



ASSURING INDIA'S STRATEGIC SECURITY

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India's weapons research and development (R&D) efforts by the Defence Research and Development Organisation (DRDO) have often fallen short of the expectations of its military forces. An examination of the entire military R&D undertaken since 1947 brings this stark fact into sharp relief. However, there are a few notable exceptions to this. One of these is the Integrated Guided Missile Development Program (IGMDP).ⁱ The other is the design and building of warships with involvement of the Indian Navy (IN). Indian Space Research Organisation (ISRO) also has a good track record in development of satellite launchers as well as satellites for several applications. These success stories hold out promise for improvements in the military R&D and manufacturing sectors in the near to medium term future.

Background and Analysis

In the continuing success story of missile developments that commenced under the IGMDP the latest landmark planned and conducted successfully on 02 Dec 2014 is the fifth test of the 4000km range Agni-IV ballistic missile by India's Strategic Forces Command (SFC).ⁱⁱ This test is expected to validate the missile's reliability and result in its induction into the nation's strategic arsenal. SFC has been carrying out regular training test launches of the earlier missiles ranging from the relatively short range Prithvi series and earlier marks of the Agni missile.ⁱⁱⁱ Such regular tests serve to ensure that SFC personnel are fully trained and tested to carry out their operational tasks if and when called upon to do so. In addition, random test launches of missiles selected at random from production batches serves as a quality control measure and leads to assuring the

forces as well as the country of their reliability and readiness for use. These launches also convey a message of readiness to potential adversaries. During the development phase of missiles these are test launched by scientists who developed the missiles in order to check that all systems are working as planned. The level of intimate knowledge that the designers and builders have of the missile and its systems is of course unmatched. Once the missile is proven as working as planned it is offered for trials by the final users who utilise their manpower that is trained for the missile handling and launch tasks but of course who cannot possess the level of knowledge about the weapon as its designers do. Once the user is able to handle the missile effectively, it is considered ready for induction into the active arsenal of the country. The Agni-V missile has undergone two development tests already that are expected to lead to user trials followed by induction into service in a few years' time. On 02 Dec 2014 the Agni-IV missile is planned to be test fired by SFC. This will be the fifth test launch of this missile. It is likely as per the media that this missile will be ready for induction into active service after this launch unless problems are encountered. The current Agni missiles in service include the Agni-I to Agni-III which have ranges from 700 km till 3,500 km with a one tonne payload.^{iv} The Agni-IV will extend this strike range to 4,000 km with a one tonne payload. Of the Agni-IV's earlier trial launches all except the very first met all mission objectives, leading to the expectation that this launch should proceed well and the missile will soon join the active arsenal that is under the SFC. The Agni-V is also likely to be test launched for the third time later in December 2014. The Agni-V would require going through at least five successful test launches before being considered ready for induction into service.

The Future Scenario

Till such time as Agni-V is ready the longest range missile with SFC is likely to be the 4,000 km range Agni-IV. Other ballistic missile developments underway include the K-15 and K-4 which are variants of the current land based ballistic missiles meant for launch from nuclear powered submarines of the Arihant class.^v In addition to ballistic missiles ranging from short range ballistic missiles (SRBMs), Medium Range Ballistic Missiles (MRBMs), and Intermediate Range Ballistic Missiles (IRBMs) there are random mentions in media of development of an Intercontinental Ballistic Missile (ICBM) also.^{vi} The development of the Nirbhay subsonic cruise missile is also continuing in parallel. The Nirbhay was successfully tested to its planned approximately 1,000 km range earlier this year.^{vii} The short range Brahmos supersonic cruise missile is already in service

on warships as well as with the Indian Army (IA). The air launched version is under integration with the Sukhoi Su-30MKI aircraft.^{viii}

