

solutions for the real world

Integrated Meteorological System

Automated Weather Observation System, Application Software

Version: 4.1

Reference Guide

February 2025

www.microstep-mis.com



MicroStep - MIS



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Authors

Editorial team: Juraj Bartok, Martin Gažák, Ivana Beláňová, Monika Kľocová, Peter Kováč, Tomáš Plank, Patrik Synek, Svetlana Manzhulei, MicroStep-MIS

Address

MicroStep-MIS
Monitoring and Information Systems
Čavojského 1
84104 Bratislava 4
Slovakia
Tel: +421 2 602 00 100
Fax: +421 2 602 00 180
info@microstep-mis.com

MicroStep-MIS develops, manufactures and markets monitoring and information systems. The key fields of our activities are meteorology, aviation, environmental sciences, seismology, power engineering, civil defense but also information systems in tourism.

MicroStep-MIS operates worldwide. Our core customer groups are airports, meteorological and seismological institutes, environmental authorities, industry, power stations and electricity distribution companies.

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About This Reference

Integrated Meteorological System is MicroStep-MIS open meteorological system, suitable for building of national meteorological networks, airport weather systems, and meteorological stations for various purposes.

IMS AWOS – as a special configuration of more complex IMS – is automated system for measuring, collecting, storing and disseminating of the weather data to provide necessary information to meteorologists, pilots and flight dispatchers in order to prepare reliable weather forecasts, to plan flight routes and to provide safe air traffic.

This user guide describes Integrated Meteorological System (IMS) Application Software designed for airport weather stations. It is intended primarily for observers, ATC operators and IMS AWOS administrators. There is described how to read the measured and computed data, how to put observation into the system, how to access and retrieve the data from files, how to display the data in charts, and other necessary tasks to use and keep the system functioning properly from the meteorological point of view.

The files, variables, values used in the pictures and in the examples are taken from various installations of IMS (e.g. station location names, sensors number and labels, names of communication channels etc...). They are presented here for the demonstration purposes only and are neither the default values, nor values for a particular IMS installation.

Typographical Conventions

Throughout this guide, several typographical conventions are used to help reader to follow instructions and identify the important information.

The special note for the reader, warning or example:

Note: *If the observed value is between two of the heights as given in the table, the code figure for the lower height shall be reported, except for code figures 90–99; in this decile, a value exactly equal to one of the heights at the ends of the ranges shall be coded in the higher range, e.g. a height of 600 m is reported by code figure 95.*

Hyperlinks and references are underlined or [braced]:

www.MicroStep-MIS.com , for further information, see [Chapter 2](#) or [1].

Introduction

IMS is a comprehensive software system designed to serve and support all processes related to the work of a professional meteorological, synoptic, aviation or climatological station. These processes include: electronic sensor measurement, data transfer, processing, presentation, archiving, computer aided creation of standard WMO¹ reports and their sending to GTS² or another data centers.

IMS Automated Weather Observation System (AWOS) is an airport weather observing system for regional, national and international airports. The IMS AWOS measures, processes, stores, presents and communicates all meteorological data at the airport: measurements produced by variety of meteorological sensors, manual observations, WMO codes received from GTS and AFTN. It provides the weather data to observers, air traffic control, pilots and other users in form of real-time weather displays, graphs, reports, voice reports, WMO and national codes and specific alarms for users.

Interfacing upper air system, low level wind-shear alert system and radars the IMS integrates the essential weather information at the airport. The IMS AWOS conforms to the all ICAO and WMO recommendations regarding the measurements and reporting.

The configuration and structure of a respective AWOS depends on the size, and category of the individual airport up to ICAO category CAT III. The modular architecture allows to expand from single Aviation Weather Display with basic set of sensors up to comprehensive systems for multi-runway airport connected to GTS and AFTN networks including a dual hot fail-over Central System, several Observer's Workstations, displays and terminals, briefings and ATIS/VOLMET services.

Measurement and Data Processing

The data measured by IMS AWOS system come from multiple sensors and data loggers. The detailed description of the field measurement system is not the subject of this reference.

The IMS AWOS system uses the following abstraction:

DCP

The Data Collection Platform (DCP) is a common term for any device, which communicates with the IMS server over TCP/IP. The DCP can be a single intelligent sensor with the TCP/IP output (or serial line output converted to TCP socket) or a data logger with multiple sensors connected:

- *forward-scatter* for the measurement of visibility, computation of RVR, detection of weather phenomena,
- *ceilometer* for cloud base assessment,
- *automatic weather station* with wind, temperature, relative humidity and pressure sensor,
- *intelligent pressure sensor*,
- etc.

The DCP-s location usually follows the ICAO sensor positioning recommendations contained in ICAO Annex 3 and other relevant documents. The IMS AWOS system communicates with multiple DCP-s and obtains the raw data from them.

Standard IMS user can view the raw data coming from the respective DCP using Maintenance module (see Chapter **Error! Reference source not found.**).

Reporting site

The measured, computed and processed data are reported to the user as representative for various reporting sites at the airport.

¹ World Meteorological Organization defines reports in Manual on Codes.

² Global Telecommunication System

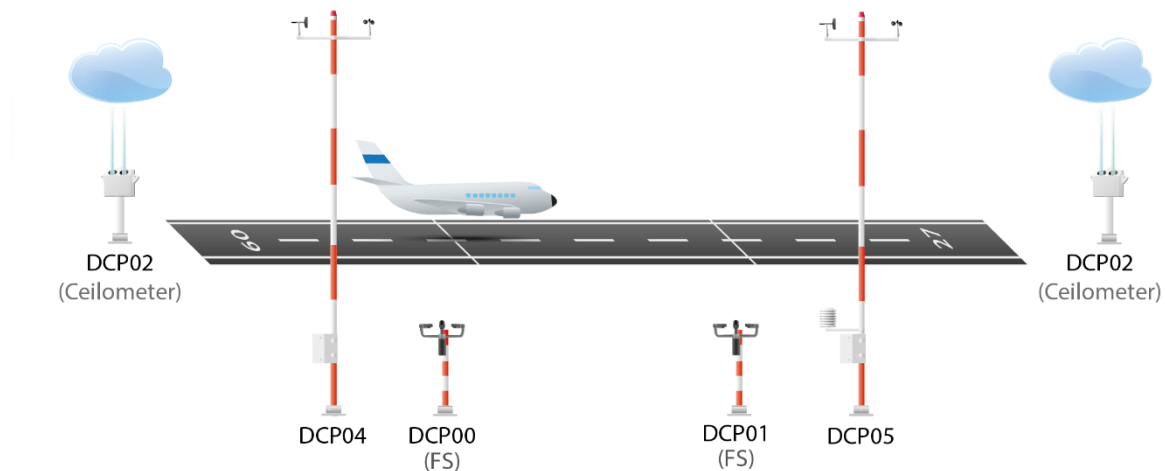
These reporting sites may include:

- MET Garden (**MET**) – all parameters representative for the airport (wind, temperature, relative humidity, QNH, etc.) to be disseminated beyond the airport (also in the form of METAR/SPECI, SYNOP and other WMO codes)
- First runway of the airport (**RWY0**) – wind, temperature, relative humidity, QFE, cloud base
 - touchdown zone of the 1st runway (RWY0 TDZ) – reporting of RVR
 - midpoint of the 1st runway (RWY0 MID) – reporting of RVR
 - midpoint 2 of the 1st runway (RWY0 MID2) – reporting of RVR (CAT III airports)
 - end zone of the 1st runway (RWY0 END) – reporting of RVR (CAT III airports)
- Second runway of the airport (**RWY1**)
 - touchdown zone of the 2nd runway (RWY1 TDZ) – reporting of RVR
 - midpoint of the 2nd runway (RWY1 MID) – reporting of RVR
 - midpoint 2 of the 2nd runway (RWY1 MID2) – reporting of RVR (CAT III airports)
 - end zone of the 2nd runway (RWY1 END) – reporting of RVR (CAT III airports)

Using modules *Archive*, *Graphical Data* and real-time screens/displays (*Current*, *Observed*, *Synoptic*, *Aviation*, *RVR*, *Cloud Base*), the IMS user can view the processed data, representative for the reporting sites (each display shows the data from the specific sites).

The IMS AWOS system is very flexible in configuration of DCP to reporting sites data flows, i.e. data from which DCP-s should be used for reporting at the respective sites. This allows configuring the data processing for the locations with non-standard sensor placement or configuring features like hot backup of the sensors. The details on mapping raw data from DCP-s to reporting sites are described in the Chapter **Error! Reference source not found.**

Example of the IMS AWOS installation:



Comments to the given example: **IMS Server** collects data from DCP00 to DCP05 (**DCP** = “data collection platform”). DCP-s are physically devices that communicate with the server:

DCP0 = Forward Scatter (Visibility and RVR)

DCP1 = Forward Scatter (Visibility and RVR)

DCP2 = Ceilometer (Cloud Base)

DCP3 = Ceilometer (Cloud Base)

DCP4 = Data logger with sensors (Wind Direction and Speed)

DCP5 = Data logger with sensors (Wind Direction and Speed, Pressure, Temperature, Humidity)

Reporting sites are logical names used in IMS assigned to DCP-s. To each DCP, several logical names can be assigned. Data on user screens are presented using Reporting sites names:

| DCP | Reporting site(s): |
|-------|--------------------------|
| DCP00 | RWY 09 TDZ RWY 27 END |
| DCP01 | RWY 09 END RWY 27 TDZ |
| DCP02 | RWY 09 |
| DCP03 | RWY 27 |
| DCP04 | RWY 09 |
| DCP05 | RWY 27 |

IMS Servers and Computers

IMS Airport Weather Observing System has the client-server architecture and usually consists of multiple computers:

- IMS Central Computer – single or dual hot failover server:
 - interfaces field measurement system and communication channels;
 - performs the computations and data processing and communicates the data with data exchange networks (GTS, AFTN, etc.);
 - serves as the web server for thick clients.
- IMS client computers.

The IMS client computers are running just web browser and/or IMS Alerts application (see [Section 0](#)) or clients running properly configured instance of IMS software.

The client workstations include (depending on IMS system configuration):

- IMS Observer/Forecaster workstation – special workstation for MET observers.
- IMS Aviation Weather Displays – workstations deployed at ATC towers.
- IMS Briefing – workstations deployed at Pilot MET Briefings

User Access and Permissions

The user interface of IMS system is provided through the application server integrated within the IMS software. The UI is based on the Java servlet technology³.

IMS 4.x uses The Apache Tomcat 5.5 Servlet/JSP Container as an application server. Apache Tomcat version 5.5 implements the Servlet 2.4 and JavaServer Pages 2.0 specifications from the Java Community Process, and includes many additional features that make it a useful platform for developing and deploying web applications and web services.

The IMS system contains resources that can be accessed by many users. Although the system is primarily dedicated to be installed within protected closed network, depending on the customer operation and security policy, the system can be accessed also from unprotected, open networks such as the Internet. In addition, different IMS users (MET observers, system administrators, ATC operators) are supposed to access only the limited subsets of modules.

Ready for such an environment, the Tomcat servlet container has mechanisms and infrastructure for meeting these requirements that share some of the following characteristics:

- **Authentication:** The means by which communicating entities prove to one another that they are acting on behalf of specific identities that are authorized for access.
- **Access control for resources:** The means by which interactions with resources are limited to collections of users or programs for the purpose of enforcing integrity, confidentiality, or availability constraints.
- **Data Integrity:** The means used to prove that information has not been modified by a third party while in transit.

³ Servlets are the Java platform technology of choice for extending and enhancing Web servers. Servlets provide a component-based, platform-independent method for building Web-based applications.

- **Confidentiality or Data Privacy:** The means used to ensure that information is made available only to users who are authorized to access it.

The Apache Tomcat (and consequently IMS) uses **role based lazy authentication** policy:

- The user starts working with IMS without the need to login/logout and all unprotected application modules, screens etc. are immediately available for the user.
- As soon as the user requires access to the protected resource (application, module, screen, etc.), the user is prompted to log in using his unique login name (preferably based on the real name of the person) and password.

IMS systems offer two levels of security policy:

- Basic security model based on the Tomcat roles;
- Fine-grained security.

The details on security configuration can be found in Subsection **Error! Reference source not found.**.

Basic Security Model

After the user logs in the roles are assigned to the user according to the information stored in the database. Following roles are recognized by IMS system:

- **operator** – IMS system operator (i.e. MET observer) with right to create METARs etc.
- **atc** – ATC controller (Remote Operator Position).
- **admin** – system administrator; super-user; full access/permissions to the system

Multiple roles can be assigned to the single user, so that one person under his/her single login name may have all three roles assigned.

The access to the resources is granted to roles, not directly to users. If a user is supposed to have access to the resource accessible to role “admin”, then his/her account must have the role “admin” assigned.

The details on user management can be found in Chapter **Error! Reference source not found.**.

Since login (including) the user interaction with the system is redirected to the secure channel (https protocol), therefore authentication, data integrity and confidentiality is ensured.

Note: *The user accounts and process of login created within the IMS system serves only for the purpose of the access to the specific modules of the IMS application. The accounts have no relation to the operating system (Windows or Linux) user accounts on the computer/server, where the IMS system is running, i.e. even the user with the **admin** role in the IMS system cannot log directly on the IMS server/computer console, if he does not have the operating system account on this computer.*

If the security policy based on this basic security model is established, the user rights for respective roles are listed in the **Error! Reference source not found.**.

Fine Grained Security Model

The fine grained security is still based on username/role model, however the IMS system defines the set of named “permissions” corresponding to some IMS system operations (for example permission **SystemRestart** for restarting the IMS through web interface), which are granted to user and roles. This allows tuning the user rights according to the security policy adopted at the particular airport.

For more information on the fine grained security configuration see Subsection **Error! Reference source not found.**.

This reference guide lists the fine grained security model permissions at the respective chapters in the form of Note or Warning of following form:

Note: *Only logged-in user with granted permission **SystemRestart** can restart the IMS AWOS software.*




IMS Alerts

IMS Alerts is a Java Web Start application running on the IMS servers as well as IMS client computers and delivering messages generated/published at IMS server to the user at the particular computer.

Note: *In case the IMS Alerts application is not running on the particular computers, IMS alert messages are not displayed at this particular computer.*


IMS Alerts application usually runs hidden in the background only with small icon visible in the system tray and queries the server for new messages every 3 seconds. New messages are stored in the local queue.


Icons shown in the system tray:


| | |
|--|---|
|  yellow | IMS server(s) is (are) active, no messages |
|  red | IMS server(s) is (are) active, message is displayed |
|  grey | IMS server(s) is (are) not responding |

Retrieved messages are being shown in the dialog messages one by one.

