BIPSS Commentary
www.bipss.org.bd April-2024
BIPSS Towards a Secure World

High Tech, High Stakes: The Rise of a New Cold War

Maxwell Goldstein[1]

Source: Airman Magazine

Introduction

The unchallenged hegemony of the United States, an indisputable factor of the post-1991 world, has ended with the rise of revisionist powers like China, and to a lesser extent, Russia. The world

[1] Maxwell Goldstein is a Research Intern at the Bangladesh Institute of Peace and Security Studies, with BA's in History, Anthropology and Geographic Information Sciences from the University of Connecticut. He is currently finishing an Erasmus Mundus International Joint Master Degree in Security, Intelligence, and Strategic Studies awarded by the University of Glasgow, Dublin City University, and Charles University.

faces a new era of tensions between these poles, a repeat of the Cold War that characterized the post-war world in the latter half of the 20th century. Many have noted the similarities between these eras – military buildups, espionage and intelligence gathering, and rhetoric (subtle and otherwise) indicating hostilities.[2] Others suggest the similarities between the 1930s and the coming decade.[3] However, these comparative analyses belay an important point of departure compared to the past. The new Cold War is not only going to be an ideological struggle between two poles, but also a test of the systems which these poles foster, specifically when it comes to the development of technology. This 'Tech Cold War' will have profound implications for the future of the rules-based international order that has structured the global commons for nearly a century, and is thus a topic more than worthy of discussion.

It would be wrong to suggest that the modern Tech Cold War is a novel geopolitical struggle. Indeed, during the 20th century's Cold War the U.S. and USSR engaged in a multifaceted struggle for global supremacy which heavily featured technology. From the miniscule scale of the atom to the vast interplanetary distances of our solar system, both poles attempted to leverage revolutionary technologies to their advantage, outperforming their rival and thus showcasing to the world the value of their ideological system in a sales pitch to garner international support. However, where technology was but one aspect of the Cold War. Proxy conflicts, ideological struggle, and political and economic pressure all colored this era to the same degree as the

[2] See; Elliot Abrams, "The New Cold War," The Council on Foreign Relations, 4 March 2022, https://www.cfr.org/blog/new-cold-war-0; "China's Rise and Russia's Invasion: Challenge US Faces in New Cold Wars," The Wilson Center, 11 April 2024, https://www.wilsoncenter.org/video/chinas-rise-and-russias-invasion-challenges-us-faces-new-cold-wars.

[3] See; Wesely K. Clark, "PART I: Rethinking Deterrence," Georgetown Journal of International Affairs, 9 July 2019, https://gjia.georgetown.edu/2019/07/09/part-i-rethinking-deterrence/; Pavel K. Baev, "Part II: The Re-Emerging Nuclear Dimension in Russian-European Relations," Georgetown Journal of International Affairs , 7 May 2019, https://gjia.georgetown.edu/2019/05/07/re-emerging-nuclear-dimension-pt-ii/; Christina Pazzanese, "Lessons for today's Cold War 2.0 with Russia, China," The Harvard Gazette, 8 August 2023, https://news.harvard.edu/gazette/story/2023/08/lessons-for-todays-cold-war-2-0-with-russia-china/.

technological rivalry between the U.S. and USSR. Where the 20th century and 21st century differ is in the relative importance of technology to the functioning of civilization as we know it.

Battlegrounds of the Tech Cold War

It is important to define what the term 'Tech Cold War' refers to, being the intensifying technology-centered rivalry between major global powers, primarily the United States and China. This contemporary conflict mirrors the ideological and geopolitical tensions of the original Cold War, but is distinctly shaped around technological supremacy across various fields.

Artificial Intelligence and Machine Learning

Often used as a buzzword to garner interest on a topic, artificial intelligence (AI) and machine learning (ML) both have the capacity to revolutionize the way in which information is processed, leading to breakthroughs in fields of strategic importance to both the U.S. and China.

