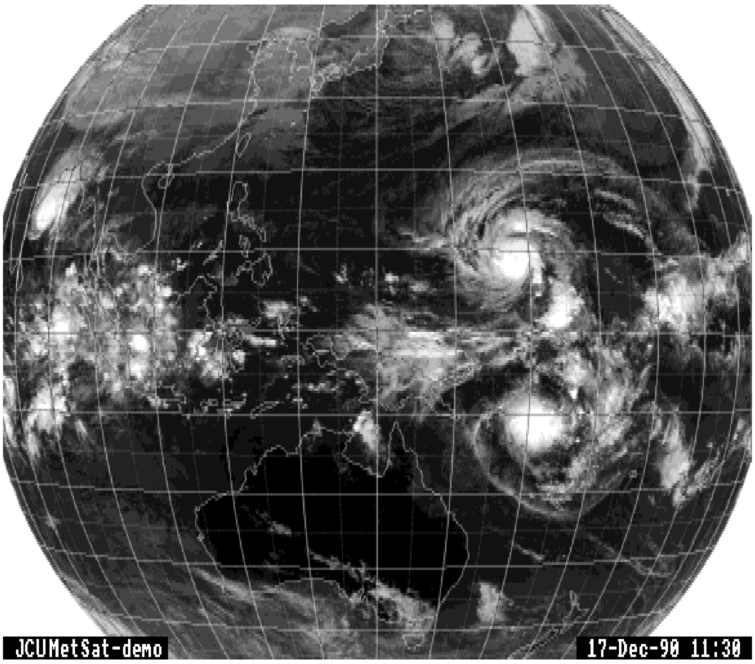
JCUMetSat

Weather Satellite Receiving System



Pasted globe produced with the JCUMetSat system.

The JCUMetSat Weather Satellite Receiving System allows the user to:

Receive Weather Facsimile (WEFAX) signals direct from Weather Satellites, avoiding costly landline charges and improving availability.
Cut and paste the resulting pictures to show the globe and regions of interest.
Display pictures singly or as an animated sequence.
Display pictures in black and white or in a user defined colour scheme.
Show animated sequences at rates from one per 4 seconds to more than 57 pictures per second for an Amiga 3000 or an Amiga 4000.
Show a picture sequence of up to 44 pictures for a 3 Mbyte computer and in excess of 400 pictures for a 18 Mbyte computer.
Directly broadcast the pictures within minutes of reception.
Print the pictures from within the software.

In addition the software is very user friendly with context sensitive help screens being available by simply pressing the *Help* key.

The system uses a low cost computer with a television standard (PAL or NTSC) display. Direct broadcasts can be made by fitting a Broadcast quality GENlock board.

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The JCUMetSat Receiving System is a system for receiving, recording and displaying the Low Resolution Facsimile signals transmitted by the Geostationary Weather Satellites. The system is developed by the Department of Electrical and Electronic Engineering at James Cook University of North Queensland, Townsville, Australia.

The JCUMetSat system allows the signals to be received directly from the satellite, thereby avoiding costly landline charges. The complete system is shown in Figure 1. The hardware consists of a satellite dish and down converter, the JCUMetSat VHF receiver hardware and an Amiga computer. The down-converter converts the transmitted signal to a signal in the 137-138 MHz frequency range. This signal is then fed into the JCUMetSat receiver, which converts the Meteorological Satellite signals into an analogue Facsimile signal. The receiver then digitises the resulting Facsimile signal and sends these to the computer using a standard parallel printer cable. The computer interface is fully opto-isolated.

