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Cover Photo: US Army MIAI Heavy Tank, source from Taiwan Sentinel.

Reconceiving Taiwan's Reserve Forces

By David G. Brown

Taiwan's Reserve Forces could make an important contribution to deterring Chinese aggression. But as presently constituted they do not. With the PLA threat growing, there is an urgent need to reconceive the way the reserves are constituted.

Under Taiwan's tri-service reserve system, upward of 2.5 million retired military personnel are identified and organized in a meticulously maintained system so they will be available for service with designated roles when an attack seems imminent. The system looks good on paper but in reality it does not contribute effectively to deterrence or defense. Speaking candidly, a former Vice Minister of Defense called the reserves "a joke."

There are many questions about the utility of the current reserves. Much of the reserve manpower is now comprised of those who have undergone only four months of service under the current conscription system. This short period of service does not produce warfighters. Once in the reserves, these minimally trained personnel are only required on paper to do reserve service five days every two years. If actually performed, these five days are usually devoted to basic tasks and drills rather than weapons or unit training. Youth perceive these five days as nothing more than discouraging make-work. Consequently, it is hard to see how they could function effectively under wartime circumstances. Some have speculated that a likely use of reserve personnel in the event of an imminent attack would be to fill vacancies

in the habitually undermanned regular army units. Although the Armed Forces authorized strength is a very modest 215,000, the actual number of active duty personnel is usually over ten percent below that level.

The Reserve Command also oversees the General Coordination Organizations of All-Out Defense Capabilities. This is a peacetime mechanism that is organized at three levels—the city/county, combat zone, and national. The General Coordination Organizations too exists largely on paper and, since it is peacetime focused, contributes little to deterrence and defense.

Given these weaknesses, the reserves do not appear to contribute to deterring PRC aggression. A 2017 RAND study examined the Beijing's assessment of Taiwan's reserves.[1] It reported that Chinese documents indicate the PLA believed that the quality of the reserves had declined over the previous decade. The RAND study concluded that, "the reserves do not factor into higher-level PRC assessments of Taiwan's military power." A further problem, is that the Reserve Program does not inspire enthusiasm and commitment from those in the reserves. To the contrary, public and political pressure led in recent years to the reduction of the reserve duty from one month to five days just as similar opposition to the conscription system shortened conscription service from one year to four months. Unfortunately, Taiwan's Ministry of National Defense (MND) does not enjoy broad public support.

The reserve system appears to be functioning so ineffectively that it requires a major review. This paper suggests some crucial perspectives that should be borne in mind when considering a fundamental reform of the current system.

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[1] Ian Easton, et. al, *Transformation of Taiwan's Reserve Force*, Rand, 2017.

Design First for Deterrence: The current system is designed for defense. It exists largely on paper until it is called up to defend against an imminent invasion. Occasionally, it is utilized in peacetime emergencies. As such it is not contributing to deterrence. Given the PLA's increasing capabilities, Taiwan needs a more robust deterrence, one element of which could be a restructured reserve force. To contribute to deterrence, the reserves must exist as real capabilities in times of peacetime tension such as Taiwan faces today. Only if they exist in peacetime will it represent capabilities that the PLA and CCP leadership would have to take into account in deciding whether to attack.

Design to Attract Participation: The current reserves do not attract youth participation or broad public support. Without such support, the PLA and CCP leadership can dismiss the current reserves. However, there is evidence from recent public opinion surveys that young people in Taiwan, both men and women, express a willingness to "resist" Chinese attacks.[2] There is widespread admiration for the courage young Hong Kong demonstrators have demonstrated in resisting China's plans for the territory. President Tsai's call to resist China by defending Taiwan's sovereignty and democratic way of life resonates with Taiwan's people, particularly youth. However, there is no vehicle available to channel this energy other than full-time military service. A reformed reserves structure could provide such a vehicle to attract those able to make a part-time commitment. That commitment to resisting aggression would also need to be reinforced by providing competitive compensation for the participant's service and by providing meaningful tasks and training.

[2] For Example: Survey of "Taiwan's Democratic Values and Governance" (in Chinese), Taiwan Foundation for Democracy, 2018 and 2019; Yao-yuan Yeh, et. al., "Are Taiwanese Citizens Willing to Fight Against China?" *The Diplomat*, March 22, 2019.

In addition, the participants should be guaranteed job security, and employers required to facilitate their participation.

Focus Locally: The current reserves are organized nationally under MND. A reformed structure could be focused locally. Establishing units that are recruited locally, led by local officers, under local leadership with meaningful missions for local defense should have greater ability to attract participation. My expectation that the local focus would attract greater commitment needs to be tested and confirmed. The reserve command has an existing organizational structure at the county/city and township level that could be built upon. Alternatively, the General Coordination Organizations mechanism, built theoretically on a city/county base, might be utilized as a framework for establishing local units, provided they were given clear defense missions. Local leadership could involve putting the new system under democratically elected county/city leaders rather than under MND and having a locally recruited officer serve as commander of the local forces. To avoid partisanship or local faction influence, the local commander and his small full-time staff should be personnel with professional qualifications certified by MND.

Real not Paper Capabilities: To create real capabilities, the reformed organization should require that units exist and operate on a part-time basis in peacetime. For example, initially the battalions within the eight or nine existing A-level reserve brigades could be reorganized and brought up to fully-manned, trained and equipped units at an "operationally ready" level, similar to the capabilities of Singapore's reserve units. This would require a meaningful commitment to at least a weekend of training each month and annual unit exercises, all appropriately compensated. To test integration with regular forces, reserve units should be incorporated routinely into the annual Han

Guang exercises. Under MND guidance, roles and missions that are appropriate for local circumstances would be defined for these local battalions. Their local military roles might include: defending against enemy special and irregular forces air-dropped behind front lines, securing critical infrastructure and transportation nodes, countering fifth column sabotage operations, specialized intel/cyber units, and establishing emergency medical facilities for armed forces casualties and detention centers for captured PLA soldiers. If many of these units were seen as territorial defense forces able to counter any PLA forces that got behind front lines that would make a major contribution to deterrence. As with the current system, the roles would be primarily army related, though some specialty air and naval units could be included. These real part-time capabilities would buttress deterrence in peacetime and be available for fulltime mobilization when aggression appeared imminent.

ROC Army Reserve Brigade in Hsinchu. (Source: youth daily news)

Quality over Quantity: The current paper system theoretically envisages a wartime reserve of 2.5 million. A reformed system could

consist of much more modest but real capabilities. Each city and county could initially have one to five 600-1,000 member battalions with missions relevant to local defense circumstances. Each unit member would have uniforms at home and appropriate weapons and equipment located locally. The increased service commitments would provide time for realistic training relevant to each unit's responsibilities. The three existing reserve training centers could be reorganized so that each of Taiwan's cities and counties would have a local armory to house the weaponry and equipment needed for the local units and to provide an organizational structure to conduct the training needed to build and maintain unit capabilities.

A New Name: It is a regrettable that contemporary Taiwan still experiences an authoritarian hangover that perpetuates negative attitudes toward the military and MND. President Tsai has worked hard to change these attitudes, but they remain a reality that undermines the attractiveness of participation. To attract broader support, the new structure should not use the term "reserves." To mark a clear break, new terminology should be chosen. In choosing new terminology, highest priority should be given to finding a new name that would have greater appeal to potential participants. As suggested in this paper, terminology that captures the new organization's local or territorial defense role should be considered. In the background, MND would continue to provide coordination, establish roles and missions, create and enforce standards, perform inspections and oversee the whole structure to ensure integration with the regular forces.

Creating such a new locally based structure would represent a major conceptual and organizational change. How can reform be accomplished within the existing relationship between the center and cities/counties? The first challenge would be to build a national political consensus that

such major reform is necessary. This would include molding new public understandings and attitudes about the role of localities in their own defense. This in turn would require both a great deal of time and consistent leadership by the President, by mayors and magistrates, by the Minister of Defense and the Chief of the General Staff.

Two specific obstacles would have to be addressed. The initial reaction of many in the armed forces leadership will likely be to resist reform. There will be resistance to ceding power and budget resources to localities. There will be skepticism that locally recruited and led units will be militarily relevant and responsive. The military's concerns will have to be addressed, and they will have to be convinced that a reformed system will actually contribute more to deterrence and defense than the existing reserves.

The second hurdle will be budgetary. A reformed force that is smaller but more effectively designed, equipped and trained will cost more than the paper forces that currently exist. Overall budget limitations, competing civilian priorities and recent increases in defense spending including the special procurement budgets will likely be cited as reasons why reforming the reserves is not affordable. On the other hand, almost all of the costs or creating and maintaining the reformed system would be domestic costs plowed back into the Taiwan economy. Hard thinking on how to realign defense spending to maximize deterrence and defense will be required.

Nevertheless, the effort to overcome obstacles would be worthwhile because it would yield real benefits for Taiwan. First, if even at the outset each city or county would have only one or two operationally-ready battalions, then Taiwan would have about 30 fully manned, equipped

and trained battalions that don't exist under the current reserve system. That would be a meaningful increase in Taiwan deterrence capability.

Second, opinion polls indicate that many civilians in Taiwan do want to participate in resisting Chinese aggression. A reformed system would provide a meaningful vehicle to channel such people's interest into real contributions to Taiwan's deterrence and defense. This would demonstrate greater public willingness to fight, something which many, including the PLA, now discount. And this public commitment would in turn strength the willingness of the U.S. to come to Taiwan's assistance.

Finally, the real capabilities of the reformed system combined with the increased evidence of public commitment to defend Taiwan would have to be taken into account by PLA defense planners and the CCP leadership. This means that the reformed forces would contribute to deterrence, something that the current reserves do not.

The purpose of this paper is to raise issues facing the reserves and to provoke hard thinking about a new system. Many will believe the ideas are too radical, too ambitious, too time consuming. Their thoughts on alternative, more practical and rapid ways for reforming reserve forces that will make a meaningful contribution to deterring Chinese aggression are welcome.

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PRC's Nuclear Force in the post-INF Era

By Arthur S. Ding

On May 8, 2020, Xi-jin HU, the editor of Beijing based Chinese language *Global Times*, China's tabloid media, proposed in his weibo chat room that China needs to increase its total size of nuclear forces to one thousand missiles (and warheads) in very short period of time, and among the total size of one thousand nuclear missiles (and warheads), at least 100 should be DF-41. Hu made this remark as a response to mounting pressure launched by the US in the context of escalating and comprehensive US-China tension.

DF stands for Dong Fong, or East Wind. DF-41, which was officially unveiled on Oct 1 2019 National Day military parade, is believed a solid-fuelled road and rail mobile intercontinental ballistic missile able to hit the whole US continent from China. It reportedly carries at least six nuclear warheads with multiple independently re-entry vehicle at a falling speed of Mach 25 capability able to penetrate US developed national missile defense system.

Hu's remark is sensational enough and has been echoed by many "little pink" fans who are ultra-nationalistic Chinese people. Nevertheless, will Hu's proposal be endorsed by Chinese Communist Party top leaders sitting in the Forbidding City? The answer is probably negative and likely disappoints him *and his "little pink" fans.*

Many factors, which are somewhat inter-related, have been considered by CCP/People's Liberation Army (PLA) top leaders to assess and evaluate the future role of nuclear weapon and ideal size of its nuclear

force. These include, but are not limited to, assessment of long term external environment, evolving warfare and operational trend in the world, and new technological development.

DF-41 unveiled on Oct 1 2019 National Day military parade. (Source from PRC Ministry of Defense, http://www.mod.gov.cn/big5/photos/2019-10/01/content_4851926_4.htm)

Assessment of External Environment

Chinese leaders frequently make assessment of external environment, and this is particularly the issue over peace and war. Their assessment can be read from series of *China's National Defense* which is regarded as China's defense white paper illuminating China's defense policy. Every version of the defense white paper starts from review of external environment.

There is no exception for the latest one, which is titled *China's National Defense in the New Era*, released on July 24 2019.[1] Briefly speaking, they

[1] *China's National Defense in the New Era* (Beijing: The State Council Information Office of the People's Republic of China, July 2019). The English version d-

are optimistic about the change of external environment, though with some caveat. It should bear in mind that the 2019 version was released after the trade war between the US and China had been launched by US President Trump, and outlook for the impact of the trade war on the future environment should be factored in this version.

The CCP top leadership sees a total re-alignment of international power in the making and this trend poses China opportunity. "The world today is undergoing profound changes unseen in a century. As economic globalization, the information society, and cultural diversification develop in an *increasingly multi-polar world*,(italic by this author)…As the realignment of international powers accelerates and the strength of emerging markets and developing countries keeps growing, *the configuration of strategic power is becoming more balanced. The pursuit of peace, stability and development has become a universal aspiration* (italic by this author) of the international community with forces for peace predominating over elements of war."

