DRONE MAKING

FOPPLE TECHNOLOGIES

BY

MITS – MADANAPALLE STUDENTS

CONTENTS:

INTRODUCTION

- A DRONE(Dynamic Remotely Operated Navigation Equipment) is an aircraft that flies without a crew on board
- In simply, a Drone is a flying robot that can be remotely controlled or fly autonomously using software-controlled flight plans in its embedded systems, that work in conjunction with onboard sensors and a global positioning system (GPS).
- The term drone usually refers to any unpiloted aircraft. Sometimes referred to as unmanned aerial vehicles (UAVs), these crafts can carry out an impressive range of tasks, ranging from military operations to package delivery.
- A UAV(unmanned aerial vehicle) is capable of controlled, sustained level flight and is powered by jet

EVOLUTION

- In 1915, NIKOLA TESLA wrote about UNMANNED AERIAL VEHICLE(UAV).
- The first attempt at a self-propelled drone as an aerial target was completed in 1916.
- The rise of modern drone technology can be traced back to World War II and the Cold War. These two events paved the way for the rapid development and adaptation of drones for survillience at boarders
- Today, these flying machines are excessively used across multiple sectors, including Military, Agriculture, photography, image segmentation and intelligence, construction, livestock mapping, terrain mapping, and many more. Also, we are witnessing the rise of AI drones, which is pushing drone technology into a new era.

CLASSIFICATION OF DRONE

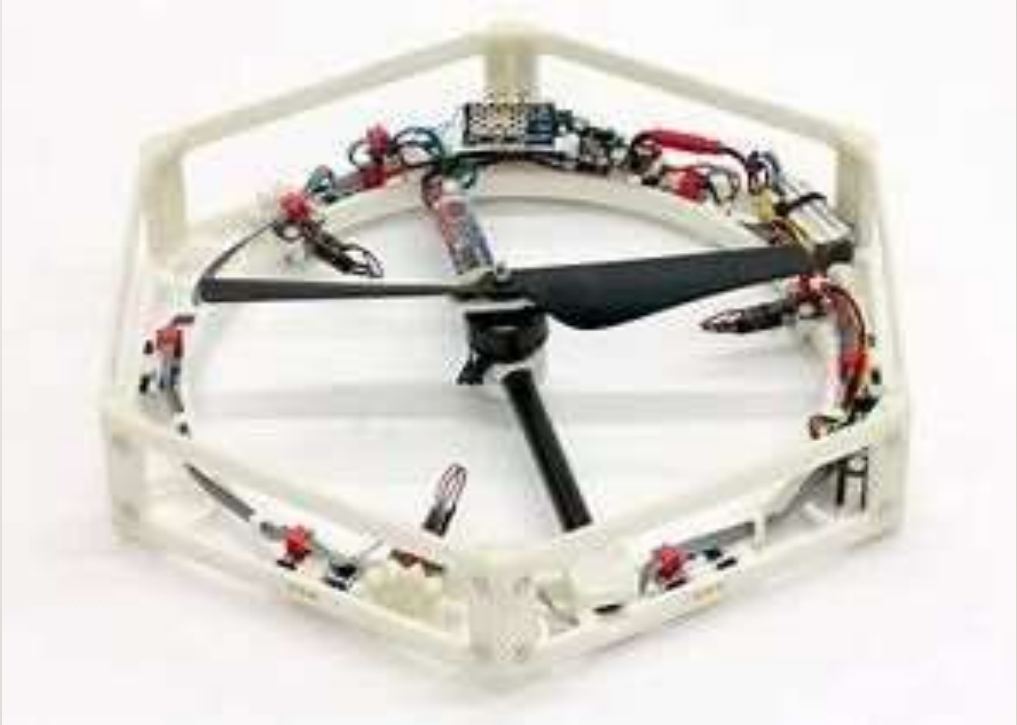
- There are mainly Two types of DRONEs:
  - MULTIROTOR
    - MONOCOPTER
    - DUALCOPTER
    - TRICOPTER
    - QUADCOPTER
    - HERACOPTER
    - OCTACOPTER
  - FIXED WING

