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CHINA'S POLAR SILK ROAD: A Stepping Stone to Space

By **Colonel John Campbell**, **Lieutenant Colonel Emmaline Hill**, **Lieutenant Colonel Eric Medina**, **Dr. José de Arimatéia da Cruz**, and **Dr. Michele Devlin**

I. Introduction

Exploration has been a defining human activity since ancient times. Throughout history, tales of humans discovering and claiming new frontiers have driven progress. Today, as the earth's surface becomes more thoroughly mapped and inhabited, few areas remain truly unexplored or unconquered. The remaining frontiers—such as the Arctic, Antarctica, and outer space—are mainly characterized by their isolated, contained, and extreme (ICE) conditions. Rapid technological progress has made these once-inaccessible regions reachable. As countries extend their interests into ICE zones, the fundamental human drive to explore, control, and dominate continues to shape global geopolitics.

The Chinese Communist Party (CCP) is exploring international ICE regions. Since sovereignty over ICE areas is unclear and such areas are governed by ambiguous international norms, ICE zones are inherently volatile, uncertain, complex, and ambiguous. The Chinese Communist Party leverages ICE environments by operating in gray zones, subtly pushing boundaries without provoking direct responses, thus preventing competition from escalating to a crisis or conflict with the United States. This strategy aligns with the fifth-century military principle Sun Tzu described in *The Art of War*: "[T]he skillful leader subdues the enemy's troops without any fighting."[1]

The Chinese Communist Party's military philosophy of active defense underpins its three-warfare strategy, which comprises psychological warfare, public-opinion warfare, and legal warfare. These three forms of warfare are key components of the party's nonkinetic tool kit. The Chinese Communist Party's active-defense philosophy enables it to conduct effective operations in the gray zone and reinforces the volatile, uncertain, complex, and ambiguous nature of gray-zone environments. The three-warfare strategy allows the Chinese Communist Party to maneuver comfortably along the competition continuum, staying below the threshold of conflict. This strategy also enables the party to leverage instruments of national power and compete both internationally and domestically. The following examples illustrate how the Chinese Communist Party leverages psychological, public-opinion, and legal warfare in the polar and space domains.

The Chinese Communist Party uses psychological tactics such as influencing perceptions, fostering doubt, and deterring rivals from making bold moves. In space, the party applies pressure to US and allied systems by placing satellites nearby, demonstrating its ability to disrupt operations without resorting to direct conflict. In the polar regions, the Chinese Communist Party dispatches research vessels and icebreakers like the *Xue Long* near Arctic choke points and areas governed

1 Sun Tzu, *The Art of War*, trans. Lionel Giles (Luzac and Company, 1910).

by NATO members, signaling its intentions and capabilities. Meanwhile, the party subtly pressures Arctic nations to accept China's Arctic presence as a fait accompli.

The Chinese Communist Party shapes both global and domestic narratives to justify its actions and question the legitimacy of its rivals. The party asserts its space program—including the China National Space Administration and the Tiangong space stations—is a purely peaceful, scientific endeavor while downplaying the program's military capabilities. This approach reduces criticism and contrasts China with the United States, which is viewed as a militarizing force in space. Additionally, the Chinese Communist Party coined the term "near-Arctic state" to bolster its activities in the Arctic, even though China has no territorial claims in the region. China frames its Arctic pursuits as scientific, environmental, and cooperative.

In the realm of legal warfare, the Chinese Communist Party manipulates legal ambiguities, reinterprets international law, and establishes new norms to justify its actions and suppress opposition. The party advocates a selective reading of the Outer Space Treaty, claiming to oppose the weaponization of space while secretly developing dual-use technologies that could enable China to achieve space dominance without violating the treaty. Additionally, China uses its observer status in the Arctic Council—which does not require China to assume the same obligations as Arctic nations—to sway rulemaking processes and promote policies aligned with its national interests.

In early April 2025, the Fram2 space mission demonstrated how the Chinese Communist Party develops links between ICE areas. Fram2 showcased how China is developing a strategic connection between the polar and space domains, inspired by the legacy of the Norwegian vessel *Fram*. The mission was supported by Chinese entrepreneur Chun Wang who, starting in 2013, accumulated wealth via f2pool, a major Bitcoin-mining pool in China. Fram2 underscores the rising impact of private capital and international stakeholders on the polar-space nexus.

The crewmembers' varied backgrounds highlight the multidisciplinary skills essential to operating in extreme environments. Norwegian filmmaker Jannicke Mikkelsen is known for her work in challenging maritime and Arctic conditions; Rabea Rogge is a German expert in robotics and polar engineering; and Australian polar explorer Eric Philips (who served as the flight medical officer) has experience leading polar expeditions. In five days, the Fram2 mission carried out more than 22 scientific experiments in the earth's polar regions. This research enhanced human knowledge of these crucial frontiers and highlighted the importance of continuous, integrated exploration.

Through its polar activities, China aims to promote its national interests by challenging the rules-based international order. China also aims to recover from the century of humiliation by reclaiming what it perceives to be its rightful position in the international order. But these actions directly threaten the US national interests detailed in the 2022 National Security Strategy: safeguarding American security, enhancing economic prosperity and opportunities, and maintaining democratic values central to the American way of life.

To remain competitive with China, the United States employs its diplomatic, informational, military, and economic (DIME) instruments of national power to address the opportunities and challenges in contested areas.

So far, the United States' efforts to rival the Chinese Communist Party in the ICE commons have been insufficient, mainly due to gaps in the traditional DIME framework, which the Chinese Communist Party exploits through its three-warfare strategy. This monograph proposes a new framework for strategic leaders to use across domains. This approach will allow leaders to operate effectively by tailoring their strategic tools in four key areas: the distinct global commons, operational postures, legal regimes, and developmental investments. By implementing the approach proposed in this monograph, the United States can develop strategies for effective competition and deterrence within contested ICE environments, while minimizing the risk of turning great-power rivalries into crises or conflicts.

II. The Commons, Operations, Lawfare, and Development Framework

China's strategy for engaging with the global commons has become complex and multilayered, aimed at advancing China's national interests while allowing it to maintain legitimacy and control. The commons, operations, lawfare, and development (COLD) framework offers a structured approach to analyzing how the Chinese Communist Party pursues and expands its strategic objectives in three key commons: the Arctic, Antarctica, and outer space. These regions are geographically remote, environmentally challenging, and only loosely governed by international laws. Still, they present substantial opportunities

for resource extraction, scientific research, and geopolitical influence. Using the COLD framework to examine the Chinese Communist Party's use of gray-zone tactics, legal instruments, and economic strategies underscores Beijing's efforts to reshape governance and alter power relations along contested frontiers and in ICE environments. This overview addresses the four pillars of the COLD framework (see figure 1), exploring the Chinese Communist Party's motivations, tactics, and long-term strategic goals, as well as the implications of its growing presence in the global commons.

Figure 1: The COLD framework

C.O.L.D.

A framework that describes China's actions in the unique commons connecting the Arctic, Antarctica, and space in a continuum where China is iterating and refining techniques and strategies to achieve national interest in ICE environments. In this continuum, DIME is insufficient to counteract and deter China's revisionist strategy to replace the US in the global hierarchy. This framework helps identify trends to allow strategic leaders to develop policies which target and deter China's maligned behavior and fait accompli strategy.

