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Editorial

Precision Across Borders — Thin Films, Thermal Systems, and a Culture of Care

Welcome to HHV World – August 2026, bringing together the latest engineering milestones, global engagements, innovations and organisational developments from across the HHV Group.

HHV Thermal Technologies (HHVTT) continues to extend its six-decade legacy in high-vacuum and high-enthalpy testing infrastructure, this time carrying that expertise beyond India’s shores with the design and export of a mid-size Hypersonic Ludwig Tunnel to a developed nation — a milestone that reflects the confidence built through two decades of work with India’s own space and aerospace testing programmes.

At HHV Advanced Technologies (HHVAT), the Thin Film Optics Division (TFED) continues to push the boundaries of precision photonics — from edge sensors that keep segmented mirror telescopes aligned to the atomic-scale control of the SAARA Atomic Layer Deposition platform and the vivid, durable colour engineering of the Opticoat-600 decorative coating system.

This issue also carries HHV Group’s continued presence on the world stage — from defence delegations in Rome and Brussels to photonics forums in Europe and the US — alongside the everyday work of building a safe, healthy, and inclusive workplace through Safety Week, Fire Safety training, International Women’s Day, and the celebration of HHV Group’s 62nd Foundation Day.

As always, we remain grateful to our employees, customers, collaborators, and partners for continuing to build technologies that push boundaries — responsibly, resiliently, and together.

CONTENTS



Taking Indian Photonics to the Global Executive Stage

4



Hypersonic Ludwig Tunnel for Global Markets

6



Precision Edge Sensors for Segmented Mirror Telescopes and Adaptive Optics

8



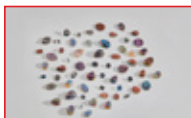
Coatings for Gaganyaan Viewports

9



Anti-Reflection Coatings on Silicon for Night Vision Optics

10



Opticoat for Decorative Coatings

12



SAARA ALD: Towards ISM 2.0

13



Corporate Events

14



Conference, Exhibitions, MoU

20

Taking Indian Photonics to the Global Executive Stage

HHV Group marked a significant milestone in its global photonics journey as Ms. Smriti Sakhamuri, Executive Director, HHV Advanced Technologies, joined the speaker programme at the EPIC AGM & Summit 2026, the premier executive gathering organised by the European Photonics Industry Consortium (EPIC)



Bringing together around 300 senior leaders from 30 countries, with approximately 85% of participants representing CEO-level leadership, the EPIC AGM & Summit serves as a high-level forum for shaping conversations around the future of the global photonics industry.

The 2026 programme combined the traditional EPIC Annual General Meeting, focused on strategic themes including innovation, entrepreneurship, investment and emerging markets, with the World Technology Summit, bringing together technology leaders to examine emerging challenges, trends and opportunities across photonics.

A Significant First for Indian Industry

Ms. Sakhamuri represented HHV Group as a speaker on April 30, 2026, standing out as the only speaker from India on the programme.

The participation was particularly significant for HHV as it marked the first time an Indian company was represented in a speaking slot at the EPIC AGM & Summit — placing an Indian-origin technology and advanced manufacturing group alongside global leaders shaping the industry's technology and business landscape.

Her presence reflected not only HHV's growing international engagement, but also the increasing relevance of India's capabilities within the global photonics and advanced manufacturing supply chain.

Showcasing Six Decades of Indian Technology Capability

During her address, Ms. Sakhamuri highlighted HHV Group's capabilities across precision optics, advanced thin-film coatings, vacuum technologies

and specialised manufacturing, supporting demanding applications in science, space, defence, medical and industrial sectors.

HHV's journey represents more than six decades of building specialised technologies in India — progressing from high-vacuum engineering to advanced optics, photonics, thin-film technologies and thermal processing solutions serving customers and technology programmes in India and international markets.

The interaction at EPIC created an opportunity to present these capabilities before decision-makers from across the global photonics ecosystem while demonstrating the depth of technology and manufacturing expertise being developed within India.

From Indian Manufacturing to Global Collaboration

Participation in international forums such as EPIC forms an important part of HHV Group's global growth journey.

Beyond showcasing technology capabilities, the summit enabled direct engagement with CEOs, technology leaders and industry decision-makers, opening conversations around future collaboration, technology partnerships, international supply chains and opportunities across European and other global markets.

For HHV, such interactions support the Group's objective of moving beyond being an equipment and component supplier to becoming a **long-term technology and manufacturing partner** for customers worldwide.

Building HHV's Global Technology Presence

Ms. Sakhamuri's participation at EPIC AGM & Summit 2026 reflects HHV Group's continued effort to strengthen its connections with the global optics, photonics and advanced-technology community.

As international industries increasingly seek resilient technology partnerships, specialised manufacturing capabilities and diversified supply chains, HHV is positioning its decades of engineering experience alongside India's rapidly expanding advanced-technology ecosystem.

The milestone represents both recognition of HHV Group's growing international presence and an opportunity to take Indian technology and manufacturing capabilities to an influential global platform — strength

strengthening the foundation for future partnerships and international collaboration.



Hypersonic Ludwig Tunnel for Global Markets

A Ludwig tunnel is an intermittent, short-duration supersonic/hypersonic wind tunnel — a ground-based test facility that puts India's space, aerospace, and missile programmes on par with international standards.



The Hypersonic Ludwig Tunnel is used to simulate the high-enthalpy hypersonic flow fields experienced by ascent and re-entry space vehicles. It evaluates the capability of materials used in space vehicles and validates their structural design. These facilities have become increasingly prominent for their mobility and operational convenience in collecting test data.

HHVTT's Contribution to Indian Space Industries

HHV Thermal Technologies (HHVTT) has played a pivotal role in India's aerospace and defence projects since 2005, notably by designing and manufacturing the dump tank and nozzles for shock wave experiments in aerodynamics at the Aeronautical Development Department, Indian Institute of Science (IISc), Bangalore. In 2007, HHVTT implemented a full-fledged hypersonic shock tunnel capable of recording Mach 10 at an Indian space industry ground-testing facility.

Building on these proven capabilities in national infrastructure projects, HHVTT commissioned a large hypersonic shock tunnel in 2012 to simulate hypersonic Mach numbers with a flow enthalpy of 12 MJ/kg for a typical run time of 1 millisecond — used to evaluate material capability and validate structural design for Indian space vehicles.

