THE STATE OF THE ART IN THE GLOBAL DEFENCE INDUSTRY: IMPLICATIONS FOR REVOLUTION IN MILITARY AFFAIRS

1–2 November 2007
SINGAPORE

PONDER THE IMPROBABLE

THE STATE OF THE ART IN THE GLOBAL DEFENCE INDUSTRY: IMPLICATIONS FOR REVOLUTION IN MILITARY AFFAIRS

1–2 November 2007
SINGAPORE

INTRODUCTION

The Revolution in Military Affairs (RMA) is a sweeping, if often ambiguous, term used to describe an ambitious effort—a "paradigm shift", if you will—to revamp the manner in which militaries will conduct warfare in the future. The RMA is seen as a process of discontinuous, disruptive and revolutionary change. Andrew Krepinevich, for example, argues that an RMA occurs when:

> *The application of new technologies into a significant number of military systems combines with innovative operational concepts and organizational adaptation in a way that fundamentally alters the character and conduct of a conflict. It does so by producing a dramatic increase … in the combat potential and military effectiveness of armed forces.*[1]

Nevertheless, even this definition leaves much to be desired when it comes to how the RMA will affect military organizations, doctrine or structure. In addition, it is still unclear how the RMA—if it does come about—will impact the global defence industrial base, which provides the means and capabilities for implementing an RMA and, in turn, how developments in the defence industry may affect the RMA itself. In other words, how might these two institutions—the RMA and the defence industry—interact and react to each other in the future?

In November 2007, the S. Rajaratnam School of International Studies organized a conference to address and discuss developments in the various national defence technological and industrial bases around the world, and their capacity to contribute to national RMAs in particular, and to the global RMA in general. Issues and questions that the conference focused on included the following.

- What particular technologies are relevant to the current RMA?
- What particular dual-use and defence-specific technological-industrial base capabilities are critical to delivering the required technologies to the RMA?
- What are the strengths and weaknesses of individual national technological-industrial bases when it comes to contributing to a national RMA?
- How dependent are some countries on importing the required technologies to engage in an RMA? Conversely, in what ways might some countries be exporters of RMA-relevant technologies, and what might be the global implications of such transfers?
- How does globalization affect the diffusion of RMA related technologies and therefore the implementation of the RMA itself?

1 Andrew Krepinevich, "From Cavalry to Computer: The Pattern of Military Revolutions", *The National Interest*, Fall 1994, p. 30.

OPENING REMARKS

Richard Bitzinger

Richard Bitzinger of the S. Rajaratnam School of International Studies (RSIS) opened the conference proceedings by taking a step back from the "Revolution in Military Affairs" (RMA) debate by posing the challenging question of whether it is even valid to speak of an RMA. If it is valid, then, "where are we?". In other words, how far has the RMA come, what are its operational principle and components, and, above all, where does the defence industry, both on national scales and on a global basis, fit into this puzzle and make, or not make, its contributions to that RMA? Alternatively, if it is invalid, then "where are we going?". If we are not in an RMA, then how can we classify it, what is the future of military innovation and modernization, short of a true revolution, and again, what is the interconnection between that future and the defence industry? Overall, this two-day conference dealt with a critical interlocking issue: What is the relationship between the so-called RMA and the global defence industry? Do state-of-the-art developments within the global defence industry affect the future of military capabilities, organization and doctrine, or do future military developments drive the state-of-the-art in the global defence industry?

SESSION I

The Defence Industry In The United States And Europe

Defence Industries and the RMA

Andrew Ross

Andrew Ross of the University of New Mexico argued that military establishments are struggling with the process of transitioning from the Industrial Age to the Information Age—an IT-centric RMA—with the United States as the vanguard in this effort. The RMA implies considerable technological, organizational and doctrinal change and innovation. At the same time, transforming the U.S. military has suffered setbacks as the operational challenges of the wars in Iraq and Afghanistan have focused resources on other military requirements, such the search for solutions to tactical problems posed by improvised explosive devices.

The defence industry, in general, has been affected by three post-Cold War processes: consolidation, globalization and dual-use technologies. Consolidation, even if incomplete from an economic perspective, might still have serious implications for military transformation. Many policymakers believe that less competition among defence contractors will lead to increased prices, decreased responsiveness to military needs and less innovation. Defence industrial globalization may be more mirage than reality, and the potential for globalization has been constrained by a number of factors, including concerns about proliferation, loss of local control over strategic industrial assets and technology seepage. Dual-use technologies and commercial-military integration (CMI) may have some impact on inexpensive, low-end, simplified acquisition threshold products and on sub-component purchases, but for leading transformational systems, the military customer need not rely on commercial firms, as traditional defence firms already possess the necessary skills to incorporate dual-use technologies—especially those related to the IT-RMA—in military products.

