



What is TETRA?

TETRA stands for TErrestrial Trunked RAdio. It is the new national police radio system, operated by O2 Service. Planned since early 1990, the contract was given in March 2000 to BT and Motorola. Since that time BT has split its business and the Airwave contract went to the section of the company that deals with mobile networks. This was initially called O2, then mmO2, and now back to O2. However, since the contract was awarded, the European Commission has found the British Government guilty of unlawfully limiting the contract to tender to Tetra systems only and in our opinion guaranteeing the contract to O2. The existing contract is unlawful as it contravenes European competition laws as defined in the treaty of Rome.

Tetra is a Home Office initiative being rolled out throughout the UK. Tetra will cost in excess of £3 billion to put in place, which is double the original estimate and we expect these costs to continue to spiral. The cost of the system is in sharp contrast to the French Police system which has the same functionality and services to Tetra but which was nationally implemented for the lowly sum of £300 million.

The government now claims to be committed to the Tetra system. It is widely believed that the Government has made £billions by selling off the original police channels to mobile phone companies and therefore have no services to fall back on. Mast Sanity do not believe this is the complete truth, however if they accepted that Tetra was a danger, then it is likely that Tetra base stations could be changed into other systems base stations relatively easily, by changing a few electronic and software modules.

Controversy has clearly followed Tetra since its inception, with questions raised about the choice of the system, the untried and unknown nature of the technology and the numerous health issues. The Public Accounts Committee (Nov 2002) concluded that:

‘Airwave might be more sophisticated and expensive than it really needs to be ... It is significant that individual police authorities and the fire service cited the cost of Airwave as their reason for being unwilling to subscribe to it ...’ The remedies available to the Home Office if the system does not work will not fully compensate police forces for the disruption and operational risks that would inevitably follow.’

The aim is to have the system in place by the middle of 2005, and Tetra is now in use by several police forces in England.

Technical problems

The system has been dogged with technical problems. Lancashire Fire Brigade said it would not use the handsets in emergency situations because they emit unprotected sparks. We believe this particular problem has been ironed out, however, many issues still exist. For instance Tetra handsets cannot be allowed into hospitals or near ambulances unless turned off because in tests by the Medical Devices Agency they have been found to interfere with medical equipment such as infusion pumps, cardiac monitors, ventilators insulin pumps, hearing aids, defibrillators and some pace makers! This is a huge cause for concern. In addition, it is known that the handsets and masts can affect car locking systems, immobilisers, burglar alarms and TVs and other sensitive electronic equipment. This could have dire consequences for industry sited close to the masts, particularly those in the high technology industry, or offices and laboratories that use electronic equipment. In addition to this the Tetra terminals may also interfere with the police forces' own electronic equipment such as breathalysers and speed cameras.

Mast Sanity believes that one of the reasons there are so many technical problems is that the system has not been trialled or tested before rollout.

Another reason is that Tetra is a very 'noisy' system that, in the opinion of Mast Sanity, fails to comply with European radio emission standards (ETS 300 -113), hence the reason it interferes with so many other electronic devices!

Health Issues

There are many issues relating to Tetra that Mast Sanity disagrees with and campaigns against. The complaints about the GSM systems relating to health are the same for Tetra, however, we believe that they are much worse, with even more potential for a public and police service health disaster. Because the police effectively cannot argue with the implementation of Tetra and therefore have absolutely no choice in its use, we actually campaign against the whole of the Tetra system rather than just the masts.

Mast Sanity considers that Tetra poses health risks to a number of groups of people – the police officers and civilian workers using the Tetra equipment, and the general public who live or work close to the masts.

