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Looking Forward to More Solid U.S.-Taiwan Friendship and Cooperation

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Looking Forward to More Solid U.S.-Taiwan Friendship and Cooperation

The U.S. presidential election catching the worldwide attention this year was finally concluded in the morning on November 9, 2016 EST. Republican candidates Donald J. Trump and Mike Pence were elected as the 45th U.S. President and Vice President. When the election results were declared, President Tsai Ing-wen, on behalf of the government and the people of the Republic of China (Taiwan), sent a congratulatory message to them on 9 November 2016 to express her congratulations and best wishes for future prospect of U.S.-Taiwan relations.

President Tsai expressed, The US is the most important democratic country in the world, and Taiwan's staunchest partner in the international community. She looks forward to working with President-elect Trump and his governing team to further strengthen the Taiwan-US relationship, which will continue to be a cornerstone for peace and stability in the Asia Pacific.

In her congratulatory letter forwarded by R.O.C. diplomatic channel, President Tsai said, Taiwan and the US enjoy a strong partnership based on values of freedom, democracy, and human rights, as well as shared interests in enhancing peace, stability, and economic prosperity. In recent years, significant progress has been made in our bilateral relations due to close and comprehensive collaboration on issues of mutual concern. Taiwan will continue to be a close and reliable partner of the US in the region and around the world. She is confident that the cordial and mutually beneficial relationship between our two countries will be further strengthened in the years ahead.



President Tsai expressed, She looks forward to working with President-elect Trump and his governing team to further strengthen the Taiwan-US relationship. (Source: Share America, US Department of State)



Taiwan and the US have comprehensive collaboration on issues of mutual concern. (Source: MOFA)

"America First" Works in Parallel with Cooperation with Allies

President-elect Trump said, he is going to adopt an "America First" policy, and hopes U.S. allies will shoulder more defense responsibilities for their own sake. This message has once caused concerns worldwide, especially for the traditional U.S. allies and those with close connections with the U.S. They are concerned that the relations as U.S. allies and their long-term interactions and cooperation in between might change.

A head of state definitely shall take the national interests as one's top priority. However, Mr. Trump has declared that "America First" policy does not mean to adopt isolationism, he simply meant that in the future U.S. allies shall be more independent and self-contained, and not always "hitchhike" on security and economic agendas.

From another perspective, the efforts and sacrifices contributed by the U.S. and recognized by U.S. Allies with trust and cooperation are indeed key factors for the U.S. to retain its position as a global leader to sway important global agendas, and directly or indirectly reap and secure its national interests out of such a position. Overzealous consideration of "America First" will make its potential competitors with fast growing national power take over its international leverage and benefits, and cause damages on its long-term interests.

Therefore, the issue for the U.S. probably is about mapping out a tradeoff policy between "America First" and its dedication to and cooperation with its allies. Only with a proper adjustment, "America First" can work in parallel with the cooperation with U.S. allies, and can be mutually beneficial and win-win.

Taiwan Remains a Helpful Partner to the U.S.

The Republic of China (Taiwan) has been maintaining a long-term close partnership with the U.S. Even though it is categorized as a small nation in comparison with the rest of the world considering its population and territory, Taiwan's comprehensive national power (CNP) figure is much more prominent.

Economically speaking, Taiwan is the 9th biggest trading partner to the U.S. while the U.S. is the 2nd largest trading partner to Taiwan. Taiwan has quality and less expensive goods and services in information, communications, electric and electronic, automated precision machinery, and future aerospace and defense sectors. The interactions and cooperation in trade and commerce between the U.S. and Taiwan will be mutually complementary and beneficial. Taiwan is situated at a location of geostrategic significance in the Asia-Pacific region, and it can play a key role in regional stability and non-conventional security. Therefore, Taiwan is a trustworthy and cooperative partner to the U.S., not its burden, and will remain a helpful partner to the U.S.

South Korea's Deployment of THAAD

Dr. Park Byung-kwang

Why is it Necessary to Deploy THAAD in South Korea ?

The most important and basic reason to deploy THAAD is to respond to North Korea's nuclear and missile threat. South Korea's Defense Ministry and US Forces Korea said in joint statement that they released on July 8. "South Korea and the United States made an alliance decision to deploy THAAD to USFK as a defensive measure to ensure the security of the South Korea and its people, and to protect alliance military forces from North Korea's weapons of mass destruction and ballistic missile threats." South Korea and the US forces Korea set the goal of deploying THAAD by the end of next year at the latest.

North Korea has conducted a total of five underground nuclear tests, 2006, 2009, 2013 and twice in 2016. North Korea's nuclear ambitions are one of the biggest threats to not only international society but also South Korea's peace and security. North Korea is banned by the UN from any tests of nuclear or missile technology and has been hit by six sets of UN sanctions so far; however, the sanctions have failed to denuclearize the North Korea.

North Korea possesses around 1,000+ ballistic missiles. About 85% of them pose a threat to the Republic of Korea. More than 23 ballistic missiles have been launched by North Korea this year alone. A single THAAD battery provides coverage for one third to two-thirds of the entire Republic of Korea against short and medium-range ballistic missiles such as North Korea's SCUD, Nodong or Musudan missiles. If THAAD is deployed, it will form a multi-layered air defense system with existing ROK-U.S. PATRIOT systems, increasing the chances for

a successful interception as it offers at least two intercept opportunities.

The intercept may take place at a high altitude of 40km or above, neutralizing the threat before the enemy's nuclear and chemical warheads can be armed, or before a ballistic missile payload with cluster warheads is able to disperse. Engagements with nuclear and chemical warheads are made above the keep-out altitude (10-12km), negating damage at ground-level. Because THAAD has no warheads on its missiles, instead destroying other projectiles by colliding with them, THAAD is potentially safer, especially for dealing with nuclear missiles.

THAAD provides coverage for one third to two-thirds of the entire Republic of Korea against short and medium-range ballistic missiles. If THAAD is deployed, it will form a multi-layered air defense system with existing ROK-U.S. PATRIOT systems.

Moreover, THAAD can intercept a missile launched at a high angle from North Korea towards the Republic of Korea. For North Korean missiles with optimized fuel volumes launched on a minimum-energy trajectory, they can be intercepted not only by THAAD, but by PATRIOT interceptors as well. Unlike North Korea's mostly untested ballistic missiles program, THAAD has been in use for several years by the U.S. military to protect units in places such as Guam and Hawaii from potential attack.

