

## **Introduction**

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The Conflict and Threat Scenario Section of the Institute for Peace Support and Conflict Management at the National Defence Academy of Vienna (IFK/LVAk) has been conducting research in the field of hybrid threats (HT) since 2012. As of 2016, the focus has been on the technological manifestations of these diverse forms of threats. Priority topics, such as technology as a means of power, are being researched. In this regard, the influence of artificial intelligence (AI) is becoming increasingly significant, especially in combination with Big Data.

High-tech weapons and equipment systems place high demands on armed forces personnel. The more complex the systems are, the longer and more costly the training periods for soldiers have to be. Another aspect concerns the different characteristics of potential application areas. In conjunction with the effects of climate change, emergency personnel on corresponding missions are reaching their stress limits at an ever earlier stage. In order to be able to survive in operations, soldiers are therefore introduced to these stresses as realistically as possible so that they can withstand them during deployment. The result is that well-trained combatants are costly, and losses – apart from the human factor – are difficult to compensate for. The ageing populations of Western societies are also leading to a smaller number of citizens who are fit to bear arms. All of these challenges are forcing states to find innovative solutions to ensure that their armed forces remain fit for purpose. There are several approaches to this. On the one hand, autonomous weapon systems could serve as a replacement for troops. On the other hand, the use of human enhancement (HE) would be a variant for optimising human capabilities, therefore compensating for the lack of soldiers. The latter approach in particular is seldom noticed by the public, despite there being astonishing research results from the medical field with all of the opportunities and limitations that it entails. Possible options for differentiated areas of military deployment are only selectively discussed in specialist circles and are rarely incorporated into perceived threats. This publication aims to fill these gaps.

The opinions expressed in the individual articles do not reflect the opinions of the BMLV. Potentially controversial findings in the scientific contributions are certainly welcome. They highlight the wide range of challenges of HE.

## **The project**

Since the IFK started studying the technological components of hybrid threats, AI has become an increasingly indispensable part of scientific research. During our thematic research work on HB, media reports about intentions for improving human performance came to our notice. There was research interest in transplanting microprocessors into brains. This awakened the interest of the IFK in Human Enhancement. In 2022, the “Artificial Intelligence (AI) as a future-decisive factor for increasing the efficiency of military task fulfilment with special consideration of human enhancement (HE)” project was initiated at our institute. Under the working title of “Human Enhancement (HE) as a Security Policy Factor”, the project was launched as part of a research process and approved by a specialist committee of the Austrian Armed Forces (Österreichisches Bundesheer – ÖBH).

As early as 2013, the German Bundeswehr Office for Defence Planning addressed fundamental questions about HE and the threats posed by it. In its HE project, the IFK addressed these aspects and dealt with the matter in great detail. The expected technical, medical, ethical, social, legal and military challenges of HE were addressed, taking the fundamental value framework of our Western social system into consideration.

The goal of the HE project was to highlight security policy challenges and possible implications that could arise from HE and constitute part of hybrid threats. It therefore represents a contribution to the perceived threat with regard to opportunities and risks for and by armed forces or security forces in general, with particular emphasis on Austria, the Austrian Armed Forces and the resilience of the EU.

