

COMPLIANCE AND ENFORCEMENT:

LESSONS FROM ACROSS
WMD-RELATED REGIMES

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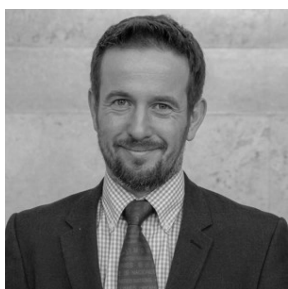
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ABBREVIATIONS AND ACRONYMS

ABM	Treaty on the Limitation of Anti-Ballistic Missile Systems
BWC	Biological and Toxin Weapons Convention
CTBT	Comprehensive Nuclear-Test-Ban Treaty
CWC	Chemical Weapons Convention
IAEA	International Atomic Energy Agency
ICJ	International Court of Justice
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
NTM	national technical means
OPCW	Organisation for the Prohibition of Chemical Weapons
WMD	weapons of mass destruction

SUMMARY

- WMD-related arms control and disarmament measures are a form of global public good. In addition to providing key national security benefits to participating States, adherence to such agreements can also deliver several other secondary benefits. Moreover, such treaties largely work, with significant cases of outright treaty violations a rare occurrence. Nonetheless, when violations do occur, they can have a deeply corrosive effect on a treaty regime and the wider security environment, including the integrity of WMD-related arms control and disarmament measures as a whole.
- Reaching judgements on allegations of non-compliance with the objectives and purposes of WMD-related agreements is contingent upon several different factors, including the gravity of the alleged case of non-compliance; the source and credibility of the allegation; the investigative processes, tools and resources of the regime; and the wider political context.
- Where mandated, international treaty organizations can play an important role in addressing allegations of non-compliance. However, sufficient perceived impartiality and integrity on the part of these organizations is required in order for them to be able to play that role effectively. Agreed procedures to facilitate the resolution of compliance concerns are particularly important. WMD-related treaty regimes often have some flexibility to address non-compliance within agreed parameters. Innovation is sometimes required to address novel challenges; however, innovative or ad hoc approaches are more vulnerable to criticism, particularly in times of political tension.
- WMD-related agreements provide States Parties with a range of tools to address concerns over compliance. Some of these tools are underused. For example, when political support is forthcoming, consultative mechanisms can build factual common ground on issues of non-compliance, resolve minor technical issues, and develop technical solutions to address more serious disputes. There are also advances in science and technology that, if validated, would augment existing verification arrangements.

- Multilateral WMD arms control and disarmament agreements are based on an implicit division of labour between the technical secretariats of international bodies and States Parties. To be compliant with multilateral WMD treaties, States Parties both commit to undertake national activities and provide some form of information about domestic compliance. On occasion, States have underestimated the domestic requirements as part of this division of labour. There is also a role for non-State actors in a collaborative governance approach to compliance and enforcement.
- A variety of tools exist for the enforcement of WMD-related agreements. These range from the provision of assistance to referral to the Security Council. States acting individually or collectively play a key role in the development of solutions to enforce WMD-related treaties and restore compliance.

1 INTRODUCTION

Over the course of the twentieth century, States have—with the support of other kinds of stakeholders, including industry, academia and civil society—developed arms control and disarmament regimes to regulate or proscribe biological, chemical and nuclear arms. In the twenty-first century, these regimes to curb so-called weapons of mass destruction (WMD) are under considerable stress.

The issues faced by these distinct and different regimes vary. However, one recurrent challenge relates to ensuring and enforcing compliance. Drawing from the preceding papers in the WMD Compliance and Enforcement series, this paper identifies several cross-regime lessons for policy practitioners in this area to consider in their efforts to implement existing WMD-related agreements, strengthen regimes where needed, and develop future instruments.

The paper begins by providing context, highlighting the value of WMD-related arms control and disarmament as global public goods that provide several possible benefits transcending national borders. The paper then proceeds to look at the challenge of determining compliance and the role of international organizations in facilitating the resolution of compliance concerns. Subsequently, it explores the important role of procedural clarity in addressing concerns over non-compliance, before looking at the importance of a division of labour within multilateral treaties. The paper then discusses some underused tools in certain WMD-related agreements and concludes with reflections on compliance and enforcement of WMD-related treaties.

2 ARMS CONTROL AND DISARMAMENT

Arms control and disarmament are intricately linked yet different endeavours. Throughout recorded history human societies have applied certain constraints on the means and methods of warfare employed.¹ However, the term ‘arms control’ was not devised until the 1950s when it emerged as a “method to manage arms competition” between nuclear armed superpowers.² The concept reflected a recognition of the mutual interests of the United States and the Soviet Union “in the avoidance of a war that neither side wants, in minimizing the costs and risks of the arms competition, and in curtailing the scope and violence of war in the event it occurs”.³

Illustrative list of WMD-related arms control and disarmament agreements	1925 - Geneva Protocol
	1963 - Partial Test Ban Treaty (PTBT)
	1968 - Nuclear Non-Proliferation Treaty (NPT)
	1972 - Biological and Toxin Weapons Convention (BWC)
	1972 - Strategic Arms Limitation Talks (SALT) I Interim Agreement
	1972 - Treaty on the Limitation of Anti-Ballistic Missile Systems (ABM)
	1987 - Intermediate-Range Nuclear Forces (INF) Treaty
	1991 - Strategic Arms Reduction Treaty (START)
	1993 - Chemical Weapons Convention (CWC)
	1996 - Comprehensive Nuclear-Test-Ban Treaty (CTBT)
	2010 - New START
	2017 - Treaty on the Prohibition of Nuclear Weapons (TPNW)

FIGURE 1 *Illustrative list of WMD-related arms control and disarmament agreements*

¹ Croft, Stuart. 1996. *Strategies of Arms Control: A History and Typology*. p. 20.

² Borrie, John and Tim Caughley. 2014. “Viewing Weapons Through a Humanitarian Lens: From Cluster Munitions to Nukes?” *Irish Studies in International Affairs* 25: 23–43. <https://doi.org/10.3318/isia.2014.25.11>.

³ Schelling, Thomas C., and Morton H. Halperin. 1961. *Strategy and Arms Control*. p. 1.

Disarmament is different from arms control in that it “seek[s] to reduce the level of national military capabilities or to ban altogether certain categories of weapons”.⁴ If arms control is about managing arms competition between States, disarmament is about reversing such competition.

2.1 ARMS CONTROL AND DISARMAMENT AS GLOBAL PUBLIC GOODS

WMD-related arms control and disarmament agreements can be considered a form of global public good as the benefits of these agreements operate “across borders, generations and population groups”.⁵

States ratify and comply with WMD-related arms control and disarmament agreements because they view doing this to be in their national security interests. However, national security interests can be seen in narrow and broader senses. In a stricter sense, the constraints that WMD arms control and disarmament measures impose reduce the likelihood of these weapons being developed and used by other States to their major strategic advantage. In the process, these measures provide some transparency to States about the actions of others and additional predictability, which can allow for less militarized postures and reduced force levels in certain respects. In a broader sense, WMD regimes embody norms that establish expectations for States. The compliance and enforcement mechanisms they contain are important for upholding standards of behaviour and thus the vitality of those norms over the longer term. It can also be argued that these regimes provide benefits to non-member States in at least some cases.

In addition, as Dunworth points out, there are several other potential benefits to WMD-related treaty compliance (see Figure 2).⁶ In some cases, WMD-regime compliance can enhance a States’ international political standing or reputation,⁷ potentially facilitating concrete returns for being a ‘responsible’ international actor.⁸ In other cases, treaty compliance might partially be driven by governments seeking to mitigate domestic pressure, including from ‘pro-compliance coalitions’. In yet other cases, treaty compliance may derive from the internalization of particular norms of behaviour. Such norms can be treaty-specific, for example, when a State rejects a method of warfare as illegitimate, unacceptable or

⁴ Tulliu, Steve, and Thomas Schmalberger. 2003. *Coming to Terms with Security: A Lexicon for Arms Control, Disarmament and Confidence Building*. UNIDIR.

⁵ Kaul, Inge, Isabelle Grunberg, and Marc Stern. 1999. *Global Public Goods: International Cooperation in the 21st Century*. <https://doi.org/10.1093/0195130529.001.0001>.

