



Australian Government

Bureau of Meteorology

REVIEW OF AERODROME FORECAST SERVICES FOR THE AVIATION INDUSTRY

DRAFT REPORT

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Executive Summary

This Review of Aerodrome Forecast (TAF) Services was commenced in 2009 in response to:

- (i) requests from the aviation industry for the Bureau to review its aviation weather services; and
- (ii) as a quality management requirement to meet ICAO (International Civil Aviation Organization) service standards.

The Bureau of Meteorology (The Bureau), as Australia's national weather, climate and water agency, was requested to undertake this review of its specific aviation weather services by the aviation industry. The main industry representative bodies have been consulted during this review and as the next step, the Bureau is releasing this draft to ensure all stakeholders have the opportunity to provide input over a three month initial period, including those affected at the local level.

The Bureau operates in a dynamic environment and is required to constantly adjust its operations to meet the changing demands of governments, business and the community, while maintaining focus on the core functions that deliver long-term benefits.

The Bureau provides services in accordance with both Australian Government legislation and international obligations, including the provision of special aviation weather services. While the Bureau receives most of its funding from the Australian Government through appropriation, the Bureau's Aviation Weather Service recovers the incremental cost incurred in the provision of specialised services to the aviation industry in accordance with government policy. This occurs through the Meteorological Service Charge (MSC). Most international meteorological aviation services are funded through a cost recovery mechanism from industry, based on ICAO policy and guidance.

As meteorology has such a significant influence on aviation activities from both a financial and safety perspective, the aviation industry maintains a strong involvement in the process of ensuring that aviation weather products and services meet all their requirements. Regular consultation occurs between the Bureau's Aviation Weather Service and representatives of international, domestic and regional airlines, general aviation, and other industry groups together with the Department of Infrastructure and Transport (DoIT) and related agencies such as the Civil Aviation Safety Authority (CASA), Airservices and the Australian Transport Safety Bureau.

In response to the industry requirement, the Bureau's Aviation Weather Service commenced a comprehensive review into the provision of regional aviation weather products and services to determine if these products and services continue to meet the needs and expectations of aviation users. This draft review is part of the process. It is recognised that the needs of government, communities and a range of aviation groups, especially those involved in regional operations, may have changed since many of these services commenced some decades ago and/or were previously reviewed. The Bureau's Aviation Weather Service has been requested by the aviation industry to better align services with funding attribution, respond to changing user requirements and to improve the quality of its services.

Additionally, ICAO has recently mandated quality management processes should be part of any service delivery. Recognising this requirement, the Bureau's Aviation Weather Service commenced the specific review into the provision of Aerodrome Forecasts (TAFs) across Australia in 2009. The Bureau recognises that TAFs are important meteorological forecasts produced for the aviation industry and the availability, or non-availability, of a quality TAF for certain locations can have significant safety and financial impacts for the aviation industry and regional communities.

As part of this review, the Bureau's Aviation Weather Services consulted with the aviation industry through industry/Bureau consultancy meetings, various industry fora and surveys of aerodrome owners and operators, aircraft companies and operators, and pilots.

As this is an aviation industry initiated review, the purpose of this draft report is to seek additional formal feedback from all stakeholders in the aviation industry on the range of proposed draft recommendations and to request updated movement and passenger numbers where the data held by the Bureau may be inaccurate.

The review will be open for comment until 31st March 2013. The Bureau welcomes any comments or suggestions from interested parties as part of the re

view and will undertake further analysis of the feedback in consultation with the major government agencies such as CASA, DoIT and Airservices.

Following feedback, the Bureau will finalise recommendations and then develop an implementation plan with phased implementation of agreed recommendations commencing in late 2013. The Bureau commits to a comprehensive consultation process prior to the submission of the final TAF Review report to industry/Bureau consultative bodies and implementation of any significant changes to existing products or services.

Summary Draft Findings

This draft report summarises the review into the provision of TAF services and presents 15 draft recommendations. A major outcome of the review is the recommendation to establish a methodology for determining which aerodromes should receive a TAF service. The methodology includes an assessment of the annual movements and passenger numbers, as well as international requirements. The review recommends that non-international designated aerodromes require at least 4000 movements or 10000 passengers per annum to be considered for a TAF. Aerodromes meeting these thresholds may however be denied an MSC funded TAF if there are other TAF services within 60nm or the TAF service benefits a single industry, rather than aviation servicing the general public.

It should also be noted that movement and passenger figures are not the only determining factors for provision of TAF, as TAF services may also be provided for safety reasons where aerodromes have complex climatologies or have no suitable alternates within a reasonable distance. Additionally, for locations where a TAF is not justified by the new methodology, an option is for the TAF service to be funded on a user pays contractual cost-recovery basis (for example for private operations).

The review also makes recommendations relating to the minimum meteorological observational elements to support the production and ongoing monitoring of a TAF during its period of validity.

As part of the draft recommendations, this review proposes the following changes to the services funded by the aviation industry:

- (i) 128 aerodromes categorisation should remain the same, resulting in continued provision of service for these aerodromes. 56 of these aerodromes should receive additional meteorological observational infrastructure.
- (ii) 14 aerodromes categorisation should be enhanced, which may result in increased hours of the aerodrome forecast service. 7 of these aerodromes should receive additional meteorological observational infrastructure.
- (iii) 29 aerodromes categorisation should be reduced, which may result in a reduced hours of the aerodrome forecast service but a service will be retained. 11 of these aerodromes should receive additional meteorological observational infrastructure.
- (iv) 78 routine aerodrome forecast services should cease to be provided via MSC funding. If a service is desired, a contractual (cost recovery) service should be offered. However, if such a service is to be provided, the following would be required:
 - 76 aerodromes require additional meteorological observational infrastructure, with 26 of these requiring a full automatic weather station
 - 2 aerodromes have sufficient meteorological observational equipment

The additional meteorological observational infrastructure in items (i), (ii) and (iii) are proposed to be funded by the aviation industry, through the MSC, at an approximate cost of \$3.3M. If the aerodrome forecast services under item (iv) were to continue to be funded by the MSC, the aviation industry would be required to fund the upgrade equipment at 76 locations at an additional cost of approximately \$7M.

For specific details on the recommendations and implications of the proposed changes, refer to Appendix 1 and Section 7 of this report, respectively.

The recommendations are aimed at improving the quality of all TAF services by ensuring that TAFs are supported by adequate observations and that forecasting staff have the capacity to monitor the large number of observations and are therefore able to be responsive to changes to the forecast conditions. The implementation of the draft recommendations will also provide additional capacity for improved quality of aviation weather services and the provision of additional routine and ad hoc services as required by users.

1 Aviation Weather Services

1.1 Role

The Bureau of Meteorology's (The Bureau's) Aviation Weather Service enhances the safety, regularity and efficiency of national and international aviation operations through the provision of accurate, timely and relevant forecasts, warnings and information for aerodromes and en-route operations. Aviation weather services are generated and delivered through:

- National Meteorological & Oceanographic Centre (NMOC) in Melbourne;
- Regional Forecasting Centres (RFC) in each State and the Northern Territory;
- Sydney Airport Meteorological Unit (SAMU);
- Meteorological Offices in Cairns and Canberra;
- Volcanic Ash Advisory Centre (VAAC) in Darwin; and
- Meteorological Unit at the Airservices National Operations Centre (NOC) in Canberra (NOCMET).

The Bureau of Meteorology's role in providing services for civil aviation is established through the Meteorology Act 1955. Under the Convention for International Civil Aviation (the Chicago Convention) the Bureau is also the designated Meteorological Authority for Australia and needs to ensure that meteorological services for civil aviation in Australia are in accordance with the standards and recommended practices set out in Annex 3 to the Convention. In fulfilling this mandate, the Bureau works closely with Airservices, which is responsible for air traffic services, and the Civil Aviation Safety Authority (CASA), which is responsible for the safety regulation of civil aviation in Australia.

1.2 Consultation

The Bureau is involved in a range of national and international stakeholder consultation and coordination processes to ensure ongoing arrangements for improved service provision. The Bureau is actively involved in a variety of committees, working groups and focus groups involving CASA, Airservices, Australian Transport Safety Bureau (ATSB) and the Department of Infrastructure and Transport, as well as representatives of international, domestic and regional airlines, general aviation, and other industry groups. International consultation and coordination occur through such forums as the World Meteorological Organization (WMO) Commission for Aeronautical Meteorology (CAeM) and working groups, the International Civil Aviation Organization (ICAO) Asia Pacific Air Navigation Planning and Implementation Regional Group, and a number of other ICAO groups.

