

About the Satellite Imagery.

The Satellites. Full details of the satellites can be found at the NOAA web site:

<http://www2.ncdc.noaa.gov/docs/podug/>

The polar orbiting satellites tracked here at Wokingham are in sun-synchronous orbits, at about 800 km above mean sea level. Each complete orbit takes about 100 minutes, the satellite thus covering the ground at a speed of 7.5 km per second. Currently (begining of 2003) I receive data from three satellites, noaa12, noaa16 and noaa17. At present noaa12 is northbound in the mid-afternoon, noaa16 is northbound near midday, and noaa17 is southbound in the late morning. The northbound passes of noaa17 are during the evening, and the southbound passes of noaa12 and noaa16 are during the night. Constraints of my time only allow me generally to take the daytime passes at present. Each satellite is visible above the horizon for two or three passes during both its ascending and descending nodes. Although data is usable from elevations as low as about 3 degrees above the horizon, provided the line of sight is clear of obstruction, I currently do not process passes whose maximum elevation is below 20 degrees.

Hardware. The satellite receiver consists of an aluminium 65-cm dish antenna with a AHF-1700 active helical feed giving over 55 dB gain. The dish is mounted on a G-5400 rotator assembly atop a short aluminium mast attached to the side of the house. The HRPT receiver is mounted on a PC card and links to a 16 bit data card. Tracking software activates a rotator interface unit, which provides the up/down, left/right signal to the elevation/azimuth controller, connected to the rotator controller unit.

The PC cards are mounted in an 'old' 486 PC running at appx. 100 MHz (upgraded to 150 MHz, April 2004). This is sufficient for receiving the satellite image files, while continuously calculating the exact position of the satellite and controlling the dish pointing hardware. The satellite is above the horizon for about 15 minutes during each pass, and in this time about 4500 to 5000 lines of data are received, a rate of about 5 lines per second. Each line consists of about 12 kb of data, so that the entire pass generates files between 50 and 60 Mb in size.

After reception, the files are transferred to a linked PC for processing using David Taylor's excellent HRPTRead software. <http://www.satsignal.net/> This PC is a homebuilt device formed around the ABIT KT7A motherboard and an AMD K7 Athlon 800 Mhz processor. Copies of all the passes received are archived on CD.

During 2005, new equipment was installed allowing reception of EUMETSAT's MSG generation of geostationary saetllites. The MSG schedule provides 15 minute coverage of the complete section of the earth as seen from its location above the equator on the Greenwich meridan. It also provides 3 hour coverage of the rest of the globe via relays from the other 4 geostationary satellites.

The equipment comprises an 80cm dish with an 10.7 to 12.75 GHz LNB (head amplifier and down converter), feeding a PC based receiver DVB card. The PC is custom built, based on the Intel celeron D335 processor running at 2.8 MHz on an ASUS P4P800SE mainboard with 1.5 GB DDR-SDRAM, and a 120 GB hard drive. The OS is Windows XP-Home, and the software suite is provided by David Taylor (see above).

During 2006, EUMETSAT added a new facility to their transmissions from MSG in the form of relays of NOAA17 and 18 HRPT data, received at several locations from the Canary Is to Svalbard. This has greatly increased the area of coverage obtainable here in Wokingham, with HRPT strips showing the whole of the Arctic Ocean, down to the Gulf of Guinea, at 1 km resolution.

Although many images are still placed on the Wokingham Weather web site, licence restrictions limit the reproduction of some MSG data, particularly that obtained in real time, and no attempt has been made to provide animated imagery, although this is available on my own display.