⁶ Dunworth, Treasa. 2019. “Compliance and Enforcement in WMD-Related Treaties”. *WMD Compliance and Enforcement series No. 1*. UNIDIR.

⁷ Keohane, Robert O. 1984. *After Hegemony: Cooperation and Discord in the World Political Economy*. p. 105; see also O’Brien, Terence. 2001. “New Zealand Foreign Policy: The Importance of Reputation”. *New Zealand International Review* 38 (5). <https://nz.vlex.com/vid/new-zealand-foreign-policy-635838493>.

⁸ As Von Stein notes “A reputation for keeping promises, for instance, can make it easier for governments to secure cooperation in the future and in other issue-areas”. Stein, Jana Von. 2010. “International Law: Understanding Compliance and Enforcement”. In *The International Studies Encyclopedia*, edited by Robert A. Denmark. p. 4.

irrational; or more habitual approaches that simply view treaty compliance as ‘the right thing to do’.⁹

Possible benefits and incentives for treaty engagement and compliance	National security benefits e.g. regimes provide reciprocal national security benefits through limiting or prohibiting certain kinds of weapons as well as through greater transparency and predictability
	Normative reasons e.g. participation in a regime helps establish or strengthen WMD-related norms of behavior in international relations, in the end providing national security benefits through enhancing collective security
	Reputational benefits e.g. to demonstrate adherence to established norms and build a reputation of a ‘responsible’ participant of the international system, possibly with a view to securing concrete returns in other areas
	Domestic factors e.g. to minimize domestic legal/political pressure, including from pro-compliance coalitions
	Access to technical assistance and expertise e.g. via OPCW Scientific Advisory Board or IAEA technical assistance
	Economic benefits e.g. the CWC precludes States Parties trading certain chemicals with non-States Parties

FIGURE 2 Possible benefits and incentives for treaty engagement and compliance

These factors, or combinations of the above, can be important in decisions related to treaty compliance. Beyond these more general benefits, several treaty-specific incentives can be identified. For example, the Chemical Weapons Convention (CWC) precludes States Parties trading certain chemicals with non-States Parties, thereby creating a potent economic incentive for treaty compliance. In contrast, article X of the CWC entitles States Parties to “equipment, material and scientific and technological information” related to “protection against chemical weapons”.¹⁰ This constitutes a positive incentive for treaty participation.

The relative value of the benefits of WMD arms control and disarmament is not fixed. Nor will the perceived benefits of adherence to these agreements always outweigh the perceived

⁹ As Blix notes, “for a vast number of obligations under treaties, compliance is achieved simply because the parties have an interest in respecting the rules that they may have helped to create or because they have the habit of respecting legally binding obligations”. Blix, Hans. 2002. “Developing International Law and Inducing Compliance”. *Columbia Journal of Transnational Law* 41 (1): 1–13. p. 9.

¹⁰ See article X of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, opened for signature 13 January 1993.

costs.¹¹ Wider contextual changes can affect the cost–benefit calculus of participation in WMD-related regimes. This is of concern in the current volatile environment, which has recently witnessed the collapse of the 1987 Intermediate-Range Nuclear Forces (INF) Treaty and ongoing division in the CWC. Technological developments, international tension and domestic politics are combining in ways that can erode confidence in WMD-related agreements.

Certainly, technological developments in areas as varied as hypersonic weapons,¹² offensive cyber capabilities, artificial intelligence and genome engineering may, in different ways, impact arms control and disarmament measures. As States compete to exploit technological progress for military purposes, it may lead States to reconsider or repudiate arms control and disarmament agreements. This might be because those States consider these developments to negatively affect their security calculus in materially discernible ways. Or, in contrast, it can be because these technological changes introduce significant new strategic uncertainties, leading States to hedge against worst case scenarios in ways other than arms control and disarmament agreements.

At the international level, the nuclear-armed States are embedded in a complex set of relationships, some of which have deteriorated this decade. For example, Russian–NATO relations have worsened significantly since the Russian Federation annexed the Crimea in 2014. In addition, the notion of arms control and disarmament sits uneasily within the domestic political contexts of several major States.¹³ Moreover, WMD arms control and disarmament are not seen by the general public in most countries as having the salience they did during the Cold War. Meanwhile, the authority of international organizations has arguably weakened, in part through the diminishing commitments of some States.

In this environment, it cannot be ruled out that the existing WMD international system of control might become progressively weaker. Indeed, some observers have framed the difficulties that WMD regimes face as indicative of a broader international security crisis unfolding that will see the breakdown of the current order. However, arms control and disarmament have been prematurely written off in the past only to bounce back as States realize the limitations of unbridled strategic competition, or following precarious periods, such as the crisis in the US–Soviet relations in the early 1980s.

¹¹ For example, one reason some European and other States were drawn to the idea of the NPT in early negotiations on nuclear non-proliferation was that they sought reassurance that any German aspirations to acquire nuclear weapons would be controlled. Over time concern over German nuclear weapons has, however, become relatively less significant. Burr, William. 2018. "The Nuclear Nonproliferation Treaty and the German Nuclear Question Part II, 1965–1969". National Security Archive. 2018. <https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2018-03-21/nuclear-nonproliferation-treaty-german-nuclear-question-part-ii-1965-1969>.

¹² Borrie, John, Amy Dowler, and Pavel Podvig. 2019. *Hypersonic Weapons: A Challenge and Opportunity for Strategic Arms Control*. ODA and UNIDIR. <https://www.unidir.org/publication/hypersonic-weapons-challenge-and-opportunity-strategic-arms-control>.

¹³ Haass, Richard. 2019. "How a World Order Ends and What Comes in Its Wake". *Foreign Affairs*. <https://www.foreignaffairs.com/articles/2018-12-11/how-world-order-ends>.

Rather than wait for another perilous phase—or for the current one to worsen further—States and other stakeholders need to develop credible approaches, methods and practices to enforce WMD-related regimes and ensure compliance. It also requires recognition that the benefits of WMD regimes are not specific to any one particular international order, when, as this paper has explained, such agreements can have more general benefits.

2.2 COMPLIANCE AND NON-COMPLIANCE

Von Stein defines compliance as the “degree to which state behaviour conforms to what [an] agreement prescribes or proscribes”.¹⁴ WMD-related treaties often contain several different obligations. These treaty obligations can be positive or negative. Positive obligations commit States to undertake a particular course of action. For example, article VII of the CWC requires States Parties to transpose the treaty into national legislation. In contrast, negative obligations commit States *not* to undertake a particular activity. For instance, under article I of the Biological and Toxin Weapons Convention (BWC), States Parties commit not to develop biological weapons; whereas under article II of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), non-nuclear-weapon States undertake “not to manufacture or otherwise acquire nuclear weapons”.

Non-compliance can also vary in terms of seriousness.¹⁵ Although all forms of non-compliance can be problematic, some forms of non-compliance are much more problematic than others.¹⁶ As Trapp notes, in the early years of the CWC several cases of relatively ‘minor’ or ‘technical’ non-compliance emerged as a result of difficulties with the implementation of the CWC or differences in treaty interpretation.¹⁷ Yet these were not matters of international significance, and so were not even labelled as non-compliance. Similarly, Heinonen notes the term ‘non-compliance’ was not used to describe breaches of obligations under Comprehensive Safeguards Agreements by Egypt, Libya, the Republic of Korea and Romania.¹⁸

At the other end of the spectrum there are conscious violations of the ‘core’ objectives and purposes of WMD-related agreements. These occur when States seek to gain the benefits of WMD-related treaty participation while willfully disregarding the constraints imposed by such treaties, typically to gain a militarily significant advantage. Fortunately, such significant

¹⁴ Stein, Jana Von. 2010. “International Law: Understanding Compliance and Enforcement”. In *The International Studies Encyclopedia*, edited by Robert A. Denemark. <https://doi.org/10.1111/b.9781444336597.2010.x>.

¹⁵ See for example Heinonen’s contribution in this series, which outlines several ways a State can be non-compliant with safeguards agreements. Heinonen, Olli. 2019. “The IAEA Mechanisms to Ensure Compliance with Nuclear Non-Proliferation”. *WMD Compliance and Enforcement series No. 2*. UNIDIR.

