Harald Schaub sees in technology assessment (TA) more than risk analysis – it is a psychologically informed reflection on how innovation shapes human cognition, ethics, and decision-making. In military contexts, TA addresses uncertainty, escalation, and algorithmic influence. As AI blurs civil-military boundaries, Schaub says that TA must evolve into a trust-building tool that bridges science, policy, and defense psychology. It must confront ambivalence, secrecy, and moral taboos to remain relevant in hybrid conflicts.

INTERVIEW

with/mit Harald Schaub

by/von Markus Bresinsky

Psychological dimensions of technology assessment

Psychologische Dimensionen von Technikfolgenabschätzung

How do you personally define technology assessment (TA) in general and particularly in the context of military technologies and future warfare?

For me, TA is far more than a technical analysis of innovation risks; it is a psychologically and socially informed process of collective self-observation. TA asks not only what technologies can do but what they do to us – to our cognition, our moral reasoning, and our perception of security and threat. In the military domain this includes uncertainty, escalation dynamics, and the human factors of decision-making under pressure.

From a psychological perspective, TA functions as a cognitive feedback loop that counteracts biases such as confirmation bias, overconfidence, and the illusion of control – all of which can have fatal consequences under stress. In the age of AI-supported command systems, TA increasingly serves as a psychological early-warning system. Autonomous systems and algorithmic decision architectures reshape not only the technical but also the mental battlespace. A contemporary TA must therefore illuminate the interface between human, machine, and morality – how trust, responsibility, and situational awareness emerge or erode when humans and algorithms co-decide.

Why do you think TA rarely addresses questions of future warfare explicitly, despite the considerable body of research on the effects of weapon technologies, dual-use, and the like?

This results from a dual mechanism – one moral, one institutional. In Europe, TA evolved within a social-democratic and humanitarian framework that linked science to welfare and peace. Military research was therefore seen as morally tainted and politically inaccessible. Psychologically, this corresponds to an avoidance strategy: Societies tend to avert their gaze from domains that provoke anxiety or moral discomfort.

Yet hybrid warfare, combining cyberattacks, disinformation, and psychological operations, dissolves the old distinction between civilian and military domains. AI systems used for predictive policing, behavioral profiling, or influence campaigns blur the line between defense and manipulation. A TA that continues to ignore this will lose relevance.

What methodological or institutional barriers (in Germany, in Europe, globally) do you see for TA in this field?

Methodologically, secrecy and classification are major obstacles. Researchers often face what psychology calls 'epistemic uncertainty': They know that they are not allowed to know, which can lead to cognitive dissonance between scientific curiosity and institutional constraint. Over time this breeds learned helplessness – the sense that inquiry itself is futile.

Institutionally, Germany's 'civil clauses' at universities and the European self-image as a 'civilian power' act as normative barriers. Globally, the absence of shared governance and transparency perpetuates mutual mistrust. These dynamics are psychological as much as political: Fear, rivalry, and symbolic competition sustain a spiral of silence. A forward-looking TA must design trust-building formats among science, policy, and defense psychology to overcome these structural taboos.

Which historical or societal factors do you believe contributed to TA addressing military issues more prominently in its early years?

In the 1960s and 1970s, the relationship between science, technology, and politics was shaped by Cold War tensions. Technologies were seen not as neutral but as instruments of power and responsibility. Societally, this period was marked by ambivalence – fascination with technical progress and fear of nuclear annihilation. TA emerged as a moral and analytical response to this contradiction: It aimed to re-balance technological potential with human control.

While earlier threats were visible – bombs, missiles, deterrence – today's conflicts unfold in the invisible realm of code, data, and perception. Yet the psy-

Keywords • *military research, technology assessment, global warfare, dual-use, defense psychology*

https://doi.org/10.14512/tatup.7287
Published online: 23. 03. 2026 (editorial peer review)

chological core remains unchanged: Preserving collective rationality under uncertainty.

How did World War II and the role of science during the Cold War shape the perception and legitimacy of TA?

World War II revealed science as a decisive force multiplier: Radar, cryptography, nuclear physics, and aerospace research transformed warfare. Psychologically, this generated alienation between knowledge and conscience; scientists recognized that their discoveries could annihilate. TA later institutionalized the need to reconcile cognition with ethics.

During the Cold War, science became both an instrument of deterrence and a symbol of progress. Trust in technology as a guarantor of security grew alongside fear of loss of control – an ambivalence we encounter again with autonomous weapons and AI-supported decision systems. From a psychological standpoint, TA was a safeguard against what Dietrich Dörner called the 'hybris of knowledge': The human tendency to underestimate complexity while overestimating control.

The same lesson applies today. AI decision-support in hybrid conflicts reproduces Cold-War dilemmas in digital form. Those who understand the psychology of technological power understand why ethical reflection must be renewed with each technological generation.

