

Institution: University of Glasgow (UofG)		
Unit of Assessment: UoA 18 Law		
Title of case study: Shaping the global regulation of Autonomous Weapons Systems		
Period when the underpinning research was undertaken: 2015–2019		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s): Robin Geiß	Role(s) (e.g. job title): Professor of International Law and Security and Director of the Glasgow Centre for International Law and Security	Period(s) employed by submitting HEI: 2013–present
Period when the claimed impact occurred: 2015–2020		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact</p> <p>Geiß's pathfinding research—on why and how Autonomous Weapons Systems (AWS) and the use of artificial intelligence in military decision-making should be regulated—provides the legal and ethical underpinnings for the policy requirement of maintaining 'meaningful human control'. The research has been instrumental in: (i) shaping the development of national policy in Germany; (ii) building consensus for the international regulation of AWS through the United Nations, NATO and the G7, as well as shaping the approach of the International Committee of the Red Cross. Through presentations, advisory group membership and media interventions, Geiß's research has: (iii) influenced debate on the use of AWS in Germany and internationally; (iv) informed the ethical investment guidelines of the trillion-dollar Norwegian State Pension Fund, which sets standards followed by ethical investment funds worldwide.</p>		
<p>2. Underpinning research</p> <p>Autonomous Weapons Systems, such as drones, are the product of recent, rapid technological advancements. It may soon be possible for AWS to enter combat without any human control. Where new technologies emerge, legal and ethical questions about when and how they should be used inevitably follow. From 2015 onwards, Geiß's research has helped to set the agenda for these discussions at national and international level.</p> <p>Geiß's initial policy study [O1] provided the first comprehensive mapping of the general legal and ethical issues arising in relation to the use of AWS, with a list of clear policy recommendations addressed to the German government. Subsequently he co-edited the first interdisciplinary collection of essays on this topic [O2], which for the first time explored in-depth a range of critical ethical issues around the use of AWS that require an urgent policy response.</p> <p>Geiß then undertook a comprehensive doctrinal review of the existing legal and ethical frameworks relevant to regulation of AWS, mapping the specific legal issues created by emergent AWS technology, identifying gaps in legal regulation and recommending law and policy solutions [O3]. Key findings from this work included a lack of clarity regarding: (a) the testing of autonomous weapons systems (as per Article 36 Additional Protocol I to the Geneva Conventions); (b) the regulation of human-machine interaction considering human dignity and ethical arguments; and (c) the requirement of meaningful human control over AWS.</p> <p>At the request of H.E. Ambassador Biontino, the Chair of the United Nations Convention on Conventional Weapons (UN CCW – explained further below) experts meeting, Geiß prepared an analysis of the issue of risk management and accountability in relation to AWS [O4]. At the request of, and together with, the German Federal Ministry of Foreign Affairs, Geiß edited a collection of statements delivered at the third UN CCW meeting of experts [O5] to provide an evidence base for the development of legal positions and national policies around the globe with a view to further developing a common policy at UN level.</p> <p>Geiß's research provides the legal and ethical underpinnings for the policy requirement of maintaining meaningful human control over a weapons system's critical functions (e.g. target selection and target engagement). In addition, Geiß's research helps to conceptualize new arms control and monitoring regimes, as well as ethical guidelines for investors for this novel technology. It also contributes to the clarification of the key issue of accountability of both states and individuals in the context of the deployment of AWS.</p>		

3. References to the research

[O1] R Geiss, [The International-Law Dimension of Autonomous Weapons Systems](#) (2015) [Policy study]. Documentation. Friedrich Ebert Stiftung.

[O2] N Bhuta, S Beck and R Geiss, "[Present futures: concluding reflections and open questions on autonomous weapons systems](#)", in N Bhuta, S Beck, R Geiss, H-Y Liu and C Kress (eds), *Autonomous Weapons Systems Law, Ethics, Policy* (2016) Cambridge University Press, pp. 347-383. ISBN 978110715356.

