2017

Ethics and Brain Implants in the Military [Commentary]

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Publication Details

Wigan, M. (2017). Ethics and Brain Implants in the Military [Commentary]. IEEE Technology and Society Magazine, 36 (1), 65-68.

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Abstract
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Disciplines
Engineering | Science and Technology Studies

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COMMENTARY

Marcus Wigan

Comment [T1]: Au: please provide heads

Ethics and Brain Implants in the Military

Definitions are a key factor when discussing the ethics of brain implants in the military. There is a world of difference between a permanent embedded rewritable chip and an active RFID-managed interface to a nervous system. However both variants are under active experimentation and both deserve to be examined on their merits – or lack of merits.

The working definition of that we shall adopt is:

> A brain implant is an implantable device with an interface to a person's nervous system, at some point, by some means.

This is still very unsatisfactory, as induction can be used to make the bridge between the external control or communications device environment and the person, meaning that an actual implant may not be required even for bidirectional controls in either direction.

The key distinctions might usefully be classified as:

1) Non-contact communication with potential control, uni- or bi-directional.
2) Implanted communications interface controlled internally, but that cannot be managed by external entities or devices.
3) Implanted device controlled externally for communication and/or control of the person.
4) Implanted device that can directly enhance some aspect of the persons' capacities – divided into permanent and removable.

These distinctions are critical for any ethical discussion to be meaningful.

Once the distinctions are clearly specified for a specific device or situation, and once the implied assumptions have been uncovered, then the discussion can begin. None of the questions are trivial. All imply some of the answers.

The subject of ethics related to the enhanced soldier has not escaped the attention of philosophers, or indeed the military. However, arguments used have been essentially utilitarian or legalistic [13]. A heartwarming exception is in Shunk [19] who summarizes his discussion with a quote from Nietzsche [17], drawn from Nietzsche's *Virtue Ethics* phase: "He who fights monsters should be careful lest he thereby become a monster."

Ethics and morals can be confused all too easily. Let us take morals to mean the value system and behaviors that are acceptable in a society (clearly a relativist framing), and ethics to be the value systems held by individuals, who must make choices. These choices may sometimes conflict with (societal) moral judgments

Our working assumptions map all too well onto Asimov's [3] framing of robotic laws. (Asimov then spent 30 stories and novels showing how easily the laws could be undermined, as discussed in this illuminating reference [3].) The robotic laws address the ethical issues of enhanced beings of any kind in relation to humans. They start with a value that places humans above machines, and ends up with machines valuing themselves in term of survival.

Addressing our subject here of the ethics of brain implants in the military then raises the question as to what kind of an entity a human+implantable actually IS! Perhaps a form of robot? Is it a question of degree, assistive technology? Or a control system extension?

If the answer is a control system extension, then all the arguments that apply to the first widespread targeted Internet of Things (IoT) embedded system malware – i.e., STUXNET – will be brought to bear, as implantable (or effectively implanted) systems are particularly vulnerable to this form of intrusion. While Jenkins [10] argues that Stuxnet can be controlled, his own arguments fail to apply to any embedded device in a human being. Still, he acknowledges the largely untested ethical domain of non-physical warfare that Stuxnet exemplifies.

Again this aspect of control via embedded systems is not a trivial question. Assistance to soldiers in their primary function of war has already extended to the use of ICE (the drug) for attention enhancement, communications integration, and visual enhancement [16], [19]. This list is steadily expanding. Head Up Display (HUD) systems can now be projected directly onto special corneas: these may be removable or implanted. There are few ethical issues with a readily removable special contact lens, but very real issues for a permanently implanted cornea with modified function or that is in some way instrumented or integrated with a remote communications channel – and any tradeoffs for eye function that are imposed.

Reversibility is a major issue. If the enhancement (brain interface, etc.) is removable without any residual effects, one might assume that there were few ethical issues involved in its removal. But in the case of military applications the effects on the soldiers' behaviors [9] when an enhanced capacity is lost has to be assessed. In addition, the further issue is the social response to soldiers when they are discharged and returned into the community, if there is any expectation of any enhancement remaining as a result of their service, and of there being any awareness by the community that they have had had such treatments, as the suspicion will always exist that the enhancements are still there.

This is a social issue and an ethical one for reentry into society – a question too rarely discussed in military Rules of Engagement - and one that might usefully be added under the rubric "Rules of **DIS**engagement"!

