

Aviation Safety Regulation Review - Bureau of Meteorology Submission

1. PURPOSE OF SUBMISSION

The Bureau of Meteorology is a major provider of meteorological services to the Australian and international aviation sector, and is making this submission to assist with the Review's principle objectives relating to the

- the relationship and interaction of agencies (involved in aviation safety) with each other, as well as with the Department of Infrastructure and Regional Development (Infrastructure); and
- the suitability of Australia's aviation safety related regulations when benchmarked against comparable overseas jurisdictions.

2. EXECUTIVE SUMMARY

Introduction

The Bureau of Meteorology provides aviation meteorological services as part of both an international framework and an Australian regulatory environment.

The Bureau operates two separate aviation functions:

- The Meteorological Authority; and
- Aviation Meteorological Services.

Suitability of regulations

The Bureau suggests considering including specific regulation regarding aviation meteorological services within the *Civil Aviation Safety Regulations 1998* (CASR).

The establishment of such regulation would:

- more clearly define the requirements for aviation meteorological services in Australia;
- bring Australia in line with other countries in the southwest Pacific who already have this in place;
- confirm which meteorological observations need to be provided by aerodrome operators to the meteorological service provider; and
- clarify the standards required within the Australian airspace.

Agency relationships

The Bureau

- works directly with:
 - Airservices Australia (Airservices);
 - Civil Aviation Safety Authority (CASA); and
 - Australian Transport Safety Bureau (ATSB) investigations; and
- provides expertise for:
 - CASA Air Safety Forums & Seminars;

- Regional Airspace & Procedures Advisory Committees (RAPAC);
- Australian Strategic Air Traffic Management Group (ASTRA);
- WMO Commission on Aeronautical Meteorology (CAeM) Working Groups and Expert Teams; and
- ICAO Operations, Study Groups, Task Force and Project Teams.

These relationships are well established and contribute to efficient and safe aviation operations.

3. INTRODUCTION

The Bureau of Meteorology (the Bureau) is the designated Meteorological Authority (MA) for Australia and the primary aviation meteorological service provider. These roles are performed in accordance with international standards and recommended practices and within the framework of Australian legislation.

The major agreements and legislation covering these operations are:

- Convention on International Civil Aviation 1944 (Chicago Convention) ;
- Convention of the World Meteorological Organization 1947;
- Meteorology Act 1955;
- Civil Aviation Act 1988;
- Civil Aviation Regulations 1988;
- Civil Aviation Safety Regulations 1998;
- Air Services Act 1995.

The relevant sections of the agreements and legislation are set out in:

- Attachment A (international) and
- Attachment B (Australia)

Bureau Operations

The Bureau is responsible for two separate aviation operations:

- The Meteorological Authority; and
- Aviation Meteorological Services.

3.1 Bureau aviation functions

3.1.1 Meteorological Authority

The Meteorological Authority Office (MAO) was established in 2011 as an independent section within the Bureau, separating the Bureau's compliance function from that of aviation weather service provision.

Aviation meteorological services are provided through the Aviation and Defence program of the Hazards, Warning and Forecasts Division (HWF) reporting to the Deputy Director Hazards, while the MAO is part of the Corporate Division reporting to the Deputy Director Corporate. The Deputy Director (Corporate) reports to the Director of Meteorology on compliance with ICAO

and other regulatory requirements, while the Deputy Director (Hazards) reports on matters related to service provision only.

As the designated MA, the Bureau is required to:

- i. ensure that aviation weather services are provided in accordance with the Chicago Convention, in particular the standards and recommended practices (SARPs) as set out in Annex 3 – Meteorological Service for International Air Navigation; and
- ii. be the primary contact point for arranging responses to meteorological related ICAO State Letters which are actioned through the Tripartite (Civil Aviation Safety Authority, Airservices and the Department of Infrastructure and Regional Development) before being sent back to ICAO.

The MAO is also responsible for:

- i. maintaining the Bureau's relationship with the CASA;
- ii. ensuring that parties seeking authorisation under CAR120 meet all required standards; and
- iii. arranging for experts to be represented on the regional (within the Asia Pacific Region) and global ICAO groups. Representation on these groups allows for Australia to provide expertise in the future development of ICAO SARPs in relation to the provision of meteorological services to aviation, gain a good understanding of user requirements and service capabilities and ensure that the needs of the Australian aviation industry are considered within the global framework.