	ARCTIC	ANTARCTICA	SPACE	OVERLAPPING CONTINUUM TRENDS
Commons: "Where" they're doIng it Physical domains charactertzed as ICE environments (Isolated, Contained, Extreme), shared by all humanity with resources that are collectively managed and utilized by all nations.	▸ Body of water surrounded by 8 Arctic States ▸ Increasing Access: Northwest Passage and Northern Sea Route are more accessible ▸ Melting Ice: 3x faster than any other region exposing minerals and resources ▸ 10% of World Fresh Water ▸ 13% of World Oil ▸ 30% of Worlds Natural Gas	▸ Continent covered by an ice shield, surrounded by an ocean ▸ Preservation for science and peaceful cooperation ▸ 'Frozen' territorial claims ▸ 72% of world's fresh water ▸ 500 billion tons of Oil ▸ 300-500B tons Natural Gas on the continent; 135B Tons in the Southern Ocean	▸ Accessed by states with advanced technology ▸ Shared space resources ▸ Sustainability issues ▸ Space weather impacts	▸ Disputes and overlapping territorial claims ▸ Untapped resource availability ▸ Increasing access/opportunities ▸ Global security rising concerns ▸ International cooperation driven by science, technology, and preservation of resources
Operations: "What" they're doIng Activities characterized by ICAD tactics (Illegal, Coercive, Aggressive, and Deceptive) and ambiguity that enable China to compete and exploit without triggering a direct military response.	▸ Increasing Competition: Resources, access, and influence in institutions ▸ Building a fleet of ice breaker ships ▸ Dual-use scientific access ▸ Tourism as access and recon ▸ Acquiring educational property ▸ Information warfare focused at indigenous populations ▸ Military operations alongside Russia	▸ Increased Competition: overlapping territorial claims ▸ Dual use facilities, logistics infrastructure, geospatial mapping ▸ Dual use scientific research (space based) ▸ Resources (energy, mining, fishing) ▸ "Perception Operations"/ Info Operations ▸ Naval force provides access and power projection	▸ Space Competition: Rings ▸ Military operations in space ▸ Dual-use technologies ▸ Space situational awareness ▸ Counterspace capabilities	▸ Gray Zone (US) vs Red lines (China) ▸ Increased competition ▸ International information narrative focus on decoupling of aligned states ▸ Dual-use capabilities ▸ Acquiring intellectual property ▸ Tourism as an intelligence source ▸ Development of capabllltles: icebreaker fleet ▸ Information warfare with indigenous populations
Lawfare: "What" they're doIng Strategic use or misuse of international governing institutions, rules, and norms to achieve strategic objectives or alter the status quo.	▸ Claims as a "Near Arctic State" ▸ Manipulating UNCLOS ▸ Messaging of 2018 China Polar Strategy ▸ Influence in Arctic Council	▸ Noncompliance with ATS inspections and information sharing ▸ Exploits legal ambiguities to block establishing new maritime conservation areas ▸ Consultative party (voting member) of the ATS, ineffective governance due to consensus-based decision making	▸ International legal frameworks ▸ Norm shaping ▸ Exploitation of legal ambiguities ▸ Weaponization vs Militarization debate	▸ Region of international laws to support interests and objectives ▸ Participates in global governance institutions but exploits ambiguities; where interests don't align with global norms, works with Russia to shape to its benefit ▸ Messaging transitioned to policy ▸ Currently unchecked actions; accountability
Development "Why" they're doing it Competitive advantage aimed at promoting economic growth, resource access (Static/ Mobile), infrastructure improvement, governance, and societal well-being to achieve China's interests.	▸ Static: Oil, Gas, Minerals ▸ Mobile: fisheries ▸ Economic: Access, basing, overflight ▸ Developing and influencing shipping routes	▸ Static: Natural resources (minerals, natural gas, fresh water, logistics infrastructure) ▸ Legitimacy as a great power to participate in and shape the rules-based international order ▸ Mobile: fisheries, tourism ▸ Influencing shipping routes	▸ Space infrastructure ▸ Belt and Road Space Initiative ▸ Commercial ventures ▸ Technological advancements	▸ Exploitation of static and mobile resources ▸ Development of pathway to territorial claims ▸ Economic exploitation of other states: access, basing, overflight ▸ Domestic Information Narrative

Master Sergeant Charles Workman, a 130th Airlift Wing electro/environmental systems specialist, walks toward an LC-130 in Antarctica during a five-week temporary duty assignment. (Courtesy photo by Captain Holli Nelson)

III. The Commons Defined

The term "commons" describes global domains—on land, at sea, in polar zones, or beyond the earth's immediate vicinity—that are characterized by ICE conditions. The commons present access and governance challenges because of their remoteness and harsh environments, and because regulations are only weakly enforced in such regions. Whereas an international consensus maintains these areas belong to all humanity, the Chinese Communist Party sees them as opportunities: sites at which to acquire resources, enhance scientific capabilities, and increase geopolitical influence.[2]

The CCP approach involves widespread engagement across multiple areas rather than a focus on a single area. Beijing works to establish influence in various domains chosen for their potential to enhance the country's economy and strengthen the Chinese Communist Party's reputation. By gaining footholds in remote regions, China receives access to new energy and mineral resources, while also demonstrating the technological and infrastructural capabilities that reinforce its great-power ambitions. Because international governance in the commons is frequently fragmented or outdated, the Chinese Communist Party can subtly expand and reinterpret existing norms to justify its activities.

The commons aspect of the COLD framework highlights the strategic mindset guiding the Chinese Communist Party's outward expansion. By targeting less contested or ambiguous areas, the Chinese Communist Party presents itself as a responsible actor within the common-heritage narrative, gradually accruing economic and political benefits that enhance its international reputation and reinforce its internal narrative of national rejuvenation.

IV. Operations Defined

The operations aspect of the COLD framework assesses how the Chinese Communist Party uses gray-zone tactics—illegal, coercive, aggressive, and deceptive (ICAD) actions designed to stay just below the level of traditional military conflict. These tactics allow Beijing to advance its territorial, economic, and security objectives without triggering a full-scale crisis that could provoke significant international opposition or unite potential opponents.[3]

Gray-zone operations usually involve gradual expansions, the creation of dual-use infrastructure, and intelligence activities disguised as peacekeeping or scientific research. By maintaining a seemingly nonthreatening attitude, the Chinese Communist

2 Michele Devlin, "Guerrillas in the Glaciers: Environmental Grey Zone Tactics in the Polar Regions" (oral presentation, US Army War College, Carlisle, PA, December 12, 2024).
3 Devlin, "Guerrillas in the Glaciers."

Party can set the stage for greater control or resource access in the future. Through these subtle, ongoing strategies, the Chinese Communist Party demonstrates its capabilities to both domestic and international audiences, shaping narratives and operating as part of public opinion and psychological warfare under the three-warfare strategy. Domestically, the party's narratives highlight its vigilance and assertiveness in safeguarding Chinese interests; internationally, they test the boundaries and responses of other parties, allowing the Chinese Communist Party to refine its tactics while avoiding direct conflict.

This approach is not haphazard. It reflects a deliberate strategy that combines historical lessons, contemporary power dynamics, and a deep understanding of the gaps in knowledge of these lessons and dynamics. Operating in ambiguous zones, the Chinese Communist Party increases its influence on international law enforcement by acquiring valuable data, infrastructure, and leverage while minimizing external condemnation and the risk of rapid escalation.

V. Lawfare Defined

Lawfare represents the third pillar of the COLD framework, highlighting how the Chinese Communist Party uses international institutions to legitimize its actions and sway legal and normative systems. The Chinese Communist Party engages or collaborates with global governance entities, leveraging its growing economic and diplomatic influence to impact agendas, interpret treaties, and amend regulations.

