EXPRESSION OF INTEREST (EoI)

Call for Industry & Strategic Collaboration: Technology Transfer, Co-Development and Product Development

7th August 2026

About this Document

Indian Institute of Technology Hyderabad (IITH), an Institute of National Importance, together with partner institutions, is developing a portfolio of indigenous, deep-technology platforms spanning agritech diagnostics, defence and industrial sensing, hardware security, and photonics. This document presents four such technologies that are ready for industry engagement and invites companies, government agencies, and strategic partners to collaborate through technology transfer, co-development, and productization. These collaborations will also strengthen IITH's efforts to secure government funding in support of these technologies. More about the institute is available at www.iith.ac.in.

How to Respond

Organisations interested in any of the opportunities below are invited to submit a brief expression of interest — a company profile, a note on relevant experience or capability, and the specific opportunity/opportunities of interest — on a rolling basis to:

office.src@iith.ac.in (please copy Prof. Shiv Govind Singh, Professor, Department of Electrical Engineering, IIT Hyderabad, on your email expressing interest)

This EoI is an invitation to explore collaboration and is issued for information-gathering purposes only; it does not constitute a commitment by IIT Hyderabad to enter into any partnership or agreement.

Summary of Opportunities

#	Technology	Domain	TRL (Current → Target)	One-line Pitch
1	On-Chip Bovine Mastitis Biosensing Platform	Agritech / Dairy Diagnostics	TRL 3/4 → TRL 7/8	Rapid, reusable chemiresistive biosensor for early on-farm detection of bovine mastitis in raw milk.
2	Uncooled LWIR Microbolometer	Defence, Automotive, Industrial Imaging	TRL 3 → TRL 5/6	Indigenous, CMOS-compatible uncooled infrared microbolometer for thermal imaging.
3	On-Chip True Random Number Generator (Project Fortress)	Semiconductor Security / Cryptography	Details on request	Ultra-low-power, tunable, on-chip true random bitstream generator based on 2D materials.
4	InP DFB Laser & GeSn Photodetector for Optical Transceivers	Photonics / Telecom / Defence	TRL 3 → TRL 5/6	Indigenous InP laser transmitter and GeSn photodetector receiver for optical transceiver modules.

EOI 1 – On-Chip Bovine Mastitis Biosensing Platform

Overview & Objective

IIT Hyderabad invites dairy technology manufacturers, veterinary diagnostic companies, and agritech partners to collaborate on the co-development, field validation, and commercialization of an indigenous chemiresistive biosensing platform for early bovine mastitis monitoring. The technology provides rapid, reusable, on-chip detection of critical mastitis biomarkers in raw milk, identifying preclinical and subclinical infections before physical symptoms appear.

Core Technology Highlights

- **Multi-Marker Biomarker Panel:** Detection optimized across key disease indicators, including Milk Amyloid A (MAA) – high specificity for early/subclinical mastitis – Lactoferrin, Haptoglobin, and Lactate Dehydrogenase (LDH).
- **High Sensitivity & Rapid Turnaround:** Ultra-low Limit of Detection (~10 pg/mL for pathogens), sample processing time under 30 minutes, and ≥90% accuracy compared to standard laboratory methods.
- **Integrated Sensing & Mobile Decision Stack:** Combines chemiresistive nano-biosensors with a custom board-level reader circuit and a smartphone interface running automated decision-making algorithms for on-farm diagnostic reporting.
- **Field-Ready Performance:** Sensor shelf-life of at least 6 months at 4°C, optimized to withstand fluctuating milk pH environments.

Target Applications

- **On-Farm Diagnostic Readers:** Handheld or portable point-of-care testing units for dairy farmers and veterinary professionals.
- **Automated Milking System (AMS) Integration:** Inline biosensor modules for real-time milk quality monitoring during milking routines.
- **Dairy Supply Chain Quality Assurance:** Rapid screening at milk collection centres and processing plants.

Collaboration Modes

- **Technology Transfer (ToT):** Licensing of verified chemiresistive sensor fabrication flows, reader circuit layouts, and algorithmic software models.
- **Co-Development & Field Validation:** Strategic alliance to execute large-scale field trials across varied dairy environments and scale the system to operational deployment.
- **Productization & Spin-off Incubation:** Joint product development, commercial packaging, and startup co-incubation for market entry.

Technology Readiness Level: TRL 3/4 → TRL 7/8.

EOI 2 – Design, Simulation and Fabrication of an Indigenous Uncooled Infrared Microbolometer

Overview & Objective

IIT Hyderabad invites industry leaders, defence agencies, and commercial partners to collaborate on the productization and technology transfer of an indigenously designed Uncooled Long-Wave Infrared (LWIR, 8–14 µm) microbolometer platform. This technology bridges the gap between high thermal sensitivity and low-cost, scalable CMOS-compatible manufacturing.

Core Technology Highlights

- **High Optical Absorption:** >90% absorption across 8–14 µm using optimized a-Si:H and VOx microbridge stacks.
- **Superior Sensitivity:** High Temperature Coefficient of Resistance (TCR) up to ~–4%/K, rapid time constant ($\tau \approx 3.5$ ms), and low 1/f noise.
- **Vertical 3D-IC Integration:** Low-temperature, low-pressure Cu–Cu bonding methodology allows high-temperature deposition of thermistor films without damaging the underlying CMOS Readout Integrated Circuits (ROIC).

