AUTONOMOUS WEAPONS: REGULATION TOLERANT OR REGULATION RESISTANT?

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Even at a very early stage of conception, autonomous weapons have provoked lively discussion concerning the possibility of international regulation. While State military policies have adopted fairly circumspect approaches[1] private humanitarian organizations and some academic commentators have mounted compelling and well-organized efforts to restrain or preemptively ban autonomous weapon systems (AWS).[2] States and civil societies have already convened regularly to study and advocate, specific regulation of autonomous weapons as part of the United Nations' (U.N.) weapons law review process.[3] Whether these expenditures of valuable political, diplomatic, and legal capital will ultimately produce effective regulatory results is an important question. The answer may come, in part, from the past.

It is almost universally accepted that the existing law of war regulates all weapons and means of warfare. General law of war principles such as humanity and distinction apply to weapons regardless of their nature or novelty.[4] Still, with respect to some weapons, States have judged generally applicable limits to be insufficient.[5] On a number of occasions, States have consented to weapon-specific regulations and even bans regarding a broad range of weapons.[6]

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1. *See* U.S. Dep't of Def. Directive 3000.09, Autonomy in Weapon Systems (Nov. 21, 2012) (imposing a number of policy-based limitations on development and employment of autonomous weapons).

2. *See, e.g.*, CAMPAIGN TO STOP KILLER ROBOTS, http://www.stopkillerrobots.org (last visited Feb. 27, 2016); *Statements,* ICRAC, http://icrac.net/statements/ (last visited Feb. 28, 2016); *Killer Robots,* HUMAN RIGHTS WATCH, http://hrw.org/topic/arms/killer-robots (last visited Feb. 27, 2016).

3. *See Meetings of the States Parties*, UNOG, http://www.unog.ch/80256EE600585943/%28httpPages%29/CE461DB2A1D128A5C12573CD004DB6F3?OpenDocument (last visited Feb. 27, 2016) (explaining the process and content of meetings of the Convention on Certain Conventional Weapons (CCW)).

4. *See* Legality of Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, ¶ 86 (July 8) (noting the rejection of the newness of nuclear weapons as an argument against the application to them of international humanitarian law).

5. *See, e.g.*, Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects, Oct. 10, 1980, 1342 U.N.T.S. 137.

6. *See, e.g.*, *id*. The CCW is the base treaty for a collection of five protocols that regulate specific weapons, including at present undetectable fragments, landmines, incendiaries, blinding lasers, and unexploded ordnance. *Id*.

The history of these efforts presents a greatly varied record. Some weapons, such as landmines and poison, have proved quite tolerant to international regulation.[7] Attempts to regulate these weapons have achieved considerable success, generating meaningful and effective limitations.[8] Other weapons and systems, such as firearms and submarines, have proved especially regulation resistant.[9] Campaigns to legislate specific limitations on their use, despite persistent effort and even after episodes of apparent progress, have either failed to gain traction or have seen initial success vanish in the crucibles of arms races and armed conflicts.[10] Still, other weapons, such as cluster munitions, have defied categorical characterization as either regulation resistant or tolerant, gaining selective, even enthusiastic, acceptance by some States but drawing persistent rejection by others.[11] These latter cases have produced a somewhat Balkanized body of weapons law. This mixed record begs explanation, yet until recently little effort had been made to analyze the forces behind weapons law successes and failures.

This article briefly applies to AWS the author's recently published analysis of regulation tolerance and resistance in weapons.[12] Using criteria that influenced past efforts to produce weapon-specific regulations and bans, including effectiveness, novelty, deployment, medical compatibility, disruptiveness, and notoriety, this article will evaluate the likelihood of success of present efforts to specifically regulate or ban AWS. This article concludes that while AWS presently demonstrate characteristics of both regulation tolerance and resistance, on balance, considerations of resistance, especially uncertainty as to effectiveness, prevail. These considerations of resistance indicate a low likelihood that States will in the immediate future consent to meaningfully ratified specific regulations or a preemptive ban.