1.3 Structure

The Bureau has also made changes in its organisational structure for aviation weather services in response to industry requests to better match its service provision with the requirements of the aviation industry. The Bureau's aviation weather service now consists of:

- Major Airport Weather Services, overseeing services provided for the major international airports within Australia;
- Regional Aviation Weather Services, overseeing services provided to regional Australia, and in low-levels of airspace. This includes services to regional aviation, general aviation and sports aviation users;
- Upper Airspace Weather Services, overseeing all upper airspace services including aviation products supplied by the Bureau's National Meteorological and Oceanographic Centre (NMOC), Tropical Cycle Advisory Centres (TCACs) and Volcanic Ash Advisory Centre (VAAC);
- National Management which develops and manages policy, standards, practices and procedures as well as the financial management of aviation weather services; and
- Meteorological Authority which ensures the aviation weather services for Australia are provided in accordance with ICAO Annex 3 and authorises aviation meteorological service providers under Civil Aviation Regulation 1988, Regulation 120 (CAR120).

1.4 Airservices National Operations Centre (NOC)

The Bureau also has an important role in Airservices' NOC located in Canberra. The NOC was established to balance air traffic flow, manage capacity at major aerodromes and to provide a central point for information sharing between Air Traffic Control (ATC) units, which is particularly important during exceptional events, including adverse weather conditions. NOCMET is an integral part of the NOC, providing Airservices staff with immediate access to information and advice regarding weather conditions affecting air traffic flow in the Australian network. NOCMET staff are experienced Bureau meteorologists responsible for monitoring and providing advice on actual and forecast weather conditions that are likely to impact air traffic flow.

1.5 Quality Management

The Bureau's Aviation Weather Services maintains certification under AS/NZS ISO 9001:2000 Quality Management Standard. The Bureau's quality management system ensures there is a rigorous ongoing independent scrutiny of the management and delivery of aviation weather services as well as providing a firm basis for continuous improvement of aviation weather services to meet industry needs. The Bureau's RFCs are scheduled to be compliant with the aviation quality management system by the end of 2012 as required by ICAO.

A centralised process has been implemented for managing meteorological investigations relating to aircraft accidents and incidents, whereby all requests received by the Bureau are dealt with in a nationally coordinated and consistent manner. Meteorological investigations relating to aviation accidents and incidents assist in identifying any possible deficiencies in, and improvements to, aviation weather services. Consistency in such investigations allows the Bureau to more easily identify widespread or common issues with the services, and also facilitates archiving of information for future reference.

1.6 Competency

The Bureau has also commenced a national aviation competency program, whereby all aviation forecasters and observers are expected to be assessed and deemed competent by November 2013. Following the initial competency assessments, forecasters will undergo routine assessments annually and major assessments every four to five years. This competency training and assessment reflects what an aviation meteorologist would be expected to do while exercising due care on the job and hence provides the foundation for service-focused and operationally-relevant training. It also provides a mechanism for benchmarking the required skills and knowledge.

1.7 Meteorological Service Charge

Australian Government policy requires that the Bureau recover the incremental costs incurred in the provision of specialised services to the aviation industry. These costs are recovered by Airservices on behalf of the Bureau, via Meteorological Service Charge (MSC). Because of this incremental cost recovery method, and the impact of weather on their operations, the aviation industry maintains a strong involvement in the scoping and approval of services delivered to the industry.

In response to a growing demand for additional Aerodrome Forecasts (TAFs) that are not warranted under the MSC, the Bureau has also commenced the provision of Contractual TAF services. Contractual TAFs enable users (typically the aerodrome operator) to fund, on a cost recovery basis, additional TAF services.

2 Aerodrome Forecast (TAF) Review

In 2009, the Bureau commenced a review into the provision of TAF services on behalf, and at the request of, the aviation industry. The review was commenced for the following reasons:

- **Changing aviation industry requirements** - There have been significant changes within the aviation industry in recent years, particularly the increase in fly-in fly-out operations to mining sites throughout Australia, and changes in the types of aircraft being utilised within the regional aviation sector. These, and other factors, have resulted in an increased pressure on the Bureau to provide additional aviation weather services.
- **Aviation services are at capacity** - With the current aviation industry funded budget (MSC), the Bureau's aviation service is operating at capacity and is unable to provide additional products and services for industry.
- **No recent review of TAF services** - While the Bureau has remained responsive to the needs of industry through ongoing consultative processes, it also recognises that no significant national review of the overall provision of regional aviation weather services and products has been completed in recent times.
- **Quality Management** - To meet the Bureau's ISO certified quality management obligations for continuous improvement, and to fully meet the aviation industry's needs and expectations, the Aviation Weather Service is required to review its products and services.
- **Contain Cost and Improved Quality** - The major MSC contributing airlines have requested that the Bureau contain the cost of its aviation service, better align its services with funding attribution, be more responsive to changes to forecast conditions and to improve the quality of services.

This review assesses regulatory obligations, explores the need of all sectors of the aviation industry and makes recommendations relating to the provision and categorisation of TAFs, including guidelines for the introduction, modification and cancellation of TAFs. The review defines policies for the provision of a TAF for locations where the TAF service largely benefits a single commercial operator or sector rather than the general public, such as commercial locations. The review also makes recommendations relating to physical and technological resources required for the provision of a quality TAF service including the minimum observational systems to support the production, and ongoing monitoring of a TAF, during its period of validity.

2.1 Legislation, Regulation and Requirements for the Provision of TAFs

2.1.1 International Regulation and Requirements

Under the Convention for International Civil Aviation (the Chicago Convention) the Bureau of Meteorology is the designated Meteorological Authority for Australia and is responsible for ensuring that meteorological services are provided for international civil

aviation in Australia (and by extension for all civil aviation through the Civil Aviation Act 1920) in accordance with the standards and practices set out in Annex 3 to the Convention. The Bureau's role in providing services for civil aviation is established through the Meteorology Act 1955.

The Bureau provides a range of aviation weather products and services including TAFs. A TAF is a statement of meteorological conditions expected in the airspace within a radius of five nautical miles of the aerodrome reference point for a specific validity period.

ICAO Annex 3 and ICAO Doc 9673 (Air Navigation Plan – Asia & Pacific Regions) set out Australia's requirements for providing a TAF service for Australia's international aerodromes. Annex 3 also contains details relating to the preparation, content and validity period of a TAF, together with information relating to review, amendment and cancellation of an issued TAF.

2.1.2 National Regulations and Requirements

Regulation 5.06(1) to the Air Services Act 1995 provides that:

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

- a) in any form or manner; and*
- b) at any place;*

that Airservices considers necessary for the safe regular or efficient operation of aircraft, according to the Chicago Convention.

A current Memorandum of Understanding (MOU) between the Bureau and Airservices (dated July 2009), as the Air Traffic Services provider within the Australian Flight Information Region (FIR), sets out arrangements for the provision of the Aviation Weather Services and states that:

4.1 The provision of the Aviation Weather Service is based on the following general principles: ...

(b) Provisions contained in Annex 3 to the Chicago Convention, Meteorological Service for International Air Navigation, shall apply to Domestic as well as International Air Navigation. ...

6.1 The practices and procedures that apply to the provision of the Aviation Weather Service are specified in the Bureau's Aeronautical Services Handbook (ASH). The manner in which meteorological services are provided by Airservices for use by the aviation community is described in the Australian Integrated Aeronautical Information Publication (AIP). The ASH and the AIP shall be consistent in content with para's 4.1 (a) and (b) of this.'

The list of Australian international aerodromes and alternates is contained in Airservices AIP GEN 1.2 and in Appendix 2 of this report.

2.1.3 Current provision of TAFs

Currently, the TAF service for Australian international and domestic aerodromes is provided in accordance with the aerodrome category, which is determined by factors

such as the type and the amount of traffic as determined from available sources. A list of aerodromes for which the Bureau provides TAF services is contained in the Aircservices En-Route Supplement (ERSA) and in the Bureau's ASH.

While the requirement to provide TAFs at international airports is clearly established, the requirement for the TAF provision at non-international airports is less clear. There is provision under Air Services Regulation 5.06 for Aircservices to request a TAF be provided for a particular location, but in practice TAF locations have been determined through consultation between the Bureau and the aviation industry. Aircservices has confirmed that they are satisfied with this current practice.

The provision or non-provision of a TAF by the Bureau, together with its period of validity, are highly significant issues for the aviation industry. In the absence of a current TAF for a location, pilots are required to carry sufficient fuel for a diversion to a suitable alternate aerodrome. Carriage of that extra fuel comes at an economic and environmental cost, and can result in a reduction in freight or the number of passengers, in order to offset the additional weight of the fuel. A number of other important operational and safety considerations are also affected by the provision or non-provision of a TAF.