Some health risks that are specific to Tetra arise from the nature of the pulsed microwave radiation signal. Tetra uses a microwave carrier frequency of between 380 and 400MHz. In order to transmit and receive up to four calls simultaneously, each conversation is broken down into parts which are compressed, so they can be transmitted in a fraction of the time, allowing three other conversations to be carried in the same time slot. This division results in bursts of multiple conversations, and these are sent at a frequency of 17.64Hz (times each second). Pulsing at around 16Hz has been proven to cause calcium efflux (leakage) from brain cells in 7 separate experiments from the 1970s to the 1990s. The Stewart Report (2000) specifically recommended that pulsed radiation at this frequency should be avoided.

The NRPB has gone to great lengths to say Tetra masts do not pulse. However, numerous independent tests, some very highly attended, have been carried out on the base stations and they do pulse. In one particular instance an independent test, commissioned by O2 Airwave and carried out by ERA Technology, performed on a mast in the Forest of Dean, was shown to pulse. O2 Airwave claim further tests have shown it does not pulse, but O2 have since described the signal as not pulsing but a non-continuous modulation and that the 17Hz 'component' is trivial – which surely means it does pulse, and that they have decided arbitrarily how much the strength of pulse matters.

The difference in findings arises because of O2's new definition of pulsing signals. They now claim that for a signal to pulse it has to rise to a peak, stay level for a period, then drop to total zero. It needs to do this at regular intervals. By that definition, your heart does not have a pulse!

The signal from Tetra base stations rises to a peak, stays level and drops to not quite zero – at regular intervals. O2 says this is not a pulse, common sense and millions of people, scientists, and politicians say it does. More importantly we believe it is the Common Sense approach to the pulsing signal that Stewart was referring to as a hazard that should be avoided at all cost. The point being it's the 17.6 changes per second that constitute the hazard, not the falling to zero strength between changes.

The weight of evidence clearly suggests that they are misrepresenting the question of pulsing however the Government blindly accepts their biased information. Why? This is not acceptable.

Many people feel that the tests produced by the NRPB and the industry are not independent and therefore cannot be trusted. In this climate of understandable distrust and a very clear difference in findings by so many different people, it is reasonable to expect people to disbelieve industry and authority evidence.

Stewart Report

The reason that O2 spend so much time trying to deny a very important part of their own systems design is because of the much talked about, but very liberal report, by the Stewart Committee. The Stewart report did not cover Tetra in their remit, but they bravely concluded that,

'... modulation around 16Hz should be avoided, if possible, in future developments.'

Later, giving evidence to the 10th parliamentary committee of the DTI, when asked if the amplitude modulation around 16Hz was the most critical area, which posed the highest risk, Sir William Stewart felt it, *'... was an area that should be avoided ...'* and then went on to describe Tetra as a hazard! The conclusion of that committee was: *'... we are very disturbed that there seems to have been no examination of the evidence on potentially adverse health effects before bringing it into service...'*

The Stewart report, in the opinion of Mast Sanity, is not an acceptable position from which to evaluate the safe siting of any mobile phone or Tetra base station, but the Government and the operators constantly use it in their arguments, except in this instance. If they are going to insist on accepting the conclusions of the Stewart report as the correct position, then they should accept Stewart's position on Tetra as well. The Stewart report is still used as a base position for the Government and the authorities and therefore we should use it as a base position for Tetra as well.

Research

We are unaware of any other true Tetra network systems in operation in this country. We understand there are a number of pseudo-Tetra systems but that these do not have the same properties as the system being implemented for the Police. The Home Office have admitted as much during questioning at the audit committee, where their Science and Technical representative stated, *'We do not yet have a user base, we need proper scientific trials.'* The NRPB admit in their Handbook on Tetra that they cannot rule out a hazard from radio frequency radiation modulated specifically around 16Hz.

Britain is one of the first networks of its kind anywhere in the world. It is a test site and the rest of the world is looking on to see if there are any problems with health or the technology.

Existing Tetra systems do not use the same frequency and therefore the health issues surrounding these systems will not be the same as for Airwave. This therefore negates any claim in defence that there have been no other health problems from existing systems across the world. In addition, we know of no other organised national monitoring of health issues relating to Tetra users, or people near base stations.

