

*Miguel IVORRA RUIZ*

*PhD student in peace and international security at the IUGM-UNED*

*E-mail: mivorra16@alumno.uned.es*

## *A2/AD capabilities. the awakening of the West in front of the dragon's nest*

### **Abstract**

The article analyzes the concept of anti-access and area denial (A2/AD), it considers its capabilities and the challenges they represent. Due to the relevance it implies, to understand the operational problem presented by the A2/AD, it has been supplemented with an explanation, a historical review of the United States' thought development, operational concepts, strategic orientation and the possible answers it raises.

As a case study, the one from The People's Republic of China has been examined, cataloguing its A2/AD and addressing the problem from a strategic, doctrinal and operational level, under the prism of the use of aerospace power.

### **Keywords**

A2/AD, anti-access, area denial, offset strategy, United States, China, security, defense, capabilities, threats.

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## Introduction

Since the end of World War II (WWII), US military dominance of the international system has been evident. Its military forces have generally enjoyed unrestricted access to the global commons of sea, air, space and cyberspace, which has facilitated the access of its military power to areas of operations. Over the past two decades, the US war experience has required different capabilities and a different way of fighting from those needed to deal with a 'peer competitor'<sup>1</sup>. The latter, coupled with the unrestricted access discussed above, has contributed to the US shifting its attention to other planning priorities rather than securing the necessary operational access.

Today, as globalisation has intensified the worldwide spread of advanced military technologies, making them more accessible, the US is losing military superiority. As stated in the US National Defense Strategy, which openly acknowledges that the competitive military advantage enjoyed by its military forces has been eroding. As a result, the primary national security concern is not terrorism, but the strategic competition between states<sup>2</sup>.

Thus, over the last twenty years, countries such as the People's Republic of China (hereafter China) and Russia have improved their economic situation and military capabilities and, in their quest to overhaul the established international order and achieve regional hegemony, are trying to weaken US influence in their areas of influence. Both countries have deployed sophisticated sensor networks and long-range weaponry along their borders and occupied territories. Deployment which, while ostensibly a defensive posture to protect its territories, also allows it to degrade the projection capacity of the US and other powers in the event of having to intervene in its neighbourhood<sup>3</sup>.

In this context of growing strategic rivalry in various areas of the world, the concept of anti-access/area denial (A2/AD) capabilities has become a focus of attention. Especially when, as potential adversaries enhance their A2/AD capabilities, US and allied capabilities are degraded, and at the same time, they may be hindered from accessing global common spaces<sup>4</sup>.

The scope, lethality and sophistication of this array of anti-access and area denial systems constitute an unprecedented range of capabilities that threatens the projection and manoeuvre model of US and allied forces. Unless these challenges are not coun-

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1 Clark, B., Gunzinger, M. and Sloman, J. (2017). *Winning in the Gray Zone. Center for Strategic and Budgetary Assessments (CSBA)*, p. 1.

2 Department of Defense - United States of America (2019).. *Summary of the 2018 National Defense Strategy of the United States of America. Sharpening the American Military's Competitive Edge*, p.2.

3 Clark, B. *Op. cit.*, pp. 1-2.

4 Fukuda, J. (2015). *Counteracting China's Anti-Access/Area Denial Capabilities. Institute for International Policy Studies (IIPS)*. Volume 6, Issue 1.

tered, it requires operating at much higher levels of risk and at greater distances from areas of interest, affecting the credibility of the US as a guarantor of international security<sup>5</sup>. In short, the conventional deterrence model will be compromised, the impact of the forward presence of US military power on regional stability will be limited and its reputation as a superpower will be damaged<sup>6</sup>.

### Conceptualisation of A2/AD capabilities

The use of A2/AD as a strategy has existed throughout the history of warfare. In World War II, for example, German submarine operations in the North Atlantic were aimed at preventing the deployment and supply of US forces in Europe. During the Cold War, US A2/AD strategies focused on preventing a Soviet offensive against Western Europe. The origins of the current A2/AD debate date back to the early 1990s, when the US military became increasingly concerned with the proliferation of WMD threats, ballistic and cruise missiles, and subsequently with the spread of advanced military technologies<sup>7</sup>.

During the Cold War period, the US defence posture was based on the permanent deployment of forces abroad as part of a military strategy that emphasised deterrence and forward defence, so that major combat formations were stationed in Europe and Asia, with additional forces rotated periodically. This posture was effective and possible because on the US side there was a clear understanding of the major security threats, a high confidence as to where major acts of aggression might occur, and a belief that forward bases were reasonably safe, even in the event of enemy attack, conditions that no longer exist<sup>8</sup>.

With the collapse of the Soviet empire in 1989 and of the Soviet Union itself in 1991, US combat forces have been redeploying to the mainland and adapting to the expeditionary era<sup>9</sup>. It was an era in which potential adversaries seek asymmetric ways to oppose the movement of US military forces in their region, presenting very differ-

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5 HUTCHENS, M., *et al.* (2017). Joint Concept for Access and Maneuver in the Global Commons. A New Joint Operational Concept. *JFQ* 84, p. 135.

6 Colom, G. (2015). Rumsfeld Revisited: la tercera estrategia de compensación estadounidense. *Revista UNISCI*. Issue 38, p. 77.

7 BITZINGER, R., *et al.* (2017). Countering Anti-Access/Area Denial Challenges. Strategies and Capabilities. *RSiS*, pp. 19-20.

8 Krepinevich, A., Watts, B. and Work, R. (2003). Meeting the Anti-Access and Area-Denial Challenge. *Center for Strategic and Budgetary Assessments (CSBA)*, p. 1.

9 In 2001, the *Global Strike Task Force (GSTF)* concept was introduced as the next step in the transformation of the US Air Force (USAF), emphasising the 'home-based, expeditionary force' as opposed to the 'forward basing overseas' of the Cold War. [*Ibid.* p. 11.].

ent challenges to those that allied forces faced during the Gulf War, or the more recent operations in the Balkans and Afghanistan.

The new challenges the US will have to face, coupled with political constraints (unlimited access to allied bases cannot be assumed) and geographical (depending on where the conflict takes place) and resource constraints (possible coincidence of several conflicts simultaneously), mean that the projection of forces to major ports and airfields is becoming increasingly complicated and operations are taking on a higher risk<sup>10</sup>.

The threats that contribute to jeopardising the foundations of US military-technological and geopolitical supremacy come from different fronts and in different forms. On the one hand, there are the challenges that present a high level of military-technological sophistication, such as the anti-access and area denial threat posed by China in the Asia-Pacific theatre and, to a lesser extent, Russian military modernisation. On the other hand, there are much smaller adversaries that opt for asymmetric forms of fighting, such as the Taliban in Afghanistan, Daesh in Syria and Iraq, and jihadist groups in Africa. Finally, there are middle powers such as Iran and Pakistan, which exhibit 'mixed' strategies, alternating capabilities of medium-high technological value with asymmetric forms of warfare<sup>11</sup>. This paper will address only those challenges that present a high level of military-technological sophistication, analysing China's model.

The concepts of A2/AD capabilities are generally presented interchangeably, referring to both defensive and offensive asymmetric measures that restrict deployments of military forces to a particular theatre of operations (anti-access), and deny freedom of movement of deployed forces (area denial). However, their actions and potential effects can be better conceptualised if done separately<sup>12</sup>.

### *Anti-access measures (A2)*

The term anti-access means the action of hindering or obstructing the projection of military forces of other nations into a given area. A2 measures comprise any action taken by an opponent that has the effect of slowing the deployment of military forces to a theatre of operations (TO), preventing them from operating from certain locations within that TO or causing them to operate from distances further away from the focus of the conflict<sup>13</sup>.

<sup>10</sup> *Ibid.*, pp. 1-3.

<sup>11</sup> Simón, L. (2015). Offset strategy: ¿hacia un nuevo paradigma de defensa de EE. UU.? *Real Instituto Elcano*. ARI 14/2015, p. 2.

<sup>12</sup> Bitzinger, R. 2017. *Op. cit.*, p. 19.

<sup>13</sup> CLIFF, R., *et al.* (2007). Entering the Dragon's Lair. Chinese Antiaccess Strategies and Their Implications for the United States. *RAND Corporation*, p. 11.

The challenges presented by these A2 actions can be projected across the entire spectrum of conflict, ranging from the establishment of political and/or economic exclusion zones, to the use of military instruments involving the denial of transit, parking or overflight rights. At the highest levels of conflict, these actions can involve the use of force, ranging from attacks on air bases, ports and aircraft carriers, through the use of long-range ballistic missiles, submarines, weapons of mass destruction, or operations from space and cyberspace.

The strategic objective of these A2 measures is to prevent additional forces from being deployed in TO, to impose high economic and operational costs, to «shape» the adversary's strategic options and to succeed in preventing his intervention or an escalation of the conflict<sup>14</sup>. Thus, A2 measures can also be seen as an asymmetric 'cost imposition' strategy to deter and defeat a technologically superior adversary.

