Assessing China’s Unmanned Aerial Vehicles

Policy, Development, Implementation, Capabilities, and Exports

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### Acronyms Used

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AVIC</td>
<td>Aviation Industry Corporation of China</td>
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<tr>
<td>BUAA</td>
<td>Beijing University of Aeronautics and Astronautics</td>
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<tr>
<td>C3I</td>
<td>Command, control, communications, and intelligence</td>
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<tr>
<td>C4ISR</td>
<td>Command, control, communications, computers, intelligence, surveillance, and reconnaissance</td>
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<tr>
<td>C4ISTAR</td>
<td>Command, control, communications, computers, intelligence, surveillance, target acquisition, and reconnaissance</td>
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<tr>
<td>CAC</td>
<td>Chengdu Aircraft Industry Group</td>
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<tr>
<td>CASIC</td>
<td>China Aerospace Science and Industry Corporation</td>
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<td>CMI</td>
<td>Civil-military integration</td>
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<td>EW</td>
<td>Electronic Warfare</td>
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<td>GAC</td>
<td>Guizhou Aircraft Industry Corporation</td>
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<td>GAD</td>
<td>General Armaments Department</td>
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<td>GSD</td>
<td>General Staff Department</td>
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<tr>
<td>HALE</td>
<td>High-altitude, long-endurance</td>
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<td>IAI</td>
<td>Israel Aircraft Industries</td>
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<tr>
<td>ISR</td>
<td>Intelligence, surveillance, and reconnaissance</td>
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<tr>
<td>MALE</td>
<td>Medium-altitude, long-endurance</td>
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<td>MAV</td>
<td>Micro aerial vehicle</td>
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<td>MTCR</td>
<td>Missile Technology Control Regime</td>
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<td>NRIST</td>
<td>Nanjing Research Institute on Simulation Technique</td>
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<td>PLA</td>
<td>People’s Liberation Army</td>
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<td>PLAAF</td>
<td>People’s Liberation Army Air Force</td>
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<td>PLAGF</td>
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<td>PLAN</td>
<td>People’s Liberation Army Navy</td>
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<tr>
<td>R&amp;D</td>
<td>Research and development</td>
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<tr>
<td>SAC</td>
<td>Shenyang Aircraft Company</td>
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<tr>
<td>SOE</td>
<td>State-owned enterprise</td>
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<tr>
<td>SR</td>
<td>Surveillance and reconnaissance</td>
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<tr>
<td>SUAV</td>
<td>Small unmanned aerial vehicle</td>
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<tr>
<td>UAV</td>
<td>Unmanned aerial vehicle</td>
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<tr>
<td>UCAV</td>
<td>Unmanned combat aerial vehicle</td>
</tr>
<tr>
<td>VTOL</td>
<td>Vertical take-off and landing</td>
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<tr>
<td>XAC</td>
<td>Xi’an Aircraft Industrial Corporation</td>
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I. Introduction

On December 6th, 1966, the Nanjing Chang Kong-I completed its maiden flight, thus ushering in a new era of Chinese unmanned aerial vehicles (UAVs). In the nearly fifty years following, there have been major developments in UAV technology, policy, and use. As increasingly advanced drones become progressively integrated into contemporary military doctrines, it is difficult to overstate their importance in modern warfare. And nowhere are the implications of UAVs more important than in the world’s fastest rising military power, the People’s Republic of China.

Yet, reliable and relevant information on Chinese UAVs remains difficult to locate. Thus, it is the purpose of this report to provide a clear foundation on several issues related to Chinese UAVs. These include policy, precedents, intended uses, development, procurement, acquisition, capabilities, integration, implementation, and exports. While information on these topics is available, it tends to be heavily specialized or compartmentalized; as a result, there does not exist a compiled source with which to familiarize oneself with the issue in a holistic way. It should be noted that it is not the intent of this report to offer politicized commentary on unmanned aerial vehicles, Chinese policy, or current or potential international disputes.

Both emerging technologies such as UAVs and emerging military powers such as China present the opportunity for speculation. Combined, this opportunity is increased exponentially. Thus, it is of the utmost importance to distinguish actuality from potentiality, demonstrated information from postulation.
II. Policy

While there have been great strides globally to advance military UAV and associated technologies, the international community still lacks well-established norms for military UAV use. There exists a strong need for political leadership to not only manage such rapid technological growth, but also to formulate relevant policies. As China seeks to formulate such policy, it must look both toward international law and national precedents.

Chinese UAV Policy

At present, Beijing’s approach toward UAV policy remains cautious. In general, for the sake of its international reputation and foreign relations, China has a great desire to portray its rapid political, economic, and military rise as peaceful. This is a particularly daunting task given China’s position in the Asia-Pacific region, where high levels of tension give minor incidents the potential to escalate into major power conflicts. UAVs provide additional sources of instability by contributing to increasingly complex and overlapping military-technical competitions between neighboring countries, including Japan, South Korea, Vietnam, the Philippines, Indonesia, and others. Given their unmanned nature, UAVs have the potential to encourage overreach and excessive risk-taking during even noncombat intelligence, surveillance, and reconnaissance (ISR) missions. This could exacerbate ongoing disagreements, such as the Diaoyu/Senkaku Islands, Spratly Islands, and Paracel Islands disputes.

The Chinese government recognizes these possibilities. As a result, its options are limited to communications facilitation within the military, electronic warfare (EW) support through communications interception and jamming, and target identification for missiles, as well as noncombat ISR missions. Yet, flaring tempers following a Chinese drone flyover
near the Diaoyu/Senkaku Islands in September 2013 show that seemingly innocuous missions feed prominently into regional tensions.\textsuperscript{6} Within the Chinese academic community, scholars have suggested UAV use for domestic surveillance, law enforcement, and noncombat tasks near China’s borders, but few have considered use overseas, fearing international criticism. It was recently reported that China considered employing drones to strike Burmese drug trafficker Naw Kham, who was convicted for killing thirteen Chinese sailors in 2011.\textsuperscript{7} China’s ultimate decision not to employ UAVs against the Burmese drug trafficker in April 2012 may have stemmed from a fear of political reproach.\textsuperscript{8}

China is seeking to employ UAVs in line with its doctrines of modernization and informatization, which focus on updating and integrating its armed forces. However, the ultimate objectives of these policies are to allow China to deny freedom of maneuverability in the East and South China seas, often with offensive weapons,\textsuperscript{9} and to monitor these seas and the Western Pacific, beyond the Philippines, to increase operational strike capabilities.\textsuperscript{10} These represent fundamentally aggressive aims in opposition to China’s intent to depict its rise as peaceful. Thus, while current policy has been cautious, there is reason to believe that future policy may not be so restrained.