We have not been able to find any independent long-term research on Tetra at the pulsing frequency used. In other words not only are our police and citizens a test site we are also the biggest experiment ever carried out.

Remembering that beyond the pulsing issue is the fact that the health issues relating to GSM are the same for Tetra then you will already know the huge amount of research showing non-thermal effects, which suggests there is a major public health disaster looming over many countries as a result of the mobile phone usage and living in close proximity to base stations. This obviously relates to Tetra as well.

O2 claims that Stewart reported in the way he did because he was basing his knowledge on experiments that were conducted in the 1970s. The implications being that there have been no other programs that suggest links to ill health. This is not the case. Independent experiments have been carried out over the last 20 years, and have identified a link between pulsing at around 17Hz and calcium efflux (Bowin et al, 1975; Blackman et al, 1979; Shepperd et al, 1979; Adey et al, 1982; Dutton et al, 1984; Lin-Liu and Adey, 1982; Kittel et al, 1996).

O2 also claim that work by Dr Alan Preece at the University of Bristol, presented at the Bio-electromagnetics Society Conference in June 2002, found no effects on cognitive brain function. However, Mast Sanity considers the issue of cognitive brain function to be irrelevant here. Cognitive brain function has never been a primary concern for either GSM or Tetra. This appears to be yet more misleading information to try and claim Tetra is trialled and safe.

In May 2003 the Government announced a 15-year, £5million research programme including laboratory studies and a review of police officers using the handsets. These results of this research will be too late for police officers forced to resign or suffer ill health. The research does not address the health issues of people living close to masts.

In addition to this, Mast Sanity members have been informed that police officers have been told NOT to report illness to the police medical team but to go direct to their GPs. If this is true then it is not the actions of those wanting to know whether the technology is affecting our police officers.

Power Issues

As the system stands at the moment, the power levels from the base stations are below, or at least similar to, GSM. However, there is the ability to increase the levels by 3 times GSM and 30 times the lowest level of power from Tetra base stations. The current system is clearly incomplete, with only 14 police authorities using/trialling it, to differing degrees, usually in parallel with existing systems, spread widely across the country. Because it is not yet a nationally rolled out system, the police forces are not using it to its full potential. When the whole system is live across the country, and being used to full capacity, with not just voice messages being passed through the system, then we believe the power of base stations will have to be increased significantly, and we believe this will lead to further health issues as well as further technical problems.

Cell size (coverage by a base station) is an issue as well. O2 claim the cell size of Tetra is 56 km (just under 35 miles). However the ITU (International Telecommunications Union – global independent telecommunications standardisation authority) has measured this as closer to 17.5 km (just under 11 miles). Obviously an exaggeration in advertising there! However, we believe these distances are for voice transmission only NOT the data transmission, which is what the emergency services need, and which is part of the promise by O2. We believe the cell size for data transmission is reduced significantly, by at least 30% less than voice, as a result of poor protection of data packets. Therefore, in order for O2 to offer acceptable coverage it will have to increase the power to overcome the cell size problem. Our conclusion from this is that though power is not yet an issue with Tetra, in the long term it will be (by 2005 if they are on time!), as in order to fulfil the contract we believe O2 will need more base stations than currently advised, and the power of many of those base stations will have to be increased significantly. More base stations means more public protest and in our opinion more ill health.

Upgrade Path

Initially Tetra2 was the expected and planned upgrade path, which was potentially significantly more powerful than Tetra1. However, Tetra2 appears to have failed to get off the ground because of the failure to standardise and the lack of interest by Tetra business partners (eg Motorola, Nokia and Marconi).

However, in the opinion of Mast Sanity it is unlikely they can plan any upgrade at all until they sort out any problems relating to different services using different versions of software and equipment. This means that, for instance, handsets from one police authority may not work in another police area and officers or HQ may not be able to communicate with other forces via the system either.