2.2 Information Sources and Considerations

As part of the TAF review the Bureau considered information from a wide range of sources including:

- International and domestic legislation, regulations and requirements;
- The needs of all sections of the aviation industry, including international, domestic, regional, general aviation and other operators;
- The needs of service providers and regulators such as the Meteorological Authority, Aircservices and the Civil Aviation Safety Authority together with other relevant agencies such as the Australian Defence Force;
- The needs and requirements of Australian regional communities;
- Bureau of Meteorology policies, procedures, budgets and resources;
- A thorough review of all available aircraft movement figures and statistics, from a range of sources, to ensure an accurate representation of aviation movements across Australia was captured;
- Current provision of TAFs;
- Consideration with respect to the climatology of locations, including suitable regular and strategic and alternate aerodromes;
- Consultation with aviation forecasters;
- International best practice standards and expectations, together with an assessment of current and future trends with respect to aviation forecasting;
- Current and future technologies and their impact on the provision and monitoring of a TAF service;

- Current and future resource requirements for aviation forecasting in each of the Bureau's regional offices;
- Current and future TAF validation and quality management requirements; and
- Current and future observational resource requirements.

2.3 Objectives

- Establish guidelines and requirements for TAF service changes for an aerodrome, including the introduction, modification and termination of a service;
- Establish guidelines for the times of validity of a TAF service;
- Establish a process for the regular review of TAF locations and service;
- Establish the minimum requirements relating to observations in order to both issue and maintain a TAF service;
- Establish guidelines for the provision and prioritisation of observational infrastructure to support a TAF service;
- Establish a quality framework and validation process to ensure the quality and continuous improvement of the TAF service; and
- Better align service with funding attribution and user needs, including the establishment of a process for the provision of a TAF on a contractual basis if required.

2.4 Stakeholders

Stakeholders include, but are not limited to:

- International, domestic and regional airlines and pilots;
- Other aviation users including charter operators, general aviation community, corporate aviation, flying training organisations and emergency medical and search and rescue services;
- Other airline and industry representative bodies and agencies;
- Government Departments including the Department of Sustainability, Environment, Water, Population and Communities (including the Bureau), the Department of Infrastructure and Transport, Airservices, CASA, ATSB, Department of Defence, and others;
- Aerodrome owners and/or operators; and
- Regional communities.

3 TAF Categorisation

3.1 Background

The Bureau provides a TAF service for Australia's international and domestic aerodromes in accordance with the aerodrome category. The aerodrome category is determined by considering three factors, these being, annual passenger numbers, annual movement numbers and ICAO mandated requirements, such as the requirement to provide TAF services to all international designated aerodromes.

Since its inception, the Bureau has been focused on customer service. This has however resulted in a situation where, up until recent times, any request for a new or extended TAF was generally implemented; often this was without considering the full implications. As a result the Bureau now produces approximately 250 TAFs.

Increasingly, changes in the aviation environment have led to a situation where small or infrequently used locations continue to receive a TAF service, while some locations with significantly greater passenger numbers or aircraft movements receive no service. Furthermore, the major MSC contributors have requested the Bureau to review where TAF services are provided with the intent of reducing the number of locations funded through core service, i.e. recovered via the MSC, with a benefit of improved weather watch and improved quality for the remaining services.

3.2 Availability of Input Data

In order to assess the requirement for the production of a TAF including the validity times, the required observational infrastructure, prioritisation and other industry needs, a review of different industry user groups was undertaken. The surveys were designed to obtain information about the Bureau's current products and services, the need for changes to products and services and to obtain information about movement and passenger numbers within Australia.

Surveys were mailed to Aerodrome Owners and Operators and to Aircraft Companies and Operators. On-line surveys were also made available for completion by individual pilots. A total of 537 surveys were sent to Aerodrome Owners and Operators and 195 were returned to the Bureau (36%). 936 surveys were sent to Aircraft Companies and Operators and 281 were returned (30%). 386 pilots completed the on-line survey form.

This information was combined with other sources of actual movement and passenger numbers from the Bureau of Infrastructure, Transport and Regional Economics (BITRE), Avdata and Airservices Australia. In reviewing the data collected, it was identified that there were large sections of missing, erroneous or anomalous data.

Recently, Airservices also provided its Airspace Research Application (ARA) which provides a complete data set of movement and passenger numbers for all aerodromes. The ARA dataset contains actual movements and passenger numbers where available and estimated numbers where actual values are not available. As the ARA data set provides a single complete data set for all aerodromes under review and is used as a decision aid by Airservices, the Bureau has adopted the ARA data

set as the primary data set for the analysis of passenger and movement numbers as part of the TAF review.

3.3 New TAF Categories

Following a review of the aircraft movement and passenger number statistics, current TAF services and user needs, the criteria for TAF categories were refined as defined in Table 1. Appendix 4 details how each aerodrome translates into the new TAF categories.

As the ARA data set contains some estimated statistics, an aerodrome owner or operator will have the ability to submit revised data should they find the new TAF category does not accurately reflect the actual movement or passenger numbers. Details on the process for submitting revised movement and passenger figures are contained in Appendix 3. It should also be noted that this initial categorisation will not be the sole deciding factor used for determining whether a TAF is produced in the future. However, the new categorisation will provide a sound basis to better align current practice with industry requirements, allow better facility planning and assessment of new and amended product and service requests.

Table 1 - Proposed TAF categories

Category	Passengers (Annual)	Movements (Annual)
International Designated Aerodromes ¹ (International) (A)	N/A	N/A
Large (B)	>150,000	>75,000
Medium (C)	50,001 – 150,000	10,001 – 75,000
Small (D)	10,000 – 50,000	4,000 – 10,000
Minor (E)	< 10,000	< 4,000

Recommendation 1

The Bureau shall categorise aerodromes based on the criteria defined in Table 1.

¹International Designated Airports as defined in AIP GEN 1.2

4 Proposed Provision of TAFs

4.1 International Airports

A TAF will be provided for those aerodromes for which there are ICAO requirements, specifically those locations defined in Airservices AIP GEN 1.2 and defined as Category A (International) within Table 1 of this review.

4.2 Domestic Aerodromes

The Bureau of Meteorology's ability to provide other TAFs is then limited by the available resources, both physical and financial. As costs for aviation products and services are fully recovered from the aviation industry (via the MSC), and the provision of services affects both the cost and safety for the industry, significant consultation with industry and stakeholders is required. Continual requests by industry for new products or the extension of existing products, are unable to be met by the Bureau without increasing the cost to industry. The cost associated with the need to continue to invest in the installation and upgrade of observational systems also needs to be met.

In order to provide new TAF locations or services, a review of existing TAF locations and a prioritisation of resources is required. It is considered that the provision of TAFs to non-international aerodromes should be determined on a range of factors but in principle, among those should be the number of aircraft movements and/or passenger numbers.

It is proposed that TAFs shall be provided for those locations categorised as International (A), Large (B), Medium (C) or Small (D). Considering the aviation community is dependent on having a national network of aerodromes offering a TAF in order to traverse our large country, some aerodromes may be classed as Category E (Minor) and receive a TAF service for domestic strategic alternate aerodromes. These locations will be determined by the Bureau in consultation with CASA, DoIT and Airservices, following input from industry. These strategic alternate aerodromes will typically be treated as a Small (D) aerodrome from a service perspective. Furthermore, Department of Defence and commercial organisations may have requirements for TAF services regardless of movement and passenger numbers. For this reason, aerodromes may also have a sub-classification assigned, as defined in Table 2.

Table 2 - Proposed TAF sub-categories, representing the reason a TAF service may be maintained regardless of movement and passenger numbers

Sub-category	Description
Contractual	Contractual (Cost Recovery) TAF services
Defence	Aerodromes primarily funded by the Department of Defence
Strategic	Domestic strategic alternate aerodromes as agreed by industry

It is proposed that any provision of a TAF is subject to the new recommendations relating to observational requirements and validity times.

There are a number of locations where a TAF is currently produced in close proximity to another TAF, or that passenger numbers and/or movement figures may warrant the provision of a TAF in close proximity to another location. It is proposed that whenever a category C or D TAF is located within 60nm of another TAF, the need for the Category C or D TAF should be assessed with typically only a single TAF being maintained. The TAF retained would generally be the one with the higher passenger or movement numbers. However, other factors such as the complexity of the climatology, availability of meteorological observations, aerodrome infrastructure and access to the alternate aerodrome/s will require consideration at some locations.

It is proposed that where the provision of a TAF is warranted by the passenger or movement number, but is for an aerodrome that exists primarily for services to an individual industry rather than the general community (e.g. does not offer regular public transport (RPT) services), such as mine sites, oil rigs or similar locations, a TAF service will only be available on a contractual (cost recovery) basis.