The Chinese Communist Party understands its formal membership and participation in international organizations give the party a sense of legitimacy. By emphasizing activities like scientific research, humanitarian aid, and peaceful development, the Chinese Communist Party aims to divert criticism that suggests its expansion is motivated by self-interest or hostility. Moreover, through continuous engagement, Beijing aims to influence international standards in a manner that supports its actions, while publicly maintaining compliance with current rules. This approach reflects a long-term strategic plan to ensure any future tightening of regulations or new governance frameworks will benefit the Chinese Communist Party's main interests.

Beijing's subtle legal influence supports its broader strategic aims. By presenting itself as a proponent of multilateral cooperation and win-win outcomes, the Chinese Communist Party counters criticism and builds alliances, notably with developing nations. Allied support is a vital component of the party's efforts to avoid unified opposition from rivals. Essentially, lawfare allows the Chinese Communist Party to appear compliant while slowly shaping the legal environment to align with its long-term goals, whether those goals relate to resource extraction, exclusive access, or geopolitical influence.

VI. Development Defined

The development pillar emphasizes the Chinese Communist Party's focus on the economic and infrastructural aspects of extending into the global commons to provide public goods worldwide. The party's approach extends beyond purely commercial initiatives, often involving dual-use projects in which civilian infrastructure also supports security or strategic objectives. Heavy investments in infrastructure such as ports, research facilities, and communication networks help the Chinese Communist Party build lasting positions it can later adapt to enhance its military influence or political power.

Economic-development initiatives that occur under the banner of large-scale programs (for example, the Belt and Road Initiative and the Polar Silk Road) carry significant diplomatic weight. This fact is a central aspect of the development pillar. Host countries or international partners may welcome influxes of capital, technology, and expertise, thereby granting the Chinese Communist Party expansive operational freedom. At the same time, these projects become conduits for Beijing to embed its technical standards, supply chains, and political narratives across critical choke points and future strategic hot spots.

Development fuels the Chinese Communist Party's growth, helps it keep its promise of continued domestic prosperity, and demonstrates to the world the Chinese Communist Party is no longer merely a participant in global affairs; rather, the party is a primary architect of its own future. Critically, any infrastructure or technology installed under civilian auspices can pivot to national security applications as needed, ensuring the party's overarching strategic interests remain protected.

VII. Summary of the COLD Framework

In sum, the COLD framework offers a cohesive perspective on how the Chinese Communist Party navigates and shapes contested global commons to serve its long-term goals. Each pillar clarifies a different dimension of Beijing's strategy.

- Commons: Exploiting the remoteness, weak governance, and resource potential of ICE domains to bolster China's economy and global standing.[4] From a security standpoint, the main priority is to protect China's ability to access and use these domains for both commercial and military activities.[5]
- Operations: Deploying gray-zone tactics and dual-use (military and either scientific or commercial) projects that are characterized by ICAD actions and expand influence without inciting outright conflict.
- Lawfare: Participating in and molding legal frameworks and institutions to legitimize and entrench CCP interests and status.
- Development: Using strategic infrastructure and technological investments to integrate civilian and military aims and ensure enduring influence and capabilities.

The Chinese Communist Party's commitment to maximizing economic returns, solidifying the party's domestic grip, elevating its international profile, and setting the stage for future dominance is woven through each element of the COLD framework. By emphasizing continuity and incremental expansion, Beijing positions itself as a decisive actor in domains once viewed as too remote or strictly cooperative to pursue unilaterally. Therefore, an understanding of the COLD framework is essential for policymakers, scholars, and strategists who seek to anticipate the Chinese Communist Party's next moves and craft balanced, effective responses.

VIII. The ICE Commons Continuum: The Arctic, Antarctica, and Space

The Arctic Through the COLD Lens

The United States is an Arctic state because the northern third of Alaska lies within the Arctic region. In October 2022, the United States published the National Strategy for the Arctic Region, which lays out four pillars for the advancement of US interests and seeks a peaceful, stable, prosperous, and cooperative Arctic. The strategy's four pillars comprise deterring threats through security and enhanced capabilities to defend US interests; reducing climate change and protecting the environment, with a focus on the impacts of Arctic weather; pursuing sustainable economic development, including investments in infrastructure and access to services, to support Alaska Native communities, allies, and partners; and conducting international cooperation and governance as a means for institutions to manage increased activity and uphold international law. In addition to the 2022 national strategy, the US Department of Defense published the 2024 Arctic Strategy, which aligns with the national strategy and addresses the geophysical and geopolitical changes occurring in the region. The document highlights a directed, monitor-and-respond approach to the Arctic, which includes a robust intelligence-collection capability, security cooperation with allies and partners, and deterrence through the Joint Force and its ability to deploy rapidly to any location at any time. The monitor-and-respond approach places the national interest in the Arctic on the periphery. But the United States' most consequential challenge will be managing the growing competition with multiple adversaries over access to and resources in the Arctic global commons.

In January 2018, the People's Republic of China published its Arctic strategy. In its strategy, China outlines the Arctic's "gaining global significance" and defines itself as a "Near-Arctic State."[6] China outlines four Arctic goals: (1) to understand the region and create favorable conditions for mankind to improve its regional protection, development, and governance; (2) to protect the natural environment and ecological system; (3) to develop the capability and capacity to use resources and shipping routes for economic and social development; and (4) to participate in the governance of the region, including by regulating and managing Arctic affairs and activities.[7] In addition to these four goals, China's four principles of Arctic affairs are respect, cooperation, win-

4 Devlin, "Guerrillas in the Glaciers."
5 Gerald Stang, *Global Commons: Between Cooperation and Competition*, Brief No. 17 (European Union Institute for Security Studies, April 2013).
6 State Council Information Office of the People's Republic of China, "China's Arctic Policy" (white paper, State Council Information Office of the People's Republic of China, January 26, 2018).
7 State Council Information Office of the People's Republic of China, "China's Arctic Policy."

win results, and sustainability.[8] Woven throughout China's goals and principles is its ambition to develop resources to pursue its own interests. China clearly states its desire to pursue oil and gas drilling and exploitation, as well as develop renewable energy in the Arctic. China also states its ambition to use Arctic resources rationally, develop shipping routes, emplace submarine fiber-optic cables, use Arctic fisheries, conduct scientific expeditions, and lead the creation, interpretation, and application of international rules and laws in the Arctic. China clearly intends to extract resources and encourages other nations to do the same, while taking the lead in establishing and safeguarding laws that would change the current regional norms. Understanding the stated strategies of China and the United States, this monograph uses the COLD framework to evaluate the challenges the Arctic faces. The DIME framework does not completely capture how China is leveraging its national instruments of power to pursue its interests and achieve its policy objectives.