Exporting to Developed Nations

This experience has given HHVTT deep technical knowledge and the confidence to look outward — reflected in the recent design and manufacture of a mid-size Ludwig Tunnel for a developed nation.

A Ludwig shock tunnel is an efficient way of producing supersonic flow at a specified Mach number in air, without any additional heating of the flow, for short durations.



Fig.1. Mid-size Hypersonic Ludwig Tunnel, designed and manufactured by HHVTT.

The custom-built HHVTT mid-size Ludwig Tunnel specifications include:

Test Section / Dump Tank — where the test model is mounted for aerodynamic study

- Volume: 6 m³
- Size: 1750 mm ID × 2500 mm L
- Ultimate vacuum: 5×10^{-6} mbar

Converging & Diverging Contour Nozzles — horizontally mounted, producing Mach numbers of 4, 6, and 8

Horizontally Mounted Pipe — for vacuum and pressurisation

- Length: 80 m
- ID: 3 inches
- Pressure: 80 bar

These shock tunnels are used for research in high-speed flows, where shock tubes generate shock waves that propagate through the test gas, raising both its temperature and pressure.

Precision Edge Sensors for Segmented Mirror Telescopes and Adaptive Optics

Edge Sensors play a critical role in maintaining optical alignment by measuring the out-of-plane degrees of freedom of each mirror segment, namely piston, tip, and tilt.

These sensors are sensitive to even the slightest displacements caused by environmental and structural influences such as gravity, temperature changes, wind loading, and mechanical deformation. The sensor outputs are continuously processed by the telescope’s active optics control system, which adjusts the position of each segment through precision actuators. This real-time feedback loop maintains the mirror’s intended hyperboloidal geometry, delivering the optical accuracy required for world-class astronomical research.

HHVAT’s precision edge sensor coatings are carried out using advanced thin-film deposition followed by precision photolithography on low thermal expansion glass substrates. Designed for segmented mirror telescopes, they accurately measure and correct piston, tip, and tilt between adjacent mirror segments, enabling active optical alignment and maintaining a single, precisely aligned optical surface. The process offers excellent dimensional accuracy, coating reliability, and environmental durability, making it suitable for demanding astronomical and scientific applications.

Technical Specifications:

- **Substrate:** Low Thermal Expansion Glass (Zerodur, Clearceram)
- **Dimensions:** 75 × 50 mm lateral, other custom dimensions possible
- **Coating Stack:** Cr/Au or other custom stacks
- **Coating Thickness Non-Uniformity:** %10±
- **Pattern Tolerance:** 20± μm
- **Pattern Alignment Accuracy:** 30± μm
- **Qualification:** ASTM and MIL Standards

Applications

- Segmented mirror telescopes
- Active optics systems
- Astronomical observatories
- Scientific optical instrumentation
- Precision optical alignment systems



Fig.1. Precision Edge Sensor for segmented mirror telescopes.

Space Coatings for Gaganyaan Viewports

Optical coatings are advanced thin-film structures deposited on optical substrates such as glass, fused silica, and crystalline materials to precisely regulate the interaction of light with a surface.



Fig.1. Replica of Gaganyaan

By controlling reflection, transmission, and absorption characteristics at designated wavelengths, these coatings significantly improve the performance of optical systems used in aerospace, imaging, sensing, laser, and communication applications.

The optical response of these coatings is achieved through the careful design of layer thicknesses and refractive index contrasts, enabling selective wavelength filtering, enhanced transmission, superior reflection control, and multifunctional properties such as thermal regulation and electrical conductivity. High-vacuum deposition processes are employed to fabricate these coatings, ensuring exceptional accuracy, repeatability, and environmental durability.

HHVAT has developed state-of-the-art optical coatings for spacecraft crew cabin viewport windows that provide effective protection against harmful UV and IR radiation while maintaining high visible-light transmission and optical transparency. These coatings ensure clear observation of Earth and deep-space environments and have successfully passed rigorous qualification tests, including short duration high-temperature exposure up to 650 °C, validating their performance in extreme operating conditions.

Anti-Reflection Coatings on Silicon for Night Vision Optics

Night vision is the technology that, as the name indicates, enables one to view the surroundings and identify objects during the night or in low-light areas.

