航空氣象現代化系統
The Advanced Operational Aviation Weather System (AOAWS)

AWOS 顯示系統 (JAVA 版)
使用者手冊
JAVA-BASED AWOS DISPLAY
Users Manual

交通部民用航空局

Civil Aeronautics Administration (CAA)

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NCAR **美國國家大氣科學研究中心** (National Center for Atmospheric Research)

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Table of Contents

1 目的及涵蓋範圍(Purpose and Scope)

AWOS 顯示系統是民航局航空氣象現代化作業系統 (AOAWS)的成果之一，其主要的目的為將氣象資料以較淺顯易懂的方式展現，以利航空相關單位應用於日常作業中。AWOS 顯示系統允許民航局外界或內部的使用者，只要有網路連線即可利用 AOAWS 上網查 AOAWS 系統的氣象資訊。

The AOAWS AWOS display is a deliverable of the Advanced Operational Aviation Weather System (AOAWS) Project for the Civil Aeronautics Administration (CAA). The goal of the system is to present weather information in an easier-to-understand fashion for use by the aviation community on a daily operational basis. The AWOS display allows users with internet access to view weather information provided by the AOAWS system both inside and outside of the CAA.

此顯示讓每個機場能從遠端觀看各 AWOS 感應器所收集到的資料。 AWOS 顯示系統是 AOAWS 中的新一代 Java 版多元化氣象產品顯示系統(Advanced Java Multi-dimensional Display System ，簡稱 JMDS)的同類，但其更著重在 AWOS 資料且更高的資料更新頻率。

This display allows for remote viewing of data collected by AWOS sensors at each airport. The AWOS display is a peer to the AOAWS Java Multi-dimensional Display System (JMDS), but is specialized for AWOS information and higher data update rates.

AWOS 顯示是安裝在 AOAWS 系統的網站端，透過以下網址可以連結
http://aoaws.caa.gov.tw/htdocs/projects/aoaws/awos/.
The AWOS display is installed on the AOAWS web site and can be accessed from
http://aoaws.caa.gov.tw/htdocs/projects/aoaws/awos/.

本手冊的目的為說明 AWOS 各項功能的概觀及操作方式，以作為使用者在操作本系統之參考。請參照本手冊目錄以便查閱各章節之要點。
This document is intended to provide the user with an overview of the functionality of the AWOS display. It also provides some operational illustrations for users. Please see the Table of Contents for the key topics of each chapter.

2 AWOS 顯示硬體環境(AWOS display Hardware Environment)

AWOS 顯示的硬體需求規格包含 1024*768 解析度之繪圖卡及螢幕，64MB 的記憶體及 25MB 硬碟空間用來安裝 AWOS 顯示程式。傳送 AWOS 顯示的氣象產品需要至少 256 Kbps 的網路頻寬。

The AWOS display hardware requirements are at minimum 1024x768 resolution graphic cards and monitor, 64MB of memory, and 25MB of hard drive space for installing AWOS display software. Minimum bandwidth of 256Kbps is required to transfer the AWOS display weather products.

3 AWOS 顯示軟體環境(AWOS display Software Environment)

AWOS 顯示需要 Java 7.0 或以上之版本。Java 可由 http://java.com 下載。Java 可在各主要電腦作業系統上安裝，包含最新版本的 Windows、Linux 及 MacOS X。

The AWOS display requires Java 7 or newer to run. Java can be downloaded from http://java.com. Java can be installed on nearly all major operating systems, including recent versions of Windows, Linux, and MacOS X.

AWOS 顯示必須透過網路來擷取資料。若上網需使用代理伺服器，則須在 Java 控制台的網路設定中設定使用代理伺服器。Java 一般會依據瀏覽器的設定來自動裝配其網路設定，但是如果遭到網路上的問題時就可能須要更改網路設定。

The AWOS display must be able to access the network to gather data. If a proxy server is used for internet access, the proxy server must be configured in the Network portion of the Java Control Panel. Java will often automatically configure its network settings based on browser settings, but if network problems are encountered the Network settings may need to be changed.

