Die Friedens-Warte

Journal of International Peace and Organization

Vol. 95 | 2022 | Issue 3–4

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Berliner Wissenschafts-Verlag

Die Friedens-Warte
Journal of International Peace and Organization
2022 | Vol. 95

Herausgeber

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Beirat

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Homepage

friedenswarte.bwv-verlag.de
elibrary.bwv-verlag.de/journal/fw

Erscheinungsweise

Zweimal jährlich als Doppelheft

Bezugsbedingungen

Die aktuellen Abonnement-Angebote und Bezugsbedingungen können über die Internetseite friedenswarte.bwv-verlag.de aufgerufen werden.

Zuschriften, die den Vertrieb oder Anzeigen betreffen, bitte nur an den Verlag.

Verlag

BWV | Berliner Wissenschafts-Verlag,
ein Imprint der Franz Steiner Verlag GmbH
Birkenwaldstr. 44, 70191 Stuttgart
Tel. +49 (0) 711 25 82-450
Fax +49 (0) 711 25 82-390
service@bwv-verlag.de
www.bwv-verlag.de

Layout und Herstellung durch den Verlag

Satz

die Setzerin | Edna Weiß, Berlin

Anzeigen

Jessica Gutsche *(verantwortlich)*
BWV | Berliner Wissenschafts-Verlag, Hauptstadtbüro
Behaimstr. 25, 10585 Berlin
Tel. +49 (0)30 841770 0
marketing@bwv-verlag.de
Die Mediadaten sind abrufbar unter www.bwv-verlag.de

Druck und Verarbeitung

docupoint, Magdeburg

Printed in Germany.
ISSN (Print) 0340-0255
ISSN (Online) 2366-6714

Die Friedens-Warte im Internet unter
www.bwv-verlag.de

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Editorial (dt.)

Zwischen Destabilisierung und der Ermöglichung von Resilienz: Perspektiven aus den Technikwissenschaften, den Sozialwissenschaften und den Rechtswissenschaften

In dieser Sonderausgabe von „Die Friedens-Warte" nähern wir uns dem Thema Resilienz aus den unterschiedlichen Perspektiven der Technikwissenschaften (mit einem Schwerpunkt auf neuen Technologien), den Sozialwissenschaften und den Rechtswissenschaften. Ein solcher interdisziplinärer Austausch innerhalb des Forschungsfeldes der Friedens- und Konfliktforschung ist aus unserer Sicht immens wichtig, zurzeit jedoch noch allzu rar.

Das heutige internationale Sicherheitsumfeld ist gekennzeichnet durch den Niedergang der klassischen Rüstungskontrollarchitektur, die Rückkehr der Großmachtpolitik und das schwindende Vertrauen zwischen den Staaten. Neue Entwicklungen im Bereich der Militärtechnologie und der Technologien mit Doppelverwendungsfähigkeit sowie Modernisierungsprogramme für Waffen machen die Bemühungen um Frieden und Sicherheit noch komplexer. Seit dem Einmarsch Russlands in die Ukraine im Februar 2022 ist allgemein anerkannt, wie wichtig es ist, sich mit diesen Fragen sachkundig auseinanderzusetzen.

Der erste Teil dieser Sonderausgabe basiert auf der interdisziplinären Konferenz Science Peace Security 2021 in Aachen, die sich mit den Auswirkungen neuer Technologien auf die Resilienz befasste. Gesucht wurden Konzepte zur Erreichung eines widerstandsfähigeren Sicherheitsumfeldes durch wissenschaftliche Beiträge und politische Maßnahmen zur Krisenbewältigung, Risikobewertung, Vertrauensbildung und Rüstungsbegrenzung. Untersucht wurden nukleare, biologische, chemische und weltraumgestützte Bedrohungen sowie Entwicklungen in der Informationstechnologie, wie z. B. Cyber- oder künstliche Intelligenz, sowie weitere relevante technischen Bereiche.

Nach zwei Begutachtungsrunden wurden die folgenden vier Beiträge zur Veröffentlichung ausgewählt:

Der Artikel „Die Militarisierung des Weltraums – einzigartige Möglichkeiten für Rüstungskontrolle" von **Arne Sönnichsen** (Universität Duisburg-Essen), **Sara Hadley** (Institut für Friedensforschung und Sicherheitspolitik an der Universität Hamburg), **Jürgen Altmann** (TU Dortmund), **Maximilian Bertamini** (Institut für Friedenssicherungsrecht und Humanitäres Völkerrecht (IFHV), Ruhr-Universität Bochum), **Max Mutschler** (Internationales Zentrum für Konfliktforschung Bonn) und **Jürgen Scheffran** (Universität Hamburg) befasst sich mit der wachsenden Besorgnis über eine zunehmende Militarisierung und mögliche Bewaffnung des Weltraums sowie seiner Entwicklung zu einem Kriegsschauplatz. Die Frage, ob Rüstungskontrolle hier eine Lösung ist oder ob Maßnahmen dieser Art vor dem Hintergrund der Komplexität von Weltraumtechnologien scheitern, wird in diesem Beitrag interdisziplinär aus physikalisch-technischer, politikwissenschaftlicher und (völker)rechtlicher Sicht analysiert. Diese Erkenntnisse werden zum einen genutzt, um den Vertrag über die Begrenzung von antiballistischen Raketenabwehrsystemen (ABM-Vertrag) von 1972 zu diskutieren, zum anderen sollen sie verdeutlichen, dass unterschiedliche Aspekte in den einzelnen Disziplinen die Rüstungskontrolle im Weltraum nicht nur einschränken, sondern auch erleichtern können.

Der Artikel „Quantentechnologien – ein neuer Bereich, der Folgenabschätzung braucht" von **Michal Krelina** (Tschechische Technische Universität Prag) und **Jürgen Altmann** (TU Dortmund) befasst sich mit dem aufstrebenden Gebiet der Quantentechnologie (QT), das durch einen großen Dual-Use-Faktor gekennzeichnet ist. Der Beitrag befasst sich mit der militärischen Ebene dieser Technologie – QT führt keine neuen eigenständigen Waffensysteme ein, sondern verbessert bestehende Waffensysteme und Führungs- und Kontrollsysteme erheblich. Ziel des Beitrages ist es daher, QT und ihre potenziellen (militärischen) Anwendungen, den aktuellen Stand und die Aktivitäten im Verteidigungs- und Sicherheitsbereich sowie die damit verbundenen potenziellen Probleme für die internationale Sicherheit darzustellen.

In ihrem Beitrag „Vertrauenswürdig? Eine europäische Vision von (bewaffneter) Künstlicher Intelligenz" baut **Stefka Schmid** (PEASEC, TU Darmstadt) auf Arbeiten im Bereich der Mensch-Computer-Interaktion (HCI) und der Technikfolgenabschätzung auf und befasst sich mit der Vision der EU von Künstlicher Intelligenz (KI) und dem Verständnis von Mensch-KI-Interaktion, einschließlich Erklärbarkeit, Interpretierbarkeit und Risiken. Eine solche interdisziplinäre Sichtweise ist relevant im Hinblick auf Debatten über die Entwicklung von KI mit Doppelverwendungsfähigkeit und die damit verbundene Innovationspolitik und trägt somit zu Debatten über die Bewertung von Visionen in professionalisierten politischen Kontexten bei.

Der Beitrag „Kleine bewaffnete Flugzeuge und Flugkörper – Gefahren für die internationale Sicherheit" von **Jürgen Altmann**, **Mathias Pilch** und **Dieter Suter** (TU Dortmund) präsentiert Informationen über kleine (Größe ≤ 2 m) und sehr kleine (≤ 0,2 m) unbemannte Luftfahrzeuge (UAVs), die in einer UAV-Datenbank gesammelt wurden. Da Streitkräfte zunehmend an solchen Klein- und Kleinstflugzeugen und -flugkörpern interessiert sind, wird in diesem Beitrag unter den Kriterien der präventiven Rüstungskontrolle eine Bewertung der zukünftigen technologischen Trends diskutiert. Darüber hinaus werden Optionen für präventive Verbote und Beschränkungen mit unterschiedlichen Graden der Nachvollziehbarkeit, der Vertrauensbildung und der Exportkontrolle erörtert.

Aus sozial- und rechtswissenschaftlicher Sicht lässt sich Resilienz am besten als die Fähigkeit eines gegebenen Systems verstehen, aktuelle oder künftige Krisen zu bewältigen (Bewältigungskapazität), sich an sie anzupassen (Anpassungsfähigkeit) und sich neu zu organisieren, um künftige Krisen zu vermeiden (Transformationsfähigkeit). In seinem zweiten Teil knüpft das Sonderheft an die in Band 95 (Heft 1–2) begonnene Diskussion über gesellschaftliche Spaltungen und sozialen Zusammenhalt in Krisensituationen an. Dabei wird der Fokus von der Pandemie COVID-19 auf breitere Argumentationslinien in den Rechts- und Sozialwissenschaften ausgeweitet. Die vier Beiträge stammen aus den Rechts- und Sozialwissenschaften und beleuchten drängende Probleme – wie Klimawandel, Flüchtlinge und Krieg – sowie verschiedene Strategien zu deren Bewältigung. Die folgenden drei Beiträge und ein Konferenzbericht wurden nach zwei Begutachtungsrunden zur Veröffentlichung ausgewählt.

Der Artikel „Öko-Autoritarismus und das Grundgesetz: Fragen, Begriffe und Resilienz" von **Michael Kalis** (IKEM und Universität Greifswald) und **Philipp Thapa** (IKEM und Universität Nijmegen) beschäftigt sich mit der Frage nach dem richtigen rechtlichen Umgang mit dem Klimaschutz. Die Auswirkungen des Klimawandels zwingen die Politik zu nachhaltigem Handeln, was nicht ohne Eingriffe in die bürgerlichen Freiheiten möglich ist. In diesem Zusammenhang ist es notwendig, ein Gleichgewicht zwischen starken Eingriffen zum Zwecke des Umweltschutzes und der Wahrung der demokratischen Freiheitsrechte herzustellen. Am Beispiel Deutschlands analysieren die Autoren, wie Verfassung und Klimaschutz in Einklang gebracht werden können, ohne eine „Ökodiktatur" zu schaffen.

Mais Masadeh (Institut für Friedenssicherungsrecht und Humanitäres Völkerrecht (IFHV), Ruhr-Universität Bochum) befasst sich in ihrem Beitrag „Resilienzstrategien syrischer Flüchtlinge in Lagern und städtischen Gebieten in Jordanien während der COVID-19-Pandemie" mit Resilienzstrategien gefährdeter Personen in Zeiten multidimensionaler Krisen. Menschen fliehen nicht nur aufgrund des Krieges aus ihrem Heimatland Syrien, sondern sind auch von den Auswirkungen der Pandemie betroffen, ebenso wie ihr Zufluchtsland Jordanien. In Zeiten dieser vielfältigen Herausforderungen entwickeln sie ihre eigenen Strategien, um mit ihnen umzugehen. Neben den identifizierbaren gemeinsamen Strategien zur Bewältigung der Herausforderungen gibt es jedoch auch Unterschiede zwischen den Strategien der Flüchtlinge im Flüchtlingslager Zaatari und denen in der Stadt Irbid. Erstere bildeten vertrauensvolle Netzwerke, während Schutzsuchende in Irbid vor allem auf den Zusammenhalt der Familie setzten und auch die Gemeinschaft mit der Aufnahmegesellschaft suchten.

Zwei weitere Beiträge mit einer anderen Perspektive runden die Beiträge zur Resilienz aus rechts- und politikwissenschaftlicher Sicht ab. In beiden Beiträgen geht es um den Krieg als Begriff bzw. Rechtsgegenstand in der historischen und aktuellen Diskussion. **Michael Hanzel** (Universität Stuttgart) befasst sich mit den unterschiedlichen Konzeptionen des Krieges aus wissenschaftsgeschichtlicher Perspektive. Sein Beitrag beleuchtet die unterschiedlichen Perspektiven und Zugänge zum Kriegsbegriff, die die wissenschaftliche und öffentliche Diskussion über diesen geprägt haben. Einen Einblick in die aktuelle rechtswissenschaftliche Diskussion zum Ukraine-Krieg gibt der Tagungsbericht von **Dimitrios Parashu** (Leibniz Universität Hannover). Er fasst die Beiträge der Konferenz „Modern Challenges in International Humanitarian Law" an der Leibniz Universität Hannover zu aktuellen Debatten über den Krieg in der Ukraine zusammen.

Darmstadt, Aachen, Wien, Bochum und Duisburg 2022

Christian Reuter, Malte Göttsche, Friederike Frieß, Pierre Thielbörger und Johannes Vüllers

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Editorial (eng.)

Between Destabilization and Enabling Resilience: Perspectives from the Technical Sciences, Social Sciences, and Law

In this special issue of the “Journal of International Peace and Organization”, we approach the topic of resilience from the different perspectives of the technical sciences (with a focus on new technologies), the social sciences, and law. In our view such interdisciplinary exchange of views within the research field of peace and conflict research is highly important, yet at the same time all too rare.

Today’s international security environment is marked by the demise of the classical arms control architecture, the return of great power politics, and eroding trust among states. New developments in military and dual use technology as well as weapon modernization programs add complexity to any effort towards peace and security. The importance of dealing with these issues in an informed manner has been widely accepted since Russia’s invasion of Ukraine in February 2022.

The first part of this special issue is based on the interdisciplinary conference Science Peace Security 2021 in Aachen, which examined the impacts of new technologies on resilience. It sought concepts on how a more resilient security environment can be achieved through scientific contributions and policy measures towards crisis resolution, risk assessments, confidence-building, and arms limitations. Nuclear, biological, chemical, and space threats as well as developments in information technology such as cyber or artificial intelligence issues, and any other relevant technical fields, were examined.

After two rounds of peer-review the following four papers have been selected for publication:

The article “The militarization of space – unique opportunities for arms control” by **Arne Sönnichsen** (Universität Duisburg-Essen), **Sara Hadley** (Institute for Peace Research and Security Policy at the University of Hamburg), **Jürgen Altmann** (TU Dortmund), **Maximilian Bertamini** (Institute for International Law of Peace and Armed Conflict (IFHV), Ruhr-University Bochum), **Max Mutschler** (Bonn International Centre for Conflict Studies), and **Jürgen Scheffran** (Universität Hamburg) addresses the growing concern of an increasing militarization, a possible weaponization and the development of space into a theater of war. The question whether arms control is a solution here or whether measures of this fail against the background of the complexity of space technologies is analyzed in this paper in an interdisciplinary way combining perspectives from physics and technology, political science, and international law. On the one hand, these insights are used to discuss the 1972 Anti-Ballistic Missile (ABM) Treaty; on the other hand, they are intended to illustrate that different aspects in each discipline not only constrain but also facilitate arms control in space.

The article “Quantum technology as the new technology that needs assessment” by **Michal Krelina** (Czech TU Prague) and **Jürgen Altmann** (TU Dortmund) deals with the emerging field of quantum technology (QT), which is characterized by a large dual-use factor. The paper deals with the military level of this technology – QTs do not introduce new stand-alone weapon systems, but significantly improve existing weapon systems and command and control systems. The aim of the paper is therefore to present QTs and their potential (military) applications, the current state and activities in the defense and security sector and associated potential problems for international security.

In her contribution "Trustworthy and Explainable: A European Understanding of (Weaponised) Artificial Intelligence", **Stefka Schmid** (PEASEC, TU Darmstadt) builds on work in human-computer interaction (HCI) and technology assessment and addresses the EU's vision of artificial intelligence and understanding of human-AI interaction, including explainability, interpretability, and risks. Such an interdisciplinary view is relevant considering debates on the development of dual-use AI and related innovation policies, thus contributing to debates of vision assessment in professionalized political contexts.

The contribution "Small Armed Aircraft and Missiles – Dangers for International Security" by **Jürgen Altmann**, **Mathias Pilch**, and **Dieter Suter** (TU Dortmund) presents information on small ($\leq 2\,\mathrm{m}$) and very small ($\leq 0.2\,\mathrm{m}$) uninhabited aerial vehicles (UAVs) collected in a UAV database. As armed forces are increasingly interested in such small and very small aircraft and missiles, this paper discusses an assessment of future technological trends under the criteria of preventive arms control. In addition, options for preventive bans and restrictions with varying degrees of comprehensibility, confidence building, and export control are discussed.

From the perspective of social science and law, resilience is best understood as the capacity of a given system to overcome (*coping capacity*), to adjust to current or future crises (*adaptive capacity*), and to re-organize itself to avoid future crises (*transformative capacity*). In its second part, the special issue follows up the discussion started in Volume 95 (Issue 1–2) with its focus on societal divisions and social cohesion in situations of crisis. Yet we broaden the focus from the COVID-19 pandemic to broader lines of arguments in law and social sciences. The four contributions come from the legal and social sciences and highlight pressing issues – such as climate change, refugees, and war – and various strategies for addressing them. The following three papers and one conference report were selected for publication after two rounds of peer-review.

The article "Eco-Authoritarianism and the German Constitution: Questions, Concepts, and Resilience" by **Michael Kalis** (IKEM and University Greifswald) and **Philipp Thapa** (IKEM and University Nijmegen) looks at the proper way to deal with climate protection in law. The effects of climate change force politicians to act sustainably, which is not possible without interfering with civil liberties. In this context, it is necessary to balance between strong interventions to protect the environment and the safeguarding of democratic civil liberties. Using Germany as an example, the authors analyse how the constitution and the protection of the climate can be reconciled without creating an eco-dictatorship.

Mais Masadeh's (Institute for International Law of Peace and Armed Conflict (IFHV), Ruhr-University Bochum) paper "Resilience during the COVID-19 pandemic: A comparison case between Syrian refugees residing in camps and urban areas in Jordan" focuses on resilience strategies of vulnerable individuals in times of multidimensional crisis. Not only are they fleeing their home country of Syria due to the war, but they are also affected by the effects of the pandemic, as is their host country (Jordan). In times of these multiple challenges, they develop their own strategies to deal with them. However, in addition to identifiable common strategies of dealing with the challenges, there are also differences in the strategies of refugees in Zaatari refugee camp compared to those in the city Irbid. The former formed trusted networks, while those in Irbid relied primarily on family unity and sought solidarity with the host community.

Two further contributions with a different perspective round off the contributions on resilience from the perspectives of law and political science. Both contributions concern war as a concept or legal object in historical and current discussions. **Michael Hanzel** (University Stuttgart) deals with the different conceptions of war from a history of science perspective. The article highlights the different perspectives and approaches to the concept of war that have shaped scholarly and public discussions about it. An insight into the current jurisprudential discussion on the Ukrainian war is provided in the conference report by **Dimitrios Parashu** (Leibniz University Hannover). It summarizes the contributions of the recent conference "Modern Challenges in International Humanitarian Law" at Leibniz Universität Hannover on current debates regarding the war in Ukraine.

Darmstadt, Aachen, Wien, Bochum, and Duisburg 2022

Christian Reuter, Malte Göttsche, Friederike Frieß, Pierre Thielbörger und Johannes Vüllers

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F-W Vol. 95 | 2022 | Issue 3–4 | P. 247–266
DOI 10.35998/fw-2022-0011

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Beiträge **Article**

The Militarization of Space – Unique Opportunities for Arms Control

Arne Sönnichsen | Sara Hadley | Jürgen Altmann | Maximilian Bertamini | Max Mutschler | Jürgen Scheffran*

Abstract Lately, commentators on spaceflight raise concerns over rising militarization, possible weaponization, and space becoming a theater of war. Some see arms control regimes as the solution, while others point to the complexity of space technologies and the impossibility to create a functioning arms control regime. These concerns are usually discussed within their separate disciplinary logic in physics and engineering, in international law, and in political science. We argue that combining these perspectives enables us to see the unique opportunities of outer space that allow the creation of a functional arms control regime. We recall major debates in technology, international law, and political science and show how distinct aspects in each discipline not only constrain, but also facilitate space arms control. We employ these findings in discussion of the Anti-Ballistic Missile Treaty (ABM) of 1972.

Keywords outer space, militarization, arms control, space policy, ASAT, ABM

Die Militarisierung des Weltraums – einzigartige Möglichkeiten für Rüstungskontrolle

Abstract KommentatorInnen zur Raumfahrt warnen seit Jahren zusehends vor einer zunehmenden Militarisierung des Weltraums, einer möglichen Bewaffnung des Weltraums und der Gefahr, dass der Weltraum zu einem Schlachtfeld werden könnte. Rüstungskontrollregime werden dabei teils als Lösung des Problems betrachtet, während andere die Komplexitäten von Weltraumtechnologien als zu große Hürde für funktionierende Rüstungskontrolle ansehen. Diese Perspektiven folgen ihrer jeweiligen disziplinären Logik in Physik und Ingenieurswissenschaften, internationalem Recht und der Politikwissenschaft. Unser Argument ist, dass sich nur durch eine Zusammenschau der involvierten Disziplinen diejenigen Faktoren herausarbeiten lassen, die für funktionierende Rüstungskontrolle im Weltraum von Bedeutung sind. Berücksichtigt man diese und die besonderen Begebenheiten des Weltraums, ist Rüstungskontrolle keineswegs unmöglich. Die Untersuchung arbeitet innerhalb der Disziplinen und disziplinübergreifend hinderliche und begünstigende Elemente für Rüstungskontrolle im Weltraum heraus und wendet sie anhand des Anti-Ballistic Missile (ABM) Vertrags (1972) an.

Keywords Weltraum, Militarisierung, Rüstungskontrolle, Weltraumpolitik, ASAT, ABM

* This paper is collaborative work of members of the SichTRaum-network (www.sichtraum-netzwerk.de). Arne Sönnichsen and Sara Hadley edited the paper. Jürgen Altmann, Maximilian Bertamini, Max Mutschler, and Jürgen Scheffran acted as co-authors and contributed substantial portions of the paper. Contact: Arne Sönnichsen, M.A., Research Assistant, University of Duisburg-Essen, Lehrstuhl für Internationale Beziehungen und Entwicklungspolitik, Forsthausweg 2, 47057 Duisburg. Email: arne.soennichsen@uni-due.de.

1. Introduction

Recent ASAT tests by India in 2019 and by Russia in 2021, emerging space forces in various nations and the continuous gridlock in the Conference on Disarmament (CD) are regularly cited as indicators for a rising threat of militarization and weaponization of outer space. Often, commentators of the most involved disciplines – physics and engineering, international law, and political science – point to the hopelessness of establishing any form of governance or arms control that would constrain these threats (cf. Hertzfeld/Weeden/Johnson 2016). For us, these conclusions are errant, since they mostly approach the issue from their disciplinary perspective alone, while neglecting other disciplinary findings. We argue that space provides unique opportunities for arms control and that it is still possible to minimize the threat of militarization and weaponization, particularly through arms control regimes, when the relevant perspectives are combined.

Generally, military space, or militarization of outer space, can best be understood as "the application of space science knowledge in the formulation and subsequent creation of instruments, devices, and machinery that have a practical use in a military context" (Sariak 2017, p. 52). Sariak distinguishes between "passive and active military space systems," meaning that the "passive" use of space, e. g., for surveillance satellites or communication, was accepted, while the active placement of offensive weapons was not. This distinction has been sufficient for the first Space Age (Wolter 2006, pp. 52–54). But with the commercialisation of outer space and the increasing number of space objects in general, many of which can have some practical use in a military context as well, the notion of what constitutes a weapon becomes blurred. This in turn causes rising tensions regarding military space and, if unchecked, will likely lead to a security dilemma. Arms control regimes might pose a way out by defusing some of the most urgent matters, complicated by a general shift from conventional treaties to norm-based soft law (Peoples 2011).

We will explore the unique opportunities for space arms control through three disciplines: technology, (international) law, and political science. Physicists and engineers generally tackle space from a perspective of problem-solving, without much regard to international law and the complex dynamics between involved actors. Lawyers and legal scholars focus on the treaties and documents to control space technologies and the use of space, while technical details escape. Political scientists, rather anew and few in the area of space policy, can unveil processes of socio-political dynamics in and between space-faring actors, but are in need of technical and legal expertise to arrive at convincing conclusions. While each of the three perspectives contributes their own facet of complexity to analyzing outer space militarization, a dialogue between them and a comprehensive perspective is missing. It is this comprehensive perspective, which the paper aims to contribute. We offer a systematic overview and introduction to those unfamiliar to this issue, knowing that this may sacrifice analytical depth. Nonetheless, we hope to provide fruitful ground for further studies on the issues.

First, the article reiterates key space technologies appropriable for weaponization and affiliated costs and risks of their use. It then touches on the definitions of weapons and their use in international law, particularly international humanitarian law (IHL), on existing arms control regimes, and established and recent space law and space governance such as the Outer Space Treaty (OST). An exploration of international security-related dynamics between and among space powers drawn from International Relations will give insight into the socio-political dimension of space militarization. A case study of the Anti-Ballistic Missile (ABM) Treaty will provide further insights. Finally, the paper will summarize our findings by each discipline.

2. Space Technology: Feasibility, Costs, and Risks of Space Warfare

Space is a unique environment that makes operations complex. While it has become a common narrative that every space technology is dual-use and could be utilized as a weapon, the matter is more intricate. The chapter provides an overview about key space technologies labeled 'counterspace technologies' and their applicability for weapons, sketches both costs and risks, and reflects on long-term effects of using space technologies as weapons.

2.1. Counterspace Capabilities

The Secure World Foundation (SWF) offers a taxonomy of 'counterspace' capabilities divided into five broad categories, namely "direct ascent, co-orbital, electronic warfare, directed energy, and cyber" (Weeden/Samson 2021, p. xiv). Some technologies are less unique to outer space – such as cyberspace and electronic warfare – or are still largely absent from the battlefield – such as directed energy weapons. Their clandestine nature is mostly problematic for verification. Direct ascent anti-satellite capabilities (DA-ASAT or short: ASAT) are derived from existing interceptor missile systems and use the sheer impact energy of a missile on its target to create the intended damage – and in consequence create clouds of space debris. Technologies used for Remote Proximity Operations (RPO) for the purposes of maintenance and refueling highlight another issue, as these could be utilized as co-orbital ASAT technology (i. e. 'space stalkers') (Chow 2017) to manipulate other countries' satellites. DA- or co-orbital ASAT can be tracked relatively easily. The DA and co-orbital capabilities are divided into those operated in LEO (low Earth orbit of 100–2.000 km altitude), in MEO (medium Earth orbit of 2.000–35.786 km), and GEO (geosynchronous equatorial orbit of 35.786 km). In addition to the offensive capabilities, Weeden and Samson identify space situational awareness (SSA) capabilities of major space powers as a passive/defensive capability (Weeden/Samson 2021, p. xiv).

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	U.S.	Russia	China	India	Aus.	France	Iran	Japan	North Korea	South Korea	U.K.
LEO Co-Orbital	■	▲	■	●	●	●	●	●	●	●	●
MEO/GEO Co-Orbital	■	▲	■	●	●	●	●	●	●	●	●
LEO Direct Ascent	■	▲	▲	■	●	●	●	●	●	●	●
MEO/GEO Direct Ascent	■	▲	■	●	●	●	●	●	●	●	●
Directed Energy	■	▲	■	●	●	■	●	●	●	●	●
Electronic Warfare	▲	▲	▲	■	●	■	■	●	■	●	●
Space Situational Awareness	▲	▲	▲	■	■	■	■	■	●	■	■

Legend: none ● some ■ significant ▲

Table 1: 2022 Global Counterspace Capabilities. Source: website of the SWF, https://swfound.org/counterspace/ (accessed on 15.04.2022), reprinted with permission by the author.

2.2. Costs and Risks

As with all military actions, the costs and risks of military actions in or from space depend on the circumstances, i. e., whether they occur in war or peace, what the target is, which defensive capabilities are available, and how much redundancy is available. And in this, space is not that unique compared to other realms of militarization. However, there are three aspects that are unique to outer space. First, developing space technology is extremely expensive. It is no coincidence that only the industrialized, wealthy countries that already have an edge in military technology, were able to create sophisticated space technology. Schrogl (2019) mentions three key indicators contributing to autonomy of great powers in space: access to space, use of satellites, and the scientific and industrial capacity that exist only in the US, Russia, Europe, Japan, India, and China. Second, while it is difficult to verify the use of cyber- or electronic weapons, space is a very transparent realm for conventional weaponry, since it is considerably easy to track who did what, when, and how, leaving only the motives of an observed attack to the interpreter. Third, space warfare has serious repercussions for all space operations. While the serious effects of weapons and even weapons of mass destruction, such as biological, chemical, or nuclear, are usually restricted to the area or country in which they are used, space warfare affects many, if not all countries.[1]

Turning outer space and Earth orbits into theaters of war has serious repercussions for the further uses of space, in military, civilian, and commercial regard. Especially those Earth-to-space weapons and space-to-space weapons, which exert kinetic force, will endanger the outer space environment by producing space debris (Smith 2019; Su 2021). Eventually, any increase of the number of objects in Earth orbits will increase the likelihood of collisions, as space debris begets more space debris, further degrading the ability to use space: a phenomenon that is labeled Kessler Syndrome. In this regard, there has been an increasing aware-

1 The Russian ASAT test of 2021 might have created a 'minefield' of space debris of 480 km – between parking and target orbits, i. e. of SpaceX's Starlink.

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ness about outer space as a part of the environment and about the concept of space sustainability,[2] which was defined in 2018 by the UN Committee on the Peaceful Uses of Outer Space (COPUOS) as:

> *"the ability to maintain the conduct of space activities indefinitely into the future in a manner that realizes the objectives of equitable access to the benefits of the exploration and use of outer space for peaceful purposes, in order to meet the needs of the present generations while preserving the outer space environment for future generations" (UN COPUOS 2018, para. 5).*

Aside from any intentional destruction of space objects, the general risk of collision is projected to increase dramatically due to the rising numbers of space operations and thus space objects (European Space Policy Institute 2020a). In short: space sustainability should disincentivize further space militarization and especially space weaponization.

Considering technology, we did not find convincing arguments suggesting that space and its 'unique' characteristics in physics and technology make arms control impossible or unfeasible. Quite the contrary: most unique weaponizable space technologies, particularly DA-ASAT and 'space stalkers', are easy to track and observe. The costs and risks of space operations are relatively high, particularly concerning space sustainability. The unique features of outer space consequently rather incentivizes space arms control regimes. Against this background we turn to international law next and examine the legal perspective on drafting an arms control regime for outer space.

3. International Law: The Unique Challenge to Define and Regulate Weapons

Arms control as a legal regime requires a clear notion of the objects and corresponding actions to be regulated. In an outer space context, the question of what constitutes a space weapon is still rather open. When attempting to find a suitable definition for weapons in an outer space context, regulators should compare how international law deals with the notion of weapons. In addition, we will review issues and solutions in outer space governance.

3.1. Defining Weapons in International Law

Insofar as international arms control in the form of a potential legally binding agreement is considered, international law suggests itself as a source for definitions of weapons. In the international legal system, weapons play an important role in three different fields: IHL, the Charter of the United Nations[3] (UNCh), and the law of arms control treaties.

2 See, e.g., Newman/Williamson 2018; UN COPUOS 2009. Plans for a "Space Sustainability Rating" were kicked off by the World Economic Forum and are currently developed, https://www.weforum.org/projects/space-sustainability-rating. See also the "Space Sustainability Talks" hosted by SichTRaum over the summer of 2021, recordings available at https://www.sichtraum-netzwerk.de/2021/06/07/our-new-series-of-online-events-space-sustainability-talk.

3 Charter of the United Nations, 24 October 1945, 1 UNTS XVI.

3.1.1. Weapons in International Humanitarian Law

IHL is primarily concerned with *jus in bello*, i. e. the law governing ways in which war is conducted – more specifically the protection of certain persons and the mitigation of unnecessary suffering (Shaw 2017, pp. 892–903). Thus, the purpose of IHL can best be fulfilled the sooner it applies, which is why IHL is considered to apply from the very initiation[4] of an armed conflict. In IHL, weapons appear in a number of contexts. The first context is the determination of an international armed conflict subject to Common Article 2 of the Geneva Conventions (GC).[5] While Common Article 2 GC I–IV does not specify how weapons determine the existence of an international armed conflict, the International Criminal Tribunal for the Former Yugoslavia (ICTY) has shed light on the issue by deciding that "an armed conflict exists whenever there is a resort to *armed* force between States […]"[6] (emphasis added). The Tribunal did not specify what exactly a weapon is, but from the purpose of IHL to prevent unnecessary suffering and provide protection, it can be concluded that weapons do not necessarily need to be able to cause large-scale destruction or suffering. It is sufficient that objects qualifying as weapons are designed or used to injure people or cause destruction. While this is a rather functional approach, the frequent reference to armed *forces* in IHL suggests objects and weapons generally used in a military context, such as firearms, explosives, etc. The second context in which IHL deals with weapons is the prohibition of certain weapon types. Under IHL actors are not free in their choice of means of warfare (see Article 22 of the Convention respecting the Laws and Customs of War on Land[7] (Hague Convention) and Article 35 (1) of the First Additional Protocol to the Geneva Conventions[8] (AP I)). Prohibited are weapons which cause superfluous injury or unnecessary suffering (Article 35 (2) AP I). While this formulation does not reduce weapons for the purposes of IHL to objects designed to cause injury or suffering, such objects appear to be included in the notion of a weapon. The Hague Convention in Article 23 mentions *weapons* in lit. a) and *arms* in lit. e) in the context of poisoned weapons and such weapons which are able to cause unnecessary suffering, but there does not appear to be a material difference between the notion of "weapon" employed by these provisions. The third context in which weapons appear in IHL is Article 36 AP I, which deals with the development of new weapons, means or methods of warfare. States parties are obliged to "determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party." While this Article does not define what a weapon is, the guide developed by the International Committee of the Red Cross (ICRC 2006) offers

4 International Court for the Former Yugoslavia (ICTY), Prosecutor v. Dusko Tadić, Appeal Judgement, 15 July 1999, IT-94–1-A, para. 70.

5 Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, 12 August 1949, 75 UNTS 31; Geneva Convention for the Amelioration of the Condition of the Wounded, Sick and Shipwrecked Members of the Armed Forces at Sea, 12 August 1949, 75 UNTS 85; Geneva Convention Relative to the Treatment of Prisoners of War, 12 August 1949, 75 UNTS 135; Geneva Convention Relative to the Protection of Civilian Persons in the Time of War, 12 August 1949, 75 UNTS 287.

6 ICTY, *supra* note 4.

7 Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land, 18.10.1907.

8 Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts, 8 June 1977, 1125 UNTS 3.

insights. The ICRC clarified the material scope of Article 36 AP I to be broad (ICRC 2006, pp. 937–938), as indicated by a number of national implementations[9] of the provision.

The national definitions as well as others referenced by the ICRC classify weapons based on their design, use, and suitability for combat or warfare, indicating a functional aspect to defining weapons. Thus, weapons can be a wide variety of objects connected only in their function.

3.1.2. Weapons under the UN Charter

Within the system of the UNCh, the prohibition on the use of force in Article 2 (4) UNCh is a cornerstone of the international legal system as a whole to which Article 51 UNCh (right to self-defense) serves as one of the few exceptions. Weapons or rather "arms" play a fundamental role in the context of states' right to self-defense as codified in Article 51 UNCh. The provision holds that "[n]othing in the present Charter shall impair the inherent right of individual or collective self-defense if an *armed* attack occurs against a Member of the United Nations" (emphasis added). At the same time, the definition of a weapon for that context is not provided by Article 51 UNCh. Due to the importance of the prohibition on the use of force, exceptions such as Article 51 UNCh generally have to be interpreted restrictively. Therefore, the International Court of Justice (ICJ) found that an armed attack required a strike that is of a significant weight in both its scale and its effects.[10] In its assessment of an armed attack in the *Nicaragua* case, the ICJ relied on the resolution on the definition of aggression by the UN General Assembly (UNGA 1974). The examples for prohibited aggression in that resolution focus mainly on military operations, but in terms of weapons Article 3 (b) of the resolution states that "any weapons" used against the territory of another state can be employed in an act of aggression. As long as the weapons are capable of producing destruction or harm of significant scale and effect, they qualify as weapons in the sense of a prohibited aggression and thus also in that of an armed attack. This scale and effects doctrine is again a functional perspective on weapons rather than a clear definition. But under the UN Charter, as well as in IHL, the purpose of the law in question demands such a perspective. For international peace, it matters less how exactly a hostile and destructive act is conducted and more that it is conducted in the first place.

The functional approach to arms in the context of Article 51 UNCh can be exemplified by two more instances. One is the treatment of the terror attacks on 11 September 2001, by the UN Security Council (UNSC). The references to the right to self-defense by the UNSC in the aftermath of 9/11 (Resolutions 1368[11] and 1373[12]) are interpreted by many as a confirmation that the terror attacks on the Twin Towers are classified as armed attacks in the sense of the Charter (von Arnauld 2019, p. 462; Peters/Marxsen 2017, p. 3), the "weapons" in this case being civilian airplanes. Another example is that of cyberattacks. A prominent example for the destructive capabilities of such operations is the 2011 Stuxnet attack on an Iranian uranium enrichment facility. In an effort to subject such capabilities to the framework of

9 For an overview see ICRC 2006, p. 934.

10 ICJ, Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. United States of America), Merits, 26. November 1986, I.C.J. Reports 1984, p. 392, para. 195.

11 UNSC 2001a.

12 UNSC 2001b.

international law, an expert group under the auspices of the North Atlantic Treaty Organization (NATO) developed the Tallinn Manual, a document that applies existing international law to cyber warfare (Schmitt 2013). Rule 13 of that manual states that "[w]hether a cyber operation constitutes an armed attack depends on its scale and effects" (Schmitt 2013, p. 54). We can learn from such approaches that for the system of the United Nations, weapons are not defined but rather determined functionally according to their destructive potential resulting from their use or design and not necessarily need to exert kinetic force.

3.1.3. Weapons in International Arms Control Treaties

Finally, some prominent arms control treaties shall be considered. As the purpose in these treaties lies in outlawing certain types of weapons *per se*, the assumption is that the notion of "weapons" is defined more clearly in arms control agreements.

The first treaty under scrutiny is the 2014 Arms Trade Treaty (ATT).[13] The ATT lists a variety of arms that fall under its material scope but leaves the interpreter to understand on her own what a weapon is in general. International law seems to assume that everybody must have a unanimously accepted idea of the notion "weapon". A similar approach is taken in the Treaty on the Non-Proliferation of Nuclear Weapons (NPT),[14] which refers to nuclear weapons or nuclear-weapon-states, without defining what a nuclear weapon is. Judging from historical examples and the time of the treaty's conclusion, one would have to imagine that weapons generally refer to bombs or explosives, but the NPT itself gives little guidance in that relation.

Most interesting for the context of outer space and its problem of dual use objects might be the conventions on the prohibition of certain biological and chemical agents. Both can be designed and used to cause human suffering and death, but also for medical procedures and other industries. The Biological Weapons Convention[15] bans substances or agents of a certain type or in quantities that cannot be used for peaceful purposes, as well as weapons designed to use these substances (Article I). The agents mentioned are thus not banned as weapons per se, but independently of weapons. Weapons are only specified regarding their ability to deliver an agent or toxin, which makes the Bioweapons Convention's approach comparable to other functional approaches examined before.

The younger Chemical Weapons Convention[16] follows a slightly different approach. In contrast to the Bioweapons Convention, it offers an explicit definition of weapons. It subsumes toxic chemicals and precursors directly under the notion of a weapon and notably also does not refer to "weapons" within the definition of chemical weapons. The toxic chemicals and precursors are themselves outlawed as weapons. What distinguishes them from legitimate purposes, which they could potentially fulfill as well, is the intention behind their use and in how far their type and quantity lends itself to using them for a purpose inconsistent with the convention.

13 Arms Trade Treaty, 2 April 2013, 3013 UNTS 269.

14 Treaty on the Non-Proliferation of Nuclear Weapons, 12 June 1968, 729 UNTS 161.

15 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, 10 April 1972, 1015 UNTS 163.

16 Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, 3 September 1992, 1974 UNTS 45.

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It can be summarized that while one might assume that the lack of a universally accepted definition of a space weapon and the complexity and dual-use dimension of space technologies may constrain the development of arms control, lessons from international law show that this is not an insurmountable challenge. Two major approaches have been used to deal with weapons:

1. Most international law employs a functional approach to weapons: objects that are designed or can be used to inflict certain levels of harm, suffering, and destruction can be deemed a weapon, without restrictions to conventional weaponry such as firearms or explosives. The scale and effects of the damage caused in their employment is the relevant factor.
2. Arms control regimes sometimes follow a functional approach, and sometimes follow a technology-design approach that identifies certain weapons or parts that can be weaponized (including dual-use) – such as certain biological or chemical agents. These areas are tailored to the applicable issue area and aim at prohibition.

What unites the approaches is the fact that when they refer to “weapons”, no description or definition of a weapon *stricto sensu* is offered. Yet, even in the more difficult dual use cases, the nature of the weapon in question was no barrier to creating effective arms control regimes. Thus, international law’s ambiguity concerning weapons cannot be seen as a constraint in creating an appropriate arms control regime. As we have seen, and will further illustrate in section 5, a purpose-centered approach – as frequently used in international law – may work for outer space as well. Accordingly, a space weapon could be defined as any device (whether land-, sea-, air-, or space-based) purposely designed or used to damage or destroy an object in orbit or any space-based device designed to attack targets on Earth or tested in such roles. On such an approach see Moltz (2008, pp. 42–43) and Grego and Wright (2010, pp. 7, 20).

3.2. Issues and Solutions in Governance

Attempts to supplement the OST regime with additional regulation better suited for contemporary developments in the militarization of space have been made in the last decades. Notably, most of the discussions and attempts focused heavily on direct-ascent capabilities. While the OST bans the deployment of weapons of mass destruction in space, it does not place limitations on conventional or any other type of weapons. Several attempts were made to fill this gap. Both Cold War superpowers were aware of the dangers that an ASAT race could bring and between June 1978 and 1979 three rounds of negotiations on ASAT arms control were held. The US negotiators initially wanted a comprehensive ban on dedicated ASATs, but this would have meant for the Soviets to dismantle their existing capacities, which they were unwilling to do. The Soviet negotiators in turn sought to limit the US space shuttle program, arguing that the shuttle might be used to interfere with Soviet satellites and hence could be considered an ASAT weapon. Limitations on its shuttle program, on the other hand, were unacceptable for the US and no agreement was reached.[17]

17 On the ASAT negotiations between the superpowers see Wertheimer 1987.

After those bilateral talks failed, the issue was discussed multilaterally. Since 1981, the UN General Assembly annually reaffirms a call to undertake the necessary steps for the prevention of an arms race in space. Finally, in 1985, the issue was referred to the Conference of Disarmament (CD) in Geneva and the Ad Hoc Committee on the Prevention of an Arms Race in Outer Space (PAROS) was set up. Right from the start, the big split in the committee was between a majority of states that wanted to start actual negotiations on the banning of space weapons and the US, which rejected such proposals. Thus, over the first ten years of its existence, PAROS was not able to agree on a negotiating mandate. Even worse, in 1995 the mandate of the committee (which was to be renewed annually) could no longer be extended, since the PAROS issue was linked with the establishment of other ad hoc committees, for example on the negotiation on a Fissile Material Cut-off Treaty (FMCT), and no agreement about the general work program of the CD could be found. As a result, no substantial talks on the question of PAROS took place in the CD since 1995.[18]

However, China and Russia issued several working papers to the CD and in February 2008 they presented a revised version of earlier ideas and proposed a Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects (PPWT).[19] The central obligation as stated in Article II of the draft treaty reads as follows:

> *"The States Parties undertake not to place in orbit around the Earth any objects carrying any kinds of weapons, not to install such weapons on celestial bodies and not to place such weapons in outer space in any other manner; not to resort to the threat or use of force against outer space objects; and not to assist or induce other States, groups of States or international organizations to participate in activities prohibited by this treaty."*

The proposal of China and Russia was openly criticized by the United States, in particular for banning the deployment of weapons in space, but not Earth-based ASAT weapons.[20] Another critique concerned the lack of concrete provisions on the verification of such a treaty. In 2014, China and Russia submitted a revised version of the PPWT, but due to the ongoing deadlock of the CD over its work program and persisting criticism regarding treaty-based space arms control such as the PPWT, no progress has been made regarding negotiations of a legally binding arms control treaty for space.

The deadlock of the negotiations within the CD on formal arms control in space led to a search for alternatives. Proposals were made that do not suggest formal agreements to ban certain weapons technologies, but instead aim to set standards of behavior in space; 'rules of the road' as they were already discussed as an alternative to arms control between the US and the Soviet Union (USSR) in the late 1970s. In 2008, the European Union (EU) suggested such standards of appropriate behavior in the form of a code of conduct for outer space

18 For a detailed account of the history of PAROS see Wolter 2006 and Mutschler 2013, pp. 136–148.

19 Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects, 29 February 2008, CD/1839.

20 In June 2001, China had delivered a working paper on a future 'Treaty on the Prevention of the Weaponization of Outer Space', that would have included a comprehensive ban of any kind of space weapons, including weapons that could be used from Earth to attack objects in space, Conference on Disarmament 2001, 6 June 2001; see also Gindullis 2016.

activities, which would be politically but not legally binding. The centerpiece of such a code was a commitment of states to refrain from any action which intends to bring about the damage or destruction of outer space objects. The EU has updated this proposal several times and sought to negotiate an International Code of Conduct for Outer Space Activities (ICoC) on this basis.[21] These negotiations failed in 2015. In particular, the BRICS countries (Brazil, Russia, India, China, and South Africa) expressed dissent with the ICoC drafted by the EU, calling for more inclusive and consensus-based multilateral negotiations (Meyer 2021).

A central problem of such a rules of the road approach is that it allows states to develop and deploy space weapons, so that they might end up in a situation where the incentives to use them are stronger than a non-legally binding code of conduct. In June 2009, Canada had submitted a working paper to the CD[22] that points at this problem and suggests that states agree on three basic rules: not to place weapons in outer space; not to test or use a weapon against any satellite so as to damage or destroy it; and not to test or use any satellite itself as a weapon to inflict damage or destruction on any other object. Whether these three rules take the form of a formal treaty or are given as pledges by the states is left open. What Canada suggested is a comprehensive but pragmatic space weapons ban, based on a general-purpose criterion. However, the Canadian proposal received not much support and the CD remains deadlocked anyway, due to disagreement on the prioritization of main issues among states. Still, in 2020 in the CD and the UN General Assembly, Canada reiterated the idea to start negotiations on a ban on destructive ASAT tests (Meyer 2021) and some of the resolutions adopted by the UN General Assembly on 1 November 2021 might shift the focus to norms of responsible behavior, one that can be seen as counteracted by the recent Russian ASAT test of November 2021 (European Space Policy Institute 2021).

In summary, it becomes clear that most of the issues revolving around space weaponization come down due to the unwillingness of states to restrict their capabilities or their distrust of the other involved parties. With this, we turn to a more conceptual section on security-related dynamics.

4. Politics: Security-Related Dynamics

While space has become a laboratory for cooperation (Schrogl 2019), militarization and securitization of space as an extension of Earth-bound operations and geopolitical ambitions is not surprising (Sönnichsen 2021), concerning, to a varying degree, the great powers in space indicated earlier (cf. Schrogl 2019). We can discern four major security-related dynamics that are determined by the countries' geographic position and technological capabilities. The first dynamic can be described as 'space superiority' or "the degree of control in space of one force over any other that permits the conduct of its operations at a given time and place without prohibitive interference from terrestrial or space-based threats."[23] A second dynamic stems out of a security dilemma. Here, regional dynamics cause states to create 'hard power'

21 Council of the European Union, Draft Code of Conduct for Outer Space Activities, 17 December 2008, 17175/08.
22 On the Merits of Certain Draft Transparency and Confidence-Building Measures and Treaty Proposals for Space Security, 5 June 2009, CD/1865.
23 US Space Force differentiates between 'space superiority' and 'space supremacy', while focusing on the first, see https://www.doctrine.af.mil/Portals/61/documents/AFDP_3-14/3-14-D03-SPACE-Superiority.pdf (accessed on 22.12.2021).

counterspace capabilities since they perceive neighboring states as a threat. The third can be considered a 'space club' dynamic: states strive for space technology as a 'soft power' symbol and for recognition. The fourth dynamic describes the reliance on civilian space as the dominant purpose of spaceflight operations. Certain dynamics apply to the same countries simultaneously.

