

UK involvement in Missile Defence

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Committee by the Yorkshire
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UK INVOLVEMENT

Yorkshire CND has been at the forefront of campaigns against UK involvement in missile defence for several years and has a direct interest in the issue, with two military bases in the region planned for use in the US project, should it get the go-ahead. The Ballistic Missile Early Warning station at Fylingdales near Whitby and the spy-base and space monitoring station at Menwith Hill near Harrogate are both touted for key roles in the system.

FYLINGDALES

Fylingdales operates under the US "Masterplan for tactical Warning and Attack" which lists the aims of BMEWS as being to:

1. Support and aid the survival of strategic military forces.
2. Provide an accurate basis for (US) national command authority response decisions.
3. Enhance warfighting effectiveness of the strategic nuclear forces.

As well as its Early Warning Function, Fylingdales also forms part of the Space Surveillance Network (SSN), an intelligence network that tracks and maintains a catalogue of space objects (military and civilian satellites and space debris). Fylingdales is therefore a significant command, control, communications and intelligence installation. Information gathered by the radar installation is fed directly to the North American Aerospace Defense Command (NORAD) in Cheyenne Mountain, Colorado. From there information is passed to the National Command authorities and to Headquarters, Strategic Air Command (SAC). In time of war, it would provide the US President with information on what has and has not been attacked, monitor trajectories of both surveillance satellites and incoming ballistic missiles and allow prioritising and accurate response and targeting on "enemy" satellites and ballistic missiles.

Preliminary MD architectures	Initial configuration	Full configuration
Planned deployment date	2005-7	2011
Number of interceptors deployed in Alaska	100	125
Number of interceptors deployed in North Dakota	0	125
Upgraded early warning radars	Beale (Marysville, Calif) Clear (Alaska) Cape Cod (Massachusetts) Fylingdales (England) Thule (Greenland)	Beale Clear Cape Cod Fylingdales Thule South Korea
X-band radars	Shemya (Alaska)	Shemya Clear Fylingdales Thule Beale Cape Cod Grand Forks (N. Dakota) Hawaii South Korea
Satellite-based infrared sensors in low-Earth orbit (SBIRS-Low)	No	Yes

Source: M. C. Sirak, Inside Missile Defense, 19 May 1999, p13

For MD however, detection and warning are not enough. Accurate tracking and discrimination between warheads, debris and decoys is required. The "preliminary" architectures released by the US Ballistic Missile Defense Organization (BMDO) in March 1999 (see table above) describes the MD system as being deployed in three phases. All 3 phases would use the current US early-warning radars in California, Massachusetts and Alaska and at Thule and Fylingdales, but they are not able to track targets accurately enough to guide interceptors. The first phase therefore, involves an Upgraded Early Warning Radar (UEWR) program to give them this capability. This would involve replacing existing computers, graphic displays, communication equipment, and the radar receiver/exciter for MD. New EWR software would allow the acquisition, tracking, and classification of small objects near the horizon and this data would be passed to other MD elements using improved communications systems. This development will take place as a result of the request made recently by the USA.

The upgraded early-warning radars will still be extremely limited in their ability to discriminate real warheads from decoys or to deal with other types of countermeasures. The system will therefore also deploy new high resolution phased-array X-band radars which use high frequencies (5.2-8.5 GHz) and advanced radar signal processing technology to improve target resolution. Phase 1 would see an X-band radar at Shemya in the Aleutian Islands (to cover missile launches from North Korea). Phase 2 would include additional X-band radars at the current BMEWS sites (including Fylingdales). Questions have been raised regarding the possible danger to the health of people living close to these installations. The BMDO insists that the microwave leakage from these high power radars is safe - but others are not so sure and independent investigations into possible health hazards need to be made. On January 6th 2003 Geoff Hoon stated in a press release that,

“Although the radar would have a different operating pattern, the power and frequency output would not change, therefore posing no risk to the health of people or livestock. The radio emissions from the radar are many times lower than the safe limits set by the relevant authorities and would remain so after the upgrade.”