Looking forward, it appears that China will maintain relatively limited UAV operations while slowly building toward more extensive and advanced capabilities. In the short-term, in addition to domestic, law enforcement, and noncombat uses, the People’s Liberation Army (PLA) is likely to employ UAVs to play increasingly prominent roles in both maritime and boundary disputes.\textsuperscript{11} In fact, it has been reported that China plans to use UAVs to conduct consistent maritime surveillance in the East China Sea by as early as 2015.\textsuperscript{12} In the long-term, the PLA is seeking to employ UAVs to extend its operations, especially in the Western Pacific. Improved ISR capabilities through a combination of UAVs, satellites, and ships will allow the PLA to detect and track fleets at greater distances.\textsuperscript{13} In
addition to better assessing foreign military force posture, China hopes that UAVs will also allow the PLA to better employ long-range weapons systems. It remains in question how China will approach the issue of lethal and kinetic UAV strikes. Yet, given its restrictive position on state sovereignty and its desire to maintain a positive international reputation, it appears that China must, and most likely will, temper its increasingly aggressive demeanor in the Asia-Pacific region with cautious and prudent, as opposed to ad hoc, policy.

**American Precedents**

While it may appear out of place to discuss American drone policy, it is important to understand that the United States has set the majority of international precedents in regard to military UAV use. China, like other countries acquiring advanced military UAV capabilities, is intently observing and analyzing US drone policy, carefully considering what methods of UAV use will be considered legitimate and legal by international standards. The United States must attempt to be explicitly specific about criteria for UAV use because the international community is paying attention, especially China. In fact, China is paying so much attention that, in April 2012, the internet security firm AlienVault Labs reported that Chinese hackers targeted US federal agencies and contractors through infected e-mails in attempts to gain information on the Department of Defense’s UAV strategies and other intelligence.

The United States has set several major precedents for UAV use, particularly in the past decade. In addition to employing drones for command, control, communication, computers, intelligence, surveillance, target acquisition, and reconnaissance (C4ISTAR) missions, the US has employed drones for lethal strikes. In its War on Terror, the United States has used UAVs to target enemy combatants, including nonstate actors such as terrorists. In some cases, the US has carried out lethal strike operations within nations in
which it technically was not fighting a war with the country’s government. As a result, the United States has justified drone strikes in Pakistan, Yemen, and Somalia by claiming that those governments were “unwilling or unable to suppress the threat posed by the individual being targeted.”

The United States has also set precedents regarding UAV exports. The US has tightly regulated UAV proliferation, exporting them only to its closest ally, the United Kingdom, and potentially soon to France and Italy.18 Exports will be discussed in greater detail at a later point.

**Chinese Precedents: Leading or Following?**

Given the lack of international norms and the fact that the United States remains the only country to extensively employ UAVs in combat situations, China is now faced with a choice: will it follow the precedents for drone use as put forth by the United States, or will it establish its own rules and regulations for employing its newly-procured technology? The answer to this question lies partially in China’s broader strategic objectives. Unlike the United States, whose primary security concerns over the past decade have consisted of terrorists and other nonstate actors, China’s main focus, remains fixed upon regional issues against established state actors. In particular, the Chinese are focused on a potential war with Taiwan, as well as maritime and territorial disputes.19 Thus, even if China were to follow US UAV policy precedent when employing drones in these scenarios, the applicability of such norms (involving nonstate actors) to these situations (involving state actors) appears questionable. Further, issues of maritime security, combined with long-established regional precedents make these scenarios even more complex. In addition to an international vacuum of established UAV norms, there is a dearth of norms, rules, and institutions for handling regional tensions in East and Southeast Asia.20
Yet, other sources of information provide indications of China’s intentions. In general, regarding action involving state actors, Beijing has tended toward taking a restrictive position on sovereignty. In international operations ranging from humanitarian interventions in Africa to anti-piracy operations in the Gulf of Aden, China has consistently sought and respected United Nations Security Council authorization. Thus, without explicit international or at least regional permission, it is reasonable to assume that China would not employ UAVs against its sovereign neighbors for fear of appearing hypocritical. Further, China also fears setting a precedent of drone use in East Asian hotspots that the US could eventually exploit for its own strategic purposes. China understands these risks and has thus limited drone use in these areas. However, China is slowly testing the limits of both the international community and its own self-imposed restrictions. The PLA has employed drones near the Diaoyu/Senkaku Islands and the North Korean border, so use against state actors is not entirely out of the question. Additionally, just as it has employed intelligence ships near Japan and in the Indian Ocean, China may employ stealth drones abroad if the risk is considered low. At present, though, China’s increasingly aggressive force posture in the region has been balanced by a sense of caution, restraint, and awareness.

Precedents also come into play when considering China’s domestic and nonstate actor security concerns. Besides the PLA, China’s domestic security apparatus has also expressed interest in drones. Given its restrictive internal policies and high levels of domestic intelligence gathering, it seems likely that UAVs would be employed for domestic surveillance, serving as merely another tool for ongoing operations. Furthermore, it has been reported that China may eventually employ lethal strikes in both Xinjiang and Tibet. Because it considers dissidents in these areas to be terrorists, China could potentially appeal to the US precedent of combatting terrorism to justify such actions. However, again, China remains cautious, realizing that any action taken in these chronic hotspots has the potential to severely
damage international support and reputation.\textsuperscript{25} China’s consideration of using a UAV strike against Burmese drug trafficker Naw Kham in Laos also clearly indicated that China would at least contemplate future lethal strikes against nonstate actors in foreign, sovereign territories.\textsuperscript{26} Again, the nature of this case contained many parallels to US drone use, further stressing the importance of clear international norms.

While the topic will be discussed in further detail later, China also faces decisions regarding UAV export precedents. In this category, it appears that China has rejected the American model of restricted exports and instead appears more than willing to sell its new technology.\textsuperscript{27} In fact, while many fear the use of Chinese UAVs against regional powers or even the United States, it seems more likely that the larger potential international threat stems from an emerging norm of loosely-regulated proliferation and delivery of armed, unmanned systems to the developing world.\textsuperscript{28} That being said, the tangible effects of this proliferation will ultimately depend upon the ability of the importing countries to integrate UAVs into their respective militaries.