4.1. Space Superiority

The idea of space superiority[24] is based on the salience of space security issues and the application of a strategic vision to these issues. Antoni (2020, p. 15) defines space security as follows: "'Space security' is the aggregate of all technical, regulatory and political means that aims to achieve unhindered access and use of outer space from any interference as well as aims to use space for achieving security on Earth." From a strategic point of view, having capabilities to pursue one's goals in space is backed by space power theory, a collection of contributions that apply geopolitical reasoning to outer space (Bowen 2020). However, Bowen cautions that space will probably remain "a cosmic coastline" and might not be the new battlefield some commentators imply.

States pursuing space superiority openly are the US, Russia, and China. Russia still draws from the experience of a developed space industry of the USSR, but due to a restricted budget, its development of capabilities has slowed. China on the other hand has openly declared its world-power aspirations and that space plays a crucial role both in hard and soft power terms. Unsurprisingly, these three states' national policies show heightened awareness of space as an environment crucial for their security (Space Security Index 2019, pp. 136–138) and develop robust counterspace capabilities (Weeden/Samson 2021). France could also be a recent entry, as it has conducted a first space war maneuver (Asterx in 2021) and might weaponize its satellites for defense (cf. Pasco 2020).

While there have been no military offensive actions between these powers, the dynamic indicates that geopolitical rivalry might heighten possible conflict. This can be witnessed particularly between the US and China since both openly claim leading roles in outer space issues and commit substantial resources to their outer space programs. And while Russia's space program is in decline, it is still a relevant military space power as the ASAT test of 2021 indicates.

4.2. Security Dilemma

Other countries do not necessarily pursue a goal of superiority but feel pressured to prepare for possible military encounters in or from space. Thus, the dilemmas apply partly to powers striving for superiority (for instance between China and the US) but are more regionally nuanced. Particularly India and Japan are examples of these developments. Especially the growing confidence of China in foreign relations and its declared goal to become *one* or *the* leading global power and its ambitious space program both in civilian and military terms might entail a possible arms race in South and East Asia. Particularly between China, India, and Pakistan, an almost classical security trilemma is unfolding (Khan/Khan 2019), while Japan is meeting the emergence of China with a growing militarization of its space program

24 *Ibid.*

(Kallender/Hughes 2019). Aliberti (2018) even claims a 'normalization' of India's space program that for a long time was dominated by the goal to provide socioeconomic benefits and is slowly catching up to the established space powers in developing military capabilities. However, for instance, the 2019 ASAT test by India has not openly deteriorated to an active arms race (Sönnichsen/Lambach 2020). But if the threat perception remains high and if the situation becomes precarious, there is a possibility that arms races will occur, and volatility will rise.

4.3. Space Club

Space has a substantial political symbolism. It not only means that certain countries can literally 'look down' on other countries, but it also heralds an enormous economic potential and reflects the development of a country, as space technology indicates a certain technological prowess. Paikowsky (2017) argued that the 'space club' is the next major technological club that constitutes a great power. While concrete security concerns score high in regard to hard power, the space club argument is more accentuated toward a soft power dimension. States with a sophisticated space program can be viewed as leading great powers which are not only able to defend themselves in a hard power way, but also as showing their claim for leadership. For instance, the US moon landings of the 1960 s and 1970 s can be considered a prime example to showcase the superiority of the US political and economic system to the world (Musgrave/Nexon 2018). Simultaneously, achieving sophisticated space technologies can also target domestic audiences (Launius 2019; Olbrich/Shim 2019).

More recently, the case of the Indian ASAT test of 2019 could be an important indication of the status of India as a space great power and cannot be overlooked if it comes down to regulation surrounding ASAT weapons. One possible interpretation of this 2019 ASAT test may be that India sought to develop ASAT capabilities ahead of the introduction of a robust space arms control regime so as to not repeat the experience of its nuclear armament: building nuclear deterrence capabilities against its neighbors Pakistan and China only in 1974, many years after the ratification of the NPT, it was denied the status of nuclear weapon state. The 2019 ASAT test thus guaranteed India a seat at the table regarding future ASAT regulation although it was equally fast to declare itself a 'responsible' actor in outer space, that it is strictly against weaponization, but for a sustainable use of outer space (Sönnichsen/Lambach 2020).

4.4. Civilian Use

Finally, some countries openly declare their commitment to rely only on civilian uses of space, including the importance of socioeconomic benefits, and favor a responsible use of outer space. Here, a rationale of the utility of space is important to justify space budgets, while nationalistic and national security arguments are dwarfed. This is particularly true for most European countries and especially the European Space Agency (ESA), which is singularly restricted to civilian uses and socioeconomic benefits, deeply rooted in the Cold War period. This is mostly mirrored by developing and emerging space powers (Harding 2013).

However, while these actors remain devoted to the civilian use of outer space, pushing international governance such as a Space Traffic Management (STM), they do not entirely refrain from security-sensitive and military instruments. For instance, while ESA is by its founding principle dedicated to peaceful and civilian use of outer space, the EU has no such restrictions and thus the major satellites contributing to European security such as Copernicus, Galileo, and Govsatcom are pooled in the European Union Agency for the Space Program (EU SPA) instead of ESA, effectively circumventing ESA's policy against militarization (cf. Klimburg-Witjes 2021). Similarly, countries like France (Pasco 2020), India (Aliberti 2018), and Japan (European Space Policy Institute 2020b) increasingly pursue security policies in outer space.

To summarize, there are certain factors in the realm of space politics that facilitate and constrain the collaborative development of arms control in space. On the one hand, the number of space actors is continuously growing, and we find different (sometimes overlapping) security related dynamics that constrain the likelihood of space arms control. In particular, the pursuit of space superiority by some states is a central obstacle to arms control. On the other hand, many factors facilitate the development of arms control, not least the interdependent nature of space security (as seen in the security dilemma), a strong legacy of space cooperation with extremely successful projects sometimes being developed by unlikely allies. Furthermore, the costs and risks of increased space militarization and in particular its weaponization are high, threatening the future of access to space, thus all space actors have a vested interest to safeguard space sustainability.

5. Facilitating Arms Control in Space: The ABM Treaty

How can states ensure that other parties adhere to an arms control agreement in space? The literature on international cooperation suggests the establishment of an international regime and rules which help to monitor compliance (Hasenclever/Mayer/Rittberger 2002). Verification provisions are a central element of nearly all arms control agreements. However, to verify compliance, it is necessary to define what compliance means in the first place. As we have detailed, the task of finding a workable definition for space arms control is not impossible but dual-use properties makes it difficult to define a space weapon purely on the basis of the technological characteristics (Baseley-Walker/Weeden 2010).

Arms control always had to struggle with such problems, and a look at arms control history provides us with strategies to solve them. A case in point is Anti-Ballistic Missile (ABM) arms control, as it was enshrined in the ABM Treaty of 1972.[25] Here, too, the decisive actors – which were the US and the USSR – faced the problem of distinguishing ABM interceptor missiles, launchers, and radars from other types of missiles, launchers, and radars that might be used for peaceful space exploration or for carrying nuclear weapons. There are indeed technical differences and specifications between ballistic missiles, missile defense interceptors and space launchers, which have different payloads, guidance systems and flight trajectories optimized for their respective design and purpose (Scheffran 1993). For instance, it would be impractical to impossible to use a ballistic missile or space launcher in an ABM role.

Nonetheless, whoever expects an unambiguous, technically detailed definition will be disappointed, as a clear-cut discrimination was not achievable. Instead, Article II of the ABM

25 Anti-Ballistic Missile Treaty (ABM Treaty), 26 May 1972. The following comparison of the ABM regime and arms control with regard to space is based on Mutschler 2013.

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Treaty defines ABM interceptor missiles simply as "missiles constructed and deployed for an ABM role, or a type tested in an ABM mode; […]." ABM launchers and radars are defined according to the same principle, focusing on the capability to meet the *purpose* of the technology. This was necessary in order to conclude an agreement because, naturally, none of the parties was prepared to give up radar or missile technology as such – similar to arms control for chemical and biological weapons. For verification, the parties of the ABM Treaty relied on the so-called national technical means of verification, which mainly included photographic reconnaissance satellites and aircraft, but also sea- and ground-based systems such as radars and antennas for collecting telemetry. Furthermore, the ABM Treaty established a Standing Consultative Commission (Article XIII) as a framework for further dialogue on the issue. This commission was used by both parties for considering several allegations of non-compliance and managed to settle all of them (Jensen 1988, pp. 176–177). The combination of these aspects of institutional design – a purpose-oriented definition of limited items, provisions for verification, and an institutional framework to deal with suspicions of cheating – gave the USSR and the US enough confidence to enable cooperation. After all, if one side would have detected something it considered a real attempt to deceive, it could have had the option to choose a 'tit-for-tat' strategy and resort to similar actions or ultimately abrogate the Treaty.[26] Despite dual use, the ABM Treaty worked well for three decades and was abandoned by US President George W. Bush not because of its dual-use element but because he chose to remove restraints on ABMs.

Effective space arms control agreements will need to be adequately verified, which depends on political and legal requirements as well as the available capabilities for verification. Verification assures early detection and interpretation of information necessary for the prevention of prohibited activities, or to allow a timely response in case of continued non-compliance. Space is a very transparent medium. This allows for remote tracking, surveillance, and observation with a number of means and procedures of verification which include monitoring systems, cooperative procedures, and institutional verification (international agency, consultation, dispute settlement) (Hagen/Scheffran 2003). Some capabilities are available, others require more research, development, and cooperation. The US and other major space powers have surveillance systems, which can track space activities of other states or non-governmental organizations.

The comprehensive prohibition of an entire category of weapons (such as ASAT) at a comparatively early stage is often easier to verify than partial measures or specific technical capabilities, provisions, or numbers. As long as advanced ASAT or space weapons do not exist, a comprehensive ban of such weapons and their testing is adequately verifiable if it is supplemented by preventive risk reduction measures (Altmann/Scheffran 2003). If advanced, specially designed space weapons based on new technologies are developed (e. g., for ASAT or missile defense, including laser or microwave technology), space arms control becomes even more important (Scheffran 2021).

26 On 'tit-for-tat' cooperation strategies see Axelrod 1984.

6. Conclusions

An assessment of the current development and testing of counterspace capabilities, and the already existing problem of space debris proliferation do not offer an overly optimistic outlook on space security. The Russian attack against Ukraine makes this outlook even grimmer. Nonetheless, it is not advisable to resign oneself to doomsday projections and reproduce rhetoric purporting the existence of a new 'arms race in space'. Contrary to accounts considering the development of arms control specifically for the space domain impossible, we put forward that the window of opportunity for arms control in space is not closed. Rather, the approach towards developing arms control for space necessarily must incorporate all three co-constituting dimensions: law, politics, and space technologies.

From our article and the reciprocal relationship between the three disciplines reflected therein, we can draw four conclusions. First, considering space technology and international law, we found that dual-use scenarios in outer space do not pose a significant hurdle for effective regulation. Particularly weaponizable space technologies are rather easy to track, and examples in international law show that technological artifacts or certain technologies used as or for weapons have been successfully tackled. Rather, we found that the major hindrance has been different security-related dynamics by space-faring actors, or simply put, politics, that prevented an agreed upon definition of to-be banned space weapons. Second, considering international law and politics, we learned that while the motivations of space-faring countries are very different, similar motivations and structural arguments apply to several actors simultaneously, indicating a leverage that could be utilized to create regional or bilateral governance solutions, like the comparable and viable (over three decades) ABM Treaty. Third, considering space technology and politics, we learned that the costs are important, but when soft power arguments apply and countries are able to show technological prowess, indicating their entrance into or underlining their membership in the space club, these costs are brushed aside. The implications are twofold: High costs are a hurdle that may prevent a broader militarization of space. Simultaneously, the high financial costs of space militarization and the connoted prestige are an important reason why many spacefaring nations choose to engage in militarization. Lowering the costs of spaceflight could at the same time disincentivize current space powers from further engaging in militarization and incentivize those states, which have so far not had the necessary resources, to launch their own military initiatives. Generally, however, the states without space programs – largely represented in the Group of 77 – have as recently as 2019 explicitly declared their aversion against space militarization (Group 77 2019), which indicates that lowered costs of spaceflight leave a considerable possibility for arms control in space. Fourth, and unfurling from all perspectives together is the importance of space sustainability. Virtually all military space technology produces space debris, which becomes a serious impediment to future space operations. This threat affects all current and emerging space-faring countries, and its effects are multiplied by the extension of space commercialization, falling launch prices, and the overall rise in space operations. In international law, this threat is only rarely addressed. If it is, then mostly in the civilian branch of outer space governance such as COPUOS, not so much in space security discourses such as in the CD. Since all actors want to use space, and since space heralds a powerful political capital and symbolism, particularly because of the 'space club'-dynamic, this rather new dynamic could be a way forward and a major argument for space arms control.

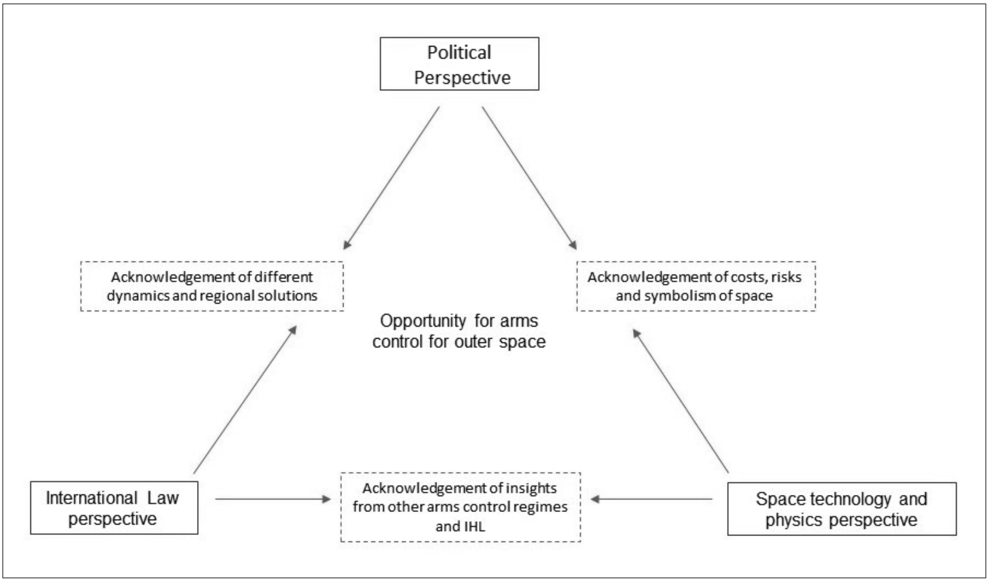

Figure 1: Interdisciplinary dynamic of space arms control; source: the authors

The way forward requires the political will of all space-faring nations and the conviction of decision makers that arms control and restraint are in fact in their countries' enlightened national interest. Increasing trust and cooperation between nations can over time lower requirements for and costs of verification and increase the willingness to jointly solve contentious issues in negotiations. The window of opportunity for comprehensive space arms control is still open, and recent events show how much is happening currently in the domain of space security. Just in April of 2022, the United States White House has announced a "New U.S. Commitment on Destructive Direct-Ascent Anti-Satellite Missile Testing", by which the "United States commits not to conduct destructive, direct-ascent anti-satellite (ASAT) missile testing, and that the United States seeks to establish this as a new international norm for responsible behavior in space." It remains to be seen how other countries will respond to this development. On the other hand, the Russian ASAT test of November 2021 as well as the erosion of civilian space cooperation between Russia and other nations in light of the Ukraine war raise concerns about the ability of major space powers and spacefaring nations to build collaborative momentum in the area of arms control in outer space. Further research could contribute to the build-up of political will for space arms control, in particular by three things: first, by highlighting the detrimental effects of a weaponization of space on space sustainability; second, by examining carefully the security-related dynamics in more detail; third, by developing concrete proposals for arms control and governance in space. Most importantly – this is a key insight resulting from this article – such research should tackle these issues from all three perspectives presented here: technology, law, and politics.

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F-W Vol. 95 | 2022 | Issue 3–4 | P. 267–289
DOI 10.35998/fw-2022-0012

Die Friedens-Warte

Quantum Technologies – A New Field That Needs Assessment

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Abstract Quantum technology (QT) is an emergent area with the potential to be disruptive and affect many human activities. QT also is a typical technology with significant dual-use applications. Specifically, the potential QT military applications were recently mapped. Although QTs do not introduce any new standalone weapon systems, they can significantly sharpen present weapon systems as well as command and control systems, including in the cyber domain. On the other hand, they also can provide non-eavesdropping secure communication or enhanced medical imaging. This contribution aims to introduce QTs and their possible applications, current status and activities related to the defence sector. Then, the military-related applications will be discussed more in detail, and potential problems for international security will be mentioned. In the end, we provide arguments why QTs should be assessed, and we ask selected questions that should be answered.

Keywords Quantum technology, military applications, dual use, international security, technology assessment

Quantentechnologien – ein neuer Bereich, der Folgenabschätzung braucht

Abstract Quantentechniken (QT) sind ein aufkommendes Feld mit der Möglichkeit, disruptiv zu sein und sich auf viele menschliche Aktivitäten auszuwirken. QT sind auch typische Techniken mit erheblichem Dual-Use-Potential. Insbesondere die militärischen Anwendungen wurden kürzlich kartiert. Obwohl QT keine neuen, eigenständigen Waffensysteme mit sich bringen, können sie gegenwärtige Waffensysteme sowie Führungs- und Steuersysteme erheblich verschärfen, einschließlich im Cyberbereich. Auf der anderen Seite können sie auch abhörsichere Kommunikation oder verbesserte medizinische Bildgebung bringen. Dieser Beitrag beabsichtigt, QT und ihre möglichen Anwendungen, den gegenwärtigen Stand und Aktivitäten mit Bezug auf den Verteidigungsbereich einzuführen. Dann werden militärbezogene Anwendungen im Detail diskutiert, und mögliche Probleme für die internationale Sicherheit werden benannt. Schließich geben wir Argumente, warum QT bewertet werden sollten, und wir stellen ausgewählte Fragen, die beantwortet werden sollten.

Keywords Quantentechnik, militärische Anwendungen, Dual-Use, internationale Sicherheit, Technikfolgenabschätzung

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1. Introduction

Quantum technology (QT) is an emergent and potentially disruptive field that tends to impact many human activities. Quantum technology covers many areas, mainly quantum computing, quantum networks, quantum sensing and quantum imaging. The common feature of all quantum technologies is exploiting quantum properties of individual quantum-mechanical systems (an electron, ion, atom, molecule etc.) such as quantum superposition,[1] quantum entanglement,[2] and quantum tunnelling.[3] Such technological use of decades-old quantum physics is called the second quantum revolution.[4]

Quantum technologies' Technology Readiness Levels[5] (TRLs) cover the full range from theory to commercially available technology. Nevertheless, quantum technologies with the highest expectations are rather at lower TRL around 5 (technology validated in the lab). Even a low TRL does not hinder large industrial and governmental interests, sometimes leading to hype and exaggerated expectations.

The expected use of quantum technologies covers, for instance, new material and drug discoveries, better medical imaging systems, improved machine learning and artificial intelligence, underground oil and minerals detection, unhackable cryptography, and optimised healthcare, transportation and supply chains (see reviews in Bruß/Leuchs 2019; Ezratty 2021). Of course, quantum technology will also bring applications with military and security[6] impacts, such as quantum cryptoanalysis, inertial navigation, radio-frequency antennas, and many more (Krelina 2021) that can potentially impact all domains of modern warfare.

Disruption from QTs could concern military stability as well as international security and peace. A situation between potential enemies is stable if neither side could gain from beginning a war, in particular by a nuclear first strike. A special aspect is crisis stability – it exists if a pre-emptive attack could not markedly diminish second-strike forces so that both are deterred from it. The second dimension of stability relates to arms racing. These concepts are explained and have been studied with respect to military applications of artificial intelligence and the risk of nuclear war (e. g. Geist/Lohn 2018; Boulanin *et al.* 2020), and ref-

1 Quantum superposition refers to a quantum state that can be represented as a sum of two or more other distinct states.

2 Quantum entanglement refers to a strong correlation between two or more qubits (or two or more quantum systems in general, e. g., photons) with no classical analogue. Quantum entanglement is responsible for many quantum surprises.

3 Quantum tunnelling refers to a propagation of a particle through a potential barrier without surmounting it using the Heisenberg uncertainty principle.

4 The first quantum revolution was about the deviations from classical physics at the level of atoms and their theoretical analysis in quantum mechanics. It led to innovations, among them the transistor, lasers, global positioning systems (GPS), nuclear bombs and energy, and medical imaging systems such as magnetic resonance imaging (MRI) or positron emission tomography (PET). These applications do not rely on individual quanta but rather on their statistical behaviour. There is no clear border between the first and second quantum revolution.

5 TRL is a scale from 1 to 9 estimating the maturity of technology, from 1 (basic principles observed) to 9 (actual system proven in operational environment). See TRLs according to EU, https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf (accessed on 14.09.2022). The TRL estimation used in this work is based on the previous work of one of the authors, see Krelina 2021. However, the reader can compare it with other sources such as Reding/Eaton 2020; The Australian Army 2021.

6 In this paper, we concentrate on military issues only. However, significant implications can also be expected for non-military security forces (police) or institutions (secret services). Some topics, for instance, quantum crypto analytical capabilities and quantum cryptography, have similar implications. However, the use of quantum sensing and networks can be more different and needs its own study.

erences therein. We use the term international security in the traditional sense, namely freedom of states from threats of external aggression (achieved maybe by cooperation, maybe by deterrence); there are wider notions of security and how to achieve it (e. g. Jackson 2020). Peace in a negative sense means the absence of war; positive peace includes an absence of structural violence within societies (e. g. Hancock/Solomon 2020). We note that the UN has as its first purpose "[t]o maintain international peace and security," Article 1 Charter of the United Nations.[7]

In principle, similar to artificial intelligence and other emerging technologies (Altmann 2020a, 2020b; Kubiak/Mishra/Stacey 2021), quantum technologies could have drastic consequences on military stability and thus international security and peace (e. g. Kubiak 2020). Breaking communication codes for military command and control could allow surprise attacks. A capability to detect and locate nuclear ballistic-missile submarines and mobile intercontinental ballistic missiles in real time would open the possibility of a disarming first strike, preventing a second strike so that this deterrent could no longer be relied on. In a severe crisis, the temptation for such attacks could rise. Even more urgently, the lack of information could drive worst-case assumptions, and the fear of such attacks could create motives for pre-emption that would start a devastating nuclear war.

As described below (Section 3.3), armed forces of high-technology countries pursue research and development of military uses of QT with high priority. Here one's own military strength is the prerogative, not military stability and international security. In order to not be negatively surprised, the international community should follow these developments closely – avoiding, on the one hand, unjustified hype, but also looking at potential consequences for military stability early enough so that preventive limitations could be discussed and implemented before a point of no return would be passed. As a basis for such considerations, this article provides an overview about activities, points out the issue areas and proposes topics for future research.

The current analyses of quantum technology military issues dominantly treat the possibility of cryptoanalysis against current asymmetric cryptographical schemes (e. g. Lindsay 2020). However, general works evaluating the dual-use character of quantum technologies are missing. A few reports describe and foresee several military applications (Davies/Kennedy 2017; Wolf *et al.* 2019). The work by Krelina (2021) is one of the most detailed mappings of quantum technology military applications so far.

The detailed assessment of quantum technology is tricky and difficult, especially for military use. This is because of the combination of high expectation, low TRL corresponding to the laboratory stage and, therefore, complicated estimation of real capabilities. For example, in theory, the quantum gravity gradiometer has the potential to discover underground structures. However, the final capability – out of laboratory performance, i. e. sensitivity and resolution – is uncertain. To what extent will it be practically deployable? And from which platform – truck, drone, or satellite? Will users be able to recognise small human-made structures or just large objects such as oil deposits?

First, this report provides a very brief introduction to quantum technology in Section 2. In Section 3, the current state of quantum technology development is presented from the international security and military point of view. Section 4 deals with quantum technology

7 Charter of the United Nations, 24 October 1945, 1 UNTS XVI.

military applications in more detail, including three examples of such technologies with high potential impact. In Section 5, the arguments for the assessment of quantum technology are listed, and questions that the assessment should answer are asked. Section 6 concludes the paper and provides general recommendations.

2. Introduction to Quantum Technologies

We will divide quantum technologies into three categories: quantum computing, quantum networks and cryptography, and quantum sensing and imaging.

As a prerequisite, quantum information science (QIS) needs to be touched on; this is an information science related to quantum physics. Here the elementary unit of data is called quantum bit or qubit. While in classical information science, the elementary unit of data, a bit, can have a value of either 0 or 1, a qubit in a two-state system can be a quantum superposition, i. e. a linear combination of the states '0' and '1' with arbitrary factors.[8] The other crucial property is quantum entanglement, where two or more qubits are correlated. A key principle is the no-cloning theorem, i. e. a qubit cannot be copied. This property causes many quantum computational limitations but also provides unprecedented security.

Quantum computing refers to the computations using quantum computers and quantum simulators utilising quantum information science. Quantum computing is not supposed to replace classical computers. Quantum computing is advantageous only for selected problems, typically with high complexity. Examples of such problems are: quantum simulations (molecule simulation for chemical and pharmaceutical research, new material development), quantum cryptoanalysis (breaking of most of the asymmetric encryption schemes), faster searching, quantum optimisations (e. g. the travelling salesman problem, more generally in supply chains, logistics, portfolio, or medicaments optimisation), or quantum-enhanced machine learning. Quantum computing can provide up to exponential speedup[9] (exponentially faster than all classical algorithms that we consider efficient) in such problems. Quantum computing's TRL is about 4–5, with a time horizon around 2030 (Krelina 2021). However, it is important to note that quantum computers can reach quantum advantage[10] in some areas already in two to three years (e. g., certified randomness, scheduling, or route and fleet optimisation), and with further development, they will likely be able to solve bigger and bigger problems (e. g., encryption breaking, large-molecules simulation, financial-crime detection) (McKinsey & Company 2021a).

Quantum cryptography comprises new cryptographical schemes capable of withstanding the crypto analytical capabilities of future quantum computers. One cryptographical scheme, called *quantum key distribution* (QKD), utilises quantum networks where the cryptographic keys are exchanged as quantum information by single photons via optical fibres or free-space channels and, e. g., the interference or eavesdropping would be immediately noticed.

8 The '0' and '1' states are noted as $|0\rangle$ and $|1\rangle$ with the superposition $|\psi\rangle = a * |0\rangle + b * |1\rangle$ where the absolute magnitudes of the complex numbers a, b obey $|a|^2 + |b|^2 = 1$.

9 By the term quantum speedup is meant that a particular quantum algorithm is faster than the (known) most effective classical algorithm. For example, if the quantum computer can solve a problem in N steps and the classical computer needs N^2 we speak about polynomial (in this case quadratic) speedup. Similarly, if the classical computer needs 2^N steps, then we speak about superpolynomial (in this case exponential) speedup.

10 The term quantum advantage refers to the point when a quantum computer will be able to solve a problem faster than the best algorithm on a classical computer.

Quantum information networks capable of quantum entanglement distribution will offer additional services such as high precision clock synchronisation, secure identification, position verification, distributed quantum computing, and entangled sensors. *Post-quantum cryptography* (PQC)[11] is an alternative to QKD to mitigate the threat from the crypto analytical capabilities of future quantum computers. The QKD TRL is in the range of 5–8 depending on the deployment:[12] metropolitan or national QKD networks are already under construction (USTC 2021), while outer-space deployment has active laboratory-level testing (Yin *et al.* 2017) and space-based QKD for commercial use was announced to be launched in 2023 (Virgin Orbit 2021). On the other hand, the TRL of quantum information networks is very low at 1–3 (Krelina 2021); their time horizon is 2030–2035. PQC is at TRL 7–8 with ongoing standardisation processes.

Quantum sensing is a well-established research area that provides more precise measurements of various physical variables such as magnetic or electric fields, gravity gradient, acceleration, rotation and time. This can be used for more precise clocks, quantum inertial navigation, underground and undersea exploration, more effective radio frequency communication receiving, etc. A specific subfield is quantum imaging that exploits features from quantum optics. Quantum imaging can offer technology such as quantum radar, 3D camera, behind-the-corner camera, and low-visibility vision devices. The TRL of quantum sensing varies technology by technology and can be considered in the range of 4–6 (Krelina 2021), often with a time horizon of the next 2 to 10 years (Krelina 2021).

3. Quantum Technology Research and Development

3.1. Research and Development Funding and Increasing Importance

The quantum technology industry is emerging and rapidly growing. This can be illustrated by over 400 start-ups and incumbents with over $4.2 billion raised funding or by total announced planned governmental funding of over $29 billion (McKinsey & Company 2021b). The timelines for the investment of funding vary per country, and part of the total sum has been funded already.

China	15.0
EU	7.2
US	1.3
UK	1.2
India	1.0
Japan	1.0
Russia	0.7
Canada	0.6

11 PQC does not use quantum physics. In principle, PQC uses algorithms that can run on classical computers and their breaking is sufficiently difficult even for future quantum computers.

12 Quantum networks are considered as metropolitan quantum networks and interconnected with other quantum networks using optical fibres at short distances, or as space-based networks at long distances.

Israel	0.5
Others	0.6

Table 1: Total announced planned governmental funding in $ billions announced until September 2021 (McKinsey & Company 2021b).

Despite the low TRL of quantum technologies and the dominance of research in academia, the number of quantum-related start-ups, spin-offs, or spin-outs is rapidly increasing. This is accelerated by large corporations (such as IBM, Google, Amazon, Microsoft, Baidu, and Alibaba), including their academic research partnerships.

The number of patents in the quantum technology area since 2000 reached 13,208 in 2020, with rapid growth since 2010, led by China, the USA, and Japan (Kurek 2020; Alex 2021). A similar trend applies to scientific publications too. The EU (where the top five countries are: Germany, France, Italy, Spain, and the Netherlands) leads in quantum technology scientific publications, followed by China. However, the scientific publications from the US have a higher impact factor, followed by the UK (McKinsey & Company 2021b).

From a different point of view, there are signals that quantum technologies are considered as technologies with significant international-security and military impact, and restrictions on research funding or exports are being applied. In particular, China has issued a list of cryptographical systems that are under export control (Ministry of Commerce of the People's Republic of China 2020). In particular, the list includes "Quantum cryptographic devices", which effectively controls the export of quantum computing hardware and software. The European Union marked quantum technology as an "emerging technology of global strategic importance" and notes that it will be used "for sensitive applications in the area of security, and in dual-use applications" (European Commission 2021b); restrictions or exclusion from Horizon Europe funding (quantum computing and space projects) are considered for the EU associated countries (Wallace 2021). Another example is from Australia, where overseas investments and funding into companies and start-ups dealing with national security issues undergo a governmental approval process (Davidson 2021). The latest news is from the USA on the updated Entity List, which prohibits exporting technologies. The Export Administration Regulations (EAR) have added eight Chinese technologies from the quantum technology sector (US Dept of Commerce 2021). These companies tried to acquire U. S.-origin items in support of the Chinese military's quantum computing efforts.

For a detailed overview of worldwide national quantum research and development activities and related policies, see Kung and Fancy (2021).

3.2. Quantum (Cyber) Military Issues

The dominant quantum security topic is the possibility of breaking most of the present asymmetric encryption schemes.[13] Even today, this is a threat because adversary or foreign intelligence could intercept encrypted traffic and store it until quantum cryptoanalysis becomes

13 Public-key cryptography or asymmetric cryptography uses a scheme with a pair of keys, a public and a private key. The public key is obtained from a private key using a so-called one-way function (it is easy to compute the output from input, but hard to invert to obtain the input from a given output). The public key (e. g. a product of two high prime numbers) then can be used for encrypting a message that can be decrypted only by the private

available. China is already suspected of such activity (Booz Allen Hamilton 2021). This is a threat to encrypted data that should remain confidential over more than the 10–15 years that are considered as a horizon when a sufficiently capable quantum computer should be available (Mosca/Piani 2021). Such long-term value data are, for instance, intelligence data, trade secrets, biometric identification markers, social security numbers, criminal records, weapon designs, and research and development around pharmaceuticals, biology, materials science, and chemistry.

There is a quantum-cryptographical solution to the problem. It can be based on post-quantum cryptography (PQC) that relies on mathematical problems hard enough for quantum computers or quantum key distribution (QKD) where an interception or eavesdropping attempt would be immediately noticed.

Both solutions, PQC and QKD, are already available commercially. However, the massive implementation is still not the order of the day. In the case of PQC, the result of the PQC standardisation (process to solicit, evaluate, and standardise one or more quantum-resistant public-key cryptographic algorithms) by the U. S. National Institute of Standards and Technology (NIST) (Moody *et al.* 2020) is expected in 2023. At the same time, other agencies in the US (NSA 2020; DHS 2021) and the UK (UK NCSC 2020) have already announced that PQC is the preferred solution.

QKD systems undergo standardisation by several authorities and institutions (e. g. International Telecommunication Union, European Telecommunications Standards Institute, European Committee for Standardisation, European Committee for Electrotechnical Standardisation, NIST) (Loeffler *et al.* 2020). QKD systems seem to be preferred in the EU (European Commission 2021a) and China (Tee 2021; USTC 2021). The QKD solution has higher requirements for realisation and implementation into current systems. On the other hand, this investment may pay off in the future when QKD networks are upgraded to quantum information networks with more services also related to security, such as secure identification, position verification and secure quantum computing (Krelina 2021).

In general, symmetric encryption[14] methods are considered secure as long as the key remains secret. Nevertheless, this is a topic of active research. For example, current quantum algorithms can offer super-polynomial speedup in breaking them (Kaplan *et al.* 2016). However, these algorithms suffer from excessive resource requirements (millions of perfect qubits, i. e. billions and more of imperfect qubits with error correction) on the quantum computer (Bogomolec/Underhill/Kovac 2019).

Quantum crypto analytical capabilities and quantum cryptography are the most studied quantum technologies. Also, several reports (of general level and in computer and political science) are exploring the potential impact of quantum computing and cryptography on nuclear security (Hemsoth 2015; Hayes 2018; Hall/Sands 2020; Sokova 2020).

At first sight, PQC seems an easier and cheaper solution to the quantum threat, while QKD needs the build-up of completely new infrastructure, but provides the best possible

key (e. g., using the two prime factors). The public key can be distributed openly because the classical computers are not able to obtain the private key from the public one (invert the one-way function, e. g., finding the prime factors) in reasonable time. However, this is not true for several asymmetric cryptographical schemes in the case of quantum computing. One method for finding the prime factors is Shor's algorithm, see Shor 1994.

14 Symmetric encryption is a type of encryption where the same key is used for encryption and decryption. The major drawback is in exchanging the secret key because any exchange must retain the privacy of the key.

security. Here, one needs to keep in mind that QKD networks are just a first step into quantum information networks or a quantum internet, where more security-related protocols will be available, far beyond of what is possible with classical, even PQC cryptography. Such networks are already under preparation (UK Quantum Communications Hub 2019; European Commission 2021a) or under construction (USTC 2021).

3.3. Quantum Technology Research and Development in the Military

The real impact of quantum technologies in the military is yet unknown, with high uncertainty. While in the case of quantum computing and networks, the requirements for civil and military use are the same, in the case of quantum sensing, the military-grade requirements are higher than for civil use, and it is unknown whether such requirements will be met. For example, quantum gravity gradiometry is a technology that can explore the Earth's underground. While for civil use, the spatial resolution can be lower (e. g., searching for oil or mineral fields), for military use, the spatial resolution should be high for discovering underground structures and facilities. However, key parameters are often anticorrelated. This means that, by improving spatial resolution, one decreases the sensitivity (and thus the detection range). It will have to be seen whether the final technology will find a balance of all parameters to deliver the required performance. In general, organisations, countries and armies oriented toward high military technology, such as NATO, the USA, UK, China, Australia, and others[15] are aware of the potential impact of quantum technologies. In recent years, many of these countries have drawn up their own military research plans or roadmaps on quantum technologies.

The USA is an example of a country fully aware of the dual-use character of quantum technologies. For instance, the Defense Advanced Research Projects Agency (DARPA) has supported basic and applied quantum technology research since the 1990 s with many success stories (DARPA 2020). Moreover, each branch of the US Armed Forces has its own corporate research laboratory, namely the Army Research Laboratory[16], Naval Research Laboratory[17] and Air Force Research Laboratory[18], that run programmes focused on quantum technologies. Finally, US non-military actors provide reports and recommendations regarding quantum technologies for the military (see, for instance, Wolf *et al.* 2019; ATARC 2021; Sayler 2021). Since 2018, the USA has the National Quantum Initiative (NQI) Act to accelerate US leadership in quantum information science and technology and coordinate the approach to quantum research and development, including the Department of Defense, National Security Agency, and Intelligence Advanced Research Projects Activity (IARPA). For the latest overview, see NSTC (2021).

The biggest governmental investment (declared) in quantum technology is by China, where the People's Liberation Army (PLA) has recognised quantum technology as a technology of strategic significance and possibly providing a decisive advantage (Kania/Costel-

15 For example, Russia has not publicly reported any quantum-related military activity. In 2022, Russia announced the National Quantum Laboratory, https://thequantuminsider.com/2022/01/28/russia-sets-up-national-quantum-lab/ (accessed on 14.09.2022).
16 https://www.arl.army.mil/what-we-do/essential-research-programs/ (accessed on 14.09.2022).
17 https://www.nrl.navy.mil/Our-Work/Areas-of-Research/Quantum-Research/ (accessed on 14.09.2022).
18 https://afresearchlab.com/technology/quantum/ (accessed on 14.09.2022).

lo 2016, 2018; Kania 2018, 2019). Detailed information about funded projects is not known. However, there have been documented several collaborations between, for example, the University of Science and Technology of China, one of the most successful institutions in the Chinese quantum effort, and various Chinese defence conglomerates (Strider 2019). The direct defence industry development is demonstrated in several press releases, e. g. claiming that the China Electronic Technology Group Corporation (CETC, state-owned) has developed a quantum radar with a range over 100 km that can potentially overcome US stealth capabilities (Phoenix News 2016; Trimble 2018). However, there are strong doubts about such a statement considering recent research on the impracticality of quantum radar realisation (Daum 2020; Jonsson/Ankel 2021).

Australia is an example of a country where the Army has published a roadmap for quantum technology development and deployment (The Australian Army 2021). This roadmap sketches a general approach and guidance to quantum technology development and applications and foresees various applications in the following twenty years. Defence-related quantum research was also announced, for example, in India (The Indian Army 2021) and France (Machi 2022).

NATO established its emerging and disruptive technologies (EDT) roadmap in 2019, where quantum technology and six other technologies were identified as emerging and disruptive technology (NATO 2021; Soare 2021). In NATO, quantum technology is a topic at several levels (most of this is probably classified). Quantum technology basis and expectations are described in “Science & Technology Trends 2020–2040” (Reding/Eaton 2020) by the NATO Science and Technology Organization (STO). To increase quantum technology research and development potential, countries can enter into a partnership. These partnerships are mostly of a non-military character. However, some partnerships also consider defence and security applications, for example, the partnership between the United Kingdom and the US (UK-US 2021), between India and Australia (Gill 2020), or the AUKUS – a trilateral security pact between Australia, the United Kingdom, and the US (AUKUS 2021). The situation about quantum technology awareness is worse in the case of smaller countries and armies that usually do not have the capacity for EDT research. It is easier for NATO members where quantum technologies are discussed or EU members who can participate in quantum calls in Horizon Europe or the European Defence Funds.

Apart from nationally coordinated or supported quantum research and development for the defence sector, many defence contractors have their quantum laboratories or join different projects and initiatives. Several examples follow:

- **Airbus** (France) – has organised the Airbus Quantum Computing Challenge;[19] projects: ViSatQT[20] (satellites for QKD), QOSAC[21] (quantum communication infrastructure); an

19 https://www.airbus.com/en/innovation/disruptive-concepts/quantum-technologies/airbus-quantum-computing-challenge (accessed on 14.09.2022).

20 https://pureportal.strath.ac.uk/en/projects/visatqt-iscf-airbus-viable-satellite-free-space-optical-quantum-k (accessed on 14.09.2022).

21 https://airbus-cyber-security.com/wp-content/uploads/2020/11/Airbus-CyberSecurity_QOSAC.pdf (accessed on 14.09.2022).

Airbus-led consortium was selected to study the design of the future European Quantum Communication Infrastructure (EuroQCI)[22] (Defense World 2021)

- **BAE Systems** (UK) – projects: HIGH-BIAS2[23] (quantum gyroscope for inertial navigation), quantum RF sensing[24]
- **CETC** (China) – quantum radar activities[25] (however, they have recognised that quantum radars will not meet the requirements of military users[26])
- **Lockheed Martin** (USA) – runs the University of Southern California-Lockheed Martin Quantum Computing Center[27]
- **MBDA** (France) – partnership with Pasqal on quantum optimisation in the field of defence[28]
- **Northrop Grumman** (USA) – partnership with Arqit on quantum encryption,[29] partnership with Brookhaven National Laboratory on a photonic quantum computer and quantum materials[30]
- **Raytheon** (USA) – has a Quantum Engineering and Computing[31] department, partnership with IBM on quantum computing,[32] quantum radar activities (Daum 2020; Koblick/Wilkinson 2020)
- **Thales** (France) – works in the area of quantum sensing, quantum communication and post-quantum cryptography[33] (Bond/Brown 2019)

Many more activities are likely not communicated publicly. The defence contractors' current research and development status of quantum technologies are usually not communicated publicly, thus, it is more challenging to estimate their current TRLs and time horizons.

22 https://www.defenseworld.net/news/29698/Airbus_led_Team_Selected_to_Study_European_Quantum_Communications_Network_Design (accessed on 14.09.2022).
23 https://optics.org/news/12/4/48 (accessed on 14.09.2022).
24 https://www.baesystems.com/en-us/article/darpa-selects-bae-systems-to-advance-quantum-technology-for-military-antennas (accessed on 14.09.2022).
25 https://aviationweek.com/defense-space/china-shows-first-quantum-radar-prototype (accessed on 14.09.2022).
26 https://www.scmp.com/news/china/science/article/3147309/chinese-team-says-quantum-physics-project-moves-radar-closer (accessed on 14.09.2022).
27 https://research.usc.edu/quantum-computing-center/ (accessed on 14.09.2022).
28 https://pasqal.io/2021/11/18/kick-off-mbda-x-pasqal-partnership/ (accessed on 14.09.2022).
29 https://qubitreport.com/quantum-computing-cybersecurity-and-cryptography/2021/06/04/arqit-signs-northrop-grumman-to-study-quantum-encryption-uses-for-national-security/ (accessed on 14.09.2022).
30 https://www.bnl.gov/newsroom/news.php?a=216965 (accessed on 14.09.2022).
31 https://www.raytheonintelligenceandspace.com/capabilities/products/quantum (accessed on 14.09.2022).
32 https://www.hpcwire.com/off-the-wire/ibm-and-raytheon-technologies-to-collaborate-on-artificial-intelligence/ (accessed on 14.09.2022).
33 https://www.thalesgroup.com/en/group/journalist/press-release/thales-unveils-three-quantum-technologies-set-revolutionise-world; https://www.thalestct.com/_template-assets/Collateral/Quantum%20Computing%20and%20Data%20Security.pdf (accessed on 14.09.2022).

3.4. Quantum Ethics

The quantum ethics topic is a young and not systematically studied area. Several calls to the discussion have been made (e. g., World Economic Forum 2020; Castellanos 2021; The Quantum Daily 2021). However, the presented examples deal mainly with quantum computing ethics that are similar to classical computing ethics and, in particular, to the ongoing discussion on artificial intelligence (AI) ethics. However, it is not the same. To quote Perrier (2021): "while the types of normative considerations applicable to quantum technologies will also apply to other technologies, such as automated algorithmic technologies in general, there are distinct features of both (a) how computing is undertaken in quantum systems and (b) the consequences of quantum computing which distinguish research programmes into quantum ethics."

Similarly, there are several papers on quantum computing responsible innovation (Coenen/Grunwald 2017; Inglesant *et al.* 2021; Ten Holter/Inglesant/Jirotka 2021).

Most papers agree on findings and recommendations such as: establishing a more direct connection between quantum experts and policymakers, supporting interdisciplinarity, and wider discussion and explanation to society. On the other hand, they also agree on the difficulty of anticipation, non-neutrality of the research and the importance of raising quantum awareness. Nevertheless, more advanced tools such as risk-based impact assessment need to be applied, and a legal-ethical framework for quantum computing established (Kop 2021).

Due to the difficulty of anticipation on the one hand and hype on the other, it is very difficult to shift this discussion deeper to study social and international-security aspects. For example, the TU Delft Quantum Vision team (Vermaas *et al.* 2019) sketches several "dark side" scenarios such as: increasing power gap between rich and poor countries; governments becoming less transparent; governments gaining too much control over their citizens; and increasing power of large tech companies. However, it is impossible to assess them reliably today.

One can note that most of the above-mentioned papers deal with quantum computing, few with quantum networks and none with quantum sensing and imaging. Military and arms-control aspects are outside of their scope.

4. Potential Military Applications of Quantum Technologies

Quantum technology, as the second quantum revolution, will likely not bring a new fundamental weapon such as the first quantum revolution and the nuclear bomb. Quantum technology will rather improve present weapon systems (better navigation, new possibilities of tracking, more powerful cyber weapons, etc.) and improve how a war or armed conflict is conducted (improved intelligence, surveillance, and reconnaissance (ISR), advanced command and control, etc.). Here, the potential of quantum technology is huge, as one can conclude from the recent study of potential military applications (Krelina 2021). We can highlight domains where a significant quantum impact can be expected. These are cyber warfare, positioning, navigation, and timing (PNT), intelligence, surveillance, target acquisition and reconnaissance (ISTAR), electronic warfare, sensors for chemical, biological, radiological, and nuclear (CBRN) warfare, the underwater and space domains.

Below, we present three examples from quantum sensing, including consideration of uncertainties. The possibilities of using quantum computers have been described above, for example, crypto analytical capabilities, chemical simulations, etc. It is only necessary to wait for their sufficient performance. In the case of quantum sensors, their future capabilities are less obvious, which is why we focus on them here. Much cutting-edge research occurs in academia, and often developments in a military or dual-use context are made public so that relevant information is available.

4.1. Example: Quantum Magnetometry

Quantum magnetometry (TRL of 5–6) refers to sensors detecting magnetic fields, such as local magnetic anomalies or weak biological magnetic signals. Examples of civil uses are the MEG (magneto-encephalography) scanner, compact magnetic resonance imaging (MRI)[34] scanners or the Earth's magnetic anomaly mapping. In the defence sector, quantum magnetic sensors are considered for detecting metallic objects generating local magnetic anomalies such as mines or improvised explosive devices (IED), submarines, camouflaged vehicles, and rotating machinery through walls. The local Earth's magnetic anomaly detection combined with previously mapped global anomalies can serve as an alternative method of underwater navigation.

The above-mentioned military applications will require a portable or mobile solution with low SWaP (size, weight, and power). At the same time, there is a need to improve parameters such as (long-range) spatial resolution and keep sensitivity as close as possible to the excellent results demonstrated in the laboratory. Unfortunately, these two requirements often go against each other. For example, the reached sensitivity will determine the possible detection range and the form factor of the device, the spatial resolution will determine a minimal size of the detected object at the probed range, and the power requirement will determine the platform from which the magnetometers could be deployed – from submarines and vessels to unmanned aerial, surface or underwater vehicles (UAV, USV, UUV) (Bond/Brown 2019).

However, the detection of submarines seems to be challenging. One could imagine building a net of quantum magnetic sensors in the ocean, mounting them on ships, drones or even on satellites moving in low Earth orbits (LEO). Here, the most important parameters are sensitivity, spatial resolution, and frequency range (Baumgart *et al.* 2016). The first refers to the possibility of detection, the second to distinguishing the object against the background, and the third to a frequency range designed to match the typical signatures of the targets. And very often, these three parameters trade-off against each other.

Without a detailed assessment of the possible quantum magnetic sensing capabilities, performance, and limits, it is impossible to provide reasonable answers to questions such as: is it possible, and from which platform could one detect a submarine? Here, advanced simulations of the underwater environment, magnetic field produced, background noise and interference combined with quantum magnetometer performance (or the range of realistic performance) are necessary.

34 MRI collects structural information and creates images of the brain while MEG collects magnetic activity from neurons, visualized as brain waves.