Some interpretations are warranted for the above observation by the CCP top leadership. The first is about US role and status in a "multi-polar world." A multi-polar world implies that no single power, the US, can dominate the world any more, while others, including China, are rising with growing national capabilities able to catch up those of the established power, the US. This involves the assessment of national powers among major powers, and many take the view that China surely cannot overtake the US yet at present, but China has grown rapidly while the US' power suffered a lot in the wake of the 2008 global financial meltdown.

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raws from *China Daily*, https://language.chinadaily.com.cn/a/201907/24/WS5d37f2aea 310d83056400bef.html.

A multi-polar world has serious implication for international relations (IR). IR theory dictates that in a multi-polar world, major powers form different coalitions based on different issues to compete one another. This implies that the US cannot dictate its old allies established since World War II anymore and the old allies are gradually falling apart. Amid this transition, some old allies form coalition, if not alliance, with China on certain issues.

The second involves the issue of peace vs. war. Since late 1970s, when Deng Xiaoping had launched the economic reform, assessment on peace and war has been frequently made. Unlike the one forecast by Chairman Mao in the 1960s at the heyday of the Cold War that an early, large scale and nuclear war was inevitable, Chinese leaders since Deng have observed a world trend toward peace. For instance, in late December 1985, Deng, when chairing the expanded Central Military Commission meeting, expounded a peaceful world ahead. It should be emphasized that Deng pointed to a stable and peaceful relations among major powers, although military conflicts among regional and small powers would erupt.

What can be implied from the forecast made by Chinese leaders? Briefly speaking, a peaceful world among major powers implies that likelihood for a nuclear exchange among major powers is low, and, as a result, there is no need to make huge investment in nuclear weapon in a hurry manner, nuclear weapon would be placed in back seat, and resources should be re-allocated to other urgent and prioritized programs and items.

As said, there is a caveat for the above mentioned conclusion of a peaceful trend. That is the US, and a rising strategic competition with the US is envisioned in the defense white paper. The US is accused of adopting unilateral policies in the white paper: "…It has provoked and intensified

competition among major countries, significantly increased its defense expenditure, pushed for additional capacity in nuclear, outer space, cyber and missile defense, and undermined global strategic stability…" This implies that China has fully realized an across-the-board competition with the US ensues, and competition in military sector is included, though likelihood for all-out war with nuclear exchange is very low.

Evolving Operational Modes

Parallel to the changed perception of war and peace is the adjusted observation of type of war or operational mode, and China has also gone a long way on this issue. Again, this has serious implication for the role of nuclear weapon, and as a consequence, procurement and deployment of nuclear weapon may be affected.

Several stage of the development of operational modes can be identified after Deng launched the reform in late 1978. Immediately after the reform was launched, it was "People's War under modern condition." In late 1985 when one-million force was cut, Deng instructed to fight a "local war." After the 1991 Gulf War in which US led coalition force employed high-tech weapon to crush Iraqi force, a new doctrine was ushered and it was "local war under high tech condition." Since 2004, operational doctrine has evolved to "local war under informationalized condition." In the latest version of 2019, no new doctrine was ushered by Xi and it is believed that "local war under informationalized condition" continues to be the official doctrine.

Two common features can be drawn from those doctrines. The first is that the old scenario of a war of invasion has been totally outdated. Chairman Mao envisioned a mighty Soviet force which might crush PLA force. In order to effectively resist possible Soviet invasion, Chairman Mao advocated to adopt "People's War" by luring the enemy forces deep

into China's hinterland and PLA would be mobilized to cut the enemy force's logistical supply, and in the end, the enemy force would be forced to retreat.

The new scenario is to pursue a war of limited objective. In fact, "local war" is equivalent to "limited war" of western concept, and it indicates a war is confined in an area with limited political objective such as maritime resource, territorial dispute and terrorist problem, and the objective is to place self in a favorable position for future political negotiation. Escalation is possible, but it does not aim to employ massive force to totally annihilate an adversary force.

A study of two textbooks on PLA's strategy vividly shows this change of military strategy and different concept of strategic focuses in China.[2] *On Strategy* of 1984, which was published by PLA Academy of Military Science, PLA's top research institute set up by Chairman Mao, still focuses on possible invasion of the Soviet force and the book only concentrates on issues of war time. Nevertheless, in a new book *On Strategy* of 1997, which was published by PLA National Defense University presumably as a professional military education textbook for PLA officials of different services, issues have been diversified to include peace time and war time, and focus has been shifted to local war.

Secondly, it is assumed that conventional force and its employment should be the main focus. If political objective is limited, there is no need to employ nuclear force, particularly those high yield nuclear weapons because high yield nuclear weapons can cause unnecessary massive

[2] Taylor Fravel, "The Evolution of China's Military Strategy," in David Finkelstein and James C. Mulvenon (eds), *China's Revolution in Doctrinal Affairs* (Alexandria, VA: Center for Naval Analysis, 2005).

casualties and ruin everything.

Related to focus on local war, a rising priority has been identified by PLA, and Xi Jinping's un-precedent defense/military reform of 2015/16 aims to achieve that prioritized goal. That is (integrated) joint operation, and it can be defined as: connected by synchronized information technology instrument to allow all operating units to share same battlefield awareness, all operational forces of different services fight against same target from different aspects.

Xi Jinping visit PLA Joint Operations Command Center on 20th April, 2016. (Source from PRC Ministry of Defense, http://www.mod.go v.c n/big5/lead ers/201604/20 /content_4650183_2.htm)

What can be implied from the above discussed evolving operational mode for the role of nuclear weapon? A military conflict (or war) employing conventional force for a limited objective is more likely to erupt. The role of nuclear weapon has receded to serve as a deterrent against possible nuclear intimidation and coercion by an adversary

power.

Nevertheless, there is a caveat again. That is the role of low-yield nuclear weapon in asymmetric operation against powerful US force in the Pacific Ocean region. Recently, China was accused by the US of "…lack of transparency on its nuclear testing activities – which has included frequently blocking the flow of data from its International Monitoring System (IMS) stations to the International Data Center operated by the Preparatory Commission for the Comprehensive Nuclear Test-Ban Treaty Organization…" [3] and rumor about developing and testing low-yield nuclear weapon abounds.

This kind of rumor about China's development of low-yield nuclear weapon is not new. There was another one in the late 1980s, in which a Chinese analyst discussed neutron bomb and as a result, a speculation on China's development of neutron bomb flied around.

The theory of this rumor has that given the fact that US force is perceived much experienced in executing joint operation with much advanced weapon systems, PLA will not be able to withhold US force and ultimately be forced to use low-yield nuclear weapon to dispel, if not to defeat, US force coming to Taiwan's aid. This theory is similar to that of the late 1980 in which PLA force could not resist Soviet mighty force and ultimately PLA had to use neutron bomb or low-yield nuclear bomb to wipe out those invading

[3] *2020 Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments (Compliance Report)* (Washington DC: Department of State Bureau of Arms Control, Verification, and Compliance, 2020), in https://www.state.gov/2020-adherence-to-and-compliance-with-arms- control-nonproliferation-and-disarmament-agreements-and-commitments-compliance-report/.

Soviet force within China's own territory.

To some extent, this theory makes sense. But, it will inevitably run the risk of escalating fight from conventional to nuclear level, and the worst risk involves legitimacy and justice of using nuclear weapon, even low-yield one. In other words, nuclear option is left out in this author's argument.

Priority on New Technology

China closely monitors the development of new technologies which may shape future direction of military operation. It involves China's strong belief that technology deeply affects a nation's economy and national security, and endorsing the well known 863 program by Deng Xiaoping exemplifies this belief.[4] Intensified strategic competition with the US definitely will enhance this belief.

With this belief, emerging technologies are frequently identified and assessed for their potential military application. Again, the 2019 defense white paper gives us a useful hint over what emerging technologies are monitored. "Driven by the new round of technological and industrial revolution, the application of cutting-edge technologies such as artificial intelligence (AI), quantum information, big data, cloud computing and the Internet of Things is gathering pace in the military field. International military competition is undergoing historic changes. New and high-tech military technologies based on IT are developing rapidly. There is a

[4] The 863 program denotes a high tech development program proposed by well respected Chinese scientists to Deng Xiaoping who formally endorsed the proposal on March 1986. See Evan Feigenbaum, *China's Techno-Warriors: National Security and Strategic Competition from the Nuclear to the Information Age* (Stanford: Stanford University Press, 2003). The high-tech designated by those scientists included IT, new material, space, biotech, automation, laser, marine, and energy.

prevailing trend to develop long-range precision, intelligent, stealthy or unmanned weaponry and equipment. War is evolving in form towards informationized warfare, and intelligent warfare is on the horizon."

It should be emphasized that some technology can be used to further improve capability of nuclear weapon. A typical case is that of hypersonic glide vehicle (HGV). Media reported that China made a test of this vehicle on January 9, 2014.[5] Although no technological detail was unveiled, it is assumed that with its changed trajectory of nuclear warhead after re-entering the atmosphere and high speed, it is impossible for the US missile defense to intercept the incoming ICBM.

In other words, some new technologies can boost China's capabilities of nuclear weapon, and HGV is one of them. Along with road and rail mobile, all these technologies can help China's nuclear weapons escape US' first strike and interception by US missile defense, allowing China's nuclear weapons to survive and penetrate missile defense of the US, and ultimately accomplishing the goal of deterrence or retaliation.

Further, new technology is likely to bring systemic change in military operation. A typical case is that of cyber operation. A successful cyber operation penetrating into adversary's computer system can disrupt and delay, if not totally ruin, its command and control mechanism, making weapon system useless. That can partially explain why Xi Jinping established the Strategic Support Force (SSF) by amalgamating relevant cyber/IT warfare related institutes and agencies, and one of SSF's major

[5] Bill Gertz, "Hypersonic arms race: China tests high speed missile to beat US defenses." *Washington Times*, January 13, 2014. https://www.washingtontimes.com/news/2014/jan/13/hypersonic-arms-race-china-tests-high-speed-missil/?utm_source=RSS_Feed&utm_medium=RSS.

pillar is to develop and execute cyber related operations.

Another example has something to do with the combination of cyber and dis-information/mis-information operation. The objective is to divide and rule of an adversary's elites and society so that the adversary's overall morale deteriorates and national solidarity breaks up.

This kind of systemic change in military operation is highly aspired in Chinese way of conducting warfare and operation. The well known classics, *Sun Zi's Art of War*, which is a must read for PLA's professional military education program at different levels, stipulates that the best smart way of conducting a warfare is to subdue an adversary force without a fight, while the worst is to have real fight. To some extent, cyber operation can help realize the above stated aspiration.

Nevertheless, Chinese top leaders are fully aware that cost has to be paid in keeping abreast of the development of new technologies. Identifying emerging technologies is the first step. Following the identification is a challenging and daunting task ranging from organizing teams to further study concrete direction of research and development (R&D) of those emerging technologies, making investment in new facilities for the R&D, to hiring qualified staff to do practical R&D work with decent pay. Briefly speaking, massive resources will be invested in the whole process, and Chinese leadership has to weigh new technology development against procurement and deployment of weapons and seek to strike a balance and to pursue an optimal usage of budget.

The above stated development of new technologies in the context of Chinese aspiration implies that as long as Chinese leadership is confidence of China's nuclear survivability and retaliation capabilities, though limited, likelihood for allocating more resources to increase the size of nuclear force is relatively low.

This does not mean that Chinese leadership is benign actor. Like any political leader in the world, they are realists who are keen on making calculation all the time, including that related to statecraft and international relations. War is a matter involving a dialectical relationship between political objective and economy, and it needs frequent assessment and calculation between the two elements. Economy may be preferable if political objective can be achieved.

The INF

There is no doubt that Hu's remark on deploying thousands of nuclear weapons is related to the US withdrawal from the INF Treaty under President Trump and China needs to make some response in order to safeguard China's national security.

INF Treaty, which stands for Intermediate-Range Nuclear Forces Treaty (or formally, Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles), was signed between the US and the Soviet Union (and its successor state, the Russian Federation) on December 8, 1987, and ratified on June 1, 1988. Its purpose is to eliminate all of the two nations' land-based ballistic missiles, cruise missiles, and missile launchers with ranges of 500–1,000 kilometers (310–620 miles) (short medium-range) and 1,000–5,500 km (620–3,420 miles) (intermediate-range). The treaty did not apply to air- or sea-launched missiles.

President Trump's decision to withdraw from INF Treaty was made based on the allegation that Russia breached the treaty. Nevertheless, many speculate that the withdrawal aims at China which, through having deployed many short and medium range ballistic and cruise missiles, along with rapidly modernizing its conventional forces, has developed a

force able to execute anti-access and area denial (A2/AD) mission against US force in the Asian Pacific region. In other words, withdrawing from INF Treaty will allow the US to develop and deploy ballistic missiles of medium range and somewhat reverse the unfavorable configuration for the US in this region.

Aside from withdrawing from INF Treaty which was announced on October 20, 2018, and effective on August 2, 2019, President Trump also proposed to include China in a multilateral negotiation of nuclear weapons. This may reflect a fact that Trump administration has perceived a world of different system in which China has been a formidable power with its growing military capability, and as a result, many nuclear related arms control regimes, in which INF Treaty was included, need to be re-arranged.