The lack of definite information from O2 and the Government regarding this issue clearly worried the audit committee as one of their conclusions was, *'... it is not certain that one of the key benefits expected from the new system – the ability of police officers to communicate with each other when operating outside their home force area – has not been rigorously evaluated. The*

Home Office and PITO did not give us any clear indication of the extent to which this facility would be taken up in practice....'

How do Police Officers Feel?

The majority of police officers on the ground and also many local Police Federation representatives are very worried and concerned about the fact that a potentially dangerous system, Tetra, has been forced upon them. They are unwilling to speak out because they feel this will put their jobs at risk. They feel totally powerless, which of course they are. Recently at a Police Federation meeting Mireille Levy, the Home Office Health and Safety Officer in charge of Tetra health studies, allegedly stated,

'I do not believe they are ill, they are not ill enough to stop this trial. Nothing will stop Tetra, if the officers don't like it they can resign.'

Not the best starting position or attitude of the person who is in charge of finding out if there are health effects.

In addition to this, we understand that some police chiefs have stated that there is some disquiet because of the total lack of data transmission and the appearance that this facility will not be available.

A recent report in a local police newsletter in Lancashire indicated that the Crime Scene Investigators in the area had had their Tetra handsets removed and replaced with mobile phones due to the discovery that Tetra causes a risk of explosion because of the metallic substances the CSIs use in fingerprinting. It has been alleged that actually the CSI have refused to use the Tetra handsets because of a number of unexplained illnesses in the CSI team.

Mast Sanity believes that the Police were chosen for the initial rollout because unlike the other Emergency Services they have few rights to object or refuse to use this potentially unsafe system, and they do not have a true Union to protect them.

Where do the ICNIRP Guidelines fit in?

O2 repeatedly claim that Tetra masts are safe simply because they fall well within the ICNIRP (International Commission on Non-Ionising Radiation Protection) guidelines, but this is not the case. The ICNIRP guidelines pre-date the introduction of Tetra. They were drawn up in 1998 and are in fact based on the National Radiological Protection Board's guidelines of 1993, when mobile phone technology was in its infancy.

The ICNIRP guidelines deal only with the thermal effects of mobile phone technology – they do not address, never mind set standards for, the pulsed characteristics of Tetra. These standards are set to limit the emissions based on thermal heating. Our concern is not the thermal effects of the emissions, but the frequency that is being used. The frequency is transmitting information that is picked up by our brain and interferes with certain biological functions in the brain. It is an issue of coherence: the frequency seems to make sense to our brains. Whether you shout (high emission) or whisper (low emission) the information is still being picked up by the brain and is interfering. We feel that the use of these guidelines as a surety of safety is similar to giving a toddler a razor blade to play with because s/he cannot possibly be knocked unconscious by it!!

There are no safety standards in place that address the specific functioning of the Tetra system. To assess one system as safe by standards set for a technically distinct second system is at best foolish, at worst criminal.

Handsets and Pulsing

There is no dispute that the handsets used by police officers do pulse. Everyone, including O2 and the NRPB admits this. It was announced in July 2002 that at least 177 police officers in Lancashire

(And additional numbers in West Mercia and North Yorkshire), the pilot area for Tetra, had already reported a range of adverse health effects from using the handsets for a period of 12/18 months.

There is also the issue that the handsets may be able to exceed the ICNIRP guidelines.

Many doctors are unaware of the issues relating to mobile phone masts and most certainly are unaware of the additional problems with the Tetra system as a whole. Therefore, when officers complain to their GPs it is unlikely that the GP will make the connection between the use of the system and the illnesses being reported. In addition, consultants in specialist areas are also unaware of the issues and therefore are unlikely to realise any links with ill health and the use of Tetra handsets and equipment.

The initial police officers that spoke out about the system seem now to be unavailable to members of Mast Sanity and the media, and we feel strongly that the issues are being hidden and dismissed by the authorities. It appears that some or all of the illnesses have not been investigated and no reasonable excuse has been given for their existence. Remembering Mireille Levy's statement that: *'...I do not believe they are ill, they are not ill enough to stop this trial ...'*, one has got to wonder whether it has ever been taken seriously.