¹⁶ For example, as Ford notes, “not all failings are equally dangerous” Ford, Christopher A. 2005. “Compliance Assessment and Compliance Enforcement”. *ILSA Journal of International & Comparative Law* 12 (2): 583–91. p. 587.

¹⁷ Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention.” *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 13.

¹⁸ Heinonen, Olli. 2019. “The IAEA Mechanisms to Ensure Compliance with Nuclear Non-Proliferation”. *WMD Compliance and Enforcement series No. 2*. UNIDIR.

cases of outright treaty violations are rare.¹⁹ As Dorn and Scott note, “most states comply with most of the agreements they have signed most of the time”.²⁰ Nonetheless, when violations do occur, they can have a deeply corrosive effect on a WMD-treaty regime. In some cases, non-compliance can resonate beyond a specific treaty, fostering uncertainty over arms control and disarmament generally, as well as fuelling tension in the wider security environment.²¹ Indeed, in the past, States have even gone to war ostensibly based on perceptions of non-compliance with WMD-related treaties.²²

¹⁹ Williamson, Richard. 2003. “Is International Law Relevant to Arms Control?”. *Chicago Journal of International Law* 4 (1): 59–82.

²⁰ Dorn, A. Walter, and Douglas S. Scott. 2000. “Compliance Mechanisms for Disarmament Treaties”. *Verification Yearbook*. pp. 229–47.

²¹ Moodie, Michael, and Amy Sands. 2001. “New Approaches to Compliance with Arms Control and Nonproliferation Agreements”. *The Nonproliferation Review*. pp. 1–9.

²² For example, one of the stated aims of Operation Iraqi Freedom was in to “disarm Iraq of weapons of mass destruction”; see The White House Office of the Press Secretary. 2003. “President Discusses Beginning of Operation Iraqi Freedom”. <https://georgewbush-whitehouse.archives.gov/news/releases/2003/03/20030322.html>.

3 DETERMINING COMPLIANCE

Reaching judgments on allegations of non-compliance is contingent upon at least four different factors.

- **The gravity of the alleged case of non-compliance** (as discussed above). Specifically, it matters where the case falls on a spectrum from comparatively 'minor' or 'technical' non-compliance to deliberate treaty violations concerning the development or use of weapons.
- **The source and credibility of the allegation of non-compliance.** Specifically, whether this comes from a State, an organization or non-State actor, and the nature of the supporting evidence.
- **The investigative processes, tools and resources of the regime in question.** In particular, it matters whether there is institutional capacity to effectively detect and investigate an allegation of non-compliance.
- **The wider political context,** including the power of the States concerned about a breach of obligations and the response of the State Party suspected of non-compliance. Other factors can include broader international sentiment regarding the gravity of the suspected violation and the general level of States' confidence in the ability of international institutions to address the compliance concern.

This section begins by looking at the sources of allegations of non-compliance with WMD-related regimes. It then proceeds to look at the process and tools for determining non-compliance.

3.1 THE SOURCE AND CREDIBILITY OF ALLEGATIONS OF NON-COMPLIANCE

Significant allegations of non-compliance with WMD-related regimes can emerge from a variety of different sources. The nature and credibility of the source is important, particularly when allegations of non-compliance relate to weapons deemed somehow 'repugnant' or 'taboo'. Such allegations can be used as a ploy to disgrace opponents. As Perry Robinson noted, "Accusations of association with [chemical or biological weapons] have for centuries, even millennia, been used by well-intentioned as well as unscrupulous people to vilify enemies and to calumniate rivals".²³

²³ Robinson, Julian P. Perry. 2013. "Alleged Use of Chemical Weapons in Syria", HSP Occasional Paper no. 4. http://www.sussex.ac.uk/Units/spru/hsp/occasional_papers/HSPOP_4.pdf.

In the case of the BWC, non-compliance has been detected and reported principally by States. For example, as Lentzos notes, the United States raised questions over the outbreak of Anthrax at Sverdlovsk in 1979, and Cuba accused the United States of ‘biological aggression’ over Cuban territory, resulting in the convening of a formal multilateral BWC consultative meeting in 1997.²⁴ Similarly, with the CWC, allegations of significant non-compliance have typically been raised by States Parties. However, the Organisation for the Prohibition of Chemical Weapons (OPCW) has also drawn from its internal verification machinery to detect cases of non-compliance. For example, as Trapp indicates, the OPCW Technical Secretariat has reported its concerns over declarations to the Executive Council. Open source information has also been used as a basis for identifying cases of alleged non-compliance with the CWC.²⁵

In the nuclear regime, as Heinonen indicates, the International Atomic Energy Agency (IAEA) infrastructure has detected incidents of non-compliance. Following the Democratic People’s Republic of Korea’s initial report to the IAEA in 1992, it was the IAEA that detected inconsistencies that suggested the existence of undeclared plutonium.²⁶ However, there is also evidence of three States—Romania, the Republic of Korea, and Libya²⁷—effectively self-reporting cases of non-compliance.²⁸ Additionally, the IAEA has benefited from third-party information and open source data in the evaluation of safeguards²⁹ in at least three cases of non-compliance that the IAEA addressed (Iraq, the Islamic Republic of Iran, and the Syrian Arab Republic).

3.2 NATIONAL TECHNICAL MEANS

Third-party information derived from national technical means (NTM)—that is, nationally-owned technical instruments, such as satellites and other remote sensing technologies—has clearly been important in detecting cases of non-compliance with WMD regimes. As Podvig and Woolf point out in relation to bilateral treaties, NTM are “essential for the successful implementation of a treaty, as they provide the parties with confidence that any significant

²⁴ See Lentzos, Filippa. 2019. “Compliance and Enforcement in the Biological Weapons Regime”. *WMD Compliance and Enforcement series No. 4*. UNIDIR.

²⁵ In 2016, an OPCW press release indicated that the OPCW was “examining [an] NGO report on allegations of chemical weapons use in Sudan”; see OPCW. 2016. “OPCW Examining NGO Report on Allegations of Chemical Weapons Use in Sudan”. <https://www.opcw.org/media-centre/news/2016/09/opcw-examining-ngo-report-allegations-chemical-weapons-use-sudan>.

²⁶ IAEA. 2009. “Fact Sheet on DPRK Nuclear Safeguards”. <https://www.iaea.org/newscenter/focus/dprk/fact-sheet-on-dprk-nuclear-safeguards>.

²⁷ Heinonen, Olli. 2019. “The IAEA Mechanisms to Ensure Compliance with Nuclear Non-Proliferation”. *WMD Compliance and Enforcement series No. 2*. UNIDIR.

²⁸ For instance, in 2003, Libya’s Foreign Ministry reported its clandestine nuclear weapons programme and promised its elimination. Davenport, Kelsey. 2018. “Chronology of Libya’s Disarmament and Relations with the United States”. Arms Control Association. January 2018. pp. 1–11. <https://www.armscontrol.org/factsheets/LibyaChronology>.

²⁹ Heinonen, Olli. 2019. “The IAEA Mechanisms to Ensure Compliance with Nuclear Non-Proliferation”. *WMD Compliance and Enforcement series No. 2*. UNIDIR.

violation of the agreement will be detected in time”.³⁰ Similarly, with the nuclear regime, States have detected significant cases of non-compliance using NTM and other forms of intelligence. States then submitted this information to the IAEA as third-party information.

NTM has also played a role in detecting non-compliance in the chemical and biological weapons regimes. However, NTM are more limited with chemical and biological weapons. As both Trapp and Lentzos indicate, the facilities required for the development and production of chemical and biological weapons and the dual-use nature of many aspects of chemistry and biology make unambiguous remote detection of non-compliance more difficult.³¹

States’ NTM-related capabilities vary considerably. NTM often require highly specialized skills, as well as sophisticated technology and substantial resources to maintain, which place NTM beyond the capacity of some States. Moreover, States cannot necessarily rely entirely on the findings of other States on issues of non-compliance as such findings are not simple matters of factual, technical assessment. As Podvig and Woolf note in relation to bilateral treaties: “compliance assessments are almost always a matter of judgment, and can sometimes be based on political, rather than technical considerations”.³²

As such, allegations of non-compliance made by one State can be vulnerable to accusations of politicization. This is particularly the case when information obtained by NTM is kept classified or otherwise withheld from the public or relevant international bodies, regardless of the merits of the case. This was evident in public discussions around the INF. As Podvig and Woolf show, the lack of open information related to allegations of compliance or selective unilateral release of information contributed to the failure to resolve the compliance dispute.³³ Accordingly, while NTM could make a useful contribution, relying on them as the only source of information for determining compliance can introduce a new set of problems.