4 AWOS 顯示操作說明(AWOS display Operational Guide)

當第一次使用時，AWOS 會顯示一個視窗詢問你是否要執行 AWOS。這個視窗將會指出 AWOS 已經通過認證為來自可信任的來源。點選”執行(Run)”後，會顯示 AWOS 應用程式之下載過程。AWOS 應用程式會被下載及執行，並顯示其所使用之設定檔。為了 AWOS 顯示可以執行並能從網路上取得資料，必需有上述步驟。

When the AWOS display is first started, a window is shown asking whether you want to run the AWOS display. This window should indicate that the AWOS display has been verified as being from a trusted source (the National Center for Atmospheric Research). Click “Run”, after which a window showing application download progress is shown. The AWOS display application will be downloaded and started, showing a list of configuration files. This step is necessary for the AWOS display to run and access the network for data.

Fig. 4.0-1: Window asking permission to run the display

圖 4.0-1: 詢問是否要執行顯示視窗

在你確定要執行程式後，程式開始下載並要驗證。

After it has been confirmed that you want to run the application, the application is downloaded and verified.

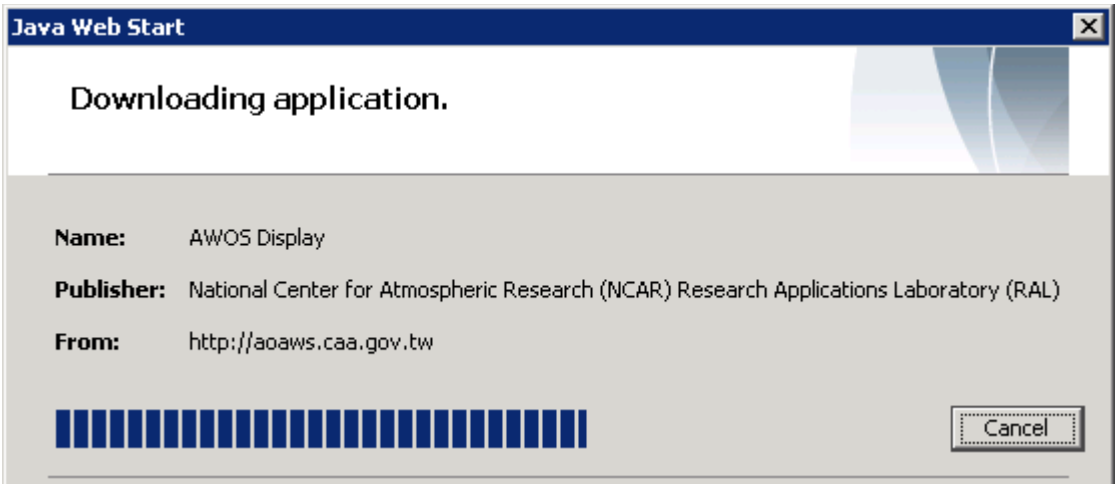

Fig. 4.0-2: Downloading and verifying window

Fig. 4.0-2: 下載及驗證視窗

4.1 AWOS 顯示概論(AWOS display Overview)

AWOS 顯示會呈現來自許多機場的所有 AWOS 感應器之資料。其可以顯示單一 AWOS 感應器的完整資料欄位；亦可顯示來自同一條跑道兩端 AWOS 感應器有關風的資料欄位。

The AWOS display shows data for all the AWOS sensors at several airports. In some cases a single AWOS sensor is shown by itself with the full set of available data fields, and in other cases a pair of AWOS sensors is shown with only wind-related data fields.