**People’s Liberation Army Ground Force Intended UAV Capabilities**

The People’s Liberation Army Ground Force (PLAGF) intends to utilize UAVs in a variety of ways. Currently, the PLAGF’s primary focus remains on preparations for a possible conflict on the Taiwan Strait or the Korean Peninsula, as well as internal security matters.\textsuperscript{29} The Chinese see high potential in employing UAVs for numerous support roles. For instance, UAVs could provide targeting support for long-range weapons systems up to distances of 2,000-3,000km.\textsuperscript{30} UAV support for long-range artillery and missile platforms would allow the PLAGF capabilities to strike targets off the coast of China with increased accuracy and precision. On the battlefield, UAV systems also provide ground forces certain
advantages. The PLAGF intends to use smaller, tactical UAVs in order to conduct battlefield reconnaissance, targeting support, and battle damage assessment.\textsuperscript{31}

**People’s Liberation Army Navy Intended UAV Capabilities**

The People’s Liberation Army Navy’s (PLAN) intended uses for UAVs are based upon a variety of short- and long-term strategic priorities. In the short-term, the PLAN is also focusing on a possible conflict with Taiwan, as well as on the enforcement of regional maritime and territorial claims in the East China Sea, South China Sea, South Pacific, and Sea of Japan. In the long-term, China is seeking to secure growing regional and global political-economic interests.\textsuperscript{32}

To address the short-term priorities, the PLAN has devised several methods of UAV employment. First, it intends to use UAVs to conduct ISR missions on ships in bordering maritime regions. Such operations will allow China the ability to detect, locate, and track high-value fixed and mobile targets.\textsuperscript{33} Second, the Chinese intend to utilize UAVs to perform communications relays in order to enable over-the-horizon targeting using long-range weapons platforms, such as missiles and artillery.\textsuperscript{34} Lastly, the PLAN is believed to be developing UAVs to hunt submarines by using dropped sonar buoys which use algorithms to calculate submarine routes.\textsuperscript{35}

In the long-term, as Chinese interests expand outwardly, the PLAN will look to employ drones in additional ways. For instance, besides using drones to provide valuable intelligence, China intends to utilize them for the positioning, security, and protection of its fleets as they move beyond regional waters to conduct operations in more remote areas of the world.\textsuperscript{36} Furthermore, as China looks toward the future, it is seeking to maximize its capabilities against the United States Navy. In order to facilitate this process, the PLAN hopes to use drones to target USN assets, jam shipborne radar and communications systems,
and pinpoint ships and precise coordinates. In addition to command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) and EW capabilities, reports have stated that the Chinese intend to develop technology which would allow them to employ swarming UAVs to attack aircraft carrier battlegroups in the Pacific, although this remains speculative.  

**People’s Liberation Army Air Force Intended UAV Capabilities**

The People’s Liberation Army Air Force (PLAAF) has planned to integrate UAVs in its ambitions to conduct increasingly distant offensive high-tech warfare. In particular, the PLAAF has expressed strong interest in high-altitude long-endurance (HALE) UAVs and unmanned combat aerial vehicles (UCAVs). Such technology would allow the PLAAF long-range reconnaissance and combat capabilities. Additionally, the PLAAF is expected to coordinate precision air and missile strikes with the Second Artillery and PLA Ground Force.

### III. Development and Acquisition

**A Brief History of Chinese Military Modernization**

The development and acquisition of Chinese UAVs is best understood within a broader historical context of Chinese military procurement and modernization. In the decades following the establishment of the People’s Republic of China in 1949, the PLA depended heavily on foreign technology via grant aid, procurement, and industrial espionage to propel modernization. During this time period, the Chinese relied primarily on Soviet technology. Yet, as the Sino-Soviet split slowly worsened relations between the two countries in the 1960s, the PLA began to look toward alternative sources. By the mid-1970s, China relied on
a combination of European, Israeli, and American technology, which lasted until US and European embargoes in the 1980s. With a growing sense of urgency, PLA officials embarked on a campaign of military self-sufficiency. China sought to achieve indigenous innovation capabilities, although it continued to rely on copying Russian technology through reverse engineering and Israeli arms sales.

However, a series of tumultuous domestic and international events provided the real catalyst for Chinese military modernization. Following the Tiananmen Square Massacre, the collapse of the Soviet Communist Party, the rapid victory of the US in the 1991 Gulf War, and the 1996 Taiwan Strait Missile Crisis, Chinese leaders began to see that modernization and self-sufficiency were not just advantageous, but indeed vitally necessary. Thus, in the mid-1990s, the PLA began to shift its emphasis from a fighting force based on a doctrine of mass mobilization to a modern force able to participate in limited wars in high-technology conditions.

**Modern Defense Spending and the Development of the Chinese Drone Industry**

In 2013, the Pentagon reported that Chinese military expenditures exceeded $145 billion (Beijing claimed it to be $119.5 billion), making it the second largest military spender in the world, behind the United States. Much of this spending was due in large part to China’s current military modernization program, which has focused on a variety of weapons systems, including drones, warships, jets, missiles, and cyber technology. This program reflects the doctrine of China’s current Five Year Plan. The 12th Five Year Plan, running from 2011-15, focuses on policies of informatization, combat effectiveness, and joint operations. Additionally, it emphasizes updated air and naval platforms, upgraded equipment, and integrated satellite command, control, communications, and intelligence (C3I) connectivity throughout the PLA.
In light of the doctrine of modernization and the policies set forth by the 12th Five Year Plan, it is quite easy to see how UAVs fit into China’s broader plans for military development. UAVs provide China increased C4ISR capabilities, while also giving it further competence in high-technology combat situations. As a result, China has promoted an ambitious plan for UAV development, paralleling growth in other programs, such as jet fighters and missiles. Despite certain technical limitations and a lack of foreign partners, which have somewhat inhibited indigenous combat drone production, the Chinese government and military have pushed to put China at the forefront of drone manufacturing, both for internal use and export. Along with this push has come a concerted effort to exploit both domestic and international technology. And, while many key systems in China’s “indigenous” equipment are still imported, the rise of new technologies is a clear step toward Chinese innovation and manufacturing of complete systems. Thus, at present, Chinese UAV development is a combination of domestic innovation and foreign acquisition.

Rapidly increasing domestic and international market demand, both civilian and military, will contribute to the growth of the UAV and UCAV market. While nearly all military drones have been sold to Chinese consumers, rising demand and a lack of export restrictions will lead to the expansion of the Chinese UAV industry and increased proliferation of military UAV technologies. In fact, market projections have predicted that, in the following decade, the Aviation Industry Corporation of China, a Chinese defense state-owned enterprise (SOE), will produce $5.76 billion worth of UAVs through 2023, making it the world’s largest manufacturer. By comparison, the second largest projected producer, America’s Northrup Grumman, is only estimated to manufacture $2.58 billion in that same period. Additionally, a report produced by the Defense Science Board cautions that Beijing’s drone push “combines unlimited resources with technological awareness that might allow China to match or even outpace US spending on unmanned systems in the future.”
Sources of Domestic Development

China’s domestic UAV industry is a complex, diverse, and expansive network of academia, the PLA, SOEs, and the private sector.\textsuperscript{57} This combination of entities represents a larger, ongoing effort within China to promote civil-military integration (CMI) in the development of new defense technologies. In terms of drone development, current research and development (R&D) primarily comes from two sources. First, there are several key R&D centers with university affiliations, including Beijing University of Aeronautics and Astronautics, Nanjing University for Aeronautics and Astronautics, and Northwest Polytechnical University’s Xi’an ASN Technology Group.\textsuperscript{58} Second, there also numerous R&D centers within the defense industry and associated with the PLA, including the Chengdu Aircraft Industry Group/Chengdu Aircraft Design Institute, Guizhou Aircraft Industry Corporation, Shenyang Aircraft Company/Shenyang Aircraft Design Institute, China Aerospace Science and Technology Corporation, and the Nanjing Research Institute on Simulation Technique.\textsuperscript{59} Further, according to both internal and external analysts, it has been reported that every major arms manufacturer in China now has a devoted drone research center.\textsuperscript{60}

Over the past decade, the PLA has developed a large, complex UAV infrastructure, including advanced military-industrial design, R&D, and production capabilities.\textsuperscript{61} China’s drive for military self-sufficiency has also encouraged competition within the country’s defense industrial base, particularly among the centers listed above.\textsuperscript{62} Thus, domestic UAV development stems from an expanding and diversifying network, spurred by increased competition.