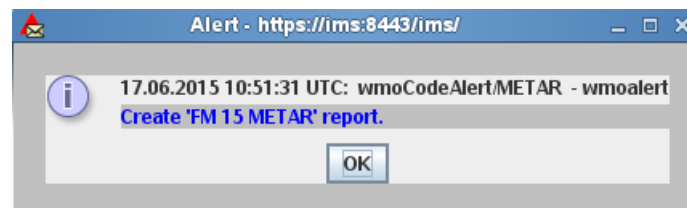
Every alert message can be either *Note*, *Warning* or *Error*. Each kind has its own visual representation (may differ at different platforms):

Note: 

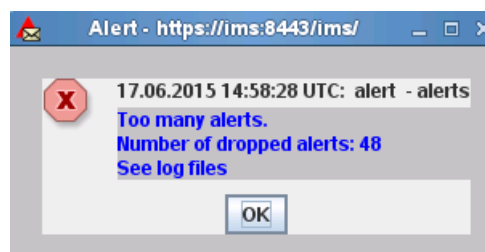
Warning: 

Error: 

Some alert messages are displayed in the form of URL link (the text of the alert is blue) and in case the user clicks on the link, the browser opens automatically with the web page specified in the alert URL link (it is necessary to have valid path to browser in Alerts Customization, see [Subsection 0](#)):



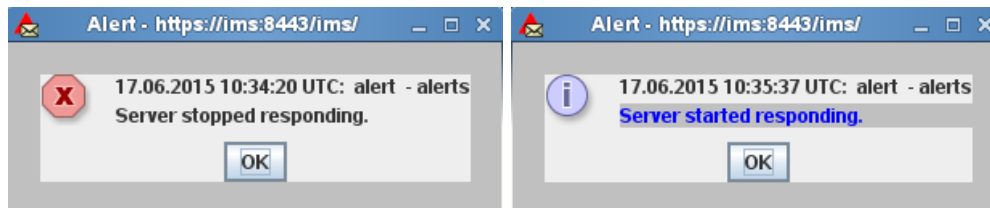
When more than one message waits in the local queue, the application chooses one of them according to rules set in the configuration, ordered chronologically ascending or descending (see IMS Alerts Customization [Subsection 0](#)). If more than the configured number of alert messages waits in the local queue, the rest of messages that exceed the limit are replaced by one cumulative error message. User can then find dropped messages in the log files at the server (see [Section Error! Reference source not found.](#)).



The alerts are generated by the IMS server modules. Each alert is of a particular type with symbolic name. In the next chapters of this guide the alerts generated by the module described in the particular chapter are listed in the text in the following form:

Note: Any change of the ATS information is alerted to the user as **infoFromATS** alert. See the Subsection **Error! Reference source not found.** for the alerts configuration.

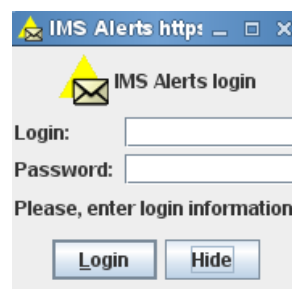
Note: When the server stops responding to query requests, the error alert **alertsServerDown** with text message **Server stopped responding** is shown. After the connection to the server is renewed, the note alert **alertsServerUp** note with text message **Server started responding** is generated.



Note: The first message shown to user after the application starts, is locally generated note alert **alertStarted** with text message **Alerts started**.

IMS Alerts Customization

The user can customize the behavior in the configuration dialog. Click on the application icon in the system tray to open this dialog. After the user clicks on the icon, login screen appears:



The user must perform login in order to view/customize IMS Alerts configuration.

Note: The login and password are verified at the IMS server. In case the server is down or inaccessible, the login fails and the user cannot view/customize IMS Alerts configuration. Note, that IMS Alerts application does not display any alerts in this case simply because the IMS server as source of alerts cannot be accessed.

The IMS Alerts panel appears.

Note: Only logged-in user with granted permission **imsAlertsConfiguration** can change IMS Alerts application settings and/or terminate the application. The user without this permission can only view settings and close the window (which does not stop IMS Alerts application).

The changes take effect immediately and are saved or canceled by buttons "OK" and "Cancel".

Pane Roles

Settings about the user.

Language – language of Alerts application (English by default). Changing of the language can help the user to configure Alerts application, however the alerts themselves will be displayed in IMS server default language.

User name – Name shown in the Alerts confirmation log (see [Section **Error! Reference source not found.**](#)).

Active roles – Coma separated list of active roles for this instance of IMS Alerts application.

Receive alerts sent to everybody:

- If this checkbox is checked, this instance of IMS Alerts application will display:
 - o All alerts without any role specified.
 - o Alerts with at least one role matching the Active roles of this application.
- If this checkbox is unchecked, this instance of IMS Alerts application will display only the alerts with at least one role matching the Active roles of this application.

For more information about alerts and roles see [Subsection **Error! Reference source not found.**](#).

Pane Message buffer

Policy for the local messages queue. Specifies which message has to be shown when more than one message waits in the queue and which message has to be dropped when the local queue is full.

Ordering - Which message has greater priority: newer or older?

Use priority - should the priority of the message be considered? If disabled, messages are sorted only by time.

Max. number of waiting messages - Maximal size of the local queue. When a message is put to the queue and the queue's size exceeds the configured limit, the least important message is dropped. Number of dropped messages is reported by one cumulative error message.

Pane Audio

Options for audio alarms.

Play count – How many times should the audio alert be repeated? Option **"off"** cancels all sounds, option **"1x"** plays one alert, option **"5x"** plays five alerts, option **"until confirmed"** plays alerts until the message is confirmed by user, but maximally 5 minutes. Option **"server configured"** plays alert according to the configuration parameter **"Alert sound duration"** of the **Alerts Configuration** (thus the audio signal duration can be configured from the server).

Play for – Should the audio alarm be used for all messages? Otherwise only alerts specified as audio alerts at server generate sounds.

Output – Should the audio alert be played on the sound card or on the PC speaker?

Note: *You can test the audio output by generating test message.*

Pane Alert Audio Reminder

Options for setting up alert reminder. When an alert is reminded the alert sound is played repeatedly for specified number of times in specified time intervals.

Reminder Mode – if **"Disabled"**, reminder is turned off; if **"Enabled"**, alerts are reminded according to values of **Reminder Period** and **Reminder Repeats**; if **"According to ATIS mode"**, **Reminder Period** and **Reminder repeats** settings are applied when in IMS ATIS is in *Interactive* or *Manual* mode and **Reminder Period #2** and **Reminder Repeats #2** settings are applied when IMS ATIS is in *Automatic* mode.

Reminder Period – a time period in seconds between two consecutive alert reminders.

Reminder Repeats – total count of reminds of each alert. If set to a finite value, reminder turns off after playing the alert sound for given number of times.

Reminder Period #2 – and alternative **Reminder Period** applied when **Reminder Mode** is set to **"According to ATIS mode"** and the IMS ATIS is in *Automatic mode*.

Reminder Repeats #2 - and alternative **Reminder Repeats** applied when **Reminder Mode** is set to **"According to ATIS mode"** and the IMS ATIS is in *Automatic mode*.

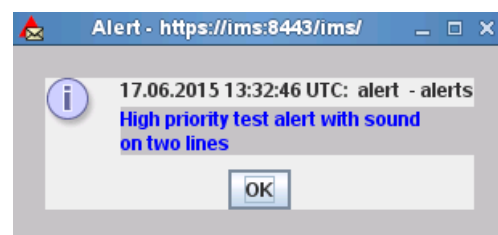
Pane Appearance

Pane Appearance allows selecting the position of the popup windows with alerts – the user can select one of center, top left, top right, bottom left, bottom right positions.

Pane Other

Pane Other allows specifying the path to the Firefox browser on the local file system.

Button "Create test message" generates test note as if it came from the server. Generated message has very high priority and audio alert with sound selected by the user.



Note: *The sounds are assigned to alerts other than testing alert by server. Button "Create test message" allows only to replay one of the available sounds, not selecting the sounds for particular alert type.*

Buttons

Terminate – After confirming the warning, the Alerts application terminates and disappears from the system tray.

OK – Saves new configuration to the disk and closes the dialog.

Cancel – Restores the configuration to the state before the dialog was opened and closes the dialog.

Logout – logout from IMS Alerts application, login will be required in case the user decides to enter the application once more. **It is recommended to logout, since logout does not prevent confirming of the alerts, but prevents unauthorized changes in IMS Alerts application settings.**

IMS AWOS User Interface

The IMS AWOS User Interface is built using industry proven standard: HTTP/HTTPS protocol, HTML and XML formats, Javascript and AJAX technologies.

IMS server software runs on the IMS Central Computer and on the thick workstations. The user can access the IMS system through web-browser in the same way as the web portals. The IMS AWOS user interface is inherently ready for access over LAN and/or WAN/VPN.

By default the desktop of the IMS computer is pre-configured to show the IMS main screen after the web-browser is started.

Note: *The IMS server software runs independently of web browsers and continues running even in case there is no web browser running. The server software serves multiple clients concurrently.*

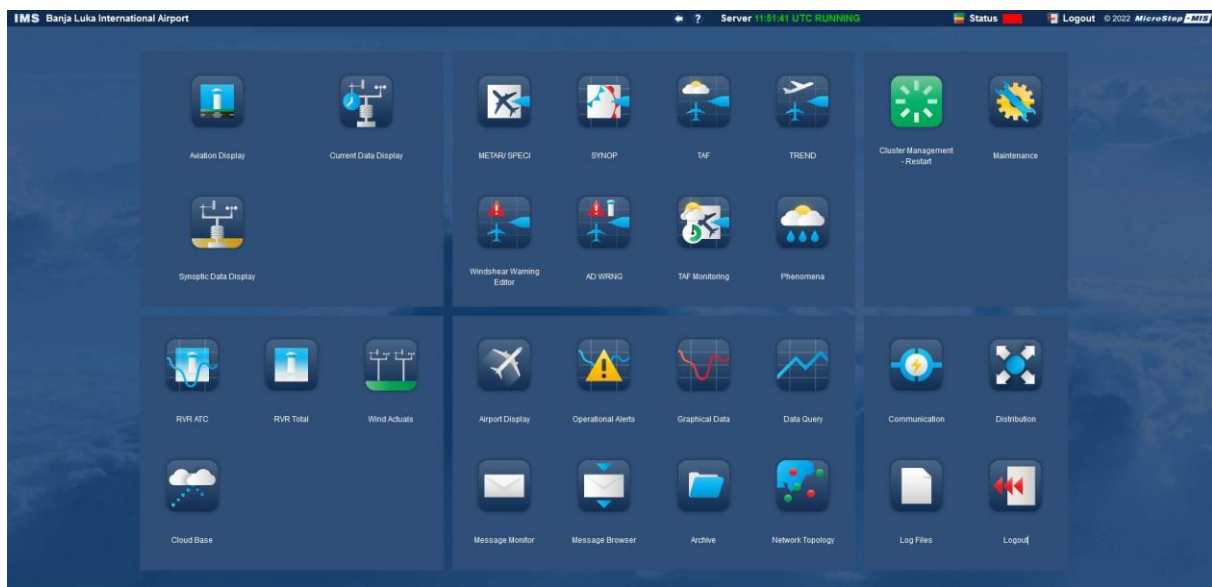
IMS Main Menu

IMS server software runs on the IMS Central Computer and on the thick workstations. The user accesses the IMS system through web-browser. The IMS main screen appears after the web-browser is started.








Note: *The IMS server software runs independently of web browsers and continues running even in case there is no web browser running. The server software serves multiple clients concurrently.*

The layout of IMS main menu depends on user's permissions and configuration. All modules of IMS software are accessible through icons. Some icons may be dimmed for currently logged user, which means the user is not permitted to enter these particular modules.



The top and bottom bar contain useful information:

- UTC time of local computer where browser is running is displayed on the right side of the bottom bar line.
- IMS Server time (UTC), i.e. time of the computer where IMS is running, is displayed in the center of the top bar line.
- Actual status of IMS is shown on the top bar line next to the Server time – see **Chapter Error! Reference source not found.** for details.
- Clicking on permanently available icons  and  on the top bar line or icon  on the bottom bar line, new window with possibility to login to / logout from IMS System opens.
- Copyright of MicroStep-MIS is displayed on the right top corner of the main screen.
- IMS software version is displayed in the bottom left corner (4.1 BA 20231108).
- Emergency contact information (if configured, see **Subsection Error! Reference source not found.**) can be displayed after clicking on the icon  or link **Contact us**.
- Visualization of the IMS can be changed clicking on  **Scheme** dropdown button on the bottom bar line. Default bluish style can be changed to Gray or Black style.
- Depending on Security Configuration (**Subsection Error! Reference source not found.**) for users with sufficient privileges top bar line contains also status for monitoring functionality of system – colored rectangle corresponds with the system status monitored in more detail via **Status Screen** (**Section Error! Reference source not found.**).

For return into IMS main menu, use left arrow (◀) control button, and for help click on help button (?):



Modules in IMS AWOS

SUMMARY DISPLAYS:

Aviation Display – see [Chapter 0](#)

Current Data Display – see [Chapter 0](#)

Synoptic Data Display – see [Chapter 0](#)

Airport Display – see [Chapter 0](#)

SENSOR DISPLAYS:

RVR Total Display – see [Chapter 0](#)

RVR ATC Display – see [Chapter 0](#)

Cloud Base – see [Chapter 0](#)

Wind Actuals – see [Chapter 0](#)

MESSAGE TEMPLATE:

METAR / SPECI – see [Section **Error! Reference source not found.**](#)

TREND – see [Section **Error! Reference source not found.**](#)

SYNOP – see [Section **Error! Reference source not found.**](#)

TAF – see [Section **Error! Reference source not found.**](#)

Windshear Warning Editor – see [Section **Error! Reference source not found.**](#)

Aerodrome Warning Editor – see [Section 12.9](#)

DATA AND MESSAGE VIEWERS:

Phenomena – see [Chapter 0](#)

TAF Monitoring – see [Chapter **Error! Reference source not found.**](#)

Operational Alerts – see [Chapter **Error! Reference source not found.**](#)

Graphical Data – see [Chapter **Error! Reference source not found.**](#)

Archive – see [Chapter **Error! Reference source not found.**](#)

Data Query – see [Chapter **Error! Reference source not found.**](#)

Message Browser – see [Chapter **Error! Reference source not found.**](#)

Message Monitor – see [Chapter **Error! Reference source not found.**](#)

MANAGEMENT:

Cluster Management - Restart – see [Chapter **Error! Reference source not found.**](#)

Maintenance – see [Chapter **Error! Reference source not found.**](#)

MAINTENANCE:

Network Topology – see [Chapter 10](#)

Communication – see [Chapter **Error! Reference source not found.**](#)

Distribution – see [Chapter **Error! Reference source not found.**](#)

IMS Log files – see [Chapter **Error! Reference source not found.**](#)

Login/Logout – see [Sections **Error! Reference source not found.** and **Error! Reference source not found.**](#)



Whenever browsing through IMS modules, click on IMS icon placed in the upper-left corner to return into IMS main screen.

Hot keys

General:

F1 = Help

Alt + → or **Backspace** = Go Back (browsing); delete character to the left (in a field)

Templates hot keys:

Tab = Forward – skip to the following item (field)

Shift + Tab = Back - skip to the previous item (field)

Enter = Confirm value in a field

F8 = Correct

F9 = Save

F12 = Save & Send or Code

Since IMS functions are accessible from web-browser, use **Ctrl+P** hot-key for printing whenever desired.

