ACQUISITION IN A GLOBAL TECHNOLOGY ENVIRONMENT

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The Problem

Governments and defense firms of other countries are experimenting with different approaches to acquiring defense technological capabilities. These strategies collapse timelines of worldwide defense acquisition and accelerate technical innovation. This, in turn, will challenge the Department of Defense to maintain U.S. leadership in critical technical areas in the next ten to fifteen years.

Introduction

Other nations have changed their approach to defense acquisition over the past two decades. During the cold war, nations had basically two choices: 1) "go-it-alone" and rely almost exclusively on domestic defense research, development, test, and evaluation (RDT&E) assets and their industrial base or 2) purchase finished systems from third parties—the performance of which was usually optimized to meet the military requirements of the supplier, not the importing customer.

Globalization of the international arms market has changed that paradigm. Nations now have a good bit of flexibility and many more options for meeting their defense technology requirements. These options ensure the end products more closely meet the buyer nations' operational requirements and (in some cases) allow the nations' entry into areas previously denied them because of cost, technical difficulty, lack of infrastructure, and/or export restraints by developers. Today, defense acquisition is, indeed, a "brave new world" for most countries.

Today's global defense industry mirrors the commercial sector. It is becoming highly competitive, more customer-oriented, more responsive to market demand, and more cost conscious. There is now a greater degree of civil-military integration in many countries. Consequently, defense planners in some nations, such as China, now specifically advocate "spinning-on" commercial/dual-use technologies for military applications, increasing the chances of asymmetric technology applications. Market pressures and fierce commercial competition among defense firms for exports also serve as forcing functions in speeding products from research and development (R&D) to serial production, increasing the overall pace of global defense technological innovation. This also facilitates the distribution of military operational capabilities (e.g., stealth, night vision, networked systems) to a wider and more diverse set of nations and non-state actors than ever before.

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Alternative Acquisition Strategies

Defense acquisition in the cold war basically followed either of two paths: self-reliance on domestic resources and infrastructure or purchasing one-size-fits-all systems from other nations. In a few cases, a nation (e.g., India) would selectively employ both approaches simultaneously depending on the nature of the capability required. While some nations still follow these traditional models, others are pursuing different acquisition strategies and even following more than one of these strategies at the same time.

Concentrate on Core Competencies, Out Source the Rest (Russia)

To increase the export potential of "big-ticket" military product lines, the Russian defense industry has reached out, especially to France, for military technical cooperation at the component level in areas where Russian industry is weak. For example, the France-based manufacturer, Thales Optronics, supplies the Catherine-FC thermal imager for Russian T-90S tanks, as well as helmet and sighting system for MiG-29 fighters sold to India ("The Cooperation of Russia and France in Industrial Defense Can Significantly Increase the Export Potential of Two Countries (the Visit of Anatoly Serdyukov, in Paris)" 2010). Russia is also seeking military technical cooperation with Armenia, Kyrgyzstan, Belarus, and other former Soviet republics to replace suppliers lost in the breakup of the Soviet Union, in lieu of developing those capabilities afresh in Russia.

Privatization of the Acquisition Process (United Kingdom)

Privatizing is closely related to the previous approach in that it, too, seeks to employ outsourcing, this time turning public functions over to the private sector on a contract basis in hopes of reducing costs and increasing the efficiency of the acquisition process. In 2009, then Chief of Defence Materiel Bernard Gray proposed a radical change to the British Ministry of Defence's (MOD) basic approach to acquisition: i.e., "letting the private sector run Defense Equipment and Support" (RUSI Acquisition Focus Group 2012). Gray's proposal envisioned replacing the government employee staffed Defence Equipment and Support (organization), which is responsible for buying and supporting all army, navy and air force equipment and services, with a government-owned, contractor-operated (GOCO) entity.

Considering implementing the idea, the British MOD did what it called "soft market testing" in the summer of 2012 and attracted foreign as well as domestic bidders (RUSI Acquisition Focus Group 2012). In 2013, the MOD chose not to proceed with the proposed GOCO approach, leaving many questions connected with this acquisition management strategy unresolved: For what period would the company be appointed? Would the GOCO be responsible for making decisions or just giving advice? Would the company have the legal status of principal or just be an agent of the MOD? How would the company handle American foreign military sales (FMS) transactions or participate in

international programs? What financial risks would the GOCO be asked to take? How would the private company make money and the MOD save money at the same time (RUSI Acquisition Focus Group 2012)?

Crawl, Walk, Run (People's Republic of China and India)

The upgrading and modernization of the People's Liberation Army of China have been accomplished using what might be called a "crawl, walk, run" approach over the last two decades. The first (crawl) phase entailed buying finished weapons systems off the shelf and acquiring licenses to manufacture some of those products domestically. For example, China initially purchased Su-27 fighters from Russia in 1992 and then ordered a second batch in 1993. Three years later, China acquired the rights to manufacture Su-27SK variants. Under that agreement, Russia would supply the aircraft in kit form for final assembly in China, as well as the avionics suite and AL-31F turbofan engines. In-country production was sometimes facilitated by foreign vendors sending specialists to China to help get the initial licensed production process started ("Su-27SK/UBK Air Superiority Fighter Aircraft" 2008).