In fact the only test of the radiation levels around Fylingdales of which the results were made public was made by the Nuclear-Free Local Authorities – a relevant authority - and contrary to the statement made by Hoon, it found that radiation levels were barely under the limit recommended by the ICNIRP (International Commission for Non-ionising Radiation Protection) – for more information on this see Appendix A). It is imperative that any information held by any government body about the radiation levels around Fylingdales be made public without delay and that, should any upgrade take place, a new test take place, with results published.

The development of US missile defence has been clouded in secrecy throughout its life and this may also be so for the possible location of an X-band radar in the UK. It has recently been suggested that an X-band radar could be located on ships at sea rather than land-based. It is vital that the public be informed whether there are plans to use any site in the UK for an X-band radar. It is reasonable to believe that, whilst sea-based X-bands may be developed, the US is likely to want a permanent station in key locations across the globe, and one of these is likely to be the UK. Current plans suggest that the huge radar would be built at the Fylingdales site – within a national park. An X-band radar would almost certainly increase radiation levels beyond the limits recommended by the ICNIRP (see Appendix B) and a full investigation in to this must take place before any go-ahead is given for an X-band radar in the UK. Should it prove to exceed levels recommended by the ICNIRP then the UK must not give permission for its location on UK soil.

MENWITH HILL

The other US MD component in Yorkshire is at Menwith Hill, which is probably better known for its use of a system called ECHELON to systematically intercept fax, email and telephone

messages and search for key words. In 1966 the National Security Agency (NSA) took Menwith Hill over and the interception of satellite communications began as early as 1974. At this time the first of the satellite communications dishes were installed - there are now nearly 30.

In 1997 the Government announced that Menwith Hill was due to become the European Ground Relay Station for the Space Based Infra Red System (SBIRS) which has two components - SBIRS-High and SBIRS-Low. General Howell M. Estes III (then Commander in Chief, North American Aerospace Defense Command and US Space Command and Air Force Space Command, Commander) said in a speech urging the US Congress to "help fulfil the promise of space" that: *"These systems will significantly improve our ability to provide much more precise launch and impact point of theater missiles to forces in a theater of operations. They are key to our ability to cue systems that we'll use for active defense as part of both theater and national missile defense."*

SBIRS-High will replace the early warning satellite system known as the Defense Support Program (DSP) to detect the boost stage of a ballistic missile after launch and provide initial trajectory information. The SBIRS-Low system is to detect and track cold missiles much later in their trajectory. Both would be used for MD. However, Professor Ted Postol of MIT has expressed grave doubts that SBIRS-Low will ever work, and SBIRS-High will be used to detect ballistic missile launches even in the absence of MD. If the US wants to use data relayed through Menwith Hill for MD, they would need to ask for UK consent. The public has a right to know if such a request has been made. It is possible however, that, as Menwith Hill's SBIRS system is already up and running for other purposes, no such request will be made. It is vital that the public are informed as to whether Menwith Hill will be used for Missile Defence, whether the UK government has had any official or unofficial talks about the use of the base for the system and whether, if any components were to be used, permission would indeed be sought from the UK government.

A TARGET?

Whilst the likelihood of an attack on the UK in order to disarm the missile defence system may be small the use of Menwith Hill and Fylingdales for the system can only work to increase awareness of the stations to opponents of the US and its allies. Should a state wish to launch a missile attack on the US it may wish to increase its chances of success by disabling missile defence. Furthermore, should the US be perceived to be using the system to aid first strikes against states then again, its disabling would be beneficial to those states. The MOD has argued that a rogue state or terrorist network is unlikely to have precise enough missile technology to be able to successfully strike either base. In the MOD press release of January 6th, Hoon is quoted as saying

"For the foreseeable future, the countries of concern are unlikely to have the capability to target specific places or installations."

However this does not take in to account the most likely form of attack on either base – striking from within the UK with a powerful weapon. Whilst the risk may be small it is irresponsible to ignore it completely.

