Australian Government
Bureau of Meteorology

Aerodrome Weather Observer

Course Overview and Syllabus

Bureau of Meteorology Training Centre

Cover Photo: B350 King Air VH-SCQ on the tarmac at Rockhampton Airport. P Toomey

AWO Course Overview and Syllabus

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BMTC, GPO Box 1289, Melbourne, Victoria, 3001

Contents

Introduction

The Bureau of Meteorology Training Centre's Aerodrome Weather Observer (AWO) course is designed to train and assess participants in the provision of Aerodrome Meteorological Observations and Reports.

An **Aerodrome Meteorological Observation and Report** is the evaluation of one or more meteorological elements and the subsequent report or broadcast of information that is made for aeronautical purposes.

Upon successful completion of the AWO course, individuals will be accredited to perform observations for the issue of:

- Aerodrome Weather Reports; and/or
- Local Reports.

Aerodrome Weather Reports generally originate from Automatic Weather Stations (AWS). At some locations, observing staff supplement the automated data with visual weather information. These reports are transmitted to the aviation industry in the METAR/SPECI format.

It is primarily Bureau Observers, and at some locations Meteorologists, who perform observations for transmission as Aerodrome Weather Reports. Those who gain accreditation to provide these reports are issued an *Aerodrome Weather Observer Class A Certificate.* Class A certificate holders are also qualified to provide Local Reports.

Local Reports are normally provided by Air Traffic Services staff (Tower Controllers). These reports are sometimes referred to as *Take-off and Landing Reports* or *Observations for Take-off and Landing* and are usually broadcast via the Automatic Terminal Information Service (ATIS). They can also be performed by certified airport ground staff to assist pilots operating at selected locations; information can also be disseminated via plain language radiotelephony on a discreet radio frequency. An *Aerodrome Weather Observer Class B Certificate* is issued to those who qualify to provide Local Reports.

The ATIS broadcast format and amendment criteria is not delivered by the Bureau as a part of the AWO course. This component is delivered to ATS personnel at the Airservices Australia Learning Academy and RAAF School of Air Traffic Control.

Regardless of the broadcast or reporting format used, the technique of observing phenomena such as visibility, weather and cloud is essentially the same.

The common requirement of all certified Aerodrome Weather Observers is to perform a continuous weather watch so as to act accordingly and promptly when specified changes in the weather are first observed.

Why are Aerodrome Meteorological Observations and Reports performed?

Aerodrome Meteorological Observations and Reports are provided for a variety of purposes. Some of these are:

- **To provide information for pilots**

  Prior to departing on a flight, a pilot in command must study all available information applicable to the operation, including a study of all current weather reports and forecasts available for the route to be flown and aerodromes to be used. The information contained in such a weather briefing plays a critical role in determining the amount of fuel on board to safely complete a flight. A pilot will also use the information to ascertain any weather related threats or hazards that may be encountered during the flight.

- **To provide information for schedulers / flight planners**

  Flight schedulers rely on accurate weather information to help schedule aircraft to ensure a most efficient and cost effective use of their resources. They are particularly interested in weather phenomena such as fog and thunderstorms that have the potential to divert or even ground an aircraft. An unforeseen diversion or grounding can prove very costly for an operator.

- **To provide information for Air Traffic Services staff**

  The current and forecast weather conditions play a large role in determining how air traffic is managed and sequenced by Air Traffic Services. In addition, the role of Tower Controllers in providing accurate weather observations for inclusion in Local Reports is critical to flight safety.

- **To provide information for weather forecasters**

  Weather forecasters rely on precise and up to date weather observations and reports to monitor the accuracy of their aviation forecasts. Many observing locations are beyond the weather watch radar coverage areas – the receipt of weather reports from observers can often be the only indication of the current conditions at an aerodrome.

- **For archival by the National Climate Centre (NCC)**

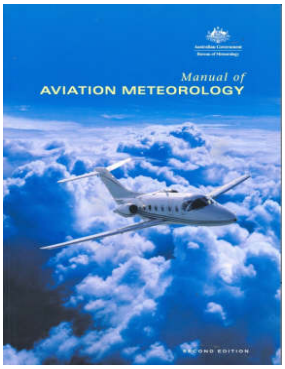
  Australia's extensive network of automatic weather stations and meteorological offices play a vital role in delivering data to the National Climate Centre for climate research and other studies.

Visibility reduced by Fog at Archerfield Airport

Aerodrome Weather Observer Course Structure

The Aerodrome Weather Observer course is comprised of three modules:

- **AWO Module 1: Basic Meteorology**

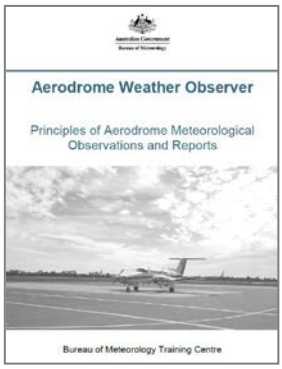


AWO Module 1 provides background knowledge of the meteorological factors that affect observations.