The United States

Peter Dombrowski

Peter Dombrowski of the U.S. Naval War College asserted that within the realm of transformational technologies and weapons systems, the U.S. military is very much focused on space systems, unmanned vehicles, special operations forces, precision-guided air-delivered weapons, lighter and more mobile army ground forces (e.g. Stryker), smaller and faster navy surface ships, and, above all, significant advances in C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) systems that link military units to highly integrated networks for conducting network-centric warfare. In this regard, the U.S. military has embarked on a number of key military IT-related programmes—including the Global Information Grid (GIG), the Joint Tactical Radio System (JTRS), the Army Future Combat System (FCS) and the U.S. Air Force Link-16—and operational concepts such as the Army Force XXI Battle Command Brigade and Below (FBCB2), U.S. Air Force Advanced Tactical Targeting Technology (AT3) and the U.S. Navy's Cooperative Engagement Capability (CEC).

Dombrowski also noted that globalization and CMI is fundamentally altering the composition of the U.S. Department of Defense's (DOD) supporting industrial base in that the DOD now is supported by a broader, less defence-intensive industrial base that is becoming increasingly international in character. At the same time, these developments are reshaping the military-technological environment in which the DoD must compete. In particular, the international conventional arms market, once driven mainly by political-military and strategic imperatives, is now increasingly also affected by economic imperatives.

Europe

Andrew James

Andrew James of the University of Manchester focused on the dynamics that have driven the international diffusion of the U.S. transformation agenda, factors that have influenced the adoption (or non-adoption) of defence transformation in Europe and the consequences for the European defence industry of Europe's pursuit of modernization rather than transformation. Essentially, the RMA reflects a particular "American way of war" in that it addresses American global strategic concerns in a uni-polar world, is preoccupied with technological "solutions" and illustrates the U.S. focus on conventional war fighting rather than counter-insurgency or peace enforcement missions. In contrast, in the United Kingdom at least, soldiers, and not networks, are viewed as the centrepiece of defence.

A variety of mechanisms have diffused the transformation agenda to Europe and Asia, such as alliance politics, bilateral military relations and interoperability concerns on the part of U.S. allies, military and technological "communities of practice", defence industry agendas, and the global nature of "transformational" technologies. However, in Europe at least, defence transformation is not inevitable because the ground truths of budgets and operational requirements indicate that European militaries are pursuing "modernization-plus" (to use Ross and Dombrowski's terminology) rather than any true RMA. European defence forces are picking and choosing elements of the transformation agenda that allow them to shift from a Cold War posture to more flexible force structures that meet the needs of national and pan-European security strategies—above all, capabilities for expeditionary and network-enabled warfare, precision strike, enhanced logistics and force protection.

Globalization of the Defence Industry

Mark Lorell

Mark Lorell of RAND, in addressing the globalization phenomenon, argued that, at the end of the 1990s, the U.S. defence and aerospace industry was much less globalized than other major U.S. manufacturing industries, such as pharmaceuticals, automotives, semiconductors and computer hardware, and information technologies. In addition, the U.S. defence and aerospace industry was also more heavily oriented towards straightforward arms exports and it dominated the global exports of finished goods (in this case, weapons systems) and major sub-systems, unlike any other U.S. industry. At the same time, it exhibited a lower level of foreign direct investment (in the form of mergers and acquisitions) than other U.S. industrial sectors. Rather, U.S. defence industrial "globalization" tended to favour project-specific teaming or joint ventures. Moreover, much of this collaboration and teaming was with British firms, who are also, where it does occur, the dominant foreign investors in the U.S. defence sector.

Beginning in the late 1990s, the DoD has undertaken a variety of initiatives to promote defence industry globalization. For example, the DoD entered into negotiations with allied nations for bilateral open-market framework agreements. It sought ITAR (International Traffic in Arms Regulations) exemptions, based on the Canadian model; it inaugurated a review of U.S. export controls and of the U.S. Munitions List (USML); and it attempted to liberalize the review process of the Committee on Foreign Investment in the United States (CFIUS), which examines and assesses the impact of direct foreign investment in strategic economic sectors. Ultimately, however, most of these initiatives came to naught, as reformers were unable to reconcile differences over U.S. and allied arms-export control regimes, EU foreign national employment rules, complex inter-connections and linkages within the pan-European defence industry and government projects, and post-September 11 concerns about proliferation and technology security.

DISCUSSIONS

Mark Lorell, Ron Matthews and Richard Bitzinger

There was a general agreement that the RMA is heavily dependent on information and networks. In reality, the world is not witnessing an RMA—that is, a drastic paradigm shift—but a "modernization-plus" phenomenon.