From a military perspective, AI and ML's capacity to reduce decision cycles enhances the responsiveness of forces responding to a given stimuli. Modern military strategy is often predicated upon rapid decision making through the OODA (Observe, Orient, Decide, Act) Loop, pioneered by John Boyd. By acting faster than an adversary, a force can throw another into a constant disorienting cycle of attempting to respond to prior events, allowing friendly forces to capitalize on subsequent confusion and achieve objectives. The introduction of networked systems for sharing and capturing ISR (Intelligence, Surveillance, Reconnaissance) data during the end of the 1980's substantially reduced the OODA loop of the American military and its allies and contributed extensively to Coalition success in Operation Desert Storm in 1991, where the conventionally strong Iraqi Army suffered a monumental defeat while inflicting minimal

losses onto the coalition. [4]This Revolution in Military Affairs (RMA) has been the subject of much study in the succeeding years and has colored military theory ever since; it is eminently possible that another such revolution could occur should AI and ML models become advanced enough.

Economically, AI and ML are anticipated to contribute significantly to economic competitiveness. The European Union Parliament cites AI's capacity to process vast amounts of data, enhance productivity, and generate new markets, services, and products as an immense boon to the economy of a given nation. [5] The Bank of America cites reports that the total contribution of AI and ML algorithms to the global economy will reach $15 trillion by 2030, up from $318 billion in 2020. [6]

Finally, AI and ML are almost certain to be utilized for their ability to control a given population. This can be done through a variety of different ways. The first is the dissemination of information favorable to a given nation's political interests. As can be seen in recent years with Russian Troll Farms, disinformation and propaganda are rife, especially in societies with a state-sanctioned freedom of expression. By using AI and ML models, nations can automate the promulgation of disinformation or propaganda on social media, contributing to all the negative outcomes of this phenomenon, including democratic backsliding, increased inter-societal tensions, and a lack of trust in state and private institutions. AI and ML have the capacity to greatly expand the reach and impact of targeted ad campaigns, such as that seen in the Facebook–Cambridge Analytica data scandal, by dynamically responding to events, tailoring content to user profiling, etc. Lastly, these algorithms have the proven capacity to enhance the

[4] Jonathan L. Jackson, "Solving the Problem of Time-Sensitive Targeting," (ADA415574, Newport, RI, 2003).
[5] Marcin Szczepański, "Economic impacts of artificial intelligence (AI)" (PE 637.967, Brussels, BE, 2019).
[6] "Artificial Intelligence: A *real* game changer," Bank of America, accessed 16 April 2024, https://business.bofa.com/en-us/content/economic-impact-of-ai.html.

surveillance capabilities of a given state. Infamously, this has been used in China to monitor its citizens activities and assign them a social credit score, which has substantial impact on the opportunities available to them.[7]

Telecommunications and 5G

The world is more interconnected in the modern era than at any other point in history, largely thanks to telecommunications technology. 5G is crucial for next-generation communication networks, boasting improved network performance and far greater data capacity. Adoption of 5G is anticipated to enhance telecom networks and has significance in several important domains pertaining to the Tech Cold War.

Economically, 5G is anticipated to substantially contribute to the GDP of early adopters – a 2023 Oxford Economics study found integration of 5G networks could boost the global productivity by 1.7%, contributing to approximately 10% of global GDP growth from 2023 to 2030. [8] The capital expenditure in establishing the hardware necessary for 5G, increased efficiency in manufacturing and real time supply chain management, and enhanced consumer benefits are a fraction of the potential economic benefits of 5G rollout.

Additionally, 5G is a foundational component of critical infrastructure, given the trends of increasing digitization and automation in management and maintenance of these systems. Ensuring the stability, safety, and availability of these systems is therefore essential in a domestic context. This implies the creation and adoption of domestic 5G networks that will be resistant to foreign machinations, in the case of the U.S. and China.

[7] Charlie Campbell, "How China Is Using "Social Credit Scores" to Reward and Punish Its Citizens," Time Magazine, 16 January 2019, https://time.com/collection/davos-2019/5502592/china-social-credit-score/.
[8] "The Global Economic Potential of 5G-Enabled Technology," Oxford Economics, 29 March 2023, https://www.oxfordeconomics.com/resource/the-global-economic-potential-of-5g-enabled-technology/#:~:text=A%20new%20report%20by%20Oxford,GDP%20growth%20in%20this%20period.