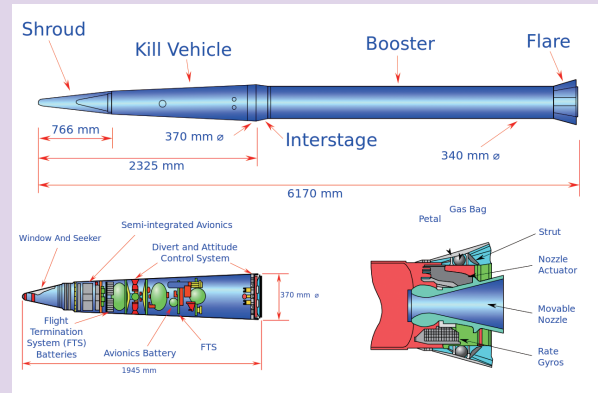
In conclusion, a THAAD battery can be likened

What is THAAD ?

Terminal High Altitude Area Defense (THAAD), formerly Theater High Altitude Area Defense, is a United States Army anti-ballistic missile system designed to shoot down short, medium, and intermediate range ballistic missiles in their terminal phase using a hit-to-kill approach.¹ Although the actual figures are classified, THAAD missiles have an estimated range of 125 miles (200 km), and can reach an altitude of 93 miles (150 km).

The THAAD Radar is an X Band active electronically scanned array Radar developed and built by Raytheon. It is the world's largest ground/air-transportable X-Band radar. The THAAD Radar and a variant developed as a forward sensor for ICBM missile defense, the "Forward-Based X-Band – Transportable (FBX-T)" radar was assigned a common designator, AN/TPY-2, in late 2006/early 2007.

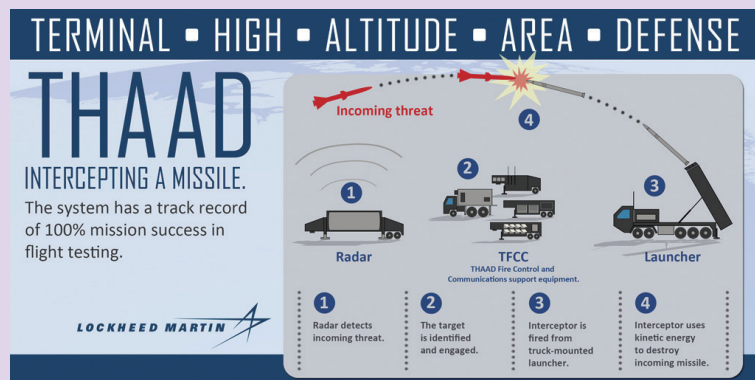
A THAAD battery consists of nine launcher vehicles, each equipped with eight



(Source: Lockheed Martin)

missiles, with two mobile tactical operations centers (TOCs) and the ground-based radar (GBR);² the U.S. Army plans to field at least six THAAD batteries.³

Lockheed Martin says, the radar first detects an incoming missile. Those manning the system identify the threat. Then, a launcher mounted to a truck fires a projectile, which Lockheed Martin calls an “interceptor,” at the ballistic missile in the hopes of destroying it using kinetic energy, basically just its sheer speed. THAAD has completed eleven successful intercepts for eleven flight tests, demonstrating its interception capability against ballistic missiles with a range of 3,000km or below.



(Source: Lockheed Martin)

Provided by author, Source: “Terminal High Altitude Area Defense”, Wikipedia.org

- 1 “PACOM Head Supports Exercises Near China, Talks THAAD”, Defense News, Feb. 25,2016.
- 2 “U.S. Army has received the latest Upgrade for THAAD air defense missile system”, Armyrecognition.com, Jan. 2, 2015.
- 3 “China’s Hypersonic Ambitions Prompt Thaad-ER Push”, Aviationweek.com, Jan. 8, 2015.

to a giant umbrella, which can provide coverage for an area that can be covered by a multiple number of smaller umbrellas (PATRIOTs), and can defend a far larger area (area defense) compared to ROK-U.S. PATRIOTs that are currently utilized to defend prioritized critical assets (point defense).

Why China Oppose Against the Deployment of THAAD ?

In July 2016, South Korean and American military officials agreed to deploy the THAAD missile defense system in the South Korea to counter North Korea's growing threats and use of ballistic missile and nuclear tests. Immediately after the decision to deploy THAAD was announced on

July 8, China's Ministry of Foreign Affairs posted a statement on its website saying that it was "strongly dissatisfied and firmly opposed."

The ministry's statement said that the THAAD deployment will do no good to the goal of denuclearization on the Korean Peninsula and it is harmful to maintaining peace and stability on the peninsula. The deployment goes against the efforts of all parties to resolve the issue through peaceful dialogue, and that it will seriously harm China's strategic security interests and regional strategic balance. China has urged the US and Korea to stop the process of deploying the THAAD system, not to take actions that could make the regional situation more complicate, and not to do anything that could harm China's strategic security interests.

South Korea's Defense Ministry responded by making clear its intention to move ahead with the deployment of THAAD. "When the THAAD system is deployed on the Korean Peninsula, it will not be aimed at any other country but will solely be operated to counter the threat of North Korea's nuclear weapons and missiles," the Ministry said.

Nevertheless, China has strongly objected to the plan on worries that it would undermine its strategic security interests. Ever since the THAAD decision was reached, Beijing has been hitting South Korea hard, with its state-run media taking a leading role in the "South Korea bashing" drive, publishing harshly worded stories every day that zeroed in on the Seoul government and even its president.

China is concerned that the deployment of THAAD in South Korea may have a negative effect on the strategic stability between the United States and China. China's perceive that the THAAD radar will enable early detection of China's key military installations and ballistic missile



THAAD missile test firing. (Source: Lockheed Martin)

launches. Furthermore, China is concerned that the deployment of THAAD in USFK will incorporate the Republic of Korea into the U.S. and Japan-led Missile Defense (MD) system in Northeast Asia.

However, THAAD is a defensive weapon system based on the right to self-defense, of which its operation will be solely dedicated against North Korea's nuclear and missile threats and not against any third countries. The optimum detection range of the THAAD radar is limited to the Korean Peninsula, and the flight trajectory of an Intercontinental Ballistic Missile (ICBM) launched from neighboring countries toward the U.S. is outside the detection range of THAAD deployed in South Korea. The THAAD deployed in South Korea is not related to the United States' regional Missile Defense system, and will be operated to intercept North Korean ballistic missiles launched towards the ROK in their terminal phase. Therefore, THAAD will only operate as a purely defensive system against nuclear and missile threats posed by North Korea.

China is concerned that the THAAD radar will enable early detection of China's key military installations and ballistic missile launches, and the deployment of THAAD in USFK will incorporate the Republic of Korea into the U.S. and Japan-led Missile Defense system in Northeast Asia.