Since the RMA requires innovation, diffusion and absorption, to what extent does competition within the defence industry play a role in the diffusion of ideas and in influencing the way RMA is appearing in actual systems? In the United States, there is no competition in many areas of the defence industry, such as main battle tanks or aircraft carriers. Even where competition does exist, acquisition usually ends up on a "joint production" basis, with the requirement to split production among geographical areas, such as nuclear submarines or surface combatants. The consolidation of the U.S. defence industry has resulted in fewer firms and an oligopoly-like state, e.g. only a fixed number of naval ship building and military aircraft producing firms. It has been argued that with regards to C4ISR, the characteristics are different as compared to "platform builders", as it allows small companies to play niche areas. This is true but a key element of the defence industry is the trusted relationship between supplier and customer: Trust is a barrier to entry in the defence industry.

Acknowledging that the RMA is an all-embracing concept that possesses technological, organizational and doctrinal aspects, it is thus essential to address defence management, especially the management of costs. The doctrinal RMA in Europe has witnessed industrial arms collaboration and the shift to coalition warfare, while the "global RMA" has resulted in an expansion in technology transfers. Competition in the United Kingdom, for example, has resulted in a much more open defence market, as, in order to gain a competitive edge and cap costs, the British arms procurement process has been opened up to foreign bidders. At the same time, however, it has beeen acknowledged that this process has its observable limits: The more the United Kingdom procured on the international market (the bulk of which comes from the United States), the greater is the erosion of the sovereignty of the British defence industry. As a result, there has been a backlash in the form of protecting key defence industrial assets. Overall, protectionism is still strong within the global arms industry, as defence-industrial capability to act independently is closely tied in with strategic influence.

It has also been argued that defence firms are usually not forward-looking when it comes to adapting to the RMA and defence transformation. For example, it has been argued that defence firms do not like to use their own limited resources on R&D, as they may end up drilling "dry holes" with nothing to show for it in return. There is also a tendency to push legacy systems and make short-term sales rather than try to predict and react to long-term (that is, 10 to 15 years out) forces that could impact future products and production. At the same time, governments often come under pressure to protect jobs at home—for example, exercising sovereignty over supply, ensuring self-sufficiency in production, and, where necessary, by pressing for licensed production arrangements.

SESSION II

The Defence Industry In India, China And South-east Asia

India

Rahul Bedi

Rahul Bedi of Jane's Defence Weekly noted that, six decades after its independence, India's vast military-industrial complex remains an industry-in-the-making. Beset by an inefficient state-owned defence industrial base, a cumbersome R&D base, technological over-reach, and haphazard and bureaucratic procurement policies, India continues to be heavily import-reliant, sourcing over 70 per cent of its military equipment from abroad. Despite repeated declarations of reducing this foreign dependency to around 30 per cent through a more focused approach to defence indigenization and private-sector involvement, India remains decades away from even remotely achieving this rather modest goal. The country's defence industry has no definitive game plan and remains riddled with "ad hoc-ism", placing little or no emphasis either on product strategy or on developing equipment for operational goals, which, incidentally, also remain too loose and more or less undefined.

Efforts to reform India's defence industry—through increased competition, opening up of the acquisition process to private industry and permitting private and foreign investment in the military-industrial complex—have so far had little or no effect. The Ministry of Defence (MoD), anxious to protect its turf, continues to disregard the private sector and depend on the economically unsound Ordnance Factory Board plants and Defence Public Sector Undertakings (DPSUs), along with the bloated and inefficient Defence Research and Development Organization (DRDO). Armament industry officials said reformation in the vital military equipment field was also largely handicapped by the socialistic leanings of successive Indian administrations that believe public ownership of defence safeguards national strategic interests.

Military planners concede that India's ad hoc procurement activities are not in sync with the region's unfolding security challenges over the next 15 to 20 years. A nascent debate is brewing in India as to what the kinds of future military products it will require. While the MoD wants to nurture the ability to design and build major armament systems, the armed forces argue that India's burgeoning technical talent should be focused on developing weapons in conjunction with foreign partners, based on comparative advantage. The latter view favours China's RMA-based strategy of evolving from "mechanization" to "informatization". At the moment, however, the MoD's views on indigenization appear to be ascendant, posing a Herculean challenge to India's defence industry and acquisition process over the next two decades. Some senior officials are hopeful that recently revised defence procurement procedures, of which a new offset policy is a landmark inclusion, will have a positive impact on the domestic military sector and keep India abreast of the RMA.

China

Arthur Ding

Arthur Ding of the S. Rajaratnam School of International Studies argued that China's concept of the RMA is driven mainly by developments in the information technology (IT) sector. In relation to war fighting, the RMA is viewed as a new type of war of mass destruction: Warfare is profoundly affected by the RMA, and countries with superior IT technology capabilities and innovation will easily overwhelm those without. Nevertheless, the PLA's self-assessment is that while an RMA is desirable, it is not feasible due to practical limitations and constraints in technology as well as economic and social aspects. This, however, does not mean the RMA can be ignored but it means that RMA ideas and practices must be adapted to suit China's future military requirements. The main priority of the Chinese RMA is to emphasize "asymmetry advantages" through the two concurrent processes of "mechanization" and "informatization"—in other words, leveraging "informatization to upgrade mechanization, and using mechanization to accelerate informatization". The PLA's long-term goal to build an informatized armed forces capable of winning informatized wars by the middle of the twenty-first century. At the same time, this rather ambiguous strategy lacks specific goals and leaves observers unclear as to the meaning and expectations of what constitutes progress or end results.

