

**Senate Standing Committee on Environment and Communications**  
**Inquiry into recent trends in and preparedness for extreme weather events**

**Response by the Civil Aviation Safety Authority (CASA):**

1. By letter dated 4 January 2013, the Committee invited CASA to make a submission addressing issues that may be of relevance to the inquiry captioned above.
2. In response to CASA's request for a clearer specification of the Committee's particular interest in CASA's views, CASA was advised, on 18 January 2013, of Senator Milne's clarifying details, which was conveyed to CASA in the following terms:

We would particularly be interested in CASA addressing the impacts on flight safety and reliability of extreme weather episodes, and any ways to strengthen Australia's regulations to make air safety more resilient in the face of future climate trends.

3. The Inquiry Terms of Reference indicate extreme weather events include but are not limited to drought, bushfires, heatwaves, floods and storm surges.
4. As a general rule, the civil aviation safety legislation does not single out or otherwise identify 'extreme' weather as distinct to other weather conditions that can affect aviation operations, such as high wind conditions, cloud, ice and dust. This is because 'extreme' weather is a risk that must be mitigated by information and planning in a similar way to other weather conditions that might be considered 'normal', but which can still pose a hazard to aviation. Extreme weather events, such tropical cyclones, thunderstorms and reduced visibility due to bushfire smoke are at least visible and traceable (both visually and electronically), unlike other potentially dangerous conditions such as clear air turbulence, and therefore can be taken into account through appropriate forecasting, planning and decision making.
5. The most significant weather related distinction in the Civil Aviation Regulations is between flight under Visual Metrological Conditions and flight under Instrument Metrological Conditions. There are different sets of rules governing each of these types of flights. Under Visual Flight Rules (VFR) (subject to certain specific exceptions), the pilot in command of an aircraft must not conduct a VFR flight at a height of, or less than, 2,000 feet above ground or water if the pilot is not able to navigate by reference to the ground or water. Flight visibility is determined by the pilot-in-command from the cockpit of the aircraft while in flight. In determining visibility, the pilot-in-command shall take into account the meteorological conditions, sun glare and any other condition that may limit his or her effective vision through the windscreen. Aircraft must also be equipped with suitable flight instruments.
6. A pilot-in-command of an aircraft that is flying in weather conditions other than Visual Metrological Conditions must comply with the Instrument Flight Rules (IFR). There are limitations on the types of flights that can be conducted under IFR and pilots must hold appropriate licences and ratings. Once again, the pilot-in-command of an aircraft operating under the IFR is responsible for determining the visibility and cloud base for the take-off and landing of the aircraft. In determining the cloud base, the pilot-in-command of an aircraft must, for take-off, take into account the current available weather forecasts and reports; and for landing determine the cloud base from the cockpit of the aircraft while in flight or from an automatic location specific weather report at larger aerodromes.

7. These rules highlight two key factors which determine the safety of flight in different weather conditions:
  - i) the critical importance of pilot decision making both before and during the flight; and
  - ii) the necessity for accurate and reliable weather forecasting and information.
8. Developments such as ‘Approaches with Vertical Guidance’ (types of instrument approaches flown by aircraft which permit safer approaches to landing in poor weather) should also assist pilots and operators in managing extreme weather conditions.

### **Pilot decision making**

9. The importance of weather related decisions by pilots is highlighted in the 2011 research and analysis report by the Australian Transport Safety Bureau (ATSB) entitled ‘Accidents involving Visual Flight Rules pilots in Instrument Meteorological Conditions (AR-2011-050 Avoidable Accidents No. 4)’. This report states:

Weather-related general aviation accidents remain one of the most significant causes for concern in aviation safety; the often fatal outcomes of these accidents are usually all the more tragic because they are avoidable.

In the past 5 years (2006–2010), there have been 72 occurrences of visual flight rules (VFR) pilots flying in instrument meteorological conditions (IMC) reported to the ATSB. Seven of these resulted in fatal accidents, causing 14 fatalities. That is, about one in ten VFR into IMC events result in a fatal outcome.

Flying into IMC can occur in any phase of flight. However, a 2005 ATSB research publication ‘General Aviation Pilot Behaviours in the Face of Adverse Weather’ concluded that the chances of a VFR into IMC encounter increased as the flight progressed, with the maximum chance occurring during the final 20 per cent of the flight distance.

The dangers of flying VFR into IMC have been recognised for a long time, yet VFR pilots still fly into deteriorating weather and IMC. This publication describes recent weather-related general aviation accidents and incidents that show that weather alone is never the only factor affecting pilot decisions that result in inadvertent IMC encounters. It has been produced solely with the intention of encouraging all pilots, no matter what their experience level, to develop the knowledge and skills required to avoid unintentional operations in IMC.