ELSEWHERE IN THE UK

US statements and the UK MOD document "Missile Defence: A public discussion paper" both suggest that plans for a US missile defence system include locating interceptor missiles in North-West Europe. There are great concerns that this implies locating them in the UK. Again, one potential site for these missiles is close to Fylingdales and/or at other US bases in the UK. Such a move could only increase the likelihood of the UK, particularly Yorkshire, becoming a target. The MOD must make public any discussions that have taken place about the possible location of interceptor missiles in the UK. They must also ensure that any past, present or

future discussions about the use of any other UK bases or US bases sited in the UK for missile defence be made public.

US PLANS

US plans for a missile defence system go well beyond those being publicly discussed by the MOD at present. Whilst early stages of development of the system require no more than a software upgrade at Fylingdales, no change to Menwith Hill and no siting of missiles on UK soil, plans for later stages are quite different. As has been stated publicly by the missile defence agency and its sibling organisations and predecessors, including US Space Command, missile defence will eventually require the use of X-band radars, air-borne lasers, space-based lasers and missile interceptors located across the globe.

The Select Committee will doubtless be aware of US Space Command's document "Vision for 2020" which clarifies the plans for missile defence.

Whilst current plans for phase one of missile defence are modest compared to those of the original star wars system proposed by President Reagan, one must not be fooled in to thinking that this is as far as current US plans go. The system will develop in to a space-based system, with weapons in space (breaking the Outer Space Treaty). Missile defence is not a tool on its own but part of a larger plan to achieve what the US calls "full spectrum dominance" – the dominance of land, sea, air, space and information. By providing space weapons, new air-borne weapons, missile interceptors and advanced missile tracking technology, missile defence is a big step towards this dominance.

That this US dream is some way from fruition is not an excuse for not considering it now. Once the UK gives the go-ahead to missile defence it will become increasingly difficult to reject further developments. The UK will become increasingly tied to US foreign and military policy and will be a key a player in the progress of US "full spectrum dominance". The long-term implications of this system must be taken in to account fully by the select committee and the government.

ARMS RACE

In the public discussion paper published by the MOD recently, it is stated that concerns that missile defence will cause an arms race are ill-founded. It is pointed out that

"Many feared that US withdrawal from the Anti-Ballistic Missile Treaty in June 2002 (after the six months' notice allowed under the treaty) would cause global instability, damage international relationships and create and arms race. But this has not happened."

This is a naïve assessment of a complicated situation. Few people predicting an arms race as a consequence of missile defence or the death of the ABM treaty would expect it to take place within six months. The argument is a more subtle one than that. The perception of missile defence by some states (as well as individuals) is that it will allow the United States to fight wars more efficiently and effectively. By giving them the ability to defend against limited missile attack, they will have the ability to launch a first strike on a country with less concern about a successful retaliatory attack. The concern is that this will allow them to go war more often, or at least make them feel they are able to do so when it suits their individual foreign policy objectives. Whether or not they will do so is irrelevant to this concern. It is the very perception of this threat that may lead to a gradual increase in the arsenals of countries that recognise it. The response of these countries would be unlikely to be an intensive increase in missile arsenals over a short period, as this would provoke instability. However, the instability already

created by missile defence means that these states will gradually increase their arsenals over time. It may be a matter of months but more likely a matter of years. As these states increase their arsenals, other states that feel threatened either by the instability created by the perceived threat of missile defence or by the states that are reacting to the perception, will then increase their own arsenals to attempt to redress the subsequent military imbalance. The result is an arms race less obvious and slower than that of the cold war, but an arms race nonetheless.

The discussion paper released by the MOD suggests that missile defence may actually help to reduce weapons of mass destruction as states will not spend the time and resources developing weapons that a shield can defend against. As has been seen countless times throughout history, as bigger shields are produced, so are bigger swords. No state would allow itself to fall in to position of impotence. If its current arsenal of weapons is rendered redundant by a new system, it will develop newer or more numerous weapons that can overcome the new system. By creating a shield one only provokes the development of more powerful weapons to pierce that shield.