3.3 OPEN SOURCE INFORMATION

Open source information can play a role in informing allegations of non-compliance. Moreover, civil society actors have long highlighted violations of WMD treaties and

³⁰ Podvig, Pavel and Amy Woolf. 2019. “Monitoring, Verification, and Compliance Resolution in US–Russian Arms Control”. *WMD Compliance and Enforcement series No. 5*. UNIDIR. p. 17.

³¹ Tucker, Jonathan B. 1996. “Chemical/Biological Terrorism: Coping with a New Threat”. *Politics and the Life Sciences* 15 (2): 167–83; Chevrier, Marie Isabelle. 1995. “Impediment to Proliferation? Analysing the Biological Weapons Convention”. *Politics and the Life Sciences* 14 (2): 209–219. <https://doi.org/10.1080/13523269508404109>.

³² Podvig, Pavel and Amy Woolf. 2019. “Monitoring, Verification, and Compliance Resolution in US–Russian Arms Control”. *WMD Compliance and Enforcement series No. 5*. UNIDIR. p. 8.

³³ *Ibid.* p. 15.

scrutinized allegations of non-compliance based on what has variously been termed “public technical means”,³⁴ “societal verification”³⁵ or open source data.³⁶

More recent advances in technology have augmented the possible tools available to State and non-State actors to scrutinize treaty compliance.³⁷ For example, open source data derived from video sharing sites, such as YouTube, has been used to detect instances of chemical weapons use in Syria.³⁸ Moreover, in some cases there may be value to governments using open source data as it is easier to discuss in public than ‘classified’, secret information.

However, open source data has limitations. Firstly, open source evidence of events can be manipulated. This problem is likely to become more complicated in the future. Convincing ‘deepfake’ videos generated using artificial intelligence (AI) have already raised concern related to data manipulation. This has led to speculation that we are at the beginning of an “AI-powered arms race between video forgers and digital sleuths”.³⁹

Second, although social media can make it more difficult to hide some events from public scrutiny, the specific details and causes of such events often remain open to interpretation. For example, for many observers, YouTube videos provided the first indication that a chemical attack had taken place in Ghouta in August 2013. However, there subsequently emerged several different accounts of what had happened and who was responsible.⁴⁰

3.4 THE ROLE OF INTERNATIONAL ORGANIZATIONS

The challenges in assessing both national allegations derived through NTM and open source information highlight the central importance of treaty organizations acting as bodies that are entrusted with the authority to assess issues related to compliance. Specialist bodies of

³⁴ See for example, Jeremias, Gunnar, and Mirko Himmel. 2016. “Harnessing Open Source Information for Transparency Building”. The Research Group for Biological Arms Control. http://www.biological-arms-control.org/projects_harnessing_open_source_information.html.

³⁵ Deiseroth, Dieter. 2000. *Societal Verification: Wave of the Future? Verification Yearbook 2000*. VERTIC. <https://doi.org/10.4324/9780429039522-7>; see also Crowley, Michael and Andreas Persbo. 2006. “The Role of Non-governmental Organizations in the Monitoring and Verification of International Arms Control and Disarmament Agreements”. In *Thinking Outside the Box in Multilateral Disarmament and Arms Control Negotiation*, edited by John Borrie and Vanessa Martin Radin. UNIDIR.

³⁶ Early examples of this sort of function are evident in the so-called Yellow Rain case in which academics developed a compelling counter-hypothesis to argue that what had been “frequently mistaken as poison from the sky and which [the US government] asserted was a chemical warfare agent, was, in fact, the faeces of Asian honey-bees”, Meselson, Matthew S., and Julian Perry Robinson. 2008. “The Yellow Rain Affair—Lessons from a Discredited Allegation”. In *Terrorism, War, or Disease? Unraveling the Use of Biological Weapons*, edited by Anne L. Clunan, Peter R. Lavoy, and Susan B. Martin. pp. 72–96. p. 80.

³⁷ The OPCW Fact-Finding Mission for example used open source data for planning and comparative purposes. See for example S/1731/2019. p. 9.

³⁸ Notably the OPCW has begun to employ open source information in support of Fact-Finding Operations.

³⁹ Knight, Will. 2018. “The Defense Department has Produced the First Tools for Catching Deepfakes”. *MIT Technology Review*, August 2018.

⁴⁰ Revill, James et al. 2016. “Allegations of Chemical Warfare Use in Syria and Their Implications—Workshop Summary”. http://www.sussex.ac.uk/Units/spru/hsp/documents/SYRIA_WORKSHOP_FINAL.pdf.

international organizations, such as the OPCW Technical Secretariat and the IAEA Secretariat, play tangible roles in responding to technical—and to a lesser extent, political—questions related to non-compliance. Authoritative outputs of these specialist bodies can inform political decision-making in a manner that is widely accepted as reliable and objective.

Yet there are also limitations to the role specialist bodies can play. For example, significant cases of non-compliance with IAEA Comprehensive Safeguards Agreements were, historically, detected by actors other than the IAEA. In the biological regime, the three-person BWC Implementation Support Unit has neither the mandate nor the capacity to detect or raise issues of non-compliance.

Moreover, as Trapp notes, the legitimacy of specialist bodies and the value of their analysis is contingent upon meeting three key criteria. First, staff must meet the highest standards of efficiency, competence and integrity. Second, specialist bodies need to be authoritative and “conduct independent, technically competent and politically unbiased verification activities”.⁴¹ Third, it is paramount that the methods and tools used are “scientifically sound, validated, and robust for use in the field”.⁴² In addition, two further criteria might be added to those identified by Trapp. A fourth is that technical bodies within international organizations require sufficient resources to achieve their objectives; and fifth, the advice and findings of these technical bodies carry more weight when they clearly adhere to treaty procedures that the States Parties have, by agreement, established to guide their activities.

⁴¹ Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention.” *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 7.

⁴² *Ibid.* p. 7.

4 PROCEDURAL CLARITY AND CONSISTENCY

The procedures to detect, assess and respond to non-compliance vary across regimes, as noted earlier. In the nuclear regime, for example, the IAEA has a well-established system to verify each State's compliance with its undertakings under Comprehensive Safeguards Agreements. These form the foundation for an extensive inspection regime based on established criteria and guidelines, which are intended to provide the IAEA with a reliable basis for decision-making in relation to compliance with safeguards obligations. When complemented by an Additional Protocol, these procedures allow the IAEA to go beyond confirming compliance with Comprehensive Safeguards Agreements and draw a broader conclusion about the absence of undeclared nuclear materials or activities in a State. It is notable that the technical findings of the IAEA Secretariat have not been openly challenged by Member States.

On chemical weapons, Trapp notes that the "CWC establishes a sophisticated, multifaceted legal and procedural framework for compliance assessments and decision making in cases of noncompliance".⁴³ This includes a routine industry verification system, as well as a yet-to-be-used challenge inspection mechanism. Through these arrangements:

the [OPCW] has successfully managed a range of situations in which States Parties had fallen short of implementing the Convention as required. ... These compliance management mechanisms worked well until the use of Sarin and chlorine in the Syrian armed conflict.⁴⁴

Under the BWC, Lentzos observes that "an accepted procedure" for multilateral consultations under article V of the Convention has been successfully applied.⁴⁵ Although, the outcome of the 1997 multilateral consultation convened to deal with Cuban allegations against the United States of 'biological aggression' was ambiguous.

While all regimes therefore have, to varying degrees, established procedures for addressing concerns over non-compliance, in practice these regimes also provide some space for operational flexibility and compromise. For example, In the case of the IAEA, the Secretariat has a degree of flexibility in the presentation of cases of non-compliance to the Board of Governors. In turn, the Board has some flexibility in adjudicating cases. In the CWC, there are several different routes for the finding of facts related to non-compliance (see fig. 3).⁴⁶

⁴³ Trapp, Ralf. 2019. "Compliance Management under the Chemical Weapons Convention." *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 33.

