Meteorological Service

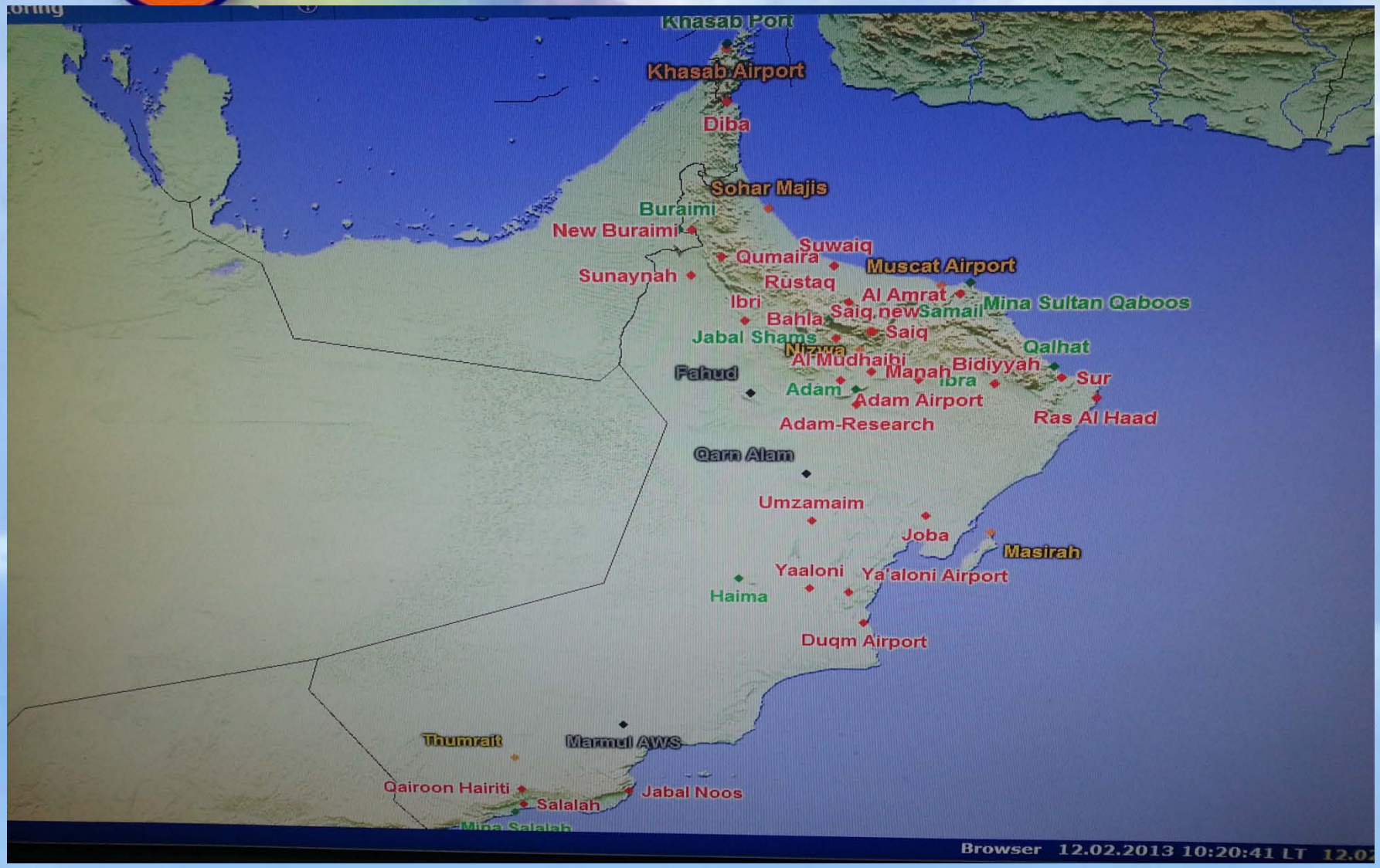
- The Meteorological Service in Oman was established in 1973.
- Oman joined ICAO in 1973
- Oman joined WMO in 1975.
- Meteorological Service is under the framework of the Directorate General of Meteorology and Air Navigation (DGMAN),Public Authority For Civil Aviation Ministry of Transport and Communications.

