Surveillance Bot

Robotics Club

Inspiration Behind this Project

We wanted to design and manufacture an all round ATV type bot, which can be used for Surveillance in Remote areas.

Decoding the Problem Statement

Mechanical Design :

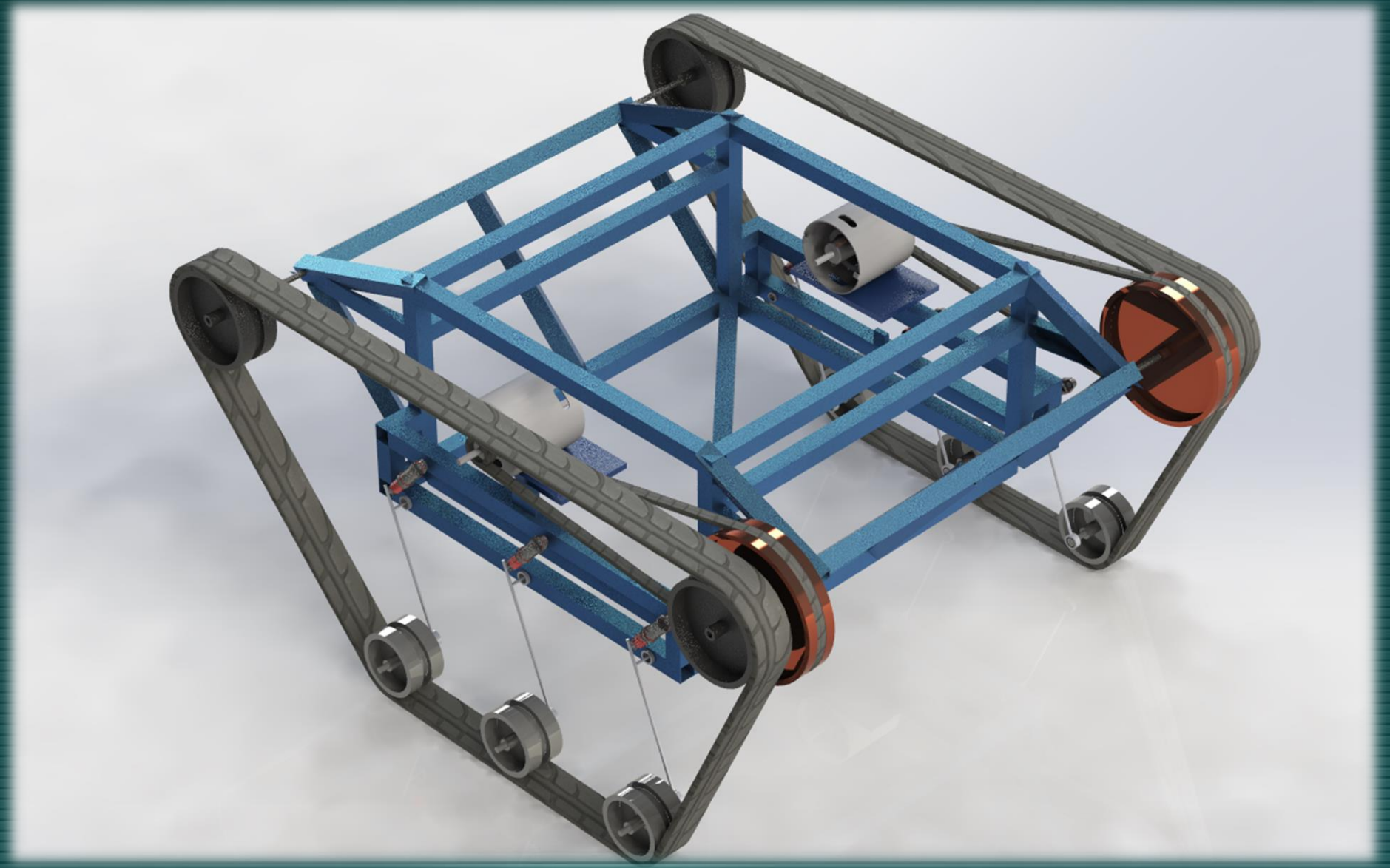
It was decided to choose a design similar to a tank, so that it can be operated on rough terrains.

Controlling and Functioning:

We decided to use components like GPS module, IMU and Arduino to operate our bot for surveillance.

