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PROGRESS OF INDIA'S DOMESTIC MILITARY INDUSTRY PROMISING

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Introduction

India has, since the period of British rule over colonial India, depended upon imports of major weapons. During the colonial period light arms and ammunition were manufactured in a few British Colonial Government owned and controlled factories [1]. More technologically intensive weapons were imported from Britain[2]. After gaining independence in 1947, independent India, while still continuing to import a large number of weapons from industrially advanced countries, strove to set up a military equipment manufacturing base in India[3]. These efforts had mixed success[4]. Most of the military equipment making facilities set up in India undertook manufacturing under license of foreign designs. Thus the Belgian 7.62 mm rifle was manufactured as the Self Loading Rifle (SLR) at Ishapore[5], and British designed aircraft such as the Vampire and Gnat were built at Hindustan Aircraft Limited (HAL)[6]. The British Vickers main battle tank (MBT) was built as the Vijayanta MBT at the Heavy Vehicles Factory at Avadi[7]. Several foreign designed warships were also built at Indian shipyards[8]. The state of technology absorption in the country and pace of indigenous technology development has led to a situation of import dependence continuing even into the second decade of the twenty first century. This has reached the extent of India having the dubious distinction of being the world's largest arms importer[9]. However, attempts to stem this tide of import dependence have continued apace. While the situation on the ground has been such that several domestic programs failed to meet user requirements and specifications, there are a few local projects that have achieved degrees of success. This trend gives hope that in the future India's import dependence will reduce while its abilities to design and build military equipment tailored to local needs will increase.

Recent Milestones

Over the past two months or so there have been several reports in the media about successes having been achieved by India's

military industry. The indigenously designed and built Light Combat Aircraft (LCA), Tejas, was accepted for induction by the Indian Air Force (IAF)[10] and the first Tejas squadron , No. 45 Squadron, commenced induction of the first two Initial Operational Clearance (IOC)-II aircraft in a ceremony at Bangalore[11]. This is a milestone event in that this is only the second time ever that an Indian built fighter aircraft has been inducted into IAF service since the HF-24 Marut was inducted into IAF in the 1960s[12]. No. 45 Squadron is expected to remain based at Bangalore for a few months to enable smoother resolution of any teething troubles with the aircraft as HAL is collocated at the airport[13]. Once the initial issues are resolved the squadron is expected to move to Sulur airbase near Coimbatore city[14]. Improved variants of the basic Tejas inducted by No. 45 Squadron, of course, remain under development to meet IAF operational requirements more closely as subsequent Tejas are prepared to enter operational service[15]. The Tejas project has had a long and torturous history of missed deadlines and cost overruns[16]. The project has included development of several advanced technologies for the first time in India. Few of these are digital quadruplex fly by wire (FBW) flight control system, ground test rigs and a full function simulator, and widespread utilisation of composite materials[17]. A few technologies remain as work in progress. These are the airborne multi-mode radar (MMR), and the Kaveri jet engine. Plans to utilise an imported radar[18] and an imported engine for the time being provides time for the domestic agencies involved to successfully complete the tasks assigned to them. The main long term benefit of the Tejas project may lie not in the Tejas aircraft itself but in the foundation that this project provides for aircraft projects in the future. A deciding factor in the success of this program, however, is likely to be the quantity and quality of post-sales support that HAL is able to provide to the Tejas in IAF squadron service. This is an aspect that merits close attention from the management of HAL, the Ministry of Defence and the IAF, especially as in the past HAL has often been found lacking on this count[19].

This time period also witnessed the first flight of the HAL-designed tandem seating basic trainer, the HTT-40[20]. The project has reportedly been pushed intensively by the Defence Minister. The interest by the minister indicates the apparent intention of the government to push harder than ever before for resorting to indigenous equipment for the armed forces. The HTT-40 aircraft's development had been delayed to the extent that faced with an urgent need for training aircraft, the IAF was forced to induct the Swiss Pilatus PC-7II tandem seat basic trainer to keep its pilot training program on track[21]. If the HTT-40 project progresses successfully, IAF could once again have a domestic aircraft for its basic training needs. Over time this aircraft could prove more cost effective than imported aircraft.

Another positive offshoot of successful development of the HTT-40 could be the fillip this can give to the domestic aircraft industry. In the long run only an indigenous aircraft industry can effectively support the country's aerospace equipment needs while enabling the country to retain strategic autonomy.

