

MSF *The time from NPL*

The National Physical Laboratory (NPL) is the UK's home of measurement and the nation's time-keeper. NPL is responsible for operating the national time system and making accurate time available across the UK.

NPL is pleased to announce that VT Communications has been awarded the contract to broadcast the MSF signal for the next 10 years, ensuring the future of the service. VT Communications will run service broadcasts from Anthorn, in Cumbria. NPL is delighted to be working with VT Communications in this new era of MSF. BT will continue to broadcast the MSF signal from Rugby until April 2007 when the new contract starts. NPL would like to thank BT for all of their support over the years.

The new service from Anthorn should bring little or no change to most users. The relocation will result in a greater strength signal for the more northern users, with the signal across the rest of the UK being at least as strong as it is now. There will be extensive testing of the new facility before the change over. During the transition period, downtime will be kept to a minimum.



Steve McQuillan, MD of NPL (left) with Doug Umbers, MD of VT Communications

New to MSF?

What is MSF?

MSF is the 60 kHz Radio signal used to transfer the national time and frequency standard across the UK.

Where is MSF broadcast from?

Currently the MSF signal is broadcast from Rugby by BT. VT Communications will take over the contract in April 2007 and the broadcast site will move to Anthorn.

Who uses the MSF signal?

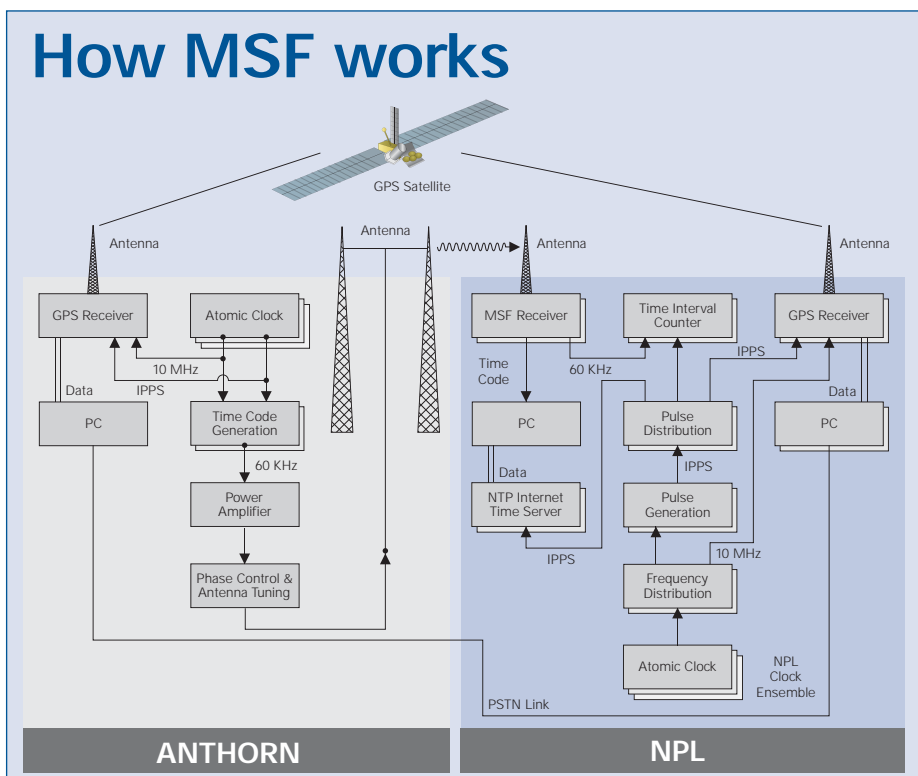
The signal is used by many different organisations, from business users such as Air Traffic Control to private individuals with radio controlled clocks.

What does MSF stand for?

MSF does not actually stand for anything; it is simply a call sign that uniquely identifies the broadcast. M is one of the three prefixes allocated to the UK by international agreement for station identification, and the letters SF were randomly allocated, however there is speculation that they stand for 'standard frequency'.

Find out more by going to:
www.npl.co.uk/time/msf

There are three atomic clocks housed at the radio station, one main time source and two back ups. They generate the time code. NPL compares these with NPL master clocks in Teddington by making use of the GPS system. Each month NPL publish a bulletin to provide traceability to the time from NPL. The group of atomic clocks at NPL keep the UK's time accurate to within one second in three million years. For more detailed information: www.npl.co.uk/time/msf



The time from NPL – the new service

The Anthorn site was chosen primarily for its location, which is close to the geographic centre of the UK and provides uniform signal coverage for the entire country. There is an existing transmitting system and infrastructure in place at Anthorn that allows the NPL's MSF system to be well supported.