Recommendation 2

TAFs shall be provided for those aerodromes categorised as International (A), Large (B), Medium (C) or Small (D) as defined in Table 1. TAFs shall also be provided for Minor (E) aerodromes with sub-classification of Contractual, Defence and Strategic, as defined in Table 2.

Recommendation 3

Where a category Medium (C) or Small (D) TAF is located within 60nm of another TAF, the need for each Category C and D TAF should be assessed with typically only one TAF being maintained.

Recommendation 4

At those locations where the provision of a TAF is warranted by the passenger or movement numbers, but is for an aerodrome that exists primarily for services to an individual industry rather than the general community (e.g. does not offer sufficient regular public transport (RPT) services), such as mine sites, oil rigs or similar locations, a TAF service shall only be available on a contractual (cost recovery) basis.

Recommendation 5

At those aerodromes where an MSC funded TAF service is not continued, a TAF service will be offered on a contractual (cost-recovery) basis.

4.3 Non-Australian FIR Aerodromes

Based on the requirements of ICAO and the Met Act, the Bureau is responsible for the provision of services within the Australian Flight Information Region (FIR) and to Australian External Territory International Airports as defined in Appendix 2.

Any TAF services provided for aerodromes outside an Australian FIR, and not defined as an Australian External Territory International Airport, shall be reviewed in

consultation with stakeholders, and a determination made as to the continued provision of the service for each such aerodrome. For these aerodromes an ICAO approved agreement must be in place between the Bureau of Meteorology and the designated meteorological authority for that aerodrome.

Recommendation 6

All TAF services currently provided for aerodromes outside an Australian Flight Information Region, except Australian External Territory International Airports, shall be reviewed in consultation with stakeholders, and a determination made as to the continued provision of the service for each such aerodrome. All retained services shall be supported by an ICAO approved agreement between the Bureau and the designated meteorological authority for the FIR within which the aerodrome is located.

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5 TAF Validity Times

5.1 Validity Time Specifications

ICAO Doc 9673² specifies the requirements for international aerodromes. In part it states;

TAF should be issued, at intervals of six hours, with the period of validity beginning at one of the main synoptic hours (00, 06, 12, 18 UTC). The period of validity should be of 24 or 30 hours to meet the requirements indicated in FASID Table MET 1A. The filing time of the TAF bulletins should be one hour before the start of the period of validity.

In November 2008, the Bureau of Meteorology implemented changes to the TAF format to comply with the format specified by ICAO. Most of those changes were due to the world-wide introduction of a TAF with a 30 hour validity period to assist in flight planning for those aerodromes required by long-haul operators. In Australia, a 30 hour TAF is provided for Brisbane, Sydney, Melbourne, Adelaide, Darwin and Perth. However, the new format applies to all Australian TAFs.

Other TAF validity times have previously been determined by the category of aerodrome and the needs of industry. It is not proposed to make any significant changes to those validity times with respect to the proposed new categorisation.

5.2 Standardisation

The issue and validity times of TAFs will be standardised as defined in Table 3.

Table 3 - Issue and validity times of TAFs

Category	Issue and Validity Times
International (A)	TAF issued 6 hourly, valid for 24 or 30 hours Commencement times 00, 06, 12, 18 UTC
Large (B)	TAF issued 6 hourly, valid for 12 or 18 hours Commencement times 00, 06, 12, 18 UTC
Medium (C)	TAF issued 6 hourly, valid for 12 hours Commencement times 02, 08, 14 and/or 20 UTC, except WA where commencement times are 04, 10, 16 and/or 22 UTC
Small (D)	TAF issued 6 hourly, valid for up to 12 hours Commencement times typically 02 and/or 20 UTC, except WA where commencement times are typically 04 and/or 22 UTC

² ICAO Doc 9673 (Air Navigation Plan – Asia & Pacific Regions, Part VI – Meteorology)

The validity period for the Medium, Small, Contractual and Defence TAFs should be determined by the National Manager Regional Aviation Weather Services, in consultation with stakeholders.

Adequate aerodrome reports should be available from at least two hours prior to the start of the TAF validity period through to the end of the TAF validity period. The filing time of international TAFs should be one hour before the start of the period of validity and within two hours for the remaining TAFs. A continuous meteorological watch and amendment service is required for all TAF services throughout the period of validity.

TAFs for other locations will only be provided in a response to emergencies.

Recommendation 7

The issue and validity times of TAFs should be standardised as follows:

Category	Issue and Validity Times
International (A)	TAF issued 6 hourly, valid for 24 or 30 hours Commencement times 00, 06, 12, 18 UTC
Large (B)	TAF issued 6 hourly, valid for 12 or 18 hours Commencement times 00, 06, 12, 18 UTC
Medium (C)	TAF issued 6 hourly, valid for 12 hours Commencement times 02, 08, 14 and/or 20 UTC, except WA where commencement times are 04, 10, 16 and/or 22 UTC
Small (D)	TAF issued 6 hourly, valid for up to 12 hours Commencement times typically 02 and/or 20 UTC, except WA where commencement times are typically 04 and/or 22 UTC

6 Observational Infrastructure

6.1 Observation Requirements

In order to both produce a TAF, and then maintain an appropriate meteorological watch during its validity period, a forecaster is required to be able to access quality data from a range of information sources. This may include forecast modelling tools, satellite imagery, radar imagery, upper air data, lightning detection equipment, and information from a range of other sources. However, the primary source of information is provided by manual and/or automatic surface observations at the aerodrome.

Several internal Bureau surveys have shown that all forecasters consider surface observations and satellite imagery to be an essential component for producing and monitoring a TAF. Surface observations are made up of a number of elements, of which the measurements relating to surface wind speed and direction, QNH, temperature, dewpoint and precipitation were considered essential. The visibility and cloud base elements were considered essential by most and rated as very important, but not necessarily essential, by the remaining forecasters. Observations of present weather are an ICAO requirement for international aerodromes and were also considered highly desirable by forecasters, however due to current sub-optimal performance of the present weather sensors, they were not considered a priority but should the performance of these sensors be improved they would be considered highly desirable. Weather cameras were also identified as a highly desirable supplementary source of information.

While most forecasters considered observations of cloud base and visibility to be essential, there was less agreement about the need for manual observations of these elements when compared to the automatic observations provided by ceilometers (cloud) and visibility meters (visibility). This was mainly a reflection of the known and documented limitations of automatic ceilometer and visibility meter (C&V) equipment when compared to manual observations. However, it was widely acknowledged that automated observations provide considerable value as they provide far more frequent or continuous observations as well as being particularly valuable during the hours of darkness. Whilst the frequent observations adds considerable value, the reduced interval between observations, typically 1 minute, results in an increased monitoring work load on forecasters.

Manual observations are becoming less prevalent, especially at remote locations, and often do not provide a full 24 hour coverage or a coverage suitable for the production of a TAF. This is particularly relevant when taking into account increasing industry expectations and requirements as well as a desire for reduced costs.

The information elements from an Automatic Weather Station (AWS) can be obtained at differing intervals and data intervals vary between different sites. Often elements such as cloud and visibility (C&V) can be obtained as frequent as every minute, while other data are generally sourced every half hour or every hour by the transmission of a routine observation (METAR) or a special observation (SPECI). In the case of a SPECI, the information may be transmitted at more frequent intervals when certain observational thresholds are met. Both the METAR and SPECI may be provided by either manual or automatic means.

The minimum aerodrome observations considered necessary to provide a new TAF service are an hourly METAR, and SPECIs whenever SPECI criteria occur, for the period commencing at least two hours before the start of the TAF validity period through to the end of the TAF validity period (Table 4).

The meteorological elements included in METAR and SPECI reports shall be surface wind, temperature, dew point, QNH, visibility, cloud amount, cloud base and precipitation. In addition, present weather is considered highly desirable and can be provided by an automatic sensor and/or by manual input by an authorised observer.

Table 4 - Minimum routine observational frequency requirements for TAF

TAF Category (where TAF Provided)	AWS (Surface Wind, QNH, Temperatures, Precipitation)	C&V Data
A (International)	30 min	1 min
B (Large)	30 min	1 min
C (Medium)	30 min	10 min
D (Small)	30 min	30 min
E (Minor)	60 min	30 min

6.2 Overseas Meteorological Authorities – Minimum Aerodrome Observational Requirements for Production of a TAF

Research was also undertaken to determine the current international practice with respect to observational systems required for the production of a TAF. The results of that research showed that there are presently no other comparable meteorological service producing a standard ICAO compliant TAF without observations from an aerodrome.

