



# ***THE ELECOMM***

## **A Quarterly Newsletter**

Department of Electronics & Communication Engg, Echelon Institute of Technology,  
Faridabad

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*This is the first issue of “THE ELECOMM” of the academic year 2022-2023. I would like to take this opportunity to motivate all the students to enroll in the internship programs and SWAYAM MOOCs to enhance their skills and earn the required credits.*

*Nitu Chauhan*

*Editor*

### **Highlights**

- **Article on Drones**
- **Activities in the department**
- **Teacher’s Day Celebration in the institute**
- **Barclay’s Life Skill Training**
- **Faculty achievements**

## **Drones**

### **WHAT IS A DRONE?**

A drone refers to any unmanned aerial vehicle that receives remote commands from a pilot or relies on software for autonomous flight. Many drones display features like cameras for collecting visual data and propellers for stabilizing their flight patterns. Sectors like videography, search and rescue, agriculture and transportation have adopted drone technology.

Originally developed for the military and aerospace industries, drones have found their way into the mainstream because of the enhanced levels of safety and efficiency they bring. These robotic UAVs operate without a pilot on board and with different levels of autonomy.

A drone’s autonomy level can range from remotely piloted (a human controls its movements) to advanced autonomy, which

means that it relies on a system of sensors and LiDAR detectors to calculate its movement. Different drones are capable of traveling varying heights and distances. Very close-range drones usually have the ability to travel up to three miles and are mostly used by hobbyists. Close-range UAVs have a range of around 30 miles. Short-range drones travel up to 90 miles and are used primarily for espionage and intelligence gathering. Mid-range UAVs have a 400-mile distance range and could be used for intelligence gathering, scientific studies and meteorological research. The longest-range drones are called “endurance” UAVs and have the ability to go beyond the 400-mile range and up to 3,000 feet in the air.

## **HOW DO DRONES WORK?**

Many parts are involved behind the scenes to support the seamless operation of drones, so it’s important to become familiar with the unmanned or remote technology that makes up a drone’s system. From delivering commands to ensuring a manageable weight, pilots must take into account the various factors that make a drone suited for specific jobs. Among the many variables in play, some of the most critical components of a drone to consider are its ground control station (GCS), payload and data links. Drones rely on a combination of hardware and software components to achieve successful takeoff, flight and landing. Drones

are often equipped with rotors or fixed wings, sensors, navigation systems and gyroscopes (for stability), and are operated by ground control stations.

### **Ground Control Station (GCS)**

Ground Control Stations are the central control unit that allows a UAV to fly and a UAS to operate. These stations can be as large as a desk with multiple views to as small as a handheld controller or even an app. The GCS can be user controlled or operated via satellites and is capable of controlling flight, controlling payload sensors, providing status readouts, mission planning and tethering the data link system.

### **Payloads**

Drones, UAVs specifically, come in a variety of sizes and are capable of carrying payloads of equally variable sized payloads. From life-saving medication to packages and more, drones provide an efficient method of delivery but must be built to handle the job at hand. Many drones are capable of rapid flight across oceans while others may be restricted to just a few thousand feet. Some drones may be capable of carrying hundreds of pounds while others can only manage fewer than ten. It is crucial for operators to choose the right drone to help them complete the job at hand.

### **Data Links**

Data Links act as the transmission centre that allow the drone to communicate with the

ground operator while in flight. Typically utilizing radio frequency technology to communicate, the data link provides the operator with crucial data like remaining flight time, distance from the operator, distance from target, airspeed altitude and more. UAV control at 2.4 GHz for control and 5 GHz for video will provide the operator with approximately four miles of usability, while frequencies of 900 MHz for flight control and 1.3 GHz for video control can provide more than 20 miles of usability — adding to the list of reasons why pilots must use the right UAS for the task they mean to achieve.

## **TYPES OF DRONES**

Drones come in a variety of types, each tailored to the unique demands of different industries.

### **Single-Rotor Helicopter Drones**

Single-rotor helicopters look exactly like tiny helicopters and can be gas or electric-powered. The single blade and ability to run on gas help its stability and fly for longer distances.

### **Multi-Rotor Drones**

Multi-rotor drones are usually some of the smallest and lightest drones on the market. They have limited distance, speed and height, but make the perfect flying vehicle for enthusiasts and aerial photographers. These drones can usually spend 20-30 minutes in the air carrying a lightweight payload, such as a camera.

### **Fixed-Wing Drones**

Fixed-wing drones look like normal airplanes, where the wings provide the lift instead of rotors- making them very efficient. These drones usually use fuel instead of electricity, allowing them to glide in the air for more than 16 hours.

### **Fixed-Wing Hybrid VTOL Drones**

Fixed-wing hybrid VTOL drones are a blend of fixed-wing drones and rotor-based drones, featuring rotors that are attached to the wings. Due to its hybrid approach, this technology offers users the endurance of a fixed-wing design and the vertical flying capabilities of a rotor-focused design.

## **WHAT ARE DRONES USED FOR?**

Drones are used for more than military and recreational purposes. In fact, UAVs can be found improving the efficiency and safety of almost every industry imaginable, from wildlife conservation to medical supply delivery.

### **Uses of Drones:**

- The oldest, most well-known and controversial use of drones is in the military. Today's drones are equipped with thermal imaging, laser range finders and even tools to perform airstrikes. One of the most prominent military drones in use today is the MQ-9 Reaper. The aircraft measures 36 feet long, can fly 50,000 feet in the air undetected and is equipped with a

combination of missiles and intelligence gathering tools.

