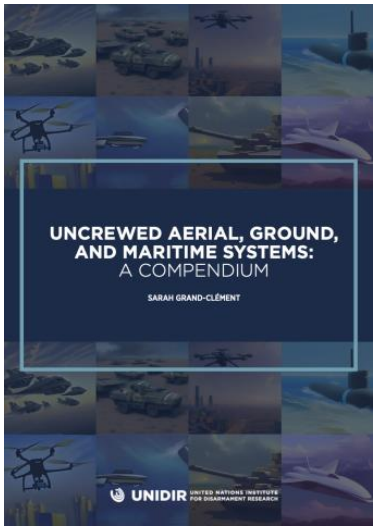
# UNIDIR Publications on Security Dimensions of Innovations in Science and Technology

## 1. Uncrewed Aerial, Ground, and Maritime Systems: A Compendium

2023
https://unidir.org/publication/uncrewed-aerial-ground-and-maritime-systems-compendium




*This compendium is intended to provide policymakers, diplomats and other non-technical interested parties with an introductory overview and comparison of technological developments and their security implications relating to uncrewed aerial, ground, and maritime systems. In 2022, UNIDIR released primers for each of the three domains in which uncrewed systems operate (air, land and sea). While each primer gives an in-depth introduction into each type of uncrewed system, this compendium provides a comparative overview that highlights the common developments and security implications of these systems, as well as what distinguishes them. The focus of the compendium is on describing the main areas of technological innovation and development related to the key components that comprise uncrewed systems, outlining the anticipated areas of progress and potential concern, as well as areas of overlap between key enabling technology across the three types of systems.*

## 2. Uncrewed Aerial Systems: A Primer

2022
https://unidir.org/publication/uncrewed-aerial-systems-primer


*The development of uncrewed aerial systems (UASs) – which include vehicles that can be piloted either remotely or semi-autonomously – has increased.*

*This primer introduces the different types of UAS (otherwise known as drones), including fixed-wing systems and rotary-wing systems such as quadcopters. It describes their key components and functions, as well as outlining the main challenges that these systems can pose to international security.*

*The focus of the primer is on describing the main areas of technological innovation and development related to the key components that comprise UASs, outlining the anticipated areas of progress and potential concern.*

## 3. Uncrewed Ground Systems: A Primer

2022
https://unidir.org/publication/uncrewed-ground-systems-primer


*The development of uncrewed ground systems (UGSs) – which include vehicles that can be piloted either remotely or semi-autonomously – has increased.*

*This primer introduces the different types of UGS (or "ground robots"), describes their key components and functions, and outlines the main challenges that these systems can pose to international security.*

*The focus of the primer is on describing the main areas of technological innovation and development related to the key components that comprise UGSs, outlining the anticipated areas of progress and potential concern.*

## 4. Uncrewed Maritime Systems: A Primer

2022
https://unidir.org/publication/uncrewed-maritime-systems-primer

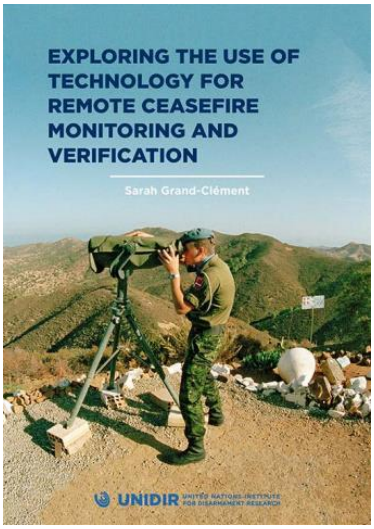

*The development of uncrewed maritime systems (UMSs) – which include vehicles that can be piloted either remotely or semi-autonomously – has increased.*

*This primer introduces the different types of UMS, otherwise known as surface, underwater or maritime drones. It also describes their key components and functions, as well as outlining the main challenges that these systems can pose to international security.*