Aviation Display



Aviation Display is launched by clicking on its icon from IMS Main Menu. It provides access to the functions necessary for operators and users from briefing, tower and air traffic control, therefore the operator is supposed to use this display very often.

In case of thick client IMS computers installed on control tower the software may consist only from Aviation Display module.

The distribution of the information on the Aviation Display screen meets specification of BHANSA.

Note: This screen is enabled only to users with permission **AviationDisplay** granted.

Since the air traffic control decision may be taken on the base of the data displayed on this display, IMS archives all the data displayed in the IMS Aviation archive - see the [Section Error! Reference source not found.](#)



The Aviation Display consists of these main sections:

- Upper banner with information about UTC Time, Transition Level, VFR/IFR, Runway occupation and ATIS designator
- Wind information
- Middle section with Meteo information
- Bottom banner with latest message information

Upper banner

At the top of the screen there are information displayed informing on:

- Current time in UTC
- Transition Level (the current transition level can be set in Transition Level Configuration)
- Information on IFR/SVFR/VFR conditions
- Information about the runway occupations. This widget also acts as button for setting the runway occupation.
- Information about the latest ATIS designator letter.

VFR/SVFR/IFR information is automatically updated depending on the current weather conditions (Visibility and Cloud base). The color of the information changes depending on the conditions:

- VFR – blue
- SVFR – orange
- IFR – red

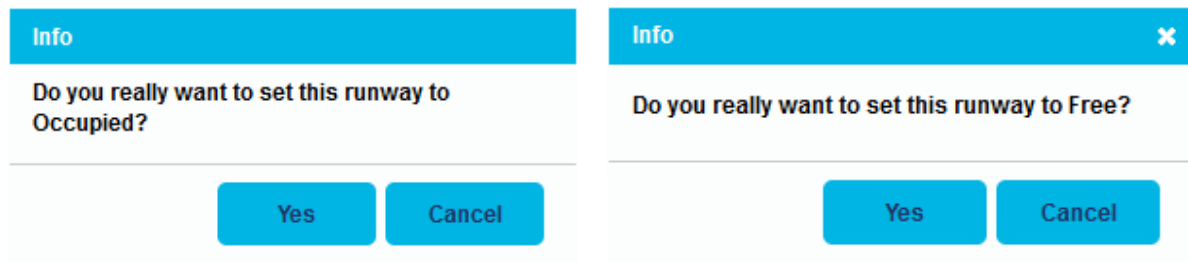


The information about the runway occupation (runway is free or runway is occupied) is displayed in the form of big info box. This info box has two states:

- Info box is highlighted – Runway is occupied
- Info box is greyed out – Runway is not occupied (Runway is free)



The status of the runway occupation can be easily changes by clicking on the info box. A new pop-up window will appear with confirmation question, whether the user really want the change the runway occupation. After confirming the action, the status of the info-box changes to inform about the current runway occupation status. This change affects all clients with Aviation Display.



Latest ATIS designator letter is displayed on the right upper corner of the display. Once a new ATIS information is available, the information is highlighted in red-white box. User can acknowledge this new information by clicking on the box. After this action, the highlighted box will dissapear and just the information about the latest ATIS designator letter remains.




Left: Highlighted new ATIS designator letter.

Right: Acknowledged ATIS designator letter.

Wind information

Wind display presents wind data both in text and graphic form.
The wind data are displayed in **2 Min actual (ICAO)** mode:

The runway that is actually viewed is displayed as a strip through the display with orientation arrows.
The arrows show direction from touch-down zone to end of the runway:

Actually used runway: TDZ  END

Runway actually not used: TDZ  END

Wind direction – (floating 2-min) average is presented by red arrow



Variation of wind direction, if occurs, is presented by yellow-colored arc:

Wind data in text form:

1. Average wind direction and 10-min variation, if occurs, is presented in the first row of the rectangle (e.g. **330°300-360°**). Variable wind is displayed as **VRB**, left from the variation range. Otherwise, floating 2-min average wind direction is presented (e.g. **360°**).



330°300-360°
07 KT
G19-03 KT

Note:

*The range of the wind directions is always displayed for the 10-minute period independently of the averaging period selected to be displayed (the variation is not displayed if the **Instantaneous** wind is displayed). That means that even if there is 2-min averaging period the wind direction variation is still for 10-min period.*

2. 2-min average wind speed is in the second row.
3. Variations from the mean wind speed are included in the third row, if the maximum wind speed exceeds the mean by 10 kt (5 m/s) or more.

Note:

The instantaneous wind speed value as well as maximum and minimum wind speed value is taken from the raw wind speed values coming into the IMS software from field measurement system (either MicroStep-MIS MWT Wind transmitter, AWS 111 automatic weather stations or other 3rd party system).

The interval of averaging for the wind speed instantaneous value is defined as system parameter in the particular field device.

MicroStep-MIS MWT Wind transmitter, AWS 111 automatic weather stations use default interval of 3 seconds and/or allow user configuration of this parameter.

The wind data are displayed according to ICAO recommendations described in ICAO Annex 3 document:

Variations from the mean wind direction during the past 10 minutes are reported as follows, if the total variation is 60° or more:

- 1) when the total variation is between 60° and 180° and the wind speed is 6 km/h (3 kt) or more such directional variations are reported as the two extreme directions between which the surface wind has varied;
- 2) when the total variation is between 60° and 180° and the wind speed is less than 6 km/h (3 kt), the wind direction is reported as variable with no mean wind direction; or
- 3) when the total variation is 180° or more, the wind direction is reported as variable with no mean wind direction

Variations from the mean wind speed (gusts) during the past 10 minutes are reported when the maximum wind speed exceeds the mean speed by 20 km/h (10 kt) or more.

When the 10-minute period includes a marked discontinuity in the wind direction and/or speed, only variations from the mean wind direction and mean wind speed occurring since the discontinuity are reported.

When the total variation is between 60° and 180° and the wind speed is less than 6 km/h (3 kt), the two extreme directions between which the surface wind has varied are displayed.

When the maximum wind speed exceeds the mean speed by 20 km/h (10 kt) or more during the past 10 minutes the variations of the wind speed will be displayed as the maximum and minimum values of the wind speed attained.

The reporting sites (runways) in left and right pane are fixed. Runway in use will be displayed in green while runway not used in grey color:

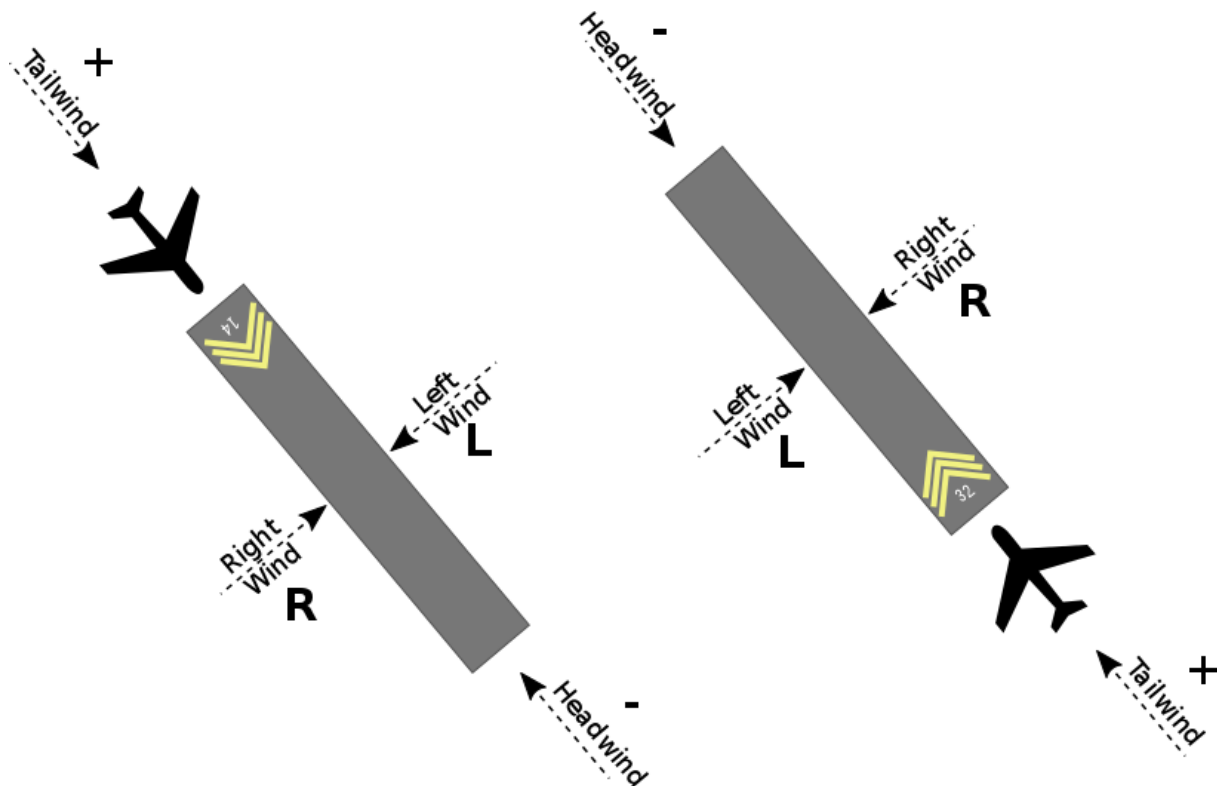


Fixed label of not used runway



Fixed label of runway in use

At the bottom of the wind dials, there is **CROSSWIND** information displayed. It is calculated with the same periodicity as its source data (2 Min). It is presented by two values. The first one is prefixed with T or H (e.g. T02) and means force of airplane speeding up (**T**, tailwind) or down (**H**, headwind). The second one is prefixed by R or L (e.g. L02) and means force which moves airplane out of runway; R means that the force influences from the right side, L denotes the left side.



Meteo information

The information displayed on the middle part of the screen:

| | |
|--------------------------|--|
| RVR TDZ, MID, END | – runway visual range in meters (1-minute average) on touch-down zone, middle and end of runway obtained from RVR system, (1-minute floating average) on touch-down zone obtained from RVR system, computed with periodicity defined by RVR update period . |
| VISIBILITY | – visibility information in meters (1-minute average) on touch-down zone, middle and end of runway, |
| CLOUD BASE | – the information about cloud base in feet on touch-down zone, middle and end of runway. |
| CLOUDS | – the information about cloud coverage and cloud base for individual layers from ceilometer. |
| T | – air temperature; 1-minute average, rounded to degrees without decimals in °C |
| DP | – dew-point; calculated from 1-minute averages of air temperature and relative humidity, rounded to degrees without decimals in °C |
| RH | – relative humidity; 1-minute average, rounded to whole percentage % |
| Present Weather | - Weather codes detected by present weather sensor coded according to WMO 4678 Table |
| SR | - Sun rise information in UTC. This information is read from configuration file based on information in AIP |
| SS | - Sun set information in UTC. This information is read from configuration file based on information in AIP |
| QNH | – QNH pressure in hPa, inHg, mmHg; 1-minute average. Values are not rounded but truncated (e.g. 1014.9 hPa is presented as 1014 hPa). |
| QFE | – QFE pressure in hPa, inHg, mmHg; 1-minute average. Values are truncated (e.g. 1014.9 hPa is presented as 1014 hPa). |
| Cloud direction | – additional information about cloud direction manually edited by observer via edit option (pen icon next to the field label). |

Note: *The data manually entered by the user or data calculated from manually entered values are marked by pink color on the screen.*

| | TDZ | MID | END | |
|-----------------|------------|------------|------------|-----------------------------------|
| RVR | //// | //// | //// | m |
| VIS | 250 | 50 | 10000 | m |
| CLD BASE | 4400 | /// | /// | ft |
| CLOUDS | OVC 4400 | NCD | NCD | ft |
| T | 21.9 °C | DP | 11.3 °C | RH 51.0 % |
| Present Weather | | | | SR 6:31:00 UTC SS 16:52:00 UTC |
| QNH | 1013.9 hPa | 29.94 inHg | 760.5 mmHg | |
| QFE | 999.4 hPa | 29.51 inHg | 749.6 mmHg | |
| Cloud Direction | CB NW | | | |

Bottom banner – message information

At the bottom of the screen, it is possible to display numerous types of aviation/meteorological messages issued or incoming to the system. Each message can be viewed by selecting its appropriate tab:

- the latest valid MET REPORT/SPECIAL report (under tab “LMR”)
- the latest valid METAR/SPECI report (under tab “METAR”)
- the latest valid TAF forecast (under tab “TAF”)
- the latest valid SNOWTAM report (under tab “SNOWTAM”)
- all current valid AD WRNG messages (under tab AD WRNG)
- all current valid WS WRNG messages (under tab WS WRNG)
- the latest valid ATIS message (under tab “ATIS”)
- the latest valid DEP INFO (under tab “DEP INFO”) – values in DEP INFO are originating in the latest MET REPORT/SPECIAL report
- all current valid GAMET forecasts (under tab GAMET)
- all current valid SIGMET forecasts (under tab SIGMET)
- all current valid AIRMET forecasts (under tab AIRMET)

When a new message is available for any type of the available messages, the corresponding tab will start blinking with orange color to indicate new issued message.

The user can acknowledge the new message by clicking on the corresponding tab.