The second (walk) phase featured hybrid systems that consisted of foreign systems (or derivatives of foreign systems) to which sub-systems developed and produced in the People's Republic of China were added. The Chinese were aided in the indigenizing process by the ability to purchase Russian engineering and design know-how on a contract basis. An example of this approach is the Type 052C (Lyuang II class) destroyer, which was a Chinese-built hull filled with a mixture of Russian, French, and Chinese systems ("Type 052C (Luyang-II Class) Missile Destroyer" 2009). Indigenous systems included a four-array, multi-function, phased array radar, HQ-9 air defense missile system, and YJ-8 series anti-ship cruise missiles. The ship's 100mm main gun was a Chinese derivative of the French Creusot-Loire T100C design, and the command and control system was derived from the French Thomson-CSF TAVITAC. The Type 052C also carried Russian-made fire-control radar for the anti-ship missiles and main gun, as well as a Russian Ka-28 ASW helicopter.

The third (run) phase is characterized by products of indigenous design and production. Examples of run phase products include the Chinese J-10 fourth generation fighter (see Figure 1) (currently using Russian engines while problems with Chinese aircraft engines are being worked out) and J-20 fifth generation fighter as well as Type 99 main battle tanks.

India is trying to pursue the crawl, walk, run phases simultaneously, with heaviest emphasis on the crawl

Figure 1. Cutaway Model of J-10 Fighter Displayed at AirShow China 2012

phase at present. Sixty-five years after its independence, India still imports as much as 70 percent of its weapons and defense equipment ("Dependence on Defense Imports Risky for India, Say Experts" 2012). In a few cases, like T-90S tanks and Su-30MKI aircraft, these foreign products are assembled from kits in India. This situation persists despite decades-long Indian government investments at 50 state-owned defense R&D laboratories and 40 defense plants to create indigenous defense systems.

These domestic facilities are, however, engaged in some walk projects that differ from the Chinese walk approach in that they start with Indian-designed basic platforms that rely extensively on foreign components for key operational capabilities. Hindustan Aeronautics Limited's Dhruv attack helicopter, for example, was designed in India, but also includes major foreign content: hydraulic systems from the United Kingdom (UK), avionics from Israel and the United States, self-protection equipment from Sweden and South Africa, engines from France, flight controls from Germany, and a braking system from Italy. The ratio of Indian to foreign content in walk projects is often quite small. For example, the Dhruv attack helicopter has only 10 percent and the light combat aircraft has only 30 percent Indian content (Purushottam 2011).

India has also pursued some run-type projects: Agni and Prithvi ballistic missiles, space launch/satellites and counter-space equipment, and ballistic missile defenses. Generally, these were technologies that were not available for import. The Indian defense research base has also worked on a host of projects, such as the Akash medium-range surface-to-air missile, Arjun tank, and Nag anti-tank guided missile (ATGM), all of which were designed to compete with foreign suppliers for the same Indian military requirements. They failed for a variety of reasons including cost, performance, and extended developmental timelines.

Indian political and military leaders recognize that, according to Air Marshal J. Chandra, air officer commanding-in-chief (Maintenance Command), "strategic self-reliance is a key result area for defense sector in the years to come" ("Dependence on Defense Imports Risky for India, Say Experts" 2012). Indeed, there is a "made-in-India" policy initiative that seeks to reverse the current 70/30 ratio of imports to indigenous production. Such a policy has been tried before and failed.

China and India offer contrasting cases. China approached the crawl, walk, run strategy as essentially a sequential process while India attempted to implement a process where all three phases were undertaken simultaneously. The Chinese approach appears to have succeeded while the Indian approach has not yet produced similar results.

Fellow Travelers (Russia and India, European Union)

Countries no longer need to "go it alone" when developing military systems because of the proliferation of multi-national joint ventures. Multi-national consortiums can sometimes afford projects and combine

technological skills to develop and field military systems beyond the financial and technical capabilities of any one of its members. For example, the Defense Research and Development Organization of India and Russia's NPO Mashinostroeyenia formed a joint venture called BrahMos Aerospace Ltd. to market supersonic BRAHMOS anti-ship and land attack cruise missiles (see Figure 2). Collaboration made it possible to share the technological assets of both countries, with India providing inertial navigation systems, mission software, and mobile launcher technology, and the Russians supplying ramjet technology and cruise missile airframes. The Indian side brought significant financial support as well. Subsequently, BrahMos Aerospace Ltd. announced a second project to co-develop a hypersonic cruise missile called BRAHMOS II.

Airbus is another example of this approach. Unable to sustain economically viable standalone national aerospace industrial bases, BAE Systems and EADS formed a consortium of aerospace manufacturers. The consortium makes a wide variety of civil and military aircraft at sixteen sites in four European countries. Military products include the A400M military transport, A330 MRTT (multi-role tanker transport), C212 light tactical transport, the multi-role CN235 tactical airlifter, and C295 tactical airlifter, a stretched version of the CN235.

