

ITC-EGYPT 2025
The International Telecommunications
Conference
28 – 31 July 2025 ADC,



International Innovation Competition

Welcome to the Fifth International Innovation Competition. The competition in its fourth session includes two main directions, which are the general competition and the challenges, and it is open to students, researchers, and graduates.

First, there is general competition for those who see in their projects the ability to challenge and implement and the possibility of transforming that innovation into a marketable model as a product or addition in the field of industry and trade. Through 7 main tracks, which are:

Robotics
Artificial intelligence
Medical sector
Mobile application
Industry and mining
Renewable Energy
Smart agriculture

The second direction is the direction of **challenges** through 5 challenges, each challenge represents a separate competition, one of the challenges is designed and implemented, noting that each challenge has requirements for the contestant to implement as many of those requirements as possible, and the challenges include:

Unmanned ground vehicle Challenge:

Design and implement an Unmanned Ground Vehicle (UGV) that can autonomously navigate through a maze or obstacle course and transmit real-time images with a minimum of 1 Mbps and real-time audio to a ground station.

Obstacle Detection: Utilize sensors to detect objects in the UGV's path to keep the UGV safe.

Path Planning: Develop algorithms to select the optimal path, avoiding obstacles and minimizing travel time.

Balance Between Speed and Accuracy: Ensure efficient movement while maintaining precision.

Power Management: Optimize energy consumption to extend operational time.

Lightweight Design: Create a design that reduces weight for better mobility.

Alternative Power Sources: Incorporate renewable energy options such as solar power.

Intrusion Detection: Equip the robot with capabilities to detect potential threats with a minimum 10 m range.

Stealthy Movement: Ensure the robot moves quietly to avoid detection.

Remote Monitoring: Provide real-time video streaming and alerts to a remote operator for continuous monitoring.

Security: use secure and efficient techniques for transmitting data.

Anti-Drone Challenge

Develop a system to detect, track, and neutralize Unmanned Aerial Vehicles (UAVs) or drones.

Key Focus Areas:

Drone Detection and Tracking Methods:

Radar Systems: Use radar to detect UAVs at various distances.

AI-Powered Cameras: Utilize cameras with AI for visual tracking of UAVs.

Thermal Imaging: Detect the UAVs through their heat signatures.

Acoustic Sensors: Identify the UAV noise through sound triangulation.

Radio Frequency (RF) Detection: Monitor RF control communications signals to identify the UAVs.

B. Countermeasure Techniques:

RF Jamming: Disrupt UAV communications with its controller.

GPS Spoofing: Mislead the UAV by altering its GPS signals (use at least two different types of UAV protocols).

Drone Interception: Physically capture or disable the UAV.

Directed Energy Weapons: neutralize the drone with direct energy (laser systems, electromagnetic pulses...).

Water harvesting from Air Challenge

Design and implement a system that extracts the maximum possible amount of water per day from the air using sustainable methods.

Key Focus Areas:

Condensation: Cool air to condense and extract moisture.

Desiccants: Use materials that absorb and release moisture upon heating.

Fog Harvesting: Use mesh or hydrophilic surfaces to capture water droplets.

B. Waste and Energy Management:

Waste Management: Ensure safe disposal or reuse of excess water.

Contamination Prevention: Maintain water purity.

Renewable Energy: Use solar energy or other renewable energy sources to power the system.

Identical Antennas (400 – 500 MHz) Challenge

Design and implement omni-directional antennas with optimal gain, and impedance matching for communication applications operating in the (400-500) MHz frequency range.

Helical Antenna (1.1-1.7 GHz) Challenge

Design a helical antenna with optimal gain, directivity, and impedance matching for communication applications operating in the (1.1-1.7) GHz frequency range.

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