Chinese ICBM trajectories would exceed THAAD interceptor range, altitude, and speed capabilities. Only ground-based interceptors based in Alaska and California are designed to intercept an ICBM launched from Asia toward the United States. THAAD interceptors based in South Korea would offer the wrong interception profile. They are designed to attack missiles heading toward the interceptors in the terminal inbound phase, not an outbound ICBM flying away in its boost and mid-

range phases.

The THAAD radar is fire-control radar designed to conduct intercept missions, and is one of the basic components of a THAAD battery along with the launchers and the TFCC unit. The THAAD radar emits a radar beam at a high angle, in order to detect an incoming enemy ballistic missile descending toward its target, and to precisely guide THAAD interceptors. As the radar has multiple roles including detection, tracking and guidance, it has a limited detection range compared to early warning radars that only provide detection capabilities.

The THAAD radar would have minimal, if any, capabilities to monitor Chinese missiles attacking South Korea or Japan. U.S. defense officials assert that the THAAD system in South Korea would be configured in "terminal mode" to optimize observation and interception of North Korea ballistic missiles before they reach targets in South Korea. This mode has a shorter radar range and would therefore not have much coverage over Chinese territory. Shifting the radar toward China would eliminate coverage of North Korea—the primary objective of deploying the THAAD to South Korea.

THAAD will be deployed and operated with the purpose of protecting the South Korea and USFK against North Korea's short and medium-range missiles with a range of 3,000km and below, which is completely unrelated to participation in the United States' MD system. 'Incorporation (participation) in the United States' MD system means a high degree of cooperation across all phases, from signing an MOU concerning missile defense cooperation to joint missile development, production, deployment, operation, exercise and training.

South Korea proceeding with a low degree of cooperation which is limited to North Korea's nuclear and missile threats, such as real-time information sharing between ROK-U.S. theater missile operations cells. South Korea has no plans to proceed with the signing of MOUs on a national level, nor to integrate our command and

control systems or jointly develop interception systems. Cooperation on the deployment of THAAD in USFK will be carried out to enhance ROK-U.S. combined defense capabilities. South Korea armed forces will establish its Kill Chain and KAMD systems by the mid-2020s, developed independently of the United States' MD system.

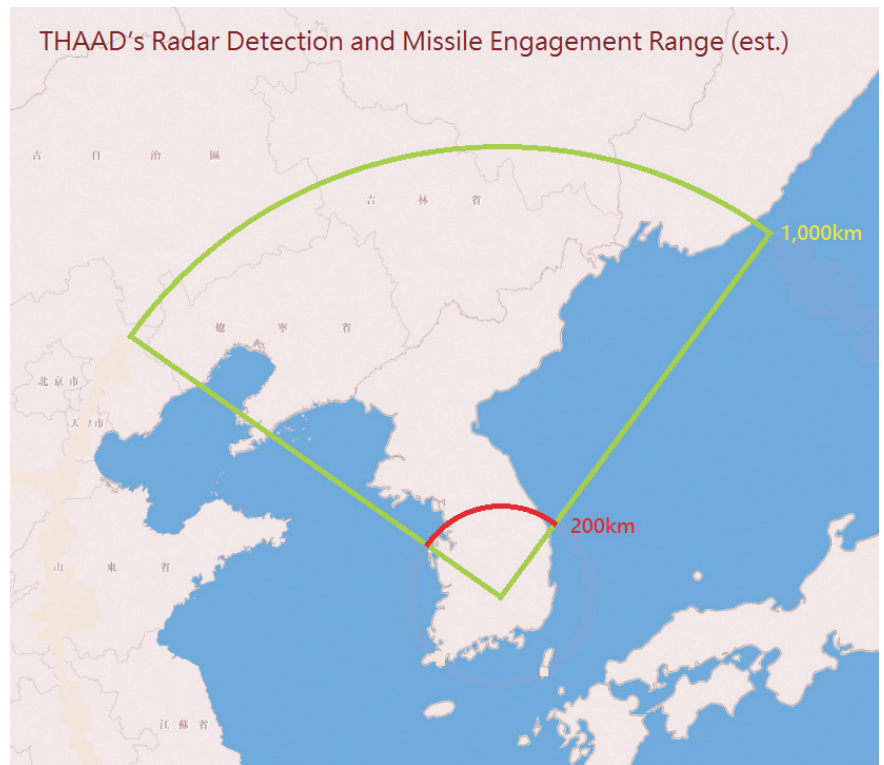
Conclusion

The evolving nuclear and ballistic missile threats posed by North Korea is a matter of survival for our country and people, and the biggest victim of North Korea's provocations is none other than the Republic of Korea and its populace. The South Korean Government has made the decision to deploy THAAD as a self-defensive measure to safeguard the well-being of the country and the lives of its people from North Korea's nuclear and missile threats.

South Korea has the right to defend itself from any other countries nuclear and missile threat. There is nothing holds a higher value than measures to ensure the security of the South Korea and to protect its people from the evolving nuclear and ballistic missile threats posed by North Korea. South Korea well knows that the THAAD is not almighty however, in the present situation THAAD is a necessary defensive system for South Korean security.

Deploying THAAD to South Korea would clearly not threaten China in any way. China claims that THAAD deployment would be against China's security interests, overlooking, of course, that North Korean development of nuclear weapons and missiles—and the repeated threats to use them—go against South Korean and U.S. security interests.

The THAAD deployment issue is a microcosm



In Dr. Park's opinion, THAAD in South Korea poses no threat to China's global security interest. (Source: ODS)

of the greater North Korea problem. Once again, China has shown itself to be more critical of South Korean reactions than to the precipitating North Korean threats, attacks, and violations. On the THAAD issue, Beijing has taken Pyongyang's side over that of Seoul, disregarding South Korea's legitimate security concerns and fundamental sovereign right to defend itself against an unambiguous danger.

Beijing again characteristically pressures Seoul rather than Pyongyang. South Korean public opinion has shifted against Beijing's heavy-handed tactics on THAAD amid concerns of becoming too subservient to Chinese pressure. August 12 in 2016, Korea Gallup poll showed that 56 percent of respondents favored THAAD deployment.

PARK Byung Kwang is the director of Center for Northeast Asia Institute for National Security Strategy (INSS), R.O.K.

China and Russia Deepen their Strategic Tie to a New Stage

Lin, Po-chou

China and Russia have conducted historical joint military exercises in the Mediterranean Sea in 2015 and in the South China Sea (SCS) in 2016. These events were seen as a new development other than cooperation in economic, diplomatic, and strategic fields between the two countries after "The Treaty of Good-Neighborliness and Friendly Cooperation Between the People's Republic of China and the Russian Federation" was signed on 16 July 2001. During the early years of the Cold War, the cooperation between China and the former Soviet Union seemed close, but their joint military exercises were unheard of.