Even so, one can deduce the general direction of China's RMA strategy. The Chinese place a high priority on RMA-related technologies such as C4ISR, information warfare, electronic warfare and precision strike. China's RMA particularly focuses on space and IT technologies, such as computer software and hardware systems, telecommunications, information acquisition and processing, optical electronics and fibre optics. In the area of space technologies, China is pursuing heavy launch vehicles, satellites for reconnaissance, navigation and communication, manned space missions and, finally, a manned space station. The PLA has showcased its "RMA in progress" on a number of occasions and has, in various military exercises, illustrated its growing capabilities for reconnaissance, surveillance and identification of fixed and mobile enemy positions, some of it in real time and in adverse weather conditions.

Even with such development, it is essential to place China's RMA in perspective. It is unclear whether the defence industry has sufficient manpower—especially skilled technicians and engineers due to the growing demand for college graduates in other industrial sectors. At the same time, it remains unclear whether the determination on the part of the government and industry to reform the Chinese defence industry is strong enough to overcome system-wide inertia and technological and institutional/organizational deficiencies rampant in the defence sector.

China

Tai Ming Chung of the University of California, San Diego, addressed those specific efforts that have been underway since the late 1990s to transform the Chinese defence industry and tackle the deep-rooted obstacles that have retarded its ability to absorb, create and diffuse technological innovation. China has a two-tracked vision of its military modernization over the next two decades. First, the PLA seeks, by 2011, to improve its war-fighting capabilities through various weapons upgrades and by the selective introduction of new conventional weapons. Second, looking out approximately 15 years, the PLA wants to engage in an IT-driven RMA to elevate China's armed force to be on par with the world's leading military powers. Taken together, they represent a blueprint for the undertaking of revolutionary-style technological leap-frogging efforts out to 2020.

Before any radical transformation can occur, the interim focus has been on tackling the PLA's current

backwardness. The 11th Five-Year Defence Plan (2006–2010) is tasked with finalizing the development and introduction into service of a number of new weapons platforms and calls for the acceleration and broadening of the rearmament drive. These are practical and pragmatic integrations that reflect the realities of limited defence budgets, restricted technological know-how and the current state of the PLA's technological standards. The national leadership has affirmed its commitment to provide ample political, financial and technological support to allow the PLA and defence industrial apparatus to maintain this momentum. Over the longer term, the PLA is investing heavily in the development of information warfare capabilities, especially in the areas of electronic and cyber-warfare.

Prior to the late 1990s, the approach to reforming the inefficient, backwards and over-capacitized Chinese defence industry was hesitant, piecemeal and incoherent. However, under a new system introduced in 1998, the defence industry has been increasingly exposed to the so-called "Four Mechanisms" of reform: competition, evaluation, supervision and encouragement. Corporate reforms were implemented to distinguish and separate the responsibilities and functions between different arms, establish two conglomerates for each industrial sector to promote "moderate" competition, encourage diversification into civilian production, promote "superior" institutions and eliminate "inferior" ones, and make financial support available to assist enterprises to reduce debts and resolve other operating difficulties. Expanding exploitation of foreign technological knowledge, products and practices, both in the military and civilian sectors (the Chinese estimate that as much as 80 per cent of the military's technological requirements can be satisfied by commercial products and know-how), has also promoted the development of the Chinese defence innovation system.

On the whole, while self-sufficiency remains a cornerstone of the country's defence technological-industrial modernization goals, this is a long-term strategic aspiration and the focus over the next few decades will be to pursue a parallel but complementary development strategy of acquiring and absorbing foreign technology that both complements and supports indigenous weapons R&D.

Southeast Asia

Tim Huxley

According to Tim Huxley of the International Institute for Strategic Studies, the concept of the RMA is an inadequate term to describe what drives most Southeast Asian defence industries. In Malaysia, for example, the creation of a domestic defence industry was predicated on former Prime Minister Mahathir's vision for the country to be a developed country by 2020. Similarly, in Indonesia, an indigenous defence sector—particularly the aircraft industry—was a critical part of the nation's overall modernization drive. Singapore is the exception. It possesses the most capable and diverse defence industry in Southeast Asia, and one that was developed primarily for military-strategic reasons. Mainly designed to meet the needs of the Singapore Armed Forces (SAF), it has been successful in developing niche areas such as small to medium-sized sea platforms, artillery and light armoured vehicles, and the upgrading of aircraft.