The reference text for this component is the Bureau's *Manual of Aviation Meteorology*, second edition.

The completion of Module 1, or the recognised prior learning credit from an approved course, or recognised current competency, is a pre-requisite for Module 2.

- **AWO Module 2: Principles of Aerodrome Meteorological Observations and Reports**



Module 2 is designed to train and examine participants in the principles of making weather observations for aviation purposes. This module places a particular emphasis on observing visibility, weather and cloud, including the use of automated sensors to assist with observations.

The reference text for this component is the Bureau of Meteorology Training Centre's *AWO Principles of Aerodrome Meteorological Observations and Reports* training notes.

Successful completion of Module 2 is a pre-requisite for Module 3 of the AWO Course.

- **AWO Module 3: Practical Aerodrome Meteorological Observations and Reports**

Module 3 of the AWO course is the practical component. Module 3 requires a minimum of 60 Aerodrome Meteorological Observations and Reports be performed under the supervision of an approved observer. During this module, participants seeking Class A accreditation will provide Aerodrome Weather Reports, with Class B participants providing Local Reports. These may be conducted in a simulated environment at the Bureau's Training Annexe, or where approved, completed in the field as a part of the on-the-job training process.

Successful completion of all three modules will qualify the participant for certification as an Aerodrome Weather Observer to permit them to make Aerodrome Meteorological Observations and Reports.

Aerodrome Weather Observer Course Syllabus

Participants completing Module 1 and Module 2 of the course should refer to the relevant learning outcomes and performance criteria during the course of their study. This will allow for a self-assessment of the level of preparedness prior to attempting the assessment tasks for each module.

The competency descriptions, performance criteria and procedures for Module 3 are to be referred to by both the AWO course participant and the person performing the supervision role for the module. Further guidance on the completion of Module 3 for participants and supervisors is included in the Module 3 Syllabus.

Regulation

Annex 3 to the Convention on International Civil Aviation (Chicago Convention) sets out the relevant international standards and recommended practices (SARPs) pertaining to the provision of meteorological services for international air navigation.

Annex 3, (ICAO, 2013) states that:

"Each Contracting State shall designate the authority, hereinafter referred to as the meteorological authority, to provide or to arrange for the provision of meteorological service for international air navigation on its behalf."

"*Each Contracting State shall ensure that the designated meteorological authority complies with the requirements of the World Meteorological Organization in respect of qualifications and training of meteorological personnel providing service for international air navigation."*

For the purposes of the Chicago Convention, the Bureau of Meteorology is the designated Meteorological Authority for Australia.

While Annex 3 pertains to services for international aviation, it also states the desirability of adopting the SARPs to national operations. Australia observes the standards and procedures as set out in Annex 3 for both domestic and international aviation, apart from specific registered differences.

The Civil Aviation Regulations specify further requirements on the provision of weather reports to the aviation industry.

Civil Aviation Regulation 120 (CAR 120) provides as follows:

> **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.*
>
> *Penalty: 5 penalty units.*
>
> *(2) An offence against subregulation (1) is an offence of strict liability.*
>
> *Note: For strict liability, see section 6.1 of the Criminal Code.*

The Meteorological Authority specifies the qualification and competency requirements for Aerodrome Weather Observers in the policy document ***Qualifications and Competencies - Aerodrome Weather Observers*****.** The document is available at:

http://www.bom.gov.au/aviation/met-authority/data/MA9a_Aerodrome_Weather_Observers.pdf

The focus of the AWO training and assessment provided by the Bureau of Meteorology Training Centre is on individuals' competence to perform aerodrome meteorological observations. Authority for dissemination of these observations under CAR 120 must be appropriately sought.

Reference Documentation

The AWO training documentation provided by BMTC is derived from a number of sources, including:

- **Aeronautical Services Handbook**

  The *Aeronautical Services Handbook (ASH)* is the Bureau's Aviation Weather Services operations manual. It specifies national policy and standards, and describes the practices and procedures followed by the Bureau in the provision of meteorological services to aviation. Chapter 6 of the ASH is of particular importance to aviation observations. Included in this chapter are the criteria for the issue of Special (SPECI) Reports.

- **Surface Observations Handbook**

  The *Surface Observations Handbook (SOH)* describes the meteorological elements and is considered the primary Bureau reference for *making* surface based observations. It includes cloud, visibility and weather definitions and observing techniques, as well as information regarding instrumentation and user console input. For observations provided for aeronautical purposes, the SOH is used in conjunction with information from other references such as the Codes Handbook and Aeronautical Services Handbook.

- **WMO International Cloud Atlas**

  Much of the information within the SOH and these notes has originated from the World Meteorological Organization (WMO) *International Cloud Atlas: Manual on the Observation of Cloud and other Meteors.* Parts of the International Cloud Atlas constitute Annex I to the *WMO Technical Regulations* and have the legal status of standardised practices and procedures.