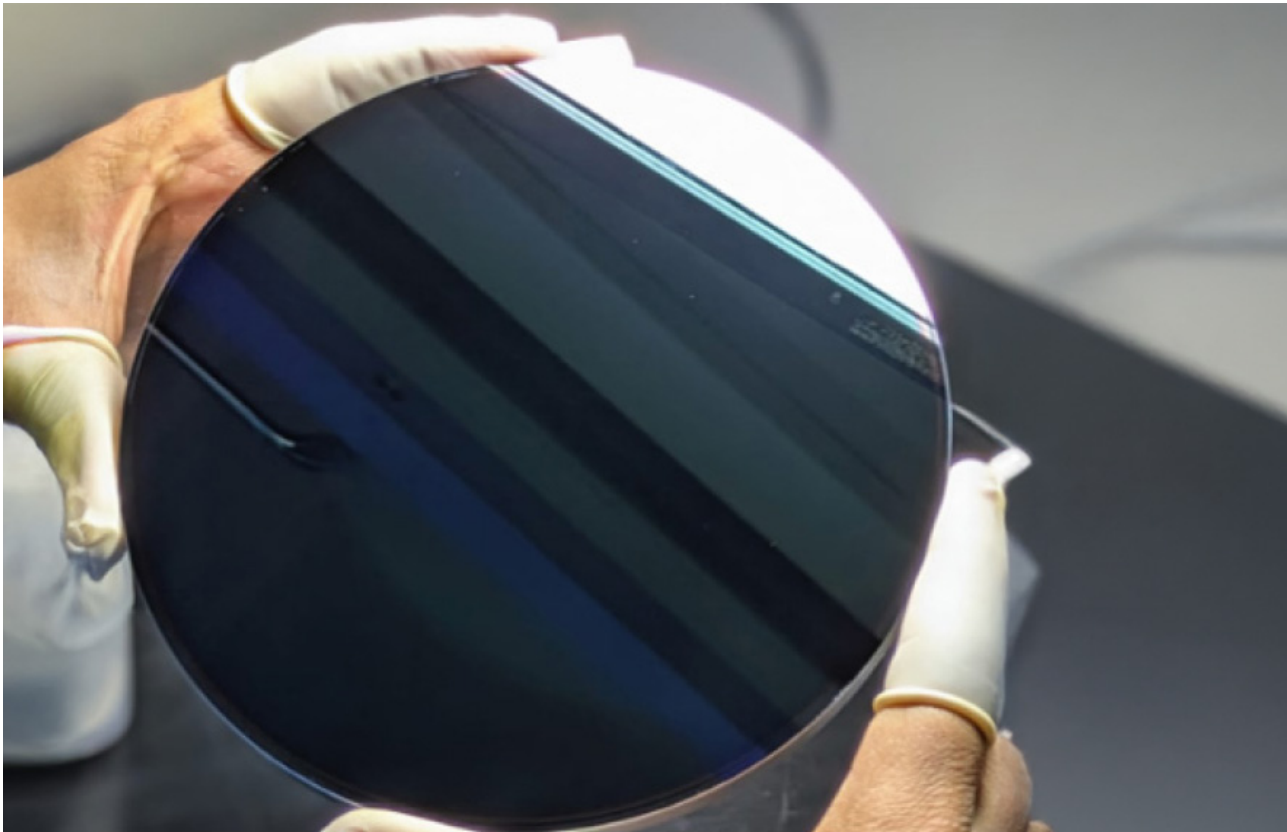


Fig. 1. Picture shows the $\Phi 150 \times 8$ mm HEAR coated Silicon window

Based on its purpose, this technology is being utilised in two different forms, namely, thermal imaging and image intensification. A thermal imaging system detects the infrared (IR) radiation emitted in the form of heat by different objects. Whereas image intensifiers take advantage of the ambient light available and convert that light energy into electrons that are amplified to give a more intense image of the object. The applications are in Defence, and commercial purposes such as surveillance cameras, navigation, demining, aviation, etc.

The **Mid-Wave Infrared (MWIR)** atmospheric transmission window (3–5 μm) has enabled the development of a wide range of electro-optical systems for imaging and sensing beyond the capabilities of the human eye. By exploiting this spectral region, modern infrared systems provide enhanced visibility in adverse environmental

conditions such as darkness, smoke, haze, and fog. Typical applications include thermal imaging systems, laser range finders, target acquisition systems, surveillance equipment, and infrared imaging sensors.

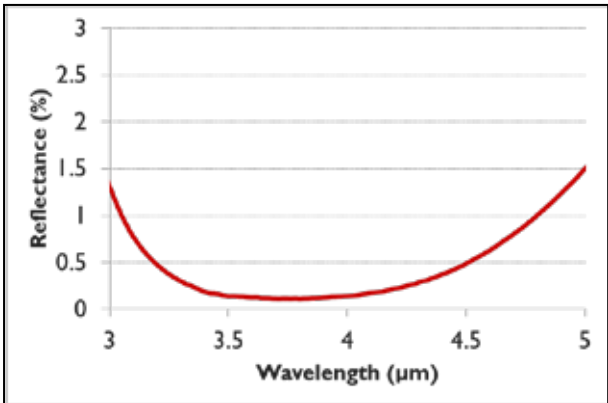
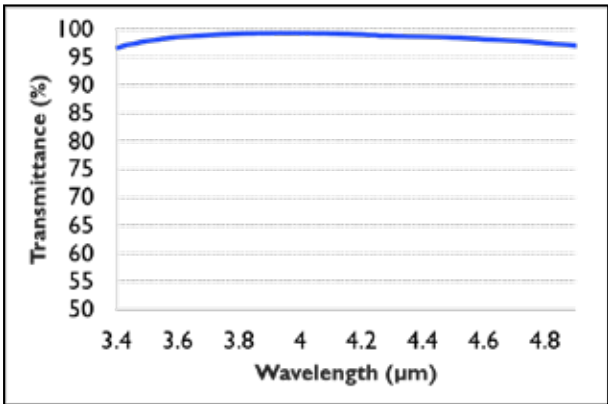
Anti-reflective (AR) coatings play a critical role in the performance of MWIR optical systems. Optical materials commonly used in this wavelength region, such as silicon, germanium, and zinc selenide, possess relatively high refractive indices, resulting in significant Fresnel reflection losses at each optical surface. For silicon, whose refractive index is approximately 3.42 in the MWIR region, the surface reflection is nearly 30 % per uncoated surface. A well-designed AR coating substantially reduces these reflection losses down to 0.5 % or lesser, thereby improving transmission, reducing stray reflections, and enhancing the overall signal-to-noise ratio of the imaging system.

Depending on whether the optics surface is exposed to the outside environment, or is on the inside of the optical assembly, there is a need for two kinds of AR coatings i.e., High Efficiency AR (HEAR) coatings and High-Durability AR (HDAR) coatings.

The HEAR coatings are utilised to get better overall transmission in the range of interest and have a lower durability specification and are coated on the inside surface of the optics which will not be exposed to the external environment. HDAR coating is done for obtaining high durability on the surface of the optics, which will be capable of withstanding the harsh environmental conditions, but will have a slightly lower spectral performance as compared to HEAR coating.

For many thermal imaging applications, the **3.6–4.9 μm** wavelength band is selected for AR coating design because the detector assembly typically incorporates an interference band-pass filter operating over the same spectral range. Depending on the application requirements, other operating bands such as **3.4–4.2 μm** and the broader **3–5 μm** atmospheric window are also specified.

At HHVAT, we have developed and qualified MWIR HEAR and HDAR coatings tailored for all three spectral bands. The coating design employs carefully selected infrared thin-film materials to achieve high transmission while maintaining excellent environmental durability. A dielectric or DLC (diamond like carbon) top layer is incorporated to improve mechanical robustness and enable the coating to satisfy the abrasion requirement.



W (μm)	3.4 to 4.2	3.6 to 4.9	3 to 5
T _{avg} (%)	>98	>98	>96
R _{avg} (%)	<0.2	<0.4	<0.5

Fig.2. Graphs showing the HEAR transmission and reflection performance of an HEAR coated Silicon window in three MWIR atmospheric transmission bands

Opticoat for Decorative Coatings

Precision photonics from atomic-scale films to telescope-grade alignment sensors and brilliant decorative coatings.



