Дрон-вездеход

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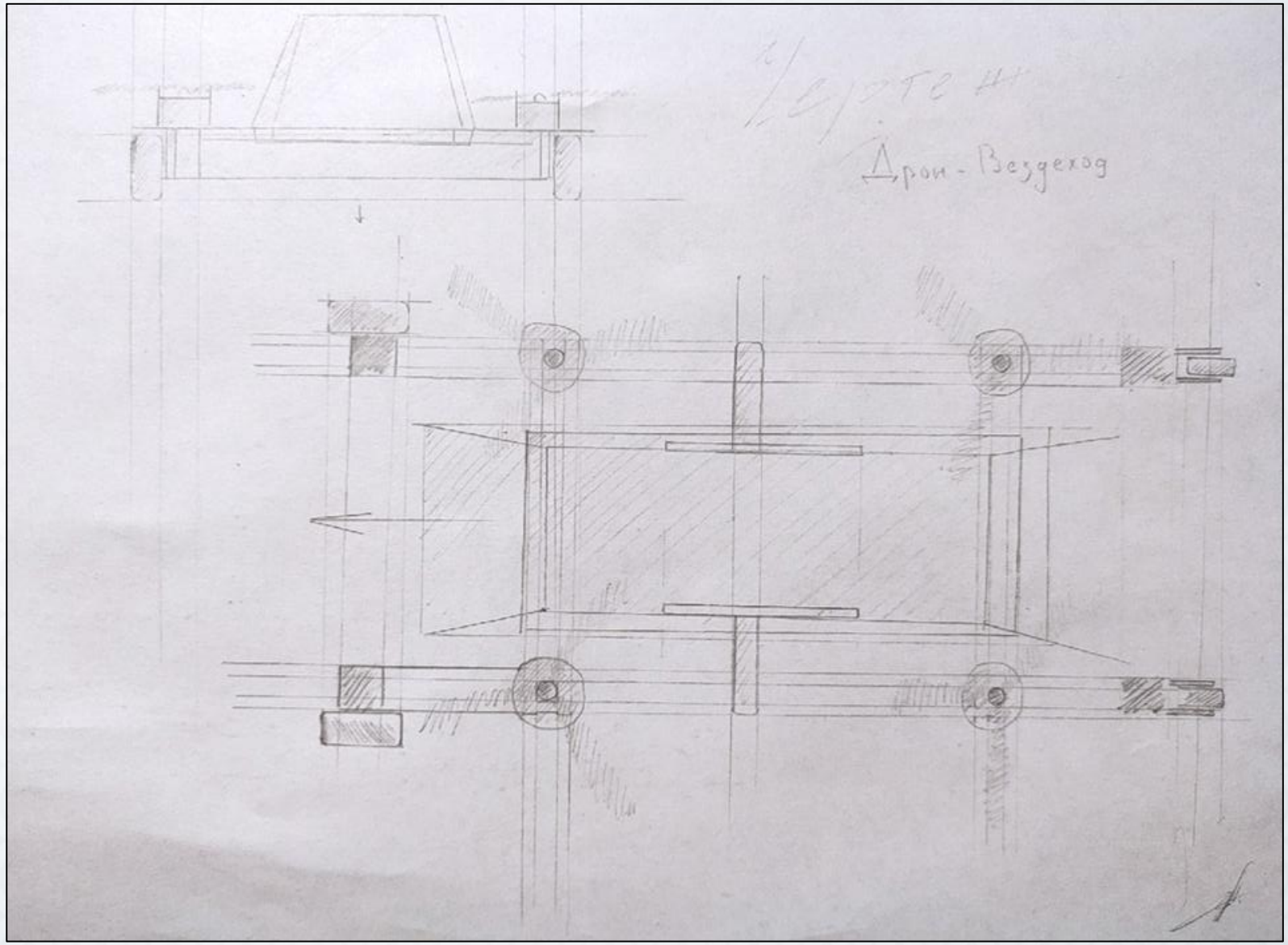
педагог дополнительного образования

«Кванториум Сампо»

2022

Гибридное транспортное средство



Цели:

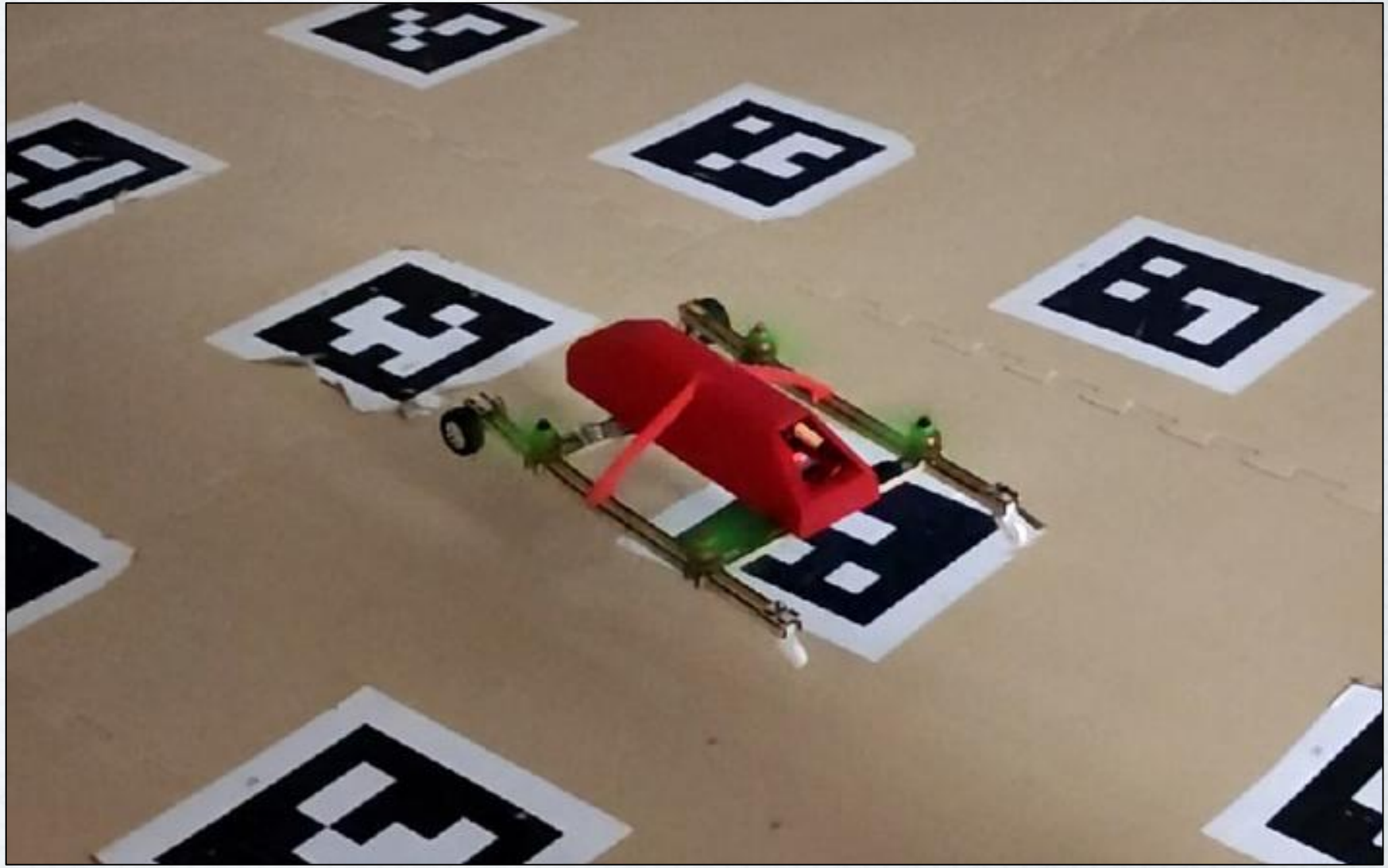
- Создание прототипа гибридного транспортного средства и исследование возможности управления разнотипными устройствами с одного пульта управления.

