ISGF
India Smart Grid Forum

India SMART UTILITY Week 2025

Ideas® Matter Most

OLYMPIAD RAID

ROBOTS - AI - DRONE

FOR UTILITY SECTOR

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India Smart Utility Week

18-22 March 2025

New Delhi

www.isuw.in

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ABOUT

ISGF
India Smart Grid Forum

The India Smart Grid Forum (ISGF) is a Think-Tank of global repute on Smart Energy, Electric Mobility and Smart Cities. ISGF, established as a Public Private Partnership initiative of Government of India in 2011. ISGF flagship annual event, India Smart Utility Week (ISUW) is among the top international events on Smart Grids, Electric Mobility and Smart Energy.

The 11th edition of ISUW is scheduled from 18 - 22 March 2025 in New Delhi, India, as an International Conference and Exhibition on Smart Energy and Smart Mobility. ISUW 2025 will include plenary sessions, special & bilateral workshops, keynotes, roundtables, technical sessions, technical paper presentations, tutorials, and technical tours. Bilateral Smart Grid Workshops with EU, UK, USA, Brazil, and Indonesia are being planned.

Ideas Matter Most

"Ideas Matter Most" (IMM) is the flagship talk show of Ideas Matter Most Ventures Private Limited in collaboration with the renowned media giant, the Hindustan Times Group. IMM serves as a platform for thought leaders, innovators, and experts from diverse fields to explore pressing global issues, groundbreaking ideas, and emerging trends that are shaping our world.

Our mission is to celebrate the power of transformative ideas and the brilliant minds behind them. Each IMM event is a dynamic exploration of concepts spanning technology, science, arts, culture, and beyond. By leveraging the global network of IMM, it amis to make ideas resonate at global level, providing visibility, attention, collaboration and support opportunities for the participants.

The Robots-AI-Drone (RAID) Olympiad 2025

Spring Edition - Seeds of Innovation

The **Robots-AI-Drone (RAID) Olympiad** is a prestigious global initiative by **Ideas Matter Most (IMM)** that seeks to ignite innovation and foster creativity in the dynamic fields of robotics, artificial intelligence, and drone technologies.

The **2025 Spring edition**, with a special focus on the **Utility Sector**, is a collaborative effort between **IMM** and the **India Smart Grid Forum (ISGF)**. This Olympiad challenges participants to develop groundbreaking solutions addressing key utility sector challenges, such as infrastructure inspection and maintenance, energy efficiency, and smart management systems.

A distinguished panel of experts from India and around the globe will evaluate and judge the competition entries across various phases, ensuring a fair and rigorous assessment process.

Rewards and Opportunities for Participants

Winning teams, runners-up, and notable participants will receive:

- **ISGF Innovation Awards on 21 March 2025**
- **Global recognition** for their innovative contributions.
- **Exciting awards** celebrating their achievements.
- An exclusive invitation to appear on the **Ideas Matter Most Talk Show**, in collaboration with **Hindustan Times**.
- **Mentorship and ongoing support** to advance their ideas and careers.
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Join us in shaping the future of the utility sector through innovation and ingenuity at the RAID Olympiad 2025!

ROBOTICS: GRID INSPECTION AND REPAIR BOT

Scenario

A scaled-down energy grid prototype is set up at the venue, featuring simulated faults (loose connections, displaced components, or obstructed paths). The robot must autonomously navigate the grid, detect faults, and either signal or attempt a repair using basic tools like grippers or manipulators.

Venue Setup

A grid layout measuring 2m x 2m, featuring:

- Narrow pathways (minimum width 20 cm).
- Simulated obstacles (e.g., foam blocks, small barriers).
- Fault markers (colored stickers or objects such as broken wires, LEDs for faulty connections).
- Robots interact with dummy components like movable blocks or magnetic connections.

Boundary Conditions: Hardware

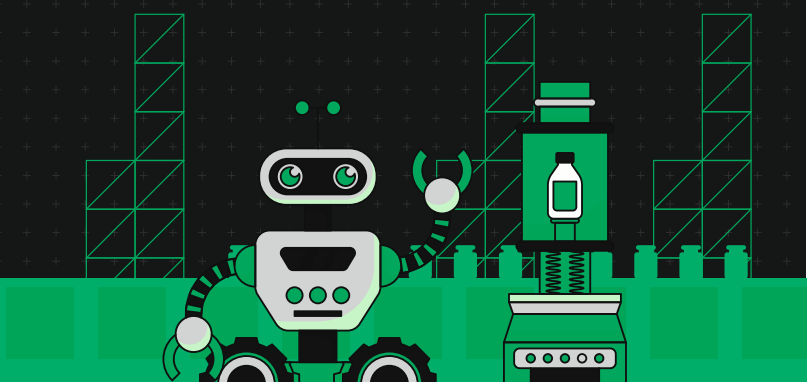
- Robot dimensions must not exceed 30 cm x 30 cm x 30 cm.
- Maximum payload: 2 kg.
- Power source: Battery-operated only (max voltage: 12V).
- Robots must use onboard sensors for navigation (e.g., IR, ultrasonic, or cameras).