⁴⁴ Ibid. p. 1.

⁴⁵ Lentzos, Filippa. 2019. "Compliance and Enforcement in the Biological Weapons Regime" *WMD Compliance and Enforcement series No. 4*. UNIDIR. p. 8.

⁴⁶ Trapp, Ralf. 2019. "Compliance Management under the Chemical Weapons Convention." *WMD Compliance and Enforcement series No. 3*. UNIDIR. Annex 1.

As Trapp notes, for much of its history OPCW decision-making around compliance was characterized by flexible ‘pragmatism’ and worked in conditions in which the OPCW Executive Council was unified and the CWC was used as a reference point.⁴⁷

Summary of Trapp’s Taxonomy of CWC Fact-Finding Mechanisms	Routine verification measures	Systematic verification of chemical weapons
		Systematic verification of Schedule 1 facilities
		Routine verification of industrial facilities
	Non-routine verification measures	Investigations of alleged use
		Challenge inspections
		Investigation and Identification Team
	Clarification procedures	Bilateral clarification procedures
		Clarification procedures involving the Executive Council
	Ad hoc mechanisms	Fact-Finding Missions
		Declaration Assessment Team

FIGURE 3 Summary of Trapp’s Taxonomy of CWC Fact-Finding Mechanisms

4.1 THE LIMITS OF FLEXIBILITY

There are nevertheless limits to the extent that international organizations can apply pragmatic flexibility in addressing cases of non-compliance. States Parties of the CWC did not invoke established provisions for non-routine inspections (i.e. challenge inspections) in response to allegations of chemical weapons use in the Syrian conflict because, Trapp argues, “States Parties feared that invoking them might carry excessive political risks; a failure to properly implement such CWC investigations could also have damaged the mechanisms themselves”.⁴⁸

Instead, the OPCW developed innovative, ad hoc tools, specifically the Fact-Finding Mission and the Declaration Assessment Team, to address allegations of Syrian chemical weapons use. These tools were developed at a time of growing political discord over the Syrian conflict, including significant disputes between States Parties over the most basic facts.⁴⁹ The ad hoc nature of these tools, and the limited negotiation on their terms of reference left

⁴⁷ Ibid. p.20.

⁴⁸ Ibid.

⁴⁹ Hart, John. 2018. “Confrontation at the OPCW: How Will the International Community Handle Syria and Skripal?” War on the Rocks. <https://warontherocks.com/2018/06/confrontation-at-the-opcw-how-will-the-international-community-handle-syria-and-skripal/>.

them “vulnerable to accusations of political bias as well as lack of procedural and technical integrity”.⁵⁰ As such, one lesson of consequence is the importance of specialist bodies and States Parties operating within the boundaries of agreed treaty procedures, particularly when dealing with potentially divisive cases of alleged non-compliance.

However, established procedures may not always be suited to dealing with new or non-standard challenges. For example, the programme to eliminate declared stockpiles of Syrian chemical weapons required an innovative approach: the destruction of chemical agents at sea, albeit in a manner rooted in OPCW procedures. This remarkable programme received political support that was “sufficiently constant to avoid legal challenges”.⁵¹ At this point, it is unclear how other innovations to manage compliance, such as the new OPCW Investigation and Identification Team, which is tasked with identifying the perpetrators of chemical weapons use in the Syrian conflict, will fare.

For States seeking to preserve WMD treaties, particularly those such as the BWC and the CWC that are of unlimited duration, the experience further highlights the value of ongoing contingency planning and scenario-mapping-type exercises to prepare treaty regimes and States Parties for an uncertain future.

⁵⁰ Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention.” *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 20. Note this is a wider issue with international organization bodies. As Tallberg and Zürn note, “When IOs fall short of widely recognized procedural standards, this creates an opportunity for opponents to delegitimize the IO with reference to these limits”: Tallberg, Jonas, and Michael Zürn. 2017. “The Legitimacy and Legitimation of International Organizations”. *Review of International Organizations*. pp. 1–40. <https://doi.org/10.2139/ssrn.3060204>. p. 15.

⁵¹ Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention”. *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 19; see also OPCW. 2014. “Statement by the OPCW Director-General on the Destruction of Syrian Chemicals Aboard the MV Cape Ray”. OPCW. <https://www.opcw.org/media-centre/news/2014/08/statement-opcw-director-general-destruction-syrian-chemicals-aboard-mv>.

5 A DIVISION OF LABOUR

Multilateral WMD arms control and disarmament agreements are based on what has been labelled a ‘division of labour’ between specialist international bodies, such as the OPCW Technical Secretariat, and States Parties.⁵² Under the conditions of this division, States (and domestic institutions within them) assume a significant, yet sometimes underappreciated, role in the implementation of treaties *and* the reporting of non-compliance, as well as the enforcement of treaties (discussed further in section 7.2).

5.1 NATIONAL IMPLEMENTATION

To be compliant with multilateral WMD treaties, States Parties often commit to undertake national activities⁵³ to transpose an international agreement into national law and implement regulatory measures in support of treaty fulfilment. As Dunworth has indicated, the detailed and intrusive nature of recent treaties can result in “complex, time-consuming and expensive” sets of national implementation measures.⁵⁴ In the past, States Parties have underestimated the effort and resources required to implement agreements.⁵⁵

Yet for all the costs, there are also considerable benefits to the process of national implementation. First, national implementation of international treaties reinforces the legal and normative weight of such agreements. Second, domestic institutions, including engaged officials, industry and civil society actors, can play an important role as guardians of compliance, limiting executive scope for non-compliance and, when required, pushing the issue of compliance onto the domestic political agenda.⁵⁶ The process of national implementation ideally “creates ownership and capacity in the States Parties and leads to long-term commitments to implement and enforce the CWC norms and requirements”.⁵⁷

⁵² Ibid; see also Robinson, J.P. Perry. 1996. “Implementing the Chemical Weapons Convention”. *International Affairs* 72 (1): 73–89.

⁵³ As required under BWC article IV and CWC article VII.

⁵⁴ Dunworth, Treasa. 2019. “Compliance and Enforcement in WMD-Related Treaties”. *WMD Compliance and Enforcement series No. 1*. UNIDIR. p. 8.

⁵⁵ As Trapp has noted, “many States Parties had underestimated the amount of regulatory and administrative work and the resources that implementing the CWC required”. One of this paper’s authors saw this first hand in the case of national implementation of the CWC after its entry into force in 1997 as a member of a national authority; see Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention”. *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 13.

⁵⁶ Hillebrecht, Courtney. 2012. “The Domestic Mechanisms of Compliance with International Human Rights Law: Case Studies from the Inter-American Human Rights System”. *Human Rights Quarterly* 34 (4): 959–85. <https://doi.org/10.1353/hrq.2012.0069>.

⁵⁷ Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention”. *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 16.

This long-term commitment also extends to creating or contributing to an informal cadre of implementers in government, academic and relevant industries.

5.2 NATIONAL REPORTING

As part of the division of labour, States Parties to multilateral agreements also commit to provide some form of information about domestic compliance with WMD-related agreements. Indeed, as Blix remarked, this form of national compliance reporting is itself, “An increasingly common, mild, and rather subtle means of inducing compliance”.⁵⁸ Yet it is also of importance in monitoring compliance and serves as a baseline for governments and international bodies to assess compliance. For example, States are required to submit declarations to the IAEA and OPCW; in the BWC, States Parties are obliged to submit politically binding confidence-building measures covering areas such as national biodefence and oversight frameworks. However, as Lentzos notes, participation in the confidence-building measures “remains limited”.⁵⁹

More recently, several innovative tools to assist with monitoring and enhancing aspects of compliance have emerged. For example, in the BWC context, collectives of States have used peer review and transparency visits to better understand national implementation and share results on lessons learned.⁶⁰ Such tools can help build confidence in compliance with treaty arrangements.

5.3 COLLABORATIVE GOVERNANCE

The thematic papers in this series have highlighted the potential role of a variety of stakeholders in bolstering WMD compliance and enforcement. This is consistent with a wider trend towards collaborative governance approaches to addressing WMD-related challenges⁶¹ and includes support from the following key groups:

1. Non-governmental scientific experts who can supply insights into the positive and negative implications for WMD treaties that arise from advances in science and technology.