The level of sophistication for respective Southeast Asian defence industries can be divided into three tiers: (i) Singapore; (ii) Malaysia and Indonesia; (iii) and all other countries. The diverse range and increasing budget of the Singapore defence industry enables it to meet the goals of the Third-Generation (3G) SAF and, as a result, the SAF operates many indigenous platforms. The Singaporean defence industry's close cooperation with the SAF allows it considerable opportunities to expand, with systems integration being a key technical feature. The Malaysian defence industry does not match the country's technological realities, while political and economic policies may actually hinder defence industrialization. As for Indonesia, its defence industry has seen a revival over the last few years, since the implementation of

legislation for the armed forces to divest its business operations to the state-run enterprise sector. Countries such as Thailand and the Philippines, however, have little in the way of a domestic defence industry, save the production of ammunition, small arms and simple communications systems. Essentially, there is no defence industry to speak of that will make a difference to their armed forces or their military capabilities.

There is a direct relationship between military capability and defence industry. Singapore is the most technologically advanced force in Southeast Asia (but this does not mean it will win wars with regional adversaries). The Singaporean defence industry ensures that the SAF has the equipment that matches national requirements, that synergize platforms and services. The SAF is the only military in Southeast Asia that can speak of an ongoing transformation.

DISCUSSIONS

Arthur Ding, Peter Hall, Jin-young Lee and Robert Wylie

The discussion kicked off with a question as to what defence-related assets would China like to obtain from Israel and Europe. One possibility was C4ISR systems such as the EL/M-2075 Phalcon Airborne Early Warning and Control (AEW&C) radar system from Israel, but it was noted that this transfer was opposed by the United States. As such, China has looked to Russia for the Beriev A-50 Shmel (an Il-76-based early warning aircraft). It is an elusive wish for China to purchase military technology from Europe and the United States in the wake of the June 1989 crackdown in Tiananmen Square. China views Israel as a source of niche technologies, such as the Chinese-built J-10 multi-role fighter aircraft, which is purportedly based on the Israel Aerospace Industries' (cancelled) Lavi. However, there has been little progress in overturning the Western arms embargo on China, due mostly to U.S. resistance. There was a possibility a couple of years ago that the EU might lift its embargo but Beijing's passing of its Anti-Succession Law all but stymied any possibility of ending the ban anytime soon.

Next, it was observed that there have actually been few examples where truly commercial technology has been integrated into military platforms. In the United States, the direct use of civilian systems by the military is especially difficult. CMI is generally given more credence than is perhaps warranted because, given the tight defence budgets in the post-Cold War era (save for the United States and China), harnessing dual-use technologies has a lot of appeal as a relatively low-cost development approach. However, one participant noted that it is difficult for the military to harness the power of the commercial sector because the military cannot re-wire and retrain personnel every 18 months, unlike the commercial sector. Overall, the commercial and military industrial sectors are at best an imperfect fit but most people are not technologically savvy enough to see this.

The third discussion point concerned Malaysia. It was noted that, over the past several decades, the Malaysian government has sought to nurture local industries, both civilian and military, as they possess the capabilities to be part of the overall national defence supply chain. For various reasons, however, these local industrial players have not been very successful in marketing themselves. In part, this is due to the inefficacies of the offset process. Direct defence-related offsets are viewed as unattractive due to the small size of the local defence industry—once a particular licensed-production programme has been completed, facilities were often closed down and become a wasted asset. Some offset incentives have permitted companies to spin off into non-defence sectors, but this has done little to promote a sustainable

defence industry. Overall, the question remains if the Malaysian defence industry should focus on pure defence-based production or on dual-use facilities. The defence industry has the potential and capabilities to do either or both, but policies and procedures at the top need to be first put in place.

SESSION III

The Defence Industry In Asia

Japan

Sugio Takahashi

According to Sugio Takahashi of the National Institute for Defense Studies, the defence industry in Japan is characterized by a flat budget mostly independent of regional events and a narrow market. Defence companies receive little state revenue and depend mainly on civilian sales. Many export prohibitions exist, such as the Three Arms Non-Export Principles (1967) and the Non Arms Export Policy (1976). There is great reliance on technology transfer and arms exports from the United States.

The RMA in Japan is primarily defensive in nature, characterized by an exclusively defence-oriented policy, a lower reliance on stand-off precision attack capabilities and missile defence systems. Current transformation, such as it is, of Japan's Self Defense Force is focused on institutions such as the Emergency Law and the Joint Staff Office, alliances such as the Japan-U.S. defence agreement, and certain military hardware, including joint Japan-U.S. co-development of the 27-inch upgraded Standard missile for missile defence, the CX cargo plane and PX maritime patrol aircraft, and the fifth-generation FX fighter programme to replace the F-4EJ.

Weaknesses of the Japanese defence industry include current export prohibitions, which hamper cooperation and limit markets for arms sales. The local industry is also deficient in certain key defence technologies such as precision guidance, stealth and network-centric warfare. Strengths include dual-use technology, sensor technology, and robotics and ballistic missile components. Overall, the SDF and the Japanese defence industry remain basically platform-centric. Regarding offsets, Japan has traditionally sought indigenous capability when acquiring defence technologies. However, this may change as Japan is unlikely to seek a licence to produce the F-22 even if it buys them from the United States.