On manned stations it is possible to create Auto METAR, if observer is not available. Auto METAR can be generated in periodic intervals (parameter <metarPeriod> in station.xml). The **METAR NIL** string displays when no new message was created (automatically or manually) or when connection to the server was broken, for a configurable “validity period” (e.g. 70 or 40 minutes).

| LMR | METAR | TAF | SNOWTAM | AD WRNG | WS WRNG | ATIS | DEP INFO | GAMET | AIRMET | SIGMET |
|---|-------|-----|---------|---------|---------|------|----------|-------|--------|--------|
| MET REPORT LQ8K 040900Z AUTO WIND RMY 16 350/6KT VIS RMY 16 TDZ 250M MID 50M END 10KM RVR RMY 16 TDZ NOT AVBL MID NOT AVBL END NOT AVBL CLD RMY 16 NCD T22 DP11 QNH 1014HPA QFE RMY 16 0999HPA RMY 34 0999HPA | | | | | | | | | | |

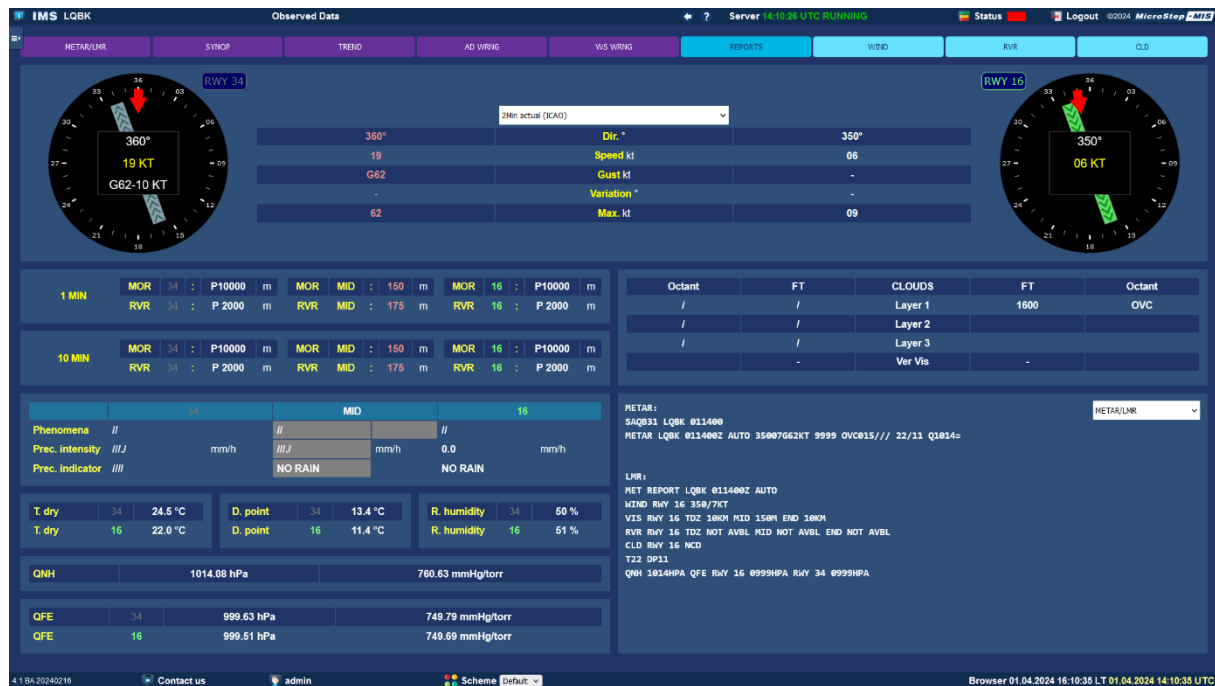
Observed Data Display

Observed data display is launched after clicking on its icon:



Note: This screen is enabled only to users with permission **ObservedDataDisplay** granted.

The Observed Data Display serves for the MET observers and provides the information on all data measured at the airport.



Update period of the display:

Unlike Aviation Display, there is no common refresh period for all parameters, each parameter (or each group of parameters) is refreshed as soon as the new data are computed in the system – see each parameter separately.

The display is divided into several panes:

WIND Pane

Wind display presents wind data both in text and graphic form. The runway that is actually viewed is displayed as a strip through the display with orientation arrows. The format of the data is the same as on the Aviation display (see [Chapter 0](#)), however the Observed data display shows the true wind direction data, not magnetic ones.

The update period of the Wind data is defined by element **Wind update period** of the **Maintenance -> Station Configuration** module (see [Subsection Error! Reference source not found.](#)). The default value is 10 seconds, updating every 5, 12 or 15 seconds is also possible.

Visibility/RVR Pane

Visibility pane shows 1 minute and 10 minute floating average of MOR and METAR RVR (i.e. RVR calculated from default light intensities specified to be used for METAR RVR calculation) for TDZ, MID and END position.

Both visibility and RVR values are recalculated (and refreshed) with the period defined by **RVR update period** of **Maintenance -> Station Configuration** module. Default value is 15 seconds (updating every 10, 12, 20 and 30 seconds also possible).

Phenomena Pane

This pane shows the phenomena from present weather sensor during last minute (updated every minute at second 00).

Ceilometer Pane

This pane shows the cloud layer (cloudbase/vertical visibility as well as coverage). The pane is updated every 10 seconds by values from cloudbase/sky condition algorithm computed from raw ceilometer data over the time interval of 10 minutes.

Temperature and Humidity Pane

The pane shows 1 minute average of temperature, dew point and relative humidity. Values are updated every minute at second 00).

Pressure pane

The pane shows 1 minute average of QNH and QFE. Values are updated every minute at second 00.

Bottom frame: METAR/MET REPORT

The bottom frame displays (depending on the user selection in the combo box in the right):

- the latest valid METAR and LMR/SPECIAL message (in combo box menu "METAR/LMR")
- the latest valid TAF, Aerodrome Warning and Windshear Warning message (in combo box menu "TAF/ADWRNG/WSWRNG")
- the latest valid GAMET, AIRMET and SIGMET message (in combo box menu GAMET/AIRMET/SIGMET)

Values are updated after new message information is entered into the system.

Current Data Display

Current data display is launched after clicking on its icon:

It presents current data from automatic sensors & devices for selected measurement site. Floating wind variables (e.g. 2-min wind speed) are loaded every 2 seconds, while 1-minute average temperature is refreshed every 1 minute.



| WIND SUMMARY | | | | | | | |
|---------------|-------|----------|----------------|-----|----------|------|----------|
| | Dir ° | Speed kt | Variation ° | | Range kt | | Time |
| | | | From | To | Min | Max | Max |
| 2-min | 070 | 11.7 | 050 | 120 | 7.8 | 23.3 | 10 28 34 |
| 10-min | 060 | 9.7 | 040 | 140 | 7.8 | 31.1 | 10 28 34 |
| 1-hour | 070 | 11.7 | | | | | |
| Gust 1-hour | 070 | 23.3 | Gust time UTC: | | 10:00 | | |
| Gust 24-hours | 070 | 23.3 | Gust time UTC: | | 00:01 | | |
| Min. 24-hours | 070 | 7.8 | Min. time UTC: | | 00:01 | | |

| REPORT | | | | | | | |
|-----------------|-----------|-------|---------|-------------------|-------|----|---|
| Air Temperature | | | | Relative Humidity | | | |
| Min. | 18-06 UTC | 19.57 | 27.7 °C | 06-18 UTC | 05.51 | 48 | % |
| Max | 06-18 UTC | 10:01 | 28.2 °C | 18-06 UTC | 17.51 | 49 | % |

| PRESSURE | | | |
|-----------|-----|---|----------|
| Tend. 3h | (8) | ↗ | -0.7 hPa |
| Tend. 24h | | | -0.1 hPa |

| PRESENT WEATHER SENSOR | | | |
|------------------------|-----|--|------|
| Phenomena | | | |
| Prec. intensity | 0.0 | | mm/h |

| ACCUMULATED RAINFALL | | | |
|----------------------|-----|--|----|
| Prev. day LT | 0.0 | | mm |
| Since 00:00LT | 0.0 | | mm |

| PRECIPITATION FOR LAST | | | | | |
|------------------------|--------|---------|---------|----------|----------|
| 10 minutes | 1 hour | 3 hours | 6 hours | 12 hours | 24 hours |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| PRECIPITATION DURING INTERVAL | | | | | |
|-------------------------------|-------|-------|-------|-----|--|
| 00-06 | 06-12 | 12-18 | 18-00 | UTC | |
| 0.0 | 0.0 | 0.0 | 0.0 | mm | |

| CLOUD BASE | | | |
|-------------------|-------|--|----|
| Lowest Base (avg) | 11000 | | ft |
| Ver Vis | | | ft |

| VISIBILITY | | | |
|------------|----------|----------|--|
| 1-min | 5-min | 10-min | |
| 22.68 km | 22.00 km | 22.00 km | |
| Minimum | | km | |

| INSTANTANEOUS VALUES | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Temp. dry | 27.7 | °C | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temp. wet | 19.8 | °C | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dew point | 15.7 | °C | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vapour pressure | 17.79 | hPa | | | | | | | | | | | | | | | | | | | | | | | | | |
| Relative humidity | 48 | % | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wind dir | 85 | ° | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wind speed | 9.7 | kt | | | | | | | | | | | | | | | | | | | | | | | | | |
| Barometer reading | 1000.2 | hPa | | | | | | | | | | | | | | | | | | | | | | | | | |
| QFE | 986.9 | hPa | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sea level QNH | 1001.4 | hPa | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sea level QFF | 1000.6 | hPa | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prec. 1 minute | 0 | mm | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prec. indicator | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prec. intensity | 0.0 | mm/h | | | | | | | | | | | | | | | | | | | | | | | | | |
| Magnetic declination | 4.93 | ° | | | | | | | | | | | | | | | | | | | | | | | | | |

| HOURLY TOTALS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|-----|--|--|
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 00-now | | | |
| Precipit. | mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |

| HOURLY EXTREMES | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|-----|--|--|
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 00-now | | | |
| Prec. int. | mm/h | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |

| PHENOMENA | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--------|---|--|--|
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 00-now | | | |
| Phenomena | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

Site and units can be changed by clicking on appropriate drop-down buttons in **Settings** block.

The following table describes the displayed quantities in details:

| English name | Interval | Function | Unit |
|---------------------|---------------|-----------|--------------------|
| Wind summary | | | |
| Wind direction | 2-min | AVG | ° |
| | 10-min | AVG+disc. | |
| | 1 hour | AVG | |
| | Min. 24-hours | MIN | |
| Wind speed | 2-min | AVG | m/s, km/h, kt, mph |
| | 10-min | AVG | |
| | 1 hour | AVG | |
| | Min. 24-hours | MIN | |
| Variation from | 2-min | MIN(CCW) | ° |
| | 10-min | | |

| English name | Interval | Function | Unit |
|-----------------------------|--|--|--------------------|
| Variation to | 2-min | MAX (CW) | ° |
| | 10-min | | |
| Range max | 2-min | MAX | m/s, km/h, kt, mph |
| | 10-min | | |
| Range min | 2-min | MIN | m/s, km/h, kt, mph |
| | 10-min | | |
| Time max | 2-min | MAX | hh:mm:ss |
| | 10-min | | |
| Wind gust direction | 1 hour | - | ° |
| | 24 hours | - | ° |
| Wind gust speed | 1 hour | MAX | m/s, km/h, kt, mph |
| | 24 hours | MAX | m/s, km/h, kt, mph |
| Wind gust time UTC | 1 hour | - | hh:mm |
| | 24 hours | - | hh:mm |
| Time min | Min. 24 hours | - | hh:mm |
| Instantaneous values | | | |
| Temperature, dry | 1-min | AVG | °C, °F |
| Temperature, wet | 1-min | Computed | °C, °F |
| Temperature, dew-point | 1-min | Computed | °C, °F |
| Vapour pressure | 1-min | Computed | hPa, torr, inHg |
| Relative humidity | 1-min | AVG | % |
| Wind direction | inst. | | ° |
| Wind speed | inst. | | m/s, km/h, kt, mph |
| Barometer reading | 1-min | AVG | hPa, torr, inHg |
| QFE | 1-min | AVG | hPa, torr, inHg |
| Sea level QNH | 1-min | AVG | hPa, torr, inHg |
| Sea level QFF | 1-min | AVG | hPa, torr, inHg |
| Precipitation 1 minute | 1-min | SUM | mm/h |
| Precipitation indicator | 1-min | 0 = not precipitation; 1 = precipitation | |
| Precipitation intensity | 1-min | 60*SUM | mm/h |
| Magnetic declination | - | value | deg |
| Report | | | |
| Air Temperature, dry, min | 00-00 LT 18-06 UTC 21-21 MST 18-18 UTC 16-16 UTC Last 24h UTC | MIN | °C or °F |
| Air Temperature, dry, max | 00-00 LT 06-18 UTC 21-21 MST 18-18 UTC 16-16 UTC Last 24h UTC | MAX | °C or °F |
| Relative humidity, min | 06-18 UTC 00-00 UTC 21-21 MST 16-16 UTC 00-00 LT | MIN | % |
| Relative humidity, max | 18-06 UTC 00-00 UTC 21-21 MST 16-16 UTC 00-00 LT | MAX | % |
| Pressure | | | |
| Tendency 3h | 3 hours | AVG | hPa, torr, inHg |
| Tendency 24h | 24 hours | AVG | hPa, torr, inHg |

| English name | Interval | Function | Unit |
|-------------------------------|-------------------|-----------------|------------------------|
| Present Weather Sensor | | | |
| Phenomena | Depends on sensor | - | Code Tables 4680, 4678 |
| Precipitation intensity | 1-min | AVG | mm/h |
| Accumulated Rainfall | | | |
| Prev. day LT | day | SUM | mm |
| Since 00:00LT | 00-now | SUM | mm |
| Precipitation for last | | | |
| 1 hour | 1 hour | SUM | mm |
| 3 hours | 3 hours | SUM | mm |
| 6 hours | 6 hours | SUM | mm |
| 12 hours | 12 hours | SUM | mm |
| 24 hours | 24 hours | SUM | mm |
| Precipitation during interval | | | |
| 00-06 | 00-06 UTC | SUM | mm |
| 06-12 | 06-12 UTC | SUM | mm |
| 12-18 | 12-18 UTC | SUM | mm |
| 18-00 | 18-00 UTC | SUM | mm |
| Cloud base | | | |
| Lowest Base (avg) | | AVG | m, ft |
| Ver Vis | | AVG | m, ft |
| Visibility | | | |
| Horizontal visibility | 1-min | AVG | km, nmi, m |
| Horizontal visibility | 5-min | AVG | km, nmi, m |
| Horizontal visibility | 10-min | AVG | km, nmi, m |
| Hourly Totals | | | |
| Precipitation | 1 hour | SUM (00-00 min) | mm |
| | 00-now | SUM | |
| Hourly Extremes | | | |
| Prec. int. | 1 hour | SUM | |
| | 00-now | | |
| Phenomena | 1 hour | AVG | Code Table 4680 |
| | 00-now | | |

inst. = instantaneous

AVG = average

AVG+disc. = special average that takes into account a discontinuity in wind speed

MIN(CCW) = extreme counter-clockwise direction

MAX(CW) = extreme clockwise direction

SUM = sum for given interval

60*SUM = sum for given interval multiplied by 60 (e.g. 1-minute precipitation intensity expressed in unit mm/h)

WIND SUMMARY block

2-min and 10-min values are floating averages, no reset time is applied.

1-hour values are reset at the beginning of the new hour (UTC time).

Gust 1-hour values are reset at the beginning of the new hour (UTC time).

Gust 24-hour values are reset at the beginning of the new day (UTC time), i.e. 00:00 UTC.

Min. 24-hours values are reset at the beginning of the new day (UTC time), i.e. 00:00 UTC.

REPORT block

Minimum and maximum values are reset at the beginning of the corresponding period. For example, in WMO Region II, minimum 18-06 UTC is displayed as fixed value from 06:00 to 18:00 UTC. From 18:00 to 06:00 UTC it is changing, whenever a new minimum (less than actually displayed minimum) is detected.

INSTANTANEOUS VALUES block

Relative humidity value has color rectangle displayed – colors for relative humidity thresholds (default setting: 0%, 80%, 90%) can be set on Airport Display (see [Chapter 0](#)).

Station pressure (QFE at MET garden) is pressure recalculated to official station elevation, if it differs from barometer elevation.

Precipitation indicator equals 1 if during the 1-minute interval at least 1 impulse was measured.

