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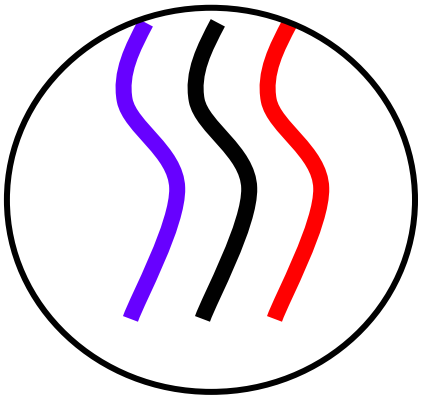

Analysis No. 20 (February 2008)

Will the Eagle Strangle the Dragon?

An Assessment of the U.S. challenges towards China's nuclear deterrence

by
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Abstract

Given the U.S.'s operational and technological experience and the development of the U.S. BMD system, this essay identifies three major challenges for China's nuclear deterrent, which can be labelled 'credible minimal deterrence'. Firstly, China cannot rely on its current ICBM fleet for a second-strike. The destructive and very precise U.S. nuclear weapons would likely destroy a lot of China's missiles in a first-strike. Secondly, the small and less capable Chinese SLBM submarine fleet is an unreliable source for a second-strike. Finally, China faces serious challenges from space for its nuclear deterrent. China would loose most – if not all – of its current deterrent, if the U.S. (as has been planned) deploys space-based BMD components. The essay concludes that only an agreement between Washington and Beijing, which bans the weaponization of space, can avoid the otherwise likely arms race in space.

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1 Introduction

This essay assesses the challenges to China's nuclear deterrent. It will begin by describing China's nuclear strategy and the United States (U.S.) Ballistic Missile Defense (BMD) system. Subsequently, it will concentrate on three major aspects which challenge China's second-strike capability: firstly, the current BMD system and China's ability to counter it, secondly, China's submarines and thirdly the future space-based components of the BMD system. This essay argues that China cannot rely on its Intercontinental Ballistic Missile (ICBM) fleet for a second-strike. Consequently, Beijing must not only increase but also improve its ICBM fleet to sustain a retaliation strike ability after a nuclear attack. However, even with improved capabilities China cannot be sure that higher numbers of ICBMs and countermeasures are sufficient enough to give Beijing a second-strike ability.

As a second consideration, the essay shows that China cannot rely on its submarine fleet either to ensure a second-strike capability for the next two decades. Not only is Beijing's submarine fleet too small, but lacks the sophisticated technology needed to avoid detection and destruction by the superior U.S. navy. Thus, China has to increase its fleet's size and improve its quality to overcome this challenge to its nuclear deterrence. The essay concludes by focusing on challenges emanating from space to China's nuclear deterrent. The assessment shows that a space-based BMD system would make a sufficient Chinese second-strike ability almost impossible to achieve. Boost-phase interceptions from space as well as the destruction of Chinese navigation and communication satellites would, in combination with the already existing ground-based BMD system, diminish the survivability and penetration capacity of China's nuclear forces. Therefore the essay concludes that if Beijing and Washington do not find an agreement and stop the further weaponization of space, a future arms race in space becomes more likely.

2 China's nuclear strategy and the U.S. Ballistic Missile Defense System

In 1972, the U.S. and the Soviet Union signed the ABM treaty and the SALT I agreement "which basically banned the development of strategic defence forces while exercising some limit on the development of their strategic offensive forces"[1]. Both treaties were founded on

[1] Jing, Zhong and Zhenqiang, Pan: Redefining strategic stability in a changing world: a Chinese view, in: *Contemporary Security Policy*, 2004, 25:1, p. 124.

the rational of Mutual Assured Destruction (MAD), giving each superpower the ability to annihilate their counterpart with nuclear weapons, even if the other attacks first. During that time "MAD […] was not only a fact of life, but also a theory, which constituted the conceptual basis for the strategy of deterrence that both superpowers were believed to embrace"[2]. In this context, it is important to distinguish between the theory of deterrence and the strategy of deterrence. In theory, "deterrence is an attempt to influence another actor's assessment of its interests. It seeks to prevent an undesired behaviour by convincing the party who may be contemplating it that the costs will exceed any possible gain"[3]. Strategy of deterrence, on the other hand, "is concerned with applying the theory of deterrence to real world conflicts"[4]. In the field of nuclear arms, this means that – given the great destruction power of nuclear weapons – one state tries to deter other states by threatening the use of nuclear weapons as retaliation in case of an attack. Thus, the focus of deterrence strategy is "on the prevention rather than the actual fighting of a nuclear war"[5].