South Korea

Chung-in Moon

Chung-in Moon and Jin-Young Lee of Yonsei University argued that the South Korean government has not officially adopted the RMA concept. Innovation, rather than revolution, remains the focus of the South Korean military and defence acquisition is driven primarily by the changing security needs of South Korea, particularly Seoul's quest for regional power status. Priority is given to developing an indigenous defence manufacturing capability to reduce the country's historical reliance on the United States and on finding niche specialties for South Korean arms exports. Particular attention is being paid to strengthening areas that were originally the responsibility the United States, including the air and naval forces, and C4ISR. Improving C4ISR capabilities is particularly important, particularly in light of the continued downsizing of the Korean military.

The transfer of operational control of certain military missions on the peninsula from the U.S. to South Korean armed forces (such as responsibility for security in the Joint Security Area, close air support control and counter-fire operations) has encouraged investment in key areas such as intelligence and command and control. The RMA, therefore, has stimulated defence development, particularly for companies with investment in communications. South Korea follows the Japanese model of civilian-military dual production systems, allowing civilian revenues to support the military development.

Acquisitions are divided between domestic production and foreign purchases. About 70 per cent of South Korea's equipment budget goes towards foreign-arms purchases rather than to building up a local defence industry. South Korea has also been heavily constrained by U.S. arms export regulations. However, efforts are being made to develop indigenous capabilities in niche specialties such as C4ISR, aeronautics (for example, the T-50 advanced trainer jet) and shipbuilding. The software aspects of C4ISR are to be produced locally while hardware (such as airborne early warning aircraft) is to be purchased from abroad. In the same way, army and navy assets are mostly acquired domestically while the air force relies on sales and technology transfers from the United States.

Australia: Peter Hall and Robert Wylie

Peter Hall

According to Peter Hall and Robert Wylie of the Australian Defence Force Academy, Australia feels relatively safe but is not unconcerned about regional security issues. It desires military capability to influence regional events but faces substantial financial barriers to further improvement. The local defence industry remains inadequate and Australia must rely on overseas suppliers and technology transfers to remain competitive.

Australia views the force multipliers of RMA technologies as essential, given her low population and high labour costs. Both indigenous capability and overseas procurement are employed to fulfil Australia's defence needs, but local companies are increasingly giving way to foreign firms in large projects. Local defence industries may be relegated to niche roles and support.

The demand for new and replacement defence capability inputs within Australia has been the dominant factor shaping the Australian defence industry. Australia has never had significant defence exports and the entry, survival and exit of defence suppliers reflect almost exclusively the opportunities offered in the domestic market and the capacity to meet them profitably. The structure of the Australian defence industry thus reflects the influence of three factors: the nature and evolution of defence capability demand over time; the ability of the local arms industry to respond effectively to that demand; and the determination of the Australian government to direct work to the defence industry. In some cases, the determination to award work to local contractors was not met with success. The challenges of meeting local content goals have proved too ambitious for the domestic industry to answer successfully. This, in turn, has led to exits and/or other forms of restructuring.

DISCUSSIONS

Jin-young Lee and Robert Wylie

The issue of offsets in technology transfer was raised with regard to Japan and it was commented that in the case of Japan, the United States has often been reluctant to release the full range of military technological capabilities. About a decade ago, for instance, the United States withheld technology on the AMRAAM missile until Japan developed a similar weapon system indigenously. Japan, therefore, cannot rely entirely on the United States to supply military technology as the United States can then control Japanese defence acquisitions, and an indigenous defence industry thus mitigates the dangers of over-reliance on the United States for military technology. Although Japan has traditionally purchased more from the United States than from Europe, Europe remains a viable alternative source for military technologies that the United States chooses not to share with Japan. For example, the Eurofighter Typhoon is a possible replacement for Japan's F-4 fighters if the F-22 is not available for purchase.

While Seoul continues to rely on the United States for most of its major weapon systems, it is also attempting to diversify its selection of other military technologies. For example, the French-designed Rafale was a strong contender for the Korean F-X fighter purchase (which ultimately went to the U.S. F-15). At the same time, industrial participation plays an increasingly critical role in South Korean arms procurement—nearly 42 per cent of South Korean arms imports have come with offset arrangements. For example, Seoul was very aggressive in pursuing offset arrangements with the United States on the F-15.

For its part, Australia has had some painful and expensive experiences with offsets. A key part of its alliance with the United States is the transfer of military technology but the issue is how much of such technology is sufficient for Australia's modest needs and how much of it is economically feasible. Another issue regarding arms-transfer agreements signed between Australia and the United States is how well Australian defence companies can safeguard the information obtained from the United States when they re-export to third parties. Local companies must institute control at least comparable to that of American firms.