PRESSURE block

3-hour and 24-hour tendency are calculated according to WMO No.306 Manual on Codes and WMO No.8 Guide to Meteorological Instruments and Methods of Observation (the CIMO guide).

PRESENT WEATHER SENSOR block

If data from present weather sensor are available, in the line **Phenomena** there is a code number from code table 4680 for SYNOP messages (present weather reported from automatic weather station) and code from code table 4678 for METAR messages (significant present weather). For example, when moderate rain is detected there are displayed codes 62 and RA. In case of two phenomena only one SYNOP code with highest priority (highest number) but both METAR codes are displayed.

PRECIPITATION FOR LAST block

All values are floating sums for 1, 3, 6, 12, 24 hours period, recalculated every minute (configurable – see [Subsection **Error! Reference source not found.**](#)).

PRECIPITATION DURING INTERVAL block

All values are floating sums for 6-hour time intervals: 00-06 UTC, 06-12 UTC, 12-18 UTC, 18-00 UTC.

When you check data e.g. on 11:20 UTC, displayed precipitation sums for intervals:

- 00-06 UTC and 06-12 UTC are calculated from today's data
- 12-18 UTC and 18-00 UTC are calculated from the previous day data.

HOURLY TOTALS block

Hourly Totals composes from 24 hourly values (00 – 23 hour of the day) and one cumulative value (sum from 00 up to now) for each element. Hourly total "01" is calculated from time interval 01:00:00 – 01:59:59 UTC.

All precipitation data (Prec. 1 minute, Prec. indicator, Prec. intensity, Precipitation for last, Precipitation during interval, Hourly totals) are measured by the rain gauge (or calculated from rain gauge measurements). In case the rain gauge is not installed at the airport, mentioned precipitation fields show data measured (calculated) by present weather sensor.

Synoptic Data Display

Synoptic Data Display is launched after clicking on its icon:



Note: This screen is enabled only to users with permission **SynopticDataDisplay** granted.

It presents measured as well as computed data for each site, useful for synoptic purposes. Floating variables (e.g. 2-min wind speed) are loaded every 2 seconds, while 1-minute average temperature is refreshed every 1 minute.

| WIND SUMMARY | | | | | | | |
|----------------|--------|----------|---------------|-----|----------|------|----------|
| | Dir. ° | Speed kt | Variation ° | | Range kt | | Time |
| | | | From | To | Min. | Max. | Max. |
| Current | 050 | 9.7 | | | | | |
| 2-min | 070 | 11.7 | 050 | 120 | 7.8 | 23.3 | 10:34:16 |
| 10-min | 060 | 9.7 | 040 | 140 | 7.8 | 31.1 | 10:34:16 |
| 1-hour | 070 | 11.7 | 050 | 120 | 7.8 | 23.3 | |
| Gust 1-hour | 70 | 23.3 | Gust time UTC | | 10:00 | | |
| Gust 6-hour | 70 | 23.3 | Gust time UTC | | 06:01 | | |
| Gust 00-24 UTC | 70 | 23.3 | Gust time UTC | | 00:01 | | |

| PRESSURE | | | |
|-----------------|-----|--------|-----|
| Bar. reading | | 1000.1 | hPa |
| QFE - RWY 17 | | 986.9 | hPa |
| Sea level (QFF) | | 1000.6 | hPa |
| Tend. 3h | (8) | -0.7 | hPa |
| Tend. 24h | | -0.1 | hPa |

| REPORT | | |
|-----------------|-------|-----|
| Dew point | 15.7 | °C |
| Vapour pressure | 17.79 | hPa |

| TEMPERATURE | | |
|---------------------|------|------|
| Current | 27.7 | °C |
| Duration with < 0°C | 0 | Hour |
| Min. 09:01 UTC | 28.0 | °C |
| Max. 09:26 UTC | 28.2 | °C |
| Max. 06:18 UTC | 28.2 | °C |
| Min. 18:06 UTC | 27.7 | °C |
| Max. 21:21 MST | 28.2 | °C |
| Min. 21:21 MST | 27.7 | °C |


| PRECIPITATION | | |
|---------------|---|----|
| 06:18-06 UTC | 0 | mm |
| 06:06 UTC | 0 | mm |

| VISIBILITY | | |
|------------|----------|----------|
| 1-min | 5-min | 10-min |
| 20.75 km | 21.00 km | 22.00 km |

| PRESENT WEATHER SENSOR | |
|------------------------|----|
| Phenomena | // |

| HUMIDITY | |
|---------------------|--------|
| Current | 48 % |
| Min. 09:01 UTC | 49.0 % |
| Max. 09:01 UTC | 49.0 % |
| Duration with < 40% | 0 Hour |
| Duration with > 80% | 0 Hour |

| SYNOP | |
|--|--|
| SNBA40 LQ0K 101000 A0XX 10104 14542 36/// /0710 10281 20164 40021= | |

Use dropdown button  to change units, if necessary.

The following table describes the displayed quantities in details.

| English name | Interval | Function | Unit |
|--------------------------|----------|-----------|--------------------|
| Wind | | | |
| Wind direction | Current | | ° |
| | 2-min | AVG | |
| | 10-min | AVG+disc. | |
| | 1-hour | AVG | |
| Wind speed | Current | | m/s, km/h, kt, mph |
| | 2-min | AVG | |
| | 10-min | AVG | |
| | 1-hour | AVG | |
| Direction variation from | 2-min | MIN(CCW) | ° |
| | 10-min | | |
| | 1-hour | | |
| Direction variation to | 2-min | MAX (CW) | ° |

| English name | Interval | Function | Unit |
|----------------------------|------------------------|----------|--------------------|
| | 10-min | | |
| | 1-hour | | |
| Speed variation max | 2-min | MAX | m/s, km/h, kt, mph |
| | 10-min | | |
| Speed variation min | 2-min | MIN | m/s, km/h, kt, mph |
| | 10-min | | |
| Time Max. | 2-min | MAX | hh:mm:ss |
| | 10-min | | |
| Wind direction - gust | 1-hour | - | ° |
| | 6-hour | | |
| | 00-24 UTC | | |
| Wind speed – gust | 1-hour | MAX | m/s, km/h, kt, mph |
| | 6-hour | | |
| | 00-24 UTC | | |
| Gust time UTC | 1-hour | - | hh:mm |
| | 6-hour | | |
| | 00-24 UTC | | |
| Temperature | | | |
| Current | 1-min | AVG | °C, °F |
| Duration with < 0°C | 1 hour | SUM | minute |
| Min. xx UTC | 1 hour | - | hh:mm |
| Max. xx UTC | 1 hour | - | hh:mm |
| Max. 06-18 UTC | 06-18 UTC | MAX | °C, °F |
| Min. 18-06 UTC | 18-06 UTC | MIN | |
| Max. 21-21 MST | 21-21 MST | MAX | |
| Min. 21-21 MST | 21-21 MST | MIN | |
| Humidity | | | |
| Current | 1-min | AVG | % |
| Min. xx UTC | 1 hour | - | hh:mm |
| Max. xx UTC | 1 hour | - | hh:mm |
| Duration with < 40% | 1 hour | SUM | minute |
| Duration with > 80% | 1 hour | SUM | minute |
| Pressure | | | |
| Barometer reading | 1-min | AVG | hPa, torr, inHg |
| QFE – MET Garden | 1-min | AVG | |
| Sea Level (QFF) | 1-min | AVG | |
| Tend. 3h | 3 hours | AVG | |
| Tend. 24h | 24 hours | AVG | |
| Report | | | |
| Dew point | 1-min | computed | °C, °F |
| Vapour pressure | 1-min | computed | hPa, torr, inHg |
| Precipitation | | | |
| Precipitation 06-18-06 UTC | 06-18 UTC or 18-06 UTC | SUM | mm |
| Precipitation 06-06 UTC | 06-06 UTC | SUM | mm |
| Visibility | | | |
| 1-min | 1-min | AVG | km,nmi, m |
| 5-min | 5-min | AVG | |
| 10-min | 10-min | AVG | |

At the bottom of the Synoptic display, there is the latest SYNOP message displayed.

inst. = instantaneous

AVG = average

AVG+disc. = special average that takes into account a discontinuity in wind speed

MIN(CCW) = extreme counter-clockwise direction

MAX(CW) = extreme clockwise direction

SUM = sum for given interval

Wind gust (00-24 UTC) is reset at 00:00 UTC (the wind direction data are **true** data, not **magnetic** ones).

Relative humidity value in Humidity section has the colored rectangle displayed - color for the relative humidity depends on the following thresholds: 0% = green, 80% = orange, 90% = red.

Minimum and maximum temperatures are reset at the beginning of the corresponding period. For example, minimum 18-06 UTC is displayed as fixed value from 05:50 to 17:50 UTC. From 17:50 to 05:50 UTC it is changing, whenever a new minimum (less than actually displayed minimum) is detected.

Precipitation 06-18-06 is reset at 05:50 and at 17:50 UTC. Depending on actual time, cumulative precipitation is displayed from 05:50 to 17:50 UTC, and then from 17:50 to 05:50 UTC, and so on. Precipitation total 06-06 is reset at 05:50 UTC.

Note: The data manually entered by the user or data calculated from manually entered values are marked by red color on the screen.

RVR Total Display

RVR display consists of runway visual range data from transmissometer readings. It opens after clicking on **RVR** icon from the IMS main menu or **RVR Total** button from **Aviation display**.



Note: This screen is enabled only to users with permission **RVRTotal** granted.

| Runway ALL | | Actualized at: 10:10:00 UTC | | | | | | | |
|-------------------------|------------------|--------------------------------------|------------|------------|------------|------------|------------|-----------------------------------|------------|
| | | RVR for METREPORT (actual lights) | | | | | | RVR for METAR (maximum lights) | |
| POSITION | | RWY 19 TDZ | RWY 19 MID | RWY 19 END | RWY 01 TDZ | RWY 01 MID | RWY 01 END | RWY 19 TDZ | RWY 01 TDZ |
| RVR | m | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 |
| RVR 1 Avg | m | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 |
| RVR 5 Avg | m | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 |
| RVR 5 Avg P | m | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 |
| RVR 10 Avg | m | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 |
| RVR 10 Min | m | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 |
| RVR 10 Max | m | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 | P 2000 |
| RVR Tend | | N | N | N | N | N | N | N | N |
| RVR Var | | | | | | | | | |
| BL | cdm ² | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| BL Indicator | | Night | Night | Night | Night | Night | Night | Night | Night |
| IT | µlx | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Relative humidity | %RH | 75%RH | 75%RH | 75%RH | 73%RH | 73%RH | 73%RH | 75%RH | 73%RH |
| EL Used | % | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 100.0 | 100.0 |
| EL Raw | % | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CL Used | % | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 100.0 | 100.0 |
| CL Raw | % | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| VIS 10 Avg | m | 15000 | 9000 | 7000 | 7000 | 9000 | 15000 | 15000 | 7000 |
| VIS 1 Avg | m | 15000 | 9000 | 8000 | 8000 | 9000 | 15000 | 15000 | 8000 |
| MOR 10 Avg | m | 15000 | 8000 | 6000 | 6000 | 8000 | 15000 | 15000 | 6000 |
| MOR 1 Avg | m | 15000 | 8000 | 7000 | 7000 | 8000 | 15000 | 15000 | 7000 |
| MOR Inst Raw | m | 15000 | 8484 | 7090 | 7090 | 8484 | 15000 | 15000 | 7090 |

The identification of **runway** is shown in the upper left corner. Select the desired runway clicking on the dropdown button right to the runway identification. The option **ALL** lists all RVR positions on the airport. The data read from the transmissometer are regularly updated (every 15 seconds by default), and the time of the latest actualization is right to the runway. The updating period depends on the measuring device and data sending interval and on the setting of RVR calculation algorithm. A chart of the last 30-minute MOR data is situated in the bottom part of the screen.

Positions of measuring transmissometers:

- TDZ** – touch down zone (used also in case of only one device)
- MID** – middle of the runway
- END** – end of the runway

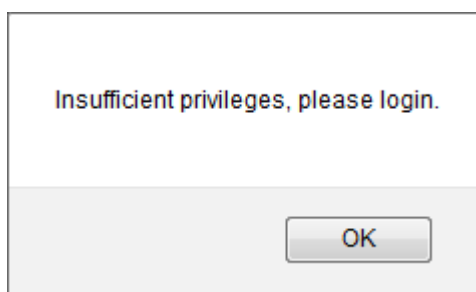
Note: RVR computation is performed with periodicity controlled by element **RVR update period of Maintenance** -> **Station Configuration** module (see **Subsection Error! Reference source not found.**). Default value is 15 seconds (updating every 10, 12, 20 and 30 seconds also possible). The screen is refreshed after new data are computed. In case of computation of statistics (average, minima, maxima) over 1 or 10 minutes the floating statistics are displayed, i.e. at 00:15:30 the 1 minute floating average is computed from raw values during time interval 00:14:30 - 00:15:30.

Displayed values:

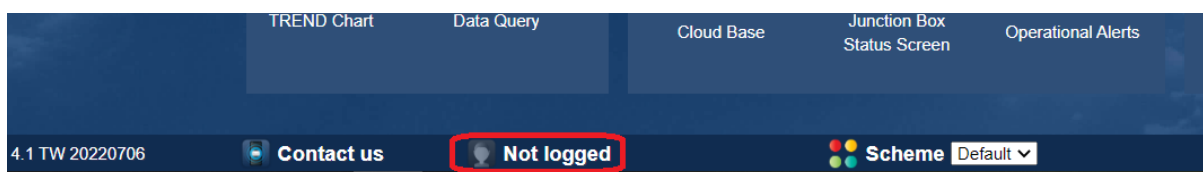
- RVR** actual value from visibility sensor
- RVR 1 Avg** 1 min average RVR
- RVR 5 Avg** 5 min average (5-minute period before observation term)
- RVR 5 Avg P** 5 min average (5-minute period from 10th to 5th minute before observation term)
- RVR 10 Avg** 10 min average

| | |
|--------------------------|--|
| RVR 10 Min | minimum over the last 10 min period (1 min value) |
| RVR 10 Max | maximum over the last 10 min period (1 min value) |
| RVR Tend | tendency: N – none + – upward - – downward |
| RVR Var | variation indicated by letter V when ICAO conditions for RVR variation are met: if the 1-minute runway visual range values during the 10-minute period vary from the mean value by more than 50 m or more than 20 per cent of the mean value, whichever is greater. If the 10-minute period immediately preceding the observation includes a marked discontinuity in runway visual range values, only those values occurring after the discontinuity are used to obtain variations. |
| BL | background luminance in cd/m ² |
| BL Indicator | background luminance in ICAO levels (0 = night, 1 = intermediate, 2 = day, 3 = bright day (sunlit fog)). Calculations with BL are more accurate compared to BL indicator and therefore preferred. |
| IT | illumination threshold |
| Relative humidity | relative humidity in %RH |
| EL Used | used intensity of edge lights (depends on configuration) |
| EL Raw | raw intensity of edge lights |
| CL Used | used intensity of center lights (depends on configuration) |
| CL Raw | raw intensity of center lights |
| Vis 10 Avg | visibility for aeronautical purposes (referred to as “visibility”) – 10 minute average |
| Vis 1 Avg | visibility – 1 minute average |
| MOR 10 Avg | meteorological optical range (horizontal visibility measured by instrument representing the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background) – 10 minute average |
| MOR 1 Avg | meteorological optical range (horizontal visibility measured by instrument representing the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background) – 1 minute average |
| MOR Inst Raw | meteorological optical range (horizontal visibility measured by instrument representing the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background) – raw value measured by visibility sensor |

Warning: Only logged-in user with granted permission **RunwayLights** can change central and edge lights. Otherwise warning post appears:



To login click on icon  or **Not logged** on the bottom bar line:



Note: ICAO Annex Appendix 3 Paragraph 4.3.5 states:

Recommendation.— When instrumented systems are used for the assessment of runway visual range, computations should be made separately for each available runway. For local routine and special reports, the light intensity to be used for the computation should be:

- a) for a runway with the lights switched on and the light intensity of more than 3 percent of the maximum light intensity available, the light intensity actually in use on that runway;
- b) for a runway with the lights switched on and the light intensity of 3 percent or less of the maximum light intensity available, the optimum light intensity that would be appropriate for operational use in the prevailing conditions; and
- c) for a runway with lights switched off (or at the lowest setting pending the resumption of operations), the optimum light intensity that would be appropriate for operational use in the prevailing conditions.