Meteorological **Service**

There are 42 surface observation stations That are distribution at all of the country. There are 8 of the station are manned and the balance. We have 2 wave Radar and one marine station . Now days starting a new project with installing 36 automated stations.

Station

Distribution Map Meteorological Stations



Case of Problem in observation Station

- There is no wind direction not change the reading
- First plane to visit the station with all tools, manuals and comparisons sensor and new wind sensor.
- Check the wind Van rotating and the Bering smooth ,check voltage from the logger to the sensor .
- There is no 12dc from the supply board on logger so connect the sensor supply from another port of the logger power board and check the wind sensor is working good..

Station Case

During the case problem

After the case problem (normal)

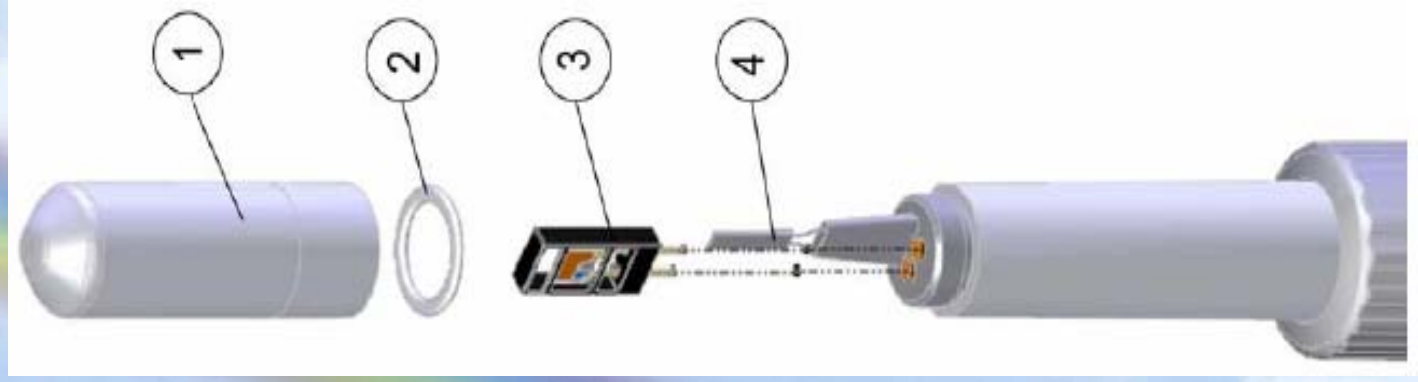
Vaisala HMP155

The HMP155 probe provides reliable humidity and temperature measurement in a wide range of applications

Humidity measurement is based on the captive thin film polymer sensor HUMICAP 180R

Temperature measurement is based on resistive platinum sensors (Pt100).

Both the humidity and temperature sensors are located at the tip of the probe, protected by a sintered Teflon filter.



Changing the Sensor

You can change the HUMICAP sensor yourself and the probe does not have to be sent in for service for a sensor change.

To change the sensor:

Remove the filter from the probe.

After removing the filter, check the O-ring and change it if necessary.

Remove the damaged sensor and insert a new one. Handle the new sensor by the plastic socket.

DO NOT TOUCH THE SENSOR PLATE.

After sensor change the humidity calibration must be done according to the instructions.

Attach a new filter on the probe.

Calibration Hmp155

The Vaisala HUMICAP Humidity and Temperature Probe HMP155 is fully calibrated and adjusted as shipped from factory.

Recommended calibration interval is one year.

Depending on the application, it is good to make more frequent checks. Calibration must always be done when there is reason to believe that the device is not within the accuracy specifications.

The recalibration is supposed to be performed in full-range, in calibration laboratory with known traceability to international standards once per 2 years at least.

Casella RG13 Rain Gauge

The Casella CEL Tipping Bucket Rain Gauge is a reliable and extremely robust transducer.

The body and funnel are made from aluminum alloy with an accurately machined septum ring at the top giving an aperture of 400 cm^2.

The tipping-bucket mechanism is mounted inside the body on a cast aluminum-alloy base equipped with fixing slots, three leveling screws and a spirit level.

Barometer PTB330

Vaisala BAROCAP Digital Barometer PTB330 provides reliable pressure measurement in a wide range of applications. Digital outputs RS-232 (standard) or RS-422/485 (optional) can be selected. Alternatively, analog outputs can be chosen between current and optional voltage signals. A local graphical display is available as well.