Currently, both countries are encountering similar international situations. China is facing containment because of the issues in the SCS, and Russia is being sanctioned by western countries

owing to its annexation of Crimea. Therefore, it is interesting to see what kind of strategic partnership this strategic environment may bring these two countries to ?

Russia's Option to Economic Sanctions from the West

In 2014, Russia invaded Ukraine and annexed Crimea. The European Union (EU) and the North Atlantic Treaty Organization (NATO) didn't take a timely and effective military response, and a diplomatic "détente" was thus developed between the East and the West. Countries in the west began to impose sanctions on Russia, and Russia was forced to switch course to China, India and Japan in the East for new energy and economic markets.



China and Russia deepen their strategic tie in recent years. (Source: The Kremlin)



In September 2016, China and Russia conducted their first joint military exercise in the South China Sea. (Source: Ministry of Defence of the Russian Federation)

Russian President Vladimir Putin invited Chinese President Xi Jinping to visit Moscow in May 2015, and they announced "The Joint Declaration on Deepening Comprehensive Partnership and Strategic Cooperation and Promoting Mutually Advantageous Ties," "Joint Declaration on Cooperation in Coordinating Development of the Eurasian Economic Union and the Silk Road Economic Belt" together during the visit, in the hope of broader cooperation in activities related to international affairs and regional economy, and less competition in the area of regional economic integration, especially for Russia's attempt in establishing a free-trade area in Central Asia which China deemed as a focal area for its "One Belt, One Road" initiative.

Chinese Premier Li Keqiang and Russian Prime Minister Dmitry Medvedev held talks at the premier level in Moscow in 2014 and in Beijing in late 2015, and during the talks signed over 70 agreements of bilateral cooperation in areas, such as energy, investment, finance, high-tech, customs, inspection, education, tourism, etc. Both countries agreed to merge China's "Made in China 2025" strategy with Russia's "Russian Innovation Strategy 2020", and expand cooperation on multilateral financial institutions, such as "The Asian Infrastructure Investment Bank (AIIB)" and "The New Development Bank (NDB), BRICS." The scale

of their cooperation is unprecedented. Russia has been trying to compensate its economic loss from sanctions by expanding economic cooperation with China. Their strategic economic cooperation is acting as their countermeasure to U.S. President Barak Obama's promotion of "Trans-Atlantic Trade and Investment Partnership (T-TIP)" and Trans-Pacific Strategic Economic Partnership Agreement (TPP)" in Europe and Asia. Therefore, the confrontation between PRC-Russia and the U.S. has expanded into the economic domains.

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China's Response to Neighbor Diplomatic Containment

In order to become a "maritime power," China has been vigorously expanding its maritime operations. It has been improving its administration activities in the SCS, and gradually enhancing activities of "land reclamation" and "militarizing islands and reefs." In 2012, for the purpose of imposing jurisdiction over Zhongsha Islands, China collided with the Philippines in an incident known as the "Scarborough Reef Standoff." The Philippines was forced to go for international arbitration for its sovereign claims, and signed "The Enhanced Defense Cooperation Agreement (EDCA)" with the U.S. to allow U.S. military to use its military installations as defense to China's potential aggression. In May 2014, China's "Haiyang Shiyou-981" platform was moved to controversial waters between China and Vietnam to prepare for drilling sub-sea oil and gas resources, and a serious

confrontation erupted between official vessels from both countries. The sovereignty dispute among the Philippines, Vietnam, and China was intensified. The first two countries were trying to solicit U.S. and Japan's support in further deepening exchanges in defense and security and the situation in the SCS then went down a spiral.

In addition, North Korea has unprecedentedly conducted nuclear tests twice and multiple firing tests of ballistic missiles in 2016, South Korea and the U.S. were forced to agree to the deployment of "Terminal High-Altitude Area Defense (THAAD)" in Korean Peninsula. At this moment, the U.S. has been strengthening the regional security cooperation mechanism in Asia guided by its "Re-balance to Asia" strategy, and China thus felt it was encountering a situation of diplomatic containment.

Facing this dilemma, China took advantage of Russian President Putin's state visit there in July 2016 to sign "The Joint Statement on Strengthening Global Strategic Stability" with Russia to cement the cooperation in global strategic affairs between two sides. Both countries voiced a coherent objection to NATO's deployment of "Aegis ashore ballistic missile defense system" and U.S. deployment of THAAD in Northeast Asia. In September 2016, China and Russia conducted their first joint military exercise in the SCS. Both countries have increased the numbers of their joint military exercises in recent years and announced that they would work diplomatically on the issues of North Korea.

Towards a Strategic Competition with the US

In its official publication of "China's Military Strategy" in 2015, China expressed, it will never seek hegemony, demarcation of turfs, military alliance and military expansion. However, one may wonder how the "comprehensive strategic cooperation partnership" growing rapidly between China and Russia is in the eyes of China under its traditional strategic mindset. To be certain, their bilateral strategic cooperation will not be rendered as a

"military alliance" because there are some strategic controversies between them. For instance, on the issue of Crimea, China still has to keep a close relationship with Ukraine for their cooperation in defense and mil-tech R&D; therefore, it will not be totally behind Russia. Then, on the issue of the SCS, Russia does not take sides on sovereignty issues, and China was upset about Russia's sale of 6 Kilo-class submarines to Vietnam.

To be certain, their bilateral strategic cooperation will not be rendered as a "military alliance" because there are some strategic controversies between them.

Another course of events is noteworthy. President Rodrigo Duterte chose China as his first state visit destination in October after being inaugurated as the head of the state, in order to mend fences with China because of the deteriorating relations between the two during the process of international arbitration. Motivated by economic reasons, Duterte began speaking ill of the U.S. vehemently, and has been trying to seek more independent means in diplomacy. Obviously, China has been getting away from its diplomatic impasse in the SCS. Russia, on the other hand, is hoping to entice Japan to work out their bilateral economic cooperation. In the foreseeable future, even though the strategic competition among China, Russia, and the U.S. will last for a while, there are potential cooperation relations existing between these rival countries. Therefore, the global situation won't be necessarily heading towards a posture of a "New Cold War."

Lin, Po-chou is associate research fellow of the Office of Defense Studies, Ministry of National Defense, ROC.