In METAR and SPECI, the runway visual range should be based on the maximum light intensity available on the runway.

IMS therefore computes sets of RVR values:

- MET REPORT RVR, which is reported in MET REPORT
- METAR RVR, which is reported in METAR

The configuration of computation of MET REPORT and METAR RVR can be changed in module **RVR Configuration** (see Subsection Error! Reference source not found.).

Usage of values for **local routine and special reports** (MET REPORT / SPECIAL):

For this type of reports, **VIS 1 Avg** and **RVR 1 Avg** value shall be used according to ICAO standard. Note that this important value is displayed on the Aviation Display screen directly. The values are emphasized by white background.

Usage of values for **METAR and SPECI**:

For METAR and SPECI reports, **VIS 10 Avg** and **RVR 10 Avg** (10 minute average value) shall be used. (The value is emphasized by white background.) When a variation in RVR values is indicated by the letter **V**, the minimum and maximum values over the last 10 minutes should be used: **RVR 10 Min** and **RVR 10 Max** (also emphasized by white background.):

The values of RVR for MET REPORT and METAR may thus differ significantly, for example under good visibility conditions during night when runway lights are switched off and real light intensity values are configured to be used. In this case, RVR for MET REPORT is M50, but RVR for METAR is P2000. According to the ICAO SARPs, the runway visual range should be based on the maximum light intensity available on the runway when reporting in METAR and SPECI.

When the 10-minute period contains a marked discontinuity, only values occurring after the discontinuity are used for calculating the **RVR 10 Avg**, **RVR 10 Min**, **RVR 10 Max**, **RVR Var** values, following thus ICAO standard.

Note that the **RVR 10 Avg**, **RVR 10 Min**, **RVR 10 Max**, **RVR Tend** are also used in the METAR template (see Section Error! Reference source not found.) for the composition of METAR / SPECI report.

| RVR for METAR (maximum lights) | |
|-----------------------------------|------------|
| RWY 19 TDZ | RWY 01 TDZ |
| P 2000 | P 2000 |
| P 2000 | P 2000 |
| P 2000 | P 2000 |
| P 2000 | P 2000 |
| P 2000 | P 2000 |
| P 2000 | P 2000 |
| P 2000 | P 2000 |
| N | N |
| 2 | 2 |
| Night | Night |
| 0.0 | 0.0 |
| 75%RH | 73%RH |
| 100.0 | 100.0 |
| 0.0 | 0.0 |
| 100.0 | 100.0 |
| 0.0 | 0.0 |
| 15000 | 7000 |
| 15000 | 8000 |
| 15000 | 6000 |

All calculations regarding RVR are compatible with ICAO Manual of Runway Visual Range Observing and Reporting Practices.

RVR ATC Display

RVR display consists of runway visual range data from transmissometer readings. Beside actual values of RVR, BL and MOR for all the positions on separate runway it contains also temporal charts for RVR and MOR for particular runway positions. It opens after clicking on **RVR ATC** icon.



The data read from the transmissometer are regularly updated (every 15 seconds by default, see Subsection **Error! Reference source not found.**). The updating period depends on the measuring device data sending interval and on the setting of RVR calculation algorithm.

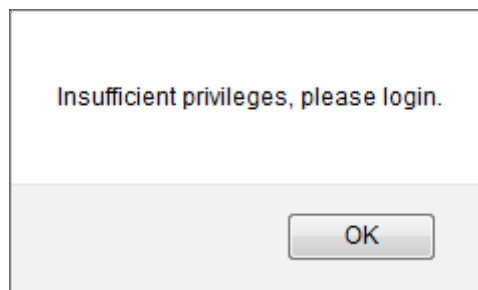
Positions of measuring transmissometers:
RWY XX/YY

At the top of the display there is a combo box for selection of displayed runway. User can select runway for which information will be displayed.

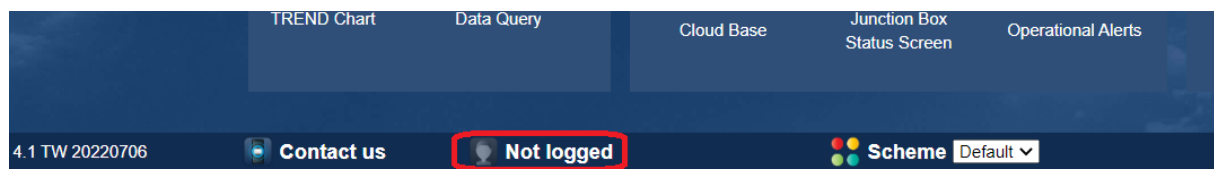
The combo box **in use** serves for changing of the status of the runway. It is possible to choose **automatic** (In case the IMS interface automatic Runway Lights Setting Instrument (RLSI) and RLSI provides also runway-in-use information this menu element is enabled and if selected, the manually entered value is replaced by the runway-in-use value received from the RLSI.) or **switch manually** (logged-in user with granted permission **RunwayInUse** can switch the runway in use manually to opposite direction.)

Intensity of edge and center lights is possible to change via appropriate combo boxes **change**. It is possible to choose **automatic** (in case the IMS interface RLSI the manually entered value is replaced by the value from the RLSI) or concrete values **100%, 30%, 10%, 3%, 1%, 0%**.

Warning: Only logged-in user with granted permission **RunwayLights** can change central and edge lights. Otherwise warning post appears:



To login click on icon  or **Not logged** on the bottom bar line:



Displayed values for particular runway positions:

RVR act

1 min average RVR for actual lights intensity with tendency (N – no change; “+” – up; “-” – down; / - no tendency in case of P2000 value). In some cases the sensor itself integrates values over longer time interval (1 minute etc.). This sensor integration period is a part of RVR Configuration – see Subsection **Error! Reference source not found.**). In case the sensor integrates time for period longer than 45s, the instantaneous value of RVR is taken also as 1 minute average.

RVR 100%

BL

MOR

1 min average RVR for 100 % lights intensity with tendency.

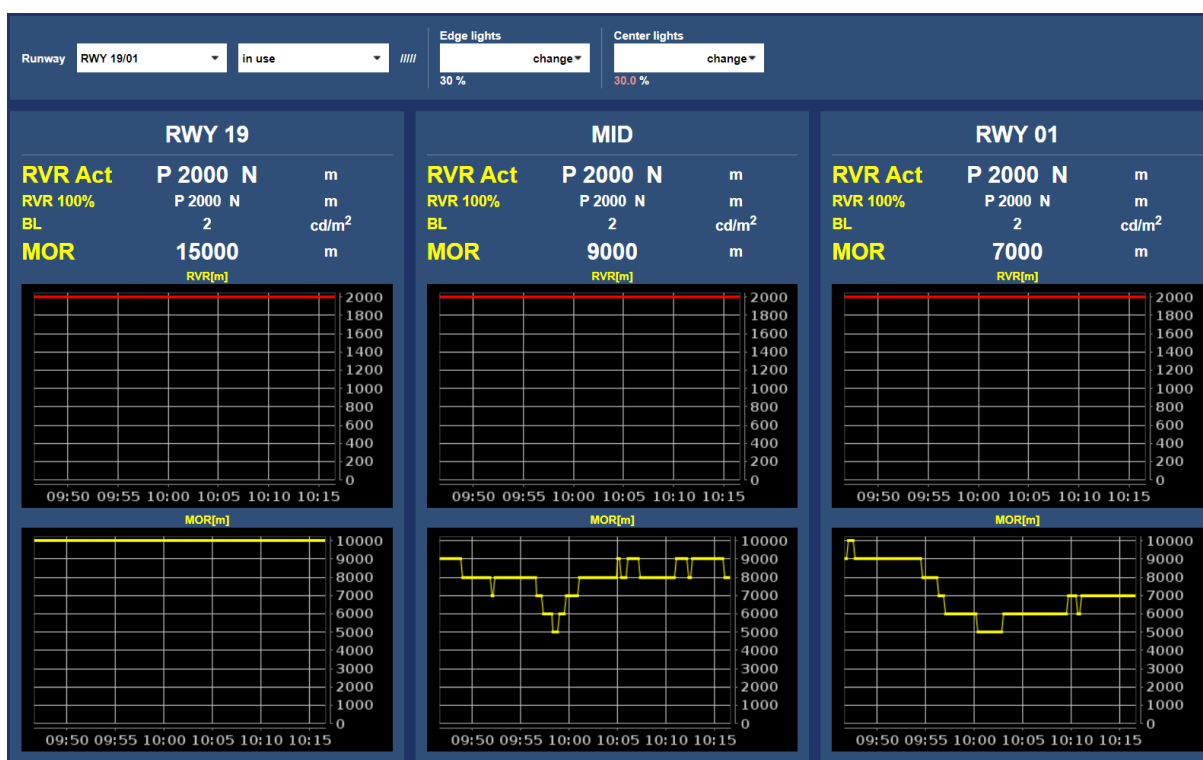
background luminance in cd/m^2

meteorological optical range (horizontal visibility measured by instrument representing the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background)

(reported in steps of 25 m when the visibility is less than 400 m; in steps of 50 m, when it is less than 800 m; in steps of 100m, when the visibility is 5 km; in steps of 1000m, when the visibility is 5 km or more but less than 10 km; and it is given as 10 km when the visibility is 10 km or more)

The data manually entered by the user or data calculated from manually entered values are marked by red color on the screen.

On the charts there is displayed time flow of the RVR and MOR for particular runway positions.



Cloud Base Display



The cloud base display shows the latest output of cloudbase/sky condition algorithm in text form as well as actual raw ceilometer data in the graph, The display is shown after pressing **Cloud Base** icon from IMS main menu or **CLD** button from Aviation Display.

Note: This screen is enabled only to users with permission **CloudBase** granted.

The values of cloud parameters computed by cloudbase/sky condition algorithm are refreshed every 10 seconds (the values are calculated from ceilometer measurements over the evaluation period – the last 10 minutes):

- **Lowest Base (avg)** – average height in [ft, m] of the lowest cloud base or NCD (when no clouds are detected)
- **Ver Vis** – vertical visibility in [ft, m]



More detailed **Sky condition** table displays the following parameters for each cloud layer separately (values are also refreshed every 30 seconds and computed over 30 minutes):

- **Base (avg)** – average cloud base
- **Hits** – occurrence frequency in % of all samples. The number of hits for each cloud base level depends on the sampling interval of ceilometer and on the length of evaluation period
- **Coverage (estimated)** – calculated coverage above ceilometer (represents sky conditions above the instrument location). Coverage, as well as hits, are cumulative. It means, coverage of a level is calculated as coverage of all lower layers plus coverage of the layer itself.

Instant data table shows current data from the ceilometer:

- **Height** – instant data of cloud height in [ft, m] of the lowest cloud base
- **Actual status** – actual status of measurement as follows: No data; Sky clear; Cloud detected; VER VIS
- **Penetration** – instant penetration depth in [ft, m]

Note: The value of cloud amount should not be considered valid for the whole sky. It is, according to Annex 3 terms "the best practicable indications of the height of cloud base and cloud amount" above the ceilometer location

The cloud bases are reported in steps of 30 m (100 ft) up to 3000 m (10000 ft) and in steps of 300 m (1000 ft) above 3000 m (10000 ft).

The cloudbase/sky condition algorithm which calculates the parameters of up to 3 cloud layers is based on FAA methodology.

Below the table, there is a chart displaying raw ceilometer data: base heights and penetrations as received from ceilometer, the charts displays values over the time extent of the last 3 hours.

Note: *Cloud-base / sky condition algorithm evaluates state of the sky from the sequence of raw ceilometer data over time interval. Two special cases are handled in the preprocessing stage:*

- if significant proportion of the samples are not valid, result of the algorithm is “sky condition cannot be computed”.*
- if significant proportion of most recent samples are labeled as vertical visibility, result of the algorithm is “SKY OBSCURED” and vertical visibility is computed from recent samples measurements and reported (element VER VIS on Aviation display).*

If neither of these cases occurred, the algorithm enters clustering stage. In this stage raw data samples with similar cloud height are merged into one cloud layer. The height of the particular cloud layer is computed as an average of all cloud height measurements from which is the layer composed. The cloud amount of the lowest cloud layer is computed as ratio of count of samples that fall into this layer and count of all measurements. The cloud amount of higher layers is computed in the same way, only cloud amount of lower layers is added to the result. The minimum height of the bottom cloud layer is reported as cloud base (element CLD BASE on Aviation Display).