EFFECTIVENESS

Unsurprisingly, States have rarely been willing to accept restraints, beyond generally applicable rules and principles, on weapons that are especially effective.[13] Surveying the catalog of weapons that have been universally banned, including, *inter alia*, poisons, barbed weapons, chemical weapons, and biological weapons, one finds a common thread of relative ineffectiveness.[14] Poisons have never been

7. *See generally* Sean Watts, *Regulation-Tolerant Weapons, Regulation-Resistant Weapons and the Law of War*, 91 INT'L L. STUD. 540 (2015), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2650779.

8. *Id*. at 543.

9. *Id*. at 543, 574.

10. *Id*. at 541–52.

11. *Id*. at 594.

12. *Id*.; *see* Rebecca Crootof, *The Killer Robots Are Here: Legal and Policy Implications*, 36 CARDOZO L. REV. 1837, 1883 (2015) (identifying similar factors relevant to international regulation of weapons).

13. *See* Watts, *supra* note 7, at 610 (recognizing that States have been especially reluctant to accept regulations that provide effective assistance to enemy forces).

14. *Id*. at 610.

employed on a sufficient scale to secure more than momentary or isolated military advantage.[15] Adding barbs to edged weapons inflicts needless injury and does not provide large-scale, immediate military advantage as they are employed on an individual basis.[16] Chemical weapons are certainly capable of producing casualties and perhaps more significantly of degrading the efficiency of enemies by forcing them to operate in burdensome protective equipment.[17] However, their use also denies or significantly limits the use of terrain equally to friend and foe.[18] And biological weapons present an alarming threat of general epidemic and blowback to friendly forces.[19] Therefore, the accepted international bans on these weapons, while undoubtedly advances for weapons law and humanity, actually required States to forego little in the way of battlefield effectiveness.[20]

Access constitutes a particularly important facet of effectiveness and is a strong consideration in evaluating the susceptibility of weapons to specific regulations.[21] Weapons that permit belligerents to gain access to previously inaccessible targets and enemy vulnerabilities have proved exceptionally effective and have had significant influence on tactical and strategic outcomes.[22] In the twentieth century, aircraft, submarines, and long-range nuclear-tipped missiles revolutionized warfare in their respective domains, primarily by permitting access to previously unreachable targets and territory.[23] Faced with repeated attempts at prohibition, each of these systems proved exceptionally regulation resistant owing largely to the unprecedented and irreplaceable access they grant belligerents and therefore their effectiveness.[24]

It is difficult to assess the future effectiveness that AWS will offer States. For now, it seems that autonomous systems are envisioned to operate primarily in

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15. *See id*. at 564 (noting that the use of poison was primarily concerned with small-scale actions like assassination rather than large-scale tactical or operational use).

16. *See id*. at 551, 616 (acknowledging that barbed weapons have long been prohibited for inflicting needless injury; they cause increased suffering associated with removal and are incompatible with standard medical treatment procedures).

17. *See* Donald B. Headley, Gerald A. Hudgens & Donald Cunningham, *The Impact of Chemical Protective Clothing on Military Operational Performance*, 9 MIL. PSYCHOL. 359, 359 (1997) (noting that chemical protective clothing limits dexterity, mobility, command and control, communications, and endurance).

18. *See*, *e.g*., Kevin J. Fitzgerald, *The Chemical Weapons Convention: Inadequate Protection from Chemical Warfare*, 20 SUFFOLK TRANSNAT'L L. REV. 425, 432 (1996) (stating that Italians used chemical weapons to deny enemy access to terrain).

19. *See* Watts, *supra* note 7, at 553 ("Many biological agents are capable of reproduction and may spread well beyond their intended targets.").

20. *See id*. at 609 (describing bans on chemical and biological weapons and that they may be just as much reflections of relative ineffectiveness as these weapons' propensity to inflict unnecessary suffering).

21. *Id*. at 610.

22. *Id*. at 609.

23. *See id*. at 610 (noting that these new means of delivery improved tactical and strategic access).