Fig.1. Colour coatings produced on the Opticoat-600 platform.

The application of colour coatings offers an effective means of enhancing the visual attractiveness and commercial worth of coated parts. In contrast to conventional colouring methods based on pigments or dyes, Physical Vapor Deposition (PVD) generates colour through optical interference within carefully engineered thin films. By depositing a series of nanometre-thick dielectric layers, selected wavelengths of visible light are reflected, resulting in brilliant and durable structural colouration.

The Opticoat-600 system is engineered for the deposition of decorative optical coatings. It is equipped with a six-pocket electron-beam gun for the sequential deposition of multiple coating materials, an ion gun for substrate cleaning and film densification, and a thermal evaporation source for metallic or auxiliary coatings. The system also incorporates advanced process features, including a precision thickness-monitoring system using a Quartz Crystal Monitor (QCM), a high-temperature substrate heating system, and controlled process

gas capability.

The system features a user-friendly auto mode capable of storing up to 100 coating recipes, enabling rapid process setup, consistent production, and easy retrieval of previously optimised process parameters. This recipe management capability significantly improves production efficiency, minimises operator error, and ensures excellent batch-to-batch reproducibility. These integrated features enhance coating adhesion, improve film density, and ensure precise control of coating materials and layer thicknesses, enabling the production of a wide range of brilliant and repeatable colours.

The coating process delivers excellent colour stability, high adhesion, improved scratch resistance, and enhanced environmental durability — enabling customised decorative finishes that significantly enhance the aesthetic appeal and commercial value of the coated jobs.

SAARA ALD: Towards ISM 2.0

Atomic Layer Deposition (ALD) has become a critical thin-film technology for advanced materials engineering and semiconductor manufacturing. As electronic devices continue to shrink and structures become increasingly complex, manufacturers require highly uniform, conformal and precisely controlled coatings at the atomic scale.



Fig.1. Atomic Layer Deposition Equipment

Unlike conventional deposition techniques, ALD delivers precise thickness control and highly conformal coatings, making it ideal for high aspect-ratio structures and ultra-thin, pinhole-free films. Through alternating, self-limiting precursor reactions, film growth is controlled at the atomic level, ensuring excellent uniformity even on complex three-dimensional components.

HHVAT has been developing and manufacturing fully automated ALD systems with both cross-flow and showerhead reactor configurations for flat and 3-D substrates. The systems support a range of high- and low-vapour-pressure precursors for the deposition of oxide, nitride and sulphide-based materials.

Expanding this capability, HHVAT has introduced the SAARA Thermal ALD platform. The system features a precision-engineered aluminium process chamber with integrated baking capability and can accommodate substrates up to 8 inches in diameter, through direct loading or an optional load-lock with telescopic transfer mechanism.

A specialised showerhead provides uniform distribution of precursor and reactant gases, including water vapour, oxygen, ozone and sulphur-containing reactants. The substrate holder supports temperatures up to 400°C, while the fixed showerhead-to-substrate geometry and corrosion-resistant platen help ensure repeatable and uniform deposition.

Process Development

Alongside equipment development, HHVAT continues to strengthen its ALD process capabilities through in-house research and validation.

Processes successfully developed and qualified include:

- Aluminium Oxide (Al_2O_3)
- Zinc Oxide (ZnO)
- Titanium Dioxide (TiO_2)
- Aluminium Nitride (AlN)
- Titanium Nitride (TiN)

These coatings have been demonstrated on both two-dimensional and three-dimensional substrates and characterised for structural, optical, electrical, mechanical and chemical properties.

Validation activities include substrate temperature-uniformity studies, film-thickness uniformity measurements, coating demonstrations on silicon wafers and complex components, and refractive-index characterisation.

Through the SAARA ALD platform, HHVAT continues to build indigenous thin-film deposition capabilities supporting advanced semiconductor, research and industrial applications as India moves towards the next phase of its semiconductor manufacturing ecosystem.

Safety Week 2026 at HHV Group — Reinforcing a Culture of Workplace Safety

Bengaluru, India | 2026 — HHV Group observed Safety Week 2026 with awareness activities and employee engagements focused on strengthening workplace safety, risk management, and responsible operational practices.

The initiative highlighted the importance of safety awareness and proactive prevention across operations, reinforcing that workplace safety remained a continuous commitment and an integral part of HHV’s organisational culture. Through such initiatives, HHV Group continued to promote a safe and responsible working environment for all employees.



Fire Safety & Emergency Handling Training at HHV Advanced Technologies

Bengaluru, India | 2026 — HHV Advanced Technologies Pvt. Ltd. conducted a Basic Fire Safety & Emergency Handling Training programme to strengthen workplace safety awareness and enhance emergency preparedness among employees.

The training covered fire prevention practices, fire extinguisher handling, evacuation procedures, and basic emergency response techniques through classroom sessions and practical demonstrations. The initiative reinforced the importance of proactive safety measures and responsible workplace practices. HHV Advanced Technologies Pvt. Ltd. continued to prioritise employee safety by promoting awareness, preparedness, and a strong culture of workplace safety across its operations.



International Women’s Day 2026 Celebration at HHV Group

Bengaluru, India | 2026 — HHV Group celebrated International Women’s Day 2026, recognising the contributions of women employees and reaffirming its commitment to diversity, inclusion, and an equitable workplace culture.

The celebration highlighted the importance of empowering women in technology and engineering while encouraging a supportive environment that enabled employees to contribute, grow, and excel. Through such initiatives, HHV Group continued to promote an inclusive workplace and strengthen its organisational culture.



HHV Celebrated 62 Years of Innovation and Excellence

Bengaluru, India | April 10, 2026 — HHV celebrated its 62nd Foundation Day, marking another milestone in the company’s journey of innovation, resilience, and technological excellence. The celebration brought together employees across all divisions to reflect on the organisation’s achievements and shared vision for the future.

The event was attended by the Board of Directors, including Managing Directors Nagarjun Sakhamuri and Prasanth Sakhamuri, Executive Director Smriti Sakhamuri, and Director Leela Amaraneni. A highlight of the celebration was the presentation of Long Service Awards and Rewards & Recognition Awards, honouring employees for their dedication and outstanding contributions. Scholarships awarded through the Sakhamuri Family Trust

further reflected HHV’s continued commitment to supporting education and nurturing future talent.