The MAO is funded primarily through the Meteorological Service Charge (MSC) and partly through meteorological certification activities.

3.1.2 Aviation Meteorological Services

The Bureau of Meteorology provides aviation weather services under the authority of the *Meteorology Act 1955* and within the International Civil Aviation Organization (ICAO) framework through the following offices:

- Volcanic Ash Advisory Centre (VAAC) and Tropical Cyclone Advisory Centre (TCAC) within the Darwin forecasting office;
- Meteorological Watch Offices (MWO) located at the Bureau's National Operational Centre, forecasting offices in Adelaide, Brisbane, Hobart, Melbourne, Perth, Sydney and Darwin (in addition to the VAAC and TCAC responsibilities);
- Aviation Meteorological Offices (MO) are located at Cairns, Sydney (SAMU, co-located with Airservices) and Canberra airports, Defence bases at Amberley, Townsville, Williamtown, Oakey, East Sale, Tindal, Pearce and embedded with the Defence Headquarters at Bungendore (DMSU), and in Antarctica; and
- Observing Offices around the country.

In addition to those defined within Annex 3 the Bureau also has a unit embedded in Airservices National Operations Centre (NOCMET).

Annex 3 to the Chicago Convention sets out the relevant SARPs pertaining to the provision of the meteorological service for international aviation. Key requirements set out in Annex 3 include:

- The provision of forecasts for international aerodromes;
- The provision of observations for international aerodromes;
- Advisories and warning Services;
- Implementation of a quality management system by all providers of aviation services including forecasts and observations; and
- Competency certification for all aviation forecast and briefing staff.

Annex 3 SARPs are used as the basis of all domestic SARPs applied in the Australian FIR with any differences registered with ICAO.

Aviation Weather Services in the Darwin VAAC, NOCMET, SAMU and the Bureau's Aviation Program with the Hazards, Warning and Forecast Division are certified to the AS/NZS ISO 9001:2008 quality management standard, and all Bureau aviation forecasting staff are certified aviation competent.

Functions of the Aviation Weather Services program are the:

- Provision of aeronautical meteorological observations;
- Provision of aeronautical forecasts and warnings;
- Provision of aeronautical climatological information;
- Coordination of research and development related to aviation weather services;
- Ensuring quality management of aviation weather services;
- Investigations into aviation weather-related incidents;
- Liaison with the meteorological community and the aviation industry;
- Development of policy and standards;
- Provision of education and training to aviation stakeholders;
- Provision of a forecaster competency program; and
- Participation in international aviation meteorology through ICAO and World Meteorological Organization (WMO) forums.

Products provided by Aviation Weather Services include:

- SIGMETs, AIRMETs;
- Volcanic Ash Advisories, Tropical Cyclone Advisories;
- Ditching Reports and Search and Rescue Forecasts;
- Aerodrome Forecasts (TAF), Trend Forecasts (TTF);
- Aerodrome Warnings, Wind Shear Warnings;
- Aerodrome Weather Reports (METAR and SPECI);
- Area Forecasts (ARFOR), Area QNH;
- Airport Weather Briefings and Code Grey;
- Upper Level Analysis and Prognosis charts;
- World Area Forecast System (WAFS) Wind and Temperature charts;
- WAFS Significant Weather charts (SIGWX);
- WAFS Forecast Route Sector Winds and Temperatures;
- Selected route forecasts for high density routes;

- Aerodrome climatological information;
- Briefing services; and
- Aerodrome Weather Information Service (AWIS).

3.1.3 Aviation-Funded Activities

The Meteorological Service Charge (MSC) funds a range of aviation-related activities across the Bureau.