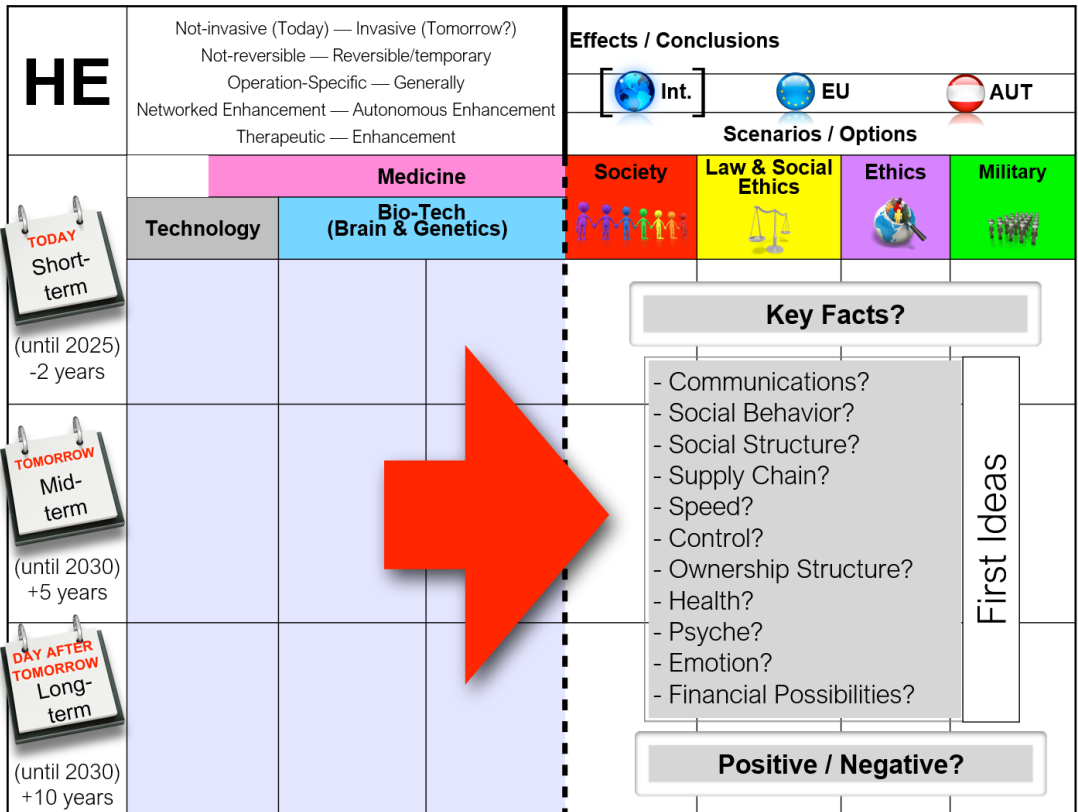
The hypothesis was that within Europe, HE innovations in the medical field were the starting point for social change. The main focus was therefore on HE technology development in medicine and the performance limitations in humans caused by illness, accidents, etc. and the restoration of original func-

tionality. Particular interest was taken in expanding human capabilities beyond the normal level. The replacement of missing body parts (prosthetics) was only of research interest if artificial limbs were coupled with nerve pathways. An invasive connection between man and machine only exists in cases such as this. Even sensory perceptions can currently be perceived with such “man-machine interfaces”. A breakthrough appears to have been made in bionic reconstruction, which will be the driver behind higher-quality HE technology changes in the future. Tremendous advancements are being made in this research field, and rapid technological developments with extreme HE creations can be expected. Utopias are more and more becoming reality. Once positive medical achievements have been anchored in society, there is a strong possibility that these successes will be extended to other sectors such as the economy or security forces (e.g. enhanced fitness criteria). Modern preliminary stages, such as prosthetics, were therefore taken into account for the project.

Improving performance capability is always a goal of the military. However, not every human intervention for optimisation purposes necessarily constitutes an improvement. The project team therefore decided to replace the term “improvement” with “extension”.

## **Methodology**

It has been widely reported in the media that Elon Musk intends to transplant a computer chip into a human brain. If the experiments and research are successful, the idea is that the findings will also find their way into military applications. The first step in the project planning phase was to outline the approach:



A qualitative research method was applied for the initiated research project, and key research fields were identified. A research exposé was prepared, and possible experts were named. A kick-off workshop took place at the LVak (National Defence Academy), during which the project planning was presented for discussion to various internal and external experts who work with the ÖBH. Additional research interests and complementary research questions raised by the experts were included in the project draft. The technologies were divided into the categories of invasive/non-invasive, permanent/non-permanent, reversible/irreversible for further focus.

The main aim of the project was to address the individual subject areas using the most comprehensive approach possible, given the complex nature of human enhancement and its area of application. For that reason, it was decided

to form an interdisciplinary group. Experts were appointed as PoCs (Points of Contact), and each of them was responsible for a sub-aspect of HE or a cluster.