IX. Arctic Commons

The Arctic commons is the physical domain that is characterized as an ICE environment, shared by all humanity, and composed of resources that are collectively managed and used by all nations. The Arctic landscape is extreme, diverse, and changeable, which makes defining the Arctic frontier challenging. The Arctic is the northernmost region of the world and is defined as the area within the Arctic Circle, at a latitude of N 66˚33'.[9] At this latitude, each year at least 24 hours pass in which the sun does not rise or set. The region's latitude is its simplest identifying characteristic. Whereas a latitudinal definition does not account for the diversity that characterizes the changing, extreme conditions of weather, terrain, humanity, and plant and animal life, it does provide a useful benchmark for the region.[10] The Arctic is a body of water that is surrounded by eight nations, including Russia, Canada, the United States, Iceland, Norway, Sweden, Finland, and Denmark (including the Danish territory of Greenland). More than four million people are contained within the Arctic's boundaries. This region is becoming more accessible to commerce and trade because Arctic ice is melting three times faster than in any other region, leading to the opening of the Northeast and Northwest Passages. Whereas the figure is debated, the Arctic is believed to contain more than $35 trillion of untapped oil and natural gas, consisting of approximately 90 billion barrels of oil, 1,700 trillion cubic feet of natural gas, and 44 billion barrels of liquid natural gas. The Arctic also holds precious minerals and biological resources, including fisheries.[11] The Arctic contains 20 percent of the world's fresh water, 13 percent of the world's oil, and 30 percent of the world's natural gas.[12] The Arctic has abundant resources and attracts the interest of many Arctic and non-Arctic states.

X. Arctic Operations

In the Arctic, the Chinese Communist Party conducts activities characterized by ICAD tactics under the threshold of violence. These ambiguous actions—aimed at resources, access, and influence over institutions in the Arctic commons—enable the Chinese Communist Party to compete in and exploit the Arctic without triggering a direct military response. Whereas the United States has one operational icebreaker, the Chinese Communist Party has four, comprising the *Xue Long* (Snow Dragon), acquired in 1993; the *Xue Long 2*, domestically built and commissioned in 2019; the *Ji Di* (Polar), which became operational in June 2024; and the *Tan Suo San Hao* (Discovery 3), a Polar Class 4 icebreaker that is expected to be operational in 2025.[13] The Chinese Communist Party is building the capability to operate in the polar regions year-round, using dual-purpose scientific operations and tourism as a means of access and reconnaissance. Chinese visitors make up a significant portion of the tourist business within the Arctic, and the number of Chinese tourists is growing exponentially each year. More than one million Chinese tourists visited the Nordic countries in 2018, up 212 percent in Sweden, 120 percent in Denmark, and 77 percent in Finland from 2017 to 2018.[14] Additionally, the Chinese Communist Party has conducted combined Arctic patrols with Russia and has invested in Russia's Arctic Liquefied Natural Gas 2 project, strengthening the

8 State Council Information Office of the People's Republic of China, "China's Arctic Policy."
9 Ryan Patrick Burke, *The Polar Pivot: Great Power Competition in the Arctic and Antarctica* (Lynne Rienner Publishers, 2022), 5.
10 Burke, *Polar Pivot*, 5.
11 Burke, *Polar Pivot*, 7.
12 Burke, *Polar Pivot*, 7.
13 "Video: China Unveils Its Fourth Research Icebreaker," *The Maritime Executive*, December 31, 2023, https://maritime-executive.com/article/the CCP-unveils-its-fourth-research-icebreaker.
14 Yunhao Zheng et al., "Chinese Tourists in Nordic Countries: An Analysis of Spatio-Temporal Behavior Using Geo-Located Travel Blog Data," *Computers, Environment and Urban Systems* 85 (2021): 101561.

The Coast Guard Cutter *Polar Sea* (WAGB 11) off the Ross Ice Shelf, Antarctica. (Photo by US Coast Guard)

two countries' military and energy relationship.[15] Last, the Chinese Communist Party has sought opportunities to influence indigenous populations through economic investments, aiming to align with indigenous cultures.[16] The party also uses scientific collaborations with indigenous communities and academic institutions to improve its regional insights and access.

XI. Arctic Lawfare

As outlined in its 2018 Polar Silk Road strategy, China seeks to exploit or subvert international governing institutions, rules, and norms to advance its strategic objectives or alter the status quo. Arctic governance involves a combination of international agreements, national laws, norms, and cooperation among Arctic and non-Arctic states. Key agreements, laws, and forums for cooperation include the Arctic Council, the UN Convention on the Law of the Sea, the International Code for Ships Operating in Polar Waters (Polar Code), and the Svalbard Treaty of 1920. The Arctic Council is a key forum for cooperation, coordination, and interaction among Arctic states. The Arctic Council consists of eight member states that reside within the Arctic (Russia, Canada, the United States, Finland, Iceland, Norway, Sweden, and Denmark [including the Danish territory of Greenland]) and six permanent participants (indigenous organizations such as the Inuit Circumpolar Council and the Saami Council). Whereas the Arctic Council focuses on environmental protection, sustainable development, and scientific research, the council does not address security or defense in its charter, nor does it address malign activity, deterrence, or accountability for bad actors. Recently, the dynamics of the Arctic Council have changed. The Russia-Ukraine War has limited Russia's participation, and in 2023 and 2024, respectively, both Finland and Sweden joined NATO, leaving the Arctic Council with seven NATO members and Russia. In addition, China declared itself a near-Arctic state in 2018, with the intent to help shape and interpret Arctic laws and norms.

XII. Arctic Development

Development is the reason the Chinese Communist Party is acting in the Arctic. To advance CCP interests, China aims to gain a competitive advantage and promote economic growth, access to static and mobile resources, infrastructural improvements, governance, and societal well-being. As stated in its 2018 Polar Silk Road strategy, China is looking to carry

15 Malte Humpert, "Final Chinese Module Arrives at Russian Arctic LNG 2 Plant, As U.S. Snoozes on Sanctions Action," gCaptain, November 12, 2024, https://gcaptain.com/final-chinese-module-arrives-at-russian-arctic-lng-2-plant-as-u-s-snoozes-on-sanctions-action/.

16 Erin Marie Parsons, *Relations on Thin Ice: A Narrative Analysis of Chinese Governance in the Arctic*, CIDOB 14 (Barcelona Centre for International Affairs, June 2022).

out the responsible mining of strategic resources such as oil, natural gas, and rare earth minerals, and to continue pursuing mobile resources like fish and krill.[17] The Chinese Communist Party is also seeking to maintain its influence over access, basing, and shipping routes, which provides an economic advantage. The Chinese Communist Party is looking toward the Arctic for opportunities to increase its limited resources, boost economic growth, and exert long-term influence over the region's governance. China is implementing its 2018 Polar Silk Road strategy and gaining the capability to operate in the Arctic and influence international systems, norms, and people. The United States must understand what opportunities are present in the Arctic and prevent China from disrupting this peaceful, stable, cooperative, and prosperous region.

XIII. Antarctica Through the COLD Lens

Geographically, within the United States' regional security architecture, Antarctica solidifies the southern boundary of the United States Indo-Pacific Command area of operations. Geopolitically, the Antarctic Treaty (AT) emerged during the Cold War with the primary goals of containing tensions between the United States and the Soviet Union and addressing the overlapping territorial claims of the seven Antarctic nations. Beginning in the early 1950s, a network of hub-and-spoke defense agreements, combined with the AT, enabled US forces in the Indo-Pacific region to maintain strategic control over critical maritime routes leading to the Arctic, Indian, and Southern Oceans. Whereas the hub-and-spoke defense strategy has not changed much over time, in the decades since the AT's inception, the number of participating nations has increased from 12 to almost 60, with about 80 research stations spanning the ICE continent.[18] Themes of naval dominance, power projection, and power expansion are as relevant in Antarctica today as they were in 1950. But instead of the United States driving bipolar, frozen competition to contain communism, multipolar great-power competition is occurring in Antarctica through the lens of China's Polar Silk Road.[19]

The United States published a national security memorandum in 2024, establishing Antarctic strategic guidance with the following objectives:

> ***(1) to protect the relatively unspoiled environment of the Antarctic Region and its associated ecosystems; (2) to preserve and pursue unique opportunities for scientific research and understand the Antarctic Region's relationship to global environmental changes; (3) to maintain the Antarctic Region as an area of international cooperation reserved exclusively for peaceful purposes; and (4) to assure the protection and conservation of the living resources in and ecosystems of the Antarctic Region.***[20]

This US policy reaffirms the nation's commitment to maintaining and upholding the established Antarctic Treaty System (ATS) mechanisms that govern human activity in Antarctica and protect the continent's natural resources.