The celebration concluded with cultural performances and employee engagement activities that reinforced the spirit of One HHV, celebrating the company’s legacy while reaffirming its commitment to innovation, collaboration, and sustained growth.



Long Service and Rewards & Recognition Award presentations at HHV's 62nd Foundation Day celebration.

Annual Employee Health Care at HHV Group

Bengaluru, India | 2026 — HHV Group organised its annual Employee Health Care Initiative, reaffirming its commitment to employee well-being through preventive healthcare and workplace wellness. The health check-up initiative encouraged regular health assessments and promoted a safe, healthy, and supportive work environment for employees across HHV Advanced Technologies and HHV Thermal Technologies.

The programme provided employees with access to health screenings while creating awareness about preventive care and healthy lifestyle practices. The initiative reflected HHV Group’s continued focus on employee welfare and building a culture of care and safety across its operations.

HHV Group remained committed to fostering a healthy and supportive workplace through initiatives that enhanced employee well-being and engagement.



World Environment Day 2026: Green Innovation at HHV Group

Bengaluru, India | 2026 — HHV Group observed World Environment Day 2026 through plantation activities across its operations, reaffirming its commitment to sustainability and environmental responsibility. The initiative highlighted the importance of environmental conservation and encouraged employees to contribute towards creating greener workplaces.

The programme reflected HHV Group's continued focus on sustainable practices and environmental stewardship across HHV Advanced Technologies and HHV Thermal Technologies. Through such

initiatives, HHV Group continued to support responsible manufacturing and contribute to a more sustainable future.



Empowering Young Minds — Internship Program 2026 at HHV Advanced Technologies

Bengaluru, India | 22 June – 31 July, 2026 — Over the course of six enriching weeks, five talented interns — Kalyani P Madhavan, Badal Kumar, Preetika Singh, Rishabh Awasthi, and Pratit Mondal — immersed themselves in hands-on learning and practical exposure at HHV Advanced Technologies Pvt. Ltd. (HHVAT). The internship provided them with valuable opportunities to work closely with industry professionals, gain insights into advanced technologies, and understand real-world applications shaping the future of science and engineering.

The programme was conducted from 22nd June to 31st July 2026, reflecting HHVAT's continued vision of bridging academic learning with industrial experience. Through technical interactions, practical assignments, and mentorship, the interns gained a deeper understanding of the challenges and opportunities within the field.

The internship concluded with a valedictory session celebrating the interns' journey, achievements, and contributions throughout the programme. The event

included certificate presentations, interactions with mentors, and reflections on a rewarding learning experience for both the students and the HHVAT team.

Through initiatives such as this, HHV Advanced Technologies continued to foster innovation, encourage knowledge sharing, and nurture the next generation of scientific thinkers and technologists.



The HHVAT team with the 2026 summer interns at the close of the six-week programme.



HHV Advanced Technologies Showcased Decora at Indian Surface Finishing Expo 2026

Bengaluru, India | February 18–20, 2026 — HHV Advanced Technologies participated in the Indian Surface Finishing Expo 2026, showcasing Decora, its advanced decorative coating solution. The exhibition featured a curated portfolio of coated samples demonstrating superior finish quality, coating uniformity, and application versatility across industries including jewellery, sanitaryware, architectural hardware, and precision manufacturing.

Throughout the three-day event, the HHV team engaged with industry professionals, technology partners, and prospective customers to discuss surface finishing requirements, scalable coating processes, and the technical capabilities behind the Decora platform.

HHV continued to advance innovative surface engineering technologies, delivering high-quality decorative coating solutions that supported precision-driven manufacturing across diverse industrial sectors.



HHV Thermal Technologies Showcased Advanced Carbon Materials at CACM 2026

Hyderabad, India | February 18–20, 2026 — HHV Thermal Technologies participated in the Conference on Advanced Carbon Materials (CACM) 2026, held at the BITS Pilani Hyderabad Campus. The company showcased its capabilities in high-temperature carbon composites and carbon-silicon carbide (C-SiC) materials for advanced engineering applications.

During the conference, the HHV Thermal Technologies team engaged with customers, researchers, collaborators, and industry professionals to discuss evolving application requirements, material performance, and opportunities for collaboration in high-temperature carbon technologies. The interactions highlighted the growing demand for advanced materials

across aerospace, defence, energy, and other high-performance engineering sectors.

HHV Thermal Technologies continued to advance materials engineering through innovative carbon-based solutions, supporting the development of next-generation technologies for demanding industrial applications.



HHV Advanced Technologies Joined Indian MoD & Defence Industry Delegation to Rome

Rome, Italy | February 26–27, 2026 — HHV Advanced Technologies participated in the official Indian Ministry of Defence and Defence Industry Delegation to Rome, strengthening international engagement in defence manufacturing and strategic technology collaboration.

Executive Director Smriti Sakhamuri represented the company alongside Suman R., AGM – Marketing, engaging with global defence leaders, government representatives, and industry stakeholders to explore opportunities for bilateral cooperation and technology partnerships. The delegation was organised by the Department of Defence Production, Ministry of Defence, Government

of India, in coordination with the Embassy of India in Rome and the Society of Indian Defence Manufacturers (SIDM).

The participation reflected HHV’s continued commitment to contributing to India’s evolving defence ecosystem through international collaboration and innovation-led manufacturing.



HHV Advanced Technologies Partnered with Siddaganga Institute of Technology to Strengthen Industry–Academia Collaboration

Bengaluru, India | March 4, 2026 — HHV Advanced Technologies signed a Memorandum of Understanding (MoU) with Siddaganga Institute of Technology (SIT), Tumakuru, to strengthen industry–academia collaboration and enhance skill development for engineering students.

The partnership established the HHV–SIT Skill Development Center, providing a platform for technical training, workshops, seminars, industrial visits, internships, and project opportunities. The collaboration also included the development of industry-aligned certification programmes focused on vacuum technology, advanced manufacturing, optics, and engineering practices.

The initiative reflected HHV’s commitment to bridging the gap between academia and industry by equipping future engineers with practical knowledge, technical competencies, and industry exposure. Through sustained collaboration with leading academic institutions, HHV continued to support talent development and build a skilled workforce for India’s advanced manufacturing ecosystem.



