

POST INDUSTRIAL DESIGN APPLICATION OF BAMBOO : DESIGN & CONSTRUCTION OF DRONES USING BAMBOO WEAVING TECHNIQUE

Guide:
Prof. P Kumaresan

Minu
176130011

Introduction to Drone

An unmanned aerial vehicle (UAVs) which is controlled remotely is commonly known as DRONE.

Types of Drone

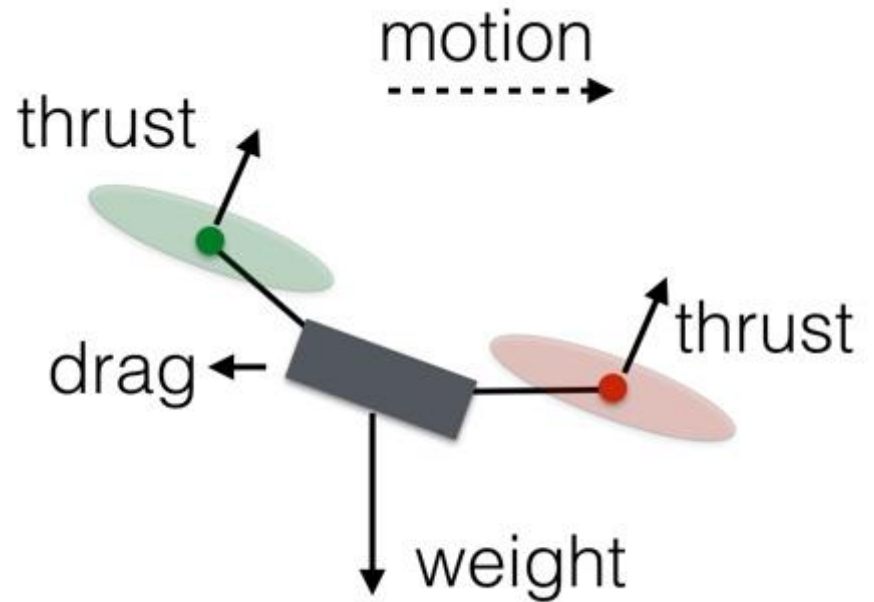
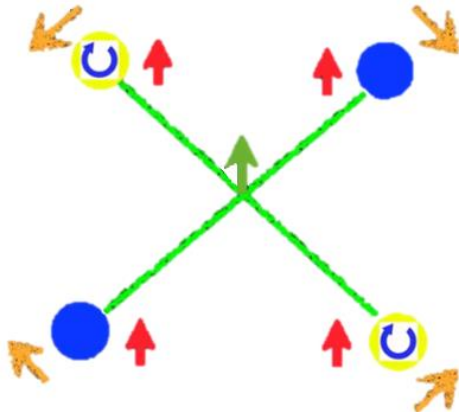
According to Number of Propellers:

- Single Rotor Drone
- Tricopter
- Quadcopters
- Hexacopter
- Octocopter

According to Size:

- Nano/ Micro Drones
- Small Drone
- Medium Drones
- Large Drones

Flight Dynamics



Basic Parts Of A Drone

- Frame (Top Cover)
- Frame (Base)
- Electronic Components
 - Flight Controller
 - Battery
 - Electronic Speed Control
 - Power Distributor
 - Motors
- Propellers
- Remote Control



Materials for Frame

Any material that can hold all the parts of strongly and still complete the flight, is suitable for frame of a drone.

- Carbon fiber
- Fiberglass
- Injection molded plastic parts
- Aluminum tubing
- Wood

Why Bamboo?

- Alternative material to reduce the consumption of Plastic
- Bamboo can be used in various forms (hollow, solid, woven, etc.)
- Cost Effective
- Ecological and strong
- Used widely as craft material
- Highly resistant to climatic condition,
- Bamboo could be useful for DIY projects
- Brings in more traditional value

Then WHY NOT BAMBOO.....