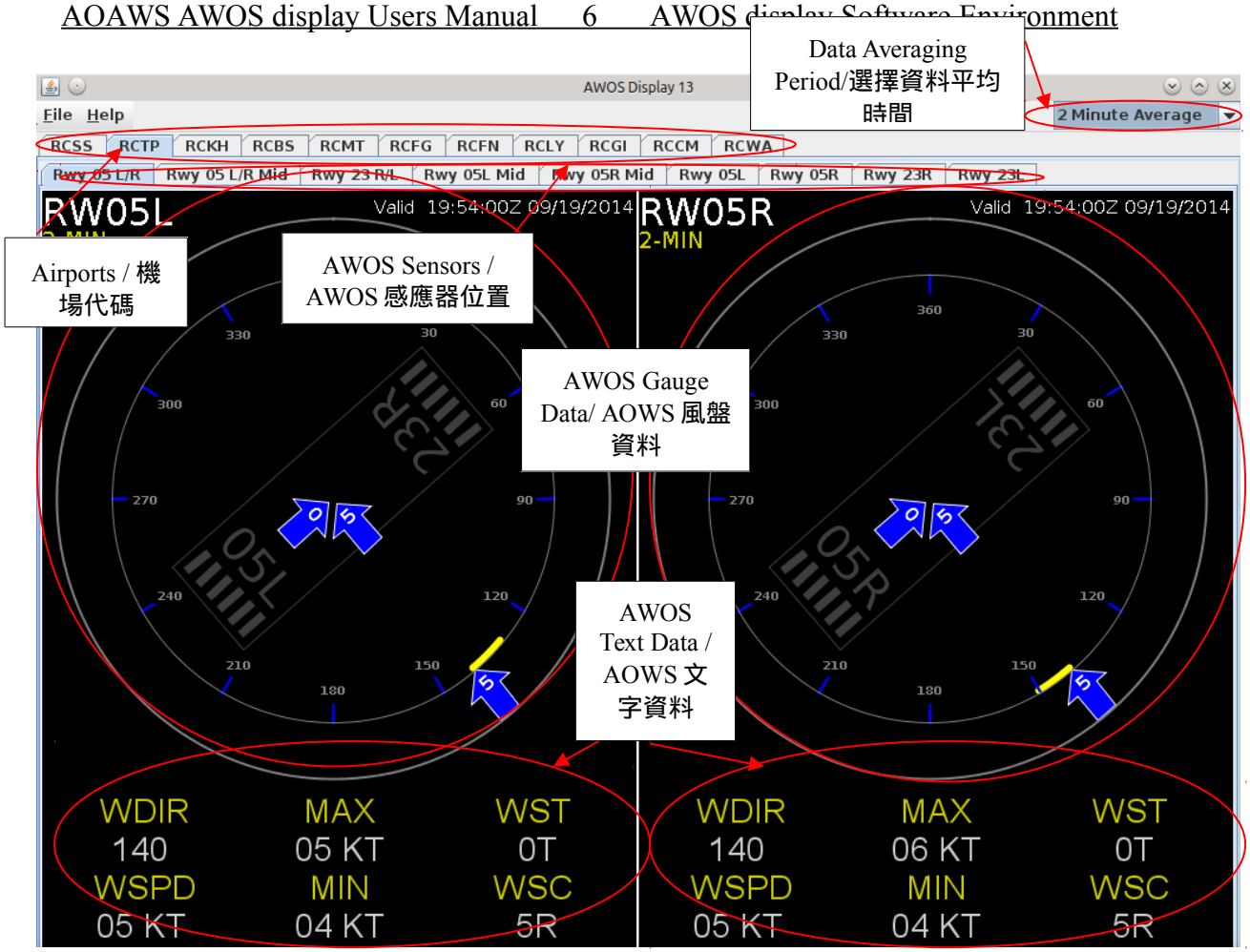

Figure 4.4.1-1: Major AWOS display components (dual AWOS) as a 2-minute average

Figure 4.4.1-1:用 2 分鐘平均所顯示的主要 AWOS 元件 (雙 AWOS)