These include:

- All operational aviation forecasters in the MWOs, MOs, VAAC, NOCMET and TCAC to undertake all operational aviation-related tasks;
- A limited number of meteorological observers at six major airports around the country;
- 400 sonde flights per year at major airports to support aviation forecasting;
- 133 automatic weather stations and a limited amount of advanced meteorological sensors such as visibility meters, ceilometers, present weather and thunderstorm sensors;
- Incremental maintenance and inspection program for all aviation funded observations infrastructure;
- Aviation computing and communications including forecaster workstations, the Aeronautical Fixed Telecommunication Network (AFTN), routers, network costs;
- Aviation research projects into improved volcanic ash detection and prediction, fog forecasting Improvement and specialist support for aviation systems; and
- Competency training and assessment for aviation forecasters.

4. Benchmarking regulations

A more detailed aviation meteorological regulation, as per the New Zealand Civil Aviation Rules Part 174 – Aviation Meteorological Service Organisations – Certification, would more clearly define the requirements for aviation meteorological services in Australia.

The establishment of such a regulation regarding aviation meteorological services would include the following benefits:

- definition of the requirements for aviation meteorological services in Australia. bringing Australia in line with other countries in the southwest Pacific who already have this in place;
- definition of the meteorological observations that need to be provided by aerodrome operators to the meteorological service provider; and
- improved understanding of the meteorological standards required within the Australian airspace.

The MAO has developed documentation based on the NZ CAR Part 174 which is currently used as part of the process for the Director of Meteorology to authorise aviation meteorological observations providers under *Civil Aviation Regulations 1988, regulation 120 (CAR120)*. This could form the basis of an initial draft for a new meteorological regulation within *Civil Aviation Safety Regulations 1998*.

5. Agency relationships

5.1 Coordination with Airservices Australia

The Bureau and Airservices Australia (Airservices) have a Memorandum of Understanding (MOU), which sets out arrangements between the organisations for the provision of meteorological services in support of civil aviation. The primary purpose of the MOU is to specify the arrangements by which meteorological information is provided to Airservices and to the aviation industry. The MOU also defines the administrative arrangements between Bureau and Airservices, including the consultation process. The Bureau/Airservices consultative group of meetings include:

- The Executive Steering Committee. This committee meets on an annual basis or as required. The Executive Steering Committee discusses, but is not limited to, issues related to high-level policy, procedures and operational concerns and planning between the two organisations;
- The Bureau of Meteorology/Airservices Working Group, reporting to the Executive Steering Committee, meets quarterly, or as required, discussing issues relating to policy, procedures and operational concerns and planning between the two organisations; and
- The Bureau of Meteorology/Airservices Technical Sub-Group, reporting to the Working Group, meets quarterly, or as required, discussing issues of a technical nature.

5.2 Coordination with the Civil Aviation Safety Authority

The Bureau collaborates with the Civil Aviation Safety Authority (CASA) regarding meteorological regulations and Australia's international obligations under the Chicago Convention. This includes advising on meteorological aspects of new and proposed amendments to regulations, input into the Aeronautical Information Package publications and articles for the CASA Flight Safety Magazine.

5.3 Coordination with the Australian Transport Safety Bureau

The Bureau collaborates with the Australian Transport Safety Bureau (ATSB) to provide meteorological information and advice for ATSB's aviation incident reports. This includes basic meteorological information as well as more detailed meteorological information in Aviation Safety Incident Reports as requested.

5.4 Consultative activities

The Bureau provides experts to take part in consultative activities including:

- CASA Air Safety Forums & Seminars;
- Regional Airspace & Procedures Advisory Committees (RAPAC);
- Australian Strategic Air Traffic Management Group (ASTRA);
- WMO Commission on Aeronautical Meteorology (CAeM) Working Groups and Expert Teams; and
- ICAO Operations, Study Groups, Task Force and Project Teams.

5.5 Future Directions

The Bureau is engaged in three further meteorological specific reviews with the aviation sector covering:

- Aerodrome Forecasts (TAFs);
- Trend Forecasts (TTFs); and
- Aviation weather services generally

5.5.1 Aerodrome Forecast Review:

In response to requests from the aviation industry, Aviation Weather Services is now completing a review into the provision of the Aerodrome Forecasts (TAFs). The purpose of this review is to assess regulatory obligations, explore the needs of the aviation industry and make recommendations relating to the provision and categorisation of TAFs, including guidelines for the introduction, modification and cancellation of forecasts. This includes the provision of TAFs for locations funded separately to the MSC funded service and the definition of minimum observational requirements to support the production and ongoing monitoring of a TAF during its period of validity.