- Delivery drones are typically autonomous UAVs used to transport food, packages, medical supplies or goods to your front doorstep.
- Sometimes it's not safe enough to send humans into a rescue situation, due to the scope or severity of the disaster. That's where drones come in.
- Drones have proven to be beneficial to the agriculture industry as well, presenting farmers with several ways to optimize their farms to maximize efficiency and reduce physical strain. Carrying out field surveys, seeding over fields, tracking livestock and estimating crop yield are all made easier through the use of UAVs while saving agriculture professionals valuable time.
- Drones are being used all over the world to track animal species and prevent poaching.
- Drones are also being used for reforestation and conservation efforts all over the world.
- LiDAR drones come outfitted with LiDAR sensors, which survey landscapes and compile in-depth data that can be used to build 3D models.

- Drones have been a boon for photographers who use UAVs to take expansive aerial photos.

### **CHALLENGES OF DRONES:**

Drones present several solutions to emerging and lingering challenges throughout industries. However, many have expressed concern over the potential negative impact that the growth of these devices presents. Given below are the challenges:

- Because drones rely on cameras to operate, which often allow operators to take photos and record videos, many have shown discontent at being captured without their consent. Several laws exist to restrict drones from intruding too far on others' privacy, but many users choose to ignore these laws.
- Since drones occupy airspace, with many able to reach heights rivaling those of a jet, concerns have been raised about drones causing or exacerbating disasters and emergency situations. Drones can often be hard to track on air traffic radars, presenting new obstacles for plane and helicopter pilots to navigate through while in flight.
- Whether in the air or on the ground, all human-operated aircraft possess an inherent risk of crashing — even when they are unmanned.

- As drones become more popular in everyday and military use, they become a bigger target for cyber-attacks. Hackers can feed false GPS coordinates to take control of a drone, and they can even intercept data that is transmitted between a drone and its remote controller.

- Sourced from Internet



*Mr Ravindra addressing the students*

## Activities in the department

### Seminar by Sofcon

The Department of ECE in collaboration with T&P organized a seminar by Sofcon India Pvt. Limited on 12<sup>th</sup> July, 2022. Mr Ravindra Mishra was the speaker from Sofcon. The topic was “Mechanical Automation and Hands on session on Arduino”.

It was a very knowledgeable session. Students were made aware of the future prospects in the domains covered in the session.

From ECE and ME department, Ms Nitu Chauhan (ECE), Ms Mrinal Manjari (ECE), Mr Naushad Khan (ME), Mr Sindhu Kumar (ME) and Mr Deepak Kaushik (ME) attended the seminar. Students of ECE and ME were present in the seminar.



*Students interacting with the resource persons*



*PLC machine*

## Bidding Adieu to Final year students

The department of ECE bid adieu to the 2018 batch students. The teachers and juniors wished them good luck for their journey ahead.



*ECE 2018 batch students*

## Project presentations

Projects are an integral part of engineering education. The students of ECE department presented their projects in the Techelon. For ECE-6<sup>th</sup> Sem students Techelon was held on 6<sup>th</sup> August, 2022 and for ECE 2<sup>nd</sup> students it was held on 2<sup>nd</sup> September, 2022.

### Techelon-6<sup>th</sup> August, 2022

Given below are few of the projects presented by ECE 6<sup>th</sup> Sem. students:

- RFID Door Lock System
- Third Eye for Blinds
- Smoke detector with Arduino Uno

- Line follower circuit with Arduino Uno
- Automatic car control system with Bluetooth



*Rishabh and Paras with their Project*



*Rahul Gaur and Piyush with their Project*

### Techelon-2<sup>nd</sup> September, 2022

Given below are few of the projects presented by ECE 2<sup>nd</sup> Sem. students:

- Water Level Alarm Circuit
- Digital Counter Using Arduino

- Electronics Dice
- EVM Machine
- Robotics Car using Sensor
- 555 Timer Led Flasher Circuit



*ECE 2<sup>nd</sup> Sem. students with their projects*

## **Teacher's Day celebration**

*The true teachers are those who help us think for ourselves.-S. Radhakrishnan*

Teacher's day was celebrated by the students of Echelon Institute of Technology on 5<sup>th</sup> September, 2022 to give heartily tribute to their teachers. Various games and competitions were organized for the teachers to showcase their talent. A cake cutting ceremony was also held and later the students presented the teachers with beautiful cards thanking them for their continuous efforts.



*Cake cutting on Teacher's day*



*Student's performance*



*Teachers enjoying the Teacher's day*

## **Barclay's Life Skill Training**

The Department of ECE in collaboration with T&P organized a Life skills training session by Barclay on 28th September 2022. The topic for the Training session was Life skill program, Interview skills, Corporate Readiness, Mock interview, Resume building, Body Language and Confidence building and Group Discussions. It was a very knowledgeable session. Students were made aware of the future prospects in the domains covered in the session.



*Students in the session*

## **Faculty Achievements:**

Following faculty members of the department participated in several faculty development programs and workshops:

### **Ms. Mrinal Manjari**

- Participated in the 5-day workshop on Designing and modeling of IoT, AI and ML systems organized by All India Council for Technical Education

(AICTE), ATAL Academy, ARM Education and STMicroelectronics from 1<sup>st</sup> August to 5th August, 2022.

### **Ms. Nitu Chauhan**

- Participated in the 5-day workshop on Designing and modeling of IoT, AI and ML systems organized by All India Council for Technical Education (AICTE), ATAL Academy, ARM Education and STMicroelectronics from 1<sup>st</sup> August to 5th August, 2022.

## ***Acknowledgment***

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Nitu Chauhan

(Editor -The Elecomm)

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