- **The Codes Handbook**

  The *Codes Handbook* describes the METARAWS/SPECIAWS and METAR/SPECI code forms. It specifies those components of an observation that are relevant for *inclusion* in an Aerodrome Weather Report for the aviation industry, and the *format* in which the message is transmitted.

  In essence the SOH *describes* the weather elements, and the Codes Handbook tells us how the weather elements are *reported*.

- **Climatological Practices Handbook**

  A paper record of each observation for Aerodrome Weather Reports is recorded on *Form A37: Register of Weather Reports*. This form is primarily a station record, and is used by Bureau observing staff to monitor trends in changes of weather over an observation period. It is particularly useful when monitoring SPECI conditions in marginal weather. The conventions on how to complete this paper form originated from the *Climatological Practices Handbook.*

- **Observations Instructions**

  A notice of a new or impending change to procedures, clarification of a procedure or a correction or amendment to a procedure is conveyed to Bureau staff via an Observation Instruction. Regional Observations Managers must bring relevant Observations Instructions to the attention of non-Bureau observing personnel.

AWO Module 1 Syllabus

Basic Meteorology

Module Purpose

To provide the participant with an understanding of the meteorological factors that affect weather observations for aeronautical purposes.

Relationship to Standards

- Forms part of the Basic Instructional Package for Meteorological Technicians (BIP-MT) as described in WMO 1083 – Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology.
- Conforms to the Background Knowledge requirements of the WMO Guidance of Aeronautical Meteorological Observer Competency Standards.
- Accredited by the Commonwealth Bureau of Meteorology.

Prerequisites

Nil

Summary of Content

1. The Atmosphere
2. Heat Exchange Processes
3. Air Temperature, Air Density and Atmospheric Pressure
4. Atmospheric Stability
5. Moisture in the Atmosphere
6. Clouds
7. Wind
8. Thunderstorms and other Hazards
9. Major Weather Systems and Patterns
10. Meteorological Services for Aviation

Reference Text

Bureau of Meteorology *Manual of Aviation Meteorology,* 2nd Edition 2007; ISBN 978-0-9578991-7-9

Assessment method

Formal examination: multiple choice question format.

LEARNING OUTCOMES	PERFORMANCE CRITERIA
1. The Atmosphere	
Describe the basic characteristics of the atmosphere	1.1 Recall the composition of gases in the troposphere 1.2 Describe the normal air temperature and pressure profile in the troposphere, at the tropopause, and the lower stratosphere 1.3 In the international standard atmosphere (ISA) recall: a) Sea level temperature and pressure b) Temperature lapse rate in the troposphere
2. Heat Exchange Processes	
Describe the processes of heat exchange within the atmosphere	2.1 Understand the process of heat exchange through incoming solar radiation and outgoing terrestrial radiation 2.2 Describe the way the sun's energy is redistributed within the atmosphere through the following processes: a) Conduction, advection, convection, radiation and latent heat 2.3 Describe the role of latent heat in the change of state of water between a solid, liquid and vapour
3. Air Temperature, Air Density and Atmospheric Pressure	
Understand the relationship between air temperature, density and pressure, and their effect on aircraft performance	3.1 Describe the method of measuring surface air temperature, and understand how temperatures throughout a locality may vary 3.2 Define the following terms: a) isotherm, temperature inversion b) isobar, pressure gradient 3.3 Recall the density of dry air at sea level in the international standard atmosphere 3.4 Recall the pressure lapse rate near sea level 3.5 Understand the effect that temperature, pressure and humidity have on air density, and how this affects aircraft performance 3.6 List factors that influence the diurnal variation of surface air temperature. 3.7 Explain the temperature gradient between land and sea surfaces over a 24 hour period

4. Atmospheric Stability	
Understand the basic principles of atmospheric stability	4.1 Define the following terms: a) adiabatic process b) dry and saturated adiabatic lapse rates 4.2 Describe the behaviour of a rising parcel of air under various conditions of stability 4.3 On an aerological diagram, identify: a) stable, unstable, neutral and conditionally unstable areas b) surface radiation inversions and subsidence inversions
5. Moisture in the Atmosphere	
Understand the various ways of describing the moisture content of the air Describe the processes involved in the change of state of water.	5.1 Recall the three states of water and the process involved in a change of state 5.2 Define the following terms: a) saturated air, relative humidity, dew-point temperature b) evaporation, condensation, freezing, deposition, sublimation
6. Clouds	
Categorise the main cloud types in the low, middle and high étages Describe basic cloud formation processes	6.1 Recall which of the main cloud types belong to the low, middle and high étages 6.2 Describe the basic cloud formation processes