A participant raised the question of how small states are able to maintain viable local defence industries and sustain technological innovation in the face of small or even declining defence budgets. It was questioned whether indigenous defence production is a matter of economic viability or military necessity.

Furthermore, some participants raised the issue of whether the so-called RMA makes it easier or harder to develop and maintain an indigenous defence industry, or whether it increases dependencies on the United States for RMA-critical technologies. With regard to Japan, it was argued that the country's defence industry is relatively minor and well-embedded in the national industrial infrastructure and is thus easily sustained by revenue from the civilian sector. Indigenous development of military technology is important mainly for prestige and in facilitating further technology transfer from the United States. In particular, by developing a similar capability indigenously it is possible to persuade the United States to release restricted technology or to discount its price.

Nevertheless, it was argued that the defence industries of most small countries are not going to be economically viable, except in rare cases like Israel. Therefore, their survival is dependent on government support. While a government may use local job opportunities created to justify a defence industry, the decision to sustain an indigenous defence industry is ultimately a political rather than economic one. Governments, therefore, must ultimately decide how much indigenous military-industrial capacity they are willing to pay for.

Ultimately, economics—in this case, the economics of armament production in light of the RMA—is about choices in resource allocation. An autonomous, sovereign military capability has a value that affects an economic decision quite directly. The United States uses military technology explicitly as an instrument of statecraft, so there will always be a need to develop military capability independently if one wishes to use military power in a sovereign fashion. Countries must prioritize RMA technology nodes that directly affect their military effectiveness.

Rapporteurs:
Mr Chan Ling Wei Samuel and
Mr Khan Zong Heng Amos

PROGRAMME

Thursday, 1st November 2007

0830 REGISTRATION

0900 WELCOME AND ORIENTATION
(CHAIR: RICHARD BITZINGER, RSIS)

0915 SESSION I: THE DEFENCE INDUSTRY IN THE USA AND EUROPE

DEFENCE INDUSTRIES AND THE RMA
Andrew Ross and Peter Dombrowski,
University of New Mexico,
U.S. Naval War College

UNITED STATES
Peter Dombrowski,
U.S. Naval War College

EUROPE
Andrew James,
University of Manchester

GLOBALIZATION OF THE DEFENSE INDUSTRY
Mark Lorell,
RAND Corporation

1030 Break

1100 Session I Discussion

1200 Lunch

1330 SESSION II: THE DEFENCE INDUSTRY IN INDIA, CHINA AND SOUTHEAST ASIA (CHAIR: BERNARD LOO, RSIS)

INDIA
Rahul Bedi,
Jane's Defense Weekly

CHINA I
Arthur Ding
S. Rajaratnam School of International Studies,
Nanyang Technological University

CHINA II
Tai Ming Cheung,
University of California San Diego

SOUTHEAST ASIA
Tim Huxley,
International Institute for Strategic Studies

1500 Break

1530 Session II Discussion

Friday, 2nd November 2007

0900 SESSION III: THE DEFENCE INDUSTRY IN ASIA
(CHAIR: RON MATTHEWS, RSIS)

JAPAN
Sugio Takahashi,
National Institute for Defense Studies

SOUTH KOREA
Chung-in Moon/Jin-Young Lee,
Yonsei University

AUSTRALIA
Peter Hall/Robert Wylie,
Australian Defence Force Academy

1030 Break

1100 Session III and Overall Conference Discussion

1200 Concluding Session

1230 Lunch

LIST OF PRESENTERS / CHAIRPERSONS / MODERATORS

1. Mr Rahul Bedi
   Journalist
   Jane's Defence Weekly
   India

2. Mr Richard Bitzinger
   Senior Fellow
   S. Rajaratnam School of International Studies
   Nanyang Technological University,
   Singapore

3. Dr Tai Ming Cheung
   Senior Research Fellow
   Institute on Global Conflict & Cooperation,
   University of California, San Diego
   USA

4. Dr Arthur Ding
   Visiting Senior Research Fellow
   S. Rajaratnam School of International Studies
   Nanyang Technological University,
   Singapore

5. Dr Peter Dombrowski
   Chair, Strategic Research Department
   Naval War College
   Newport, RI
   USA

6. Prof Peter Hall
   University of New South Wales
   Australian Defence Force Academy
   School of Business
   Australia

7. Dr Tim Huxley
   Executive Director
   International Institute for Strategic Studies-Asia
   Singapore

8. Mr Andrew James
   Senior Lecturer
   University of Manchester
   Business School
   United Kingdom

9. Mr Jin Young Lee
   Ph. D. Candidate
   Yonsei University
   Seoul, Korea

10. Dr Bernard Loo
    Assistant Professor
    S. Rajaratnam School of International Studies
    Nanyang Technological University,
    Singapore

11. Dr Mark Lorell
    Senior Political Scientist
    RAND CORP
    USA

12. Prof Ron Matthews
    Deputy Director of the Institute of Defence and Strategic Studies
    S. Rajaratnam School of International Studies
    Nanyang Technological University,
    Singapore