Target Audience

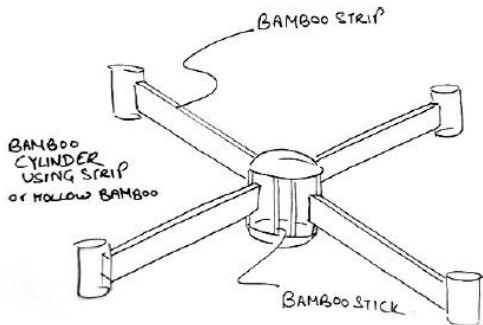
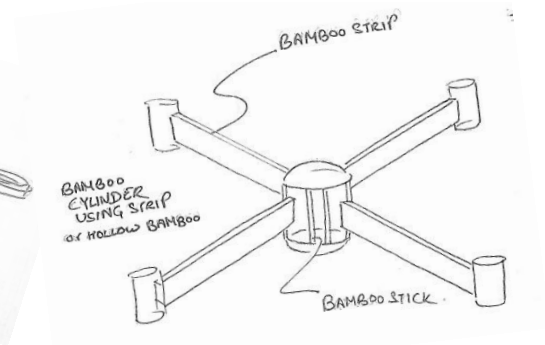
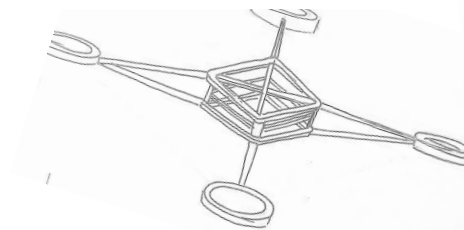
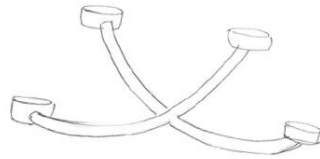
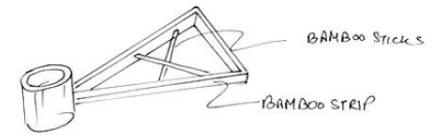
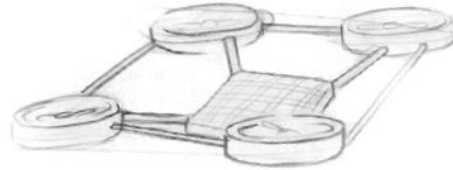
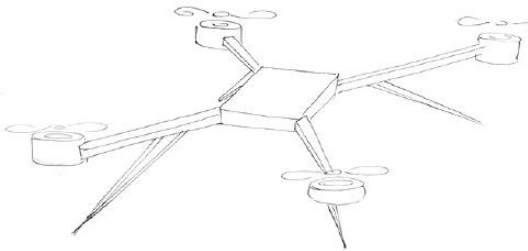
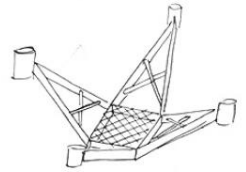
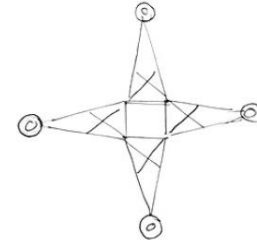
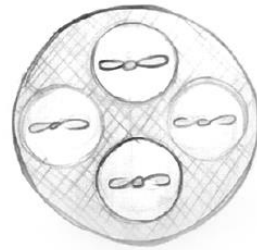
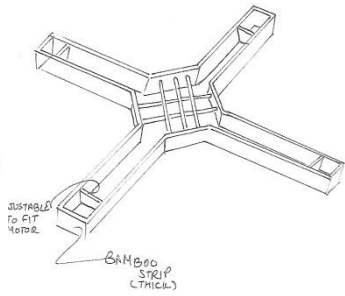
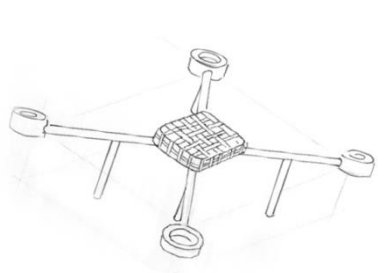
- 'Do it yourself' projects
- Hobby or personal drones
- Agricultural drones
- Spy drones
- Drones for disaster management
- Military purpose