China's opposition to the US withdrawal from INF Treaty and the proposal of multi-lateralization of nuclear arms control is expected. China's position was explained by Hua Chunying, spokeswoman of PRC's Ministry of Foreign Affairs. Her remark included several points:[6]

- China is concerned with and opposes the possible abandonment of the treaty as a result of U.S. unilateral withdrawal.
- China will in no way agree to making the INF Treaty multilateral… multilateralization of the treaty, which is bilateral in nature, involves political, military, legal and a series of other complex issues.
- China's development of intermediate-range missiles is purely for defensive purposes, which is not intended to and will not pose a threat to any other country. The true purpose of the United States pulling out of

[6] This draws from "China reiterates opposition to multilateralization of INF treaty," *Xinhua*, July 30, 2019, http://www.xinhuanet.com/english/2019-07/30/c_1382 70534.htm.

the treaty is to avoid its bounden duties.

- China champions a comprehensive ban on and thorough destruction of nuclear weapons, but nuclear disarmament should adhere to the internationally recognized principle of 'undiminished security for all' concerning arms control.

Real questions are two: will the withdrawal really help US militarily and will the withdrawal pose a military threat to China? A short answer to these two question is No, although it may cause problem for China to monitor.

The withdrawal makes no difference to US force and poses no threat to China in conventional force. INF Treaty only restricts those ground based ballistic and cruise missiles, leaving sea and air launched ones untouched. Since the 1980s, the US has deployed well known Tomahawk cruise missiles in surface warships and submarines with ranges between 1,300 kilometers and 2,500 kilometers, and the cruise missiles have been launched in many large military operations by the US with proven record.

It means that the US can extend the flight range of Tomahawk missiles easily with its established technology to hit fixed targets in China. This extension of range is required assuming that China may execute A2/AD operation denying the US force to get close to Chinese mainland. What these Tomahawk missiles cannot do is to hit Chinese military's mobile targets both in the sea and land, allowing PLA military assets to survive.

There is no doubt that the US can easily produce land based ballistic and cruise missiles. Nevertheless, the problem is on deployment: where they can be deployed in countries along the first island chain? Japan, South Korea, and the Philippines are very likely to reject requests made by the US of deploying ground launched ballistic and cruise missiles for fear of angering China, and in the end, the US may find no ground base to deploy

those missiles, and ultimately, the US will continue to rely on surface warship and submarine launched cruise missiles.

Further, the above stated reason can be applied to medium-range missiles with nuclear warhead. Nuclear warhead can be mounted on Tomahawk missiles to hit China's targets from US surface warships and submarines, while no country along the first island chain will agree to deploy US' ground launched nuclear warhead mounted ballistic and cruise missiles. This means that the withdrawal does not help US force and pose no real threat against China at all. It actually makes no difference at all.

As for multilateralization of nuclear arms control, it will go nowhere at this stage. Given the fact that US-Russia relations has deteriorated, it is unlikely for Moscow to echo the US proposal so that Moscow-Beijing can continue their anti-US coalition and to have the US fight a two-pronged pressure. Reluctance by Russia will create no pressure against China, while other western nations of US allies will concentrate on more urgent issues such as revitalizing own economies and combating COVID-19 pandemic.

Conclusion

US' withdrawing from INF Treaty is definitely a big issue. As many have posited that it may spark another round of arms race among US, Russia, and China. In fact, a strategic competition in the field of space and nuclear which are inter-related between the US and China had been kicked off in the 2000s as China quietly modernized limited nuclear force and developed its space assets.[7] Previous practice initiated by Russia

[7] Arthur Ding, "Sino-U.S. Competition in Strategic Arms," Rajaratnam School of International Studies (RSIS) Working Paper No. 157 (Singapore:

President Putin on many international issues demonstrates that he will not sit idle on the withdrawal issue.

PLA's force development pattern in the past more than two decades reflects its perception of changing external environment. Record shows that China has developed and deployed more short and medium ranges ballistic and cruise missiles with conventional and nuclear warhead capability than that of ICBMs. This implies that China has not expected and foreseen a possible nuclear confrontation with the US, but a military conflict in conventional mode with a focus on Taiwan is envisioned given the fact that the US involved in the 1995/96 Taiwan Strait crisis and later frequently provided assistance to Taiwan.

The above observation does not deny China's effort in modernizing its nuclear force. What we can see is a trend toward strengthening survival capabilities with a slow pace on developing new and longer range of ICBM. Difficulties in technological progress may have served as a constraint factor to China's ambition to rapidly develop and deploy more ICBM and sea launched long range ballistic missiles.

China's nuclear policy is featured as credible minimum deterrence.[8] Credible minimum deterrence means that with road and rail mobile as

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RSIS, April 24, 2008), http://www.rsis.edu.sg/publications/WorkingPapers/WP157.pdf.

[8] Michael Chase, "China's Transition to a more credible deterrent: implications and challenges for the US," *Asia Policy*, No. 16 (July 2013), pp. 69-102, and Eric Heginbotham, Michael S. Chase, Jacob L. Heim, Bonny Lin, Mark R. Cozad, Lyle J. Morris, Christopher P. Twomey, Forrest E. Morgan, Michael Nixon, Cristina L. Gara fola, Samuel K. Berkowitz, *China's Evolving Nuclear Deterrent—Major Drivers and issues for the US* (Santa Monica, CA: Rand, 2017), in https://www.rand.org/co ntent/dam/rand/pubs/research_reports/RR1600/RR1628/RAND_RR1628.pdf.

well as penetration capabilities, China can survive first strike launched by adversary against China's limited volume of nuclear force, and successfully execute retaliation. Let alone the fact with improved early warning, reconnaissance, and surveillance capabilities, China actually may develop and execute retaliation based on launch-under-strike capability although Beijing always claims to stick to the principle of no first use.

In conclusion, the US withdrawal from INF Treaty poses no major problem for China in both nuclear and conventional force field. It is quite unlikely for Beijing to increase its size of nuclear stockpile in a hurry manner.

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A Rising China's Military Power: Examining the U.S. DoD's Report on China Military Developments and China's Defense White Paper

By Michael Shao-Cheng Sun

I. Introduction

China is using its economic and military power to persuade other states to comply with its agenda. Such Chinese assertiveness is willing to accept friction with other states in order to pursue its own national interests. For instance, China has militarized the South China Sea and patrols Diaoyutai Islands in the East China Sea with ships and aircraft that imperil the free flow of trade while confronting against the U.S. military vessels and warplanes. The People's Liberation Army (PLA) has increased patrols around and near Taiwan using bomber, fighter, and surveillance aircraft to threaten Taiwan.[1] This rising Chinese military power has become an increased concern to the U.S. Department of Defense's (DoD).

The U.S. DoD's Report on China Military Developments and China's Defense White Paper have long been regarded the most important documents for studying China's military development. The U.S. DoD 2019 report, *Military and Security Developments Involving the People's*

[1] U.S. DoD, *Indo-Pacific Strategy Report: Preparedness, Partnerships, and Promoting a Networked Region*, June 1, 2019 (Washington D.C.: The Department of Defense), pp. 8-9.

Republic of China, was released on May 2, 2019.[2] This report includes five chapters: understanding China's strategy, force modernization goals, capabilities for operations along China's periphery, resources for force modernization, and U.S.-China military-to-military contacts. Since this report is the most credible and updated assessment of China's military build-up, it is an indispensable intelligence for those who closely observe Chinese military development. In July 2019, the PRC State Council Information Office released the Defense White Paper entitled *China's National Defense in the New Era*. The content includes international security situation, defense policy, the missions of armed forces, reform in national defense, defense expenditure, and building a future community. The Paper expounds on defense policy and explains the purposes to build a national defense, with a view to helping the international community better understand China's defense.[3] Anthony Cordesman, Arleigh Burke Chair in strategy at Center for Strategic and International Studies (CSIS), contended that the detailed contents of the White Paper are a direct response to the U.S. reports on Chinese military power.[4] In order to come up with a neutral stance and accurate analysis of China's military build-up during the Xi' administration, this research revisits major points of two reports and assesses the implication of the rising Chinese military power. It will examine China's national strategy,

[2] U.S. DoD, "DOD to Release 2019 Report on Military and Security Developments in China," May 1, 2019, retrieved May 10, 2019, https://dod.defense.gov/News/News-Releases/News-Release-View/Article/1833267/dod-to-release-2019-report-on-military-and-security-developments-in-china/.

[3] The State Council Information Office of the People's Republic of China, *China's National Defense in the New Era*, July 2019, (Beijing: The State Council Information Office of the People's Republic of China).

[4] Anthony H. Cordesman, "China's New 2019 Defense White Paper: An Open Strategic Challenge to the United States, But One Which Does Not Have to Lead to Conflict," July 24 2019, p. 1, http://apo.org.au/node/249869.

defense policy, force modernization and make suggestions on how Taiwan can counter China's growing military threat.

II. National Strategy

Chinese leaders advance an agenda of military modernization while pursuing economic growth and improving their technological strength. China's strategy aims at achieving the objective of the "great rejuvenation of the Chinese nation." [5] Strategic objectives are comprehensive including politics, foreign relations, economy, and military in the hope of building a powerful nation. Their overall strategies and policies are as follows:

(1) Strategic objectives

The strategic objectives of the Chinese Communist Party (CCP) are perpetuating CCP rule, maintaining domestic stability, sustaining economic growth, defending sovereignty, and securing China's status as a great power. These objectives have been revealed in President Xi's "China Dream" that strives to restore China's status as a powerful and prosperous nation.[6] Chinese leaders acknowledge that building a strong China without a stable society will be in vain. "Stability overrides all" has turned out to be their firm belief.

(2) Foreign policy

China's foreign policy seeks to enhance its profile in international community while pursuing the establishment of new multilateral

[5] Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2019* (Washington. D.C.: Office of the Secretary of Defense, 2019), p. 1.

[6] Ibid., p. 3.

mechanisms. China advocates for the building of a "community of common human destiny" while stressing that it will defend its core national interests and not be afraid to respond to the U.S. provocations.[7] China's foreign policies have become more confident by promoting multilateral mechanisms to counter U.S. rebalancing in Asia and to prevent U.S.'s unilateral domination of international affairs.

(3) Economic policy

Sustaining China's economic growth is one of the CCP's strategic objectives. Along with investments in infrastructure to support its economic growth, China is investing in technologies that will be foundational for future innovations with both commercial and military applications.[8] In recent years, the China's most important strategy is the One Belt and One Road (OBOR) initiative that strives to develop investment opportunities, cultivate export markets, spike incomes, and maintain influence in the world.[9]

(4) Defense policy

The strategic goals for the development of national defense are: to achieve mechanization by 2020 with enhanced informationization; to advance the organizational structure, military personnel, and weaponry in align with the national modernization; to complete the modernization of the military by 2035; and to fully transform the PLA into world-class

[7] Ibid., p. 6.

[8] Ibid., p. 9.

[9] Andrew Chatzky and James McBride, "China's Massive Belt and Road Initiative," *The Council on Foreign Affairs*, Jan 28, 2010, retrieved May 16, 2019, https://www.cfr.org/backgrounder/chinas-massive-belt-and-road-initiative.

forces by 2050.[10] Chinese leaders continue to emphasize developing a military that can fight and win the war through realistic combat training.[11] The military strategy will speed up its military buildup and enhance its military training to meet its security interests.

China's national strategy includes all dimensions that ambitiously endeavor to realize Xi Jinping's "China Dream."[12] To achieve this goal, China needs a peaceful society, stable international environment, sustainable economic growth, and strong military.

III. Defense Policy

China's Defense White Paper states that international security order is undermined by growing hegemonism and unilateralism. China faces security threats as a result of the U.S. strengthening its own military alliances and reinforcing military intervention. For example, the deployment of the Terminal High Altitude Area Defense (THAAD) system in South Korea by the U.S. has undermined the East Asian strategic balance. [13] The Chinese government also views the Taiwan

[10] The State Council Information Office of the People's Republic of China, *China's National Defense*.

[11] Office of the Secretary of Defense, *Annual Report*, p. ii.

[12] China Dream as attaining the "Two Centenary Goals": the material targets of China becoming a "moderately well-off society" by around 2021, the 100th anniversary of the CCP, and the modernization target of China becoming a completely developed country by around 2049, the 100th anniversary of the PRC. Please see, Ehizuelen Michael Mitchell Omoruyi, "China's march towards a moderately well-off society," *China Daily*, Mar 16, 2018, retrieved May 17, 2019, http://www.chinadaily.com.cn/a/201803/16/WS5aab21d6a3106e7dcc142020.html.

[13] The State Council Information Office of the People's Republic of China, *China's National Defense*, p. 2.

independence movement as the gravest threat to peace in the Taiwan Strait.[14] In response to these security threats, China will pursue a defense policy to safeguard its sovereignty, maintain its combat readiness, develop nuclear weapons, and fulfil its international responsibilities.

