io by HFCL

Case Study

HEMRL - Research

Defense's Make in India Shift

Indigenously Engineered Switches Power HEMRL's Excellence

Background

High Energy Materials Research Laboratory (HEMRL) stands as one of the premier research facilities within the Defense Research and Development Organisation (DRDO), situated in Pune, Maharashtra. Established with the aim of advancing research and development in the domain of high-energy materials and associated technologies, HEMRL holds a distinguished reputation for its contributions to defense science. HEMRL's primary objective revolves around the formulation, design, and development of a wide spectrum of high-energy materials critical for defense applications. These materials encompass propellants, high explosives, pyrotechnics, polymeric substances, liners/insulators, and various other specialized compounds. Through a blend of basic and applied research, HEMRL delves into the physicochemical and combustion characteristics of these materials, aiming to enhance their performance, reliability, and safety.

With a workforce comprising approximately 600 highly skilled professionals, including chemists, physicists, mathematicians, and engineers specialized in chemical, mechanical, and electronic domains, HEMRL has a formidable intellectual and technical resource base. The laboratory serves as a postgraduate center for both basic and applied research, nurturing talent in defense science.

HEMRL's infrastructure is equipped with state-of-the-art research facilities and production units tailored for the study and synthesis of high-energy materials. These facilities encompass a diverse range of capabilities, including measurement of flame intensity and temperature, investigation of detonation phenomena, determination of mechanical properties of propellants and polymers, static rocket testing and non-destructive testing of materials.

HEMRL operates under stringent quality standards and holds an ISO-9001:2015 certification, underscoring its commitment to excellence in research and development practices. Furthermore, the laboratory's contributions to defense science have earned it recognition as a crucial asset within the DRDO ecosystem.

The Indian government has set a target of achieving a level of 70% self-reliance in defense production by 2027. [1]

The Indian government has introduced several policy initiatives to promote domestic defense manufacturing, including increasing the Foreign Direct Investment (FDI) cap in the defense sector to 74% through the automatic route.[2]

We are proud to have provided HEMRL with our indigenous switches, ensuring reliability, security, and seamless communication for their critical defense research. This successful deployment reinforces our commitment to supporting national security and domestic innovation.

Anand Kumar
(Associate Vice President, Communications)

Overview

HEMRL is an integral part of the Defense Research and Development Organisation (DRDO), focusing on advancing high-energy materials and associated technologies vital for national security. Its mission is diverse, centered on driving the boundaries of defense science by combining theoretical insights with practical applications.

Day-to-day operations at HEMRL are heavily reliant on a robust network infrastructure to facilitate seamless communication and collaboration among researchers and engineers. Various laboratory analytical instruments and research facilities require network connectivity for data collection, analysis, and sharing. This infrastructure supports activities ranging from measuring flame intensity and temperature to conducting static rocket testing and non-destructive material testing. In this context, switches play a crucial role by providing the necessary connectivity to integrate these instruments into the network infrastructure. They ensure efficient data transmission, enabling real-time data collection and collaborative analysis. Security is paramount at HEMRL due to the sensitive nature of its research and the critical role it plays in national defense. Protecting research data, intellectual property, and classified information is essential to safeguarding national security interests. Therefore, the replacement of outdated switches with indigenous alternatives not only addresses security concerns but also aligns with the Make in India initiative, supporting domestic manufacturing and innovation.

In 2022-23, the Indian defense industry achieved a record production level of Rs. 1.07 lakh crore (around $13 billion), of which 68% was from the public sector and 32% from the private sector.[3]

India's defense exports have grown nearly six-fold in the last six years, reaching a value of Rs. 16,000 crore (around $2 billion) in 2022-23.[4]

Challenge

HEMRL, a critical research facility under DRDO, faced the challenge of replacing their outdated 8-Port switches which were reaching End of Life status. Security was a paramount concern due to the sensitive nature of their work in defense research. Additionally, in line with the Make in India initiative, there was a requirement for OEM Indian switches to replace foreign ones, aligning with the focus on domestic indigenous technology.

Solution

To address HEMRL's requirements, we provided a comprehensive solution centered around deploying switches from HFCL, an Indian original equipment manufacturer (OEM) specializing in network infrastructure solutions. HFCL's indigenously engineered 8-port non-PoE switches were the perfect fit, enabling HEMRL to comply with the government's Make in India initiative while addressing their networking needs. In total we provided 60 non-PoE Switches. These switches offered the necessary functionality and reliability while adhering to the Make in India initiative. Their compatibility with HEMRL's existing infrastructure and the robust security features met the stringent requirements of a defense research facility.

The switches feature all Gigabit ports access with options for both copper and fiber termination, ensuring high-speed data transmission across the network. With support for Auto MDIX and Auto-Negotiation on RJ45-based ports, these switches offer seamless connectivity and adaptability to varying network configurations. In alignment with HEMRL's security priorities, the switches are powered by fully indigenous NiOS, a secured operating system with a hardened protocol stack.

Managed Switches

8-Port Non-PoE Switches

This includes robust security features such as L2/L3/L4 ACL, DHCP snooping, Dynamic ARP Inspection, and 802.1x Port Security with dACL. These measures help safeguard HEMRL's sensitive research data, intellectual property, and classified information, ensuring compliance with stringent security standards.The implementation process began with the assessment of HEMRL's network infrastructure and requirements. A detailed plan was devised to ensure minimal disruption to ongoing operations. Delivery of the switches was completed within three weeks, followed by swift installation and configuration within another four weeks.