Target Applications

- **Defence & Security:** Night-vision optics, UAV thermal payloads, and perimeter security.
- **Automotive:** ADAS night-vision enhancement and pedestrian detection.
- **Industrial & Health:** Non-destructive thermography, electrical inspection, and non-contact body temperature screening.

Collaboration Modes

- **Technology Transfer (ToT):** Licensing of verified MEMS fabrication process flows and ROIC architecture.
- **Co-Development:** Tailoring pixel pitch and scaling arrays from 4×4 to 240×240 commercial formats.
- **Productization:** Joint System-in-Package (SiP) vacuum packaging and field testing to advance the technology further.

Technology Readiness Level: TRL 3 → TRL 5/6.

EOI 3 – On-Chip, Runtime-Tunable True Random Bitstream Generator (Project Fortress)

Overview & Objective

IIT Hyderabad and BITS Pilani Hyderabad Campus invite semiconductor foundries, defence R&D organizations (e.g. DRDO, ISRO), fabless IP vendors, and hardware security providers to collaborate on Project Fortress – a scalable, on-chip platform for cryptography and encryption based on a runtime-tunable true random bitstream generator.

Core Technology Highlights

Project Fortress features patented technology for tunable random number generation at the heart of a multi-filamentary stochastic source based on novel 2D materials. By bridging nanoscale material innovation with back-end-of-line (BEOL) CMOS integration, Fortress delivers a high-quality, on-chip, tunable True Random Number Generator (TRNG) bitstream operating at ultra-low power (<0.2 mW @ 3V) with real-time dynamic entropy control.

Target Applications

The platform provides certified physical entropy tailored for:

- **Hardware Roots of Trust (HRoT) & Secure Elements:** in next-generation SoC architectures.
- **Defence & Tactical Communications:** requiring tamper-resistant, side-channel resilient key generation.
- **Automotive ECUs & Connected Vehicles:** needing robust security under extreme thermal environments (–40°C to +125°C).
- **Edge-AI & Resource-Constrained IoT Nodes:** where traditional power-hungry TRNGs are prohibitive.
- **Post-Quantum Cryptography (PQC) Acceleration:** requiring continuous non-deterministic seed streams.

Collaboration Modes

- **Technology Transfer (ToT):** Licensing fabrication workflows, device layouts, ASIC readout schematics, and firmware IP packages.
- **Co-Development & Pilot Productization:** Integrating Fortress TRNG IP cores into custom ASICs, FPGA acceleration boards, and commercial SoCs.
- **Industrial & Defense Validation:** Joint stress testing, environmental benchmarking, and NIST/FIPS security compliance certification.

Technology Readiness Level: Details available on request.

EOI 4 – Fabrication and Characterization of Indigenous InP-based DFB Laser and GeSn Photodetector for Optical Transceiver Applications

Overview & Objective

IIT Hyderabad and BITS Pilani invite industry leaders, defence agencies, and commercial partners to collaborate on the productization and technology transfer of an indigenously developed InP-based Distributed Feedback (DFB) laser transmitter and a nanoengineered GeSn-based photodetector receiver – critical building blocks of an optical transceiver. This joint effort addresses a critical gap in India's photonic integration ecosystem, where high-performance InP light sources and telecom-band photodetectors remain almost entirely import-dependent.

Core Technology Highlights

- **InP DFB Laser Transmitter:** Single-mode, direct-modulation-capable laser source operating around 1310 nm, fabricated using optical lithography, anisotropic dry etching, and low-resistance ohmic contact processes, targeting direct modulation ≥1 Gb/s with side-mode suppression ratio >20 dB.
- **Nanoengineered GeSn Photodetector:** CMOS-compatible receiver grown by co-sputtering on low-cost, large-area substrates (avoiding the lattice-matched InP epitaxy and Zn-diffusion steps required for conventional InGaAs detectors), targeting responsivity ≥400 mA/W, dark current ≤1 µA, bandwidth ≥40 GHz, and detectivity ≥ 10^{10} Jones.

Target Applications

- **Telecom & Data Center Interconnects:** Indigenous transceiver modules for optical communication links and high-density on-chip/inter-chip interconnects.
- **Defence & Strategic Systems:** Secure optical communication links, LIDAR, and quantum key distribution (QKD) front-ends.
- **Sensing & Spectroscopy:** Tunable narrow-linewidth sources for gas sensing, spectroscopy, and quantum optics applications.

Collaboration Modes

- **Technology Transfer (ToT):** Licensing of validated InP laser fabrication process flows, GeSn detector growth recipes, and device architectures.
- **Co-Development:** Joint optimization of laser cavity/grating design, GeSn detector geometry, and packaging for target application-specific specifications.
- **Productization & Validation:** Joint reliability testing (thermal cycling, bias stress), packaging, and field trials to advance the transceiver prototype to TRL 5/6 in a relevant operational environment.

Technology Readiness Level: TRL 3 → TRL 5/6.