Задачи:

- Сконструировать и построить транспортное средство - гибрид колесного транспортного средства и квадрокоптера
- Разработать программу и запрограммировать модуль управления
- Протестировать работу собранной мной системы, выявить и устранить недостатки и наметить пути дальнейшего развития проекта

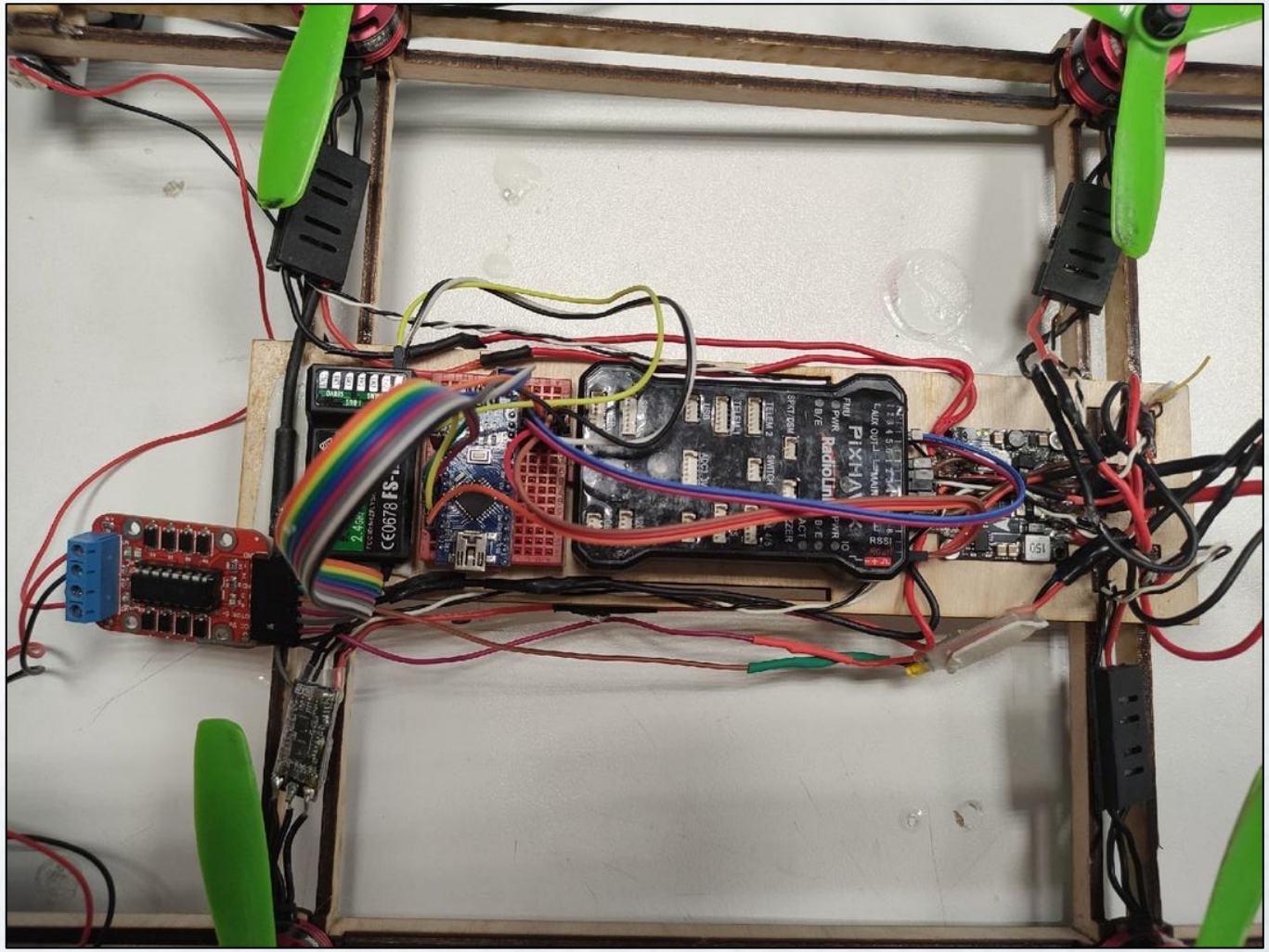
Методы исследования:

- Использование программ, таких как: CorelDraw, 3D Компас, Arduino IDE, QGround Control
- Поиск информации среди ресурсов Интернета