The LVAK's Central Documentation Centre (ZentDok) created its own internal cloud solution with password access, in which the experts shared or presented their knowledge and initiated discussions about it. ZentDok also provided comprehensive research on HE for a cloud query. During workshops (WS), six subject clusters (see figure above) with PoCs were formed. These had the opportunity to add additional experts to their clusters in order to provide the required specialist knowledge.

The individual challenges addressed in the clusters were presented and discussed at subsequent events. The working groups presented their findings in panel discussions at a final conference. A selected audience was given the opportunity to ask questions or make comments. The input from the conference has been considered in the written articles in this final project publication.

### **Human enhancement. A question of definition**

The term “human enhancement” is often used in the professional world, which indicates the complexity of the subject. In a nutshell, it is about reinforcing existing human capabilities.

China's perspective on the issue shows that Western terminology is not used. China initially referred to the subject of HE as “man-machine cooperation” or “brain-machine interface”. In late 2021, the term changed to “human-machine integration” or “cloud-brain control”. In addition, the literal translation of the Mandarin word for AI is “common body”.<sup>1</sup>

Challenges pertaining to terminology particularly arise because of the many facets of HE. The countless definitions of terms in scientific articles, analyses etc. explain this versatility. At the beginning of the project, the various terms

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<sup>1</sup> See Vogl, Doris: Human enhancement with Chinese characteristics – AI as a factor for China's military modernisation with special consideration of human-machine teaming. As a case example in this publication.

were introduced to the participants and put up for discussion. Since the definitions that were presented proved to be unsatisfactory for the project group, a separate method was chosen to find an operational definition. During a kick-off meeting, the following **operational definition** was established, using specific expert expertise in conjunction with ChatGPT suggestions:

Human enhancement refers to the use of technologies, methods or substances for expanding the capabilities (physical or cognitive) of humans beyond what is normal and considered natural.

When dealing with the topic of HE, the question of distinguishing between optimisation and enhancement soon arises. In the project, the experts reached the following decision: Optimisation brings humans closer to their biological performance limits, whereas enhancement exceeds these limits.

In addition, the term transhumanism was always used during the analyses, which itself raised a question of differentiation. Again, several (unsatisfactory) definitions were put forward. Therefore, the ChatGPT survey method was employed once more. The experts established the following definition from a series of suggestions:

Transhumanism is a philosophical movement aimed at enhancing human psychological and physical capabilities through advanced technology. By viewing the mind and body as systems to be optimized, it challenges conventional notions of human nature. Transhumanists aspire to transcend biological limitations, envisioning a future where technology improves human life and capabilities. Unlike traditional approaches to human enhancement, which focus on improving existing functions or addressing medical conditions, transhumanism seeks to fundamentally transform human existence – extending lifespan and advancing traits far beyond current human potential.

## **General considerations**

Societies are becoming increasingly reluctant to accept casualties in their armed forces. Difficult conditions in operational areas also make missions more challenging. In addition to climatic conditions, this includes an increasing number of different combat-ready actors, which reinforces the desire for “super soldiers”.

That which is fascinating about HE is its game-changing potential, particularly with regard to security policy. Anyone who is pioneering in this field of research will have global power constellations and dominance turn in their favour. This is illustrated by the statement of Chinese author Chen Wehui: “... the one who wins the platforms wins the world ...”.<sup>2</sup> Even Russian President Putin, who is partly isolated internationally due to his war of aggression against Ukraine, toyed with the idea of HE at the World Festival of Youth.

“Genetic engineering will open up incredible opportunities in pharmacology, new medicine altering the human genome if a person suffers from genetic diseases. All right. This is good. But there is another part to this process. It means, we can already imagine it, to create a person with the desired features. This may be a mathematical genius. This may be an outstanding musician. But this can also be a soldier. An individual who can fight without fear or pain. You are aware that humankind will probably enter a very complicated period of its existence and development. And what I have just said may be more terrifying than a nuclear bomb.”<sup>3</sup>

Decision-makers must therefore be confronted with future technological aspects such as HE technology issues for armed forces. The need for collaboration in the field of HE due to its complexity is revealed in the following statement by Yang, Qiong and Gao, Xiaoyu: “The field of human enhancement technologies requires multi-stakeholder collaboration and joint response”.<sup>4</sup> The EU is no exception to this.