Unrest over the US proposals remains high and vocal. Whilst the US is attempting to placate Russia by involving them in the system, they are still wary of the programme and concerned that it will have negative implications for their own foreign policy, sovereignty and power. Interfax reported on December 18th that Russia's foreign minister Igor Ivanov said:

"Such steps must not hurt Russia's security interests, or the interests of other countries ... Such a move must also not prompt a new arms race."

China, which is not likely to be offered any involvement in the system, is equally uneasy. Foreign Ministry spokesman Liu Jianchao is quoted by the Guardian on December 19th as saying that missile defence:

"should not undermine the security and stability of the world... We worry about the possible negative impact on regional stability of a missile-defense system. We hope the relevant parties will act prudently... Only through the good cooperation of the international community can we effectively solve the threat posed by the proliferation of weapons of mass destruction,.. The missile-defense system should not undermine the security and stability of the world. Neither should it undermine global and regional security."

The idea that the system is no longer of concern internationally is false, and the idea that many states are not concerned about the prospect of a subsequent arms race is equally incorrect.

SPACE

The United States and the United Kingdom are both signatories of the Outer Space Treaty, which forbids siting weapons in space or fighting wars in space. However, missile defence, in its later stages, is likely to require the use of space-based weaponry. As the US Space Command document "Vision for 2020" states, space command would have a

"...greatly expanded role as an active warfighter in the years ahead as the combatant command responsible for national missile defence ...".

Whether in fact it would indeed be the US Space Command, the Missile Defence Agency or another US body that takes on this role, it is clear that such a role will be a major aim for the US. Previous Chiefs of the US Space Command have spoken of fighting wars in, through and from space. The link is not hard to make. Missile defence will play a key role in providing warfighting capabilities to the US. Its role is not one of defence but of offence. Rhetoric like this

will provoke an increase in the numbers of WMD in other countries. Again, whilst the MOD discussion paper argues that the “current territorial missile defence proposals are much more limited” than the Reagan plans, long-term proposals are even more ambitious and destabilising. It is worth repeating that, once the UK becomes involved in the system, a way out will become increasingly difficult to find. The go-ahead to these current proposals is a giant step towards the US achievement of their ultimate proposals.

As Canada’s Foreign Minister Bill Graham was quoted as saying on December 18th in the Globe and Mail newspaper, missile defence would be a

“bad mistake... The big red line we all have is the weaponisation of outer space, which I believe would be immoral, illegal and a bad mistake... There are voices in Washington that are calling for that and we are strongly urging them this would be an extremely unfortunate development for peace... The fact of the matter is they will have established the principle (of space weapons) and they can't guarantee they'll have the technological superiority 25 years from now and that's going to be a problem for everybody.”

SAYING NO

As Jean-Philippe Racicot, strategic affairs researcher at the University of Quebec at Montreal is quoted as saying in the same Canadian article, while Canada may oppose the initiative politically, militarily it might not have much choice but to support the action.

“In 12 to 24 months the Americans are going to ask us: are you in or not? And at that point, if Canada says no, it will be marginalized ... So despite the official protests, we're not going to have any choice but to go along.”

Louis Balthazar, interim head of the same university's strategic studies department continued,

“Canada is so closely tied to the United States, it would be difficult to bypass this project.”

The UK is, if anything, more closely tied to the US than Canada. With its reliance on the US to maintain its Trident nuclear submarines, its ties to US information gathered from Menwith Hill and through other means, the UK has become dangerously reliant on the US for its defence. Agreeing to the use of UK facilities or land for missile defence would take us far deeper in to this chasm of reliance and make it vastly more difficult to escape. If the UK is to give the go-ahead for missile defence it should do so not only because the security of the nation and NATO allies would be increased, but because the stability of the entire international spectrum would be maintained or enhanced. Either way, a decision by the UK government should be based more on the benefits to the people of the UK than on the ties to the US. The two are not necessarily inextricably linked.

CONCLUSION

It is important to remember that current public plans for missile defence do not tell the whole story. Whilst a software upgrade at Fylingdales is all that is necessary at present, the full plans for missile defence are far greater and the implications far more destabilising. It is a path that is hard to turn back on once the journey has been started.

