



# PANIMALAR ENGINEERING COLLEGE

An Autonomous Institution

## [JAISAKTHI EDUCATIONAL TRUST]

Approved by AICTE | Affiliated to Anna University | Recognized by UGC

All Eligible UG Programs are Accredited by NBA

Bangalore Trunk Road, Varadharajapuram, Poonamallee, Chennai- 600 123

### INDIA'S WOMEN CENTRIC NATIONAL LEVEL 24 – HOUR HACKATHON **TECHDIVATHON – 2.0** She blooms. She leads. She conquers



**Domain: DEFENCE**

**Problem Statements:**

S.No	Title	Problem Statement	Description
1	AI-Controlled Adaptive Signal Jammer	Traditional jammers block signals blindly, disrupting even authorized communication.	Uses AI to identify and selectively jam unauthorized frequencies, ensuring secure operations without interference to friendly networks.
2	Bio-Mimetic Camouflage Fabric for Field Uniforms	Static camouflage fails against modern thermal and multispectral sensors.	Develop adaptive fabric using electrochromic materials and phase-change substances that automatically matches surrounding thermal, visual, and IR signatures for enhanced stealth.
3	Holographic Perimeter Defense Projector	Traditional fences are visible and easily bypassed.	Engineer ground-based projectors creating dynamic, invisible laser barriers that trigger non-lethal countermeasures when breached, with adaptive patterns confusing intruders.
4	AI-Powered Disaster Response and Communication Hub	Communication and coordination often fail during large-scale disasters.	Combines IoT sensors and satellite backup to create a resilient emergency communication system with AI-based location tracking.
5	Solar-Powered Autonomous Surveillance Tower	Remote surveillance systems require frequent maintenance and manual control.	Self-powered tower with 360° AI vision and motion detection for long-term remote area monitoring.
6	Thermal + Night Vision Smart Goggles with Target Recognition	Existing night vision lacks intelligent target detection.	Integrates thermal imaging with AI-based recognition to highlight humans, vehicles, and threats in low-light conditions.
7	AI Soldier Vital Monitoring and Prediction Device	Health trackers lack predictive analysis for stress or fatigue detection.	Wearable AI system tracks vitals, predicts health risks, and sends real-time alerts to command units.
8	Autonomous Mine Detection and Disposal Robot	Current robots detect mines but can't neutralize them autonomously.	Uses advanced ground-penetrating radar and AI-driven path planning to detect, classify, and neutralize landmines safely.

9	Self-Powered Acoustic Signature Suppressor	Equipment noise reveals positions during stealth operations.	Create portable panels using piezoelectric materials that convert engine/vehicle noise into electricity while simultaneously emitting counter-phase sound waves for acoustic stealth.
10	IoT + Blockchain Smart Ammunition Tracking System	Manual ammo tracking causes security and supply errors.	Uses IoT sensors with blockchain verification for real-time, tamper-proof ammunition usage tracking.
11	AI-Powered Threat Intelligence and Surveillance Analyzer	Manual threat detection from multiple cameras is slow and error-prone.	Deep learning system analyzes live feeds to detect abnormal patterns, intrusions, or hostile movement.
12	Quantum-Secure Communication App for Defense Teams	Encrypted apps remain vulnerable to future quantum decryption attacks.	Uses quantum-resistant encryption for highly secure defense communications and mission coordination.
13	AI Mission Planning and Simulation Dashboard	Mission planning lacks data-driven risk and resource forecasting.	Uses AI and GIS data to simulate operations, allocate resources optimally, and predict mission success probability.
14	Swarm Micro-Robot Decoy Deployer	Single decoys are ineffective against advanced sensors.	Develop launcher deploying hundreds of insect-sized robots that mimic human heat, motion, and EM signatures to overwhelm enemy targeting systems and create confusion.
15	Integrated Border Intelligence Command System	Border data from different devices isn't centralized effectively.	Fuses input from cameras, sensors, and drones into a unified AI dashboard for real-time decision support.
16	AI-Powered Cyber Threat Detection and Defense System	Traditional cybersecurity systems react after breaches occur.	Employs AI anomaly detection to predict and block cyberattacks before they impact mission networks.
17	Satellite Intelligence Analyzer with AI Image Processing	<b>Manual interpretation of satellite imagery is time-consuming.</b>	<b>AI-powered system identifies terrain changes, movement patterns, and potential threats from satellite data in real time.</b>
18	Mixed Reality Training Simulator for Combat Scenarios	Conventional defense training lacks realism and adaptability.	Uses AR/VR and motion tracking to simulate tactical missions, improving readiness and teamwork.
19	AI-Driven Reconnaissance Route Optimizer	Recon missions often waste time on low-priority areas.	AI analyzes terrain and threat data to automatically suggest high-priority reconnaissance routes.
20	Encrypted Tactical Field Reporting App with Offline Sync	Communication blackouts interrupt mission reporting.	Secure field app transmits reports via encrypted local mesh or satellite sync during network loss.
21	Modular Exoskeleton Power Harvesting System	Exoskeletons drain batteries rapidly during extended missions.	Design kinetic energy harvesters integrated into joints that capture soldier movement and convert it to power for sustained exoskeleton operation without recharging.

22	Integrated Soldier Communication and Health Wearable	Separate systems for communication and health tracking create inefficiency.	A single wearable combines encrypted communication, GPS tracking, and AI-based health monitoring
23	AI-Assisted Combat Support Robot	Existing robots can't make tactical adjustments during missions.	Uses vision-based AI to assist soldiers with reconnaissance, equipment transport, and self-defense functions.
24	Mobile Command and Control Hub with Cloud Synchronization	Command centers lack portable, real-time coordination tools.	A mobile app-based command hub integrates live feeds, maps, and sensor data for tactical control and mission planning.
25	Defense Field Intelligence and Threat Mapping Kit	Real-time troop tracking and threat detection remain difficult.	Portable kit integrates GPS, IoT, and AI to map troop locations, detect movement anomalies, and visualize threats.

## Reviewer's Digital Signature

**Reviewer's Name:**

**Position:**

**Organization:**

**Date:**

**Digital Signature:**