Boundary Conditions: Software

- Allowed programming languages: Python, C++, or any microcontroller-supported platform.
- Robots must operate autonomously during the task. Limited manual control is allowed but incurs penalties.

Evaluation Metrics:

- Fault Detection Accuracy (40%): Number of faults detected correctly.
- Repair Efficiency (30%): Timeliness and success rate of repairs.
- Navigation Efficiency (20%): Smooth and fast traversal of the grid.
- Innovation (10%): Creative solutions and design.



AI: REAL-TIME POWER LOAD BALANCING ADVISOR

Scenario

A miniature power grid is set up with fluctuating power demand (represented by LEDs or loads) and variable supply sources. The AI model must monitor the grid in real time and suggest actionable load-balancing strategies to optimize power distribution and prevent overloading.

Venue Setup

- A 1m x 1m power grid prototype with:
- Three adjustable load points (simulated using LEDs).
- Two adjustable power sources (voltage-regulated).
- A central microcontroller providing sensor data (e.g., load levels, voltage readings).

Boundary Conditions: Hardware

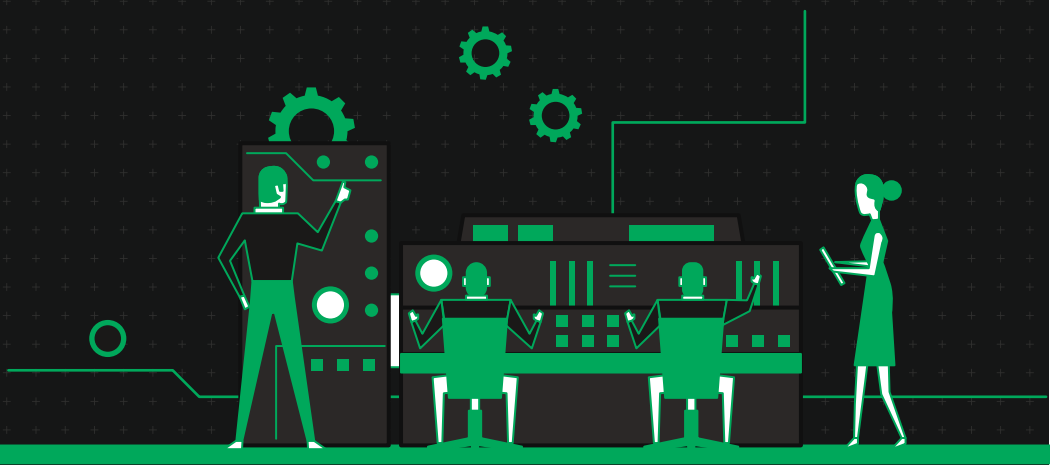
- Teams must bring a laptop or Raspberry Pi to run their algorithms.
- External sensors or devices must not exceed a size of 15 cm x 15 cm x 15 cm.

Boundary Conditions: Software

- Algorithms must run in real time (maximum delay: 2 seconds).
- Allowed frameworks: TensorFlow Lite, PyTorch, or custom Python/C++ scripts.
- Teams will receive a protocol to read grid data during
- the competition (e.g., through UART or Wi-Fi).

Evaluation Metrics:

- Accuracy of Load Balancing (40%): Minimization of load fluctuations.
- Response Time (30%): Speed of actionable recommendations.
- Implementation Simplicity (20%): Efficiency of the code and clarity of results.
- Scalability and Practicality (10%): Applicability of the model to real-world scenarios.



DRONES: DAMAGE DETECTION AND PACKAGE DELIVERY

Scenario

A scaled-down terrain simulates a power grid site affected by a storm, with damage zones marked by color codes or small objects. The drone must identify damaged areas (color codes) and deliver lightweight "repair kits" to designated spots.

Venue Setup

A 5m x 5m area with:

- Predefined obstacles (e.g., foam blocks, artificial poles).
- Damage zones marked by 3 distinct colors.
- Lightweight repair kits (20g tokens) placed at a central point.

Boundary Conditions: Hardware

- Maximum drone dimensions: 50 cm x 50 cm x 50 cm (including rotors).
- Maximum weight: 2 kg.
- Power source: Battery-operated only (max voltage: 16V).
- Drones must carry onboard cameras for detection.

Boundary Conditions: Software

- Autonomous navigation is mandatory; manual intervention incurs penalties.
- Allowed programming languages: Python, C++, or platforms like ROS.
- Use of open-source image recognition libraries (e.g., OpenCV) is encouraged.

Evaluation Metrics:

- Damage Detection Accuracy (40%): Correct identification of marked zones.
- Delivery Precision (30%): Successful placement of kits in the right locations.
- Navigation Efficiency (20%): Smooth and quick flight path.
- Innovation (10%): Novelty of design and implementation.