7. Wind	
Explain the physical processes surrounding the development of both large-scale and local winds	7.1 State the standard height for measuring surface wind 7.2 Describe the relationship between pressure and wind and apply Buys Ballot's law to approximate the location of high and low pressure systems for large-scale flow 7.3 Differentiate between: a) squalls and gusts b) backing and veering 7.4 Describe the effect of surface friction on wind direction and speed when comparing winds above and below the friction layer 7.5 Describe the characteristics of the Coriolis force 7.6 Describe the process that leads to the formation of: a) sea-breezes and land breezes b) katabatic and anabatic winds c) a Föhn wind d) mountain waves
8. Thunderstorms and other Hazards	
Describe the features of thunderstorms and the conditions under which they form Determine the conditions favourable for the occurrence of other weather related hazards to aircraft operations	8.1 Recall the lifecycle of an ordinary thunderstorm cell 8.2 State the conditions necessary for thunderstorm development 8.3 Describe the hazards to aviation associated with thunderstorm activity and microbursts 8.4 State the conditions favourable to the development of: a) radiation fog b) advection fog 8.5 Describe the conditions favourable for the formation of the following structural airframe icing types: a) clear ice, rime ice, and mixed ice b) hoar frost

9. Major Weather Systems and Patterns	
Identify and interpret the typical features depicted on a weather map Understand the basic characteristics of tropical cyclones in the Australian region	9.1 Identify the following features depicted on a mean sea level weather chart: a) high and low pressure systems b) troughs, ridges, cols c) warm, cold, occluded and stationary fronts 9.2 Indicate the change in wind direction, temperature and pressure following the passage of a front 9.3 With respect to tropical cyclones, recall: a) the cyclone season for the southern hemisphere b) the requirements for cyclone development in terms of • latitude; and • water temperature c) the associated wind speeds d) the life cycle
10. Meteorological Services for Aviation	
Decode meteorological observation and forecast products prepared for the aviation industry	10.1 Decode the following products: a) METAR/SPECI b) TTF c) TAF d) ARFOR

AWO Module 2 Syllabus

Principles of Aerodrome Meteorological Observations and Reports

Module Purpose

To equip the participant with the theory and an inventory of skills to provide weather observations for aeronautical purposes.

Prerequisites

The successful completion of AWO Module 1, or the recognised prior learning credit from an approved course, or recognised current competency.

Relationship to Standards

- Complies with ICAO Annexe 3 International Standards and Recommended Practice – Meteorological Service for International Air Navigation (with Australian exceptions).
- Complies with WMO 49 Volume II Technical Regulations for International Air Navigation (with Australian exceptions).
- Forms part of the Basic Instructional Package for Meteorological Technicians (BIP-MT) as described in WMO 1083 – Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology.
- Conforms to the WMO Implementation Guidance of Aeronautical Meteorological Observer Competency Standards.
- Accredited by the Commonwealth Bureau of Meteorology.

Summary of Content

1. Meteorological Instruments
2. Cloud Observations
3. Visibility Observations
4. Weather Observations
5. Aerodrome Weather Reports

Reference Text

Bureau of Meteorology Training Centre's *AWO Principles of Aerodrome Meteorological Observation and Reports* training notes.

Assessment method

Formal examination: multiple choice question format.

LEARNING OUTCOMES	PERFORMANCE CRITERIA
1. Meteorological Instruments	
1.1 Identify the instruments that provide data for Aerodrome Meteorological Observations and Reports and have a basic understanding of their operation	1.1.1 Describe the basic operation of the: a) Anemometer b) Visibility Meter c) Ceilometer d) Wet and dry bulb temperature sensors e) Barometer f) Tipping Bucket Rain Gauge
1.2 Know the limitations of the instruments and recognise suspect automated observational data	1.2.1 Understand the effect of an empty wet-bulb reservoir on dew point and humidity data 1.2.2 Describe the limitations of the ceilometer sky condition algorithm output with slow moving or stationary cloud 1.2.3 Describe the issues associated with the ceilometer sky condition algorithm output when multiple cloud layers exist 1.2.4 Describe the limitations of the visibility meter data when the transparency of the atmosphere is not uniform
2. Cloud Observations	
2.1 Identify the cloud types applicable to Aerodrome Meteorological Observations and Reports	2.1.1 Identify the following cloud types: a) Stratus b) Cumulus c) Towering Cumulus d) Cumulonimbus e) Stratocumulus f) Altocumulus g) Altostratus h) Nimbostratus i) Cirrocumulus j) Cirrostratus k) Cirrus 2.1.2 Recognise characteristics specific to each cloud type (in 2.1.1) 2.1.3 Indicate the standard heights of the low, middle and high étages based on Australian climatology 2.1.4 Indicate the composition of the cloud types ie. warm water droplets, supercooled water droplets, ice crystals

