

SUPERPOSITION OF IMAGERY AND NWP PRODUCTS FOR DISPLAY TO FORECASTERS

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1. Introduction

Over the past year, a team from the Forecasting Products Branch of the UK Meteorological Office has been developing a scheme for presenting, to forecasters at the Central Forecast Office at Bracknell, graphical displays of selected products from the NWP suite superimposed on imagery valid for the same time. The objectives of the scheme are:

- (a) to enable more effective intervention on model initial data
- (b) to facilitate checking of evolution of model during first few hours of operational forecast
- (c) (hopefully) to give forecasters more insight into atmospheric and NWP model structures by seeing them in combination operationally

2. Sources of data

(a) Imagery

Imagery data, which are produced by a variety of specialised computer systems, are collected together on the IBM mainframe as an 'image database': they include

(i) satellite imagery:

data from geostationary satellites is presently used:
METEOSAT (digital and analogue), GOES-E and GOES-W (analogue)

(ii) radar imagery:

from network of radar stations, calibrated, quality-controlled (part subjectively, part objectively)

(b) Numerical model output:

This is transmitted from the supercomputer (currently a CYBER 205) to the IBM mainframe at the end of the forecast as a series of field values on the latitude/longitude grid of the model, one field for each level of the model.

3. Display Hardware

Displays are generated on an IBM 5080 graphics device. This device has the usual vector-drawing facilities, and in addition offers a pixel display facility. It is difficult to program, but is one of the few devices which support high-speed (up to 2 Mbit/s) data transfers from an IBM mainframe.

4. Software development

Displays are generated over a fixed set of chart areas, each covering a specific area of the earth's surface in a specific projection (eg polar stereographic, Mercator). Imagery is reprojected and composited to cover these chart areas, the resulting reprojected imagery being added to the image database.

Selected model fields are subjected to an appropriate graphical realisation (eg contouring, or plotting as symbols), and the resulting graphics, projected on to the same set of chart areas as those chosen for imagery, are stored as graphical metafiles on a 'graphical products database', which has been created during the past year.

When the scheme was first mooted, it was hoped that it would be possible to implement it using GKS for the display software and a suitable metafile structure, eg CGM, in which to store both vector products and raster images. However, this has not proved possible as yet, for several reasons, including:

- the inefficiency of the standard FORTRAN binding for the GKS 'cell-array' primitive; on an IBM system, this requires us to use 32 bits per pixel
- lack of a CGM driver from our current GKS package
- inability of this package to generate images of more than 135 * 135 pixels

At present, therefore, different 'home-grown' formats are employed to store both kinds of product; and display software is written in low-level code for the 5080.

5. Experience to date, and present problems

The scheme will be offered to forecasters in the near future. Initial reaction from those who have seen the prototype has been favourable.

There are problems with response time: consequence of users sharing both databases and cpu resources to do pixel mapping

6. Future work

- gradual transfer to common metafile standard for both imagery and graphics, eg CGM
- large extension to imagery database with new satellite system

- large extension to products database -- many more fields, increase in model resolution
- display software entirely in GKS
- more powerful workstations offering better response time and allowing eg pixel mapping in hardware
- different connection to central databases -- LAN?