[O3] R Geiß and H Lahmann, "[Autonomous weapons systems: a paradigm shift for the law of armed conflict?](#)", in JD Ohlin (ed), *Research Handbook on Remote Warfare* (2017) Edward Elgar Publishing, pp. 371-404. ISBN 9781784716981.

[O4] R Geiß, Autonomous Weapons Systems: Risk Management and State Responsibility, Statement delivered at the third UN CCW meeting of expert on lethal autonomous weapons systems (LAWS), Geneva, April 2016, available online at: <https://bit.ly/2EtXj6n>, reprinted at pp.109-118 of [O5] below.

[O5] R Geiß, (ed), [Lethal Autonomous Weapons Systems: Technology, Definition, Ethics, Law & Security](#) (2017) Federal Foreign Office, Berlin.

Evidence of quality of research

Output [O2] is a 36-page scholarly article published in an edited collection with a world-leading publisher (Cambridge University Press). Output [O3] is a 33-page scholarly article published in an edited collection with a world-leading publisher (Edward Elgar).

4. Details of the impact

From 2015 onwards, Geiß's research has had a significant influence on the development of national and international policy and public debate in respect of the use and regulation of AWS as follows:

4.1. Shaping national policy on the regulation of AWS in Germany

In Germany, Geiß's research has been instrumental in shaping national policy on the regulation of AWS (confirmed by statement [E1] from the former Deputy Head of Arms Control, German Federal Foreign Office). Germany has no plans to procure or develop AWS and has adopted an approach that recognises the complex legal and ethical concerns surrounding the issue, while moving towards an outright ban. In particular, Geiß's work (most notably [O1]) has brought about a focus on the issue of human dignity and the notion of 'meaningful human control' as a central concern within German AWS regulation. The former Deputy Head of Arms Control, German Federal Foreign Office, confirms that, *'through his work, Prof. Geiß has also contributed to informing government policy, including the German position, on aspects of a regulatory framework [...] as outlined in the coalition treaty.'* (statement [E1]). This claim is corroborated by Coalition Treaty [E2a] (2018) and a letter from the Head of Division Internationale Politikanalyse, Friedrich Ebert Stiftung [E2b].

In supporting the development of national policy, Geiß was invited to provide briefings on his work to key people within the government, including members of the German Federal Foreign Office's Arms Control Division, a member of the German Bundestag (federal parliament), and German government officials from various departments (confirmed by Bundestag Defence Committee invitation [E3]). Geiß was also invited to become a member of influential think tank Böll Foundation's International Task Force on disruptive technologies (2017–2018) and contributed his expertise to the Task Force's Final Report [Autonomy in Weapon Systems](#) [E4a], which argued that meaningful human control over weapon systems must be retained, and made recommendations to the German government and the German armed forces to that effect (confirmed by a letter from the Chairperson, Disruptive Technologies Task Force, Böll Foundation [E4b]).

4.2. Informing the International regulation of AWS

Germany is leading the drive for the introduction of universal legal and ethical standards in relation to the use of AWS in combat situations. International regulation of this type must be

developed by the United Nations, but the negotiation process is potentially difficult. Some countries—such as the US, China and Russia—have invested in the development of AWS and, therefore, oppose calls for regulation. Others, primarily developing countries, are calling for an immediate ban on AWS. Germany has adopted a step-by-step approach, arguing that to effectively ban fully autonomous weapons, countries that are currently developing such weapons must be brought on board. The significance of Geiß's research to the German government's position is demonstrated by his role in the government's programme of international consensus-building around the regulation of AWS, as follows:

The United Nations Conference of State Parties to the Convention on Certain Conventional Weapons (UN CCW) is the key forum in which these discussions take place. The German Ministry of Foreign Affairs invited Geiß to address a UN CCW experts meeting on 15 April 2016 in Geneva (confirmed by letters [E5a][E5b]). In October 2016, Geiß was commissioned to edit a collection of statements [O5], which in 2017 was delivered on behalf of the German Ministry of Foreign Affairs and distributed to all 124 member states of the UN CCW, with the specific aim of raising awareness of legal and ethical issues around AWS regulation. In November 2017, Germany and France submitted a joint statement to the UN CCW affirming the conviction that humans should continue to be able to make the ultimate decisions with regards to the use of lethal force, and should continue to exert sufficient control over the lethal weapons systems that they use.