Glimpses of China's Armament Development from the 11th Zhuhai Air Show

Shu, Hsiao-hwang

The China International Aviation & Aerospace Exhibition, also known as the Zhuhai Air Show, is the one held at Zhuhai City of Guangdong Province, China and this year marked the 11th such event since 2 decades ago in 1996. Although its scale isn't up to that of the renowned international air shows and PLA's participation is rather restrained, it is still an important venue to observe Chinese defense industries, aviation and space, and each event has some developments of significance and important military news releases about the PLA. For example, the latest Russian Su-35 fighter took part in the air show last time and China was heard soon after to place the order for 24 Su-35s. In its 20-year anniversary, the Zhuhai Air Show was said to have J-20 stealth fighter shows to catch the media spotlight.

The Debut of J-20s

One of the two J-20s that took part in the aerial demonstration in Zhuhai Air Show was painted with radar absorbent coatings while the other was painted with a new two-toned jagged camouflage. Through the aerial demonstrations of these developmental J-20s, it was clear that J-20's developments were mature enough to kick off its low-rate initial production (LRIP).

Both international and in-country military experts believe that J-20 will be China's mainstay fighter, but its operational capabilities are widely doubted. For instance, "National Interest" was quoted as saying after comparing it with various U.S., Russian and Chinese fighters, the J-20 is not in

the same league as the U.S. and Russian advanced fighters. Andrei Chang, editor-in-chief of Kanwa Defense Review, thought, speaking of performance, the J-20 cannot challenge the U.S. F-22 fighter.

Even though a J-20 did some vertical climbs and tight turns in the show, those moves were not different from the fighters in service and were a far cry from the super maneuverability demonstrated by the F-22 in its numerous demonstrations. Furthermore, in terms of stealth, the J-20 has indeed gone through considerable stealth design. Speaking of its forward stealthiness, the J-20 incorporated the designs of F-22 and F-35 fighters, and was put in some special features to decrease its radar cross section (RCS). However, its design with canards and conventional exhaust nozzles has revealed it doesn't fulfill the requirements of all dimensional stealthiness.

"Red Star", a Russian military website, pointed out that the J-20 was designed after Mikoyan Design Bureau's MiG 1.44 proto-type. The design of canards doesn't fit the current design trend of stealthiness. None of the stealth fighters in service or during flight tests has canards, and the main reason is the consideration of decreasing RCS. But the J-20's design ran counter to the trend, and it was thought to increase J-20's maneuverability while offsetting its forward stealthiness.

However, the J-20 should not be underrated. Seeing its bulky fuselage, the J-20 was not designed for dogfights. It is more likely to play the roles of an interceptor, such as J-8, or fighter-bomber, such as JH-7, by using its sizable fuselage in exchange for sufficient fuel and armament payload. China's

massive territories and current contentious areas in the East China Sea and the South China Sea all require large aircraft with adequate range and endurance to intercept invading bogies far away offshore or with sufficient fuel and armament payload to strike hostile targets on the "first island chain."

None of the stealth fighters in service has canards, and the main reason is the consideration of decreasing RCS. But the J-20's design ran counter to the trend, and it was thought to increase J-20's maneuverability while offsetting its forward stealthiness.

In addition, another technological limitation of China's fighter development resides on the high-thrust turbo-fan engine. China's homebuilt WS-10 Taihang turbo-fan engine powers domestically made J-11B, but is not selected for J-15 carrier-based fighter or single-engine J-10 fighter, revealing that the PLA Air Force (PLAAF) is less confident on its reliability. A Chinese report has pointed out that Russia recently is going to sell 200 engines to China, including the AL-31 and D-30 models, with a total value of USD 1 billion. The AL-31 engines can be provided for the mass production of J-20, J-15, J-10B, etc. and D-30 engines can be used for large aircraft, such as IL-76 transport, IL-78 aerial tanker, H-6K bomber and the first batch of Chinese homebuilt Y-20 transport. Even though it has many types of domestically produced engines, China still invests heavily on acquiring engines from Russia. It is self-evident that the performance of Chinese made engines cannot win the trust of the PLAAF.

Development of Precision Strike Weapons

In the Zhuhai Air Show, China as always has showcased its multiple surface-to-air missiles. Among them, "Hidden Blade" air defense missile

is rather small in size and weighed 2.5 kgs, and its launch system weighed 1.5 kg, lighter than a rifle as advertised. It can reach a range of 2 km and can be used to attack unmanned aerial vehicles (UAV).

As usual, various airborne air-to-ground precision strike weapons, ground-to-ground strike weapons, such as multiple launch rocket systems (MLRS) and ballistic missiles, were exhibited in the show. Majority of them were not in service with the PLA, but for export only. China has made great progress in developing airborne precision munitions, which will be carried by its latest generation multi-role fighters, such as J-11D, J-15, J-16, and J-20.

Many ground attack weapons were showcased in the event, and were categorized as "Ground-to-ground Attack Systems" mainly for export. Items of attention include AR3 series rockets, the M20 ballistic missiles, etc., and they were in fact shown



PLAAF J-20 stealth fighter (Source: Asia-Pacific Defense Magazine)



Cloud-Shadow UAV (Source: Asia-Pacific Defense Magazine)

in the past events. AR3 has two calibers: 300mm and 370mm. The latter can reach 280 km in range, and its accuracy is close to that of the ballistic missiles. If the PLA uses the AR3 MLRS, it can inflict attacks on important military installations on Taiwan's western coast. Then, the M20 is the export variant of China's DF-12 short range ballistic missile (SRBM), and bears a resemblance to the Russian Iskander missile. The M20 uses single-stage solid fuel and its terminal guidance uses inertial navigation, active radar scene matching system and GPS to increase its accuracy. At the same time, the M20 adopts the latest orbit changing technology so that its entire flight path after re-entering the atmosphere is controllable and it will be difficult for the missile defense system to intercept. In addition, its maneuverability is good. It can be carried by an 8X8 transporter or shipped by IL-76 or newest Y-20 cargo planes in order to demonstrate its tactical flexibility.

More Mature UAV Technology

Aside from the J-20, UAVs are also focal points of the venue. China has owned the largest commercial UAV industries in the world, and its UAV technology has been developing exponentially. The Yilong-2 and the CH-5 UAVs in the show have far better performance than their predecessors and they can carry up to 12-16 light-weight air-to-ground missiles. The Cloud-Shadow UAV is jet-propelled to drastically increase its speed and it can also launch missiles. All the previous mentioned UAVs have so-called "reconnaissance-strike capability" to handle multiple types of military operations.