*The focus of the primer is on describing the main areas of technological innovation and development related to the key components that comprise UMSs, outlining the anticipated areas of progress and potential concern.*

## 5. Exploring the Use of Technology for Remote Ceasefire Monitoring and Verification

2022
https://unidir.org/publication/exploring-use-technology-remote-ceasefire-monitoring-and-verification



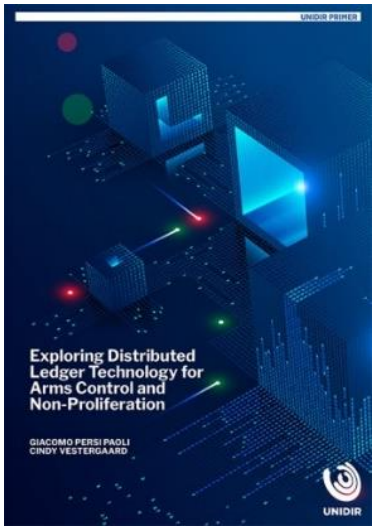

*Ceasefires play an important role in the prevention of further conflict and armed violence. Monitoring and verifying that the terms of a ceasefire agreement are respected plays a key role in ensuring an end to violence.*

*Traditionally, ceasefire monitoring and verification has been human-led. In some circumstances, it can however be difficult deploy observers on the ground. While technology cannot replace humans in all aspects of the monitoring and verification of ceasefires, especially within dialogue and de-escalation efforts, technology can nonetheless support and complement human-led activities.*

*This report explains what technological solutions are available to help monitor and verify ceasefires, outlining the respective technological advantages and limitations of each solution. The report also provides a series of guiding considerations around the use of technology, highlighting recommended issues to reflect upon before using technology to aid with ceasefire monitoring and verification.*

## 6. Exploring Distributed Ledger Technology for Arms Control and Non-Proliferation: A Primer

2021
https://unidir.org/publication/exploring-distributed-ledger-technology-arms-control-and-non-proliferation-primer



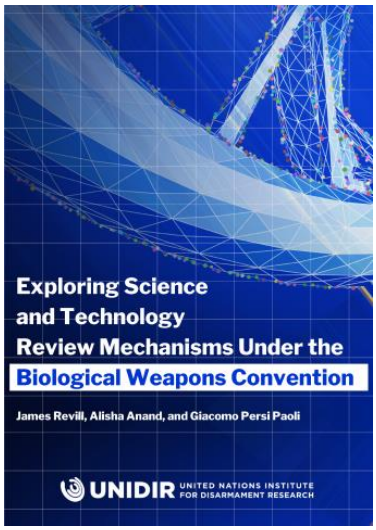

*The intrinsic characteristics of distributed ledger technology (DLT) platforms, combined with over a decade of successful development and deployment of this technology in a variety of sectors, make it a particularly relevant opportunity for international security and, more specifically, for arms control and non-proliferation.*

*This paper provides a brief overview of DLT, including its main characteristics, benefits and risks, as well as its potential applications and utility in the context of arms control and non-proliferation.*

## 7. Exploring Science and Technology Review Mechanisms under the Biological Weapons Convention

2021

https://unidir.org/exploring-science-and-tech




*Since the Biological Weapons Convention (BWC) opened for signature in 1972, biology and other converging disciplines have advanced considerably. To address changes in biology and biotechnology, BWC States Parties have established processes to review developments in science and technology (S&T), including annual expert meetings on this topic. However, shortcomings are evident in the current approaches and many BWC States Parties have expressed support for a more systematic review of science and technology under the Convention.*

*This study seeks to inform discussions on establishing a dedicated and systematic S&T review process under the BWC through an examination of existing S&T review-type mechanisms employed in different regimes beyond the BWC, a survey of States Parties' views on a possible review mechanism and a study of past and present discourse on this issue in the BWC. Based on the analysis conducted, this study also presents options for BWC States Parties to consider ahead of the Ninth BWC Review Conference.*