24. *Id*.

situations where human limitations constrain effectiveness or in order to free humans for other tasks.[25] Future autonomous systems might offer substantial effectiveness in environments where tedium, danger, and environmental extremes limit human performance. Although humans might monitor and make use of the same sensing and targeting technology and may perform many of the same missions, autonomous systems could likely do so unhindered by boredom, fear, anger, and fatigue or illness.[26] Equally important, if conceived as weapons-delivery platforms, like the airplane or submarine, AWS might similarly expand access to targets, particularly if programmed to accept risks of harm that would deter humans.

In theory, each use of an AWS frees a human to perform another battlefield function; a saved opportunity cost that is, in itself, a form of effectiveness. Due to their effectiveness, AWS seem likely to register the regulation resistance exhibited previously by other delivery platforms such as airplanes, submarines, and missiles. Campaigns to regulate weapons, such as those directed at cluster munitions, have already integrated arguments concerning ineffectiveness into their advocacy.[27] Any successful effort to regulate AWS would seemingly need to rebut what is, at least conjecturally, a compelling case for these weapons' effectiveness.

NOVELTY

Innovative weapons have encountered mixed experiences with international regulation. For example, novel aerial bombardment technology and chemical weapons yielded to international treaties early in their development and prior to their widespread use.[28] As early as 1899, States consented to a time-limited treaty banning aerial bombardments.[29] At the same diplomatic conference, several States adopted a declaration banning the use of still novel asphyxiating gases.[30]

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25. *See* Memorandum from Dr. Paul Kaminski, Chairman, Defense Science Board (July 19, 2012), http://www.fas.org/irp/agency/dod/dsb/autonomy.pdf ("[U]nmanned systems are making a significant, positive impact on DoD objectives worldwide. However, the true value of these systems is not to provide a direct human replacement, but rather to extend and complement human capability by providing potentially unlimited persistent capabilities, reducing human exposure to life threatening tasks, and with proper design, reducing the high cognitive load currently placed on operators/supervisors.").

26. *See id.* (observing that the high cognitive load on operators can be reduced by autonomous systems).

27. *See, e.g.*, Human Rights Watch, *Fatally Flawed: Cluster Bombs and Their Use by the United States in Afghanistan*, 14 HUM. RTS. WATCH, no. 7, 2002 at 17, http://www.hrw.org/reports/2002/us-afghanistan/Afghan1202.pdf (noting the reduced military impact of cluster bombs in light of high dud rates); Int'l Comm. of the Red Cross, *Anti-Personnel Landmines: Friend or Foe?*, 40–46 (Aug. 1997), https://www.icrc.org/eng/assets/files/other/icrc_002_0654.pdf.

28. *See* Watts, *supra* note 7, at 612 (noting that States responded to emerging weapons technology like aerial bombardment and biological warfare with a willingness to regulate new military technology).

29. Declaration (IV, I), to Prohibit, for the Term of Five Years, the Launching of Projectiles and Explosives from Balloons, and Other Methods of Similar Nature, July 29, 1899, 32 Stat. 1839.

30. Declaration (IV, II) on the Use of Projectiles the Object of Which is the Diffusion of

Yet, nuclear weapons and submarines, novel weapons or means of war in their own right, proved exceptionally resistant to specific regulation.[31] Other novel weapons, such as blinding lasers and landmines, required prolonged and determined campaigns before yielding to specific regulation.[32] In fact, meaningful specific restraints never materialized with respect to nuclear weapons and submarines.[33] In the cases of blinding lasers and landmines, States appear to have favored a "wait and see" approach, an approach that continues today in some cases.[34] For example, the slow-moving procedures of the U.N. Convention on Certain Conventional Weapons (CCW) review process have drawn criticism, but are surely indicative of States' preference for cautious, deliberative procedures for developing weapons law. Accordingly, most of the recently concluded international regulations of novel weapons have required patient and persistent efforts on the part of their proponents.[35] For instance, despite repeated calls from civil society, as well as from States, for regulation of cyber weapons, the majority of States seems to regard a specific cyber weapon treaty as premature.[36]

With respect to novelty, AWS seem highly analogous to cyber weapons. Presently, States seem uncertain of the full potential of AWS.[37] And while States have fielded, and even according to some accounts employed cyber weapons, autonomous weapons are for now true *terra incognita*. Indeed, at a recent U.N. meeting that included representatives of parties to the CCW, Germany, a State that has been of late a relatively enthusiastic supporter of weapons law, submitted what it termed "Food-for-thought"—a guarded series of questions concerning the "State of play" of autonomous weapons.[38]

Asphyxiating or Deleterious Gases, July 29, 1899, 187 Consol. T.S. 453.