### *Area denial measures (AD)*

The term area denial means the action of hindering or obstructing the operation of other nations within a given area. AD measures encompass any action that denies the opponent's capabilities and freedom of action, providing a decisive TO advantage at the operational and tactical levels. AD operations challenge the ability to maintain local air, land and maritime superiority; superiority and security in space and cyberspace; and the ability to conduct joint operations in certain areas of the conflict zone. AD measures act as a 'kind of barrier' against the operations of opposing air, sea and land forces.

The strategic objective of these AD actions is to influence the adversary's strategic calculations prior to the escalation of the conflict by introducing various unknowns into his planning, such as increasing the level of operational risk and uncertainty in estimating the likely outcome of a decision to use force.

Like A2 measures, AD measures use a wide range of capabilities such as the use of missiles, integrated air defences, electronic and cyber warfare, counter-satellite operations, as well as the use of non-military, non-conventional actors or local 'proxies' that increase levels of resistance in certain areas<sup>15</sup>.

Security concerns are heightened by the increasing proliferation of missile technology and commercial satellite services that will allow even terrorist regimes, failed states, or regional actors to access and target any key fixed installation, as well as monitor deployments of military forces to forward bases. It is highest when such adversaries have the possibility and threat of using chemical, biological, radiological, nuclear or CBRNE (Chemical, Biological, Radiological and Nuclear Enhanced Warhead) missiles<sup>16</sup>.

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<sup>14</sup> Bitzinger, R. 2017. *Op. cit.*, p. 19.

<sup>15</sup> *Ibid.*, p. 20.

<sup>16</sup> Krepinevich, A. *Op. cit.*, p. 4.

In order to make entry into a TO or freedom of action once inside more difficult and to degrade the effectiveness of operations against their A2/AD capabilities, states developing and deploying A2/AD capabilities could adopt the following complementary measures<sup>17</sup>:

- Deny political access, through alliances or threats to neighbouring countries.
- Deny geographical access.
- Reinforce fixed targets (command centres, weapons production and storage facilities, etc.).
- Establish sanctuaries, positioning their military forces in non-combatant neighbourhoods or near cultural sites.
- Increase their survival and effectiveness, through mobility, dispersal and deception.
- Conduct information operations and unconventional attacks against embarkation and disembarkation areas.

Having conceptualised the term A2/AD, it should be mentioned that it has its detractors. Like Admiral John Richardson who considers A2/AD to be a loosely distributed term lacking a precise definition, it conveys a variety of vague or conflicting ideas depending on the context in which it is used (exclusion zone, family of technologies or even strategy) so the US Navy should avoid using it as a stand-alone acronym<sup>18</sup>. Richardson criticises the term as unrelated to the broader history of naval strategy, focusing too much on the idea of defensive bubbles, without contemplating the complexity of fighting inside and outside defence systems. He therefore advocates more flexible language to discuss the US Navy's needs and priorities in a variety of different theatres.

Other analysts see the A2/AD debate as primarily about the future rather than the present, arguing that the main reason for concern lies not with China's current arsenal, but rather with continuing trends in procurement and the development of employment techniques, the maturation of which could take decades or even generations<sup>19</sup>.

17 *Ibid.*, pp. 6-7

18 There are four reasons the Admiral advocates for avoiding its use: «A2AD» is not a new phenomenon; the term «denial», as in «anti-access/area denial» is too often taken as a *fait accompli*, when it is an aspiration, as achieving success requires completing a complex chain of events, each of which is vulnerable and can be disrupted; A2AD is inherently defence-oriented; and the A2AD problem is challenging, but well understood. [Richardson, J. (2016). Deconstructing A2AD. *The National Interest*. October.].

19 Biddle, S. And Oerlich, I. (2016). Future Warfare in the Western Pacific. Chinese Antiaccess/Area Denial, U.S. AirSea Battle, and Command of the Commons in East Asia. *International Security*, Vol. 41, Issue 1 (Summer), p. 10.

Depending on the scenario and the countries incorporating A2/AD measures, there are differences that acquire specific characteristics and singularities. For example, Russia, in response to NATO, has already established ‘bubbles’ or large A2/AD zones since the beginning of the Cold War, around the Baltic states, the Black Sea, the Eastern Mediterranean and the Arctic. These A2/AD bubbles, which still exist, are based on the integration of surface-to-air missiles and interdiction fighters, allowing the denial of the use of air and sea space in these regions (although they are not impenetrable) and limiting the movement of ships and ground forces in times of crisis<sup>20</sup>. Over the past decade, its armed forces have acquired and deployed modern weapons systems that have increased their mobility and combat readiness, demonstrating in operations in Ukraine and Syria new high-tech capabilities such as long-range precision strike with cruise missiles and guided bombs, and the use of remotely piloted aircraft (RPAS)<sup>21</sup> to detect targets, reflecting a high level of sophistication<sup>22</sup>.

As another example, Iran is attempting to develop and deploy a range of A2/AD capabilities in the Persian Gulf with military technical support from China, North Korea and Russia, which could jeopardise maritime navigation and also the oil and gas production infrastructures of other states in the region. The implementation of these capabilities has singularities that compared to China, although obviously they cannot be equalled, have advantages such as geography, as it is a smaller area with its particular orography and with a ‘bottleneck’, the Strait of Hormuz<sup>23</sup>, which undoubtedly confer operational differences that will affect the development and subsequent use of its A2/AD capabilities.

## Implementation of an A2/AD strategy. China versus the US

Potential US adversaries have studied the characteristics of the new American style of warfare, have equipped themselves with the technological means<sup>24</sup> and related capa-

20 Bitzinger, R. (2017). *Op. cit.*, p. 34.

21 *Remotely Piloted Aircraft Systems (RPAS): Unmanned Aircraft Systems (UAS), Unmanned Aerial Systems (UAS), Unmanned Air Vehicles (UAV), or simply drones.* [Ruiz, F. (2013). The importance of RPAS/UAS for the European Union. *Spanish Institute for Strategic Studies*. Opinion Paper 78/2013.].

22 Currently, A2/AD capabilities are mainly based on three fairly new systems: the S-400 anti-aircraft system, the *Bastion* anti-ship system and the *Iskander* ballistic (ground-targeting missile system). [Dalsjö, R., Berglund, C. and Jonsson, M. (2019). Bursting the Bubble. Russian A2/AD in the Baltic Sea Region: Capabilities, Countermeasures, and Implications. *FOI—4651--SE*. March, pp. 10-25.].

23 Krepinevich, A. (2010). *Why AirSea Battle?* *Center for Strategic and Budgetary Assessment (CSBA)*, p. 27.

24 C<sup>4</sup>ISTAR (Command, Control, Communications, Computers, Information/Intelligence, Surveillance, Targeting Acquisition and Reconnaissance) systems to digitise the battlefield, smart weapons to accurately engage enemy targets, and stealth or unmanned platforms to enter risky areas without being shot down.

bilities<sup>25</sup> and are developing specific measures, such as A2/AD or hybrid strategies, to prevent the US from being able to project its war power and exploit its military-technological potential<sup>26</sup>. These measures pose economic, operational, strategic and political costs that make it impossible to maintain the current US strategic defence paradigm based on forward presence and power projection<sup>27</sup>.

China's establishment of A2/AD capabilities vis-à-vis the US gives it several advantages, the main one being that it enjoys geographic location. In the event of any possible conflict in the East and South China Seas<sup>28</sup>, most of its forces are already positioned in the vicinity and could be used for A2/AD operations. In addition, it has reinforcements on occupied islands in these seas, such as the heavily militarised Woody Island in the Paracel Islands archipelago<sup>29</sup>. It also has the recent construction of important military infrastructure on the artificial islands in the Spratlys, such as the three new airfields with runway lengths long enough for any aircraft in the Chinese inventory to operate<sup>30</sup>. This forward presence significantly extends the reach of Chinese People's Liberation Army (PLA) operations<sup>31</sup> and, at the same time, serves as a first defensive barrier.

Over the past fifteen years, the PLA has acquired considerable hardware that enhances A2/AD capabilities, mainly benefiting the forces that control missiles in China<sup>32</sup> and, in particular, the air force, which has significantly improved its air defence system and now has one of the largest and most advanced forces of long-range surface-to-air missile (SAM) systems in the world. The recent acquisition of several hundred fourth generation and fourth generation plus fighter aircraft, as well as the aggressive expansion of the US arsenal of ballistic and ground-attack cruise missiles, have provided it with enhanced long-range precision strike capabilities that place US military forces

25 Joint action, dispersed operations, special forces and cyber warfare.

26 Colom, G. (2015). Air Power in the Third Offset Strategy. *Revista de Aeronáutica y Astronáutica*, May, pp. 384-385.

27 Colom, G. (2015a). *Op. cit.*, p. 77.

28 It represents a semi-enclosed space with an area of about 3.5 million km<sup>2</sup> of considerable geopolitical importance. More than half of the total tonnage of the world's merchant fleet and one third of the world's shipping traffic passes through straits in this region (Malacca, Sunda, Lombok).