5.5.2 Trend Review:

The review into the provision of Trend Forecasts (TTFs) at major airports is being undertaken at the request of the aviation industry. The review's objectives are to assess the current systems, personnel requirements and costs for the provision of TTFs, TAFs and METAR/SPECIs at Australia's major airports, and to provide, after consultation with industry and based on user requirements, a recommendation on the future forecast and observation service at major airports.

5.5.3 Review of Aviation Weather Services:

Following a number of requests from the airline industry the Aviation Weather Services Program has commenced an investigation into methods of improving the delivery of aviation weather services and products. This investigation, led by an international expert in aviation weather services, will evaluate whether the Bureau's Aviation Weather Services Program can be more efficiently structured to more effectively meet the needs of the aviation industry.

Although requests from the aviation industry have supported the need for the above reviews, a key driver is also the Bureau's implementation of the AS/NZS ISO 9001:2008 quality management standard and certification.

APPENDIX A: International Obligations Relating To Aviation Meteorology

CONVENTION ON INTERNATIONAL CIVIL AVIATION 1944

The Bureau has two aviation roles under the Convention on International Civil Aviation 1944 (Chicago Convention, ratified 1947):

- (i) as the designated Meteorological Authority (MA) for Australia; and
- (ii) as a provider of meteorological services for international aviation within the Australian flight information region (FIR).

As the designated MA, the Bureau is required to ensure that aviation meteorological services are provided in accordance with the relevant standards and recommended practices (SARPs) in the Annexes to the Chicago Convention, in particular those of Annex 3 – *Meteorological Service for International Air Navigation*.

Annex 3 states that *'the objective of meteorological service for international aviation shall be to contribute towards the safety, regularity and efficiency of international air navigation.'* The Bureau adopts the same SARPs for domestic meteorological service provision where appropriate.

Although meteorological service provision and the Meteorological Authority role are both provided by the Bureau within Australian airspace, both sections are independent within the Bureau. Aviation meteorological services are provided through the Aviation and Defence Branch of the Hazards, Warning and Forecasts (HWF) Division reporting to the Deputy Director Hazards, while the Meteorological Authority Office is part of the Corporate Division reporting to the Deputy Director Corporate. Both Deputy Directors report directly to the Director of Meteorology on their respective responsibilities.

CONVENTION OF THE WORLD METEOROLOGICAL ORGANIZATION 1947

Australia is a signatory to (a Member of) the *Convention of the World Meteorological Organization 1947* (WMO Convention). The WMO Convention was ratified on 11 October 1947 and it came into force for Australia and generally on 23 March 1950. Article I of the WMO Convention establishes the World Meteorological Organization (WMO), whose purpose is set out in Article 2 and includes:

“(a) To facilitate worldwide cooperation in the establishment of networks of stations for the making of meteorological observations or other geophysical observations related to meteorology and to promote the establishment of meteorological centres charged with the provision of meteorological services;

*(d) To further the application of meteorology to **aviation**, shipping, water problems, agriculture and other human activities; ...”*

WMO regulations related to aviation meteorology can be found in *WMO-No.49 - Technical Regulations, Volume II, Meteorological Service for International Air Navigation* aligns with Annex 3 to the *Convention on International Civil Aviation, Meteorological Service for International Air Navigation*.

APPENDIX B: Australian Legislation Relating To Aviation Meteorology

METEOROLOGY ACT 1955

Section 5 of the *Meteorology Act 1955* establishes the Bureau of Meteorology and provides for a Director of Meteorology who has general administration of the Act.

Section 6 of the *Meteorology Act 1955* defines the functions of the Bureau and sub-section 6(2) provides that:

“The Bureau shall perform its functions under this Act in the public interest generally and in particular:

*(b) for the purposes of navigation and shipping and of **civil aviation**;...”*

Section 8 of the *Meteorology Act 1955* empowers the Director to levy charges for forecasts, information, advice, publications and other matter supplied in pursuance of the Act.