In the case of China one can distinguish three stages of nuclear deterrence.[6] Firstly, China conducted 'existential deterrence' as soon as it possessed nuclear warheads. Since Beijing lacked any effective delivery systems, it had no real means of retaliation and could only effectively threaten the use of nuclear weapons against near-border targets. The second stage was a 'minimal deterrence', meaning that Beijing attempted to deter enemies with a small but indefinite number of nuclear weapons. Here, China deployed enough ballistic missiles to maintain a second-strike ability. It also pledged not to use nuclear weapons for a first strike (the so-called no-first-use policy). China followed the premise that even if only a few of its ICBMs survived a first strike, they would inflict enough "unacceptable damage"[7] on any adversary to deter him from starting a first strike. China's third and current deterrent state can be labelled as 'credible minimal deterrence'. With this form of deterrence, China tries to increase the credibility of a second-strike by accumulating more mobile and harder to detect nuclear forces, which are a bit higher in quantity and have better quality.[8] Both historic changes of Chinese strategic deterrence stage were triggered by China's need for better

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2 ibid.

3 Jervis, Robert: Perceiving and Coping with threat, in: Jervis, Robert et al. (ed.): *Psychology and Deterrence – Perspectives on Security*, The Johns Hopkins University Press: Baltimore, 1989, p. 21.

4 ibid. See also Stern, Paul C. et al. (ed.): *Perspectives on Deterrence*, Oxford University Press: New York & Oxford, 1989.

5 Jing and Zhenqiang 2004, p. 124.

6 Chase, Michael: China's Second Artillery Corps: New Trends in Force Modernization, Doctrine, and Training, in: *China Brief* of The Jamestown Foundation, 27.2.2007, p. 2.

7 Acharya, Sukanta: Security Dilemmas in Asia, in: *International Studies*, 44:1, 2007, p. 61.

8 U.S. Department of Defense: *Annual Report to Congress - Military Power of the People's Republic of China*, 2007, http://www.defenselink.mil/pubs/pdfs/070523-China-Military-Power-final.pdf [accessed 22.02.2008], pp. 18-20.

delivery capabilities in case of a needed second strike. The second change, however, was also evoked by other causes, which arose shortly after the Cold War.

Since the end of the East-West confrontation, several factors have started to shape China's nuclear thinking. Today, China faces a new nuclear environment. A strategic partnership between Russia and China has removed the prospect of a Russian nuclear first strike, while the possibility of a conflict between Beijing and Washington has increased. Furthermore, two new nuclear states have appeared at China's periphery: India and Pakistan. Additionally, North Korea's nuclear program resulted in the deployment of a Theatre Missile Defence (TMD) system in China's neighbourhood. Moreover, reunification with Taiwan has been complicated because of a likely U.S. military intervention should Beijing try to achieve this by military means. Finally, the U.S. started to deploy a BMD system, which poses great challenges to China's nuclear deterrent.

This last point is of immense importance for the Chinese nuclear deterrent and the securing of 'credibility' by China's political and military leadership. Beijing wants to "preclude nuclear blackmail"[9], particularly by Washington. It hence tries to "keep a credible retaliatory nuclear force which can survive a massive first strike and launch a counter-strike at the enemy"[10]. However, both the survivability of China's nuclear forces and the penetration of America's anti-missile defence shield are currently far from established – a fact, which heavily endangers the credibility and the deterrence ability of China's nuclear forces.