29 There are four groupings of archipelagos in the South China Sea: the Paracel Islands, the Spratly Islands, Macclesfield Bank and Pratas Reef. The Paracels are currently claimed by Vietnam, Taiwan and China (occupied by the latter in full since 1974), Macclesfield Bank is claimed in full by China and Taiwan and in part by the Philippines, while the Spratlys are claimed in full by China, Taiwan and Vietnam, and in part by the Philippines and Malaysia (Brunei only claims maritime space within that archipelago). [Granados, U. (2016). Las islas Spratly: internacionalización de un conflicto regional. 22 February. Available at: <https://www.redalyc.org/jatsRepo/4337/433753443004/html/index.html>].

30 One of its reefs, the 'Fiery Cross Reef', has a 3,000-metre-long airstrip.

31 The 'People's Liberation Army'.

32 Navy (*PLA Navy*), Air Force (*PLA Air Force*) and Missile Force (*PLA Rocket Force*).

and allied bases in the Western Pacific (including Guam, Okinawa and Taiwan) under new threats<sup>33</sup>.

All this hardware development is being supported by a number of other software developments, namely improvements in command, control, communications, computers, intelligence, surveillance and reconnaissance (C<sup>4</sup>ISR); communications, reconnaissance, navigation satellites; RPAS<sup>34</sup> for surveillance and attack; secure communications and secure data networking; and a digitised command and control system. Recent US Department of Defense (DoD) reports on Chinese military power suggest that offensive cyberspace operations could support its A2/AD capabilities, particularly in the use of anti-satellite (ASAT) systems to destroy enemy satellites<sup>35</sup>.

In projecting US military power into distant areas such as the Western Pacific, the main disadvantage it faces is distance. The US territories of Hawaii or even Guam<sup>36</sup> are respectively 10,700 km and 3,150 km away from the South China Sea. Moreover, in the event of conflict, most of the US allied bases where they have forces deployed are not well placed to be of assistance. For example, in Japan, the US naval forces in Okinawa are about 1,800 km away and in Yokosuka about 3,200 km away. Thanks to the fact that in 2014, Washington and Manila signed a new Enhanced Defence Cooperation Agreement (EDCA) allowing access to military bases in the Philippines, the US could have facilities located about 800 km away from the South China Sea<sup>37</sup>.

Another disadvantage for the US is the uncertain involvement of its allies in the Asia-Pacific region in the event of a conflict between China and the US. Although it is very likely that it would drag some of them along, it is not certain how countries such as South Korea, Japan and Australia would contribute, bearing in mind that US military doctrine advocates deep-strike missions that could generate situations of conflict escalation<sup>38</sup>.

In projecting power and accessing environments with strong A2/AD defences, Washington considers that its armed forces face four major operational problems<sup>39</sup>:

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33 Bitzinger, R. (2017). *Op. cit.*, pp. 3-4.

34 See note 22.

35 Bitzinger, R. (2016). *Third Offset Strategy and Chinese A2/AD Capabilities*. *Center for a New American Security*, pp. 3-4.

36 The US has considerable military power at its disposal, including B-1, B-2 and B-52 bombers.

37 The agreement provides for the use of 8 bases. Its forces rotate in these facilities along the lines of the 'US Joint Special Operation Task Force-Philippines' (JSTOF-P) in Mindanao and Darwin (Australia) with forward operational presence and pre-positioning of assets.

38 Bitzinger, R. (2017). *Op. cit.*, pp. 5-6.

39 Martinage, R. (2014). *Toward a New Offset Strategy. Exploiting U.S. Long-Term Advantages to Restore U.S. Global Power Projection Capability*. *Center for Strategic and Budgetary Assessments (CSBA)*.

- The increasing vulnerability of facilities where US forces are deployed.
- Their adversaries are equipping themselves with strategic C4ISTAR assets capable of detecting, identifying and tracking the movements of surface ships from great distances, and are equipping themselves with anti-ship missiles to sink them before they reach the coast.
- The fourth-generation aircraft<sup>40</sup> represent the bulk of its fleet, lack stealth technology and are vulnerable to enemy anti-aircraft defences.
- Satellites and the capabilities they provide (global positioning, navigation, intelligence, observation, communications, etc.) are increasingly vulnerable to physical or cyber attacks<sup>41</sup>.

In order to accommodate its security architecture to the international environment, and conditioned by the proliferation of new security risks, the narrowing of the military gap with its rivals and the financial crisis, the US requires a new strategic model that seeks to maintain both the supremacy of its armies on the battlefield and the ability to project its power globally while reducing defence spending<sup>42</sup>.

### Historical development of operational concepts for countering A2/AD capabilities

The use of A2/AD capabilities as a strategy has existed throughout the history of warfare, with recent years witnessing the progressive adoption by China, Russia and other US strategic competitors of some of the technologies, capabilities and operational concepts that were developed by the US in the 1970s and 1980s and that have sustained its technological and strategic leadership for more than three decades. Its main geopolitical adversaries, especially China, have been compensating for this technological gap by putting its projection capacity at risk<sup>43</sup>.

Today, the A2/AD capabilities that countries such as China and Russia have been equipping themselves with not only include what are considered traditional capabilities such as aircraft, submarines, mines and missiles, but also encompass emerging capabilities in all domains, including space and cyberspace<sup>44</sup>. Moreover, as Sonne points out: «[Russia and China] *have learned from what we have done, they have learned from*

<sup>40</sup> The most representative of the fourth generation include: F-15, F-16, F/A-18 and the MiG-29.

<sup>41</sup> Colom, G. (2015a). *Op. cit.*, p. 76.

<sup>42</sup> *Ibid.*, pp. 72-73.

<sup>43</sup> Bitzinger, R. (2017). *Op. cit.*, pp. 19-28.

<sup>44</sup> Hutchens, M. *Op. cit.*, p. 135.

our success», serving to prepare them for a type of high-intensity warfare<sup>45</sup>, which the US has not faced for many years<sup>46</sup>. The events of 11 September 2001 forced a rethinking of the country's defence to focus on addressing the problems that arose during the War on Terror (stabilisation, military support for reconstruction, counter-insurgency, counter-terrorism) rather than preparing for future conflicts<sup>47</sup>.

For all of the above reasons, the expeditionary and precision paradigm that emerged from the second offset strategy<sup>48</sup> has entered into crisis for financial, political and strategic-technological reasons, the latter being the main one. In order to regain its hegemony, the US DoD has been developing new operational concepts, capabilities and technologies over the past decade<sup>49</sup>, which will be discussed below.

In July 2009, recognising the growing challenge posed by anti-access and area denial capabilities, US Secretary of Defense Robert Gates unveiled a new operational concept called 'Air-Sea Battle' (ASB) to enhance US military expeditionary power projection capabilities and strategies, access its forward bases and ensure the necessary freedom of movement across potential battle spaces<sup>50</sup>.

It is a limited operational concept, which identifies both the actions needed to defeat such threats and the investments required to carry them out<sup>51</sup>. The central idea is to develop networked integrated air and naval forces capable of conducting attacks in depth (NIA) by applying operations in the different combat domains to destabilise,

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45 The spectrum of conflict ranges from peacetime actions, to generalised high-intensity combat, to a transitional zone (non-peace/non-war). In high-intensity environments, the military opposition is organised and has combat power with a high capacity for physical destruction. Conventional combat operations predominate, although these may be combined with asymmetric-type actions. Ministry of Defence (2018). *Publicación Doctrinal Conjunta PDC-01 (A). Doctrine for the employment of the Armed Forces*, pp. 90-91.

46 Sonne, P. and Harris, S. (2018). U.S. Military Edge Has Eroded to A Dangerous Degree. *Study for Congress Finds. The Washington Post*. 14 November.

47 Colom, G. (2015a). *Op. cit.*, pp. 72-73.

48 The first 'New Look' offset strategy was developed in the 1950s. The Eisenhower Administration identified US leadership in nuclear technology and long-range bombers and missiles as the most efficient way to offset Soviet conventional superiority. By the mid-1970s, after the Soviet Union had devoted much effort to building up its nuclear arsenal, it had nuclear parity and a three-to-one conventional advantage. This situation endangered the strategic and geopolitical balance in Europe and, in response, a second 'Offset Strategy' emerged, based on US technological and industrial superiority that made possible substantial advances in precision weapons, stealth technologies and communication, computing, surveillance, reconnaissance, information and navigation systems in combat, which would later lead to the creation of GPS and the Internet.

49 Simón, L. *Op. cit.*, pp. 2-7.

50 Bltzinger, R. (2017). *Op. cit.*, p. 23.

51 Cordesman, A., Hess, A. and Yarosh, N. (2013). Chinese Military Modernisation and Force Development. A Western Perspective. *Center for Strategic & International Studies (CSIS)*, p. 189.

destroy and defeat (D3) the adversary's A2/AD capabilities and provide maximum operational advantage to own forces (NIA/D3)<sup>52</sup>.