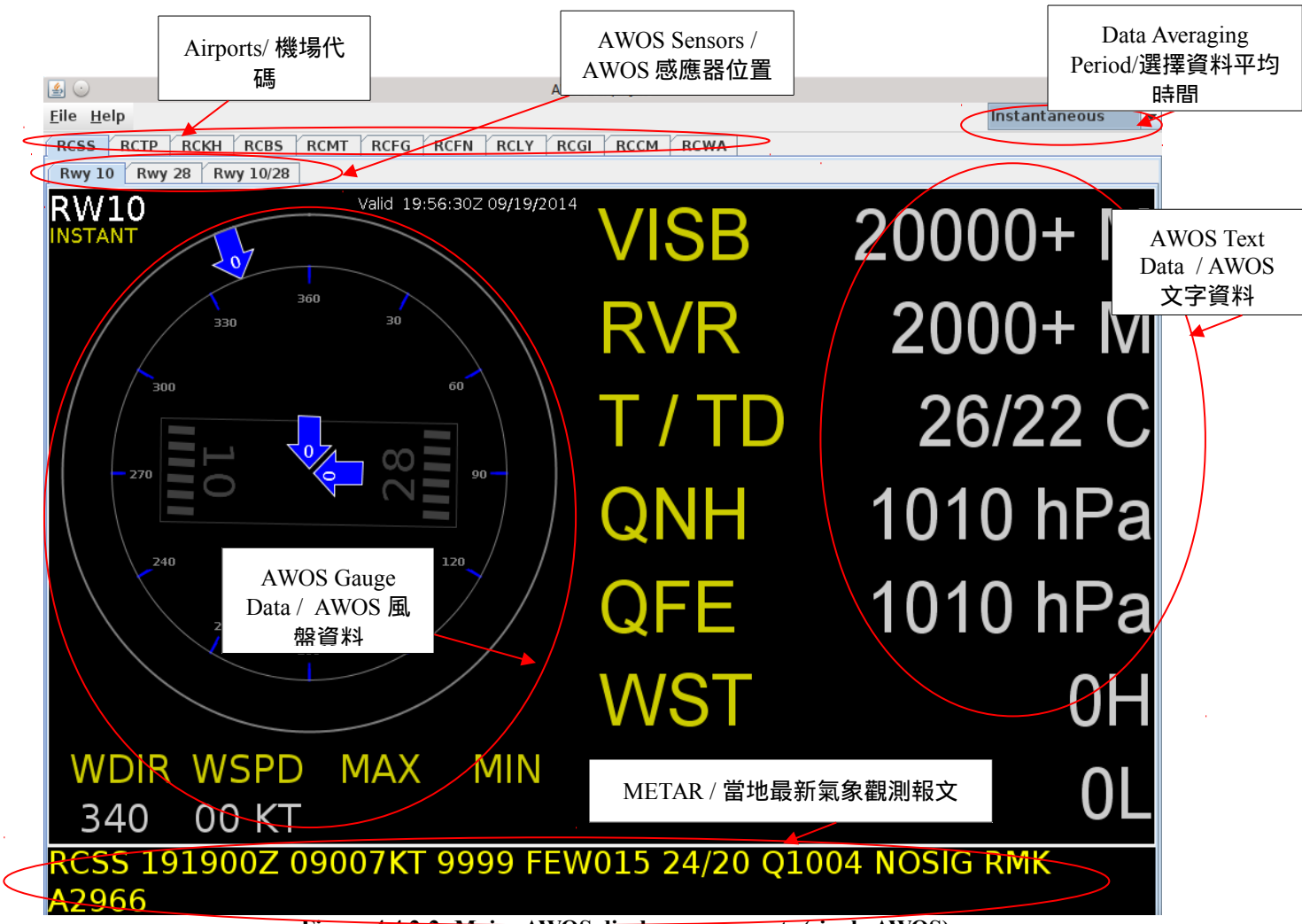

Figure 4.4.2-2: Major AWOS display components (single AWOS)

Figure 4.4.3-2:主要的 AWOS 顯示元件 (單一 AWOS)

機場代碼(Airports)

機場代碼活頁可用以選取要看哪個 AWOS 站。每個機場可瀏覽一或多個的感應器資料，可透過 AWOS 感應器位址活頁選取（下述）

The Airport tabs are used to select which AWOS site is visible. Each airport has one or more sensors that can be viewed, which is selected with the AWOS Sensor tabs (described below).

AWOS 感應器位址(AWOS Sensors)

AWOS 感應器活頁是用來選擇目前所選機場要顯示哪個 AWOS 感應器資料。一般在機場的每條跑道兩端會各有一個 AWOS 感應器。此處 AWOS 感應器顯示頁面會以單一或兩端方式標示。

The AWOS Sensor tabs are used to select which AWOS sensor is visible for the current airport. There is typically an AWOS sensor at each end of each runway at airport locations. In some cases AWOS sensors are listed here in a single-sensor and dual-sensor view.