31. *See* Watts, *supra* note 7, at 612 ("On one hand, States have proved surprisingly willing to accept restraints on newly emerging technologies . . . . On the other hand, States proved resistant to early efforts to regulate nuclear weapons, as well as blinding lasers and submarines.").

32. *Id*. at 614–15.

33. *Id*. at 605, 574.

34. *See generally* Stephen Goose, *The Case for Banning Killer Robots*, HUMAN RIGHTS WATCH (Nov. 24, 2015), https://www.hrw.org/news/2015/11/24/case-banning-killer-robots.

35. *See generally id*. (discussing the efforts of various parties within the international community to address concerns about the development of fully autonomous weapons).

36. *See id*. ("Some oppose a preemptive and comprehensive prohibition, saying it is too early and we should 'wait and see' where the technology takes us.").

37. *Cf*. Elise Viebeck, *A Cybersecurity Treaty? Not so Fast, Says State Cyber Czar*, THE HILL (Apr. 28, 2015), http://thehill.com/policy/cybersecurity/240276-a-cybersecurity-treaty-not-so-fast-says-state-cyber-czar ("Calls for an international treaty on cybersecurity are premature given the evolving nature of online threats . . . .").

38. *Lethal Autonomous Weapons Systems, Food-for-Thought for the Informal Meeting of Experts on Lethal Autonomous Weapons Systems*, submitted by Germany at the Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, U.N. Doc CCS/MSP/2015/WP.2 (Mar. 20, 2015), https://documents-dds-ny.un.org/doc/UNDOC/GEN/G15/061/30/PDF/G1506130.pdf?OpenElement; *see also* Michael W. Meier, U.S. Department of State, U.S. Opening Statement at the CCW Informal Meeting of Experts on Lethal Autonomous Weapons Systems (Apr. 13, 2015), https://geneva.usmission.gov

At least for the near future, it is likely most States regard international regulation of novel autonomous weapons as premature. Academic commentators have directly cautioned States in this respect.[39]

DEPLOYMENT

The extent to which a weapon has been acquired, fielded, integrated into operations, and deployed in State arsenals bears significantly on its susceptibility to regulation. Weapon deployments involve not only large investments of financial capital but also immense investments in training and planning to incorporate them into military doctrine and operations.[40] Historically, States have been slow to abandon weapons that are widely fielded or form a critical component of existing tactical, operational, or strategic plans.[41] For example, the earliest progress on regulating chemical and biological weapons occurred before States had fielded significant quantities of either weapon.[42] More recently, the ban on blinding lasers entered into force before any State had fielded that weapon at all—thus, the ban required no State to meaningfully alter its force structure, doctrine, or military plans.[43]

Anti-personnel landmines (APL) present a contrasting case. Widely deployed by militarily significant States, APL proved regulation resistant for decades.[44] While they are now regulated by a detailed, weapon-specific treaty and are banned by another, notable military powers have not adopted the latter instrument.[45] Cluster munitions, also widely deployed and now the subject of a weapon-specific treaty, have proved similarly resistant to regulation among major military powers

/2015/04/15/u-s-opening-statement-at-the-ccw-informal-meeting-of-experts-on-lethal-autonomous-weapons-systems/ (discussing the United States' especially cautious reactions to such efforts).

39. *See*, *e.g.*, Eric Talbot Jensen, Presentation at the CCW Informal Meeting of Experts on Lethal Autonomous Weapons Systems: Lethal Autonomous Weapon Systems (Apr. 13, 2015), http://www.unog.ch/80256EDD006B8954/(httpAssets)/FF46D72262535835C1257E28006182EB/$file/19+Eric+Talbot+Jensen+SS.pdf.