Critics of this operational concept argued that its successful implementation was conditioned by a number of factors, such as the vulnerabilities of US forward bases and deployed forces; the ability of stealthy<sup>53</sup> and unmanned aircraft to penetrate enemy air defences and damage C4ISR networks; and the possible measures taken by the adversary (dispersal of its A2/AD assets to increase survivability) to counter US actions. In addition to the above, the ASB operational concept amplified the inherent risks of an escalation of the conflict, particularly at the nuclear level, and did not establish clear lines of interoperability, roles and missions for US allies in the conflict region, omitting their possible involvement at different levels, political, strategic and operational<sup>54</sup>.

At the same time as the ASB concept generated uncertainties and posed different operational risks, the debate to counter the challenges presented by A2/AD capabilities shifted towards an alternative of 'indirect' strategies, prioritising deterrence, prevention, surveillance and intelligence, and defence diplomacy, to the detriment of direct military intervention. Where air and naval operations outside the range of A2/AD systems and the imposition of economic costs and military pressure on the adversary were considered<sup>55</sup>. A clear example is the 'Offshore Control' concept, which consists of the US adopting an A2/AD strategy in the Asia-Pacific theatre with the aim of intercepting Chinese imports of energy, raw materials and industrial exports. It establishes a set of concentric rings of defence and air and sea space dominance inside and outside the first island chain, denying China the use of the sea inside this chain. In addition, penetration of Chinese airspace is expressly prohibited in order to reduce the possibility of nuclear escalation and to facilitate the termination of the conflict<sup>57</sup>.

In an effort to improve the ASB operational concept so that it could address current and future 'contested environments', it was renamed the 'Joint Concept for Access and Maneuver in the Global Commons' (JAM-CG) in October 2016. As Hutchens quotes: «*It is a joint concept built on the ASB chassis*»<sup>58</sup>. Some important ideas can be

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52 'Networked, Integrated Attack-in-Depth' disrupt/destroy/defeat (NIA/D3).

53 Stealth or very low observability technology is achieved by a combination of several techniques: shape geometry (design with angular shapes), the use of composite (non-metallic) materials, the application of radar absorbing paint and the use of passive sensors.

54 Bitzinger, R. (2017). *Op. cit.*, p. 24.

55 *Ibid.*, p. 24.

56 Simón, L. *Op. cit.*, p. 6.

57 Hammes, T. (2012). Offshore Control: A Proposed Strategy for an Unlikely Conflict. *Institute for National Strategic Studies (INSS)*. Pp. 3-5.

58 Hutchens, M. *Op. cit.*, p. 136.

gleaned from the name of the concept itself: 'access and maneuver' reflects the general importance of operational access and freedom of action; while 'global commons' recognises that the global commons belong to no state and their access is vital to national interests, both as an end in itself and as a means to project military force into hostile territory.

Unlike the ASB concept which was designed to counter emerging A2/AD challenges on an approach of destabilising, destroying and defeating<sup>59</sup> the capabilities of a specific adversary; the JAM-GC concept, instead of concentrating on dismantling their capabilities, establishes an approach to operations in contested environments by focusing on defeating the adversary's planning and intentions. A subtle but important shift, it describes the acceptance that A2/AD capabilities evolve faster than anticipated and require a high level of risk-taking.

The new concept is an operational-level approach that recognises the importance of overcoming adversary capabilities, defending one's own vulnerabilities, and the limits of technology. It therefore builds on existing systems and capabilities along with the need to integrate 'low-tech' operations when and where appropriate for the joint force. It does not advocate any specific emerging capabilities, nor does it endorse promising future capabilities (still under development), without ruling them out if they were to materialise, as they would serve to make the JAM-GC approach more effective.

Operating against an A2/AD threat set requires the integration of many capabilities across the five 'warfighting domains' (land, sea, air, space and cyberspace) and not just the maritime and air domains as the name of the predecessor concept suggested. It also sees building US engagement with allies and friends around the world as essential to successfully overcoming threats that limit or impede access to the global commons. JAM-GC therefore focuses on improving the integration of all armies in all domains and interoperability with allies and friends<sup>60</sup>.

In November 2014, former US Secretary of Defence Chuck Hagel launched two projects: the 'Defence Innovation Initiative' and the 'Long-Term Research and Development Programme', with the respective goals of generating new military capabilities and making the country's military administration more flexible; and identifying and maturing emerging technologies in the 2030-35 timeframe. These two projects constitute the pillars of the 'Third Offset Strategy' developed to ensure future US military supremacy<sup>61</sup> over its adversaries.

The third offset is based on the legacy of the information RMA (US technological capabilities), designed to define the model of military power projection, aimed at

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<sup>59</sup> *Disrupt/Destroy/Defeat*.

<sup>60</sup> *Ibid.*, pp. 135-139.

<sup>61</sup> Hagel, C. (2014). Speech by the Secretary of Defense at the opening of the Reagan National Defense Forum. Sim Valley. 15 November.

guaranteeing the ability to access any point on the planet independently of the A2/AD strategies deployed by its enemies and aimed at both strengthening security ties with its allies and strategic partners and forcing its potential adversaries to embark on a new arms race that its military-industrial complexes may not be able to sustain. This new offset strategy will motivate the development of new operational concepts, the generation of new military capabilities and the consolidation of new styles of conceiving, planning and conducting warfare on land, at sea, in the air, in space and in cyberspace<sup>62</sup>. This is precisely what is new about this new offset strategy, which, in addition to research into new and improved capabilities, is also working on new operational concepts.

TABLE I. THE THIRD OFFSET STRATEGY

<p>Goals:</p> <ul style="list-style-type: none"> <li>– Increase US ability to project war power in anti-access and area-denial (A2/AD) environments.</li> <li>– Strengthen conventional deterrence.</li> <li>– Impose a high opportunity cost on potential adversaries.</li> </ul>
<p>Lines of action:</p> <ul style="list-style-type: none"> <li>– It will exploit the gap that the US maintains in five ‘core competencies’: unmanned operations, long-range naval and air operations, unobservable operations, undersea warfare, and systems engineering and integration<sup>63</sup>. Enabling the global observation and attack network.</li> <li>– It will replace the traditional approach to conventional deterrence based on the threat of armed intervention with one that prioritises both deterrence by denial and deterrence by punishment<sup>64</sup>.</li> </ul>

The Pentagon’s adoption of the ‘third offset strategy’ in late 2014 symbolises the emergence of a new paradigm in US defence policy, an attempt to bring coherence to a series of processes and to address a series of challenges that have ‘matured’ in recent years. Its goal is not to arrive at a specific technological solution, but to identify a common conceptual framework encompassing a set of operational, technological and industrial concepts<sup>65</sup>, integrating the various existing initiatives and channelling the financial, intellectual and technological resources of the US strategic community around a coherent vision that will enable the US to neutralise the challenges to its current force projection model.

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62 Colom, G. (2015b). *Op. cit.*, pp. 390-391.

63 Martinage, R. *Op. cit.*, p. 71.

64 *Ibid.*, p. 46.

65 Simón, L. *Op. cit.*, pp. 7-8.

## People's Republic of China A2/AD Capabilities

### *Doctrinal aspects*

During the 1990s, the People's Liberation Army of the People's Republic of China (PLA) progressively learned from the US war experience, from conflicts such as the 1991 Gulf War and NATO's Kosovo air war in 1999. Over the years, China has adapted its military planning to rely on new technologies and strategies that can maximise its strengths while creating opportunities to exploit US weaknesses. Thus, the PLA increased investments in A2/AD-related technologies<sup>66</sup>, such as: ballistic missiles (nuclear and conventional warheads), advanced air defence and early warning systems, electronic and cyber warfare capabilities, new classes of submarines, surface combat ships and fourth and fifth generation 'multi-role' combat aircraft. These investments in technology and other experimental developments (hypersonic vehicles, space and cyberspace capabilities) will enable the PLA to achieve a decisive advantage in combat against its opponents, through both denial of its military power projection and advanced presence and freedom of action<sup>67</sup>.

In 2015, China's ambitious military modernisation entered a new phase as President Xi Jinping unveiled the most sweeping reforms in at least thirty years<sup>68</sup>. The PLA updated high-level strategies, plans and policies that reflect its intention to continue to transform itself into a more flexible and advanced force, capable of conducting highly complex joint operations<sup>69</sup>.

In addition to the old doctrinal concept of '*People's War*', which has been modified and updated to remain relevant in the 21st century, the two highest-level concepts in its body of doctrine are: '*Active Defense*' and '*Local Wars under Conditions of Informatization*' or '*Local Wars*'<sup>70</sup>. While the former provides the basic strategic posture for the PLA, the latter regulates its concept of operations in this new era.

