

A novel use of network computer facilities for GCSE coursework

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In my GCSE courses I decided to use a unique approach for my GCSE Information Technology and Geography projects by using the school's weather satellite receiving station. This approach allowed me to link Information Technology and Geography but at the same time complete a separate project for each course. As well as saving valuable time, I found the project more relevant.

Software and hardware

The Timestep receiving station is designed to run on an expanded RM Nimbus personal computer which contains disk drives, a silicon disk and a black and white monitor. The school made this available. A standard satellite dish is connected onto the Geography room roof and receives images from the *Meteosat* geostationary equatorial satellite. A wealth of software came with the system for manipulating the images, which was supplied by the manufacturers of the receiving station — Timestep. I mainly used *Timestep's Key* software because it had the least limitations, allowing me to receive images from virtually anywhere in the world.

Aim of the project

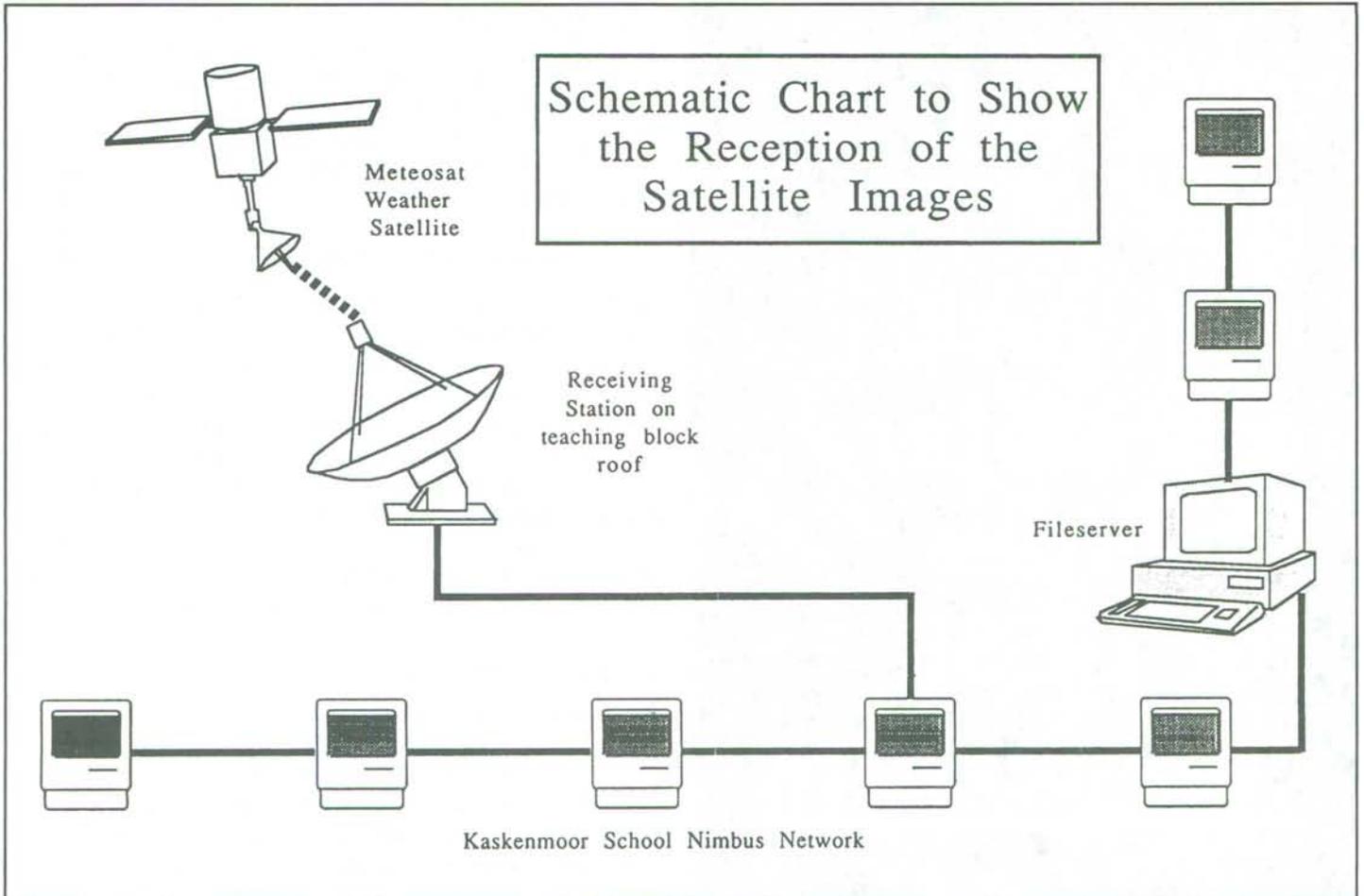
My main aim was to download satellite images from the geostationary satellite *Meteosat* of North West Europe onto disk. I hoped to do this in such a way that they were able to animate, showing detailed cloud movements over a given period of time. As an extension, I hoped to reproduce the black and white images into full colour for display on the standard Nimbus monitor. Copying captured images onto the school network was one way of making them widely available to other school departments and my fellow pupils.