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4.2. Example: Quantum Inertial Navigation

Inertial navigation is essential when a global navigation satellite system (GNSS) is not available (e. g., underwater) or the GNSS signal is jammed or spoofed. Quantum inertial navigation is a direct analogue of classical inertial navigation. The acceleration and rotation of a moving platform are measured and integrated over time to yield the velocity and then the location in three dimensions. In particular, a quantum inertial navigation system consists of a quantum accelerometer, a quantum gyroscope and a quantum or atomic clock. Individual parts are being tested in laboratories and relevant environments with stabilities sufficient for the military level. However, creating a complete quantum inertial measurement unit is still challenging. For example, sensors need to increase measurement rates to several hundred Hertz (improvement of the measurement bandwidth of quantum sensors) for navigation for highly mobile platforms (Bongs *et al.* 2019; Travagnin 2020). Another problem is the lowering of SWaP, especially when cryogenic cooling needs to be used.

The present methods of inertial navigation suffer from drift, a loss of precision over time. For example, marine-grade inertial navigation (for military ships and submarines) has a drift of 1.8 km/day and navigation grade (for military aircraft) has a drift of 1.5 km/hour (Travagnin 2020). Despite the problems described above, general expectations are high that quantum inertial navigation (TRL of 4–5 at present) will offer an error of only a few hundreds of meters per month (Lewis/Krämer/Travagnin 2016; Till/Pritchard 2016). An overview of recent results can be found in Feng (2019).

The first users will probably be submarines with lower demands on low SWaP parameters. With the possible miniaturisation and the implementation in missiles, it is reasonable to expect a significant impact on strategic weapons such as ballistic or hypersonic missiles with nuclear or even conventional precision warheads. For example, a hybrid quantum-classical accelerometer could have a position error after 4 hours smaller by a factor of 100 compared to a classical accelerometer (Wang *et al.* 2021). However, this factor holds at the laboratory level. Its real deployment on, for example, a ballistic missile will require low SWaP and will need to face extremely high vibration and acceleration during launch in addition. Consequently, one can expect a significantly lower factor when deployed.

4.3. Example: Quantum Radio-Frequency (RF) Receiver

An RF receiver receives radio-frequency signals that can stem from communication (mobile network, WiFi, Bluetooth, etc.), flight control, navigation (GPS, Galileo, etc.), radars, electronic warfare (signal detection, jamming, spoofing), etc. Quantum technology offers a new type of antenna and receiver (TRL of 4–5) with several potential features, such as a wideband receiver, better signal-to-noise ratio, small size (classical antennas should be no less than approximately 1/3 of measured signal wavelength vs. Rydberg atoms-based antenna size of tens of µm), angle-of-arrival detection, self-calibration, and measuring both weak and very strong fields.

The considered technology is based on Rydberg atoms or nitrogen-vacancy (NV) centres.[35] It was demonstrated for frequencies 0 to 20 GHz for AM or FM radio, WiFi, and

35 Rydberg atom sensors use atoms with one or more highly excited electrons (Rydberg atoms) which creates an extremely large electric dipole moment allowing them to be very sensitive to external fields. They can be in the

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Bluetooth signals (Meyer/Kunz/Cox 2021). It can find applications in navigation, active imaging (radar), electronic warfare, telecommunications, media (radio, TV) receivers or passive terahertz (THz) imaging. In the defence context, quantum RF receivers could be a key enabler for advanced low probability of intercept/low probability of detection (LPI/LPD) communication, over-the-horizon directional RF, resistance to RF interference and jamming, RF direction finding, or RF-THz imaging (Krelina 2021).

As a consequence, the quantum RF receiver is an object of high interest in defence projects. The European Defence Fund has opened a call for Quantum technologies for defence[36] with a scope on "Quantum radio frequency sensing". DARPA announced several contracts for quantum RF sensors to BAE Systems (BAE Systems 2021) and teams led by Honeywell, Northrop Grumman, ColdQuanta, and SRI International (DARPA 2021). For example, ColdQuanta is developing an arrayed quantum RF sensor as a potential upgrade for the F-35 fighter (ColdQuanta 2021).

Quantum RF sensing is well on its way to real deployment. Most efforts are focused on the miniaturisation of lasers and the readout systems. For military purposes, the goal is to create an array of many quantum RF sensing modules that will be able to determine the properties and angles-of-arrival of the detected signals at several frequencies in parallel.

5. Need for Assessment

Quantum technologies concern international security if they are used by the military. Due to their dual-use character, many civilian developments are relevant, too, e. g., by proliferation to state and non-state actors. Quantum technologies can increase threats and can have a negative influence by, e. g., accelerating military decision making and destabilising the military situation, in particular furthering uncontrolled escalation in a crisis. Accelerating military decision making in the context of quantum technology will follow from new and more precise data for ISTAR from quantum sensing and imaging and the command and control process supported by quantum computing, e. g., big data processing (ability to filter, decode, correlate, and identify features in signals and images), enhanced situational awareness, improved wargaming for the decision-making process, and general quantum enhancement of AI. Based on the text above, we found the following indications that quantum technology has become an emerging and potentially disruptive technology:

- An increasing number of national initiatives and strategies;
- Increasing national budgets on quantum research and development;
- Increasing private investments in quantum technology;
- The quantum technology topic is becoming part of strategic treaties (e. g. AUKUS);
- Growing interests from defence contractors;

form of atomic vapour working at room temperature or cold atoms that are more precise but require complex laser cooling. A laser is also required for their control. An NV centre in diamond is a point defect leading to an extra electron whose spin transition is sensitive to microwave fields. NV centres work at room temperature and need laser control as well.

36 EDF-2021-DIS-RDIS-QSENS, https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/edf-2021-dis-rdis-qsens (accessed on 14.09.2022).

- Various studies and reports assume wide use in the defence, security, and intelligence sector.

Considering the discussed quantum technology military applications, questions about possible threats and risks of their use or misuse are emerging. In particular, one can ask, for example:

- What is the risk of a new surprising quantum algorithm that can threaten (cyber) security?
- Could quantum computing be used for chemical or biological warfare?
- Is there some threat from low-cost quantum technologies that could be abused or misused mainly by non-state actors? And how easily could such low-cost quantum technology be accessed and manufactured?
- Could quantum sensors become so advanced that they could be used from space for military purposes? Could they discover strategic submarines deep in the sea?
- Which quantum technologies could realistically be deployed in autonomous vehicles? And what about quantum AI?
- What are the threats and risks when quantum networks are accessible to malevolent actors? What could a hacker do when controlling an endpoint connected to a quantum network?
- How large are threats from crypto analytical capabilities of quantum computers for command and control (C2) and communication?

Many other questions can arise with quantum technology development and the appearance of new applications.

The assessment of quantum technologies is a complex task that needs to consider various technologies as well as applications. It is complicated by low TRL and often speculative capabilities and features. Nevertheless, calls for a closer look into this topic and closer collaborations between quantum experts and peace and international security researchers are here already (Lewis 2021).

Such questions should be studied systematically in interdisciplinary research. Ignoring quantum technologies and their military applications could lead to military surprises from neighbouring or potentially hostile countries.

The assessment should be done in two stages. The first stage should provide a more technical study of possible and feasible capabilities and features of individual quantum technologies, carried out by scientists and experts in quantum technology.

The second stage should focus on particular applications. In case of concerns for international security and peace, such assessments should be carried out in interdisciplinary teams consisting of quantum technology, military, and international security experts. They should foresee what could be risks, impacts, consequences, probabilities, and time frames of quantum technology deployment concerning international security and what states can do with it or against it. They should provide roadmaps and patterns that could indicate that particular scenarios can or will likely happen.

6. Conclusion

Quantum technologies are disruptive technologies. In a commercial, civilian context, they could have beneficial, but also problematic consequences. Military applications of quantum technologies, possible in virtually all areas of warfare, its planning and preparation, could increase combat strength, optimise strategies and tactics, and accelerate decision making and actions, all the more if they are combined with other emerging technologies such as AI. But it is exactly these increases in military capabilities and speed that have the potential for reducing military stability and endangering international security and peace.

Quantum computing could be used to optimise logistics and routes, to simulate war and to improve machine learning. Very problematic would be its use for designing new chemical/biological agents, but the corresponding conventions with near-universal adherence prohibit this. International security will be most affected by the capability of breaking most asymmetric encryption schemes, e. g., by the above-mentioned Shor's algorithm. With a quantum computer of 20 million qubits and much optimisation – maybe possible in 10–15 years, RSA-2048 breaking will be a matter of hours (Gidney/Ekerå 2021), whereas a classical computer would need hundreds of trillions of years.

Fortunately, this algorithm and its consequences have been studied long before it could be used in reality. It is not difficult to imagine the 'mayhem' that would ensue if such an algorithm were discovered ten years later when capable quantum computers would be available.

But *quantum cryptography* and *quantum networks* provide solutions to this problem. One method is post-quantum cryptography, using mathematical tools that are secure against attacks by quantum computers. But even here a principal risk remains. For example, someone could discover a novel quantum algorithm that will exploit a hidden structure in symmetric encryption (Kaplan *et al.* 2016).

It is very difficult to predict and assess such a risk or just say what the chance of such a surprise is. Such algorithms will likely not be as simple as Shor's and will likely have huge quantum computing requirements. On the other hand, adding a new quantum computing feature can lead to the emergence of new promising algorithms, for example, mid-circuit measurement[37] (García-Pérez *et al.* 2021). There is a high risk that a novel code-breaking algorithm will remain a national top secret with other parties unaware, leading to instability.

The other solution is using symmetric encryption that is secure as long as the key remains secret. With quantum key distribution, the key could be transmitted in such a way that any interception attempt would be noticed. Standardisation efforts are underway in both post-quantum cryptography and quantum key distribution. By adapting their encryption methods, armed forces, governments, and enterprises will likely be able to protect secret information also in the age of quantum computers.

Quantum sensing could create much bigger problems for international security. Mobile nuclear second-strike systems such as missile submarines or land-mobile ballistic missiles are vulnerable if their locations are known. With sufficient accuracy, they could even be attacked with conventional weapons. As long as nuclear-weapon states find deterrence the

37 Mid-circuit measurement refers to measuring qubits and reusing them. It can effectively work as an IF-ELSE statement. Most quantum computer designs allow for measuring all qubits only at the end of the algorithm.

essential method to prevent an attack, secure second-strike forces are a main component of military and, in particular, crisis stability. Should quantum sensors – maybe in conjunction with artificial intelligence, possibly quantum-enhanced – in some future provide the capability for (near-)real-time localisation of mobile nuclear-weapon carriers, that stability would be lost. Nervousness would increase, and in a severe crisis the temptation for a pre-emptive strike would rise. In order to prevent such a situation, nuclear-weapon states could choose to increase and diversify their arsenals, that is, produce arms-race instability.

How far unilateral moves by the nuclear powers can avert such a situation is an open question. Probably co-operative solutions would prevent it more reliably. The history of the last six decades shows a rich menu of options, from legally binding arms control, including its preventive version, via politically binding confidence and security measures to informal agreements and unilateral, maybe reciprocated actions. In all such endeavours to contain quantum-technology-related risks, stability should be the prerogative. Since the use of quantum technologies would, in many cases, not show up in externally observable features of weapon systems and other military equipment, difficult conceptual problems will have to be solved. This concerns definitions, design of limitations and methods of verification of compliance. Export controls by unilateral or maybe coordinated decisions by the producer countries would be easier to implement. However, while they could slow down proliferation to other states, they would not limit the capabilities of the exporting countries, and it is here where bigger risks to military stability can arise.

In conclusion, quantum technologies have the potential to disrupt international security and peace. The international community should take risks seriously and search for co-operative solutions to contain the dangers from their problematic military uses.

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Die Friedens-Warte

F-W Vol. 95 | 2022 | Issue 3–4 | P. 290–315
DOI 10.35998/fw-2022-0013

Trustworthy and Explainable: A European Vision of (Weaponised) Artificial Intelligence

Stefka Schmid*

Abstract The European Union (EU) has undertaken policies which address the research and development of artificial intelligence (AI). In light of debates of technology assessment which focus on risks for humans and questions of control of AI, the EU has propagated an ethical, human-centred approach of the application of AI. It is important to identify how the EU envisions AI as this may guide emerging norms in AI governance and today's research and development of (weaponised) AI. Building on works of Human-Computer Interaction (HCI), this work derives the actor's understanding of human-AI interaction, including conceptualisations of explainability, interpretability, and risks. Analysis of EU documents on the implementation of AI as a general-purpose technology and for military application reveals that explainability and risk identification are crucial elements for trust, which itself is a necessary component in the uptake of AI. Interdisciplinary approaches allow for a more detailed understanding of actors' fundamental views on human control of AI, which further contributes to debates on technology assessment in professionalised political contexts.

Keywords EU, trust, artificial intelligence, human-computer interaction, vision assessment

Vertrauenswürdig? Eine europäische Vision von (bewaffneter) Künstlicher Intelligenz

Abstract Die EU zielt auf erfolgreiche Innovationspolitik mit Blick auf die Forschung und Entwicklung Künstlicher Intelligenz (KI) ab. Im Kontext internationaler Debatten über die Forschung und Entwicklung mit Blick auf Auswirkungen für Menschen und die Ausgestaltung menschlicher Kontrolle propagiert die EU einen ethischen, menschzentrierten Ansatz. Eine Betrachtung der sich entwickelnden, normativen Vorstellung von KI ist auch mit Blick auf die Regulierung von (bewaffneter) KI relevant. Aufbauend auf Arbeiten der Mensch-Computer-Interaktion (HCI) stellt dieser Beitrag das Verständnis der EU von Mensch-KI-Interaktion, einschließlich von Erklärbarkeit, Interpretierbarkeit und Risiken, heraus. Die Analyse von EU-Dokumenten zur Implementierung von KI als Allzwecktechnologie sowie für militärische Anwendungen zeigt, dass Erklärbarkeit und Risikoformulierungen

* This work has been funded by the German Federal Ministry for Education and Research (BMBF) in the Regional Research Center "Transformations of Political Violence" (TraCe) (01UG2203E) as well as by BMBF and the Hessian Ministry of Higher Education, Research, Science and the Arts within their joint support of the National Research Center for Applied Cybersecurity ATHENE. I would like to thank Anja-Liisa Gonsior and Helene Pleil for their support in the qualitative analysis and especially my colleague Thea Riebe for insightful conversations on trust which culminated in a publication. My presentation of research on trust among human and artificial agents relies on this prior work (Schmid, Stefka/Riebe, Thea/Reuter, Christian (2022): Dual-Use and Trustworthy? A Mixed Methods Analysis of AI Diffusion between Civilian and Defense R&D. In: Science and Engineering Ethics 28 (12), pp. 1–23). Contact: Stefka Schmid, M.A., Research Assistant at Science and Technology for Peace and Security (PEASEC), Department of Computer Science, TU Darmstadt, Pankratiusstraße 2, 64289 Darmstadt, Germany. Email: schmid@peasec.tu-darmstadt.de.

entscheidende Elemente für Vertrauen sind, welches selbst eine notwendige Komponente für die Einführung von KI darstellt. Interdisziplinäre Ansätze ermöglichen ein detailliertes Verständnis der grundlegenden Ansichten von Akteuren zur menschlichen Kontrolle von KI, und tragen so zu Debatten der Technikfolgenabschätzung in professionalisierten politischen Kontexten bei.

Keywords EU, Vertrauen, Künstliche Intelligenz, Mensch-Computer-Interaktion, Vision Assessment

1. Introduction

Nations states across the globe have been invested in funding the research and development of AI. While the United States and China have been at the forefront in the AI competition, Russia has also focused on winning the AI "arms race" (Pecotic 2019) and the European Union has proposed a more ethically-aligned approach. Besides various economic and scientific actors who are involved in R&D of AI, states have not only been dedicated to funding but also regulating innovation processes. Additionally, they have been active in international fora to cooperate or contest against each other on setting standards (Lorenz 2021). This is also the case considering "weaponised" AI and questions of human control within the Group of Governmental Experts at the UN Convention on Certain Conventional Weapons (Hynek/Solovyeva 2021; Rosert/Sauer 2021).

Debates on technology assessment (TA) have focused on different technologies in the past (for example, nuclear technology) and risks associated with them. More recently, scholars have pointed out that it is necessary to focus on political actors' visions as these set the basis for potential developments. Proponents of "vision assessment" emphasise the importance of horizons that comprise prejudices, promises, values, and assumptions about risks (Grin 2000; Grunwald 2018). In peace and conflict studies, the analysis of such horizons ("*Sinnhorizonte*") have also been found relevant to identify options for future conflict transformation in present constellations (Buckley-Zistel 2008). Thus, vision assessment may not only contribute to domestic debates on consequences of technological developments but also help in relating an actor's position to other actors. Interested in understanding an actor's vision of (weaponised) AI, I investigate both documents in which AI is perceived as a general-purpose technology as well as instances about weapon autonomy, indicating "the most consequential application of artificial intelligence (AI) in a military context" (Sauer 2021). As noted by Fischer and Wenger (2021), the discussion surrounding AI-enabled weapon systems has partly presumed a deterministic understanding towards future developments. Thus, such insights may be crucial for reflection and ongoing cooperation efforts (Bareis/Katzenbach 2021). Vision assessment connects to the idea of open processes of technology development as it regards issues of rationalist technology assessment as well as theoretical debates on the social contingency of technology (Grin 2000; Grunwald 2018). In particular, it is important to capture how research and development (R&D) of AI is pushed both by looking at material developments such as technology diffusion as well as by considering relevant actors' ideas such as the EU and its member states' visions of AI. They make support of AI R&D policies possible, including offering incentives for the distribution of dual-use technology and military applications. Gaining insight into the heuristics of an actor with regard to technological developments allows to derive more concrete values that help to meet stakeholder interests, identify risks for (certain groups of) people and assess states' different positions in the context of international economic competition.

I focus on the EU as it proposes an ethically ambitious AI strategy. The EU member states, albeit lagging behind in the publication of AI patents, mark together a strong supranational actor in deliberations and brand Trustworthy AI as its own approach (Floridi/Cowls 2019; WIPO 2019; Roberts *et al.* 2021). As it envisions "trustworthy AI" (High-Level Expert Group on Artificial Intelligence 2019), I am interested in the EU's understanding of the human-AI relationship of trust, including the role of trust in research and development of AI, "explainability" as an important value to the uptake of AI as well as associated risks. Such an analysis allows to derive points of intervention in the context of human-AI collaboration with respect to human control, which is particularly relevant to the issue of weaponised AI.

Inspired by works of Human-Computer Interaction (HCI), this work takes a useful perspective to capture perceptions on the human-AI relationship. As a design-oriented discipline, HCI is dedicated to the development of technological artefacts based on the systematic analysis of socio-technological interactions (Xu 2019). More recently, it has introduced its focus on human-AI interaction (Inkpen *et al.* 2019). Interested in human-centred, ethical AI (Xu 2019; Robert Jr/Bansal/Lütge 2020), scholars understand related interactions to be embedded in a social context. In this regard, explainability can be identified as important to opening up the "black box" of AI (Xu 2019; Shin 2021). Additionally, as HCI has been noted as a discipline which is engaged with explainable AI (XAI), it matches the European wording on AI and thus allows to interpret trust with respect to explainability, interpretability by (non-expert) users, and collaboration in human-machine teaming (Huelss 2019; Xu 2019; Brown 2020; Warren/Hillas 2020). This is accompanied by macro perspectives considering public trust and responsible R&D of AI, as conceptions of human-AI interaction are reflected and abstracted by collective actors and institutional regulation is necessary when approaching dual-use[1] AI. Thus, this research is guided by the following questions:

- (RQ1) How does the EU envision (weaponised) AI?
- (RQ2) What understanding of trust is implied in the EU strategy with regard to the (i) human-AI relationship, (ii) explainability as a sociotechnological norm and (iii) identification of risks?

I find that (1) the EU, albeit critical of AI as a buzzword, benefits from the openness of the concept and mostly refers to machine learning when elaborating on AI. Further, weaponised AI is seen both as a problematic yet certain game-changer which can be managed. Regarding trust, I identify (2) that the EU follows a hierarchical, human-centric and relational perspective on technological use, which is aware of the relationship's indeterminacy. Explainability, as one of the main values supporting *Trustworthy AI*, functions as a generator of trust and when insufficiently designed, it is compromised or delayed into future negotiations. Additionally, as risks are formulated, their regulation is proposed and reflexively evaluated which is seen as crucial for the creation of public trust. Answering these research questions allows for implications in the context of technology assessment and AI governance, such

1 I follow the traditional understanding of dual-use as an artefact which is used for both military and civilian purposes (Harris 2016), more specifically as part of a weapon system (Forge 2010). Other definitions of dual-use research or technology differentiate between malicious and beneficial use (Brundage *et al.* 2018).

as the EU's potential to reach a shared, but likely imposed, definition of AI due to its open understanding.

In the following, I sketch a literature overview (2), which is succeeded by a presentation of methodology (3) and findings (4). Building on the analysis, I discuss (5) relevant insights, followed by concluding remarks (6).

2. Related Work

2.1. Vision Assessment & Socio-technological Interaction

Traditional technology assessment has primarily concentrated on the identification of risks in societies in which technologies are distributed all across the globe with their "being far-ranging into the future" (Grunwald 2018). Building on formal institutionalisation, technology assessment has offered advice to parliaments (Grunwald 2022) and constituted a research practice which increasingly relies on interdisciplinary efforts to capture the myriad ways in which technology can have both positive and negative consequences to humans and the environment (Lösch *et al.* 2019). This also includes design works, with social and legal perspectives becoming more relevant to "Constructive Technology Assessment" (Fleischer *et al.* 2020).

More recently, TA has started to focus on assessing visions, which hold both ex- and implicit assumptions about the future development of a technology. It has been found important to analyse their constitutive role regarding emerging technologies, such as AI (Schmidt 2022). Thereby, characterisations and definitions of technology also reflect judgments built on prior knowledge (Grunwald 2018). It has further pointed out that human-made design is value-sensitive, and thus that both risks and technology share a "social moment" (Grunwald 2018). Considering "guiding visions" of state actors, scholars emphasise that imaginations of future R&D can lead to more acceptability and trust towards technology which allows for economic advantages (Grin 2000; Lösch *et al.* 2019; Frey/Schaupp 2020). As value-oriented technology development includes the identification of socially relevant characteristics, ambivalent relationships between "safety" and economic prosperity have been noted (VDI 1991; cited in Grunwald 2018). While referred to (Grunwald 2022) but not discussed extensively in TA literature, technology usage in the military context is also characterised by the reflection of different, sometimes ambivalent values. Here, the development of AI-enabled robotic systems is envisaged, and values may differ from the ones relevant to civilian applications. Sharkey (2012) has argued that anthropomorphising language used to describe robots has a greater impact on their regulation "rather than what robots can actually do". Others (Verbruggen 2019; Riebe/Schmid/Reuter 2021) raise the issue of civilian-military knowledge transfers with respect to AI as important to slow down R&D, while Williams (2015) notes that AI developments are likely to spill over from civilian to military industries. In the field of TA, Grunwald (2022) also raises awareness about assessing the dual-use potential of technologies. Importantly, both the assessment of potential consequences, including risks, as well as states' visions of technology reflect *present* thoughts about what is perceived to be likely to happen in the future (Grunwald 2018) as foresight into prospective developments is impossible.

Connecting to these debates of TA and vision assessment, insights of HCI, such as value-sensitive design, may allow to identify foundational understandings on which R&D

processes of AI are built. Although concerning a highly sensitive context, development of military AI applications is shaped – as any technology – by its purpose, context, as well as technical boundaries and potentials, which are also identified in the course of research. Second and third wave HCI theories have stressed the need to consider social contexts as relevant to the form human-computer interaction takes (Dourish 2001; Frauenberger 2019). Further, assuming human-world relations to be mediated by technology, related HCI methodologies are eager to capture the impact of technology on social interactions, more specifically by interaction design[2]. While norms prevail intersubjectively, they are also inscribed in design and come to light in interaction (Verbeek 2015). Thus, HCI scholars focus on identifying design affordances, values in design or notable design requirements which structure human behaviour (Friedman/Hendry/Borning 2017; Abe 2021). Looking at ethical guidelines such as the EU's proposal of *Trustworthy AI*, values or design characteristics are proposed (High-Level Expert Group on Artificial Intelligence 2019). As does TA (Grunwald 2018), this work builds on HCI foundations such as value-sensitive design (Friedmann/Hendry/Bornig 2017). This allows the qualitative analysis of EU policy documents to capture both the heuristics and relevance of explainability as a socio-technological value that is associated with (future) applications of AI.

Based on an examination of the EU's understanding of (weaponised) AI and trust, it is possible to anticipatorily approach innovation dynamics which point out risks to humans (Grunwald 2018). Inspired by new materialist approaches (Lösch *et al.* 2019), technology assessment with a focus on an actor's vision can focus on prevalent values in design and promises that serve the generation of acceptability or trust to the cost of risk reduction.

2.2. Trust in Artificial Intelligence

Numerous scholars have focused on relational approaches of trust among both human and non-human agents (Taddeo 2010; Tavani 2018). A relation can be characterised by trust between trustor and trustee considering affective, rational, and normative dimensions (Ryan 2020). In this regard, Ryan (2020) argues that humans perceive artificial agents primarily as trustworthy, i. e. performing as expected without any supervision (Taddeo 2010), due to rational reasoning instead of assuming that actions are based on goodwill or on normative commitments. As already taken up by Schmid, Riebe and Reuter (2022), such a relationship has been considered as a form of reliance, which implies some form of human control rather than a relationship built on trust (Taddeo/McCutcheon/Floridi 2019). However, as critically noted by Grodzinsky *et al.* (2011), humans may build trust in autonomous agents due to their mimicking of human behaviour. Further, Arkin *et al.* (2012) question whether it is legitimate to produce artificial agents which imitate empathy while Taddeo (2017) notes that people may only remember that they are dealing with artificial agents "when something goes (badly) wrong".

2 Some works focus more specifically on user interface design while others concentrate on computer-supported cooperative work or specific situations of collaboration when conducting the same task (Bullinger-Hoffmann *et al.* 2021; Interaction Design Foundation 2022). While collaboration is at times perceived to imply a harmonious relationship among interacting entities, it does not necessarily assume agentic qualities of technology (Schmidt/Bannon 1992). In contrast, human-machine teaming puts its focus on utilising human-AI partnerships with regard to achieving a shared goal (Warren/Hillas 2020).

Reflecting on relationships of trust, Nissenbaum (2001) refers to Luhmann (1979) and emphasises its societal function of "reducing complexity". She argues that trust is crucial for technology acceptance and that it allows for risky behaviour (Nissenbaum 2001; cited in Schmid/Riebe/Reuter 2022). Trust in AI can be seen as functional[3] as it allows for technology adoption in various fields of application (Nissenbaum 2001). However, the existence of institutional frameworks may enhance relationships of trust in the first place. Public trust can be generated through the establishment of ethical codes, responsible practices, and procedures that ensure ethically aligned governance of technology (Winfield/Jirotka 2018; cited in Schmid/Riebe/Reuter 2022). Further, Warren and Hillas (2020) emphasise the crucial role (and risks) of trust in human-machine teaming in the context of warfare.

In computer science, more specifically the AI community and HCI, trust on an interactional level has also been identified as highly relevant (Ha/Lee/Kim 2018; Liao *et al.* 2019; Li *et al.* 2020). Often, trustworthiness is seen as a requirement, with features such as explainability or transparency being necessary to achieve it (Ha 2018; Schmidt *et al.* 2020). More recently, scholars have pointed out divergent understandings of these quality characteristics and related implications (Coeckelbergh 2020; Rudin 2019; Schmidt 2020). While explainability has been distinguished from interpretability and understandability[4], it has been highly associated with inquiries into opening the AI "black box" (Rudin 2019; Erasmus/Brunet/Fisher 2021).

However, it is crucial to note that this is not entirely possible due to opacity and that computer scientific debates have also assessed both the potentials and limitations of AI (Coeckelbergh 2020; Schmidt 2020; Thieme *et al.* 2020). For example, with regard to autonomous weapon systems, Cummings (2006) stresses the risk of an automation bias comprising the disregard of contradictory information and preference of automated recommendations. Further, Holländer *et al.* (2019) rely on Lee and See (2004) in their characterisation of problematic "overtrust" by which "the operator's trust exceeds the capabilities of the automation" (Holländer/Wintersberger/Butz 2019). Overtrust is perceived as problematic as it may lead to a decrease of control measures, as Ullrich *et al.* (2021), building on insights of trust in human-human interaction, emphasise in their work on human interaction with social robots. Considering such cognitive biases, it appears relevant to implement procedural measures.

Interested in "techno-political" utopias, Frey and Schaupp (2020) show how seemingly managerial and technological problem-solving approaches laid out in governmental presentations about the future are political in their nature. This fits Beck's notion of a "risk society" (1986) in which discourses are characterised by a predominant interest in the concrete application of knowledge and functionalities instead of deliberation among overt normative standpoints (Beck 1986; Steffek/Wegmann 2021). In a "risk society", not only have political actors professionalised by using scientific problem-solving approaches, but also science

3 In contrast, purely ethical advisory boards which are organisationally independent (such as the European Group on Ethics in Science and New Technologies (European Commission 2018)) focus on autonomy, transparency as well as explainability, but not particularly on trust.

4 For example, Erasmus *et al.* (2021) point out the conflation of explainability and interpretability and emphasise that explainability does not necessarily imply that an explanation is "good", i.e. that it can be understood. Instead, interpretability is seen as a separate characteristic of artificial neural networks which allows for understanding. Further, Rudin (2019) criticises the use of "explainable AI" in high-stake decisions and argues that the dichotomisation of "interpretability" vs. "accuracy" is a myth.

has become reflexive, i. e. confronted with its insufficiencies but capable to expand beyond them.[5] Considering "micro politics of design" (Fischer/Wenger 2021) and both its promises and pitfalls, I assume that human-AI interaction carries values which may be normatively laden to varying degrees. I analyse a governmental actor's effort in establishing public trust. Establishing trust by engaging with trained experts and "observing" societal actors relying on their "gut feeling" lays the necessary foundation for integrating AI into the civilian and military domain (Warren/Hillas 2020). As pointed out by Strand (2019), research and innovation initiatives which followed demands to focus on "Ethical, Legal and Social Implications" (ELSI) of technological developments was born out of concern of the *Collingridge Dilemma*[6] and thus tries to identify risks anticipatorily. Therefore, interdisciplinary efforts, relying on the social sciences as they were perceived to be inherently reflexive, were pushed and presumed to produce "better" technologies (Strand 2019). As part of a speculative imaginary (Jasanoff/Kim 2009; Strand 2019) reflexive science, including efforts to include stakeholder perspectives, can be seen as crucial for the generation of public trust and also economic competition (Frey/Schaupp 2020).

3. Methodology: Data Collection & Analysis

For the qualitative study of the EU's vision of AI, nine documents were collected which reflect EU activity with regard to R&D of AI (see Appendix, Table 1). Considering the new "AI wave" and the EU's increased interest in governing related R&D dynamics (WIPO 2019), documents published between 2017 and 2021 which focus on trust in and regulation of AI were included in the sample. Documents mostly comprise elaborations on how to push AI R&D and formulate a European strategy by presenting AI as a general-purpose technology which mainly serves commercial (civilian) purposes. Further, documents are included which refer to AI as dual-use technology. For collection of the documents, the OECD database on governmentally initiated AI projects was searched and, based on literature review and online research, relevant texts were subsequently selected. Initiatives on the country-level, such as by Estonia or France were omitted while the focus was on documents by the Commission as one of the most powerful, executive EU bodies. I further disregarded publications focusing generally on (the economic potential of) so-called emerging technologies or robotics. As the aim was to capture the EU's strategy on AI, I followed prior literature on the topic, which refers to *Trustworthy AI*, for example (Carriço 2018; Franke 2021). Although the Coordinated Plan on AI of 2018 and its Review of 2021 were also identified as relevant to the overall AI strategy (Gill/Bal 2020), they followed the perspective of global economic competition. Thus, I chose the 2020 White Paper with its focus on building trust towards AI instead.

5 Beck (1986) describes a *reflexive modernity*, in which science has become aware of its limitations and that it is responsible for, defines, and offers solutions to risks at the same time. This allows for the expansion into new fields of application. As political actors professionalise, political decision-making increasingly refers to scientific results, offering diverse solutions. Risks are formulated by (reference to) science and solutions, if not available, are suggested to be found based on future scientific developments (Beck 1986).

6 The *Collingridge Dilemma* "describes that in the process of research and development, it is not always easy to see the harmful potential of the outcome. Because early in its life, when still easy to change, the application and consequences of technology are difficult to predict, and later on, they are expensive to adjust" (Riebe/Reuter 2019).

Selected documents which reflect the EU's strategy on AI also indicate an understanding of the latter as a general-purpose-technology. Thus, while the guidelines on *Trustworthy AI* (High-Level Expert Group on Artificial Intelligence 2019), the White Paper (European Commission 2020) or the latest Proposal by the European Commission (European Commission 2021) focus on an overall AI strategy, texts about military applications (European Parliament 2018b; European Defence Agency 2020) or innovation potentials (European Parliament 2018a) pay particular attention to AI as a dual-use technology. All documents can be accessed online. The EU is a supranational organisation to which various institutional entities belong. Thus, documents may also reflect specific perspectives determined by the particular institutional setting. Considered as part of a collection of EU documents, they contribute to gaining insight into identification of a European strategy on AI. Thereby, it is not presumed that ideas about AI are necessarily consistent across EU institutions and that the EU can always be taken as a unified, coherent actor.

For the qualitative content analysis, a coding scheme was developed deductively, relying on literature of science and technology studies and HCI (for further explanation and illustration of coded segments see Appendix, Table 2). Qualitative analysis resulted in 534 codes. Besides manual coding of text documents, automatised labelling (1,030 codings) was conducted in MAXQDA as well, which allowed to gain insight into word occurrences. Consensus coding was conducted in team, with one researcher developing the coding scheme, including definition of codes, categories and sub-codes, and two other researchers labelling the documents based on the scheme. Subsequently to group discussions and reflections on coded instances, their work was checked by the initiating researcher. By coding the documents, it was possible to gain insight into the EU's relevant embodied knowledge and view on AI. Building on the three code categories *AI, Human-AI Interaction*, and *Risk Awareness*, it was possible to answer RQ1 regarding the EU's understanding of AI as well as RQ2 with respect to the relationship of trust, explainability, and anticipation of risks.

4. Findings

4.1. The EU's Vision of AI

Interested in how the EU imagines AI, including "weaponised" versions, this work first focuses on instances in which AI is specified. While the EU often refers to AI in general, it also indicates that the unawareness of the diversity of AI technology is problematic:

> *"Artificial intelligence is the broad and overarching term. It encompasses various algorithms and techniques which exploit the huge power of computers (in their widest sense) to quickly make an immense number of calculations to solve specific goals. This capability can provide useful responses that can be construed as or equivalent to those coming from an intelligent human being. However, that is not a very precise or useful definition" (European Defence Agency 2020).*

The European Defence Agency (EDA) points out that AI and machine learning are often used interchangeably, with "the commingling […] found everywhere, whether in articles for the layman or scientific texts" (European Defence Agency 2020). However, this also proves beneficial as "[i]n any new legal instrument, the definition of AI will need to be sufficiently flexible to accommodate technical progress" (European Commission 2020).

It is further explained that machine learning (ML) encompasses "so-called deep-learning algorithms such as 'Convolutional Neural Networks' or 'Recurrent Neural Networks'" (European Commission 2020). Thereby, the potential of deep learning is emphasised as it has "produced spectacular results and [is] behind the explosion of AI in the last ten years regarding image- and voice-identification" (European Commission 2020). Across EU documents (see Appendix, Figure 1), AI is relatively frequently specified by referring to "machine learning" (European Commission 2019). There is also focus on "recognition systems" and neural networks (European Commission 2019, 2021). Further, the technological purpose, such as "face recognition" (High-Level Expert Group on Artificial Intelligence 2019; European Commission 2020) is already foregrounded, instead of different machine learning techniques associated with AI. Additionally, the EU states computer vision and natural language processing (NLP) as referent objects of AI (European Defence Agency 2020). AI is also perceived as beneficial to mobility (i. e. autonomous driving, transportation systems) and healthcare (European Commission 2019; High-Level Expert Group on Artificial Intelligence 2019).

The EU also envisions AI to be highly relevant for the military. Tasks conducted in interaction with "weaponised AI" are identified as diverse. They range from mapping and surveillance (European Commission 2017), "learning machines with cognitive skills to decide whom, when and where to fight" (European Parliament 2018b) to "missiles capable of selective targeting." Unmanned (aerial) vehicles are seen as important hardware to autonomous weapon systems (European Commission 2017) and robotics is essential to "search and rescue missions, and sensors for intruder detection" (European Commission 2017). Similarly, a robotic underwater lander is seen as highly advantageous as "[t]he system can dive and ascend with a high degree of efficiency, helping to reduce operational costs and increase flexibility." (European Commission 2017) In general, the EDA perceives AI as highly influential to warfare, stating that it

> *"will transform the future battlefield far beyond that [i. e. the incremental increase of operational capacities; AN]. […] We need a new generation of planners who understand the optimisations AI can induce to their systems, and who think differently" (European Defence Agency 2020).*

Not getting too specific on the use of AI in target cycles, the EU emphasises the dual-use nature of AI as advantageous. It stresses the benefit of synergies that are created by funding projects which focus on "integrating 'internet of things' technology with unmanned aerial vehicles": "This is about moving beyond the internet, with sensors in environments like jungles that can connect and linkup with other devices […]" (European Commission 2017). While references to "military" applications occur relatively more frequently in documents focusing on AI as a dual-use technology, "risks" are solely assessed in publications in which AI is reflected as a general-purpose technology (see Appendix, Figure 2).

The organisation further highlights algorithms' reliance on the AI ecosystem as "without data, there is no AI" (European Commission 2020) and its potential integration into hardware (*ibid.*). Continuous learning is stressed as a main characteristic: "In case of machine learning techniques […] algorithms are trained to infer certain patterns based on a set of data in order to determine the actions needed to achieve a given goal. Algorithms may continue to learn when in use" (European Commission 2020). The indeterminacy of AI is regulated by human developers as they ultimately "determine and programme the goals which an AI system should optimise for" (European Commission 2020).

In sum, while there are critical notes on diffuse understandings of AI, the EU itself regards AI broadly as learning systems and, consistent with the nature of political actors, goes less into technological specifics but predominantly points out fields of application. The dual-use nature of AI is highlighted, however, barely framed as a normative issue but instead as offering beneficial synergies. Despite awareness of autonomous weapon systems (AWS), reflected by references to autonomous functions in the targeting cycle (European Parliament 2018b), AI is mostly presented to materialise by unarmed robotic vehicles. Envisioned civilian applications, e.g., in the context of healthcare or face recognition, are imagined as intangible developments, always dependent on data and human decision-making.

4.2. Trust in Human-AI Interaction

Trustworthy AI and a Relationship of Trust

Considering EU documents with regard to interpretations of trust, a hierarchical understanding of the human-AI relationship prevails. Repeatedly, the EU emphasises the importance of human-centrism and that AI, like any other technology, is supposed to serve a purpose to society: "AI is not an end in itself, but a tool that has to serve people with the ultimate aim of increasing human well-being" (European Commission 2019). Thus, it "should be developed in a way that puts people at its centre" and "is thus worthy of the public's trust" (European Commission 2019). This reflects that AI's trustworthiness as an ascribed property is associated with human-centric characteristics and not independent of its design in general. However, while respective statements indicate a hierarchical human-AI relationship, AI is at times anthropomorphised and credited some agency by "support[ing] individuals in making better, more informed choices" and "act[ing] as enablers" (European Commission 2019). Instances referring to human-machine "teaming" (High-Level Expert Group on Artificial Intelligence 2019) or learning activity of AI (European Commission 2020) compare AI systems' functioning with human cognition as they indicate the existence of shared goals in co-working or refer to human-ascribed "intelligence, […] reasoning […] perception, cognition" (European Defence Agency 2020).

Further, as humans are supposed to be given "the confidence to embrace AI-based solutions" (European Commission, 2021), an affective account of trust is notable. In contrast, text documents also criticise mimicking of human behaviour and stress that "natural persons should be notified that they are interacting with an AI system" (High-Level Expert Group on Artificial Intelligence 2019; European Commission 2021). It is also noted that AI may influence human behaviour by harnessing sub-conscious processes which may be difficult to detect (High-Level Expert Group on Artificial Intelligence 2019). Consistent with a reflexive modernity (Beck 1986), the EU transparently evaluates hard-to-manage issues which may not be easy to solve currently (but potentially in the future).

Clarifying that the EC's proposal or a "solid European regulatory framework" does not only generate trust but also allows for economic competitiveness, the instrumental understanding of trust becomes prevalent (European Commission 2021). Thereby, societal trust is put directly in relation to economic profit: "As a result of higher demand due to higher trust, […] the single market for AI will likely flourish" (European Commission 2021). It is further pointed out that regulation of risks is chosen to be relatively strict (Option 3+ with Option 4 posing the biggest interventions to the development process) and that the "preferred option will increase people's trust in AI" (European Commission 2021). Thus, the EU assumes that the creation of guidelines and institutional rules leads to trust in the first place which allows for economic synergies:

> *"Ethical AI is a win-win proposition. […] it also facilitates acceptance by the public and increases the competitive advantage of European AI companies by establishing a brand of human-centric, trustworthy AI […]" (European Commission 2019).*

Therefore, trustworthiness is seen as "a prerequisite" for the uptake of AI (European Commission, 2020), which "will continue to impact society and citizens in ways that we cannot yet imagine" (High-Level Expert Group on Artificial Intelligence 2019). The EU follows an instrumental perspective on trust and therefore understands the human-AI relationship rather as a form of rational trust, with awareness towards both the affective and normative dynamics of trust. While some instances reflect strong confidence into the potentials of AI, the hierarchical relation between humans and technology is stressed. Although accountability is emphasised as an important value of *Trustworthy AI* (High-Level Expert Group on Artificial Intelligence 2019), normative associations of accountability are ultimately directed towards human developers, companies or other legal entities.

Further, it is important to note that while perceived as human-centric and instrumental, human-AI interactions are fundamentally perceived as interrelated. In contrast to purely instrumental understandings (i. e. AI as a purpose-fulfilling tool for humans), there are relationships which are context-embedded. An "ecosystem of trust" is envisioned and it is clarified that

> *"[t]rust in the development, deployment and use of AI systems concerns not only the technology's inherent properties, but also the qualities of the socio-technical systems involving AI applications" (High-Level Expert Group on Artificial Intelligence 2019).*

This non-deterministic view also implies that interrelations are understood to be dynamic and that "redress is possible when things go wrong" which "is key to ensure trust" (High-Level Expert Group on Artificial Intelligence 2019). With regard to fostering a trustworthy ecosystem, the EU also refers to research (High-Level Expert Group on Artificial Intelligence 2019). Although non-linear dynamics of AI development and trust are noted by referring to socio-technological ecosystems and the openness of algorithmic learning, the uptake of AI, requiring public acceptance, is determined to happen. With regard to dual-use endeavours of the EU, there is neither a reference to trust as an issue (see Figure 2) nor a broader discussion of potential regulation of risks. Thus, considering visions of military AI, including the depiction of various beneficial purposes, the affective dimension of trust is enhanced for reduced complexity.

Explainability

Fundamentally, necessitated trustworthiness is achieved by offering good quality as “AI systems – and certainly high-risk AI applications – must be technically robust and accurate in order to be trustworthy” (European Commission 2021). Additionally, trustworthiness is enabled by explainability as “the entity accountable for the decision must be identifiable, and the decision-making process should be explicable” (High-Level Expert Group on Artificial Intelligence 2019). Explainability is identified as crucial for building users’ trust in AI systems and comprises transparency and interpretability. Although open communication and interpretability are referred to specifically, the requirement of explainability already implies comprehensibility (i. e. interpretability) as it should be “explainable to those directly and indirectly affected” (High-Level Expert Group on Artificial Intelligence 2019).

While it does not suggest explainability to be always possible, the EU relativizes the promise of transparency of relevant elements such as data, system and business models (*ibid.*), by pointing out the existence of so-called “black box” algorithms:

> *“An explanation as to why a model has generated a particular output or decision (and what combination of input factors contributed to that) is not always possible. These cases are referred to as ‘black box’ algorithms and require special attention. In those circumstances, other explicability measures (e. g. traceability, auditability and transparent communication on system capabilities) may be required, provided that the system as a whole respects fundamental rights. The degree to which explicability is needed is highly dependent on the context and the severity of the consequences if that output is erroneous or otherwise inaccurate” (High-Level Expert Group on Artificial Intelligence 2019).*

Transparency and thus explainability are flexible requirements, depending on technical possibilities and contextual necessity. As explainability depends on users’ information literacy, technical possibilities, and “severity of the consequences” of wrong output, the EU opts for a “certain degree of transparency” “to address the opacity that may make certain AI systems incomprehensible or too complex” (European Commission 2021).

Further, potential trade-offs between explainability and accuracy are pointed out as it is assumed that increasing a system’s explainability “may reduce its accuracy” (High-Level Expert Group on Artificial Intelligence 2019). Explainability becomes again less attractive. However, research on XAI is introduced and, serving as a point of reference which is worth funding, works on solving the problem of inexplicable systems based on neural networks (High-Level Expert Group on Artificial Intelligence 2019). In this regard, the EU illustrates the problem of small changes in data resulting in “dramatic changes in interpretation” by confusing a school bus with an ostrich (High-Level Expert Group on Artificial Intelligence 2019). Reflecting on such vulnerability, the ethics guideline is critical about romanticizing envisioned and necessitated explainable AI. Still, hope is invoked by pointing out research which is trying to offer a solution while absent discussion on explainability with respect to military AI suggests that it is not as relevant in this area of application.

Risk Assessment

As pointed out by Nissenbaum (2001), trust may allow for "possibly risky modes" of behaviour as there is less regulation perceived to be necessary for public acceptance in an already highly complex context. However, the EU opts for assessing benefits and risks of AI implementation and aims for generation of public trust through regulation. They identify various risks AI may pose to society, such as socio-economic risks (due to change in labour relations), unfair (e. g. racist or sexist) bias discriminating by sociodemographic background, as well as violation of fundamental rights, associated also with privacy and international humanitarian law (European Union 2018; European Commission 2019, 2020; High-Level Expert Group on Artificial Intelligence 2019). While these risks are clearly stated and the EU also proposes the category of "high-risk AI" regarding AI systems across application fields which infringe the "health and safety or fundamental rights of persons" (European Commission 2021), they are seen as manageable:

> *"Diversity in terms of gender, racial or ethnic origin, religion or belief, disability and age should be ensured at every stage of AI development. AI applications should empower citizens and respect their fundamental rights. They should aim to enhance people's abilities, not replace them, and also enable access by people with disabilities" (European Commission 2019).*

Reflecting on risks, it is also noted that risks cannot always be anticipated and cause unintentional harm. In numerous instances, it is advised to adhere to ethical principles and "ensure that […] implementations avoid unintended harm" (European Commission 2019). However, the EU also clarifies not only that violation of fundamental rights by AI may have a "much larger effect" but also that potentially the "outcome could not have been prevented or anticipated at the design phase" but was formulated during operation while learning (European Commission 2020). It is noted that due to characteristics such as "opacity ('black box-effect')" or unpredictability, it is "hard to verify compliance" with existing ethical and legal rules that are "meant to protect fundamental rights" (European Commission 2020).

In the White Paper, the potential loss of human control is considered, pointing out a potential lack of means "to verify how a given decision made with the involvement of AI was taken and, therefore, whether the relevant rules were respected" (European Commission 2020). Thus, while often relativized by quick references to benefits of AI, the EU critically presents the risk of losing control with respect to incomprehensible factors and considers difficulties in singular interactions to lead to a general lack of institutional control.

Still, the EU offers regulation of risks through opacity by introducing transparency requirements. In contrast to others who consider potential long-term concerns associated with "Super-intelligence" or "Artificial Moral Agents", the EU follows "many others [who] believe these to be unrealistic" (High-Level Expert Group on Artificial Intelligence 2019). However, notions on learning and autonomous behaviour as defining characteristics of AI relate to the continuous possibility of change "which may require a new risk assessment" (European Commission 2020).

