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Environmental data acquisition for the global network

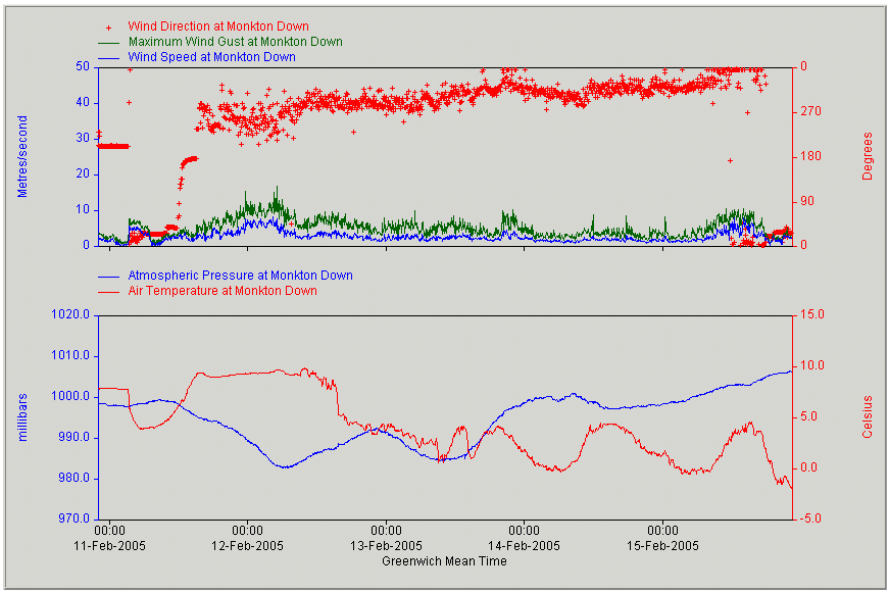
ARTEMeS

A Real Time Environmental Measurement System

ARTEMeS is a global, web-based, real time measurement and display system for environmental data. Designed with the twin aims of enabling true world-wide data acquisition and display of results, with the ability to handle measurements of almost any type, ARTEMeS allows environmental data to be viewed remotely using highly interactive displays.

Data such as meteorological and oceanographic parameters are acquired directly from instrumentation and sent across a corporate network or the Internet to an ARTEMeS server using small micro-controllers. The absence of conventional computer hardware ensures that security issues such as hacking and tampering are minimised.

ARTEMeS allows complete flexibility in the type of data to be acquired; a single measurement may comprise a simple value, such as temperature or pressure; or be much more complex, such as a photograph or binary data block from an intelligent instrument. Measurement sets may comprise any combination of measurement types, and additional data types may be added without compromise.



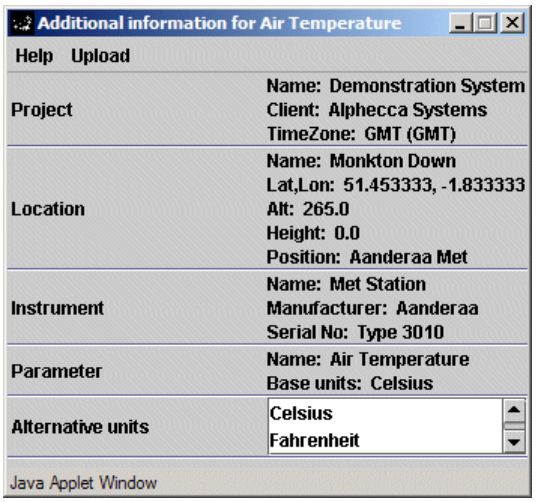
ARTEMeS displays are interactive, allowing a user to easily change scales, read the values of data points and access metadata.

A series of frontal systems measured by an Aanderaa Met Station (left)

All data within ARTEMeS are inseparably linked to vital metadata that fully describe the measurements.

These contain details of measurement location, timezone, instruments, sensors and units as well as others such as calibration dates and alternative units. A subset of this information is available on every display.

Subset of metadata available from every display (right)



Alphecca Systems
www.alphecca.co.uk
Stephen.andre@alphecca.co.uk
+44 [0] 1672 539641

2 The Beeches
Winterbourne Monkton
Swindon UK
SN4 9NL

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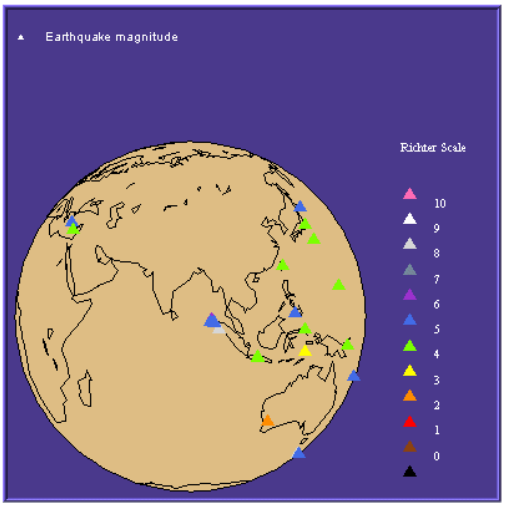
ARTEMeS is a multi-project, multi-user system; access to each item of data is controlled using a hierarchy of users and usergroups, with individuals identified by username and password.
Data may only be accessed by authorised users.