Nonetheless, the concept of '(credible) minimal deterrence' has, despite the fact that it served China very well for several decades, a weakness. It relies on "a strict ban on ballistic missile defense [as] an absolute requirement for regime stability"[11]. Such a ban was maintained with the ABM treaty and the SALT I agreement during the Cold War until 2002. The appearance of the U.S. BMD system, however, changed the foundations of the nuclear balance. A BMD system consists of three stages: boost-phase, mid-course and terminal interception.[12] This means it can either be deployed to protect the continental U.S. (National Missile Defense, NMD) or U.S. forces and allies in other particular regions (TMD). Furthermore, the BMD system can be used ground-based (by the Ground-based Midcourse Defense (GMD) in

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[9] Rajain, Arpit. *Nuclear Deterrence in Southern Asia: China, India, and Pakistan*. Thousand Oaks, Calif.: Sage Publications, 2005, p. 140.

[10] Yao, Yunzhu: Chinese Nuclear Policy and the Future of Minimum Deterrence, in: *Strategic Insights*, 9:4, September 2005.

[11] Tarr, David W., *Nuclear Deterrence and International Security*, Longman: New York & London, 1991, p. 144.

[12] Lindsay, James M., and Michael E. O'Hanlon, *Defending America. The Case for Limited National Missile Defense*, Brookings Institution Press: Washington, D.C., 2001, pp. 43-46. See also Quackenbush, Stephen L.: National Missile Defense and Deterrence, in: *Political Research Quarterly*, 59:4, December 2006, pp. 533 – 541.

Alaska, the ship-based Aegis-LEAP system and the Air-borne Laser (ABL program) or space-based (Space-based Laser (SBL) Program). Currently, Washington deploys only ground-based BMD systems. In the future, however, the deployment of a space-based BMD system is planned for the next five to ten years.[13] Both, the current ground-based and the future space-based BMD system "pose serious challenges to the nuclear capabilities of medium-sized nuclear countries"[14] like China.

3 Ground-based BMD and the run for countermeasures

Being one of the medium-sized nuclear states, whose deterrent is currently challenged by the U.S. BMD system, China has to act. It will likely take Beijing more than a decade to reshape its forces in order to correct the current nuclear imbalance.[15] Until then, Beijing cannot be sure, that its small nuclear forces pose a credible second-strike capability. Currently, China owns between 20 and 30 CSS-4 ICMBs, which are capable of reaching the continental U.S.[16] At least some of them would likely be destroyed by an American first-strike. On top of that Washington's current ground-based mid-course and terminal BMD system presents a high likelihood that the few Chinese missiles which may survive an American first-strike, will be intercepted on their way to retaliation. Together with the new generation of U.S. nuclear weapons, which are smaller in size, more precise and have stronger electronic anti-jamming mechanisms as well as a higher capacity of earth penetration and defence penetration, this threatens the survival of China's nuclear forces.[17]

Theoretically, there are several ways how China could try to regain a more credible nuclear deterrence against a ground-based BMD system.[18] Possible Chinese responses to the U.S. BMD system may include the deployment of more missiles to overwhelm the defence as well as new missiles, which would be upgraded with stealth technologies (like radar absorbing materials or infrared protection) and the ability to deploy decoys and chaffs. This would make

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[13] Taylor, Jessica: Experts debate space-based BMD assets, in: *United Press International*, July 25, 2006 http://www.freerepublic.com/focus/f-news/1675666/posts [accessed 22.02.2008].

[14] Zhongchun, Wang: Nuclear Challenges and China's Choices, in: *China Security*, 3:1, Winter 2007, p. 61. See also Ghosh, P. K.: Deterrence asymmetry and other challenges to small nuclear forces, in: *Contemporary Security Policy*, 2004, 25:1, pp. 37 – 53.

[15] Schwarz, Benjamin: The perils of primacy, in: *The Atlantic Monthly*, January/February 2006, p. 37.

[16] Zhang, Baohui: The Modernization of Chinese Nuclear Forces and Its Impact on Sino-U.S. Relations, in: *Asian Affairs: An American Review*, 34:2, Summer 2007, p. 91.

[17] Zhongchun 2007, p. 61.