A Glimpse of China's Aviation Development from Zhuhai Air Show

The Zhuhai Air Show is not only China's stage

China has owned the largest commercial UAV industries in the world, and its UAV technology has been developing exponentially. Some kinds of UAVs in the show have far better performance than their predecessors and they can carry up to 12-16 light-weight air-to-ground missiles.

to showcase its capabilities in aerospace technology but also constitutes a great opportunity for it to sell products globally. In general, China's strength in aviation has taken another leap forward. Even though China's newest generation fighters are entering service, the aging ones cannot be phased out all at once. New and aging aerial assets are going to serve

together for quite a while and the 4th generation fighters (categorized in the Chinese definition, otherwise categorized as 5th generation in the U.S.) like the J-20 will join updated fighters of previous generation and those purchased from Russia to form the mainstay of PLAAF's fleet. China's acquisition of Russian Su-35 fighters reveals its need to make improvements on its critical aviation capabilities, such as avionics and engine technologies. Then, China's domestically developing capabilities in aviation industries will continue to be a focus to attract international attention.

Shu, Hsiao-hwang is associate research fellow of the Office of Defense Studies, Ministry of National Defense, ROC.



H-6K bomber can carry 6 land-attack/anti-ship cruise missiles. (Source: Asia-Pacific Defense Magazine)

The UK Royal Air Force and the Japan Air Self-Defense Force Hold the First-ever Joint Exercise

The Japanese Ministry of Defense announced in 16 October 2016 that the UK Royal Air Force will send fighters to Japan to take part in a joint exercise in November 2016. The exercise will take place at Misawa Air Base, located in Aomori Prefecture, northeast of Japan. This is the Japan Air Self-Defense Force's (JASDF) first-ever in-country joint exercise with a foreign nation other than the US, and is the RAF fighters' first time in 25 years after the end of the Cold War to come to Northeast Asia for training and exercise.



High ranking officers exchanged their views on the occasion of the first Japan-UK bilateral exercise. (Source: JASDF)

This exercise was agreed in the 2016 Foreign and Defense Ministers Dialogue (2+2)

This joint exercise between the UK and Japan was agreed at the January 2016 Foreign and Defense Ministers Dialogue (2+2). The RAF assigned 4 Typhoon fighters, 1 aerial tanker and 150 personnel to Japan while the JASDF participated with 4 F-2 and 4 F-15J fighters. The courses in the exercise included intercept, air defense, air-to-air combat and anti-ship operations, and were practiced in the airspace and waters surrounding the Misawa Air Base. An official from the British Ministry of Defense pointed out that this UK-Japan joint military exercise has shown that Japan is UK's closest partner for security cooperation in Asia. Then an officer from the JASDF expressed that the UK-Japan joint military exercise was meant to improve JASDF's combat skills and the inter-operability with friendly forces.

Closer Security and Mil-tech Cooperation between the UK and Japan

Currently, the scale of military cooperation between Japan and the UK is only next to that between Japan and the US. In addition, Japan and the UK see eye to eye on co-developing military equipment. Thales UK, BAE Systems, Augusta Westland and Rolls-Royces have established relations of cooperation with relevant Japanese industries. For instance, the aero-engine subsidiary of Rolls-Royces has co-developed the Trent 1000 turbo-fan for Boeing 787 with Mitsubishi Heavy Industries (MHI) and Kawasaki Heavy Industries (KHI). Augusta Westland is also planning to co-develop a helicopter engine with Japan.

U.S. Army Plans to Deploy ASBM to Counter Hostile Navies

U.S. Pacific Command (USPACOM) has asked the U.S. Army to deploy anti-ship missiles in the South China Sea to counter potential adversaries. Admiral Harry Harris, USPACOM Commander, in his recent speech touted deployment concept of such weapon to the Army.

The Pacific theater has encompassed immense waters, and the traditional role for the U.S. Army is specifically for land operations. Neighboring countries in the Pacific, such as Japan, Taiwan, etc., mostly have deployed mobile shore-based anti-ship missile system to counter hostile surface vessels. U.S. anti-ship missions are usually conducted by its surface vessels, submarines, and carrier-based aircraft, and the U.S. Army does not have anti-ship missiles.

The U.S. Army did have a similar strike asset – Army Tactical Missile System (ATACMS) – and U.S. Department of Defense Strategic Capabilities Office in November 2016 announced such system will be upgraded to be capable of engaging moving targets both on land and sea, and ranged up to 300 km. Adm. Harris pointed out that deploying such system will not only increase U.S. operational capabilities in Asia Pacific, but also improve U.S. cooperation with regional countries.

The U.S. Army used to have a coastal artillery corps, which was disbanded 66 years ago. However, under the pressure of exponential growth of Chinese military's capabilities of anti-access/area denial (A2AD), the U.S. military has been promoting "the 3rd generation offset strategy" and "multi-domain battle" strategy. One focal point of these strategies is to combine existing missiles and munitions with latest high-tech seekers to enhance their performance in conducting multi-domain battles. After having capabilities of conducting multi-domain battle, the U.S. Army can project its firepower towards the sea.

The upgraded system can not only deployed in the Western Pacific to defend against China, but also can be deployed in the Baltic Sea and the Black Sea to protect U.S. allies against the threats from Russia.

Now, the ATACMS is capable of hitting fixed targets with precision, and attacking moving targets. However, the latter was not actually put into practice. Sources from U.S. defense industries pointed out, it will not be difficult to integrate the latest seekers with the ATACMS to hit moving targets on both land and sea.



Army Tactical Missile System (Source: US DoD)

Challenges from Application of UAV Swarming Technology for Future Defense and Security