Foreign Acquisition
Yet, despite an expansive domestic UAV infrastructure, China has historically relied on the acquisition of foreign technologies in order to drive innovation. In fact, the PLA’s first two drones were reverse engineered from Soviet and American UAVs. In the 1960s, the Chinese used the Soviet Lavochkin La-17 to develop the Chang Kong-1 target drone. Similarly, China used downed American AQM-34 Frisbee drones from Vietnam to create the Wu Zhen-5.63 And, while European and American arms embargoes of the 1980s limited UAV technological acquisition,64 China succeeded in procuring an undisclosed number of Israeli Harpy UCAVs in the 1990s.65

Currently, the Chinese government is strongly pushing an extensive campaign to gather UAV technology, including foreign technologies.66 This campaign has included a number of different methods. Reverse engineering has remained commonplace, and engineers have also turned toward studying open source material and debriefing visiting American drone experts in China.67 Yet, with the advent of new communications capabilities, cyberespionage has evolved to become one of China’s most effective forms of foreign technology acquisition. It has been reported that Chinese hackers have targeted at least twenty foreign defense contractors in an effort to obtain US drone technology. While China has adamantly denied these claims, US cybersecurity companies have tracked the hackers to a PLA building in Shanghai, confirming suspicions. Specifically, it is believed that PLA Unit 61389, also known as “Comment Crew,” was responsible for the drone theft campaign, which focused both on large military technology companies, as well as smaller boutique drone firms.68

While the methodology of obtaining new technologies from international sources has changed, current efforts represent an aggressive and ongoing campaign of foreign acquisition in order to further UAV development. For information on specific models, please refer to the data charts at the end of the report.
IV. Capabilities

Demonstrated Capabilities

As discussed earlier, the branches of the PLA have indicated numerous plans for employing UAVs into their strategic doctrines. Yet, claims of actual capabilities are often exaggerated and undependable. Gauging demonstrated capabilities of Chinese UAVs relies on a combination of information emerging from R&D centers, government releases, industry conferences, and events such as China’s biennial Zhuhai Air Show. Thus, reports can be overstated, subjective, and out of context.

At present, the PLA primarily utilizes inexpensive, short-range, tactical drones for intelligence, surveillance, and reconnaissance missions. The PLAN has also employed them for communications relay, in which forward-deployed UAVs are used to pass along information to land-, sea-, and air-based command and control units. Further, it has been reported that PLAAF is developing UAVs to fly in formations, perform aerial fueling, and execute autonomous takeoff and landings. However, these reports appear unsubstantiated.

Newly-developed UAVs have also been incorporated into a variety of non-defense missions. These include border security, maritime law enforcement, humanitarian assistance, and disaster relief. Additionally, new UAV technologies have several civilian applications, such as disaster assessment, environmental protection, and atmospheric and meteorological research. Following deadly earthquakes in 2008 and 2013 in China’s Sichuan province, drones were employed to perform remote sensing in affected areas.

Yet, overall, despite massive amounts of investment and extensive development, the demonstrated capabilities of Chinese UAVs still appear limited. While many in the Asia-Pacific region and the international community fear the possibility of China acquiring the
ability to perform precision strikes and long-duration, long-distance reconnaissance, a multitude of factors still inhibits these capabilities.

Potential Capabilities

Although current Chinese UAV capabilities are limited, the PLA appears committed to advancing drone technology and achieving tactical parity with the United States. While it will certainly take time to reach this goal, China continues to work to develop new capabilities for its UAVs based on its existing strategic and technological doctrines.

As stated above, China intends to employ drones in areas of maritime dispute in the Taiwan Strait, as well as the East and South China Seas. UAV systems deployed in these contentious areas would enable the PLA to carry out long-range precision strike missions within 3,000 km of Chinese shores, in addition to standard ISR missions. As a result, unlike US drones, which are not designed to enter contested or denied airspace, China is designing UAVs to operate in those exact conditions. However, given their relatively slow speeds and high detectability, drones are often easy targets for defense systems; further, Japan has stated that it is exploring options to shoot down drones that enter its airspace. Thus, the PLA has placed a large emphasis on advancing technologies to reduce radar detection in order to increase UAV survivability in contested areas.

Related to this goal, China appears to be rapidly developing its own model of stealth drone. In May of 2013, it was reported that China began tests of its Lijian drone, or “Sharp Sword.” If verified, this would make China the third country to test a large, unmanned stealth attack aircraft, joining an elite tier that includes only the United States and France. Such technology would place China ahead of Britain, Russia, and India, which have only stealth UAV development plans, as well as Sweden, Italy, Israel, and Iran, which have only stealth UAV study programs. Stealth combat UAV technology would also increase the
number of tools at the PLA’s disposal, including long-range C4ISR missions and precision drone strikes in foreign airspace.

In addition to traditional ISR missions, it appears likely that the PLA is seeking electronic warfare capabilities. EW capabilities would provide PLA ground units the ability to jam tactical communications and GPS systems. It would also allow the PLA to generate false targets for detection and warning systems, as well as the ability to attack power grids. In the future, China hopes to develop long-range UAVs that would be able to perform ISR and EW missions in the Pacific against high-value targets, including the United States Navy.

Lastly, it is almost certain that the PLA continues to develop lethal UAV capabilities. For instance, in the Naw Kham case, while China ultimately decided to capture the drug lord instead of performing a drone strike, the event nevertheless indicated that China has attained at least basic lethal UAV strike capabilities, even if it may still lack confidence in untested drones, systems, and operators. Additionally, China appears to be seeking to develop swarming technologies, which would use large numbers of drones to attack US aircraft carrier battle groups with a combination of electronic warfare and kinetic strikes.