Конструкция

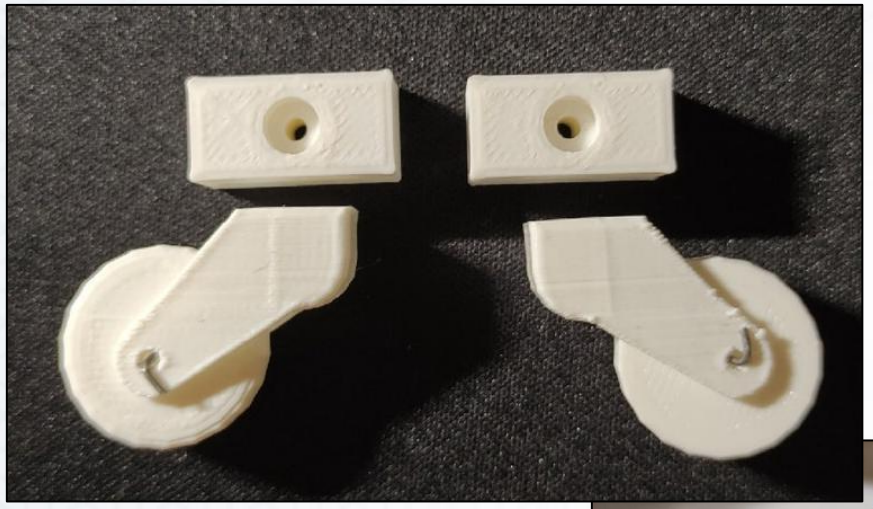
- Каркас

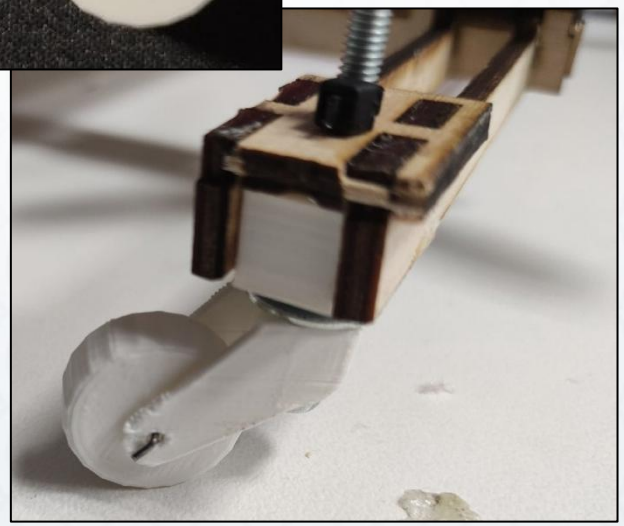


- Крепление моторов

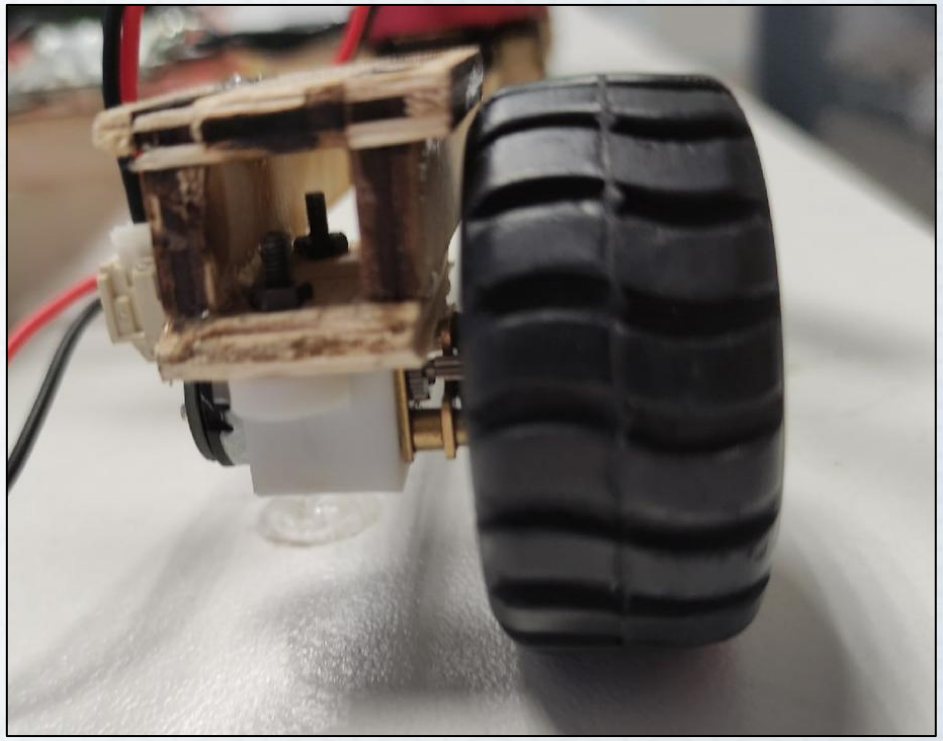
Расположение колес

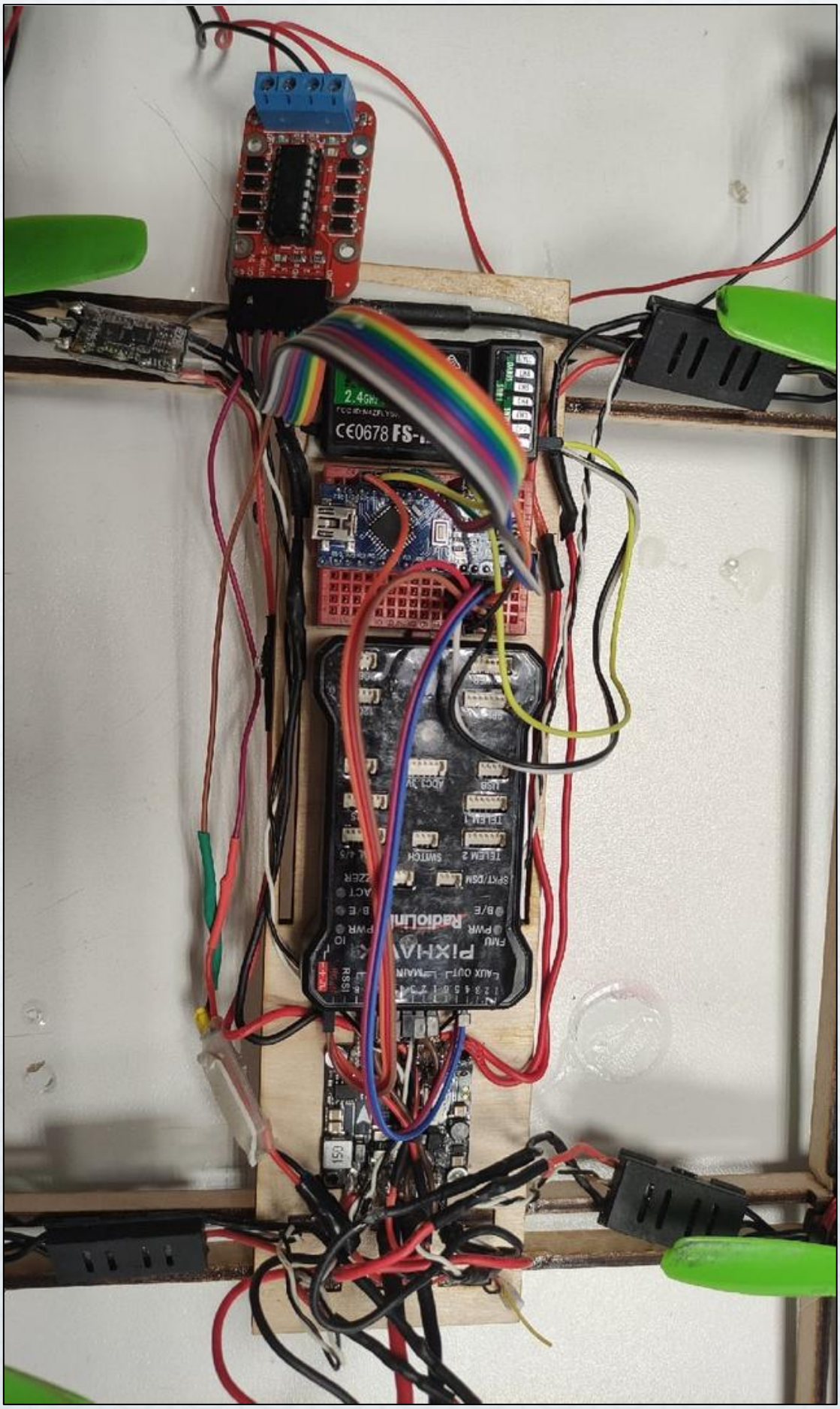