'Local Wars' has been the PLA's official doctrine since 1993, formulating that the war of the near future will be geographically local (mainly) to China's periphery, limited in scope, duration and means, and conducted under 'conditions of informatisation'. These conditions are described by the DoD as those in which modern military forces use advanced computer systems, information technology and communications net-

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66 In China's strategic thinking the concept closest to A2/AD is 'Active Strategic Counterattacks on Exterior Lines' (ASCEL), which envisages the use of long-range precision strike capabilities against opposing forces.

67 Bitzinger, R. (2017). *Op. cit.*, pp. 4-6.

68 Office of the Secretary of Defense (2016). *Military and Security Developments Involving the People's Republic of China 2016. Annual Report to Congress*, pp. 42-43.

69 *Ibid.*, p. 3.

70 Bitzinger, R. (2017). *Op. cit.*, p. 53.

works to gain operational advantage over the opponent. The ability of military forces to communicate and coordinate rapidly through C4ISR networks implies that, at the operational level, these forces must be agile with the capacity to conduct high-intensity operations in depth, characterised by being resource intensive, critically reliant on information and present in all domains of warfare.

'Active Defence', 'Local Wars' and 'People's War' describe how China strategically postures, develops its military forces and fights at the strategic level. Operationally (at the campaign level in China's terminology) the PLA has developed doctrines and principles of warfare where it considers joint operations to be a critical component of future operations and a necessary means to defeat technologically superior adversaries. It is worth noting that the doctrinal concepts of 'Local Wars' and 'People's War' are complementary, the latter often being confused with guerrilla warfare, while the latter is a concept in which the population actively supports (logistically, politically or operationally) military forces during times of war. These civilian personnel support functions are still fully accepted in PLA doctrine, which it considers necessary to achieve victory in local wars<sup>71</sup>.

In May 2015, China launched a new defence White Paper in which it reaffirms many of the existing elements of its military strategy, particularly the concept of Active Defence. Concept that develops the commitment not to attack until attacked, but once hit to strike back with full force using offensive operations at all levels and at all stages of conflict<sup>72</sup>. It also insists on China's 'no-first-use' nuclear policy, declaring to use its nuclear forces only in response to a nuclear attack. Although there is some ambiguity about the conditions under which China might need to use nuclear weapons, such as to deal with a conventional attack that would threaten the survival of its nuclear force or the regime itself.

Notably, its White Paper presents a vision of a more joint, flexible and active force overall, confirming its transition from continental to maritime power by elevating the maritime domain within the strategic orientation of the PLA, and paying more attention to emerging domains such as space, cyberspace<sup>73</sup> and the electromagnetic spectrum. Cyberwarfare has become a major aspect of PLA modernisation, with a

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71 In PLA doctrinal documents, «arming the civilian population for military operations» generally refers to the militia, civil defence and reserve forces.

72 The PLA doctrinal document 'The Science of Military Strategy' has described the principle of «active defence» as the pillar and guide of the strategic theoretical framework. According to General Zhang Qinsheng, 'active defence' is 'in general' strategically defensive, but 'in the details' potentially offensive. The relationship between 'active defence' and the 'Military Strategic Guidelines' is so intimate that the two are almost indistinguishable in the PLA's mind. The Pacific Review (2016). Washington's Perceptions and Misperceptions of Beijing's Anti-access Area-denial (A2-AD) 'Strategy': Implications for Military Escalation Control and Strategic Stability. *RPRE-2016-0037*. [Accessible on 20 June 2020] .Available at: <http://mc.manuscriptcentral.com/rpre>

73 Office of the Secretary of Defense. *Op. cit.*, pp. 42-43.

singular focus on electronic warfare (EW) and promoting through networked warfare and EW tools the crippling of adversary C<sup>4</sup>ISR capabilities.

Its main doctrinal principles also include the central role that Information Warfare will play in future conflicts. Recognising that information superiority or the ability to access and process information in C<sup>4</sup>ISR networks must be achieved and maintained while denying the enemy<sup>74</sup>.

China's current doctrine enhances the use of offensive and defensive platforms, with a wide range of capabilities from integrated command and control (C<sub>2</sub>) to the use of a combination of ballistic and cruise missiles to attack potential adversaries' military forces in order to deny access to their air and sea lanes of approach in the Asia-Pacific theatre<sup>75</sup>.

The reform in A<sub>2</sub>/AD capabilities undergone by China has become a source of concern for the US, which, if it were to hinder its force projection in the Western Pacific theatre, would result in seriously serious implications<sup>76</sup>.

### *Ballistic and cruise missile capabilities*

The development of China's long-range precision strike capability using conventional missiles has been extraordinarily rapid. As recently as ten years ago, its ability to strike targets beyond the first island chain (such as US bases on Okinawa or Guam) was very limited. However, it is currently deploying a range of short-range ballistic missiles (SRBMs)<sup>77</sup>, as well as land-attack cruise missiles (LACMs)<sup>78</sup>, special operations forces (SOF) and cyber warfare capabilities to keep targets at high risk throughout the region. Thus, US bases in Japan are within range of LACMs and an increasing number of medium-range ballistic missiles (MRBMs)<sup>79</sup>. Guam could also be targeted by air-launched LACMs, as evidenced by flights first conducted in 2015 by H-6K bombers in the Western Pacific<sup>80</sup>.

China's ballistic and cruise missiles have significantly improved accuracy, making them more capable of reaching their targets (adversary air bases, logistics facilities, communications, power projection elements and other infrastructure). All (nuclear

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74 PLA doctrine considers that advantages in information gathering, transmission and processing at the tactical level bring advantages at the operational and strategic levels.

75 Bitzinger, R. (2017). *Op. cit.*, pp. 5-6.

76 Fukuda, J. *Op. cit.*

77 *Short-Range Ballistic Missiles*.

78 *Land-Attack Cruise Missiles*.

79 *Medium-Range Ballistic Missiles*.

80 Office of the Secretary of Defense. *Op. cit.*, p. 59.

and conventional) ground-launched missiles are operated by the People's Liberation Army Missile Force (PLARF)<sup>81</sup> which has an inventory of some 1,200 short-range ballistic missiles (SRBMs) capable of striking targets in Taiwan. The PLARF has deployed a large number of them (DF-11, DF-12, DF-15/CSS-6)<sup>82</sup> along the Taiwan Strait<sup>83</sup> and is increasing the lethality of its conventional missile force with the DF-16/CSS-11 ballistic missile<sup>84</sup>, a missile that entered service in 2015, is road-transportable, has an estimated range of 700-1,000 km and is designed to specifically counter Taiwan's Patriot MIM-104 PAC 3 system<sup>85</sup>.

With sufficient range to reach targets in Japan, China has the DF-21C/CSS-5 medium-range land-attack ballistic missile (MRBM)<sup>86</sup> and is deploying a growing number of conventionally armed MRBMs, such as the DF-21D/CSS-5 Mod-5 anti-ship ballistic missile (ASBM), which represents the ultimate expression of China's anti-ship capabilities<sup>87</sup>. This solid-fuel rocket-propelled missile has an estimated range of 1,500-1,700 km (potentially extended to 2,150 km), has a manoeuvrable warhead and can be equipped with both conventional and nuclear strike capability. The DF-21D variant is specifically designed to counter air defence systems such as the AEGIS combat system used by most modern US and allied ships.<sup>88</sup>

The ballistic missiles are complemented by the DH-10 (DF-10)/CJ-10 ground-launched cruise missile (GLCM)<sup>89</sup>, which is the PLA's first cruise missile and is derived from the Cold War Soviet Kh-55 cruise missile<sup>90</sup>. It has a range of 1,500 km-4,000 km and, compared to ballistic missiles, offers different flight profiles that improve the chances of locating targets<sup>91</sup>.

During the September 2015 military parade in Beijing, China unveiled the DF-26 intermediate-range ballistic missile (IRBM), with an estimated range of 3,000-

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81 *PLA Rocket Force*.

82 Chinese/US nomenclature will be provided. DF is an acronym for Dong-Feng («east wind») and CSS for *China surface-to surface (missile)*.

83 Fukuda, J. *Op. cit.*

84 Office of the Secretary of Defense. *Op. cit.*, p. 22.

85 Kuper, S. (2019). The Teeth in China's Antiaccess/Area Denial Defences. *Defence Connect*. 24 April.

86 Fukuda, J. *Op. cit.*

87 Office of the Secretary of Defense. *Op. cit.*, pp. 22-25.

88 Kuper, S. *Op. cit.*

89 There is a variant, the CJ-20, which can be launched from the H-6K bomber, giving the Chinese military the ability to reach distant targets such as Hawaii.

90 *Ibid.*

91 Office of the Secretary of Defense. *Op. cit.*, pp. 22-25.

4,000km, has the capability to conduct precision strikes against ground targets (key US infrastructure in the Pacific, mainly on the island of Guam) and can carry nuclear warheads, contributing to strategic deterrence in the region. Like most Chinese missiles, it is road-transportable, allowing it to evade pre-emptive strikes by an adversary, increasing its survivability and deterrence capability<sup>92</sup>.