13. Dr Chung-in Moon
    Professor
    Yonsei University
    Seoul, Korea

14. Prof Andrew Ross
    Director
    Center for Science, Technology, and Policy
    University of New Mexico
    Dept of Political Science
    USA

15. Mr Sugio Takahashi
    Senior Fellow
    The National Institute for Defense Studies
    Japan

16. Mr Bob Wylie
    Visiting Fellow
    University of New South Wales
    Australian Defence Force Academy
    School of Business
    Australia

LIST OF PARTICIPANTS

1. Dr. Kogila Balakrishnan
   Principal Assistant Secretary
   Defence Industry Division
   Ministry of Defence
   Malaysia

2. LTC Hor Cheong Wai
   Senior Manager (Industry Development)
   Defence Industry & System Office –
   Ministry of Defence
   Singapore

3. Mr Koh Kok Keng
   Director (Collaboration)
   Defence Science Technology Agency
   Singapore

4. Mr Tong Lau
   Vice President, Defence Business
   ST Engineering
   Singapore

5. Dr Terence Lee
   Assistant Professor
   S. Rajaratnam School of International Studies
   Nanyang Technological University,
   Singapore

6. Dr Lim Choo Hoon
   Senior Lecturer
   SAFTI Military Institution,
   Ministry of Defence
   Singapore

7. Dr Long Shi Ruey Joey
   Assistant Professor
   S. Rajaratnam School of International Studies
   Nanyang Technological University,
   Singapore

8. Ms Ng Sue Chia
   Associate Research Fellow
   S. Rajaratnam School of International Studies
   Nanyang Technological University,
   Singapore

9. Mr Christopher Roberts
   Associate Research Fellow
   PhD Candidate UNSW@ADFA
   S. Rajaratnam School of International Studies
   Nanyang Technological University,
   Singapore

10. Mr Teo Hoon Beng
    DY Director (System)
    Defence Industry & System Office – MINDEF
    Singapore

11. Mr Mohd Zubir Zakaria
    Under Secretary
    Defence Industry Division
    Ministry of Defence
    Malaysia

ABOUT RSIS

The S. Rajaratnam School of International Studies (RSIS) was established in January 2007 as an autonomous School within the Nanyang Technological University. RSIS's mission is to be a leading research and graduate teaching institution in strategic and international affairs in the Asia Pacific. To accomplish this mission, it will:

- Provide a rigorous professional graduate education in international affairs with a strong practical and area emphasis
- Conduct policy-relevant research in national security, defence and strategic studies, diplomacy and international relations
- Collaborate with like-minded schools of international affairs to form a global network of excellence

Graduate Training in International Affairs

RSIS offers an exacting graduate education in international affairs, taught by an international faculty of leading thinkers and practitioners. The teaching programme consists of the Master of Science (MSc) degrees in Strategic Studies, International Relations, International Political Economy, and Asian Studies as well as an MBA in International Studies taught jointly with the Nanyang Business School. The graduate teaching is distinguished by their focus on the Asia Pacific, the professional practice of international affairs, and the cultivation of academic depth. Over 150 students, the majority from abroad, are enrolled with the School. A small and select Ph.D. programme caters to advanced students whose interests match those of specific faculty members.

Research

RSIS research is conducted by five constituent Institutes and Centres: the Institute of Defence and Strategic Studies (IDSS, founded 1996), the International Centre for Political Violence and Terrorism Research (ICPVTR, 2002), the Centre of Excellence for National Security (CENS, 2006), the Centre for the Advanced Study of Regionalism and Multilateralism (CASRM, 2007); and the Consortium of Non-Traditional Security Studies in ASIA (NTS-Asia, 2007). The focus of research is on issues relating to the security and stability of the Asia-Pacific region and their implications for Singapore and other countries in the region. The S. Rajaratnam Professorship in Strategic Studies brings distinguished scholars and practitioners to participate in the work of the Institute. Previous holders of the Chair include Professors Stephen Walt, Jack Snyder, Wang Jisi, Alastair Iain Johnston, John Mearsheimer, Raja Mohan, and Rosemary Foot.

International Collaboration

Collaboration with other professional Schools of international affairs to form a global network of excellence is a RSIS priority. RSIS will initiate links with other like-minded schools so as to enrich its research and teaching activities as well as adopt the best practices of successful schools.

S. RAJARATNAM SCHOOL OF INTERNATIONAL STUDIES

A Graduate School of Nanyang Technological University

S. Rajaratnam School Of International Studies, Nanyang Technological University,
Block S4, Level B4, Nanyang Avenue, Singapore 639798
TEL 65-6790-6982 | FAX 65-6793-2991 | EMAIL wwwrsis@ntu.edu.sg | WEBSITE www.rsis.edu.sg

Design by Oxygen Studio Designs