Cleaning

Clean the barometer enclosure with a soft, lint-free cloth moistened with mild detergent.

Calibration

The PTB330 is fully *calibrated* and adjusted as shipped from factory.

Calibration points depending on the pressure range of the barometer.

The standard factory calibration includes :
500…1100hPa
(500, 550, 650, 750, 850, 950, 1000, 1050 and 1100 hPa)

50…1100hPa
(50, 75, 150, 300, 500, 700, 900, 1000 and 1100 hPa)

WAA151 Anemometer Wind speed

0.4 ... 75 $m.s^{-1}$ Measurement range

< 0.5 $m.s^{-1}$ Starting threshold

2.0 m Distance constant

Characteristic transfer function

$U = 0.328 + 0.101 \times R$

(where U = wind speed [$m.s^{-1}$], R = output pulse rate [Hz])

Accuracy (within range 0.4 ... 60 $m.s^{-1}$)

with characteristic transfer function ± 0.17 $m.s^{-1}$

with transfer function $U = 0.1 \times R \pm 0.5$ $m.s^{-1}$

Periodic Maintenance

Cleaning

Heavy contamination in the vane, such as bird drop lets or ice will deteriorate the accuracy of the wind vane. Clean the vane when necessary.

Testing Proper Operation

The sensor will hold its accuracy in all conditions for 1 year. If the rains are mostly casual and moderate, and the atmospheric corrosion is typical, the sensor accuracy will remain for 2 years.

However, the ball bearings must be checked once a year and the sensor shaft rotated manually. To do this, remove the vane assembly. To ensure proper operation, the shaft should spin smoothly and it

Calibration

should not create any detectable noises.

on demand calibration wind directions sensors.

WAV151 Wind Vane Wind direction

0 ... 360°	Measurement range
<0.4 m/s	Starting threshold
±2.8°	Resolution
0.19	Damping ratio
0.55	Overshoot ratio
0.4 m	Delay distance
±3°	Accuracy better than

Pyranometer CMP 21

The pyranometer is designed for measuring the irradiance (radiant flux, Watt/m²) on a plane surface, which results from the direct solar radiation and from the diffuse radiation incident from the hemisphere above

The CMP 21 is a high performance research grade pyranometer, and is fully compliant with all ISO 9060 Secondary Standard Instrument performance criteria (highest possible ISO pyranometer performance category)

- **Maintenance**
- Once installed the radiometer needs little maintenance. The outer dome(s) must be cleaned and inspected regularly, ideally every morning.
- A periodic check is to ensure that the radiometer is level and that the silica gel desiccant is still coloured orange.
- When the orange silica gel in the drying cartridge is turned completely transparent (normally after several months), it must be replaced by fresh silica gel as supplied in the small refill packs.
- The content of one pack is sufficient for one complete refill. At the same time check that the radiometer mounting is secure and that the cable is in good condition.

Standards and Equipment for Calibration

We currently have calibration laboratory with basic calibration chambers. We are planning to upgrade these in the near future.

We are doing calibration for pressure sensors and temperature & humidity sensor at our Calibration laboratory.

Calibration Standards

This for pressure sensor calibration

Model : Rezipient 870
Manufacture : Th.Fredrichs &co Germany

Standard : Paroscientfic.in
Model : 745
Manufacture: U S A

Portable Standards

Ptb330(500JJ1100) Digital Barometer

Serial No.F5010001

Manufacture : Vaisala

Calibration Certificate

VAISALA

1 (1)
Certificate report no. H53-12080001

CALIBRATION CERTIFICATE

Before adjustment

Instrument	PTB330(500-1100) Digital Barometer
Serial number	F5010001
Manufacturer	Vaisala Oyj, Finland
Calibration date	23rd February 2012

The above instrument was calibrated by comparing the readings of the instrument to the factory working standard of Vaisala.

The pressure readings of the factory working standard have been calibrated at an ISO/IEC 17025 accredited calibration laboratory (FINAS), Vaisala Measurement Standards Laboratory (MSL), by using MSL working standards traceable to NIST.