CIVIL AVIATION ACT 1988

The *Civil Aviation Act 1988* establishes, under amendments made in 1995, the Civil Aviation Safety Authority (CASA) with functions relating to civil aviation, in particular the safety of civil aviation. The main objective of the Act is to ‘*establish a regulatory framework for maintaining, enhancing and promoting the safety of civil aviation, with particular emphasis on preventing aviation accidents and incidents*’.

Section 98 of the *Civil Aviation Act 1988* provides that the Governor-General can make regulations, not inconsistent with the Act, for:

*‘3(e) the planning, construction, establishment, maintenance, operation and use of air route and airway facilities, including the obtaining of **meteorological information**’*

CIVIL AVIATION REGULATIONS 1988

Civil Aviation Regulations 1988, Regulation 120 (CAR 120) provides as follows:

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.

(2) An offence against subregulation (1) is an offence of strict liability.

In order for the Director to make an assessment of an application for authorisation of aviation meteorological reporting services, it is a requirement that the interested applicant(s) provide

documentation detailing the intention of the proposed services, procedures and processes that will be used as well as any other supporting material.

In the absence of a detailed aviation meteorological regulation, the authorisation process follows recommendations from the Australian Government Solicitor (AGS) and a similar process framework to that of the Australian Civil Aviation Safety Authority and the New Zealand and United Kingdom Civil Aviation Authorities.

It is a requirement that all meteorological reporting service providers, authorised by the Director, comply with SARPs in the Annexes to the Chicago Convention and any Australian Registered Differences.

CIVIL AVIATION SAFETY REGULATIONS 1998

Civil Aviation Safety Regulations 1998 (CASR) currently do not have a specific regulation regarding aviation meteorological services.

Several Civil Aviation Safety Regulations have references to specific aviation meteorological requirements. These include:

- *CASR Part 139 – Aerodromes;*
- *CASR Part 171 – Aeronautical telecommunication services and radionavigation service providers;*
- *CASR Part 172 – Air Traffic Service Providers; and*
- *CASR Part 175 – Aeronautical information services (currently under development).*

CASR Part 139, clause 139.185 indicates that an aerodrome can be exempt from installing a wind direction indicator (wind sock) for non-precision approaches if the wind information is available from:

(a) an automatic weather observing system that:

- (i) is compatible with the Bureau of Meteorology’s weather observing system;*
- and*
- (ii) provides surface wind information through an aerodrome weather information broadcast; or*

(b) an approved observer having a communication link with pilots through which timely information about surface wind can be clearly passed to pilots

CASR Part 171, clause 171.012 states that the aerodrome weather information broadcast service (AWIS), the certified air/ground radio service (CA/GRS) at an aerodrome and the UNICOM service are NOT considered a telecommunications service for the purposes to the Regulation.

AIR SERVICES ACT 1995

The purpose of the *Air Services Act 1995* establishes Airservices. Airservices provides facilities to permit safe navigation of aircraft within Australian administered air space, for example, air traffic services, an aeronautical information service, an aeronautical radio navigation service, an aeronautical telecommunications service, and rescue and fire fighting services.

Air Services Regulations 1995, Part 5 sets out the additional functions of Airservices and Regulation 5.01 provides that the purpose of this Part which includes the provision of meteorological information.

Regulation 5.06 *Provision of meteorological information* provides that:

(1) Airservices may make arrangements with the Director of Meteorology for the provision of meteorological information:

(a) in any form and manner; and

(b) at any place;

that Airservices considers necessary for the safe, regular or efficient operation of aircraft, in accordance with the Chicago Convention.

(2) If there is any information of a kind referred to in subregulation (1) that cannot be provided under arrangements made under that subregulation, Airservices may make any other arrangements that are necessary for the provision of that information.'

Regulation 4.11 sets out the function of the Aeronautical Information Service provider (which is Airservices) and that this includes:

'(3) Aeronautical information is to be disseminated in connection with the following matters, services and facilities:

(a) aerodromes;

(b) air traffic services and facilities;

(c) communication and air navigation services and facilities;

*(d) **meteorological services;***

(e) search and rescue services and facilities;

(f) procedures and regulatory requirements connected with air navigation;

(g) notification of hazards to air navigation.'