HE as a form of performance enhancement does not have entirely positive connotations. The many facets raise several questions on several levels, ranging from technical to medical, social, judicial and military areas, with a particular focus on philosophical/legal aspects. The issue of limits, for example: When does a human being stop being a human being, and what effects would exceeding limits have in the future?

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<sup>2</sup> See Vogl, Doris: Human enhancement with Chinese characteristics – AI as a factor for China’s military modernisation with special consideration of human-machine teaming. As a case example in this publication.

<sup>3</sup> President Putin at the World Festival of Youth, Sochi, Russia, October 21, 2017, Source: Joosten, Peter: Festival of Youth - What Vladimir Putin Thinks About Genetic Engineering. Via YouTube. 2021. <https://www.youtube.com/watch?v=WnlaAIKPjAw>.

<sup>4</sup> See Vogl, Doris: Human enhancement with Chinese characteristics – AI as a factor for China’s military modernisation with special consideration of human-machine teaming. As a case example in this publication.

Social questions include whether HE also contributes to promoting equality. Does technology “compensate” for human dysfunction in any way? We could find ourselves facing these and similar philosophical/military concerns sooner than expected. This is also the case when HE is used by security forces, for example. This applies both to our own defences and those of our opponents. How far can, should or must the development of HE technology advance?

Current high-tech developments rely on non-invasive human-machine connections such as headsets or pilot helmets equipped with electrodes. If we look at the progress in prosthetics, the next logical step would be to invasively network future products. Other research interests, such as transporting computer components (chips) via the bloodstream or transplanting electronic components into the brain, are on the verge of a breakthrough. The initial research ideas are ushering in a new technological and medical age.

If these developments initially serve primarily to improve human deficits, future use in the armed forces can be expected. Even NATO is thinking seriously about the potential of HE:

“Human enhancement technologies also present defence and security risks against which Allies and NATO must safeguard, including strategic competitors and potential adversaries enhancing their forces, or otherwise seeking to degrade Allied forces by exploiting cognitive, physical or technological vulnerabilities, to achieve military advantages.”<sup>5</sup>

Critical “side effects” cannot be overlooked in this kind of research. If we intervene in the mind of an individual, the door is wide open for comprehensive manipulation – and in the case of mass application, the influencing of entire societies.

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<sup>5</sup> NATO: Summary of NATO’s Biotechnology and Human Enhancement Technologies Strategy, 2024. [https://www.nato.int/cps/en/natohq/official\\_texts\\_224669.htm#:~:text=Human%20enhancement%20technologies%20also%20present,physical%20or%20technological%20vulnerabilities%2C%20to,%20accessed%2013%20August%202024,accessed 13 August 2024.](https://www.nato.int/cps/en/natohq/official_texts_224669.htm#:~:text=Human%20enhancement%20technologies%20also%20present,physical%20or%20technological%20vulnerabilities%2C%20to,%20accessed%2013%20August%202024,accessed 13 August 2024.)



## **Technology**

The pursuit of technical superiority is the fundamental goal of a number of countries – albeit with different intentions – including the USA. “My biggest concern right now is the overall erosion of our Technology superiority...,” says Frank Kendall, Under Secretary of Defense for Acquisitions, Technology and Logistics.<sup>6</sup> Efforts in this regard are unlikely to deter a number of states, especially authoritarian ones, from carrying out unrestricted human enhancement developments. Governments, such as those of China and Russia, also have a strong interest in technological advancement because it forms the basis for political, economic and military power.

AI has been on everyone’s lips ever since the introduction of ChatGPT. Visions of the future, especially of changes brought about by new technologies, stimulated the imagination. The initial curiosity and positive expectations of AI were followed by potential fears. Quantum leaps in AI have been achieved through increased computing power and improved chip designs – smaller, better, lighter and faster – making AI suitable for everyday use. The application possibilities are also increased by high storage capacities. New areas of application, such as science, medicine and the military, make aspirations become reality. Creativity knows virtually no boundaries.

