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Issue Brief

Harnessing Cutting-Edge Technology: Lessons from Project Beta

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Summary

Project Beta successfully developed a handheld tactical computer intended for use at the infantry platoon level. The project, however, was shelved subsequently. Project Beta's successful collaboration model—uniting research institutions, academia and private enterprises—offers a blueprint for strengthening Atmanirbhar Bharat in the defence sector.

Project Beta was a unique effort in Indian defence innovation, marked by a collaboration between academia, industry and the Indian Army. Despite ambitious timelines and evolving requirements, Project Beta successfully developed SATHI (Situational Awareness Tactical Handheld Interface), a small palm-sized or handheld tactical computer intended for use at the infantry platoon level. Just as the world was witnessing the US Army's technological prowess, equipping soldiers with Personal Digital Assistants (PDAs) for enhanced battlefield awareness during the Iraq War of 2003, the Indian Army embarked on testing its own ground-breaking handheld PDA, SATHI.

This ambitious project, sought to equip the Indian infantry with cutting-edge technology that was far ahead of its time. The project sought to combine several technologies such as

> Geographical Information System, Global Positioning System and Wireless Networking, customized for use by Infantry troops deployed in Counter Insurgency Operations. The project is aimed at developing a single low-cost hardware platform to meet the Infantry requirements of navigation, map reading, radio communications and information management, so that situation awareness and command and control in close combat situations are immensely facilitated.[1]

The Ministry of Defence (MoD) pointed out that the project was the 'first R&D project initiated by the Army with no precedence or parallel'.[2] The MoD highlighted that maintenance of command and control was the most difficult part in successful execution of operations by the Infantry. The MoD noted that the SATHI device could help in reducing casualties in counter-insurgency tasks and enable cohesive operations.

Looking at it retrospectively, the SATHI device was far ahead of its time when it was conceived and delivered in 2005. SATHI packed a lot into an 875-gram rugged set that was smaller than a brick. The solar-powered PDA ran on a 128-bit encrypted system, a Linux program, and was capable of withstanding temperatures between -20°C and +70°C. It had a 5 km range, a GPS receiver, and a 24-hour battery life. It supported both voice and text communication for devices deployed in the mission area. Its software-controlled radio allowed regular updates of device positions, messages and map markings over the entire network, either directly or by relay.[3]

The password-protected device could even act as a decoy if it fell into enemy hands. If unauthorised attempts were made to log in, the unit could reveal the position of the person attempting the break-in to friendly troops. SATHI represented the mastery

[1] **"Annual Report, 2004-05"**, Ministry of Defence, Government of India, pp. 36–37.
[2] Ibid.
[3] Sandeep Unnithan, **"Why the Army's Changed Mindset on Indigenous Technology is a Relief"**, *India Today*, 21 October 2019.

of technological change and leveraging existing technology and industry to our advantage. It delivered a state-of-the-art device comparable to the best in the world, showcasing the potential of Indian defence innovation.

The device was GPS-enabled, with built-in radio communication, pre-loaded GIS, and a wireless data network to provide soldiers with real-time location tracking, navigation and secure communication on the battlefield. With a 24-hour battery life, 120 initial devices were tested by the Rashtriya Rifles Sector in J&K, and the SATHI device provided a critical technical edge in the increasingly electronic battlefield scenario.

The SATHI device received high praise from top military officials and even the then Hon'ble President Dr A.P.J. Abdul Kalam, with plans underway to expand its deployment and further refine its capabilities, which were approved by the Director General of Military Operations (DGMO). An additional order for 1,300 devices was cleared by the DGMO.[4] Despite initial success and promising results, Project Beta was terminated around 2007 in favour of commercial off-the-shelf (COTS) solutions. This decision, as highlighted by analysts such as Bharat Karnad, exemplified a recurring pattern in India's missed opportunities in efforts to achieve indigenous technological self-reliance.[5]

The cancellation of Project Beta, despite its initial success and potential for further development, highlights the challenges faced by indigenous defence innovation in India. It also underscores the missed opportunity to capitalise on a home-grown solution that was ahead of its time, and could have potentially transformed the capabilities of the Indian infantry. The closure of Project Beta, therefore, represented a significant opportunity cost, hindering India's potential to become a leader in military technology and innovation.

