

General Meteorological Applications

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Introduction

The workstation project at the Danish Meteorological Institute started out in 1990 when the danish weatherservice was reorganized. The old Meteorological Institute was joined by Civil Aviation weatherservice and the military weatherservice to form the Danish Meteorological Institute.

The 3 different weatherservices had different equipment, and it was decided to have a common hardware platform, a workstation.

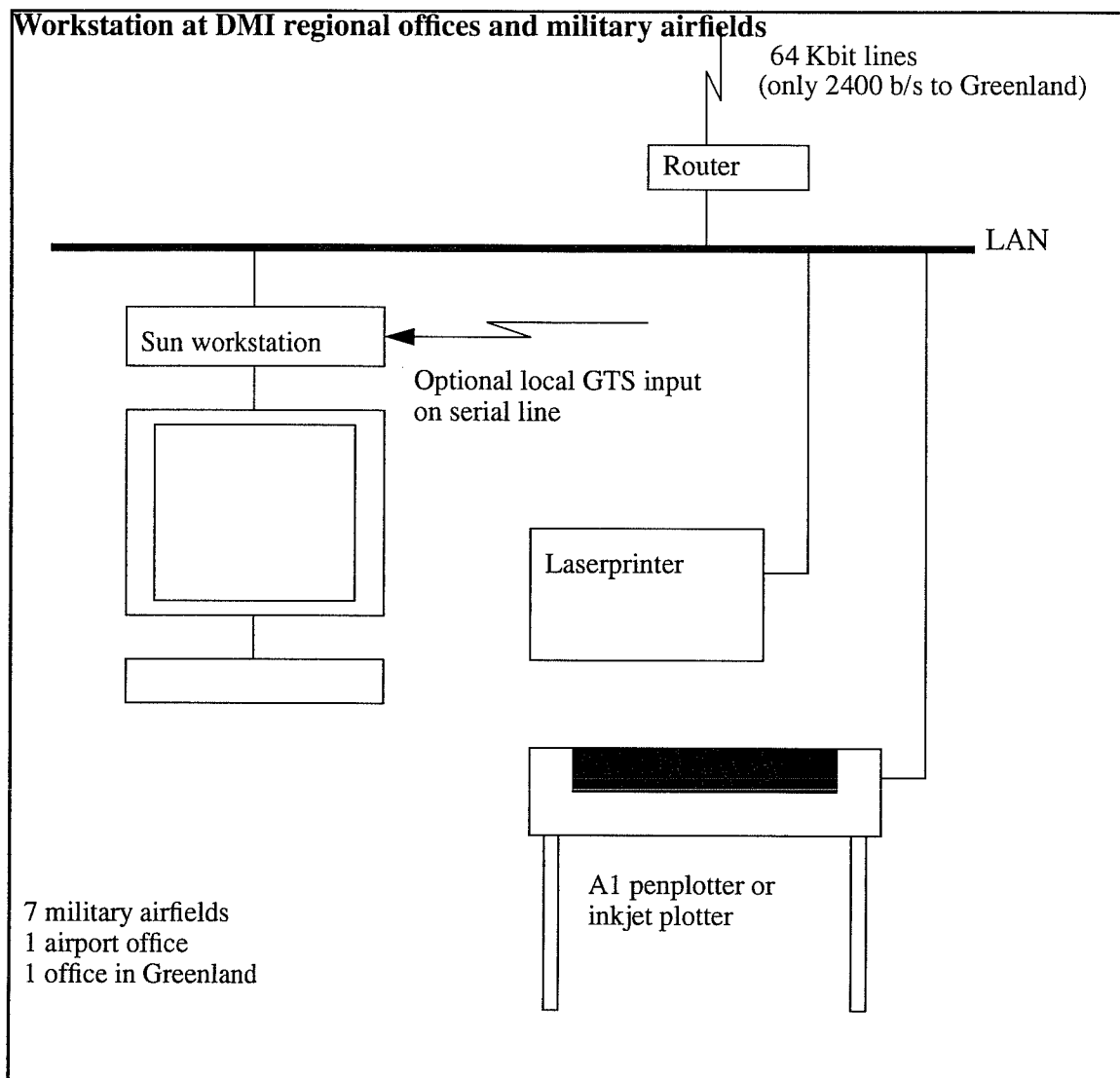
In the beginning a lot of older equipment had to be replaced by applications on the workstations as fast as possible. In that way we got the presentation for Meteosat and Noaa images in replacement for old dedicated hardware, that was very expensive to run. The old fax receiver was replaced by an application on the workstations and dedicated radar terminals was also replaced by a workstation application.