Figure 2. BRAHMOS Inclined Launcher at Defense Service Asia 2012

The Eurofighter/Typhoon consortium is a third instance. In 1986, companies from Germany, Italy, Spain, and the UK pooled their resources to build a next generation fighter—a project no single European country could afford. A similar approach was used to develop the engines and radar. Eurojet Turbo GmbH was set up by Avio (Italy), ITP (Spain), MTU Aero Engines (Germany), and Rolls-Royce (UK) to develop the EJ200 engine for the new fighter aircraft. Likewise, the Euroradar consortium brought together EADS Defense Electronics (Germany), SELEX Galileo (UK and Italy), and INDRA (Spain) to design, develop, and produce the advanced Captor radar ("Eurofighter Jagdflugzeug GmbH" 2013).

Joint Ventures Plus Contracts That Result in Transfer of Skills and Technology (United Arab Emirates, Indonesia, and India)

This approach usually involves a technologically advanced, but funds-limited, company pairing with a technologically limited, but ambitious, partner with ample funds. The resultant "marriage" provides

the original developer with sufficient funds to bring a project to completion and the technologically ambitious partner with access to advanced technologies and know-how.

The United Arab Emirates (UAE) is making a major effort to build domestic defense manufacturing capabilities to diversify its economy as well as to reduce its dependence on military imports with too many strings attached. Thus the UAE is establishing a small defense industry located primarily in a city between Dubai and Abu Dhabi. Interest extends to maintenance and repair of defense systems as well. The UAE is using a strategy that combines joint ventures with foreign firms and defense procurement contracts that commit foreign companies to transferring technology and skills to the UAE. The Multiple Cradle Launcher (displayed for the first time at IDEX 2013) is an example of this process (see Figure 3). The Multiple Cradle Launcher was designed with the help of a Serbian contractor and then assembled and integrated in the Emirates. In another case, the UAE supplied money for Russia's KBP Instrument Design Bureau to finish final development of the

Figure 3. Multiple Cradle Launchers at International Defense Equipment Exposition (IDEX) 2013

Pantsir-S1 (SA-22 Greyhound) surface-to-air missile in exchange for regional marketing rights (see Figure 4). Emirates Advanced Research and Technology Holding (EARTH) and Yugoimport also

Figure 4. Pantsir Air Defense Missiles-Gun Complex at IDEX 2011

signed an initial agreement at IDEX 2013 to jointly develop the fiber-optic guided Advanced Light Attack System (ALAS-C) missile intended for coastal defense, anti-ship, and land attack roles. According to the deputy director of Yugoimport, "This is a big investment that will significantly speed up the current process and new technological capabilities in the field of sophisticated missile technology, and the development of sensors for missile guidance and control" ("Serbia UAE Firms to Develop Missile" 2013).

Indonesia, to gain access to advanced technology, signed an agreement with South Korea in August 2012 to participate in an R&D program to produce an advanced multi-role combat aircraft by 2020. In return for paying up to 20 percent of development program costs, 30 scientists and engineers from Indonesia's state-owned R&D agency and aviation company, PT Dirgantara Indonesia (PTDI), would be permitted to participate (Hardy and Grevatt 2013). These Indonesian engineers

would go to South Korea's Aerospace Industries defense facility ("Indonesia, South Korea to Build Fighter Aircraft" 2013). Indonesia will also participate in marketing the finished aircraft and receive 20 percent of the money from the export sales.

India is also pursuing this strategy in a few cases. The most prominent example is the joint Indo-Russian project to produce the Indian fifth generation fighter aircraft (FGFA), a two-seat variant of the Russian T-50 PAK FA next generation fighter (Yousaf 2013). As part of the effort, around 30 Indian engineers went to Russia to work on the preliminary designs. Participation also calls for India to have access to advanced Russian aerospace technology. And as one India journalist observed:

> What defense observers have missed is that the FGFA is a quantum leap for India's armaments industry, especially HAL [Hindustan Aeronautics Limited]. After decades of dabbling in joint production—a euphemism for screwdriver technology—India's aerospace sector will finally step up to joint development.
>
> This will catapult India to a new level where it will finally be able to develop advanced stealth aircraft on its own. Not even America's leading partners in the F-35 Joint Strike Fighter program, such as Turkey or the UK, have access to such red hot technology. Instead of being a sidekick, India will be a joint partner in a leading military project. (Simha 2012)

Final Observations

Governments and defense firms of other countries are experimenting with different approaches to acquiring defense technological capabilities. Their motives vary. Some seek access to technology and know-how otherwise unavailable. Some seek to reduce acquisition costs and/or find funding to complete projects that would be impossible to finance with resources at hand. Some seek to do both. It is also clear that nations do not confine their experimentation with acquisition to just one approach. *The bottom line: These strategies accelerate technical innovation and reduce costs for countries worldwide, proliferating more advanced technologies, better meeting individual country needs, and facilitating other countries obtaining more advanced weapons capabilities. Together these developments can collapse the timelines of world defense acquisition. This, in turn, will challenge the Department of Defense to maintain technical leadership. What used to be a clear U.S. technical dominance seems to be eroding, and the long-term implications of the trend are not clear.*

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