2.2 Use resources where appropriate to assist with visual cloud identification and anticipated cloud development	2.2.1 Identify typical signatures of various cloud types as indicated by satellite images, synoptic charts, ceilometers, aerological diagrams 2.2.2 Determine the atmosphere's stability characteristics and explain the corresponding effect on cloud development
2.3 Describe the techniques used to determine the height of the base of clouds	2.3.1 Determine an approximate convective cloud base height given surface temperature and dew point temperature 2.3.2 Use ceilometer data to assist in determining height of the cloud base 2.3.3 Use an aerological diagram to assist in determining the height of the cloud base 2.3.4 Use knowledge of spot heights of local features to assist in determining the height of the cloud base 2.3.5 Convert a cloud base height relayed via a pilot from height AMSL to height AGL
3. Visibility Observations	
3.1 Understand the techniques for determining visibility for Aerodrome Meteorological Observations and Reports	3.1.1 Define meteorological visibility by both day and night. 3.1.2 Determine from a 'visibility scenario diagram' the following: a) Minimum Visibility and Direction b) Prevailing Visibility 3.1.3 Give examples of the meteorological factors that will reduce visibility 3.1.4 Describe the use of visibility markers to assist with determining visibility

4. Weather Observations	
4.1 Identify the weather phenomena observed in Aerodrome Meteorological Observations and Reports	4.1.1 Define the following precipitation phenomena: a) Drizzle b) Rain c) Snow d) Hail e) Snow Grains f) Small Hail g) Snow Pellets h) Ice Pellets i) Ice Crystals 4.1.2 Match the types of precipitation associated with particular cloud types 4.1.3 Determine precipitation intensity using both rate of fall and visibility cues 4.1.4 Describe the appropriate use of the following descriptors: a) Shallow, Patches, Partial b) Drifting c) Showers d) Thunderstorm e) Freezing 4.1.5 State the cloud type associated with thunderstorms 4.1.5 Define the following phenomena: a) Mist and Fog b) Smoke, Dust, Sand, Haze c) Volcanic Ash d) Dust Devil e) Squall f) Funnel Cloud g) Duststorm and Sandstorm h) Thunderstorm 4.1.7 Recall the visibility reduction associated with fog phenomenon 4.1.8 Interpret data from a weather watch radar to assist with weather identification 4.1.9 Describe the characteristics of microbursts and the cloud types associated with them 4.1.10 Recognise when microburst and wind shear activity is hazardous to aircraft operations 4.1.11 Recall the communication process used to report wind shear activity at an aerodrome

5. Aerodrome Weather Reports	
5.1 Decode an Aerodrome Weather Report	5.1.1 Decode a METAR/SPECI 5.1.2 Describe the differences between messages with and without manual input
5.2 Understand the requirements for reporting visibility in Aerodrome Weather Reports	5.2.1 Determine how visibility is reported in an Aerodrome Weather Report given a 'visibility scenario diagram'
5.3 Understand the term Runway Visual Range (RVR)	5.3.1 Define Runway Visual Range (RVR) 5.3.2 Decode the RVR component of an Aerodrome Weather Report 5.3.3 Recognise that RVR is only approved for use during low visibility conditions characterised by fog or mist
5.4 Understand the requirements for reporting present weather in Aerodrome Weather Reports	5.4.1 State the distances from the aerodrome reference point used to determine whether phenomena is occurring at the aerodrome or in the vicinity 5.4.2 Recall the technique used to report more than one form of precipitation in an Aerodrome Weather Report 5.4.3 Explain the requirements for the inclusion of a thunderstorm either at the aerodrome, or in the vicinity, in an Aerodrome Weather Report. 5.4.4 Recall any visibility requirements for reporting phenomena as present weather in an Aerodrome Weather Report, where applicable
5.5 Understand the requirements for reporting clouds in Aerodrome Weather Reports	5.5.1 Determine which clouds are included in an Aerodrome Weather Report given a series of cloud observations 5.5.2 Recall the equivalent okta cloud amounts for FEW, SCT, BKN and OVC in an Aerodrome Weather Report 5.5.3 Explain the technique used to report Cb and TCu with a common base in an Aerodrome Weather Report

5.6 Understand the use of the term CAVOK and NSC in Aviation Observations and Reports	5.6.1 Define the terms CAVOK and NSC 5.6.2 Understand the term '25nm Minimum Sector Altitude' 5.6.3 Identify when CAVOK or NSC will be coded given a series of observations
5.7 Understand the requirements for reporting recent weather and windshear as supplementary information in Aerodrome Weather Reports	5.7.1 Recall those phenomena that are applicable to recent weather reporting 5.7.2 Determine which phenomena are to be reported as recent weather given a series of observations 5.7.3 Describe the format for reporting windshear in an Aerodrome Weather Report
5.8 Understand the requirements for the issue of Special (SPECI) Weather Reports.	5.8.1 Given a series of reports, use ASH Table 6.1 and 6.2 to determine which SPECI criteria have been the 'trigger' for the issue of a SPECI 5.8.2 Given a series of observations, use ASH Tables 6.1 and 6.2 to determine whether a SPECI report should be issued 5.8.3 Recall the procedure to issue a clearing SPECI following an improvement in weather conditions

AWO Module 3 Syllabus

Practical Aerodrome Meteorological Observations and Reports

Module Purpose

To assess participant's competence to perform all tasks associated with the provision of Aerodrome Meteorological Observations and Reports.

Prerequisites

The successful completion of AWO Module 1, or the recognised prior learning credit from an approved course, or recognised current competency, and AWO Module2.