40. *See* Watts, *supra* note 7, at 608 ("[I]n many cases the immense investments of political, diplomatic and financial capital required greatly reduce opportunities for progress [in convincing States to sign on to treaties to regulate or ban certain weapons].").

41. *See* Jensen, *supra* note 39 (discussing the hesitancy of States to fully accept new forms of weaponry in international warfare at the 1899 Hague Convention and the 1907 Hague Conference).

42. The first attempt to regulate chemical and biological warfare occurred in 1925 with the Geneva Protocol. Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, June 17, 1925, 26 U.S.T. 571.

43. *See* Protocol on Blinding Laser Weapons (Protocol IV) to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, Oct. 13, 1995, T.I.A.S. No. 09-721.2, 1380 U.N.T.S. 370 (discussing the ban on blinding lasers).

44. *See* John Lewis, Comment, *The Case for Regulating Fully Autonomous Weapons*, 124 YALE L. J. 1309 (2015) (discussing the difficulty in regulating autonomous weapons).

45. Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, Sep. 18, 1997, 2056 U.N.T.S. 2011, https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-5&chapter=26&lang=en.

like the United States, China, and Russia.[46] To abandon cluster munitions at this point would arguably require drastic changes to the battlefield techniques, tactics, and procedures of these armed forces—explaining in part, their relative resistance to the ban.[47]

At first blush, the fact that AWS have not been deployed appears to favor chances for regulation. Once States have invested in their acquisition and, more importantly, once States have integrated them into military doctrine and strategies or rely on them to maintain positions of military advantage over competitors, experience indicates that the prospects for regulation, and especially for a ban, will diminish significantly.[48] In fact, the U.N. Special Rapporteur for Extrajudicial, Summary and Arbitrary Executions recently expressed concern that ongoing consideration of limitations on AWS might be undermined by delays permitting States to deploy AWS before a ban can be adopted.[49]

MEDICAL COMPATIBILITY

Weapons that produce wounds compatible with existing medical protocols[50] and field hospital capacity have generally proved resistant to international regulation.[51] Despite protracted campaigns to regulate small arms projectiles such as high-velocity bullets and flechettes, the relatively conventional wounds produced by each has not been sufficient to generate a lasting and universal prohibition on these weapons.[52] Only weapons that frustrate widely available battlefield medical capabilities or that inflict suffering beyond that required to put belligerents out of action have managed to generate sufficient support for regulation on the basis of humanity.[53] Non-detectable fragments and barbed

46. *See* Convention on Cluster Munitions art. 2.2, Dec. 3, 2008, 2688 U.N.T.S. 39 (listing all signatories of the treaty, from which Russia, the United States, and China are absent).

47. *See* Steven Groves & Ted R. Bromund, *The United States Should Not Join the Convention on Cluster Munitions*, THE HERITAGE FOUND., (Apr. 28, 2011), http://www.heritage.org/research/reports/2011/04/the-united-states-should-not-join-the-convention-on-cluster-munitions (discussing American resistance to the ban on cluster munitions).

48. Human Rights Council Res. 26/12 U.N. Doc. A/26/12, at 2 (Nov. 7, 2014).

49. Harriet Grant, *UN Delay Could Open Door to Robot War, Say Experts*, THE GUARDIAN, Oct. 6, 2015, http://www.theguardian.com/science/2015/oct/06/autonomous-weapons-un-delay-robot-wars/ (discussing the concerns of the U.N. Special Rapporteur over the slow pace of negotiations regarding a pre-emptive ban on lethal autonomous weapons).

50. The Hague Regulations create a medical protocol that prohibits the use of weapons that cause unnecessary suffering. *See* Watts, *supra* note 7, at 615 (stating that weapons that produce wounds that cannot be treated by using prevailing protocols of medical care provided to war victims seem more susceptible to regulation).

51. *See* Int'l Comm. of the Red Cross, *Weapons that may Cause Unnecessary Suffering or have Indiscriminate Effects* 11 (1973), https://www.loc.gov/rr/frd/Military_Law/pdf/RC-Weapons.pdf (discussing regulations that prevent the use of weapons causing unnecessary suffering, and indiscriminate weapons or methods of combat).