6.2.1 New Zealand

No TAFs are prepared for locations where observations are not issued. The New Zealand Meteorological Office requires METAR to contain at least wind speed and direction, visibility, cloud and present weather information.

6.2.2 Canada

Two consecutive hourly observations are required for the issuance of a TAF. Generally cloud, visibility and surface wind velocity would be the minimum requirements. Canada provides Aerodrome Advisories, rather than Aerodrome Forecasts, for locations where observations are not recorded within 3km of the aerodrome. These advisories are in the format of a TAF but contain the text “ADVISORY OFFSITE” to indicate that local observations were not available.

6.2.3 United Kingdom

No TAFs are prepared for locations where observations are not issued. The METAR (including Auto METAR) is required to contain observations of wind speed and direction, visibility and runway visual range (RVR - where appropriate), cloud amount and height, present weather, temperature, dew point and QNH.

When an aerodrome is not open 24 hours the issue of a TAF will be delayed until at least two consecutive METARs have been received and accepted by the forecaster at the forecast office responsible for its preparation. The METAR will be produced by an accredited observer and separated by an interval of not less than 20 minutes and not more than 1 hour.

However, in the event that an automatic observing system located at the aerodrome regularly issues Auto METARs containing information on wind speed and direction, visibility, cloud amount and height, present weather, pressure, temperature and dew point when the aerodrome is closed, the forecaster will, with agreement of the Civil Aviation Authority (CAA) Meteorological Authority (MA) issue the TAF on the basis of the Auto METAR. Routine observations produced by an accredited observer are required to be issued whilst the aerodrome is operational.

6.2.4 United States of America

The following elements, at a minimum, are required for National Weather Service approval of new TAF locations: wind (speed and direction), visibility, weather and obstructions to vision, cloud amount and base, temperature, dew point and QNH. These elements can be obtained from a mix of automatic observation sites and manual observer sites.

It should, however, be noted that not all existing TAF services have the full complement of equipment.

6.2.5 France

The minimum meteorological elements used at a TAF location are hourly or half-hourly METAR issuance or METAR AUTO issuance.

Recommendation 8

The minimum observations required for the provision of a new TAF shall include observations of surface wind speed and direction, QNH, temperature, dew point, precipitation, visibility, cloud amount and cloud base. This information shall be available to the forecaster on at least a half-hourly basis as defined in Table 4.

Recommendation 9

All TAF services to aerodromes categorised as International (A), Large (B) or Medium (C) will be required to have observations of surface wind, temperature, dew point, QNH, visibility, cloud base and cloud amount within 2 years. International (A) aerodromes will also be required to have observations of present weather within 2 years to meet ICAO requirements.

Recommendation 10

All remaining locations determined to be eligible for the provision of a TAF shall be equipped with an AWS providing surface wind speed and direction, QNH, temperature, dew point and precipitation within 2 years. These aerodromes will also require observations of visibility, cloud amount and cloud base within 5 years. The continued provision of a TAF for any location not suitably equipped after the aforementioned periods will be subject to review.

6.3 Summary of existing observational infrastructure at current TAF locations using current categorisation

If the proposed changes to the categorisation of aerodromes is accepted, the minimum observational infrastructure required to both produce and monitor the proposed list of TAFs is;

- 114 aerodromes meet the minimum required infrastructure
- 13 aerodromes require C&V sensors within 2 years and a further 44 aerodromes require C&V within 5 years
- 1 aerodrome requires an AWS within 2 years
- 10 international aerodromes require present weather sensors within 2 years.

The additional meteorological observational infrastructure listed above is proposed to be funded by the aviation industry, through the MSC, at an approximate cost of \$3.3M. If all existing TAF services were to be funded by the MSC, the aviation industry would be required to fund the upgrade of equipment at a further 76 locations with an additional cost of approximately \$7M.

Based on the proposed TAF classifications there are 13 category B & C aerodromes that do not meet the minimum recommended observational systems and 1 retained category D TAF location that does not have an AWS. These *may* be considered to have a higher priority for upgrading or installing observational infrastructure in the absence of other significant factors. Some of these identified locations have already been scheduled, or have been proposed for upgrading or installing observational infrastructure and are currently awaiting approval, as shown in Table 5. However, ongoing discussion with both internal and external stakeholders, together with updated information, will ultimately determine any future prioritisation.

Table 5 - Possible priority installations based on proposed TAF categories

Location	Proposed Category	Required Infrastructure
Barrow Island	B	C&V (Planned 2012-13)
Century Mine	C	C&V
Curtin	C	C&V
Derby	C	C&V
Groote Eylandt	C	C&V
Hamilton Island	B	C&V (Planned 2012-13)
Moomba	C	C&V
Narrabri	C	C&V
Port Augusta	C	C&V
Roma	C	C&V (Planned 2012-13)
Taree	C	C&V (Planned 2012-13)
Telfer	C	C&V
Trepell	C	C&V
The Granites	D	AWS, C & V

6.4 Observational costs associated with the provision of TAFs

The Bureau has recently seen a significant increase in the leasing costs associated with observational equipment at aerodromes. The Bureau and industry cannot sustain these costs. Whilst the Bureau has an obligation for the provision of TAFs for international aerodromes (ICAO Annex 3 and ICAO Doc 9673 - Air Navigation Plan – Asia & Pacific Regions) it does not specifically have an obligation for taking observations at aerodromes or the provision of TAFs for non-international aerodromes. Therefore if the Bureau is unable to negotiate reasonable (based on standard off aerodrome costs for Automatic Weather Stations) rent for these aerodromes, the Bureau may elect to remove its equipment from the aerodrome and allow the aerodrome to organise its own meteorological observations. Furthermore, as the aerodrome owner benefits from the provision of a TAF, the Bureau will only provide MSC funded TAFs for aerodromes where reasonable rents are received.

In addition to leasing costs, there are significant costs associated with the purchase and installation of additional equipment defined in the aforementioned sections. The costs of typical equipment installations are contained in Table 6, although it should be noted some remote sites may cost significantly more.

Table 6 - Typical costs for the purchase and installation of additional equipment

Item	Cost ³
New AWS (Wind, Temp, QNH) site	\$50K
Addition of C&V	\$55K
Addition of Present Weather	\$16K

The actual cost per site to upgrade equipment will be reviewed prior to any decision to progress with the installation of additional equipment. If the upgrade costs are considered exorbitant, the provision of service will be reviewed.

Recommendation 11

The Bureau should only provide observations and TAFs for aerodromes where reasonable (based on off-aerodrome rents for Automatic Weather Stations) rents can be obtained.

Recommendation 12

If the cost of observational equipment for a particular site is considered excessive, the provision of the service shall be reviewed.

³ Typical costs. Actual costs may be much larger and vary significantly depending on a range of factors including the distance to reliable communications and mains power

7 Implications and Updates of the TAF Review

7.1 Implications of Applying the Proposed Methodology for TAF Categorisation

According to information available to the Bureau, the proposed recommendations will result in aerodromes being categorised as per Table 1. The proposed implications of applying these categories and other recommendations are defined in Table 7.

Table 7 - Implications of applying proposed methodology for TAF categorisation

Location	ICAO Id	State	Current TAF Category	Proposed TAF Category	Meets observing Req's	Maintain (I, D, S)	Cease (T, D, C)
Adelaide	YPAD	SA	A	A	Y	I	
Albany	YABA	WA	B	C	Y		
Albury	YMAY	NSW	B	B	Y		
Alice Springs	YBAS	NT	A	A	Y	I	
Amberley	YAMB	QLD	B	B	Y	D	
Archerfield	YBAF	QLD	B	B	Y		
Argyle	YARG	WA	D	D	Y		
Armidale	YARM	NSW	B	C	Y		
Avalon	YMAV	VIC	A	A	Y	I	
Ayers Rock	YAYE	NT	B	B	Y		
Bairnsdale	YBNS	VIC	D	D	Y		
Balgo Hill	YBGO	WA	D		-CV		T
Ballarat	YBLT	VIC	D	C	Y		
Ballera	YLLE	QLD	D	D	-CV		
Ballina	YBNA	NSW	B	B	Y		
Bankstown	YSBK	NSW	B	B	Y		
Barcaldine	YBAR	QLD	D		-AWS CV		D
Barrow Island	YBWX	WA	D	B	-CV		
Bathurst	YBTH	NSW	C	C	Y		
Bathurst Island	YBTI	NT	D		-AWS CV		D
Bayu Undan	YBYU	WA	D		-CV		C
Bendigo	YBDG	VIC	D	D	Y		
Birdsville	YBDV	QLD	D	D	-CV		
Blackall	YBCK	QLD	D		-CV		T
Borroloola	YBRL	NT	D		-CV		T
Boulia	YBOU	QLD	D		-AWS CV		T
Bourke	YBKE	NSW	D	D	-CV		
Brisbane	YBBN	QLD	A	A	-P	I	
Broken Hill	YBHI	NSW	B	C	Y		
Broome	YBRM	WA	A	A	Y	I	
Bundaberg	YBUD	QLD	B	B	Y		
Burketown	YBKT	QLD	D	D	-CV		
Busselton	YBLN	WA	D	D	-CV		
Cairns	YBCS	QLD	A	A	Y	I	
Camden	YSCN	NSW	B	B	Y		
Canberra	YSCB	NSW	A	A	-P	I	
Carnarvon	YCAR	WA	C	D	Y		
Ceduna	YCDU	SA	C	D	Y		
Century Mine	YCNM	QLD	D	C	-CV		
Cessnock	YCNK	NSW	D		-CV		T
Charleville	YBCV	QLD	C	D	Y		
Charters Towers	YCHT	QLD	D		-AWS CV		T
Christmas Island	YPXM	EXT	A	A	-P	I	