- Самоориентирующиеся





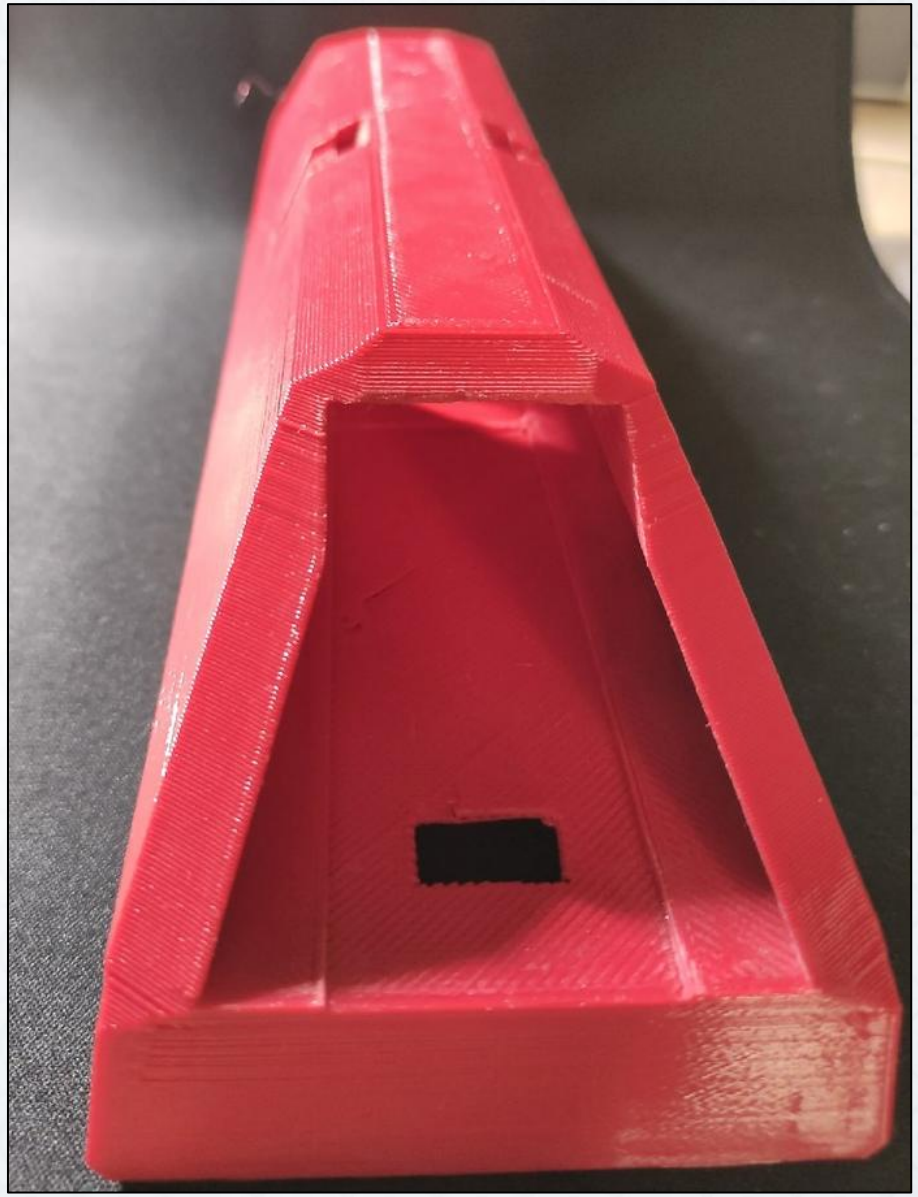
- С приводом



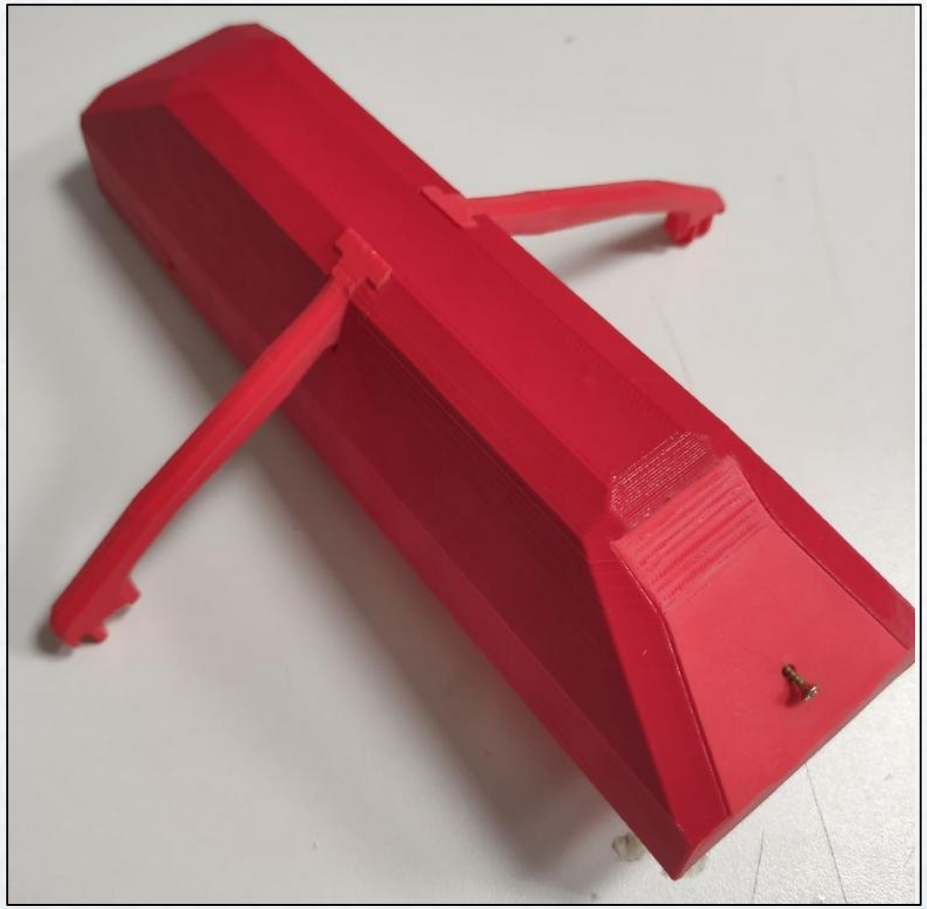

2.4GHz
CE0678 FS-i
PIXHAWK
Radiolink
AUX OUT
SWITCH
TELEM 2
TELEM 1
USB
ACT
B/E
PWR
FMU
SPKT/DSM
RSSI

эстетическая функция.