Design Brief

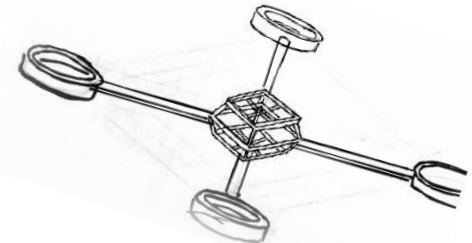
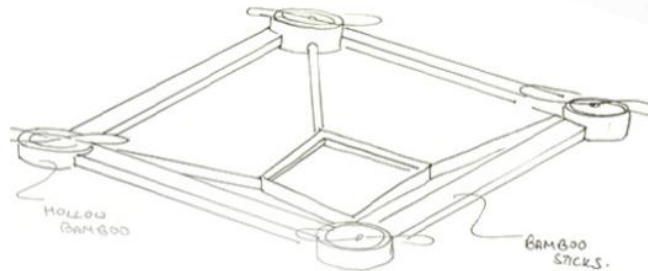
To design a working prototype of a Quadcopter using Bamboo as the base material for structure (frame),

- Keeping the weight as less as possible
- Using bamboo for as many parts possible
- Including craft techniques and aesthetics

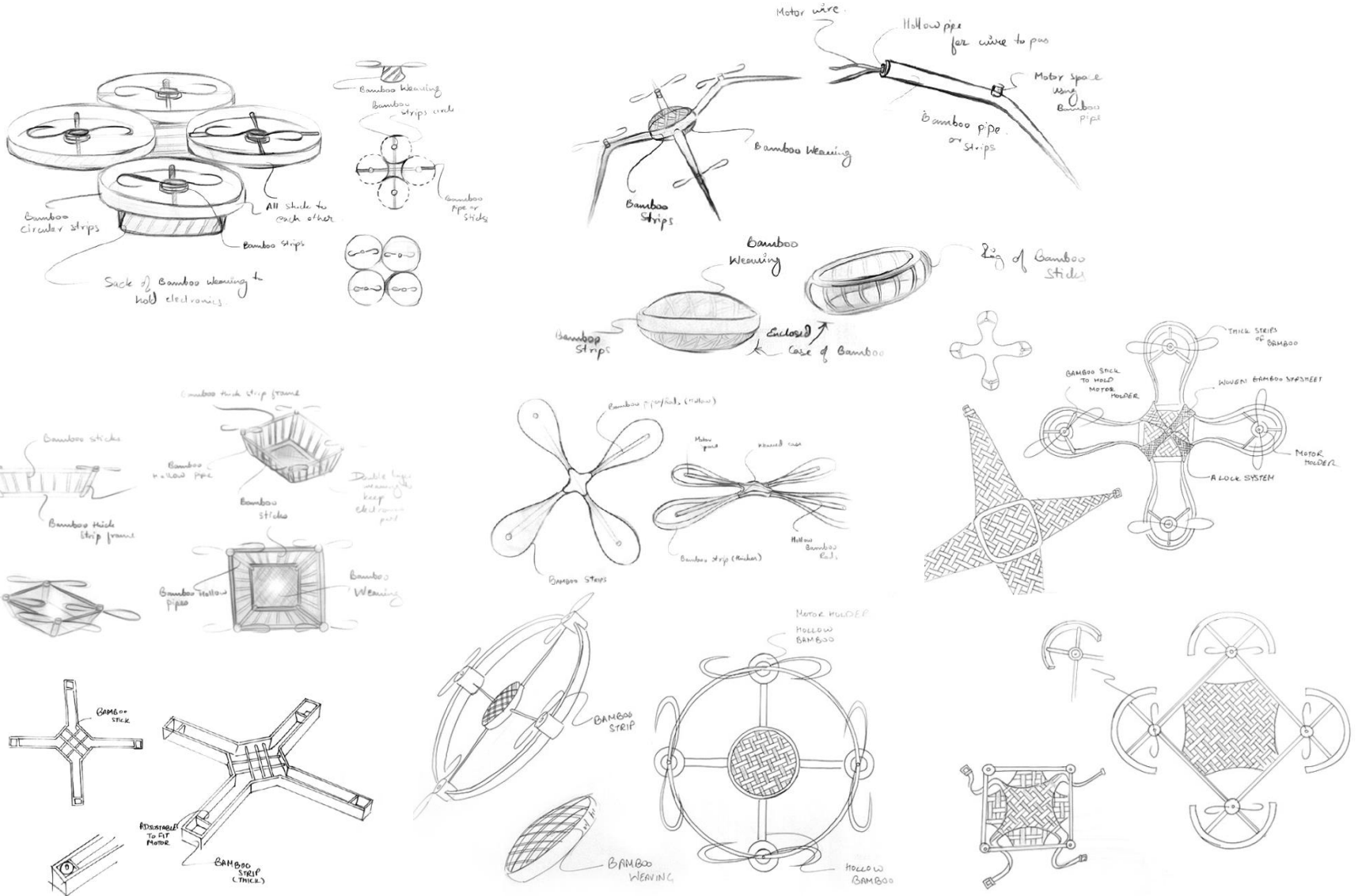