Other Emergency Services

Tetra was originally envisaged as an emergency services system, piloting initially with the Police. However, both the Fire Service and the Ambulance services have yet to decide which their system will be. There is now a tendering process for each local ambulance and fire service to buy their own system. Potentially this means there could be a variety of systems interoperating with each other, however we feel very strongly that the majority of local services are being pressured into accepting the O2 Airwave Tetra solution.

The MOD are also set to use Tetra, however, as they currently use the Tetrapol system in many areas we feel it is unlikely that a large part of the MOD will wish to take on the Tetra system.

Mast Sanity has shown on a number of occasions that ministers have not been given correct and appropriate information. We believe this is the current situation. We believe Mr Blunkett is unaware of many of the issues raised in this briefing and we believe that the information he and his ministers are given is biased and inaccurate. We believe the Home Office may well try to prevent the other emergency services from going through a fair and legal tendering process.

Mast Sanity is very concerned that extreme pressure is being applied by the Government and industry in order to ensure they accept Tetra. Part of the recent agreement made between the Government and the Fire Fighters Union was for them to accept new technology. We dearly hope that they have not been persuaded to accept Tetra through the back door.

The British Government agreed that the remaining contracts would be put out to full and fair tender, however, we believe that the local emergency services are being told that they will not have any government funding unless they choose Tetra. Not the fair tendering process that was agreed, and another abuse of the European Commission ruling against the initial police contract!

Interoperability

Comments and claims have been made about the potential for interoperability with other systems. In particular, Tetrapol (which is an alternative system that predates Tetra) sounds the same but uses a completely different communications methodology. It is a long standing respected system and it is used throughout the world in national emergency services. It is intrinsically more bio-friendly as it does not pulse. It has been suggested that for full and seamless communication the other emergency services would have to go for Tetra. **This is not true.** There is **full** interoperability with Tetrapol.

This has been proven in several situations including in Spain where the national Tetrapol (Sirdee) network is interoperating with a local Tetra based (small local police network) network in the north of the country.

What is an issue, is that if the other emergency services go for a Tetra solution, we believe they will have to go for the O2 contract rather than other possibly cheaper Tetra solutions, as we understand that different Tetra suppliers are rarely interoperable with each other!

Planning Issues

There are 3 potential routes for approving a telecommunication installation,

- that of full planning permission (*all those ground based installations higher than 15m and other installations on buildings or structures that exceed the relevant height considerations*)
- those that come within the Prior Approval process set out in Part 24 of the GPDO
- and those that fall within one of the areas that used to be known as 'Prior Notification' (*although the Government has taken away the obligation to give the LPA 28 days notice*) these include 'Small Antenna', 'De Minimis' and those that fall within A.2(4)(b) of the GPDO that allows installations that are not greater than 4 metres of a building or structure without informing the LPA.

Three successive Planning Ministers have stated that prior approval applications should be considered as full planning applications in all but name. However, this rarely happens due to an inability on the part of most planners to grasp this important aspect. Therefore, those applications that do come before local planners should, if the systems are followed, have the same considerations given to them. Concerns will continue though if you have a growing number of installations that bypass any specific planning consideration being applied, or the concerns of the public not being taken into account.

In a recent meeting with Lord Rooker (the last planning minister replaced in July 2003) it became clear to Mast Sanity representatives at the meeting, that the planning minister had not been given the true facts of the situation when making this statement.

Whilst the same planning criteria applies to Tetra as other mobile systems, the inability within these criteria to cover the real concerns that relate to the Tetra system, causes grave concerns. In our view there is a need to review policies and procedures as a matter of urgency.

There is an inability within the planning system to take into account the effect of the entire Tetra system. If there is an objective concern on health relating to the antennae, then that can be taken into account, however, the concern of the individual police officers who are forced to use the hand sets cannot, nor can the concerns of members of the public who are fitted with life saving devices that can be affected by the handsets.