Thus, the EU is transparent about risks and does not suggest trust or trustworthiness to be independent from qualitative outcomes. While risks are often depicted in relation to benefits (potentially balancing each other out), text documents reveal clarity about boundaries of anticipation. With regard to broad, civilian use of AI, it therefore rather seems like the EU is critically assessing risks and proposing regulatory means in order to generate trust instead of assuming trust to be produced independently. This does not mean that ultimately trust won't fulfil its function to allow for unregulated application of AI, but it shows that AI development is embedded into a European context in which institutional regulation is perceived as advantageous, also with regard to the generation of trust. It also indicates that (at this point in time) complexity is not reduced at all. Political decision-making is marked by ambivalent positions and reflections on scientific results that allow both for the propagation of explainability as well as the formulation of risks. The latter is, along the value of explainability, presented in documents suggesting civilian use of AI (see Figure 2). In contrast, publications on military AI applications neither refer to the relevance of explainability nor to identified risks as established for AI as a general-purpose technology used by civilian users. The unawareness of risks reflected by EU documents on dual- and military use of AI suggests less interest in discussing solutions and opening military AI as an issue of societal discussion but rather points out a dynamic to reduce complexity. As military AI is predominantly framed positively, there is no elaboration on the value of explainability to produce a more trustworthy human-AI relationship.

5. Discussion

5.1. Vision Assessment: Implications for Governing and Assessing Future AI R&D

Interested in the EU's vision of (weaponised) AI (RQ1), this work offers an analysis of text documents with regard to technological specifics of AI. It is revealed that, although pointing out the inadequacy of a broad understanding of AI as being intelligent, the EU itself relies on a rough categorisation of AI systems by referring to machine and deep learning, and more specifically (but rarely) to recognition systems. Based on the assumption that definitions "are not purely describing something" but "are also shaping" (Grunwald 2018) the course of AI R&D, it becomes clear that the EU is rather open (or reserved) about specific developments. This generally allows for a shared international understanding but also for other, more dominant actors to define visions, competition, and technological advancements. The rather diffuse vision of AI is accompanied by data as being fundamental for its functioning and materialisation in robotic vehicles. The latter plays a more significant role with regard to military applications. In this regard, the EU's regulation efforts do not specifically concentrate on weaponised AI but instead highlight civilian fields of application to increase public trust. In general, the development of AI is perceived as dynamic, yet ultimately determined by human decision-making and taken for granted due to identified potentials.

Regarding military AI applications and the dual-use character of the technology, the EU documents emphasise advantages and focus less on risks and the creation of trust through explainability (RQ2). Although a resolution on AWS by the European Parliament (European Parliament 2018b) points out the relevant issues of human control, malfunctioning, and misuse, other documents focusing on AI as a dual-use technology omit raising such critical points. This suggests that risk awareness, while prevalent in international discussions (European Union 2018), is not indicated in more self-referential publications on the use of AI in the military domain. Considering the eagerness to push for and regulate civilian AI, one would expect documents focusing on military AI to reflect a similar direction of generating trust. However, as these papers follow a more economically-oriented narrative, there is no production of public trust through the establishment of regulatory or ethical procedures (Winfield/Jirotka 2018). Emphasis on identified benefits allows to strengthen affective and instrumental views on AI. Ultimately, there is no need for elaborating more detailed procedures of regulation to the civilian audience as they will most likely be neither prospective individual consumers nor producers. While the target audience may differentiate from that of civilian AI, one should also note that EU member states have until recently still been in the process of finding common ground on the military application of AI (FINABEL 2021). As the EDA pushes forward, risks will more likely be evaluated and managed, contributing to technologies' trustworthiness as it matches with the EU's reflexive and ethics-oriented approach. Relating to internationally relevant actors, such as the US or China, the EU can be a relevant "norm entrepreneur" in international negotiations, pushing for a more rational account of trust in AI and weighing in on public opinion as part of its branding.

Further, it is found that the human-AI relationship is understood as a hierarchical, human-centric one which mainly indicates a rational account of trust, i. e. reliance (Taddeo/McCutcheon/Floridi 2019; Ryan 2020). Although civilian-oriented EU documents reflect a favourable image of AI, both normative and affective accounts of trust are not explicitly envisaged, which is reflected by the need for accountability and the risk of misinterpreting decisions as human behaviour (Grodzinsky/Miller/Wolf 2011; Arkin/Ulam/Wagner 2012). Although AI is anthropomorphised in some instances, the EU reflects awareness of perception biases based on mimicking human behaviour (Grodzinsky/Miller/Wolf 2011; Arkin/Ulam/Wagner 2012) and is interested in tackling risks rather than misguided depictions of AI (Sharkey 2012), which would fuel affective trust. Regarding discussions of the military application of AI on the European level, vision assessment can contribute by pointing out the necessity to assess risks which may otherwise be omitted in positive visions of future AI applications and lead to the creation of affective trust.

Looking at explainability, I note the value's function to generate trust in the context of risk assessments of AI. This applies in particular to civilian AI, whereas documents focusing on AI as a military or dual-use technology barely point out risks or potential harm and thus refrain from referring to explainability. Conducting professionalised politics, EU institutions rely on computer scientific findings. Thus, epistemic communities which are involved in R&D of AI and connected transnationally can foster substantial interdisciplinary collaboration, focusing on "implicit layers" (Strand 2019) of assumptions especially with regard to trust and explainability (Erasmus/Brunet/Fisher 2021). While states' visions are important as these guide governing processes, scientists and developers contribute to the design and development of AI and transfer knowledge into political spaces. Initiatives of Constructive TA can benefit from vision assessment in that they conduct forward-looking analyses while acknowledging that visions reflect present reasoning and power constellations (Lösch *et al.* 2019). Situating AI Governance and TA as reflexive allows to take a step back and look for (in)determinacies of developments, including scientific processes and prevalent interests among stakeholders (Beck 1986; Fischer/Wenger 2021). This also applies to the EU's effort to focus more on the military context of application of AI in the future, which may also entail elaborations of risks and explainable AI to propose trustworthy AI.

Through vision assessment, promises of benefits outweighing (controllable) risks can be relativized which allows, also regarding potential military applications, for more nuanced debates on international security and stability and reduction of "overtrust" (Holländer/Wintersberger/Butz 2019). TA, which has been conducted within national frames of action and holds the ambition to democratise deliberations on technology use (Grunwald 2022), can function as a guiding approach for carrying discussions about the military use of AI into domestic civil societies. While military matters should not depend on superficial, potentially short-sighted standpoints of the public debate, it is important to raise attention and foster civil societal exchange in times of reconfiguration of the European role in international security. This entails critical perspectives which reflect an understanding of race dynamics as well as differentiated insight into the military application of AI, which may comprise more established techniques of data management (e. g., in logistics or maintenance) or identification and selection of targets in combat with a greater impact on people's lives. Vision assessment departs from harmonious depictions of stakeholder collaboration but assesses the conflictual nature of relationships, represented by different values, with the utilitarian objective to find an optimal consensus (Frey/Schaupp 2020; Grunwald 2022; Schmidt 2022).

5.2. Limitations and Outlook

This article argues for taking caution in assessing AI as explainable and trustworthy per se and takes the task to illustrate the EU's underlying vision of transformative innovation as well as risks associated with it. Relying on qualitative coding for the case study, results are non-representative but propose an approach for interpretation. As I concentrate entirely on EU statements, the analysis does not consider non-verbalised practices outside the official political arena. Future works may embed discursive activities into broader material context to identify essential developments and gain a more holistic picture. Additionally, as this work does not systematically consider the specific institutional backgrounds of the European Commission, Parliament, or Defence Agency, prospective analyses may differentiate between perspectives of single institutional bodies to avoid over-simplification. Approaching the vision of AI by the EU perceived as a more coherent entity, I focus on documents by the supranational Commission or reflections of a European standpoint in the context of the Group of Governmental Experts at the UN Convention on Certain Conventional Weapons instead of documents by the European Council which is more strongly characterised by intergovernmental decision-making. My work proposes to focus on explainability as a value, illustrating its importance for the creation of trust which is in turn crucial for fostering AI R&D. However, other norms identified as crucial, e. g., predictability, are disregarded here. Prospectively, it can be useful to gain more insight into their interrelations and the degrees to which they depend on technical or human dispositions. This may be especially fruitful as computer scientific works on AI, information systems and HCI are dedicated to the formulation and assessment design features such as transparency or accuracy. Interested in the production of relationships of trust on a macro level, studies on human-AI interaction and perception in military contexts can complement findings.

6. Conclusion

With respect to AI, an "arms race" (Pecotic 2019) has been declared. At the same time, AI governance and cooperation on international regulation of AWS is characterised by diverging interests and R&D developments. Focusing on the European Union, this work presents an analysis of relevant documents which reflect an EU strategy on AI. Assuming AI to be broadly applicable, the EU perceives human trust as essential in this regard. While trust is heavily framed by a rational account and thus poses more a form of reliance, EU documents also reflect determined enthusiasm with respect to the uptake of (trustworthy) AI. This is both relativized and enabled by introducing limitations of explainable AI and risks, allowing for the generation of trust as problems are tackled. However, focusing on the vision of military AI, explainability has not yet been introduced as a trust-enhancing value and documents on AI as a dual-use technology reflect absent risk awareness. Considering the assessment of the EU's vision, this work points out the actor's potential to contribute to international cooperation with a more ethical approach of AI while the creation of trust in military AI can be assumed to follow from presenting regulatory efforts by EU bodies and explainability as key to human-AI interaction.

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Appendix

Institution	Title	Year	Focus
European Commission	Dual Use Technology in the EU helping SMEs bring Innovation to Market	2017	civilian & military
European Union	EU Statement Group of Governmental Experts Lethal Autonomous Weapons Systems Convention on Certain Conventional Weapons Geneva, 27–31 August 2018	2018	military
European Parliament	Resolution on autonomous weapon systems	2018	military
European Parliament	Assessing the innovation capability of EU companies in developing dual use technologies	2018	civilian & military
High-Level Expert Group on Artificial Intelligence	Ethics Guidelines for Trustworthy AI	2019	civilian
European Commission	Building Trust in Human-Centric Artificial Intelligence	2019	civilian
European Commission	White Paper on Artificial Intelligence – A European approach to excellence and trust	2020	civilian
European Defence Agency	Artificial Intelligence: Joint quest for future defence applications	2020	military
European Commission	Proposal for a Regulation of the European Parliament and of the Council – Laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) and amending certain Union legislative acts	2021	civilian

Table 1: Documents which were analysed and can be differentiated by applications areas of AI.

	Code (Category)	Definition	Example
Risk Awareness	Ethical Problems	Awareness regarding fundamental moral and ethical problems which may arise with (future) AI	"For AI systems to be trustworthy, they should hence also be ethical, ensuring alignment with ethical norms." (High-Level Expert Group on Artificial Intelligence 2019)
	Loss of Human Control	Concerns regarding that humans will not be able to control their surroundings, including nature or AI or that AI might gain control such as super-intelligence	"The principle of respect for human autonomy. […] Humans interacting with AI systems must be able to keep full and effective self-determination over themselves […]." (High-Level Expert Group on Artificial Intelligence 2019)
	Socio-economic Problems	Human awareness regarding problems which may arise from certain aspects in society or the economy, such as potential job loss or environmental destruction	"The use of AI systems should be given careful consideration particularly in situations relating to the democratic process, including opinion-formation, political decision-making or electoral contexts. Moreover, AI's social impact should be considered. While AI systems can be used to enhance social skills, they can equally contribute to their deterioration." (European Commission 2019)
	Humanitarian Concerns	Awareness of humanitarian concerns, often with regard to military applications of AI	"The European Parliament has called for the urgent development of a common, legally binding position addressing ethical and legal questions of human control, oversight, accountability and implementation of international human rights law, international humanitarian law and military strategies." (High-Level Expert Group on Artificial Intelligence 2019)
Human-AI Interaction	Embedded in Inst./Legal Environment	Awareness of states that human-AI interactions are not proceeded in an isolated matter but rather in an embedded relationship governed by (legal) institutions	"[…] in the context of the upcoming defence research programme, the defence industrial development programme and other relevant features of the post-2020 European Defence Fund." (European Parliament 2018b)
	Trust	Instances reflecting trust in the potentials of AI	"Trustworthy AI has three components […]" (High-Level Expert Group on Artificial Intelligence 2019)
	Transparency	One way to enhance the public's trust in AI is to make the development of AI as transparent as possible, by providing the public with necessary information	"[…] This means that processes need to be transparent, the capabilities and purpose of AI systems openly communicated […]." (High-Level Expert Group on Artificial Intelligence 2019)

	Code (Category)	Definition	Example
Human-AI Interaction	Explainability, Interpretability	Any phrase which talks about interpretability, explainability, explicability, understandability, comprehensibility (often used interchangeably).	"Explicability is crucial for building and maintaining users' trust in AI systems. […] and decisions – to the extent possible –explainable to those directly and indirectly affected." (High-Level Expert Group on Artificial Intelligence 2019)
	Motivation	The intention of states when trying to enhance trust	"The White Paper sets out policy options on how to achieve the twin objective of promoting the uptake of AI and of addressing the risks associated with certain uses of such technology" (European Commission 2021)
	Tech Acceptance	Institutions with authority might be motivated to enhance socie-ty's acceptance of new technol-ogies	"Without AI systems – and the human beings be-hind them – being demonstrably worthy of trust, unwanted consequences may ensue and their up-take might be hindered" (High-Level Expert Group on Artificial Intelligence 2019)
	Reduction of Complexity	Trust allows the reduction of factors humans have to think about; instead of rules, trust allows for spaces of free (and sometimes risky) practices	"Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition" (European Commission 2020)
	Ontological Symmetry	Instances in which there is no hierarchal relationship between humans and AI but rather a relation of parts of a group, each fulfilling different functions	"Many AI definitions refer to human intelligence (itself not a well-defined term), reasoning (not clearly described either), concepts such as perception, cogni-tion, intelligence or vague allusions to applications such as 'computer vision', 'natural language understanding' or 'problem solving'." (European Defence Agency 2020)
	Anthropomorphization	Trust can be influenced by in-stances in which AI is ascribed typical human characteristics, such as feelings.	"This can also happen when the AI system 'learns' while in operation." (European Commission 2020)
	Human-Centrism	Trust can also be enhanced by emphasising human interests in AI and that the technology follows a human-centric approach	"We firmly believe that humans must make the decisions with regard to the use of lethal force, exert control over lethal weapons systems they use, and remain accountable for decisions over life and death. Appropriate human control is essential" (European Parliament 2018b)

	Code (Category)	Definition	Example
	AI as an instrument	Emphasises the perceptions of AI as a means to meet a certain goal and as a tool for a special purpose	“AI systems […] should support humans in the working environment, and aim for the creation of meaningful work.” (High-Level Expert Group on Artificial Intelligence 2019)
AI		Any phrase which relates to AI as a technology and gives further insight (contains diverse auto-codes such as deep learning, computer vision)	“AI is the capability provided by algorithms of selecting, optimal or sub-optimal choices from a wide possibility space, in order to achieve specific goals by applying different strategies including adaptivity to the surrounding dynamical conditions and learning from own experience, externally supplied or self-generated data.” (European Defence Agency 2020)

Table 2: Coding Scheme including code memos and examples of manually labeled instances (N_{total}=534) in documents.

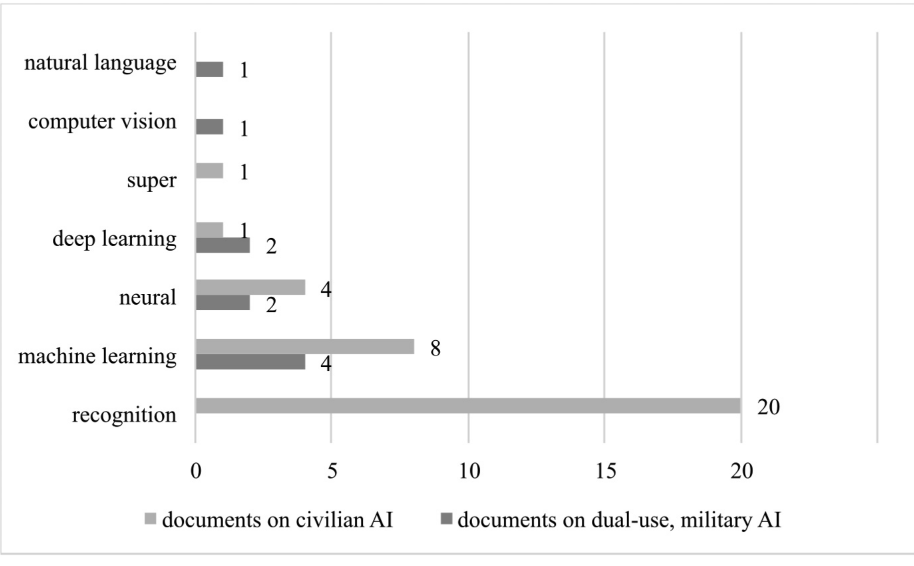

Figure 1: Auto-codes regarding AI technology in EU documents. In total, 1,030 segments were automatically labeled in MAXQDA, with only 44 capturing more specific descriptions of AI (e.g., $N_{recognition}$= 20).

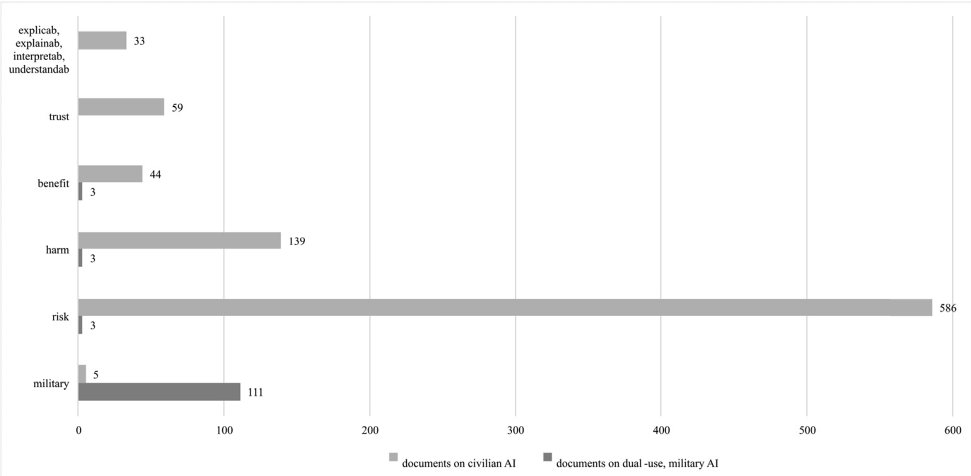

Figure 2: Auto-codes referring to relationships of trust and normative assessments such as benefit or harm. In total, 1030 segments were automatically labeled in MAXQDA, with 986 dealing with such normative indicators. Risk assessment is predominantly reflected by documents dealing with civilian AI while instances of explainability are also indicated in there.

Die Friedens-Warte

F-W Vol. 95 | 2022 | Issue 3–4 | P. 316–339
DOI 10.35998/fw-2022-0014

Small Armed Aircraft and Missiles – Dangers for International Security

Jürgen Altmann | Mathias Pilch | Dieter Suter*

Abstract Armed forces show interest in small and very small aircraft and missiles; research, development, and deployment are increasing since about a decade and will likely accelerate further. We have collected information on small (size ≤ 2 m) and very small (≤ 0.2 m) uninhabited air vehicles (UAVs). Our UAV database contains 152 types from 30 countries, 24 types are armed. Much less military effort has gone into small and very small missiles (diameter < 69 mm and ≤ 40 mm, respectively). Some types have existed since decades, new ones could be used, e. g., as weapons of small UAVs. Our missile database has 50 types from 17 countries. Basic properties of UAVs and missiles, major results from the databases, and a short assessment of technological trends are given. Both kinds of armed systems are considered under criteria of preventive arms control. Options for preventive limitations, for confidence building, and for export control are discussed and recommended.

Keywords UAV, drone, missile, military technology assessment, preventive arms control, stability, proliferation

Kleine bewaffnete Flugzeuge und Flugkörper – Gefahren für die internationale Sicherheit

Abstract Streitkräfte zeigen Interesse an kleinen und sehr kleinen Flugzeugen und Flugkörpern; Forschung, Entwicklung und Stationierung wachsen seit etwa einem Jahrzehnt und werden sich wahrscheinlich weiter beschleunigen. Wir haben Informationen über kleine (Größe ≤ 2 m) und sehr kleine (≤ 0,2 m) unbemannte Luftfahrzeuge (uninhabited air vehicles, UAVs) gesammelt. Unsere UAV-Datenbank enthält 152 Typen aus 30 Ländern, 24 sind bewaffnet. Viel weniger militärischer Aufwand ist in kleine und sehr kleine Flugkörper (Durchmesser < 69 mm bzw. ≤ 40 mm) gegangen. Einige Typen gibt es seit Jahrzehnten, neue könnten z. B. als Waffen auf kleinen UAVs dienen. Unsere Flugkörper-Datenbank hat 50 Typen aus 17 Ländern. Grundeigenschaften von UAVs und Flugkörpern, wichtige Ergebnisse aus den Datenbanken und eine kurze Abschätzung technologischer Trends werden gegeben. Beide Arten bewaffneter Systeme werden unter Kriterien der präventiven Rüstungskontrolle betrachtet. Möglichkeiten für präventive Beschränkungen, für Vertrauensbildung und Exportkontrolle werden diskutiert und empfohlen.

Keywords Drohne, Flugkörper, Militär-Technikfolgenabschätzung, präventive Rüstungskontrolle, Stabilität, Weiterverbreitung

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1. Introduction

Armed uninhabited air vehicles (UAVs, often called drones) are increasingly being used by armed forces. These UAVs have wingspans of many metres. In parallel, military research and development have taken up work for smaller UAVs. Also, smaller missiles are beginning to appear, e. g., for arming small UAVs. In order to investigate whether these developments can endanger military stability and international security, we have collected information on such systems.[1] Civilian, academic research and development for small UAVs are covered, too, since they indicate potential future military developments.

There are some data collections on (armed) UAVs already, most of which are not small. Gettinger and Michel (2017) compiled loitering munitions, Gettinger (2019, update 2020) lists military UAV infrastructures and technical specifications of over 170 UAVs of all sizes, and Gettinger (2021) presents armed UAVs. Countries with armed UAVs are given in Bergen, Salyk-Virk, and Sterman (2020). A systematic catalogue of UAVs is offered by Streetly and Bernadi (2018). Reviews of small UAVs, including research of biomimetic and other micro air vehicles, were given by Cai, Dias, and Seneviratne (2014), and Ward *et al.* (2015, 2017). Catalogues and collections of missile data – without a focus on small missiles – are Dhingra (2019), Udoshi (2019), Widlund, Nais, and Hawkes (2019), CSIS (2021), and CISR (2004a, 2004b). Different from small UAVs, there seems to be little academic research on small missiles.

Systematic presentations of militarily relevant small UAVs and small missiles do not exist. In order to fill these gaps, we have investigated the extent of their deployment, research, and development. The results are presented in two reports (Pilch/Altmann/Suter 2021a; Altmann/Suter 2022a) and in two databases (Pilch/Altmann/Suter 2021b; Altmann/Suter 2022b). In UAVs we focus on military types and work for the military, leaving aside commercial UAVs. Included are unarmed UAVs designed, e. g., for intelligence, surveillance, and reconnaissance purposes. Systems under research are generally unarmed but could be equipped with weapons later. Missiles are nearly exclusively used by or developed for the military and are armed throughout.

Here, we give an overview of the project approach and the results so far. Section 2 covers the UAVs, Section 3 treats the missiles, both with example types and overviews of the databases. In Section 4, the relationship between destructive size and accuracy is treated and Section 5 gives a general, short outlook on the technological trends. Section 6 assesses small UAVs and missiles under the criteria of preventive arms control and discusses options for limitation. Conclusions are given in Section 7.

2. Small and Very Small UAVs

2.1. Definitions

According to the International Civil Aviation Organization (ICAO) an aircraft is "[a]ny machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface" (ICAO 2010, p. I-1). Consequently, cruise

1 The project was funded from 2019 to 2021 by the German Foundation for Peace Research (DSF). We thank the Foundation for its support.

missiles count as aircraft, as do missiles with rocket propulsion as long as they use aerodynamic lift (however, we treat missiles separately). Similarly, an uninhabited aircraft (the ICAO uses the term "unmanned") is an "aircraft intended to be flown without a pilot on board" (ICAO 2020). In order to exclude larger UAVs, we set size limits, where size is length, wingspan, or rotor diameter (for multicopters over all rotors), whichever is biggest. Aircraft with a size of 0.2 m to 2 m we count as 'small', and below 0.2 m as 'very small'.[2] These limits are somewhat arbitrary, and properties do not change abruptly as they are crossed.

2.2. Aircraft Configurations

Small and very small aircraft come in three basic configurations:

Fixed wings:[3] Often with vertical and horizontal stabiliser at the tail, some are flying wings. They are steered by control flaps. Propulsion is by (often pusher) propeller, one type uses a turbojet. Most (88 % of our database) use electric motors, powered by batteries. In order to stay airborne, they need a certain minimum speed and cannot hover. Typical (cruise) speeds are in the range 30–110 km/h, the turbojet type flies at 341 km/h. The endurance is tens of minutes, but 2–3 hours occur. Most types have ranges up to 20 km, three exceptions achieve 100–120 km, the turbojet type 400 km.

Rotary wings: Here, one or more main rotors generate lift. A forward thrust is created by a slight forward tilt, either by varying the pitch of the rotor blades during rotation or, in multi-rotor arrangements, by different rotation rates. Rotary-wing aircraft can take off and land vertically and hover. Cruise speeds are between 20 and 60 km/h. The endurance is 7 to 75 minutes except for three types with 1.5, 2, and 3.5 hours, respectively. Ranges are up to 15 km, with two exceptions with 50–56 km and one with 200 km.

Flapping wings: Here, the flapping motion provides lift and thrust, in tailless variants also movement control. Often, they mimic bird or insect flight. Wingspans are up to 0.28 m and masses up to 13 g (one exception has 0.6 m and 0.22 kg). Power comes from an electric battery. The speed is several km/h, the endurance is minutes, the range below 1 km. Nearly all types are at the research stage.

There are a few special configurations, among them using four fixed wings, tilt-rotor wings, ducted fans, or tethered rotary wings (for close surveillance or, in extremely small experimental systems, for supply of electrical power).

Producer, type	**Configuration**	**Wingspan or rotor diameter/m**	**Length/m**	**Take-off mass/kg**	**Payload/kg**	**Speed/km/h**	**Endurance/minutes**	**Range/km**
Raytheon *Coyote*	FW	1.47	0.79	6.4	1.4	111/157	90	37
AeroVironment *Switchblade*	FW	0.61	0.36	2.5		101/161	>15	10–45

2 For overviews of more general UAV classifications see Hassanalian and Abdelkefi (2017) and Dalamagkidis (2015).
3 Variable wings as in normal-size supersonic aircraft do not (yet) occur.

Producer, type	Config-uration	Wingspan or rotor diame-ter/m	Length/m	Take-off mass/kg	Payload/ kg	Speed/ km/h	Endur-ance/ min-utes	Range/ km
FLIR *Black Hornet*	RW	0.123	0.168	0.033		22	25	2
IAI *ROTEM*	RW	c. 0.8	c. 0.6	5.8	1.2	102–157 /370	30	10
Harvard Univ. *RoboBee*	FlpW	0.03		0.000,08	-		-	-

Table 1: UAV Examples
FW: Fixed Wing, RW: Rotary Wing, FlpW: Flapping Wing.

2.3. A Few Examples (Table 1)

The Raytheon *Coyote* from the USA is a fixed-wing aircraft (e.g., Streetly/Bernadi 2018, pp. 340–341). Four tandem wings unfold after launch from a tube. It is guided by a ground control station. A civil version is used for hurricane research; for military purposes a warhead of up to 0.9 kg can be carried.

Generally similar, but markedly smaller, is the AeroVironment *Switchblade*, also from the USA (e.g., Streetly/Bernadi 2018, pp. 252–253). Supported by navigation systems, it is guided into the target under remote control by a soldier where the warhead of unknown mass explodes.

The FLIR *Black Hornet* (from the USA, in use in many countries) is a very small, unarmed helicopter, to be used, e.g., by a dismounted soldier (FLIR Systems 2019). Control is from a hand-held base station with the help of several navigation systems. Video and still images from cameras for visible and infrared light are relayed back by digital link.

The quadrotor IAI *ROTEM* from Israel (IAI no date) carries cameras for visible and infra-red light and sensors for communication intelligence. Used for intelligence, surveillance, and reconnaissance (ISR) it is recoverable, with a warhead of 1.2 kg it acts as a loitering munition. It is equipped with various navigation systems and guided by a control touchpad. The targeting accuracy is below 1 m.

The Harvard University *RoboBee* from the USA is an extremely small flapping-wing UAV that mimics insect flight (Ma *et al.* 2013). Power is provided by a wire tether. It is an object of research without short-term military utility but goes back to military programmes.

2.4. UAV Database

The UAV database[4] contains 152 types with their properties.[5] Table 2 gives a general over-view. Most types use either the fixed-wing or the rotary-wing configuration.

4 Pilch/Altmann/Suter 2021c, published 27 May 2021. The first version of 5 February 2021 (Pilch/Altmann/Suter 2021a) had 129 types, it was also published in the appendix of (Pilch/Altmann/Suter 2021c). This report should be consulted for more information.

5 See, for example, Streetly/Bernadi 2018; van Blyenburgh 2018; Gettinger 2019, 2020. Due to the sources available, some of the database information may be outdated. The statistics have gaps where sources give incomplete information.

UAVs total	152
Manufacturers	89
Countries of origin	30
Fixed-wing UAVs [a]	75
Rotary-wing UAVs [b]	63
Flapping wing UAVs [c]	14
Small UAVs [d]	117
Very small UAVs [d]	11
Armed UAVs	24
Armed-UAV manufacturers	15
Armed-UAV countries of origin	10

a includes 7 flying wing + 2 tiltrotor
b includes 4 (optionally) tethered
c includes 1 tethered
d 24 types without size, but clearly ≤ 2 m

Table 2: General database properties.

USA	33	Germany	3
Israel	16	Australia	3
Ukraine	9	Norway	3
China	8	SouthKorea	3
France	7	Malaysia	2
Italy	7	UK	2
Turkey	6	Denmark	2
Poland	6	Singapore	2
India	6	Czechia	2
Netherlands	5	Belarus	1
Estonia	5	Spain	1
Pakistan	5	Indonesia	1
Russia	4	Slovenia	1
Portugal	4	Bulgaria	1
Taiwan	3	Sweden	1

Table 3: Number of small and very small UAV types per country of origin. The total number of countries is 30.

The 152 UAV types are produced in 30 countries, Table 3 gives the respective numbers. Our database contains exports from seven countries to in total 38 countries, as shown in Table 4.

Origin	Exports to
Germany	South Africa, USA
Israel	Peru
Italy	Brazil
Norway	Australia, France, Germany, India, Netherlands, New Zealand, Poland, Spain, Turkey, USA, United Kingdom
Poland	Peru, Ukraine
Turkey	Qatar
USA	Australia, Belgium, Bulgaria, Burundi, Canada, Colombia, Czechia, Estonia, Hungary, Iraq, Kenya, Lebanon, Lithuania, Luxembourg, Netherlands, Norway, Philippines, Poland, Portugal, Romania, Spain, Sweden, Thailand, Uganda, Ukraine, United Kingdom, Uzbekistan

Table 4: List of countries exporting small and very small UAVs. The total number of recipient countries is 38. Because the list is based on our database, it probably is incomplete.

Of the fixed-wing UAVs nearly all have take-off masses (maximum take-off weight, MTOW) between 0.2 and 15 kg and endurances between 10 and 150 minutes; most have ranges between 3 and 40 km. An exception is the Alcore Futura (France, 2 m wingspan, turbojet) with 70 kg mass, 70 minutes endurance and 400 km range.

The rotary-wing UAVs have take-off masses (MTOW) between 0.2 and 30 kg, endurances between 7 and 180 minutes, and ranges between 0.5 and 56 km. One outlier, the Matrix UAV Comandor (from Ukraine, with 1.5 m rotor diameter, 12 rotors, main rotors driven by a piston engine), has 110 kg mass, 210 minutes endurance, and 200 km range.

Flapping-wing UAVs have take-off masses between 0.000,26 and 0.22 kg and endurances between 0.7 and 10 minutes. Ranges were found only for two of 13 types: 0.05 km and above 1 km.

Israel	7
Turkey	3
Poland	3
Russia	2
USA	2
Australia	2
Ukraine	2
Netherlands	1
France	1
China	1

Table 5: Number of armed small and very small UAV types per country of origin. The total number is 24 from 16 different manufacturers and 10 countries.

2000	1
2007	1
2010	1
2015	4
2016	4
2017	5
2018	3
2019	5

Table 6: Number of armed small and very small UAV types introduced per year, the total is 24. Note the time gaps before 2015.

2.5. Armed UAVs

Most small and very small UAV types carry sensors for ISR (except for ones still at the research stage). 24 of the 152 types are armed, produced in ten countries (Table 5). Except for one tiltrotor, the armed systems use either fixed or rotary wings; none of the flapping-wing UAVs have been armed. The numbers introduced per year (Table 6) show that the first system appeared in 2000, but a general trend towards small armed systems started in 2015.

Most of the armed types (19) have integrated warheads (high explosive or fragments, one is listed with an anti-tank charge), self-destructing on attack. As "loitering munition" they are capable of many minutes or even tens of minutes of flight for searching targets, then flying into them. Three types can optionally carry missiles, grenades, bombs, or a shotgun and can be re-used. Very few types can use non-lethal payloads: smoke grenades, tear gas, and a net against UAVs.

For the ten types with integrated warheads for which total mass (MTOW) and warhead mass were given, Table 7 shows these values and the relative share of the warhead mass. This varies between 11 % and 31 %, the average is 19 %.

Name	**Configuration**	**Wingspan or rotor diameter / m**	**Warhead mass / kg**	**MTOW / kg**	**Ratio Warhead mass / MTOW**
Hero-20	Rotary wing		0.2	1.8	0.11
Spike Firefly	Fixed wing		<0.35	3	<0.12
Hero-30	Fixed wing		0.5	3	0.17
Coyote	Fixed wing	1.47	<0.9	6.4	<0.14
Hero-70	Rotary wing		1.2	7	0.17
ROTEM	Fixed wing	c. 0.8	1.2	5.8	0.21
Warmate	Fixed wing	1.4	<1.4	5.3	<0.26
Warmate TL	Rotary wing	1.7	1.4	4.5	0.31
Warmate V	Fixed wing		1.6	7	0.23
Green Dragon	Fixed wing	1.7	2.5	15	0.17

* Where only a limit was given, this value was used.

Table 7: List of UAV types with integrated warheads for which the warhead mass and maximum take-off weight (MTOW, actually a mass) were stated by the manufacturer (10 out of 20 armed with a warhead). The types without size information are clearly above 0.2 m, that is in the "small" class. *

All 24 armed UAVs are in the 'small' class (size between 0.2 and 2 m); no 'very small' type (< 0.2 m) has been armed yet. The heaviest in the 'very small' class is the flying wing Black Widow with 0.15 m wingspan and 0.8 kg mass. With 11 to 31 % of the total mass as in Table 7, an armed UAV of 1 kg could carry a warhead of 0.1 to 0.3 kg, in the range of anti-personnel mines; the upper value is in the range of the most lightweight small armed UAVs of Table 7. Thus, very small UAVs near 0.2 m size could attack personnel and light vehicles, but not penetrate heavy armour.

Much smaller UAVs could still kill humans: a skull simulant was penetrated with a shaped charge of 3 grams of explosive, proving that the attacks in the fictitious video 'Slaughterbots' (Russell 2017) would be feasible (Drapela 2018). An unspecified attack by a UAV of centimetres size in (near) contact with the neck of a human sniper had already been shown in an animated video (US AFRL 2009). Of course, chemical, or biological agents – prohibited by the respective conventions – could kill with a mass much below 1 g, so that even millimetre-size UAVs – fully artificial or bio-technical hybrids – could have lethal or incapacitating effects on persons if the agent is injected or inhaled (Altmann 2006, pp. 4.2.16, 4.2.17, 2017).

Concerning autonomy, in 50 of 152 types autonomous flight and guidance are mentioned as one option, for 14 also automatic take-off and landing. The methods used for targeting are given in 18 cases; in at least 15 of these target tracking or recognition are mentioned, several with "autonomous" or "automatic" (Table 8). Not all of these types are armed, but they provide basic sensor and processing capabilities as they would be required for autonomous attack; armed successor types could act as autonomous weapon systems. "Autonomous targeting" is mentioned explicitly for the armed quadrotor Kargu. Acting as a loitering munition, Turkish Kargu-2 were used in 2020 in the Libyan civil war to autonomously attack logistics convoys and retreating forces (UN Panel of Experts 2021, p. 17; see also Kallenborn 2021). The Russian KUB-UAV (1.2 m wingspan, not yet in the database) can attack using image recognition; it may have been used in this mode in the war against Ukraine in 2022 (Kallenborn 2022).

Type	Configuration	Mass/ kg	Armed	Targeting
Alpagu	FW	1.9	A	Embedded, real-time object tracking, detection + classification
Alpagu Block II	FW		A	Autonomous, real-time object tracking, detection + classification
Aquilon	FW	4	-	Automatic target acquisition and tracking
Da-Vinci	RW	5.6	-	GPS assisted point-to-target function, target management modes
DACELO	FW	>2	-	Target tracking, object detection + identification, change detection
HawkEye MK II	RW	4	-	Target tracking
Hawker Q800X	RW	8	-	Object tracking
Kargu	RW		A	Autonomous targeting
Patriot R2	RW	5.8	-	Real-time air vehicle location tracking
Sparrow	FlyW	3.3	-	Automatic tracking of moving targets, target aiming + artillery fire correction
Spike Firefly	RW	3	A	Proximity sensors, tracker designed for agile targets

Type	Configuration	Mass/ kg	Armed	Targeting
TOGAN	RW	<7		Enhanced target recognition using machine learning
Warmate R	FW	5.2	.	Automatic target lock
Warmate TL	FW	4.5	A	Automated videotracker even under communication loss
ZALA 421–08M	FW	2.5	-	Active target tracking unit

Table 8: List of UAVs in the database that provide capabilities that could be used for autonomous targeting. FW: Fixed Wing, RW: Rotary Wing, FlyW: Flying Wing.

2.6. Swarms, Countermeasures

Armed UAVs would present much higher combat strength if they were used in swarms, overwhelming targets by simultaneous or staged attacks from many directions. Swarms of small, cheap UAVs could consist of very many elements. With full autonomy they would be more effective (e.g., Scharre 2018). Swarm development, testing, and demonstrations are underway in the USA, in China, and in Russia (e.g., US SCO 2019; Kania 2017, p. 23; Hambling 2020).

The increasing numbers of UAVs, in particular armed ones, create motives for countering them without big, expensive air-defence systems. Many different types have been developed (Michel 2019). Against a swarm a counter-swarm could be used (e.g., Scharre 2015).

3. Small and Very Small Missiles

3.1. Definitions

We use a definition that excludes cruise missiles (actually aircraft): Here, a missile is "A vehicle, in military use usually carrying or acting as a weapon, travelling above the surface of the Earth (through air or outer space), usually at a speed above the speed of sound, usually with a body of circular cross section, usually with wings, fins etc. arranged symmetrically at more than two angles around the body axis, usually propelled by a rocket engine, in most cases with attitude and trajectory control." This definition is somewhat vague in order to include hybrid or modified forms.

As size criterion we use the (largest) body diameter, excluding wings, fins, and control flaps, independent of length. To exclude not only the many existing missiles of diameter 200 mm and above, but also the ones of traditional man-portable air defence systems (MANPADS) most of which have diameters of 69–72 mm, a *small missile* is one with a diameter below 69 mm and above 40 mm. We denote a missile as *very small* if its diameter is equal to or below 40 mm.

Consequently, some old anti-tank missiles are in the "small" class; insofar as they are still in use, they are included in our missile database. Many rocket-propelled grenades are launched from a 40-mm tube launcher, but in most a thicker warhead protrudes from the tube; diameters to 120 mm occur. Such types are excluded. As in the UAV case, these limits are somewhat arbitrary, properties do not change abruptly as they are crossed.

3.2. Properties and Components of Small and Very Small Missiles

Small and very small missiles have ranges of km and do not leave the atmosphere. Early types are unguided, following a parabolic trajectory (modified by air drag) after burnout. Newer types are guided, producing lift by controlling the attitude, that is, the angle of attack between the body axis and the movement direction. The lift force allows to fly horizontally and take turns. It arises on the body and short wings, canards, and fins; the latter can be used to stabilise the attitude and control the trajectory in vertical and horizontal directions. The effect decreases as the missile after burnout loses speed due to air drag.

Due to the ease of storage and handling virtually all military missiles (with rocket propulsion) use solid fuel. Once ignited, a solid-fuel motor burns to the end. Variation of thrust can be achieved by the shape of the fuel surface in the burn chamber.

The payload of small and very small missiles is a few kg at most. Nuclear warheads of mass 100 kg and more would be much too big and heavy. Chemical and biological weapons could be carried in small amounts for attacking one or a few persons but are prohibited. As with bigger tactical missiles, the warheads can use conventional high explosive (HE) for overpressure damage, often augmented by fragments. For penetrating armour and structures, high-explosive anti-tank (HEAT) warheads use a shaped charge where a jet focusses the explosive energy; against heavy armour this needs a mass upward of 1 kg, possible from the upper end of the very-small category. Submunitions or kinetic-energy penetrators are used rarely. Damage radii of metres or below require corresponding target accuracies.

A (guided) missile with solid fuel consists of several components: missile body with control surfaces; launch system (usually with a tube or rail for initial guidance); rocket motor (in some types ignited at some distance to protect the shooter); flight-control system (for following a planned trajectory and approaching the target); navigation, guidance, and targeting system (by an inertial system, satellite or remote control, homing on infrared emission, laser designation or radar – the latter with higher mass and power requirements); warhead with fuse.

In the design of missiles many parameters can be controlled. Basic parameters are the mass and size of the payload, the range over which it is to be carried, and the required speed, together with the altitude profile and the amount of manoeuvring that are expected.

3.3. A Few Examples (Table 9)

Producer/ type	**Diameter/ mm**	**Length/ m**	**Mass/ kg**	**Warhead type, mass/kg**	**Burn time/ s**	**Burnout speed/ m/s**	**Range/ km**
M72 LAW	66	0.508	1.8	HEAT	0.01	145–200	0.20–0.35
NAVAIR *Spike*	57	0.635	2.4	EFP, 0.45	< 1.5	270	3.2
Raytheon *Pike*	40	0.427	0.77	HEFr, 0.27	<< 1	340	2

Table 9: Missile Examples. The speed of sound at low altitude is around 340 m/s.
HEAT: High Explosive Anti-Tank, EFP: Explosively Formed Projectile, HEFr: High Explosive Fragmentation.

The portable anti-tank rocket launcher *M72 LAW* (Light Anti-Tank Weapon), deployed by the US Army since 1963 with improvements, in use by many countries, uses an unguided small missile (e. g., Nammo 2018). The propellant burns out extremely fast while the missile is still in the launch tube. The flight time is 1–2 seconds.

The NAVAIR *Spike* is a new small guided missile, in development since 2004, with much less weight and cost than existing guided missiles (e. g., Defense Update 2010). An explosively formed projectile is to be used against UAVs, helicopters, bunkers, and small armoured vehicles. For guidance and targeting, an inertial system, an electro-optical seeker, semi-active laser tracking, and a radio-frequency data link are provided. The missile could be launched from (small) uninhabited vehicles or shoulder-fired.

The Raytheon *Pike* is a new very small missile, being developed by the US company Raytheon since 2015 (e. g., Raytheon Missiles and Defense 2015/2021). One soldier launches it from a 40-mm grenade launcher while a second soldier laser-designates the target. A one-metre accuracy is obtained, the lethal radius of the fragments is 10 m. Deployment on (uninhabited) vehicles is foreseen, too.

The Pike example shows that very small guided missiles with high precision are possible. It may present a role model for future developments; e. g., the Turkish Yatagan missile, introduced in 2019, has similar properties (Roketsan 2019). With easy portability and low price, such systems would give many actors a missile capability.

3.4. Missile Database

The missile database (Altmann/Suter 2022a)[6] contains 50 types, all armed, with their properties based on public sources, mainly the military press and catalogues such as (Dhingra, 2019; Udoshi, 2019; Widlund/Nais/Hawkes 2019), in some cases manufacturer data sheets or Wikipedia entries.[7] Table 10 gives a general overview, Table 11 the numbers per country.

The number of types introduced per five-year period is shown in Table 12.[8] Higher activities occurred in the 1950 s, 1980–2000 and after 2010. In the distributions of diameters (Table 13) and of masses (Table 14) there are correspondences between clusters: missiles around 40 mm have masses around 2 kg, ones around 55 mm lie around 5 kg. The masses of the cluster around 68 mm, on the other hand, are more or less evenly distributed. Of the 10 'very small' types, only one is below 40 mm, the others are at the margin, 40 mm.

6 Version of 30 December 2021, also contained in Altmann/Suter 2022b. This report should be consulted for more information.

7 Due to the sources available, some information may be outdated. The statistics given have gaps where sources give incomplete information.

8 Here "1980 s" was assigned to 1985 and "1990 s" to 1995.

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Missiles total	50
Manufacturers	26
Countries of origin	17
Small missiles [a]	39
Very small missiles [a]	10
Deployed/on offer	42
In development	4

[a] excl. 1 unknown diameter

Table 10: General database properties.

Bulgaria	13	Croatia	1
France	6	Egypt	1
USA	6	Poland	1
USSR/Russia	6	South Africa	1
China	5	South Korea	1
Georgia	2	Taiwan	1
Italy	2	Turkey	1
Argentina	1	Yugoslavia	1
Brazil	1		

Table 11: Number of small and very small missile types per country of origin. The total number of countries is 17.

Time period/years	**Number of types**
1955 – 1960	6
1960 – 1965	1
1965 – 1970	0
1970 – 1975	1
1975 – 1980	2
1980 – 1985	3
1985 – 1990	3
1990 – 1995	0
1995 – 2000	5
2000 – 2005	1
2005 – 2010	1
2010 – 2015	3
2015 – 2020	6

Table 12: Number of types over years of introduction in 5-year bins. Shown are 32 of 50 types (not for all types a year of introduction was found).

Diameter/mm	**Number of types**
36.5 – 39	1
39 – 41.5	9
41.5 – 44	4
44 – 46.5	0
46.5 – 49	0
49 – 51.5	3
51.5 – 54	0
54 – 56.5	10
56.5 – 59	5
59 – 61.5	2
61.5 – 64	4
64 – 66.5	2
66.5 – 69	9

Table 13: Diameter distribution in 2.5-mm bins. Shown are 49 of 50 types. As shown in Table 10, 10 of 50 types count as “very small” (diameter ≤ 40 mm).

Mass/kg	Number of types
0.25 – 1.25	4
1.25 – 2.25	14
2.25 – 3.25	7
3.25 – 4.25	5
4.25 – 5.25	11
5.25 – 6.25	3
6.25 – 7.25	0
7.25 – 8.25	1
8.25 – 9.25	1

Table 14: Mass distribution in 1-kg bins. Shown are 38 of 50 types (not for all types a mass was found).

Range/km	Number of types
0.2 – 1.2	19
1.2 – 2.2	4
2.2 – 3.2	2
3.2 – 4.2	1
4.2 – 5.2	2
5.2 – 6.2	3
6.2 – 7.2	2
7.2 – 8.2	5

Table 15: Range distribution in 1-km bins. Shown are 38 of 50 types (not for all types a range was found).

In the distribution of ranges (Table 15) the peak at 0.2–1.2 km is caused by the high number of shoulder-fired anti-tank missiles; 15 of these 19 have a range no bigger than 0.4 km.