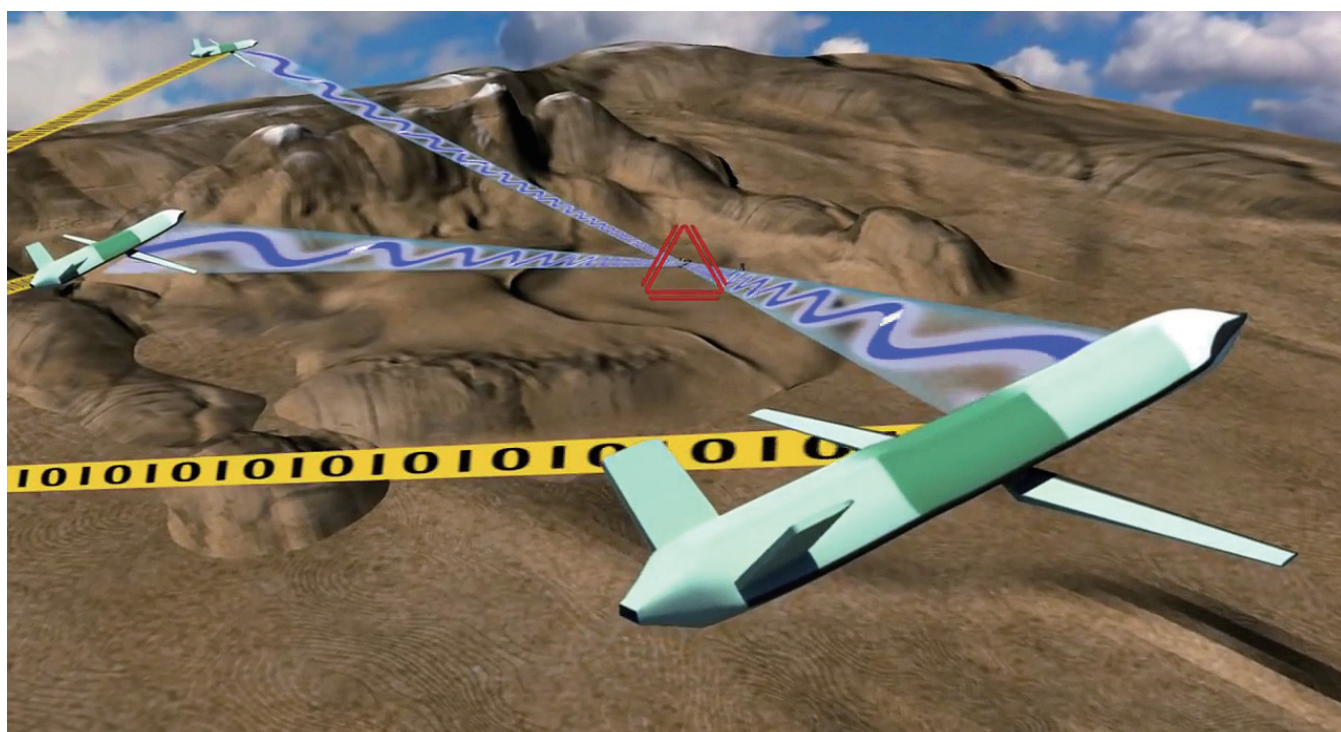
In most people's minds, an unmanned aerial vehicle (UAV) is controlled by individual remote control system to do its designated mission. However, Raffaello D'Andrea, an academic from ETH Zürich, was seen in a TED video clip of February 2016 demonstrating UAV swarming technology by controlling up to 30 micro multi-rotor UAVs simultaneously in a not-so-spacious auditorium. Those micro UAVs could hover and switch formations without bumping into each other.

This is not an exception. China Electronics Technology Group Corporation (CETC) broadcasted a flight test video of "Fixed-Wing UAV Swarm Prototype" in Zhuhai Air Show of November 2016, successfully demonstrating capability of controlling 67 light-weight UAVs simultaneously. In addition, Intel Corporation from the U.S. was seen on Youtube in November 2016 to demonstrate its capability

of using 500 micro multi-rotor UAVs at the same time to perform a magnificent light show. It is obvious that UAV swarm flying and its autonomous technology are maturing.

Generally speaking, UAV swarm technology is using built-in sensors to distinguish individual UAV's location, and its built-in computer and autonomous software will decide its next move independently. During the flight, only higher order instructions (such as taking off, landing, purposes of flight, and next swarm move or mission) will be given externally. Theoretically, by applying this swarming technology, the number of UAVs under simultaneous control is unlimited.

For the general public, an aerial show of large pack of UAVs can be sensational and exhilarating, but in the eyes of national security and military units this can pose a serious threat, or becomes



Three UAVs work together to initiate an electronic warfare to enemy. (Source: DARPA)



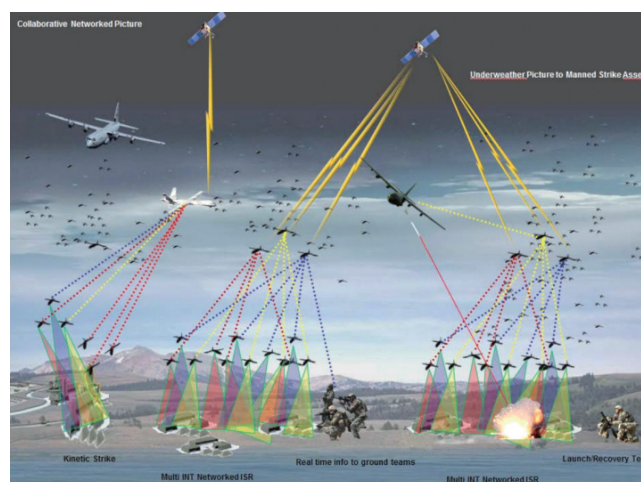
US Air Force plans to defeat enemy missiles with swarms of drones. (Source: DARPA)

an extremely effective offensive weapon. These UAVs can autonomously take off, fly, and land in formation, and they can automatically avoid adjacent UAVs or terrains. They can automatically form a communications grid, perform coordinated multi-aerial-search, or can be dispersed to conduct wide-range surveillance. They can even initiate saturation strike of kamikaze style on high value targets (HVT).

For the defensive side, current defensive measures cannot effectively handle large amount of incoming UAVs all at once because they cannot detect, track, and target multiple transpositioning UAVs. Current air defense weapons cannot engage large numbers of UAVs altogether, and it is not cost-effective by applying expensive air defense weapons to hit less expensive UAVs. Using wide-area electronic jamming measures might be more effective, but its success cannot be guaranteed while facing adversary's more advanced autonomous UAV technology. In the battlefield, the tactics of dispersal and maneuver that used to be adopted while avoiding enemy's attacks might become obsolete. For the side of using UAV swarming attacks, with proper operational environment and tactical applications, the attacks can reap tremendous results, such as using swarming UAVs to take out opponent's amphibious

/ triphibious landing vehicles, or using them by terrorists to attack critical infrastructure of power, electricity, and transportation, or important political and military figures.

To sum up, UAV swarming technology will bring considerable revolutionary changes for future operational methods and major challenges to maintaining national security. Its follow-on progress is highly noteworthy.



Current defensive measures cannot effectively handle large amount of incoming UAVs all at once. (Source: USAF)

ROC Army Held “Chang-Qing 15” Force-on-force Exercise

The ROC Army has held the "Chang-qing 15" force-on-force exercises from 31 October to 4 November 2016. The 542th armor brigade, stationed in Hukou Township, Hsinchu Country of northern Taiwan, and the 234th mechanized infantry brigade, stationed in Wanjin Village, Pingtung County of southern Taiwan, encountered and confronted each other in the Yunlin area of central Taiwan.