HHV Supported Science Outreach at IISc Open Day 2026

Bengaluru, India | March 7, 2026 — HHV participated as a sponsor at IISc Open Day 2026, supporting one of India’s largest public science outreach initiatives. The event brought together students, researchers, educators, and members of the public to experience interactive demonstrations and explore ongoing scientific research across the Indian Institute of Science.

Through its support, HHV contributed to initiatives that encouraged scientific curiosity, promoted STEM education, and highlighted the role of advanced engineering and vacuum technology in research applications.

HHV remained committed to fostering scientific awareness and inspiring the next generation of researchers and innovators.



HHVAT Executive Director, Addresses International Women’s Day Celebration at SIT Tumakuru

Tumakuru, India | March 13, 2026 — Smriti Sakhamuri, Executive Director of HHV Advanced Technologies, was invited as the Chief Guest at the International Women’s Day celebration hosted by Siddaganga Institute of Technology (SIT), Tumakuru. Addressing faculty and staff, she shared insights on the evolving role of women in India’s science, technology, and advanced manufacturing ecosystem.

Her keynote address highlighted the importance of empowering women in engineering while emphasizing the contributions of advanced manufacturing, photonics, and precision optics in supporting the national vision of Atmanirbhar Bharat and Viksit Bharat. She also spoke about the growing opportunities for women to lead innovation across research, technology, and manufacturing sectors.

The event further reinforced the long-standing academic-industry relationship between HHV Advanced Technologies and Siddaganga Institute of Technology, reflecting the company’s continued commitment to nurturing future talent, strengthening industry-academia collaboration, and advancing inclusive leadership in STEM.



HHV Advanced Technologies Showcased Thin Film Optics at ET DEFTECH Summit 2026

India | March 18, 2026 — HHV Advanced Technologies participated in the ET DEFTECH Summit 2026, showcasing capabilities from its Thin Film Optics Division (TFOD) for defence applications. The company presented precision optics and advanced thin-film coating technologies designed to meet the demanding requirements of mission-critical defence systems.

The summit provided an opportunity to engage with industry leaders, technology partners, and key stakeholders involved in India's growing defence manufacturing ecosystem while highlighting HHV's expertise in advanced optical solutions.

HHV continued to strengthen indigenous defence capabilities through innovation in precision optics, thin-film technologies, and advanced manufacturing.



HHV Thermal Technologies Showcased Carbon Composite Solutions at HEMCE 2026

Hyderabad, India | April 29 – May 1, 2026 — HHV Thermal Technologies participated in the 15th International High Energy Materials Conference & Exhibits (HEMCE 2026), showcasing its expertise in advanced carbon composite solutions for aerospace and defence applications.

The exhibition provided an opportunity for the company to demonstrate its capabilities in thermal and vacuum technologies designed for mission-critical environments. The HHV team engaged with defence organisations, researchers, industry professionals, and technology partners to discuss the performance of carbon composite materials and their applications in high-energy and high-temperature systems.

HHV Thermal Technologies continued to strengthen its position in advanced materials engineering by developing carbon composite solutions that supported the evolving requirements of India's aerospace, defence, and strategic technology sectors.



HHV Advanced Technologies Shared Expertise in High-Power Laser Optics Webinar

Online | May 14, 2026 — HHV Advanced Technologies participated in a technical webinar hosted by Photonics Media, featuring M. Sreenivasan, Chief Technology Officer, as the keynote speaker.

The session explored high-power laser optics, Laser-Induced Damage Threshold (LIDT) performance, precision optical coating technologies, engineering challenges, and laser safety solutions. It also highlighted HHV's expertise in thin-film coatings and advanced optical engineering for high-performance laser applications.

Through knowledge-sharing initiatives, HHV continued to contribute to the advancement of the global photonics and laser optics community.



ADVANCED
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HIGH-POWER
LASER OPTICS

Explore emerging developments and innovations in **high-power laser optics** and **photonics** technologies.

 THU, MAY 14, 2026

 11:00 AM EDT



SPEAKER

CTO

HHV Advanced Technologies Pvt. Ltd.

 EMERGING DEVELOPMENTS

 INNOVATIONS IN LASER OPTICS

 HIGH-POWER LASER TECHNOLOGIES

 ENGAGE WITH THE GLOBAL PHOTONICS COMMUNITY

HHV Advanced Technologies Participated in UK Defence MSME Trade Mission

Bengaluru, India | May 15, 2026 — HHV Advanced Technologies participated in the UK Defence MSME Trade Mission hosted by the Society of Indian Defence Manufacturers (SIDM) in association with the UK Ministry of Defence and the UK India Business Council.

Representing HHV, Suman R., AGM – Marketing, engaged with leading defence and aerospace organisations from India and the United Kingdom to explore opportunities in advanced manufacturing, aerospace technologies, precision engineering, AI-enabled systems, and strategic supply chain collaboration.

The participation reinforced HHV's commitment to expanding international partnerships and contributing to the future of defence and aerospace manufacturing.

HHV Advanced Technologies Showcased Advanced Engineering at DEF-TECH Bharat 2026
Bengaluru, India | May 20–22, 2026

HHV Advanced Technologies participated in DEF-TECH Bharat 2026, showcasing its advanced engineering, optics, photonics, and precision technology solutions for aerospace, defence, and space applications.

During the exhibition, the company engaged with industry professionals, technology leaders,

defence organisations, and strategic partners while demonstrating capabilities that supported high-performance and mission-critical applications.

HHV continued to advance innovation in aerospace, defence, and space technologies, strengthening its contribution to India's growing strategic manufacturing ecosystem.



HHV Advanced Technologies Participated in SurfEnTech Expo 2026
Chennai, India | June 13, 2026

HHV Advanced Technologies Pvt. Ltd. participated in SurfEnTech Expo 2026, where the team engaged with industry professionals and showcased its advanced surface engineering and coating solutions.

During the three-day exhibition, HHV connected with customers, partners, and industry stakeholders to discuss advancements in surface engineering

technologies and their applications across diverse industries.

The participation reinforced HHV's commitment to delivering innovative coating solutions and strengthening collaborations within the surface engineering ecosystem.



