

TOHOKU UAV TECH. ACTIVITY REPORT

AKITO IKUSHIMA (B3), TAKUMI FURUSAWA (B3)

Organization Overview

Foundation : Sep.2021

Objectives :

- Win the indoor flying robot contest
- Understand the mechanism of flying through making flying robots

Members : 12 members

(M1 × 2, B3 × 3, B2 × 1, B1 × 6)

PREVIOUS ACTIVITIES

In 2022

We Had 2 Teams in the general division

→ Resulted in 1ST and 2ND place



Goals for 2023

- Participate in unique design division
- Win the general division again



UNIQUE DESIGN DIVISION (ORNITHOPTER)

We decided to make an ornithopter
But...We finally couldn't

Problems

- Not enough torque
- Weight saving



GENERAL DIVISION

participated in general division

B1 × 2 B2 × 1

Concept

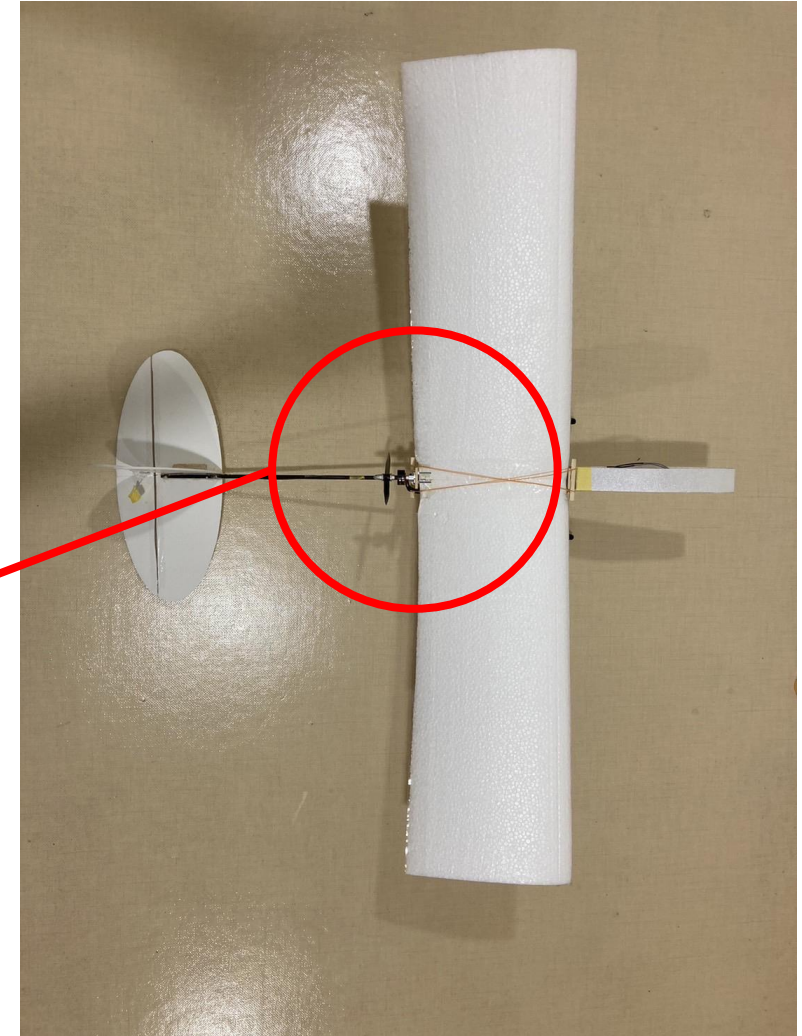
Easy to repair

→ Simple and strong structure

Pusher configuration

Easy to control

→ Large wing area for low-speed flight



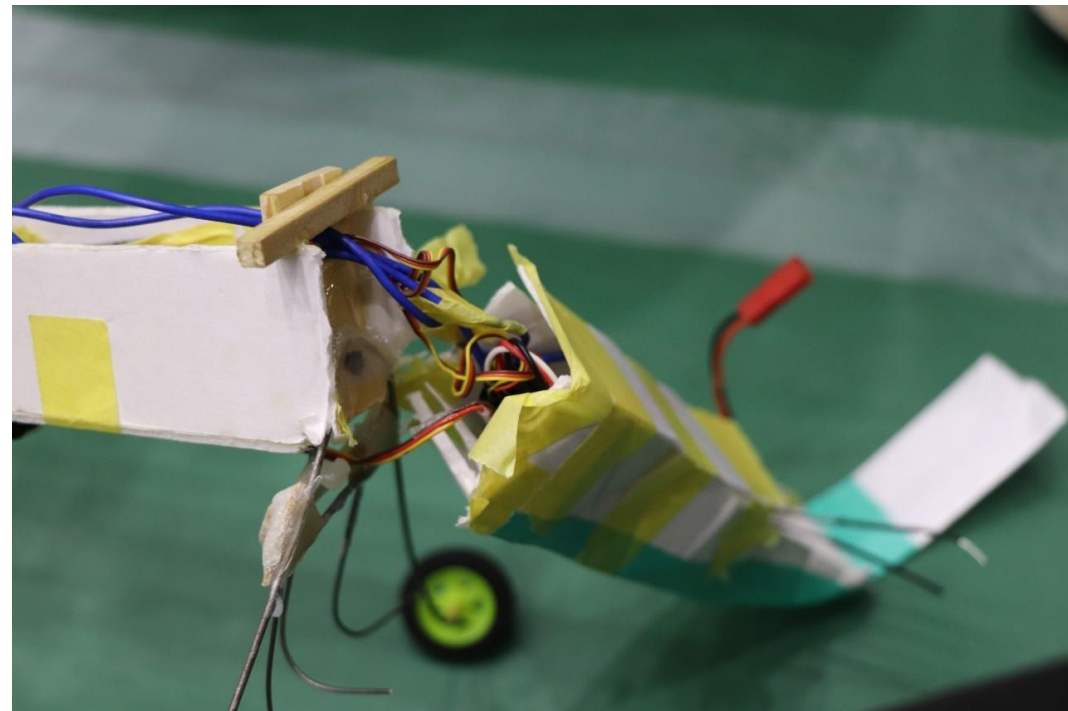
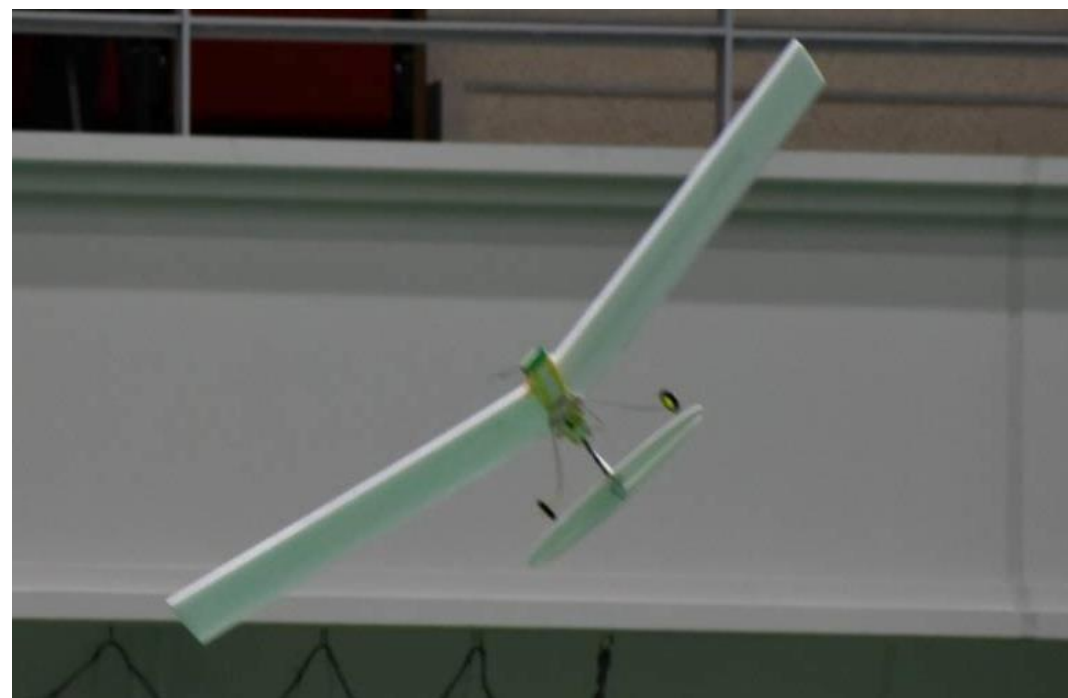
GENERAL DIVISION

Result

- Passed the qualifying round
- Crashed in the final round → Retired

Causes

- Pilot error
- Insufficient handover from last year
(A little heavier and not good aerodynamics)