Relationship to Standards

- Complies with ICAO Annexe 3 International Standards and Recommended Practice – Meteorological Service for International Air Navigation (with Australian exceptions).
- Complies with WMO 49 Volume II Technical Regulations for International Air Navigation (with Australian exceptions).
- Forms part of the Basic Instructional Package for Meteorological Technicians (BIP-MT) as described in WMO 1083 – Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology.
- Conforms to the WMO Implementation Guidance of Aeronautical Meteorological Observer Competency Standards.
- Accredited by the Commonwealth Bureau of Meteorology.

Reference Material

All operational documentation relevant and available for the observing location.

Assessment method and conditions

Competency is assessed during the provision of a minimum of 60 Aerodrome Meteorological Observations and Reports conducted in a real or simulated workplace environment.

AWO Module 3: Guidance for participants and supervisors

AWO Module 3 places the AWO course participant in the company of an experienced observer to perform a practical demonstration of the knowledge and skills acquired over the previous AWO modules under supervision. During this demonstration the participant will perform a minimum of 60 aerodrome meteorological observations and corresponding reports.

Role of the supervisor

The supervisor shall hold a current Aerodrome Weather Observer qualification for the class of certificate sought by the participant, with at least six months continuous experience providing Aerodrome Meteorological Observations and Reports. It is acceptable that more than one person will perform the supervisor role for the participant during the course of the module.

While the supervisor's role will primarily involve the observance and evaluation of performance of the participant, it is expected a degree of coaching will be required to help the development of the required competence of the participant.

In addition to any coaching to assist with the participant's learning, some discussion will be required during the initial stages of this module relating to the logistics of performing an observation. These discussion areas will include, but not be limited to:

- the observations routine for the location
- the maintenance of the instrumentation
- the use of the display console and other computer software/hardware
- mechanisms for reporting and recording of observations
- location specific observing requirements

Notwithstanding the above points, the supervisor should always afford the participant the opportunity to provide their best interpretation of the meteorological elements when performing an observation in the initial instance. The supervisor should intervene with further discussion points and suggestions when necessary for the benefit of the participant to provide a more accurate assessment of these elements.

As the participant becomes more familiar with the observing location's environment and operating logistics, it is expected the supervisor's role will become more passive with minimal input. However, as the supervisor is considered the issuing officer for all disseminated weather reports, they shall always check and confirm the accuracy of an observation made by the participant prior to the transmission of a report.

Module Completion Report

Both the course participant and supervisor shall familiarise themselves with the details within each of the four key competencies for Module 3.

The attached ***Module Completion Report*** is to be completed by the supervisor during the conduct of AWO Module 3. The ***demonstration of skills*** checklist items within each of the four key competencies of the Module 3 syllabus forms part of the Module Completion Report, as does the completed log of observations.

Every item within the demonstration of skills checklist must be completed:

- with a tick (✓) to indicate the standard has been demonstrated; or
- the words **N/A**, where a particular item is not applicable for the certificate class being sought.

Each of the key competency areas also includes the section: ***Questions/scenarios to support demonstration of knowledge and skills***.

These questions/scenarios are provided to assist the supervisor to determine the competence of the participant to perform the job role, particularly where specific phenomena or circumstances are not encountered during the conduct of the module. Supervisors are not limited to the questions/scenarios provided; additional questions can be asked and opportunities offered that will challenge the participant, but setting excessive expectations beyond the experience level of the participant must be avoided.

Log of Observations

A Log of Observations pro forma is provided in this document. This log shall be maintained by the AWO participant detailing each Aerodrome Meteorological Observations and Report performed. Each entry shall be authenticated by the signature of the supervisor.

The log shall show a minimum of 60 observations performed over a period of at least 30 hours. The observation sessions must have been performed over a minimum of three calendar days. These days do not have to be consecutive. An example log entry is provided.

Where an alternative observation log pro forma is used to record meteorological observations at an observing location, this log may be submitted as evidence of completion of the 60 observations provided it includes the same details as the attached log, including a signature column for the supervisor.

Where the Bureau's A37 Register of Weather Reports is used for the above purpose, an extra column shall be provided (in the remarks section) for the participant to initial each observation. Supervisors shall initial the column titled OFFICER as normal.

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Module Completion Report

AWO: Module 3

Practical Aerodrome Meteorological Observations and Reports

Name of Participant: _____

Name of Supervisor: _____

Observing Location: _____

AWO Certificate Class sought (delete one): **Class A / Class B**

The above named participant has demonstrated their competence to provide Aerodrome Meteorological Observations and Reports in accordance with the AWO Module 3 performance criteria. This competency has been demonstrated during the conduct of:

- at least 60 Aerodrome Meteorological Observations and Reports
- over a period of at least 30 hours
- during a minimum of 3 days (not necessarily consecutively).

The completed competency checklist and log of observations is appended to this report.