Through the National Science Foundation, the Department of State manages the US Antarctic Program (including the program's budget, logistics, and operations). Additionally, in carrying out its mandate to conduct scientific research on the coldest, windiest, and driest continent on earth, the Department of State coordinates with the Department of War and other agencies as needed. The United States maintains three research stations in Antarctica: McMurdo Station, Amundsen-Scott South Pole Station, and Palmer Station. United States Indo-Pacific Command maintains the Joint Task Force-Support Forces Antarctica: a skeleton capability that contributes to large-scale Joint and global exercises and conducts operational planning. The AT allows for the peaceful use of military capabilities to support scientific efforts in Antarctica. Accordingly, the Department of War provides annual logistical support to the US Antarctic Program via ski-enabled LC-130 cargo aircraft and airmen from the New York Air National Guard. Additionally, the US Coast Guard provides a national maritime presence in Antarctica through its one heavy icebreaker: the US Coast Guard Cutter *Polar Star*, which is homeported in Seattle, Washington. Strategic capabilities are critical in achieving access to and maintaining a presence in Antarctica, and as US assets age and the nation prioritizes preserving longevity over taking risks, China continues to shift focus and money toward its Polar Silk Road.[21]

17 Parsons, *Relations on Thin Ice*.

18 Klaus Saalbach, "The Geopolitics of Antarctica" (working paper, Universität Osnabrück, Osnabrück, DE, February 2024), https://osnadocs.ub.uni-osnabrueck.de/bitstream/ds-2024021610690/1/Geopolitics_Antarctica_2024_Saalbach.pdf.

19 Anne-Marie Brady, *China's Expanding Antarctic Interests: Implications for New Zealand*, Policy Brief no. 2 (University of Canterbury, June 2017), 20.

20 Joseph R. Biden Jr., memorandum, "National Security Memorandum on United States Policy on the Antarctic Region," May 17, 2024, Washington, DC.

21 Christopher Ford, interview by the authors, February 13, 2025.

China's engagement in Antarctica has expanded considerably since it ratified the AT in 1983 and obtained consultative status in 1985, raising concerns about the potential strategic consequences of China conducting activities alongside other nuclear powers that use Antarctic bases to house offensive weapon systems. Observers warn China's efforts could undermine the long-standing peace in both the Indo-Pacific region and Antarctica. Meanwhile, China has reinforced its Antarctic presence by building multiple research stations: Great Wall Station (1985), Zhongshan Station (1989), Kunlun Station (2009), Taishan Camp (2014), and, most recently, Qinling Station (2024). China has employed its dual-use military to support the construction of these sites and continues to provide logistical support via People's Liberation Army sea, air, and land capabilities. In tandem with expanding infrastructure and logistical networks on the southernmost continent, the Chinese Communist Party has conducted strategic communications and built narratives around its Antarctic activities, which have come under scrutiny. China's focus on public opinion and information shaping—which is encapsulated in the three-warfare concept—highlights the complex motives that drive Beijing's engagement in Antarctica, ranging from security to resource extraction and scientific development.

China's national interests in Antarctica are multifaceted and are obscured by its three-warfare concept, in which the Chinese Communist Party curates a single message for its domestic audience and adjusts the narrative to shape international opinion. For example, the Chinese Xinhua News Agency quoted President Xi Jinping during his 2014 visit to Australia: "The Chinese side stands ready to continuously work with Australia and the international community to better understand, protect, and exploit the Antarctic."[22] In comparison, the Chinese Communist Party's English-language newspaper quoted Xi as follows: "to better understand, protect, and explore the Antarctic."[23] As the view of the Chinese Communist Party's strategic Antarctic interests sharpens, the frame of public-opinion warfare compounds the People's Liberation Army's dual-use, civilian-military mandate. The following quotation lists CCP strategic interests in order of priority: "[1] Security (Traditional and Non-traditional): China has economic, political, and military interests in the polar regions. [2] Resources: China wants access to Arctic and Antarctic minerals and hydrocarbons, fishing, tourism, transport routes, water, and bioprospecting. [3] Science and Technology: Access to the polar regions is essential for the rollout of the BeiDou navigational system, China's space science program, and accurate weather forecasting in China."[24] Collectively, these intertwined security, resource, and technological interests—which are amplified by the Chinese Communist Party's careful curation of domestic and international narratives—underscore the strategic depth and complexity of China's Antarctic ambitions.

As the Chinese Communist Party's interests in security, resources, and science converge with its carefully managed public narrative, the founding of the Chinese National Antarctic Research Expedition (CHINARE) has provided an official framework through which China can justify and sustain its ambitions under the auspices of peaceful research. In line with accepted global norms and the status quo of international governing institutions and treaties, CHINARE was founded in 1984 with the official mission of advancing scientific knowledge, safeguarding the Antarctic environment, and ensuring the peaceful use of the region. As a great power, China is interested in using Antarctica as a strategic frontier through which to expand its influence, presence, and participation in the rules-based order. China also seeks to use Antarctica to help set the conditions for Chinese primacy in the strategic, commanding heights of space.

XIV. Antarctic Commons

Antarctica's status as a global commons is rooted in the ATS, which designates the continent for peaceful purposes and scientific research while precluding sovereign claims. The ATS includes the original AT from 1959, as well as a host of ensuing agreements and conventions aimed at conservation—most notably the Protocol on Environmental Protection to the Antarctic Treaty, signed in 1991.[25] The ATS establishes a legal framework for the region below 60º south (per Article VI of the AT), including the continent of Antarctica and the Southern Ocean. The AT's preamble underscores the fact Antarctica should remain dedicated to peaceful uses and untouched by international disputes. According to Article I, only peaceful activities are permitted, and any military measures are disallowed. Article II guarantees the ongoing freedom to conduct scientific research, and Article III mandates the results of such research be shared openly. Last, under Article IV, the

22 Dan Southerland, "Does China Want to Explore Antarctica, or Exploit Its Resources?," Radio Free Asia, November 30, 2017, https://www.rfa.org/english/commentaries/china-antarctica-11302017154333.html.

23 Southerland, "Explore Antarctica," 20.

24 Brady, *China's Expanding Antarctic Interests*, 20.

25 Saalbach, "Geopolitics of Antarctica."

treaty does not allow any nation to make new territorial claims or expand existing ones. Essentially, the territorial claims that predate the treaty are frozen, and though nations are not obligated to acknowledge the territorial claims of other nations, all nations have the right to make future claims (should the AT be modified to allow such claims). This unique legal arrangement underscores the contest over resources and the challenge of establishing control in an inherently ICE environment.[26]

Antarctica is rich in natural resources, yet these resources are physically and legally inaccessible due to treaty constraints, ice conditions, and a massive ice shelf. Global energy requirements and food-security concerns place limited Antarctic resources at the forefront of strategies by nations, governments, and political parties that are intent on remaining in power. Antarctic ice comprises 70 percent of the world's fresh water; the ocean surrounding Antarctica is rich in marine protein; the number of tourists visiting the continent annually exceeds the number of scientists; and no regime is in place to manage bioprospecting, ice harvesting, or wave, solar, and thermal power.