52. *See id*. at 71–72 (discussing the lack of regulation of small arms projectiles).

53. *See id*. at 11 (discussing regulations that ban the use of weapons causing unnecessary suffering).

weapons are prime examples of weapons banned because of the nature of wounds they inflict.[54]

While a compelling indicator of potential regulation of many weapons, medical compatibility is unlikely to prove an especially relevant criterion with respect to AWS. In a sense, AWS are better characterized as a means of warfare than a weapon.[55] More precisely, they might be better classified as delivery platforms.[56] AWS may have more in common with submarines and aircraft than with bullets and shells or gases and grenades. In theory, an AWS might be armed with any conceivable weapon from a small arms projectile to a high-yield nuclear device, making wound generation and medical compatibility a function of the arms employed rather than of autonomy itself.

DISRUPTIVENESS

Some efforts to regulate or ban weapons appear to be derived from strategic rather than humanitarian considerations.[57] Weapons that have threatened to disrupt existing balances of power or military hegemony have often provoked campaigns to achieve through law what States feared they could not accomplish on the battlefield.[58] Where hegemons have seen danger, challengers have often seen potential.[59] The crossbow, improved artillery, and submarines are all examples of highly disruptive weapons that provoked preemptive regulatory campaigns by military hegemons.[60] Yet few, if any, of these efforts have succeeded,[61] suggesting that a weapon's potential for disruptiveness indicates regulation resistance.

To the extent AWS demonstrate potential to undermine existing military advantages, such as population size, training, and geographic separation, it is likely that States suffering disadvantages in these respects will resist regulations.[62] The

54. *See id*. at 15–16 (discussing regulations that ban the use of weapons with barbed heads and projectiles filled with broken glass because they cause unnecessary suffering).

55. Michael N. Schmitt, *Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics*, HARV. NAT'L. SEC. J. FEATURES (2013), http://harvardnsj.org/2013/02/autonomous-weapon-systems-and-international-humanitarian-law-a-reply-to-the-critics/.

56. *See* United Nations Inst. for Disarmament Res., *Framing Discussions on the Weaponization of Increasingly Autonomous Technologies* 6 (2014), https://www.justsecurity.org/wp-content/uploads/2014/05/framing-discussions-on-the-weaponization-of-increasingly-autonomous-technologies-en-606.pdf (discussing removing humans from weapon delivery platforms).

57. *See* Watts, *supra* note 7, at 616 (explaining the military strategy behind regulating weapons).

58. *See id*. (discussing why States use international law to limit other States' access to weapons and technology).

59. *See id*. (stating that States' efforts to limit other States' access to weapons rarely prove successful and that disruptive weapons almost always managed to find their way to the battlefield).

60. *See id*. at 566–77 (describing weapons which sparked preemptive regulation campaigns in the past).

61. *See id*. at 616–17 (discussing the correlation between social and military disruptiveness and regulation resistance).

62. *See id*. (concluding that States normally at a disadvantage in war will resist regulations

possibility of resorting to AWS to achieve a new battlefield asymmetry[63] may be too tempting for many States to resist, as it has been throughout history.[64]

NOTORIETY

While military decisions to develop or field weapons are rarely made in the civic sphere or by popular opinion, especially visceral or fervent public disapproval can reduce a weapon's chances to evade regulation.[65] Weapons that attract notoriety either by their effects or by their nature may find themselves susceptible to increasingly well-engineered and coordinated efforts to ban them.[66] Natural human aversions to poison have been cited as an explanation of the ban on their use in warfare.[67] The campaigns to ban landmines and cluster munitions have relied heavily on social media and publicity to rally public opinion against these weapons and to pressure States to adopt bans.[68]

Again, it may be too early to identify a prevailing public opinion on AWS. Yet, the fact that they eliminate humans from the critical function of target selection and life-and-death decisions has caused deep concern among scientists, ethicists, and others.[69] Robot wars and ensuing doomsday scenarios that engulf humanity may attach notoriety to autonomous weapons that will be sufficient to induce States to accept some form of specific regulation.[70]

EQUIVOCATIONS AND CONCLUSION

All theories have limitations. The author's initial description of a model for evaluating regulation tolerance and resistance included an important series of equivocations.[71] First, it was conceded that the criteria of this model are not exclusive factors of regulation tolerance or resistance.[72] Political, cultural, religious, economic and even interpersonal factors influence weapons law and may

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of autonomous weapons).