The successful development of these missiles serves to add to the country's security. It is possible to defend against some missiles through development of suitable counter systems such as Ballistic Missile Defence (BMD) systems and advanced sensors and weapons able to detect and engage low flying low signature cruise missiles. These advanced anti-missile technologies, however, come at a very high cost and limited effectiveness. The fielding of a mix of ballistic missiles of various ranges launched from land as well as the sea as well as a mix of cruise missiles makes the other party's task of defending against them that much more difficult. Such a complementary mix of different types of missiles serves to make the point to the potential adversary that despite his best efforts to intercept our missiles, some are bound to reach their targets. These missiles are also backed up with long range fighters able to carry a varied mix of payloads. This assurance of our being able to effectively address targets even deep within his territory gives credence to our deterrent posture and helps maintain peace as required by the country's development needs. In this manner the investment into these military technologies, often erroneously assumed to be wasteful expenditure as it does not produce a hard product that can be sold to the population at large, is actually a great facilitator of the country's economic progress. These military specific products of the IGMDP and DRDO actually could be said to produce a sizeable portion of the nation's Gross Domestic Product (GDP) as in their absence there might be no scope or room to generate any GDP at all. Indigenous products also serve to generate jobs and employment within the country thus contributing further to the country's GDP.

The challenge ahead is twofold. Firstly DRDO requires working at improving the accuracy as well as survivability of the missiles. Development of technologies such as multiple independently targetable re-entry vehicles (MIRVs) and Manoeuvrable re-entry vehicles (MARVs) would ensure greater lethality and survivability making these missiles more lethal. Application of low observable (LO) technologies would also reduce the probability of their being intercepted.

In a broader context the powers that be would gain from a critical examination of the missile program to cull out the factors that made it a success. This learning would be of use in

improving the performance of other sections of the country's R&D efforts to develop land and air systems indigenously.

Conclusion

India's defence R&D effort has usually not been able to deliver equipment required by the armed forces. One notable exception to this is the IGMDP. The Prithvi and Agni-I to Agni-III missiles are already in service and boast characteristics at par with the best in the world. On 02 Dec 2014 the Agni-IV is to be test launched for the fifth time while the Agni-V, Sagarika K-15, K-5, and Nirbhay remain under development and the Brahmos is also in service. The mix of missiles already developed and under development provides a depth of capability sufficient to deter our opponents effectively. In the near future efforts are likely to improve the accuracy and survivability of these weapons. The learning from the IGMDP could also be applied in other sectors of defence R&D.

(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))

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ⁱ Neha Kumar, "DRDO's Integrated Guided Missile Development Programme", <http://www.ipcs.org/article/military/drdo-integrated-guided-missile-development-programme-2480.html>, accessed on 02 Dec 2014.

ⁱⁱ Rahul Singh, "China-centric Agni-IV missile to be tested today", <http://www.hindustantimes.com/india-news/china-centric-agni-iv-to-be-tested-today/article1-1292278.aspx>, accessed on 02 Dec 2014.

ⁱⁱⁱ Saurav Jha, "'Agni II test by Strategic Forces Command proves reliability'", <http://m.ibnlive.com/blogs/sauravjha/2976/63778/agni-ii-test-by-strategic-forces-command-proves-reliability.html>, accessed on 02 Dec 2014.

^{iv} Ibid.

^v "India's K-15 Sagarika Submarine Launched Ballistic Missile Completes Developmental Tests", http://defense-update.com/20130127_k5_slbm_complete_tests.html, accessed on 02 Dec 2014.

^{vi} Zachary Keck, "'India Is Developing Its First 'Real' ICBM'", <http://thediplomat.com/2013/09/india-is-developing-its-first-real-icbm/>, accessed on 02 Dec 2014.

^{vii} "India successfully test-fires cruise missile 'Nirbhay'", <http://www.thehindu.com/news/national/indigenously-developed-cruise-missile-nirbhay-testfired/article6509942.ece>, accessed on 02 Dec 2014.

^{viii} "Russian Deputy Prime Minister Dmitry Rogozin praises BRAHMOS Joint Venture", <http://www.brahmos.com/>, accessed on 02 Dec 2014.