Name	Diameter/mm	Length/m	Warhead mass/kg	Total mass/kg	Ratio
57–1 / 57–2	40	0.44	1.38	3.99	0.35
Kodori-4	40		1	1.55	0.65
Pike	40	0.43	0.27	0.77	0.35
Kodori-3	43		0.93	1.85	0.50
Firos 6	51	1.05	2.2	4.8	0.46
SNIA 51	51	1.02	2.2	4.8	0.46
RF-7MA / OGi-7M	55	0.91	1.38	1.76	0.78
S-5K	55	0.83	1.59	4.5	0.35
S-5K / S-5K1	55	0.83	1.1	3.64	0.30
S-5KO	55	0.99	1.36	4.43	0.31
S-5KO	55	1.01	1.36	4.5	0.30
S-5M	55	0.88	1.39	3.86	0.36
S-5M / S-5M1 / S-5S	55	0.88	0.82	3.86	0.21
S-5MO	55	1	0.82	4.82	0.17
S-5MO	55	1	2.3	4.82	0.47

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Name	Diameter/mm	Length/m	Warhead mass/kg	Total mass/kg	Ratio
Spike	57	0.64	0.45	2.4	0.19
RILL-7MA	60		2.7	3.2	0.84
RHEF-7LDMA	65		2.71	3.19	0.85
SNEB 68–253	68	0.91	1.8	5	0.36
SNEB AMV / SNEB AML	68	0.94	1.8	6.2	0.29
SNEB HE-IMP	68	0.91	3	6.2	0.48

Table 16: Diameter, length, warhead mass, total mass, and warhead mass ratio, sorted by diameter. Shown are 21 of 50 types. Types with identical names come from different manufacturers and have different specifications (see database).

For the 21 types for which both the total mass at launch and the warhead mass was found, Table 16 shows these values and their ratio, together with the parameters diameter and length. Typically, the warhead mass is one third to one half of the total mass (the average is 43 %). Two exceptions with 84–85 % of the mass are the Bulgarian RILL-7MA with illumination warhead and the Bulgarian RHEF-7LDMA with HE/fragmentation warhead. Both have only 100 m/s speed, reflecting a lower fuel portion.

3.5. Swarms or Salvoes, Countermeasures

The concept of a swarm as discussed with UAVs cannot be transferred easily to missiles. Their limited flight time would restrict the capability to manoeuvre severely, e. g., the re-arrangement of swarm elements or co-ordinated reaction to enemy movements or actions. More applicable is the notion of a salvo; here a multitude of guided missiles would be launched, possibly in temporal sequence, and attack a target from many sides, saturating defences.

Countermeasures against small or very small missiles could be passive or active. Because of the limited damage potential, passive hardening would provide a significant level of protection. As the accuracy will increase, protection of soft spots will become more important. Decoy methods (e. g., flares to confuse infrared seekers) seem useful.

For active defence, microwave or laser pulses could interfere with the sensors or electronics. Small and very small missiles are foreseen to attack bigger missiles, thus they could be used against smaller ones, too, depending on cost considerations.

4. Size, Destructive Effect, and Accuracy

The destructive capability of an armed system depends strongly on the mass of the weapon payload that in turn hinges on the size and total mass of the system.

Generalising from the UAV database, at the upper end of the small-UAV class (2 m size), a total mass around 100 kg is possible with a destructive payload of few tens of kilograms. This could consist of a single warhead or of several missiles. Smaller types can act as loitering munitions, with payloads on the order of kilograms, acting via high explosive or fragments against light vehicles or persons, or through a shaped charge against armour. At the upper end of the very-small class (0.2 m size), the total mass will be below 1 kg with a payload of 0.1 kg or less, allowing action against unprotected individuals or soft spots. Much smaller and lighter UAVs with payloads of grams or even milligrams could only attack persons at very close distance.

While bigger armed UAVs will likely continue to play the dominant role, small and very small UAVs open some new options for offence. Markedly higher effect would arise with swarms of UAVs that would multiply the destructive potential. The smaller UAVs get, the more swarms elements will be possible.

Missiles at the upper end of the small class (diameter below 69 mm) can have a mass of 10 kg, with a warhead of around 5 kg, capable of various kinds of destruction. Smaller types could use high explosive or fragments against light vehicles or persons. Shaped charges against heavy armour need about 1 kg warhead mass with around 2 kg total mass, which is possible at the low end of the small or the upper end of the very-small class (up to 40 mm diameter). As with UAVs, much smaller missiles with warheads of 0.1 kg or less could act against unprotected individuals or soft spots. Even smaller and lighter missiles with payloads of grams or even milligrams could only attack persons at very close distance.

For explosive or fragmenting weapons, greater targeting accuracy allows smaller warheads, so the miniaturisation of armed UAVs and missiles is coupled to the capabilities of sensors and electronics (and their size reduction). Minimal size would be possible with direct hits. Shaped charges have to hit the target directly, anyway, requiring sub-metre accuracy. With centimetres accuracy soft spots on military vehicles or individuals could be attacked, with very little mass. How far miniaturisation can go is unclear. Lower size limits can result from the requirements on communication antennae – less so with autonomy – and on the power for motors or for active sensors.

5. Technological Trends

Our sketch of the possible evolution in the relevant areas over the next 5–20 years necessarily paints a rough picture and remains on a general level, without time frames and references. Going more into detail will require studies for each individual field.

Generally, technologies will show continuous progress, but with strongly differing rates of advance. These rates depend on the maturity of the respective field, on the spending for military research and development, but also on developments in the civilian industry. Several areas apply to both kinds, UAVs as well as missiles. Continuing fast advance is expected in the miniaturisation of electronics and sensors, including cameras, strongly driven by civilian developments in mobile phones. Thus guidance, control, and targeting systems can become lighter and more sophisticated. Targeting precision will be improved steadily; onboard target recognition with sub-metre accuracy will allow smaller warheads, in particular if soft spots can be hit. Due to the weight penalty, active sensors (e. g., radar) will be used rarely and only on the relatively bigger vehicles.

Concerning energy, small UAVs will profit from the steady improvement in batteries and later maybe fuel cells from the drive towards electric automobiles. Solar cells will only improve slowly. Qualitative change could occur if centimetre-size gas-turbine/electric-generator combinations become practicable. For extremely small vehicles energy harvesting (from the ambient medium, e. g., electromagnetic fields or temperature differences) may become relevant. Electrically powered propellers and rotors will continue to dominate. As demands for speed, manoeuvrability or range – e. g., for evading defences or for combat against UAVs – will increase, traditional combustion (including jet) engines – where only some improvement is expected – may be used more, probably rather with relatively bigger vehicles.

On the materials side, steady improvement in metal alloys and fibre-reinforced composites is expected; qualitative change in the latter would ensue with nanotubes as fibres. Additive manufacturing (3-D printing), already demonstrated for some components of UAVs and missiles, likely will bring marked change in the ease of production, will bring down its cost and will also reduce the weight. When mass production of extremely small and cheap UAVs or missiles can arrive is unclear.

More UAV types will be armed. Work for swarms will continue, in particular for the control software. Requirements for human swarm control could follow from international limits on autonomous weapon systems (see Section 6.2).

In small and very small missiles, more light-weight sensors and control systems as well as thinner casings would allow carrying the same payload to longer ranges or to increase the manoeuvring capability. Also, the missile size could be reduced; diameters of 20 mm and below can come into reach. Efforts to produce missiles at lower cost will continue. As these will succeed, more types will be developed, and higher numbers deployed.

6. Preventive-Arms-Control Considerations

Preventive arms control is about limiting or prohibiting new military technologies or systems before they are being acquired or deployed (Altmann 2006, ch. 5, 2008). Such regulation can include the earlier stages of development and testing. Several arms-control treaties contain preventive elements, directly or indirectly. Applying limits early, before armed forces feel dependent on the new technology, should be easier, but the lack of actual experiences complicates political action. Also, armed forces may be interested in new options for combat.

Preventive arms control starts with an analysis of the possible effects the new technology or system would have. If a negative outcome has to be feared, one then investigates options for limitation and for verification of compliance with these.[9]

6.1. Applying the Criteria of Preventive Arms Control[10]

The first group of criteria is about arms control, disarmament, and international law. Here, the first criterion aims at *preventing dangers to existing or intended arms-control and disarmament treaties*. Small and very small armed UAVs can endanger the Treaty on Conventional Forces in Europe (at present out of function with Russia). While the CFE-Treaty definitions of a battle tank and a heavy armament combat vehicle contain weight (mass) limits (at least 16.5 and 6.0 metric tons, respectively), the definitions of combat aircraft and combat heli-

9 For a corresponding discussion of armed uninhabited vehicles in general, see Altmann 2013, 2020.
10 Altmann 2006, ch. 5, 2008, and references.

copters hold independently of their mass so that arbitrarily small armed UAVs are covered.[11] When introduced into Europe, states would oppose counting them against the numerical limits for the big traditional air vehicles. Without modification of the Treaty their deployment in significant numbers would endanger the Treaty or a possible follow-on agreement.

In the United Nations Register of Conventional Arms (UNROCA 2017) the definitions of “Combat aircraft and unmanned combat aerial vehicles (UCAV)” (Category IV) and of “Attack helicopters” (Category V) similarly neither include a weight limit. The Category VII “Missiles/missile launchers” covers rockets, ballistic or cruise missiles, or remotely piloted vehicles with at least 25 kilometres range – this limit excludes all missiles and all but one potentially armed UAV of our databases – and MANPADS. If such transfers would be reported, there would be no danger to the Register. The Arms Trade Treaty refers to these definitions, so similar arguments apply there.

In principle, small and very small UAVs could affect arms control positively if they would be used as tools of verification, e. g., by on-site inspection teams. But for this purpose, military types, all the more armed ones, would not be needed, and commercial quadcopters, even hobby ones, would suffice, maybe after some adaptation.[12] Being armed, missiles could not play a supporting role.

The second criterion is about *observation of existing norms of humanitarian law*. Here, small and very small UAVs and missiles as such do not seem to introduce more or more problematic issues than their larger variants, issues arise rather with the mode of using them. If they would attack autonomously, they would raise the same compliance issues as bigger vehicles – violations of international humanitarian law have to be feared. Since small vehicles will have fewer sensor and processing capabilities, they will tend to create even stronger problems. This holds also with respect to UAV swarms more of which will be deployed with smaller vehicles.

The third criterion aims at *no utility for weapons of mass destruction* (WMD). Here small and very small UAVs and missiles have the advantage that they cannot carry nuclear weapons the mass of which is above 100 kg.[13] They could carry chemical or biological weapons (in small amounts, but still potentially killing many people), but these are prohibited by the respective conventions with nearly complete adherence. Due to the massive devastation that they could create, swarms of fully autonomous armed UAVs could be regarded as WMD (Kallenborn 2020).

Criteria Group II covers the maintenance and improvement of stability. Here the first criterion is about *preventing destabilisation of the military situation*. Armed UAVs and missiles in general can destabilise the situation between potential opponents, that is, increase pressure to attack or react fast. But small and very small UAVs and missiles have limited range, thus limited potential for deep penetration, and limited payload. However, surprise attacks against a small country or a region are conceivable. The escalation potential from mutual interactions

11 Art. II Treaty on Conventional Armed Forces in Europe (CFE Treaty). 15 November 1990. availhttps://www.osce.org/library/14087 (accessed on 24.01.2022). The definitions do not mention a human crew, so that legally armed UAVs are included.

12 Similarly, the OSCE Special Monitoring Commission for Eastern Ukraine has used small quadrotor and fixed-wing UAVs (but for longer ranges a bigger helicopter with 3.4 m rotor diameter), see, for example, OSCE SMM 2019.

13 Note that the Missile Technology Control Regime in its Category I uses 500 kg as a threshold, based on an assumed first nuclear weapon of a proliferator (MTCR 2022).

between fleets of autonomous small and very small UAVs will be low; such danger would rather ensue from the various other, mostly bigger elements of the respective force structure. There may arise a problem of swarm attacks against nuclear-strategic installations, carried out by small UAVs and/or missiles transported to the vicinity by larger carriers.

The second criterion in this group deals with the *prevention of a technological arms race*. This criterion is fulfilled whenever a new technology promising increased combat strength comes into view and is being developed with high effort by potential adversaries. While a technological race is already on with bigger armed UAVs and counter systems, in small and very small UAVs as well as missiles it has only just begun but will accelerate if no limiting measures will be introduced.

In the third criterion one considers the *prevention of horizontal or vertical proliferation/ diffusion of military-relevant technologies, substances, or knowledge*. Also, concerns with bigger armed UAVs and missiles exist here, in part since decades. Proliferation of small and very small types is just beginning and will likely increase. The smaller systems get, the easier transfers will get, including covert and/or illicit ones to non-state actors. Sophisticated systems that had been developed by states would greatly enhance the capabilities of such actors, much beyond of what they could fabricate by themselves. As a consequence, limitation among states would indirectly also limit the degree of sophistication of non-state-actor systems. It has to be noted that export-control regimes such as the Missile Technology Control Regime (MTCR 2022) or the Hague Code of Conduct against Ballistic Missile Proliferation (HCOC 2022) cover only big systems with heavy payloads, as they would be needed for nuclear warheads. Another proliferation risk arises if more components and systems can be produced by additive manufacturing because here the required information resides in the digital control files that could be accessed and distributed more easily than specialised components as such.

Criteria Group III looks at the protection of humans, the environment, and society, already in peace time. *Dangers to humans, to social and political systems*, and *to the societal infrastructure* could ensue if small or very small UAVs or missiles were to fall into the hands of criminals. Both would make ideal tools for terrorism. Important persons or institutions could be attacked selectively. Mass destruction could be brought about by infectious biological agents[14] – terrorist groups need not feel constrained by the Biological Weapon Convention. Here, limitations among states would contain dangers preventively.

Direct *dangers to the environment and sustainable development* are not foreseen.

In sum one can state that while small and very small UAVs and missiles raise markedly smaller problems than their bigger counterparts, there are still relevant concerns. Thus, preventive arms control seems advisable.

6.2. Options for Limitations or Prohibitions of Small and Very Small UAVs and Missiles

Autonomously attacking UAVs and missiles of all sizes would best be prohibited within a general ban of autonomous weapon systems (AWS).[15] Such a ban is under consideration

14 For mass destruction by chemical agents, they would need to be spread in amounts too heavy for small UAVs and missiles.

15 See, for example, Altmann 2013, 2020. Missiles have much less time for searching, but autonomous selection and engagement of targets is nevertheless conceivable, singly as well as in salvoes.

among the parties to the Convention on Certain Conventional Weapons (CCW)[16] since 2014, but consensus seems unattainable (see, e. g., Reaching Critical Will 2022); non-governmental organisations have begun to argue for a treaty outside of the CCW as with anti-personnel mines and cluster munitions (e. g., Campaign to Stop Killer Robots 2021). Verification could work via secure records of all attacks by uninhabited armed vehicles, proving that a human had directed them (Gubrud/Altmann 2013).

Since combat swarms would achieve full effectiveness with autonomy, an AWS ban, if implemented strictly, would strongly limit the escalation potential from swarms and the damage and exclude their use as WMD.

Swarms of armed UAVs below the WMD threshold should be limited. A general swarm prohibition (applying to air, ground, and water vehicles of all sizes) would be best but may be difficult to achieve. Limits could include the number of swarm elements, their size(s), the armament, the range, and the capacity for transport to the target area. Here, detailed research is required.

Independently of the swarm issue, mainly the capacity for terrorist uses calls for lower bounds on the size of armed UAVs and missiles, e. g., our definitional limits for very small UAVs and missiles (size below 0.2 m and diameter up to 40 mm, respectively). There are not many armed UAVs and missiles in these classes, and the military interest in them may be limited, so that a preventive prohibition might not meet strong military resistance. If such boundaries will not be attainable, a prohibition could use smaller limits, e. g., 0.1 m and 20 mm, respectively. This would exclude insect-like armed UAVs and pencil-size missiles, but also systems of mm and even lower size, as they could become possible by nanotechnology.

Because there are many more small and very small UAV types than missile types and because the developments are much more dynamic in UAVs, it may be advisable to introduce special limits for them. However, this would meet more opposition of armed forces. More stringent regulation may be more acceptable for small and very small missiles, but this would require clear differentiation from existing missile types most of which armed forces will not want to forego. There could be the idea of allowing some new types for defence, but separating them from offensive uses may turn out difficult.

Since such limits would concern physical systems that can be seen and counted, verification of compliance could rely on traditional methods of on-site inspections, including observation of exercises and training, and data exchanges.[17]

6.3. Confidence and Security Building Measures, Transparency

Confidence and security building measures (CSBMs) can be a precursor to legally binding arms control but can also underpin it. Virtually all kinds of CSBMs holding for conventional armed forces in Europe (OSCE 2011) could be applied, *mutatis mutandis*, to small and very small armed UAVs and missiles. For UN transparency measures, the definitions of the arms categories of the Register of Conventional Arms Transfers and of the Arms Trade Treaty

16 Convention on Prohibitions and Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to be Excessively Injurious or to Have Indiscriminate Effects, 10 October 1980, 1342 UNTS 137.

17 If extremely small systems (size mm and below) would have to be taken into account, then magnifying equipment may need to be permitted, see Altmann 2005, 2006, Section 7.1.

should be systematised and expanded, so that these systems are fully covered, without exceptions for ground-to-air missiles and without range thresholds.

6.4. Export Controls

Most export control regimes are problematic because some countries grant themselves military systems while trying to block access by others.[18] Nevertheless, export control can limit the access to dangerous technologies and systems by non-state actors. The Missile Technology Control Regime focuses on potential carriers of WMD, in particular nuclear weapons. In rocket systems as well as UAVs it focuses on a payload of at least 500 kg and a range of at least 300 km (MTCR 2022). It seems difficult to extend its scope to small and very small UAVs and missiles with drastically lower parameters. The Hague Code of Conduct against Ballistic Missile Proliferation (HCOC 2022) is for big missiles by definition (and excludes cruise missiles and other UAVs). Extension to small and very small missiles seems similarly difficult. The Wassenaar Arrangement On Export Controls for Conventional Arms and Dual-Use Goods and Technologies via its Munitions List already allows the member states to block exports of "rockets, […] missiles, […] specially designed for military use" as well as "'UAVs', Remotely Piloted Air Vehicles (RPVs), autonomous programmable vehicles" that are "specially designed or modified for military use," all without any size, mass, or range limit (Wassenaar 2021a, para. ML4.a., ML10.a.1). Accumulations by member states and technologically competent states outside of the regime – that are much more destabilising – are beyond its scope.

7. Conclusion

Small and very small armed UAVs and missiles open up new options for offence, for producing mass casualties, and for terrorism, and their proliferation can be foreseen. To contain the risks, preventive arms control is recommended, optimally with a wider focus. Ranked by the degree of comprehensiveness, the international community could and should:

1. Prohibit autonomous weapon systems (independent of size);
2. Prohibit swarms of fully autonomous armed systems (independent of size);
3. Introduce qualitative and quantitative limits on swarms of armed systems (e. g., differentiated by size);
4. Introduce lower limits on the sizes of armed UAVs and of missiles; and
5. Introduce quantitative limits on the holdings of small and very small armed UAVs and missiles.

Verification of such prohibitions and limits can mostly rely on traditional methods of on-site inspection with data exchanges. Conceiving possible details for measures 3 through 5 needs substantial research.

18 The exception is the Australia Group for chemical and biological dual-use items (Australia Group 2022) because of near-universal adherence to the respective conventions.

Confidence and security building measures (CSBMs) as well as transparency measures should be added, building on the OSCE CSBMs and the UN arms-transfer register. Export controls should include small and very small armed UAVs and missiles better.

Unfortunately, much of co-operative arms control has broken down and relevant countries rather push for military-technological superiority. Here small armed UAVs and missiles are just one of many problems – they should be included in limits on wider military technologies dangerous to stability and international security. Such revitalisation of preventive arms control will require a major change of the present political climate.

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Die Friedens-Warte

F-W Vol. 95 | 2022 | Issue 3–4 | P. 340–361
DOI 10.35998/fw-2022-0015

Eco-Authoritarianism and the German Constitution: Questions, Concepts, and Resilience

Michael Kalis | Philipp P. Thapa*

Abstract Effective climate protection will increasingly be possible only through massive restrictions on freedom. Against this background, some people demand a system change and consider the necessity of eco-authoritarianism to enforce a full brake on climate change. Others see the threat of an eco-dictatorship already partly realised by the judicial recognition of a right to climate protection. The authors analyse the concept of eco-authoritarianism, showing that it is necessary to distinguish between authoritarian measures or institutions and an authoritarian regime. Eco-authoritarian policies may be desirable as a measure with clear boundaries in scope and duration, to protect the well-being of citizens and the democratic systems. Such policies, however, do not necessarily pose a threat to the free democratic order. With regard to the German constitution, the authors show that the law is resilient both against an unhindered progression of climate change and against a change of the political system to a full-fledged eco-authoritarian regime. Neither the constitutional obligation to protect the climate nor the social reality of ecological boundaries necessarily lead to an "eco-dictatorship".

Keywords Eco-authoritarianism, eco-dictatorship, right to climate protection, free democratic basic order, ecological boundaries

Öko-Autoritarismus und das Grundgesetz: Fragen, Begriffe und Resilienz

Abstract Effektiver Klimaschutz wird zunehmend nur noch durch massive Freiheitsbeschränkungen möglich sein. Einige fordern einen Systemwechsel und sehen öko-autoritäre Maßnahmen als eine Notwendigkeit, um eine Vollbremsung des Klimawandels durchzusetzen. Demgegenüber erkennen andere eine drohende Öko-Diktatur, die in der gerichtlichen Anerkennung eines Rechts auf Klimaschutz bereits teilweise realisiert sei. Die Autoren analysieren das Konzept des Öko-Autoritarismus und zeigen, dass zunächst zwischen autoritären Maßnahmen oder Institutionen und einem autoritären Regime zu unterscheiden ist. Eine Ökoautoritätspolitik als Maßnahme mit klaren Grenzen in Umfang und Dauer kann wünschenswert sein, um das Wohl der Bürger und das demokratische System zu schützen. Eine solche Politik stellt nicht zwangsläufig eine Bedrohung der freiheitlich-demokratischen Ordnung dar. Mit Blick auf das Grundgesetz belegt der Beitrag die Resilienz des Rechts zum einen gegen ein ungehindertes Fortschreiten des Klimawandels, aber auch gegen einen politischen Systemwechsel im Sinne einer „Öko-Diktatur". Weder die verfassungsrechtliche Verpflichtung zum Schutz des Klimas noch die gesellschaftliche Realität ökologischer Grenzen führen zwangsläufig zu einer „Öko-Diktatur".

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Keywords Öko-Autoritarismus, Öko-Diktatur, Recht auf Klimaschutz, Freiheitlich-demokratische Grundordnung, Ökologische Belastungsgrenzen

1. Introduction

Climate change is advancing. In its latest report, the Intergovernmental Panel on Climate Change (IPCC) states that there is a threat that the international climate protection targets will be exceeded before the end of the first half of the century.[1] The global average temperature has already risen by 1.1 °C compared to pre-industrial levels.[2] The Paris temperature target of limiting the increase in the global average temperature to well below 2 °C and ideally 1.5 °C seems to be exhausted soon. However, this also means that human activity will overshoot the "planetary boundaries."[3] The corridor for an orderly transformation of society is shrinking.

Against this backdrop and in view of the impending signs of advancing climate change, calls for ambitious climate protection are growing louder. This includes calls for a system change.[4] Advocates of a system change reject a continuation of the current approach to climate protection in the existing social, legal, and state systems and demand a new systemic approach.[5] These criticisms and alternative approaches cannot be reduced to one position. They range from a comprehensive critique of capitalism,[6] a critique of international law based on state sovereignty,[7] a critique in the sense of an (alleged) anthropocentric focus of law and society,[8] to a critique of the current structure of democratic states.[9] The present paper focuses on the latter, i. e. the critique of current democratic systems and the desire to change and improve them.

System change is also a topic in the debate on ongoing and increasingly successful climate change litigation.[10] Some authors see climate lawsuits and the judicial decisions on them as a danger to the democratic state.[11] Some speak of difficult multipolar trade-offs in connection with environmental and climate protection, which are beyond the scope of judicial decision-making.[12] Others accuse the courts of eco-paternalism, which culminates in excessive constitutional competences in the sense of the constitutionally prescribed separation of powers.[13] In the trajectory of this discussion looms the danger of an "eco-dictatorship" and thus the demise of democracy, initiated by climate lawsuits.[14]

1 Intergovernmental Panel on Climate Change (IPCC) 2021, B.1.3.
2 IPCC 2021, A.1.2. In 2011–2020, the global surface temperature was already 1.09 °C higher than in 1850–1900.
3 The theory of planetary boundaries was first established by Rockström *et al.* 2009, pp. 472–475.
4 See for an overview of social movements demanding "System change not climate change", Beer 2022, p. 175.
5 See Beer 2022, p. 175.
6 See for a critical remark and further references Ekardt 2021, pp. 138 ff.
7 Cf. Kotzé/Rakhyun 2019, p. 7.
8 Cf. Du Toit/Kotzé 2022, p. 3.
9 Cf. Wurster 2013, pp. 77 f.; Di Paola/Jamieson 2018, pp. 373 ff.
10 With regard to climate change litigation in Germany and Europe see Wegener 2019, pp. 3–13; Graser 2019, pp. 271–280; Winter 2019, pp. 259–272; Rodi/Kalis 2022a, pp. 5 ff.; for a broader picture of climate change litigation see Peel/Osofsky 2015; UNEP 2017; for a comprehensive collection of cases see Sabin Center for Climate Change Law, http://climatecasechart.com.
11 Cf. Wegener 2019, pp. 3–13.
12 Cf. Voßkuhle 2013, p. 5.
13 See Wagner 2021, p. 2261.
14 Cf. Wegener 2019, pp. 3–13.

However, systemic criticism and new approaches, much less an explicit rejection of democracy, cannot be inferred from climate lawsuits.[15] The plaintiffs in systemic climate lawsuits regularly press for the establishment of state obligations to protect the climate and to adopt adequate climate protection measures.[16] Thus, for example, in the context of climate lawsuits before the German Federal Constitutional Court, the (democratically legitimised) legislature should be obliged to take adequate and, in this case, foremost legislative measures to protect the climate.[17] By going to court, however, the plaintiffs operate within the framework of the existing political system. By applying the principles of the rule of law, in particular the environmental rule of law, the plaintiffs use existing judicial mechanisms to advance the climate protection they believe is necessary.

In contrast, the opponents of such climate change litigation fear the emergence of a 'super-right' (*Superrecht*)[18] to climate protection through an increasing juridification and, in particular, the anchoring of climate protection in fundamental legal norms. They regard courts to be an inappropriate forum for clarifying the factual and legal questions associated with the fight against climate change.[19] Starting from a system of legal protection based on subjective rights, the recognition of a relevant right, for example in the form of a fundamental right to climate protection, entails the danger of a general, i.e. unconditional, priority of climate protection.[20] Acknowledging the quite correct premise that the exercise of fundamental rights actually presupposes, among other things, existential conditions, which also include climatic conditions,[21] a subjective right to climate protection would lead to irresolvable contradictions.[22] A climate protection right understood in this way would precede every other right to freedom as a super-right.[23] According to the critics, such a dictate of climate protection law and thus of climate protection paves the way for an "eco-dictatorship," making it a danger to the democratic constitutional state.[24] Other authors, also recognising a relevant fundamental right that protects against the effects of climate change, fear a policy dictate from climate change.[25] In their analysis, a state obligation to protect the climate would mean that, as climate change advances, the scope for political design and action will shrink. The physical limits of the Earth system in the form of the climate subsystem also limit the margin of appreciation and might even "dictate" policy.[26]

15 For reference, see only the constitutional complaints before the German Federal Constitutional Court: Prue *et al*. 2020, Steinmetz *et al.* 2020, and Neubauer *et al.* 2020.

16 *Ibid*.

17 *Ibid*.

18 See on the fear of such an environmental *Supergrundrecht* Kalis 2022a, pp. 99 ff.

19 Cf. Wagner 2021, p. 2256; Timmermann 2019, pp. 193–194.

20 Cf. Oexle/Lammers 2020, p. 1726; Wegener 2019, p. 3.

21 See FCC 2021, paras. 37, 117.

22 Cf. Wegener 2019, p. 3.

23 Cf. Wegener 2019, p. 3; critical and with further references Kalis 2022a, pp. 99 ff.

24 Cf. Wegener 2019, p. 3; critical of the accusation of an impending eco-dictatorship Graser 2019, p. 272; on the danger of an eco-dictatorship also Calliess 2001 pp. 12 ff.; see also Kloepfer 1993, pp. 200 ff.; cf. for the equivalent discussion of fiscal feasibility as element of a super-constitution Kratzmann 2000, pp. 124 ff.; in a not necessary scientific approach the former constitutional judge Papier warns against an eco-dictatorship, Papier 2019; Wegener recognizes eco-paternalism in the ongoing climate change litigation, Wagner 2021, p. 2261; cf. also on the fear of an eco-state, eco-terror and eco-dictatorship in the context of drafting an environmental code in Germany Sendler 1996, p. 1151; see for an overview on the discussion Rodi/Kalis 2022a, pp. 5 ff.

25 Climate may not dictate policy, says Buser 2020, p. 1396.

26 Cf. Buser 2020, p. 1396; Kalis 2022b, Chapt. D, 3, lit. c).

It seems that the world as we know it is at a crossroads.[27] This concerns both our climate and the Earth system as a whole, but at the same time also coexistence in a liberal democracy. We need to preserve the resilience of the Earth system and avoid overshooting so-called tipping points which would lead to irrevocable changes in the Earth's subsystems and the Earth system as a whole.[28]

But how resilient is the system of liberal democracy itself in the face of this Herculean task? Can democracy withstand the external and arguably also internal shocks of the global climate crisis? Can it adapt to the path of the necessary transformation[29] of society as a whole on the way to climate neutrality and general ecological sustainability? And will liberal democracy itself survive this transformation?

In this paper, the authors examine the debate on the perceived threat of "eco-authoritarianism." What is behind the term? Does eco-authoritarianism pose a threat to democracy in the face of the climate crisis? We focus on the question to what extent we need to take the threat of an eco-authoritarian regime seriously and how constitutional law defends itself against it. We refer to German constitutional law as an example of resilient constitutional law.

2. The Concept of Eco-Authoritarianism

In current legal debates, the term 'eco-authoritarianism' (or 'eco-dictatorship', *Ökodiktatur*), though a long-standing linguistic staple, is hardly ever defined or submitted to critical examination.[30] It usually appears as a polemical catchword sounding above the actual arguments.[31]

There has been serious debate on the claim that democratic decisions, i.e. decisions based on majority voting, are unsuitable for dealing with the climate crisis.[32] One of the reasons put forward is that the longer the delay that separates today's actions, or failures to act, from their future climate impacts, the less today's voters can be trusted to consider them relevant.[33] Therefore, as long as future generations are not represented in majority decision-making, their interests are likely to be treated as low-priority.[34] Similarly, the short

27 For an interesting overview of climate change and the end of the world as we know it in literature see Schröder 2020, pp. 47 ff.

28 On tipping points and planetary thresholds see Rockström *et al*. 2009; see also Rahmstorf *et al*. 2019.

29 On the idea of a 'Great Transformation' see WBGU 2011.

30 Cf. Graser 2019, p. 272; Wagner 2021, p. 2261; Rogers does not speak of an eco-dictatorship, but no less drastically, of the war against climate change, Rogers 2009, pp. 1 ff.; see for a two-dimension classification and further references Gilley 2012, pp. 288 ff.; see for the historical background of the debate and an analysis of the literature on eco-authoritarianism Humphrey 2007; cf. also Radcliffe 2000.

31 Cf. Wegener 2019 p. 3; Graser 2019 p. 272; Kloepfer 1993, pp. 200 ff.; von Weizsäcker 1993, pp. 206 ff.; Vollmer 1993, pp. 211 ff.; see on different forms of argumentation Honnacker 2020.

32 See on this accusation Wurster 2013, pp. 77 f.; Di Paolo and Jamieson speak of challenges for (liberal) democracy in times of the Anthropocene, Di Paola/Jamieson 2018, pp. 373 ff.; see for an overview and further references Fent 2018, pp. 110 ff.; see also Niemeyer 2014, pp. 16 ff.; Shearman/Smith 2007; see with regard to the United Nations and the principle of consensus Schwarze 2010, p. 57.

33 Cf. Di Paola/Jamieson 2018, pp. 406 ff.

34 Cf. Di Paola/Jamieson 2018, pp. 408 f.; see on the lack of representation of future generations and young people and the proposal to establish a Council for Intergenerational Justice. SRU 2019, pp. 179 ff.; cf. Rux 1999, pp. 301 ff.; Calliess speaks of deficit of long-term responsibility, Calliess 2001 pp. 365 f.; see also Appel 2005, pp. 85 ff.; cf. Franzius 2022, pp. 140 ff. Franzius provides several proposals for solution of this problem including courts as one element, pp. 142 f.; Wegener on the other hand recognises with a view to initiatives such as Friday's for Future, sufficient democratic representation opportunities for future generations, Wagner 2021, p. 2259.

legislative periods of modern democratic states are considered unfit for ensuring effective long-term responsibility in politics.[35] The common conclusion from these observations is that the political system should change in order to enable strict and consistent environmental policies, thus guaranteeing ecological sustainability in the long run.

In contrast, in the context of the debate on the recognition of a right to climate protection a threat to the democratic constitutional state is seen.[36] The danger of eco-authoritarianism, although little explained, is put forward here as a major argument against the recognition of a right to climate protection and thus also against the so-called climate lawsuits mentioned earlier.[37] The main assumptions behind this are as follows: Based on the premise that an environment fit for human life and civilization is the very basis for any chance of realising freedom, an (at least *de facto*) priority of environmental protection, including climate protection, might be assumed.[38] Apparently – and indeed misleadingly – critical voices translate this assumption of a factual necessity for such an environment as a precondition of freedom into a normative priority of a right to climate protection, into a super-right.[39] Understood in this way, a super-right to climate protection would have unconditional priority over any other freedom, paving the way to 'eco-dictatorship.'[40]

These two aspects of the same discussion suggest that the terms 'eco-authoritarianism' and 'eco-dictatorship' are often used in a more figurative than technical sense, depending on the rhetorical effect desired by the author.[41] However, this does not change the fact that they are a verbalised expression of an assumed danger to liberal democracy, the rule of law and the separation of powers through increasing juridification and subjectification of climate protection. Following this it is even more relevant to explore what they could or should mean if taken seriously. A better understanding of what distinguishes democracy from authoritarian institutions or regimes will help us understand to what extent democracies may already be at risk, from 'ecological' actors or otherwise.

Political scientists distinguish three major systems of political rule: democratic, authoritarian, and totalitarian regimes.[42] However, they accept that the term 'authoritarianism' has a broader use, including as a characteristic of individual personalities.[43] Distinguishing the terms 'authoritarianism' and 'authoritarian regime' in this way, it is possible to say that authoritarianism, in the sense of a mode of governing that is intolerant of public opposition and dissent, can occur even within a democratic system. In contrast, authoritarian *regimes* are defined by four traits first proposed by Juan Linz: (1) Political freedom and pluralism are restricted by government controls on legislature and political organisations. (2) The re-

35 Cf. Calliess 2001, pp. 365 f.
36 Cf. Wegener 2019, p. 3.
37 Cf. Wegener 2019, p. 3.
38 The Federal Constitutional Court makes this point here on the premise that almost every exercise of freedom is accompanied by CO2 emissions, FCC 2021, paras. 37, 117.
39 Cf. Wegener 2019, p. 3; critical and with further references Kalis 2022a, pp. 99 ff.
40 See on the apparently logical consequence of an eco-dictatorship if accepting a right to environment that takes priority, Kalis 2022a, pp. 99 ff.
41 Cf. Schwarze 2010, p. 57. Schwarze distinguishes between the abandonment of democracy and the call for an eco-dictatorship; Wegener 2019, p.10; Wustlich 2009, p. 515; cf. in this context also the discussion on eco-dictatorship in the literature, Steiger 2015.
42 Schlumberger 2017, p. 2.
43 Cf. Fromm 1941, Adorno *et al*. 1950.

gime legitimises itself by emotional appeals, as a necessary evil to fight important societal problems. (3) Social and political activism is discouraged or suppressed by government. (4) Executive powers are unclear and shifting.[44]

The distinction between authoritarianism as a mode of governing within a democratic regime and a full-fledged authoritarian regime also applies to eco-authoritarianism. The fact that it is possible to speak of authoritarian policies or an authoritarian leader or administration within a democratic system makes the accusation of eco-authoritarianism less drastic and perhaps also more analytically useful. In this sense, it is possible to say that eco-authoritarian policies may be desirable as a measure with clear boundaries in scope and duration, to protect the well-being of citizens and the democratic system as a whole.[45] Similarly, it becomes clear that defending a democratic constitutional order against the emergence of an authoritarian regime, 'eco-' or otherwise, requires (along the lines of Linz' four traits) at least to protect political freedom and pluralism, to base politics on reason and argument instead of emotional appeals, to maintain an active and independent civil society, and to safeguard clear rules and limits to executive powers.

In the wider academic literature, the origins of the debate on eco-authoritarianism are traced back to William Ophuls' paper 'Leviathan or oblivion?'[46] (1973) and Robert Heilbroner's 'An Inquiry into the Human Prospect.'[47] Both authors continued to write about the subject in other works. Although Garrett Hardin's famous analysis of environmental problems as examples of the "tragedy of the commons"[48] is often cited as part of this debate, Hardin did consider alternative solutions besides direct government control.[49]

Eco-authoritarianism, as articulated by Heilbroner and Ophuls, was based on three assumptions: (1) The environmental crisis is a result of unchecked autonomy in a world of ecological limits. (2) Democratic polities, which depend on majority voting, will systematically fail to impose necessary constraints. (3) Societies will be able to respond more effectively if those who understand what needs to be done ("ecological mandarins," in Ophuls' words)[50] are empowered to act without approval from the rest of us.[51] In their vision, an authoritarian regime is necessary to enable ecological central planning.

More recent revivals of the debate on eco-authoritarianism accept that central planning, having failed on a grand scale both in the erstwhile Soviet Union and in the People's Republic of China, is not a viable option. Still, they tend to consider today's China as a potential model regime that combines the advantages of a relatively free, innovation-friendly market

44 Linz 1964, pp. 297 ff., further elaborated in Linz 2000.

45 In the same vein, but with regard to the term 'dictatorship', Linz 2000, p. 61, suggests that given its loose, pejorative colloquial meaning, its scientific usage "should be limited to describe emergency rule that suspends or violates *temporarily* the constitutional norms about the accession to an exercise of authority" (emphasis added). This was the case with the original *dictatores* of ancient Rome. Following Linz' related equation of "constitutional dictatorship" with temporary "crisis government," p. 63, and somewhat ironically in the context of the current discussion, the term 'eco-dictatorship' could be rescued, specifically to describe constitutional crisis governments instituted to deal with ecological emergencies.

46 Ophuls 1973.

47 Heilbroner 1974.

48 Hardin 1968.

49 Shahar 2015, p. 346, footnote 2.

50 Ophuls 1977, p. 163.

51 Shahar 2015, p. 348.

with those of an authoritarian government that has the power to enact strict environmental regulations and force technological and social innovation towards ecological sustainability.[52]

Our brief examination of eco-authoritarianism as a serious concept has yielded several important results for the legal debate. For one, we can distinguish between limited eco-authoritarian policies, institutions, or states of emergency within a democratic system and full-blown eco-authoritarian regimes. Proposals of both kinds may be said to endanger the democratic constitution, but only the demand for a permanent system change to an eco-authoritarian regime is necessarily anti-democratic, in the sense often associated with 'eco-authoritarianism' as a polemical catchword.

In addition, we would like to emphasise that it cannot count as eco-authoritarianism in a political and legal sense if a democratic legislature reacts, or is 'forced' by necessity to react, to ecological facts. Terms such as authoritarianism or dictatorship refer to forms of (human) governance and domination. Just as the laws of nature cannot be rewritten by parliament, so ecological facts do not exert political power, although they may influence political decision-making. Similarly, just as a law prohibiting child labour is not authoritarian just because child labour was previously permitted, so a law restricting the emission of greenhouse gases does not count as authoritarian just because there was previously no restriction.

3. Eco-Authoritarianism – Threat or Salvation?

Having distinguished different possible meanings of eco-authoritarianism as a serious concept, we can now apply them to the question of whether eco-authoritarianism represents a danger to the democratic constitutional state – or is perhaps the best way for democracies to survive, both politically and biologically, in times of environmental catastrophe.[53] Although empirical comparisons appear questionable due to the massive differences in the design of democracy and eco-authoritarianism, analyses to date suggest that the latter can achieve greater success in environmental protection in the short and medium term.[54] It seems that eco-authoritarianism in the sense of crisis management can be useful.[55]

3.1. Eco-Authoritarian Policies and Institutions within Democratic Regimes

Many environmental issues such as climate change mitigation can be described as coordination problems subject to the tragedy of the commons. They involve large numbers of agents who need to coordinate their use of a public good, e.g., the global climate system, if they want to achieve the desired result, e.g., minimising harmful climate change. However, each individual agent will only benefit from coordinated behaviour, e.g., reducing greenhouse gas emissions, if most other agents do the same. If the collective fails, the efforts of indi-

52 Shahar 2015, pp. 352–354.

53 Empirical comparisons of environmental protection in democracy and dictatorship prove difficult in view of significant differences in the individual objects of comparison. Nevertheless, Deacon finds relevant differences. For example, the funds earmarked for environmental protection in democracies exceed those in dictatorships by almost 100 %, Deacon 2009, p. 261; see also Wurster 2013, pp. 77 ff. Wurster shows that dictatorships can achieve greater success, at least in short- and medium-term environmental protection. They therefore seem to be quite capable of managing crises in this way; see also Beeson 2010, pp. 282 ff.

54 Cf. Deacon 2009, p. 261; Wurster 2013, pp. 77 ff.; see also Beeson 2010, pp. 282 ff.

55 See Wurster 2013, pp. 77 ff.

viduals will have been futile. If the collective succeeds, the behaviour of any one individual will have made next to no difference to the outcome. Either way, individuals have an egoistic incentive to opt out of the coordinated behaviour and to keep using the commons for maximal individual (short-term) benefit.[56] While states are capable of enforcing coordinated behaviours in various ways, voters in democracies tend to opt out of the necessary policies in advance, by withholding political office from those who would introduce them. This motivational quandary is aggravated if successful collective action in any one country would still make little difference and the coordination problem extends to the international level, as in the case of climate change mitigation.

Against this backdrop, circumventing the weaknesses of democratic decision-making by giving authority over certain areas of administration and policy to special bodies can seem like an appropriate measure to protect crucial environmental goods and ensure the long-term survival and well-being of citizens. In fact, such arrangements are a common feature of any modern democratic state. The various organs of the executive - including ministries with regulatory powers in their respective policy areas, police departments with their authority to temporarily restrict civil freedoms, water boards or national park administrations managing natural resources, and central banks that independently make monetary policy - do not just execute commands issued by the sovereign people or its representatives in parliament. They all wield discretionary authority - within limits set by law and subject to accountability mechanisms. The judiciary of democratic states even has the power to dismiss and correct laws and set legal norms through their verdicts. Given these precedents, it is conceivable that special institutions could have independent authority to set and monitor limits on national greenhouse gas emissions and other environmental impacts, veto laws that threaten to undermine long-term environmental policy, or manage access to and distribution of crucial natural resources.

Such proposals have certainly been advanced for the international arena. For example, one long-standing idea is the establishment of international environmental or ecological courts. In the recent debate, Solntsev argues for the creation of an International Environmental Court that would parallel the existing International Criminal Court or a suggested International Investment Court,[57] as part of a larger movement towards global constitutionalism.[58] A global environmental constitution could also support the establishment of further regulatory and executive bodies including a “world environment organization much more powerful than the current UN Environment,” an “ombudsman for future generations,” and a UN Trusteeship Council reformed and reactivated as the UN Environment Trusteeship

56 However, individuals and polities may still choose not to frame the situation as a tragedy of the commons and act according to reasons other than their egoistic short-term advantage. Cf. Ortmann/Veit 2022, Bunzl 2009.

57 See Solntsev 2019, p. 132, for mention of these analogous international courts.

58 According to Kotzé 2019, p. 20 (citing MacDonald/Johnston 2005), global constitutionalism aims to close harmful gaps in the current global law and governance order by addressing key issues including “the normative and political aspects related to state sovereignty; lack of legitimacy and authority of international laws, governance actors and processes; the rise of global non-state actors, such as transnational corporations operating outside juridical boundaries of accountability; the intensification of globalized processes, such as trade and migration; and the rise of complex global governance challenges, such as terrorism, migration and environmental degradation, and their normative implications.”

Council.[59] Similarly, based on his theory of ecological justice, Baxter envisions an entire system of institutional arrangements, from the subnational to the global level, to protect and adjudicate the interests of all living beings, again including an International Court of Ecological Justice.[60]

Baxter rightly insists that proposals such as his are not *necessarily* 'tantamount to a form of oligarchy or authoritarianism' in the sense of an authoritarian regime.[61] But not only are they the kind of proposals that could permanently shift power towards environmental concerns, therefore fuel much of the public debate on 'eco-dictatorship', and so deserve our critical attention in this paper. There is also a real risk that divesting too much political authority towards institutions beyond immediate democratic control can erode democracies even without overt regime changes. According to Freedom House, democracy around the world has been on the decline for most of the 21st century so far. Conversely, authoritarian rule is on the rise.[62] However, unlike in the previous century, such regime changes now rarely occur in the shape of, in Bermeo's terms, "classic coups d'état" (typically, military organisations ousting a sitting executive), "executive coups" (an elected leader seizing authoritarian rule) or even just "blatant election-day fraud."[63] Rather, if there is a discernible coup, it is often 'promissory,' with coupmakers projecting themselves as saviors of democracy. Even more common today, according to Bermeo, is "executive aggrandizement." It "takes place without executive replacement and at a slower pace," its defining feature being that "institutional change is either put to some sort of vote or legally decreed by a freely elected official - meaning that the change can be framed as having resulted from a democratic mandate."[64] Given this current trend of stealthy democratic backsliding, it makes sense to be cautious about new institutions beyond immediate democratic control, including environmental ones.

However, while cautioning against such dangers, we conclude that authoritarian environmental policies or institutions are possible within a working democratic system, without *necessarily* leading to a full-fledged authoritarian regime. As in other areas of policy, balancing the risks and benefits of authoritarian policy elements is the ongoing task of democratic politics.

3.2. The Threat of an Eco-Authoritarian Regime Change

In contrast to limited authoritarian elements in environmental policy or temporary emergency rule during environmental crisis, the establishment of a permanent authoritarian *regime*, 'eco-' or otherwise, by definition coincides with the demise of the liberal democratic state. Based on the premise that, according to the current state of affairs, almost every exercise of freedom is accompanied by the emission of greenhouse gases and thus contributes to global climate change,[65] authors that fear the recognition of a right to climate protection as it might

59 Kotzé 2019, p. 18. The UN Trusteeship Council was originally founded under the UN Charter to supervise the administration of trust territories. Its operations have been suspended since briefly after Palau, the last remaining trust territory, became independent in 1994 (United Nations 2022).

60 See Baxter 2005, Part III, on institutional arrangements, and p. 183 on the International Court of Ecological Justice.

61 Baxter 2005, p. 156.

62 Freedom House 2021.

63 Bermeo 2016, pp. 6 ff.

64 Bermeo 2016, pp. 6, 8 ff.

65 Cf. FCC 2021, paras. 37, 117.

lead to an eco-authoritarian regime see climate protection as a mere restriction of freedom.[66] To oversimplify slightly, they believe that to protect the climate means to restrict the freedom of citizens. Against the background of this premise and with the addition of a subjective right to climate protection as a super-right, i. e. as a right with unconditional priority over other (freedom) rights, the path to a dictate of climate protection seems to be logically prepared.[67] Understood in this way, a super-right to climate protection shakes the foundations of democracy.[68] If climate protection has priority literally over all other objectives, then applying the above premise means that, on the one hand, liberties and freedoms are subject to restrictions. On the other hand, the ability of the democratically legitimised institutions of the state to make choices and shape policy is significantly reduced.[69] In the view of these critics, restricting the liberal democratic order in this way, i. e., dictating climate protection, already amounts to eco-dictatorship and presents a danger to the democratic constitutional order.[70]

3.3. Evaluation

Eco-authoritarian policies and even a full-fledged eco-authoritarian regime may seem tempting to some as a way out of the global climate crisis.[71] In particular, the assumption that this form of authoritarian rule is not a reign of terror, but rather a dictate to protect freedom, could pave the way to a widespread acceptance of such a regime.[72] It also makes sense to consider a system change for democracies in view of the challenges posed by long-term responsibilities and the international dimension of climate change. However, a complete replacement of the liberal democratic order seems to go beyond the goal. This also applies to a temporary form of eco-authoritarian rule.[73] For the purpose of this paper we assume that even this view, which sees eco-authoritarian rule as a way out of the global climate crisis, is by no means pursuing the goal of stopping climate change for its own sake. Notwithstanding

66 Cf. Wegener 2019, p. 3; critical on this Kalis 2022b, Chap. D, 3, lit. c), aa), (3).

67 Cf. Wegener 2019, pp. 3 ff.; critical Kalis 2022a, pp. 99 ff.

68 See Ekardt 2021 p. 348; cf. Klein 2006, p. 8. Although certainly on a different occasion, he correctly states that the state is not only potentially the greatest threat to freedom, but also its best guarantor. Accordingly, the state must not be weak and must be organised in accordance with freedom. This leads to a certain parallelism between the preservation of the free democratic basic order and the protection of the preconditions for freedom. The Federal Constitutional Court also considers ad infinitum climate change to be incompatible with the constitution, FCC 2021, para. 185. Admittedly, the Federal Constitutional Court then focuses here on the climate protection requirement under Article 20a GG and its concretisation in the form of the temperature limit, para. 185. At the same time, however, it considers severe restrictions on freedom due to the distribution of the constitutionally remaining CO2 residual budget to be legally irreversibly set, para. 186. This means nothing other than that today's legislation legally and factually deprives the future legislator of the basis for a balanced protection of freedom and thus – at least in the worst form of climate change – of the substance *per se*. Buser highlights that the climate should not dictate policy, Buser 2020, p. 1396. Burgers posits that the growing realisation that the environment is a condition for a functioning democracy is the background to the climate change litigation, Burgers 2020, p. 75.