The timely execution ensured continuity of operations without compromising security or efficiency.By choosing HFCL's indigenously developed switches, HEMRL not only addressed their immediate networking requirements but also demonstrated a strong commitment to the government's Make in India initiative. This decision aligns with the broader goal of promoting domestic manufacturing capabilities and reducing reliance on foreign vendors in critical sectors such as defense research and development.

Result

01 The deployment of HFCL's switches ensure the integrity and confidentiality of sensitive defense research data.

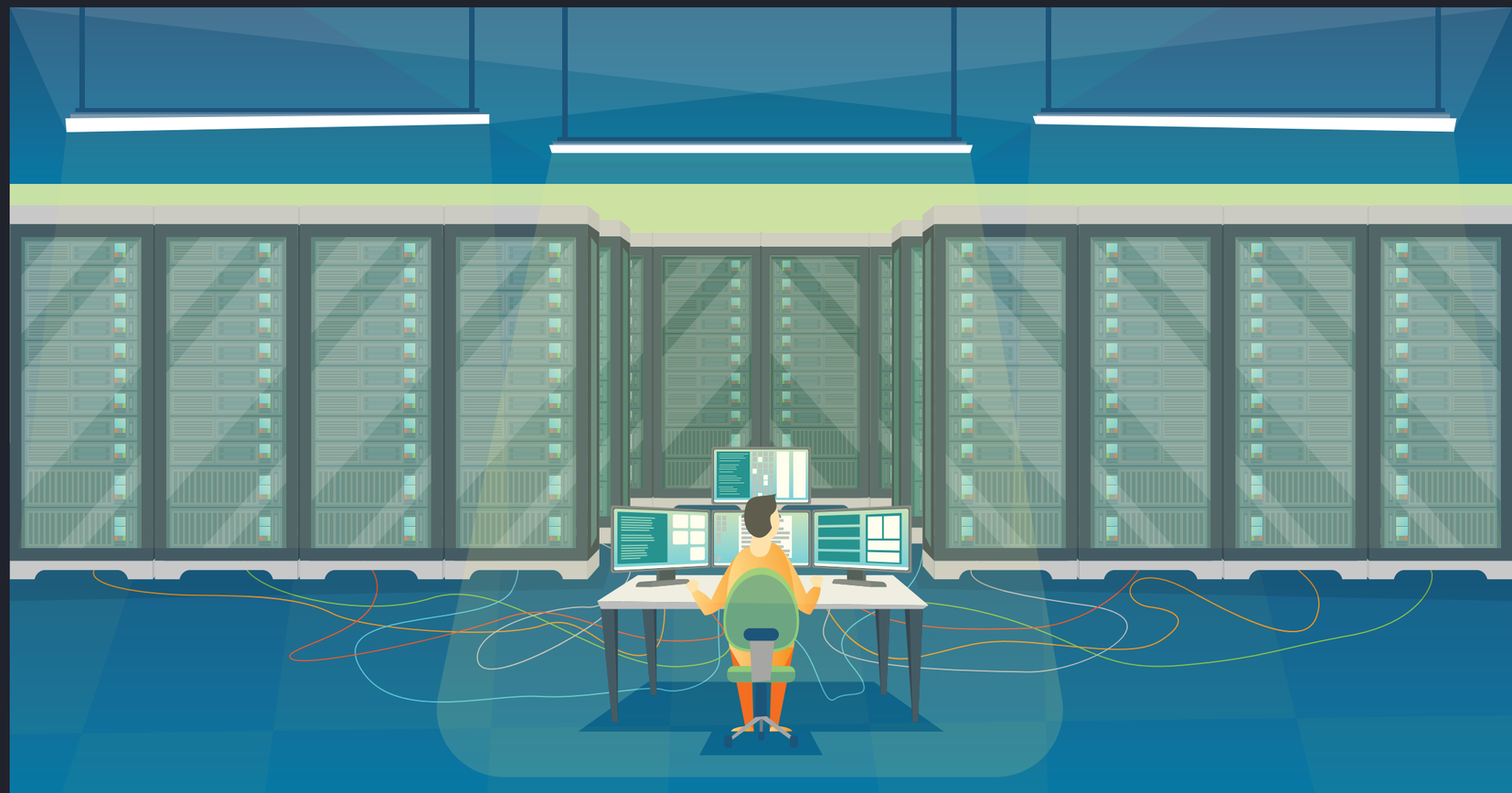
02 By opting for indigenous switches, HEMRL demonstrated its commitment to supporting domestic manufacturing and innovation.

03 The modernized LAN network equipped HEMRL with reliable connectivity, facilitating seamless communication and collaboration among research teams.

04 The scalable and robust nature of the deployed switches ensures that HEMRL's network infrastructure is equipped to meet evolving demands and technological advancements in defense research.

Conclusion

In conclusion, the successful deployment of HFCL's indigenous switches at HEMRL effectively addresses the challenge of replacing outdated infrastructure while ensuring security and aligning with the Make in India initiative. By upgrading to reliable switches, HEMRL enhances its network capabilities, thereby facilitating seamless communication and collaboration among researchers. This solution not only demonstrates HEMRL's commitment to national security but also supports domestic manufacturing and innovation.



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