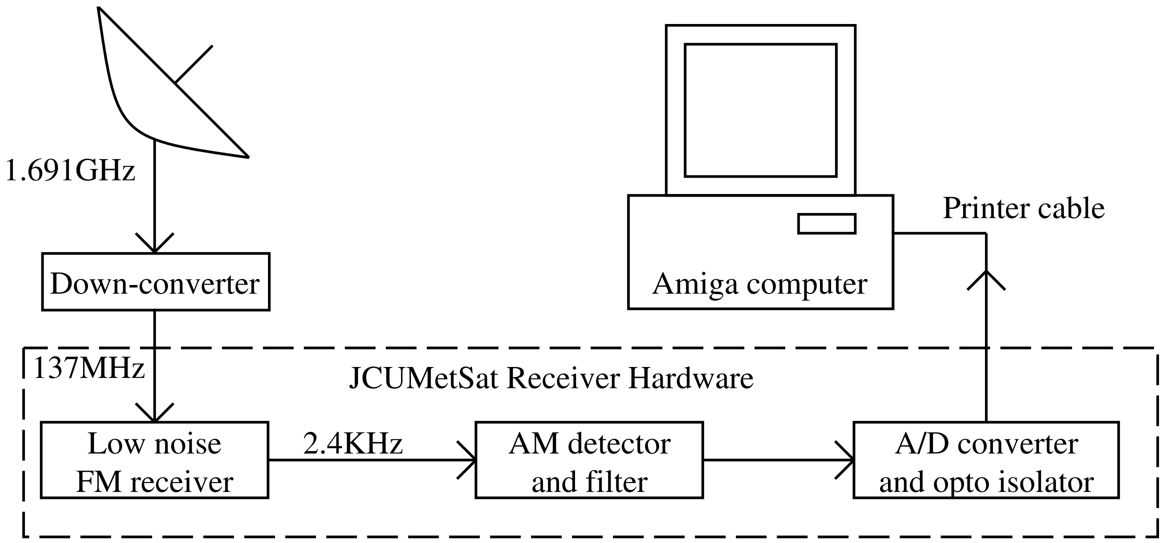
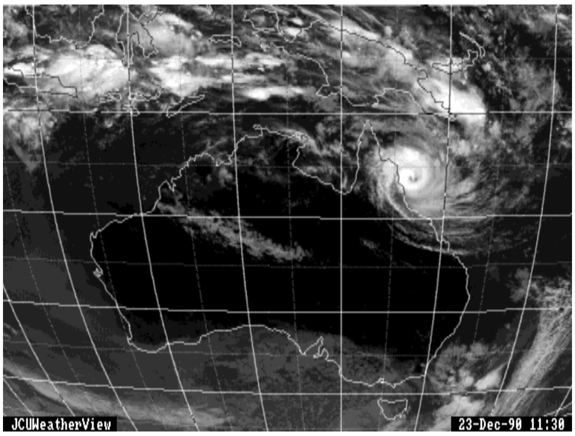


Figure 1 The JCUMetSat Receiving system Block Diagram

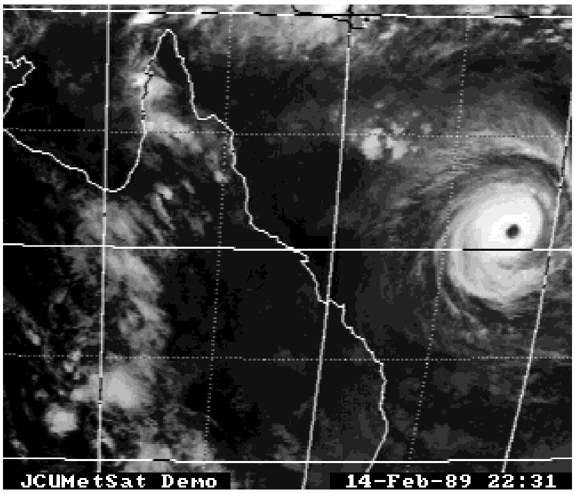
An Amiga computer records and displays these digitised pictures. These pictures can be displayed either singly or as an animated sequence in black and white or in a false colour scheme. All the colours for this false colour scheme can be selected by the user and stored in an initialisation file. The picture displayed on the screen can be printed from by the software. All the scan lines in the satellite picture are recorded so that full resolution displays are possible.

The Amiga computer has a video display which is the same as the TV standard used in the country, ie PAL in Australia. This makes it easy to broadcast the weather satellite pictures directly. A broadcast quality GENlock board can be incorporated in the computer to synchronise the computer's video to that of a broadcast studio. The received pictures can thus be broadcast directly, without the use of any cameras, NTSC or PAL format conversion equipment or expensive graphics cards.

The JCUMetSat software has been designed to be very user friendly and simple to operate. Context sensitive help is available by pressing the *Help* key on the computer keyboard. The data logging takes priority over viewing or printing and will automatically start at programmed times. Minimal operator training and intervention is thus required.