Missile Defence

- threatens to provoke a new arms race
- will lead to the weaponisation and militarisation of space

- is provoking concern and anger amongst key states including China, Russia and Canada
- may pose a threat to UK bases
- may lead to the siting of interceptor missiles in the UK
- will allow the US to achieve “full spectrum dominance” and so perceive themselves more able to fight wars without threat of retaliation
- may increase radiation levels in the North York Moors national park and surrounding villages
- will tie the UK ever more tightly to US foreign and military policy

The UK government must take the brave step of rejecting use of Fylingdales, Menwith Hill and any other part of the UK for any component of the missile defence system. Instead they should take genuine multi-lateral steps towards nuclear and conventional disarmament and peace and confront the root causes of inequality and unrest, and urge the US to do the same. Creating new levels of warfighting technology is not a step towards peace or security.

APPENDIX A

EMR concerns associated with existing and proposed development at RAF Fylingdales

Health Effects

The replacement of the familiar BMEWS 'golf balls' with a large Phased Array Radar at the Fylingdales site, that commenced operation in 1993, led the Nuclear Free Local Authorities to conduct a ground-based EMR survey of the surrounding area¹. This survey was an extension of earlier work in the summer of 1991 and used 23 measurement sites, including moorland paths and tracks, roadside locations and habitations. The survey found maximum field values of about 10Vm^{-1} with typical values around 5Vm^{-1} . The report concluded:

- "At no point in the area accessed by the survey is the field strength due to RAF Fylingdales' transmission higher than that recommended in the current UK guidelines for protection against biological hazard from non-ionizing radiation;
- "In the northerly locations, the new phased array radar has not significantly changed the time averaged levels of field to which walkers and residents are exposed;
- "South of the transmitter, the levels to which walkers and residents are exposed are now ten times that which they were before the pyramid upgrade became operational;
- "The threat to vehicles using the A169 from interference to their electronic control systems has been reduced though not eliminated."

International Safety Standards: the International Commission on Non-Ionizing Radiation Protection (ICNIRP)

Exposure limits for Radio Frequency (RF) fields are developed by international bodies such as the ICNIRP. The ICNIRP is a non-governmental organization formally recognised by the World Health Organisation and has drafted guidelines to protect against RF health effects. They state that:

*"Environmental RF levels from radars, in areas normally accessible to the general public, are normally at least 1,000 times below the limits for continuous public exposure allowed by the ICNIRP guidelines."*²

At frequencies in the range 300 MHz to several GHz, there is significant local, non-uniform absorption by the human body – the recommended maximum field levels are shown in the following table (where f is the radar frequency in MHz).

Reference levels for general public exposure to time-varying electric and magnetic fields (unperturbed root mean square values)

Frequency range	E-field strength (V m^{-1})	H-field strength (A m^{-1})	B-field (μT)	Equivalent power wave density (W m^{-2})
10-400 MHz	28	0.073	0.092	2
400-2000 MHz	$1.375f^{1/2}$	$0.037f^{1/2}$	$0.046f^{1/2}$	$f/200$
2-300 GHz	61	0.16	0.20	10

A comparison between the survey results and the table above indicates that the $5\text{-}10\text{Vm}^{-1}$ EMR levels recorded around RAF Fylingdales (operating in the frequency at 420-450 MHz) were in fact quite close to the ICNIRP reference levels ($28\text{-}29\text{Vm}^{-1}$) and not "...1,000 times below the limits for continuous exposure".

¹ "RAF Fylingdales EMR survey: second phase" by Tim Williams, Elmac Services, August 2, 1993

² WHO Fact Sheet N°226, June 1999

Also, a number of factors significantly alter human exposure to RF generated by radar systems, often by a factor of at least 100:

- Radar systems send electromagnetic waves in pulses and not continuously. This makes the peak pulse power emitted much higher than the measured average or root mean square power.
- Radars are directional and the RF energy they generate is contained in narrow beams. RF levels away from the main beam fall off rapidly. In most cases, these levels are thousands of times lower than in the main beam.
- Early warning radars are continuously changing the direction of their beam.