Ideas



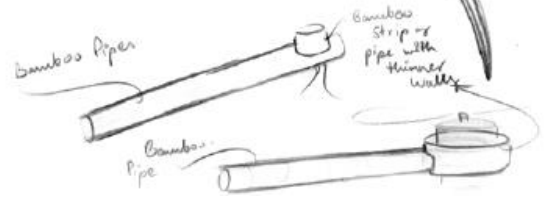
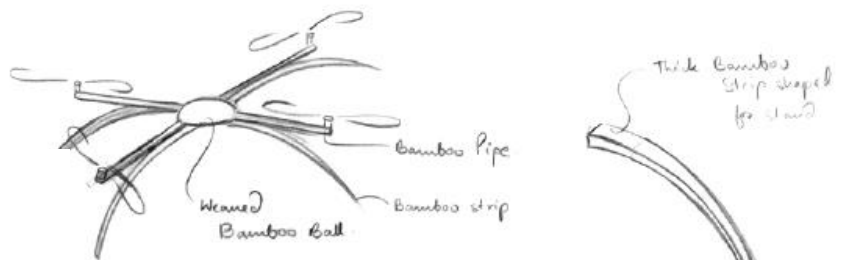
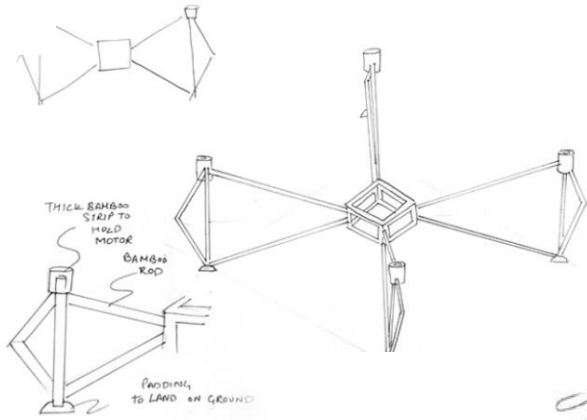
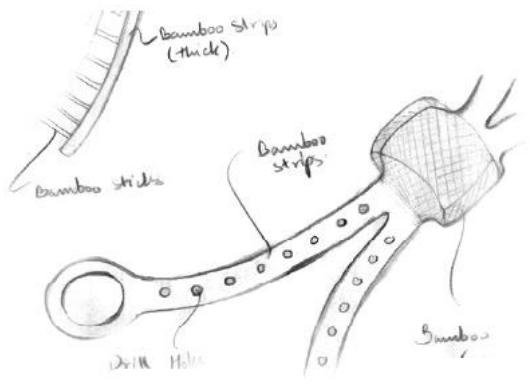
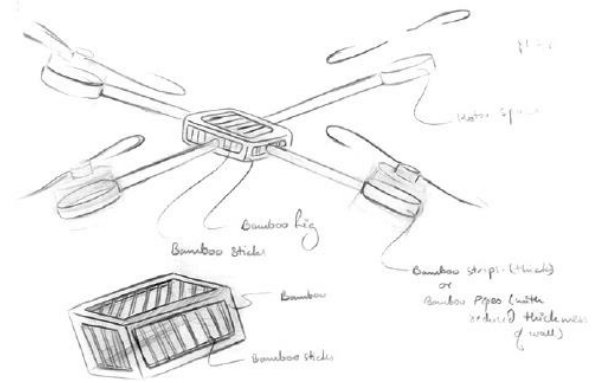
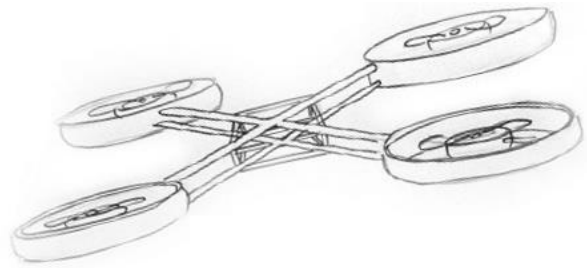
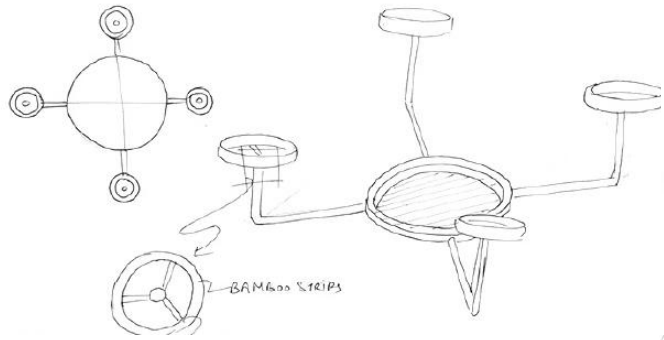
BAMBOO CYLINDER USING STRIP or HOLLOW BAMBOO