[18] See Lindsay and O'Hanlon 2001, pp. 46-49, 96f as well as Li, Bin: The Impact of the U.S. NMD on the Chinese Nuclear Modernization', research paper at the Institute of Science and Public Affairs, China Youth College for Political Science, 2000, 5, http://www.emergingfromconflict.org/readings/bin.pdf [accessed 22.02.2008].

it harder for anti-missile systems to track the ICBM or its deployed nuclear warhead. Furthermore, China could use multiple independently targetable re-entry vehicles (MIRV, multiple warheads which can change their trajectory) instead of a single, unguided warhead per missile. This would increase the rivalry between incoming warheads and interceptors, which in turn increases the likelihood of penetrating the defence shield. Two steps to enhance China's ICBM survivability, would be to use more mobile ICBM delivery systems (trucks, aircrafts and submarines), and the deployment of a domestic Missile Defence System which intercepts incoming first-strike attacks or launch its missiles as soon as a first-strike attack is detected. Such a posture, called Launch On Warning (LOW) in defence jargon, is indeed very scary, but luckily only imaginable as an act of desperation. Additionally, this practice can only be adapted with fast reacting solid-fuel missiles and even then nothing has been said about the ability of the missiles to penetrate a BMD system.

However, what seems easy in theory is much harder to accomplish in practice. Although the constraints are much less, "real obstacles to developing a large, operationally deployed nuclear force remain even after a state has successfully developed nuclear weapons"[19]. The key constraints in this context are costs, technical difficulties, the quantity of available fissile material stocks, the size of the nuclear infrastructure, the need to develop reliable and survivable delivery systems as well as an adequate command, control and communication (C3) system and, of course, the opponent's response on such measures.

It is, for instance, uncertain, how many offensive missiles China really needs to overcome the American BMD system. A large increase to China's nuclear forces would definitely be "the most direct response to missile defense"[20]. However, while some scholars argue that a 1:3 ratio of Chinese warheads to American interceptors would be enough to ensure a minimum second-strike capability[21], other have the opinion that Beijing then still would have to worry about some possible scientific surprises, such as an almost perfect interception rate.[22] If Beijing follows the latter's logic, it will have to deploy at least as many missiles as the BMD system has interceptors in order to pose a credible nuclear threat.[23] Such a move would lead to "an unnecessary drain on the nation's limited budgetary resources"[24]. Despite the high costs for the construction and maintenance of its increasing ICBM fleet, this posture would likely

[19] Acharya 2007, p. 60.
[20] Wu Chumsi cited in Zhang 2007, p. 94.
[21] Lebovic, James H.: The Law of Small Numbers: Deterrence and National Missile Defense, in: *Journal of Conflict Resolution*, 46:4, August 2002, p.474.
[22] Li 2000, 5; Blair, Bruce G. and Yali, Chen: The Fallacy of Nuclear Primacy, in: *China Security*, 2:3, 2006, pp. 51 – 77.
[23] Lee, Wei-Chin: China's Military after the Sixteenth Party Congress: Long March to Eternity, in: *Journal of Asian and African Studies*, 38:4, 2003, p. 434.
[24] Yao 2005.

encourage India and Pakistan, the other regional nuclear powers, to increase their nuclear armament as well. Additionally, Japan, South Korea and even Indonesia might feel threatened by a growing nuclear arsenal in the region and could try to become nuclear powers themselves.[25] Finally, the easiest way for Washington to respond to Beijing's increasing ICBM fleet would be to deploy more interceptor missiles. Hence, an increase of China's ICBM is far from being a panacea and could even deteriorate the current situation for China.

On the other hand, it is also not an option for China not to increase its fleet. As it has no sophisticated early warning radars, which are required to detect an enemy's attack soon after his missiles have started, Beijing cannot rely on a LOW counterattack.[26] Hence, in case of an attack, China would have to take the hit before firing back. It is likely that, given the precision and the destruction power of America's nuclear weapons, a big part of the small ICBM fleet would be destroyed. In a worst case scenario, the remaining missiles may be too few to overcome the BMD system or, if they can, may not create – in the horrible logic of nuclear war – enough destruction to retaliate for Washington's nuclear assault. Thus, a moderate increase of China's ICBM numbers is inevitable if it wants to regain a more credible nuclear deterrent.