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Clermont	YCMT	QLD	D	D	-CV		
Cleve	YCEE	SA	D		-CV		T
Cloncurry	YCCY	QLD	D	D	-CV		
Cobar	YCBA	NSW	D	D	-CV		
Cocos (Keeling) Island	YPCC	EXT	A	A	-P	I	
Coen	YCOE	QLD	D	D	-CV		
Coffs Harbour	YCFS	NSW	A	A	Y	I	
Condobolin	YCDO	NSW	D		-CV		T
Coober Pedy	YCBP	SA	C	D	-CV		
Cooktown	YCKN	QLD	C	D	Y		
Cooma	YCOM	NSW	C	D	Y	S	
Coonabarabran	YCBB	NSW	D	D	-CV	S	
Coonamble	YCNM	NSW	D		-CV		T
Cootamundra	YCTM	NSW	D		-AWS CV		T
Corowa	YCOR	NSW	D		-AWS CV		D
Cowra	YCWR	NSW	D		-CV		T
Cunderdin	YCUN	WA	D		-CV		T
Cunnamulla	YCMU	QLD	D		-AWS CV		T
Curtin	YGIN	WA	B	B	-CV	D	
Darwin	YPDN	NT	A	A	Y	I	
Deniliquin	YDLQ	NSW	D		-CV		T
Derby	YDBY	WA	D	C	-CV		
Devonport	YDPO	TAS	B	C	Y		
Dubbo	YSDU	NSW	B	B	Y		
East Sale	YMES	VIC	B	B	Y	D	
Edinburgh	YPED	SA	B	B	Y	D	
Elcho Island	YELD	NT	C	D	-CV		
Emerald	YEML	QLD	B	B	Y		
Ernabella	YERN	SA	D	D	-CV	S	
Esperance	YESP	WA	C	C	Y		
Essendon	YMEN	VIC	B	B	Y		
Fitzroy Crossing	YFTZ	WA	D		-CV		T
Flinders Island	YFLI	TAS	C	D	Y		
Forbes	YFBS	NSW	D		-CV		T
Forrest	YFRT	WA	D	D	-CV	S	
Gayndah	YGAY	QLD	D		-CV		T
Georgetown (Qld)	YGTN	QLD	D	D	-CV	S	
Geraldton	YGEL	WA	B	B	Y		
Giles	YGLS	NT	D	D	-CV	S	
Gladstone	YGLA	QLD	B	B	Y		
Glen Innes	YGLI	NSW	D		-CV		T
Gold Coast	YBCG	QLD	A	A	-P	I	
Goondiwindi	YGDI	QLD	D		-AWS CV		T
Goulburn	YGLB	NSW	D		-CV		T
Gove	YPGV	NT	B	C	Y		
Grafton	YGFN	NSW	D	D	Y		
Griffith	YGTH	NSW	B	C	Y		
Groote Eylandt	YGTE	NT	C	C	-CV		
Gunnedah	YGDH	NSW	D		-CV		T
Halls Creek	YHLC	WA	D	D	-CV		
Hamilton	YHML	VIC	D	C	Y		
Hamilton Island	YBHM	QLD	B	B	-CV		
Hay	YHAY	NSW	D		-CV		T
Hervey Bay	YHBA	QLD	B	B	Y		
Hobart	YMHB	TAS	A	A	-P	I	
Hooker Creek	YHOO	NT	D	D	-CV	S	
Horn Island	YHID	QLD	A	A	Y	I	
Horsham	YHSM	VIC	D	D	-CV		
Hughenden	YHUG	QLD	D	D	-CV		
Innisfail	YIFL	QLD	D		-AWS CV		T
Inverell	YIVL	NSW	D		-AWS CV		T
Ivanhoe	YIVO	NSW	D	D	-CV	S	
Jabiru	YJAB	NT	D	D	-CV		
Jandakot	YPJT	WA	B	B	Y		
Julia Creek	YJLC	QLD	D		-CV		T
Kalgoorlie	YPKG	WA	A	A	-P	I	
Karratha	YPKA	WA	B	B	Y		
Kempsey	YKMP	NSW	D		-CV		T
Kingaroy	YKRY	QLD	D		-CV		T

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King Island	YKII	TAS	C	C	Y		
Kingscote	YKSC	SA	B	C	Y		
Kintore (Wulungurru)	YKNT	NT	D		-CV		T
Kowanyama	YKOW	QLD	D	D	-CV		
Kununurra	YPKU	WA	B	C	Y		
Latrobe Valley	YLTV	VIC	D		Y		T
Launceston	YMLT	TAS	A	A	-P	I	
Laverton	YLTN	WA	D		-CV		D
Learmonth	YPLM	WA	A	A	-P	I	
Leigh Creek	YLEC	SA	D		-CV		T
Leinster	YLST	WA	D	C	Y		
Leonora	YLEO	WA	D	C	Y		
Lismore	YLIS	NSW	B	C	Y		
Lockhart River	YLHR	QLD	D	D	-CV		
Longreach	YLRE	QLD	C	D	Y		
Lord Howe Island	YLHI	NSW	A	A	Y	I	
Mackay	YBMK	QLD	B	B	Y		
Maitland (NSW)	YMND	NSW	D		-AWS CV		T
Mallacoota	YMCO	VIC	D		-CV		T
Mangalore	YMNG	VIC	D	D	Y		
Maningrida	YMGD	NT	C	C	Y		
Mareeba	YMBA	QLD	D	D	-CV		
Maryborough (Qld)	YMYB	QLD	C	D	Y		
McArthur River Mine	YMHU	NT	D	D	Y		
Meekatharra	YMEK	WA	D	C	Y		
Melbourne	YMML	VIC	A	A	-P	I	
Merimbula	YMER	NSW	B	C	Y		
Mildura	YMIA	VIC	B	B	Y		
Milingimbi	YMGB	NT	D		-CV		T
Moomba	YOOM	SA	D	C	-CV		
Moorabbin	YMMB	VIC	B	B	Y		
Moranbah	YMRB	QLD	C	C	Y		
Moree	YMOR	NSW	C	C	Y		
Mornington Island	YMTI	QLD	D	D	-CV		
Moruya	YMRY	NSW	C	C	Y		
Mount Gambier	YMTG	SA	B	C	Y		
Mount Hotham	YHOT	VIC	D		-C		T
Mount Isa	YBMA	QLD	B	B	Y		
Mount Keith	YMNE	WA	D		-AWS CV		D
Mount Magnet	YMOG	WA	D	D	-CV		
Mudgee	YMDG	NSW	D	D	-CV		
Murray Bridge	YMBD	SA	D		-CV		T
Murrin-Murrin	YMMI	WA	D		-AWS CV		D
Naracoorte	YNRC	SA	D		-CV		T
Narrabri	YNBR	NSW	C	C	-CV		
Narrandera	YNAR	NSW	C	D	-CV		
Newman	YNWN	WA	B	B	Y		
Ngukurr	YNGU	NT	D	D	-CV		
Nhill	YNHL	VIC	D		-CV		T
Norfolk Island	YSNF	EXT	A	A	Y	I	
Normanton	YNTN	QLD	D	D	-CV		
Norseman	YNSM	WA	D		-CV		T
Northern Endeavour Rig	YNEN	WA	D		Y		C
Northern Rankin	YXNR	WA	D		-AWS CV		C
Nowra	YSNW	NSW	B	B	Y	D	
Nyngan	YNYN	NSW	D		-AWS CV		T
Oakey	YBOK	QLD	B	B	Y	D	
Olympic Dam	YOLD	SA	C	C	Y		
Onslow	YOLW	WA	D		-CV		D
Oodnadatta	YOOD	SA	D		-CV		T
Orange	YORG	NSW	B	C	Y		
Paraburdoo	YPBO	WA	B	B	Y		
Parafield	YPPF	SA	B	B	Y		
Parkees	YPKS	NSW	C	D	-CV		
Pearce	YPEA	WA	B	B	Y	D	
Perth	YPPH	WA	A	A	-P	I	
Point Cook	YMPC	VIC	D		-AWS CV		D
Port Augusta	YPAG	SA	D	C	-CV		
Port Hedland	YPPD	WA	A	A	-P	I	