Given its importance in critical infrastructure, however, it also provides a means by which to influence nations geopolitically. An apt analogy is that of weapons sales during the Cold War of the 20th century. When purchasing foreign weapon systems, nations forfeit certain amounts of sovereignty, or the capability to act in a unilateral or independent manner. The nation providing the equipment, capacity or capability may cut off supply if a situation develops which it doesn't approve of. An example of this occurring is the Falkland War of 1982, where France halted the transfer of Exocet AShM (Anti-Ship Missiles) upon Argentina's seizure of the Islands, and is certain to have saved Royal Navy ships and lives. Smaller nations cannot develop advanced capabilities on their own given their limited resources, and thus are forced to rely on larger nations to fulfill certain niches. In a modern, 5G specific context, smaller nations are unlikely to have the funds, capacity or political will to install 5G infrastructure and as such will rely on foreign corporations to install this essential infrastructure should they wish to remain economically relevant. This reduces their technological sovereignty, as by embedding foreign technology into critical infrastructure or governmental networks, countries may expose themselves to potential surveillance, influence exertion, and even direct control by the country that provides the technology.

Quantum Computing

Quantum Computing represents a revolutionary leap forward in capabilities when compared to conventional computing. IBM describes the function of quantum computing as such;

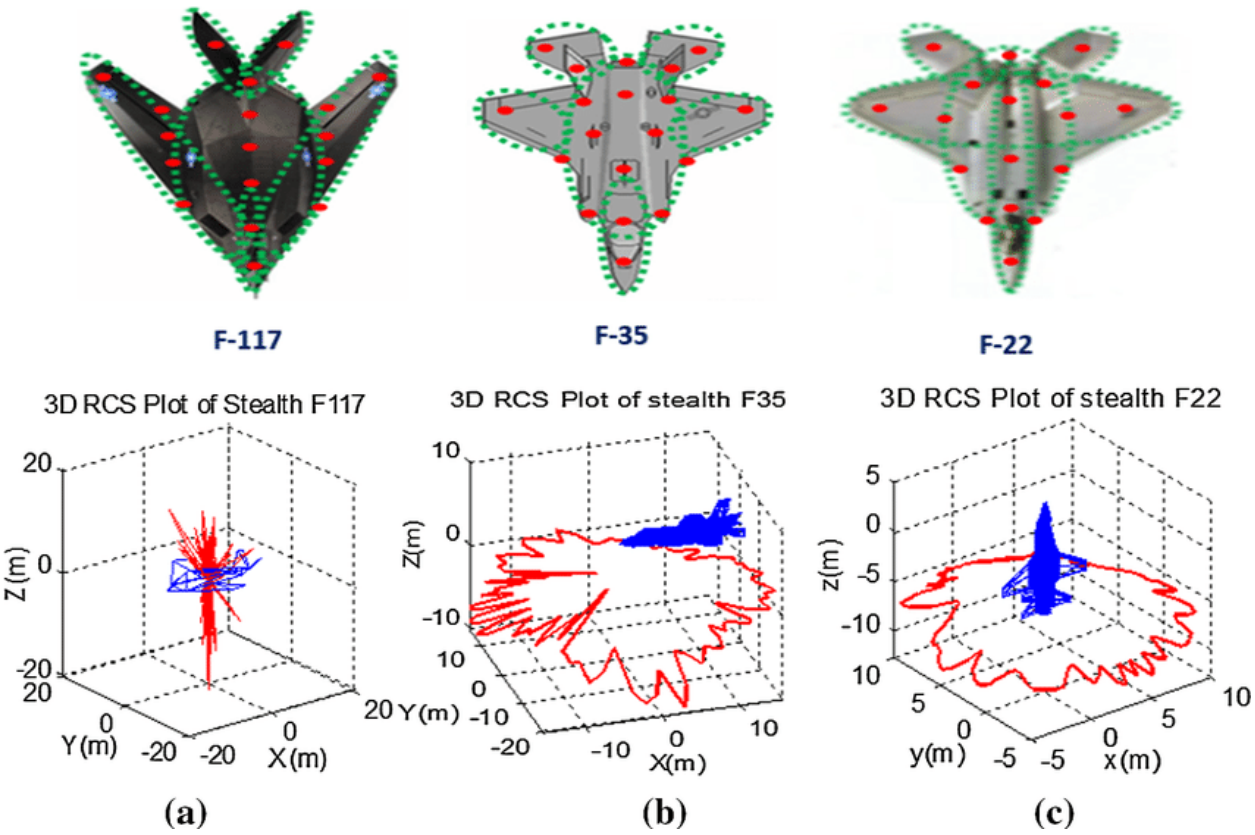
> "A computation on a quantum computer works by preparing a superposition of all possibile [sic] computational states. A quantum circuit, prepared by the user, uses interference selectively on the components of the superposition according to an

