



**Summaries of Working Group presentations
WG 4 – Emerging technologies and strategic stability
Warwick Peace Conference, 10th March 2018**

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Presentation 1: Anti-submarine warfare and strategic stability
Sebastian Brixey-Williams, BASIC

Sebastian Brixey-Williams gave a short presentation on the disruptive effect that emerging technologies in anti-submarine warfare could have on the ability of states to protect their second-strike nuclear ballistic missile submarines (SSBNs), based on research that he has conducted for British Pugwash and BASIC over the last two years.

Mr Brixey-Williams suggested that a combination of rapidly-improving collaborative robotics and drone technologies, underwater communication protocols, big data, algorithms, machine learning and sensors, could create a more 'translucent' ocean in which submarines can be more easily tracked. If this happens over the lifetime of the coming generation of SSBNs, and cannot be offset by advances in stealth technologies or other countermeasures, it could have profound consequences for strategic stability.

Presently, deterrence theory suggests that the global nuclear order is stable if the major powers' SSBNs retain the ability to remain hidden and return fire if needed, thereby removing the incentive for a state to launch a first-strike. If states do not have confidence that their SSBNs can remain hidden, this would add major risks and uncertainties to a crisis. Further attention to this issue is needed to ensure the avoidance of strategic surprise.

Presentation 2 - Schrodinger's Panda - Quantum technology in China

Raymond Wang, MIIS

The presentation was titled "Schrodinger's Panda – Developments in Quantum Technology in China." Quantum technologies have become both a technical and a political priority in China, and as such, it is pertinent to examine its potential impacts on strategic stability. The presentation argued that there are both stabilizing and destabilizing potentials in quantum technologies, specifically in its applications in radar, navigation, and communications.

Raymond first outlined the bureaucratic structures behind quantum technological development, highlighting key research laboratories and personalities. Then, he presented the potential strategic effects of these technologies– for instance, 'unhackable' nuclear ballistic submarine (SSBN) communications and quantum navigation could increase SSBN survivability and crisis stability; anti-stealth quantum radar could enhance strategic early-warning capabilities. At the same time, he outlined some limitations of these technologies. Subsequently, Raymond identified technical and political markers that will allow policy makers to follow China's intentions and progress – for instance, the recent establishment of joint labs between quantum research laboratories and China's submarine manufacturer, and the pursuit of converters that will enable quantum radars to operate at microwave-frequencies. Finally, he outlined policy recommendations, arguing that the cross-domain effects of quantum technologies could provide opportunities for engagement – for example, China will increasingly rely on quantum satellites in the future, which could provide incentives for negotiating a code of conduct in space activities.

China is devoting an increasing amount of political and technical capital to quantum technologies, which will have profound strategic consequences. On a broader level, Raymond hopes his presentation will catalyze a reflection on how we think about emerging technologies

Presentation 3 - Atomic clocks - From GPS to Geopolitics
Carl Mohr, University of Warwick

To be uploaded shortly...

Presentation 4 – Fighting wars in space is a bad idea

Nicolas Ayala Arboleda, University of Warwick

The presentation provided an overview of why military conflict in space should be avoided and explained how space technology, mainly satellites in this case, is being used for military purposes.

The presentation first covered the most important rules in current space law and then debunked some myths surrounding space warfare. The current focus on the production of national space legislation instead of international space legislation was then criticised.

The militarisation of space was then explored. After defining the term, it was argued that space assets are a critical part of many countries military and civilian infrastructure. The discussion then addressed the vulnerability of these assets and it was also explained that the situation in space has become much more complex and dangerous because of the entry of new state and private actors.

The weaponisation of space was then covered by first establishing its legal status. The presentation addressed the dual-use nature of technologies being tested to handle space debris and orbital missile interceptors. The essay focused on the relaunching of orbital interceptors as a proposal in the NDAA 2018. It was then argued that such a system would be the destabilising, ineffective and extremely expensive.

Conflict in space was also signalled as dangerous because of the lack of guidelines regarding retaliation. Conflict in space would be undesirable because it could render orbits inhabitable following the creation of space debris. Space debris was explored further by analysing the current situation and arguing that ASAT weapons could worsen the problem.

The presentation identified stagnant treaty negotiations, the attitude of states and state national security concerns as obstacles in the creation of responsible international space law and policy. Likewise, it was argued that mediocre international space law could be used as a precedent and justification of unlawful acts in other fields.

Finally, some steps forward were proposed. Firstly, the need for space to be legislated accordingly with what it is, a global common, was urged. This should be accompanied by less attempts of passing national space legislation and an urgent change of attitude in the international system. Additionally, the ban of ASAT weapons tests and the ban of space weapons as short-term and long-term goals, respectively, was proposed. Space has become a fashionable topic again. This reality should be used to make ideas gain traction and kick-start a new wave of international space legislation.