A Terminal High Altitude Area Defense Interceptor is seen in Seongju, South Korea, April 26,2017 (Source: Voice of America)

(1) Safeguard sovereignty

The PLA conducts air defense, reconnaissance, and an early warning to respond to security threats. The PLA aims to safeguard national security, to protect maritime interests, and to oppose Taiwan independence. Beijing claims that the South China Sea islands and Diaoyu Islands are inalienable parts of the territory. They view building infrastructure, deploying military on the reefs in the South China Sea, and conducting patrols in the waters of Diaoyu Islands as legitimate to defending

[14] Ibid., p. 3.

national sovereignty.[15] To fight "the terrorists, extremists, and separatists" in Xinjiang, the People Armed Police (PAP) has tightened security such as guarding key targets, setting checkpoints on key passages, etc. Since 2014, the PAP has assisted the government of Xinjiang Uygur Autonomous Region in capturing dissidents.[16] In addition to that, the PLA thinks it is essential to send a clear warning to the Taiwan leaders by sailing ships and flying aircraft around Taiwan.

The Paper further threatens that they will defeat anyone attempting to separate Taiwan from China at all costs.[17]

In this Nov. 4, 2017, file photo, Uighur security personnel patrol near the Id Kah Mosque in Kashgar in western China's Xinjiang region by NG HAN GUAN. (Source: The Public Radio)

[15] Ibid., p. 5.

[16] Ibid., p. 12.

[17] Ibid., p. 10.

(2) Maintain combat readiness

The Central Military Commission (CMC) and the Theater Commands' (TCs) have frequently conducted regular drills to ensure combat readiness.[18] To enhance realistic training, the PLA conduct supervision on military training for emergencies and combat, implement the responsibility system for training and readiness, and organize contests. Military training in real combat conditions across different services is in full swing.[19] The increased exercises and realistic combat trainings have sharpened the PLA's skills.

(3) Develop nuclear weapons

To safeguard China's national security, the PLA has continued to develop capabilities of nuclear weapons. China's nuclear weapons policy prioritizes a limited but survivable nuclear force. China has long maintained a "no first use" (NFU) policy, though ambiguity remains over the conditions under which China's NFU policy would no longer apply.[20] There has been no indication what national leaders are willing to attach to China's NFU doctrine.[21] Chinese government is enhancing peacetime readiness levels for nuclear forces to ensure their responsiveness.[22]

(4) Fulfil international responsibilities

In order to improve its international image, China aims at fulfilling its international organization by upholding the principles of the UN charter,

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[18] Ibid., p. 10.

[19] Ibid., p. 10.

[20] Office of the Secretary of Defense, *Annual Report*, pp. 65-67.

[21] Defense Intelligence Agency, *China Military Power: Modernizing a Force to Fight and Win* (Washington D.C.: Defense Intelligence Agency, 2019), p. 36.

[22] Office of the Secretary of Defense, *Annual Report*, p. 67.

and building a new-model security partnership featuring equality, mutual trust, and win-win cooperation.[23] The PLA participates in vessel protection operations, and international efforts in humanitarian assistance and disaster relief, strengthen international cooperation in arms control, and respond to global challenges such as terrorism and cyber security. [24] Furthermore, China's participation in the UN Peacekeeping Operations supports China's objectives by obtaining operational experience for the PLA.[25]

IV. Force Modernization

China is advancing force modernization and deepening reform in its national defense. The PLA Army (PLAA) has restructured the combined-arms battalions to conduct independent operations. The PLA Navy (PLAN) has constructed 12 nuclear submarines over past 15 years. The PLA Air Force (PLAAF) aims at narrowing the gap with the U.S. Air Force. The PLA Rocket Force (PLARF) has enhanced its "strategic deterrence" capability. Strategic Support Force (SSF) centralizes strategic space, cyber, electronic, and psychological warfare missions.[26] The PLA force modernization has the following trends.

(1) Increased military expenditures

For decades, those who study PLA military spending have been suspicious of China's statement of annual defense budget. China announced that its 2019 defense spending grows by 7.5 % to 1.19 trillion yuan ($177.6 billion) in 2019. The increase in defense budget is mainly

[23] The State Council Information Office of the People's Republic of China, *China's National Defense*, p. 29.

[24] Ibid., p. 8.

[25] Office of the Secretary of Defense, *Annual Report*, p. 24.

[26] Ibid., p. 48.

to be allocated to develop new weapons and equipment, improve training conditions, and guarantee military reform and benefits for military personnel.[27] Most scholars agree that China's actual military spending is higher than stated in the official budget. The U.S. DoD estimated it to be more than $200 billion in 2018. It is difficult to calculate China's actual military expenses, largely because of its poor accounting transparency. According to the Report, China's defense budget will likely increase by an annual average of 6%, growing to $260 billion by 2022. This will allow the PLA to dedicate more money for training, operations, and modernization.[28] However, China's Defense White Paper argues that from 2012 to 2017 China's average defense expenditure was about 1.3%, comparing to the U.S. 3.5%, Russia 4.4%, India 2.5%, the UK 2.0%, and France 2.3%.[29]

(2) Reforming the command system

The PLA has dismantled the systems of general departments, military area commands (MACs) and the force composition with a dominating ground force. First, reorganizing new CMC organs. The former four departments have been reorganized into 15 organs. Second, improving the management system for services. The PLA has established the Army Strategic Support Force (ASSF) and the Joint Logistic Support Force (JLSF).[30] The PLA is attempting to transform from a quantity to quality force, as well as from personnel-intensive to Science and Technology-intensive force. Third, restructuring force composition. 300,000

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[27] "China's Defense Budget," Global Security Org., retrieved May 19, 2019, https://www.globalsecurity.org/military/world/china/budget.htm.

[28] Office of the Secretary of Defense, *Annual Report*, p. 95.

[29] The State Council Information Office of the People's Republic of China, *China's National Defense*, p. 26.

[30] Ibid., p. 14.

personnel have been cut to maintain the active force around 2 million. The PLA has downsized the PLAA, maintained the number of the PLAAF, and increased number of the PLAN and PLARF. Fourth, reorganizing the troops. The previous 18 group armies have been reorganized into 13. All major combat units follow a group army-brigade-battalion system. Additionally, the former 7 MACs have been reorganized into 5 TCs.[31]

(3) Promoting military development

Chinese government has actively promoted military development. The PLA has promoted innovation in defense S&T and military theory to establish a modernized force.[32] China has increased its capability to address its security objectives. First, China will realize its goal of a multi-carrier force in 2019 when China's first domestically produced carrier will be commissioned. Next generation of carriers will have greater endurance and a catapult launch system. The PLAN continues to develop into a global force, extending its reach beyond East Asia. Second, China is developing a new generation of long-range bombers with the features of a stealthy design and a capability to employ nuclear weaponry. Third, the Rocket Force fields multiple missiles capable of conducting strikes beyond the first island chain.[33]

The PLA has created an informatized force capable of expanding China's security. Since the information operations (IO) as a means of achieving information dominance early in a conflict, China has prioritized Command, Control, Communications, Computers, and Intelligence (C4I) modernization as a response to trends in modern warfare. One of the most efficient approaches in achieving an informatized military is to

[31] Ibid., p. 17.

[32] Ibid., p. 21.

[33] Office of the Secretary of Defense, *Annual Report*, p. 62.

accelerate the development of its capable cyber forces.[34] According to the China's Defense White Paper, the PLA accelerates their cyberspace capabilities by developing cyber security.[35] China is using cyber power to win global dominance. The Chinese government is behind the scenes in many cyber activities.[36]

(4) Espionage Activities

The international community has concerns about China's espionage activities worldwide in acquiring important intelligence. The PLA also expedited the development of its cyber forces that has infamously intruded into other foreign government computer systems. In 2018, the U.S. government found many hard evidences of China espionage activities in the U.S. First, a Chinese national residing in the U.S. fulfilled instructions from the Chinese military to obtain dual-use technology used for anti-submarine warfare and other advanced military capabilities. Second, the PRC Ministry of State Security (MSS) intelligence officers were indicted on charges of conspiring to steal sensitive technological information related to engines used in commercial airliners. Third, a MSS officer was arrested with espionage involving the theft of secrets for aircraft technology related to communication systems, and jet engines and aircraft propulsion from U.S. aviation firms. Finally, the officer targeted industry experts for recruitment by facilitating travel to China under the guise of delivering

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[34] Ibid., pp. 63-65.

[35] The State Council Information Office of the People's Republic of China, *China's National Defense*, p.12.

[36] Lyu Jinghua, "What Are China's Cyber Capabilities and Intentions?" Carnegie Endowment for International Peace, April 11, 2019, retrieved May 19, 2019, https://carnegieendowment.org,/2019/04/01/what-are-china-s-cyber-capabilities-and-intentions-pub-78734.

university presentations.[37] The PRC security related apparatuses have attempted to steal high technology from the U.S. in support of China defense modernization. China's intelligent community will increase their espionage activities in supporting the military; however, they will be more vigilant in their clandestine intelligent collection to avoid tarnishing China's image.

Hu Jintao's New Historic Missions in 2004 ushered in the incremental expansion of the PLA's modernization. During the modernization process, PLA ground, air, naval, and missile forces have become increasingly capable to project power during peacetime and in the event of regional conflicts.[38] Under Xi Jinping, the PLA has sought to modernize its military in the hope of achieving a military world power. The PLA is speeding up its modernization process that attempts to catch up with the U.S. forces.

V. Recommendations for Taiwan

China's national defense will stride forward along its own path to build a stronger military and to achieve the goal of developing world-class forces.[39] Beijing's interest to compel Taiwan's reunification with China and to deter Taiwan from moving toward independence has served as one of the primary drivers for China's military modernization.[40] China's growing military power has posed a grave threat to Taiwan's security. Taiwan should increase its fighting power in the face of escalating military threats from China. Since Taiwan has difficulty in purchasing

[37] Office of the Secretary of Defense, *Annual Report*, pp. 103-104.

[38] Defense Intelligence Agency, *China Military Power*, p. 33.

[39] The State Council Information Office of the People's Republic of China, *China's National Defense*, p. 35.

[40] Defense Intelligence Agency, *China Military Power*, p. 33.

weapons abroad, Taiwan should continue to boost its defense-industrial sector.[41] There are several ways for Taiwanese military to secure its national interests.

(1) Strengthening Taiwan's self-defense

Taiwan has a limited defense budget and a restraint acquisition of desired weapon systems. On the contrary, China's rising economic power and increased defense budget has caused the cross-strait military balance to lean heavily toward China's favor. The PLA could attack Taiwan when the Chinese leaders deem Taiwan's violation of the so called "Anti-Sessation Law." In time of Cross-Strait military conflicts, Taiwan has to fight for their own survival. Thus, receiving military training and defense education for people in Taiwan is significant and indispensable. The Taiwanese military should also increase its military training, strengthen its defense buildup, develop more creative asymmetrical tactics, and boost its fighting will in preparation of future potential military conflicts.

(2) Striving for peace across the Taiwan Strait

Preventing war should be the shared belief among top leaders in Taiwan and China. Unfortunately, the Chinese government has now taken a more aggressive military posture. The Taiwanese government should do all in its means to prevent war from occurring, including advocating international community to promote peace across the Taiwan Strait. The Taiwanese government's response to China's provocation should be very vigilant; otherwise, China will use Taiwan's response as an excuse

[41] Emanuele Scimia, "The Only Way Taiwan Can Deter China," *The National Interests*, retrieved May 15, 2019, https://nationalinterest.org/blog/the-buzz/the-only-way-taiwan-can-deter-china-19988.

to initiate military attacks. Even though the current cross-strait relations face obstacle (The former Director of American Institute in Taiwan, Richard Bush calls it a "knot"), both governments should seek any possible means to cross the hurdles. The dialogues and contacts between governments, academics, and even militaries should be encouraged. The best approach to resolve the difference is through engagements because only the Taiwanese and Chinese can untie knot by themselves.

(3) Building a closer relation with the U.S.

To deter China, Taiwan needs America's vigorous support, both in political and defense terms.[42] Currently, there is a trade war between the U.S. and China. The Taiwanese government could seize this window of opportunity by further enhancing relations with the U.S. In particular, Taiwan should upgrade its military capability with the U.S. assistance, including purchasing advanced weaponry, increasing military trainings, upgrading weapon systems, and improving its military fighting capability. The U.S. security apparatus is friendly to Taiwan and regards it as a reliable security partner. However, while building up the close relations, Taipei should keep a low profile to avoid China from retaliation.

VI. Conclusion

The two reports have shown that China military power has continuously strengthened. China's military strategy aims at expediting its military modernization process. China also participates in international space cooperation and manages space-based information resources.[43]

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[42] Ibid.

[43] The State Council Information Office of the People's Republic of China, *China's National Defense*, p. 11.

The key takeaways of this research are as follows: China's strategy are wide-ranging. Chinese leaders carve for a peaceful domestic environment, sustainable economy, and strong military to realize their "China dream." With the help of sustainable defense spending, rigorous training, and growing military civilian industry, the PLA's fighting capability has significantly been enhanced. China's power projection has further expanded through acquisitions of new weaponry that contributes to closing the gap with the U.S. military. As China's response to Taiwan, and territorial disputes with claimants in East China Sea and South China Sea have become more coercive, the strain between the U.S. and China has become tense. For the interests of the both countries, the mutual military relations will continue to be for reducing risk, though differences will still exist.

China has increased military activities in large part targeted for the future invasion against Taiwan. The Taiwanese military should increase its military training, develop creative asymmetrical tactics, and boost its fighting will. Building a robust relation with the U.S. is always crucial. Meanwhile, the Taiwanese government and military should try any means to avoid any military confrontation and seek opportunity in making peace with China.

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U.S. Proposed Its Own Pacific Strategy after China

By Po-Chou Lin

In 2019, the diplomatic competition between China and Taiwan in the Pacific Ocean intensified. The Republic of China on Taiwan lost two Pacific allies, the Solomon Islands and Kiribati, in one week of September. At present, only four Pacific friends, Marshall Islands, Nauru, Tuvalu, Palau, maintain diplomatic relations with Taiwan. In fact, there seems to be a strategic contest between China and the United States lying behind the diplomatic competition between China and Taiwan over the Pacific. China has built diplomatic ties with ten Pacific island countries. And now, China is developing a comprehensive strategic partnership with these countries.

China's Expanding Influence in the Pacific

The south Pacific used to be the traditional sphere of influence of the U.S., Australia and New Zealand. In the face of hostile expansion, U.S. Indo-Pacific Command and U.S. regional allies have been shouldering the first-line defense responsibilities for over seventy years. However, the influence of China in the Pacific, be it political, economic, technologic or social, has clearly been expanding rapidly in the past decade. In 2006, the then-Premier Wen Jiabao said, "China is concerned, to foster friendship and cooperation with the Pacific island countries is not a diplomatic expediency. Rather, it is a strategic decision." In the first China-Pacific Island Countries Economic Development and Cooperation Forum held in

Fiji,[1] China established the China-Pacific Island Forum Cooperation Fund (China-PIF Cooperation Fund) to promote regional cooperation. At the same time, China has also been developing cooperation with regional countries through the China-Pacific Island Countries Program of Action on Economic Development and Cooperation. Currently, nine Pacific island countries have signed bilateral Memorandum of Understanding (MOU) on Cooperation on the Belt and Road Initiative with China. China has invested up to $15.01 billion in infrastructure in various island nations.[2] As Xi Jinping mentioned, China also expects to strengthen communication and coordination with the Pacific island countries in international affairs, support these countries to issue "Pacific Voice", jointly promote the implementation of the 2030 Agenda for Sustainable Development, and support these countries in advancing the "Blue Pacific" initiative.[3] This shows China's attempt to align different Pacific island countries' positions on foreign policies.

There are a total of 35 countries in the Indo-Pacific region, and 14 are Pacific island countries. Pacific island countries are mostly democracies, and their main economic activities are agriculture, fishery and tourism. The land area of each country is not large, but they own extensive

[1] "Wen's speech at China-Pacific Island Countries forum," *China Daily*, April 5, 2006, http://www.chinadaily.com.cn/china/2006-04/05/content_560573.htm.

[2] "China-Pacific Island Countries Program of Action on Economic Development and Cooperation," Ministry of Finance & Economic Management, http://www.mfem.gov.ck/images/documents/China-Pacific_Islands_Countries_Program_Oct_2019_MoU.pdf; "China, Pacific island countries hold 3rd economic development and cooperation forum," *Xinhua*, October 21, 2019, http://www.xinhuanet.com/english/2019-10/21/c_138490687.htm.

[3] "China, Pacific island countries lift ties to comprehensive strategic partnership," *Xinhua*, November 17, 2018, http://www.xinhuanet.com/english/2018-11/17/c_137612239.htm.

exclusive economic zones (EEZ) and rich marine resources. Not surprisingly, U.S. is trying to maintain its place as an existing power, and China is striving to penetrate U.S. influence in the region. Although, U.S. President Donald Trump regards the "Free and Open Indo-Pacific Strategy" as a top priority, it remains doubtful whether Pacific island nations' positions on international affairs would be in line with that of the U.S.

Figure 1-1: Chinese ship "Yuan Wang 2" in Waitemata Harbour, Auckland, New Zealand, 2005. (Source: Wikimedia Commons)

China's security and military intentions deserve more attention. In 2015, China started to deploy the BeiDou Navigation Satellite-3 (BDS-3) system to provide all-time, all-weather and high-accuracy positioning, navigation and timing services to global users. BDS-3 will be a constellation of 35 satellites. China has sent 31 satellites into the space in recent years. It is estimated that the system will be completed in 2020 to provide global services. The BDS-3 depends on the ground stations, including the reference stations, time synchronization stations, monitoring stations, and ground-based augmentation systems, to

improve the accuracy of navigation. China currently has monitoring stations in Thailand, Laos, Pakistan, Australia and other countries, and is now increasing the number of countries along the "One Belt One Road "for the construction of the stations. It is estimated that 1,000 ground stations will be built in ASEAN countries by 2020.[4]

Before 2000, most of China's precision weapons depended on the U.S.-owned Global Positioning System (GPS). The completion of BDS-3 can reduce the dependence of China's precision strike weapon systems on GPS. China's Satellite Maritime Tracking and Control Department, namely the Strategic Support Force Aerospace System Department or the PLA's 63680 unit, serves to support tracking and control during satellite launches. This unit frequently sends spacecraft tracking ships to the Pacific Ocean and the Indian Ocean to track rockets and satellites into orbit. The fleet comprises four spacecraft tracking ships, namely Yuanwang-3, Yuanwang-5, Yuanwang-6 and Yuanwang-7, and two rocket-carrying ships, which are Yuanwang-21 and Yuanwang-22. These vessels are all subordinate to the Satellite Maritime Tracking and Control Department. The fleet has executed 13 satellite maritime tracking missions and the Long March 5 transporting mission in 2019.[5]

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[4] "Full Text: China's BeiDou Navigation Satellite System," The State Council Information Office of the People's Republic of China, June 17, 2016, https://www.scio.gov.cn/ztk/dtzt/34102/34674/34678/Document/1480626/1480626.htm ; Jordan Wilson, "China's Alternative to GPS and its Implications for the United States," U.S.-China Economic and Security Review Commission, January 5, 2017, pp. 2, 7-8, https://www.uscc.gov/sites/default/files/Research/Staff%20Report_China's%20Alternative%20to%20GPS%20and%20Implications%20for%20the%20United%20States.pdf.

[5] Zhao Lei, "Roaring rocket lifts satellite into space," *China Daily*, December 27, 2019, https://www.chinadaily.com.cn/a/201912/27/WS5e060688a310cf3e3558129f_1.html; "China's spacecraft tracking ships depart for missions," *Xinhua*,

Given that the accuracy of the Beidou system is slightly lower than that of the U.S.-owned GPS, ground-based augmentation stations need to be built in various locations in order to implement global services. Considering that the Pacific is also the main area for its anti-access/area-denial (A2AD) strategy, China needs to build land-based monitoring facilities in the Pacific, and the countries that signed the "One Belt One Road Memorandum" with China are ideal candidates. In 2018, China appeared to be preparing to set up aerospace monitoring and control stations or military bases in Vanuatu. Although local officials have denied military cooperation between the two countries, it still caused concerns in Australia. In addition, the PLA has set up its first overseas support base in Djibouti in 2017, and Tajikistan and Pakistan are also considered possible locations for China to build overseas bases.[6] In the future, China may establish an overseas support base in the South Pacific. By then, Chinese warships and aircraft will be unimpeded, and the long-term military superiority of the U.S. military in this region may be weakened.

U.S.'s Belated Commitment to the Pacific

Under the Obama administration, the U.S. defined itself as a Pacific power and proposed a rebalancing policy to Asia-Pacific. With this policy in mind, the U.S. deepened its alliance with Japan, South Korea, Australia,

November 10, 2019, http://www.xinhuanet.com/english/2019-11/10/c_138544617.htm; "Yuanwang-3 departs for new monitoring missions," *Xinhua*, June 8, 2019, http://www.xinhuanet.com/english/2019-06/08/c_138127150.htm.

[6] "Vanuatu and China deny holding military base talks," *Reuters*, April 20, 2018, https://af.reuters.com/article/worldNews/idAFKBN1HH0MJ; Minnie Chan, "China's mystery 'military base' in Vanuatu could be a space tracking station," *South China Morning Post*, April 10, 2018, https://www.scmp.com/news/china/diplomacy-defence/article/2141134/chinas-mystery-military-base-vanuatu-could-be-space.

New Zealand, Thailand, and the Philippines, and continued to support regional countries in security, development, and democracy. Nevertheless, the Pacific island countries were not included in the policy. In the 2010 and 2015 National Security Strategy Reports, the Obama Administration did not propose any comprehensive Pacific policies. While the then U.S. President Obama did not regard the Pacific issue as a top priority, China has been interested in Pacific.

In Trump's first National Security Strategy Report released in 2017, it was stated that "Working with Australia and New Zealand, we (U.S.) will shore up fragile partner states in the Pacific Islands region to reduce their vulnerability to economic fluctuations and natural disasters." In high-level relationships, the U.S. sent high-level officials from the Department of the Interior, Department of State, Department of Defense, Coast Guard, Agency for International Development, and the National Oceanographic and Atmospheric Administration to attend the 31st Pacific Islands Forum (PIF) on August 16, 2019 in Tuvalu. The U.S. officials also discussed issues of regional and international challenges with Pacific islands leaders in the roundtable.[7] In 2019, President Trump, Vice President Mike Pence, Secretary of State Mike Pompeo, Secretary of Veteran Affairs Robert Wilkie, and Secretary of the Interior David Bernhardt met Pacific island leaders in different occasions to pledge to tackle regional challenges.

[7] "Pacific Islands Forum – U.S. Engagement in the Pacific Islands," Department of State, August 17, 2019, https://www.state.gov/pacific-islands-forum-u-s-engagement-in-the-pacific-islands/; "U.S. Delegation Attends the 31st Pacific Islands Forum Partners Dialogue," Department of State, August 9, 2019, https://www.state.gov/u-s-delegation-attends-the-31st-pacific-islands-forum/.

Figure1-2: Taiwan and the United States held the inaugural Pacific Islands Dialogue on October 7 in Taipei. (Source: Ministry of Foreign Affairs, Republic of China (Taiwan))

The U.S. Indo-Pacific Strategy is built upon three pillars, which are economics, governance, and security. President Trump has placed the strategy at the top of his diplomatic list. In the Indo-Pacific Strategy, the U.S. provided over $100 million assistance to the Pacific region. This included the $ 65 million announced by Secretary of State Pompeo at a meeting with Pacific island leaders on the side meeting of the UN on September 27. The other foreign assistance was the $36.5 million announced at the 50th Pacific Islands Forum in August.[8] In 2018, U.S. joined the Asian Development Bank's Pacific Region Infrastructure Facility (PRIF) to provide Pacific Island nations other financial and funding supports for infrastructure projects. PRIF received grants

8 "U.S. Engagement in the Pacific Islands: UN General Assembly Update," Department of State, October 3, 2019, https://www.state.gov/u-s-engagement-in-the-pacific-islands-un-general-assembly-update/.

from Australian Department of Foreign Affairs and Trade (DFAT), the New Zealand Ministry of Foreign Affairs and Trade (NZMFAT), the World Bank Group (WBG), the International Finance Corporation (IFC), the European Commission (EC) the European Investment Bank (EIB), and the Japan International Cooperation Agency (JICA). PRIF will become a competitor to China's Asian Infrastructure Investment Bank (AIIB).[9]

The U.S.' engagement with Pacific Island nations among like-minded partners is a collective approach. As a close U.S. ally in the region, Australia proposed the "Pacific STEP-UP" policy in its 2017 Foreign Policy White Paper. Australian Pacific Maritime Security Program will provide 19 replacement patrol vessels and fund aerial surveillance in the region.[10] New Zealand announced "Pacific Reset" with the whole-of-government approach to deepen relationships with Pacific island nations. The New Zealand Defense Force will increase 1,500 service personnel to meet the regional challenges of the future.[11] U.S. and Taiwan also co-hosted the first Pacific Islands Dialogue in October 2019

[9] "United States Joins Pacific Region Infrastructure Facility," Asian Development Bank, December 11, 2018, https://www.adb.org/news/united-states-joins-pacific-region-infrastructure-facility.

[10] "2017 Foreign Policy White Paper," Australian Department of Foreign Affairs and Trade, November 24, 2017, pp.101-104, https://dfat.gov.au/about-us/publications/Documents/2017-foreign-policy-white-paper.pdf.

[11] "Pacific Reset: The First Year," New Zealand Ministry of Foreign Affairs and Trade, December 4, 2018, https://www.mfat.govt.nz/assets/OIA/R-R-The-Pacific-reset-The-First-Year.PDF; Strategic Defence Policy Statement 2018, Ministry of Defence, July 6, 2018, pp. 12-13, 26-27, 31-32, http://www.nzdf.mil.nz/downloads/pdf/public-docs/2018/strategic-defence-policy-statement-2018.pdf; Defence Capability Plan 2019, Ministry of Defence, June 11, 2018, p. 13, 17, 36, https://www.defence.govt.nz/assets/Uploads/03acb8c6aa/Defence-Capability-Plan-2019.pdf.

to explore future issues for regional cooperation. Sandra Oudkirk, the U.S. senior official for APEC and deputy assistant secretary for Australia, New Zealand, and the Pacific island nations, represented President Trump and Secretary Pompeo to kick off the inaugural dialogue. U.S. and like-minded partners are working together to strengthen engagement with the Pacific island nations, while China adopts unilateral approaches to expend relationships in the Pacific.

In security cooperation, U.S. has signed SHIPRIDER agreements with the Cook Islands, the Federated States of Micronesia, Fiji, Kiribati, Nauru, Palau, the Marshall Islands, Samoa, Tonga, Tuvalu, and Vanuatu in the Pacific. Through bilateral accords, U.S. can assist 11 partners to monitor waters surrounding these islands and allow local law enforcement personnel to embark on U.S. Coast Guard and U.S. Navy vessels to patrol and safeguard their sovereign waters. The U.S. official ships will continue its presence in the region to help partners detect illegal, unreported, and unregulated (IUU) fishing. Under its close and traditional relationships with Micronesia, the Marshall Islands, and Palau, U.S. Department of Defense also provided $ 24.5 million to the three members of the Compacts of Free Association (COFAs) to help protect their territorial waters, conduct border security operations, and counter illegal activities. The U.S. Army also plans to expand the exercises and training events of Pacific Pathways in 2020 to reinforce its military presence in the Pacific. By then, U.S. military presence will cover an extensive area of the Pacific to include East Timor, Papua New Guinea, Tanga, Fiji,

Vanuatu, Samoa, Palau, French Polynesia and the Federated States of Micronesia.[12]

Restore Pacific Order

As China's regional influence and role is growing rapidly, its secret expansion and penetration, by means of One Belt One Road initiative, Digital Silk Road and military-civil fusion approaches, deserves attention.[13] The long-term military superiority of the U.S. military in this region since the end of World War II will be weakened, if U.S. does not value the Pacific as much as it used to be. It is predictable that China's influence and activities, such as infrastructure projects, overseas supply facilities, and military footprint, will continue to be seen in the Pacific. A potential Chinese String of Pearls vision will be extended from Indian Ocean to the Pacific. There is no doubt that U.S. engagement will be the only way to ensure a peaceful, prosperous, free and open Pacific region.

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[12] Jen Judson, "Pacific Pathways in 2020 lead to Oceania," *Defense News*, October 14, 2019, https://www.defensenews.com/digital-show-dailies/ausa/2019/10/14/pacific-pathways-in-2020-lead-to-oceania/.

[13] Steven Lee Myers and Chris Horton, "As Taiwan Loses Influence, China Gains Ground in Race With U.S," *New York Times*, September 23, 2019, https://cn.nytimes.com/asia-pacific/20190923/taiwan-kiribati-china/zh-hant/dual/.

An Alternative for the Republic of China Navy after Coronavirus Disease 2019

By Jung-Ming Chang

Introduction

It is reported that 36 sailors aboard the three ships of Taiwan's Friendship Flotilla to the South Pacific were tested positive for coronavirus disease (COVID-19) on April 18, 2020, which led to the quarantine of 744 personnel on board. [1] During the quarantine period, operations of the three ships were inevitably shut down. Although the infections did not create a spread inside the military barracks, there were concerns during the quarantine period whether the pandemic would have a negative impact on the Republic of China's Navy (ROC) and whether ROCN personnel was physically sound to carry out missions as usual. As of May 18, 2020, the flotilla became combat ready after the infected sailors cured themselves of the disease and healthy ones received negative results for the tests. In the aftermath of this incident, it is perhaps appropriate to find out what implications we can learn from the ROCN perspective. The following sections proceed as follows: this paper outlines the worst-case scenario in the second section and present a partial solution in the third section. The fourth section traces the development of missile boats in Taiwan. The fifth section focuses on the

[1] Keoni Everington, "Taiwan marks 12 days without new coronavirus case," *Taiwan News*, May 19, 2020, https://reurl.cc/629XOZ.

advantages of automated missile boats. Finally, this paper makes a short conclusion in the sixth section.

The Worst-Case Scenario

The world remains uncertain of the origin of COVID-19 pandemic; it could have been synthesized artificially or may have evolved naturally. Supposing it is a deliberate attempt to reduce the war preparedness of adversaries, we should not underestimate the damage this malicious attempt might have caused. Even if the pandemic emerged naturally, contagious diseases are likely to spread among sailors given the limited space on ships. A pandemic that stems from either the natural environment or an artificial one renders sailors vulnerable to it.

ROC Minister of Defense Yen Teh-fa ROCN Friendship Flotilla on 18th May, 2020. (Source from Military News Agency, https://mna.gpwb.gov.tw/post.ph p?id=9&me ssage=98780)

COVID-19 infection is not severe among Taiwanese civilians or military personnel. Although the pandemic has infected at least 440 people and

caused the loss of 7 lives in Taiwan as of May 30, 2020, the situation has been largely well controlled. Restated, the current situation in Taiwan could be termed the "best case scenario"; however, we must also consider the "worst case scenario," in which a pandemic and foreign invasion occur concurrently. Considering Taiwan's defensive posture, the focus of its national defense is on its capability to withstand attacks and counter-attack adversaries in the Taiwan Strait or the littoral area surrounding Taiwan Island. Locations beyond this scope may be important but are not critical. Specifically, the potential adversary of Taiwan is the People's Liberation Army (PLA), especially its Navy branch (PLAN), of the People's Republic of China (PRC). A war across the Strait may have numerous forms, but eventually the PLAN must land on Taiwan Island to claim success. One means of preventing the PLAN from landing is immobilizing PLAN fleets in the Strait.

Mini Missile Assault Boat

In 2017, then Chief of General Staff Admiral Lee Shi-ming [李喜明] proposed the "Overall Defense Concept" (ODC) [整體防衛構想] as a new direction for Taiwan's national defense.[2] The spirit of the ODC is to prevent an arms race with China, but to focus on asymmetrical warfare and preservation of military strength. One substantive idea is to build 60 stealth mini missile assault boats (MMABs) that could be stationed in fishing harbors in disguise but still fire surface-to-surface missiles to take out PLAN vessels.[3] According to the proposal unveiled in 2019 regarding the MMABs, four boats will be constructed first as the

[2] Drew Thompson, "Hope on the Horizon Taiwan's Radical New Defense Concept," War on the Rocks, October 2, 2018, https://reurl.cc/d09OkV.

[3] "Taiwan's Navy Likely To Get 60 Stealth Mini-Missile Assault Boats By 2022," *Defense World*, January 25, 2018, https://reurl.cc/rxokGx.

prototype. Then, the ROCN will evaluate the protype and decide whether to continue building the remaining ones.

If we consider the impact of heavily contagious disease and the construction of MMABs, then automation of vehicles is necessary for the national defense of Taiwan and should be established in a speedy fashion. In this article, I focus on unmanned surface vessels (USVs). This is not to say that unmanned aerial and ground vehicles are unimportant. The reason to touch on only USVs is because there is an ongoing project evaluating the feasibility of MMABs. What I propose here is to add automated systems onto the MMABs to reduce casualty, keeping manpower at the same level. The rationale applies to other ROCN surface ships and underwater vehicles. Besides, the system could also extend to vehicles of ROC Air Force and Army as well. Consequently, one small step for the ROCN could mean a big step for the national defense of Taiwan.

A Lesson from the Past

History repeats itself, with actors switched their roles this time. Before touching on the current situation of the ROCN, let me mention a battle taking place 45 years ago in the Taiwan Strait. On August 6th, 1965, right before the execution of the *Kuo Kuang* Plan [國光計畫], a ROCN flotilla composed of two ships were ambushed, beleaguered, and sunk by the PLAN torpedo boats. The tragic loss was a fatal blow to then President Chiang Kai-shek and later led to the abolishment of the plan to recover mainland China through the use of force.

There were at least two lessons from this sea battle: First, micro-class boats could compose a devastating power when used in groups. The tactics were not invented by the PLAN, but by the German Navy during

World War II and dubbed by the British as "wolf pack" tactics.[4] Second, it is appropriate to deploy micro-level boats in the littoral zone. Although small boats are not designed to endure rough sea conditions in the first place, they could perform well from shore to littoral zone during good weathers. Seashores could also serve the functions of protection, maintenance, and supply.

Five decades have passed and the situation has reversed: the PLAN has honored big ship policy and has constructed vessels in a speed of "throwing raw dumplings into boiled water." On the contrary, the ROCN has managed to decrease the number of its vessels. The sea battles in 1965 provide good examples for nowadays asymmetrical warfare. Asymmetrical warfare could be a new term, but the spirit has been adopted by the ROCN for at least four decades. After losing the sea battles on August 6, 1965, the ROCN did not immediately learn from its adversary. It was until 1979 that the ROCN finally started to deploy the *Hai Ou* [海鷗], or *Dvora* class, missile boats (See Table 1). Every boat was equipped with two indigenous surface-to-surface *Hsiung Feng-I* [雄風一型] missiles that could hit targets about 40 kilometers away.

In 2010, a newer type of missile boat, the *Kuang Hua-VI* [光華六號], was commissioned. Even though the quantity of the *Kuang Hua-VI* class is fewer than that of the *Hai Ou* class, both displacement and armaments are greater. A *Kuang Hua-VI* class is almost four times larger than a *Hai Ou* class and enjoys twice as much armaments. In addition, the *Hsiung Feng-II* [雄風二型] missiles deployed on the *Kuang Hua-VI* class have an

[4] Ivano Massari, "Wolf Packs – The Battle of the Atlantic, at a given signal, the U-boats simultaneously launched their torpedoes at multiple targets & then slipped away," War History Online, April 25, 2018, https://reurl.cc/arREj3.

operational range of 140 kilometers, which is three times farther than that of the *Hsiung Feng-I*.

Table 1: ROCN's Missile Boats

	Completed	Displacement	Armaments	Service History
Hai Ou missile boat	50	47 tons	2 x *Hsiung Feng-I* missile	1979-2012
Kuang Hua-VI missile boat	30	186.5 tons	4 x *Hsiung Feng-II* missile	2010-present
Mini missile assault boat*	60	40 tons	2 x *Hsiung Feng-II* missile	2022-onward

*Mini missile assault boats are under evaluation and, hence, information herein is based on the original proposal (Source from Data collected by the author)

USVs' Advantages for the ROCN

Taiwan Navy has begun the project of building MMABs since 2019. According to the schedule, 56 boats will be constructed after a prototype of four boats is proven to be qualified. Currently, the project remains at the evaluation stage. It is yet unknown the outcome of the evaluation, but building micro-size missile boats is the right course to take so as to deal with current and future warfare especially in the context of asymmetrical warfare.

It would, however, be appropriate to go one step further and transform micro-size missile boats that the ROCN is evaluating into USVs. Automated control of ships is nothing new but has been used for decades. Some minesweepers in Taiwan have been equipped with such facility for at least twenty years.[5] Automated ships have at least two advantages:

[5] Interview with Hsin-biao Jiang, former Captain ROCN, who is the Acting Director of the Division of National Defense Strategies and Policies, INDSR.

First, USVs do not need sailors aboard and, thus, do not increase the demand of human power. Second, USVs can better endure rough sea and weather conditions.

Let me start from the first one. In its original design, a MMAB needs three sailors aboard for combat mission. If the evaluation of MMABs is passed and the ROCN really constructs 60 of them in total, the newly-increased shortage of manpower is 180. It could be a problem to transfer 180 sailors (officers and non-commissioned officers included) from other ROCN units since some of the units are already short-staffed. In addition to manpower, training might be another issue. It takes time to write users' manual and make sailors acquaint with the new boats. If, however, automated systems are installed on the MCMABs that are currently under evaluation, no seamen are needed for handling and maneuvering. Therefore, automated MMABs do not create extra workloads for the ROCN and no transfer of personnel is necessary.

Since the MMABs are designed to be roughly 40 tons in weight, the good sea keeping performance is between level four and five of the sea state code of the World Meteorological Organization (WMO). The original design of the boat, however, could endure bad weather conditions up to the WMO level of seven. If automated systems are installed, not only would sea sick cease to exist, the MMABs can embark on rougher sea conditions as well.

After touching on some of the advantages of unmanned MMABs, let me also point out a few concerns for balance. To begin with, the MMABs are mini boats that could capsize during rough sea conditions, or WMO level above five to be exact. This is an innate problem that cannot be solved since the MMABs are designed to be tiny. A somewhat good news is that the PLAN is less unlikely to carry out amphibious or traditional warfare

on the sea where WMO level reaches five and beyond. After all, the natural environment is neutral and does not choose sides. Even if the PLAN worries less about seasick of its seamen and insists on crossing the Taiwan Strait during bad weathers, the MMABs could still launch missiles from local fishing harbors where they are deployed in relatively calm waters.

In other words, the MMABs do not need to leave harbor during bad weathers and can still be lethal. One could also argue that unmanned MMABs are redundant since 18 wheelers could also fire surface-to-surface missiles on coastal highways. However, automated MMABS are flexible under different weather conditions. Weather permitting, these mini boats could leave port and push forward the first line of defense. In addition, they can escape PLA's first wave of missile attacks and shelling, given their mobility.

The second concern is the capability for operations during wartime. Broadly speaking, the capability is closely associated with command, control, communication, computer, intelligence, surveillance, and reconnaissance (C4ISR). Unmanned MMABs need inputs of coordinates of adversarial ships to launch attack. Put differently, the MMABs are doomed to fail for combat missions without C4ISR, which is most likely to be at risk after the onset of war. Currently, there are no good solutions but the problem might be solved using satellites or sensors from other branches of services for transmission. Another way is to rely on the functions of active radar homing and automatic target recognition of *Hsiung Feng-II* missiles.[6] By doing so, the missiles could still hit targets without knowing exact coordinates.

[6] "HF Ⅱ Anti-Ship Missile," *NCSIST*, https://reurl.cc/9Ex0YY.

The third concern is that the MMABs are going backward and making no progress. There are in general two critiques. First, the displacement of a MMAB of 40 tons resembles that of a *Hai Ou* class. The only difference is that a MMAB will be equipped with missiles that have a longer range. Second, the ROCN already acquired a *Tuo Chiang* [沱江] class light frigate in 2014 that has much greater firepower than that of a MMAB, and it would be a waste to procure the MMABs that are obviously inferior. However, one feature of the MMABs is its stealth performance, while the other feature is its size. A MMAB is better than a *Hai Ou* missile boat in terms of the missiles installed. A stealth MMAB is also superior to a stealth *Tuo Chiang* light frigate for its small size that can be deployed at a fishing harbor without being noticed. Combining the two reasons, the MAABs are actually making progress and should have a higher survival rate during wartime.

Tuo Chiang class corvette. (Source from *Youth Daily News*. https://www.ydn.com.tw /News/359775)

Conclusion

The spread of COVID-19 pandemic provides the impetus to reconsider the shortage of manpower under all circumstances. This is especially the case for the ROCN since sailors on board the Friendship Flotilla were infected and led to the shutdown of routine operations for weeks. The ROCN may be lucky this time, but we cannot rely solely on fortune in the future.

The ROCN has begun the process of evaluating the proposal of building 60 MMABs as part of Taiwan's new thinking for asymmetrical warfare against China. Given the advantages of automated systems, it is reasonable to consider installing them on the MMABs to reduce the demand for manpower and negative impact of highly-contagious disease to the minimal level. By doing so, the ROCN war preparedness would not be interrupted by highly contagious disease or even a worldwide pandemic. Therefore, it makes sense to consider deploying unmanned surface vehicles in the context of Taiwan's preparation for asymmetrical warfare against China.

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China Commits to Dominate Facial Recognition Technology

By Tsunghan Wu

Introduction

According to the *Financial Times* in December 2019, a leaked source reported that several Chinese telecommunication companies including ZTE, Dahua Technology, and China Telcom are proposing a draft for a new international standard at the International Telecommunication Union (ITU) which, if passed, would apply to facial recognition system, camera equipment, and resemblance surveillance tools in the future.[1] While discussion over the proposal is still ongoing as of the time of writing (May 2020), the impact that the new potential standard may cause, has drawn concerns from activists and governments in the West and like-minded democratic countries.

Two implications are considered here. For one thing, China has been explicit in its ambition and confidence with its growing capability to be a rule-maker on the global stage. The releases of *Made in China 2025* and *China Standards 2035* disclosed these blueprints and acts.[2] For another,

[1] The news report was initially published on December 1, 2019, and then updated on December 6, 2010. See Anna Gross, Madhumita Murgia, Yuan Yang, "Chinese tech groups shaping UN facial recognition standards," *Financial Times*, December 6, 2019, http://www.ftchinese.com/story/001085431/en?ccode=LanguageSwitch.

[2] Arjun Kharpal, "Power is 'up for grabs': Behind China's plan to shape the future of next-generation tech," *CNBC*, April 26, 2020, https://www.cnbc.com/2020/04/27/china-standards-2035-explained.html.

the event itself reflects that the UN and its associated organizations have been targeted by the Chinese authority as effective platforms to promote and shape its image and power, which furthermore arguably may transform the current global order. This essay argues that the Chinese submission of the aforementioned proposal presents a vivid case of such, against a context of Sino-American strategic competition in recent years.

From below, this essay offers a brief review on facial recognition technology and analyzes China's dynamic and salient achievements in this area. It also analyzes China's recent commitment at the ITU.

Facial Recognition Technology: Features and Applications

Facial recognition technology can be used to verify or identify a person through a pre-established database. It is a sub-sphere of biometrics and does not refer to a specific method. Broadly, multiple approaches include geometric shape-based, local face-based, eigenface-based, neural networks-based, etc., can reach to the same goal while adopting different algorithms. This technology is strongly related to areas of telecommunication, artificial intelligence (AI), machine learning, and deep learning. It has been pushed forward by a set of scientific experiments and an interdisciplinary field of research where computer scientists, social scientists and governmental agencies have engaged with time and space.[3]

Facial recognition technology was pioneered by Woodrow Wilson Bledsoe, Helen Chan Wolf, and Charles Bisson in the US in the 1960s, then with advances in the following decades by other groups of scientists, including Larry Sirovich, Michael Kirby, AlexPentland, and Matthew Turk.

[3] Kelly Gates, *Our Biometric Future: Facial Recognition Technology and the Culture of Surveillance* (New York: NYU Press, 2011).

During the time, the US Defense Advanced Research Projects Agency (DARPA) under the Department of Defense and National Institute of Standards and Technology (NIST) became increasingly involved in the development and commercialization of the technology.[4] Given this trend, facial recognition soon appeared in other regions.

Since the 2000s, development of facial recognition technology has been further aided by Big Data by not only many national governments around the world, but also enterprises and social media companies. These institutions deployed relevant systems on various occasions on various devices for various purposes. Governments including the US, some member states in the EU, the UK have usually adopted this technology to tackle criminals and terrorism, in particular in the post-911 context.[5] In 2011, the US Army used it to confirm the death of Osama Bin Laden.[6] On the other side, governments such as China also began adopting this technology under the same banner.

Facial recognition technology comes with many benefits indeed.

[4] Jesse Davis West, "A Brief History of Face Recognition," *FaceFirst*, August 1, 2017, https://www.facefirst.com/blog/brief-history-of-face-recognition-software/ ; Claude Hochreutiner, "The History of Facial Recognition Technologies: How Image Recognition Got So Advanced, "*AnyConnect*, September 19, 2019, https://anyconnect.com/blog/the-history-of-facial-recognition-technologies.

[5] "Facial recognition: top 7 trends (tech, vendors, markets, use cases and latest news)," *THALES*, May 16, 2020, https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/biometrics/facial-recognition; "Met Police to deploy facial recognition cameras" *BBC NEWS*, January 30, 2020, https://www.bbc.com/news/uk-51237665; Elena Sanchez Nicolas, "EU backtracks on plans to ban facial recognition," *euobserver*, February 20, 2020, https://euobserver.com/science/147500.

[6] "US military deploys facial recognition technology in Bin Laden operation," *Biometric Technology Today*, 2011 (5).

Combined with other devices, it can be widely employed for users to access to their mobile phone or working/residential environments etc. Law enforcement agencies also use the technology to prevent crime and violence by deploying it on public occasions.

Megvii cameras capture images of a Beijing street. (Source from National Public Radio, https://www.npr.org/sections/parallels/2018/04/03/598012923/facial-recognition-in-china-is-big-business-as-local-governments-boost-surveilla)

Taking a most recent example, it has been reported that facial recognition has been helping to curb the COVID-19 epidemic in China amid the worldwide outbreak. The government has deployed the system combined with other sensors to detect people with abnormal body temperature. With this system integrated in the nationwide CCTV network, the government can trace travel history of individuals.[7]

[7] Liza Lin, "China Marshals Its Surveillance Powers Against Coronavirus," *The Wall Street Journal*, February 4, 2020, https://www.wsj.com/articles/china-marshals-the-power-of-its-surveillance-state-in-fight-against-coronavirus-11580831633.

But where there are advantages to facial recognition technology, its shortcomings have similarly at a large degree drawn attention. Activists suggest that the technology, if abused, will pose challenges and even threats to personal privacy and human rights, causing ethical concerns. The line between public and private life is then blurred. Furthermore, authoritarian and totalitarian regimes may crack down on opponents by utilizing the technology to strengthen civil and social surveillance. It goes without saying that there is an issue about data protection and security. As a result, how to balance the technology's brought benefits and negative aspects, meaning the convenience and privacy breach deserves exploration.[8]

China: A Latecomer but A Great Power

To discuss the technological development of facial recognition, as well as the broader fields of telecommunications and AI, China is a subject that is unavoidable, as the country has become a driver in the relevant areas. Chronologically speaking, it is a latecomer, but in terms of business scale and innovation capability at this time, it is definitely a great power. In general, China built its facial recognition technology under its national development programs in telecommunications and AI, starting in the 1990s. With the rapid rise of overall state socio-economic capacity, China reached leapfrog progress in the 2000s. This section presents relevant policy programs and white papers guiding Chinese evolvement, and it focuses on the era of Xi Jinping.

Chinese development usually maintains a state-led character, and this case is no exception. Having understood the significance and power of

[8] Brenda leong, "Facial Recognition and the Future of Privacy: I Always Feel Lik e…Somebody's Watching Me," *Bulletin of the Atomic Scientists* 75, no. 3 (April 2019), pp. 112-114.

telecommunications and AI, China believes that developing such technologies is necessary in order to prevail in the global power competition for the future. Although the leadership often sets frameworks dictating the industrial direction, it has always granted some flexibility for the business sector. This ping-pong interaction between the state and society has resulted in mutual reinforcement over telecommunication and AI technology; since President Xi Jinping took office, China's aggressive national programs have brought about great progress within a short time.[9]

On May 8, 2015, the State Council of China launched the *Made in China 2025* program, serving as a guideline to lead China towards becoming a global leader in innovation in manufacturing within the next thirty years, with the transformation of the current industry into an AI-based industry as its core strategy.[10] Two months later, another order on internet development by the State Council was published, vowing to cast a greater investment in and strengthening of digitalization in industry, economy, and social life. In particular, AI has been highlighted and the order sought to make AI technology and Internet development mutual reinforcement.[11] Following this, National Development and Reform Commission under the State Council claimed in May 2016 that it will

[9] Chris C. Demchak, "China: Determined to dominate cyberspace and AI," *Bulletin of Atomic Scientists* 75, no. 3 (April 2019): pp. 99-104.

[10] "guo wu yuan guan yu yin fa 'Zhongguo zhi zao' 2025 de tong zhi [國務院關於印發《中國製造 2025》的通知, The State Council Prints and Sends about Made in China 2025]. *The State Council of Chin*a, August 5, 2015, http://www.gov.cn/ zhengce/content/2015-05/19/content_9784. htm.

[11] "guo wu yuan guan yu ji ji tui 'jin hu lian wang plus xing dong de zhi dao yi jian [國務院關於積極推進"互聯網+"行動的指導意見, The State Council's Instruction on Pushing Internet Plus]. *The State Council*, July 1, 2015, http://big5.www.gov.cn/gate/big5/www.gov.cn/zhengce/content/2015-07/04/content_10002.htm.

accomplish the creation of large public databases of video, audio, image, map, etc., for AI Deep Learning by 2018. National standardization of the AI industry and the fostering leading-edge AI enterprises at global level were set as major goals.[12]

In 2015, the Chinese government again emphasized the strategic significance of the AI industry in its 13th Five-Year Plan (2016-2020), one of the most important national programs every five years.[13]

In July 2017, the Chinese government published a white paper targeting AI development. The importance of this white paper was due not only to the fact that it narrated a strategic insight as to why China must become involved in the global AI competition, but also the inclusion of a provision with a comprehensive proposal for how the government and the private sector can work together. The specific idea of a civil-military fusion stood out in this context. In addition, the white paper also set a goal for China to build an independent supply chain and become an international

[12] "guan yu yin fa 'hu lian wang plus' ren gong zhi hui san nian hang dong shi shi fang an [關於印發"互聯網+"人工智慧 3 年行動實施方案, Notification about "Operational Proposal about Internet Plus and AI for 3 Years]. *The State Council*, May 18, 2016, https://www.ndrc.gov.cn/xxgk/zcfb/tz/201605/t20160523_963069.html.