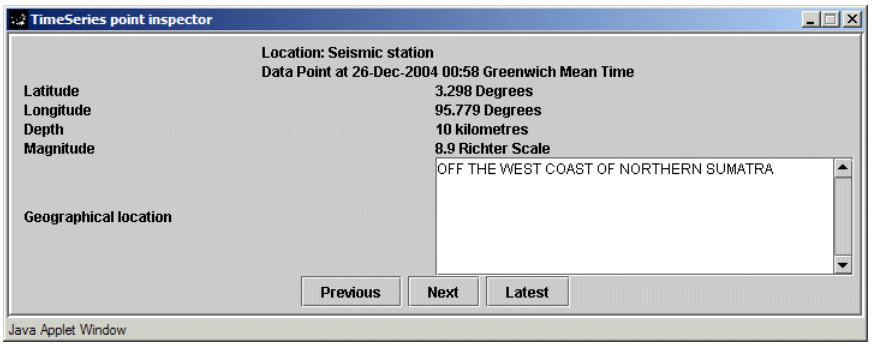


ARTEMeS displays have been carefully designed to be both intuitive and use strong mathematical and scientific principles. A time series of location data, for example, may be plotted on a globe that can be rotated using the users' mouse.

Seismic events world-wide are shown in this plot (left) The earthquake that generated the Asian tsunami of 26 December 2004 can be seen near the centre of the globe.

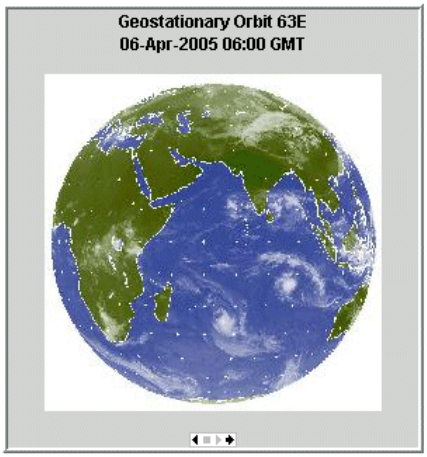
Individual points of a time series may be inspected by a mouse click on the point.

The TimeSeries inspector allows the individual points of a time series to be inspected. (right)



Type-specific displays are used to view complex data types. A time series of photographs, for example, may be viewed singly or as an animation using the photograph display.

Other complex data types include oceanographic current profilers, text fields and raw data blocks, while others may be easily added.



Infra-red satellite images from Meteosat 5 are shown in this display. The sequence of images may be viewed as a movie using the animation buttons.
(left).

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ARTEMeS is not restricted to the acquisition and display of environmental data using the Internet, but offers a number of other benefits:

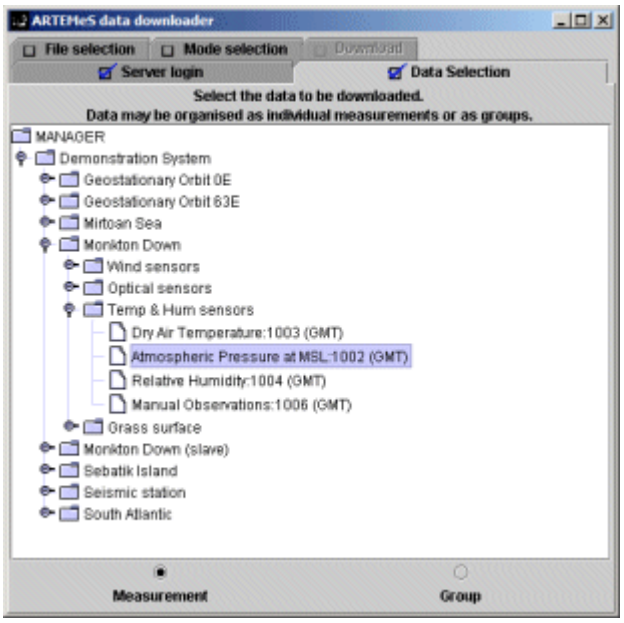
Automatic tasks can be run at regular intervals to provide data management, export or reporting functions. For example, a fax or e-mail containing a data summary may be sent automatically to an interested party, or data may be exported to another computer for further processing. Automatic tasks are defined and held on the central ARTEMeS server, but are executed on a separate machine that can be located anywhere with network access. This means there is almost no restriction on the functionality that can be provided by this means.

ARTEMeS servers may be chained together, so that data are acquired from one server by another. This can be used to provide a degree of redundancy and local autonomy in the event of network failure, with any missed data being automatically infilled when the fault is corrected.

Measurements may be accessed using a low-cost mobile phone having WAP technology. Values of selected measurements are available to authorised users anywhere, anytime (subject to suitable mobile phone coverage). This facility can provide valuable information to personnel in the field.

A typical WAP-phone display is shown in this image (left).

A user may download his data directly from the ARTEMeS server for post processing using a standalone program held on the server. After entering his login details, the program provides the user with a choice of data to which he is authorised, before downloading to a local text file. More complex data, such as images, are downloaded to separate files referenced by a text file.



Data Downloader program allows a user to download his data to files (right).

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Data may be entered into ARTEMeS manually using a web-based form, enabling measurements to be acquired even from un-instrumented sites. Once acquired, data are handled in exactly the same manner as those from automatic instruments. Manually-entered data may be measured values or text, allowing visual observations or comments to be acquired and accessed.

For more information about ARTEMeS, contact Stephen André of Alphecca Systems.

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