

APPLICATIONS FOR A NEW TECHNOLOGY: COMPACT WEATHER RECORDING SYSTEM

P.R. Rodeck

Envirodata Australia Pty Ltd, PO Box 395, Warwick, Qld 4370

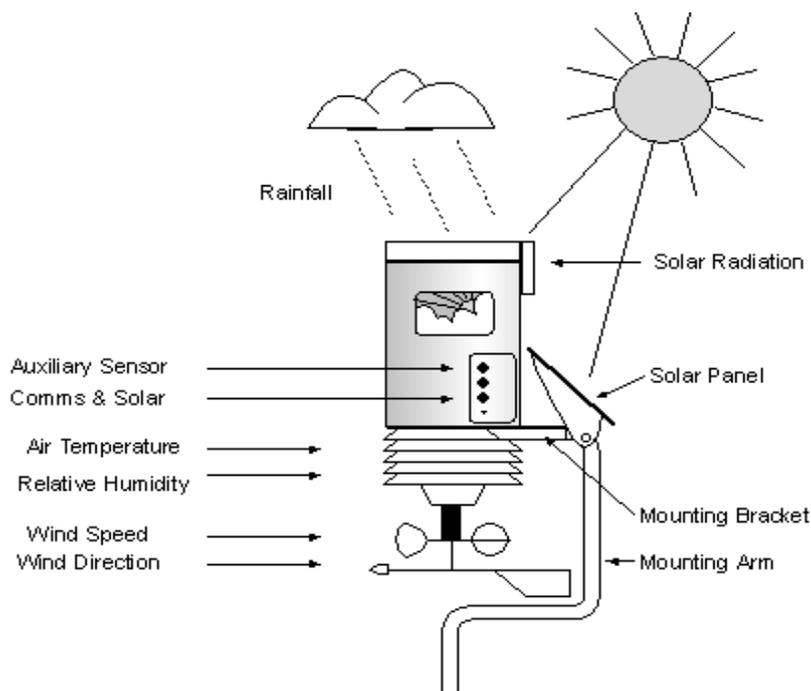
INTRODUCTION

Envirodata has supplied over 1200 automatic weather stations to the agricultural research market over the last 14 years. While we have tried to make our weather stations as simple to install and use as possible, many competitors have aimed to reduce their costs, and in so doing, have required the user to have some knowledge of electrical wiring, mechanical assembly, software programming, and a degree of ad hoc-ery!

To further our approach, the logical next step was to develop an all-in-one system which required minimal installation, was easy to use and move around, and which would have a wider application than the scientific/agriculture research field.

NEW TECHNOLOGY

The new automatic weather station which has resulted, the WeatherMaster 2000, is a compact single unit with an integral fixed set of the six most commonly used sensors. An optional extra sensor from our existing range can be connected and mounted outside the main housing. The standard sensors measure and record air temperature, relative humidity, rainfall, solar radiation, wind speed, and wind direction. The system is solar powered.



For growers and researchers alike, this new system is much easier to install, because it is delivered as one major item, which mounts on its question-mark bracket by two bolts. This bracket is then attached to the accompanying pole by one bolt. All that remains to be done is to slide the wind vane and cups on to the central shaft of the system, tighten them up, attach the solar panel to the bracket, and align the system to North. An equivalent modular system has sixteen major items, plus cables and dozens of screws, nuts, and bolts, to be connected and assembled.

This simplicity also means that returning the unit for periodic service is quick and easy. Moreover, where a system must be moved from site to site, or carried by hand into a relatively inaccessible area, the WeatherMaster 2000's light weight [7 kg compared to 35 kg for an equivalent conventional system] and portability become important.

In keeping with previous Environdata weather stations, the system is supplied pre-programmed so that it can be used effectively immediately, and its multiple memory method is such that no user intervention is required to maintain it. That is, the memory always holds the most recently recorded data in preference to older data. That is, collecting the data is optional!

The internal software includes self-diagnostics for the sensors, such that any out-of-range readings are identified in a separate diagnostics memory. The fact that there is a problem requiring attention is also highlighted by an external indicator, which changes its flash rate. The software also uses a unique data compression method that eliminates storage of repeated and constant readings. This means that from 3 to 5 times the effective data storage is possible between downloadings.

Currently, a simple menu data collection system has been written as a DOS-based programme that will suit all computers, including older DOS-based laptops. Under development is a Windows-based programme which includes data analysis and presentation that will suit today's generation of IBM computers.