- Корпус



- Крепления



Программа

- Получение PPM сигнала и его декодировка

```
void setup() {
Serial.begin(9600);
  pinMode(2, INPUT_PULLUP);
  attachInterrupt(0, read_me, FALLING);
  // enabling interrupt at pin 2
}

void loop() {
read_rc();

Serial.print(ch[1]);Serial.print("\t");
Serial.print(ch[2]);Serial.print("\t");
Serial.print(ch[3]);Serial.print("\t");
Serial.print(ch[4]);Serial.print("\t");
Serial.print(ch[5]);Serial.print("\t");
Serial.print(ch[6]);Serial.print("\n");

delay(100);
}


void read_me()  {
 //this code reads value from RC reciever from PPM pin (Pin 2 or 3)
 //this code gives channel values from 0-1000 values
 //    -: ABHILASH :-    //
a=micros(); //store time value a when pin value falling
c=a-b;      //calculating time inbetween two peaks
b=a;        //
x[i]=c;     //storing 15 value in array
i=i+1;       if(i==15){for(int j=0;j<15;j++) {ch1[j]=x[j];}
             i=0;}
           }//copy store all values from temporary array another array after 15 reading


void read_rc(){
int i,j,k=0;
  for(k=14;k>-1;k--){if(ch1[k]>10000){j=k;}}  //detecting separation space 10000us in that another array
  for(i=1;i<=6;i++){ch[i]=(ch1[i+j]-1000);}}     //assign 6 channel values after separation space
```

Переключение между режимами «квадрокоптер» и «вездеход»

- Режим «вездеход»

```
void loop() {
read_rc();

if (ch[6] > 1500)
{
      if (ch[3] > 1700)
    {

      analogWrite (MOTOR_PIN0, 255);
    }

  else if (ch[3] < 1300)
    {

      analogWrite (MOTOR_PIN, 255);
    }
    else {
    analogWrite (MOTOR_PIN0, 0);
    analogWrite (MOTOR_PIN, 0);
    }


        if (ch[2] > 1700)
     {

       analogWrite (MOTOR_PIN10, 255);
     }

    else if (ch[2] < 1300)
     {

        analogWrite (MOTOR_PIN1, 255);
     }
```

```
      else {
       analogWrite (MOTOR_PIN10, 0);
       analogWrite (MOTOR_PIN1, 0);
      }


      }
else if (ch[6] < 1500)
{

  ppmEncoder.setChannel(0, ch[1]);//1
  ppmEncoder.setChannel(1,ch[2]);
    ppmEncoder.setChannel(2, ch[3]);
      ppmEncoder.setChannel(3, ch[4]);//4      макс90  мин0
        ppmEncoder.setChannel(4, ch[5]);//5
          ppmEncoder.setChannel(5, ch[6]);
            ppmEncoder.setChannel(6, ch[7]);
            ppmEncoder.setChannel(7, ch[8]);//Persent
}




Serial.print(ch[1]);Serial.print("\t");
Serial.print(ch[2]);Serial.print("\t");
Serial.print(ch[3]);Serial.print("\t");
Serial.print(ch[4]);Serial.print("\t");
Serial.print(ch[5]);Serial.print("\t");
Serial.print(ch[6]);Serial.print("\n");

delay(100);
}
```

- Режим «квадрокоптер»

```
else if (ch[6] < 1500)
{

  ppmEncoder.setChannel(0, ch[1]);//1
  ppmEncoder.setChannel(1,ch[2]);
    ppmEncoder.setChannel(2, ch[3]);
      ppmEncoder.setChannel(3, ch[4]);//4      макс90  мин0
        ppmEncoder.setChannel(4, ch[5]);//5
          ppmEncoder.setChannel(5, ch[6]);
            ppmEncoder.setChannel(6, ch[7]);
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}
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void read_me()  {
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 //    -: ABHILASH :-    //
a=micros(); //store time value a when pin value falling
c=a-b;      //calculating time inbetween two peaks
b=a;        //
x[i]=c;     //storing 15 value in array
i=i+1;       if(i==15){for(int j=0;j<15;j++) {chl[j]=x[j];}
             i=0;}
           }//copy store all values from temporary array another array after 15 reading


void read_rc(){
int i,j,k=0;
  for(k=14;k>-1;k--){if(chl[k]>3000){j=k;}}  //detecting separation space 10000us in that another array
  for(i=1;i<=6;i++){ch[i]=(chl[i+j]);}}     //assign 6 channel values after separation space
```