Aside from organic armored vehicles, artillery pieces, short-range SAMs, equipment of communications, the participating forces were additionally attached with dissimilar combat units, such as special forces, sniper teams, UAVs, etc. to improve the operational capabilities of the participants and the complexity of this



Combat vehicles of the 542th armor brigade marched toward the central area of Taiwan. (Source: Military News Agency)

confrontational exercise. Furthermore, the exercise area was close to a suburban area, and the routes of passage for participants went through populated towns and cities, presenting extra challenges for the sake of force maneuvering.

The exercise was roughly divided into 3 phases: (1) Marshalling Phase, which is used to verify the effectiveness of staging, rehabilitation and supply, and operational readiness; (2) Maneuvering and Engaging Phase, which is used to verify the effectiveness of force maneuvering, command and control, etc.; (3) Offensive and Defensive Operational Phase, which is centered on practicing scenario disposal, tactical operations and combined arms operations of dissimilar service branches . Furthermore, the set-up of command posts (CP) and communications facilities, verification of Improved Mobile Subscriber Equipment (IMSE) and tactical mining operations were also the focal points of this exercise.



Minister of National Defense Feng, Shih-kuan inspected “Chang-qing 15” Exercise, and heard the briefing. (Source: Military News Agency)

ODS Seminar of the Month: Forecasting China's Comprehensive National Power

China's comprehensive national power (CNP) has been attracting worldwide attention. In order to adequately analyze the development of China's CNP in a much longer term in the future, the Office of Defense Studies held a seminar of "Forecasting on China's Comprehensive National Power" in November 2016, and attendees included Arthur S. Ding, Director of Institute of International Relations, National Chengchi University; Tieh-Lin Yen, Deputy CEO of Center for Security Studies, IIR, National Chengchi University; Alexander C. Huang, Chairman of the Council on Strategic

and Wargaming Studies; Professor Bernard Lai of Shih Chien University, and Professor Shi-Ping Fan of National Taiwan Normal University. They all expressed their views concerning the topic of this seminar. Representatives from the Ministry of National Defense were also present.

Political and Economic Trends

Under the assumption of continued growth for China's economic and military strength in the next 15 years, 10 years of two consecutive terms for



ODS held a seminar to forecasting China's comprehensive national power. (Source: Military News Agency)

presidency, and a functioning collective leadership, the attending academics forecast situations in Asia Pacific, U.S.-China relations, and prospects of the two sides of Taiwan Strait.

1. China's diplomatic and economic leverage will gradually expand in the vicinity of Asia Pacific region. Even though it may not fully control over many regional political, economic, military and security affairs, China can still wield its veto power over them. Chinese opinions on specific regional issues will be major policymaking considerations for its neighboring countries.
2. Current international and Asia Pacific situations are comparatively tilted to China's favor. China strength in controlling regional situation will be improved, and its circle of influence can possibly be expanded to the Indian Ocean.
3. Some academics expressed more negative views towards China's mega economic projects, such as "One Belt, One Road," which is like a castle in the air with only propaganda and no realistic agenda and practical policy planning, and the "Asian Infrastructure Investment Bank (AIIB)," whose prospect remains unknown as it does not have any substantive investments since its founding in 2015.
4. U.S.'s comprehensive national power is still rock solid. Even though it lacks obvious momentum for improvement for the next 15 years, its position as a global leader is still difficult to be shaken. China will avoid real conflicts with the U.S.
5. In the next 15 years, the gap of CNP between two sides of the Taiwan Strait will continue to widen. In China's overall policies, less consideration will be given to the so-called Taiwan factor.
6. Potential contingencies in the next 15 years that may influence Asia Pacific include the eruption of war on Korean Peninsula, change in China's mindset of "the party commands the

gun", and dissolution of European Union and diminishing influence of Europe. It is quite certain that powerful figures like Xi Jinping of China and Vladimir Putin of Russia will not be in office 15 years later, and China-Russia relations and U.S.-China-Russia relations will have unpredictable changes by then.

Military Trends

1. The Chinese People's Liberation Army (PLA) established joint operational command mechanism, the five theaters, and services management system at the end of 2015. In the future, the PLA will gradually reorganize units at all levels to create a modern military power with Chinese characteristics, and it is planned to reach its total modernization goals in the mid-21 century.
2. It is estimated that the PLA Ground Forces (PLAGF) will retain 18 combined corps, but units at division and regiment levels will be dissolved gradually. Operational units will be centered on units at brigade and battalion levels with fewer personnel. Whether the PLAGF is developing towards a light-weight, digitalized, and specialized force and even adopts the "Future Combat System (FCS)" concept as that of U.S. military requires close attention.
3. It is predicted that the PLA Navy (PLAN) will maintain 3 Theater Naval Commands. Its operational fleet mainly consists of 6 destroyer groups, 4 littoral frigate groups, and 9 inshore frigate groups. The destroyer groups constitute the main force of China's "open seas protection," and both the littoral and the inshore frigate groups are in charge of defense of 200 nm within China's exclusive economic zones (EEZ). With a bold assumption, in the future, PLAN's forces in the Southern Theater has its strategic direction towards the South China Sea and the Indian Ocean, PLAN's forces in the Central Theater towards the



Scholars noted that China's diplomatic and economic leverage will gradually expand in the Asia Pacific region. (Source: Military News Agency)

Pacific, and PLAN's forces in the Northern Theater towards the North Pole and even the Atlantic Ocean. From the angle of force projection, combined with its establishment of aircraft carriers and the aforementioned fleets, PLAN's future construction of 6 carrier battle groups and 3 amphibious operational groups shall meet its basic requirement. In addition, the PLAN has acquired Djibouti's permission to set up overseas supply bases in the country. It is noteworthy whether it will increase the number of such bases according to its requirement for open seas protection missions and continued improvement on its overseas force projection capabilities.

4. Development and deployment of stealth

fighters and next-gen bombers and whether a strategic air force will be established will be focal points of future observation on the PLA Air Force (PLAAF). The shortcoming of development for the PLAAF is inadequate R&D and manufacturing capabilities for advanced engines. China has been sparing no efforts to develop aeronautical engine technologies. If it can achieve a major breakthrough in this regard, the development of its air power certainly cannot be ignored.

The opinions expressed in this article are solely those of the attendees and do not reflect the views of the Office of Defense Studies.

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For comments or questions about Defense Security Brief, please contact us at

thoughts168@gmail.com

3F, Boai Building, No. 409 Bei-an Road, Zhongshan District, Taipei, R.O.C.

Tel: +886-2-8509-9405

Fax: +886-2-8509-9406

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