**Overall Capabilities Assessment**

Overall, there appears to be large discrepancy between China’s demonstrated and intended UAV capabilities. While it has become increasingly clear that China aims to advance stealth, electronic warfare, and lethal strike capabilities, UAV employment by the PLA remains limited to ISR and communications relay missions.
V. Implementation and Integration

The limitation of Chinese UAV capabilities is related to a variety of factors that extend beyond drones themselves. Carrying out advanced UAV missions is dependent not only on development, procurement, and production, but also upon a complex network of integrated doctrines, supporting technologies, and experience.

In general, as the PLA transitions from a mass army designed to fight protracted wars of attrition to a smaller, modern, professional force focused on high-intensity local wars against high-tech adversaries, it is focused on several goals. First, to lay the foundation for advanced doctrines, China is attempting to upgrade C4ISR capabilities in order to integrate weapons, systems, and units. This includes development of both land-based telecommunications and space-based technology, as well as improved information sharing between organizations and departments. Second, China is seeking to promote a doctrine of joint warfare, one which focuses on coordination between branches, as well as electronic warfare capabilities. Lastly, China is focused on the strategies of mechanization and informatization. These include deep battle strike capabilities requiring agile and mobile units and greater airborne projection, as well as campaigns based on simultaneous action in the land, sea, air, space, and electronic spheres.

More specifically, as UAVs are integrated into the PLA, they will become increasingly reliant on an intricate support structure of communications technology, infrastructure, experience, doctrines, and associated institutions.

Communications and Support Systems

Historically, UAVs were inhibited by limits in command, control, communications, and information systems. In the 1990s, however, the introduction of high bandwidth satellite
communications and navigation, as well as computerized mission planning systems, enabled more advanced capabilities. World powers quickly sought to develop global navigation systems, including the United States’ Global Positioning System, Russia’s Glonass system, and the European Union’s Galileo network. Yet, China’s military satellite network is far less dense, severely limiting UAV operations, particularly in remote areas. Without an established satellite system, China would have to remain dependent on less advanced, land-based telecommunications systems to carry out drone missions. Thus, China has turned toward developing the Beidou (Compass) global navigation system in order to compete.

Established in 2000, the Beidou satellite system has since expanded to 16 navigation satellites over Asia and the Pacific Ocean. It is estimated that the network will provide global coverage when it includes over 30 satellites. By 2020, it is also estimated that the system will provide coverage to over 100 cities and 200 million users. More relevant, however, are reports that indicate that the Beidou satellite system has the potential to enable global Chinese UAV operations within the coming decade.

The PLA is seeking to leverage new communication networks, including the Beidou satellite network, to achieve coordination among services. This effort will link satellite systems, long-range and short-range UAVs, and precision strike weapons systems. In addition to allowing the PLA to expand the range and capabilities of UAV operations beyond less advanced forms of communications technologies, the Beidou network will also allow China to be self-reliant for UAV navigation and targeting, as opposed to controlling its drones through foreign satellite constellations.

In addition to communication systems, China has also invested in other forms of support infrastructure and technology. China is currently in the process of constructing two drone bases in order to enable surveillance missions in its coastal waters. One will be located in city of Yingkou, which will provide coverage of the Bohai Sea, and the other will be in the
city of Dalian, which will provide coverage to areas of the Yellow Sea. In the coming years, China plans on building eleven such UAV bases along the Chinese coastline, with at least one drone stationed at each base. These bases will vastly extend the range of Chinese UAV maritime surveillance. Furthermore, China is simultaneously developing a multitude of UAV support systems. These include advanced flight control systems, navigation systems, data recycling systems, launch systems, recovery systems, and power supply systems. Domestic development of these technologies will allow the Chinese to manufacture and operate completely indigenous systems. Combined with the navigational autonomy provided by the Beidou satellite system, the Chinese UAV program has the potential to become nearly entirely independent.

**Doctrines, Institutions, and Experience**

The modernization of UAV, communications, and support technologies has been complemented by a series of doctrinal, organizational, and personnel policy changes. These reforms have been implemented in order to promote informatization and mechanization, as well as joint warfare efforts.

Over the past decade, the PLA has developed an increasingly large, integrated, and complex UAV organizational infrastructure. This structure is focused on developing UAV mission requirements, in addition to developing an advanced military-industrial design, R&D, and production infrastructure. Overall, decisions in China regarding UAVs are controlled by two departments of the PLA, the General Staff Department (GSD) and the General Armament Department (GAD). The GSD’s main priority focuses on joint mission command and operational requirements for UAV-related missions. On the other hand, the GAD focuses on UAV R&D, as well as technological and industrial policy. While these two organizations serve as the overarching national authorities, decisions are also affected by the
PLA Second Artillery, Air Force, Ground Force, and Navy. As these branches have obtained a growing number of operational UAV units, they have provided input through GSD and GAD channels.102

A number of other sub-organizations control more specific aspects of UAV policy. The GSD Intelligence Department, which is increasingly reliant on airborne and space technologies, has worked to develop UAV ISR capabilities. Meanwhile, the Electronics Countermeasures and Radar Department focuses on several different priorities, including EW, reconnaissance, countermeasures, and anti-radiation capabilities. The Military Training Department works on developing strategy and operations training, with a specific focus on integrating UAVs into operational forces.103 Lastly, it is believed that different types of drones are controlled by different branches of the PLA. For instance, it is likely that the GSD and Second Artillery are in command of HALE UAVs, while the PLAAF, PLAN, and Ground Force currently oversee tactical and training UAVs.104

Yet, a large aspect of integrating UAVs into the PLA and advancing their operational capabilities has to do with experience. In this area, China is severely lacking. As stated above, China currently employs UAVs in ISR and communications relay missions, and it is focusing on advancing stealth, electronic warfare, and lethal strike capabilities. However, even if China develops these capabilities technologically and doctrinally, it does not guarantee efficient execution. For over a decade, the United States has been refining UAV capabilities and techniques through extensive campaigns in Iraq, Afghanistan, Pakistan, Yemen, Somalia, and other countries. It has taken years of operations to iron out operational complications. Thus, China will likely encounter impediments as it begins to field more advanced UAVs in increasingly complex and intricate operations.
Overall Integration and Implementation Assessment

However, while China certainly faces challenges as it seeks to integrate and implement UAVs, it appears that it is committed to addressing these issues. By simultaneously developing support systems, associated technologies, and UAVs, China is laying the proper foundation in order to achieve advanced operational capabilities in the future.

VI. Exports

Currently, the RAND Corporation estimates that 70 countries have or are developing drones, while 23 have or are developing armed drones. Because indigenous UAV design, development, and production programs are difficult and expensive to establish, there exists an increasing demand for purchasing foreign technology instead. Over the past decade, there has been tremendous growth in the international UAV market. China has expressed a clear desire to capitalize on this market to increase its defense exports. Thus, China has begun to show off dozens of models to potential foreign buyers at airshows, and within the market, it has several key advantages. These include loose export restrictions and low-cost UAVs.