資料平均時間(Data Averaging Period)

某些 AWOS 感應器所顯示的資料，例如風向，表示的是平均值。資料平均時間選項讓使用者可以選取 AWOS 資料的一種時間長度，以得出平均值。總共有三種資料平均時間：

- 瞬間 – 顯示值所有欄位的最新收集資料。
- 二分鐘平均 –將有二分鐘平均值的資料欄位以二分鐘平均值顯示。沒有二分鐘平均值的資料欄位以則以瞬間值顯示。
- 十分鐘平均 –將有十分鐘平均值的資料欄位以十分鐘平均值顯示。沒有十分鐘平均值的資料欄位以則以瞬間值顯示。

Certain AWOS data are available as averages, such as the wind direction. The Data Averaging Period allows the user to select an averaging period for the AWOS data fields that have averaged data available. The three periods are:

- **Instantaneous** – Show the most recent data collected for all fields
- **2-Minute Average -** Show a 2-minute average of those fields that have a 2-minute average collected. For fields without a 2-minute average, the instant values are shown
- **10-Minute Average** – Show the 10-minute average of all fields that have a 10-minute average collected. For fields without a 10-minute average, the instant values are shown

以下表格會列出哪些欄位有 AWOS 感應器的平均值。

The following table shows which fields have averaged data being collected by the AWOS sensors:

資料欄位 **Data field**	瞬間 **Instantaneous**	有二分鐘平均值 **2-Minute Average Available**	有十分鐘平均值 **10-Minute Average Available**
風向 Wind direction (WDIR)	是(Yes)	是(Yes)	是(Yes)
風速 Wind speed (WSPD)	是(Yes)	是(Yes)	是(Yes)
最大風速 Max Wind Speed (MAX)	是(No)	是(Yes)	是(Yes)
最小風速 Min Wind Speed	是(No)	是(Yes)	是(Yes)

(MIN)			
能見度 Visibility (VISB)	是(Yes)	否(No)	是(Yes)
跑道能見度範圍 Runway Visual Range (RVR)	是(Yes)	否(No)	是(Yes)
溫度與露點 Temperature and Dewpoint (T / TD)	是(Yes) 桃園中間跑道 (RCTP Midfield)	否(No)	否(No)
海平面氣壓 QNH (QNH)	是(Yes)	否(No)	否(No)
當地場面氣壓 (QFE)	是(Yes)	否(No)	否(No)
頂風 / 順風風速 Head/Tail Wind Speed (WST)	是(Yes)	是(Yes)	是(Yes)
側向風速 Cross Wind Speed (WSC)	是(Yes)	是(Yes)	是(Yes)

AWOS 風盤資料(AWOS Gauge Data)

AWOS 風盤資料是將 AWOS 感應器所收集到的資料以圖形方式呈現。那包含了利用二分鐘與十分鐘平均值的風向與風速描述。

The AWOS Gauge is a graphical representation of data collected from the AWOS sensors. It includes depictions of wind direction and wind speed for the currently-selected data averaging period (instant, 2-minute, 10-minute).