•Вся программа

```
#include "PPMEncoder.h"
 unsigned long int a,b,c;
int x[15],ch1[15],ch[7],i;
                    //specifing arrays and variables to store values
#define MOTOR_PIN 9
#define MOTOR_PIN1 8
#define MOTOR_PIN0 7
#define MOTOR_PIN10 6
  #define OUTPUT_PIN 10


void setup() {
  pinMode(MOTOR_PIN, OUTPUT);
  pinMode(MOTOR_PIN1, OUTPUT);
    pinMode(MOTOR_PIN0, OUTPUT);
  pinMode(MOTOR_PIN10, OUTPUT);
Serial.begin(9600);
  pinMode(2, INPUT_PULLUP);
  attachInterrupt(0, read_me, FALLING);
  // enabling interrupt at pin 2
ppmEncoder.begin(OUTPUT_PIN);
}

void loop() {
read_rc();

if (ch[6] > 1500)
{
      if (ch[3] > 1700)
    {

      analogWrite (MOTOR_PIN0, 255);
    }

  else if (ch[3] < 1300)
    {
```

```
      analogWrite (MOTOR_PIN, 255);
    }
    else {
    analogWrite (MOTOR_PIN0, 0);
    analogWrite (MOTOR_PIN, 0);
    }


        if (ch[2] > 1700)
     {

       analogWrite (MOTOR_PIN10, 255);
     }

    else if (ch[2] < 1300)
     {

        analogWrite (MOTOR_PIN1, 255);
     }
     else {
      analogWrite (MOTOR_PIN10, 0);
      analogWrite (MOTOR_PIN1, 0);
     }


     }
else if (ch[6] < 1500)
