

SYNERGIE : A WORKSTATION FOR OPERATIONAL WEATHER
MONITORING AND FORECASTING

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Summary : Synergie is a French project of meteorological workstation for weather monitoring and forecasting. The goal of the Synergie project is to provide forecasters with the whole available information (particularly any kind of graphical images), to help them to select, display and combine the various sources of information, to assist forecasters in producing final products (charts, messages) and to facilitate the man-machine communication through a friendly user interface. The first step of the project, called Synergie_0, was to implement a reduced set of functionalities in order to replace old systems in the regional centers and to begin a concrete dialog with forecasters. We hope this step will help our end-users to learn how to use a modern workstation, to understand what they can expect from a machine and what they cannot, and that it will maybe start a graduated evolution in their working habits.

This sub-project is planned to end in december 91. Just now forecasters can display observation plotting, vertical profiles, chronological evolutions for one parameter and very soon model outputs. We also implemented an alarm system to inform them in case of special phenomena. From a technical point of view we use UNIX, C, ORACLE for data base management, MAGICS as often as we can, X-Window and Motif for the user interface.

1. INTRODUCTION

During the last few years, forecasters assisted to an explosion of the amount of data they have to deal with due to many technical innovations. Forecasts improved already a lot but we reached a new locking because of the strict constraints of time forecasters have to respect. Recent hardware improvements make it possible now to design, for a very reasonable price, a system able to help forecasters in their daily work, without requiring from them to be computer science specialists or to memorize magic formulas.

Several projects in this way emerged from different national services, Synergie is the name of the French one.

2. SYNERGIE

2.1. Objectives of project

The aim of Synergie is to provide forecasters with an integrated interactive workstation.

Integrated because it will allow forecasters to access all types of information : observations, output fields from numerical weather prediction models, satellite and radar images, messages, charts or graphics issued from foreign meteorological services, climatological databases and mail.

It will offer classical functionalities of superimposition, animation, panning and zooming and some assisted drawing tools. It will allow local postprocessing, reprojection and emission to end users.

Interactive because we think the user interface has to be very friendly and the response time very short. The purpose is not to make a computer science gadget with a long string of menus to change colors or line types but to provide forecasters with what they really need for their daily work. Of course they should be able to customize for instance their graphics but the user interface has to be designed in a hierarchical way according to the usual activities of the users. At last, the forecast departement staff is numerous (because it works 24 hours a day), it has a big turnover and so the training has to be as short as possible.

2.2. Strategy

We chose to use standard software :

- UNIX as operating system,
- C, Fortran and maybe C++,
- TCP/IP protocols for files transfers,
- X-Window and Motif for the user interface.

We decided to use meteorological standards too, such as GRIB and BUFFER codes and to use MAGICCS as often as possible.

At last we will use a DBMS to manage data.

In order to facilitate the dialog between forecasters and the development team, we decided to implement as soon as possible some basic functionalities and to install a machine at the forecast departement. We call this sub-project Synergie_0.

The whole project is planned to finish at the end of 1993.

2. SYNERGIE_0

2.1. Objectives of the sub-project

The goal of this sub-project is to provide forecasters with a reduced set of functionalities but with real time data in order to involve them in the development of the Synergie project. The functionalities are :

- Observation plotting,
- Vertical profile display,
- One parameter chronological graphs,
- Alarms,
- Model output display,
- Messages display.

This subproject is planned to end in december 1991.

2.2 Development state

We installed a Sun sparc 1+ machine at the forecast department at the beginning of October with observation plotting on a restricted-area around France, vertical profiles all over the world, and one parameter chronological graphs over the world too for up to 10 days graphs.

We hope to implement very soon model output display and alarms.

The user interface is based on Motif but is still rough because we offer just now too poor functionalities to design a really sophisticated interface. It was designed with an interface generator called X-Designer.

At one time only one board of document definition is visible on the screen but several documents can be displayed. The user is responsible for cleaning the screen (of the documents he asked) the same way he is responsible for cleaning his desk. He can minimize the size of the documents or iconify them if he wants to keep them for a while or he can destroy them just as he throws papers to the dustbin.

Each time he asks for a document the application generates a process and he can ask something else meanwhile the first document is being elaborated. As soon as a process is created a small window appears on the screen with a clock as cursor to confirm that the command is in progress.

The data are managed with the data-base management system Oracle. All the data we receive are completely decoded and put away in the data base.

The strategy should be different of course for imagery. For GRIBs, we will test two strategies depending on the choice between keeping them coded or decoding them.

Our tries revealed that the performances of Oracle depend a lot on the customisation of the DBMS relatively to the data structures. Hopefully the DBMS offers tools that help a lot for this work.

Up till now response time is still suitable.

2.3. Users feedback

We let a grievance notebook near the workstation, and we consult it very often in order to debug, upgrade the application or just answer to the remarks as quick as possible in order to encourage forecasters to go on giving their impressions. Until now there were 3 types of remarks :

- some about the windowing system always more or less around the same point : How to grab a document which is under a stack? The problem in fact is that the desk metaphor has some limits : one can have up to thirty or fourty documents on a large desk, it is hard to manage such a number of windows on a screen, all the more that the user is more patient to look for a paper with his hands than he is to look for a window via the mouse. It could be possible to give tools to help the user to find more quickly a window (put all the windows of the same type in piles or grep windows with hints...). But the solution would rather be to train them to clean their screen very often. If the response time to get a document is good, it will be easier to create it again than to look for it across the screen. That is maybe the first evolution in the forecasters way of working we can expect from Synergie_0.

- The second type of remarks is about little graphics options : this is the type of upgrade we try to make very fast.

- At last they ask for new functionalities and we think that this is a good point.

We let a user guide of five pages near the machine and presented the system only once to the forecasters that were on duty at that time ; nobody else asked us how the system was working and they seem to use it : it is a proof of the "plus" of graphical user interfaces.

3. FUTURE DEVELOPMENTS

Until January 1992 we plan to finish the Synergie_0 sub-project and to make the global analysis of Synergie. 1992 and 1993 will be dedicated to the detailed analysis and coding of the project. The integration will be made by the end of 1993 and the beginning of 1994.