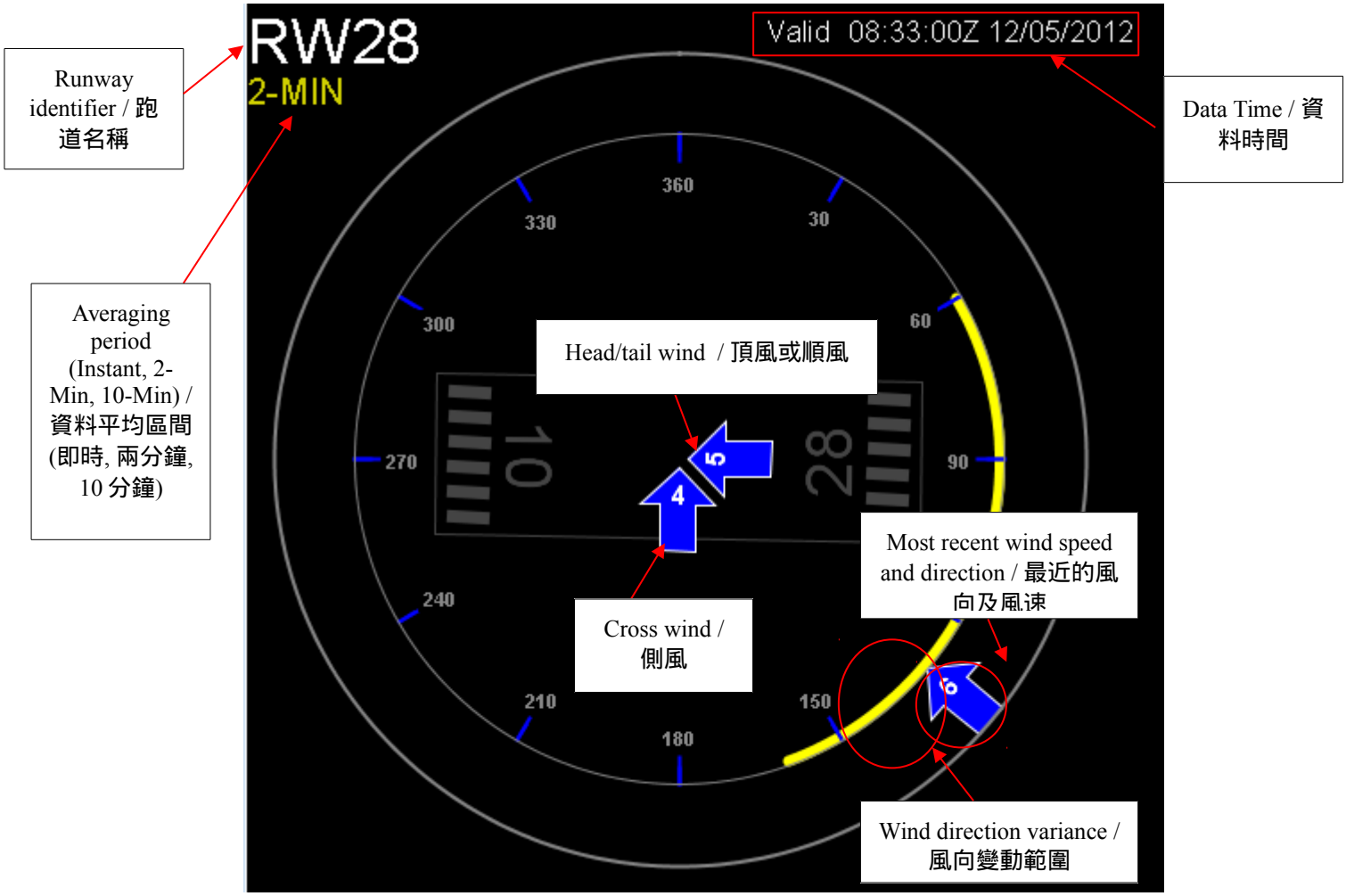

Figure 4.5-1 - AWOS Gauge

Figure 4.5-1 - AWOS 風盤

每個 AWOS 感應器有一個對應的風盤顯示畫面（如上圖）。風盤顯示畫面包含以下的內容：

- 風向
- 風速
- 跑道資料，含跑道名稱及方向
- 側風及頂風。這是將原始風向依跑道分解成側風及頂風
- 風向變動（如平均資料期間，對非瞬間風）
- 資料時間 - AOWS 資料傳送時間。備註：此時間並非由 AWOS 系統所記錄之時間，而是 AOAWS 接收該資料的時間。

Each AWOS sensor has an associated gauge rendering (see figure above). This element of the display includes several basic elements:

- Wind direction

- Wind speed
- Runway information, including runway name and direction.
- Cross wind/ head wind. This is the raw wind direction broken into cross and head wind components relative to the runway
- Wind direction variance (for averaged data periods, i.e. non-instant winds)
- Data time – when the AWOS observation was ingested by the AOAWS system. **Note:** this is not the time that the AWOS sensor recorded the data, but is the time at which the AOAWS system received the data

AWOS 文字資料(AWOS Text Data)

AWOS 文字資料部份將 AWOS 資料以文字格式呈現。對照於風盤的表示方式，這樣可以一次就讀到大量資料。

The AWOS text data components report AWOS information in a textual form. This complements the gauge form by providing a large readable value at a glance.