China continues in the process of developing and deploying a modern and sophisticated arsenal with more advanced capabilities, such as anti-ship ballistic missiles equipped with independently manoeuvrable multiple warheads (MIRVs)<sup>93</sup> and hypersonic glide vehicles (HGVs)<sup>94</sup> like the DF-17<sup>95</sup>.

This process is conducted in secret because of the country's unwillingness to be subject to international arms control and other transparency agreements. The combination of all these capabilities will degrade the survivability of key elements of US military power projection such as the aircraft carrier and forward air bases. In addition, China is also developing a growing fleet of submarines equipped with ballistic missiles and nuclear-capable intercontinental ballistic missiles capable of attacking the US mainland<sup>96</sup>.

On nuclear weapons policy, China prioritises maintaining a nuclear force capable of surviving an attack and responding with sufficient force to inflict unacceptable damage on the enemy. It has a large arsenal of ballistic missiles, including some 75-100 intercontinental ballistic missiles (ICBMs) such as the silo-based DF-5/CSS-4 Mod-2 and the MIRV-equipped DF-5B/Mod-3; the solid-fuelled, transportable DF-31 and DF-31A/CSS-10 Mod-1 and 2, capable of reaching targets on the US mainland; and the shorter-range DF-4/CSS-3.

This force is complemented by transportable solid fuel DF-21/CSS-5 Mod-6 MR-BMs. China is also developing a new road-transportable ICBM, the DF-41/CSS-X-20 equipped with MIRVs<sup>97,98</sup>.

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92 Kuper, S. *Op. cit.*

93 *Multiple Independent Reentry Vehicle.*

94 *Hypersonic Glide Vehicle.*

95 *Ibid.*

96 Missile Defense Project (2018). Missiles of China. *Missile Threat, Center for Strategic and International Studies*. [Accessible on 06 June 2020]. Available at: <https://missilethreat.csis.org/country/china/>

97 Office of the Secretary of Defense. *Op. cit.*, pp. 22-25.

98 In relation to nuclear-capable offshore platforms, China continues to produce Hainan Island-based JIN-class nuclear-powered submarines (SSBNs) capable of carrying JL-2/CSS-NX-14 SLBMs with an estimated range of 7,200 km.

TABLE II. PLARF MISSILE TYPES<sup>99</sup>

Missile	Class	Range (Km)
<i>Short-range ballistic missiles (&lt;1,000 km)</i>		
DF-11	SRBM	280-300
DF-12		420
DF-15		600
DF-16		800-1,000
<i>Medium-range ballistic missiles (1,000-3,000 km)</i>		
DF-21	MRBM	2.150
<i>Intermediate-range ballistic missiles (3,000-5,000 km)</i>		
DF-4	IRBM	4,500-5,500
DF-26		3,000-4,000
<i>Intercontinental ballistic missiles (&gt;5,500 km)</i>		
DF-31	ICBM	8,000-11,700
DF-41		12,000-15,000
DF-5		13,000
<i>Hypersonic glide vehicles</i>		
DF-17	HGV	1,800-2,500 km
<i>Land-attack cruise missiles</i>		
DH-10 (DF-10)	LACM	2,000 km

China's ballistic and cruise missile capabilities pose a direct threat to Japan and the US, making ports and bases in the Western Pacific vulnerable<sup>100</sup>.

### *Chinese Air Force Capability*

China's aviation, consisting of its PLA Air Force (PLAAF) and the PLA Naval Air Force (PLANAF), is the largest in Asia and the third largest in the world (behind the USAF and the Russian Air Force). In terms of its composition, it has made great strides in many areas, replacing its ageing inventory of obsolete aircraft with modern multi-role aircraft. Currently, one third of the total aircraft in its inventory are modern<sup>101</sup>.

TABLE III. GLOBAL FLEETS OF MILITARY AND COMBAT AIRCRAFT<sup>102</sup>

Global fleet of military aircraft				Combat aircraft	
Ranking	Country	In service	%	In service	%
1	USA	13,266	25	2,657	18
2	Russia	4,163	8	1,616	11
3	China	3,210	6	1,603	11
4	India	2,123	4	710	5

<sup>99</sup> Table prepared by the author.

<sup>100</sup> Fukuda, J. *Op. cit.*

<sup>101</sup> Cordesman, A. *Op. cit.*, pp. 192-217.

<sup>102</sup> Source: Flight International. *World Air Forces 2020*. P. FightGlobal 13-14. [Accessible on 27 June 2020]. Available at: <https://www.flightglobal.com/download?ac=66025>

TABLE IV. SPECIAL MISSION AIRCRAFT FLEETS, AAR AND TRANSPORT<sup>103</sup>

Ranking	Special missions			Resupply Aerial			Transport		
	Country	In service	%	Country	In service	%	Country	In service	%
1	USA	744	38	USA	614	77	USA	945	22
2	Japan	152	8	Saudi Arabia	22	3	Russia	424	10
3	Russia	127	6	France	20	2	India	250	6
4	China	111	6	Russia	19	2	China	224	5

Since the beginning of this century, the PLAAF has undergone a major change in its structure and composition from an air defence-based approach (based on interdiction aviation) to a multi-mission approach, having to acquire a large number of modern combat aircraft capable of performing air defence, strike, transport, ISR and EW missions. Between 1995 and 2003, the PLAAF inventory reduced the specific weight of interceptors from 80% to 50% and increased that of surface attack aircraft by more than 2.5 times.

In 2004, the PLAAF published its strategy ‘Integrated Air and Space Operations, Being Prepared for Simultaneous Offensive and Defensive Operations’ in which it restructures its force to respond to the needs stipulated in the ‘Local Wars’ doctrine, contemplating further reductions in the proportion of aircraft dedicated to the interdiction role and the need to acquire a greater number of advanced aircraft to be able to carry out missions against adversary air defences. A tendency that shows a strong desire to have the ability to conduct both defensive and offensive missions.

Another important aspect highlighted in this paper is the need to build the capacity to develop the human capital necessary to operate these advanced systems and conduct the required missions. To this end, they have put in place a combination of measures affecting the training of their personnel and their instruction (improved academic performance, renewed intensive training and enhanced joint military exercises). In terms of personnel, the PLAAF and the PLAN have respectively 398,000 and 235,000 personnel, representing 27.5 percent of the total number of PLA personnel<sup>103</sup>, confirming the priority given to them in the PLA’s organisational plans<sup>104</sup>.

In terms of infrastructure, China has a total of thirty-two air bases configured in three lines of defence (forward, middle and rear), the first two lines are heavily reinforced and protected<sup>105</sup>.

<sup>103</sup> Office of the Secretary of Defense. *Op. cit.*, pp. 30-32

<sup>104</sup> Shlapak, D. (2007). *Coping with the Dragon. Essays on PLA Transformation and the U.S. Military*. National Defense University. Center for Technology and National Security Policy.

<sup>105</sup> Fukuda, J. *Op. cit.*

To achieve air superiority and conduct strike operations, China has a fleet of fourth-generation aircraft: Su-27, Su-30, Su-35 (fourth-generation plus fighter), Russian-made J-11A and domestic J-11B, JH-7 and J-10 (own design).

The 2013 DoD report on Chinese military power revealed that China is developing A2/AD capabilities, precision strike and enhanced air defences, and stealth technology<sup>106</sup>. Air-to-air capability is central to its transformation from a predominantly territorial air force to one capable of offensive and defensive operations, and the availability of fifth-generation fighter aircraft<sup>107</sup> would significantly strengthen it. Thus, China is, along with the United States, the only country that has two stealth technology programmes simultaneously, the J-20 fighter and the FC-31<sup>108</sup>, the latter of which is similar in size to a US F-35 fighter and appears to incorporate similar design features to the J-20.

In the bomber fleet, the PLAAF continues to upgrade the H-6<sup>109</sup> to increase operational effectiveness and lethality by integrating long-range weaponry. There are different versions of the H-6, all of which have a weapons bay in the fuselage hold capable of carrying gravity bombs, precision-guided bombs and naval mines. The H-6H and H-6M versions are the older versions; the H-6G is the embarked version, equipped with dedicated systems and four armament-loading pylons; and the H-6K, a new variant redesigned with turbofan engines and capable of carrying six LACMs, providing extended range and long-range offensive capability.

With regard to airlift, China has a small fleet of aircraft, relying on a limited number of Russian-made IL-76 aircraft for strategic airlift and continues to introduce its large Y-20 transport aircraft into the PLA inventory to complement and replace its fleet<sup>110</sup>.

The number of bombers coupled with the small number of aerial refuelling aircraft (AAR) reveals a limitation of PLAAFs to conduct strike missions on close-in targets (those within the first island chain). Although cruise missile versions of the H-6 bomber give it the capability against long-range targets, this is considered to be relegated in the PLARF due to limited bomber and missile holdings.

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106 Cordesman, A. *Op. cit.*, pp. 207-208.