Mechanical Work

CAD modelled in Solidworks'15



Technical Details - Mechanical

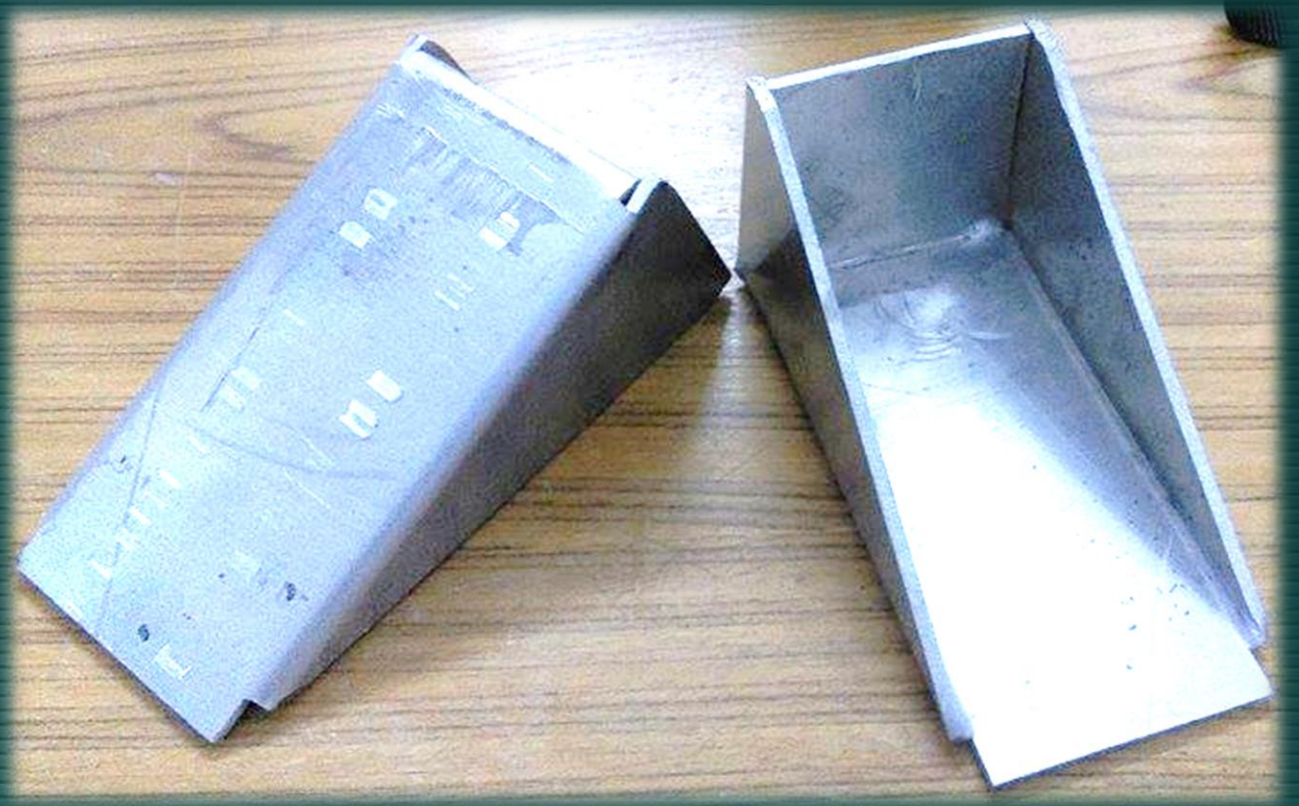
- Aluminium Box chassis 18*18mm with 1mm thickness
- 6000rpm-24V DC motor
- Aluminium Pulleys for RPM reduction
- Fan belt 10mm width
- Caterpillar Belt
- Roller Bearings OD 12mm ID 6mm
- MS rod 6mm dia.
- Nylon for bearing housing
- Wheels of various dia.