Because of that, AI has been hailed by experts as *THE* new technology that will impact almost all areas of everyday life and radically change our daily lives. AI lays the foundations for HE. This means that the desire to artificially expand human capabilities is within reach. Like AI technologies, HE requires two basic variables: enormous amounts of data and fast data processing speed.

As Budde and Pickl mention in their article,<sup>7</sup> the majority of HE technologies require an Internet connection to control the respective product that is used. This in turn poses challenges for the IT infrastructure and the energy supply that is required for it. How much energy does an enhancement need, and

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<sup>6</sup> Wells, Jane: The Man with the Pentagon Checkbook. In: CNBC. May 13, 2014. <https://www.cnbc.com/2014/05/13/ll-the-man-who-procures-weapons-for-the-pentagon.html>.

<sup>7</sup> See Budde, Dieter/ Pickl, Stefan: Human enhancement - An ethical perspective. In chapter ETHICS in this publication.

where does this energy come from, even if the enhancements are in the nano range, for example? Will the current energy storage devices be able to fulfil the needs of future HE technology?

Comprehensive questions arise for all HE systems, irrespective of whether they are used non-invasively (outside the body), invasively (inside the body), reversibly or irreversibly. Particularly the irreversible applications such as brain-computer interfaces (BCI) raise further problems. For instance, the question of the right of disposal of invasive high technology remains open. Who is the owner of the HE product that is installed for a certain period of time or for a certain purpose (e.g. military)? Is it the person with the product inside them, or is it the institution that financed the procedure? It is plausible that such HE deployments could be coupled with the promise of social or economic benefits for soldiers following their military service. It is very likely that future technologies for establishing communication between the brain and external products will include a more moderate (non-invasive) form of BCI, as well as an increasing number of different sensors.<sup>8</sup>

## **Medicine**

Technical achievements have always inspired the medical world. The stated goal is to free people from health restrictions. The use of HE methods has become almost routine at some levels in the healthcare system. In addition, thanks to AI, increasingly intelligent computer systems make Homo sapiens appear in need of optimisation. Successes, particularly in the technical and medical fields, appear to make this possible.

In addition to a number of clinical challenges, further disadvantages of HE for humans are possible. Health risks, especially with invasive HE variants, have yet to be satisfactorily and comprehensively researched. There may be a risk of side effects, such as those associated with the medical use of HE. Cognitive optimisation could lead to fatal long-term effects. More research is needed here.

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<sup>8</sup> See Klerx, Joachim: Outlook into the future of warfare with innovation race regarding human enhancement. In chapter MILITARY in this publication; Klerx, Joachim: The future of human enhancement in the military domain. In chapter TECHNOLOGY in this publication.

Studies of German soldiers deployed in Afghanistan have shown that more than 20% of military personnel suffer from a mental illness.<sup>9</sup> A cost-benefit analysis could lead to the minimisation of failures such as this using HE technologies, at least for elite soldiers. Would HE be an adequate solution? However, possible solutions using brain-machine connections cause epileptic seizures in humans.<sup>10</sup> Tests for effective use for military purposes must be carried out in a holistic approach, drawing on adequate scientific disciplines.<sup>11</sup>

## **Ethics**

Which challenges, particularly those of an ethical nature, can be expected? Are humans as human beings called into question? Countless other ethical issues are linked to HE, such as, whether HE can/should/may be applied by personal request. Additional considerations arise in the military context. Are there moral/legal exceptions to the use of HE in a military context, such as in war or conflict operations? Is it permissible for a sovereign state to order HE to be used in its armed forces, or is it exclusively subject to the voluntary consent of the user? Is it possible for military personnel to refuse HE without consequences? Will this have a detrimental effect on their career? Does a soldier weaken their own platoon if they refuse to use HE? When it comes to developments in HE, human dignity is usually an under-represented, yet essential, social building block.