⁵⁸ Blix, Hans. 2002. “Friedmann Award Address - Developing International Law and Inducing Compliance”. *Columbia Journal of Transnational Law* 41 (1): 1-14, p. 10.

⁵⁹ Lentzos, Filippa. 2019. “Compliance and Enforcement in the Biological Weapons Regime” *WMD Compliance and Enforcement series No. 4*. UNIDIR. p. 12.

⁶⁰ See for example Belgium, Luxembourg and Netherlands. 2015. “Benelux BTWC Peer Review: Outline of Key Features and Objectives”. BWC Meeting of Experts. BWC/MSP/2015/MX/WP.13/Rev.1; Germany, Switzerland and the United Kingdom. 2016. “Confidence in Compliance—Peer Review Visit Exercise at the Bundeswehr Institute of Microbiology in Munich, Germany”. BWC Eighth Review Conference. BWC/CONF.VIII/WP.11; United States. 2016. “BWC Implementation Review Initiative: Report by the United States of America on the Visit to Washington, DC”. BWC Eighth Review Conference. BWC/CONF.VIII/WP.18.

⁶¹ Barnett, Michael, and Martha Finnemore. 2004. “The Power of Liberal International Organizations”. In *Power in Global Governance*, edited by Michael Barnett and Raymond Duvall. pp. 161–84. <https://doi.org/10.1017/CBO9780511491207.007>.

2. External stakeholders with treaty-related expertise that can, under certain conditions, provide technical expertise in support of treaty implementation and maintenance or compliance monitoring.
3. Non-governmental stakeholders engaged in scientific research in industry and academia that can play an important role in shaping treaty negotiations and optimizing domestic governance. Industry and academic engagement are particularly important in regimes, such as the CWC and the BWC, that seek to manage dual-use technology around the world.
4. Civil society actors outside of government that can play a valuable role in holding States accountable, monitoring compliance and investigating alleged non-compliance with WMD treaties through 'societal'⁶² or 'open source' verification.
5. There may also be scope for considering how actors in the financial sector might play a greater role in bolstering WMD compliance and enforcement.⁶³ For example, a collective of investors has already developed mechanisms to boycott investments in companies producing weapons.⁶⁴

⁶² Deiseroth, Dieter. 2000. "Societal Verification: Wave of the Future?". *Verification Yearbook 2000*. London: VERTIC. <https://doi.org/10.4324/9780429039522-7>.

⁶³ See for example Beenes, Maaïke. 2019. "Beyond the Bomb: Global Exclusion of Nuclear Weapons Producers". Don't Bank on the Bomb. 2019. <https://www.dontbankonthebomb.com/executive-summary-beyond-the-bomb/>.

⁶⁴ Nystuen, Gro. 2006. "Investment Policies and Arms Production—Experiences from the Norwegian Pension Fund—Global". In *Thinking Outside the Box in Multilateral Disarmament and Arms Control Negotiation*, edited by John Borrie and Vanessa Martin Radin. UNIDIR.

6 UNDERUSED TOOLS AND TECHNOLOGIES

WMD-related agreements can provide States Parties with a range of tools and technologies to address concerns over non-compliance. Some of these tools appear to have been underused.

6.1 CONSULTATIONS

WMD-related treaties often make use of treaty-based consultative mechanisms to resolve concerns over non-compliance.⁶⁵ These mechanisms have been successful in many cases. Podvig and Woolf argue, for instance, that bilateral consultative bodies in treaties such as the START Treaty, have “proven effective over the years because the parties can share technical data and devise compromise solutions to vexing problems”.⁶⁶ Trapp points to how cooperative procedures for resolving CWC compliance concerns were generally successfully addressed either through bilateral procedures or through OPCW facilitation.⁶⁷ Lentzos’ account of the BWC highlights how the consultative process was used successfully in 1997 in so far as both Cuba and the United States, and many other delegations, were satisfied with the handling of the consultative process and it allowed States to have their say.⁶⁸

In some cases, there may be sound reasons for not using consultation procedures. For example, there is sometimes a preference for informal backroom diplomacy over the formal invocation of multilateral consultation procedures as provided for under article V of the BWC,⁶⁹ particularly if the former approach seems likely to resolve the compliance concern without the need to escalate the process further. In other cases, States Parties may deem it to be more constructive to defer difficult consultations over non-compliance until political conditions are more conducive to constructive discussion. This obviously has its risks: it might be seen as avoiding difficult compliance questions, which might encourage non-compliance. In addition, instances of non-compliance could become worse in the absence of a response.

⁶⁵ For example, SALT I had the Standing Consultative Commission; the Intermediate-Range Nuclear Forces Treaty the Special Verification Commission; START the Joint Compliance and Inspection Commission; and in New START there is the Bilateral Consultative Commission.

⁶⁶ Podvig, Pavel and Amy Woolf. 2019. “Monitoring, Verification, and Compliance Resolution in US–Russian Arms Control”. *WMD Compliance and Enforcement series No. 5*. UNIDIR. p. 3.

⁶⁷ Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention”. *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 31.

⁶⁸ Lentzos, Filippa. 2019. “Compliance and Enforcement in the Biological Weapons Regime” *WMD Compliance and Enforcement series No. 4*. UNIDIR. p. 8.

⁶⁹ European Union. 2016. “Enhancing the Effectiveness of the Consultative Provisions of Article V of the Biological and Toxin Weapons Convention.”. BWC/CONF.VIII/WP.16 31. Geneva.

Nevertheless, consultations have proved successful, particularly in bilateral treaties, wherein they have helped to establish factual common ground related to issues of non-compliance; to resolve minor issues arising from treaty implementation; and to develop technical solutions that address more serious disputes. Such consultative procedures can further provide a safe space in which States can build a better understanding of the legitimate concerns of other States, a step that is important in resolving disagreements over compliance. It has been suggested that consultations could have “latent potential” in other regimes, such as the BWC.⁷⁰

6.2 INVESTIGATIONS AND SPECIAL INSPECTIONS

As discussed above, the OPCW did not apply non-routine inspections in response to recent uses of chemical weapons. Similarly, as Heinonen indicates, a special inspection tool is available to the IAEA in cases where the information provided by a State is inadequate. Yet, as noted by Heinonen, this has only been invoked on two occasions.⁷¹ It was invoked in 1992, when a special inspection of Romanian facilities was undertaken at the request of Romania;⁷² and again in 1993, when the IAEA Director-General requested a special inspection of nuclear storage facilities in the Democratic People’s Republic of Korea, but the agency was refused access.⁷³ As such, the IAEA system of special inspections has never really been tested outside of a cooperative environment.

Special inspections and investigations should not be invoked frivolously. However, these should be considered normal components of treaty regimes. Moreover, as Heinonen has remarked, “when they make it possible to clarify the picture or to remove inconsistencies, the world community must not shy away from them”.⁷⁴ By not using investigations and special inspections, States have elevated the political sensitivities associated with their use to the point where they may be becoming unusable.

⁷⁰ Sims, Nicholas A. 2013. “BWC Article V: Under-Reviewed but Ripe for Exploration”. HSP Occasional Paper no. 3. http://www.sussex.ac.uk/Units/spru/hsp/occasional_papers/HSPOP_3.pdf. p. 9.

⁷¹ Heinonen, Olli. 2019. “The IAEA Mechanisms to Ensure Compliance with Nuclear Non-Proliferation”. *WMD Compliance and Enforcement series No. 2*. UNIDIR.

⁷² Carlson, John. 2005. “Special Inspections Revisited”. Paper presented to Annual Meeting of the Institute of Nuclear Materials Management. Phoenix, Arizona. 10–14 July 2005. <https://www.belfercenter.org/sites/default/files/legacy/files/uploads/INMM2005SpecialInspections.pdf>.

⁷³ Heinonen, Olli. 2019. “The IAEA Mechanisms to Ensure Compliance with Nuclear Non-Proliferation”. *WMD Compliance and Enforcement series No. 2*. UNIDIR.

⁷⁴ Heinonen, Olli. 2010. “The Case for an Immediate IAEA Special Inspection in Syria—The Washington Institute for Near East Policy”. The Washington Institute. Policy Watch 1715. 2010. <https://www.washingtoninstitute.org/policy-analysis/view/the-case-for-an-immediate-iaea-special-inspection-in-syria>.