The landmass of Antarctica spans 14.2 million square kilometers, is covered by an ice shield, and is protected as the common heritage of mankind by the AT until the treaty ends in 2048. Additionally, the harsh climate and remoteness of Antarctica complicate traditional governance and offer a natural laboratory for testing operational strategies under conditions analogous to those encountered in space. Yet precisely this inhospitable environment, coupled with ambiguous legal frameworks, sets the stage for novel modes of engagement and competition, ushering in a distinct set of strategic considerations.

In this context, the absence of clear sovereignty in Antarctica enables unconventional forms of power projection and influence, as well as creating a legally fluid environment in which both state and nonstate actors can experiment with dual-use technologies and operational methods. This strategic latitude is further magnified by the interplay between resource ambitions and stringent environmental limitations: a dynamic that resonates with challenges observed in other contested arenas. As such, Antarctica has emerged as a focal point in understanding how evolving international norms, technological innovations, and environmental constraints converge, underscoring the region's growing importance in shaping contemporary strategic thought and practice.

XV. Antarctic Operations

The operational dimension of Antarctica is increasingly characterized by ICAD, dual-use activities that serve both scientific and strategic objectives. Scholars argue the most critical step a state can take toward securing an asymmetric advantage in the ICE commons is to position its research stations strategically.[27] For example, the Chinese Communist Party has developed a national Antarctic observation network, integrating land-based, airborne, sea-based, vessel-borne, ice-tethered, and seabed platforms to provide dynamic logistical support for its Antarctic expeditions and research. This network underpins CCP scientific endeavors through CHINARE and simultaneously furnishes a foundation for the party to assert territorial presence, regulate access, and consolidate authority.[28] The observation network includes infrastructure that potentially has both civilian-research and military applications, thereby epitomizing gray-zone tactics. Building upon these operational tactics, the Chinese Communist Party's Antarctic scientific agenda reveals how ostensibly peaceful research can be intertwined with strategic imperatives.

The Chinese Communist Party's scientific pursuits in Antarctica appear, on the surface, to focus on advancing atmospheric and upper-atmospheric research, ranging from solar wind–energy studies to investigations of auroral, polar-ionospheric, geomagnetic, and space-plasma phenomena. But these same endeavors also bolster broader CCP objectives in the ICE commons of space, particularly the party's defense- and military-related pursuits. In collaboration with Australia, CHINARE has conducted wide-ranging surveys, produced more than 400 maps, formally named more than 300 Antarctic locations, and collected more than 12,000 meteorite samples that contribute to the Chinese Communist Party's wider ambitions for deep-space exploration.[29] By enabling the Chinese Communist Party to map resources and terrain, these nominally benign scientific efforts offer the party substantial intelligence value and strategic insights into lunar mining and mineral and energy reserves located both in Antarctica and in its adjacent seabed and oceanic shelf. Such dual-purpose initiatives underscore

26 Pervaze A. Sheikh et al., *Antarctica: Overview of Geopolitical and Environmental Issues*, Congressional Research Service Report R46708 (Congressional Research Service, March 2021).

27 Sheikh et al., *Antarctica*.

28 Chen Liqi et al., "Overview of China's Antarctic Research Progress 1984–2016," *Advances in Polar Science* 28, no. 3 (September 2017): 152–53.

29 Chen Liqi et al., "China's Antarctic Research," 152.

the delicate balance between genuine scientific collaboration and covert power projection, foreshadowing more contentious strategic interactions across the Antarctic commons and beyond.

The Chinese Communist Party's ICAD tactics and dual-use strategy extend to its strong interest in exploiting Antarctic resources. Whereas the ATS promotes peaceful and orderly activities including free scientific research and personal exploration, managed fishing, and effectively unlimited tourism and bioprospecting, the system does not clearly distinguish between peaceful scientific ends and the kinds of research that might pave the way for resource extraction in the ICE commons. The Chinese Communist Party perceives the eventual opening of Antarctica's resource frontier as inevitable and frames this development as a boon for humankind. Chinese researchers estimate the Antarctic continent alone contains roughly 500 billion tons of oil and 300–500 billion tons of natural gas, with a further 135 billion tons of oil potentially being located in the Southern Ocean.[30] This expansive view of Antarctica's resource potential underscores the strategic weight China's claims carry and demands a reassessment of the ATS's capacity to uphold its principles amid mounting dual-use activities.

XVI. Antarctic Lawfare

Lawfare, the strategic use of legal frameworks to achieve political objectives, plays a significant role in Antarctic operations. The AT serves as the core of the ATS, outlining the legal framework for activities in Antarctica and ensuring all nations have the freedom to access and conduct research on the continent. Signed in 1959, the treaty currently includes 54 member states, though only some states—such as the United States, Australia, Russia, and China—are consultative parties entitled to take part in formal decision making. The treaty's preamble highlights the fact Antarctica must remain exclusively dedicated to peaceful undertakings and free from international contention. The treaty also voided any prior territorial claims, effectively positioning the continent as a shared domain for scientific investigation. Whereas the ATS ensures the continent remains dedicated to peaceful purposes, the system contains ambiguities nations can exploit to advance their interests (for example, the ambiguities in the ATS's consensus-based decision-making process). Scholarly analyses indicate lawfare in Antarctica involves leveraging the AT's language to justify dual-use activities and shape international norms of acceptable behavior in the global commons.[31]

By portraying infrastructural development and scientific research as contributions to the collective good, states can secure legitimacy while establishing strategic footholds: a dual strategy of legal compliance and normative disruption that remains central to maintaining influence in Antarctica and that informs tactics in domains such as space. China, like several other countries, capitalizes on Antarctica's unresolved sovereignty and legal ambiguities by installing space-tracking and ground-receiving stations for polar satellites—assets that would likely be unwelcome within the recognized, sovereign territories of other states. At the same time, the ability to pioneer achievements in polar science remains crucial for any state seeking greater influence over Antarctic governance meetings. Yet, as evidenced by its actions at meetings of the Commission for the Conservation of Antarctic Marine Living Resources from 2012 through 2015, China exploits ambiguities in the ATS's current consensus-based system of legal decision making by simply voting against proposed initiatives without offering counterevidence or alternative research. China employed this approach when it opposed the creation of new marine protected areas in Antarctica. Finally, the Chinese Communist Party has repeatedly excluded People's Liberation Army personnel—including their installation of the CCP BeiDou Navigation Satellite System in 2013–14—from the CCP Antarctic program's required annual reports to the AT. Ultimately, this interplay between scientific endeavors and strategic maneuvers underscores how the Chinese Communist Party uses a form of legal warfare to leverage international legal ambiguities in reshaping global norms from within existing institutions.

XVII. Antarctic Development

Development initiatives in Antarctica are a critical component of the broad CCP strategy to project power and expand influence in the ICE commons, setting the conditions for China to secure strategic resources and access to global markets. The Chinese Communist Party's essential interest is to remain in power in China, and the best way to achieve this objective is to be prosperous, healthy, and strong. Antarctica and the ICE-commons continuum are critical areas through which to achieve these goals. Through gray-zone ICAD tactics and lawfare, the Chinese Communist Party intends to exploit

30 Brady, *China's Expanding Antarctic Interests*, 20.
31 Sheikh et al., *Antarctica*.

Antarctica to gain access to energy sources and critical minerals, and to achieve food security by sourcing fresh water and marine protein. China also aims to use psychological warfare and influence public opinion, supporting the narrative that asserts China's great-power status (1) is rising due to China's salami-slicing methods of gaining positional power and (2) is a basis for China's Antarctic territorial claims.