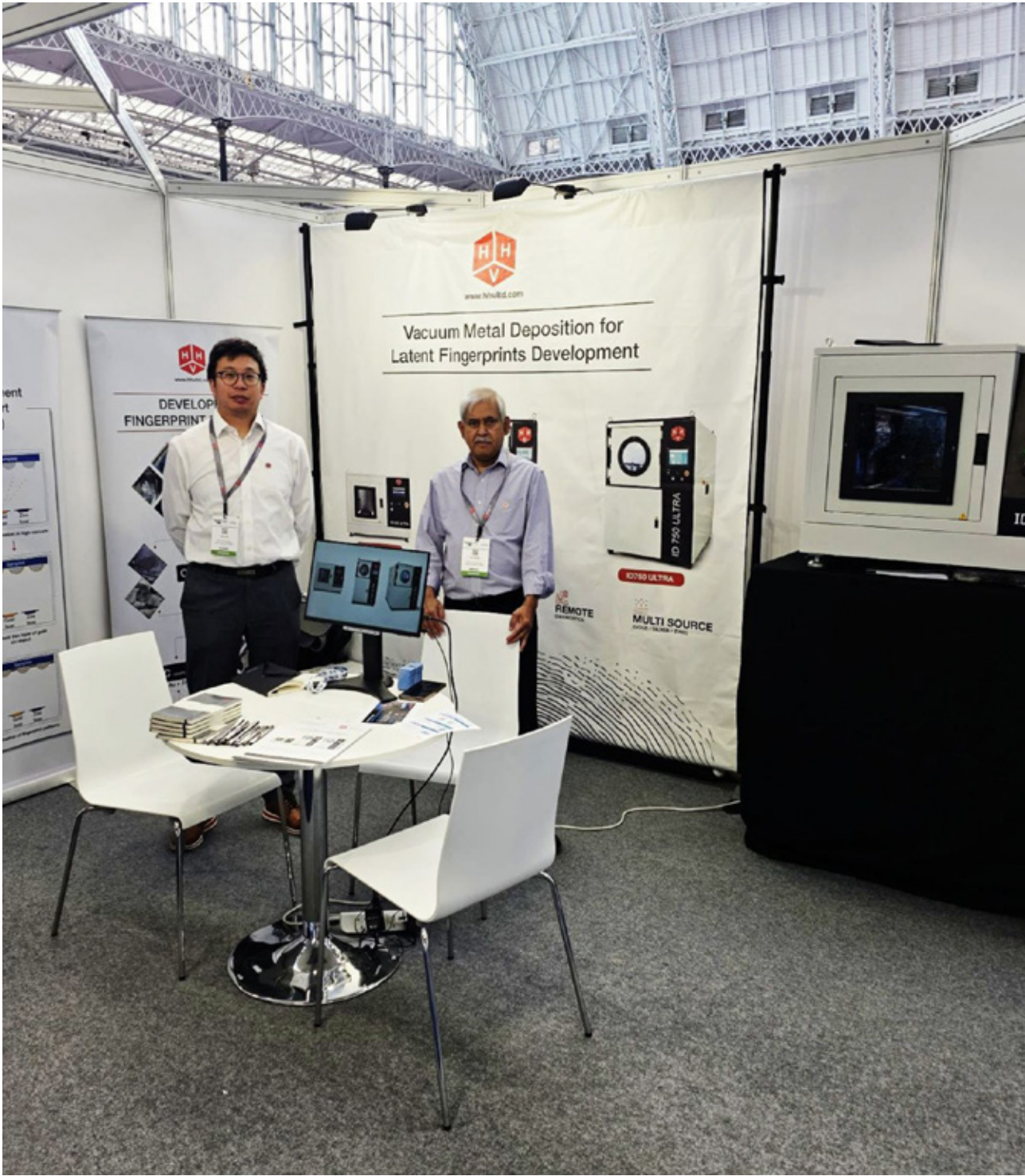
**HHV Advanced Technologies Participated in Forensics Europe Expo 2026
London, United Kingdom | July 1–2, 2026**

HHV Advanced Technologies Pvt. Ltd. participated in Forensics Europe Expo 2026, where the team showcased its precision optical components and advanced coating solutions for forensic and analytical applications.

Representing HHV, the team engaged with industry professionals to discuss application-specific optical

solutions and explore opportunities for collaboration in forensic science, analytical instrumentation, and related technologies.

The participation reinforced HHV's commitment to advancing precision optical technologies and strengthening partnerships within the global forensic and analytical instrumentation ecosystem.



**HHV Advanced Technologies Participated in SPIE Astronomical
Telescopes + Instrumentation 2026
Copenhagen, Denmark | July 7–9, 2026**

HHV Advanced Technologies Pvt. Ltd. participated in SPIE Astronomical Telescopes + Instrumentation 2026, held from July 7–9, 2026, where the team showcased its large-area telescope mirror coaters, precision optical coatings, and custom vacuum coating equipment.

Representing HHV, the team engaged with

researchers, observatories, and industry professionals to discuss advancements in astronomical instrumentation and precision optical technologies.

The participation reinforced HHV's commitment to advancing optical coating solutions for the global astronomy and scientific research community.



Meet Us at SES 2026 — HHV Advanced Technologies at the Strategic Electronics Summit Bengaluru, India | July 23–24, 2026

HHV Advanced Technologies Pvt. Ltd. participated in the 15th Strategic Electronics Summit (SES) 2026, held at the Bangalore International Exhibition Centre (BIEC), Bengaluru.

At Booth D55, the HHV team showcased its advanced thin-film and precision optics solutions, engaging with industry leaders, partners, and technology professionals on innovations supporting the defence, aerospace, and strategic electronics sectors.

HHV Advanced Technologies continued to strengthen its engagement with India’s strategic electronics ecosystem, reinforcing its role in supporting the country’s growing defence and aerospace manufacturing capabilities.



The HHVAT team at Booth D55, SES 2026, BIEC Bengaluru.

HHV Advanced Technologies Exhibited at ICCAP 2026 Bengaluru, India | July 30–31, 2026

HHV Advanced Technologies Pvt. Ltd. (HHVAT) exhibited at the International Conference on Chalcogenides and Applied Photonics (ICCAP 2026), held at the Indian Institute of Science (IISc), Bengaluru.

At its booth, the HHVAT team showcased its photonics solutions, advanced thin-film deposition technologies, and optical coating capabilities, engaging with researchers, scientists, and industry professionals interested in cutting-edge research and industrial applications.