Another noteworthy success in the recent past has been the effort by Brahmos Aerospace, the makers of the Indo-Russian Brahmos supersonic cruise missile, to reduce the weight of the Brahmos missile by approximately 400 to 500 kilograms (kg), in parallel with the development of a suitable launcher by HAL along with structural modifications to the Su-30MKI airframe to enable carriage of the Brahmos by the Su-30MKI[22]. This domestic effort indicates a degree of comfort achieved by HAL with the Su-30MKI, and of Brahmos Aerospace with the collaboratively developed Brahmos missile. Earlier, it was widely reported in the media that India would need to ask the Russians to carry out the integration of the Brahmos with the Su-30MKI. Such a contract with the Russians would come at appreciable costs in hard currency. The domestic effort has helped reduce the time and cost of the integration of the Su-30MKI with the Brahmos. Integration of the Brahmos on the Su-30MKI gives IAF even sharper teeth to the already formidable Su-30MKI fighter. The Su-30MKI's already long range strike capability now stands extended by at least another 290 km or so. In addition, it needs to be highlighted that the supersonic (nearly Mach 2.8 speed in terminal phase of attack) Brahmos is near unstoppable by enemy anti-aircraft / cruise missile defence systems once it is launched. The Su-30MKI – Brahmos combination gives a very high assurance of effective and accurate attack by IAF. The Brahmos cruise missile is touted to have very high accuracy, of the order of less than 3 meters from the aim point. While the Brahmos carries a mere 300 kg payload, its high supersonic terminal attack speed delivers a very high kinetic energy destructive impact independent of the warhead itself.

DRDO is reported to be readying for the test phase of its Rustom-II medium altitude long endurance (MALE) remotely piloted aircraft (RPA)[23]. The Rustom-II MALE RPA is supposed to have 24 hour endurance and a range of 250 km. Such an RPA could be invaluable for myriad operational tasks. Armed variants of Rustom-II, if and when developed, could provide an unmanned precision attack capability similar to that provided by the US Predator and Reaper RPAs. Such RPAs could have great applicability in conventional military as well as in counter insurgency (COIN) operations by India's security forces. Information from suitably configured RPAs could assist the civil administration and concerned authorities to provide relief to the affected population during natural calamities as well.

In the string of recent DRDO successes, the Indo-Israeli collaboratively developed Medium Range Surface to Air Missile (MRSAM) system - also called the Barak-8 - was successfully tested in India as well as in Israel[24]. This missile system fills a crucial capability gap in our air defence capability by covering the airspace beyond the 25 km covered by indigenous Akash missiles out to 70 km[25]. The initial MRSAM systems are likely to be expensive. It is reported that the IAF's nine MRSAMs come at a tag of Rs 10,076 crore, while each MRSAM for the Navy is likely to cost Rs 1,200 crore[26]. Bharat Dynamics in Hyderabad is the designated production agency in India for the MRSAM. Once production at Bharat Dynamics picks up and economies of scale come into play, unit costs could be expected to reduce somewhat. More importantly, the experience of co-developing the MRSAM is likely to help DRDO consolidate on its learning from its independent development of the Akash SAM system. With this enhanced learning and technology absorption, it is likely that follow-on SAMs to the MRSAM and Akash could be developed completely indigenously in future.

Naval systems are not far behind. The first heavy weight torpedo developed by DRDO, the Varunastra, was formally handed over to the IN during June 2016[27]. This development is a move in the right direction. Over the past several decades India had developed self-sufficiency in the design and construction of the hull and structures of warships. Most sensors and weapons aboard Indian warships were, however, imported. The development of the ship fired Brahmos, and now the Varunastra, indicates initial success in reducing this import dependency in the naval military domain.

The long drought in induction of capable howitzers by the Indian Army (IA) has been broken by the delivery of the first three Dhanush 155mm/45 indigenous howitzers to IA[28]. The Dhanush has been developed by the Ordnance Factory Board (OFB) based upon documentation provided by Sweden as part of the transfer of technology (ToT) at the time of purchase of the Bofors howitzers in the 1980s. The Dhanush has undergone stringent testing and is reported to outperform its parent Bofors 155mm howitzers in range, accuracy and ease of use. This is a welcome development which bodes well for the future.

Analysis

It has been brought out that progress has been seen on several projects over the past few weeks. A few of these projects have been pending for several years, while a few others have been completed in remarkably short time frames. The time taken aside, these projects impinge on the land, air and maritime domains. The media reports that have brought the news on the latest status of these projects bring out that behind the scenes there has been considerable effort by the country's Research and Development (R&D)

organisations to develop capabilities needed by the country.

Success, however, has not always come within desired time frames or within initially projected costs. While the endeavour must be to meet initially projected time frames and costs, it also needs to be understood that when developing a technological capability ab initio there are likely to be cost and time overruns. When such overruns take place they need to be taken in the stride while continuing to focus on early completion of the project.

The trend is unmistakably positive overall, with indications that in due course India should be able to shed the "biggest importer" tag and even possibly enter the export market in a modest way. Such developments are welcome as they hold out the promise of lower costs for equipment as well as equipment tailored to the specific needs of the Indian armed Forces.

Conclusion

India has been an importer of military equipment for its armed forces for a long time. In earlier times efforts to produce equipment indigenously failed to deliver desired results. However, in the recent past there have been indications that several indigenous military equipment development projects are close to delivering required results. This trend leads to hope for a future when India could turn around from being a net importer of military equipment to carrying out some exports as well.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS])

Notes

[1] Ofbindia.gov.in, "History", http://ofbindia.gov.in/index.php?wh=history&lang=en, accessed on July 19, 2016.

