent increase in fixed wing charter.
- 67 per cent increase in rotary.
- 5 per cent decrease in fixed wing training.
- 12 per cent increase in rotary wing training.

Between 1993 and 2005 the ING wholesale Australian share trust rose 400 per cent. Over the same period the Standard & Poors Australian Stock Exchange all ordinaries index rose 280 per cent.

How can anybody seriously consider that general aviation is even standing still when the measure of overall business growth in this country, as measured by the relevant indices above, have ploughed ahead by up to 130 times the rate of growth of GA.