Project Beta and the Simputer

Project Beta originated in 2000 with the Late Prof. Roddam Narasimha's vision to empower the infantry through technology. Narasimha's proposal, inspired by the challenges faced by soldiers in Jammu and Kashmir, aimed to improve situational awareness, communication and decision-making on the battlefield. The project gained momentum with the emergence of the Simputer,[6] a revolutionary handheld

[4] Ibid.
[5] Bharat Karnad, *Why India Is Not A Great Power (Yet),* New Delhi, Oxford University Press, 2015, pp. 321–324.
[6] The Simputer, a revolutionary handheld device, was designed by a team of scientists from the Indian Institute of Science (IISc) in Bangalore, led by Swami Manohar, V. Vinay and Shashank Garg. PicoPeta was responsible for the manufacturing and commercialisation of the Simputer. It garnered international acclaim, including being listed by *Time Magazine* and *The New York Times* in 2001 as a technology poised to change the world. Its ground-breaking features such as a touchscreen interface, handwriting recognition, and text-to-speech capabilities, were ahead of their time and are now considered standard in modern mobile devices.

device designed for farmers, which garnered international recognition. The Simputer's affordability, user-friendly interface and advanced features made it an ideal foundation for a military-grade tactical device. By integrating GPS, wireless communication and battlefield mapping functionalities, the Simputer could be transformed into a powerful tool for soldiers on the front lines.

Project Beta was thus launched in 2003 with the ambition of bridging the gap between India's IT prowess and its military capabilities down to the platoon level. It aimed to leverage existing technologies and the expertise of academia and industry to deliver a cost-effective and customised solution for the Indian infantry. The project's success would not only enhance the Army's operational effectiveness but also serve as a testament to India's growing prowess in defence technology innovation. Project Beta thus became a significant initiative by the MoD focused on adapting the Simputer, a low-cost revolutionary handheld device, for military use at the platoon level.

A high-level steering committee, chaired by the Scientific Advisor to the Raksha Mantri (SA to RM) and comprised of leaders from diverse sectors such as the Chairman of Indian Space Research Organisation (ISRO), the Atomic Energy Commission (AEC), the Director of the Centre for Artificial Intelligence and Robotics (CAIR), the Deputy Chief of Indian Army and Army HQ Tactical Command and Communication and Intelligence (TacC3I) Directorate, was established to oversee this important project.[7] The involvement of these organisations highlighted a comprehensive collaboration between the government, academia and the private sector to harness technology for national defence.

The Indian Army's funding of Project Beta underscored the military's recognition of the Simputer's potential to transform battlefield technology. This comprehensive approach, involving collaboration between the military, industry and academia, aimed to transform the Simputer into a powerful tool for the Indian Army, highlighting the country's commitment to technological innovation in defence. Lt Gen S.S. Mehta, PVSM, AVSM, VSM, who was the Beta Executive Committee (BEC) Chair, played a pivotal role in identifying the Simputer's military applications and championing its customisation to cater to the specific needs of the infantry. This proactive approach, coupled with the emphasis on leveraging India's IT industry and defining military requirements, demonstrated the country's commitment to innovation and self-reliance in defence technology.

The BEC comprised representatives from various sectors, including the National Institute of Advanced Studies (NIAS), Defence Finance, ADG Information Systems, CAIR (representing DRDO), PicoPeta and Encore Software. Day-to-day operations

[7] The author served as the focal point for Project Beta from its inception till 2006 when he joined Ministry of Defence. The Army's TacC3I Directorate was renamed as Directorate General Information Systems (DGIS) in May 2004. See **"Annual Report, 2004-05"**, Ministry of Defence, Government of India, p. 35.

were managed by the Beta Project Management Team (BPMT), a dedicated group of officers with field experience, including Col K.P.M. Das (Signals) (who headed the project), Lt Col P.R. Menon (Signals), Maj Amitabh Roy, VrC, SM, and Bar of Garhwal Rifles, and Maj S.S. Wirk of JaK Light Infantry (LI).