107 Combat aircraft with high manoeuvrability and low observability (radar absorbing paint, angled design and internal weapons bay), with modern avionics and sensors (radars with advanced tracking and targeting capabilities, protection against enemy electronic countermeasures and fully integrated EW systems) that provide improved situational awareness for the pilot in network-centric combat environments.

108 The FC-31 made its maiden flight on 31 October 2012 and debuted at the 10th China International Aviation and Aerospace Exhibition in Zhuhai in November 2014.

109 Originally adapted from the Soviet Tu-16 design of the late 1950s.

110 *Ibid.*, pp. 30-32.

TABLE V. COMPOSITION AND TYPES OF PLAAF AIRCRAFT<sup>111</sup>

People's Liberation Army Air Force			
Combat/Bomber		Special mission	
H-6	120	737 (MPA) <sup>112</sup>	2
J-7	388	An-30 (EW)	3
J-8	96	Challenger 870 (Reconnaissance)	5
J-10	235	Il-76 (A501) (AEW) <sup>113</sup>	1
J-11/16/Su-27/30/35	351	Il-76 (KJ-2000) (AEW)	4
J-20	15	Tu-154(EW)	8
JH-7	69	Y-8 (AEW)	11
Q-5	118	Y-8 (EW)	16
Transport		Y-8 (Reconnaissance)	1
Il-76	22	Y-9 (KJ-500) (AEW)	13
MA60	9	<i>Resupply</i>	
Tu-154	2	Il-78	3
Y-7	47	<i>Training</i>	
Y-8	69	JJ-7	35
Y-9	15	JL-8	170
Y-12	11	L-15	2
Y-20	7	Y-7	13

TABLE VI. COMPOSITION AND TYPES OF PLANAF<sup>114</sup> AIRCRAFT

People's Liberation Army Naval Air Force			
Combat/Bomber		Special mission	
H-6	30	Challenger 870 (Reconnaissance)	2
J-7	30	Ka-31 (AEW)	9
J-8	47	SH-5 (SAR) <sup>114</sup>	3
J-10	25	Y-7 (SAR)	1
J-15/Su-30/33	45	Y-8 (AEW)	8
JH-7	34	Y-8 (MPA)	9
Training		Y-8 (Reconnaissance)	8
JJ-6	14	Y-9 (HJ/KJ-500) (AEW)	6
JL-8	11	Z-18 (AEW)	1
JL-9	2	<i>Transport</i>	
L-15	12	Y-7	17
Y-7	5	Y-8	13

111 Source: Flight International. *World Air Forces 2020*. P. FightGlobal 13-14. [Accessible 06 June 2020]. Available at: <https://www.flightglobal.com/download?ac=66025>

112 Maritime Patrol Aircraft.

113 Airborne Early Warning and Control Aircraft.

114 Search and Rescue.

Some American experts believe that the limited number of AAR, EW, ELINT, AEW&C, and C2 aircraft indicates that the PLAAF's effectiveness is comparatively less than that of other Western or Russian air forces; but that leveraging this diversity of capabilities shows that it is on the right path of modernisation and development to achieve similar capabilities<sup>115</sup>.

China is moving ahead with the development, procurement and employment of longer-range UAVs that would increase its ability to conduct ISR and long-range strike operations<sup>116</sup>. Just as it is incorporating stealth technology into combat aircraft, it also sees it as an integral part of unmanned aircraft, especially those with an air-to-surface strike role, as it would improve the ability to penetrate heavily protected targets. The new unmanned combat air vehicle (UCAV) in service is the «Gongji-II» (GJ-II) largely influenced by Western designs (very similar to the Northrop Grumman X-47B UCAV).

The PLAAF is rapidly closing the technology gap with Western air forces through the development of a broad spectrum of capabilities spanning C2, jammers, EW and datalink<sup>117</sup>. The modernisation of both force structure and composition indicates a focus on targets within the first island chain, which is consistent with the 'Local Wars' doctrine and is an indicator that this doctrine is influencing the modernisation of Chinese aviation, and it is expected that these modernisation trends will continue and that it will progressively increase its capacity to act in contingencies that arise along its borders<sup>118</sup>.

China has a robust Integrated Air Defence System (IADS) that relies on early warning, fighter aircraft and a variety of SAM systems, which provide it with the capability to counter different types of targets (fighter aircraft, unmanned aerial vehicles, helicopters, and long-range strike air platforms).

The PLAAF has one of the largest forces of advanced SAM systems in the world, consisting of a combination of Russian-origin S-300PMU/SA-10<sup>119</sup> and S-300PMU1-2/SA-20 battalions<sup>120</sup> and domestically produced HQ-9 battalions (similar to the S-300PMU) with a maximum range of 200km, all capable of intercepting aircraft and cruise missiles at low altitude. In an effort to improve its strategic air defence systems, China is importing the Russian S-400/Triumpf SAM system<sup>121</sup> (with a theoretical range

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115 Cordesman, A. *Op. cit.*, pp. 192-217.

116 In 2015, Chinese media reported the development of the *Shendiao* (Holy Eagle or Divine Eagle) as the most modern high-altitude, long-range UAV for a variety of missions.

117 Office of the Secretary of Defense. *Op. cit.*, pp. 30-32.

118 Cordesman, A. *Op. cit.*, p. 212.

119 Russian designation/NATO designation.

120 One of the most advanced SAM systems Russia offers for export with a range of over 200 km.

121 In 2014 China was the first foreign buyer to seal a government-to-government agreement with Russia. Moscow has already begun delivering an undisclosed number of S-400 missile systems (NATO designation, SA-21 Growler) to Beijing.

of 400 km), and is also expected to continue research and development of its own HQ-19 system providing the basis for a ballistic missile defence capability<sup>122</sup>.

With regard to ballistic missile defence (BMD) capability, the existing inventory of long-range surface-to-air missiles offers limited capability against ballistic missiles. With new domestically produced radars, such as the JL-1A<sup>123</sup> and JY-27A, which are designed to address such a threat; with the SA-20 PMU2 SAM that has the capability to engage ballistic missiles at speeds of 2,800 metres per second; and with the acquisition of the Russian S-400 system, it is estimated that China could gain the capability to counter MRBMs<sup>124</sup>.

### *Other capacities in support of A2/AD*

China's latest White Paper reaffirms the PLA's focus on new and emerging security domains such as outer space and cyberspace. In terms of space capabilities, China continues to invest significantly in improving and strengthening its military space capabilities.

China is seeking to use space systems to enhance the C2 of joint operations and to establish a surveillance, reconnaissance and warning system capable of real-time monitoring of targets around the world and in space. It has placed more than thirty satellites in orbit with the intention of supporting platforms with precision strike capability<sup>125</sup>, with particular emphasis on the following capabilities: satellite communications (SATCOM), ISR, satellite navigation (SATNAV) with advances in the *Beidou* navigation satellite system, meteorology, as well as space exploration (manned, unmanned and interplanetary). In addition to satellites in orbit, China's space programme has built a vast ground infrastructure that supports the manufacture of spacecraft and space launch vehicles, C2 and downlink data.

In parallel with its space programme, China continues to develop a variety of counter-space capabilities designed to limit or prevent the use of space-based capabilities by adversaries during a crisis or conflict. However, China publicly opposes the militarisation of space<sup>126</sup>.

Chinese military doctrine also advocates taking advantage of 'cyberspace superiority' by developing offensive capabilities to deter or stop an adversary. Chinese offensive cy-

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122 Office of the Secretary of Defense. *Op. cit.*, pp. 30-32.

123 Theoretically, the JL-1A radar is capable of accurately tracking multiple ballistic missiles.

124 *Ibid.*, pp. 60.

125 Fukuda, J., *Op. cit.*

126 In 2009, then PLAAF commander Xu Qiliang retracted his earlier claim that space militarisation was a «historical inevitability» after former president Hu Jintao contradicted him.

berspace operations could employ A2/AD measures against critical nodes of adversary communications and data networks to disrupt them throughout the conflict region<sup>127</sup>. As part of the US-China defence consultative talks, the US DoD is urging China to provide greater transparency on its military doctrine and missions in cyberspace.

Another essential element of China's ability to counter third-party intervention is its control of the information spectrum in all dimensions of the modern battlespace. In PLA doctrine, it is often cited that in order to establish the conditions necessary to achieve air and sea superiority in modern warfare, it is necessary to control information (calling it 'information blocking' or 'information dominance') and take the initiative early in the campaign. China is improving information and operational security to protect its own information structures and, at the same time, is developing other information warfare capabilities, including denial and deception<sup>128</sup>.

## Conclusions

Potential US adversaries have learned by studying the characteristics of its new style of warfare and globalisation has facilitated the spread of advanced military technologies, both of which have eroded the competitive military advantage that the US military has enjoyed.

The use of A2/AD capabilities as a strategy has existed throughout the history of warfare, both defensive and offensive measures that restrict force projection and deny freedom of movement. Today, they represent a kind of asymmetric strategies of 'cost imposition' and 'influencing strategic calculations' that seek to deter a technologically superior adversary by raising unknowns in its decisions or even defeating it.