Wind Actuals

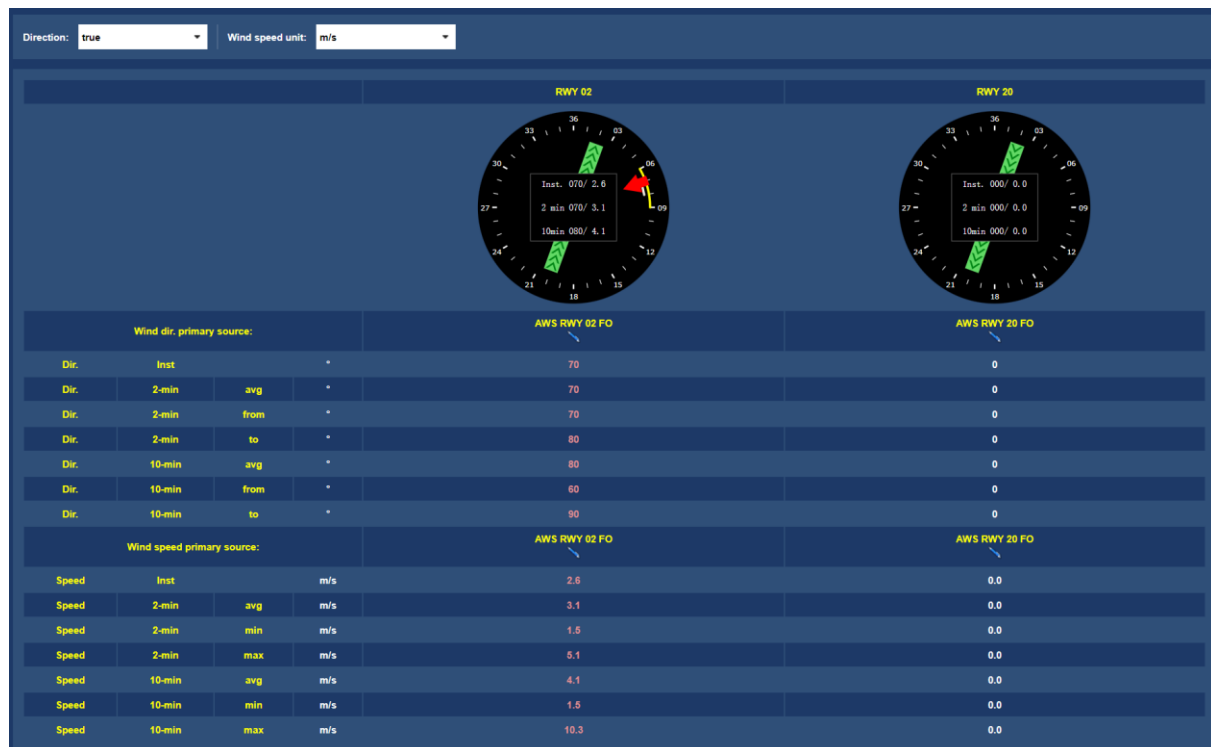
Display of wind data allows viewing indicated wind direction and speed summary from all sites connected to the system – MET Garden as well as runways.



Note: This screen is enabled only to users with permission **WindSites** granted.

The displayed direction can be either true or magnetic. It depends on selection in combo box in upper left corner of the screen. The unit of the wind speed can also be changed via combo box in line of instantaneous wind speed (kt, m/s km/h or mph are available).

For each site the primary data source is also listed there – it corresponds to the DCP – wind measurement system.



Data are displayed in graphical and tabular form.

Wind data are simultaneously displayed in the middle of the wind display in three variants:

- **2 Min actual (ICAO)**
- **10 Min**
- **Instantaneous** – instantaneous wind data (last samples read from sensor)

```
Inst. 290 /19.4
2 min 280 /19.4
10min 280 /23.3
```

Wind direction – instantaneous or floating (2-min or 10-min) average is presented by red arrow

Variation of wind direction, if occurs, is presented:

- by yellow-colored arc for 10-min average period
- by merino-colored arc for 2-min average period.



In case of instrument failure or malfunction it is possible for logged user with permission

DistributionConfiguration granted to change the measured value manually using icon – this will open the window for entering wind speed or direction manual data for the particular DCP:

Manual value for Wind Direction Summary Magnetic at site AWS RWY 20 FO

Wind Direction Summary Magnetic:

| | |
|-----------------------|--------------------|
| Instantaneous value: | 16 |
| 2-min average value: | 16 |
| 2-min from value: | 330 |
| 2-min to value: | 20 |
| 10-min average value: | 16 |
| 10-min from value: | 330 |
| 10-min to value: | 60 |
| Unit: | deg D |

Activate

Deactivate

Cancel

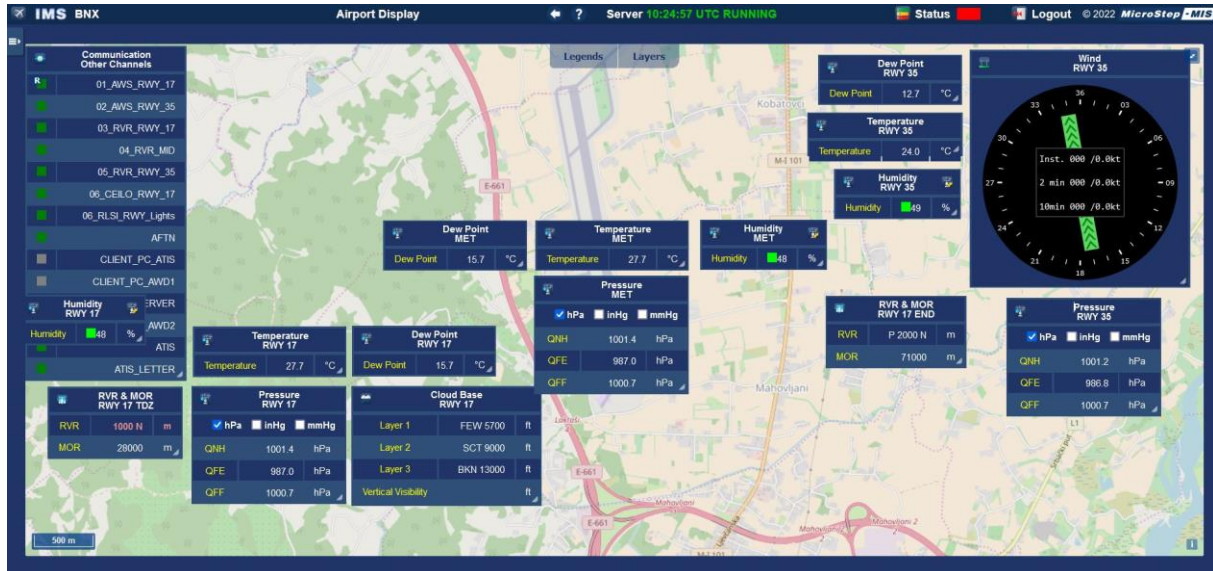
Note: The manual value replaces the value from particular DCP – wind measurement system. This change will therefore affect all sites / runways which use wind data from this particular DCP.

Note: The IMS AWOS assumes the input wind direction data (both measured as well as manually entered through the distribution screen described earlier) are **magnetic** ones. This fact should be taken into account when entering the wind direction data manually on sites with the significant magnetic declination.

For more information of data distribution from DCP-s to reporting sites see also Chapter Error! Reference source not found.

Airport Display

Airport Display contains meteorological data measured at the airport and display them in separate movable windows on the map background.



Movable windows can be set to default position by clicking on button **R** on the left upper side of the screen. Scale of the map is shown on the left bottom part of the screen **1000 m** and to active full screen mode click on button **i** on the right upper side of the screen.

Movable windows can be set to desired positions for each logged user separately. Their positions will be fixed until the logged user click on default button **R** or change their positions. The windows show meteorological data for measured positions at the airport in graphical or tabular form. Each window has title (information about kind of data and position of measurement) with shortcut to relevant display module (click on icon on the left side of the title):

| Pressure RWY 02 | | |
|---|-------------------------------|-------------------------------|
| <input checked="" type="checkbox"/> hPa | <input type="checkbox"/> inHg | <input type="checkbox"/> mmHg |
| QNH | 1007.8 | hPa |
| QFE | 1004.6 | hPa |
| QFF | 1007.6 | hPa |

Size of the windows can be changed – catch the right down corner of the window to resize it:

| Pressure RWY 02 | | |
|---|-------------------------------|-------------------------------|
| <input checked="" type="checkbox"/> hPa | <input type="checkbox"/> inHg | <input type="checkbox"/> mmHg |
| QNH | 1007.9 | hPa |
| QFE | 1004.7 | hPa |
| QFF | 1007.7 | hPa |



To configure properties of data visualization color of relative humidity click on configuration icon on the right side of the title. The following window appears:



Settings

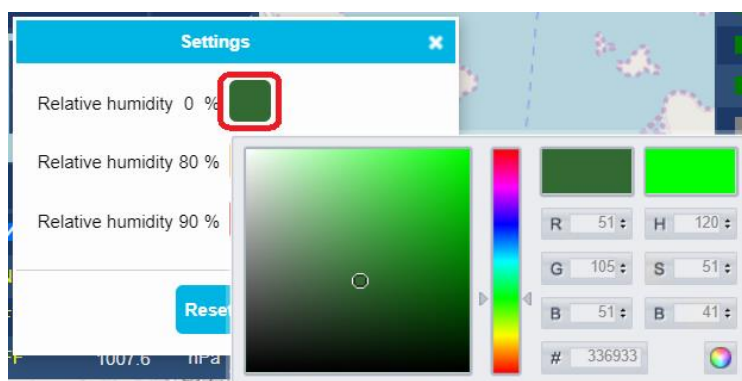
Relative humidity 0 %


Relative humidity 80 %

Relative humidity 90 %

Reset defaults Close

The color can be changed by clicking on the color square:



User can set default colors by clicking on the button **Reset Defaults**. To close configuration window click on button **Close** or sing  in its upper right corner.

The movable windows contain the following meteorological data:

Cloud Base

- Cloud Base – average height in [ft] of the lowest cloud base or NCD (see [Chapter 0](#))
- Vertical Visibility – vertical visibility in [ft] (see [Chapter 0](#))

Communication Other Channels

- communication blocks with name and status of communication channels (see [Chapter Error! Reference source not found.](#))

Dew Point

- Dew Point – calculated from 1-minute averages of air temperature and relative humidity, rounded to degree without decimals in [°C] (see [Chapter 0](#))

Phenomena

- SYNOP – phenomenon for last 1-minute (WMO table 4680) (see [Chapter 0](#))
- METAR – phenomenon for last 1-minute (WMO table 4678) (see [Chapter 0](#))

Pressure

- Check boxes for pressure units ☒ hPa ☐ inHg ☐ mmHg
- QNH – 1-minute average, value is not rounded but truncated (see [Chapter 0](#))
- QFE – 1-minute average, value is not rounded but truncated (see [Chapter 0](#))
- QFF – 1-minute average, value is not rounded but truncated (see [Chapter 0](#))

Temperature

- Temperature – 1-minute average rounded to degree without decimals in [°C] (see [Chapter 0](#))

Humidity

- Humidity – 1-minute average rounded to percentage without decimals in [%] (see [Chapter 0](#))

RVR & MOR

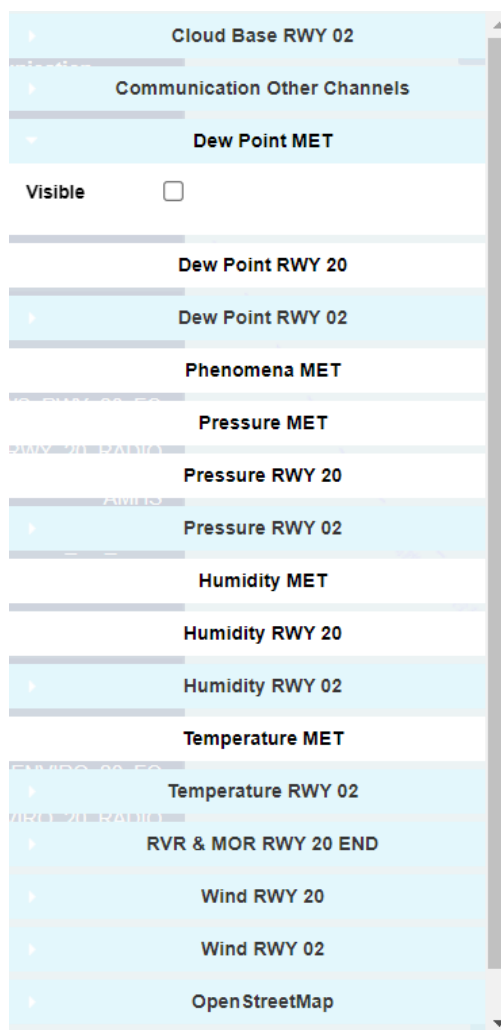
- 1-minute average RVR (see [Chapter 0](#))
- 1-minute average MOR (see [Chapter 0](#))

Wind

- Wind display – Runway in use has green runway strip.

Layers button

Click on button **Layers** (in the upper middle of the screen) to show the configuration tool of the windows and background. User can set to each window if it will be visible or not (check the check box **Visible** to switch on):



Color can be set only for **Background**. The color of the background can be changed by clicking on the color square and selection of the new color:



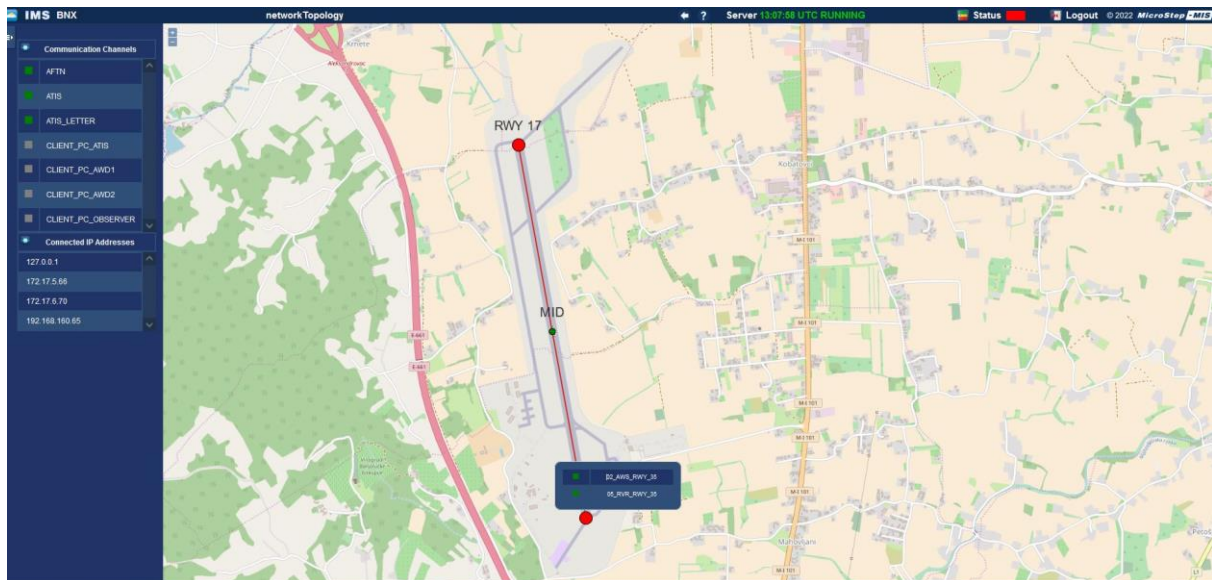
Network Topology

Network Topology is a tool for displaying all the communication channels and their status in relation to their location at the airport. The module is opened from the Main Menu after clicking on its icon.



Each communication node (measuring site/server location, etc.) is represented on the map as a color-filled point.

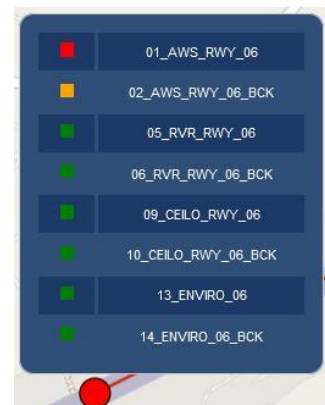
Clicking on the point opens the list of channels which are serving the communication from this specific site. For example, for Banja Luka airport, such points are RWY 17, RWY 35 and MID.