10. The key messages conveyed in the ATSB report are:

Avoiding deteriorating weather or IMC requires thorough pre-flight planning, having alternate plans in case of an unexpected deterioration in the weather, and making timely decisions to turn back or divert.

Pressing on into IMC conditions with no instrument rating carries a significant risk of severe spatial disorientation due to powerful and misleading orientation sensations in the absence of visual cues. Disorientation can affect any pilot, no matter what their level of experience.

VFR pilots are encouraged to use a ‘personal minimums’ checklist to help control and manage flight risks through identifying risk factors that include marginal weather conditions.

11. Regulation 239 of the Civil Aviation Regulations 1988 specifies the importance of pilot planning and decision making taking weather conditions into account, as follows:

239 Planning of flight by pilot in command

(1) Before beginning a flight, the pilot in command shall study all available information appropriate to the intended operation and, in the cases of flights away from the vicinity of an aerodrome and all IFR. flights, shall make a careful study of:

- (a) current weather reports and forecasts for the route to be followed and at aerodromes to be used;
- (b) the airways facilities available on the route to be followed and the condition of those facilities;
- (c) the condition of aerodromes to be used and their suitability for the aircraft to be used; and
- (d) the air traffic control rules and procedures appertaining to the particular flight;

and the pilot shall plan the flight in relation to the information obtained.

(2) When meteorological conditions at the aerodromes of intended landing are forecast to be less than the minima specified by CASA, the pilot-in-command shall make provision for an alternative course of action and shall arrange for the aircraft to carry the necessary additional fuel.

12. CASA conducts frequent seminars for pilots in regional centres around the country which can include a presentation “Weather to fly” about flight planning and decision making. A copy of the slides from this presentation have been provided with this response for the Committee’s information.
13. CASA is aware that, while it is important to provide appropriate guidance, excessive detail and regulation may interfere with the pilot decision-making process, which needs to take into account all the different variables that may apply in a dynamic aviation environment. CASA considers that the decision-making training undertaken by pilots in the process of acquiring their licences is sufficient to allow them to assess the implications of extreme weather events.
14. Under the civil aviation safety regulations, CASA has general powers to issue directions to pilots and operators if required. However because extreme weather such as floods, cyclones, thunderstorms and bushfires are regular occurrences experienced by pilots and operators in this country, directions are rarely issued. CASA may declare Temporary Restricted Areas limiting operations in airspace to emergency services in the event of cyclones, thunderstorms, bushfires and other extraordinary occurrences. CASA ensures all aviation approvals are facilitated as quickly as possible for emergency and support organisations during any extreme event such as flooding and fires.

## **Weather forecasting and reporting**

15. The Bureau of Meteorology's Aviation Weather Service provides aviation users with comprehensive and detailed meteorological information necessary for safe and efficient civil aviation operations. The service includes the provision of observations, forecasts, warnings and advisories, and is provided within the technical and regulatory framework of the International Civil Aviation Organization and the World Meteorological Organization. Details of these meteorological services are provided to pilots through Airservices Australia's Aeronautical Information Publication. Regular forecasts are available for different aerodromes and localities. These include, in order of growing importance, METAR (aviation routine weather report), SPECI (aviation special weather) and SIGMET (information concerning en route weather phenomena which may affect the safety of aircraft operations).
16. Regulation 120 of the Civil Aviation Regulations 1988 makes the importance of these reports clear:
  - 120 Weather reports not to be used if not made with authority
    - (1) The operator or pilot in command of an aircraft must not use weather reports of actual or forecasted meteorological conditions in the planning, conduct and control of a flight if the meteorological observations, forecasts or reports were not made with the authority of:
      - (a) the Director of Meteorology; or
      - (b) a person approved for the purpose by CASA.
17. CASA is satisfied with the timeliness, quality and delivery of weather information to Australian pilots provided by the Bureau of Meteorology and Airservices Australia. Technological improvements in weather forecasting will lead to enhancements to flight planning and thus to safety.

## **Conclusion**

18. While there is no doubt that extreme weather conditions pose challenges to aviation safety, in CASA's view the existing aviation safety regulations provide sufficient coverage to enable pilots and aircraft operators to come to terms with these events. However, CASA, together with the ATSB, monitors trends in aviation occurrences, accidents and safety. Should evidence emerge that extreme weather events are posing a heightened hazard to the safety of aviation then CASA will take any necessary steps to continue Australia's good record of aviation safety.