Calibration results

Reference hPa	Observed hPa	Correction* hPa
500.01	500.25	-0.24
550.01	550.24	-0.23
650.01	650.22	-0.21
750.02	750.19	-0.17
850.00	850.14	-0.14
950.00	950.12	-0.12
1000.00	1000.11	-0.11
1050.00	1050.10	-0.10
1100.00	1100.09	-0.09

*To obtain the true pressure, add the correction to the barometer reading.
Interpolated corrections may be used at intermediate readings of the scale of the barometer.

Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
PPC4	476	2011-10-21	K008-U02090

Uncertainty (95 % confidence level, k=2)
Pressure ± 0.07 hPa

Ambient Conditions

Humidity	45 %RH ± 5 %RH
Temperature	23 °C ± 1 °C
Pressure	988 hPa ± 1 hPa

Technician

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Calibrations Standards for Temperature &Humidity

This for Temperature Humidity Calibration

Manufacture : Th.Fredrichs &co Germany

Portable Standards

HMP 76 Humidity& Temperature Probe

Model No. : C3540008

Manufacture : Vaisala

Calibration Certificate

VAISALA

Certificate report no. H52-12270042 1 (1)

CALIBRATION CERTIFICATE

Before adjustment

Instrument	HMP76 Humidity and Temperature Probe
Serial number	C3540008
Manufacturer	Vaisala Oyj, Finland
Calibration date	3rd July 2012

The above instrument was calibrated by comparing the readings to two factory working standards.
The relative humidity readings of the two factory working standards have been calibrated at the Vaisala factory by using dewpoint transfer standard. Dewpoint transfer standard has been calibrated at Centre for Metrology and Accreditation (MIKES) by using primary standard traceable to the National Institute of Standards and Technology (NIST).
The temperature readings of the two factory working standards have been calibrated at an ISO/IEC 17025 accredited calibration laboratory (FINAS), Vaisala Measurement Standards Laboratory (MSL) by using MSL working standards traceable to NIST.

Humidity calibration results

Reference humidity* %RH	Observed humidity %RH	Humidity difference %RH
0.2	0.2	0.0
11.5	11.5	0.0
33.5	33.4	-0.1
54.6	54.8	+0.2
75.5	76.2	+0.7
90.4	91.5	+1.1

Temperature calibration results

Reference temperature* °C	Observed temperature °C	Temperature difference °C
+22.1	+22.1	0.0

*Average of two references

Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
HMT337/RH	G0470117	2012-06-18	H52-12250003
HMT337/RH	G0470119	2012-06-18	H52-12250004
HMT337 / T	G0470117	2012-02-22	K008-V00314
HMT337 / T	G0470119	2012-02-22	K008-V00316

Uncertainties (95 % confidence level, k=2)

Humidity	±1.1%RH @ 0..15%RH, ±1.6%RH @ 15..78%RH, ±1.7%RH @ 78..93%RH
Temperature	±0.15°C

Ambient Conditions

Humidity	45 ± 5 %RH
Temperature	22 ± 1 °C
Pressure	1017 ± 1 hPa

Technician

DOC010024-L

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Technical summary report sultanate of Oman

- In Oman we have quite a number of automatic and semi automatic or manned stations spread out around the country.
- In these stations we mainly monitor the following parameters:
- Ambient air temperature, humidity, wind speed , wind direction, barometric pressure , precipitation, ground temperature , present weather sensors in some weather stations
- Our technical center is based at Muscat international airport. The number of technical staff has been seven persons for quite a long time. We have recently received nine new technical e staff.
- We also have a small technical center in the southern region of Oman at salalah which is mainly responsible for stations in that area.
- Since Oman is mainly a desert terrain with mountainous, sand, and wadis . rainfall is very scarce.
- The eastern side is mainly sea shore.
- Due to high temperature, humidity and dusty winds the weather sensors are greatly affected at most weather stations especially those based at the coastal areas.
- Due to severe weather conditions and mainly in summer we do visit our stations on routine basis for maintenance, repair and comparison checks to make sure units are up to date and accurate.
- Units with major faults are brought to workshop at Muscat for repairs.
- We currently have calibration laboratory with basic calibration chambers. We are planning to upgrade these in the near future.
- Our reference units and travelling standards are sent to centers abroad for calibration checks.
- We current program to install aws in every wilaya (region) several weather radars and sea wave monitoring systems.

THANK YOU