69 With regard to the reduced margin of appreciation and the judicial control mechanism see Kalis 2022b, Chap. D, II, 2, lit. b).

70 Cf. Wegener 2019, pp. 3 ff.

71 See Jonas 1979, pp. 262 f.

72 Cf. Niemeyer 2014, pp. 21 f.; see on the advantages of authoritarianism with regard to long-term responsibility, here speaking of a benevolent, well-informed tyranny inspired by the right insight, Jonas 1979, pp. 262 f.

73 A temporary eco-dictatorship cannot legitimise itself with a view to the output of democracy protection either, cf. Schröder 2017, p. 813.

the arguments of environmentalism to be discussed elsewhere, here too eco-authoritarianism is supposed to be the way out for democratic states and thus for the free democratic basic order.[74] Ultimately, it is aimed at preserving and protecting precisely this form of state. Indeed, it is democracy that promises the greatest possible rationality and maximisation of the realisation of freedom.[75] By this standard, in particular the maximisation of freedom, however, eco-authoritarianism is not a way to steer successfully through the global climate crisis and hence to protect the free democratic constitutional order. Rather, it is perceived as a threat to democracy.

However, the premisses of this view are flawed. The introduction of climate-protection measures does not *per se* amount to a regime change towards eco-authoritarianism. Characterising climate protection as a restriction of freedom is not just an oversimplification, but fundamentally problematic.[76] Here, too, the following applies: climate protection does not take place for its own sake, but on the basis of constitutional obligations. An obligation to protect the climate can be derived directly from fundamental and human rights - or more generally, with a view to transferability to diverse jurisdictions - from rights of freedom.[77] Fundamental rights and civil liberties, based on the protection of and respect for human dignity, serve the greatest possible development and realisation of individual freedom, autonomy, and self-realisation.[78] Freedom, however, does not exist in an empty space. Fundamental rights and freedoms are not empty promises, but demand (potential) realisation and thus de facto freedom.[79] The preconditions for the realisation of freedom are thus an essential part of freedom itself. In other words, a free life is inconceivable without an adequate physical environment that provides existential necessities including air, food and, last not least, a suitable climate.[80]

Consequently, environment and climate are not subordinate to freedom, they are prerequisites of freedom and thus part of the rights of freedom themselves.[81] The fact that fundamental rights and liberties have preconditions is not seriously doubted.[82] However, doubts can be raised with regard to the exact application and consequences of such preconditions of freedom as part of the rights to freedom.[83] Some authors reject a participation of the preconditions of freedom in the rights of freedom themselves, i. e. a classification of the precon-

74 Cf. Niemeyer 2014, pp. 20 f.

75 Cf. with further references Ekardt 2021, p. 337.

76 Cf. Ekardt/Heß 2021, p. 1423.

77 See Ekardt 2021, pp. 239 ff.; Kleiber 2014, p. 276; Kalis 2022a, pp. 99 ff.; see for extensive discussion Kalis 2022b, Chap. D.

78 Cf. Ekardt 2021, pp. 598 ff.

79 On safeguards of material freedom and the changing understanding of freedom over time see Sartorius 2000, pp. 59 ff.; on the protection of de facto freedom see Kleiber, 2014, p. 315; on preconditions for the potential realisation of fundamental rights and freedoms see Hochhuth 2006, pp. 221 f.; see also Söhnlein 1999, p. 38.

80 See Ekardt 2021, p. 240; Kleiber 2014, p. 312; Koenig uses the notion of prerequisites to fundamental rights, Koenig 1994, pp. 198 f.; in terms of state theory, Montesquieu says that freedom rests in security, Montesquieu 1748, Chap. 3; what is legally due or protected to the individual must therefore also be preserved with certainty, says Klein 2006, p. 21; according to Böckenförde, social life goods, as a necessary precondition for the realisation of freedom, are precisely part of freedom itself, Böckenförde 1991, p. 149.

81 See Ekardt 2013, pp. 70 ff.; on further approaches to the justification of preconditions for freedom see Kleiber 2014, pp. 287 ff.

82 Isensee 2011, pp. 265 ff.; Kleiber 2014, pp. 287 ff.; Kloepfer 2016, pp. 135 f.; Kloepfer 2010, pp. 170 f.; Murswiek 1985, pp. 227 ff.; Böckenförde 1991, p. 149; Söhnlein 1999, p. 38; Ekardt 2021, p. 240.

83 For an extensive discussion see Kalis 2022b, Chap. I, D, 3, lit. c), aa), (2).

ditions of freedom as a right.[84] The background to this is ultimately the handling of rights presupposing freedom in relation to rights of freedom. Based on a regular distinction between the duty to protect and the right to defend, i.e. between the state's duty to act and the prohibition of disproportionate state intervention, the question arises how the protection of preconditions of freedom and the exercise of rights of freedom can be reconciled.[85] This becomes evident not least in the context of climate protection. The protection of the climate as a prerequisite for the actual exercise and realisation of existing rights of freedom, i.e. as the protection of preconditions for freedom,[86] can only be achieved by interfering with rights of freedom, given that virtually every exercise of freedom is currently accompanied by emissions of greenhouse gases and is thus causal for climate change.[87] However, this in no way implies a rejection of the right to protection of the preconditions of freedom; rather, the opposing rights, i.e. the preconditions of freedom and the rights of freedom, must be brought into proportionate balance.[88] As the German Federal Constitutional Court rightly recognises in its climate decision, this also raises the interesting question of who the bearers of freedom are – individuals or generations? However, we leave this discussion for another occasion.[89]

Recognising a right to protection of the preconditions of freedom as the basis of climate protection also avoids encumbering the constitution with transient political issues (*Überkonstitutionalisierung*).[90] As the protection of the climate makes clear, preconditions for freedom are far from being the only factors that shape policy. Rather, they enable freedom itself, and hence the entire range of diverse political options within a democratic framework. Likewise, freedom prerequisites do not necessarily impact every conceivable policy area. For example, critics have warned against consequences for pension and social policy.[91] In doing so, however, they fail to recognise the vehement differences between elementary and non-elementary preconditions of freedom. Elementary and thus legally relevant preconditions of freedom, such as air, food, water or climate, concern precisely those preconditions on which humans can already have such an impact that irreversible and serious damage occurs, making it impossible to exercise freedom later. However, this is not the case for other areas, such as pension and social policy, which remain fundamentally open to future redesigns.

It is also unconvincing to reject the recognition of preconditions for freedom and its protection with reference to the derivation of fundamental rights and their classification primarily as defensive rights in the relationship between the state and the citizen. Such an understanding of fundamental rights is truncated.[92] In fact, it fails to recognise that conflicts over freedom do not take place exclusively in the bipolar relationship between state and citizen, but rather ubiquitously between citizens.[93] Freedom is multipolar.[94] Well-known doctrines such as *in dubio pro libertate* and Kant's statement that my freedom ends where the freedom

84 Cf. Beckmann 2021, p. 246.
85 Cf. with further references Kalis 2022a, pp. 99 ff.
86 The FCC speaks of an intertemporal protection of freedom, FCC 2021, paras. 117, 184.
87 FCC 2021, paras. 37, 117.
88 Cf. Kalis 2022b, Chap. I, D, 3, lit. c), aa), (2); shorter Kalis 2022a, pp. 99 ff.
89 FCC 2021, paras. 184 ff.
90 But see Franzius 2020, p. 10.
91 Cf. Beckmann 2021, p. 243; Ruttloff/Freihoff 2021, pp. 918 f.; Möllers/Weinberg 2021, p. 1077.
92 Cf. Kalis 2022a, pp. 99 ff.; see also Isensee 1983, p. 32.
93 Cf. Isensee 1983, p. 32; Calliess 2001, pp. 256 ff.; Ekardt 2021, pp. 273 ff.; Brönneke 1998, pp. 274 f.
94 Ekardt 2021, pp. 273 ff.; cf. Kalis 2022a, pp. 99 ff.

of others begins constitute a limited understanding of liberalism.[95] Conflicts over freedom, however, occur primarily among freedom bearers.[96] It is the essential task of the liberal democratic state to regulate these conflicts of freedom and thus to ensure the greatest possible realisation of freedom for all.[97]

In this respect, the prevailing understanding in Germany, among others, of a distinction between duties to protect and rights of defence is unnecessarily restrictive.[98] It arises from the question of the separation of powers and the fear that a control of protective duties by the courts, which is equivalent to the rights of defence, encroaches on the competences of the legislature. This fear is mistaken. Rather, an overstepping of competences can be prevented by applying a control by the courts that is similar to the proportionality test.[99] Thus, when protecting the preconditions of freedom by intervening in freedom rights, it is necessary, yet possible, to strike a careful balance of executive and legislative power.[100] The decisive factor is the greatest possible rationality and consistency of the decision.[101] In reviewing this balancing decision, the courts do not have to make their own balancing decision, which would probably also result in exceeding their competence, but rather review the absence of errors. Ultimately, however, this means that nothing other than the proportionality of measures to protect the preconditions and rights of freedom is the subject of judicial review.[102] From a legal point of view, climate protection measures instituted in this way are not *per se* steps towards an eco-authoritarian regime, but rather required by the democratic constitution.

Constitutions that guarantee the protection of liberty also secure the preconditions for the realisation of liberty. In this context, protection is not limited to the precondition of a specific fundamental and human right or a specific exercise of freedom. Rather, what is meant is the protection of freedom and its preconditions as a whole.[103] The protection of freedom understood in this way is at once part of the liberal democratic order.[104]

According to these standards, as climate change advances and its dangers reach apocalyptic proportions, even drastic restrictions of freedoms may not constitute unlawful acts. If there is a constitutional duty to protect the climate, the state's restrictions on freedoms do not by themselves constitute an eco-authoritarian regime, but rather serve to protect freedoms in the long run. Understood in this way, climate protection simultaneously protects the very substance of the democratic basic order.[105] This also applies if this protection leads to a lack of alternatives in the choices and options of the democratically legitimised state powers. Here, too, there is no authoritarian regime in the above sense of a form of state. Rather, due to physical planetary boundaries, the options are so limited that there hardly any alternative options for action. In this case, however, it is not the state that dictates restrictions, but

95 Cf. Isensee 1983, p. 47; Ekardt 2021, pp. 283 f.
96 For convincing examples see Calliess, pp. 312 f.
97 Isensee 1983, p. 4.
98 Cf. also with further references Kalis 2022a, pp. 99 ff.
99 Cf. Ekardt 2021, pp. 339, 342 ff.; cf. also for further references Kalis 2022ab, chap. D., II., 2., lit. b).
100 Ekardt 2021, pp. 342 ff.
101 Cf. Riehm 2006, pp. 94 ff.
102 For an extensive discussion on this see Kalis 2022b, Chap. D., II., 2., lit. b); cf. also Ekardt 2021, pp. 342 ff.
103 See FCC 2021, paras. 117, 184.
104 Cf. Ekardt 2021, p. 348; Ruland 1971, pp. 66 ff.; Hain 1999, pp. 244 ff.
105 Cf. Ekardt 2021, p. 348.

ecological limits presenting as a social reality.[106] However, such a progression to the point where eco-authoritarian rule seems to be the only option left can be averted through timely and ambitious climate protection.[107]

4. Resilience of the German Constitution

Having established that climate protection measures do not inevitably lead to an eco-authoritarian regime or to eco-authoritarian measures, in this section we examine the resilience of German constitutional law. In this context, resilience means both resilience against progressive climate change, i. e. the factually narrowing scope for action due to the effects of climate change, and resilience of the law against a systemic change towards eco-authoritarianism, i. e. the resilience of the essential components of the democratic system according to the German Constitution (GG).

Starting from democracy as a form of government based on a majority, one could take the view that it is precisely its majority-based nature that opens the path to eco-authoritarianism. Be it through an appropriate decision or through the majority's failure to implement ambitious climate protection measures. In that case, however, only the decision of the majority would stand between democracy and impending eco-authoritarianism. There would then be no resilience of democracy, no resilience of law. It is correct that the people have the option of a corresponding form of state, although this would be accompanied by restrictions on their own rights. The *pouvoir constituant* or the peoples' right to self-determination does not exclude alternatives to the free democratic basic order. Apart from such self-determination that gives rise to new constitutions, the free democratic basic order is certainly resilient to its own abolition. The defensive constitution (*wehrhafte Demokratie*) protects against eco-authoritarianism.[108]

The constitution itself – like the protection of universal human rights or, in this case, freedom as a whole – is designed to endure over time.[109] The so-called guarantee of eternity under Article 79 (3) GG specifies the unalterable elements of the constitution, which are valid forever, i. e. as long as the German state exists.[110] These elements include the principles laid down in Article 1 and Article 20 GG, i. e. human dignity and the liberal democratic basic order. The principles include the principle of democracy, the principle of the social state, and the principle of the rule of law.[111] The environmental state principle (*Umweltstaatsprinzip*) is not laid down in Article 20 GG.[112] It was not until the legislature amending the constitution introduced Article 20a GG that the state's responsibility for the protection of the natural foundations of life, including responsibility for future generations, was established.[113] Article 20a GG, which was most recently (re)interpreted by the German Federal Constitutional

106 On the relation of fundamental rights and the social reality see Kleiber 2014, p. 312.

107 Cf. FCC 2021, paras. 194, 247.

108 For resilient democracy (*wehrhafte Demokratie*) as a fundamental principle of the German constitution see Thiel 2003, pp. 1 ff.

109 See FCC 2021, para. 183; cf. Brönneke 1998, pp. 198 f.; Ekardt 2021, pp. 264 f.

110 On Art. 79 (3) GG as part of the resilience of the constitution see Zacharias 2003, pp. 57 ff.

111 Hain 1999, pp. 244 ff.; Ruland 1971, pp. 66 ff.

112 Söhnlein, however, holds that Art. 20a GG takes part in the guarantee laid out in Art. 20 GG, Söhnlein 1999, pp. 59 ff.

113 See on the history of Art. 20a GG Calliess 2001, pp. 105 ff.; Söhnlein 1999, pp. 46 ff.; Brönneke 1998, pp. 37 ff.

Court as the so-called climate protection requirement (*Klimaschutzgebot*),[114] has a temporal component.[115] Protecting the natural foundations of life - including the climate - requires a long-term legal basis, especially with regard to responsibility towards future generations. In its climate decision, the German Federal Constitutional Court emphasises the importance of Article 20a GG for constitutionally enshrined climate protection and, for the first time, explicitly classifies it as an objective-legal climate protection requirement.[116] Accordingly, Article 20a GG obliges the state to protect the climate.[117]

Due to the global nature of climate change, the climate protection imperative requires the state to seek not only domestic, but also international solutions.[118] It also contains an objective legal duty to protect future generations.[119] This duty can coincide with the objective duties to protect arising from fundamental rights, in particular Article 2 (2) GG,[120] such duties to protect based on fundamental rights can reinforce each other.[121] The target of the climate protection requirement is to maintain a temperature threshold.[122] If and when the constitutionally permissible temperature threshold is exceeded, the climate protection requirement obliges the state to limit greenhouse gas emissions to a neutral level.[123] This means that the climate protection requirement under Article 20a GG implies a duty to enable climate neutrality.[124] When weighed against other constitutional principles and constitutional rights, the climate protection requirement does not have unconditional priority.[125] However, in view of the largely irreversible nature of climate change, the relative weight of the climate protection imperative in the balancing act will continue to increase as climate change progresses.[126] The Federal Constitutional Court's statements on the so-called climate protection requirement is largely on point. At least it does not deviate from the basic principles of Article 20a GG. Rather, the Federal Constitutional Court applies these principles to the actual challenges of global climate change.

Based on the climate decision of the German Federal Constitutional Court, it is sometimes assumed that this protection over time leads to an intertemporal protection of freedom and the proportional distribution of freedom opportunities between generations.[127] However, constitutionally guaranteed climate protection over time understood in this way says nothing in principle about the form of government required or constitutional for this. The climate protection requirement thus creates a resilience of constitutional law against the advancing global climate change if it obliges the German state to ensure ambitious and timely climate protection. However, it neither secures the liberal democratic basic order

114 FCC 2021, paras. 117. 198 ff.; see also Härtel 2020, pp. 577 ff.
115 See FCC, Decision of the First Senate of 24 March 2021–1 BvR 2656/18 -, *et al.*
116 For an extensive discussion on Article 20a GG as so-called *Klimaschutzgebot* see Kalis 2022b, Chap. D., I., 2., lit. c).
117 FCC 2021, paras. 197 f.
118 FCC 2021, para. 199.
119 FCC 2021, paras. 193 f.
120 FCC 2021, paras. 146, 191.
121 FCC 2021, paras. 117, 246.
122 FCC 2021, paras. 192, 198.
123 FCC 2021, para. 198.
124 FCC 2021, para. 198.
125 FCC 2021, paras. 198, 246.
126 FCC 2021, para. 198.
127 Cf. Franzius 2021, p. 18.

from an eco-dictatorship beyond the environmental state, nor does it participate in the constitutionally guaranteed perpetuity, despite its inherent responsibility to protect over time. This is harmless, however, since the guarantee of eternity itself and the immutability of the principles laid down in Article 1 and Article 20 GG already ensure that the constitution is capable of defence.

As argued above, the principles laid down in Article 1 and Article 20 GG also include the preconditions of freedom and the preconditions of the liberal democratic basic order itself.[128] If progressive climate change deprives freedom as a whole as well as the free democratic basic order of their substance and then leads to a lack of alternatives in political design, it is necessary to undertake ambitious climate protection in good time in order to protect the elements of the constitution that fall under the guarantee of eternity. Article 79 (3) GG lays down which parts of the Constitution remain untouchable even by the legislature amending the Constitution. In particular, the principles laid down in Article 1 and Article 20 GG may not be deviated from. Admittedly, there is dispute about the scope of the principles protected by the constitution, especially in view of the absolute nature of the guarantee of eternity.[129] The dispute about the scope of human dignity protected by the guarantee of eternity, the inclusion of fundamental rights or of a content of human dignity lying in them, need not to be further elaborated here. Even the narrowest interpretation will assume at this point that the security of existence of Article 79 (3) GG guarantees the preconditions for the realisation of human dignity in the sense of material preconditions of freedom and equality.[130]

In other words, today's democratic legislators cannot stand by idly as climate change advances, and with it the pressure of necessity to adopt authoritarian measures. On the contrary, the constitution obliges the state to take timely and adequate action to protect the liberal democratic basic order. It is in this way that the constitution defends itself against the threat of an eco-authoritarian regime.

Of course, one could now argue that this defence of the liberal democratic basic order has little clout. With the above remarks on the preconditions for freedom as part of freedom and the liberal democratic basic order, the defensive constitution does not exist only on paper. Rather, it is the original bone of contention of this discussion – i. e. climate change litigation based on a subjective right to climate protection – that, as an instrument of climate protection, also contributes to the defensive capability of the liberal democratic basic order.

5. Conclusion and Closing Remarks

As the factual limits of the Earth system's resilience, i. e. in this case the planetary boundaries indicated by the global climate, are being reached or even exceeded, so are the normative limits of the Paris Agreement in the form of its maximum acceptable increase in global temperature. The ongoing postponement of ambitious climate protection measures contributes to the fact that effective climate protection will increasingly only be possible through massive restrictions on freedom. However, neither is an eco-authoritarian regime necessary

128 Cf. Kleiber 2014, p. 39; critical to the theory of natural preconditions to democracy is Humphrey 2007, pp. 84 ff. Humphrey underlines that these preconditions do not promote democracy but merely an anthropocentric argument for sustainability.

129 Cf. Hain 1999, paras. 59 ff.

130 See Hain 1999, para. 62.

to enforce a full brake on climate change, nor is a regime change looming because of recent legislation and court decisions that determine climate protection to be a state obligation. The spectre of 'eco-dictatorship' that haunts this debate is an overblown projection of fear and misinformation.

The recognition of existing constitutional imperatives for climate protection in the form of objective and subjective rights, i. e. in the form of a climate protection imperative (*Klimaschutzgebot*) and a right to climate protection (*Recht auf Klimaschutz*), does not change this assessment either. Indeed, the German constitution obliges the state to protect the climate and ultimately to initiate a transformation towards climate neutrality in good time. Likewise, as has been shown, the constitution grants a fundamental right to climate protection in the form of protection of the preconditions of freedom. The constitution thus initially proves to be resilient to global climate change, as it essentially prohibits an unhindered progression of the climate crisis. However, according to the above explanations, this does not yet imply a statement on the form of the state, i. e., on how to cope with the challenge without turning away from the liberal democratic order. Nevertheless, on this legal account as well, the fears of an impending eco-authoritarian regime prove to be unfounded. The liberal democratic basic order of the German constitution is resilient against such forms of systemic change. Rather, notwithstanding the existing climate protection imperatives, the obligation for timely and ambitious climate protection by the state already follows from the unalterable principles of human dignity and the liberal democratic basic order itself. Progressive climate change would undermine the future democratic legislator and the liberal democratic basic order as a whole. Insofar as the German constitution implies duties to protect the climate, it is already resilient against such developments.

But even if climate change cannot be stopped, or cannot be stopped completely, despite the constitutional imperatives to protect the climate and to protect the resilience of the free democratic basic order – for example, due to a lack of equivalent efforts by other states – democratic systems can survive. Restrictions on freedom may then be necessary and limitations on the legislative scope for margins of appreciation may be possible due to actual ecological boundaries. Social reality can be the factual basis for restrictions on freedom. But a system change to an eco-authoritarian regime is far from inevitable. Here, too, the German constitution proves to be resilient.

It is true that law cannot escape social reality. This realisation is by no means fundamentally new or even limited to climate change and other areas of ecological boundaries. Factual constraints of social reality that lead to restrictions of legislative scope or freedoms can also be found in other areas of life. Be it regarding demographic change and the factual power of the older population to shape parliament and policy, or with regard to multinational corporations, especially in the area of social media, and their global spheres of influence. The law, the constitution, however resilient, must take social reality into account. At least for climate change, however, the constitution obliges ambitious and timely measures, not least to prevent drastic developments.

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DOI 10.35998/fw-2022-0016

Strategies of Resilience during the COVID-19 Pandemic among Syrian Refugees Residing in Camps and Urban Areas in Jordan

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Abstract Using data drawn from interviews with Syrian refugees in Zaatari Refugee Camp and in the city of Irbid in Jordan, this study examines how they build resilience strategies and negotiate challenges in the context of migration, specifically during the COVID-19 pandemic and lockdown periods. The interviews took place between March and July of 2020. The findings show that despite many difficulties, refugees have responded to the crisis through specific strategies and adaptive mechanism which promoted resilience building. This was due to their perception and understanding of the pandemic, acquiring different meanings frequently compared to their past experiences surviving war while in Syria. Refugees in Zaatari demonstrated strategies of forming trusted networks whereas refugees in Irbid focused on family unity and on establishing solidarity with host community members. Mutual resilience strategies included strengthening faith during times of hardship and cultivating a collective sense of humor.

Keywords Resilience, COVID-19, Syrian refugees in Jordan, humanitarian aid, self-reliance and agency, social support

Resilienzstrategien syrischer Flüchtlinge in Lagern und städtischen Gebieten in Jordanien während der COVID-19-Pandemie

Abstract Anhand von Daten aus Interviews mit syrischen Flüchtlingen im Flüchtlingslager Zaatari und in der Stadt Irbid in Jordanien wird in dieser Studie untersucht, wie während der COVID-19-Pandemie – insbesondere während der Lockdowns – Resilienzstrategien aufgebaut und Herausforderungen im Kontext der Migration bewältigt wurden. Die Interviews fanden zwischen März und Juli 2020 statt. Die Ergebnisse zeigen, dass die Flüchtlinge trotz vieler Schwierigkeiten mit spezifischen Strategien und Anpassungsmechanismen auf die Krise reagierten, die den Aufbau von Resilienz förderten. Dies war auf ihre Wahrnehmung und ihr Verständnis der Pandemie zurückzuführen, die im Vergleich zu ihren früheren Erfahrungen mit dem Überleben des Krieges in Syrien häufig eine andere Bedeutung erlangten. Die Flüchtlinge in Zaatari zeigten Strategien zur Bildung vertrauenswürdiger Netzwerke, während sich die Flüchtlinge in Irbid auf den Zusammenhalt der Familie und die Solidarität mit den

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Mitgliedern der Aufnahmegemeinschaft konzentrierten. Zu den gegenseitigen Resilienzstrategien gehörten die Stärkung des Glaubens in Zeiten der Not und die Pflege eines kollektiven Sinns für Humor.

Keywords Resilienz, COVID-19, syrische Flüchtlinge in Jordanien, humanitäre Hilfe, Selbstständigkeit und Eigenverantwortung, soziale Unterstützung

1. Introduction

In 2020, the COVID-19 pandemic drastically affected all forms of human mobility, including global migration. Border closures, restrictions on humanitarian aid, enforced curfews, and social distancing all resulted in severe disruption of social networks and loss of livelihoods. The pandemic's impact affected refugees worldwide and imposed unforeseeable challenges on their day-to-day survival. In Jordan, a country in which 6.8 % of its population are identified as refugees, which also ranks as the third largest host country of Syrian refugees after Turkey and Lebanon (Global Migration Data Portal 2021), the pandemic outbreak has taken its toll on the health, social, and economy sectors. On 17 March 2020, King Abdullah II declared a state emergency under the "National Defense Law," which allowed military intervention to organize the public, close roads, and limit the movement of people (UNDP 2020). Measures such as cancelation of flights, imposition of curfews, curtailing public gatherings, and quarantine followed. On 22 March, the Government of Jordan (GoJ) announced that all shops would be closed except of pharmacies, bakeries, clinics, and medical laboratories. In refugee camps, international organisations (IOs) and United Nations (UN) agencies responded by reducing staff on the ground and imposing curfews in camps to limit any possibility of virus spread. Under these sudden and rapid measures, an estimated 10 million inhabitants found themselves, similar to other populations around the world, in a state of ruptured social life and economic instability.

Between lockdown and curfew periods in Jordan, many refugees lost their livelihoods and sources of income overnight. Not only that, but confinement in small spaces, particularly as enforced in refugee camps under the government's pandemic response, prompted frustration, anger, and violence. While COVID-19 pandemic emerged as a new phenomenon in many ways, its social and economic consequences for migrants were all too familiar. Similar to hardship settings in migration, the pandemic forced refugees as well as asylum-seekers to navigate and negotiate their way to the scant social, health, and physical resources available to them. They tried to revive and reshape existing social networks, seize social support when available, and access health resources to sustain their well-being.

This study provides original empirical findings to answer the following questions: Focusing on Syrian refugees in Jordan, what strategies and experiences of resilience emerged and developed during the lockdown, social isolation, and loss of livelihoods? And can the pandemic be perceived as an opportunity for new social practices to emerge?

This article starts with the context of COVID-19 pandemic in forced migration and its consequences on refugees and asylum seekers. It follows with the state of the art on resilience definition, characteristics, and strategies. Next, it examines Jordan's national and international protection and prevention measures to contain COVID-19 and safely respond towards refugees. The article proceeds with the methodology and empirical research findings before the discussion and conclusion.

2. Context of COVID-19 in Forced Migration

While the consequences of the pandemic have been felt globally, they have not been felt equally. According to the World Health Organization (WHO), refugees were among the groups whose social, economic, and physical well-being and safety faced greatest risk during the pandemic. Multiple significant pitfalls immediately surfaced because of lockdowns, ongoing limitations of human mobility, and enforced social distancing. These policies led to weakening of social networks, loss of employment and livelihoods, and increased incidence of violence and risks to health (WHO 2020). Examples of these patterns were documented among urban refugees facing malnutrition in Uganda after the loss of jobs and livelihoods (UNHCR 2020); and in the case of asylum-seekers in Greece left unattended in cramped and inhumane conditions (Human Rights Watch 2020).

During the pandemic, women have faced variety of challenges unique to their gender. The United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women) has noted that the spread of COVID-19 has elevated the risk of worsening gender inequalities as well as violence against women. Furthermore, reduced access to services related to reproductive health, pregnancy, and childbirth, in addition to limitations to psychological counseling, have resulted in further health risks disproportionately impacting women. Drawing from historical health challenges, the impact of the Ebola outbreak of 2013 to 2016 demonstrated how quarantines were linked to the reduction of women's economic and livelihood activities leading to an increase in poverty rates and food insecurity (UN-Women 2020). Empirical research has further examined how the pandemic deepened pre-existing inequalities along lines of class and gender. A study with refugee women in Durban, South Africa, illustrated the ways in which COVID-19 has exacerbated refugee women insecurities and intensified domestic violence as well as structural violence which resulted in housing and food insecurity (Mutambara/Crankshaw/Freedman 2022).

Scholars have already examined the link between the impact of the pandemic to deteriorating socio-economic status and mental health of many groups. For instance, immigrants and refugees found it extremely difficult to pay rent, maintain or regain employment, and even pay for basic utilities such as electricity, gas, and water (Aragona *et al.* 2020; Bukuluki *et al*. 2020; Kavuro 2022). Similar findings were also reported by the IO of Norwegian Refugee Council regarding Syrian refugees in Jordan where 71 % of respondents reported that they had lost all their household income by week four of the pandemic (NRC 2020). Ultimately, feelings of uncertainty, distress, anxiety, as well as economic and health insecurity amplified.

Amid COVID-19 outbreak, reports raised concerns regarding increased social stigma, discrimination, and violence against refugees and migrants. The intensified animosity stemmed from fear and false accusations that refugees and migrants were spreading the disease and infecting the population. This phenomenon has been documented across Europe, cited in reports on discrimination in Belarus for example (IOM 2021), against COVID-19 patients in Nepal (Singh/Subedi 2020), and against refugees in Sweden (Mangrio/Maneesh/Strange 2020). As a result of discriminatory attitudes, tens of thousands of refugees have been forced out from their accommodations and were exposed to higher risks of violence, stigma, abuse, and exploitation.

Some scholars have proposed constructive responses to these challenges. Khouzam and Verma (2020) presented recommendations to mitigate the economic consequences of COVID-19 and its challenges on internal displacement. Through a 'development' view, they proposed to rethink inclusive responses to the pandemic in cities by prioritizing stronger and more focused livelihood, housing, and employment programming. Other scholars have suggested a holistic approach steered by migrant-led organisations, civil society, IOs, and researchers working with migrant groups in the development of appropriate responses (Mukumbang/Ambe/Adebiyi 2020). Some of these recommendations stemmed from the view, especially at the peak of the outbreak, that the impacts of the pandemic on the global economy will be severe, disparate, and long-lasting (World Bank Group 2020). Thus, innovative solutions to mitigate economic and social tensions between all groups in the society should be prioritized.

This is the context in which the impact and consequences of the pandemic on refugees and vulnerable groups continue to emerge and develop. COVID-19 has affected everyone from refugees in remote and isolated camps to refugees living in precarious conditions in urban settings. The health crisis has illuminated numerous ways in which social, political, economic, and civic systems almost crumbled to fully meet the needs of refugees and their children (Bhopal 2020). Currently, scarce research exists focusing on the impact of the pandemic on refugees in developing and transit countries such as Jordan which is dependent on international aid. Research on refugees' resilience strategies remain important in these countries to understand how they adapt when faced with different types of adversity, particularly when humanitarian aid temporarily stop or become limited.

3. Resilience of Refugees

This section defines the term resilience for this study and examines empirical studies on resilient strategies as well as factors in forced migration which either promote or impede refugee's resilience.

Fiddian-Qasmiyeh *et al.* (2014) defined resilience as "the ability of individuals to anticipate, withstand, and bounce back from external pressures and shocks." Further expansion of the definition includes the role of collective communities and individuals' competence to harness and utilize resources to achieve well-being (Panter-Brick *et al.* 2018). Some scholars have criticized these definitions on the basis that they focus solely on actors' personal abilities and capacities. Stemming from these limitations, Pulvirenti and Mason argued that resilience "is a process, one that can be built through support, not just from within immediate refugee communities but also from the wider host community" (Pulvirenti/Mason 2011, p. 48). Other scholars have expanded the resiliency concept to include actor's capacities and their interactions with their social environment such as Ungar. He defined resilience in a broader conception as an ability and capacity of individuals to interact in their social environment in ways that optimize their developmental process (Ungar 2011).

For the purposes of this study, resilience is defined as a multilayered phenomenon of an individual's capacity to cope and maintain control under hardship while utilizing meaningful resources to function. It is a communal construct which includes refugees' broader social contexts in their community. Under this definition, resilience does not form independently in individuals, but instead through an interplay between mental and personal abilities, social

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experiences, and friction within and between social organisational networks, social groups, and resources.

Refugees around the world adopted several strategies to build resilience amid the pandemic. For instance, a study on the experiences of Tibetan refugees in India during COVID-19 showed that the ones who were practicing Tibetan rituals, religious and cultural practices became more resilient than their peers who did not. Moreover, resorting to literary activities, healthy diet and exercising resulted in a good mental health (Lhamo/Shukla 2021). Displaced Somali community in the United States, similar to many other refugee communities, encountered challenges during the pandemic. Such as the loss of jobs, suffering from social distancing, and facing difficulties accessing health services since many of them were uninsured. The study showed that focusing on faith and social connectedness has helped them bond together. Their community resilience has been catalyzed by common values and longstanding shared adversity, such as strong faith in God and social connection (Bentley *et al.* 2020). Comparably, scholars in forced migration studies have highlighted similar factors that contributed to refugees' resilience-building in transit and at country of destination. This included the role of religious and faith community networks (Ager/Fiddian-Qasmiyeh/Ager 2015; Fiddian-Qasmiyeh/Ager 2013), the existence or absence of trusted social networks and social capital, (Williams 2006), in addition to social and community support to provide employment (Alzoubi/Al-Smadi/Gougazeh 2017).

Several empirical studies examined factors that affect and influence resilience in refugees. For example, refugees' inability to obtain a legal status from the United Nations High Commissioner for Refugees (UNHCR) exposed them to vital dangers including inaccessibility to food, health, and education (Yotebieng/Syvertsen/Awah 2019, pp. 209–211). Other studies found that restrictions on refugee movement (Hynie 2018) and the prolonged conditions and implications of displacement (Doná 2015), influenced their ability to find housing and employment and impeded refugees' recovery and resilience process. Gender inequality and the engrained cultural and social norms dictating gender roles in patriarchal society, along with poverty and deprivation has been found as significant factors hindering women refugees from coping and adapting (Ensor 2014).

4. The COVID-19 Pandemic in Jordan

4.1. National, Institutional, and Organisational Response

On 8 March 2020, the Jordanian prime minister initiated the country's preliminary COVID-19 protection measures by closing sea, land, and air borders to all non-commercial cargo and non-diplomatic travel. The Ministry of Health (MoH) along with the Ministry of Interior (MoI) promptly sat up quarantine zones while hospitals and clinics increased the number of beds in their facilities. During the first week of March, MoH launched an educational website on how to minimize the transmission of COVID-19, enhancing outreach efforts via an agreement with Meta (formerly as Facebook) to promote its content and safety guidelines among Meta users. A medical task force initiated by MoH patrolled neighborhoods in cities to transport identified positive patients to clinics. Furthermore, they worked closely with IOs in refugee camps to provide test kits, masks, and hygienic products and refer patients to quarantine sites and clinics (Ministry of Health 2020). The Ministry of Education (MoE) suspended schools and universities, while educational curricula swiftly transformed to e-learning (Ministry of Education 2020). To ensure information and communication reached all target groups in the country, the MoE developed audio messages for radio and visual messages on TV encouraging children to practice good hygiene. Pandemic-related information and news updates were translated into sign language and Braille for the benefit of the aurally and visually impaired. Media networks remained alert to promote key updates as well to counter fake news aiming to disrupt public order.

The lockdown-imposed challenges on the sick, pregnant women, young mothers, and the elderly. To support these vulnerable groups, the GoJ utilized public transportation vehicles to distribute bread, grocery, gas, water, and baby formula to focal points in neighborhoods. Business leaders from the host-community contributed with monetary donations to support MoH pandemic response. Private businesses and firms such as Jordanian chemical companies which manufactured hand sanitation products distributed products for free. Some landlords waived rent for the month of April and May, and some restaurants distributed food to families in need before those businesses were mandated to close.

Jordanian NGOs and civil society organisations supported refugees and other vulnerable groups during the pandemic. For instance, the Jordan Women Union (JWU)[1] facilitated access to urgent medical and legal services as well as shelter to women who became victims of gender-based violence (GBV) during the pandemic (JWU 2021). Confinement at home led to mental and emotional fatigue. The average Syrian refugee family comprises of six to seven members.[2] Families in camps are confined to even smaller living spaces compared to those living in urban areas; these cramped conditions exacerbated feelings of isolation, frustration, and fatigue, which in many cases led to domestic violence. Tamkeen, another non-profit local organisation provided legal counseling to migrants and refugees (Syrians, Iraqis, Sudanese, Yeminis) whose rights were exploited by their employers during the pandemic, including arbitrarily dismissals, unpaid wages, and exposing them to health risks (Tamkeen 2020).

4.2. International Humanitarian Response Towards Refugees

Since the escalation of violence in Syria in 2010, over 1.4 million Syrian refugees have migrated to Jordan in search of safety and security. According to the UNHCR, Jordan currently hosts 673,957 registered Syrian refugees across its cities (UNHCR Operational Portal 2022). The largest populations of Syrian refugees reside in two major refugee centers: the Zaatari and Azraq camps located in Eastern Jordan. These two camps accommodate around 82,232 and 40,000 refugees respectively, while 538,113 Syrian refugees live in urban areas interspersed throughout the country (UNHCR Operational Portal 2022). Irbid, a city in northern Jordan, located approximately 40 km away from the Syrian border, accommodates the

1 JWU is a non-governmental organisation focusing to improve the status of women and children throughout empowerment programs, building capacity and awareness raising on their rights.

2 On 19 October 2020, the author interviewed Dr. Kilani, the representative from the Ministry of Interior for the Syrian Refugee Response Department. He pointed out that, on average, one Syrian infant is born every 20 minutes in Jordan. Previously, the Independent Newspaper revealed that Syrian husbands in Azraq Camp in Jordan discouraged their wives from using contraception, partly out of a sense of duty to repopulate the country. On average, 70 infants are born per month in that camp, https://www.independent.co.uk/news/world/middle-east/birth-rate-soars-jordan-refugee-camp-husbands-discourage-wives-using-contraception-a6928241.html (accessed on 28.09.2022).

third largest number of Syrian urban refugees with 136,563 persons. Along with the rest of Jordan, refugees have been on a complete lockdown since 31 March until May 2020 in response to the nationwide National Defense Law (Picheta/Qiblawi 2020). At times, curfew hours were also implemented from 6 p.m. to 10 a.m.

Humanitarian assistance and services were available and accessible to refugees in camps and in urban areas. UN agencies, IOs, and local organizations have coordinated various services and provided food, medicine and cash assistance to refugees during the lockdown months (Dunmore/Cherri 2020). UNICEF along with the World Food Program (WFP) coordinated rapid response projects to provide parallel support with the MoH to provide testing kits and refer patients to quarantine sites. Additional response efforts included an information strategy called "communication with communities" (CwC). This communication service aimed to disseminate key messages to all refugees through SMS regarding locations of mobile clinics. Last, five hotlines were activated in respond to the high reports regarding sexual and gender-based violence during lockdown, especially in camps (UNHCR/Inter-Sector Working Group Jordan 2020). Additionally, both groups benefit from the educational and health services provided by the government. According to MoH, all Syrian refugees who are registered with UNHCR receive equal access to health services with their Jordanian counterparts. Likewise, refugee children have free access to public schools in cities.

Zaatari Camp management put new measures in place to reduce transmission as well as infection among refugees. This included checking refugee temperatures, and placing controls on queuing for bread, water, and supplies. In terms of health measures, WHO along with MoH provided tests, masks, and hygienic kits to mobile clinics and medical centers in all refugee camps (MoH 2020). UN-Women together with the Jordan National Commission on Women have produced concrete recommendations on ways to mitigate the impact of COVID-19 on pregnant women. UNICEF continued to support essential water and sanitation services in Zaatari despite limited personnel. Similarly, Oxfam and World Vision continued to provide solid waste management services. Clinics in Zaatari enforced their referral mechanism of health networks.[3] Finally, camp management continued to impose restrictions of movement and curfews to limit Coronavirus transmission.

The living conditions and access to services for urban refugees living in formal and informal settlements in the city of Irbid differ from their counterparts in the camp. Since urban refugees are likely to be dependent on the host community and social networks around them rather than IOs, they pursue a wide range of professions, livelihoods, and activities. Many urban refugees practice various forms of entrepreneurship, including opening kiosks, providing educational tutoring, and engage in skilled labour such as agriculture, construction, or waitering in restaurants around the city. Also, refugee children have free access to public schools unlike the children residing in camps, who highly depend on camp-run educational opportunities organized by IOs. After the activation of defense law, all livelihoods were suspended in March, April, and May, and schools were closed. As a result, many urban refugees lost their livelihood, entrepreneurships, and main income.

3 For more information on the specific services and what agencies are involved on the ground, see the Syrian Regional Refugee Response by UNHCR under the COVID-19 Inter-agency coordination, https://data2.unhcr.org/en/working-group/251?sv=4&geo=36 (accessed in August 2022).

5. Methodology

5.1. Sampling Outreach

The author first contacted the UN-International Organization for Migration (IOM) main office in Amman. She explained the aim of the study and requested their assistance to outreach to Syrian refugees in camps and urban areas.[4] Since entry to refugee camps requires pre-approval from authorities, which might take months, IOM suggested Zaatari camp as they already have obtained accessibility and work there. JWU is located in Irbid and was suggested by IOM as a reliable and trusted implementing partner that could outreach to a wide sampling. Therefore, the sampling of this study can be considered as an unbiased random sampling. Consequently, JWU informed five households about the study.[5] The sampling by JWU yielded a total of 16 interviewed participants from Irbid. After obtaining respondent's consent, IOM provided the author with contact information for six all-male-headed households in Zaatari camp. The author was advised by an IOM-officer to talk with the male-headed household first and get his approval before reaching out to the wives, daughters, or sisters. The sampling by IOM yielded 12 interviews, covering an overall of 28 study participants.

5.2. Data Collection and Profile of Participants

This study involved a series of interviews conducted as part of a mixed-method approach. Interviews took place between 2 March 2020 and 27 July 2020. Quantitative information was collected through a questionnaire focusing on household demographics, including sex, marital status, educational level, and types of livelihoods. The author also conducted semi-structured interviews to collect qualitative information on respondents' access to social and health support during the pandemic, access to food and medical resources, types of family and community support, time spent in Jordan, and challenges encountered.

As Table 1 below shows, the 28 participants sample comprised of eleven females (39%) and 17 males (61%). 24 participants were literate (86%), while four had limited literacy skills, mainly difficulties in reading texts (14%). Respondent livelihoods included managing a kiosk, working in bakeries, providing private tutoring in math or Arabic language, and working as taxi drivers, gardeners, or logisticians. Others were unemployed, stay-at-home mothers, or students. The average respondent age was 32.2 years, and the average time spent in Jordan was five years and eight months.

Most of the follow up interviews were instigated by direct verbal contact through phone calls and online video conference. The author obtained verbal informed consent from all participants after reading a consent form outlining the purpose of the survey, guarantees of confidentiality of survey responses, and the voluntary nature of participation. Pseudonyms have been used to protect the privacy and safety of participants.

Participants were open in discussing the intimacies of their social lives and experiences comfortably. They considered the author as an outsider in the sense that she didn't identify

4 The author shared the study outline and interview questions with IOM and JWU beforehand for two reasons. First, to provide full transparency about the goal of this study. Second, to demonstrate that the questions of the study follow ethical considerations towards the subjects of research and aligned with the universal Do No Harm principle which states to avoid exposing vulnerable groups to risks through harmful questions or actions.

5 This study defines a household as a group of people living together in one place.

as either a Syrian, a refugee, or an official employee with one of the IOs or NGOs working for refugees in Jordan. Therefore, it was more likely to achieve an independent and neutral outsider view as researcher. This neutrality contributed to a stronger rapport and trust with the participants. Notably, gender dynamic was a present element during interviews. Identifying as a female contributed to building a quick rapport with women.

	N 28	%
Sex:		
Female	11	39
Male	17	61
Marital status:		
Single	5	18
Married	14	50
Divorced	3	11
Widowed	6	21
Can read or write a simple message in Arabic:		
Yes	24	86
No	4	14
Educational status:		
No school	4	14
Some primary	5	18
Intermediate	15	54
High school	4	14
Identified livelihood		
Food business (bakery, kiosk, café)	9	32
Educational services (tutoring)	2	7
Skills (agriculture, construction, taxi driver)	8	29
Employed by IOs (driver, logistics)	2	7
None	7	25

Table 1: Sociodemographic profile of the respondents

5.3. Data Analysis

The quantitative dataset was imported into SPSS for Descriptive Statistical Analysis. It included information about participants' sociodemographic composition as shown in Table 1.

This analysis offered some insights on the link between participants' literacy and educational level and their ability to read COVID-19 alert message via the CwC services and understand the health leaflets distributed to them. Qualitative questions were transcribed, translated to English, and imported into MAXQDA for content analysis (Mayring 2015). The dataset was then coded and analyzed based on themed codes developed through an inductive process. Upon completion of the analysis process, five representative finding themes were identified in the dataset.

5.4. Challenges and Limitations

It was challenging at the beginning of each interview to manage the expectations of participants. Most of them expected a financial reward or a gift of some kind for their cooperation in the study. On all occasions, the author firmly communicated to participants that no monetary rewards or any gifts of any sort would be provided, and that taking part in the study was purely voluntarily. Finally, since most of the follow up interviews were held over the phone, instable telephone signal and internet connection frequently interrupted the interview process. Interviews frequently required multiple call-backs; in some instances, it took days to complete one interview with one person due to incompatible schedules.

6. Research Findings

The findings of this study revealed resiliency strategies by Syrian refugees in Jordan during the long periods of lockdown and curfew hours between March to June 2020. These strategies enabled them to navigate conflicts arising between themselves and their challenging situations. The development of resilience in refugees residing in Zaatari camp and those in Irbid, is manifested as a process which simultaneously involves at both the individual and group level, rendering these two levels inseparable from each other.

6.1. Turning to God and Committing to Religious Beliefs and Rituals

Turning to religious rituals and strengthening faith to find meaning and calmness was one of the strategies followed by some participants to mitigate and navigate hardship during the lockdown. For those respondents that adopted this strategy, their approach stemmed from their understanding of the COVID-19 pandemic. Some refugees perceived the pandemic as a punishment from God, while others considered the virus to be a conspiracy orchestrated by a foreign power to break up close-knit communities through disruption of social and religious events. Other respondents compared the pandemic to previous experiences living through warfare, describing how the lockdown-related restrictions brought back memories of family separation and remote communication. Therefore, increasing the role of faith in shaping their outlook in these difficult and uncertain times became more important than ever to these respondents.