Pasted Country Picture

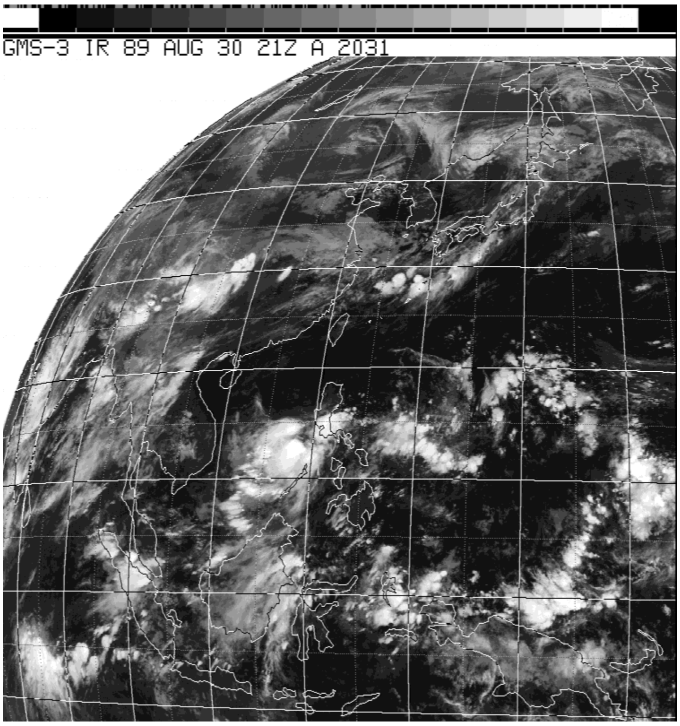


Pasted Local Picture, Cyclone Harry

The earth as seen from the GMS satellite is transmitted in 4 separate sectors. These 4 sectors can be electronically pasted to make a Globe picture. Most Australian TV stations in their Weather Report show a view of Australia which spans more than one sector of the GMS pictures. The JCUMetSat programme permits electronic cutting and pasting to combine the relevant parts of two sectors into the conventional cloud maps of Australia used by the TV stations. Pictures covering the Local ie State area only can also be stored. Such Local pictures are very useful to display cyclones, fronts and storms. The Local picture sequences are normally stored Low Resolution, ie 320x256 pixels per picture, format. The pasted pictures can be stored and displayed in the High, Medium or Low Resolution display modes of the Amiga, depending on operator preferences. The sectors as transmitted by the satellite are stored as 752x800 pixel images for the PAL software and 960x800 pixel images for the NTSC software.

The pasting coordinates of the pictures can easily be changed to suit the users preference. The pasted pictures can thus cover Australia as well as China and Local conditions as well as Cyclones or Typhoons in other parts of the world as seen by the satellite can easily be monitored. A very large number of different pastings can automatically be made following the reception of satellite data. Special viewing software is incorporated in the JCUMetSat system. All the pictures are stored in the standard Amiga graphics format, so that the pictures can be viewed, edited or printed using any of the Amiga's graphics programmes. Special effects programmes such as "AmigaVision" can be used to create multi-media presentations using these pictures.

The pasted pictures, can be shown as an animated sequence. The number of pictures forming the sequence is purely determined by the amount of memory in the computer. An Amiga with 9 Mbyte of memory can display a movie of up to 98 Medium resolution pictures or 200 Low resolution pictures. An Amiga with 3 Mbyte of memory can show up to 20 Medium resolution pictures or 44 Low resolution pictures. The animation speed can easily be varied. For an Amiga 2000, the fastest rates are approximately 18 pictures per second for Low resolution pictures and 9 pictures per second for Medium resolution pictures. For an Amiga 3000 or an Amiga 4000, the maximum animation rates are more than 3 times faster. The sequences can go forward, backward, faster, slower, single step, stop and change from colour to black and white and vice versa or be printed under keyboard control.

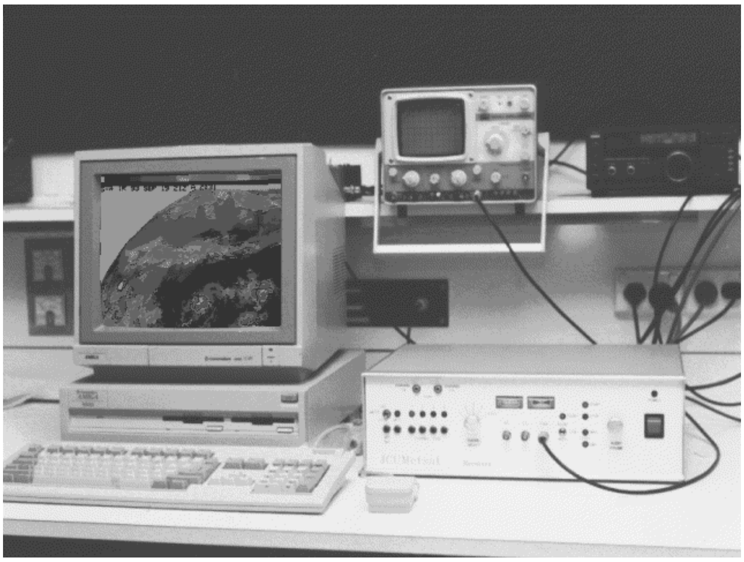


A WEFAX picture as received from the satellite.

The JCUMetSat Receiving System also permits additional signals to be received. The Facsimile signals transmitted by shortwave stations such as AXM in Canberra and AXI in Darwin are able to be received and displayed in the same manner as the Geostationary satellite pictures. These transmissions are sent at either 120 or 240 lines per minute compared with 240 lines per minute for the Geostationary satellite pictures. The software automatically detects and selects the correct scanning speed for the incoming data. By changing the Receiver channels NOAA satellites can also be received. The software to decode and display the NOAA pictures is not yet fully incorporated in the JCUMetSat receiving system.

The JCUMetSat system requires an Amiga computer, fitted with at least 3 Mbyte of memory and a hard disk drive. The software will fully utilise any additional memory fitted. A Broadcast quality GENlock board or an Ethernet card can be fitted if required. Fitting an Ethernet card allows the received pictures to be automatically networked to other computers. Ethernet script files are included with the software if required. Viewing software for Amiga and IBM-PC computers is available.

PAL and NTSC versions of the software are available.



The JCUMetSat Receiver System in use.

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