

METAR AUTO Reporting Programme

The generation of METAR AUTO reports at New Zealand airports from automatic weather stations (AWS) has been in place for more than ten years. The automated programme provides objective weather observations coded to industry standards with a high degree of reliability. The following information provides background information on the measurement techniques involved.

The Technology

MetService currently operates a network of more than 37 aviation AWS at aerodromes around the country. The key elements of an aerodrome AWS are:

Wind speed and direction comes from an electronic ultrasonic wind sensor, normally mounted on a 10-metre mast adjacent to the runway to provide representative readings for the airport. The report contains the averaged direction and speed for the 10 minutes prior to the time of the observation.

Visibility (or *Meteorological Optical Range*). Visibility sensors utilise an infrared light transmitter and receiver to measure the amount of light scattering. The sensor makes a spot measurement at a representative site on the aerodrome. The visibility reported in METAR AUTO reports is averaged over the 10 minutes prior to the observation.

Present Weather Sensor combines data from the visibility sensor and a precipitation detector to identify various liquid and solid precipitation types as well as fog, mist and haze. This information is averaged over the 15 minutes leading up to time of the report. Weather occurring during the previous 15 minutes is coded as 'recent' weather. Because the sensor makes a spot measurement, 'VC' (vicinity) weather is not reported.

Thunderstorms. Information from the National Lightning Detection Network is used to determine the locations of thunderstorms across the country. Whenever a lightning discharge is detected within 8km of an aerodrome, the present weather condition 'TS' is added to the METAR AUTO report, while 'VCTS' is reported when thunderstorms are detected between 8km and 16km away from an aerodrome.

State of the Sky is measured using a laser ceilometer. The ceilometer detects up to three cloud layers simultaneously directly above the instrument. In compiling the METAR AUTO report, an average of the previous 30 minutes is used to represent the extent and height of each cloud layer.

Temperature and Dew Point are also measured electronically by a combined temperature and humidity sensor mounted in a standard meteorological screen.

QNH is measured by a precision electronic barometer.

The core of the AWS is the iSTAR data logger which processes inputs from all sensors and generates the METAR AUTO report every 30 minutes. The report is sent via MetService telecommunications infrastructure and distributed to users through a range of portals and data feeds.

The iSTAR platform also generates a data feeds of 1-minute values which are provided to ATC Control Tower display systems, and to MetAWIB VHF radio broadcast services at selected aerodromes.

Interpreting METAR AUTO

Although the code forms are very similar, there are some important differences in the METAR AUTO reports from manual METAR reports that pilots should be aware of.

1. Because AWS visibility is a spot measurement, directional variation in visibility are not reported.
2. Because ceilometers only view directly above the instrument and do not view the whole sky, AWS observations cannot categorically state that the sky is clear. Therefore METAR AUTOs report 'NCD' (No Cloud Detected) in places of 'SKC' (Sky Clear) reported in manual METAR reporting.

Furthermore, because ceilometers cannot determine cloud type, three strokes “///” are placed at the end of each cloud layer group to indicate that the instrument does not identify TCU or CB cloud types.

3. The situation with present weather is similar. The fact that ‘weather’ is not detected by the sensor is not an absolute guarantee that there is no precipitation, fog or other phenomena affecting some part of the aerodrome, so, when the AWS does not sense a reportable present weather condition, rather than the field being left blank, two strokes “//” are inserted in the present weather field.