RISK MANAGEMENT

For researchers, weather data is an essential part of the research process, and weather stations are the norm these days. For a grower, weather data is only useful if it can be converted to practical management advice. In many instances, the cost of suitable equipment is relatively small compared to the value of a crop. The real benefit is the opportunity to produce a better crop or minimise the risk of losses. This trend will continue as growers become more scientific in their approach. As other variables such as soil, nutrients, varieties, and moisture are better managed and contained, weather will increasingly be seen as the major uncontrolled variable.

APPLICATION EXAMPLES

The WeatherMaster 2000 is being quickly adopted by researchers where the standard weather data it collects is sufficient for their needs. If more detailed study with extra sensors is required, then Environdata's traditional modular systems are more appropriate. Additionally, this compact station provides a convenient means of micro-climate study which is also being utilised by some researchers.

In terms of growers, horticulture is the initial major area of use of weather stations. Here, detailed weather data can provide immediate returns through prediction of germination of fungal diseases. For horticulturalists, the cost-saving in sprays is minimal compared to the cost of the loss of production. Clearly, risk management is the major issue.

The rapid expansion of Australia's wine industry has led to the development of new vineyards in new geographical areas where no previous local weather data is available. Recent technical publications showing the relationship between day degrees, sunshine hours, and appropriate grape varieties, have highlighted the need for weather data. Tables are also available showing optimum grape varieties for a range of weather conditions in the last month of ripening. A recent survey showed that 70% of growers wanted access to more weather data and that this was not linked to spray control requirements.

Major Australian apple growing areas have steadily adopted weather station data interpreted by researchers, as a means of controlling spray regimes for Black Spot. Recent developments include the set-up of 2 to 5 weather stations in an area to make this data more localised and therefore more precise for a given location. However, this data is not directly accessible by the growers and still needs researchers to interpret and disseminate it.

Talking of risk management, litigation seems to be a new growth industry and one in which we would prefer not to participate! For this reason, we recognise that our systems must provide advice only. The grower is still required to make the final decision. Technically, it is possible to develop a system with just a red and green light for Spray or Don't Spray. However, this would leave us wide open to attack.

Forestry and bushfire management is another area that is indicated for this new weather station system. Rapid deployment of weather stations around the perimeter of wildfires is a strategy currently being developed. In particular, temperature, relative humidity, wind speed, and wind direction are all critical factors in fire management and personnel safety. Local weather data is also used to obtain more reliable local forecasts from Bureau of Meteorology forecasters.

The WeatherMaster 2000 is also ideally suited to monitoring of weather conditions immediately prior to and during prescribed burning. In particular, temperature, humidity, and wind speed are critical to the rate and intensity of the fire, and this intensity might determine not only whether the fire is controllable but also affect the rate and species of regrowth.

CONCLUSION

For researchers, weather data is essential and the WeatherMaster 2000 provides a simple and convenient tool where basic weather data is required.

For growers, local weather data is only of value in terms of short and/or long term economic advantage gained as a result of using it. Any system used to supply such data needs to be convenient to use and readily accessible, and must provide not only the weather data itself but also relevant management advice. For this to be possible, the weather station equipment must be integrated with software which is based on basic research proven in the field.

WeatherMaster 2000 V1.08 1995/10/19 9508-0100

Envirodata Compact Weather Data Recording System

1995/10/24 09:40:41

#01 AVERAGE 01 Air Temperature

#02 AVERAGE 02 Wind Speed

#03 CURRENT 03 Wind Direction

#04 AVERAGE 04 Solar Radiation

#05 AVERAGE 05 Relative Humidity

#06 TOTAL 06 Rainfall

1995/10/21,08:00:00,0018.3,0006.9,00096.,00261.,0072.5,0001.2

1995/10/21,09:00:00,0022.2,0003.7,00270.,00220.,0053.0,0007.6

1995/10/21,10:00:00,0023.5,0000.0,00342.,00001.,0046.9,0002.4

1995/10/21,11:00:00,0025.7,0000.0,00006.,00005.,0043.2,0000.2

1995/10/21,12:00:00,0026.7,0000.0,00288.,00008.,0038.0,0000.0

1995/10/21,13:00:00,0027.4,0000.0,00288.,00010.,0035.5,0000.0

1995/10/21,14:00:00,0027.8,0000.0,00054.,00007.,0035.4,0000.0

1995/10/21,15:00:00,0028.0,0000.1,00354.,00005.,0035.1,0000.0

1995/10/21,16:00:00,0028.3,0000.0,00006.,00010.,0034.3,0000.0

1995/10/21,17:00:00,0030.3,0000.0,00348.,00014.,0029.3,0000.0

1995/10/21,18:00:00,0028.7,0000.0,00348.,00014.,0032.6,0000.0

1995/10/21,19:00:00,0026.3,0000.0,00348.,00000.,0038.9,0000.0