Collection of the satellite images

Before I could even begin using the Timestep software, I had to plan out what I wanted to do. This involved using a timetable to make sure the software received the correct images. The timetable gave me the choice of receiving any format of image and virtually any place in the world that I wanted, which included visible light, infra-red, and water vapour images. I decided to use visible light images because they were the most understandable in my opinion. All images are transmitted every four minutes from the *Meteosat* satellite. I chose to receive pictures of North West Europe which seemed more relevant, three times a day for five days to get a full representation of that week's weather patterns. The next step was to instruct the *Key* program about my choices and also to tell it when to start and stop receiving the images. As an added extra, I provided a zoom into North West Europe so that I got a larger view of Great Britain which I was mostly interested in. All that was left to do at this stage was to sit back and let the *Key* software do the rest.

Processing of the satellite images

After five days, I returned to find raw images. They were of little value of their own. Animating them together provided interesting possibilities and was not difficult — a program called 'Makedis' did this for me. To the trained eye, these images were spectacular enough but they could only be



viewed on the special black and white monitor which was unsatisfactory if I wanted to transfer them onto the network. For this reason, I had to convert all the images to colour, so that they could be seen on a standard Nimbus monitor. This did not present too many difficulties. First I had to find a base map for North West Europe (a colour underlay). Luckily, *Timestep* had already supplied one but I could have easily made one using *Paintbrush*. The next step was to make room for the overlay on my disk. I had to delete image 15 for this. After I'd copied the overlay file across, I had to tell the software that there was a colour base map available and that I wanted to use it. A simple change to the *autoexec* batch file was all that was needed:

```
echo off
cls
echo 'Loading Colour Display ...'
Display/c
```

The /c parameter which you can see above instructs the program to go into colour mode. When the program is executed, it simply loads each image one by one, overlaying the colour base map each time. The result is a beautifully animated *colour* satellite sequence.

Printing out the colour images

The next stage in my project was to provide some hard evidence of the work that I'd done, which was in the form of print-outs. Black & White print-outs were less than spectacular, so I decided to use the converted colour sequence

and print each image out using the school's colour printer. This posed a problem because *Timestep's* programs only allowed you to print out on a black & white printer. I soon overcome this problem by using a program called *Screen Saver*, which allowed me to save each image separately onto disk in a paint program format. By using a dedicated printing program, *Image Management*, I could load the images and print them out using the program's colour printer driver. The results were spectacular and well worth the effort — every little detail of the cloud and land formation could be seen.

The diagram shows a flow chart of each of the steps I used when processing the raw satellite images to create an animated colour sequence and the print-outs to go with them.

How the two projects were pieced together

Finally, I repeated the whole process a few months later to obtain contrasting sequences. All that was left to do was to work out how to include my work in the Information Technology and Geography projects. For the former, I concentrated on the technical side of the project (altering batch files, converting image formats, overcoming printing problems etc.) and for the latter I concentrated more on the geographical side, creating hypotheses, critically comparing the two different sequences and adding weather fronts to the print-outs. The geographical side was more time consuming but extremely interesting.

□ Future developments

During my projects, I only touched the surface of *Timestep's* software. There is much more to explore, for example, it is possible to have a stored image on the computer screen and move a box across it showing where you want to zoom in, next time you receive that area. This is called a *roving zoom*. Also it is possible to alter the grey shades of the picture that you will receive, to account for the varying light and temperature conditions, depending on the time of year. This will hopefully give a clearer, crisper image. Finally, I would eventually like to receive zoomed images from other areas of the world, creating my own base maps for them, so that they can be displayed in full colour.

Flow chart showing the processing of the satellite images.