## 8. The 2020 Innovations Dialogue Conference Report

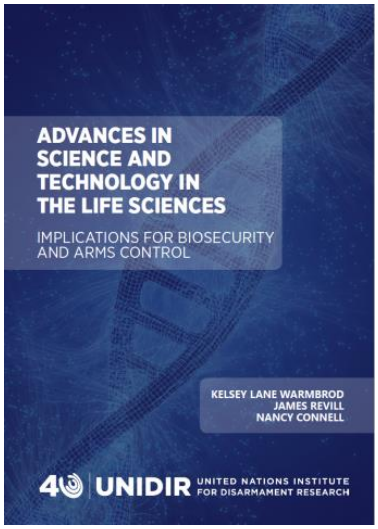
2020

https://unidir.org/publication/2020-innovations-dialogue-conference-report


*The 2020 Innovations Dialogue examined technological advancements and trends that could radically affect the creation, production and delivery of biological weapons: gene editing techniques, DIYbio, cloud labs and nanobiotechnology. The Dialogue also explored the challenges to existing governance and arms control approaches arising from the dual-use nature of technological innovations in the life sciences and considered what new instruments, if any, are needed and how can existing ones improve and adapt to safely and securely support the peaceful exploitation of 21st century biotechnology. This report provides a summary of the key themes, issues and takeaways that emerged from the two-day discussions at the 2020 Innovations Dialogue.*

## 9. Advances in Science and Technology in the Life Sciences

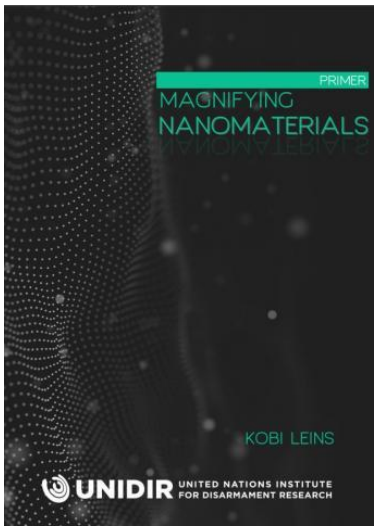
2020
https://unidir.org/publication/advances-science-and-technology-life-sciences




*This report outlines a number of trends that are facilitating advances in different areas of the life sciences, including immunology, neuroscience, human genetics and reproductive science, agriculture and infectious disease. Research and development in these fields is overwhelmingly undertaken for peaceful purposes and potentially provides many benefits to society, the global economy, and future generations. However, the same areas of research raise a number of ethical, legal, safety and security concerns, including concerns that developments therein could feed into new forms of biological weapons with different and potentially more damaging effects to those of the past.*

## 10. Magnifying Nanomaterials

2020
https://unidir.org/publication/magnifying-nanomaterials




*For more than three decades, the manipulation of nanomaterials has been subtly changing the world around us, including how wars are fought. The use of nanomaterials has increased military capabilities in numerous ways already and will continue to shape battlefield capacity as our understanding of the human brain and body, and the ways we can intervene in their functions, increases. The term "nanotechnology" has become shorthand for a wide range of ideas, meanings and applications. Research into the use of nanomaterials for neurological and biological applications is racing alongside advances in understanding of the human brain.*

*Deploying these types of nanoscale material in war requires contemplation of existing limits on use, particularly given their potentially deleterious effects on humans and on the environment, some of which are long term and potentially not yet known.*

## 11. Innovations Dialogue Report

2019
https://www.unidir.org/publication/innovations-dialogue-report


*Recognizing the interest of the international community to learn about developments in science and technology of relevance to international security, in December 2018 the United Nations General Assembly requested the United Nations Institute for Disarmament Research (UNIDIR), to convene a one-day informal seminar on the role of science and technology in the context of international security and disarmament, "in order to facilitate dialogue among relevant stakeholders on current developments in science and technology and their potential impact on international security and disarmament efforts." The innovations in science and technology that were discussed included quantum computing and distributed ledger technology.*