Signature of Supervisor: _____

Date: _____

Post completed documentation to:

Composite Operations Training Officer
Bureau of Meteorology
GPO Box 1289
Melbourne Victoria 3001

Competency 1:

Continuously monitor the weather situation

Competency description : Weather parameters are appraised to identify the significant and evolving weather phenomena that are affecting or will likely affect the area of responsibility throughout the watch period.	
Performance criteria : 1. Analyse and describe the existing local weather conditions.	
Procedures : The participant makes a detailed study of available resources to assess the synoptic weather situation before taking the first observation, and when updates become available. He/she analyses the local and regional weather conditions and formulates the short-term change of weather parameters and phenomena. Appropriate action is taken when significant changes are observed or anticipated in the short term.	
During the demonstration of skills, did the participant :	✓ **(Yes)**
i. where available, study the weather charts, weather radar, satellite images and aerological diagrams	
ii. study observations from nearby automatic weather stations (AWS)	
iii. study relevant regional observations and forecasts from METAR/SPECI, TTF and TAF of neighbouring aerodromes as required	
iv. study the local forecasts indicated in the TAF and TTF, ARFOR and public weather forecast	

Questions/scenarios to support demonstration of knowledge and skills :
• What is the direction of the synoptic background wind over the local area? • Any local effect on the wind flow? • Any significant weather affecting neighbouring aerodromes? • Any significant weather approaching the local area? • Any significant weather is expected during the shift judging from forecast or observed data and the possible timing? • Any weather parameters requiring particular attention during the shift?
Remarks :
Participant signature :
Supervisor signature :

Competency 2:

Observe and record aeronautical meteorological phenomena and parameters

Competency description : Observations of weather parameters and phenomena, and their significant changes, are made according to documented thresholds and regulations.	
Performance criteria : 1. Perform and record routine and non-routine observations of the following (where applicable): • surface wind direction and speed, including spatial and temporal variations • visibility for aeronautical purposes, including spatial and temporal variations • RVR, including spatial and temporal variations • significant weather phenomena (as defined in ICAO Annex 3) • cloud amount, height of base, and type, including spatial and temporal variations • vertical visibility • temperature and humidity • atmospheric pressure; determining QFE and QNH • supplementary information, wind shear and special weather phenomena. 2. Interpret automatic observed parameters to ensure that observations remain representative of local conditions when differences occur between automatic sensor technologies and manual observing techniques. 3. Ensure that observations are prepared and issued in accordance with ICAO Annex 3, WMO-No.49, regional and national formats, codes and technical regulations on content, representativeness and timeliness.	
Procedures : The participant makes weather observations in accordance with the prescribed time schedule and procedures. The observation is prepared, issued and recorded in the prescribed format via the documented method.	
During the demonstration of skills, did the participant :	**✓ (Yes)**
i. start the sequence of weather observations within the prescribed time preceding the meteorological report (where routine METAR/SPECI, 10 minutes)	
ii. record and check the consistency of wind data noting the current weather situation and local effects	
iii. determine the prevailing visibility and note any visibility sector reductions, with the assistance of a visibility marker diagram	
iv. identify weather phenomena at the aerodrome, in the vicinity, and in the distance where appropriate	

v.	determine the precipitation type and intensity and conduct a consistency check with rainfall measurements, radar data and observation of clouds	
vi.	identify cloud type, cloud base and cloud amount of different types/layers where appropriate	
vii.	include any reports of windshear in accordance with prescribed procedures	
viii.	identify and consider the inclusion of recent weather phenomena in accordance with the prescribed procedures	
ix.	record and check the consistency of temperature, humidity and pressure data, noting the current weather situation and local effects	
x.	consider information for reporting as plain language where appropriate	
xi.	pay due attention to areas or directions which are likely to be affected by significant weather during the observation	
xii.	accurately interpret data from automated sensors to assist with performing the observation	
xiii.	re-check the accuracy of the components of the observation before issuance	
xiv.	verify the completeness of observation elements in the report before issuance	
xv.	issue the meteorological reports on time (where METAR/SPECI, not more than 5 minutes after observation time)	
xvi.	issue the meteorological reports using the correct coding and format	
xvii.	take special observations and issue SPECI according to documented thresholds	
xviii.	issue SPECI in a timely manner	
xix.	issue the meteorological reports via documented methods and dissemination channels	
xx.	check and confirm that the reports have been successfully disseminated	
xxi.	record the observation in accordance with documented procedures	

Questions/scenarios to support demonstration of knowledge and skills :