Are International Safety Standards Reliable?

A recent report on the *Physiological and Environmental Effects of Non-ionising Electromagnetic Radiation* for the European Parliament³ states:

“What distinguishes technologically produced electromagnetic fields from (the majority of) those of natural origin is their much higher degree of coherence. This means that their frequencies are particularly well-defined, a feature that facilitates the discernment of such fields by living organisms, including ourselves. This greatly increases their biological potency, and ‘opens the door’ to the possibility of frequency-specific, non-thermal influences of various kinds, against which existing Safety Guidelines – such as those issued by the International Commission for Non-ionising Radiation Protection (ICNIRP) - afford no protection. For these Guidelines are based solely on consideration of the ability of radio frequency (RF) and microwave radiation to heat tissue, and of extremely low frequency (ELF) magnetic fields to induce circulating electric currents in the interior of the body, both of which are known to be deleterious to health, if excessive.”

The report points out that the frequency-specific sensitivity of living organisms to ultra-low intensity microwave radiation was discovered over 30 years ago in Russia and there the exposure guidelines are approximately 100 times more stringent than those of ICNIRP. It also notes that some symptoms have been reported in epidemiological studies involving humans, animals and plant life connected with a radar operating at 154-162MHz, with a pulse repetition frequency of 24.4Hz - at a location where the intensity of the emitted radiation is *comparable* to that typically found at 150m from a base-station. Additional reported effects include⁴:

- Depressed nocturnal melatonin levels in cattle⁵.
- Less developed memory and attention span (as well as decreased endurance of their neuromuscular apparatus) of children living within a 20 km radius of the radar, subject to a maximum exposure of 0.00039 W m^{-2} .
- A six-fold increase in chromosome damage in cows exposed to a likely maximum intensity of 0.001 W m^{-2} .

(The cited field intensities are estimated from information on the electric field intensity as a function of distance from the radar installation⁶).

In April 2001 the US Air Force agreed to conduct “time-domain measurements” on a similar radar installation (known as PAVE PAWS – Phased Array Warning System) at Cape Cod in the United States. Local residents there have been concerned about the radar because the area has some of the highest rates of cancer in the state. From 1993 to 1997, nine of the Cape's 15 towns had breast cancer rates at least 15 percent higher than the rest of the state.⁷

3 “The Physiological and Environmental Effects of Non-ionising Electromagnetic Radiation”, by G.J. Hyland, Private Treaty No. EP/IV/A/STOA/2000/07/03

4 Science of the Total Environment; Issue No 180, 1996

5 “Study of Health Effects of Short-wave Transmitter Station at Schwarzenburg”, by E.S. Altpeter et al., University of Berne, Inst. for Social & Preventative Medicine, August, 1995.

6 “Measurement of the intensity of electromagnetic radiation from the Skrunda radio location station, Latvia”, by T. Kalnins et al, Science of the Total Environment 1996; 180: 51-56

7 “Radar tower plan rekindles fears” by Richard Higgins, The Boston Globe, 5 March 2001

Richard Albanese, an Air Force scientist for more than 31 years, and others are worried that the Cape Cod radar's phased wave fronts affect human tissue in ways that are not yet understood. In a presentation given in February 2002 at the start of a series of experiments to measure the PAVE PAWS radar, Albanese said he has conducted animal testing that showed animals suffering harm when exposed to phased array radar at levels 1,000 below the current electrical health standards.⁸

The Fylingdales PAR operates by emitting a series of pulses and additional, perhaps more serious, problems may arise at frequencies around 17 Hz. As mentioned in the above European Parliament report, this lies in the range of beta brain-wave activity and is close the frequency of a flashing visible light that can provoke seizures in people with photosensitive epilepsy. It is also the modulation frequency at which *"...there is a maximum in the expression of calcium ions from brain cells when they are irradiated with amplitude modulated, low intensity RF radiation over a wide range of carrier frequencies"* and *"...any interference ...could well undermine the integrity of the whole nervous system, although the extent to which this actually occurs is, at present uncertain, owing to a lack of the necessary research."*

The pulse repetition frequency of the radar is understood to be 27 pulses per second⁹. This was the documented frequency of the previous system and it is not known whether there are any similar effects at or around this frequency that need to be examined closely.

