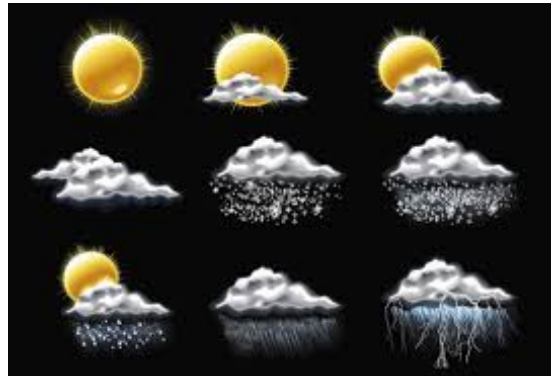


Weather monitoring status and plans @ Armazones



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UAB & CERES-IEEC

Central Calibration Facilities meeting
Barcelona 20-23 June 2016

Overview

The goals

- Provide the site with weather monitoring information to guarantee safety operation of the telescopes. Prevent equipment damage.
- Contribute to the site climatology and full atmospheric characterization of the site.

The strategy

- Acquire robust WS and weather monitoring instrumentation (24/365 with no failure for 30 years of remote operation)
- Redundancy
- Final selection and placement of the sensors is site-specific (Classic WS + anemometers + rain sensors + complementary instruments)
- Production: all equipment and implementation for methods that are part of the final observatory .

The Southern Site: Armazones

Pre-production

3.10.3.4.6	Weather monitoring
3.10.3.4.6.7	Complementary Instruments
3.10.3.4.6.7.1	Electric field mills
3.10.3.4.6.7.1.1	Establish usefulness
3.10.3.4.6.7.2	Dust counters
3.10.3.4.6.7.2.1	Establish usefulness
3.10.3.4.6.7.3	Accelerometers
3.10.3.4.6.7.3.1	Establish usefulness
3.10.3.4.6.7.4	National Rain radars
3.10.3.4.6.7.4.1	Check availability
3.10.3.4.6.7.4.2	Check possibility of integration in ACTL
3.10.3.4.6.7.5	Weather forecasts
3.10.3.4.6.7.5.1	Check availability
3.10.3.4.6.7.5.2	Check possibility of integration in ACTL

- ✓ Probably not needed. Still to be studied.
- ✓ Useful for aerosol modelling and feedback to operators
- ✓ Useful, although analysis still ongoing
- ✗ Not available for Armazones
- ✓ Useful, although no studies performed yet

Coverage: 100% :no equipment cost; only labour (FTEs)

Next actions (to do)

Push for usefulness studies

The Southern Site: Armazones

Production

			Whole CTA	Whole CTA	Armazones
10 COM	4.100.030.04.06	Weather monitoring	€ 374.868,00	€ 316.339,00	€ 161.347,00
10 COM	4.100.030.04.06.01	Classic weather station	€ 55.135,00	€ 52.484,00	€ 26.242,00
10 COM	4.100.030.04.06.02	Anemometers	€ 98.928,00	€ 83.226,00	€ 41.613,00
10 COM	4.100.030.04.06.03	Rain sensors	€ 68.051,00	€ 27.876,00	
10 COM	4.100.030.04.06.04	Complementary Instruments	€ 152.754,00	€ 152.754,00	€ 93.492,00

3 classic WS + 2 spares (1 from LSTs weather monitoring)

6 anemometers + 2 spares (3 recycled from LSTs weather monitoring)

9 rain sensors + 2 spares

Complementary instruments:

1 Electric field mill: 35.362,00

1 dust counter: 17.900,00

Rain radars: Not available

Weather forecasts: 6.000,00

Accelerometer: 34.230,00

Coverage

~ 0% !!!

Next steps

Ask Johannes for EoI data related to Weather monitoring.

Identify Institutes interested in collaborating.

Take advantage of Use cases and ACTL integration from the Northern site.



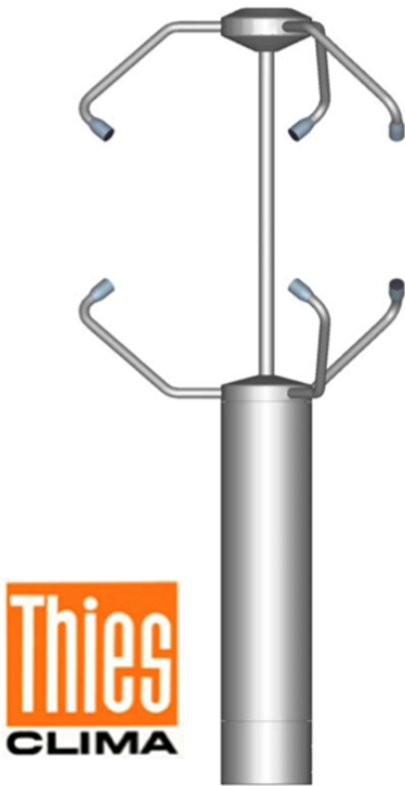
✓ Sensors (almost) decided

Standard Weather Stations



✓ Sensors (almost) decided

Ultrasonic anemometers 3D



4 Maintenance

As the device does not have moving parts, i.e. is not subject to wear during operation, no servicing is required.

5 Calibration

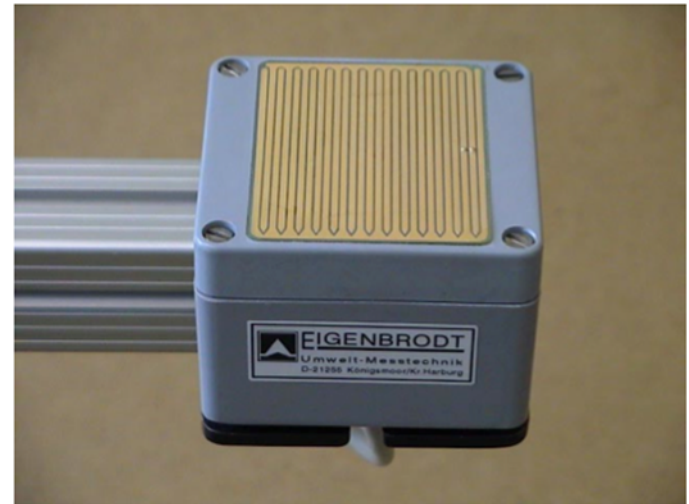
The ultrasonic anemometer does not contain any adjustable components such as electrical or mechanical trimming elements. All components and materials used show invariant behaviour in terms of time. This means that no regular calibration is required due to ageing. Errors in measured values are only caused by mechanical deformation of the transformer arms and associated changes in measurement path lengths.

The acoustic virtual temperature can be used to check the measurement path length. A change of 0.17 % in the measurement path length and thus a measuring error of 0.17 % for the wind velocity corresponds to a deviation in the virtual temperature of 1 K at 20°C.

With a 6 K temperature deviation there is thus a measuring error of approx. 1 % for the wind velocity

✓ Sensors (almost) decided

Rain sensor: PRECIPITATION SENSOR – IRSS 88 from Eigenbrodt



EIGENBRODT