MULTIROTOR

- Vertical takeoff and landing
- Short distance and less pay load

TYPES OF MULTIROTOR

- MONOCOPTER



TYPES OF MULTIROTOR

- DUALCOPTER

TYPES OF MULTIROTOR

- TRICOPTER

TYPES OF MULTIROTOR

- QUADCOPTER

TYPES OF MULTIROTOR

- HEXACOPTER

TYPES OF MULTIROTOR

- OCTACOPTER

FIXED-WING

- Horizontal takeoff and landing
- longer distance and more pay load
- Router is placed Infront or backside of the body

OTHER HYBRID DRONES

- X8

OTHER HYBRID DRONES

- Y6

OTHER HYBRID DRONES

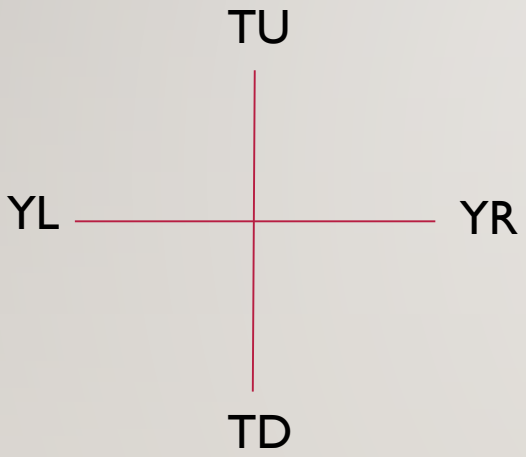
- VTOL(Vertical TakeOff and Landing)

DRONE CALCULATIONS

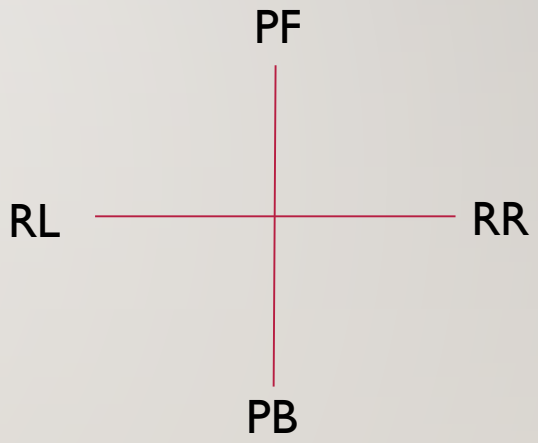
DRONE	BODY	LOAD	AUW
OK	70%	30%	100%
GOOD	50%	50%	100%
BEST	40%	60%	100%

EFFICIENCY = AUW X WEIGHT / THRUST GREATER THAN AUW

FLYING CONTROLS

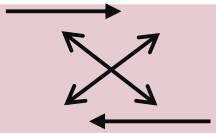
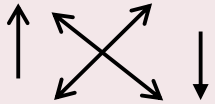
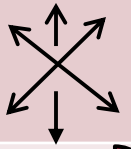
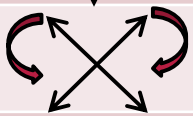


TU – Throttle Up
TD – Throttle Down
YL – Yaw Left
YL – Yaw Right
PF – Pitch Forward
PB – Pitch Backward
RL – Roll Left
RL – Roll Right



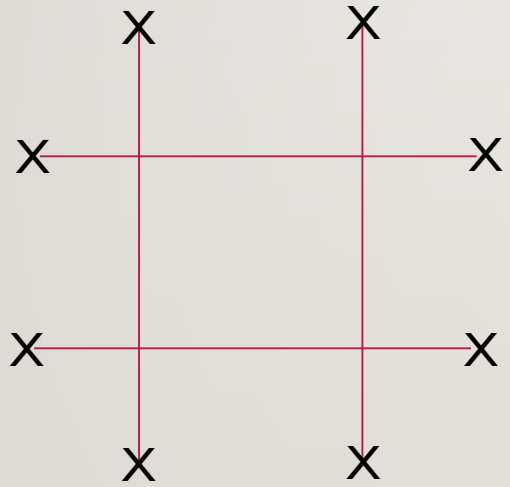
FLYING CHANNELS

- For DRONE flying controls, it need minimum 5 channels:

Channel no.	Channel Name	Channel Controls
1	ROLL	
2	PITCH	
3	THROTTLE	
4	YAW	
5	FLIGHTMODE	GPS/AUTOMATIC/MANUAL

