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I am honored to have been asked to participate in today's public hearing of the Commission. This will be my third appearance before this distinguished panel and I always approach these events with some trepidation because of the expertise of panel members such as Dr. Larry Wortzel, who continues to serve as a de facto but important teacher as I continue to try to learn about Chinese national security capabilities and infrastructure. I also want to note some difficulties in assessing China's military equipment, budget, infrastructure, and capabilities. Those American observers who profess to know with certainty China's military capabilities and intentions should be viewed with skepticism. Among the difficulties facing analysts of the PLA are, first, the difficulties posed by language; those of us without fluency in Chinese are forced to rely on translations and this can lead to different interpretations. Another factor we must bear in mind is the dynamic nature of Beijing's military modernization efforts; it is a moving target. Finally, we face the secretiveness that is the goal of the People's Liberation Army (PLA), a secretiveness that also evidences itself internally: several years ago I asked the Shanghai Naval Garrison Commander how many surface combatants were then operated by the PLA Navy, or PLAN. He professed not to know the exact number, and indeed he may not have known. Even today, I can name several sources of information about relatively simple issues concerning the PLAN, how many submarine squadrons that navy includes, for instance, and find several different answers. But these are questions that we must continue to pursue, for they are important elements in our attempts to try to gain an understanding of Chinese military capabilities and intentions.

*Introduction*

China has designed, built, and deployed navies during several periods of its long history. Historians are familiar with the maritime prowess of the Yuan and especially the Ming Dynasties, for instance. The latter regime in the early 15$^{th}$ century dispatched the Muslim Admiral Zheng He on a series of far-ranging voyages that reached at least to the east coast of Africa and the Persian Gulf. These navies typically were allowed to deteriorate into ineffectiveness following their accomplishment of specific national missions.

During approximately the past decade and a half, China has again been deploying a modern, capable navy. The People's Liberation Army Navy, or PLAN, of the 21$^{st}$ century appears to be of a different character than its predecessors.

First, the navy China is currently expanding and modernizing is, in the near term, almost certainly being designed to deter, intimidate, and if necessary attack Taiwan. But almost certainly, contrary to what happened during past dynasties, China is not going to decommission the PLAN once the Taiwan issue is resolved. Hence, the assessment process for the new Chinese navy currently under development must deal with at least two strategic levels of analysis. The first of these is the capabilities, strategy, operational intent, and tactics envisioned for a Taiwan scenario. The second may best be framed as "what after Taiwan for the PLAN"? In other words, THIS navy represents something of a break with traditional Chinese military developments.

Second, Beijing is drawing on both indigenous and foreign sources of material, technology, and expertise as it attempts to build a combat-effective navy for the new century. Late 19th century China drew on foreign sources during naval modernization efforts, but today's effort appears far more coherent and carefully planned. And while China is expanding domestic shipbuilding facilities and weapons systems development capabilities, it is also buying expensive components, systems, and complete combatant platforms from foreign suppliers.

Assessing this second factor is the subject to which I hope I may contribute today, in particular by responding to the five questions posed to me before today's hearing.

The first of these is "what quantity and quality of equipment and technical support is China receiving from foreign nations"? Obtaining military equipment from foreign sources is not new for Beijing, as indicated above. This has taken several forms since 1950, including outright purchase, covert purchase through front organizations or third party nations, and theft via espionage. Technical expertise has been similarly obtained, including through national level agreements, corporate cooperation, and probably individual contracts. Beijing has continued all of these routes into the 21st century. Historically, military equipment and expertise has been obtained from a range of countries, including the Soviet Union, Cold War-era Warsaw Pact states, the United States, Israel, and various Western European nations. Detecting and analyzing such transfers of equipment and technical expertise is much more difficult today than it was in previous decades, due primarily to the increasing dual-use character of the elements of science, technology, and engineering that contribute to both civilian and military systems. The universality of computer technology is perhaps the best such example. And even when a technological advance or piece of equipment is suspected or known to have military applications, its legitimate civilian design and intended use complicates controlling its transfer, with post-transfer usage even more difficult to track.