The blurring of civilian and military has further ethical consequences, especially when direct or indirect "brain jacking" and manipulated attitudes are involved:

> The ways in which military psychological resilience programming works to wage both war and austerity in the fields of social and inter/national security are significant because they raise troubling questions about the evolving status and ethics of what it means to be a human being [9].

Many measures taken to enhance soldier efficiency extract a price in terms of their personal humanity. We are still coming to terms with the results of soldier training and conditioning, but we have hardly begun to address the consequences of desensitization and the experiences of inevitably traumatic events.

The experiences of Vietnam veterans in their various communities post service have not been entirely positive – especially when their combat conditioning became apparent in cases of violent responses. The civilian legal issues surrounding highly trained martial arts specialists becoming capable of becoming designated "lethal weapons" is relevant. Soldiers are necessarily specifically conditioned as part of their

training: martial arts specialists choose to develop their lethal skills, and most martial arts have a code of conduct to limit their use on others.

These importance of these questions will be amplified if enhancements are left in place and functioning, as enhancement of lethality(in some form) is a major objective of military enhancement in the first place.

Comment [T2]: Au: could you clarify thes passages a bit. What does "these reaction refer to? What does "that" in the phrase "that is a major objective…" refer to?

Some of the existing condition processes are not readily reversible, and are in general ignored as far as possible by the military, leaving the soldiers themselves and the community to pay the price. The price might be substantial if enhanced warfighters are captured and become subject to disassembly to extract the enhancement devices and interfaces themselves.

As long as these were the results of the process of embedding (and conditioning is undeniably that), the questions could be deferred- but not indefinitely.

Let us consider extensive embedding as providing a genuinely enhanced physical and reactive capacity. Then we could perhaps "disarm" the enhancements upon discharge. Timothy Zahn (Cobra) [21] illustrates once again from the stance of science fiction framings the likely prices to be paid by all parties. Precisely this point is made 40 years later in very recent explorations into the ethics of enhancement technologies for warfighters, and is even now under consideration for the ethical approval of human enhancement technology experiments as a whole [11].

Now let us move one step further, to intellectual enhancements, collapse of perceptions and decision lags, controlled locally or remotely. These are all under active research and experiment already.

What happens in the case of these further steps?

First the morals and ethics of the controller, the solider, and the society now become severely strained. Responsibility for actions has to be spilt – not as now between orders and compliance – but to ethical issues of consequences and who is taking the price?

Society blindly attributes these responsibilities to the physical actors. This will no longer be accurate, appropriate, or workable: we need to work out how to handle these questions.

Second, if intellectual enhancements form part of the bundle, can we morally disarm those who have paid a real price in other terms upon demobilization?

The displacement of command and actor/agent in deadly force is already creating real problems in defense deployments. (Drone warfare is currently the most salient of these.) The focus of discussion is still currently on the uncertainties of precise information for targeting (i.e., costed by collateral damage). But embedded technologies, which will inevitably be linked to battlefield communications command and control, shift the ground another step. The battlefield is also now changing, and has become an undifferentiated landscape populated by civilians, soldiers, and asymmetric fighters alike

We are patently not there yet. It is arguable that the most telling enhancements will be those that integrate sensors and weapon responses more rapidly than can be achieved by the best soldiers with excellent normal field of action communications.

So we must add to military efficiency enhancement the following goals:

- How to discharge enhanced soldiers?
- How to clarify both for them and their commanders and society who are responsible for what while in active service?
- Who pays what prices in the end?
- How do we negotiate these tricky moral and ethical questions with the very different context of military service and risk balances?

Some of the answers may lie in the technical separation of solider and command structures. However the experiences of remote drone pilots clearly shows that physical separation from the battlefield does not reduce the price paid by the soldiers launching drone-born weapons. Enhancing the reaction speeds and causing

them to launch before the "pilot" is consciously aware of it is a predictable enhancement capability.

But if (as is already possible) detection of subliminal decisions saves the few hundred milliseconds (or longer) before the action is conscious raises serious ethical strains on the pilot/soldier, who has full responsibility yet may have launched a lethal attack without any conscious action. This type of enhancement has consequences and may raise serious post-traumatic stress disorder (PSTD) issues. It is ethically very difficult to address – particularly if such ethically initiated stresses are neither anticipated nor addressed in training.