Technological innovations developed for use in Antarctica, such as advanced remote sensing and resilient communication systems, are directly applicable to space operations. The capacity to sustain operations in an isolated, inhospitable environment provides valuable insights into ways of overcoming similar challenges in extraterrestrial settings. Development initiatives both expand operational capabilities and contribute to the goal of using strategic expansion to reshape the balance of power in the global commons. China's multifaceted approach to Antarctica, encompassing operational experimentation, legal maneuvering, and strategic development, has significant implications for US national security. As states learn to exploit the unique features of the Antarctic environment, the lessons derived from these activities will likely inform broader strategies, including those targeting the space domain.

For US policymakers, the challenge lies in developing countermeasures that address China's nuanced blend of gray-zone operations and lawfare tactics. Strengthening international legal regimes, enhancing dual-use technological development, and improving surveillance and intelligence in the global commons are critical steps toward mitigating the strategic risks posed by China's activities. As the dynamics of influence in Antarctica continue to evolve, so must the policies designed to safeguard US strategic interests and preserve the stability of the international order.

XVIII. Outer Space Through the COLD Lens

Space Commons

The Chinese Communist Party does not merely characterize space as another theater of operations; the party fundamentally views space as inextricably linked to its overall military power, economic strength, and technological advancement. The Chinese Communist Party emphasizes the fact control in space directly translates to influence and control on earth, highlighting the strategic importance of the space domain. The Chinese Communist Party considers outer space and other transnational spaces to be new strategic frontiers of great-power competition, underscoring the imperative to secure its interests in these arenas.[32] The People's Liberation Army characterizes space as a war-fighting domain, underscoring its willingness to compete and, if necessary, engage in conflict to protect Chinese strategic interests and reshape traditional warfare paradigms: "Recent Chinese research papers and people familiar with the program say plans are underway to deploy a national mega-constellation of almost 13,000 low-orbit satellites."[33] The existing three-warfare strategy is limited because it does not fully address the importance of controlling the space commons, particularly in terms of economic and technological gains.

The Chinese Communist Party is also expanding its military strategy to include a more assertive presence in the oceans and an expansion toward the two poles.[34] Additionally, the Chinese Communist Party's strategy to dominate the global commons involves strengthening its international voice in areas such as biosafety. The CCP approach to the global commons extends to the Arctic, where the party seeks to increase its influence through economic investments and scientific research, further highlighting the DIME framework's limited ability to address the Chinese Communist Party's multifaceted strategy.

Space Operations

Chinese military writings on space operations highlight several recurring themes that likely appear in the People's Liberation Army's space doctrine, including strategic reconnaissance and early-warning systems. As outlined in military documents, Chinese space doctrine does not encompass the three-warfare strategy. In addition to conducting space deterrence, Chinese space forces also conduct offensive, defensive, and information operations. Chinese military analysts see the United States' dependence on space as an exploitable weakness, while also recognizing the Chinese Communist Party's own growing reliance on space-based assets

32 Camilla T. N. Sorensen, "The Polar Regions As New Strategic Frontiers for China," National Bureau of Asian Research, January 25, 2024, https://strategicspace.nbr.org/the-polar-regions-as-new-strategic-frontiers-for-china/.

33 Cate Cadell, "China's Military Aims to Launch 13,000 Satellites to Rival Elon Musk's Starlink," *The Washington Post*, April 6, 2023, https://www.washingtonpost.com/national-security/2023/04/06/elon-musk-china-starlink-pla/.

34 "War in Space Is No Longer Science Fiction," *The Economist*, January 31, 2024, https://www.economist.com/international/2024/01/31/america-china-and-russia-are-locked-in-a-new-struggle-over-space.

An LC-130 Hercules assigned to the 109th Airlift Wing, New York Air National Guard, sits on an airfield made of snow near McMurdo Station, Antarctica. (Courtesy photo)

and the threat posed by US counterspace capabilities.[35] The Chinese Communist Party aims to break enemies' resistance with no or minimal fighting, emphasizing nonkinetic options. For example, the party considers asymmetric, independent operations to be a key method of creating advantages against its enemies. The Chinese Communist Party focuses on both offensive and defensive operations, including strategic counterair attacks. China's approach to military operations in space highlights a gap in the traditional DIME framework, which may not fully address the nuances of space warfare and escalation dynamics.[36]

Space Lawfare

China aims to generate legal support for its operations to protect its national interests. This effort involves shaping global norms to align with Chinese strategic objectives, including by manipulating the international legal order to solidify sovereign claims and by taking a proactive approach toward shaping the legal landscape.[37] Enhancing China's voice in areas like biosafety and participating in international biological conventions are elements of Chinese legal strategy. The Chinese Communist Party aims to strengthen its role in formulating the rules that govern ICE domains. The CCP three-warfare strategy includes legal warfare, which aims to manipulate the international legal order. This approach is evident in how the Chinese Communist Party presents its activities in the South China Sea and the Arctic, and in its use of legal arguments to advance its claims.[38] This proactive use of international law and institutions allows the Chinese Communist Party to gain strategic advantages and shape the global order in its favor. The party also focuses on strengthening legal protections for its overseas military operations, further underscoring the importance of lawfare to its overall strategy.

Space Development

Through its five-year plans, the Chinese Communist Party commits significant resources to advancing its space program away from strategic preparations and toward the development of world-class technologies and industrial bases.[39] This development also involves accelerating the construction of new combat forces for reconnaissance, early warnings, long-range precision strikes,

35 Mark A. Stokes and Ian Easton, *Evolving Aerospace Trends in the Asia-Pacific Region: Implications for Stability in the Taiwan Strait and Beyond* (Project 2049 Institute, May 2010), 9–13.

36 Stokes and Easton, *Evolving Aerospace Trends*, 14–18.

37 Sascha-Dominik Bachmann and Andres Munoz Mosquera, "China's Strategic Preconditioning in the Twenty-First Century," *Wild Blue Yonder*, April 13, 2020, https://www.airuniversity.af.edu/Wild-Blue-Yonder/Articles/Article-Display/Article/2145001/the CCPs-strategic-preconditioning-in-the-twenty-first-century.

38 Stephanie Pezard et al., *China's Strategy and Activities in the Arctic: Implications for North American and Transatlantic Security* (RAND Corporation, 2022), 25–26.

39 Marc Berkowitz and Chris Williams, *Strategic Implications of China's Cislunar Space Activities* (National Security Space Association, August 2023), 29.

maritime attacks, and information operations.[40] The CCP development strategy extends beyond advancing technology to include shaping international norms and standards in areas such as biosafety, as well as strengthening international cooperation. This multifaceted approach to development—which integrates military and civilian resources and aims to achieve both technological and strategic advantages—highlights a key gap in both the DIME framework and in the three-warfare strategy. These frameworks tend to treat military and civilian elements as separate and distinct. The Chinese Communist Party's comprehensive approach underscores the need for a more integrated framework that accounts for the interconnectedness of military, economic, technological, and legal factors in modern strategic competition. Furthermore, the Chinese Communist Party emphasizes how the national scientific and technological innovation system should work to develop weapons and equipment.