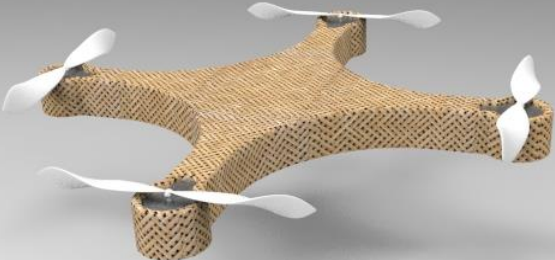
Ideas



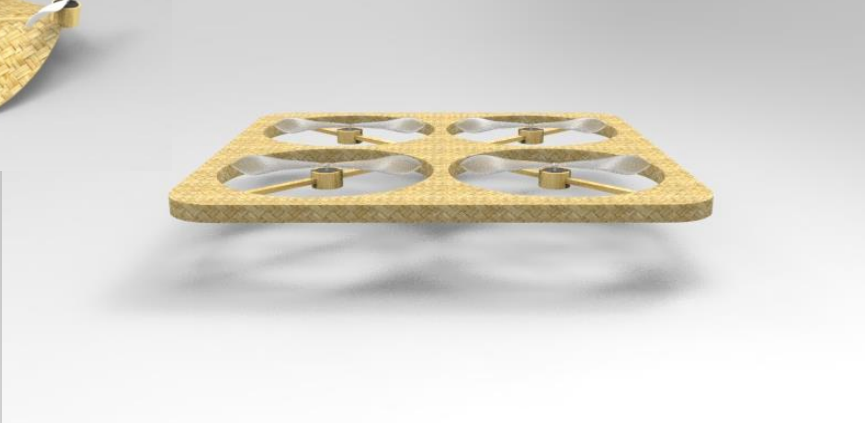
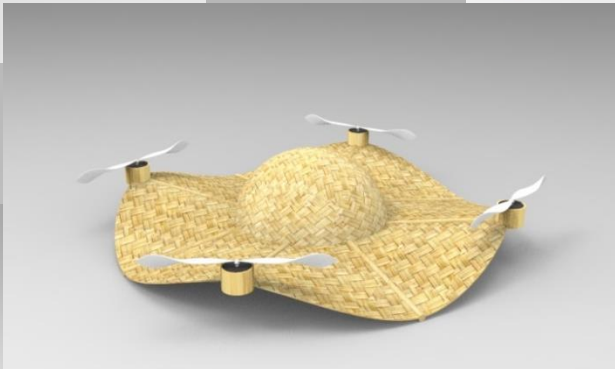
Ideas