安裝在不同地方的 AWOS 感應器，其功能可能不一樣。例如，不是每個感應器都會收集並輸出溫度及露點資料。當這個感應器未提供相關資料時，該欄就會顯示“-“。

Different AWOS sensors are equipped with different sensors. For example, not all AWOS sensors collect or report temperature and dewpoint data fields. When a sensor does not report a data field, it is shown as blank or as a dash (“-“).

Figure 4.6-1 - AWOS Weather Text

Figure 4.6-1 - AWOS 氣象數值

Figure 4.6-2 - AWOS Brief Winds Text

Figure 4.6-2 – AWOS 簡述風的數值

Figure 4.6-3 - AWOS Full Winds Text

Figure 4.6-3 - AWOS 完整敘述風的數值

除了幾種特定的例外，幾乎所有資料欄位的右側都會標示出單位。對 WDIR(風向),單位是經過磁偏角修正後與真北方位之所夾度數。對 WST(頂風／順風)，若風速相對於跑道是頂風則標示 H，相對於跑道是順風則標示 T。對 WSC(側風)，若風速相對於跑道是從右側來的則標示 R，若是從左側來的則標示 L。(備註：以上資訊皆由當地機場設置之跑道方位計算而得。)

With a couple exceptions, almost all data fields have associated units that are shown to the right of the data value. In the case of WDIR (wind direction) the units are degrees magnetic. In the case of WST (tail/head winds), the value is “H” if it is a head wind relative to the runway, and a “T” if the winds are a tail wind relative to the runway. In the case of WSC (cross wind speed) the value is “R” if the wind speed is blowing from the right relative to the runway, and “L” if the wind speed is blowing from the left relative to the runway. (Note: The above information is derived base on the relative runway position at each local airport.)

單位符號 **Unit symbol**	**說明** **Description**
KT	節(Knots). 用於風速測量(Used for wind speed measurements)
M	公尺(Meters). 用於高度及距離(Used for height and distance measurements)
hPa	百帕(Hectopascal). 用於壓力測量(Used for pressure measurements)
C	攝氏(Degrees Celsius). 用於溫度測量(Used for temperature measurements)

氣象觀測報文(METAR)

在底端的 METAR 部份顯示在這機場的最新原始 METAR 報文。METAR 報文只有在單一感應器資料畫面才會顯示出來。

The METAR component at the bottom shows the most recent raw METAR for the current airport. METAR text is only shown with the single-sensor configuration.


RCSS 111800Z 10008KT 8000 -DZ FEW008 SCT018 BKN030 23/22 Q1016 NOSIG

5 AWOS Data Availability

本節介紹顯示系統如何警告用戶觀測資料更新有問題。一共有兩種錯誤狀態顯示方式：1）資料延遲；2）與資料伺服器的通信錯誤。通信錯誤也可被解釋為“資料輸入問題(Data Feed Problem)”。當資料延遲的情況下，系統會在有問題的資料顯示區域上顯示一個紅色的”X“，如圖 5.0-1。當顯示系統和資料伺服器之間的通信發生問題時，則會在受影響的顯示區域上出現粉紅色的'X'的，如圖 5.0-2。

This section covers how the display warns users that there is problem updating the observations. There are two error states that display recognizes: 1) late data; 2) communication error with the data server. The communication error is also referred to a ‘Data Feed Problem.’ In the case of late data a red ‘X’ will appear over the region of the display with late data. See Figure 5.0-1 for an example. In the case of a communication problem between the display and the data server a pink ‘X’ will appear over the region of the display affected. See Figure 5.0-2 for an example.