However, the scenario that the U.S. BMD system could intercept all Chinese ICBMs is very unlikely in reality. This is true even for a ground-based BMD system, which attacks ballistic missiles while they are starting (boost-phase). There can be no doubt, that such a BMD system will give the U.S. an advantage over China, but Beijing's future offensive capability will likely allow China to overwhelm a non-space based BMD system. China has heavily invested in countermeasures which can trick the American anti-missile defence.[27] For almost a decade, Beijing has had the technological experience to build MIRVs and will most likely deploy them in the new DF-31A ICBMs.[28] Beijing, furthermore, invested heavily to improve its ballistic missiles' electronic anti-jamming capabilities[29] and in the mobility of its nuclear forces by deploying the solid-fuelled and road-mobile DF-31 ICBM in 2006. In addition to that Beijing is trying to build up a submarine fleet, capable of firing nuclear ballistic missiles.[30] China has also developed precision strike cruise missiles in 2000/01. These

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[25] Doyle, James: Strategy for a New Nuclear Age, in: *The Nonproliferation Review*, 13:1, 2006, p. 90.

[26] Lindsay and O'Hanlon 2001, p. 58; Nuclear Threat Initiative: China's Nuclear Doctrine – A Credible "Minimum Deterrent", 25. September 2003, http://www.nti.org/db/China/doctrine.htm [accessed 22.02.2008].

[27] Acharya 2007, p. 68.

[28] Zhang 2007, p. 91.

[29] Zhongchun 2007, p. 61.

[30] U.S. Department of Defense 2007, p. 19.

missiles have a range up to 3,000 km and can be fit with tactical nuclear warheads.[31] Thus, even in case most of its continental ICBMs being destroyed, China could still fall back on other nuclear delivery systems as an insurance[32] – especially against regional targets of value to the U.S.[33]

4 Chinese submarines and their second-strike capability

Another challenge that China's nuclear deterrent faces, is an undependable second-strike capability by its current submarine fleet. Presently, "China […] deploys the world's most formidable force of conventionally powered submarines, [but] has never succeeded in deploying a nuclear-powered submarine with nuclear-tipped inter-continental ballistic missiles"[34]. Because of their concealed operability, nuclear-powered ballistic missile firing submarines (SSBN) are very important for deterrence. They can provide an important leg for the highly needed second-strike capability. Hence, SSBN-equipped states can "force another state to deal with their own on a level playing field however backward their own economy and ideology may seem to the other"[35]. Being aware of this fact, the development of SSBN has been China's navy's chief objective in the last decades.

However, it will take China more than ten to fifteen years to "achieve a secure second-strike capability by a new generation of nuclear strategic submarines armed with multiple war-headed missiles capable of striking any part of the United States"[36]. Currently, China is only operating a single submarine of the Type 092-class, which is able to fire submarine-launched ballistic missiles (SLBM). The sub is equipped with twelve JL-1 SLBM; each carrying a single warhead with a range of approximately 2,500km.[37] The construction of China's second-generation submarine started in 1999. Five years later, the first submarine of the Type 094-class was launched for its still ongoing sea-trials. The Type 094 submarines can be

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[31] Zhang 2007, p. 93.

[32] International Institute of Strategic Studies: The impact of missile defence in Asia, in: *Strategic Comments*, 10:6, 2004, pp. 1–2.

[33] Guam, where Washington is currently undertaking a 13 billion dollar investment in the islands military infrastructure, springs to mind here. For further details see Harden, Blaine: Guam braces for peaceful military incursion, in: *The Washington Post*, 25 January 2008 http://www.washingtonpost.com/wp-dyn/content/article/2008/01/24/AR2008012403509_pf.html [accessed 22.02.2008].

[34] Cole, Bernard D.: Rightsizing the People's Liberation Army Navy: How Much Naval Force Will Beijing Deploy by 2016?, in: *Asia Policy*, 4, July 2007, p. 85.

[35] McConnaughy, Christopher: China's Undersea Nuclear Deterrent: Will the U.S. Navy Be Ready?, in Goldstein, Lyle J./Erickson, Andrew S. (ed.), *China's Nuclear Force Modernization*, Naval War College, New Port Papers 22, 2005, p. 24.

[36] Zhang 2007, p. 89.