RF DESIGN

MSF broadcasts at 60 kHz, at this frequency, where the wavelength is 5 km, antennas are naturally electrically short and have to be tuned to work correctly. The most suitable transmitting antenna for this service has been found to be the T-Antenna, which is a top loaded monopole antenna in the shape of a 'T'. Three wires, spaced 5 metres apart are used for both the vertical and horizontal sections. This arrangement ensures that the antenna can be tuned for use over a good bandwidth.

Because the tuning of the antenna changes as the elements move, particularly under the influence of the wind, the antenna has to be dynamically tuned. This is carried out in the antenna tuning hut, located directly below the antenna, using computer controlled tuning elements. These continually monitor the match into the antenna and adjust the value of the tuning elements as required.

The service will provide 15 kW of effective radiated power. The power input to the antenna can be adjusted both manually and automatically to ensure that this level is maintained.

MONITORING

NPL are able to connect, over a secure internet line, to the Anthorn transmitter control system. This enables direct monitoring of all the transmission parameters, as well as NPL-owned 10 MHz and 1PPS signals. This data can be downloaded by NPL to create system log files of the frequency accuracy of the Caesium reference sources. To ensure long term service monitoring VT Communications will have a computer based radio receiver at a remote site to monitor and check the radiated service.

FREQUENCY REFERENCE

The transmitted signal is fixed to 60 MHz so it can be used as a highly accurate and precise frequency reference. It is essential for UKAS accredited laboratories and their customers to be aware of the testing

schedule as there will be a phase change in the transmitted signal, which will require the monitoring of sensitive equipment and may require some adjustment. If, as is commonly the case, the signal is averaged over a period of time, the averaging must be switched off during the changeover to prevent spurious results.

TESTING THE NEW SYSTEM

Technical testing and practice transmissions will be scheduled to ensure that the system works fully and achieves the required transmission strength. There will also be a series of over and back tests for the new system. This is to allow user of MSF to ensure that their antennas can receive the signal and will provide sufficient time for any antenna realignment that maybe required. The schedule of these tests will be announced by the end of January 2007. If you would like to receive details of these tests, please register at the web address at:

www.npl.co.uk/time/msf

MSF – a user's view

Following NPL's announcement that the MSF transmitter location will move to Anthorn, NPL has been engaging with the MSF users to ensure that the transition can be effectively managed with the minimum impact on the users community

NPL invited National Grid Wireless, who are responsible for many of the BBC's broadcast services, to explain and share their perspective of the upcoming move at the recent Time & Frequency Club meeting.

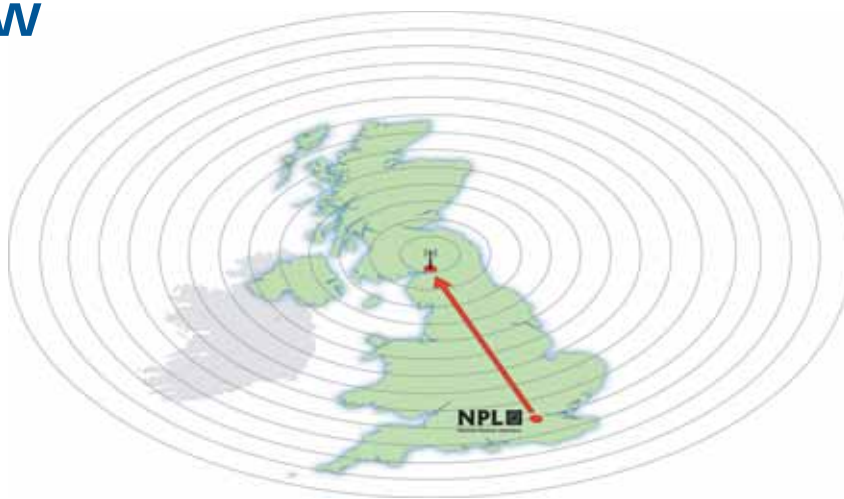
Peter Lee from National Grid Wireless explains "We provide the BBC's transmitter network and make use of the MSF 60 kHz time and standard frequency transmissions from Rugby. We have several hundred MSF-derived clocks at transmitting stations around

the UK used to synchronise the RDS (Radio Data System) time broadcasts on BBC FM transmissions. We also use the 60 kHz carrier to provide frequency standards against which we set the frequencies of our MSF transmitters. The relocation of the transmitter station 300 km north will require a significant amount of testing."

In order that the new system can be tested by the user community,

VT Communications and NPL will be announcing a test schedule early in the new year to allow time for both testing and adjustment.

If you would like to be informed when these trials are taking place please register on the NPL website:
www.npl.co.uk/time/msf



Does your business utilise the MSF signal?
Sign up for maintenance schedules at: www.npl.co.uk/time/msf