3D Models



3D Models

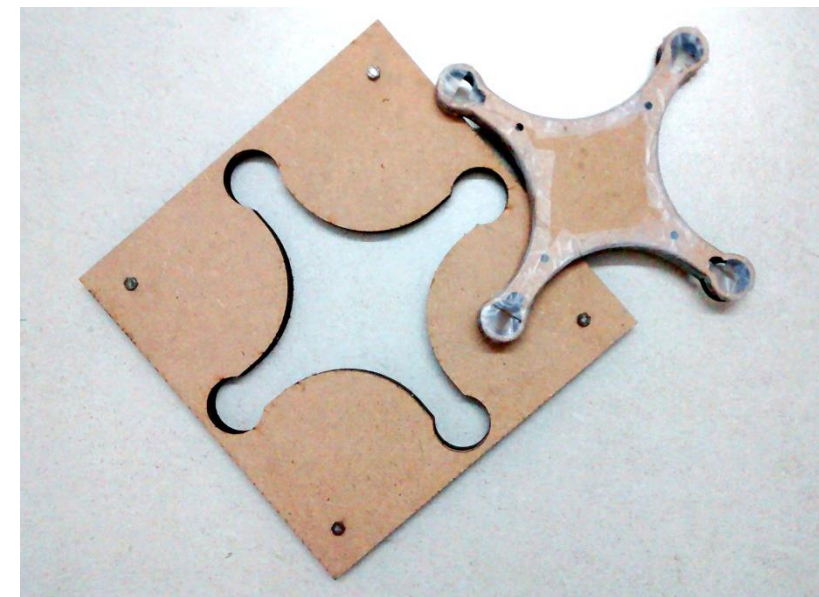
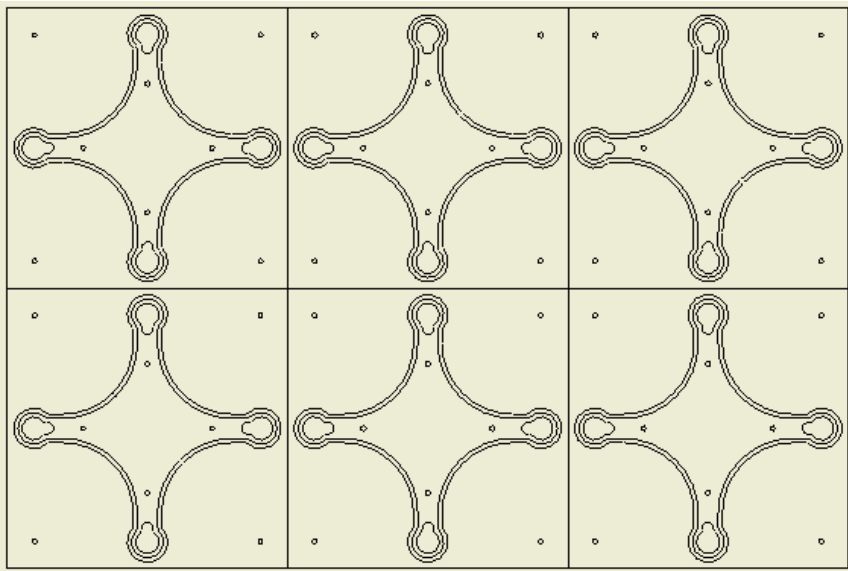
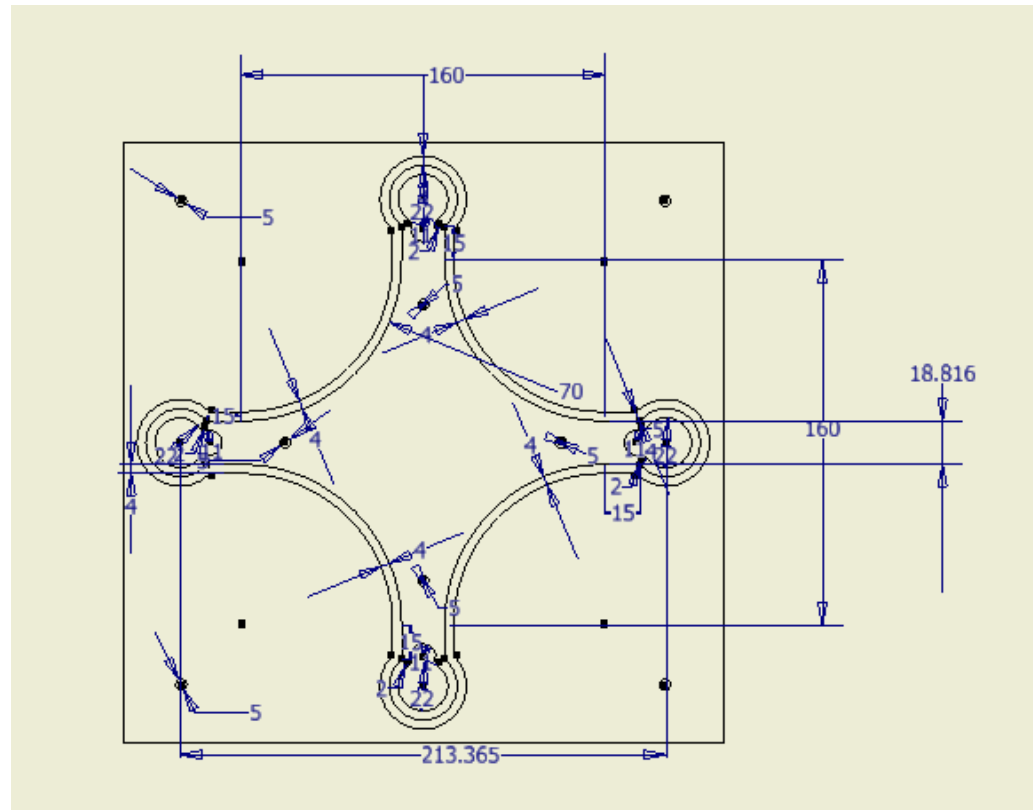