Next to the name of the channel there is a color point which shows the current status of that communication channel. State is marked with specific color which have their own meaning: ■ green = OK, ■ orange = warning, ■ red = error, ■ grey = inactive.

The point on the map representing the whole communication node is highlighted with the color which means the worst operational status from the whole list of the channels. If at least one channel has yellow/orange/red color, the point itself will have that color.

Clicking on the name of the channel will open Communication module of IMS where all additional information about the operation of the channel is present. Detailed information about that can be found in [Chapter 23 Communication](#).



On the left side of the screen, there is a list of the channels which can not be attributed to any geographical location. Each communication channel in this list contains current status information represented by its status color, analogous to the communication channels represented on the map.


Additionally, connected IP Addresses are listed underneath the list of communication channels. The list represents all IP addresses which are currently connected to the system.

Phenomena

Note: This screen is enabled only to users with permission **Phenomena** granted.



This part of IMS is designed for observers and users with *operator* or *admin* permissions to insert the observed phenomena (hydro-, litho-, photo-, electro-meteors, and other phenomena describing present weather) and their optional properties.

Phenomena can be inserted also automatically from present weather sensor, thunderstorm sensor, etc. The main Phenomena window contains date frame and a list of phenomena. Phenomena can be displayed for default interval **Last 2 days (live)** or for selected period after clicking on button **Select**. User can write in the **From** and **To** fields any custom period he wants to be displayed or select from calendar after clicking on its icon .

Phenomena can be ordered in two ways:

- oldest to newest – **Top-down** button
- newest to oldest – **Bottom-up** button

Select the **Site** (All Sites, MET Garden, RWY XX) for which phenomena will be displayed and click on button **Load data**. The list of all recorded phenomena in given period for selected site is displayed:

Note: Phenomena detected by the present weather sensor located on MID point of the runway are stored for the Site “MET Garden”.


The list of observed phenomena is divided by days in sections, so that user can easily count phenomena for given day. Each row in Phenomena list corresponds to one phenomenon, and contains:

- * – open mark – asterisk marks opened phenomena that are lasting and were not finished yet
- Name** – name of phenomenon (e.g. **Haze**). See table below for full list of available phenomena. There is a picture - international symbol of the phenomenon, before the name.
- Start** – start time, must be within given day
- The following attributes are usually filled by observer after the phenomenon finished:
- End** – time when phenomenon ceased (ended). For some phenomena can be the same as start time. End time must be within the same day as start time.
- Int** – the maximum observed intensity of a phenomenon
- VC** – distant phenomenon
- Vis** – minimum visibility during occurrence of phenomenon
- Wind gust** – wind gust (direction, speed, time)

| | |
|--------------------|---|
| Dist | – distance of phenomenon (e.g. thunder) |
| Sq | – whether squall was observed with phenomenon |
| From | – incoming direction from which the phenomenon is moving |
| To | – outgoing direction to which the phenomenon is moving |
| Auto | – whether the phenomenon was written automatically by sensor (True) or it was inserted/corrected by observer (empty value). The list of phenomena that can be detected by automatic system vary according to sensor type used. |
| Site | – site where phenomenon was observed |
| Result code | – SYNOP 4677 Code, METAR 4678 Code |
| Note | – additional note |
| Del | – icon for deleting chosen phenomenon |

Note: Do not enter commas (,) into additional note field! Use other characters (space, dot). IMS data files contain comma separated values.

Entering new phenomenon

When observer noticed that a phenomenon begins, he should enter it into IMS as soon as possible. After clicking on **Start new** button, choose phenomenon in field **Phenomenon** and confirm/correct/insert the date/time⁴ when the phenomenon started. Save opened phenomenon clicking on button **OK**. Click **Cancel** to return to phenomena list and nothing will be saved. Choosing of phenomenon can be done via typing text or clicking on drop-down button .

Ending phenomenon

Additional properties of the phenomenon are allowed to be entered after the phenomenon finished (i.e. the end time of phenomenon is entered by observer).

Additional properties are:

Intensity – phenomenon maximum intensity

Distant – whether the phenomenon was distant (Yes or No)

Visibility – minimum visibility in km (e.g. 0.05 km). The complete list of intensity tables can be found in **Error!**

Reference source not found..

Gust – speed, direction, date – wind gust (speed [m/s], direction [0°-360°], date & time)

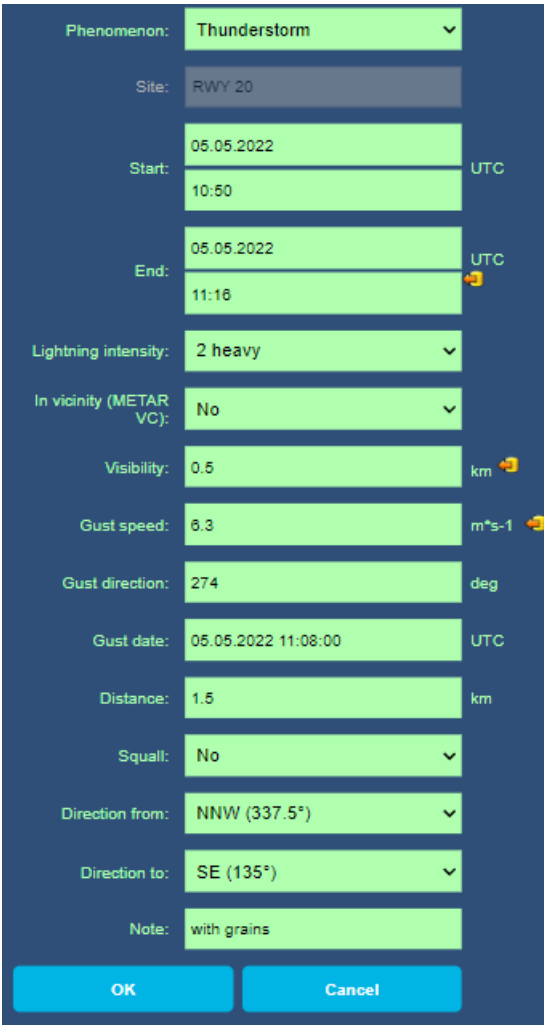
Distance – distance in km



Squall – whether squall was observed (Yes or No or empty)

Direction from – direction from which the phenomenon is incoming (N, NNE, NE, ...)

Direction to – direction to which the phenomenon is shifting (N, NNE, NE, ...)

Note – a short text (70 characters, without comma characters (,))



To load actual date and time to field **End**, click on a special button  next to it. Similarly, to load wind gust speed with direction and time of occurrence, click on a special button  next to field **Gust speed**.

⁴ Current date/time is offered by default.

Correcting phenomenon


To correct any attribute of a phenomenon, click on given attribute in list of phenomenon:

| * | Name | Start | End | Int | VC | Vis | Wind gust | Dist | Sq | From | To | Auto | Site | Result code | | Note | Del |
|---|---------|-------|-----|-------|----|-------|-----------|------|-----|------|----|------|--------|-------------|-------|------|---|
| | | UTC | UTC | | | km | m/s | ° | UTC | km | | | | SYNOP | METAR | | |
| 05.05.2022 | | | | | | | | | | | | | | | | | |
|  | Rain | 11:00 | - | 11:13 | 0 | 9.00 | | | | | | | RWY 20 | 61 | -RA | |  |
| 06.05.2022 | | | | | | | | | | | | | | | | | |
|  | Drizzle | 07:25 | - | | 1 | 10.00 | | | | | | | RWY 20 | 53 | DZ | |  |

After this, the Phenomenon Edit screen appears with cursor focused on field to be corrected. Click **OK** to save correction, or **Cancel**.

When any change is performed on phenomenon written automatically (from present weather sensor), the **Auto** flag value changes from **Yes** to empty value.

Deleting phenomenon

To delete a phenomenon, click on trash  at the end of line of given phenomenon and answer **OK** to the following question:

Clicking on **Cancel** the phenomenon will not be deleted.

Really delete?

Quality checking

Simple quality checks are implemented, while user tries to enter phenomena attributes.











The following checks are used:

| Only | Quality checking message |
|-------------|---|
| | Wind gust time must fall within phenomenon duration. |
| | End time cannot be greater than actual time. |
| | Phenomenon cannot finish earlier than it started. |
| | You cannot start phenomenon before it really occurred |
| | Visibility must be from <0...10> km |
| 44, 45, 146 | Visibility must be from <0...1> km |
| 10 | Visibility must be from <1...5> km |
| | Distance must be from <0...100> km |
| 198 | Distance must be < 3 km |
| 17 | |
| 102 | Gust speed must be from <10.6...99.9> m/s |
| 103 | Gust speed must be from <17.2...99.9> m/s |

ID numbers of phenomena for which the given check is applied are in column **Only**.

List of available phenomena

| Type | Symbol | ID | Name |
|--------------------|--------|-----|---|
| Lithometeors | | 04 | smoke, volcanic ashes |
| | | 05 | haze |
| | | 06 | (Widespread) dust |
| | | 07 | Drifting or blowing dust/sand |
| | | 08 | Dust devil (dust/sand whirl) |
| | | 13 | Dust storm |
| | | 13 | Sand storm |
| Fogs | | 10 | mist |
| | | 11 | patches of shallow fog |
| | | 12 | continuous shallow fog |
| | | 40 | fog at distance |
| | | 41 | fog in patches |
| | | 44 | fog, sky visible, no change |
| | | 45 | fog, sky invisible, no change |
| | | 48 | fog, freezing, sky visible |
| | | 49 | fog, freezing, sky obscured |
| | | 141 | fog going up |
| | | 399 | snow mist |
| Electrometeors | | 13 | lightning (IC, CG, CC, CA) |
| | | 17 | thunderstorm |
| | | 198 | thunder only |
| | | 114 | Saint Elmo's Fire |
| | | 184 | aurora |
| Other | | 19 | funnel cloud/tornado/(water) spout |
| | | 102 | strong breeze |
| | | 103 | gale |
| | | 181 | sun shining |
| Precipitation | | 36 | low drifting snow |
| | | 38 | blowing snow |
| | | 50 | drizzle |
| | | 56 | freezing drizzle |
| | | 58 | drizzle and rain |
| | | 60 | rain |
| | | 66 | freezing rain |
| | | 68 | rain with snow |
| | | 70 | snow |
| | | 76 | diamond dust (ice crystals, ice prisms) |
| | | 77 | snow grains |
| | | 78 | isolated star-like snow crystals |
| | | 79 | ice pellets |
| | | 80 | rain showers |
| | | 83 | rain with snow showers |
| | | 85 | snow showers |
| | | 89 | hail showers |
| | | 167 | freezing rain showers |
| | | 169 | ice pellets showers |
| | | 188 | snow pellets showers |
| Other hydrometeors | | 120 | dew |
| | | 122 | hoar-frost (silver thaw) |
| | | 123 | soft rime |
| | | 126 | glaze |
| | | 128 | ground ice |

| Type | Symbol | ID | Name |
|----------------|---|-----|--|
| |  | 129 | continuous snow cover |
| |  | 130 | soft or hard rime |
| Automatic only |  | 204 | haze/smoke/dust; visibility \geq 1km |
| |  | 205 | haze/smoke/dust; visibility $<$ 1km |
| |  | 230 | fog |
| |  | 232 | fog, has become thinner |
| |  | 233 | fog, no change |
| |  | 234 | fog, has become thicker |
| |  | 235 | fog, freezing |
| | UP | 240 | precipitation |
| Photometeors |  | 398 | mirage |

Templates for Inserting Observed Values

Observed and measured data should be regularly inserted into IMS templates by privileged user (with operator or admin roles). There are several templates, depending on the purpose of the station:

| Purpose | Template | IMS data file / GTS header [TTAAii] |
|-----------------------|---------------|-------------------------------------|
| Synoptic observation | SYNOP | SMAAii, SlAAii, SNAAii |
| Aviation observation | METAR / SPECI | SAAAii / SPAAii |
| Phenomena observation | Phenomena | SXAA89 |

AA is different for each country, e.g. AA = SQ denotes a message from Slovakia.


Entering observed atmospheric phenomena is described in [Chapter 0 Phenomena](#).

Selecting Date and Term of Observation

After clicking on any template icon, an interface for selecting date and term of the measured/observed data appears. There is displayed IMS Server date and time (**IMS Date**) in UTC.

User should select **Date (UTC)** and term **Term (UTC)** of the observation before he wants to edit it. By default, the actual date and actual term are selected (e.g. between 17:51:00 UTC and 18:51:00 UTC the term will be 1800 UTC for surface observation).

In case the IMS system is configured to enable automatic creating of the METAR reports, the bottom half of the screen allows to enable/disable AUTOMETAR either **always** (if **"Code always"** is checked) or **from selected term to selected term** (if **"From (UTC)"** and **"To (UTC)"** is filled). This feature allows easily switching on/off AUTOMETAR e.g. out of MET office working hours.

The older date can be easily selected using Calendar, when necessary. Just click on calendar icon  and Calendar window opens. Select month and year from available list using upper-right dropdown

button. To load current date, click on button **Today**. When you finish selection of date click on button **Close**.

In dependence on the configuration (see [Subsection **Error! Reference source not found.**](#)) it is not possible to enter all older terms. For example when configuration is set to allow editing of messages from last hour, it is possible to enter only messages that are not older than 1 hour. Even though it is possible to select each terms but those older than configuration allows can be seen only in “view only” mode. In this mode all the values that have been saved for that term are reloaded (dimmed) but it is not possible to rewrite them. The button **Code** allows only viewing calculated values, coded message, etc. but not sending or saving of the message.

After clicking on **Code**, the template opens or alert message is displayed.

In case of selecting no/wrong date or term the following alert messages appear:

term configuration missing
reference time missing
invalid form
selected term out of period
selected term too ahead
invalid date/time format

It is possible to save and send any observation again later, if corrections must be made. However, this should not happen often during normal operation.

To leave an interface for selecting date and time click on button **Esc**. You will be redirected to IMS Main Menu.

Inserting values into templates

To move through the fields use control keys (help is displayed in the bottom line):

Tips: **Tab=Forward** **Shift+Tab=Back** **Enter=Confirm** **F1=Help** **F12=Code**

Tab = Forward

Shift + Tab = Back

Enter = Confirm value

F1 = Help – to display context help, if exists for the given field

F12 = Code – to create coded data file(s)

Colors in fields of template

Wind gust kt

Fields displayed in **white** color are those which are empty and neither AWS sensors nor observer inserted any value there.

Wind speed 255 kt

Compulsory fields with missing value, or containing value out of range (wind speed 255 kt), or containing wrong value (e.g. when entered string where number is expected) are displayed with **red** background.

Cloud type

Some fields in template are disabled (dimmed in **grey** color) because they should not be reported at given observation term or under specific conditions (e.g. when total cloud cover is 0, then cloud genera fields are disabled). These fields are skipped by cursor, when moving between fields.

Humidity 042 %

Fields with **green** background are active and values were entered into them by observer or automatically. Values from AWS can be corrected, if necessary.