Ahmad, 26 years old, lives in an apartment in Irbid with seven family members. He explained his understanding of the global pandemic and his coping mechanisms as follows:

> *"It is a punishment from God. We forgot our elderly, we forgot our neighbors, and we forgot ourselves in this digital world. Now, we all have to sit home together to remind ourselves of our purpose of life, to worship God, and be kind to all humans."*

He is not alone in perceiving the pandemic in this way. His 59-year-old mother, Fidaa, agreed with her son. She believes the pandemic to be a test from God to distinguish devoted Muslims from those less committed. She stressed that “resilience in these hard times requires the acceptance of the pandemic as a test by God. Only by resorting back to [him], will one be protected.” In regard to the curfew and lockdown imposed by the government, Fidaa added: “We thank God that the protection measures are ones which forced us to stay home and not to be driven out of our home,” in a reference to her previous experience of being forced out of Syria. Since Fidaa found a home in Jordan, she does not perceive the lockdown as a negative situation. Instead, she perceives it as an opportunity to stay home, pray, and reflect on her life.

Others believed the pandemic outbreak to have much more earthy provenance. Saadi, a 52-year-old falafel vendor and refugee living in Zaatari refugee camp, believes that the Coronavirus is a man-made disease which at first, he claimed, was specifically designed to target the Muslims in China. According to Saadi, while the virus was designed by human hands, the pandemic was the result of a decision by God to punish all humanity later on. He shared:

> *“It is a conspiracy to destroy us. Our Islamic prayers are about solidarity and brotherhood. They are a collective call to God. Now, we are banned from going to Mosques by the camp management. But we protest by praying in front of the Mosque’s door.”*

Saadi explained that despite the curfew, his religious group did not comply with social distancing requirements and will continue to pray in the Mosque – *jammaa* – collectively in groups. He argued that God will only lift the punishment of the pandemic in response to continued prayers. Saadi added, “God has his wisdom; I am not affected by this disease now, but others are. We pray for all. Once you strongly believe in God, when you resort to and not forget [him], then you will be protected.”

Religion and spirituality are identified as major factors contributing to refugee resilience. Several studies have shown that resorting to spiritual beliefs and religion during difficult times is linked to enhancing a person’s psychological and physical wellbeing (Atefoe/Kugbey 2018). Turning to God (or a higher power) allows acceptance of a problem and cultivates a sense of individual control over one’s environment. Ahmad and his family in Irbid believe the pandemic to be a punishment from God, one that could only be protected from if people adopt a specific religious doctrine. In contrast, Saadi in Zaatari camp perceived the pandemic as a conspiracy by some foreign power against Muslims. Both groups found going back to religion a tool of solace, comfort, and resilience.

6.2. Strengthening Family Unity and Sharing Meaningful Activities

For Hussein and his family, the lockdown provided an opportunity for self-reflection, exercise, family bonding and developing a positive future outlook. Hussein, age 34, is a teacher; his wife Huda, 26, works as a secretary. Both described the pandemic as a temporary situation of hardship that is easy for them to deal with. They recalled their previous experiences fleeing conflict in Syria, and how their continual relocation during that time improved their ability to adapt to instability. For Hussein and Huda, the lockdown and uncertainties of the pandemic were relatively easy for them to face and navigate.

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During Huda's flight from Syria, at one point she was separated from her husband for a period of seven months, during that time she possessed no knowledge of Hussein's whereabouts. From a Jordanian transit camp in 2014 to an Emirati-Jordanian camp further east, Huda was the sole caretaker of she and Hussein's two boys, then aged four and two. Huda recalled constantly searching for food and health resources for her and the boys' wellbeing during fleeing war. Recalling that difficult period, Huda recounted:

> *"I did not even know if my husband was alive at that time […] having two kids alone through fleeing is not an experience I want to recall. But – Hamdullilla – thank God, now my husband is with us. So, if we survived that difficult time with little food and daily insecurity, then, today, living safely in this apartment, and most importantly being together and healthy, we can survive anything."*

Throughout their fleeing and transit experiences, Huda and the children lived on meager rations and in unstable shelter conditions. They spent one period living in temporary tents when the family's belongings were all stolen. Huda was forced to manage the little means they had, along with the support furnished by UN agencies, to cope and survive. After surviving fleeing war, for her, the lockdown and curfew in Jordan did not pose a serious challenge since they survived worst times fleeing the war, separation, and conflict in Syria.

When asked about daily life, Huda and Hussein noted that family activities, such as following dancing and aerobic-themed TV programs with the children, made their days easier. Huda added:

> *"It keeps them busy, and I also have a good time getting away from all the stressing news. I use a Treadmill at home, my husband started to use it too recently which motivates my children to discover other ways to [stay active]. Gardening on the balcony and finding creative ways to engage my children indoors helps my well-being because, in the end, everything is related. I feel calm, my family feels calm, too."*

Hussein pointed out that the organisational steps of the GoJ and UNHCR through the CwC SMS communication service brought a sense of relief and preparedness on what to do. The dissemination of knowledge, including where to go and whom to contact in various circumstances, made them feel less alone in their ordeal. A sense of structure and organisation during the lockdown provided a source of optimism and hope that, with the right policies and practices, the pandemic would be under control.

A positive outlook on the pandemic, particularly in terms of fostering family unity and sharing meaningful activities were key factors to strengthening resilience in the Hussein family. Resilience, to them, meant the ability to stay together and build capacity to support one another, as well as the collective process of enabling motivation, hope, and optimism among themselves and with others during the pandemic lockdown. The Hussein family, like other urban refugees that survived the war in Syria found the pandemic's challenges relatively easy to cope with.

6.3. Cultivating a Collective Sense of Humor

Humor has also emerged as a common coping strategy. Memes and jokes became means to navigate the suffocation of quarantine and lockdown by finding comfort through collective humor. Many participants shared that they received dozens of memes, jokes, and messages through social media, which helped to keep them in high spirits. Ahlam, a 22-year-old female student who lives in Irbid with her family of six, shared:

> *"Every day when I wake up, I check my messages. I am part of many groups online and we share [content on] different topics and tips on how to deal with stress during lockdown. Sometimes, it's just about sarcasm. For example, one joke which I received several times since COVID-19 started goes like this: two infamous proverbs shall no longer be told this year: 'all roads lead to Rome;' and 'seek knowledge though it be in China'," the joke referring to how the outbreak started in China and how Italy became marked as a red zone.*

Another joke emerged because of the repeated messages of MoH to wash hands and use alcoholic sanitizers. It reads: "it smells like alcohol now. I'm not sure if my neighbour is drunk or heavily disinfected." This joke is particularly amusing for some, in light of the cultural context in Syrian refugee communities of a conservative alcohol-free society. Other jokes poked fun at curfew hours, including a commonly shared maxim that: "the one who roams, loses his home," in reference to frequent arrests of individuals violating curfew regulations. Other jokes suggested using trained pigeons to deliver cigarettes during curfews and lockdown. Photos of pigeons had attached captions such as "safest delivery during curfew" and "activate the Pigeon App for free." Other messages humorously tackled issues related to gaining weight during quarantine.

Comic cartoon developed to highlight or mock newly emerging rules of social etiquette between people. Figure 1 below calls for people to stay home: it shows an individual unwilling to comply with the curfew tied to his chair with masks to keep him at home. Figure 2 reflects the new social practices of welcoming guests at home. On the one hand, as hygienic products became scarce and expensive, the host presents them to guests in a form of delicacy. On the other hand, the cartoon encourages the use of sanitizer and masks during social visitation as the new norm.

Figure 1: Comic cartoon showing an individual tied to his chair with masks to comply with the curfew.
Source: Jordanian cartoonist Emad Hajjaj, known in the Middle East as Abu Mahjoob.

Figure 2: Comic cartoon showing how hygienic products are presented to guests in a form of delicacy.
Source: Jordanian cartoonist Emad Hajjaj, known in the Middle East as Abu Mahjoob.

Collective participation in exchange of humorous content, including jokes and memes, befitted as means for individuals to navigate and mock challenges of lockdown and quarantine. For those participants, resilience involves moving through frustrations, including the emotional and mental fatigue of quarantine, with good spirits and a sense of humor. The jokes that took social media in Jordan by storm were a direct product of the contemporary social and cultural contexts and highlighted the daily problems facing those who shared those jokes with their peers. In this collective exercise of humor, many people found comfort.

6.4. Retrieving Control by Forming Closed Female Trusted Circles

All women interviewed from Zaatari camp shared that forming a cohesive, trusted group of a few women living in close proximity is crucial to managing the difficulties of daily life in the camp. Nowar and Samia, 24 and 31 years old respectively, were among the women who addressed unsafety and fear during lockdown and curfew hours in Zaatari camp. They shared stories of being harassed when going to washrooms and when walking back to their caravan blocks during permitted hours. Although these concerns existed before, the women reported that the situation worsened during quarantine periods and curfew times. Samia shared:

> *"We always felt like our dignity is less prioritized here. You know, we still get harassed when we go to washrooms. The management fixed the fence around the female washrooms fifteen or twenty times. But these boys cut it and sneak in. Now, with curfew and limited hours, I am afraid to go to the toilets. It has reached the point where I drink very little water at night, so I don't have an urge to go. Even with the curfew, people need to go to washrooms. At night, it is frightening when there is little movement of people out there."*

All women shared similar concerns, and they reported these concerns to the camp management. In response, camp managers fixed the fence around the washrooms, but this measure was not enough to prevent harassers from sneaking into female washrooms. Furthermore, as UNHCR reduced their staff on the ground during the lockdown, the women felt more insecure. These concerns were consistent with the reports of the Protection Cluster in Zaatari camp and feeling insecure were documented in the COVID-19 Response Update reports (UNHCR/Inter-Sector Working Group Jordan 2020).

Although UNHCR has launched an additional five hotlines in Zaatari Camp during the pandemic, the women reported that they were disinclined to report on sexual harassment because they believed the hotline existed exclusively for COVID-19 matters. One woman shared that reaching the hotline of domestic violence to report on incidents of harassment was not helpful. She hoped that action can be taken immediately to stop these harassers, but the telephone-helper guided her through a checklist (for example, to commute with a friend and not alone), and ended the call by "we don't have enough staff on the ground at the moment."

Frustrated with insufficient resources available, the women in Zaatari decided to take control of their own security and wellbeing. They formed a support group to care for each other. Responsibilities of group members included, for instance, to watch a fellow group

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member's child when she needed to run errands or visit the washroom. In addition, group members would also accompany each other whenever possible and text each other immediately if they felt threatened by potential harassers.

The support group also helped to keep all its members informed on the constantly evolving rules and guidelines of camp pandemic response. Group members capable of reading and writing supported those who had limited literacy skills. In general, illiterate camp residents were forced to rely on radio messages for news on COVID-19 and unable to benefit from the CwC service notices conveyed by SMS. These individuals could remain current on general national news, but not on camp-specific updates. To address this, women in the solidarity group took care to keep all members of informed of all updates, notifying one another about the content of CwC messages and educational leaflets distributed by camp management.

The COVID-19 protection and prevention measures were unprecedented to refugees. Most refugees in Zaatari Camp had never experienced regulation of daily life to the extent posed by COVID-19 protection and prevention measures. The limitations posed by these measures forced refugee women to seek their own solutions to everyday problems, leading to an increase in self-dependence rather than dependence on IOs or other agencies. Collective support, especially among women in refugee camps, is a common phenomenon in forced migration environments, but the reasons for the formation of these groups and their various *modi operandi,* are always unique to their context. For these women, resilience meant the ability to adapt to the pandemic through their own competence, to communicate with each other for safety, and to proactively negotiate new challenges in their environment in order to move forward. These strategies of support signal communal cohesion and enhance trust and mutual caretaking during insecure times.

6.5. Reconstructing Communal Solidarity and Social Cohesion with the Host Society "Status divides, Corona unites" المكانة الاجتماعية بتفرقنا و كورونا بتوحدنا

Most of the refugees interviewed in Irbid talked proudly about their experiences of social bonding, support, and solidarity with members of the host community during the lockdown. The famous slogan "Status Divides, Corona Unites" arose during the pandemic and was promoted by most of the participants living in Irbid. The slogan was often circulated between social media users along with pictures of people helping one another.

Throughout the COVID-19 pandemic, and particularly during periods of lockdown, social tension among urban refugees and native residents seemed to diminish amid a growing sense of communal solidarity and friendliness. Twelve urban refugee households interviewed in the course of this study shared similar findings. Each of the survey respondents reported acts of support and friendly initiatives from the host community, lending credence to the slogan "Status Divides and Corona Unites." The slogan points out that difficult ordeals have the power to unite people regardless of social status. Rami, a 32-year-old pastry vendor, commented:

> *"You know, it's all over the news. It's not only in Irbid or Jordan or in camps; it's all over the world. So, people anywhere can relate to Corona. We received a call from our landlord, and he nicely checked on us and asked if we need anything. It meant a lot to us just to feel that we are not alone in this. He offered to waive the rent for the month of April and that we can pay half rent in May."*

Solidarity and communal support between refugees and host communities took various forms. Khaled, male, 47 years old, expressed his empathy for those who lost their main source of income over night. He explained that when his family was living in a refugee camp before moving to Irbid, they occasionally went days without any source of income. Despite the assistance of IOs, it is a matter of pride for many refugees to be able to provide for the family. Khaled recalled, "when my child asks me for a pack of chips or candy from the shop, I can't afford it, but I can't tell him that. It really hurts." Due to his previous experience, Khaled felt the need to share his food and cooking gas with his Jordanian neighbor in the same building. He said that he never experienced any animosity or unfriendliness from them. He affirmed that in these difficult times: "we are all brothers; we are all fathers, and we understand that being able to provide for our family is important regardless of where we come from."

These findings challenge previous empirical studies which characterized the relationship between Syrian refugees and members of the host community in Jordan as one of social and economic tension. For example, aggression and animosity between the two groups were highlighted in some studies due to competition over limited employment opportunities. Syrian refugee workers in Jordan are willing to work for little compensation, which makes them attractive to employers. As a result, many employers terminated contracts with Jordanian employees and replaced them with skilled Syrian workers. Similarly, landlords perceived the refugee crisis as an opportunity to increase rent, given the rising demand for a limited supply of real estate. While the monthly income for Jordanians remained limited, many Syrians were supported by IOs and received a stable monthly allowance. As a result, landlords preferred to rent their properties out to Syrians with higher rental fees (Achilli 2015). Furthermore, a study conducted by the Japan International Cooperation Agency (JICA) in 2018, pointed out that the high influx of Syrian refugees in a short time clustering in specific areas in northern of Jordan resulted in "the decline in levels of public services, such as water, electricity supply, and waste management." As a result, members of the host community blamed the decline on the influx of refugees, leading to conflict between the two groups (Yamamoto 2019). Baylouny and Klingseis (2018) observed that rapid population surges caused by refugee migration caused significant curtailment of water deliveries. Overall, these events have resulted in heightened social tension between the host community and urban refugees, occasionally leading to inter-group acts of criminality and subsequent police intervention.

During the pandemic, empathy, solidarity, and sharing of resources between the two groups signaled reciprocal cooperation and allowed resilience strategies to emerge among refugees. Resilience, to this urban refugee group of respondents, signified unity, cooperation and harnessing of resources to successfully navigate difficult times. Refugees did not feel alone in this hardship, but rather supported by surrounding members of the host-community. Although members of the host-community were not the focus of this study, urban refugee respondents shared anecdotes of solidarity and support initiated by members of the host-community. Similar gestures of mutual support were also initiated by the refugees towards members of the host-community, which further supports the conclusion that intergroup solidarity during the pandemic was a mutual phenomenon.

7. Discussion and Conclusion

The emerging of resilient strategies by Syrian refugees in Jordan during the pandemic draw on two main arguments: First, resilience for them showed as a developing process that is not formed in a linear way but through multiple experiences in their life. This means that it is a construct which does not form independently but includes broader social contexts in their community. As shown, Syrian refugees learnt from their past experiences to cope better in the present. When they were asked about life under lockdown, they were quick to recall experiences of wartime in Syria. Comparing present life under the pandemic to past experiences of war were noted in the closing of borders, inflated demands on essential commodities, and the resultant product scarcity especially on basic food, hygiene, and toiletry items. The application of the National Defense Law, which allowed the military to deploy troops in the streets and restrict people's mobility, reminded them of checkpoints and border crossings. To move through these challenges, strategies of resilience in their case focused on a collective approach inseparable from their social context.

The Hussein family, for instance, immediately focused on maintaining family unity and seize organizational support provided by the government and UNHCR. Having been previously separated in the war, they realized the importance of fostering family unity and staying optimistic that this hard time will also pass. Fidaa, Ahmad, and Saadi focused on strengthening faith and spirituality. Despite the curfew and ban on gatherings, Ahmed remained committed to pray in groups. Religious and spiritual rituals helped to cultivate internal strength and improve their psychological well-being. These findings support already existent strategies of refugees that associates with the role of family, social support, and faith to resilience-making in adversity (Porobić 2020; Hutchinson/Dorsett 2012; Ager *et al.* 2015; Fiddian/Qasmiyeh/Ager 2013). Ahlam navigated through humor which became a mean to navigate the confinement of quarantine and eased frustration of social isolation. All strategies eased acceptance of the problems and cultivated a sense of control in them.

The second argument demonstrates that social rupture – because of long lockdown periods, social isolation and limited social support – pushed many participants to seek self-efficacy and independence instead of relying on intervention by IOs and NGOs. For instance, the reduction of IOs and NGOs' staff on the ground counterintuitively produced positive developments for some refugee women in Zaatari Camp. Although staff reduction in Zaatari fueled insecurities among refugee women, it also urged them to take greater control over their own security, increase their agency, and become less reliant on external actors. The findings here build on already identified strategies of refugee women in the absence of their male guardians or adequate humanitarian help. For example, Sudanese refugee women in refugee camp in Kenya lived in closed proximity to each other for protection (Gladden 2013). Rupture in Rhino Camp settlement in Uganda forced refugee women to renegotiate gender relations which ultimately led to their self-empowerment (Krause 2014). Forming and leading a support group in Zaatari, similar to what Nowar and Samia did, challenged not only the view of perceiving refugee women as helpless actors, but also revealed strategies of how they can further be resourceful, self-reliant and succeed without external help.

Moreover, linked to rupture, the loss of livelihood and source of income prompted a wave of solidarity, communal help, empathy, and collective support between urban refugees and members of the host communities. In the context of this study, this phenomenon was observed primarily among urban refugees in Irbid, likely because refugees in Zaatari camp have very limited exposure to other social groups outside of the professional staff of support organisations. The stable monthly allowance from UNHCR to refugees facilitated a sense of economic security to cover their basic needs during lockdown periods. Some of these refugees elected to use part of this allowance to provide food and other resources to members of their host community as in the case of Rami and Khaled. In other cases, host community landlords extended support to refugees by waiving rent during early months of the crisis.

These reciprocal gestures between the two groups show that social ties and networks of refugees can change, develop, and transform at times of adversity. The analysis also challenged existing literature on social tensions between Syrian refugees and Jordanian host communities (Yamamoto 2019; Baylouny/Klingseis 2018). Often, forced migration research focus on what the host-community can provide to refugees and not *vice versa*. The social and economic consequences of the pandemic revealed a transfer of responsibilities from external humanitarian actors to refugees themselves. A renewed view on the relation between refugees and host communities challenge the static way of thinking that resources and initiatives always have to come from IOs or host-community but not from refugees. However, the findings here showed otherwise, proving that refugees proactively initiated to help members of the host-community.

In conclusion and reverting to the main questions in this article, the author sought to explore what strategies and experiences of resilience emerged during the lockdown of the pandemic and if the hardship of the pandemic promoted opportunities for new social practices to emerge. The results of the analysis have shown that several resilient strategies have emerged among Syrian refugees. They were: strengthening faith during times of hardship, cultivating a collective sense of humor, family unity, forming trusted networks, and establishing solidarity and fostering connections with members of the host community. Furthermore, the analysis showed that rupture can be a driving force for positive change and opportunities. As some refugees were able to achieve self-efficacy and independence instead of relying on intervention by IOs and NGOs, others reinforced collectiveness and solidarity with other social groups through sharing of limited resources and reciprocal help.

Finally, the results of this study might be of interest and relevant to humanitarian actors and policy makers in the field of migration as well as to practitioners wanting to improve their aid efforts. The outcomes suggest to decision-makers to rethink of ways to foster refugees' agencies and capabilities. Building their capacities serves as a long-term solution to their resilience process instead of merely providing short term on-ground assistance like food, medicine, and shelter. This way refugees can demonstrate self-reliance, resilient function, and overcome challenges without the constant dependency on humanitarian intervention in its current form.

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F-W Vol. 95 | 2022 | Issue 3–4 | P. 384–401
DOI 10.35998/fw-2022-0017

Existenzialistische Kriegsauffassung – Portrait einer vergessenen Konzeption des Krieges

Michael Hanzel*

Abstract Krieg ist eines der zentralen Motive der ältesten schriftlichen Überlieferungen der Menschheitsgeschichte. Das systematische Nachdenken über diesen hat heute eine mindestens zweieinhalbtausendjährige Geschichte. Betrachten wir solche Erzählungen genauer – man könnte bei ausreichender Komplexität und Systematik solcher dann von Kriegstheorien sprechen – so fällt auf, dass der Krieg hier in völlig unterschiedlicher Gestalt erscheint, wobei das Bild jenes dabei in entscheidender Weise von der jeweils eingenommenen Perspektive auf diesen geprägt ist. Im Rahmen des Artikels soll eine im heutigen Diskurs weitgehend vergessene Betrachtungsweise des Krieges beleuchtet werden. Dieser widmet sich dabei sogenannten existenzialistischen Kriegsauffassungen deren Logik, Form und Argumentationsfiguren hier systematisch nachgezeichnet, dargestellt und exemplifiziert werden sollen. Ziel dessen ist es dabei ein überblickartiges Portrait solcher im sozialwissenschaftlichen Diskurs der Gegenwart kaum mehr präsenten existenzialistischen Kriegsauffassung zu zeichnen, um solche dadurch für den aktuellen Diskurs des Fachs sicht- und nutzbar zu machen.

Keywords Krieg, bewaffneter Konflikt, Bellizismus, Sozialwissenschaften

Existentialist Conceptions of War – Portrait of a Lost Notion

Abstract War is a central motive of even the oldest manuscripts of human history. The contemplation about war has at least a two and a half thousand-year history. By closely observing such traditions of war – one could refer to these by sufficient complexity and classification as military theories – it is apparent that war appears in entirely different shapes. The image of war is here vitally informed by the taken perspective. In the scope of this article, such an, in the current discourse widely forgotten, view of war shall be illuminated. This article is devoted to so-called existentialist conceptions of war, which logic, form, and figures of argumentation will here be traced, portrayed, and exemplified. The aim is to draw a brief portrait of such existentialist conceptions of war, which are merely present in current socio-scientific discourse, with the goal of making them visible and usable for current academic discourse.

Keywords war, armed conflict, bellicosity, social sciences

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1. Der Krieg in den Sozialwissenschaften

Für Sozialwissenschaftler*innen, welche sich mit dem Krieg beschäftigen, gilt es zunächst zwei zentrale Fragen zu beantworten. Warum macht es aus sozialwissenschaftlicher Sicht überhaupt Sinn, sich mit dem Krieg zu beschäftigen? Und welche Erkenntnisse lassen sich aus einer solchen Analyse gewinnen? Zu klären ist damit also, inwiefern ein Verständnis des Krieges die Analyse sozialer Verhältnisse und Strukturen sowie der Interaktion zwischen gesellschaftlichen Gruppen voranbringt. Versuchen wir uns an einer Antwort auf jene Frage, so lässt sich anführen, dass der Krieg als eines der ältesten Motive menschlicher Geistes- und Kulturgeschichte bezeichnet werden muss, stellen Berichte bzw. Erzählungen über diese doch eine der frühesten Textgattungen schriftlicher Überlieferungen der Menschheitsgeschichte dar (vgl. Habermas 2019, S. 280 f.).[1] Hieraus resultiert dann vielleicht auch die Prominenz des Krieges als literarisches Motiv, erwies sich dieser über weite Strecken der Menschheitsgeschichte hinweg doch als zentraler Faktor für das Überleben bzw. Überdauern von Staaten, Kulturen und Gesellschaften, denn es mussten sich solche in der Regel doch früher oder später gegen äußere Feinde verteidigen.

Neben einer solch konservativen, also bewahrenden Funktion des Krieges im Hinblick auf die Verteidigung der eigenen Kultur bzw. Gemeinschaft, weist dieser jedoch auch ein durchaus progressives, um nicht zu sagen transitorisches Moment auf. Denn vor allem in Zeiten disruptiv-gesellschaftlichen Wandels, also an der Schwelle politischer, sozialer und kultureller (Epochenum)Brüche übt der Krieg einen nicht zu unterschätzenden Einfluss auf die gesellschaftliche Ordnung aus. Dieser fungiert hier sowohl als Motor solch radikal-gesellschaftlicher Transformationsprozesse wie auch als gemeinschaftsstiftendes, ideologisches Fundament sich im Zuge dieser neu herausbildenden sozialen und politischen Formationen. So ist neben dem Großteil der europäischen Nationalstaaten[2] dann auch die Charta der Vereinten Nationen durch die spezifischen Erfahrungen des Krieges geprägt, um hier nur zwei Beispiele einer solchen durch den Krieg angestoßenen Neujustierung grundlegender gesellschaftlicher Ordnungsvorstellungen aus der jüngeren Geschichte zu nennen.

Somit kann dann auch für eine umfänglichere sozialwissenschaftliche Beschäftigung mit dem Thema Krieg argumentiert werden, scheint dieser doch durchaus gesellschaftliche Implikationen über rein militärstrategische Fragen hinaus zu besitzen. So lassen sich neben den primär politikwissenschaftlichen Fragestellungen der Geopolitik und staatlicher Interaktionsbeziehungen auch für zentrale soziologische Themen entscheidende Impulse aus einer sozialwissenschaftlichen Beschäftigung mit dem Krieg gewinnen. Denn es lassen sich, wie

1 Die anderen beiden Textgattungen solch schriftlicher Überlieferungen früher Zivilisationen sind neben Berichten über den Krieg verwaltungstechnische Auflistungen wie Ressourcenbestände, Einnahmen und die Deklarationen von Herrschern sowie religiöse Erzählungen.

2 Eine Untersuchung des Deutschen Historischen Museums zeigt, dass sich das Motiv des Krieges im Großteil der Gründungsmythen der europäischen Nationen findet, vgl. Langewiesche 2003, S. 1. Folglich konstatiert Langewiesche dann auch: „Ohne Kriegsmythen kam in den Vorstellungen des 19. Jahrhunderts keine einzige Nation aus“, Langewiesche 2003, S. 2. Krieg ist hier jedoch keineswegs lediglich eine romantische Vorstellung in den Mythen und Erzählungen der europäischen Geistesgeschichte, sondern auch eine historische Konstante der Nationalstaatsbildung. Und so stellen dann auch Planert und Frie fest: „Kriegerische Gewalt ist vom Aufstieg des modernen Staates nicht zu trennen“, Planert/Frie 2016, S. 2, sehen diese doch wie Langewiesche auch im gemeinsamen Kampf, Leiden und Opfer einen zentralen Faktor für die Herausbildung des Nationalbewusstseins als notwendige Grundlage jedweder Nationalstaatsbildung, vgl. Planert/Frie 2016, S. 9; Langewiesche 2019, S. 267.

ich zu argumentieren versucht habe, durchaus Einflüsse des Krieges auf die Struktur der gesellschaftlichen Verhältnisse sowie deren Wandel nachweisen. Damit erscheint dann auch für zentrale sozialwissenschaftliche Anliegen und Forschungsinteressen eine Beschäftigung mit dem Krieg als spezifische Form menschlicher bzw. staatlicher Interaktion sinnvoll.

Im krassen Gegensatz zum Einfluss des Krieges auf die Herausbildung der Strukturen der modernen Welt besitzt das Nachdenken über diesen in den Sozialwissenschaften jedoch keine besonders ausgeprägte Tradition (vgl. Giddens 1985, S. 22; Joas 2000, S. 184). So stellen Joas/Knöbl bspw. fest: Es haben alle bedeutenden Soziologen der Nachkriegszeit „eine mehr oder minder systematische Theorie der Gesellschaft ausgearbeitet, ohne daß ihnen darüber der Krieg und die mit ihm verbundenen Phänomene überhaupt zu einem ernsthaften Problem geworden wären. [… Denn es ist] Gewalt, sei es im Inneren von Gesellschaften, sei es solche zwischen Staaten, in der Geschichte der Disziplin nie zum zentralen Thema gemacht worden“ (Joas/Knöbl 2016, S. 11). In den Sozialwissenschaften kam es viel eher zu einer Abspaltung der Kriegsforschung in randständige Subdisziplinen, von welchen aus dann kaum mehr Einflüsse auf die Entwicklung des Faches auszumachen sind (vgl. Joas 2000, S. 185; Joas/Knöbl 2016, S. 243 f.). Es liegt die Kriegsforschung in den Sozialwissenschaften damit sowohl historisch betrachtet[3] als auch im heutigen Diskurs erstaunlich brach. Und dies, wo doch das 20. Jahrhundert in entscheidendem Maße vom Krieg geprägt war.[4] „Who, living in the twentieth century, could for a moment deny the massive impact which military power, preparation for war, and war itself, have had upon the social world?“ (Giddens 1985, S. 22).

Joas/Knöbl als auch Giddens führen diesen Umstand dann primär auf den Einfluss des Liberalismus und dessen fortschrittsoptimistisches Bild der menschheitsgeschichtlichen Entwicklung zur Zeit der Entstehung des Faches zurück (vgl. Giddens 1985, S. 22). Dem Krieg wird in einem solchen Denken keine größere Bedeutung zugemessen und infolgedessen auch keine systematisch-analytische Betrachtung zu teil, weil dieser für den Entwicklungs-, und damit im liberalen Denken, Fortschrittsprozess der Menschheit als bestenfalls voraufklärerisch und schlimmstenfalls temporäre Entgleisung einer solchen Entwicklung erscheint (vgl. Joas/Knöbl 2016, S. 11, 13). „Die Soziologie insgesamt hatte sich […] ein lineares, in bezug auf Brüche und Zäsuren geglättetes und fortschrittsgläubiges Geschichtsverständnis zu eigen gemacht, so daß ihr Krieg und Gewalt nur mehr als Störfaktoren erschienen“ (Joas/Knöbl 2016, S. 258). In den das Fach der Sozialwissenschaft im 20. Jahrhundert prägenden Modernisierungstheorien ist deshalb auch die Vorstellung einer weitgehend gewaltfreien Moderne vorherrschend (vgl. Joas/Knöbl 2016, S. 246). Dies sieht auch Nieraad, der die beinahe durchweg negative Bewertung von Gewalt auf die in der Soziologie des 19. Jahrhunderts verbreiteten Vorstellung einer historischen Zivilisierung (und damit der Kontrolle oder gar Überwindung der Gewalt) zurückführt (vgl. Nieraad 2002, S. 1279). Hinzu kommt dann noch, dass die soziologische Gewaltursachenforschung dazu neigt, Gewalt zu pathologisie-

3 Es beschäftigten sich weder die liberalen (Durkheim, Spencer), noch linken (Marx) Vordenker des Faches mit dem Einfluss des Krieges auf die Gesellschaft, da beide Gruppen, wenn auch in unterschiedlicher Weise, an eine Pazifizierung der Gesellschaft im Zuge des sozialen Fortschritts glaubten. Für eine ausführlichere Darstellung hierzu siehe Giddens 1982, S. 22 ff.

4 Der Erste Weltkrieg als Urkatastrophe des 20. Jahrhunderts, die Neuordnung der Welt nach dem Zweiten Weltkriegs, die gewaltsame globale Dekolonisationsbewegung und die zahlreichen Stellvertreterkriege zur Zeit des Kalten Krieges sind hier nur einige zu nennende Beispiele.

ren (vgl. Spreen 2010, S. 55) bzw. als inhuman zu beschreiben (vgl. Nieraad 2002, S. 1281).[5] Beides führt dann ebenfalls nicht zur Priorisierung des Nachdenkens über den Krieg in der Sozialwissenschaft.

Hierauf reagierend will dieser Artikel einen Beitrag zur systematischen Betrachtung des Krieges aus sozialwissenschaftlicher Perspektive leisten. Ziel dessen ist es, die zentralen Charakteristika einer spezifischen Betrachtungsweise des Krieges, sogenannter existenzialistischer Kriegsauffassungen, herauszuarbeiten sowie bedeutende Unterschiede einer solchen Konzeptualisierung des Krieges zur verbreiteten instrumentellen Betrachtungsweise zu verdeutlichen. Denn solch existenzialistische Auffassungen des Krieges stellen in der generell spärlichen sozialwissenschaftlichen Beschäftigung mit der Thematik eine weitgehend vergessene Randposition dar. Sinnvoll erscheint mir die nähere Beschäftigung mit jenen dann aber gerade deshalb, handelt es sich bei solch existenzialistischen Kriegsauffassungen doch um eine Perspektive auf den Krieg, welche sich drastisch von den heute verbreiteten (instrumentellen) Betrachtungen des Krieges unterscheidet. Ziel des Artikels ist es, die Charakteristika solch existenzialistischer Kriegsauffassungen herauszuarbeiten und zu präsentieren, um dadurch eine heute beinahe vergessene Konzeptualisierung des Krieges zu beleuchten und erneut in den sozialwissenschaftlichen Diskurs einzubringen.

Denn auch wenn mit dem Ausbruch des Russland-Ukraine Krieges nun im sozialwissenschaftlichen Kontext verstärkt über jenen nachgedacht und geschrieben wird, geschieht dies quasi ausschließlich unter der Perspektive einer instrumentellen Betrachtung des Krieges. Im Zentrum der Überlegungen stehen dann bspw. Kriegsziele, Strategien, Kräfteverhältnisse und Ressourcen, allesamt typische Motive einer instrumentellen Betrachtungsweise des Krieges. Und obwohl solch sozialwissenschaftliche Analysen des Konflikts durchaus zu begrüßen sind, verfestigt sich dadurch doch auch die in der zweiten Hälfte des 20. Jahrhunderts dominante (rein) instrumentellen Perspektive auf den Krieg. Dabei kaum in den Blick geraten die typischen Motive existenzialistischer Kriegsauffassungen wie bspw. die Unberechen- bzw. Unkontrollierbarkeit von Kriegen sowie Fragen einer sich entwickelnden eskalativen Eigenlogik solcher, welche sich rein instrumentell-strategischen Überlegungen weitgehend entziehen.

Die sozialwissenschaftliche Forschung scheint damit aktuell nicht ihr volles Potential zur Einordnung, Beschreibung und Analyse bewaffneter Konflikte und Kriege zu nutzen, bleiben existenzialistische Perspektiven auf jene in der aktuellen Beschäftigung mit der Thematik doch weitgehend unberücksichtigt. Darüber hinaus scheint auch der historische Stellenwert solcher im Fach unterschätzt, da solch existenzialistische Kriegsauffassungen in den vergangenen Jahrzehnten weitgehend in Vergessenheit geraten sind. Der Text richtete sich damit gezielt auch an die große Zahl an SozialwissenschaftlerInnen, Friedens- und KonfliktforscherInnen, die bisher nicht mit einer starken historischen Ausrichtung primär zum Thema Krieg forschten, bspw. im Kontext des Russland-Ukraine Konflikts nun allerdings verstärkt mit diesem in Berührung kommen. Ziel des Textes ist es deshalb die im Folgenden präsentierten zentralen Merkmale existenzialistischer Kriegsauffassungen pointiert herauszuarbeiten sowie prägnant und übersichtlich zusammenzufassen. Dabei zielt der Artikel

5 Es ließen sich darüber hinaus noch weitere Ursachen für das nur geringe Interesse des Faches an der Kriegs- bzw. Gewaltforschung identifizieren. Siehe für eine ausführlichere Darstellung Spreen 2010, S. 52–57.

darauf im Sinne eines Einstieges einen knappen Überblick über das Thema zu präsentieren, keine vollumfängliche Analyse dieses vorzulegen.

2. Zwei Perspektiven auf den Krieg

Trotz des angesprochenen generell geringen Interesses der Sozialwissenschaft an der Thematik des Krieges, lassen sich, bei genauerer Recherche, doch einige (wenige) Texte identifizieren, welche systematische Überlegungen zum Krieg anstellen. Im deutschsprachigen Raum sind hier, im Zeitraum der vergangenen 30 Jahren, vor allem die Arbeiten Trutz von Trothas und Herfried Münklers zu nennen. Auf Münkler geht dabei auch ein grundlegendes Schema zur Klassifikation sog. Kriegstheorien zurück, welches dabei grundsätzlich zwei Kriegsauffassungen unterscheidet. Münkler bezeichnet diese als instrumentelle und existenzielle (bzw. existenzialistische) Kriegsauffassungen, eine Terminologie, welcher dieser Artikel folgt. Die beiden unterschiedenen Kriegsauffassungen, man könnte hier auch von Perspektiven auf bzw. Konzeptualisierungen des Krieges sprechen, charakterisiert Münkler dann wie folgt: „Die instrumentelle Kriegsauffassung ist und bleibt bezogen auf eine unfraglich legitime politische Ordnung; diese definiert die Zwecke, die zu erreichen der Krieg das Mittel ist. Anders die existenzielle Auffassung des Krieges, in welcher der Krieg wohl auch ein Mittel ist, aber nicht ein Mittel zur Verfolgung vorgegebener Zwecke, sondern eines, das seinen Zweck selbst erst hervorbringen soll" (Münkler 1992, S. 108).

Einer instrumentellen Auffassung des Krieges folgend, stellt der Akt des Krieges damit ein Instrument zur Erreichung eines politischen Ziels dar.[6] Oder wie von Clausewitz formuliert: „Der Krieg […] geht immer von einem politischen Zustand aus und wird durch ein politisches Motiv hervorgerufen. Er ist also ein politischer Akt" (von Clausewitz 2017, S. 46). Der Krieg erscheint hierbei dann als Instrument zur Erreichung eines spezifischen politischen Zieles und damit als rational-kalkulierter Akt im Sinne einer Zweck-Mittel-Relation. „So wird also der politische Zweck als das ursprüngliche Motiv des Krieges das Maß sein, sowohl für das Ziel, welches durch den kriegerischen Akt erreicht werden muss, als für die Anstrengungen, die erforderlich sind" (von Clausewitz 2017, S. 37). Der Krieg wird damit zur kalkulierbaren Größe und zum strategischen Werkzeug der Politik. Als Mittel zur Erreichung eines politischen Ziels muss er unter diesem Blickwinkel betrachtet und analysiert werden. „Da der Krieg kein Akt blinder Leidenschaft ist, sondern der politische Zweck darin vorwaltet, so muss der Wert, den dieser hat, die Größe der Aufopferung bestimmen, mit welchen wir ihn erkaufen wollen. Dies wird nicht bloß der Fall sein bei ihrem Umfang, sondern auch bei ihrer Dauer. Sobald der Kraftaufwand so groß wird, dass der Wert des politischen Zwecks ihm nicht mehr das Gleichgewicht halten kann, so muss dieser aufgegeben werden, und der Friede die Folge davon sein" (von Clausewitz 2017, S. 54).[7]

Einer existenzialistischen Auffassung des Krieges folgend, erscheint dieser hingegen in einem völlig anderen Licht. Der Krieg tritt hier in Form eines für den Menschen unbe-

6 Der Begriff des Ziels wird hier nicht wie bei von Clausewitz in Abgrenzung zum Begriff des Zwecks, sondern synonym verwendet.

7 Ich referiere hier nicht von Clausewitz‘ eigene Position, sondern stelle die Perspektive instrumenteller Kriegsauffassungen dar. Eine solche findet sich dann zwar durchaus prominent in dessen Werk, ist in der hier präsentierten Form jedoch nicht als repräsentatives Bild von von Clausewitz‘ Position zum Krieg zu verstehen. Dieser beschreibt den Krieg nämlich keinesfalls ausschließlich als rein rational-instrumentellen Akt. Sein Werk ist hier wesentlich differenzierter. Siehe hierzu bspw. von Clausewitz 2017, S. 30–33, 49 oder Nitschke 2015, S. 13.

herrschbaren Naturereignisses zutage. Er kommt dabei wie eine Naturkatastrophe über die Völker und Staaten, welche diesem weitgehend ausgeliefert sind. Der Krieg ist hier gerade kein rational- kalkulierbares Mittel, kein Werkzeug der Politik und kein menschlicher Intention folgender kontrollier-, berechen- oder steuerbarer Akt. „Der Krieg ist ebenso wenig eine menschliche Einrichtung wie der Geschlechtstrieb; er ist Naturgesetz […]. Er wird auch nicht geboren von einigen Staatsmännern und Diplomaten, wie viele glauben. Das alles ist nur äußerlich. Die wahren Quellen des Krieges springen tief in unserer Brust" (Jünger 2016, S. 64, 67).

Instrumentelle und existenzialistische Kriegsauffassungen unterscheiden sich darüber hinaus in der Perspektive, welche die Kriegstheorien der jeweiligen Gattung einnehmen. Denn wo sich der Blick instrumenteller Kriegstheorien primär nach außen richtet und diese den Krieg selbst lediglich als Werkzeug betrachten, dem hauptsächlich in seiner Wirkung auf das jeweilige politische Ziel Aufmerksamkeit geschuldet ist, nehmen existenzialistische Kriegstheorien, in einer Art Introspektion, das Subjekt des Krieges in den Blick. Infolgedessen erscheint das Subjekt des Krieges (sei dies nun Individuum oder Gemeinschaft) im Rahmen instrumenteller Kriegsauffassungen dann auch als weitgehend unveränderliche Größe, während es aus der Perspektive existenzialistischer Kriegsauffassungen gerade die auf dieses einwirkende Transformationsprozesse des Krieges sind, welche im Zentrum der Betrachtung stehen. „Die Differenz zwischen beiden Auffassungen des Krieges bildet die Frage nach der Identität des den Krieg führenden Subjekts: Heißt Subsumtion des Krieges unter die Politik im Falle der instrumentellen Kriegsauffassung, daß dieses Subjekt durch den Krieg selbst nicht verändert werden soll, so setzt die existenzielle Kriegsauffassung gerade auf solche Transformations- und Konstitutionsprozesse, die durch den Krieg und Gewalt angestoßen und beschleunigt werden. […] Die existenzielle Auffassung des Krieges ist der adäquate Ausdruck einer Strategie, die das kriegsführende Subjekt durch den Krieg erst konstituieren oder zumindest doch es im Kriege transformieren will. Demgegenüber geht die instrumentelle Auffassung des Krieges von einem identischen Subjekt aus" (Münkler 2003, S. 114–115).

Für die dabei jeweils primär eingenommenen Blickwinkel könnte man vielleicht vereinfacht von einer Unterscheidung in Teilnehmer- versus Beobachterperspektive bei der Betrachtung des Krieges sprechen. Die Beobachterperspektive instrumenteller Kriegsauffassungen ist dabei der typische Modus sozialwissenschaftlicher Gegenstandsbetrachtungen, lässt sich diese doch als systematische Beobachtung, Analyse und Erklärung gesellschaftlicher Strukturen und Prozesse beschreiben. Durch eine solch entrückt-reflektierte Observation des Gegenstands gewinnt die sozialwissenschaftliche Forschung dann ihre Erkenntnisse über diesen, bleibt dabei aber zwangsläufig in der Beobachterposition. In einer solchen sind der Erkenntnisfähigkeit dann jedoch gewisse Grenzen gesetzt, scheinen aus jener vor allem authentische Erfahrungen sowie aus solchen resultierende Selbstverständnisse von Akteuren schwer zu fassen. Somit muss davon ausgegangen werden, dass bei Betrachtungen aus der Beobachterperspektive gewisse Aspekte des Untersuchungsgegenstandes verborgen bzw. verschlossen bleiben, welche lediglich aus einer Teilnehmerperspektive zugänglich werden. Denn dem Teilnehmer, welcher selbst in die Interaktion mit dem Untersuchungsgegenstand tritt, erschließt sich dieser auf eine ganz andere Art und Weise, als dies aus einer reinen Beobachterperspektive gelingen kann, wird dieser dabei doch völlig anders vom Gegenstand bzw. dem Geschehen affiziert.

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Jene epistemologische Kluft lässt sich dann auch durch keine noch so ausgefeilten Forschungsmethoden überbrücken. Mit dem dargestellten Unterschied zwischen Beobachter- und Teilnehmerperspektive ist dann jedoch keinesfalls eine Aussage bezüglich deren Güte getroffen. Es ist damit kein Vorzug einer jener Perspektiven gegenüber der jeweils anderen impliziert. Festzuhalten wäre jedoch, dass sich der Untersuchungsgegenstand, je nach eingenommener Perspektive, dem Beobachter bzw. Teilnehmer zwangsläufig anders darstellen muss. Unter den später im Text zitierten Autoren finden sich dann in Georg Simmel und Thomas Mann sowohl Beobachter wie auch in Ernst Jünger und Frantz Fanon Teilnehmer des Krieges. Aus beiden Perspektiven lässt sich dabei eine existenzialistische Auffassung des Krieges entwickeln, ist eine solche doch keineswegs ausschließlich aus der Teilnehmerperspektive zu gewinnen.[8] Auch darf der Teilnehmerperspektive dabei keinesfalls ein Reflektionsmoment abgesprochen werden. Diese ist zwar durch das eigene authentische Erleben gekennzeichnet[9], muss allerdings nicht hierauf begrenzt bleiben. Inwiefern die jeweilige Perspektive des Autors dann letztendlich die Auseinandersetzung mit dem Gegenstand prägt und ob sich für die Thematik des Krieges hier spezifische Zusammenhänge oder gar Gesetzmäßigkeiten erkennen lassen liegt jenseits des Horizonts dieser Arbeit. Festzuhalten bleibt lediglich, dass für die Darstellung existenzialistischer Kriegsauffassungen beide Perspektiven berücksichtigt wurden, um damit ein möglichst breites Spektrum solcher abzubilden.

Abschließend lässt sich die präsentierte Unterscheidung der beiden Kriegsauffassungen vielleicht prägnant mit zwei historischen Zitaten illustrieren. Denn wo von Clausewitz vom Krieg als politischem Instrument, als Fortsetzung des politischen Verkehrs mit anderen Mitteln, spricht (vgl. von Clausewitz 2017, S. 47), nennt Heraklit diesen den Vater aller Dinge und König aller (vgl. Heraklit 1922). Die unterschiedlichen Perspektiven und damit Konzeptualisierungen des Krieges werden darin nochmals deutlich. Bei von Clausewitz sehen wir auf den Krieg als kontrollier- und berechenbares Instrument der Politik herab, wodurch er uns als Objekt erscheint, während wir bei Heraklit zu diesem als einer unserer Kontrolle entzogenen, unverfügbaren Entität aufsehen, wodurch dieser einen eigenen Subjektcharakter gewinnt.

Forschungstheoretisch bedeutend ist dabei jedoch, dass die hier unterschiedenen Kriegsauffassungen nicht im Sinne konkurrierender Hypothesen verstanden werden dürfen, von denen nach ausführlicher empirischer Prüfung eine bestätigt und eine verworfen wird. Vielmehr handelt es sich dabei um unterschiedliche Blickwinkel auf das Phänomen des Krieges, wodurch jeweils unterschiedliche Facetten dieses sichtbar werden. Eine solche Position bedeutet im Umkehrschluss dann jedoch auch, dass sich für beide Perspektiven blinde Flecken bei der Betrachtung des Gegenstandes ergeben. Denn jede Perspektive ist notwendigerweise an einen bestimmten Standpunkt der Betrachtung gebunden und verliert damit, um auf spezifische Bereiche fokussieren zu können, gleichzeitig andere Facetten des betrachteten Gegenstandes aus dem Blick. Ein möglichst umfassendes Bild dieses erlangen wir deshalb nur durch die Berücksichtigung unterschiedlicher Perspektiven.

8 Selbiges gilt dann auch für instrumentelle Kriegsauffassungen, ist Carl von Clausewitz, welcher hier als Referenzautor einer solchen zitiert wird, doch als Berufsoffizier klar als Teilnehmer des Krieges zu beschreiben.

9 Wobei auch darauf hingewiesen werden sollte, dass z. T. Erlebnisse bis zur Veröffentlichung noch erhebliche Ästhetisierung erfahren. Dies lässt sich z. B. beim Vergleich Ernst Jüngers Notizbücher aus dem Ersten Weltkrieg und den auf diesen basierenden späteren Veröffentlichungen beobachten.