{

  ppmEncoder.setChannel(0, ch[1]);//1
  ppmEncoder.setChannel(1,ch[2]);
    ppmEncoder.setChannel(2, ch[3]);
      ppmEncoder.setChannel(3, ch[4]);//4
        ppmEncoder.setChannel(4, ch[5]);//5
          ppmEncoder.setChannel(5, ch[6]);
```

```
          ppmEncoder.setChannel(6, ch[7]);
          ppmEncoder.setChannel(7, ch[8]);//Persent
}




Serial.print(ch[1]);Serial.print("\t");
Serial.print(ch[2]);Serial.print("\t");
Serial.print(ch[3]);Serial.print("\t");
Serial.print(ch[4]);Serial.print("\t");
Serial.print(ch[5]);Serial.print("\t");
Serial.print(ch[6]);Serial.print("\n");

delay(100);
}

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i=i+1;       if(i==15){for(int j=0;j<15;j++) {ch1[j]=x[j];}
             i=0;}
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void read_rc(){
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  for(i=1;i<=6;i++){ch[i]=(ch1[i+j]);}}     //assign 6 channel values after separation space
```
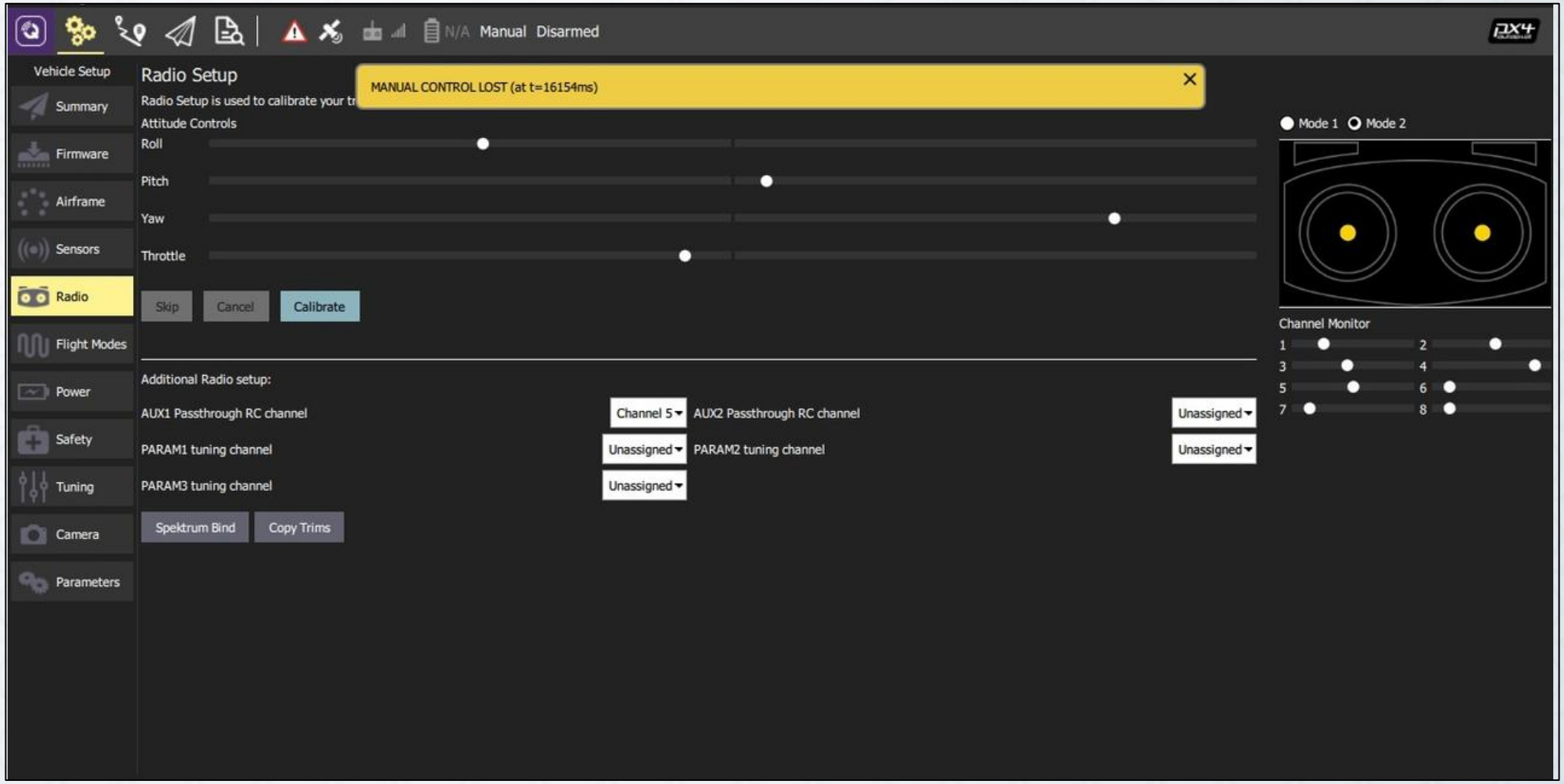
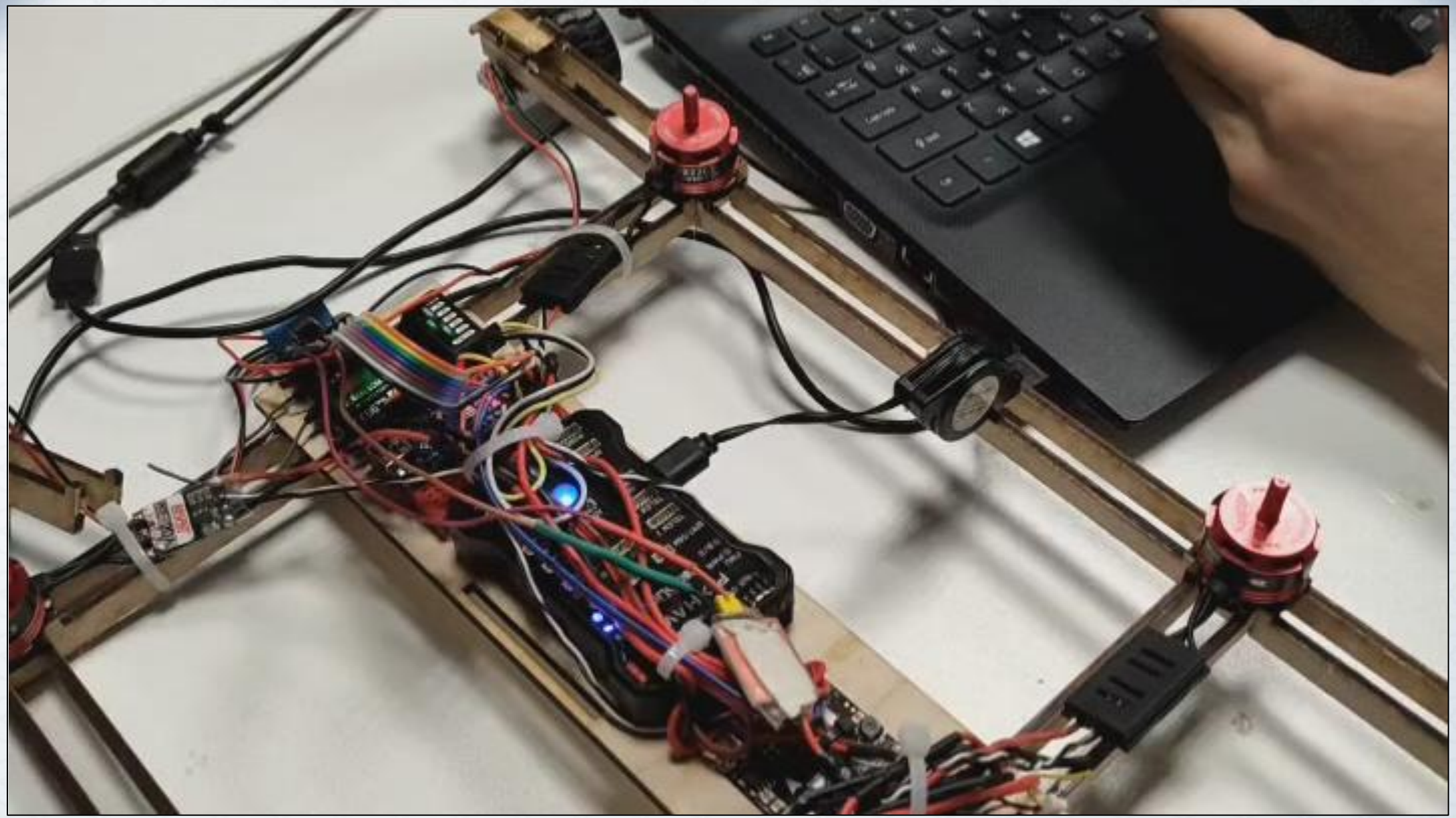
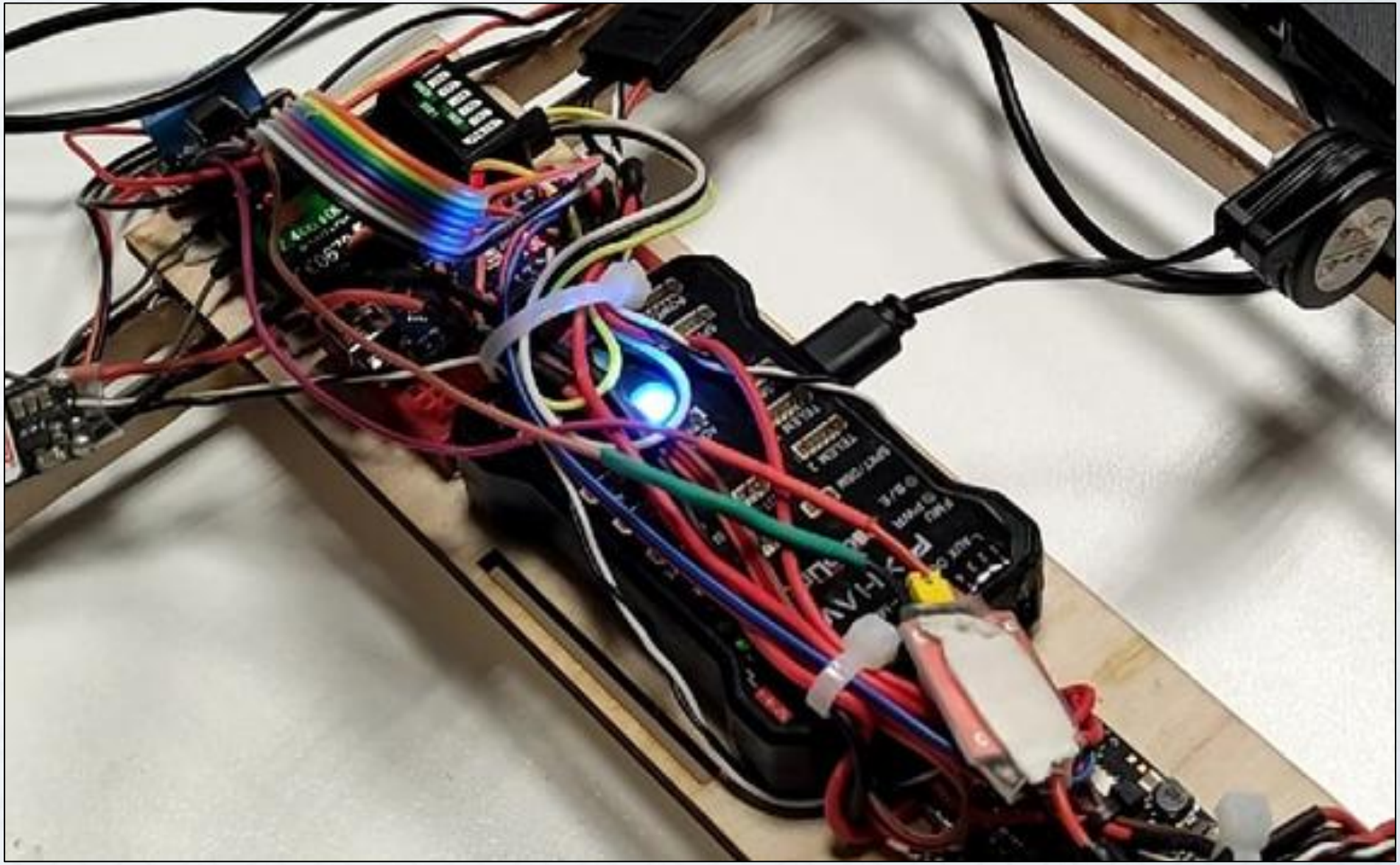
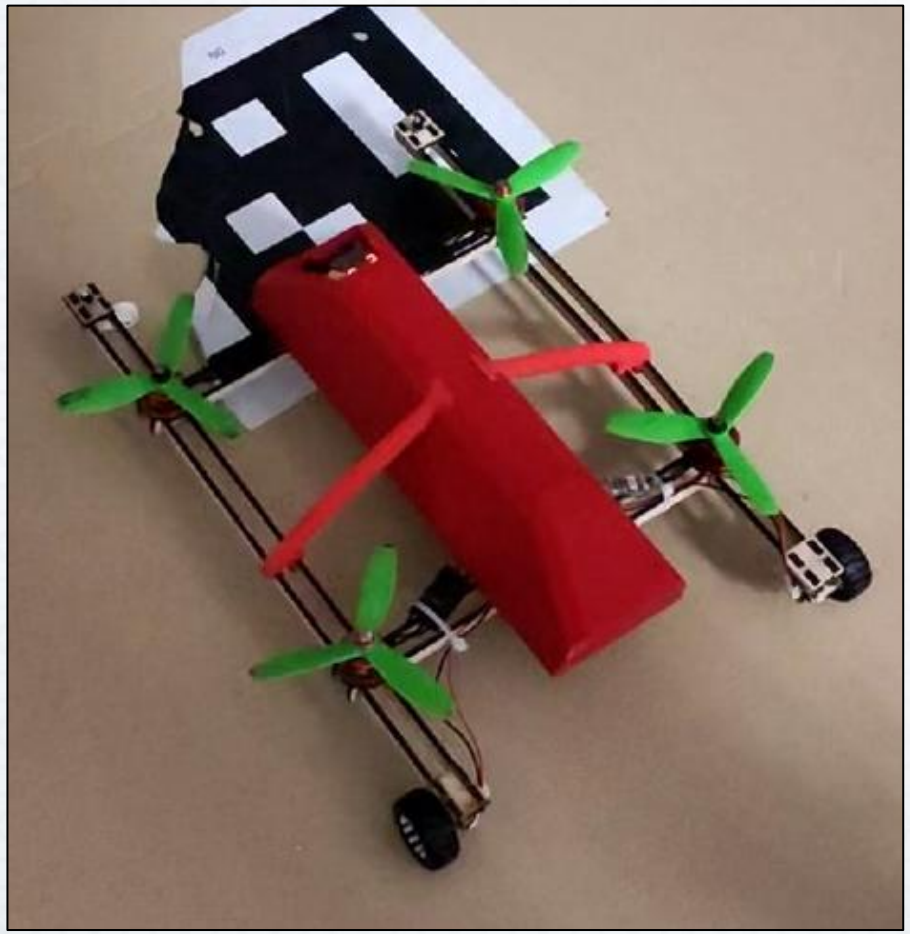