3D Models



Model Making

Drawing

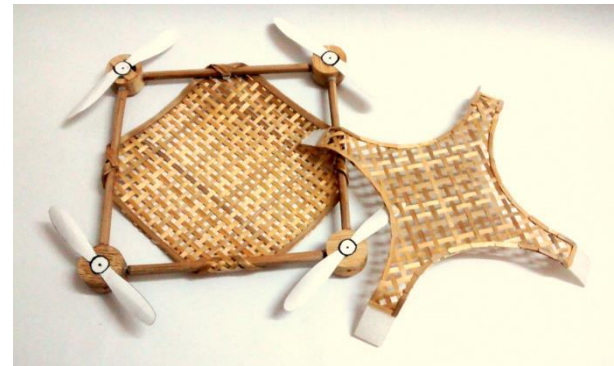
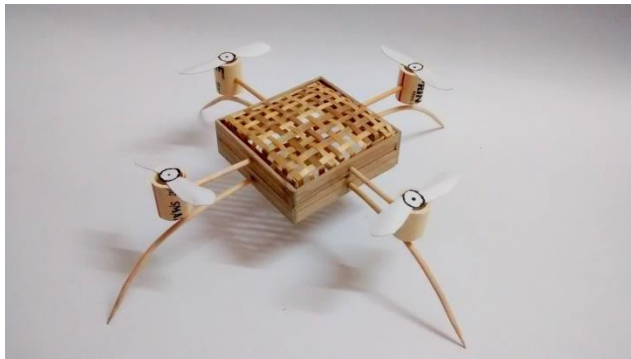
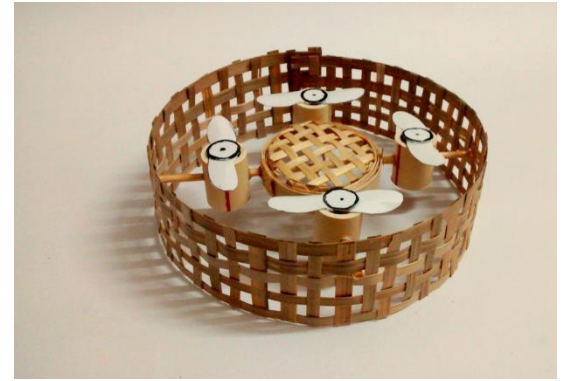
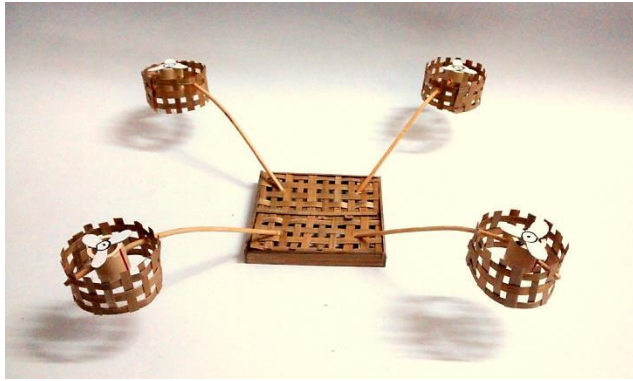