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Port Lincoln	YPLC	SA	B	B	Y		
Port Macquarie	YPMQ	NSW	B	B	Y		
Portland	YPOD	VIC	C	D	Y		
Proserpine	YBPN	QLD	B	B	Y		
Quilpie	YQLP	QLD	D		-AWS CV		T
Renmark	YREN	SA	D		-CV		T
Richmond (NSW)	YSRI	NSW	A	A	Y	D	
Richmond (Qld)	YRMD	QLD	D		-CV		T
Rockhampton	YBRK	QLD	A	A	Y	I	
Roma	YROM	QLD	C	C	-CV		
Rottnest Island	YRTI	WA	D		-CV		T
Scone	YSCO	NSW	D		-CV		T
Shark Bay	YSHK	WA	D	D	-CV	S	
Shepparton	YSHT	VIC	D	D	-CV		
Smithton	YSMI	TAS	D		-CV		T
Smith Point	YSMP	NT	D		-AWS CV		T
Snake Bay	YSNB	NT	D		-AWS CV		D
South Goulburn Island	YGBI	NT	D		-CV		T
Southern Cross	YSCR	WA	D	D	-CV		
St George	YSGE	QLD	D	D	-CV	S	
St Helens	YSTH	TAS	D	D	-CV	S	
Strahan	YSRN	TAS	D	D	Y	S	
Sunshine Coast	YBSU	QLD	B	B	Y		
Swan Hill	YSWH	VIC	D	D	-CV		
Sydney	YSSY	NSW	A	A	Y	I	
Tamworth	YSTW	NSW	B	B	Y		
Tanami	YTMN	NT	D		-AWS CV		T
Tarcoola	YTAR	SA	D		-CV		T
Taree	YTRE	NSW	C	C	-CV		
Telfer	YTEF	WA	D	C	-CV		
Temora	YTEM	NSW	D		-CV		T
Tennant Creek	YTNC	NT	D	D	Y		
Thangool	YTNG	QLD	C	D	Y		
Thargomindah	YTGM	QLD	D		-CV		T
The Granites	YTGT	NT	D	D	-AWS CV		
The Monument	YTMO	QLD	D	D	-CV		
Tibooburra	YTIB	NSW	D		-CV		T
Tindal	YPTN	NT	A	A	Y	I	
Toowoomba	YTWB	QLD	D	C	Y		
Townsville	YBTL	QLD	A	A	Y	I	
Trepell	YTEE	QLD	D	C	-CV		
Troughton Island	YTTI	NT	D		-CV		T
Truscott (Mungalu)	YTST	NT	D	D	Y		
Victoria River Downs	YVRD	NT	D		-CV		T
Wagga Wagga	YSWG	NSW	B	B	Y		
Walgett	YWLG	NSW	D	D	Y		
Wangaratta	YWGT	VIC	D	D	-CV		
Warburton	YWBR	NT	D		-CV		T
Warrnambool	YWBL	VIC	D	D	-CV		
Wave Hill	YWAV	NT	D		-AWS CV		T
Weipa	YBWP	QLD	B	C	Y		
West Sale	YWSL	VIC	D		-AWS CV		D
West Wyalong	YWWL	NSW	D		-CV		T
Whyalla	YWHA	SA	B	C	Y		
Wilcannia	YWCA	NSW	D		-CV		T
Williamtown	YWLM	NSW	A	A	Y	I	
Wiluna	YWLU	WA	D		-AWS CV		D
Windsorah	YWDH	QLD	D		-AWS CV		T
Winton	YWTN	QLD	D		-CV		T
Wollongong	YWOL	NSW	D	C	Y		
Woomera	YPWR	SA	B	B	Y	D	
Wudinna	YWUD	SA	D		-CV		T
Wyndham	YWYM	WA	D		-CV		T
Wynyard	YWYY	TAS	B	C	Y		
Young	YYNG	NSW	D	D	-CV	S	
Yuendumu	YYND	NT	D		-AWS CV		T

Notes:

Meets observing equipment (only displayed for proposed TAF sites):

- Y : Currently includes AWS with ceilometer and visibility meter
- AWS CV : Currently has no AWS, ceilometer or visibility meter
- CV : Currently has AWS, but no ceilometer or visibility meter
- P: Requires additional present weather sensor/s

Maintain:

- I (International) : Maintained as a Designated International Airport
- D (Defence) : Maintained for Defence or dual use purposes
- S (Strategic) : Maintained for domestic strategic alternate purposes

Cease (to be provided by MSC funding):

- T (Threshold) : Service ceased as neither the annual passenger or movement numbers met required thresholds. TAF service will only be offered on a contractual basis
- D (Distance) : Service ceased due to other TAF services within close proximity. TAF service will only be offered on a contractual basis
- C (Contractual) : TAF service will only be offered on a contractual basis

7.1.1 Impact of Cessation of TAF service

The operation of services into an aerodrome is not dependent on the availability of a TAF for that location. Moreover, there are hundreds of aerodromes that operate without a TAF. Flights to destinations without a TAF are required to carry sufficient fuel to allow them to divert to a suitable alternate (with a TAF), that is unless the destination aerodrome does not have a prescribed instrument approach procedure, in which case the minimum requirement is to flight plan based upon the appropriate Area Forecast⁴.

7.2 Updates to the TAF Review

While the Bureau has not been requested by industry to undertake a national review its TAF services for some decades, there have been significant changes in the aviation industry and increased pressure on that industry's costs of operation. The Bureau will therefore regularly review its services to ensure the services match demand. These reviews will be conducted in consultation with industry and all proposed changes will be presented to the industry for endorsement.

Recommendation 13

Any proposed changes to the categorisation and service for individual aerodromes should be provided to industry at the next scheduled Bureau of Meteorology/Industry Consultative meeting, depending on the level of comment and analysis required. This

⁴ AIP Enroute (ENR) 1.10, 1-.2.1

shall not limit the Bureau from making any temporary arrangements it deems necessary.

Recommendation 14

A full review of TAF categorisation, based on updated aerodrome passenger and movement data, shall be conducted every three years.

Recommendation 15

A post-implementation review of any changes made as a result of the Bureau's TAF review shall be conducted 12 months after the completion and publication of the TAF review, in consultation with major stakeholders.

DRAFT

Appendix 1 - Summary of Recommendations

Recommendation 1:

The Bureau shall categorise aerodromes based upon the following criteria:

Category	Passengers (Annual)	Movements (Annual)
International Designated Aerodromes ⁵ (International) (A)	N/A	N/A
Large (B)	>150,000	>75,000
Medium (C)	50,001 – 150,000	10,001 – 75,000
Small (D)	10,000 – 50,000	4,000 – 10,000
Minor (E)	< 10,000	< 4,000

Recommendation 2:

TAFs shall be provided for those aerodromes categorised as International (A), Large (B), Medium (C) or Small (D). TAFs shall also be provided for Minor (E) aerodromes with sub-classification of Contractual, Defence and Strategic, as per:

Sub-category	Description
Contractual	Contractual (Cost Recovery) TAF services
Defence	Aerodromes primarily funded by the Department of Defence
Strategic	Domestic strategic alternate aerodromes as agreed by industry

Recommendation 3:

Where a category Medium (C) or Small (D) TAF is located within 60nm of another TAF, the need for each Category C and D TAF should be assessed with typically only one TAF being maintained.

⁵International Designated Airports as defined in AIP GEN 1.2 and summarised in Appendix 2

Recommendation 4:

At those locations where the provision of a TAF is warranted by the passenger or movement numbers, but is for an aerodrome that exists primarily for services to an individual industry rather than the general community (e.g. does not offer sufficient regular public transport (RPT) services), such as mine sites, oil rigs or similar locations, a TAF service shall only be available on a contractual (cost recovery) basis.

Recommendation 5:

At those aerodromes where an MSC funded TAF service is not continued, a TAF service will be offered on a contractual (cost-recovery) basis.