- Проверка

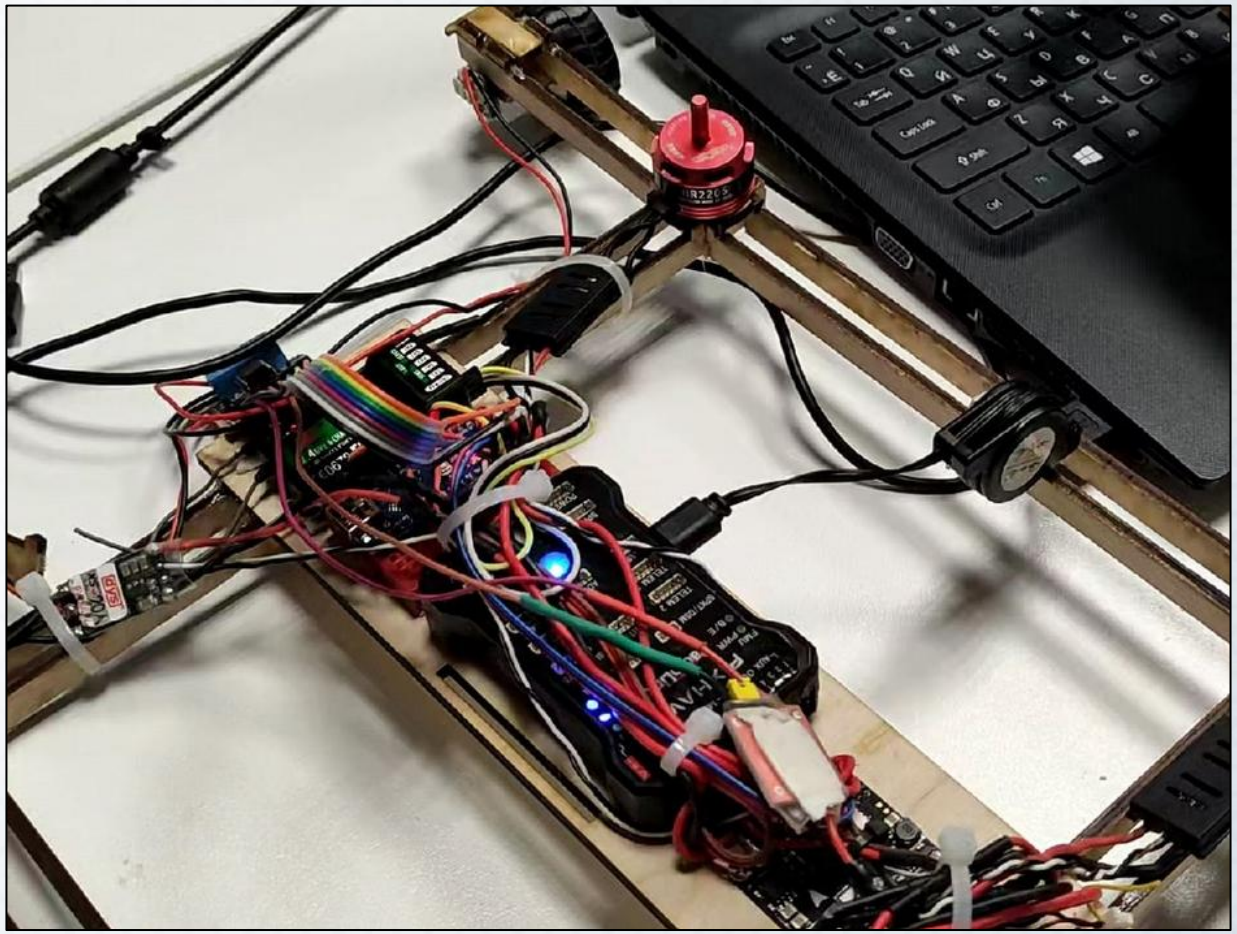

N/A Manual Disarmed
Vehicle Setup
Summary
Firmware
Airframe
Sensors
Radio
Flight Modes
Power
Safety
Tuning
Camera
Parameters
Radio Setup
Radio Setup is used to calibrate your tr
MANUAL CONTROL LOST (at t=16154ms)
Attitude Controls
Roll
Pitch
Yaw
Throttle
Skip
Cancel
Calibrate
Additional Radio setup:
AUX1 Passthrough RC channel
Channel 5
AUX2 Passthrough RC channel
Unassigned
PARAM1 tuning channel
Unassigned
PARAM2 tuning channel
Unassigned
PARAM3 tuning channel
Unassigned
Spektrum Bind
Copy Trims
Mode 1
Mode 2
Channel Monitor
1
2
3
4
5
6
7
8

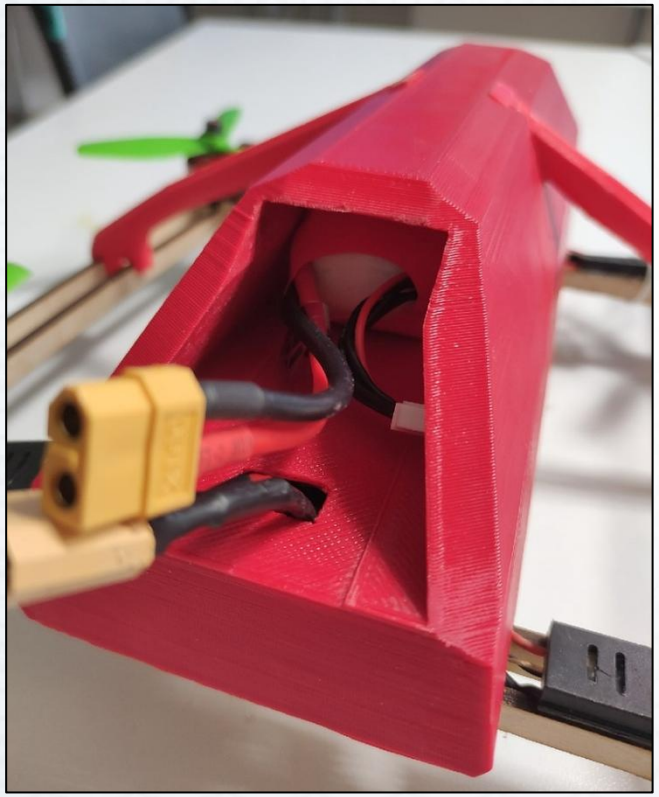


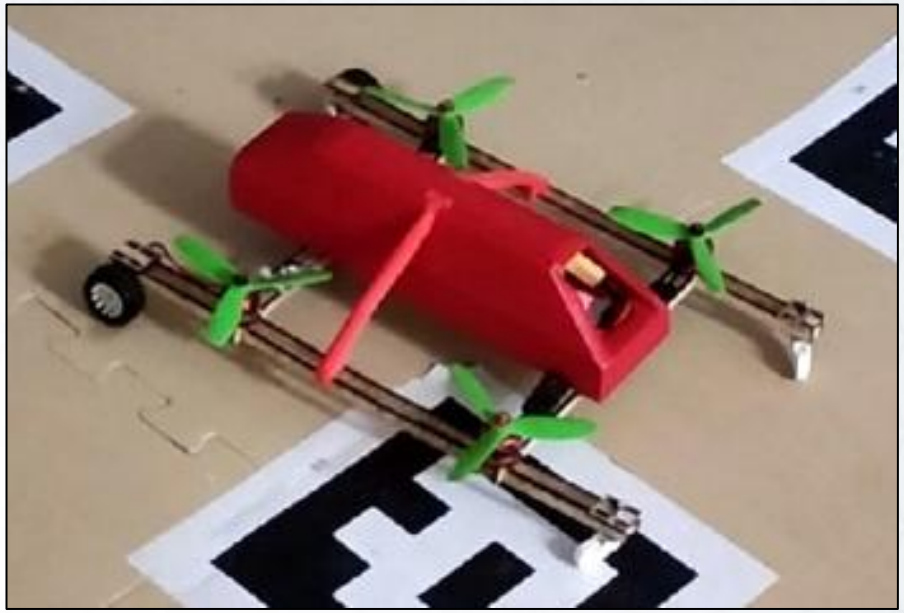


Итог









Спасибо за внимание!