Limits on Exports

As stated earlier, the most prominent drone operator in the world, the United States, maintains tight regulations on UAV exports. At present, it only exports UAVs to the United Kingdom, although it is considering further exports to both France and Italy. There are two primary institutions that regulate the exports of US UAVs. The first is the Missle Technology Control Regime (MTCR), an international partnership of 34 countries which establishes export control policies for ballistic missiles, cruise missiles, UAVs, space launch
vehicles, drones, remotely piloted vehicles, sounding rockets, and underlying components and technologies.\textsuperscript{109} The second is the Wassenaar Agreement, a multilateral export control regime.\textsuperscript{110} Further, while Israel, another chief UAV exporter, is not a member of these institutions, the United States still exerts enormous political pressure on its ally in order to limit exports. In fact, in 2005, the United States ordered Israel not to return upgraded Harpy UAV models to China, representing American fears of UAV proliferation.\textsuperscript{111} Moreover, in addition to US opposition, Israel remains hesitant to export drones to countries in the Middle East due to longstanding animosities in the region.\textsuperscript{112}

China is neither a member of the MTCR nor the Wassenaar Agreement.\textsuperscript{113} However, China did apply for MTCR membership in 2004. While China no longer sells complete missile systems, has tightened its export controls, and voluntarily pledged to follow the regime’s export control guidelines, China’s application was ultimately denied. The rejection stemmed from concerns that Chinese entities continued to provide sensitive technologies to countries developing ballistic missiles, such as North Korea.\textsuperscript{114}

Thus, China is in the unique position of having a thriving UAV industry but few export restrictions. As a result, it has begun a major push to promote both civilian and military drones as major potential exports. International demand is substantial, especially in Africa and the Middle East, where many developing countries are seeking to acquire modern military technology.\textsuperscript{115} These countries are now looking to the Chinese UAV market as a loophole around restrictive US and Israeli arms sales. Yet, even Chinese sales have some limits. China has taken several steps to ensure that its exports conform to binding international arms sale regulations. Therefore, current export versions of Chinese UAVs are controlled only by ground stations, which limit their operational range.\textsuperscript{116} Further, it would appear that China’s restrictive views on state sovereignty would prevent it from exporting UAVs to nonstate actors.
Yet, along with looser restrictions on UAV technology itself, China could also offer less restrictive access to associated communications systems. It has been reported that China’s new Beidou satellite system could potentially be opened to foreign users.\textsuperscript{117} Combined access to new UAV technology and communication systems would allow numerous countries to rapidly advance their UAV capabilities.

\textbf{Costs}

Another feature of China’s UAVs that foreign customers find appealing is their cost. China has identified a gap in the global UAV market: low-cost drones. China intends to utilize inexpensive models of drones to capture this segment. For example, two of the United States’ most prominent UAV models are the General Atomics MQ-1 Predator and MQ-9 Reaper. On average, each Predator costs around $4.5 million, and each Reaper costs around $10 million. Again, these are the costs of the models if countries are even allowed to purchase them at all.\textsuperscript{118} On the other hand, China offers a similar model, the Chengdu Aircraft Industry Group Yilong Pterodactyl-I (also known as the Wing Loong), at a cost of only $1 million.\textsuperscript{119} While certainly there are discrepancies in quality and tested capabilities, China is nevertheless able to offer advanced technology at incredibly competitive prices. Furthermore, China can also offer low-cost alternatives for associated weapons systems. For instance, many US UAVs, including the Predator and Reaper models, typically use AGM-114 Hellfire air-to-surface missiles, which cost around $110,000 per unit. Alternatively, the Chinese use HJ-10 Red Arrow missiles, which cost only $70,000 and have been exported since 2002.\textsuperscript{120} Thus, in addition to looser export restrictions, the Chinese UAV industry is capable of delivering advanced UAV and weapons technologies at low costs.
Contracts

At present, China has completed contracts to sell its latest UAV technology, the medium-altitude long-endurance (MALE) Pterodactyl-I, to four countries, and it is in ongoing negotiations with at least five others. Uzbekistan and the United Arab Emirates were the first export customers of the UAV. In April of 2014, Saudi Arabia became yet another customer when Crown Prince Salman signed a deal with PLA General Wang Guanzhong in China to purchase an unknown number of Wing Loongs. It was reported that Saudi Arabia turned to China to purchase UAVs after it was unable to procure US Predator drones. The fourth country remains unspecified.

It appears that Pakistan may follow a similar route to that of Saudi Arabia. Pakistan has long been interested in acquiring drones in order to address internal security concerns, particularly in its semi-autonomous tribal regions. However, between strict US export restrictions and political tensions with Israel, it is likely that Pakistan may be seeking Chinese-made UAVs. And, given past cooperation between China and Pakistan in jointly developing various weapons platforms, such as multirole fighter jets, it is logical that Pakistan would appeal to its partner for assistance. In November of 2013, Pakistan released two UAV models, the Burraq and Shahpar, both of which strongly resembled Chinese UAVs. Thus, in addition to official contracts for countries to purchase Chinese UAVs, it appears that proliferation may also be accelerated by technological assistance.

VII. Conclusion

Ultimately, as we continue to assess Chinese UAVs, it is essential to distinguish potential from actuality. While drones are not a new concept, UAVs remain an emerging technology. And, as it has been historically shown, emerging technologies have a tendency to
promote large amounts of speculation. China’s rapid rise has also contributed to these suppositions. Yet, crafting prudent and appropriate policy depends upon removing such speculation when performing evaluations.

China has infused massive amounts of funding into the development of indigenous UAVs, a program which has spurred a growing market within and outside of the country and promoted competition between an increasing number of R&D centers. Yet, many of China’s UAVs rely on foreign systems and components. Further, the international community has begun to denounce China’s questionable methods of foreign technological acquisition, including reverse engineering and cyberespionage. These factors limit China from reaching its full potential in domestic, indigenous UAV development and production.

In terms of capabilities, there is a large discrepancy between the intended and demonstrated capabilities of Chinese UAVs. While China is seeking to advance stealth, electronic warfare, and lethal strike capabilities, demonstrated functions have been quite limited. In actuality, it appears that capabilities remain confined to intelligence, surveillance, reconnaissance, and communications relay missions.

Regarding integration and implementation, China has the potential to develop a global UAV network through the establishment of a global satellite network, improved systems, and an integrated policymaking infrastructure. China has made great strides to advance is operational capabilities around the world. However, moving forward, China is still limited by outdated communications systems, a highly centralized command structure, and a significant lack of experience.

Given its loose export restrictions and the low costs of its systems, China has the potential to significantly increase the proliferation of UAV technology around the world. In an effort to increase its defense exports, China continues to negotiate contracts to sell UAVs and associated technologies to numerous countries. Yet, despite these facts, exported systems
remain significantly limited in capability, and the countries importing these UAVs generally lack the necessary command, control, communications, and intelligence capabilities to fully integrate them into effective service.

