

## **Pugwash Peace & Disarmament Conference Working Group C: Emerging technologies**

**Chair:** Dr Richard Guthrie, British Pugwash

**Rapporteur:** Nicolas Ayala Arboleda, Student/Young Pugwash UK

*These notes were taken by the rapporteur, whom was asked to record some interesting points from the presentations and the ensuing discussions. They are not a comprehensive summary and do not necessarily reflect the views or emphasis of the guest speakers.*

If you would like to contact a presenter, please enquire via [syp@britishpugwash.org](mailto:syp@britishpugwash.org)

### **Presentations (followed by discussion):**

- Malware Proliferation and Challenges to International Security: Understanding the Impact on Critical Infrastructure - Muhammed Ali, Plymouth University.
  - Dark web trade in illicit nuclear materials and knowledge – Dr Stephan Blancke, Independent researcher.
  - The Earth observation boom - Tom Syndercombe, University of Warwick Aerospace.
  - Social media: Weapon of Mass Confusion - David Almassi, Warwick Pugwash.
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### **Rapporteur notes**

#### *Malware Proliferation and Challenges to International Security: Understanding the Impact on Critical Infrastructure*

A brief technical outline of the nature of malware was offered as an introduction to the presentation. This allowed the participants to better understand several types of malware currently in operation. The speaker then proceeded to explain the current context of malware proliferation, emphasising the rapid pace of production and innovation within this domain. Moreover, the Working Group heard that this technology is increasingly available for and targeted against non-state actors.

The speaker then explained Lockheed Martin's Cyber Kill Chain framework, which identifies what actors must complete in order to achieve their objective in a cyber operation involving malware. The cyber attack on Natanz was used as an illustrative example to better understand the strengths and limitations of this model.

The presentation then focused on exploring the use of artificial intelligence to bolster the defensive capabilities of a network. The presenter argued that the development of deep learning is currently revolutionising the field and might even present a solution to data bias. This claim was contested during the discussion following the presentation. The discussion also highlighted the importance of considering the

interactions between cyber and other technologies whenever assessing situations involving malware.

### *Dark web trade in illicit nuclear materials and knowledge*

The speaker started his presentation by clarifying the nomenclature used to describe the section of cyberspace in which his research is focused. He then went on to discuss the variety of fora which his research has covered. The Working Group heard that some of these spaces host very sophisticated technical information about the production and capacities of nuclear weapons, while others are filled with mostly inconsequential interactions.

The speaker then explained that the preferred method of payment used by actors possibly trading illicit nuclear materials and knowledge in the dark web are crypto currencies due to the difficulty there is in tracking these transactions. The motivation driving the users which share technical know-how for free in these forums is unknown.

Furthermore, the Working Group heard that it has been hypothesised that it is possible to create a dirty bomb with fissile material from ubiquitous items, for example the americium found in smoke detectors. The presenter then referred to data from the IAEA which documented the 'miss-delivery' of several americium shipments. It was also mentioned that said bombs are being offered for sale on the dark web. However, confirming whether these markets are functional or not has proven challenging. Additionally, there are a number of fora which can be accessed on an invite only basis, increasing the difficulty of conducting research on these troubling developments.

### *The Earth observation boom*

The Working Group heard that earth imaging technology and the technologies facilitating it have advanced exponentially in recent years. The development of more efficient launch systems, cloud computing and the arrival of smaller satellites has significantly lowered the cost of space-enabled services. This has resulted in the widespread use of earth imaging and its applications.

The speaker argued that this progress was prompted and is widely being taken advantage of by the private sector. Said trend is an important shift from the previous earth observation ecosystem, which was dominated by state actors. State actors tended to prefer large satellites placed at higher orbits. In contrast, the private sector has decided to develop smaller hardware, which is usually stationed on low Earth orbit (LEO) and has better coverage and image resolution. However, the private sector development has not always been done responsibly. There have been instances in which companies have illegally launched unregistered satellites and the Earth observation boom is leading dangerously crowded orbits and frequencies.

Moreover, the dual-use nature of Earth observation systems explored. While it is clear that there are numerous beneficial applications for this technology, it was also stated that actors could use Earth imaging with malicious intent in many scenarios. This threat has become evermore dangerous given the democratisation of this technology

and the services it provides. The discussion explored ideas for regulating this technology, but no consensus was achieved on a solution.

### *Social media: Weapon of Mass Confusion*

The speaker set out to explain how social media adds a layer of complexity to the understanding of conflict. This point was illustrated by an examination of the chemical attacks in Douma, Syria.

It was firstly argued that social media has become a useful tool for disinforming the public because the first accounts of the attacks, in this case, were communicated through these channels by a variety of actors. These accounts were not readily verifiable at the time, which allowed for fake news to be passed as trustworthy information and allowed for campaigns of discreditation of sources which might have been accurate to take place. Thus, secondary source reporting of the attack became more of an ideological battleground than a quest to find the truth. Such approach entrenches ideological divides across the public. This ideological division is furthered by algorithms within social media which prevent users from coming across views with which they might disagree, thus creating an information bubble.

It was also mentioned that social media complicates the work of experts when interacting with media outlets. This is because experts are expected to comment on conflicting accounts of often unverified information. This makes it crucial to be extremely clear when communicating what are the undisputable facts available, what evidence is likely correct but has not been verified and what are the conclusions which the expert draws from the available information.

### *Concluding remarks*

The session came to an end with a set of remarks provided by the chair, speakers and participants. The Working Group heard that Pugwash has always gained its strength by bringing technical expertise and political savoir-faire together. This transdisciplinary cooperation is essential. It was agreed that it is necessary for the organisation to reach out to individuals with expertise in fields which are considered emerging technologies, in order to improve the positive impact which Pugwash may have in the present and future. It was also mentioned that it is important that these technologies are very often dual-use and are also in constant interaction with each other. Additionally, there were calls to ban technologies which may only bring detrimental effects to society, such as the so-called deepfakes. Finally, participants were encouraged to remember that all technology is political in its development and that all data is biased in its collection, labelling and storage. Understanding these political relations might be extremely beneficial. However, it is often equally difficult.

This was a very productive session with notable interventions from the chair, speakers and participants. It was an excellent example of constructive dialogue across disciplines and, on occasions, across divides.