Geiß was subsequently invited to join and inform the [International Panel on the Regulation of Autonomous Weapons Systems](#) (iPRAW), an independent, interdisciplinary group of scientists set up by the German Institute for International and Security Affairs in collaboration with the German Federal Foreign Office. The purpose of the panel is to support UN debates on lethal autonomous weapons systems (LAWS) with scientifically-grounded policy recommendations. The Head of Security Policy at iPRAW testifies to Geiß's, "*extraordinary expertise on international humanitarian law*", stating that he has, "*shaped the German and international discourse on LAWS*". This expertise, "*helped the panel's understanding of critical and uncritical uses of artificial intelligence and software in weapon systems*". In particular, Geiß helped to develop more specific ideas for the practical elements on the criterion of human control of LAWS. This had a, "*meaningful and valuable impact on iPRAW's work and thereby the international debate on regulation of LAWS*" (confirmed by statement [E6] from the Head of Security Policy, iPRAW).

Additionally, Geiß was invited by the German Federal Foreign Office to address a G7 meeting to promote his position on AWS in support of Germany's UN strategy with the aim of promoting international consensus around its positions. In light of his reputation and expertise in the field, Geiß was also repeatedly invited to brief NATO officials on autonomous weapons systems and to teach a course to Geneva-based diplomats at the Geneva Centre for Security Policy (confirmed by invitations [E7a][E7b]).

Geiß's research has also heavily influenced the International Committee of the Red Cross's approach to AWS. Bilateral discussions have taken place between Geiß and senior Red Cross officials (including the Chief Legal Officer and Head of the Arms Unit) on numerous occasions between 2013 and 2020 (confirmed in a letter from the Head of the Legal Division [E8]). The Chief Legal Officer confirms that, "*Geiß' research has made a distinct and material contribution to our mapping of humanitarian protection needs relating to autonomous weapons systems*" and has, "*informed the development of our ICRC positions on autonomous weapons systems*". She also testifies to Geiß's influence on the UN CCW, stating that his, "*oral and written interventions... have helped to shift debates about accountability and risk management pertaining to autonomous weapons systems in new directions, especially with regard to relevant due diligence obligations*" [E8].

4.3. Influencing public debate in Germany

Geiß's research and engagement activities have influenced and informed the ongoing debate about AWS in Germany. In particular, Geiß's research has enabled clearer distinctions between critical and uncritical uses of artificial intelligence in military systems and other applications.

With respect to the ethical implications of autonomous weapons systems, Geiß was a member of the scientific advisory board of the [Die Forschungsstätte der Evangelischen Studiengemeinschaft](#), the research arm of the Evangelical Church in Germany (EKD) (confirmed by [E9]). He was the only member of the group with expertise in law and provided advice based on his research that led to the establishment by the EKD of a continuing project: [“New ethical standards in view of digitization processes using the example of autonomous weapons”](#), part of the Military and Peace theme. Geiß was also invited to brief the advisory board of the German Centre of Ethical Education in the Armed Forces and to address the 101st German Catholic Convention in 2018, which had over 50,000 participants (confirmed by invitation [E10]). In addition, Geiß has contributed to the wider public debate in Germany by way of op-ed and radio interviews, focusing on the key issues of human dignity and meaningful human control within this multifaceted legal and ethical debate (confirmed by media activity [E11]).

4.4. Informing international investment guidelines and policies

Geiß’s research has informed international investment guidelines and policies. He has achieved this by working with the [Norwegian State Pension Fund \(GPF\)](#), one of the world’s largest sovereign wealth funds with assets under management worth approximately USD1 trillion. Its investment strategy (including [ethical guidelines](#)) is determined by the Norwegian Ministry of Finance, with oversight by Parliament. The Norwegian Central Bank (which manages the Fund) must comply with this. Ethical guidelines are developed by a [Council on Ethics](#), which also oversees compliance. The ethical guidelines are translated into English, published and followed by ethical investment funds worldwide (confirmed by a statement from the Council on Ethics [E12]).

