CONFERENCER PROGRAMME

RAeS Weapon Systems & Technology Group & RUSI

EXTREME THREATS TO THE UK - VIRTUAL CONFERENCE

THURSDAY 17 SEPTEMBER 2020

12:30 LEAD SPONSOR: RAYTHEON UK - VIRTUAL EXHIBITION STAND OPEN
Exhibitor: Johanna Summers, Events Marketing Project Manager, Raytheon UK
Exhibitor: James Gray, Managing Director, Cyber & Intelligence, Raytheon UK

12:30 Networking Session

13:00 DAY ONE WELCOME & INTRODUCTION
Chair: Tim Marshall, Chair, RAeS Weapon Systems & Technology Specialist Group

13:10 KEYNOTE ADDRESS
Speaker: Camille Grand, Assistant Secretary General for Defence Investment, The North Atlantic Treaty Organization

13:30 1) BEYOND THE LEVEL OF THE TOLERABLE?
Speaker: Tom Plant, Director, Proliferation and Nuclear Policy, Royal United Services Institute
Synopsis: In the fifty years since the entry into force of the Nuclear Non-Proliferation Treaty the number of states possessing nuclear weapons has not quite doubled, a much reduced rate of spread than some had feared. As the established nuclear order gradually decomposes and co-operative security increasingly takes a back seat to poorly defined competition, one might expect this rate once again to increase; and one might also expect established possessors to value their own capabilities more highly, however, it would be as unwise to extend this trend uncritically, and the bounds of plausible nuclear threats are wide.

This presentation will discuss the variables affecting possible nuclear futures, the potential for emergence of true nuclear multipolarity, and examine how nuclear weapons might be framed in the security concepts of mid-late 21st century states, with reference to possible future nuclear threats to the UK.

14:00 Networking Break

14:15 2) THE DEVELOPMENT OF HYPERSONIC WEAPONS
Speaker: Stuart Cutting, Senior Manager, Missiles and Fire Control, Lockheed Martin UK
Synopsis: New technology development and weapon enhancements by potential adversaries have led to the fielding of warfare systems capable of holding UK and allied forces increasingly at risk in our ability to retain operational advantage. One such threat comes from the evolution of hypersonic weapons and their impact on conventional detection methods, countermeasures, and effectors capable of defeating them.

This presentation will look at the development of hypersonic weapons and set the scene for future discussion on the skills and technologies to counter such extreme threats.

14:45 3) EXPLOSIVE THREATS
Speaker: Dr. Tracy Vine, Group Leader, Weapons Science, QinetiQ
Synopsis: The explosives threat covers extremes, from massive tonne-size devices such as those used in Oklahoma City and Canary Wharf down to several orders of magnitude smaller devices, but the consequence can still be significant if deployed in an environment such as an aircraft or mass transit system. During this presentation, Tracy will provide examples from a variety of incidents using improvised explosives to manufacture devices from readily available materials and discuss methods of making the materials unusable whilst limiting the impact on their legitimate use.

15:15 Networking Break

15:30 4) CONFLICT IN SPACE: AN INEVITABLE SCENARIO?
Speaker: Alexandra Stickings, Research Fellow, Space Policy and Security, Royal United Services Institute
Synopsis: This presentation will explore current and potential counterspace capabilities, their proliferation to new actors, and what

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this means for the balance of power in space. Alexandra will also discuss the concepts of militarisation and weaponisation of space, space warfare, different international perspectives and how worried we should be about all-out conflict in space.

16:00 5) THREATS FROM SPACE WEATHER

**Speaker:** Dr Gemma Attrill, Senior Principal Scientist - Space Environment Project Technical Authority, Dstl

**Synopsis:** Extreme manifestations of space weather have been captured as a Tier 1 threat on the UK National Risk Register since 2011. “Space Weather” is a term used to describe the variations in the flux of solar or galactic energy and matter entering the Earth system. It includes key phenomena such as coronal mass ejections (CMEs, vast eruptions of magnetised plasma that explode from the solar atmosphere), and solar flares (hugely energetic and rapid releases of energy in the solar atmosphere).

This talk will provide a physical explanation of the powerful solar eruptions that impact our near Earth environment, as well as a description of extreme space weather events and the threat they pose to both space, and ground-based, modern engineered systems and infrastructure. The talk will conclude by considering options for mitigation strategies.