The project's success can be attributed to the close collaboration between the BPMT and the manufacturers, Encore Software, in Bangalore. This unique user–manufacturer coordination, unusual for such projects, allowed for efficient problem-solving and rapid development, resulting in the project's completion within a short span of 18 months. The close relationship between the project team, which included officers with battle experience and accomplished signal officers from the Indian Army, and the manufacturers fostered a highly productive environment that contributed to the project's overall success.

Recent Initiatives and Atmanirbhar Bharat

Project Beta serves as a cautionary tale, underscoring the importance of nurturing indigenous innovation, investing in long-term research and development, and fostering a robust ecosystem for technological advancement. It highlights the need to learn from past mistakes and avoid over-reliance on external solutions. It also offers valuable lessons for the Indian Army's recent steps towards Atmanirbharta. Recent initiatives by the Indian Army, such as the 'Make in India' programme, defence industrial corridors, and collaborations with DRDO and academia, demonstrate a renewed commitment to Atmanirbharta. These efforts, coupled with a changing mind set among military leaders, offer hope for a future where indigenous innovation is not only embraced but actively championed.

For Atmanirbhar Bharat to succeed, India must invest in cultivating domestic talent and capabilities through robust research and development programmes, incentivising domestic manufacturing, and establishing a resilient defence industrial base. This endeavour necessitates a sustained, long-term vision and unwavering commitment to indigenous innovation, with consistent leadership support and adequate funding.

Creating a thriving ecosystem for innovation is paramount. This entails fostering collaboration, mentorship and resource-sharing initiatives, such as iDEX, defence innovation hubs and academic partnerships. It is also imperative to learn from past failures of implementation, like Project Beta, by incorporating mechanisms for analysing mistakes and identifying areas for improvement into Atmanirbhar Bharat plans. Reducing reliance on foreign solutions, which contributed to the decision to terminate Project Beta, is essential for achieving national security and technological self-reliance under Atmanirbhar Bharat.

Project Beta's successful collaboration model—uniting research institutions, academia and private enterprises—offers a blueprint for strengthening Atmanirbhar Bharat in the defence sector. India should harness the combined expertise and resources of diverse stakeholders to enhance indigenous capabilities, accelerate defence technology development and reduce reliance on foreign suppliers, stimulate economic growth, and foster technology transfer and skill development within the country.

India needs to adopt a more holistic and long-term approach to defence technology development. The following need to be the essential elements that encompass defence technology development.

- *Stable Funding*: Ensuring stable and predictable funding for critical projects is crucial to prevent disruptions and compromises.
- *Clear Priorities*: Defining clear priorities and aligning them with national security goals will help avoid unnecessary shifts in focus. There should be no mid-course cancellation of projects unless due to sinking costs.
- *Support for Domestic Innovation*: Encouraging and supporting domestic research and development is essential for building a self-reliant defence industrial base.
- *Streamlined Decision-Making*: Efforts should be made to streamline the decision-making process and reduce bureaucratic hurdles to ensure timely project implementation.
- *International Collaboration*: Strategic international collaborations can provide access to technology and expertise that may not be readily available domestically.

India can bolster its defence capabilities and achieve self-reliance in critical technologies, ultimately enhancing national security, by strategically leveraging global expertise while nurturing domestic innovation. Combining the expertise and resources of diverse stakeholders can streamline the innovation cycle, resulting in cost-effective solutions that leverage the strengths of each partner. Key areas that require such a collaborative approach include cyber security, space technology, unmanned systems, artificial intelligence and robotics, materials science, 6G technology, quantum technologies, alternative fuels and dual-use technologies.

By learning from the past and building on these lessons, India can ensure that future defence innovations are not only developed but also successfully deployed and sustained, contributing to a stronger and more self-reliant nation. India's pursuit of Atmanirbhar Bharat in defence technology is a multi-faceted endeavour, requiring strategic vision, robust collaboration, sustained investment and a commitment to innovation.

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