[37] SinoDefence: Type 092 Xia Class Nuclear-Powered Missile Submarine, 2007, http://www.sinodefence.com/navy/sub/type092xia.asp [accessed 22.02.2008].

equipped with 16 of the new JL-2 SLBM. This new generation SLBM was successfully tested in 2005 and is able to carry three independently guided warheads.[38]

Experts suggest that Beijing plans to deploy at least five Type 094 subs in the next ten years.[39] While some claim that this "will provide China with a modern and robust sea-based nuclear deterrent force"[40] others are more sceptical. A 2006 RAND report argues that given the range of the JL-2 SLBM, Chinese submarines only could provide an assured retaliatory capability, if they were deployed relatively far away from Chinese shores. This, however, would make it necessary to avoid detection and destruction by enemy attack submarines or other anti-submarine forces.[41] Avoiding the exposure by U.S. submarines will be a very difficult task for the Chinese navy. Not only is the U.S. navy bigger than its Chinese counterpart (e.g. almost 60 attack submarines), but has also extensive experience in playing cat and mouse with the – compared to the Chinese subs – technological much more sophisticated Russian submarines. Additionally, the US is currently trying to gain "further advances in anti-submarine […] warfare"[42].

Beijing's new Type 094 bases on Type 093, which is a Chinese version of the more than twenty year old Russian Victor III-class. Thus, even the future Chinese submarines will be on a different quality level than the U.S. Navy. America has a big head start in important nuclear submarine categories like silence, sonar arrays and propulsion due to which China will find it hard to catch up. Moreover, if Washington's BMD system reaches a sufficient interception level, U.S. navy subs would likely increase the threat for their Chinese counterparts "by containing the Chinese submarine force within a geographic area, such as the Yellow Sea, enabling the [ballistic missile] defenses to focus on that single vector"[43].

5 Challenges in space

Another – and perhaps the greatest – challenge that confronts China's strategic nuclear deterrence lies in space. Currently, Washington's BMD system only consists of limited mid-

[38] Zhang 2007, pp. 91f.

[39] Fisher, Richard: Trouble below: China's Submarines Pose Regional, Strategic Challenges, in: *Armed Forces Journal*, March 2006, http://www.armedforcesjournal.com/2006/03/1813965 [accessed 22.02.2008].

[40] U.S. Office of Naval Intelligence cited by Gertz, Bill: China expands sub fleet, in: *The Washington Times*, 02.03.2007, http://johnib.wordpress.com/2007/03/02/china-expands-sub-fleet/ [accessed 22.02.2008].

[41] RAND, *Chinese Responses to U.S. Military Transformation and Implications for the Department of Defense*, RAND Corporation Press: Santa Monica, 2006, p. 104.

[42] Schwarz 2006, p. 37.

[43] McConnaughy 2005, 42. Furthermore, unless the JL-2 performs really well, in case the Chinese navy would be limited to the Yellow Sea as a launching area for a nuclear strike against the U.S., "only" the U.S. overseas territories, Alaska and some parts of the mainland's north-west would be within range of China's newest SLBM.

course and terminal interception systems. As shown, China will probably find countermeasures to ensure its nuclear deterrent against such a defence system. This, however, will change as soon as the "defence 'system of systems' expands to include airborne or space based lasers, as is scheduled after 2008, the task [of keeping up deterrence] will become more complicated, as these boost-phase intercept systems can sanitise large areas of the globe and intercept offensive missiles more easily"[44]. Space-based boost-phase oriented defence systems are very effective against ballistic missile for several reasons. First, ballistic missiles are relatively slow during their boost-phase, which can take several minutes. Furthermore, the system has fewer targets to aim at, since there are no decoys deployed yet. Additionally, the targeted ICBM would not only be much larger but also much more fragile than a re-entry vehicle. Finally, the missile would be easier to detect because of the bright plumes of its propulsion unit.[45] A space-based BMD system would hence "enable[e] the United States to neutralize China's strategic nuclear missile deterrent"[46].