Mold

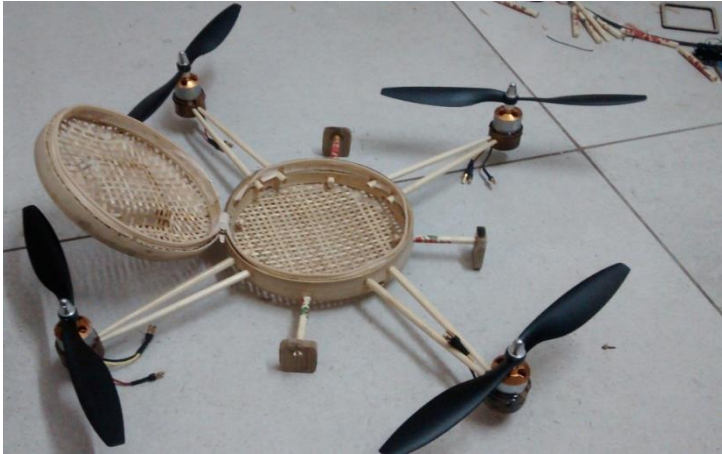
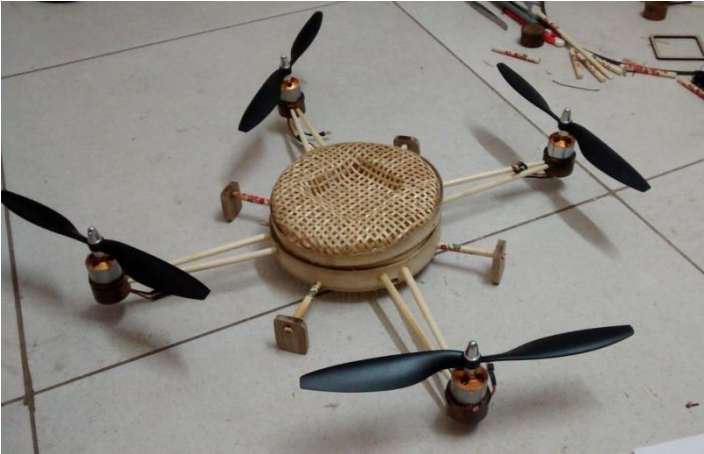
Model Making



Model Making



Final Model



Flight test



Future Scope

Durability and strength of bamboo can further be improved by mixing it with other materials like resin, etc. thereby improve the scope of use of bamboo in development of bigger and better drones.

Scope of selling ready to use bamboo craft materials like bamboo woven mats, bamboo sticks and strips of various sizes, bamboo saw dust, bamboo hollow sticks, bamboo bent sticks, bamboo rings, etc.

Application of bamboo can be extended to appliances and electronic gadgets

In disaster affected areas and earthquake prone areas, bamboo framed drone is the best option.

Reference

HOW DO DRONES FLY? PHYSICS, OF COURSE!

<https://www.wired.com/2017/05/the-physics-of-drones/>

How A Quadcopter Works With Propellers And Motors Explained

<https://www.dronezon.com/learn-about-drones-quadcopters/how-a-quadcopter-works-with-propellers-and-motors-direction-design-explained/>

Thank You