- From a series of 'visibility scenario diagrams' the participant demonstrates how the visibility is reported and recorded.
- If cumulus clouds were developing at the aerodrome, with a surface temperature of (x) and a dewpoint temperature of (y), what would the approximate cloud base height be?
- The participant is asked to identify images of various clouds from the Cloud Atlas or similar resource.
- What types of precipitation are associated with each of the basic cloud types?
- What are the visibility reporting requirements for FG, HZ, BR, FU, DU, DS, SS to be reported as present weather in a METAR/SPECI?
- What hourly rainfall rates are used to assist with determining the intensity of rain? Using the display console show how you would determine what the hourly rainfall rate equivalent is?
- What visibility reduction values are used as a guide for determining the intensity of drizzle and snow?
- What are criteria for the issue of a SPECI for:
  - Cloud and Visibility (including multiple minima criteria)?
  - Wind?
  - Weather?
  - Temperature and QNH?
- What are the HAM figures for cloud and visibility for (this) aerodrome? Where are these figures published? What does the term 25 nm MSA refer to? What is the 25 nm MSA for this aerodrome? How does the 25 nm MSA affect a weather observation?
- Where is the Plan of Visibility markers diagram for this location? How far away is (that) marker?
- Ask the participant to find information on the company intranet (Source reference handbooks, etc)

Remarks :

Participant signature :

Supervisor signature :

Competency 3:

Ensure the quality of the performance of systems and of meteorological information.

Competency description : The quality of meteorological observations is maintained at the required level by the application of documented quality management processes.		
Performance criteria : 1. Apply the organization's quality management system and procedures. 2. Check and confirm the quality of meteorological observations before issuance, including relevance of content, time of validity and location of phenomena. 3. In accordance with prescribed procedures: • identify errors and omissions in meteorological observations • correct and report errors and omissions • make and disseminate corrections in a timely manner.		
Procedures : The participant monitors the performance of automated sensors. Appropriate techniques are applied to validate automated data against human observation. Where a discrepancy exists appropriate action is taken.		
During the demonstration of skills, did the participant :		✓ **(Yes)**
i.	compare and verify the output from the anemometer with an estimation of the manually observed wind speed and direction	
ii.	check the consistency and reliability of air temperature, humidity data and pressure given the current weather situation	
iii.	monitor the performance of visibility sensors against human observations and take appropriate action where significant discrepancies are recognised	
iv.	monitor the performance of the ceilometer against human observations and take appropriate action where significant discrepancies are recognised	
v.	compare TBRG readouts with observed precipitation location, intensity and duration	
vi.	compare manually read temperature, humidity, pressure and rainfall information where necessary to verify the accuracy of suspect data from automated sensors	
vii.	rectify (where appropriate) any quality errors and warnings detected on the display console prior to issuing a report	

Questions/scenarios to support demonstration of knowledge and skills :
• What are the limitations of the visibility sensor? • Demonstrate how to view the one minute visibility meter data on the display console. • What is the current one minute and ten minute visibility meter output? Is this representative of the manually observed visibility? • What are the limitations of the ceilometer and the sky condition algorithm? • How accurate is the sky condition algorithm in predominantly convective skies? • When will the sky condition algorithm often over-estimate cloud amount? • When is the sky condition algorithm generally quite accurate? • What readings on the display console would you expect to see if the wet-bulb reservoir was dry? • Do the current temperature/dew point/humidity values look reasonable to you? How did you come to that conclusion? • Does the current QNH figure look reasonable to you? How did you come to that conclusion? • What actions would you take if suspicious data are identified?
Remarks :
Participant signature :
Supervisor signature :

Competency 4:

Communicate meteorological information to internal and external users

Competence description : All meteorological data and information are concise, complete and communicated in a manner that will be clearly understood by the users.	
Performance criteria : 1. Ensure that all observations are disseminated through the authorised communication means and channels to designated user groups. 2. Present aeronautical meteorological data and information in a clear and concise manner using suitable terminology. 3. Alert forecasters to observed or imminent significant changes in the weather within the local area.	
Procedures : The participant confirms the dissemination of the aerodrome meteorological reports and adheres to any documented local alerting procedures to forecasting staff, observing staff, air traffic services staff, etc.	
During the demonstration of skills, did the participant :	✓ **(Yes)**
i. confirm availability of the meteorological report for users (METAR/SPECI, METARAWS/SPECIAWS, Local Report, etc)	
ii. notify users of significant or hazardous phenomena by alternate means when required	
iii. notify forecasters of any sustained significant difference in forecast conditions compared to actual conditions	

Questions/scenarios to support demonstration of knowledge and skills :
• Describe your actions if you recognise a significant difference between the TAF for your local aerodrome and the actual observed conditions. • Describe a situation where you would alert forecasters or users in order to provide more information than what is contained with the aerodrome meteorological report. • What would you do if your normal dissemination system was not functioning? How would you notice and what action would you take?
Remarks :
Participant signature :
Supervisor signature :

Log of Observations

Participant Name:_____ Observing Location:_____

Date	Time (UTC)	Type of report	Visibility	Weather	Cloud	Name of Supervisor	Signature of Supervisor
23/07/14	2300	ATIS	9999	-SHRA	FEW012 SCT030	JOHN BLOGGS	J. Bloggs

Date	Time (UTC)	Type of report	Visibility	Weather	Cloud	Name of Supervisor	Signature of Supervisor

Date	Time (UTC)	Type of report	Visibility	Weather	Cloud	Name of Supervisor	Signature of Supervisor

Notes: