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Development of Peoples' Republic of China's Unmanned Aerial Vehicles (UAVs) and Its Impact on the East China Sea

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Abstract

This article analyzes the People's Republic of China (PRC)'s vibrant development of military unmanned aerial vehicles (UAVs) and their application in the East China Sea. Military UAVs have been proliferating around the globe, and their distinctiveness in low cost both economically and politically accelerates the proliferation. Economically, UAVs reduce costs of vehicles, operation and training of pilots compared to those of manned aircraft. Also, politically, they can lower the threshold of using forces in multiple ways. Thus, military UAVs can be used in bold intelligence, surveillance and reconnaissance (ISR) mission and provide information superiority to whoever use them, which can lead to strengthening influence on disputed territories. The PRC began to develop military UAVs since the 1950s copying technologies from the US and Soviet Union and is now competing with the US in UAV technologies. China is developing UAVs with a government-led top-down approach and lively cooperation among industries, academics and military and strives to expand her influence in the surrounding region. Since Xi Jinping was inaugurated in 2012, he has enforced aggressive policies to secure the control of the sea in the first island chain. Military UAVs are expected to be instrumental in Xi's strategy in the East China Sea where the PRC has been at odds with its neighbours. The PRC has deployed advanced UAVs such as the BZK-005 and WZ-7 in this region and is deemed to have employed them audaciously for ISR. In response, Japan and the ROC as well have developed and acquired lethal UAVs, which arouses concerns of regional instability.

Keywords: *China, UAV, drone, East China Sea, territorial disputes*

1. Introduction

The military UAV is a vibrantly proliferating weapon in the 21st century. While the number of countries with heavy UAVs was no more than eleven in 2009, after a decade, the number had reached up to 30 in 2019 (Munich Security Conference, 2019: 52). Also, the size of the global military UAV market has continuously been growing and is forecasted to grow up to $98.9 billion in 2025 (Teal Group, 2019). With the world's second biggest military budget in 2019 (Tian, Kuimova, Lopes da Silva, Wezeman and Wezeman, 2020: 2), the People's Republic of China (PRC) has been a driving force of the horizontal and vertical proliferation of military UAVs. As a non-participant of the Wassenaar Agreement (WA) and the Missile Technology Control Regime (MTCR) which partly restrict military UAV exports, the PRC faces no constraints on her overseas sales of military UAVs unlike the US. Table 1 shows the PRC's military UAV export from 2010 to 2018. Along with the PRC's growing military expenditure as well as UAV exports, its diplomatic policy has been changed in a more and more proactive way, from *taoguang yanghui* ("biding one's time while building up capability", 韜光養晦) to *heping jueqi* ("peaceful rise", 和平崛起) and to *fen fa you wei* ("striving for achievement", 奮發有爲) (Park, 2018: 207). In terms of military, the PRC has adopted the Anti-Access/Area Denial (A2/AD) strategy against the US influence and intervention around the region, especially in the South and the East China Sea (Tri, 2017). In this regard, the PRC has been expected to expand its influence in the East China Sea where several disputed areas are located including the Senkaku/Diaoyu Islands and the Taiwan Strait taking the benefit of the advanced military UAVs (Ying, 2016: 1-13; Cai, 2019: 68-92).

Thus, this paper studies the PRC's development in military UAVs and analyzes its impact on disputes surrounding the East China Sea. Conflicts in the East China Sea have been less evident than those in the South China Sea. While the PRC has been daring in the South China Sea utilizing the *fait accompli* on the disputed maritime region, she has been cautious in the East China Sea especially in countering Japan and other powers, all of whom are strongly allied with the US. Hence, the PRC's use of military forces in the East China Sea has been relatively constrained so far compared to her recent aggressive measures in the South China Sea. However, since the PRC has been developing advanced military UAVs, the new emerging technology is deemed to drop the threshold of military action such as ISR in the East China Sea so that her influence in the region could be strengthened.

In the next section, this paper analyzes the distinguishing features of overall military UAVs, which could lead to bold ISR missions. Section 3 studies the development and capabilities of the PRC's military UAVs. Subsequently, section 4 seeks to find out how the PRC deploy and employ UAVs in the East

Table 1 PRC's UAV Exports from 2010 to 2018

Recipient	Weapon	Year of order	Year of delivery	No. of weapons
Egypt	ASN-209	2010	2012-2014	18
	Wing Loong-I	2016	2017-2018	10
	Wing Loong-II	2018	unknown	unknown
Pakistan	CH-3	2005	2013-2016	20
	Wing Loong-I	2015	2015	5
Algeria	CH-3	2017	2018	5
	CH-4	2017	2018	5
Indonesia	Wing Loong-I	2017	2018	4
Iraq	CH-4	2014	2015	4
Jordan	CH-4	2015	2016	6
Kazakhstan	Wing Loong-I	2015	2016	3
Myanmar	CH-3	2013	2014-2015	12
Nigeria	CH-3	2014	2014	5
Saudi Arabia	CH-4	2014	2015	5
	Wing Loong-I	2014	2015-2017	15
	Wing Loong-II	2017	2017-2018	15
Turkmenistan	CH-3	2015	2-16	2
UAE	Wing Loong-I	2011	2013-2017	25
	Wing Loong-II	2017	2017-2018	15
Uzbekistan	Wing Loong-I	2013	2014	5

Source: Stockholm International Peace Research Institute (undated).

China Sea. Lastly, in conclusion, this paper elicits implications of the PRC's UAV deployment in the East China Sea for the region.

2. Distinctiveness of Military UAVs

Various studies have highlighted the low-cost aspect as a distinctive feature of UAVs. Analyzing profoundly this feature is critical to understanding expected outcomes in the proliferation and operation of UAVs in the PRC. This section attempts to analyze in detail the distinctiveness of military UAVs which is its low cost especially compared to that of manned aircraft.

2.1. Low Economic Cost

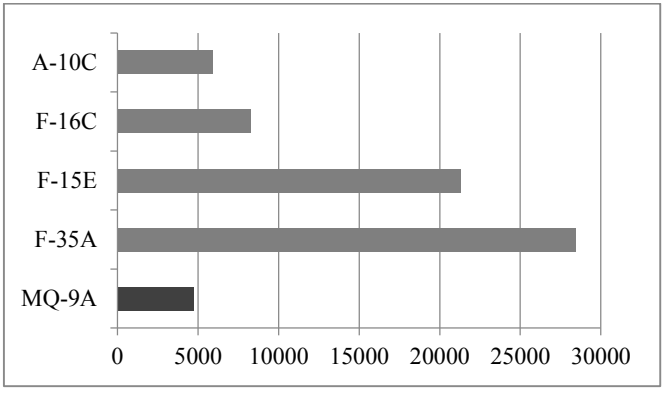
David H. Dunn (2013: 1239) explained that compared to manned aerial vehicles, UAVs are revolutionary technology because they are decreasing the cost of acquisition, operation and training of the weapon system. Amy Zegart

(2018: 14-15) also emphasized that the cost of operations with UAVs is much cheaper than other military options such as one battalion level of ground forces and manned aviation.

Although the capability of UAVs is left behind that of manned aircraft, nevertheless ongoing development of UAV technology has enabled UAVs to replace many roles of manned aircraft. In this vein, comparing the cost of acquisition between UAV and manned aircraft could be finitely meaningful. Zegart (2018: 15) suggested the cost comparison between the F-35 Joint Striker Fighter and XQ-58 (222) Valkyrie, one of the most advanced UAVs in the US, to show this distinct character. The price of a single F-35 is estimated to be around $122 million, while that of the XQ-58 (222) is expected to be around $2-3 million. Also, the PRC's up-to-date armed UAV, the CH-4, which has been exported to many states, is estimated to cost about $1-2 million (China Power Team, 2018), while the estimated cost of Chengdu J-10, one of the People's Liberation Army Air Force (PLAAF) fighter, is $41 million (Hornby, 2010).

The cost of operation for UAVs is also lower than manned aircraft to a certain extent. For instance, the air to ground attack mission such as close air support (CAS), which had been conducted mostly by manned aircraft, is recently operated by UAVs. In the US Air Combat Command, manned aircraft which are capable of CAS are the F-15E Strike Eagle, F-16C/D Fighting Falcon, F-35A Lightning II, and A-10 Thunderbolt II (International Institute for Strategic Studies, 2019: 55). The cost of operation per hour is substantially higher with these manned vehicles compared to that of the MQ-9A Reaper, which has proven its capability in a targeted attack in the various battlefields. Figure 1 below shows a clear gap in operating costs between human crewed aircraft and UAVs.

Figure 1 Cost of Operating US Fighter Planes (in US dollars)



Sources: McCarthy, 2016; Thompson, 2013.

Moreover, the cost of training pilots supports this distinguishing feature of UAVs as well. Hoffman and Kamps (2005: 36) made a comparison between the cost of the pilot training program for the B-52 manned aircraft and that of a UAV in their research. According to their findings, it costs $685,051 per pilot for the B-52, while only $13,000 was enough for training one UAV pilot. A similar analysis was conducted in 2014 and it was written that in the US Air Force, the Undergraduate Pilot Training course for crewed aircraft costs $557,000 per pilot, whereas for a parallel proficiency level, training of a pilot for remotely piloted aircraft (RPA) costs $65,000 (News Desk, 2014). According to a report by the RAND Corporation, even training one pilot for the most advanced UAV, MQ-9 Reaper, costs no more than $68,968 (Hardison, Mattock and Lytell, 2012: 14), while training a pilot for the F-35A costs $10,170,000 (McCarthy, 2016).

2.2. Low Political Cost

Plaw and Fricker (2012: 355) stated that "the drone strikes are a relatively low-cost tactic, not only in terms of US blood but also in terms of the degree of international criticism they have occasioned". Also, Brunstetter and Braun (2011: 343) pointed out that attacks by UAVs are less invasive than those with ground forces. To decision makers, the military operations with UAVs could lower the political cost of using armed forces in both domestic and international ways.

First, domestically, countries' use of armed forces have no way but to sacrifice people's lives since the birth of state-nations. This fact have made the threshold of using armed forces high so that the military has been considered as the last resort when no other alternatives are available. According to the Bureau of Investigative Journalism (as cited in Zegart, 2018: 14), during 568 times of airstrike by armed UAVs from 2002 to 2015, no US casualty was reported. In a 2015 US opinion poll conducted by the Pew Research Center, up to 58% of Americans supported the 'US Drone Strikes' while only 35% of respondents disapproved it. Among those that disapprove, a major concern was that the US drone strikes could "endanger civilian lives" in disputed regions (Pew Research Center, 2015: 1-5). This high level of support from the people enabled the Obama government to utilize UAV strikes, especially in Afghanistan. This domestic support for military operations with UAVs may not be much different in other parts of the globe.

Another part of the political cost is international reputation. In the 2015 poll mentioned earlier, 24% of people chose "Very Concerned" that UAV attacks "Damage America's reputation". States are concerned of international response and condemnation. Despite the 24% response, military options with UAVs arouse a lesser degree of international criticism than other means

of military action such as ground forces (Plaw and Fricker, 12: 355). This is because not only are UAV attacks less seemingly invasive and obvious (Fowler, 2014: 112-113), but it is also hard to figure out the genuine operator of UAVs immediately. This can been seen empirically through examples in the Korean peninsula and Kashmir, the disputed region between India and Pakistan. When the Republic of Korea (ROK) forces found unidentified UAVs around the military demarcation line (MDL) and even above the Blue House in 2014, the ROK suspected the Democratic People's Republic of Korea (DPRK). However, when the government of ROK made an allegation against the DPRK; instead, the DPRK government argued that those UAVs were the fabrication of the ROK. In another example, India and Pakistan have lodged accusations against each other several times concerning UAV airspace intrusion in 2019. However, neither of them acknowledged the other's accusation (Ghauri and Mir, 2016; Bremmer, 2019).

2.3. Daring ISR Operations with UAVs and Impacts on Territorial Disputes

The distinguishable character of UAVs in lowering the economic and political costs of using armed forces, thus could drop the threshold in the use of military force by eroding the deterrence among states (Boyle, 2013: 24-25). Furthermore, there is concern that the use of UAV could serve as "a coercive measure" (Brunstetter and Braun, 2011: 339; Horowitz, Kreps and Fuhrmann, 2016: 31). Zegart (2018: 10), as well, emphasized that UAVs increase the credibility of coercion by dropping "the risk of human lives", "the financial costs of action", and "domestic audience costs and international reputational costs". Boyle (2013: 27) warned that authoritarian regimes especially, might exploit the benefits of UAV as coercive instruments. How then would daring and even coercive employment of UAVs appear? Forms of employment might be hardly different from their typical activities.

According to a research by Easton and Husiao (2013: 5), primary missions of Chinese UAVs are "intelligence, surveillance and reconnaissance (ISR)", "precision strike", "electronic warfare", and "data relay". According to Gertler (2012: 4), in the US as well, military UAVs are performing similar missions – ISR and strike. Among missions stated above, ISR has been the initial and traditional mission of UAVs, as this new form of technology strengthens the capability in surveillance (Gill and Gill, 2016: 71; Boyle, 2013: 26; Davis et al., 2014: 2). The PRC also suggested that ISR is where UAVs can exhibit their merit (Chase, Gunness, Morris, Berkowitz and Purser, 2015: 2-3). With their capabilities of collecting high level of intelligence and distributing a massive amount of information, ISR UAVs satisfy demands of today's complex and rapidly changing environment, which allows commanders of advanced situational awareness (Brannen, Griffin and

McCormick 2014: 8; Gill and Gill, 2016: 71-72; Sun 2020: 17). Besides the low-cost aspects of UAVs, their prolonged endurance is another merit in surveillance, allowing them to loiter over contested territories for a long time as means of gathering information (Boyle, 2015: 115). Thus, with the lowered threshold of using forces, ISR operations with UAVs could appear in the form of coercion restraining counter-measures of neighbouring states which are relatively weaker than the UAV operator.

Empirical cases of ISR operation with UAVs have demonstrated the influence of the unique characteristics of UAVs, which allows decision makers to make daring employment of forces. One of the significant phenomena from this has been intruding the air space or the Air Defence Identification Zone (ADIZ) of neighbouring states or approaching war vessels of other states with UAVs. In 2019, this has been the issue in the Middle East, especially between the US and Iran. On June 20, 2019, Iran's Revolutionary Guard shot down the US RQ-4A Global Hawk, the high altitude long endurance (HALE) UAV which was flying around the Strait of Hormuz and argued that the US UAV intruded Iranian territory (Berlinger, Tawfeeq, Starr, Bozorgmehr and Pleitgen, 2019). Also, after less than a month later, the US shot down an Iranian UAV over the Strait of Hormuz alleging that the Iranian UAV approached the US vessel within 1,000 yards and had ignored numerous multiple warnings (Fredericks, 2019). Cases mentioned above between ROK and DPRK, and India and Pakistan can be interpreted in the same context.

Daring ISR operations provide states more information than before. And this means something in conflicts among states. The importance of information and its superiority has been unambiguously emphasized from old military volumes in both eastern and western societies. According to Sun Tzu (2000: 59-60), information which enables foreknowledge is critical in the art of war. He wrote that foreknowledge based on accurate information "enables the wise sovereign and the good general to strike and conquer, and achieve things beyond the reach of ordinary man." Also, Clausewitz (2010: 105-106) stated that the uncertainty which comes from the lack of information makes a critical feature of war itself and influence from this is "so great as to render the pre-determined plan completely nugatory."

In any form of conflict, dominance in the battlefield has been dependent upon information superiority which enables prioritization and targeting (Deakin, 2010: 13). The ability to collect accurate and timely information allows a faster tempo of the military operation, including situation analysis, decision-making and action. Moreover, if one could have adversaries remain in partial or erroneous information by dominating intelligence, hasty and poor quality decision-making of adversaries would follow. Consequently, an improved tempo from information superiority enables one's predominance in

any conflicts (Deakin, 2010: 13-14). Thus, a country's development of UAVs and subsequent daring ISR operations could lead to strengthening its influence on disputed territories.

3. Development in the PRC's UAV

3.1. Early Development

Despite the present advanced technology of Chinese UAV, the history of the PRC's UAV technology began with the acquisition of foreign UAVs and reversed engineering from them (Malhotra and Viswesh, 2014: 168). In the 1950s, the PRC acquired 20 Lavochikin-17s (La-17) from the Soviet Union and used them as targets in the training of weapons. When the Soviet Union withdrew its military support in the early 1960s after its alienation from the PRC, China developed its indigenous version of UAV named CK-1 (Chang Kong-1, "Vast Sky", 长空一号) in the 1960s, which was also used in the same way with the La-17 (Kania, 2018: 4). Since the 1960s, the PRC kept proceeding with the development of target drones to test ground-to-air as well as air-to-air weapons. To test air-to-air weapons, the PRC developed supersonic drones as well and successfully tested them in 1995, becoming the third country with supersonic drones in the globe (Kania, 2018: 5). In the 1960s, the capture of the US AQM-34 Firebee by shooting it down in Vietnam was another significant acquisition of UAVs in the PRC. The AQM-34 Firebee was also reengineered to the WZ-5 (Wu Zhen-5, 无侦-5) in the 1980s. However, unlike the CK-1, WZ-5 was principally employed for reconnaissance regarded as the most critical mission of UAVs today (Kania, 2018: 4).

3.2. PLA Modernization, Civil-Military Integration and UAV Institutions

In the context of PLA's modernization, UAV has been considered as a key weapons system to support the claims to maritime territories as well as enhancing a position in the global arms market (Chase et al., 2015: 2). Also, in a piece of Jane's research by Nurkin, Bedard, Clad, Scott and Grevatt (2018: 150-154), unmanned systems were pointed out as a critical component of the PLA's modernization for achieving its goals: near sea protection, power projection and intelligentized modernization. The development of the PRC's UAVs has been accelerated in recent years by the modernization of the PLA, including vibrant civil-military integration (CMI).

The PRC, which is spending the second largest defence budget in the world, has pushed forward PLA modernization along with strengthening the domestic defence industry with an ambition of being "a top-tier supplier in

the global arms trade" (US Office of the Secretary of Defense, 2019: 93). Accordingly, Xi Jinping initiated aggressive military reforms in December 2015 (Lafferty, 2019: 627). To support PLA's modernization, the science and technology (S&T) apparatus had to be reformed. Thus, the PRC established the strategic Commission of Science, Technology and Industry for National Defense (COSTIND) in 2015 and the S&T Commission in 2016. These two advisory groups facilitated and accelerated the goals of PRC. The first, COSTIND, has encouraged PLA's modernization – advising leaders of the military as well as the defence industry, while the latter has promoted innovation by emphasizing CMI (US Office of the Secretary of Defense, 2019: 96).

CMI could be defined as follows: "the process of combining the defense and civilian industrial bases so that common technologies, manufacturing processes and equipment, personnel and facilities can be used to meet both defense and commercial needs" (Bitzinger, 2004: 2). CMI is especially critical to the modernization of PLA for the distinctiveness of today's security environments: correlation between the development of military and economy, dual-use technology, demanding aspects of military development, and the informationized warfare (Lafferty, 2019: 633-637). Hence, the PRC's CMI reform has concentrated on resource sharing between civilian institutions and military and sought to merge two parts into one organically blended system so that the efficiency and effectiveness could be maximized at the end. Among many areas of weapon systems, the UAV industry must have been an essential part of PLA's CMI for the PRC has pursued a smaller but stronger PLA (Lafferty, 2019: 629-637). Also, to achieve *qiang jun meng* ("strong military dream", 强军梦) which is an indispensable part of *zhongguo meng* ("China's Dream", 中国梦) (Jian, 2019: 222), the PRC's military reforms have been oriented toward building an intelligent military that can dominate battlefields in the information age (State Council Information Office of the PRC, 2019: 13-22).

With national-level funding and vibrant CMI, numerous organizations are conducting vigorous research and leading development of UAVs. These organizations are:

– Nanjing University of Aeronautics and Astronautics; Nanjing Research Institute on Simulation Techniques/PLA General Staff Department 60th Institute; Northwestern Polytechnic University; Xi'an ASN Technology Group; Beijing Wisewell Avionics Science and Technology Company; Beijing University of Aeronautics and Astronautics; China Aerospace Science and Technology Corporation; China Aerospace Science and Industry Corporation (Chase et al., 2015: 4).

The PRC could proceed with its development in military UAVs by "a clear national strategy with a top-down approach" with state-lead strategic development under the control of the PLA (Malhotra and Viswesh, 2014: 167). Under national-level guidance, various advanced military UAVs have been developed by cooperative researches of industry-university and military-industrial complexes, as mentioned above.

3.3. PLA's UAVs and Their Abilities

Table 2 epitomises the various advanced military UAVs in the PRC. The Northwest Polytechnical University–Xi'an ASN Technology Group develops the ASN series of UAV which has been deployed in various forces in the PLA. This university–industry based corporation, also known as the No. 365 Research Institute, is the largest UAV production company and R&D base in China. Various ASN UAVs have been employed in the PLA: in the PLA Army, since the mid-1990s, the ASN-206 was introduced and subsequently the ASN-207 was adopted; in the PLA Navy, at least since 2011, the ASN-209 was fielded; in the PLA Air Force, the ASN-301 was introduced in 2017; lastly, the PLA Rocket Force has employed the ASN series for surveillance, reconnaissance, target position and damage assessment (Kania, 2018: 12-22). Among the series of ASN UAVs, the ASN-209, so called the Silver Hawk, is one of the most advanced UAVs in the PLA with a practical ceiling of

Table 2 Advanced Military UAVs in the PRC

Weapon	Max Altitude (m)	Max Range (km)	Max Endurance (hr)	Estimated Price ($)
ASN-209	5,000	200	10	Unknown
BZK-005	8,000	2,400	40	1 million
Wing Loong-I	5,000	5,000	20	Unknown
Wing Loong-II	9,900	1,500 (radius)	32	1-2 million
CH-4	14,440	2,750	30	1-2 million
CH-5	9,000	10,000	48	8 million
WZ-7	18,000	7,000	10	Unknown

Source: Xian Aisheng jishu jituan gongsi, undated; Biggers, 2015; Military Factory, 2018; Army Recognition, 2020; Military Factory, 2019; Gady, 2018; Lei, 2016; China Power Team, 2018; US-China Economic and Security Review Commission, 2013: 314.

5,000m, an endurance of 10 hours, a range of 200km, a maximum speed of 180km/h, and a maximum mission payload of 50kg (Xian Aisheng jishu jituan gongsi, undated). So far, the PRC has exported 18 ASN-209s to Egypt.

The Beijing University of Aero and Astronautics (BUAA), which has received funding from the 863 Program of the PRC's Ministry of Science and Technology, is where the BZK series was designed (Hsu, Murray, Cook and Feld, 2013: 7). The BZK-005 (Chang Ying, 长鹰), also known as the Giant Eagle, is sometimes compared with the US RQ-4 Global Hawk for its long-range reconnaissance capability but considering its range and altitude, is closer to the US MQ-1 Predator (Hsu et al., 2013: 8). This UAV is classified as the medium altitude long endurance (MALE) with an endurance of 40 hours, a payload of 150kg and a flight ceiling of 8,000m (Tan, 2018: 16). The BZK-005, so far, is not reported to carry any weapon unlike the US Predator, but mainly functions as an ISR asset (Mccaslin, 2017: 11).

The Pterodactyl (Yilong, Wing Loong, 翼龙) is another form of advanced UAVs in the PRC which has various variants designed by the China Aviation Industry Corporation (CAC)'s Chengdu Aircraft Design Institute (CADI) (Kania, 2018: 17). Unveiled in the Aerospace Exhibition (Zhuhai) 2010, the Wing Loong I is the MALE as well with a range of 5,000km, a ceiling of 5,000m and endurance of 20 hours (Military Factory, 2018). Also, its next version, Wing Loong II, was introduced in 2015. Air-to-air and air-to-ground combat capability is a distinctive feature of these variants equipped with bombs and missiles. Their weaponry options include "AKD-10 air-to-surface anti-tank missile, BRMI-90 90mm guided rocket, FT-7/130 small 130kg bomb with planar wing, FT-9/50 50kg bomb for drones, FT-10/25 25kg bomb, GB-7/50 50kg precision-guided munition (PGM), and GB-4/100 PGM" (Air Force Technology, n.d.). These have been vigorously exported to many countries such as Egypt, Pakistan, Indonesia, Saudi Arabia, UAE and Uzbekistan.

Another strong exporter contributing to the PRC's military trade is the CH (Cai Hong, "Rainbow", 彩虹) series developed by the China Aerospace Science and Technology Cooperation (CASC) (Hsu et al., 2013: 11). As a HALE, the CH-4 is capable of both reconnaissance and strike mission with two types, the CH-4A and the CH-4B. While the CH-4A is mainly deployed for ISR missions, the CH-4B could be equipped with armaments such as "anti-tank guided missiles (ATGMs) as well as precision-guided drop bombs – up to 770lb of ordnance." This type of UAV already has been used in battlefields by Iraqi and Saudi Arabian forces against the ISIS and Houthi rebels (Military Factory, 2019). The CH-5, a step forward from the CH-4, seems to have longer endurance and flight range than its previous version. The prototype of this UAV was displayed in November 2016 with its maiden flight in August 2015 (Gady, 2018). The CH-5 achieved the nickname of "air bomb truck" because it can carry 16 missiles at once (Pickrell, 2018). The CH-7 is

another model of the CH series. The most distinguishable feature of this type might be stealth or low observability at "a subsonic speed of 740 kilometres per hour" (Kucinski, 2018).

The Guizhou Aircraft Industry Corporation (GAC) has developed another HALE, the WZ-7 (Xiang Long, "Soaring Dragon", 翔龙). The WZ-7 was fielded in 2018 and is seemed to be deployed for ISR missions along the PRC's coastline for its A2/AD strategy with a range of 7,000km and an endurance of 10 hours (Hodgkins, 2016).

4. The PRC's Strategy and UAV Employment in the East China Sea

4.1. China's Dream, the East China Sea Policy, and Utilities of UAVs

Since Xi Jinping used the term *zhongguo meng* ("China's Dream", 中国梦) in his first address on March 17, 2013, which means "the great rejuvenation of Chinese nation", it has been a representative expression showing the PRC's ambitious rise (BBC, 2013). In his address in the Twelfth People's National Congress on 17th March 2013, Xi stated that the road to China's Dream should promote the spirit of China with patriotism in it (Xinhua, 2013). Moreover, in "the Eighth Collective Learning of the Politburo" in July 2013, Xi emphasized that building a great maritime power should be a part of the great revival of China to keep her robust economic development, to secure national sovereignty and interest, and to promote her flourishing society (Bae and Kim, 2014: 22-23; Hu, 2018: 19). The PRC's emphasis on maritime power could be found in the recently published Defence White Paper where the PRC stressed and specified her goals for the national defence such as "to defer and resist aggression", "to oppose and contain 'Taiwan independence'", "to safeguard national sovereignty, unity, territorial integrity and security", and "to safeguard China's overseas interests" (State Council Information Office of the PRC, 2019: 7).

The A2/AD is what the PLA has pursued to achieve the above strategic goals with capabilities to make long-range attacks against potential adversaries who could approach from the Western Pacific (US Office of the Secretary of Defense, 2019: 54-55). Thus, securing disputed offshore islands has been exceedingly crucial to conduct the PRC's strategy (Fravel, 2008: 267). To achieve these challenging tasks, the PLA created the idea of island chains. For the PLA, the concept of island chains is a defensive or offensive geographical perimeter for the maritime strategy of the A2/AD. Within the first island chain, which connects "the Kurils, the Japanese home islands, and the Ryukus to Taiwan, the Philippines, and Indonesia", the PLA is planning to "deny adversaries the ability to operate" (Vorndick, 2018). The first island chain was initially designated by John F. Dulles, the 52nd US Secretary of

State in the 1950s and has been used for containment or blockade of the Soviet Union and the PRC by the US during the Cold War era (Vorndick, 2018).

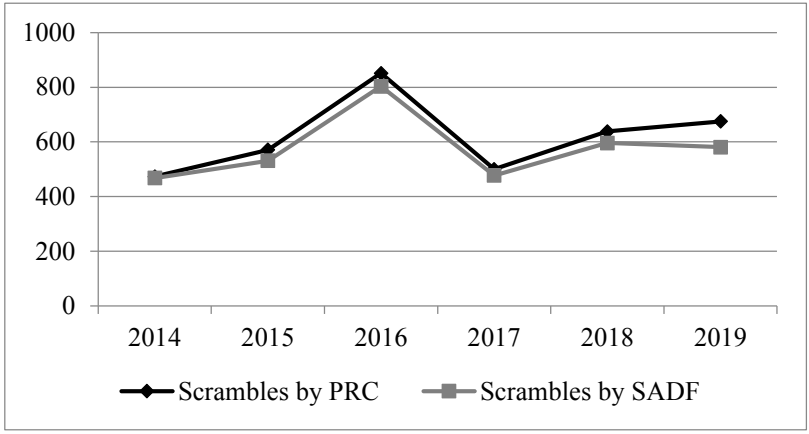
Thus, the first island chain is the fatal obstacle which could encircle the PRC and block the PRC's nautical activities (Yoshihara, 2012: 299) and thus is where the naval competition between the US and the PRC seems apparent (Qi, 2019: 6). Along the first island chain, the Bash Channel and Miyako Strait have been critical passages for the PRC as they connect the South and the East China Sea with the Western Pacific respectively. The PRC has expanded her naval and aerial military activities around these passages which are "principal entryway for the People's Liberation Army Navy (PLAN) into the Pacific Ocean" (Gady, 2019). Disputed regions in the East China Sea, Taiwan and Senkaku/Diaoyu Islands, are strategic points in this regard: the Bash Channel is a waterway between Taiwan and the Philippines and the Miyako Strait is that between Senkaku/Diaoyu Islands and Okinawa of Japan.

In this context, the PRC's maritime policy on the East China Sea in the 2010s turned into a more assertive way than in the 2000s. On 23rd November 2013, the Ministry of National Defense of the PRC unilaterally announced that she has established an Air Defence Identification Zone (ADIZ) in the East China Sea including Senkaku/Diaoyu Islands and Ieodo/Suyanjiao (Xinhua, 2013). Her new ADIZ overlapped the existing ADIZ of the ROK, Japan as well as the Republic of China (ROC, Taiwan), which revealed the PRC's aggressive change in policies in the region after Xi's inauguration (Reinhard and Elias, 2015: 6-7).

The PRC has expressed her strong desire to change the status quo, although it does not seem to use military powers overtly in the near future (Yang and Li, 2016: 149). For instance, the PRC deems to seek a change in the status quo of the Senkaku/Diaoyu Islands from Japanese exclusive control to joint control by both countries (Yang and Li, 2016: 145). The PRC has been patrolling disputed islands with law enforcement ships and aircraft, exploiting low-level coercive provocations around claiming areas, and seeking slow progress with negotiations (Duchâtel, 2016: 21). In Figure 2, statistics released from the Ministry of Defense of Japan show vibrant flights of aircraft from the PRC and those of the Southwestern Composite Air Force of Japan mainly countering flights of the PRC above the East China Sea.

In this context, the PRC emphasized the importance of situational awareness of where she has claimed her sovereignty to protect her rights and enforce the law (State Council Information Office of the PRC, 2019: 14). It is inconceivable to find other forms of operation prerequisite to achieve the above goals besides ISR (Cronin and Neuhard, 2020: 19). Advanced military UAVs must be a perfect fit for expanding maritime situational awareness and are expected to be operated in ISR by the PLA to control disputed territories (Jennings, 2019). Many reports by US officials as well have stated that

Figure 2 Number of Flight Scrambles by the PRC and Japan's SADF in the East China Sea (2014-2019)



Source: Joint Staff, Ministry of Defense of Japan, 2019; 2020.

"UAVs will probably become one of the PLA(N)'s most valuable ISR assets in ongoing and future maritime disputes and protection of maritime claims" (Karotkin 2014: 10; O'Rourke 2018: 114). Also, studies from the ROC analyzed that the PRC's military UAVs are capable of being strategic weapons in A2/AD considering their long flight duration as well as heavy payloads (Ying, 2016: 11; Cai, 2019: 68). Moreover, recently developed long-range UAVs in the PRC definitely will advance capabilities for ISR (Chase et al., 2015: 4), without detracting from her allegedly love of peace (State Council Information Office of the PRC, 2019: 14).

4.2. UAV Deployment and Employment in the East China Sea

The PLA allegedly activated two UAV brigades in the Air Force – 178th and 151st UAV Brigades, and also two UAV regiments in the Navy – one in the South East Fleet and the other in the East Sea Fleet. The UAV Regiment in the East Sea Fleet is headquartered in Daishan Air Base, Zhejiang province and equipped with BZK-005, BZK-007 and ASN-209 (Gettinger 2019: 13). The East Sea Fleet is mainly responsible for the East China Sea and Taiwan Strait (US Office of Naval Intelligence, 2009: 13). The ASN-209 has been detected in the East China Sea since 2011 from satellite images (Gettinger, 2018). With a range of 200km, ASN-209s can conduct ISR missions around coastal waters or launch from naval ships.

The BZK-005 seems to have been deployed in Daishan since 2013 (Kania 2018: 15). According to satellite imagery in 2015, at least three BZK-005

were stationed off the coast of the East China Sea (Jamestown Foundation, 2016). The deployment of BZK-005, the MALE UAV whose range is extended to 2,400km could be threatening to neighbouring states because when launched from Daishan Island or Ningbo in Zhejiang Province, they could cover the Senkaku/Diaoyu Islands, Japan's Southwest Islands and all of the ROK's territories (Mccaslin, 2017: 13).

Moreover, seven of the WZ-7 were fielded on three strategically critical airbases, three at Shigatse in the Tibet Autonomous Region, two at Lingshui on Hainan Island, and two at Yishuntun in Jilin province (Bellingcat Investigation Team, 2018). As a HALE whose range is up to 7,000km, the deployment of the WZ-7 in Hainan Island is expected to exercise an effect on the East China Sea as well, although Hainan Island is bordering the South China Sea (Kania, 2018: 17; Axe, 2019). Considering the three balanced positions of WZ-7 and its expansive range, the PRC seems to plan to cover both the South and the East China Sea with allegedly two HALEs in Lingshui.

In the East China Sea, the PRC has collided with Japan and the ROC over the Senkaku/Diaoyu Islands and the sovereignty of the ROC respectively. The Senkaku/Diaoyu Islands which have been controlled by Japan since 1895 have been a subject of the territorial dispute among Japan, the PRC, and also the ROC. The PRC has argued that numerous historical literature from the Ming dynasty gave proof of her ownership over the islands while the ROC, as well, put forward the "Illustrations of Taiwan (*Quantai Tushuo*)" which was written by a prefect in the Qing dynasty, to support her claim (Kawashima, 2013: 123). In addition, both the PRC and ROC have asserted that Japan annexed the islands after its victory in the First Sino-Japan War in 1895 and the subsequent Treaty of Shimonoseki, but should have returned the islands in 1945 when it surrendered in World War II (Su, 2005: 28). On the other hand, Japan has asserted that the islands were discovered by Japanese businessman Koga Tatsushiro in 1884 and were incorporated into Japanese territory since 1886 (Suganuma, 2000: 96-98).

The PRC's UAVs have been found around the Senkaku/Diaoyu Islands several times, and some of them aroused severe tension between the PRC and Japan. On 9th September 2013, a Chinese UAV conducted reconnaissance and intruded into Japanese airspace above the Senkaku/Diaoyu Islands while a Japanese F-15 fighter scrambled in response. The Japanese government announced new rules of engagement for drones stipulating that any foreign UAVs intruding Japanese airspace could be qualified as a target when it ignores warning to leave. These new rules of engagement stimulated the PRC to react with no apology against Japan's condemnation over the UAV intrusion in September. The PRC warned that any intercepting of Chinese UAVs by Japan could be regarded as "an act of war" (Gettinger, 2013).

Due to the deteriorated relations with China, the Japanese government decided on January 2014 to buy three Global Hawks – long-range unmanned surveillance aircraft – from the US and explained its decision was based on reactions against China's aggressive actions in disputed maritime areas as well as North Korea's nuclear and missile threats (Robson, 2014). Gettinger wrote that this accident showed how drones could lower the boiling point of territorial disputes (Gettinger, 2013).

Another case of airspace intrusion by UAV was reported on 18th May 2017 by the Japan Coast Guard. Accordingly, four ships of the Chinese Coast Guard intruded into Japanese waters and loitered around for two hours. The Japanese Coast Guard also found one drone with the Chinese vessels, although of which type was not confirmed (*The Japan Times*, 2017). The maritime area where Chinese ships entered was 12 nautical miles away from Uotsuri which is the main island of the Senkaku/Diaoyu Islands (Burke and Sumida, 2017; Joint Staff, Ministry of Defense of Japan, 2018: 6).

UAVs of the PRC also seem to have played an important role in strengthening her dominance in the Taiwan Strait and surrounding maritime areas. The ROC, also known as Taiwan, has been an independently governed island since 1949. According to the PRC's 'One China' principle, Taiwan is no more than a province of the PRC and allegedly agreed with this idea by signing the 1992 Consensus between the Chinese Communist Party (CCP) and the Kuomingtang (KMT) political party. However, Taiwan's President Tsai Ing-wen declared the rejection of the consensus and implied the future official independence of Taiwan in her January 2019 speech (Albert, 2019). The tension around the Taiwan Strait has been escalated, as the PRC intensified its military exercises against Taiwan since President Tsai Ing-wen from the pro-independence Democratic Progressive Party was elected in 2016, as well as the continuation of the Sino-US trade war (Lin, 2019). In addition, the Trump administration has sought to deepen ties with Taiwan since the inauguration.

In June 2013, the *Taipei Times* published a concerning article titled "China developing drones to spy on Taiwan: study" which quoted a study from the US-China Economic and Security Review Commission (Lowther, 2013). The study warned that "shorter-range UAVs could perform ISR on fixed and mobile targets on Taiwan and in the Taiwan Strait" (Hsu et al., 2013: 5). The warning from the study became a reality through a case on 24th July 2019. On this day, the US Navy cruiser sailed through the Taiwan Strait for a cause of the freedom-of-navigation against China's condemnation (Ali and Wu, 2019). Against the sailing of the US Navy, the PRC responded by launching a WZ-7, the PLA's long-range reconnaissance UAV, above the Taiwan Strait to keep tabs on the US Navy cruiser (Axe, 2019).

To be brief, the PRC has deployed numerous types of advanced UAVs around the East China Sea and seems to employ them to strengthen her influence in the region, especially the Senkaku/Diaoyu Islands and the ROC. The PRC seeks to achieve information superiority through active ISR mission with UAVs, which has aroused the concerns of neighbouring states.

5. Conclusion

The development of PRC's UAV capability is expected to strengthen her situational awareness and increase her influence in the East China Sea. With their distinctive low cost character, UAVs allow states to gather information more fearlessly through ISR missions without triggering prompt confrontation of other states. As the PRC is planning to expand her influence in the region and perceives that securing adjacent seas is highly crucial for her strategy, UAVs might be a useful tool to achieve her goals. UAVs could lead to more active ISR in the East China Sea considering the PRC has been cautious so far in this region. The PRC's approach in maritime disputes in the East China Sea will be to utilize fissures between her neighbouring states and the US and try to change the status quo of the region gradually into favourable conditions for her (Cooper, 2018).

The vibrant UAV development in the PRC seems to trigger a counter development or acquisition of UAVs in neighbouring states. Japan is planning to take delivery of three RQ-4 Global Hawk drones – the long-range ISR UAV in the US Forces (Kelly, 2018) while the ROK has recently been delivered four RQ-4 (Panda, 2020). Also, the ROC which received approval of a $2.2 billion arms package from the US has unveiled a suicide UAV, the Jian Hsiang drone at the Taipei Aerospace and Defence Technology Exhibition in August 2019 (Chung, 2019). Neighbours of the PRC, as well, are expected to utilize the benefits of UAV to satisfy their information requirements to counter the development of the PRC's UAV and its impact on their disputed maritime areas. What could be worrying is that the competitive development of UAVs in the region might trigger militarized interstate disputes or precarious arms race among these militarily advanced states around the East China Sea.

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Note

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