Do you see elements in historical developments that could serve as a starting point for today's debate on military research in TA?

Absolutely. The 'dual-use dilemma' – the capacity of one and the same technology to serve both civil and military ends – is more acute than ever. Psychologically, it confronts our craving for cognitive coherence: We want technology to be either good or evil, yet reality demands tolerance of ambivalence. Cultivating such 'ambivalence competence' is a core skill for contemporary TA. History also shows that progress and escalation often evolve together. Deterrence works only as long as it remains psychologically stable. Once AI systems accelerate decisions beyond human comprehension, that stability erodes. Ultimately, technology mirrors society: It is a psychological resonance space where fear, hope, and power circulate.

While earlier threats were visible – bombs, missiles, deterrence – today's conflicts unfold in the invisible realm of code, data, and perception.

What role did the peace movement and civil clauses (Zivilklauseln) at universities play in moving away from military-related research?

Harald Schaub

is Professor of Psychology at University of Bamberg and Senior Scientist at IABG. He is also trainer for systems thinking with expertise in human factors, leadership, complexity, and failure management.

The peace movement of the 1970s and 1980s was a profoundly psychological phenomenon – a collective attempt at moral reintegration after decades of nuclear anxiety. Civil clauses institutionalized this aspiration: Science should again serve humanity rather than destruction. Yet this moral purification also entailed repression. By defining military topics as illegitimate, academia externalized its own fears.

Such avoidance offered short-term relief but created long-term blindness. The capacity to analyze destructive potential diminished, and 'the military' became a taboo rather than an object of inquiry. In the age of AI, this moral decoupling is untenable. Hybrid warfare exploits exactly the cognitive and ethical gaps left open by such repression – cyberattacks, disinformation, and cognitive warfare operate precisely where academic ethics has chosen silence.

In your view, were there deliberate strategic decisions after 1990 to avoid military topics at universities for moral reasons?

Yes. After 1990, many European societies embraced what might be called the 'illusion of post-conflict modernity'. Psychologically, this was a phase of collective relief – a belief that history's violent chapters had ended. Academia aligned with this narrative, focusing on sustainability, digitalization, and welfare. This selective perception – seeing only progress and peace – amounted to moral self-soothing.

Institutionally, avoiding military themes became a badge of virtue. In psychological terms, it was a form of normative conformity: Aligning with moral majorities to secure social approval. Yet today, AI-driven disinformation, automated weaponry, and cognitive manipulation demonstrate that the military logic has quietly re-entered civil domains. Hybrid warfare erases boundaries between truth and narrative, defense and offense.

Has Russia's attack on Ukraine changed TA's self-understanding with regard to military-related research?

https://doi.org/10.14512/tatup.7287

Yes, profoundly. The attack triggered a collective awakening: Security is not a stable state but a fragile psychological equilibrium. For TA, it was a moment of dissonance – realizing that decades of moral distance from defense issues had also produced epistemic naivety.

Researchers now recognize that technology is both an instrument of progress and a vehicle of power. AI systems, drones, and cyberoperations are psychologically potent tools because they redistribute fear, trust, and control. The war in Ukraine is also a war of perception – of images, narratives, and attention economies. TA must therefore expand its scope from material to 'cognitive technologies of warfare'.

Psychologically, this means re-examining human factors under the conditions of the 'Zeitenwende': decision overload, moral fatigue, and cognitive manipulation. A modern TA must integrate human factors and information psychology to understand how hybrid warfare affects not only systems but minds.

Technology assessment must avoid becoming an instrument of military agendas, yet abstention equals irrelevance.

Under current geopolitical conditions, should TA accept, reject, or assess military research in a more differentiated way?

Neither moral approval nor categorical rejection is adequate. The only responsible stance is differentiation – psychologically informed ambivalence competence. TA must avoid becoming an instrument of military agendas, yet abstention equals irrelevance. Context matters: Who conducts the research, for what purpose, under what accountability?

From a psychological viewpoint, the issue is responsibility delegation. Under cognitive overload, humans tend to offload moral agency to machines. TA should design frameworks that expose and regulate these mechanisms. Differentiated engagement is not moral compromise – it is the precondition for sustained human agency in algorithmic environments.

In your opinion, can military-related research also have peace-promoting effects, for example in the field of conflict prevention?

Yes, and it must. Peace promotion today means anticipating conflict escalation and fostering cognitive resilience. Technology can assist – through early-warning systems, AI-based analysis of hybrid threats, or psychological simulations of escalation behavior – provided these tools are designed with human factors in mind.

Yet technology alone does not create peace. It is human interpretation, trust, and moral framing that determine outcomes. Peace-promoting technology thus depends on the mental models people hold about security and threat. TA can serve as a mediator here – evaluating technologies not only by technical criteria but also by their emotional and social resonance. It can discern when a 'defensive AI' contributes to reassurance and when it generates mistrust or loss of control. In the 21st century, peace is a function of psychologically intelligent design.