⁸ "Measured Response" by Kevin Dennehy, Cape Cod Times, 28 February 2002

⁹ Jane's Radar and Electronic Warfare Systems, Second Edition, page 62, 1990-1

APPENDIX B

Effects of X-band radar

The final configuration of NMD will require the deployment of high resolution phased-array X-band radars (XBRs) which use high frequencies (5.2-8.5 GHz) and advanced radar signal processing technology to improve target resolution and discrimination. These systems emit a series of electromagnetic pulses over a 50° field of view in azimuth and elevation, and can be rotated to track targets from any direction.

The initial NMD configuration includes an XBR at Shemya in the Aleutian Islands (to cover missile launches from North Korea). The final NMD configuration is expected to include additional XBRs at the current BMEWS sites, and this including Fylingdales. When fully operational each system will include a radar mounted on pedestal and associated control and maintenance facility, and a power generation facility.

XBRs have an average power of 170 kW and an antenna area of 123m², which means a power aperture product of about 20 million, though this usually incorporates a "thinned" array of only 1/5 of the total possible number of aerial elements (around 81,000) decreasing the gain by a factor of 5. In this case more energy goes into radar beam side lobes but does produce a narrower beam and provides greater tracking accuracy.

Although the BMDO insists that the microwave leakage from XBRs is not harmful¹⁰, recently questions have been raised regarding the possible danger to the health of people living close by.

Potential effects

The XBR BMDO fact sheet¹¹ states that *"The exposure limits established by [the US standard] ANSI/IEEE C95.1 1999 are used to ensure that public health will not be impacted by EMR emitted from the XBR"*.

Two major exposure environments are defined: inside and outside a controlled area of radius 150m where security personnel would prevent any unauthorized access. It is claimed that outside the controlled area EMR will be no higher than the power density levels specified in ANSI/IEEE C95.1 1999. The BMDO provide the following table:

Comparison of EMR exposures

System	Distance	Power Density (W m ⁻²)	Power Density (mW cm ⁻²)
Microwave Oven	5cm	50	5
X-Band Radar [at fence boundary]	150m	25	2.5
Walkie-Talkie	10cm	25	2.5
Cellular phone	1cm	6	0.6

The BMDO continue:

¹⁰ US DoD say (Press Release, 6 October 1999: NATIONAL MISSILE DEFENSE DRAFT ENVIRONMENTAL IMPACT STATEMENT RELEASED): "...Overall, the expected environmental impacts resulting from potential NMD deployment are minimal. Areas analyzed in the DEIS include: potential electromagnetic radiation effects to airspace, biological resources, and humans from operation of the X-Band Radar; construction and operation impacts on vegetation, wildlife, threatened and endangered species, wetlands and fisheries; health and safety issues to the public associated with transportation and operation of the Ground-Based Interceptor; potential impacts to geology and soils and water resources; noise related impacts from both construction and operation; increases in hazardous waste generation and air emissions; and socioeconomic impacts and benefits resulting from both construction and operation of the NMD system."

¹¹ "X band radar Fact Sheet" from the BMDO - www.acq.osd.mil/bmdo/bmdolink/pdf/jn0019.pdf

“There is a possibility that EMR may effect television reception out to a distance of 4 kilometers (about 2.5 miles) from the XBR and that occasional static may occur in some radios out to 7 kilometers (about 4.3 miles) from the XBR.”

However, the projected power density level is higher than that recommended by the ICNIRP guidelines for radars (10W m^{-2} at this frequency range – see table in Appendix A).

The BMDO also claim that wildlife will not be adversely affected. Although there is a potential for higher levels of exposure to birds flying through the main XBR beam, it is claimed that exposure would only be for a short time and *“...time-averaged power densities would not raise body temperatures or cause adverse biological effects”*.

However, this claim is not consistent with the European report cited earlier.