6.3 TECHNOLOGIES OF RELEVANCE FOR ADDRESSING NON-COMPLIANCE

As Trapp notes, advances in science and technology can “offer new solutions for the conduct of verification activities” and help organizations in “taking on new investigative challenges”.⁷⁵ For example, open source datasets can be—and have been—analysed with machine learning to follow events, make connections, and determine patterns and trends that might not otherwise be readily discernable.⁷⁶ Chemical forensics can potentially assist in identifying production methods for chemical weapons, something that can potentially be useful, along with other data, in the attribution of chemical attacks.

Several other specific technologies, including remote sampling technologies, geospatial tools, blockchain and drones could all potentially play a role in enhancing existing verification systems. However, to contribute successfully to verification or investigation activities, these new tools—and their limitations—need to be understood, to ensure such tools are “scientifically sound, validated, and robust for use in the field”.⁷⁷ Operating guidelines also need to be developed and assimilated by relevant organizations that could learn from, and otherwise assist, each other in this regard.

⁷⁵ Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention”. *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 29.

⁷⁶ See for example the discussion on this topic as part of the New Shape Forum. See Global Challenges Foundation and Geneva Disarmament Platform. 2019. “2019 New Shape Forum: Weapons Governance Summary Report”. <https://globalchallenges.org/wp-content/uploads/GCF-Weapons-Governance-Summary-Report.pdf> ; see also Schneider, Tobias and Theresa Lütkefend. 2018. “Nowhere to Hide: The Logic of Chemical Weapons Use in Syria”. 2019. Global Public Policy Institute. <https://www.gppi.net/2019/02/17/the-logic-of-chemical-weapons-use-in-syria>.

⁷⁷ Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention”. *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 7.

7 ENFORCEMENT MEASURES

As Dunworth discusses in her paper, there are a range of types of non-compliance.⁷⁸ Correspondingly, there is a menu of possible tools for the enforcement of WMD-related agreements.⁷⁹ These range from the provision of assistance to redress non-compliance; to national measures, such as 'naming and shaming' or the use of national criminal courts; to gradually escalating treaty-based measures; to the International Court of Justice (ICJ) and the Security Council; through to unilateral action (see fig. 4).

Illustrative examples of tools to respond to non-compliance	Technical assistance e.g. supporting enactment of national legislation
	Reputational sanctions e.g. naming and shaming non-compliant States
	Civil law actions e.g. Class action against exporters of chemical precursors
	Request for measures to redress e.g. through the OCPW Executive Council
	National criminal prosecution e.g. French/German prosecution on Syrian chemical weapons
	National sanctions e.g. US non-proliferation sanctions
	Likeminded/regional sanctions e.g. EU sanctions on nuclear programmes
	Diplomatic approaches by Director-General e.g. in response to reports of Sudanese chemical weapon use
	Suspension of treaty privileges/assistance e.g. IAEA suspension of technical assistance to a State
	Collective treaty measures e.g. OPCW Conference of States Parties recommendation for collective punitive measures
Referral to Security Council e.g. IAEA 2003 referral of the Democratic People's Republic of Korea	

⁷⁸ Dunworth, Treasa. 2019. "Compliance and Enforcement in WMD-Related Treaties". *WMD Compliance and Enforcement series No. 1*. UNIDIR.

⁷⁹ Ford, Christopher A. 2005. "Compliance Assessment and Compliance Enforcement: The Challenge of Nuclear Noncompliance". *ILSA Journal of International & Comparative Law* 12 (2): 583–91.

Referral to the ICJ e.g. CTBT Organization referral of issues to ICJ by mutual consent
United Nations Sanctions e.g. Sanctions imposed on Iraq
ICJ Advisory Opinion e.g. Advisory Opinion on legality of nuclear weapons use
Unilateral action e.g. Military strikes

FIGURE 4 *Illustrative examples of tools to respond to non-compliance*

In some cases of non-compliance, there is the option of invoking specific treaty measures. For example, under article XII of the CWC, the Conference of the States Parties can agree to restrict or suspend another States Parties' rights and privileges or "recommend collective measures". Similarly, as Heinonen indicates, the IAEA Board of Governors can call for the return of materials and equipment and suspend membership or cooperation.⁸⁰ International organizations can also refer cases to the Security Council, as the IAEA Board of Governors has done in the past. However, international organizations have limited powers to deal with significant cases of non-compliance and to enforce hard cases. Moreover, States do not always fully accept the findings of international organizations. For example, before the 2003 Gulf War, the United States chose to rely on its own assessment of Iraq's nuclear programme, rather than on the conclusions of the IAEA.⁸¹

7.1 EXOGENOUS ROUTES TO TREATY ENFORCEMENT

In more serious cases, enforcement options lie outside of treaty regimes. Trapp's paper is illuminating in this regard, highlighting how States have sought different approaches to enforcing the CWC.⁸² For example, Germany and France have reportedly opened criminal investigations into chemical weapons use in the Syrian conflict; while a collective of States launched the International Partnership Against Impunity for the Use of Chemical Weapons, which applies sanctions against individuals and entities involved in Syrian chemical weapons attacks. Singly or in combination, measures such as criminal investigation, civil law measures and naming and shaming might deter treaty violations by States and national public sector organizations, private companies and individuals. However, as Trapp notes there is a risk that such efforts might "confuse the issues of treaty compliance and criminal

⁸⁰ Heinonen, Olli. 2019. "The IAEA Mechanisms to Ensure Compliance with NPT Safeguards." *WMD Compliance and Enforcement series No. 2*. UNIDIR.

⁸¹ Ruzicka, Jan. 2019. "Nuclear Non-Proliferation Regime: Between Prevention and Prohibition". In *Regulating Global Security: Insights from Conventional and Unconventional Regimes*, edited by Nik Hynek, Ondrej Ditrych, and Vit Stritecky. pp. 53–75. https://doi.org/10.1007/978-3-319-98599-2_4.

⁸² Trapp, Ralf. 2019. "Compliance Management under the Chemical Weapons Convention". *WMD Compliance and Enforcement series No. 3*. UNIDIR.

responsibility”.⁸³ Moreover, the use of national or regional enforcement tools can generate political challenges and fuel political divisions, even when they are intended to complement or reinforce multilateral WMD regimes.

Some WMD-related compliance challenges concerning non-proliferation can potentially be addressed through export control regimes, such as the Australia Group, the Missile Technology Control Regime, and the Nuclear Suppliers Group. Export controls can deny actors suspected of non-compliance with WMD treaties the materials, equipment and knowledge they require to pursue WMD-related programmes. Some States view these strategic export control regimes as important components of their efforts to comply with the prohibitions and obligations of WMD regimes in that they permit adherents to these regimes to, in effect, coordinate their national export control practices.⁸⁴ However, this is not without controversy: decisions made in the context of such regimes can be contentious for non-adherents, and some States view these mechanisms as unfair, arbitrary suppliers’ cartels. Moreover, intangible (digital) transfers of technology pose growing challenges to the effectiveness of export controls.⁸⁵

States also have the option of referring some matters to the ICJ and indeed some WMD treaties, such as the CWC and the Comprehensive Nuclear-Test-Ban Treaty (CTBT), include provisions for seeking an ICJ Advisory Opinion or referring disputes to the ICJ. However, as Dunworth notes, there appears to have been a preference in the past for avoiding external adjudication of treaty related issues.⁸⁶ Moreover, ICJ procedures can take a considerable amount of time and some States remain outside of the ICJ and beyond its jurisdiction.

In the cases of serious non-compliance with core treaty obligations, States are often limited to referring the matter to the Security Council, which remains the ultimate arbiter of compliance disputes. The Security Council has several tools to enforce treaties at its disposal, including sanctions and, in extreme cases, authorizing the use of force. In reality, political division in the Security Council has in many cases prevented this body from reliably enforcing WMD treaty compliance, particularly when an allegation involves one of the five Permanent Members or a close ally of one.⁸⁷ This is particularly problematic in the current environment. As Trapp notes, when “willingness to cooperate and apply common rules is lacking, narrow

⁸³ Ibid. p. 32.