As for Chinese drone policy, it appears that Beijing will continue to take a cautious approach toward employing UAVs. While the PLA hopes that UAVs will begin to serve in increasingly significant roles throughout the Asia-Pacific region, numerous factors—including China’s desire to promote a peaceful image, its fear of international reproach, and strict stance on state sovereignty—prevent China from employing drones in anything but low-risk, noncombat ISR missions.

China is in a unique position. On the one hand, China’s expanding domestic UAV program is leading to the development of advancing technologies and increased capabilities. It is also poised to allow China to exploit growing domestic and international markets. Yet, Chinese UAVs remain limited by associated technologies and command systems. Additionally, a combination of cautious self-imposed restrictions and international suspicions inhibit complete employment and implementation of its drones. Thus, China clearly displays high levels of potential in regard to advancing and developing UAV systems. Whether it will be able to realize this potential, and in what capacity, however, is yet to be determined.
Figure 1: China’s Key Operational UAVs by Function\textsuperscript{126}

<table>
<thead>
<tr>
<th>Function</th>
<th>Developer/ Manufacturer</th>
<th>Designator</th>
<th>Est. Date in Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target Drones. Used for target training</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target drone, air sampling for nuclear tests</td>
<td>Nanjing University of Aeronautics and Astronautics (based on Soviet La-17)</td>
<td>Chang Kong-1</td>
<td>Late 1970s</td>
</tr>
<tr>
<td>Target drone, cruise missile simulation</td>
<td>Nanjing Research Institute on Simulation Technique/PLA General Staff Department (GSD) 60\textsuperscript{th} Institute\textsuperscript{10}</td>
<td>Tian Jian 1</td>
<td>~2005</td>
</tr>
<tr>
<td>Target drone, multipurpose</td>
<td>Northwestern Polytechnic University (precursor to Xi’an ASN Technology Group)</td>
<td>Ba-2</td>
<td>Early 1970s</td>
</tr>
<tr>
<td>Target drone, naval antiaircraft artillery</td>
<td>Xi’an ASN Technology Group</td>
<td>Ba-9</td>
<td>?</td>
</tr>
</tbody>
</table>

**MINI: Micro, Mini, and Short-Range. Ranges from handheld platforms with a range of less than 10 km to those with a range of approximately 70 km**

<table>
<thead>
<tr>
<th>MINI: Micro, Mini, and Short-Range</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro and mini models for reconnaissance</td>
<td>Beijing Wisewell Avionics Science and Technology Company</td>
<td>AW series</td>
<td>Mid-2000s</td>
</tr>
<tr>
<td>Short-range rotary wing reconnaissance, communication relay\textsuperscript{11}</td>
<td>Nanjing Research Institute on Simulation Technique/PLA GSD 60\textsuperscript{th} Institute</td>
<td>Z series, (I-Z, Z2, Z-3, Z-5)</td>
<td>Early 2000s</td>
</tr>
<tr>
<td>Short- and medium range reconnaissance</td>
<td>Nanjing Research Institute on Simulation Technique/PLA GSD 60\textsuperscript{th} Institute</td>
<td>W/PW series (W-30, W-50, PW-1, PW-2)</td>
<td>?</td>
</tr>
</tbody>
</table>

**TACTICAL: Medium-Range. Approximate max range 150 km-200 km**

<table>
<thead>
<tr>
<th>TACTICAL: Medium-Range</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium-range, real-time reconnaissance</td>
<td>Xi’an ASN Technology Group</td>
<td>ASN 104/105</td>
<td>Late 1980s</td>
</tr>
<tr>
<td>Medium-range multirole</td>
<td>Xi’an ASN Technology Group</td>
<td>ASN 206</td>
<td>Mid-1990s</td>
</tr>
<tr>
<td>Medium-range endurance multirole</td>
<td>Xi’an ASN Technology Group</td>
<td>ASN 207</td>
<td>Early 2000s</td>
</tr>
<tr>
<td>Medium-range, naval use</td>
<td>Xi’an ASN Technology Group</td>
<td>ASN 209</td>
<td>~2011</td>
</tr>
</tbody>
</table>

**TACTICAL: Medium-Range, antiradiation. Targets ground-based radar, approximate max range 500 km**

<table>
<thead>
<tr>
<th>TACTICAL: Medium-Range, antiradiation</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Antiradiation destruction of ground-based radar</td>
<td>Israel-exported: Israel Aerospace Industries</td>
<td>Harpy</td>
<td>Early 2000s</td>
</tr>
</tbody>
</table>

**STRATEGIC: Low-altitude deep penetration. Max range 2500 km, max endurance 3 hours for reconnaissance missions**

| STRATEGIC: Low-altitude deep penetration                                 | Beijing University of Aeronautics and Astronautics (based on U.S. Firebee)             | WZ-5       | ~1981                |

**STRATEGIC: Medium-altitude long-endurance. Reported max range 2400, max endurance 40 hours for reconnaissance and other missions**

| STRATEGIC: Medium-altitude long-endurance                               | Beijing University of Aeronautics and Astronautics                                      | BZK-005    | Mid- to late 2000s   |
Figure 2: Fielded Chinese UAVs

<table>
<thead>
<tr>
<th>Designator</th>
<th>Designer/Manufacturer</th>
<th>UAV Type</th>
<th>Est. Date in Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>BZK-005</td>
<td>Beijing University of Aeronautics and Astronautics</td>
<td>MALE</td>
<td>2009</td>
</tr>
<tr>
<td>Ptreodactyl-Loong</td>
<td>AVIC</td>
<td>MALE</td>
<td>2008</td>
</tr>
<tr>
<td>I/Yilong/Wing</td>
<td>Xian ASN Technology</td>
<td>MALE</td>
<td>2008</td>
</tr>
<tr>
<td>W-30/W-50 Series</td>
<td>CASIC</td>
<td>MALE</td>
<td>2005</td>
</tr>
<tr>
<td>ASN-206/7</td>
<td>Xian ASN Technology</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>RMAX</td>
<td>Yamaha Motor Company</td>
<td>?</td>
<td>2001</td>
</tr>
<tr>
<td>ASN-15</td>
<td>Xian ASN Technology</td>
<td>Hand-launched</td>
<td>2000</td>
</tr>
<tr>
<td>ASN-104/5B</td>
<td>Xian ASN Technology</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>ASN-209</td>
<td>Xian ASN Technology</td>
<td>Communications Relay</td>
<td>2011</td>
</tr>
<tr>
<td>Harpy</td>
<td>IAI</td>
<td>UCAV</td>
<td>1994</td>
</tr>
<tr>
<td>WJ-600</td>
<td>CASIC</td>
<td>MALE</td>
<td>?</td>
</tr>
</tbody>
</table>
### Chinese UAVs in Trial and Development