63. Watts, *supra* note 7, at 616–17 (stating that disruptive weapons have nearly always managed to find their way to the battlefield).

64. *See id*. at 616 ("Historical examples abound of attempts to use law to achieve, sustain or artificially prolong military technical advantages that could not be otherwise maintained in armories or on the battlefield.").

65. *See id*. at 617–18 (explaining how public opinion affects weapon regulation).

66. *See id*. at 618 (discussing how public notoriety and disapproval of weapons lead to campaigns targeted at banning them).

67. *See id*. (concluding human reactions caused poison to be banned).

68. *See id*. (describing the campaigns against landmines and cluster munitions).

69. *See* Grant, *supra* note 49 (discussing the concerns of campaigners of the robotics and technology field of the dangers of autonomous weapons).

70. *See id*. (explaining that the vision of doomsday scenes that goes along with discussion of AWS may influence States' regulations of those weapons).

71. *See* Watts, *supra* note 7, at 618 (listing equivocations regarding the author's model for evaluating regulation tolerance and resistance).

72. *See id*. (explaining that regulation tolerance and resistance are not solely determined by the nature of the weapons themselves).

even displace the model's criteria as determinants of regulatory success or failure.[73]

Second, in some cases, it may not be accurate or possible to label weapons as either regulation resistant or tolerant. Poisons, for example, present a complicated case under the author's model.[74] Their capacity for social and military disruption suggests strong regulation resistance.[75] But poison's incompatibility with medical treatment protocols and public notoriety inspired longstanding and categorical bans on their use.[76] In this regard, balancing is critical to effective assessments of regulation tolerance and resistance. A strong showing of resistant characteristics might overcome multiple indications of tolerance and *vice versa*.

Overall, AWS present an uncertain case with respect to regulation tolerance and resistance. On one hand, public notoriety concerning autonomous weapons, and the fact that States have not yet deployed them, suggests a degree of tolerance for regulation. A ban would address building public concern for the implications of automated warfare.[77] And a ban would not, at this point, impose significant costs of adjustment on States' armed forces or cause them to forfeit hard-won military advantage.[78] On the other hand, their novelty and potential to disrupt established military hegemony suggest strongly that autonomous weapons will prove regulation resistant. The truly novel nature of a weapon system that can reliably target enemy forces and military objects certainly counsels States not to forgo its advantages precipitously. A ban on AWS might deny a weak State the opportunity to disrupt a currently disadvantageous balance of military power.

Finally, it is difficult at present to evaluate the military effectiveness of AWS. It appears that, in some circumstances, they may offer relative advantages over manned systems or human soldiers.[79] It also seems possible that AWS might grant States access to enemy targets and vulnerabilities previously inaccessible to manned systems.[80] On balance, uncertainty as to effectiveness seems a sound basis for predicting that States will exercise extreme caution toward or even resistance to attempts to regulate autonomous weapons. To the extent there is State support for regulation or a ban, it is likely to be fragmented support with lines predictably drawn according to perceptions of effectiveness and extent of deployment, producing alongside that of cluster munitions and landmines, yet another Balkanized sector of weapons law.

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73. *See id*. (discussing the factors that influence weapons law).

74. *See id*. at 619 (explaining into which category poison falls).

75. *See id*. (describing poison as regulation resistant).

76. *See id*. (explaining why the use of poison was banned).

77. *See* Watts, *supra* note 7, at 613–14 (concluding that States have shown a degree of tolerance for AWS regulation).

78. *See id*. at 613–15 (noting a correlation, historically, between State willingness to accept regulations and prohibitions and the level of investment).

79. *See id*. at 609–12 (discussing the benefits of AWS versus human soldiers).

80. *See id*.