What risks do you see if TA continues to ignore military-related topics?

The foremost risk is loss of relevance – epistemic, ethical, and societal. If TA keeps excluding military technologies, it cedes interpretive authority to actors unconstrained by democratic accountability. That would be disastrous.

Neglect creates a double hazard: technological (unchecked innovation) and psychological (societal unpreparedness). Cognitive dissonance, anxiety, and erosion of institutional trust are typical symptoms of a TA that represses the security dimension.

Hybrid warfare exploits precisely these psychological blind spots. Those who refuse to think about threat become reactive, emotional, and manipulable. If TA truly aims to generate anticipatory knowledge, it must investigate military and security technologies – not to legitimize them, but to reveal the cognitive mechanisms by which protection can mutate into domination and innovation into control.

Which methodological approaches would be suitable to reorient TA towards security and defense-related issues?

Three approaches stand out: scenario analysis, system dynamics, and human-factors research – supplemented by psychological diagnostics and qualitative reflection formats. Scenario analysis helps visualize alternative futures and overcome the cognitive limits of probabilistic risk models. Especially in security contexts, it trains tolerance of uncertainty, acceptance of ambiguity, and mental simulation of complexity – key components of decision resilience.

System dynamics models the feedback loops between perception, response, and escalation. In hybrid conflicts, small perturbations – such as a viral rumor – can cascade through social and algorithmic systems to strategic scale. Understanding such dynamics requires systems thinking informed by psychology.

Human-factors research remains indispensable because safety and security ultimately depend on human information processing: attention, trust calibration, stress regulation, and accountability. Mixed-methods designs that combine behavioral data with qualitative reflection can bridge the gap between classified knowledge and public accountability. In an age where AI systems increasingly 'think' for us, TA must become a 'reflexive system' – a meta-model capable of observing its own reasoning.

Should TA establish guidelines to govern the handling of military topics in research and policy advice?

https://doi.org/10.14512/tatup.7287

Yes. Guidelines serve a dual function: external orientation and internal psychological containment. Researchers dealing with sensitive defense issues often oscillate between loyalty, ethics, and fear of misuse. Clear principles provide moral structure and protect independence.

From a psychological standpoint, such frameworks create an 'ethical containment space' – a safe environment where moral reflection can occur without collapsing into censorship or moral panic. Without its own normative compass, TA risks being normatively colonized by political or corporate interests.

The key lies in psychological self-reflection. Any institution working at the intersection of security, power, and knowledge risks becoming part of the very systems it analyzes. TA must therefore cultivate metacognitive awareness of its own biases – authority effects, groupthink, moral self-confirmation, institutional loyalty. Practically, TA should not take sides between military and civil spheres but act as a dialogical bridge – translating between disciplines, values, and perceptions. It can function as a 'psychological mediator' between the logic of defense and the logic of society.

Without its own normative compass, technology assessment risks being normatively colonized by political or corporate interests.

Given the rise of AI and hybrid warfare, guidelines must integrate not only legal but also psychological dimensions: managing ambiguity, reflecting cognitive bias, and fostering empathy and moral judgment. What TA needs is an 'ethics of observation' – a disposition to understand before judging. Transparency then becomes not an ideology but a stabilizing psychological signal: predictability in an increasingly unpredictable world.

How could TA make a constructive contribution in the future without falling into the trap of political instrumentalization?

In hybrid warfare, legitimacy is itself a psychological battlefield: Who defines what counts as defense, aggression, or disinformation? TA can help deconstruct these categories and restore cognitive clarity. With AI accelerating opaque decision chains, TA must demand not only technical explainability but psychological 'intelligibility' – understanding how human intuition and empathy interact with machine logic.
Neutrality, in this sense, is not the absence of values but the discipline of questioning where others assert certainty.

Finally: Should TA even do military-related research or should it shy away from all military aspects of technology?
TA must engage – critically, reflectively, and human-centrically. Military technologies are no longer confined to the battlefield; they permeate civil infrastructures, digital economies, and cognitive environments. AI-based decision systems, cyber defense, autonomous drones, and influence operations shape not only national security but also collective psychology. A TA that ignores them would analyze the future blindfolded.

At the same time, TA should avoid moral superiority. Military research often expresses collective anxiety – a societal attempt to control the uncontrollable. Understanding this dynamic enables critique without condemnation.

Ultimately, TA is a space for reflection on power, fear, and technology. A society that examines its military technologies examines itself. Only such self-aware societies can remain resilient in the face of hybrid threats, algorithmic manipulation, and the psychological disruptions of the AI age.

This interview relates to this issue's Special topic "Technology assessment and future warfare: The Good, the Bad, and the Ugly".
https://doi.org/10.14512/tatup.7286

https://doi.org/10.14512/tatup.7287