## **Society**

Soldiers are part of society. It is therefore crucial to analyse the positive and/or negative aspects of HE for the general public in advance. If HE is

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<sup>9</sup> Willmund, Gerd/et al. Psychotraumazentrum der Bundeswehr (Psychotrauma of the Bundeswehr): Wehrpsychiatrie für eine Armee im Einsatz (Military Psychiatry for an Army in Action). Psychiatrische Forschung und Entwicklung in der Bundeswehr 2010 – 2020 (Psychiatric Research and development in the Bundeswehr) 2020, p. 12, <https://www.bundeswehr.de/resource/blob/109368/d6195ce9a544497a2b31e1f94f0bb581/06-download-studie-zur-wehrpsychiatrie-fuer-eine-armee-im-einsatz-data.pdf>.

<sup>10</sup> See Vogl, Doris: Human enhancement with Chinese characteristics – AI as a factor for China's military modernisation with special consideration of human-machine teaming. As a case example in this publication.

<sup>11</sup> See Grinschgl, Sandra: Cognitive enhancement – A critical reflection from psychology and neuroscience. In chapter MEDICINE in this publication.

integrated into daily life, social consequences can be expected. One facet is the handling of the personal data that is collected by HE. This will have to be taken into account in both civil and military use. The issue of who in society is ultimately intended for optimisation measures raises further ethical and legal questions. Do only those from higher social classes “benefit” from improving human capabilities? Or should HE be used primarily as a hyped benefit for lower population groups? What would be the psychological and resulting long-term effects of HE on society? The positive aspects of HE certainly include the possibility of social equality. Conversely, everyday use of HE could create unwanted peer pressure to avoid exclusion. Socio-political tension is inevitable. Principles for the applications of HE are essential, as are political, legal and ethical regulations. For this reason, the early inclusion of humanitarian rights and Western values is essential.

### **Law and social ethics**

The general line of argument is that people can make their own decisions about their bodies. Therefore, performance enhancement should be possible for everyone, by means of technological assistance. This argument legally contradicts the autonomy of individuals, which is subject to restrictions. There is no legal way for a person to voluntarily give up human dignity, since these rights are regarded as inalienable. An exception is a combatant who, during an operation, is obliged to have minor interventions, such as vaccinations, in accordance with the mission.<sup>12</sup>

HE presents countless legal challenges for soldiers. For example, what should be observed in the case of HE when taking prisoners of war? Should “enhanced” personnel be treated like standard prisoners of war? If they are captured, do their special medical needs (e.g. service, energy, etc.) need to be taken into account?

What generally happens in the event of technical malfunctions, and who is responsible for them? Does a different code of conduct apply on the battle-

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<sup>12</sup> See Balthasar, Alexander: Human Enhancement: The perspective of the Charter of the United Nations. In chapter LAW & SOCIAL ETHICS in this publication.

field? Is the currently applicable law of war prepared for HE? Such challenges are addressed in the legal chapter of this publication.

## **Military**

In the future, complex technological developments will “fundamentally change the dynamics of armed conflict. [...] If the necessary steps are not taken now, the challenges in the future will increase because it will be very difficult to catch up with important developments and adjustments.”<sup>13</sup>

In order to be well prepared for emergencies, political and military leaders rely on analyses of probable threat factors. The aim of the project was to intellectually prepare Austrian defence forces for possible aggressors – equipped with HE technologies. Potential situational developments therefore had to be determined, in order to develop counter-strategies in a timely manner. Together with an interdisciplinary pool of experts, the IFK focused on the current and future challenges of HE. The intention was to prepare the results for political, economic and military decision-makers. The purpose of the HE project was not to promote the use of HE for the ÖBH and its soldiers.

Revolutionary technological changes must at least be tolerated by society in order to obtain sufficient support. This is similar to the civilian use of drones, which later became an integral part of military tactics. Once interventions for human enhancement have been accepted by society, introducing them into the armed forces is only a small next step. A strategic approach is required in order to achieve something like this with citizens. Sci-fi novels, blockbuster films and video games with heroes who gain superpowers by means of technology would be a promising approach. There are obvious parallels to historical state propaganda films depicting heroic deeds in crisis situations.