There is another key called Application key which is used to perform the main Work

MODEL:



DRONE COMPONENTS:

- MOTORS
- PROPELLERS
- TX & RX
- BATTERY
- FLIGHT CONTROLLER
- ESC
- FRAME
- PMU
- PDB

- MOTORS

SPECIFICATION	VALUE
KV	935
WEIGHT	55grams
DIAMETER	27.9mm
LENGTH	39.7mm
3S(Li-Po)	1045(prop)
MAXIMUM THRUST	850grams
ESC RECOMMENDED	18Amps

- PROPELLERS

SPECIFICATION	VALUE
DIAMETER	10 Inch(25.4 cm)
SLOPE	4.5 Inch(11.43 cm)
BORE	3 – 7.8mm(approximately)
RECOMMENDED MOTOR	800KV – 2200KV

- TX & RX

SPECIFICATION	VALUE
WIRELESS PROTOCOL	AFHDS 2A
REMOTE CONTROL DISTANCE	500 to 1500m(in the air)
POWER	4.0 – 6.5 V
DATA INTERFACE	PWM/PPM
HUMIDITY RANGE	20-95%

- # BATTERY

For this project, we use 3S battery and its specifications are:

BATTERY	Min. VOLTAGE(V)	Max. VOLTAGE(V)
1S	3.7	4.2
3S	11.1	12.6
6S	22.2	25.2
12S	44.4	50.4

SPECIFICATION	VALUE
MODEL NO.	Flipo 3300/3S 40C
VOLTAGE	11.1V
Max. CHARGE CURRENT	13.2 A(4C)
CAPACITY	3300(mAh)

FLIGHT CONTROLLER

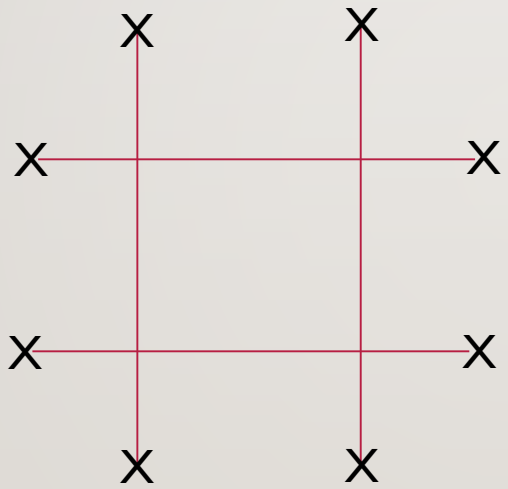
- NAZA-M V2 Multirotor Autopilot Controller set With GPS acts as the brains of the aircraft, managing pilot input and interpreting data from the various sensors, helping maintain a stable flying condition.

- ESC (ELECTRONIC SPEED CONTROLLER)

SPECIFICATION	VALUE
Burst Current	40 Amps
Constant Current	30 Amps
BEC	5V/2Amp
Suitable Lipo Batteries	2 - 4S
Weight	28 gms

• FRAME

- For this project, we are using Aluminium ¾” squared pipe.



‘X’ - indicates the position of Motors

- PMU(POWER MANAGEMENT UNIT)

- The DJI NAZA M PMU V2 is a compact power management unit (PMU) that features enhanced BEC functionality and extendable CAN BUS ports. It can be used as an independent PMU for the DJI Zenmuse H3-2D brushless gimbal when used with your DJI Phantom quadcopter

PDB(POWER DISTRIBUTION BOARD)

- For this project, we are using octacopter PDB board
- Its job is to split an incoming electrical power feed into multiple secondary or subsidiary circuits.

DRONE DESIGN

STEPS FOR MAKING DRONE:

- MAKING FRAME
- SOLDERING ECS's, POWER CABLE, PMU to PDB
- FIXING THE MOTORS TO ARMS
- FIXING FC, RECIEVER AND CONNECT THE ESC,s TO EACH MOTOR
- THROTTLE CALIBRATION
- ARMING AND FLIGHT MODE
- BASIC TAKE-OFF WITHOUT PAY LOAD
- TAKE-OFF WITH PAYLOAD
- FIELD TRAIL