In tests undertaken by the Medical Devices Agency, they found that the adverse effects were greatest at distances of up to 2 metres from a hand set. Therefore a person fitted with a pacemaker, going about their daily chores in the town centre, could pass within 2 metres of a police officer and find that their pacemaker malfunctions. In a worse case scenario, it could result in their death. However, these concerns cannot be taken into account when determining whether or not to grant permission for the site where the offending signal has been received or transmitted to.

Some may argue that this is rather too far fetched. However, these tests have been carried out, the results are within the public domain, and the fear that they, and the general issues surrounding health, do create a genuine fear, in particular in individuals who use/are fitted with the life saving equipment that may be affected. This fear is in itself a material planning consideration when related to the actual development. Similar arguments can be put forward in relation to sensitive electronic equipment.

Householders are informed of the applications by the LPA in the majority of cases and in the non-statutory pre-application discussions, community and amenity groups may have been consulted as well. However, it is rare for industry to be widely consulted. Tetra base stations can be sited close to industrial sites which could be affected by the emissions. This could put workers lives at risk as a result of malfunctioning safety equipment. This certainly would be a material consideration, and on its own should open up the debate as to where these installations should be sited, and the degree of notification that should be given. We would argue that all commercial premises, hospitals, doctors and dental surgeries within a given distance should be notified of the application, or at the very least consulted within the pre application discussions.

mm02 are gaining a particularly bad reputation for attempting to bypass the normal planning processes. Mast Sanity has illustrations of them seeking to unlawfully claim that installations come within the emergency installation provisions of the GPDO. On numerous occasions they claim that installations are de minimis, when they clearly are not, but they install the base station in the hope that the LPA will not issue an enforcement notice. There are many other examples where they have claimed installations are temporary, and that they can put them up for 6 months, when in fact they could only put them up for 28 days. Mast Sanity has recently discovered that in many cases they are not putting a time span on the planning documentation. This means that the installation has no time limit and therefore equates to full planning permission.

They are also starting to make use of the provisions under A.2(4)(b) of the GPDO (*these are not small installations, but full size, full strength installations, only restricted by the 4m height criteria*). We could see the situation where a Tetra installation is placed close to a hospital using the A.2(4)(b) process whilst a caring local authority stands by helpless in their ability to control inappropriate developments within their area from affecting the health and well-being of residents and patients.

Conclusion

Whilst O2 abuse the planning system and walk over local communities, and whilst they continue to mislead the British public and their elected representatives, public trust in them and the Government bodies supposedly controlling their output and behaviour, will be eroded. The British public is never going to accept Tetra is safe in the current climate, because it has never been tested and because Government bodies, industry and the authorities scientists have got it wrong so many times before – too many times before!

O2 claim a minority of people are concerned about the health issues. This is not true, where residents are aware of an installation and the nature of the service being provided, we can guarantee that in 99% of the cases there is huge public outrage. The Government and parliamentarians cannot continue to ignore what is an issue, that combined with GSM system, is responsible for more correspondence, and therefore expense, than any other issue. They cannot continue to ignore a potential 90% of the population without dire consequences at the polls.

Clearly Ministers are under intense pressure as a result of the increased threats since 9.11, however this is no excuse to force an inferior, untried, untested and unsafe system on our emergency services workers and the general public. It may render us more at risk.

Mast Sanity will continue to fight the uptake of Tetra wherever possible. We are dedicated to helping local campaigners fight the erection of masts in their areas and we will continue to advise police officers and civilian workers about the dangers of the system. We will continue to record the increasing number of ill health clusters emerging around Tetra base stations until a time where we can show a clear and undisputable link to ill health around these masts. We do not envisage that this will take long, as ill health issues are already being raised in communities where the Tetra system has been turned on.

TETRAWATCH is associated with Mast Sanity, the national campaign for the sensible siting of phone masts. Advice Line: 08704 322 377. www.mastsanity.org