Recommendation 6:

All TAF services currently provided for aerodromes outside an Australian Flight Information Region, except Australian External Territory International Airports, shall be reviewed in consultation with stakeholders, and a determination made as to the continued provision of the service for each such aerodrome. All retained services shall be supported by an ICAO approved agreement between the Bureau and the designated meteorological authority for the FIR within which the aerodrome is located.

Recommendation 7:

The issue and validity times of TAFs should be standardised as follows:

Category	Issue and Validity Times
International (A)	TAF issued 6 hourly, valid for 24 or 30 hours Commencement times 00, 06, 12, 18 UTC
Large (B)	TAF issued 6 hourly, valid for 12 or 18 hours Commencement times 00, 06, 12, 18 UTC
Medium (C)	TAF issued 6 hourly, valid for 12 hours Commencement times 02, 08, 14 and/or 20 UTC, except WA where commencement times are 04, 10, 16 and/or 22 UTC
Small (D)	TAF issued 6 hourly, valid for up to 12 hours Commencement times typically 02 and/or 20 UTC, except WA where commencement times are typically 04 and/or 22 UTC

Recommendation 8:

The minimum observations required for the provision of a new TAF shall include observations of surface wind speed and direction, QNH, temperature, dew point, precipitation, visibility, cloud amount and cloud base. This information shall be available to the forecaster on at a least half- hourly basis as defined in Table 4.

Recommendation 9:

All TAF services to aerodromes categorised as International (A), Large (B) or Medium (C) will be required to have observations of surface wind, temperature, dew point, QNH, visibility, cloud base and cloud amount within 2 years. International (A) aerodromes will also be required to have observations of present weather within 2 years to meet ICAO requirements.

Recommendation 10:

All remaining locations determined to be eligible for the provision of a TAF shall be equipped with an AWS providing surface wind speed and direction, QNH, temperature, dew point and precipitation within 2 years. These aerodromes will also require observations of visibility, cloud amount and cloud base within 5 years. The continued provision of a TAF for any location not suitably equipped after the aforementioned periods will be subject to review.

Recommendation 11:

The Bureau should only provide observations and TAFs for aerodromes where reasonable (based on off-aerodrome rents for Automatic Weather Stations) rents can be obtained.

Recommendation 12:

If the cost of observational equipment for a particular site is considered excessive, the provision of the service shall be reviewed.

Recommendation 13:

Any proposed changes to the categorisation and service for individual aerodromes should be provided to industry at the next scheduled Bureau of Meteorology/Industry Consultative meeting, depending on the level of comment and analysis required. This shall not limit the Bureau from making any temporary arrangements it deems necessary.

Recommendation 14:

A full review of TAF categorisation, based on updated aerodrome passenger and movement data, shall be conducted every three years.

Recommendation 15:

A post-implementation review of any changes made as a result of the Bureau's TAF review shall be conducted 12 months after the completion and publication of the TAF review, in consultation with major stakeholders.

Appendix 2 - Designated International Airports

Designated International Airports - Australia⁶

2.1 Major International Airports

2.1.1 "Major International Airport" means an airport of entry and departure for international air traffic where all formalities incident to Customs, Immigration, Health, and similar procedures are carried out.

... [Adelaide, Brisbane, Cairns, Darwin, Melbourne, Perth, Sydney]...

2.2 Restricted Use International Airports

2.2.1 "Restricted Use International Airport" means an airport of entry and departure at which the formalities incident to Customs, Immigration, Health, and similar procedures are made available on a restricted basis, to flights with prior approval only.

...[Avalon, Broome, Canberra, Coffs Harbour, Gold Coast, Hobart, Learmonth, Lord Howe Island, Port Hedland, Townsville, Williamtown/Newcastle]...

2.3 Alternate Airports to International Airports

2.3.1 "Alternate Airport" means an airport specified in the flight plan to which a flight may proceed when it becomes inadvisable to land at the airport of intended landing (see also AIP GEN 1.3 Section 6.).

...[Alice Springs, Avalon, Canberra, Coffs Harbour, Gold Coast, Kalgoorlie, Launceston, Learmonth, Port Hedland, Rockhampton, Tindal, Townsville]...

2.4 International Non-Scheduled Flight Airports

2.4.1 "International Non-Scheduled Flight Airport" means an airport at which approval may be granted, provided the prescribed prior notice is given, for international non-scheduled flights only. No other form of international operation is permitted:

... [Horn Island]...

2.5.1 "External Territory International Airport" means an airport of entry and departure for international air traffic located upon an Australian External Territory, where all formalities incident to Immigration, Health and Territory Customs, and similar procedures are available. Australian external territory international airports are as follows:

... [Norfolk Island, Christmas Island, Cocos (Keeling) Island]...

⁶ Aircservices Aeronautical Information Package (AIP) Book, 28 June 2012, GEN 1.2 Entry, Transit and Departure of Aircraft

Appendix 3 - Submission of Revised Aerodrome Details

This form is to be used by an aerodrome owner to provide revised movement and passenger statistics to the Bureau of Meteorology. This data will be used by the Bureau of Meteorology to determine whether the aerodrome is entitled to receive a TAF free of charge (funded by Meteorological Service Charge (MSC)), based on the criteria defined in the TAF review. The Bureau will also offer contractual (cost recovery) TAF services to those aerodromes not meeting the criteria. Such contractual services will incur service charges.

Given the intended use of this submitted data, it is essential that aerodrome owners provide accurate information. Should the Bureau determine that an aerodrome has submitted erroneous data that resulted in the provision of a TAF service at no direct charge, the aerodrome will be required to pay the Bureau all costs incurred to provide this TAF and observational service.

Operators are required to provide accurate information which reflects annual movement numbers and annual passenger numbers for the aerodrome. It is requested that information be provided during the year 1 July 2011 to 30 June 2012 inclusive. If data for this period is unavailable for some reason, please provide most suitable data indicating the period and how it was collected.

The following form is to be completed by the Aerodrome Chief Financial Officer or Chief Executive Officer and submitted to:

National Manager Regional Aviation Weather Services
Weather and Ocean Services Policy Branch
Bureau of Meteorology,
GPO Box 1289
MELBOURNE, VIC 3001
Email: sral@bom.gov.au

Submission of Revised Aerodrome Figures

Airport Details:

Aerodrome Name:

Aerodrome ICAO Code:

Data:

Movement Numbers (PA):

Passenger Numbers (PA):

Meta Data:

Is this data for the period 1 Jul 2011 to 30 Jun 2012

Yes No.

If no, for what period was the data collected?

Is the data actual recorded details or estimated?

Actual Estimated.

If estimated, provide specific details of how details were calculated (overleaf if required)

Authorisation:

I certify that the above information is true and correct.

Name of Completing Officer:

Title:

Note: Only details from CFO or CEO will be accepted

Signature:

Date:

Appendix 4 - Glossary of Terms, Abbreviations and Acronyms

ASH Aeronautical Services Handbook

ATC Air Traffic Control

ATSB Australian Transport Safety Bureau

ERSA En-Route Supplement

CAA Civil Aviation Authority

CAR120 Civil Aviation Regulation 1988, Regulation 120

CASA Civil Aviation Safety Authority

C&V Ceilometer and Visibility

DEW POINT The temperature to which air must be cooled, at constant pressure and water vapour content, in order for saturation to occur. If the air is cooled further, some of the water vapour will condense to liquid.

FIR Flight Information Region

ICAO International Civil Aviation Organization

MA Meteorological Authority

METAR A French acronym for a meteorological report from an aerodrome at a routine time (1/2 hourly) when conditions are better than specified thresholds. It is the primary format in aeronautical meteorology for reports of surface meteorological information at an aerodrome.

MOU Memorandum of Understanding

MSC Meteorological Service Charge

NMOC National Meteorological & Oceanographic Centre

NOC National Operations Centre

NOCMET Meteorological Unit at the Airservices National Operations Centre (NOC)

QNH A brevity code for barometric pressure adjusted to sea level.

PA Per Annum

PRECIPITATION In meteorology it is any product of the condensation of atmospheric water vapour that falls under gravity.

RFC Regional Forecasting Centre

RELATIVE HUMIDITY The ratio of the vapour pressure to the saturation vapour pressure with respect to water. Also known as the ratio of the existing amount of water vapour to that which could be held by a parcel of air. It is usually expressed as a percentage.

SAMU Sydney Airport Meteorological Unit

SPECI A special report of surface meteorological information at an aerodrome. They are only issued when specific criteria are met. Has the same format as a METAR, except for the name.

UNIVERSAL TIME COORDINATED (UTC) The primary time standard by which the world regulates clocks and time. In aviation forecasts and reports it is signified by the letter Z.

VAAC Volcanic Ash Advisory Centre

WMO World Meteorological Organization