PANIMALAR ENGINEERING COLLEGE
An Autonomous Institution

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

Domain:DRONE
Problem Statements:

S.No	Title	Problem Statement	Description
1	Autonomous Underwater Coral Reef Restoration Drone	Coral bleaching destroys reefs faster than manual restoration can keep up.	Develop submersible drones that plant coral fragments with precision depth control, monitor growth via bio-luminescent sensors, and deploy nutrient gels to accelerate reef regeneration.
2	Swarm Drone Atmospheric Water Harvesting Network	Arid regions lack scalable fog and dew collection for agriculture.	Design high-altitude drone swarms that create artificial condensation trails and collect atmospheric moisture, delivering it to ground reservoirs through automated filtration.
3	Precision Wildlife Contraceptive Delivery Drone	Overpopulation threatens endangered species in protected areas.	Create drones using thermal imaging and pheromone targeting to deliver non-lethal contraceptives to specific animals, stabilizing populations without culling.
4	Airborne Microplastic Ocean Cleanup Filtration Drone	Surface ocean plastic collection misses microplastics below waves.	Engineer drones with electrostatic filtration nets that skim ocean surfaces, electrostatically attracting and collecting microplastics while releasing plankton.
5	Volcanic Ash Monitoring and Dispersion Drone	Volcanic eruptions ground aircraft and threaten communities unpredictably.	Build heat-resistant drones with laser particle sizers that map ash clouds in 3D, predict dispersion patterns, and guide safe evacuation corridors.
6	Autonomous Glacier Calving Prediction Drone	Climate change accelerates unpredictable glacier collapses endangering researchers.	Deploy fixed-wing drones with seismic sensors and ice-penetrating radar to monitor crevasse propagation and provide real-time calving warnings to polar expeditions.
7	High-Altitude Wind Energy Harvesting Drone	Wind turbines can't access jet stream energy at 30,000+ feet altitude.	Design tethered kite-drones that dynamically position themselves in high-altitude wind currents, generating electricity transmitted via carbon nanotube cables to ground stations.
8	Precision Forestry Canopy Gap Seeding Drone	Deforestation creates canopy gaps that prevent natural forest regeneration.	Create drones with variable seed payloads that analyze gap geometry via LiDAR and deploy species-matched seeds with protective germination pods.

9	Autonomous Avalanche Rescue Beacon Deployer	Avalanche victims often buried too deeply for traditional transceiver detection.	Develop drones that rapidly scan avalanche debris with ground-penetrating radar, autonomously drill to beacon depth, and deploy self-heating locator beacons.
10	Bio-Luminescent Mosquito Population Control Drone	Insecticide spraying harms beneficial pollinators and creates resistance.	Engineer drones releasing sterile male mosquitoes tagged with glowing bio-markers, allowing precise tracking of population suppression without broad-spectrum chemicals.
11	Deep-Sea Methane Seep Monitoring Drone	Underwater methane leaks accelerate climate change undetected.	Build pressure-resistant drones with gas chromatographs that autonomously navigate seep fields, quantify emissions, and deploy sealant blobs on active vents.
12	Autonomous Desertification Reversal Drone	Desert expansion outpaces manual tree planting efforts.	Design solar-powered drones that drill micro-wells, plant drought-resistant seeds with hydrogel capsules, and create wind-breaking straw grids for sand dune stabilization
13	AI-Guided Drone Network for Environmental Disasters	Response teams need instant, wide-area wireless comms post-disaster.	Invent an AI-assisted drone swarm that autonomously self-organizes to restore area wireless coverage and relay emergency communications.
14	5G-Enhanced Drone Swarm Coordination Platform	Coordinating hundreds of drones over wireless is unreliable above certain scales.	Design a 5G-enabled platform for seamless, real-time control, collision avoidance, and data relay among drone swarms for agriculture, delivery, or security
15	Drone-Based Livestock Herding Assistant	Herding livestock over large rural fields is labor-intensive.	Develop an environment-aware drone that can safely guide, monitor, and count livestock, reducing manual labor and loss.
16	Autonomous Drone Swarm for Crop Health Analytics	Single drones cover limited areas, and delayed analysis affects timely disease prevention.	Multiple AI-enabled drones coordinate to scan large fields using multispectral imaging for early pest, weed, and disease detection.
17	Autonomous Seed Planting Drone with AI Terrain Mapping	Traditional sowing drones struggle with uneven land and accuracy.	AI mapping enables precision seed placement across varied terrains for maximum coverage.
18	Autonomous Swarm Drones for Border Intelligence	Manual monitoring of borders is slow and limited by visibility and range.	Multiple AI-coordinated drones autonomously patrol borders, perform real-time object recognition, and share data through a secure mesh network.
19	Portable Rapid Radar Deployment Drone	Setting up radar systems quickly in changing field conditions is challenging.	Drone-based radar system deploys instantly and provides 3D terrain mapping and live movement tracking.
20	Fully Autonomous Drone Surveillance Network	Manual drone operations limit coverage and autonomy.	AI-coordinated drone fleet performs continuous surveillance and automatically returns to base for charging or data sync
21	Smart Agriculture Drone	Traditional farming in semi-urban and rural areas lacks precise, real-time monitoring of crop health, leading to inefficient use of water, fertilizers, and pesticides.	Design an intelligent agriculture drone that uses cameras and sensors for crop health monitoring, AI/ML for disease and stress detection, and automated spraying mechanisms to optimize resource usage and improve yield while remaining easy to operate and safe for farmers.

22	Women Safety & Surveillance Drone	Women often lack rapid-response safety mechanisms in public or remote areas, and existing CCTV-based systems are limited by static coverage and delayed action.	Develop an emergency-enabled surveillance drone that can be triggered via alert, stream live video, track GPS location, and use computer vision for face/object detection to identify threats, assisting authorities or guardians in real time with a focus on women-led operations and control.
23	Disaster Management & Rescue Drone	Disaster zones frequently become inaccessible, slowing search and rescue operations and reducing situational awareness for responders.	Create a drone solution equipped with thermal/vision sensors to locate victims, map affected areas, and transmit live data to control centers, using autonomous navigation and AI-assisted prioritization to support faster, safer rescue operations.
24	Infrastructure Inspection Drone	Manual inspection of buildings, bridges, power lines, and solar plants is risky, time-consuming, and prone to human error.	Design an inspection drone that uses high-resolution imaging and AI-based crack/fault detection to assess structural health, perform routine inspection of critical infrastructure, and enable predictive maintenance while reducing cost and risk.
25	Medical & Essential Supply Delivery Drone	Remote and semi-urban regions often lack timely access to medical supplies and essentials, especially during emergencies or disruptions.	Develop an autonomous short-range delivery drone with reliable navigation, payload monitoring, and safe landing mechanisms to transport medicines and essential items quickly and cost-effectively, ensuring operational safety and regulatory compliance.
26	Drone-Based Disaster Assessment System	After a cyclone, rescue teams struggle to assess blocked roads and trapped people.	Build an autonomous drone path-planning and real-time video analytics system that surveys affected regions, identifies damaged roads, waterlogging, structural collapse, and probable survivor locations, and streams insights to control rooms.

Reviewer's Digital Signature

Reviewer's Name:
Position:
Organization:
Date:

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