Endeavours by states to emerge militarily victorious on the battlefield using all possible means and therefore change the political power structure will

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<sup>13</sup> Arnold, Torben: Neue Technologien für die Bundeswehr, SWP-Aktuell, Nr. 14, März 2024, S. 1 (New technologies for the armed forces, SWP-Aktuell, No. 14, March 2024, p 1).

continue to be the intention of conflict resolution in the future. Developments in the field of human enhancement could reinforce this notion.

It is questionable whether HE procedures can be imposed on a soldier if they will increase the chance of survival of the individual combatant or the entire group. What if military combat could only be successful with the use of HE?

Can the use of HE have any negative effects, and which ones would be specifically related to military applications? Could HE products be subject to sanctions? This is particularly problematic in the case of invasive use, as travel restrictions, for example, are to be expected in such cases. Do invasive components in a human-machine combination enable electronic traceability? What would this entail for individual security forces?

There is a risk that countries producing HE technology will be able to locate and even disrupt “their” exported products. A procedure needs to be clarified for when, for example, irreversibly implanted chips are installed in brains. Should the originally intended functionality be deactivated during a family holiday, due to safety concerns? What should be done if this is not possible? What if the soldier equipped with the expansion resigns?

In addition to possible health consequences, HE has both technical and economic consequences. For example, logistical problems could arise. Who produces HE devices, and what does that mean for maintenance and spare parts, etc.? In her article, Grinschgl raises the question of what would be expected if the producing company were to go bankrupt.

An increasingly ageing population in a society results in a smaller range of young talent. At least three possible solutions are imaginable:

1. Younger generations from other countries could be recruited to serve in the military.
2. High-tech weapon systems may be acquired, so that even older personnel can operate them.
3. The country's own nationals may undergo HE procedures. This means that they could be recruited for military service well into old age or could serve in the forces for longer due to their improved physical and mental capabilities.

Ray Kurzweil – inventor, futurist and Director of Engineering at Google LLC – popularised the concept of “technological singularity”, which leads to a fourth solution: using only machines in war. Kurzweil refers to “[...] the point at which machines, as a result of the further development of AI, will gain their own consciousness and be able to improve themselves without human intervention.”<sup>14</sup> That sounds like an ideal situation, since hardly any human casualties would be expected. The disadvantage is that the old military premise, that a territory is only taken over when real people set foot in it, is still applicable. The philosopher, futurist and writer Nick Bostrom is convinced that, “[...] computers with their own will are among the greatest existential risks that humanity will have to reckon with in this century, and are even more dangerous than nuclear weapons”.<sup>15</sup> If this proves to be the case, such a development could only be countered by an amalgamation of man and machine or by “updating” human capabilities. A modification such as this would override all of the previous social and military rules.

Climate change is one aspect that speaks for the advantages of an application of HE in and by the military. In the future, armed forces will have to cope with increasingly extreme weather conditions and therefore more extraordinary stress levels in their missions. HE would be a possible option for continuing to deploy security forces for successful crisis and conflict management tasks.

The aspect of camaraderie is a factor that should not be underestimated in military operations. If “HE equipment” leads to different qualities of soldiers and therefore to a two-class combat community, this community could suffer. Would the “enhanced” super soldiers be seen as an elite unit and would a “healthy” mutual ability dependency develop accordingly? Potential psychological effects such as aggressive behaviour or “disturbances” in the social group structure must be ruled out in advance.

Ultimately, the question as to the efficiency of HE arises. Not all conceivable HE deployment options make sense from a military perspective. Optimising

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<sup>14</sup> Wagner, Thomas: Der Vormarsch der Robokraten (The Advance of the Robocrats), In: *Blätter für deutsche und internationale Politik* 3/2015, S. 112 (Pages for German and International Politics 3/2015, p. 112).

<sup>15</sup> Ibid.

humans with skills that machines could master better and more specifically is suboptimal and needs careful consideration.

Finally, there is an economic and, for the armed forces, logistical question. Whoever provides HE technologies and the required resources is able to influence the provision of such products and their supply chains. There is also access to raw materials (e.g. rare earth, etc.). The issue of spare parts, which are often subject to government sanctions, has already been addressed. HE therefore has the potential to trigger hybrid threats on multiple levels.



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