<table>
<thead>
<tr>
<th>Designator</th>
<th>Designer/Manufacturer</th>
<th>UAV Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH-3</td>
<td>CASIC</td>
<td>MALE</td>
</tr>
<tr>
<td><strong>Long Haul Eagle</strong></td>
<td>AVIC</td>
<td>Global Hawk class</td>
</tr>
<tr>
<td><strong>Soaring Dragon</strong></td>
<td>Xianglong</td>
<td>Global Hawk class</td>
</tr>
<tr>
<td><strong>ASN-213</strong></td>
<td>Xian ASN Technology</td>
<td>Micro Air Vehicle (MAV)</td>
</tr>
<tr>
<td><strong>Night Eagle</strong></td>
<td>AVIC</td>
<td>Hand-launched</td>
</tr>
<tr>
<td><strong>Whirlwind Scout</strong></td>
<td>AVIC</td>
<td>VTOL</td>
</tr>
<tr>
<td><strong>U8E</strong></td>
<td>AVIC</td>
<td>VTOL</td>
</tr>
<tr>
<td><strong>SL-200</strong></td>
<td>CASC</td>
<td>Stealth HALE UCAV</td>
</tr>
<tr>
<td><strong>CH-802</strong></td>
<td>Poly Technologies, Inc.</td>
<td>Hand-launched</td>
</tr>
<tr>
<td><strong>V750</strong></td>
<td>Qingdao Haili Helicopter Manufacturing Co.</td>
<td></td>
</tr>
<tr>
<td><strong>Tian Yi-3</strong></td>
<td>LOEC</td>
<td>High-speed HALE</td>
</tr>
<tr>
<td><strong>Warrior Eagle</strong></td>
<td>AVIC</td>
<td>?</td>
</tr>
<tr>
<td><strong>Soarhawk</strong></td>
<td>Sunward</td>
<td>?</td>
</tr>
<tr>
<td><strong>DUF-2</strong></td>
<td>BUAA</td>
<td>Hand-launched SUAV</td>
</tr>
<tr>
<td><strong>Anjian/Darksword</strong></td>
<td>Shenyang Aircraft Co.</td>
<td>UCAV</td>
</tr>
<tr>
<td><strong>BL-60</strong></td>
<td>BE</td>
<td>Rotary design</td>
</tr>
<tr>
<td><strong>SVU200</strong></td>
<td>Sunward Tech Star-Lite</td>
<td>Rotary design</td>
</tr>
<tr>
<td><strong>Daofeng/Blade SF-460</strong></td>
<td>CASIC</td>
<td>?</td>
</tr>
<tr>
<td><strong>Daofeng 300</strong></td>
<td>CASIC</td>
<td>?</td>
</tr>
<tr>
<td><strong>Blue Eagle 200W</strong></td>
<td>Keyuan</td>
<td>MALE</td>
</tr>
<tr>
<td><strong>T-120</strong></td>
<td>Hubei Taihang Xinghe Aircraft Manufacturing</td>
<td>Reconnaissance UAV</td>
</tr>
<tr>
<td><strong>T-100</strong></td>
<td>Hubei Taihang Xinghe Aircraft Manufacturing</td>
<td>SUAV</td>
</tr>
<tr>
<td><strong>TF-1C</strong></td>
<td>Shenyang Aerospace</td>
<td>?</td>
</tr>
<tr>
<td><strong>TF-5</strong></td>
<td>Shenyang Aerospace</td>
<td>SUAV</td>
</tr>
<tr>
<td><strong>Z-5</strong></td>
<td>PLA Research Institute</td>
<td>Rotary Design</td>
</tr>
</tbody>
</table>
Figure 4: Chinese UAVs in PLA Army Service

<table>
<thead>
<tr>
<th>Type</th>
<th>Manufacturer</th>
<th>Role</th>
<th>Delivery Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night Eagle</td>
<td>AVIC</td>
<td>ISR</td>
<td>?</td>
</tr>
<tr>
<td>ASN-207</td>
<td>Xian</td>
<td>SR</td>
<td>?</td>
</tr>
<tr>
<td>ASN-15</td>
<td>Xian</td>
<td>SR/Trainer</td>
<td>?</td>
</tr>
<tr>
<td>ASN-206</td>
<td>Xian</td>
<td>SR</td>
<td>1996</td>
</tr>
<tr>
<td>D-4 RD</td>
<td>Xian</td>
<td>SR</td>
<td>?</td>
</tr>
<tr>
<td>D-4 RD</td>
<td>Xian</td>
<td>SR</td>
<td>?</td>
</tr>
<tr>
<td>D-4 RD</td>
<td>Xian</td>
<td>SR</td>
<td>?</td>
</tr>
<tr>
<td>LT series</td>
<td>CASIC</td>
<td>SR</td>
<td>2002</td>
</tr>
</tbody>
</table>

Figure 5: Chinese UAVs in PLA Navy Service

<table>
<thead>
<tr>
<th>Type</th>
<th>Manufacturer</th>
<th>Role</th>
<th>Delivery Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASN-9/Ba-9</td>
<td>XAC</td>
<td>Target drone, naval anti-aircraft artillery</td>
<td>?</td>
</tr>
<tr>
<td>BZK-005/Soaring</td>
<td>BUAA</td>
<td>Medium-range, endurance, Multirole</td>
<td>2005-2008</td>
</tr>
<tr>
<td>Dragon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BZK-007/Sunshine</td>
<td>BUAA</td>
<td>Medium-range endurance, Multirole</td>
<td>?</td>
</tr>
<tr>
<td>Chang Hong/WZ-5</td>
<td>BUAA</td>
<td>High-altitude air-launched multipurpose</td>
<td>1981</td>
</tr>
<tr>
<td>ASN-206</td>
<td>XAC</td>
<td>Short-range Multirole</td>
<td>Mid-1990s</td>
</tr>
<tr>
<td>ASN-207</td>
<td>XAC</td>
<td>Medium-range endurance, Multirole</td>
<td>Early 2000s</td>
</tr>
<tr>
<td>ASN-209/Silver Eagle</td>
<td>XAC</td>
<td>Medium-range Tactical</td>
<td>2011</td>
</tr>
<tr>
<td>Type</td>
<td>Manufacturer</td>
<td>Role</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>Warrior Eagle</td>
<td>SAC</td>
<td>Light attack</td>
<td></td>
</tr>
<tr>
<td>Anjian/Hidden Sword</td>
<td>SAC</td>
<td>Light attack</td>
<td></td>
</tr>
<tr>
<td>WJ-600</td>
<td>CASIC</td>
<td>ISR/Attack</td>
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<td>Chang Hong/Long Rainbow</td>
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