> algorithm. Many possible outcomes are cancelled out through interference, while others are amplified. The amplified outcomes are the solutions to the computation.[9]"

Adoption of quantum computing means access to and exploitation of far greater computational models than what is currently available with conventional computers or supercomputers. This of course will have enormous potential in a huge variety of fields for countries able to adopt it.

To illustrate the revolutionary potential of advances in the processing power provided by quantum computing, consider the development of the F-117 Nighthawk. The development of the aircraft was only possible due to advances in computing in simulating RCS (Radar Cross Section), a task far too complex to be undertaken by hand. The distinctive angular design of the F-117 is due to the computational limitations of the 1970s. [10] Even so, the F-117 was able to penetrate the most heavily defended airspace in the world during the Persian Gulf War of 1991, flying dozens of sorties over Baghdad. The introduction of stealth technology was seen at the time to be another aspect of the RMA described previously – in direct support of this, stealth has been adopted as an essential aspect of fifth-generation and sixth-generation military aircraft.[11]

[9] "What is quantum computing?" IBM, accessed 16 April 2024, https://www.ibm.com/topics/quantum-computing.
[10] Ben R. Rich, *Skunk Works: A Personal Memoir of My Years of Lockheed* (London, UK: Hachette UK, 2013).
[11] Kevin J. Kennedy, "Stealth: A Revolutionary Change in Air Warfare," *Naval College Review* 46, no. 2 (1993).



Source: Multidimensional Systems and Signal Processing

For instance, quantum computing will have a profound impact on the field of cryptography. The unrivaled processing power and speed of quantum computers is almost certain to break existing cryptographic codes that protect national and global communication and data systems. This capability could redefine cyber warfare, allowing countries with quantum capabilities to decrypt secured communications, potentially leading to a significant shift in intelligence gathering and cybersecurity. In response to quantum threats, the development of quantum encryption methods, such as Quantum Key Distribution (QKD), offers a countermeasure that may be able to secure communications against even the most powerful quantum computers. [12] This in turn will prompt the developments of increased decryption capabilities, prompting increased encryption, etc. This

[12] "Quantum Key Distribution (QKD) and Quantum Cryptography (QC)," NSA, accessed 16 April 2024, https://www.nsa.gov/Cybersecurity/Quantum-Key-Distribution-QKD-and-Quantum-Cryptography-QC/.

cyclical nature of innovation and counter-innovation is a constant in cryptography throughout the ages; quantum computing is almost certain to increase the speed at which this is happening.

Quantum computing is also likely to significantly enhance the capabilities of industries that rely on complex calculations and optimizations, such as pharmaceuticals, finance, and logistics. Countries leading in quantum technology could gain a competitive edge in these sectors, influencing global economic dynamics. Quantum simulations could lead to the discovery of new materials and processes that enhance the performance of infrastructure and machinery, with profound impacts on aerospace, manufacturing, and energy production. Research at MIT has suggested that quantum computing has the potential to accelerate the process of generating fusion energy devices. [13]

Conclusion

The Tech Cold War represents an end of the brief period of American hegemony over the world stage coinciding with the rise of China as an independent, alternative pole to American liberal democracy and the international rules-based order that has dictated international relations since the end of the Second World War. While reminiscent of the 20th-century ideological and technological confrontations of the Cold War, the modern Tech Cold War is distinctly defined by the strategic imperatives of technological supremacy, fundamentally influencing international relations and the structure of global power. This ongoing competition necessitates robust engagement in technological innovation and policy making to navigate and shape the emerging global order.

[13] Plasma Science and Fusion Center, "A new mathematical "blueprint" is accelerating fusion device development," MIT News, 22 June 2023, https://news.mit.edu/2023/mathematical-blueprint-accelerating-fusion-device-development-0622.