XIX. Recommendations and Conclusion

The COLD framework reveals significant gaps in governance, security, and strategic influence across the Arctic, Antarctica, and space: domains that are critical to US national security and global stability. The COLD framework provides a better way to define the commons and identify how adversaries are attempting to change norms and exploit resources and access according to their own interests. The framework can be used in two ways. First, the framework can help synchronize domains and regions to understand trends. As this monograph shows, relationships between the polar regions and space should drive cross-domain and regional communication and intelligence sharing. The second and broader approach involves overlaying the framework on a world map to identify the global commons, operations, developments, and the exploitation of lawfare. This approach can help address security concerns more effectively and help understand key linkages through which adversaries are shaping their interests. Adding the COLD framework to professional military education can help fill gaps in the global commons where the DIME framework is insufficient. The COLD framework will also help leaders better understand the operational environment and drive a more holistic approach to deterring adversarial actions.

As for the operational approach to the global commons, the monitor-and-respond model currently used in ICE environments is insufficient because access is expanding, thus intensifying competition and potential conflict. To counter China's increasing exploitation of the global commons, the United States must advance a proactive strategy.

Recommendations for Strategically Analyzing Risks Related to National Security

1. **Capability Development and Posturing**

   Maintaining a persistent and active presence in the Arctic, Antarctica, and space is essential to deterring adversarial actions and preventing coercive territorial claims. The Chinese Communist Party's expansionist strategies—evident in the South China Sea (including in the Fiery Cross, Subi, and Mischief Reefs)—are a blueprint for potential land grabs or fait accompli maneuvers in the Arctic and beyond. Without a robust US and allied presence, the Chinese Communist Party may attempt to conduct unregulated resource extraction under the guise of responsible mining (as stated in its 2018 Polar Silk Road strategy), or challenge US and allied sovereignty through incremental territorial claims. To counteract these threats, the United States must take the following actions.

   - Transition Joint Task Force-Support Forces Antarctica to a polar Joint task force, enabling it to solve challenges across the Arctic and Antarctic regions, as well as monitor and coordinate with space operations.
   - Accelerate the expansion of the US icebreaker fleet to sustain operations in polar regions.
   - Invest in resilient command-and-control infrastructure, ensuring satellite communications and navigational capabilities function effectively in the Arctic.
   - Invest in Antarctic research stations to support international research and scientific developments in the polar regions and in space.
   - Modernize airfields and establish deepwater ports in Alaska and Greenland to improve logistics, increase presence through mobility, and support regional economic development.

40 Shelby Kenyon, "The Strategic Advantage in Space. Who Has It?," *Wild Blue Yonder*, April 4, 2024, https://www.airuniversity.af.edu/Wild-Blue-Yonder/Articles/Article-Display/Article/3731188/the-strategic-advantage-in-space-who-has-it/.

2. Sustain Joint and Combined Military Exercises and Freedom of Navigation

Although the posturing of forces is important, integrating capabilities and a coalition force that can synchronize operations is a critical part of deterring bad actors.

- Work with allies and partners to strengthen the Joint Force's posture, leveraging existing capabilities to enhance mobility and sustainment in extreme environments.
- Sustain military exercises with NATO allies that enhance readiness and normalize regional presence.
- Conduct routine freedom-of-navigation operations in the polar regions to challenge the Chinese Communist Party's influence and interests.
- Work alongside other nations to support space exploration.

3. Strengthening International Relationships and Institutions

The Chinese Communist Party systematically alters global norms to suit its strategic ambitions, exploiting legal and diplomatic ambiguities across multiple domains. The United States must lead efforts to fortify and enforce the international institutions governing the Arctic, Antarctica, and space. Whereas forums such as the Arctic Council, the ATS, and space-related governance bodies exist, they lack enforcement mechanisms.

To strengthen US leadership in the Arctic, Antarctica, and space, the Department of War and interagency partners must do the following.

- Codify and reinforce international norms to prevent China from manipulating legal frameworks.
- Expand multilateral security initiatives such as the Arctic Security Forces Roundtable to foster joint military coordination.
- Find opportunities to develop new bilateral and multilateral agreements with polar nations, enforcing territorial sovereignty and protecting US interests in space.
- Engage like-minded allies to build a coalition-based enforcement mechanism, ensuring allies uphold norms beyond diplomatic discussions and counter China's Polar Silk Road initiative.
- Secure agreements for joint military bases and logistics support, enabling rapid responses and a sustained presence.

As global competition for strategic resources intensifies, these efforts will be critical for mitigating conflict and ensuring the continued stability and security of the global commons.

4. Information Sharing and Strategic Messaging

The Chinese Communist Party exploits information asymmetry to divide coalitions, sow discord among allies, and justify aggressive actions. To combat the party's exploitation, the United States must develop a unified and transparent informational strategy. This strategy should educate senior US leaders on adversaries' actions across the Arctic, Antarctica, and space; allow the United States to counter misinformation and coercion by sharing intelligence with allies and partners; and communicate to domestic and international audiences the importance of protecting ICE regions. Therefore, the United States must take the following actions.

- Ensure the security of the Arctic, Antarctica, and space is discussed within the national defense strategy and the defense budget.
- Enhance mechanisms for sharing intelligence with key allies, ensuring real-time situational awareness.
- Launch strategic communications campaigns to counteract China's influence and expose its violations of international norms.
- Strengthen public-private and academic partnerships to secure US economic and industrial investments in polar and space infrastructure and technologies, including investments in communications capabilities, power generation, and energy supply chains.

5. Secure Space-Based Infrastructure and Power for Arctic and Antarctic Operations

The Chinese Communist Party is investing in dual-use technologies to gain strategic advantages, access, and influence within the Arctic, Antarctica, and space. The United States must focus on optimizing resources, securing its interests, and preventing the Chinese Communist Party from expanding its influence.

- Invest in next-generation polar-orbiting satellites to enable secure communications and intelligence collection.
- Enhance space-based intelligence, surveillance, and reconnaissance to support the monitoring of adversary actions in remote areas.
- Invest in advanced nuclear microreactors, which can provide reliable energy in ICE regions, reduce the reliance on traditional fuel supplies, and support year-round operations.
- Develop the capabilities to operate in extreme cold weather, including by enhancing power generation to sustain military operations in hostile conditions.
- Enhance the US defense industry's collaborative efforts to develop next-generation cold-weather military technology (for example, vehicles, unmanned aerial vehicles, expeditionary logistics, ships, and long-range missile defense and strike capabilities).

XX. Conclusion

The recommendations provided in this monograph are interdependent and require a coordinated approach. The first two recommendations—which pertain to developing capabilities and posturing, and sustaining Joint and combined military exercises and freedom of navigation—are enforcement actions that must be backed by the third recommendation (strengthening international relationships and institutions). Information sharing and strategic messaging must reinforce collective resolve, set the conditions to empower the industrial base and partners moving forward, and help develop the last recommendation: Secure space-based infrastructure and power for Arctic and Antarctic operations. The United States must clearly communicate redlines to China and other adversaries, ensuring violations of security in the global commons are met with decisive consequences. The time to invest proactively and demonstrate leadership in these contested regions is now. The failure to act will allow the Chinese Communist Party to rewrite the rules, threaten US sovereignty, and irreversibly alter the strategic balance in the critical domains of the Arctic, Antarctica, and space.

Note: *The views expressed are those of the authors and do not necessarily reflect the official policy or position of the Department of the Army, the Department of War, or the US government.*

US ARMY WAR COLLEGE
Center for Strategic Leadership
650 Wright Avenue Carlisle, PA 17103-5049
OFFICIAL BUSINESS