Comment [T3]: Au: please clarify this sentence?

Implantable enhancements for the military will raise practical questions of training, conditioning, and civilian society re-entry. It will be costly in fiscal, personal and societal terms if this is not planned for.

A Canadian military assessment is very well aware that

> When examining the operational potential of invasive PA [Personal Augmentation], one must consider how it relates to Canadian core values [15]

However, Michaud-Shields also asserts that civilian take up of augmentations might actually lead introduction and acceptance by the military deployment target of 2030. The progressive integration of warfighters into the sensor, communication, command, and control of aircraft is already well on its way [2].

Comment [T4]: Au: correct word?

The delays in military research introduced after successful initial trials of brain reading non-contact "implants" by DARPA in 2009 [6] tends to support Michaud-Shields' suggestion. The ethical aspects are evident if such implants or noncontact two-way communication (in military terms, inevitably control) is normalized in society by choice. Then the necessary "military exceptionalism" in the social judgment context is diminished substantially. The questions of differential applications of the ethical issues of autonomy (a key feature of virtue ethics) [1] for the military, as distinct from civilians, have yet to be widely addressed, but are clearly a key factor.

Against this there are arguments that if augmentation is available to warfighters, that we have an ethical duty to provide augmentation to them if it can enhance their survival [8].

It is tempting to treat "brain implants" as somehow worse or more significant than other implant locations, but the questions remain the same. Does "spinal chord implant" have the same emotional load? Or does "RFID reception in the wrist" seem less of a challenge? Are physical implants genuinely different than extreme conditioning processes or tailored drug delivery (both long used by the military)? All are designed to remove constraints on deadly decision-making and action.

Is it any easier to consider an implant of a cell that can inject genetically tailored extreme drugs as a "brain implant" [16]? It would undermine autonomy just as well, and external communications would bring it under external control and probably achieve a more rapid enhanced response than a direct brain implant could achieve due to the slow decision process in the brain itself. Would not the limbic system be an equally effective (and problematic) channel for enhancement?

Moreno was criticized only recently for "Star Trek" references – yet implementation of many of the brain implant and connection technologies are already emergent [7]. Yet Bloom *et al.* [5] omitted all mention of the ethics of direct active brain implants as late as 2009 – and Moreno has had to update his book several times, observing with increasing concern:

> As the national security implications of neuroscience become more apparent, the pressing need to examine how our brains dispose us to peace as well as war should gain currency [16].

This is a hopeful, if as yet experientially unjustified Virtue Ethics response to brain jacking in all its forms – especially military.

The additional ethical complexity presented by brain implants (direct or effectively direct) is that it arguably makes these enhanced warfighters into weapons – and thus subject to the moral and legal requirements of Article 36 of the Geneva

Convention on War [4], [12] – in addition to the ethical dilemmas of reduced autonomy of potential remote control undermining or removing the decision making of the warfighters themselves, as already raised.

Although the ethos of the military is "be all you can be," the problematic situation of being unable to refuse enhancements requires attention. Any enhancements that involve brain jacking present significant personal control and autonomy issues. These issues relate not to the initial intrusiveness of the enhancement, but also to the lack of full transparency as to exactly what inserted chips or communications might do to the person or how such enhancements could affect behavior – and how these aspects could readily be changed without a person's full informed concurrence [18].

A further dimension is raised by the growing gender aspects of warfighters, as women increasingly appear on the front lines [14].

Comment [T5]: Au: this is a repeat of an earlier sentence – checking that you want repeated?

Until we can address all these questions clearly and in a widely understood and acceptable form, the term "brain implants" offers an immediate cyborg shock to the audience, in order to stimulate and permit a series of badly needed contextually - dependent ethical discussions to begin in a wider sphere, beyond the military. These questions ares about what we are, and what we can permit ourselves to be made to become.

Singer [20] asserted more broadly about killer applications of technology that we are "ethical infants" on this subject. He pointed out the anticipation of these issues in science fiction (as we have done here from a different angle):

> We had better act soon. For the thread that runs through all of this is how fast–moving pace of technology and change is making it harder for our all too human institutions, including those of ethics and law, to keep pace [20].

The next level of science fiction speculation on direct brain-software interfaces focuses on the weaponisation aspects [22] complementing the same authors technical contribution [23]: More will follow.

Singer made his statement six years ago: We clearly should make a really serious start now.

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