Today, China is obtaining the vast majority of its foreign purchases of military equipment from Russia, with former Soviet states such as Ukraine providing specific, important systems. The latter has been the source of China's acquisition of the Soviet-designed *Shkval* torpedo, a system originally intended as an anti-aircraft carrier weapon armed with a nuclear warhead and designed to take advantage of the principle of hypercavitation to travel at very high (~200 knot) speeds. I suspect the Chinese have bought the *Shkvals*

not to employ them in their original design, but rather to reverse engineer their most advanced technological features for newer, more capable weapons. Ukraine has also provided China with gas turbine engines for its newest warships.

Beijing continues to obtain many state-of-the-art weapons and sensor systems from Moscow. I will not attempt to present a complete list of these equipments, which increasingly form the core of the PLA Navy and Air Force, but note first the Su-27 and Su-30 tactical aircraft, and the advanced sensor and weapons systems with which they are equipped and armed. Russia also supplies the Chinese Navy with its most advanced, capable helicopter, the Ka-family of shipboard, multi-mission helicopters. The Chinese Navy has acquired four *Sovremenny*-class destroyers armed with the world's most capable anti-surface ship cruise missiles, the SS-N-22 ("Sunburn") and follow-on missiles, the SS-N-26 ("Yakhont") and SS-N-27 ("Club") series. Russia also provides the anti-air warfare weapons and sensors with which China is equipping its newest warships.
Furthermore, Beijing continues to consider purchase of long-range, nuclear weapons-capable strategic bombers from Moscow; the Tu-160 ("Blackjack") and Tu-22 ("Backfire") aircraft are sometimes mentioned in press reports. Additionally, China has acquired more than two dozen of the Russian-produced Il-76 family of airframes, aircraft used for transport, aerial tanker, and "AWACS" missions.

I think that the most effective military capabilities being acquired by China—especially given the inherently maritime nature of the East Asian region—is its already capable and growing submarine force. China's current inventory of attack submarines includes dozens of old, conventionally powered Romeo-class submarines, based on a Soviet design. These boats are reaching the end of their useful life, but are being replaced with far more capable submarines, both conventionally and nuclear powered. China has acquired a dozen *Kilo*-class submarines from Russia, and there is no announced end to that supply line. The *Kilo* is one of the world's most capable attack boats, especially when armed with the anti-ship cruise missiles noted above. China also has underway a program to build a number of nuclear powered attack boats and ballistic missile armed submarines. These are almost certainly being built with extensive participation by Russian engineers and technicians, taking advantage of Russian-designed maritime nuclear reactors for propulsion.

Israel apparently has also continued to supply some equipment, with the recent "Harpy" incident fresh in mind. The J-10 fighter currently under production in China also appears to draw on Israeli "Lavi" technology, which in turn appears to draw on the U.S. F-16 fighter aircraft.

Some of China's guided missile frigates are powered by German-designed diesel engines, but these may be the product of diesel manufacturing plants built as joint ventures before the imposition of sanctions following the 1989 Tiananmen Square massacre. This demonstrates the nature of dual nature technology. There have also been reports of China equipping its new indigenously-produced family of *Song*-class submarines with French sonars; more likely is the use of French technology and perhaps engineering methods in

producing these systems. And this illustrates the complexity of technology transfer, which does not necessarily involve the acquisition of complete, recognizable systems. The 1990s generation of Chinese warships are equipped with many systems of foreign design, including Italian-designed torpedo tube systems firing American torpedoes, French anti-air warfare systems, tactical command systems, and helicopter designs, American electronic warfare/decoy systems, and two are powered by U.S.-supplied gas turbine engines (provided before the 1989 sanctions). And Great Britain continues to provide jet aircraft engines to the PLA Air Force.