⁸⁴ This case was bolstered by Security Council resolution 1540 and subsequent related resolutions, which compel all States “to take and enforce effective measures to establish domestic controls to prevent the proliferation of nuclear, chemical, or biological weapons and their means of delivery, including by establishing appropriate controls over related materials”; see Security Council. 2004. S/RES/1540. Operative paragraph 3.

⁸⁵ Brockmann, Kolja, Sibylle Bauer, and Vincent Boulanin. 2019. “BIO PLUS X—Arms Control and the Convergence of Biology and Emerging Technologies”. SIPRI. p. 25.

⁸⁶ Dunworth, Treasa. 2019. “Compliance and Enforcement in WMD-Related Treaties”. *WMD Compliance and Enforcement series No. 1*. UNIDIR.

⁸⁷ Dorn, A. Walter, and Douglas S Scott. 2000. “Compliance Mechanisms for Disarmament Treaties”. *Verification Yearbook*. VERTIC. pp. 229–47; Roberts, Brad. 2000. “The Road Ahead for Arms Control”. *Washington Quarterly* 23 (2): 219–32. <https://doi.org/10.1162/016366000560908>.

national interest and geopolitical considerations can become predominant and collectively enforcing the law is becoming more and more difficult".⁸⁸

7.2 LEADERSHIP AND THE RESTORATION OF COMPLIANCE

Ultimately, States will get the WMD-related regime compliance they invest in—as reflected in their commitment, impartiality and efforts to support these regimes over the long run. Furthermore, as the papers of this series illustrate, States, individually or collectively, need to show leadership in the development of solutions to enforce WMD-related treaties and restore compliance.⁸⁹ For example, it was the United States that concluded the 1994 Agreed Framework that aimed to bring the Democratic People's Republic of Korea back into compliance with its NPT safeguards obligations and established a freeze on some of its nuclear activities. As well, a collective of European States, working with China, the Russian Federation and the United States, developed the Joint Comprehensive Plan of Action aimed at ensuring Iranian compliance with the nuclear regime. Similarly, the Russian Federation and the United States agreed the framework for the destruction of declared Syrian chemical weapons, as well as the establishment of the United Nations–OPCW Joint Mission.

In all these cases, international organizations played an important supporting role, but it was interested States acting independently of treaty regimes that individually or collectively led the process of restoring compliance to these regimes. This reliance on the willingness of States is problematic in an era where some key States that have historically provided leadership are pulling back—or have pulled back—and when there are no guarantees that a State or coalition of States will be sufficiently concerned to address a serious case of non-compliance with a WMD-related regime. As such, perhaps a further lesson is that States must be willing to assume a greater burden for the enforcement of WMD-related treaties in ways that exercise the potential of these agreements, rather than bypassing them in pursuit of their immediate, short-term goals.

⁸⁸ Trapp, Ralf. 2019. "Compliance Management under the Chemical Weapons Convention". *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 32.

⁸⁹ As Heinonen notes, responding to non-compliance is dependent upon the will of Member States to come up with measures; Heinonen, Olli. 2019. "The IAEA Mechanisms to Ensure Compliance with Nuclear Non-Proliferation". *WMD Compliance and Enforcement series No. 2*. UNIDIR.

8 MOVING FORWARD

There are several ways in which the findings of this, and other papers in UNIDIR's series on compliance and enforcement of WMD-related regimes, can be built upon to strengthen these treaties.

1. **Systematically mapping out compliance and enforcement in other issue-areas** to identify how practices beyond arms control and disarmament regimes could be adapted and applied to enhance compliance and enforcement in WMD-related treaties. As Dunworth notes, important lessons and considerations could be derived from practices in the fields of human rights, environmental law and the financial sector, for instance.⁹⁰
2. **Building a greater understanding of the comprehensive range of mechanisms to enforce treaty compliance and their advantages and disadvantages.** Recent events have led some States to apply less traditional approaches to compliance management, such as extraterritorial criminal investigations. The full implications of these approaches are not yet clear, but in some cases this has been politically divisive. Laying out the full range of tools available to States to enforce treaty compliance, along with their strengths and weaknesses, could also serve as a deterrent to potential treaty violators.
3. **Updating policy practitioners' understandings of why States comply with WMD-related treaties** and whether the incentives and benefits of treaty compliance could be better leveraged to facilitate compliance with WMD-related regimes and improve their political support. Dunworth notes that academic scholarship on compliance-related matters has advanced considerably in recent decades as scholars have investigated compliance and non-compliance cases and developed and tested more sophisticated theories.⁹¹ These developments have yet to trickle into policy discussions and could inform the cost-benefit analysis of compliance with WMD-related regimes and point to new, practical ways in which to incentivize compliance.

⁹⁰ Dunworth, Treasa. 2019. "Compliance and Enforcement in WMD-Related Treaties". *WMD Compliance and Enforcement series No. 1*. UNIDIR. p. 20.

⁹¹ *Ibid.* p. 19.

4. **Undertaking a cross-regime analysis of the technologies available to States and international organizations to detect and assess treaty violations.** This could include looking at new forms of remote sensing; at mechanisms to collect, validate and preserve open source data; and at the use and limitations of big data and machine learning. It would also be useful to look across regimes at operating procedures to ensure the “methods and tools used ... are scientifically sound, validated, and robust for use in the field”.⁹²
5. **Systematically assessing the role that actors outside of government could play in collaborative governance across WMD-related regimes.** As indicated in this series, several sets of stakeholders play valuable roles in supporting WMD compliance and enforcement. Thinking strategically about how their future contributions could aid WMD-related regime compliance and enforcement, and in which ways, would help to optimize those regimes. Nowhere is this clearer than in the life sciences, in which the so-called democratization of biology is changing the nature of the risk of hostile misuse of the life sciences and necessitating a web of prevention involving a range of non-State actors.⁹³

⁹² Trapp, Ralf. 2019. “Compliance Management under the Chemical Weapons Convention”. *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 7.

⁹³ Lentzos, Filippa. 2019. “Compliance and Enforcement in the Biological Weapons Regime” *WMD Compliance and Enforcement series No. 4*. UNIDIR. p. 5.

9 REFLECTIONS

WMD-related arms control and disarmament measures are a form of global public good. In order to maximize the benefits of these agreements, States Parties need to have confidence in others' compliance, and in the credibility and impartiality of procedures to detect, assess and respond to concerns of non-compliance.

Detecting and assessing compliance depends upon several different factors, including the processes and tools available to States (and treaty bodies) and the wider political context. Assessing compliance can involve political judgements as well as technical observations. This points to the important role that international treaty organizations can play as impartial bodies in resolving concerns of non-compliance.

Significant treaty violations are better addressed through established procedures. Moreover, key WMD-related treaties have a degree of flexibility within agreed procedures that can be utilized when political support for the resolution of compliance issues is forthcoming. However, in conditions where political support is absent, flexible approaches or ad hoc solutions to address concerns over non-compliance are vulnerable to accusations of politicization or a lack of "procedural and technical integrity".⁹⁴ This points to the importance of, first, operating within established procedures wherever feasible and, second, contingency planning to prepare treaty regimes as far as possible for an uncertain future.

Effective compliance also requires that States fulfil their responsibilities as part of the division of labour between themselves and international organizations (and other stakeholders). This requires tending to treaty regimes and compliance reporting, something that can involve a wider range of actors as part of a collaborative governance approach, but the primary responsibility lies with States. After all, when faced with non-compliance, States ultimately assume the burden for the enforcement of WMD-related treaties. Moreover, a wide range of enforcement tools is at their disposal to respond and restore treaty compliance. In sum, States need to demonstrate leadership and commitment to the treaty regimes to which they are party.

⁹⁴ Trapp, Ralf. 2019. "Compliance Management under the Chemical Weapons Convention". *WMD Compliance and Enforcement series No. 3*. UNIDIR. p. 20. Note this is a wider issue with international organization bodies. As Tallberg and Zürn note, "When IOs fall short of widely recognized procedural standards, this creates an opportunity for opponents to delegitimize the IO with reference to these limits"; Tallberg, Jonas, and Michael Zürn. 2017. "The Legitimacy and Legitimation of International Organizations". *Review of International Organizations*. pp. 1–40. <https://doi.org/10.2139/ssrn.3060204>. p. 15.

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