Fabrication

- Riveted Chassis

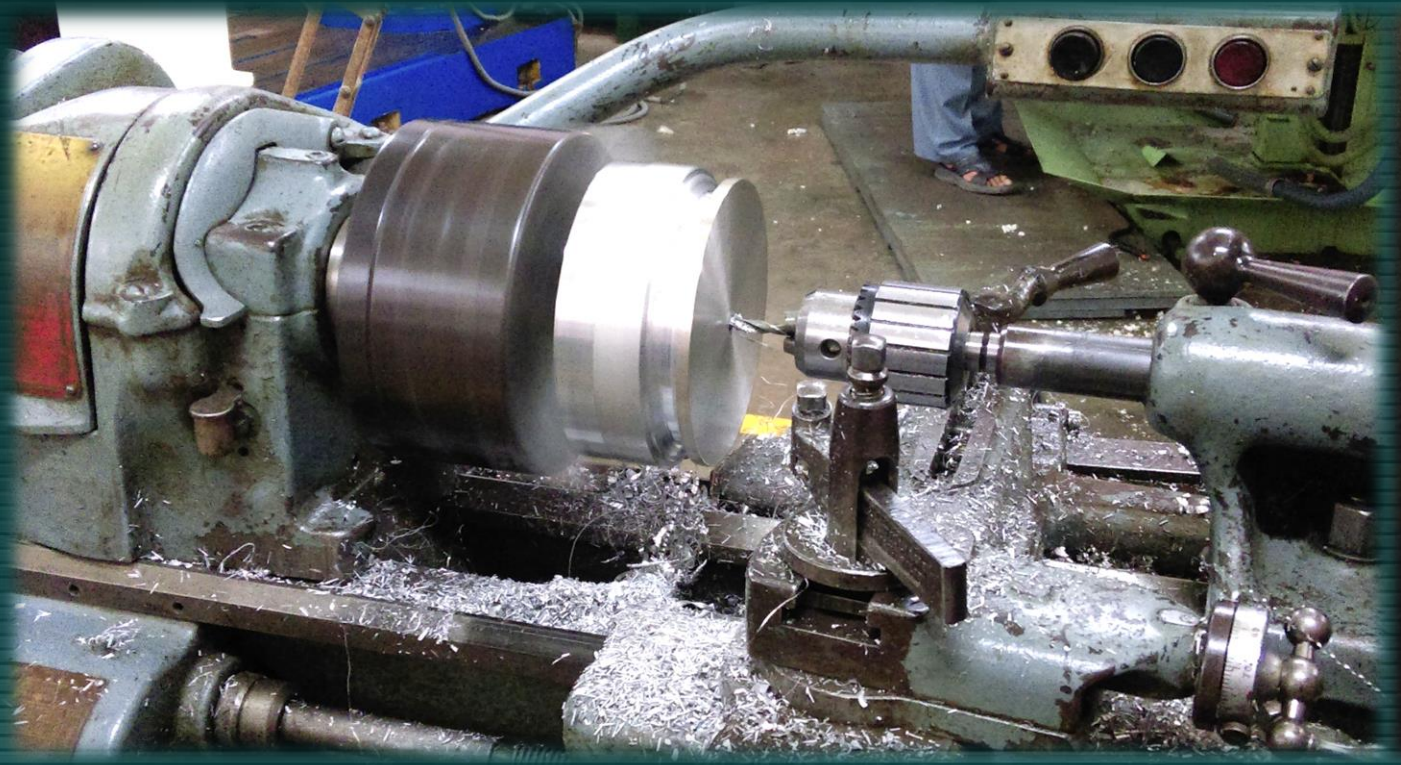
Fabrication

- Nylon Housing and Motor mount cut through Water-Jet



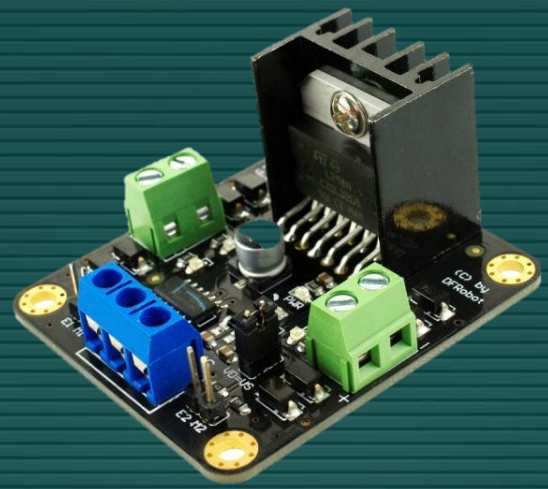
Fabrication

- Fabricated Pulley



Electronic Components

- GPS Module
- IMU
- Telemetry
- Arduino Mega
- Motor Drivers
- Lead Acid Batteries