The second question posed by the Commission is "which foreign nations provide weapons systems and other military support to China, what is the level of assistance being provided, and how successful has China been in integrating the new weapons into its forces"? These points are addressed in part above, but I want to make a few remarks on the most important point in this question: "how successful has China been in integrating the new weapons"? As a former naval officer who served on surface combatants and aircraft carriers, I think that the issue of integration is the key point in assessing PLAN capabilities. A colleague of mine, retired Rear Admiral Eric McVadon, made the point several years ago that one of China's newer warships, the *Luhu*-class, incorporated approximately three dozen systems of foreign origin. Operating a ship with this complexity poses very difficult supply, maintenance, and training challenges, as I have heard first-hand from China's naval officers. But the PLAN has been successfully operating these ships for many years. I assume then, that while integrating diverse systems onboard a single ship remains a significant challenge for China's navy, it is one that is being met.

At the next level of operations, between and among different surface ships, submarines, and aircraft, indeed between the different military services, integration remains the most difficult challenge for China's military as it does for any operational force. Here, China is also making progress, as evidenced in open-source reports of naval and air exercises, but remains far behind the integrative operational capability of U.S. and allied military forces. But the challenge is recognized by Beijing and strong efforts are being made to attain the level of operational synergy resulting from thorough integration of air and naval systems and platforms.

Third is the question "are EU members adhering to post-Tiananmen moratorium criteria? and "what assistance is China receiving from EU and NATO partners"? Although information is offered above about systems and technology apparently originating in Great Britain, France, Germany, Italy, and other U.S. allies—and the United States itself—I have no reason to doubt that the EU and NATO governments themselves are not adhering to post-Tiananmen moratorium criteria. But the insidious character of dual-purpose technology and the primacy of the profit motive at the commercial level leads me to perhaps cynically assume that indeed technological and scientific knowledge is indeed being transferred to China. Such transfer may come through impossible to halt scholarly and scientific exchanges or through more nefarious commercial exchanges.

The fourth question the Commission posed is "what countries are providing Mil-Tech Cooperation to Chinese defense industrial plants and research institutions? and "what is the level of that support and what are the ramifications"? Here, I possess no factual information, but assume that Russian engineers and technicians are playing a strong role in the Chinese construction of the Type-093 and Type-094 nuclear powered submarines currently underway. The first of these is an attack submarine bearing a strong resemblance to the Soviet "Victor III"-class submarines. I further assume that while China is educating and training an increasing number of engineers and scientists—both in domestic and foreign institutions of higher education (especially American institutions)—it has had available a number of former Soviet Union personnel seeking employment.

Finally, and most significant is the question of "why is it essential that the EU Moratorium and U.S. export controls remain in place"? There is no doubt that Beijing is well into a decade's long process of modernizing its military capabilities. This will include increasing the overall number of air and naval platforms, but will focus more on improved combat effectiveness by deploying state-of-the-art systems across the spectrum of warfare mission areas. I also think that China is proceeding along this path at a measured pace, and has not launched "crash" programs and has not set its goal as matching the United States or any other nation, per se, as a military competitor. Rather, I think that Beijing is focusing its military ambitions on specific scenarios; the most immediate of these would involve the use of military force against Taiwan, of course, but I also think that Beijing is beginning to focus on scenarios in a post-Taiwan issue world. In other words, China is not building a military either just for a Taiwan scenario or for a global challenge to the United States.

China's military modernization efforts—and obviously I am best qualified to address naval improvements—are benefiting increasingly from that nations' improving military-industrial complex, drawing on the scientific, technological, and engineering advancements that are part and parcel of China's expanding, improving economy. But despite the increasing personnel and economic resources available to China's military modernization efforts, Beijing would still benefit from a lifting of the EU Moratorium and U.S. export controls. These controls do not preclude the transfer of significant knowledge, procedures, and equipment to China, but they do serve as a check on the transfer of complete systems and significant components.