China's current doctrine promotes the use of offensive and defensive platforms, with a wide range of capabilities and combined use of assets in order to deny potential adversary forces access to the Asia-Pacific theatre.

The People's Liberation Army's ambitious military modernisation, updating strategies, plans and high-level policies reflects its intention to continue to transform itself into a more flexible and advanced force, capable of highly complex joint operations. The synergy produced by air force restructuring and composition, aircraft modernisation and personnel policies ensures that the PLAAF is increasingly capable of fighting and winning «Local Wars» as it moves forward with its modernisation programme.

Today, the scope, lethality and sophistication of anti-access and area denial systems, coupled with the development of doctrinal and operational concepts and the

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<sup>127</sup> Office of the Secretary of Defense. *Op. cit.*, p. 59.

<sup>128</sup> China's 'information blocking' probably envisages the use of military and non-military instruments of state power across the entire battlespace, including cyberspace and space.

training and instruction of personnel, threaten the projection and manoeuvre model of US and allied forces. Mainly because they pose economic, operational, strategic and political costs that make it impossible to maintain the current US strategic defence paradigm based on forward presence and power projection.

As China continues to implement A2/AD capabilities, develop the necessary technologies and employ them to their full potential, US control of the global commons will be compromised. We will enter a new era of regional hegemony in the Western Pacific, where there will be a more differentiated pattern of control, shaped by a system of competing spheres of influence. Resulting in a US sphere of influence around allied territories (including most of the region's disputed island chains); another Chinese sphere of influence over mainland China; and finally, a mutual exclusion zone or contested battle space covering much of the South and East China Seas, in which neither side will enjoy freedom of movement<sup>129</sup>.

The US requires a new strategic model in order to accommodate its security architecture to the international environment. The third offset strategy symbolises the emergence of this new paradigm in its defence policy, in which, in addition to researching new and improved capabilities, it seeks to identify a common conceptual framework encompassing a range of new operational, technological and industrial concepts that will enable it to neutralise challenges to its current model of force projection and, in the process, ensure future military supremacy over its adversaries.

Despite the popularisation of the term A2/AD and its use to guide US strategy, it should be borne in mind that each case is different. The US's focus over the years on the third offset strategy, while it has helped to narrow down the problem, is focusing too much on an operational issue when it is the framing strategy that is relevant. In defining the new paradigm in US defence policy, it needs to be framed within a much broader strategy, in which more subtle or silent functions of the military instrument, such as deterrence, prevention, surveillance and intelligence, and defence diplomacy, among others, are revalued to the detriment of direct military intervention.

Moreover, one of the key advantages the United States has over its potential competitors is its strong network of allies and alliances, so the third offset strategy will not succeed without the participation of its allies, and interoperability cannot be an impediment, a critical factor that is not being taken into consideration.

Although new technologies tend to spread rapidly, the benefits they provide tend to be short-lived. While identifying and acquiring innovative technologies presents significant challenges, the challenges do not end once these two steps are achieved. It is then that new capabilities and new operational concepts must be integrated into the culture of the armed forces, which is not always particularly receptive to

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129 Biddle, S. *Op. cit.*, pp. 43-48.

change. There is a need to promote changes in the institutional culture in order to enable innovation at the organisational level. Developing technology is only the first step in innovation, as what you fight with is only as useful as how effectively you fight with it.

Finally, it should be noted that A2/AD capabilities are proliferating globally, in regions such as Eastern Europe, the Middle East and North Africa, which are of great relevance for Europe and, more specifically, for Spain. So the A2/AD capabilities debate should be raised. At the level of the armed forces, the capacity to innovate, to develop and integrate new operational concepts to take advantage of innovative technologies; and at the political level, the need to provide sufficient budgetary stability, even if some of the innovation paths do not bear immediate fruit.

## Bibliography

- Biddle, S. and Oerlich, I. (2016). Future Warfare in the Western Pacific. Chinese Anti-access/Area Denial, U.S. AirSea Battle, and Command of the Commons in East Asia. *International Security*. Vol. 41, Issue 1 (Summer), p. 10.
- Bitzinger, R. (2016). Third Offset Strategy and Chinese A2/AD Capabilities. *Center for a New American Security*, pp. 3-4.
- Bitzinger, R.; *et al.* (2017). Countering Anti-Access/Area Denial Challenges. Strategies and Capabilities. *RSiS*, pp. 19-20.
- Clark, B., Gunzinger, M. and Sloman, J. (2017). Winning in the Gray Zone. *Center for Strategic and Budgetary Assessments (CSBA)*, p. 1.
- Cliff, R., *et al.* (2007). Entering the Dragon's Lair. Chinese Antiaccess Strategies and Their Implications for the United States. *RAND Corporation*, p. 11.
- Colom, G. (2015a). Rumsfeld Revisited: La Tercera estrategia de compensación estadounidense. *Revista UNISCI*. Issue 38, p. 77.
- (2015b). Air Power in the Third Offset Strategy. *Revista de Aeronáutica y Astronáutica*. May, pp. 384-385.
- Cordesman, A., Hess, A. and Yarosh, N. (2013). Chinese Military Modernizaion and Force Development. A Western Perspective. *Center for Strategic & International Studies (CSIS)*, p. 189.
- Dalsjö, R., Berglund, C. and Jonsson, M. (2019). Bursting the Bubble. Russian A2/AD in the Baltic Sea Region: Capabilities, Countermeasures, and Implications. *FOI-R--4651--SE*. March, pp. 10-25.
- Department of Defense-United States of America (2019). Summary of the 2018 National Defense Strategy of the United States of America. Sharpening the American Military's Competitive Edge, p. 2.

- Flight International (2020). World Air Forces 2020. P. FightGlobal 13-14. [Accessible on 20 June 2020]. Available at: <https://www.flightglobal.com/download?ac=66025>
- Fukuda, J. (2015). Counteracting China's Anti-Access/Area Denial Capabilities. *Institute for International Policy Studies (IIPS)*. Volume 6, Issue 1.
- García Sieiro, J.M. (2006). Planeamiento por capacidades. *Revista Española de Defensa*. June, Issue 220, p. 38.
- Granados, U. (2016). Las islas Spratly: internacionalización de un conflicto regional. 22 February. [Accessible on 20 June 2020]. Available at: <https://www.redalyc.org/jatsRepo/4337/433753443004/html/index.html>
- Hagel, C. (2014). Speech by the Secretary of Defense at the opening of the 'Reagan National Defense Forum'. Sim Valley. 15 November.
- Hammes, T. (2012). Offshore Control: A Proposed Strategy for an Unlikely Conflict. *Institute for National Strategic Studies (INSS)*, pp. 3-5.
- Hutchens, M., et al. (2017). Joint Concept for Access and Maneuver in the Global Commons. A New Joint Operational Concept. *JFQ* 84, p. 135.
- Krepinevich, A., Watts, B. and Work, R. (2003). Meeting the Anti-Access and Area-Denial Challenge. *Center for Strategic and Budgetary Assessments (CSBA)*, p. 1.
- Krepinevich, A. (2010). Why AirSea Battle? *Center for Strategic and Budgetary Assessment (CSBA)*, p. 27.
- Kuper, S. (2019). The Teeth in China's Antiaccess/Area Denial Defences. *Defence Connect*. 24 April.
- Missile Defence Project (2018). Missiles of China. *Missile Threat, Center for Strategic and International Studies*. [Accessible on 6 June 2020]. Available at: <https://missilethreat.csis.org/country/china/>
- Martínage, R. (2014). Toward a New Offset Strategy. Exploiting U.S. Long-Term Advantages to Restore U.S. Global Power Projection Capability. *Center for Strategic and Budgetary Assessments (CSBA)*.
- Office of the Secretary of Defense. Military and Security Developments Involving the People's Republic of China 2016. *Annual Report to Congress*, pp. 42-43.
- Richardson, J. (2016). Deconstructing A2AD. *The National Interest*. October.
- Ruiz, F. (2013). The importance of RPAS/UAS for the European Union. *Spanish Institute for Strategic Studies*. Opinion Paper 78/2013.
- Shlapak, D. (2007). Coping with the Dragon. Essays on PLA Transformation and the U.S. Military. National Defense University. *Center for Technology and National Security Policy*.
- Simón, L. (2015). Offset strategy: ¿hacia un nuevo paradigma de defensa de EE. UU.? *Real Instituto Elcano*. ARI 14/2015, p. 2.

Sonne, P. and Harris, S. (2018). U.S. Military Edge Has Eroded to A Dangerous Degree. *Study for Congress Finds. The Washington Post*. 14 November.

The Pacific Review (2020). Washington's Perceptions and Misperceptions of Beijing's Anti-access Area-denial (A2-AD) 'Strategy': Implications for Military Escalation Control and Strategic Stability. *RPRE-2016-0037*. [Accessible on 20 June 2020]. Available at: <http://mc.manuscriptcentral.com/rpre>

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