[13] "guo min jing ji he she hui fa zhan di shi san ge wu nian gui hua gang yao [國民經濟和社會發展第 13 個五年規畫綱要, 13th Five Years Project about national economy and social development]. *Chinese Communist*, http://www.12371.cn /special/sswgh/wen/#17; "guo wu yuan guan yu yin fa shi san wu guo jia ke ji chuang xin gui hua de tong zhi [國務院印發十三五國家科技創新規劃的通知, Notification about The State Council Prints and Sends the 13th Five Year Project]. *TheState Council*, July 28, 2016, http://www.gov.cn /zhengce/content/2016-08 /08/content_5098072.htm.

standard-maker by 2030.[14]

In 2018, the government announced 56 state-sponsored projects for the internet, AI innovation, and the digital economy, in which facial recognition technology was specifically upheld as a main area.[15]

In the same year, the Standardization Administration of China under the State Council published a white paper on the AI industry, which encouraged more investment and study in the field, as well as cooperation among enterprises. The white paper also advocated for accelerating standardization in China, paving a way towards entering the international market.[16]

To give a concise picture, the Chinese telecommunication technology has sharply upgraded since the *Made in China 2025* program initiated. Then,

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[14] "guo wu yuan guan yu yin fa xin yi dai ren gong zhi hui fa zhan gui hua de ton g zhi [國務院關於印發新一代人工智能發展規劃的通知, The State Council Publishes AI Innovation Program]. *The State Council*, Jul y 8, 2014, http://www.gov.cn/zhen gce/content/2017-07/20/content_5211996.htm; Guest Blogger for Net Politics, "Civil-Military Fusion: The Missing Link Betwee n China's Technological and Mil-itary Rise," *Council on Foreign Relations*, January 29, 2018, https://www.cfr.org/b log/civil-military-fusion-missing-link-between-c hinas-technological-and-military-rise.

[15] "56 ge xiang mu ru xuan hu lian wang plus, ren gong zhi hui chuang xin fa zhan he shu zi jing ji shi dian zhong da gong cheng [56 個項目入選"互聯網 + "、人工智慧創新發展和數字經濟試點重大工程, 56 Projects Selected for Internet Plus, AI Innovation Development and Digital Economy Constructions]. *The People's Republic of China*, January 22, 2018, http://big5.www.gov.cn/gate/big5/www.g ov.cn/xinwen/2018-01/22/content_5259438.htm

[16] "2018 ren gong zhi hui biao zhun hua lun tan zai jing ju xing [2018 人工智慧標準化論壇在京舉行, 2018 AI Stand ardization Platform Takes Place in Beijing]. *Xinhua*, January 19, 2018, http://www.xinhuanet.com/city/201801/19/c_12 9795056.htm.

having seen a recent release of *China Standards 2035*, Beijing showed a more active gesture in involving in international standards-making process. Massive funding has spurred business and research, which in return has strengthened overall Chinese performance in international competitions. The Carnegie Endowment for International Peace published the *AI Global Surveillance (AIGS) Index* in 2019, by which it notes that 52 out of 75 states with AI surveillance tools, or about 70%, have deployed Chinese facial recognition systems.[17] In total, 63 countries are using Chinese technology-based AI monitoring systems. Recently, the *Nikkei Asian Review* has also noted that China surpassed the U.S. in the number of international patent applications in 2019, emphasizing the importance of telecommunications innovation to Chinese decision-makers.[18] The top 50 companies working on facial recognition technology in China are listed in the end of this paper (See Table 1).

This section has addressed China's accumulated abilities. In next section, we turn to the analysis of the Chinese proposal for facial recognition at the ITU in December 2019.

China to Reinvent the International Standard

The ITU is an organization under the UN responsible for services related to the internet, telephone, radio, satellite, etc. Membership includes officials of UN member states, academic institutions, enterprises, and various public and private "professional units", specializing in traffic,

[17] Steven Feldstein, *The Global Expansion of AI Surveillance* (DC: Carnegie Endowment for International Peace, 2019), pp. 25-28.

[18] Rintaro Hosokawa, "China overtakes US as leader in international patent flings," *Nikkei Asian Review*, April 8, 2020, https://asia.nikkei.com/Business/Technology/China-overtakes-US-as-leader-in-international-patent-filings.

finance, healthcare, etc. As an international organization, however, the ITU has no enforcement powers, and can only request its members follow or adopt "international" standards. In fact, the standards are officially referred to as "recommendations" that they merely function as reference for any individual units establishing standards internally. Even so, given the ITU's widespread presence, it must be a field where Beijing aims to expand its influence.[19]

Facial recognition technology is shown at DeepGlint booth during the China Public Security Expo in Shenzhen 30th October, 2017. (Source from Council on Foreign Policy)

Prior to the Chinese submission of its proposal to the ITU, the second meeting of the Biometric Characteristic Technology Commission under the China National Information Technology Standardization Commission was held in Beijing on November 20, 2019. During the meeting, 27 enterprises, including Tencent, Sense Time, Ping An, Ant Financial,

[19] Gianluigi Negro, "A history of Chinese global internet governance and its relations with ITU and ICANN, *Chinese Journal of Communication*, 13, no. 1 (2020), pp.104-121.

Dahua, iFLYTEK etc. altogether announced the establishment of the National Standardization Working Group for Facial Recognition. According to Xinhua, this Working Group will not only formulate national standards in China, but also promote such Chinese standards onto the international arena. Chronologically speaking, the Chinese proposal at the ITU may be a follow-up commitment.

Promoting the Chinese standard up to an international one will also greatly benefit Chinese enterprises dominating the global market. If this comes true, for one thing, Chinese companies will be able to access to the market more easily compared to having to adopt other standards. While traditional economics theories claim that monopolies often lead to inefficiency, the success of digital giants such as Google and Amazon in this era implies that the wider and larger collection of data, the more powerful and efficient their algorithms and services. Eventually, they seem to enjoy incomparable advantages.

For another, those adopting different standards would face great challenges. Firstly, they might lose customers. In addition, if they are going to adapt into the Chinese standard, they will have to set up new production lines and even pay patent fees to Chinese companies. Costs of the adapted companies under this situation must increase. In either case, it is quite possible that enterprises not adopting the Chinese standard would fallen.

In June 2019, a standard on intelligent lamps was passed at the ITU identical with the standards of ZTE's products. As a result, ZTE's products should enjoy more favorable conditions compared to its competitors.

Importantly, China may achieve a breakthrough amid its contestation and confrontation with the U.S. in their trade and technology war since

2018, driving new progress. From this perspective, the Chinese submission of its proposal to the ITU at this time seems to be an attempt to take a stand over issues such as Huawei 5G technology. As the US-led group of countries regard Chinese products with suspicion over data security or privacy violations, setting the international standard will help justify the Chinese standpoint.

Chinese facial recognition technology has been known for its advanced quality along with its competitive cost. However, the Chinese product is often criticized in terms of its wide application to its surveillance tools, which have not only widely been used in the minority regions of China, but also the whole of Chinese society. Since the revelation of "reeducation camps" in Xinjiang, human rights campaigners have paid great attention to the abuse of surveillance.[20] The website Compritech published two reports in August and December 2019 respectively, highlighting that China reportedly performs poorly with the protection of biometric information from the city- to the national-level.[21] Since December 1, 2019, Chinese authorities have implemented a new policy of real name registration, demanding all new telephone users to complete facial registration and submit personal information.[22]

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[20] Chris Buckley and Paul Mozur, "How china uses high-tech surveillance to su bdueee minorities, *The New York Times*, May 24, 2019, https://www.nytimes.c om/2019/05/22/world/asia/china-surveillance-xinjiang.html.

[21] Paul Bischoff, "The world's most-surveilled cities," *Comparitech*, August 15, 2 019, https://www.comparitech.com/vpn-privacy/the-worlds-most-surveilled-ci ties/; "50 countries ranked by how they're collecting biometric data and what th ey're doing with it," *Comparitech*, December 4, 2019, https://www.comparitech. com/blog/vpn-privacy/biometric-data-study/.

[22] Lily Kuo, "China brings in mandatory facial recognition for mobile phone use r s," *The Guardian*, December 2, 2019, https://www.theguardian.com/world/2019/ dec/02/china-brings-in-mandatory-facial-recognition-for-mobile-phone-users.

In past cases, ITU recommendations were listed in a form of guidelines without much in the way of details. However, the Chinese proposal presents details where possible, especially with regards to which biometric features should be permissible to collect and how this technology can be applied. Such features are therefore linked to Chinese characteristics.

Conclusion

To deal with the international concerns and criticism, Beijing has raised its own narrative, insisting on the usefulness and necessity of using facial recognition systems. It is true that not only China, but also many Western countries have deployed the technology nationwide for various purposes, and such has then led China to stand firm in justifying its massive usage of the technology. In addition, with its great success with Chinese products entering international markets over the past few years, Beijing has become more confident and active in engaging in international standard-making, which is also aligned with the Chinese national programs *Made in China 2025* and China Standards 2035. Moreover, Beijing has attributed its alleged control over the COVID-19 epidemic to its policies of containment, within which the Chinese surveillance tools have played a visible role in a time when most countries are still suffering from the epidemic. To some extent, Beijing aims to shape a public opinion about the superiority of the "Chinese model," be it its institutions, value, or products.[23]

[23] David P. Goldman, "China suppressed Covid-19 with AI and big data," *Asia Times*, March 3, 2020, https://asiatimes.com/2020/03/china-suppressed-covid-19-with-ai-and-big-data/; Jan van der Made, "China's Covid-19 about-face: From 'sick man of Asia' to 'savior of the world'," *rfi*, April 4, 2020, http://www.rfi.fr/en/asia

However, there is no thought more chilling than "Big Brother is watching you," a concept proposed by English writer George Orwell in his classic novel *1984*, depicting a surveillance society.[24] The Chinese argument, in fact, ignores the differences in the scale and scope of data collection and applications between China and the West. By doing this, it seeks to dilute ethical and privacy concerns. Also, the success of Chinese products should be attributed to little more than its competitive pricing. And speaking of its control over COVID-19, which has been one of most serious global disasters since World War II, Chinese containment policies have been successful and inspiring, but the controversy over the violation of privacy and human rights is still concerning. In addition, there are many outstanding development models in the rest of world, with the Taiwanese model being one of them.

For reasons unknown, despite the ITU planned to complete this process by December 2019, the Chinese proposal is yet still under discussion. The Chinese attempt has been revealed, and those who are concerned about the issue are expected to keep their eyes open and possibly take actions.

Table 1: Top 50 Companies on Facial Recognition Technology in China

Ranking	Company	Ranking	Company
1	YITU (依圖科技)	**26**	Shengshihuaan (盛世華安)
2	CloudWalk (雲從科技)	**27**	WATRIX.AI (銀河水滴)
3	MicroPattern (微模式)	**28**	Fortsense (阜时科技)
4	Megvii (曠視科技)	**29**	29 SandStar (視達)
5	SenseTime (商湯科技)	**30**	AuthenMetric (中科奧森)
6	Alibaba Cloud (阿里雲)	**31**	Aratek (亞略特)

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[24] George Orwell, *1984* (London: Penguin, 2004).

7	Baidu Netcom (百度雲)	**32**	Anviz (安威士)
8	Hikvision (海康威視)	**33**	Moredian (魔點科技)
9	Reconova (瑞為科技)	**34**	Roadefend Vision (徑衛視覺)
10	Seetatech (中科視拓)	**35**	CAS Cogniser (凱澤科技)
11	ReadSense (閱面科技)	**36**	IFC Technology (臉雲科技)
12	Intellifusion (雲天勵飛)	**37**	Mysher Technology (麥哲科技)
13	Hanwang Technology (漢王科技)	**38**	SYKEAN (思源科安)
14	Dahua Technology (大華股份)	**39**	Tupu Technology (圖普科技)
15	Tecent Cloud (腾訊腾雲)	**40**	JUNYU Technology (駿聿科技)
16	CloudMinds (達闥科技)	**41**	TRUTHVISION (趨視科技)
17	Boya Information Technology (鉑亞信息)	**42**	OPNOUS (炬佑智能)
18	Opzoon Technology (漢柏科技)	**43**	Face all (飛搜科技)
19	PCITECH (佳都科技)	**44**	Aiwinn (愛華盈通)
20	Wisesoft (川大智勝)	**45**	Hat Technology (小帽科技)
21	Ping An (平安科技)	**46**	Dilusense (的盧深視)
22	PIXEL SOLUTION (像素數據)	**47**	Axon Intelligence (艾芯智能)
23	iFLYTEK (科大訊飛)	**48**	Deep Sense (深感科技)
24	Athena Eyes (智慧眼)	**49**	Vision Miracle Intelligent (視覺傳業)
25	eyecool (眼神科技)	**50**	Pami Technology (帕米科技)

Source: Hong Yi, "2019 ren lian shi bie ji shu 50 qiang (Top 50 Companies on Facial Recognition Technology in 2019)," *hu lian wang zhou kan* (CIWEEK) (November 5, 2019), p. 41.

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