Facing such a challenge China will find it much harder to counter it without starting an arms race in space. But it is very unlikely, that Beijing can convince Washington to limit its missile defence system to ground-based means, which would be less threatening to China's nuclear deterrent. Additionally, many inside and outside of the Pentagon claim that "a robust global-coverage BMD system would have to include boost-phase missile defense"[47]. Furthermore, in its 2004 'Counterspace Operations Doctrine', Washington states that it wants to achieve space superiority as this alone "provides freedom to attack as well as freedom from attack [since] space and air superiority are crucial first steps in any military operation".[48] Chinese strategists hence believe that China has to prepare to challenge the current U.S. hegemony in space even though it opposes the weaponization of space.[49]

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[44] International Institute of Strategic Studies 2004, 1. Given the current development status of the ABL program, the plane has to be within a certain range to its target, which makes it vulnerable to air defence. Nevertheless, an ABL plane which covers North Korea can attack missiles starting from China's eastern Heilongjiang, Jilin and Liaoning provinces. Furthermore, although satellites equipped with Space-based Laser (SBL) systems sound like Star Wars, Washington's efforts start to bear fruit. For further details see Manke II, Gerald C.: Space-Based Laser Research - Researchers are developing a reliable and versatile high-powered, space-based laser for missile defense systems, 2004, http://cndyorks.gn.apc.org/yspace/articles/bmd/sbl_lives.htm [accessed 22.02.2008].

[45] Zhang, Hui: Space Weaponization And Space Security: A Chinese Perspective, in: *China Security*, 2:1, Spring 2006, 33. See also Krepon, Michael, and Katz-Hyman, Michael: Space Weapons and Proliferation, in: *The Nonproliferation Review*, 2005, 12:2, pp. 323–341.

[46] Blair, Bruce G. and Yali, Chen: The Space Security Dilemma, in: *China Security*, 2: 2, Summer 2006, p. 6.

[47] Zhang 2006, p. 33.

[48] U.S. Air Force: *Counterspace Operations*, Air Force Doctrine Document 2-2.1, 2 August 2004, p. 1, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_2_1.pdf [accessed 22.02.2008].

[49] Shixiu, Bao: Deterrence Revisited: Outer Space, in: *China Security*, 3:4, Winter 2007, p. 2.

Beijing, furthermore, faces a second space-related challenge to its nuclear deterrent. Although its space assets – compared to the U.S. – are more or less "rudimentary"[50], China presently has approximately 35 satellites in space (America has more than 400).[51] Chinese satellites operate mostly in low-orbit and medium-orbit. They are primarily used for civilian purposes, but their functions (meteorology, communication, reconnaissance) are also very useful for the Chinese military. Additionally, Beijing has deployed pure military satellites with imaging radar and synthetic aperture radar capability (which can 'see' through clouds and under water) and uses Chinese communication satellites as part of its military C3 infrastructure.[52] Especially the latter function is important to ensure the command and control capability for a second-strike. Furthermore, China is developing COMPASS, an independent satellite navigation system comparable to GPS and Galileo, which is scheduled to have world-coverage in 2010. Such a system is crucial to meet China's needs for very-high-quality guidance and navigation, which will be used to improve the precision of its current and future ballistic missiles. The constant external update of missiles is necessary as "small errors accumulate over long flights"[53].

The challenge China faces is that systems developed to intercept ballistic missiles can easily be used as Anti-satellite (ASAT) weapons. U.S. ground-missile defence systems such as the Ground-based Midcourse Defence (GMD) in Alaska, the ship-based Aegis-LEAP system or the Air-Borne Laser (ABL) program can attack *at least* low-orbiting satellites.[54] The tasks of intercepting a ballistic missile or attacking a satellite on a predictable orbit are relatively similar, so the U.S. could knockout Chinese satellites which are important for command and control or guidance functions. As it is likely that U.S. missile technology will further improve, Washington will possibly be able to attack COMPASS within a decade or two in order to weaken China's second-strike potential even more. Both possibilities create a veritable challenge for Beijing's nuclear deterrent.[55] China has hence to ensure that other command and control lines stay intact after a nuclear attack and that the military leadership is able to reach

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50 O'Hanlon, Michael E.: Neither Star Wars Nor Sanctuary: Constraining the Military Uses of Space, Washington, D.C.: Brookings, 2004, p. 61.

51 For a good overview on China's ambitions in space see Solomone, Stacey: China's Space Program: the great leap upward, in: *Journal of Contemporary China*, 2006, 15:47, pp. 311–327.