In 2019, the Norwegian Government set up a Committee to review the Fund’s ethical guidelines. Geiß was invited to provide an expert briefing to this Committee on critical and uncritical military uses of artificial intelligence and the defining criteria for AWS that ought to be prohibited [E12]. As a result of this briefing, the Norwegian State Pension Fund revised its funding guidelines to prohibit investment in certain deadly autonomous weapons systems. A member of the Council of Ethics confirms that the definition of prohibited weapons systems was, *“heavily informed by the research and expert briefing of Professor Geiß”* [E12]. The Council of Ethics will now start to track companies in the Fund that may be involved in the development of such systems and will engage with them *“in order to explore ways to avoid the development or production of this particular technology”*. Companies that do not comply will be excluded from the Fund (as confirmed by statement [E12]).

4.5. Next steps

In recognition of his work in the field of new technologies, United Nations Secretary-General António Guterres [announced](#) the appointment of Professor Robin Geiß as Director of the United Nations Institute for Disarmament Research on 5 February 2021. This appointment ensures that Geiß’s pathfinding research will continue to influence efforts to build international consensus on the regulation of AWS beyond the REF2021 period.

5. Sources to corroborate the impact

[E1] Letter from the former Deputy Head of Arms Control, German Federal Foreign Office (confirms the influence of Geiß’s work on the development of German national AWS policy and contributions to the coalition treaty, below) [\[PDF available\]](#).

[E2a] Coalition Treaty, [Ein Neuer Aufbruch für Europa](#) between the CDU Germany and the SPD Germany (2018) (see para 7027) [\[In German\]](#) [\[PDF available\]](#).

[E2b] Letter from Head of Division Internationale Politikanalyse, Friedrich Ebert Stiftung (confirms the influence of Geiß’s work on the national policy arena) [\[PDF available\]](#).

[E3] Email from the office of a member of the Bundestag Defence Committee (confirms appointment to meet with key members of the German government) [\[PDF available\]](#).

[E4a] Heinrich Böll Stiftung (Foundation) [Autonomy in Weapon Systems](#) (2018) (Geiß’s contribution is acknowledged in the Foreword on p.11 and his research is twice cited in the report: [O3] at p.19 and [O1] at p.25) [\[PDF available\]](#).

[E4b] Testimonial from Chairperson, Disruptive Technologies Task Force, Heinrich Böll Foundation [\[PDF available\]](#).

- [E5a] Letter from Chairperson of United Nations Conference of State Parties to the Convention on Certain Conventional Weapons (confirms invitation to speak to CCW) **[PDF available]**.
- [E5b] Letter from Chairperson of United Nations Conference of State Parties to the Convention on Certain Conventional Weapons (thanking Geiß for his contribution) **[PDF available]**.
- [E6] Letter from Head of Security Policy, German Institute for Security Policy and Chairperson, International Panel on the Regulation of Autonomous Weapons Systems (confirms Geiß's contribution to the international debate on AWS) **[PDF available]**.
- [E7a] Invitation from Emerging Security Challenges Division of NATO *[In German, English translation provided]* **[PDF available]**.
- [E7b] Invitation from NATO Defense College **[PDF available]**.
- [E8] Letter from Head of Legal Division, ICRC (confirms Geiß's influence on ICRC policy) **[PDF available]**.
- [E9] List of advisory group members, available at: <http://www.konsultationsprozess-gerechter-frieden.de/index.php/wissenschaftlicher-beirat> **[PDF available]**.
- [E10] Invitation letter from Secretary-General of the Central Committee of German Catholics (confirms expected attendance of 'tens of thousands' of people) **[PDF available]**.
- [E11] Media work: (a) [Süddeutsche Zeitung](#), 7 June 2014; (b) [Deutschlandfunk Kultur](#), 3 August 2015 *[In German]* **[PDFs available]**.
- [E12] Letter from a member of the Council on Ethics, Norwegian Pension Fund (confirms the contribution of the underpinning research on the Norwegian State Pension Fund's revised guidelines) **[PDF available]**.