Fig. 5.0-1: Example of late METAR data on the display

圖 5.0-1: METAR 資料延遲的顯示範例

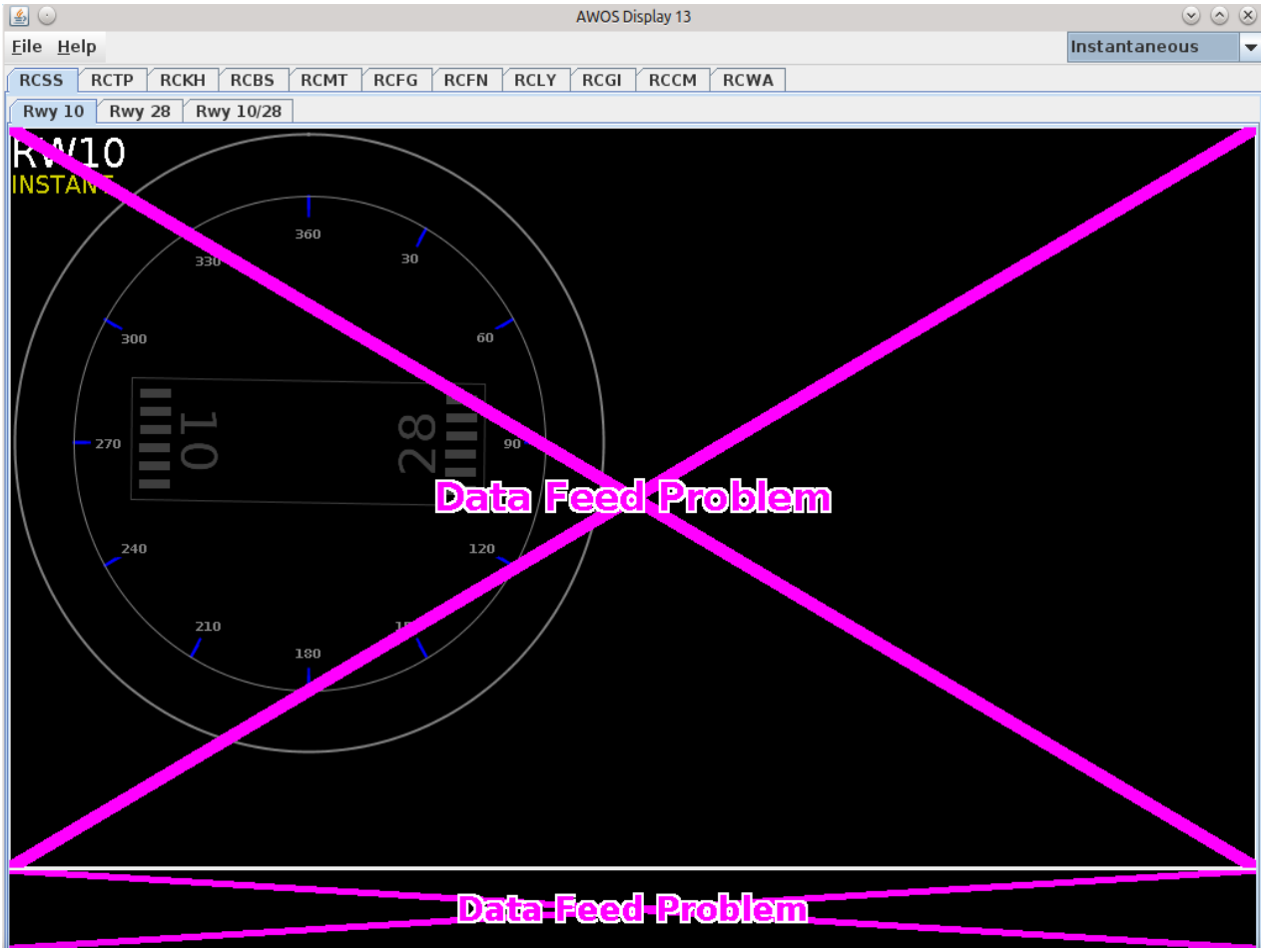

Fig. 5.0-2: Example of a communication error on the display

圖 5.0-2: 通信錯誤的顯示範例

資料延遲的原因，可歸因於觀測資料提供者或 AOAWS 系統所造成的延遲時間。

造成資料伺服器通信錯誤的原因大多可歸因為顯示電腦與資料伺服器間的網絡連接問題。

AWOS 顯示系統之資料可用性最新故障排除之相關資訊可以在下列網頁中找到，http://aoaws.caa.gov.tw/htdocs/projects/aoaws/awos/。

The causes of late data can be attributed to latencies at the observation provider or from with the AOAWS system.

The causes of a data server communication error can mostly be attributed to network connection be the computer hosting the display and the data server.

Up to date troubleshooting guidance related to data availability for the AWOS display can be found at http://aoaws.caa.gov.tw/htdocs/projects/aoaws/awos/.