52 Johnson-Freese, Joan: China's Space Ambitions, in: *Proliferation Papers*, Summer 2007, pp. 18f, http://www.ifri.org/files/Securite_defense/China_Space_Johnson_Freese.pdf [accessed 22.02.2008].

53 RAND 2006, p. 117.

54 Gouveia, William Jr.: An Assessment of Anti-Satellite Capabilities and their Strategic Implications, in: *Astropolitics*, 2005, 3:2, p. 178. Both, Beijing and Washington, proved on 11 January 2007 and 20 February 2008 respectively, that they are capable of ASAT operations and destroyed each one of their own (defunct) satellites with missiles. See for instance Hagt, Eric: China's ASAT Test: Strategic Response, in: *China Security*, 3:4, Winter 2007, pp. 31–51.

55 International Institute of Strategic Studies 2004, p. 1.

its own submarines even far away from Chinese waters. Furthermore, it has to be aware that it can not rely on satellite navigation for its nuclear-tipped ICBMs. But after all, Washington has to be convinced to stop the further weaponization of space, which would otherwise force Beijing to deploy weapons in space and intensive its anti-satellite capability programmes.[56] This, however, would start an arms race in space.

6 Conclusion

For several decades, the Chinese nuclear strategy of 'minimal deterrence' has worked successfully, but today, China finds it hard to provide a credible nuclear deterrent. As this essay has shown, the current Chinese deterrence strategy of 'credible minimal deterrence' faces three major challenges. Almost all of these challenges are related to Washington's BMD system, which creates – today and in the future – great challenges for Beijing's second-strike ability. After describing China's nuclear strategy and the U.S. BMD system, this essay's assessment has shown that, although China has the technological knowledge to produce countermeasures against the American anti-missile defence, it cannot be taken for granted that they would ensure a reliable second-strike ability. China hence has to increase the number of its missiles and has to anticipate possible technological surprises by the U.S., which may diminish countermeasures against the BMD system. Furthermore, China cannot – at least in the next two decades – rely on its nuclear submarines to ensure a second-strike ability. Not only is China's current and planned SSBN fleet small in size, but has also to counter a much bigger and technologically more advanced American navy, which has long experiences in anti-submarine warfare. To overcome such a challenge, China needs to increase the fleet's size and improve its quality by bridging the technological gap between own and U.S. naval forces.

However, the greatest challenge for China's nuclear deterrent lies in space. As soon as the BMD system has a space-based component, China's nuclear deterrent would – given that the BMD system works – be blocked. Beijing could then no longer expect to have a credible second-strike ability that may create enough damage to deter an American first-strike. Washington would then not only be able to intercept Chinese ICBMs during their boost-phase, but could also destroy Beijing's space assets which are crucial for the C3 infrastructure, or support the guidance of ballistic and cruise missiles.

[56] Hagt, Eric: Mutually Assured Vulnerabilities in Space, in: *China Security*, 2:1, Spring 2006, pp. 84–106.

In the end, the challenges China faces in the upcoming two decades are immense. China has to increase the number and enhance the quality of its ICBMs as well as its submarines. This, however, might frighten other actors in the region and could trigger an arms race. Additionally, if Beijing cannot find an agreement with Washington about a partial ban of space weapons (which would have to include space-based BMD systems) a nuclear-driven arms race in space will be hard to avoid. As China wants to preclude nuclear blackmail, a space-based U.S. BMD system will push it to take steps to countering the challenges to its nuclear deterrent Washington would hardly welcome.

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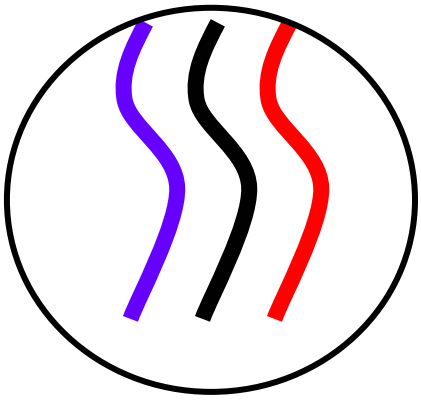

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