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3. Historische Einordnung

Auch wenn sich in der Geschichte beide Perspektiven bzw. Kriegsauffassungen finden, soll hier nicht der Eindruck entstehen diese hätten dabei dasselbe Gewicht in der historischen Betrachtung des Krieges. Ganz im Gegenteil haben wir es historisch gesehen mit einem deutlichen Übergewicht instrumenteller Kriegsauffassungen zu tun. So findet sich bis ins 19. Jahrhundert der Krieg beinahe ausschließlich unter einer solch instrumentellen Perspektive analysiert. Von Clausewitz mag diese dann in seinem Werk „Vom Kriege“ (1832) zwar brillant dargestellt, ausformuliert und systematisiert haben, revolutionär war eine solche Betrachtung des Krieges zu jener Zeit allerdings keineswegs. Sie entspricht vielmehr der verbreiteten Sicht auf die politische Realität des Krieges des späten 17. und 18. Jahrhunderts in Europa. Auch im 19. Jahrhundert blieb eine solche Perspektive auf den Krieg dann weit verbreitet. Ja bis heute kommt niemand, der sich ausführlicher mit dem Thema Krieg beschäftigt, an von Clausewitz und damit einer primär instrumentellen Betrachtung dieses vorbei.

Das kriegsführende Subjekt tritt hier dann lediglich am Rande in Erscheinung. Der Blick ist vielmehr auf den Kontrahenten, dessen Stärke und die notwendigen Ressourcen für dessen Unterwerfung gerichtet. „Wenn der Gegner unseren Willen erfüllen soll, so müssen wir ihn in eine Lage versetzten, die nachteiliger ist als das Opfer, welches wir von ihm fordern […]. Soll also der Gegner zur Erfüllung unseres Willens durch den kriegerischen Akt gezwungen werden, so müssen wir ihn entweder faktisch wehrlos machen, oder in einen Zustand versetzten, dass er nach Wahrscheinlichkeit damit bedroht sei“ (von Clausewitz 2017, S. 32). Das zweite Charakteristikum solch instrumenteller Kriegsauffassungen findet sich dann in der Bezeichnung selbst, nämlich die Konzeptualisierung des Krieges als Instrument zur Erfüllung eines politischen Ziels. Oder in den berühmten Worten von von Clausewitz: „Der Krieg ist also ein Akt der Gewalt, um den Gegner zur Erfüllung unseres Willens zu zwingen“ (von Clausewitz 2017, S. 29). Der Krieg ist damit ein Werkzeug der Politik zur Erlangung und Sicherung der Macht, denn was anderes ist Macht als die „Chance […] den eigenen Willen auch gegen Widerstreben durchzusetzen“ (Weber 1980, S. 28). Dies hatte über 300 Jahre zuvor auch bereits Machiavelli so gesehen, welcher den Krieg als politisches Instrument zur Ergreifung und Konsolidierung staatlicher Macht beschrieb (vgl. Machiavelli 2011, S. 84, 121 f.). Bis ins 19. Jahrhundert, vielleicht sogar bis zur Wende zum 20. Jahrhundert, blieb dies das in Europa vorherrschende Bild des Krieges, was auf mindestens drei Faktoren zurückzuführen ist.

Zum ersten beschreibt eine solch instrumentelle Auffassung des Krieges, im Zeitalter der Kabinettskriege des späten 17. und 18. Jahrhunderts, recht präzise das Bild der Staatsmänner und Politiker jener Zeit. Diese betrachteten den Krieg primär als politischen Akt zur Aneignung von Land und Ressourcen sowie zur Erlangung und Sicherung von Macht. Der Gedanke eines existenzialistischen Moments oder einer transformierenden Wirkung des Krieges war diesen hingegen weitgehend fremd. Ein zweiter Faktor stellt die damit einhergehende Konzeptualisierung des Krieges als rationaler, kalkulier- und steuerbarerer Akt dar, entspricht ein solches Bild des Krieges doch viel eher dem Weltbild der Aufklärung als die existenzialistische Konzeption des Krieges als ein durch den Menschen unkontrollierbares Naturereignis. Der Glaube an die Überlegenheit des menschlichen Geistes, auch über den Krieg, passt in eine Zeit, in welcher das Glück des Menschen primär auf dessen Vernunftbegabung und Rationalität bei der Gestaltung der Welt zurückgeführt wurde. Hieran schließt dann auch der dritte Faktor für die Dominanz der instrumentellen Kriegsauffassung zu jener Zeit an. Denn auch dem im Zuge der Aufklärung aufkommenden Pazifismus kam eine solche Konzeptualisierung des Krieges durchaus gelegen. Denn wie Göke formuliert: „Es war wohl das größte Versprechen der Aufklärer, den Krieg mit der Macht der Vernunft abzuschaffen“ (Göke 2015, S. 43). Und eine solche Abschaffung bzw. Überwindung des Krieges scheint bei weitem wahrscheinlicher, wenn dieser als bloßes Werkzeug der Politik, anstatt als Naturereignis konzeptualisiert wird.

Gegen alle drei dargestellten Positionen richtet sich dann auch die zum Beginn des 20. Jahrhunderts mehr und mehr an Bedeutung gewinnende existenzialistische Auffassung des Krieges[10] – sowohl gegen den im 19. Jahrhundert immer weiter an Bedeutung gewinnenden Pazifismus, der Zivilisierung des Krieges und der Idee eines ewigen Friedens als auch gegen die Etablierung des rationalistisch-humanistischen Menschenbilds der Aufklärung[11] sowie gegen die Konzeptualisierung des Krieges als Spiel von Politikern und Diplomaten. Es „stand nicht allein die Aufklärung für ihre Ächtung des Krieges am Pranger bellizistischer Kritik, sondern ebenso die aufgeklärten absoluten Fürsten als Verwirklicher ihres rational-instrumentellen Kriegsverständnisses. […] [Denn es] lag sowohl dem kriegsaffinen aufgeklärten Absolutismus wie auch den Friedensprojekten der Aufklärung ein rational-instrumentelles Kriegsverständnis zugrunde. […] Die modernen, politischen Bellizisten setzten diesem Konzept ihr eigenes entgegen: die Essenz des Krieges. Sie schrieben dem Krieg ein eigenes Wesen zu, das ihn der Verfügbarkeit der menschlichen Vernunft entzog“ (Göke 2015, S. 47, 52). So bezeichnet von Seeckt den Krieg dann als „die ewigen Gesetze des Werdens und Vergehens der Völker, [über welchen] höhere Gewalten als Fürsten, Staatsmänner, Parlamente, Vertrage und Bündnisse entscheiden“ (von Seeckt nach Meier 2012, S. 121).

4. Existenzialistische Kriegsauffassungen

Wie bereits erwähnt finden wir in existenzialistischen Kriegsauffassungen häufig die Metapher des Krieges als Naturereignis. Hier sind es vor allem Ereignisse wie Vulkanausbrüche, Erdbeben, Stürme oder Gewitter, die immer wieder zur Beschreibung des Krieges dienen.[12] Eine solch naturanaloge Beschreibung des Krieges dient dabei dazu, eine Gegenposition zur pazifistischen Position der Überwindbarkeit des Krieges zu formulieren. Denn sofern dieser ein naturhaftes Ereignis darstellt, lässt er sich durch intentionales menschliches Handeln genauso wenig überwinden wie die erwähnten Naturkatastrophen. Thomas Mann spricht diesbezüglich dann auch vom mystischen Element, welches jedem Krieg innewohne (vgl.

10 Es finden sich auch in den vorhergehenden Jahrhunderten bereits einzelne Autoren, welche der damals vorherrschenden instrumentellen Auffassung des Krieges widersprachen, siehe hierzu z. B. Göke 2015, S. 44–49, es blieben solche Positionen dabei jedoch weitgehend unbedeutend. Wirklich wirkmächtig wurde die existenzialistische Auffassung des Krieges erst im 20. Jahrhundert. Spreen spricht deshalb auch von einer alten „Idee, die zu Beginn des Ersten Weltkrieges aufgegriffen wird“, Spreen 2010, S. 72. Für einen knappen Überblick über prominente Positionen in der Literatur zu jener Zeit siehe dann Nieraad 2002, S. 1288–1291.

11 Wir stehen zu dieser Zeit noch vor der, in Freuds Terminologie, dritten (psychologischen) Kränkung der Menschheit und dem damit einhergehenden Bedeutungsgewinn des Triebhaften und Unterbewussten der menschlichen Natur für dessen Handeln. Noch erscheint der Mensch, am Ende des 19. Jahrhunderts, als Vernunft- und Verstandswesen.

12 Für eine Explikation dessen am Beispiel der Metapher des Gewitters siehe Meier 2012, S. 188 f.

Mann 2009, S. 505). Häufig wird der Krieg dabei auch als Naturgesetzlichkeit und/oder in der menschlichen Natur verankert beschrieben. „Der Krieg wurzelt also im ‚Boden des Daseins- und Interessenkampfes der Menschheit' und stellt einen Teil des allgegenwärtigen Daseinskampfes dar" (Reichenau nach Meier 2012, S. 166).[13] Neben der Demonstration der Sinnlosigkeit pazifistischer Bemühungen zur Überwindung des Krieges, verunmöglicht eine solche Position auch weitgehend eine moralische Bewertung dieses. Denn als Naturgesetzlichkeit lässt sich dieser so wenig sinnvoll moralisch bewerten wie die Schwerkraft (vgl. Meier 2012, S. 191 f.).

Neben einer solch naturanalogen Sprache bedienen sich existenzialistische Kriegsauffassungen noch einer zweiten typischen Argumentationsfigur – der geschichtsphilosophischen Deutung des Krieges.[14] Dem Krieg wird hier „ein höherer, über seine politisch-instrumentelle und machtstaatliche Funktion hinausgehender Sinngehalt zugeschrieben. [… Er wird] zu einem Ereignis mit tieferer Bedeutung, sei es hinsichtlich des geschichtlichen und kulturellen Fortschritts, sei es in Bezug auf die Revitalisierung des Kollektivs und Individuums" (Meier 2012, S. 154 f.). Der Krieg erscheint dabei als Entscheidungsinstanz im Richterstuhl der Geschichte. „Mir ist Kampf noch immer etwas Heiliges, ein Gottesurteil über zwei Ideen. […] Wohl wurde alle Freiheit, alle Größe und alle Kultur im Stillen geboren, doch nur durch Kriege erhalten, verbreitet oder verloren" (Jünger 2016, S. 73, 64). Und so spricht Thomas Mann dann auch vom Krieg als „eine unsterbliche Einrichtung [..], ein unentbehrliches revolutionäres Mittel, der Wahrheit auf Erden zu ihrem Recht zu verhelfen" (Mann 2009, S. 503).

Aus einer solchen Perspektive ist es dann vor allem die Erhaltung bzw. Erneuerung der Sittlichkeit und Kultur der Völker und Staaten, ein Einhaltgebieten der Degeneration und des Verfalls dieser sowie die Stärkung deren Gemeinsinns gegenüber individuellem Egoismus, was durch den Krieg erreicht werden soll. Wenn auch theoretisch unterschiedlich fundiert, teilen beide Positionen, die naturanaloge wie die geschichtsphilosophische, dann den Gedanken der Unvermeidbarkeit des Krieges. „Kriege sind menschenlos, […] sind unvermeidliches Völkergeschick. Ewiger Frieden ist den Sterblichen in dieser Welt nicht beschieden" (Goltz 1899, S. 430).[15] Existenzialistische Kriegsauffassungen zeichnen sich daneben durch die Position aus „Krieg und kriegerische Aktionsmacht nicht nur als etwas Zerstörerisches, Dysfunktionales oder Pathologisches an[zu]sehen, sondern nach ‚produktiven' Rollen und Wirkungen von Krieg und kriegerischer Gewalt [zu] suchen. ‚Produktiv' meint [hier], dass Gewalt etwas gesellschaftlich Nützliches, Sinnvolles oder Wertvolles hervorbringen kann"

13 Interessant ist hier die Verwendung der Begriffe „Boden" und „wurzelt", welche die Natürlichkeit des Krieges nochmals unterstreichen sollen. Eine solche Position findet sich dabei häufig unter (deutschen) Militärs in der ersten Hälfte des 20. Jahrhunderts, vgl. Meier 2012, S. 186 f.

14 Diese wird dabei in der Regel auf Hegel oder Kant zurückgeführt, vgl. Münkler 1992, S. 104; Meier 2012, S. 108. Inwiefern die beiden genannten Autoren dabei jedoch korrekt referenziert werden, ist eine offene Frage. Es finden sich zwar bei beiden durchaus den Krieg in seiner Wirkung bejahende Textstellen, es müssen diese jedoch im Kontext des Denkens und damit des Gesamtwerks der Autoren interpretiert werden und können nicht als singuläre Textstellen aus dem Kontext herausgegriffen werden. Für eine genauere Auseinandersetzung mit dem Bild und der Rolle des Krieges bei Kant und Hegel siehe Meier 2012, S. 108 f. Nicht bestreiten lässt sich jedoch deren Einfluss auf die existenzialistischen Kriegsauffassungen am Ende des 19. Jahrhunderts, vgl. Meier 2012, S. 110–116.

15 Bei einigen Autoren wird der Gesetzescharakter des Krieges dabei auch theologisch fundiert, wie bspw. bei von Moltke, welcher den Krieg als „ein Glied in Gottes Weltordnung" beschreibt, von Moltke nach Meier 2012, S. 124.

(Spreen 2010, S. 49). Existenzialistischen Kriegstheorien sehen im Krieg somit ein Ereignis, welches nach Münkler „Transformations- und Konstitutionsprozesse“ oder in Meiers Terminologie „kathartisch, revitalisierende Wirkungen“ auslöst.

Unter solch existenzialistischen Kriegsauffassungen lassen sich nun zwei zentrale Argumentationsstränge identifizieren.[16] Im Zentrum der Differenzierung steht hier die Frage nach dem Subjekt, das vom Krieg berührt und verändert wird. Bei Spreen klingt der grundlegende Gedanke einer solchen Differenzierung dann auch bereits an, wenn er schreibt: „Zunächst kann festgehalten werden, dass Krieg nicht allein als destruktives und dysfunktionales soziales Phänomen bezeichnet werden kann. Vielmehr kann Krieg produktive Ursache für soziale und kulturelle Prozesse sein. […] ‚Produktive‘ Wirkungen können ihnen etwa im Hinblick auf die Konstitution von Ordnung, Subjektivität oder integrativen Werten zukommen. Die konstitutiven Funktionen des Krieges können also ganz unterschiedliche soziologische Gegenstände betreffen“ (Spreen 2010, S. 73). Differenziert werden diesem Gedanken folgend hier nun existenzialistische Kriegsauffassungen gemäß den „unterschiedlichen soziologischen Gegenständen“, auf welche sich die „Transformationsprozesse“ bzw. „kathartische Wirkung“ des Krieges dabei beziehen.

Als Subjekt lässt sich hier zwischen Individuum und Kollektiv (also Staat oder Nation) unterscheiden. Im Rahmen des Überblicks, welchen dieser Artikel zu geben gedenkt, wird das Feld existenzialistischer Kriegstheorien deshalb nun entlang der Frage strukturiert werden, ob der Krieg primär als Medium der Selbststeigerung des Individuums oder als identitärer Selbstfindungsprozess der politischen Gemeinschaft konzeptualisiert wird (vgl. Münkler 1992, S. 104). Erstere Perspektive wird dabei im Folgenden individualistisch, zweitere kollektivistisch genannt werden. Eine solche Differenzierung folgt dann weitgehend Meier, der feststellt: „Die Deutung der kathartischen Wirkung des Krieges wurde sowohl auf das Kollektiv als auch auf das Individuum angewandt, so dass ein kollektivbezogener von einem individuumsbezogenem Bellizismus[17] unterschieden werden kann“ (Meier 2012, S. 154). Im Folgenden sollen nun beide Perspektiven bzw. Positionen anhand typischer Texte der jeweiligen Gattung exemplifiziert werden.

Bei der Auswahl der dafür im Folgenden referenzierten Texte ist zu konstatieren, was bereits Flasch in seinem 450 Seiten starken Werk über die deutschen Intellektuellen und den Ersten Weltkrieg anmerkt, nämlich dass es immer mehr Autoren und Texte zu berücksichtigen gibt und die getroffene Auswahl damit zwangsläufig unvollständig bleibt (vgl.

16 Ein solcher Gedanke zur grundlegenden Strukturierung des Feldes findet sich auch bei Münkler der feststellt: „Diese existentielle Auffassung des Krieges läßt sich in zwei Ideenstränge weiterverfolgen“, Münkler 2003, S. 111. Inhaltlich weicht dieser Beitrag jedoch von Münklers Position ab. Zur Darstellung dieser siehe Münkler 2003, S. 111 f.

17 Es wird der Begriff des Bellizismus in der Literatur unterschiedlich verwendet. Je nach Definition kann dieser dabei als Synonym existenzialistischer Kriegsauffassungen gebraucht werden. Z. B. nach Meier, welcher diesen wie folgt definiert: „Der bellizistische Kriegsdiskurs lässt sich im Großen und Ganzen in zwei thematische Schwerpunkte bzw. Stränge aufschlüsseln: Zum einen ist es die auf den Krieg bezogene Fortschrittsidee, zum anderen die Vorstellung von der kathartischen, revitalisierenden Wirkung des Krieges“ (Meier 2012, S. 113). Sofern hierin die beiden zentralen Charakteristika des Bellizismus identifiziert werden, stellt dieser eine Form existenzialistischer Kriegsauffassungen dar. Der Begriff wird in der Literatur jedoch nicht zwangsläufig so verwendet. So bezeichnet dieser bei manchen Autoren auch lediglich eine kriegsbejahende Position. Hier wird dann bspw. auch häufig Machiavelli als bellizistischer Autor geführt (z. B. bei Münkler 2003, S. 51). Einer solchen Definition des Bellizismus folgend hat dieser dann jedoch nichts mit der existenzialistischen Kriegsauffassung gemein.

Flasch 2000, S. 10).[18] Selbstverständlich gilt dies auch für den vorliegenden Artikel, welcher hier keinesfalls einen Anspruch auf Vollständig- bzw. Umfänglichkeit bei der Textauswahl erhebt. Die Auswahl der im Folgenden zitierten Texte orientiert sich dabei an drei Kriterien. Zum Ersten sollten diese eine gewisse Bekanntheit und zeitgeschichtliche Prominenz besitzen. Zum Zweiten sollten sie die typische Position des jeweiligen Autors (zumindest zur Zeit deren Veröffentlichung) wiederspiegeln. Und zum Dritten sollten sie die von mir beschriebenen Charakteristika anschaulich explizieren. Mit etwas gutem Willen lässt sich bei diesen damit von prominenten Beispielen der jeweils dargestellten Position sprechen. In erster Linie dienen die zitierten Textstellen jedoch der Illustration der jeweiligen Argumentation des Kapitels.

4.1. Individualistische Perspektive

Ernst Jünger ist als prominenter Vertreter einer individualistisch-existenzialistischen Kriegsauffassung zu bezeichnen, bleibt dieser in seinen Erzählungen und Reflexion über den Krieg doch beinahe prototypisch einer solchen verhaftet. Sein dabei eingenommener Blickwinkel spiegelt sich bereits im Titel seines hier zitierten Werkes „Der Kampf als inneres Erlebnis“ (1922) wider. Damit ist dann bereits Jüngers zentrale Perspektive auf den Krieg beschrieben – eine Innenschau des Individuums. Es lässt sich eine solch individualistisch-existenzialistische Kriegsauffassungen nach Massimo Mori dann wie folgt beschreiben: „Das Sterben, das Opfer und der Schmerz hören auf, ausschließlich negative Werte zu sein und werden wesentliche Aspekte für die moralische Bildung des Menschen. […] Der Krieg wird zum unentbehrlichen Mittel der moralischen und bürgerlichen Bildung des Menschen: In ihm allein vermag der Mensch seine eigenen geistigen Fähigkeiten im höchsten Maße zu entwickeln. […] Seine Bedeutung besteht nicht darin, zu politischen Lösungen zu führen, sondern darin, das wieder lebendig zu machen, was im menschlichen Geiste bereits abgestorben ist“ (Mori 1989, S. 72). Auch wenn Mori selbst nicht Jünger referenziert, trifft seine Beschreibung doch erstaunlich gut den Ton dessen Werkes, in dem es z. B. heißt: „Im Tanze auf schmaler Klinge zwischen Sein und Nichtsein offenbart sich der wahre Mensch“ (Jünger 2016, S. 131).

Die vitalisierende, transformativ-kathartische Wirkung des Krieges zeigt sich dabei auf mindestens dreierlei Weise. Zum ersten durch die Transformation des alten und der Genese eines neuen Menschen durch den Krieg. „Der Krieg, aller Dinge Vater, ist auch der unsere; er hat uns gehämmert, gemeißelt und gehärtet zu dem, was wir sind“ (Jünger 2016, S. 35). Der Gedanke besteht hier in der Palingenese des Menschen durch den Akt des Krieges, aus welchem dieser durch das Feuer des Kampfes „gehämmert, gemeißelt und gehärtet“ hervorgeht. Eine zweite transformierende Wirkung des Krieges besteht darin, dass erst durch diesen, zurückgeworfen auf das Elementare, das bloße Überleben, der Mensch eine Art (Gefühls)Bildung erfährt, welche ihm im bürgerlichen Alltag verwehrt bleibt. Erst hier werden diesem gewisse Aspekte der menschlichen Existenz gewahr, die ihm sonst für immer verschlossen blieben. „Die Feuertaufe! Da war die Luft so von überströmender Männlichkeit geladen, daß jeder Atemzug berauschte, daß man hätte weinen mögen, ohne zu wissen wa-

18 Auch wenn Flasch in seiner Bibliographie dann über 13.000 Titel (ohne fiktive Texte und Gedichte) führt (vgl. Flasch 2000, S. 228). Für einen Überblick über die prominenten deutschen Autoren, welche sich zum Ersten Weltkrieg publizistisch äußerten, siehe dann Flasch 2000, S. 227–258.

rum. O Männerherzen, die das empfinden können. […] Der Mannesmut ist doch das Köstliche. In göttlichen Funken spritzt Blut durch Adern, wenn man zum Kampfe über die Felder klirrt im klaren Bewußtsein eigener Kühnheit. Unterm Sturmschritt verwehen alle Werte der Welt wie herbstliche Blätter. Auf solchen Gipfeln der Persönlichkeit empfindet man Ehrfurcht vor sich selbst“ (Jünger 2016, S. 44, 72). Der Krieg erscheint hier als eine männliche Charakterschule, eine „*Verfeinerung* des einzelnen Menschen […] eine Erhöhung, Steigerung, Veredelung des Menschlichen durch den Krieg“ (Mann 2009, S. 501, 502) wie Thomas Mann formuliert.[19] Eine solch erzieherisch-transformierende Wirkung der Gewalt verspricht sich dann auch Hitler vom Krieg, wenn er schreibt: „In dieser Schule soll der Knabe zum Mann gewandelt werden“ (Hitler 1936, S. 458). „Was für das Mädchen die Begegnung mit dem Mann, das ist für ihn der Krieg. Wenige Tage genügen, aus dem Knaben einen Mann zu machen“ (Hitler 2000, S. 71).

Im Unterscheid zu Autoren wie Hitler wird dann aber auch Jüngers differenziertere Betrachtung des Krieges deutlich.[20] Denn diese behält trotz bildgewaltiger und emotionalisierender Sprache einen reflektierten Charakter und verkommt damit nicht zur bloßen Kriegsverherrlichung und -propaganda. Dies zeigt sich z. B. in der dritten Facette der transformativen Wirkung des Krieges auf das Individuum, welche jedoch weit weniger häufig in entsprechenden Texten zu finden ist,[21] bei Jünger aber durchaus thematisiert wird. Auch deshalb haben wir es bei diesem nicht nur mit einer wortgewaltigen, sondern gleichzeitig komplexen und vielschichtigen Beschreibungen des Krieges zu tun. So sieht Jünger im Krieg nämlich auch ein Bildungsmoment darin, dass dieser demjenigen, der ihn aktiv erlebt, die Schönheit des Lebens (im Frieden) erst wirklich bewusst macht. Denn erst durch den Kontrast zum Leben im Krieg wird dem Menschen bewusst was diesem sonst als selbstverständlich erscheint. Erst durch den Krieg lernt dieser den Frieden zu schätzen. „Wie überreich ist doch das Leben an feinen Dingen, an Genüssen, die man jetzt erst zu würdigen weiß. Das verdanke ich dem Kriege, dieses Bedürfnis, jedes Fäserchen meines Wesens ins Leben zu senken, um es in seiner ganzen Pracht zu fassen. Dazu muß man die Verwesung kennen, denn nur wer die Nacht kennt, weiß das Licht zu schätzen“ (Jünger 2016, S. 89).

4.2. Kollektivistische Perspektive

Die kollektivistische Perspektive existenzialistischer Kriegsauffassungen steht nicht prinzipiell im Widerspruch zur gerade geschilderten individualistischen Perspektive. Beide Positionen lassen sich durchaus parallel vertreten. Trotzdem sind die meisten Texte recht klar einer der beiden Positionen zuordnen, haben wir es doch mit verschiedenen, wenn sich auch nicht logisch ausschließenden Blickwinkeln zu tun. Die kollektivistische Perspektive nimmt nun nicht das Individuum und dessen inneres Erleben und Empfinden, sondern die

19 Thomas Mann wird sich zum Krieg später grundlegend anders äußern. Es zeigt sich hieran jedoch, wie wirkmächtig solches Denken gerade in den ersten Jahren des 20. Jahrhunderts war.

20 So vermied Jünger es auch zeitlebens sich von den Nationalsozialisten vereinnahmen zu lassen. „Ernst Jünger hätte der Ilja Ehrenberg des Dritten Reiches, der Vorzeigedichter des NS-Staates werden können. Doch der Autor von ‚In Stahlgewittern‘ hat, anders als beispielsweise Gottfried Benn oder Hanns Johst, der Versuchung widerstanden und sich 1933 nicht in die gesäuberte und gleichgeschaltete Akademie der Dichtung berufen lassen. […] Auf die Frage, was er Hitler vorwerfe, antwortete Jünger 1982: ‚Sein ganz offenbares Unrecht nach 1938‘“, Schwilk 1999.

21 Siehe hierzu Meier 2012, S. 136–144.

Gemeinschaft (in der Regel in Form von Staat oder Nation) in den Blick. Sie fokussiert dabei auf Entstehungs- oder Erneuerungsprozesse dieser, welche sie als Gegenentwicklung zu den in Friedenszeiten typischen gesellschaftlichen Individualisierungstendenzen begreift. Auch hier haben wir es also mit „Transformations- und Konstitutionsprozessen" sowie den „kathartisch, revitalisierenden Wirkungen" des Krieges zu tun, nur wirken diese in erster Linie auf die Gemeinschaft und nicht das Individuum. Mori beschreibt eine solche Perspektive dann prägnant wie folgt: „Da die ökonomischen Systeme in sich den Krebs bergen, der die Staaten zerfrißt und sie abhängig von partikularen Interessen macht, hat der Krieg, der diese Systeme unter dem Banner der Allgemeinheit erschüttert, eine heilsame Wirkung für die ethische Substanz des Staates. Der Krieg zerstört die Hegemonie der besonderen Egoismen und belebt ein organisches Gemeinschaftsgefühl" (Mori 1989, S. 78). Der Krieg wirkt hier dann entweder als Erneuerer in der Zeit des Friedens und Wohlstandes degenerierter Kollektive oder er fungiert als Schöpfer neuer Gemeinschaften, welche erst durch diesen ein Bewusstsein bzw. eine Identität entwickeln. Der Krieg revitalisiert damit also entweder alternde Gesellschaften oder er fungiert als Geburtshelfer neuer Kollektive. In beiden Fällen geschieht dies durch die Stärkung bzw. der Genese eines Gemeinschaftsgefühls, das durch den Krieg entsteht. Die erste Variante werde ich hier anhand von Georg Simmels Text „Deutschlands innere Wandlung" (1914), die zweite anhand von Franz Fanons „Die Verdammten dieser Erde" (1961) exemplarisch darstellen.[22]

Simmel sieht im Ersten Weltkrieg den Weg, um die noch junge deutsche Nation zu einer wirklichen Gemeinschaft zu schmieden. „Der Tatsache nach aber ist, was wir jetzt erleben, erst die Vollendung von 1870. Von neuem gilt es, das Reich zu gewinnen, nur wie auf einer höheren Stufe, in einem höheren Sinne des Gewinnens" (Simmel 1914). So soll der Krieg durch seine Entbehrungen die deutsche Nation stählen und dadurch „auf einer höheren Stufe" neu entstehen lassen. Denn es wird sich der Einzelne durch diesen nicht mehr primär mit seinen egoistischen Interessen, sondern dem Kollektiv als Schicksalsgemeinschaft identifizieren. „Ein anderes Deutschland, als das in diesen Krieg hineinging, wird aus ihm hervorgehen. […] Diese Wandlung heftete sich zunächst an einen neu gefühlten Zusammenhang zwischen dem Einzelnen und der ganzen Nation" (Simmel 1914). Dieser Prozess der Erneuerung vollzieht sich dabei durch die kulturelle Auslesefunktion des Krieges, welcher alle Zeichen der Degeneration und des Überkommenen abbürsten wird, bis nur noch der strahlende Kern der Volksgemeinschaft übrigbleiben wird. Im Feuer des Krieges, so glaubt Simmel, besännen die Menschen sich auf das Elementare, die Gemeinschaft, weshalb aus dem Krieg eine geeinte deutsche Nation hervorgehen werde. So sieht Simmel im Krieg dann auch „die Scheidung zwischen dem, was in Deutschland noch lebens- und zeugungsfähig ist, und dem, was an die Vergangenheit angenagelt und ohne Recht an die Zukunft ist: Menschen und Institutionen, Weltanschauungen und Sittlichkeitsbegriffe. Die behagliche Ungestörtheit des Friedens mag es sich leisten können, das Überständiggewordene, innerlich Abgestorbene noch mitzurechnen […]. Mit der Härte und Entschiedenheit, zu der der Krieg unser Dasein ausgehämmert hat, verträgt sich dies nicht länger, er stellt alle und alles vor ein unbarmherziges Entweder-Oder von Wert und Recht und lässt nur noch Raum für das wahrhaft Keimkräftige und Echtgebliebene" (Simmel 1914).

22 Für eine breitere Auswahl an Texten einer solchen kollektivistischen Perspektive siehe Meier 2012, S. 116–121.

Die zweite Variante einer solch kollektivistisch-existenzialistischen Kriegsauffassung findet sich prominent bei kommunistischen Autoren, welche im Krieg den Weg zur Schaffung bzw. Geburt einer neuen, klassenlosen Gesellschaft sehen. Auch hier steht dann der Gemeinschaftsgedanke im Mittelpunkt, zeichnet sich eine solch kommunistische Gesellschaft doch gerade durch die Abschaffung der Klassenprivilegien und in dessen Folge des Klassenbewusstseins selbst aus.[23] Fanon reiht sich dann weitgehend in jene Tradition ein (vgl. Sartre 1966, S. 12). Der Kerngedanke ist auch bei ihm dann die Entstehung des Kollektivs der Nation aus dem Krieg (hier in Form der gewaltsamen Dekolonisation). „Der Überlebende fühlt zum erstenmal einen *nationalen* Boden unter seinen Füßen. Von diesem Moment an weicht die Nation nicht mehr von ihm […]. Der Krieg […] schafft neue Strukturen, die die ersten Institutionen des Friedens sein werden“ (Sartre 1966, S. 18 f.). Der (Befreiungs-) Krieg ist auch bei Fanon damit nicht lediglich ein strategisches Mittel, um die Unabhängigkeit von der Kolonialmacht zu erringen, sondern ein (notwendiger) schöpferischer Akt im existenzialistischen Sinne. Denn im Zustand der Kolonialisierung empfinden die Kolonisierten sich (noch) überhaupt nicht als Gemeinschaft.[24] Hier herrscht noch das Denken in Stammesstrukturen, nicht in Begriffen wie der der Nation vor.

Erst durch den Akt des Krieges wird es gelingen, aus einer solche heterogenen Masse an Menschen, Stämmen und Kulturen ein Kollektiv mit nationalem Bewusstsein zu formen. Dieser ist deshalb unverzichtbar, um die Identität und das Gemeinschaftsgefühl des Volkes durch den kollektiv-bewaffneten Kampf entstehen zu lassen. „Im Feuer des Kampfes müssen allen inneren Barrieren zerschmelzen. […] Wenn sich die Mobilisierung der Massen anläßlich des Befreiungskrieges vollzieht, führt sie in jedes Bewußtsein den Begriff der gemeinsamen Sache, des nationalen Schicksals, der kollektiven Geschichte, ein. […] Die Gewalt wirkt totalisierend und national“ (Fanon 1966, S. 72). Auch Fanon weist an dieser Stelle dann explizit auf die schädlichen westlichen Werte des Individualismus hin, gegen welche sich koloniale Befreiungsbewegungen dezidiert zu richten haben. Denn er zielt durch den Krieg spezifisch auf die Erweckung und Verbreitung eines kollektivistischen Geists ab, wenn er schreibt: „Die Gemeinschaft […] erzeugt ihre eigene Aufklärung, ihre eigene Vernunft“ (Fanon 1966, S. 37). Es ist hierbei dann auch nicht der Krieg als machtpolitischer Akt, sondern die diesem innewohnende Gewalt und deren transformatives Potential auf das Fanon setzt. „Das kolonialisierte Volk erlebt, daß diese Gewalt […] positive und aufbauende Züge annimmt. Die gewalttätige Praxis wirkt integrierend, weil sich jeder zum gewalttätigen Glied der großen Kette, der großen gewalttätigen Organisation, macht […]. Die Gruppe erkennt sich gegenseitig, und die zukünftige Nation ist von Anfang an ein ungeteiltes Ganzes. Der bewaffnete Kampf mobilisiert das Volk, er wirft es in eine einzige Richtung ohne Gegenströmung. […] Es existiert ein in Blut und Zorn geschaffenes Bindemittel“ (Fanon 1966, S. 72, 103).

23 Für eine detaillierte Darstellung von Engels Position hierzu siehe Münkler 2003, S. 135 f., für die Lenins Ionin/Cernych 1989, S. 133 ff.

24 Fanon denkt hier im Grund leninistisch. Die ausbleibende Revolution muss durch eine kleine Gruppe von Berufsrevolutionären angestoßen werden, um den nicht vorhandenen revolutionären Geist der Massen zu entfachen. Aus dem Konflikt selbst wird sich dann ein tragfähiges Klassenbewusstsein für das Kollektiv herausbilden. Interessant ist hier, dass wahrscheinlich erst der Zweite Weltkrieg (im Russischen als der große vaterländische Krieg bezeichnet) erreichte, was der bolschewistischen Revolution versagt geblieben war, nämlich die Schaffung eines sowjetrussischen Nationalbewusstseins.

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Hier lässt sich dann auch recht anschaulich die kollektivistisch-existenzialistische Perspektive erkennen. Hier zeigt sich der Krieg wahrhaft als Naturereignis mit schöpferischer Qualität. Als gewalttätige Katastrophe der Zerstörung des Bestehenden, aus dessen Asche jedoch eine neue Gemeinschaft erwächst. Als Vernichter etablierter, überkommener Strukturen, welche untergehen müssen, um Platz für Neues zu schaffen. Der Krieg erscheint also auch hier und damit schließt sich der Kreis, wie in der individualistisch- existenzialistischen Perspektive, als Schmiedefeuer, aus welchem gehärtet und gestählt ein neues geschichtliches Subjekt hervortritt. Dort ein neuer Mensch, hier eine neue Nation.

5. Bedeutung existenzialistischer Kriegsauffassungen

Ich hoffe mit den Ausführungen des vorangegangenen Kapitels nun einen knappen Einblick in das Feld existenzialistischer Kriegsauffassung geboten zu haben. Das solche Betrachtungsweisen bzw. Konzeptualisierungen des Krieges heute quasi aus dem sozialwissenschaftlichen Diskurs verschwunden sind, halte ich dabei aus mindestens zweierlei Gründen für problematisch. Zum einen, weil sich wie, deutlich geworden sein sollte, solche grundlegend von der heute verbreiteten instrumentellen Perspektive auf den Krieg unterscheiden. Dies zeigt sich bereits in der Sprache, Wortwahl sowie dem Ton der betrachteten Texte und gilt dann auch für die Konzeptualisierung des Krieges selbst. In weitgehender Unkenntnis solcher Betrachtung und Beschreibung des Krieges, haben wir es heute verstärkt mit einer Einseitigkeit der sozialwissenschaftlichen Konfliktanalyse zu tun, welche solche Perspektiven kaum (mehr) zur Kenntnis nimmt. Aus einer rein instrumentellen Perspektive, so die These, lässt sich das Phänomen des Krieges jedoch nicht umfänglich erfassen. Deshalb halte ich es für zielführend auch solch existenzialistische Kriegsauffassungen nicht völlig aus dem Blick zu verlieren. Denn aus der möglichst breiten Betrachtung eines Forschungsgegenstandes ergibt sich doch schon dahingehend ein epistemologischer Mehrwert, als dass dadurch unterschiedliche Facetten dieses beleuchtet werden (können), welche sonst verborgen blieben. Ein Einbezug auch existenzialistischer Kriegsauffassungen in die Analyse von Kriegen ermöglicht es so diese aus sozialwissenschaftlicher Sicht besser fassen, umfänglicher beschreiben und präziser analysieren zu können.

Abgesehen davon halte ich es für bedeutsam, einmal wieder auf die Perspektive existenzialistischer Kriegsauffassungen zu verweisen, weil solche Konzeptualisierungen des Krieges auch in ihrer Wirkung auf die historischen Entwicklungen des 20. Jahrhunderts nicht unterschätzt werden sollten. Auch wenn die Aufarbeitung und Darstellung des spezifischen Einflusses solcher auf die Geschichte des 20. Jahrhunderts an dieser Stelle nicht geleistet werden kann[25], will ich zumindest darauf hinweisen, dass die zu Beginn des 20. Jahrhunderts prominenten existenzialistischen Konzeptualisierungen des Krieges die Historie dieses in entscheidender Weise (mit)geprägt haben dürften. Wenn Nieraad also konstatiert: „Die Literatur des 20. Jahrhunderts hat auf die Gewalttätigkeit ihrer Epoche reagiert“ (Nieraad 2002, S. 1276), sollte, wie ich glaube, zumindest ergänzt werden, dass auch die Literatur den Verlauf des Jahrhunderts in entscheidender Weise beeinflusst hat. Eine detaillierte Darstellung dessen muss ich an dieser Stelle leider schuldig bleiben, ich glaube jedoch, dass

25 Dasselbe gilt auch für eine kritische Auseinandersetzung mit existenzialistischen Kriegsauffassungen im Hinblick auf die in solchen zu Tage tretende Kriegsverherrlichung und der damit verbundenen Kriegsgefahr in der Folge solchen Denkens.

ein Einfluss existenzialistischer Kriegsauffassungen sowohl auf die beiden Weltkriege in der ersten als auch auf die gewaltsamen Dekolonisationsbewegungen in der zweiten Hälfte des 20. Jahrhunderts zu erkennen ist. So lässt sich bspw. eine weite Verbreitung existenzialistischer Kriegsauffassungen in der deutschen Generalität vom wilhelminischen Deutschland bis ins Dritte Reich nachweisen (vgl. Meier 2012). Und auch über die Führungselite des deutschen Militärs hinaus finden sich existenzialistische Kriegsauffassungen in den Schriften prominenter Autoren des 19. und 20. Jahrhunderts von Friedrich Engels und Wladimir Iljitsch Lenin über Georg Simmel, Ernst Jünger und Thomas Mann bis hin zu Franz Fanon.

Mit einer solch weiten Verbreitung existenzialistischer Kriegsauffassungen lässt sich dann zumindest für einen gewissen Einfluss dieser auf das Bild und die Funktion des Krieges zu Beginn des 20. Jahrhundert argumentieren. Hier nun allerdings spezifische Entwicklungslinien nachzuzeichnen und herauszuarbeiten wäre Stoff für eine eigene Arbeit. Ohne das Thema an dieser Stelle also noch weiter zu vertiefen, halte ich es dennoch aus einer sozialwissenschaftlichen Perspektive für produktiv existenzialistische Kriegsauffassungen und deren Einfluss bei der Analyse der sozialen und politischen Strukturen unserer heutigen Welt sowie aktueller Konflikte nicht völlig aus dem Blick zu verlieren. Und vielleicht kann dieser Artikel als Einstieg in die nähere Beschäftigung mit einem solchen Denken und Weltbild dienen.

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Die Friedens-Warte

F-W Vol. 95 | 2022 | Issue 3–4 | P. 402–404
DOI 10.35998/fw-2022-0016

Panorama
Konferenzbericht

Panorama
Conference Report

Modern Challenges in International Humanitarian Law

Internationale Tagung an der Gottfried Wilhelm Leibniz Universität Hannover

Dimitrios Parashu*

Am 3. September 2022 fand im Königlichen Pferdestall der Gottfried Wilhelm Leibniz Universität Hannover unter dem Oberbegriff *Modern Challenges in International Humanitarian Law* ein Kickoff-Meeting zu einer sich anschließenden Summer School (in der Woche vom 5. bis zum 9. September 2022) selbiger *Alma Mater* statt, welche thematisch dem Topos des *International Humanitarian Law* verschrieben war. Gerade in Zeiten verstärkter (und diesmal auch den europäischen Kontinent tangierender) Kriegswirren ist eine Bezugnahme zum humanitären Völkerrecht nicht nur wissenschaftlich lohnend, sondern – idealerweise zwecks Findung einschlägiger Lösungsansätze – geradezu notwendig.

Die Veranstaltung, welche in enger Zusammenarbeit des Deutschen Roten Kreuzes-Region Hannover e. V. und des Instituts für Internationales Recht der Juristischen Fakultät Hannover stattfand, stand unter der wissenschaftlichen Leitung des Präsidenten der Leibniz Universität Hannover, Prof. Dr. Volker Epping. Die Eröffnungsworte von Prof. Dr. Claas Friedrich Germelmann und Dr. Stefan Birkner hoben die Bedeutsamkeit der bilateralen Zusammenarbeit im Rahmen der Veranstaltung sowie der allgemeineren Aktivitäten des Deutschen Roten Kreuzes-Region Hannover e. V. hervor. Vorgestellt wurde den Teilnehmer*innen auch der Rahmen der sich anschließenden Summer School.

Frau PD Dr. Ines Gillich, LL.M. (UCLA), Universität zu Köln, eröffnete sodann den Reigen der Referent*innen aus dem In- und Ausland. Sie bezog sich in ihrem Vortrag „The War in Ukraine and International Humanitarian Law“ zum einen auf die Entwicklung des Humanitären Völkerrechts und dessen einschlägige Quellen und zum anderen auf die Behandlung kontemporärer Herausforderungen dieses Gebietes des Völkerrechts, worauf freilich bereits aus Aktualitätsgründen eine Bezugnahme zum aktuellen Ukrainekonflikt thronte.

In seinem Vortrag „New Age Transparency and A Special Hybrid Court for War Crimes in Ukraine: A New Model for War Crimes Prosecutions in Ukraine” beschäftigte sich Prof.

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em. Dr. Patrick R. Hugg (Loyola University College of Law, New Orleans) vor dem Hintergrund des Ukraine-Krieges zum einen mit dem Topos, dass moderne Technologie auch für moderne Kriegsführung missbraucht wird („The war was on – and so were the satellites“) und zum anderen mit der Notwendigkeit einer effizienten Sanktionierung einschlägiger, aggressiver Kriegshandlungen durch das Völkerrecht. Hierbei arbeitete er die Notwendigkeit eines *ad hoc* hybriden Internationalen Sondergerichtshofes heraus, welcher (das Römische Statut des Internationalen Strafgerichtshofs insb. hinsichtlich des Verbrechens der Aggression aus Artikel 8 bis im Blick habend) in Kooperation mit ferneren Interaktanten des Völkerrechts gerade im Ukraine-Kontext zu tragfähigen juristischen Lösungen führen könnte. Ferner wurde der *Briand-Kellogg-Pakt* der Zwischenkriegszeit als ein geeignetes Beispiel notwendiger internationaler Kooperation zwecks möglicher Abhilfe in vergleichbaren Fällen angeführt.

Mit dem Ausgangspunkt des alten, *Cicero* zugeschriebenen Rechtsgrundsatzes *silent enim leges inter arma* – Es schweigen die Gesetze unter den Waffen – versuchte Prof. Dr. Gerhard Fiolka (Université de Fribourg) in seinem Vortrag „«Inter Arma …»? – The Role of Criminal Law in Armed Conflict“ das bestehende Völkerstrafrecht im materiellen wie im prozessualen zu würdigen und hierbei seinen praktischen ‚Effekt‘ herauszuarbeiten. Betrachtet wurde insbes. die „Illusion of Protection“. Im Ergebnis schloss er, dass das Völkerrecht gerade im Kontext der Aggression keine präventive Schutzwirkung entfalten könne, mithin „immer zu spät“ komme. In diesem Kontext wurde die Möglichkeit abschreckender Maßnahmen vor dem Bruch des Völkerrechts erörtert, und Fiolka warnte vor einer letztlichen „Inflation des (Völker)Strafrechts“ ohne praktischen Nutzen.

Seinerseits unterstrich Prof. Dr. Rui Guerra da Fonseca (Universität Lissabon) in seinem Vortrag „The EConvHR and the ECrtHR‘s Jurisprudence on Conflict Situations: The Concept of Jurisdiction and International Humanitarian Law“ die Bedeutung der EGMR-Judikatur zur Auslegung der EMRK im Rahmen von (internationalen) Konfliktsituationen und leistete solcherart einen wichtigen Diskussionsbeitrag zur prozessualen Handhabe einschlägiger Kalamitäten. Hierbei arbeitete Guerra da Fonseca die Tangente wie auch die Schnittmengen zwischen Menschenrechten und dem (kontextuelleren, da stärker auf die Konfliktsituation zwischen Staaten bezogenen) humanitären Völkerrecht sehr konzise heraus, was durch eine Bezugnahme auf diverse Fallgruppen im Rahmen der bezeichneten Judikatur emphatisiert wurde; hierunter fanden u. a. der ständig schwelende Zypernkonflikt wie auch die Auseinandersetzung zwischen Armenien und Aserbaidschan hinsichtlich Nagorno-Karabach ausführliche Erwähnung. Im Ergebnis warnte der Referent davor, das humanitäre Völkerrecht zu sehr zum Beurteilungsmaßstab in einschlägigen EGMR-Entscheidungen werden zu lassen.

Im Vortrag „Jurisdictional Immunity of a State: As Seen from Ukraine Amid the War“ des aufgrund der aktuellen Situation live zugeschalteten Prof. Dr. Bohdan Karnaukh (Yaroslav Mudryi National Law Universität Kharkiv) wurde bereits als Ausgangspunkt der alte römische Rechtsgrundsatz *par in parem non habet imperium* – Gleiche haben über Gleiche keine Macht – emphatisiert und in diesem Zusammenhang umfangreiche internationale Judikatur wie auch ukrainische Verfahren etwa bzgl. der Entschädigung von Witwen gefallener Soldaten (Fall Nr. 308/9708/19 des Obersten Gerichtshofes vom 14. April 2022) gewürdigt.

Prof. Dr. Manuel Brunner (Polizeiakademie Niedersachsen) nahm in seinem Vortrag „Law of Neutrality and Weapon Shipments to Ukraine“ die Entwicklung der Praxis der Waffenlieferungen an die Ukraine im Laufe des Jahres 2022 zum Anlass, die Entwicklung des

Rechts der Neutralität insb. während des 20. Jahrhunderts bis zum heutigen Tage kritisch zu beleuchten. Im Ergebnis kam er zum Schluss, dass ein Aggressor nicht legitimerweise von einschlägigen Vorgaben des Völkerrechts profitieren solle und könne, was er nicht zuletzt durch die 2022er Resolution ES-11/1 der UN-Vollversammlung bestätigt sah.

Zwischen den Vorträgen bestand regelmäßig die Gelegenheit, sich in intensiven Diskussionen mit den zuvor präsentierten Inhalten auseinanderzusetzen – eine wertvolle Gelegenheit, welche das Publikum vor Ort wie auch das im Rahmen der hybriden Veranstaltung online verbundene Auditorium ausgiebig wahrnahm.

Berliner Wissenschafts-Verlag

Die Friedens-Warte

F-W
Vol. 95 | 2022 | Issue 3–4

ISSN-Print 0340-0255
ISSN-Online 2366-6714

9 770340 025001

Berliner Wissenschafts-Verlag

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https://elibrary.bwv-verlag.de