16:30 DAY ONE CLOSING REMARKS & THANKS

**Chair:** Tim Marshall, Chair, RAeS Weapon Systems & Technology Specialist Group

16:45 Networking Session

17:30 END OF DAY ONE

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13:00 DAY TWO WELCOME & INTRODUCTION

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13:10 6) THE FUTURE THREAT UNDERSTAND AND DISRUPTION (FTUD) PROGRAMME: AN OVERVIEW

**Speaker:** Ella Fleming, Senior Analyst, Dstl

**Co-Speaker:** Nick Harris, Principal Scientist, Dstl

**Synopsis:** Emerging technologies can offer great benefit to defence and security but equally many challenges are faced from a world of rapid and fundamental change. The Future Threat Understanding and Disruption (FTUD) programme works to ensure that the UK understands the potential defence and security impact of emerging science and technology in order to reduce the chance of future ‘shocks’, and that the UK is prepared to respond to and counter future threats.

This presentation will provide insights into the FTUD programme, and is flavoured by the experiences from two key members of the programme team.

13:40 7) DIRTY DELIBERATE ACTIONS AND EMERGING DISEASES

**Speaker:** Dr. Cerys Rees, Fellow - CB Analysis & Attribution, Dstl

**Synopsis:** This presentation will examine the deliberate use of chemical agents over the last decade in the UK and overseas, and will highlight approaches to countering the use and impact of these materials. In the case of biological agents, the challenge of distinguishing deliberate events from naturally occurring diseases will be discussed, including strategies for increasing our understanding and mitigation of these events.

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14:10 Networking Break

14:25 8) CYBER DECEPTION - A PHILOSOPHY FOR ATTACK AND DEFENCE
Speaker: Dr. Mike Westmacott, Senior Cyber Security Researcher, Thales UK
Synopsis: Deception has been used throughout the ages as a tool for both attack and defence. At its core deception is a game of psychological manipulation - being able to impart an effect upon the beliefs of an opponent to change their decision making and thus actions. The same tactics may be used as either attack or defense - deception can be used to camouflage an entity to avoid being detected during an attack, or it could be used by a defender to lure an attacker into a trap. This talk will discuss the deceptive cyber tools and techniques that are used by both threat actors and system defenders with illustrations from real industrial manufacturing and avionics cyber attacks.

14:55 9) THE CYBER THREAT TO THE UK’S CRITICAL NATIONAL INFRASTRUCTURE
Speaker: James Gray, Managing Director, Cyber & Intelligence, Raytheon UK
Synopsis: The Government’s 2016 National Cyber Security Strategy states that a successful cyber-attack on the UK’s Critical National Infrastructure (CNI) “would have the severest impact on the country’s national security”, with the National Cyber Security Centre (NCSC) categorising a cyber attack on the UK a matter of “when, not if”.

This presentation will assess how well cyber risk is understood across different CNI sectors and highlight areas in which government, regulators and the private sector can better work together as the cyber threat continues to diversify and increase.

15:25 Networking Break

15:40 10) A REALITY CHECK ON QUANTUM COMPUTERS - WHAT’S ACTUALLY GOING ON
Speaker: Ilyas Khan, Chief Executive Officer, Cambridge Quantum Computing
Synopsis: Quantum Computing has moved from being reported about only in specialist journals and scientific papers to front page mainstream media. Large corporations such as Microsoft and Google and AWS have publicly launched significant (even by their standards) quantum computing projects.

This short will examine what, exactly, is the current capability of quantum processors and what might be the likely applications in the near term.

16:10 11) THREATS TO PRECISE TIMING SYSTEMS
Speaker: Professor Bryn James, Senior Fellow, Dstl
Synopsis: Innumerable technological systems are dependent upon precise timing to deliver the required function. In addition to the well-known requirements in navigation, timing and synchronisation is critical to such applications as communications (both open and secure), finance transactions, electrical energy distribution, railway management and signalling, law enforcement, signals intelligence, radar, command and control, sensor fusion, electronic warfare and many more. As these applications are critical to both civilian and military infrastructure and capability, they also represent a vulnerability.

This talk will address threats to the timing infrastructure and suggest means of mitigating those threats.

16:40 DAY TWO CLOSING REMARKS & THANKS
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17:00 END OF CONFERENCE

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