[2] Ibid.

[3] Fau.edu, "The Indian Economy Since Independence", http://home.fau.edu/sghosh/web/images/India%20talk.pdf, accessed on July 19, 2016.

[4] Ibid.

[5] Rfi.nic.in, "Rifle Factory Ishapopre", http://www.rfi.nic.in/, accessed on July 19, 2016.

[6] Hal-india.com, "Our History", http://www.hal-india.com/Our%20History/M__111, accessed on July 20, 2016.

[7] Globalsecurity.org, "Vijayantha", http://www.globalsecurity.org/military/world/india/vijayanta.htm, accessed on July 20, 2016.

[8] Scribd.com, "Naval Construction in India", https://www.scribd.com/doc/6346892/Naval-Construction-in-India, accessed on July 20, 2016.

[9] Rajat Pandit, "India remains world's largest arms importer", http://timesofindia.indiatimes.com/india/India-remains-worlds-largest-arms-importer/articleshow/46591086.cmsremains-worlds-largest-arms-importer/articleshow/46591086.cms, accessed on July 20, 2016.

[10] Vivek Raghuvanshi, "Indian Air Force Inducts Indigenous Tejas Aircraft", http://www.defensenews.com/story/defense/international/asia-pacific/2016/07/01/tejas-india-air-force-flying-daggers/86592274/, accessed on July 20, 2016.

[11] Ibid.

[12] Shushant Singh, "In fact: 49 years before Tejas, India had its own fighter — Marut", http://indianexpress.com/article/explained/tejas-hf-24-

marut-tejas-combat-aircraft-indian-air-force-2894021/, accessed on July 20, 2016.

[13] Indiandefencereiview.com, "Light Combat Aircraft 'Tejas' inducted into No 45 Squadron of Indian Air Force", http://www.indiandefencereview.com/news/light-combat-aircraft-tejas-inducted-into-no-45-squadron-of-indian-air-force/, accessed on July 20, 2016.

[14] Ibid.

[15] Ibid.

[16] M Ahmed, "Sanctions Raise Cost Of Lca Development", http://www.business-standard.com/article/specials/sanctions-raise-cost-of-lca-development-198061001041_1.html, accessed on July 20, 2016.

[17] Air Marshal Philip Rajkumar *The Tejas Story Light Combat Aircraft Project* Lordson Publishers Pvt Ltd, Delhi, (2008) Pp 19-92

[18] "LCA Tejas to have Israeli radar due to problems with indigenous technology" available at website http://www.8ak_india_defence_news/2009/03/lca-tejas-to have-israeli-radar-due-to-problems-with-indigenous-technology.html last accessed on July 20, 2016.

[19] PTI, "HAL supplied poor MiG spares: report", http://articles.economictimes.indiatimes.com/2002-05-13/news/27337046_1_mig-21-quality-spares-iaf, accessed on July 20, 2016.

[20] Wordpress.com, "*HAL HTT-40 Trainer Aircraf",* https://thaimilitaryandasianregion.wordpress.com/2016/06/02/hals-indigenous-trainer-aircraft-htt-40-makes-first-flight/, accessed on July 20, 2016.

[21] Pib.nic.in, "IAF Inducts Basic Trainer Aircraft Pilatus PC 7 MKII", http://pib.nic.in/newsite/PrintRelease.aspx?relid=96325, accessed on July 20, 2016.

[22] ANI, "BrahMos Aerospace successfully demonstrates integration of supersonic cruise missile BrahMos on Su-30MKI", http://www.business-standard.com/article/news-ani/brahmos-aerospace-successfully-demonstrates-integration-of-supersonic-cruise-missile-brahmos-on-su-30mki-116062500266_1.html, accessed on July 20, 2016.

[23] Indiandefencenews.in, "Rustom-II UAV To Be Tested In Chitradurga", http://www.indiandefensenews.in/2016/07/rustom-ii-uav-to-be-tested-in.html, accessed on July 20, 2016.

[24] Ajai Sghukla, "Missile test an urgent step towards defending IAF bases", http://www.business-standard.com/article/economy-policy/missile-test-an-urgent-step-towards-defending-iaf-bases-116070100021_1.html, accessed on July 20, 2016.

[25] Ibid.

[26] Ibid.

[27] ANI, "Defence Minister Parrikar hands over torpedo 'Varunastra' to Indian Navy", http://www.newindianexpress.com/nation/Defence-Minister-Parrikar-hands-over-torpedo-Varunastra-to-Indian-Navy/2016/06/30/article, accessed on July 20, 2016.

[28] PTI, "Gun Carriage Factory hands over 3 'Dhanush' guns to Army", http://www.thehindu.com/news/national/gun-carriage-factory-hands-over-dhanush-guns-to-army/article8862254.ece, accessed on July 20, 2016.