In 1992 all regional offices and military airfields had workstations installed and they have now access to the same information as the forecasters in the central office in Copenhagen.

At the moment we have around 45 workstations running the operational applications. This number is still growing and includes workstations at the national television headquarters, the Copenhagen University Geophysics Department and the Air Traffic Control Centre.

Workstations

A typical installation for one forecaster in a regional office or military airfield consist of a Sun workstation with a penplotter and a laserprinter. On the workstation you find applications for presentation of observations, radar images, satellite pictures, numerical models and digital fax.



All our workstations are from Sun, but we use various models IPC, IPX, Classic and SPARCstation5. The common operating system for all workstations is Solaris 2.4 (some still Solaris 2.3 and a few are still running SunOS).

Data for the applications is distributed to all workstations and stored on the local disk to make access fast. This also makes it possible to have everything running during a short break in the communication lines.

With the introduction of new tools to generate products, there is a growing need for more than one screen on the workstation, so in the central weather service all forecasters have a workstation with 2 monitors.

Applications

All applications have been developed in close contact with the users, resulting in fast implementation of any good ideas from the forecasters.

Numerical Models

Presentation of pre-processed PostScript files that can be combined from different input files and animated. Each product is only generated once and then reused in combination with other, f.x. surface pressure combined with 850hPa temperature, precipitation or wind. At the moment NCAR Graphics is used to produce PostScript files, but a change to MetView is planned.

ObsShow

Presentation of observations in SYNOP, TEMP, METAR, SFLOC code. Data is presented on a user defined map with zoom facility. Tempdiagrams and cross-sections can be presented from all TEMP-stations.

Radar

Images from the danish radar net every 10 minutes.

Satellites images

Images from Meteosat and Noaa satellites with animation of Meteosat images. In near future fog-detection and cloud temperatures will be included for Noaa.

Digital Fax

Fax products from Bracknell and our own products.

Lightning Detection

Data from the danish lightning detection system.

Plotting of SYNOP maps on inkjet or penplotter

Inkjet plotters have taken over all production of plotted maps at the central office, reducing the need for support staff. The maps are based on the Digital Chart of the World and the resulting PostScript files are 2-4Mbytes which can be sent to the plotter in 2-5 minutes. The actual plot takes around 5 minutes (A1 size, draft quality). TEMP-diagrams and upperwind charts can also be produced in this way.

Apart from these general applications, there are several specialized applications for production of television weathermaps, prediction of flooding situations, ship routing etc.

Semiautomatic Systems

The demand for forecast products is still growing, so it is necessary to make the production more efficient. One way to do this is to make more directly use of the numerical models. We have developed a semiautomatic tool for production of forecasts for sea areas that present the forecaster with a proposed forecast text directly from the model. With this tool, the forecaster can graphically edit wind and weather information and let the computer generate the forecast text in different languages.

The system is currently used for the generation of forecasts to a tourist telephone service, but is planned to become the main tool for production of sea area forecasts within the next year.

The TAFmonitor is a tool for the forecaster who issues taf's. Currently the application checks the observations (METAR and SPECI) and warns the forecaster if a TAF should be amended. The system also checks the syntax of a new TAF issued, so that no TAF can be sent out with a syntax error. In the future an automatic suggestion based on HIRLAM may be introduced.

Development Tools

All applications are designed with the Motif toolkit using XDesigner. The code is written in C or C++.

Data formats are different for different data types and everything is stored in the Unix file system. In the future GRIB and BUFR will be used for more and more data types.

All output to printers and inkjet plotters is in PostScript format. For pen plotters HPGL is used.