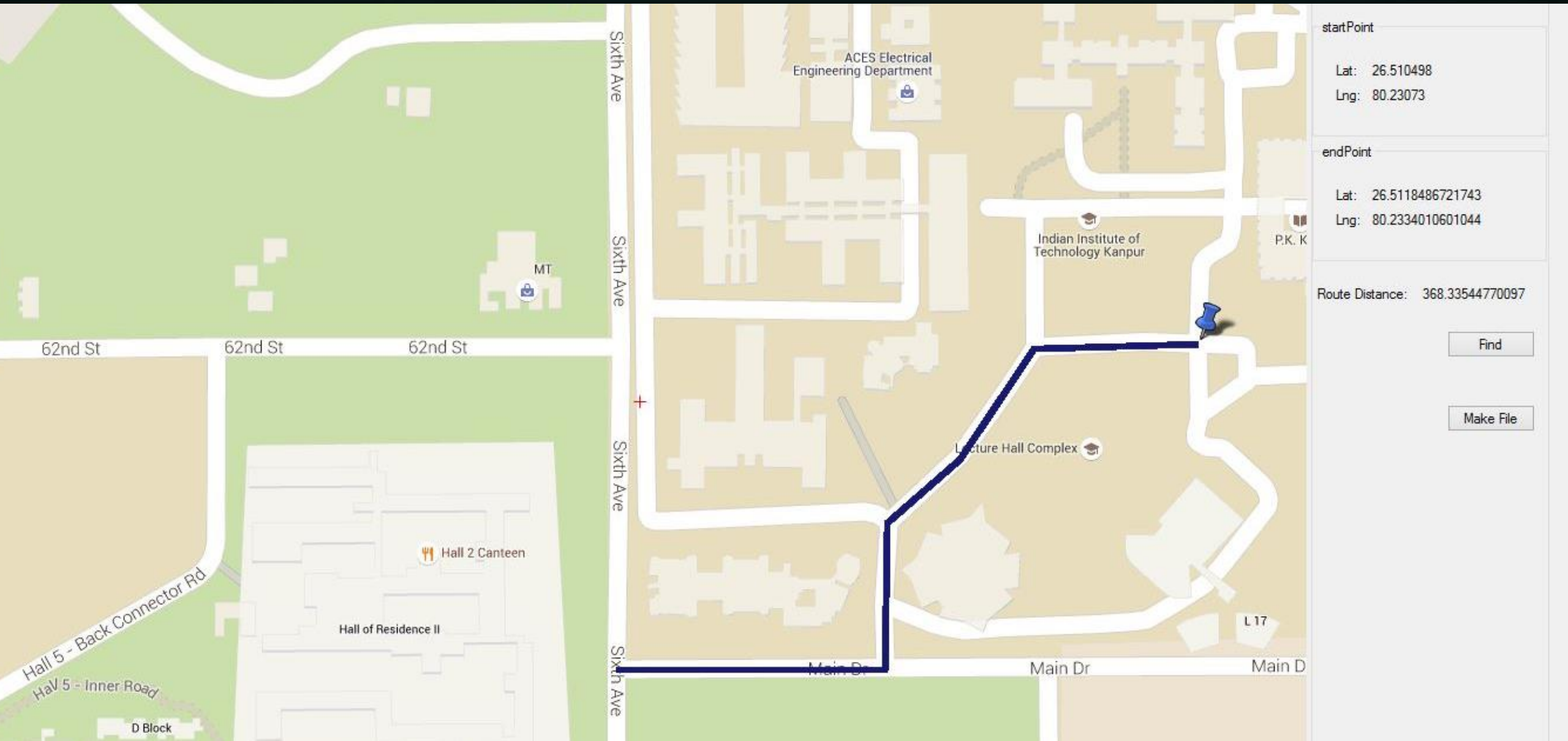
Navigation System

- Task was to make an application that can find a optimal path between two given points on map and store the path data in latitude and longitude format.

- We used GMaps.NET library which provide us some basic maps functions.

- Then our program is designed to take input value of initial location coordinates from bot. We have to click the final destination point on map.

Route on our program



Linking with mission planner

- After the route is created our program creates a waypoint file that contains all the intermediate waypoints that will come in our bots path.
- Then the waypoint file is uploaded on bot's APM module via mission planner.

Challenges faced

- Failure of Ardupilot after 30 days
- Motor Drivers failure
- Problems with IMU, GPS, calibration and filters
- Interference of motor's magnetic field in Magnetometer
- Serial communication lag with Telemetry
- I2C communication of components with same address

Prototype Video Link

www.youtube.com/watch?v=oLeQH6g9hCo

fppt.com

Future Work and Improvement

- Integrating with our All terrain bot
- Combining GPS and IMU data using Kalman filter
- Coding GPS internally to get data at higher frequency
- Obstacle detection and avoidance
- Camera for surveillance

Thank You !