

Conclusion and derivations

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Human Enhancement (HE) technology has many facets – both positive and negative. For example, if it leads to the promotion of social equality, increased acceptance in society can be expected. A further advantage would be the offsetting of diverging performance capability. To this regard philosophical considerations should be made at an early stage, so that all resulting concerns can be taken into account in further decision-making processes - including the influence of HE on armed forces.

What remains unresolved in the case of HE technology is the energy supply required for it. A comparison of the relatively low energy requirement of highly efficient human brain performance against the hunger for energy of contemporary microchips makes certain forms of HE appear unfeasible at this moment in time. In addition, neither the necessary storage capacities nor the microprocessors for the complex computing power are foreseeable. The challenges of HE technology are also intensified by AI-supported applications and the high energy capacity which they require. Achievements such as those that use of this technology to isolate toxins from the body can generally be considered as advances in terms of improving general health. However, they also pose a risk of carelessly exposing people to greater risks without providing prior protective measures.

Although Thomas Wagner predicts that the Robocrat will be a “super robot” with better abilities than humans, a robot-soldier surpassing a regular soldier’s military performance seems unrealistic for the time being. E.g., a territory can be occupied by machines, but not taken over by them. Only human beings can do that. It is therefore more likely that robots will be used to fight for the territory, and that human soldiers will take over the conquered area following the victory of the robotic army. This may not reflect the status quo, but it illustrates a potential future in which robots surpass soldiers as combatants. From a strategic military perspective, securing terrain is only meaningful through the occupation of a defined area, which constitutes the primary objective of any armed conflict.

It remains to be seen how HE will develop. One thing is certain: the increasing technological advancement of the armed forces requires an ability to react to military operations with ever-increasing speed. In the future, it will no longer be possible for soldiers to cope with the increasingly complex information that they receive without having to multitask. This is particularly true if a “human-in-the-loop” or “human-on-the-loop” is required for AI-controlled weapon systems, which can only be achieved with HE functionality. Whether this can be achieved by using invasive or non-invasive means depends on social, legal and ethical conditions. If HE prevails, sufficient cyber security measures must be planned to prevent malicious access by hostile parties. However, progress in the HE research area will depend largely on both public and private investment resources.

A look at countries where research into HE technology is already being carried out gives rise to concerns that such products are highly unlikely to be beneficial to European countries.

Derivations for the EU, Austria and the Austrian Armed Forces

- There is a great interest in research in the field of HE, for example in China, the USA and Great Britain. Therefore, the trend in HE development will continue rapidly in the interests of power politics.
- Research in this area is essential – it is imperative that rationality remains paramount when it comes to dealing with HE. A meta-level must be adopted when assessing the advantages and disadvantages of it. Pragmatic solutions in harmony with technical, medical, ethical-legal and military possibilities must be researched holistically and thoroughly discussed.
- If a significant breakthrough in HE research is achieved, a race for the best technology can be expected – similar to the nuclear arms race during the Cold War. It is important to counteract this in a timely manner by means of political and legal guidelines.
- Military needs will be informed by civilian research in the field of HE. This will enable global research results in the field of HE to be analysed and evaluated.

- The following must be noted: Research and development in the field of HE must be monitored – and advanced, if necessary – in order to keep up to date with technological developments. Failure to do so will result in loss of sovereignty.
- Due to the high costs, appropriate research can only be carried out in collaboration with the EU and/or NATO.
- Social acceptance of HE will increasingly be accompanied by medical successes in the treatment of patients. The desire to restore or expand human capabilities (including possible economic gains) will drive the spirit of research. A race in the field of HE is to be expected in the medium term. European countries must observe and analyse trends that go beyond this.
- Potential side effects on health – particularly long-term consequences – must be investigated thoroughly.
- Long-term results can be expected in several areas, even if the HE endeavours still appear to be uneconomical from a surgical perspective. Europe needs to steel itself. Simply playing a passive role will result in negative consequences.
- Due to the unresolved technical and medical challenges posed by HE, increased automation of the battlefield using machines can be expected in the medium term.
- The dynamics of armed conflicts will be revolutionised. This will change the strategy, operation and tactics in military operations. The armed forces must be prepared for this.
- Political, legal and ethical regulations and security standards are needed to counteract social upheaval and negative undemocratic tendencies. Europe can play a crucial role in this regard, akin to its involvement in the EU AI Act.
- Even if the exact development of HE cannot be predicted, human rights and Western values must be taken into consideration from an early stage. Together with the UN, the EU could make a significant contribution to this.
- The armed forces in Austria and the rest of Europe must be increasingly devoted to emerging technological developments in the civilian sector, in order to be able to react to trends in a timely manner.

- It is important to address potential proliferation problems with HE technologies in good time, in order to prevent misuse. General rules and standards for the use and application of HE technologies must be established.
- Due to the increasing speed and complexity of future battlefields, optimisation efforts among soldiers are likely scenarios. Europe has to deal with this.
- Armies must always be prepared for worst-case scenarios, some of which may be revolutionary in nature. HE has a plan for the long term. Particular attention must be paid to countries where ethical standards in HE research do not have the same priority as they do in EU Member States. Adherence to values is of intrinsic importance for armed forces, especially in peacekeeping and conflict management missions, since this symbolises their credibility.
- Non-compliance with (or exploitation of) standards relating to HE technology development and its fields of application is likely in the case of less democratic states. For such cases, response options for Western countries must be planned in advance.
- The impact of attacks by potential aggressors equipped with HE fighters must be taken into consideration in perceiving long-term threats. This includes both negative and positive consequences for the individual soldiers – due to enemy forces being equipped with HE, and the use of HE by their own troops.
- The positive effects of HE, such as the expansion of capability criteria for soldiers and security forces, must be evaluated.
- If HE is associated with an enhancement of baseline human performance, its long-term use for this purpose can be anticipated.
- The hybrid threat of HE is strong on multiple levels. The Austrian Armed Forces (Österreichisches Bundesheer – ÖBH) could play a key role in HE research within the EU from an early stage, by developing appropriate counter-strategies.