The participation reinforced HHVAT’s continued commitment to advancing photonics and thin-film technologies in collaboration with India’s scientific research community.



The HHVAT booth at ICCAP 2026, IISc Bengaluru.

HHVAT Executive Director Speaks at CII Women in STEM Summit India | July 2026

Our Executive Director, Ms. Smriti Sakhamuri, participated as a panelist at the CII Women in STEM Summit for the session “Future-Ready STEM Talent: Building the Next Generation of Women Leaders.”

Moderated by Prof. Dr. Akshay Dvivedi (IIT Roorkee), the panel brought together distinguished leaders

including Dr. Sangita Garg, Ms. N. Pramila Rao, Dr. Hafsa Ahmad, and Prof. Dr. Balvinder Shukla to discuss strengthening India’s STEM ecosystem through industry-academia collaboration, innovation, and leadership.



At HHV Advanced Technologies Pvt. Ltd., we believe developing future STEM talent requires sustained collaboration between academia and industry. Through university partnerships, internship programmes, industrial visits, and skill development initiatives, we are committed to creating opportunities that help bridge the gap between education and advanced manufacturing.

HHV thanks the Confederation of Indian Industry (CII) for bringing together diverse perspectives to shape the future of STEM in India.



Smriti Sakhamuri on the panel at the CII Women in STEM Summit.

HHV Group Managing Director Joins Aerospace 360 Panel on India's Global Space Economy
Mumbai, India | Aug 11, 2026



India's aerospace and space ecosystem is witnessing significant growth, driven by increasing private-sector participation, indigenisation, advanced manufacturing and expanding opportunities in the global space economy.

Mr. Prasanth Sakhamuri, Managing Director, HHV Group, participated as a panelist at **Anand Rathi's Aerospace 360: Altitude, Armour, Orbit**, held on 11 August 2026 at Taj Santacruz, Mumbai.

Speaking during the panel discussion, **"Beyond the Atmosphere: India's Launch into the Global Space Economy,"** he joined industry leaders to exchange perspectives on commercial innovation in space, the growing contribution of private enterprises, India's advanced manufacturing capabilities and the opportunities ahead for the country within the global space ecosystem.

Ms. Smriti Sakhamuri, Executive Director, HHV Advanced Technologies, also attended the conference and interacted with leaders and stakeholders from across India's aerospace, defence and space sectors.

The discussions closely reflect HHV's own journey of developing advanced technologies in India for demanding space and scientific applications. With capabilities spanning **precision optics, thin-film technologies, vacuum systems and specialised manufacturing**, HHV continues to strengthen its contribution to India's growing space ecosystem and its increasing participation in global technology programmes.

HHV Group Celebrates India's 80th Independence Day
Bengaluru, India | August 15, 2026

HHV Group marked India's 80th Independence Day with flag-hoisting ceremonies at HHV Advanced Technologies and HHV Thermal Technologies, bringing employees together to celebrate the spirit of freedom, unity, and national pride.

The National Flag was unfurled at both facilities, followed by moments of collective respect and reflection on India's journey of progress and self-reliance.

The celebration also served as a reminder of the role Indian industry, engineering, and

manufacturing continue to play in strengthening the nation's technological capabilities. As a home-grown technology group with over six decades of engineering heritage, HHV remains committed to contributing through innovation, indigenous manufacturing, skill development, and technologies serving science, industry, defence, aerospace, and space.

The occasion brought teams across both businesses together in the shared spirit of pride, responsibility, and One HHV.



HHVAT at C4I2 & Electro-Optics for Defence and Aerospace conference
New Delhi, India | August 18, 2026

HHV Advanced Technologies participated in IMR's Surveillance, C4I2 & Electro-Optics for Defence and Aerospace conference, held on 18 August 2026 at the Air Force Auditorium, New Delhi.

The conference brought together representatives from the armed forces, defence agencies and industry to discuss emerging requirements in surveillance, electro-optics, secure communications and next-generation defence technologies.

At the event, HHV showcased its capabilities in precision optics and thin-film technologies for defence applications, including night vision optics, laser optics, precision optics and specialised optical coatings. The event provided a valuable platform to engage with key stakeholders and understand evolving technology requirements across India's defence and aerospace ecosystem.



HHV Advanced Technologies Now Featured on MeetOptics
Bengaluru, India | 2026

HHV Advanced Technologies Pvt. Ltd. (HHVAT) is now featured on MeetOptics, a global marketplace connecting optics buyers with specialised suppliers worldwide.

The listing brings HHVAT's precision optics and thin-film coating capabilities — including custom optical components, decorative and functional PVD coatings, and precision-engineered vacuum coating systems — within easy reach of researchers, OEMs, and procurement teams across the globe.

This digital presence complements HHVAT's ongoing participation in international exhibitions and conferences, further strengthening the company's visibility within the global photonics and precision optics community and making it easier for prospective partners to discover and connect with HHV's capabilities.

<https://www.meetoptics.com/suppliers/hhv-advanced-technologies>

Make in India, Make for the World: HHV at FICCI Defence Manufacturing Session
New Delhi, India | August 18, 2026



India's defence manufacturing ecosystem is witnessing significant transformation, supported by indigenous design and development, greater private-sector participation, innovation and an increasing focus on global markets.

Suman Racha, AGM – Sales, HHV Advanced Technologies, represented the company at FICCI's session on "Catalysing Bharat's Prowess in Defence Manufacturing & Exports: Make in India, Make for the World", held at Federation House, New Delhi.

The session brought together senior representatives from government and industry to discuss the progress of India's defence industrial ecosystem and the opportunities for strengthening the country's position as a globally competitive defence manufacturing and export hub.

Discussions covered the growing confidence in Indian defence capabilities, the importance of international partnerships and strategic collaboration, indigenous design and development, domestic procurement, innovation programmes

and the increasing role of private enterprises. Emerging technologies such as drones and their rapidly evolving role in modern defence applications were also highlighted.

For HHV Advanced Technologies, participation in such industry forums provides valuable insight into evolving defence requirements and opportunities for greater indigenous technology development.

With capabilities spanning precision optics, defence optical coatings, thin-film technologies and advanced vacuum equipment, HHV continues to contribute to India's journey towards greater technological self-reliance and globally competitive manufacturing.



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