POINTS OF IMPROVEMENT

- Pilot error
- Insufficient handover from last year



Lack of comprehensive
knowledge

Acquire comprehensive knowledge through daily activities

CURRENT ACTIVITIES

Participated in a drone pre-competition on December 9, 2023

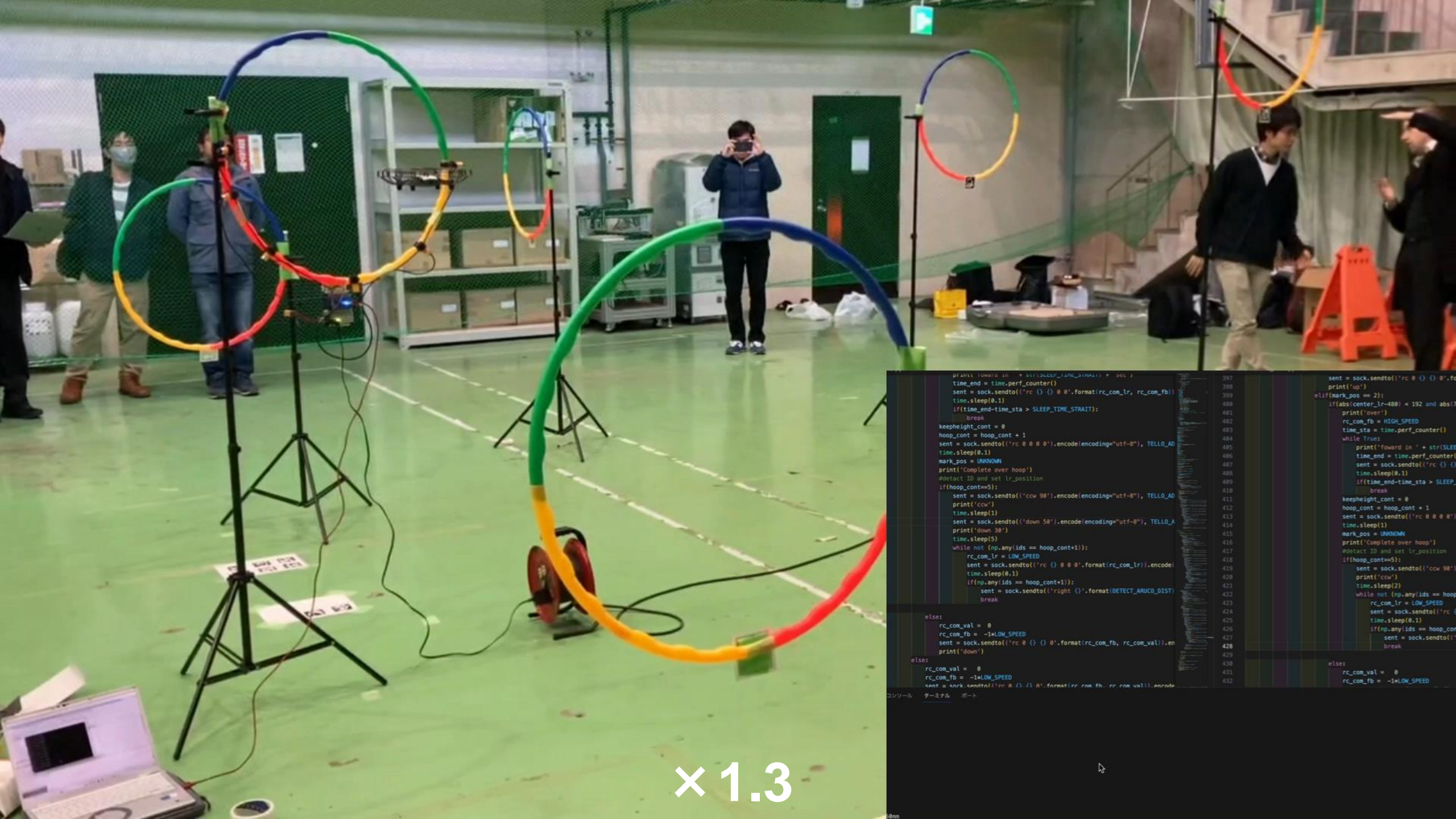
- Use DJI Tello EDU
- Make Programs for missions on AP

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idrone_race.py x
idrone_race.py > ...
224 #input 'start', if you start program.
225 sta_str = input('Enter \'start\' if you want to start the program.')
226 if(sta_str == 'start'):
227     print(sta_str)
228 else:
229     print('your input isn\'t \'start\' ')
230     print('landing tello')
231     sent = sock.sendto('land'.encode(encoding='utf-8'), TELLO_ADDRESS)
232     cap.release()
233     cv2.destroyAllWindows()
234     sock.sendto('streamoff'.encode('utf-8'), TELLO_ADDRESS)
235     print("STOP PROGRAM")
236     sys.exit()
237
238 #main code
239 #if you press CTRL+C, land tello and stop program.
240 try:
241     while True:
242         time.sleep(0.1)
243         # カメラ映像を画面に表示
244         cv2.imshow('Tello Camera View', frame_markers)
245
246         #marker 1, 2, 6, 7
247         if(hoop_cont == 0 or hoop_cont == 1 or hoop_cont == 5 or hoop_cont == 6):
248             if(keepheight_cont == 0):
249                 #set init_height
250                 if(hoop_cont < 2):
251                     target_height = hight_ary[hoop_cont]
252                 else:
253                     target_height = hight_ary[6 - hoop_cont]
254                 print('setting height : ' + str(target_height) + 'mm')
255                 print('Now setting ...')
256                 while (keepheight_cont == 0):
257                     keep_height(tof_dst, target_height)
258                     if(abs(tof_dst - target_height) < 40 and keepheight_cont==0):
259                         keepheight_cont = 1
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Program Code



DJI Tello EDU



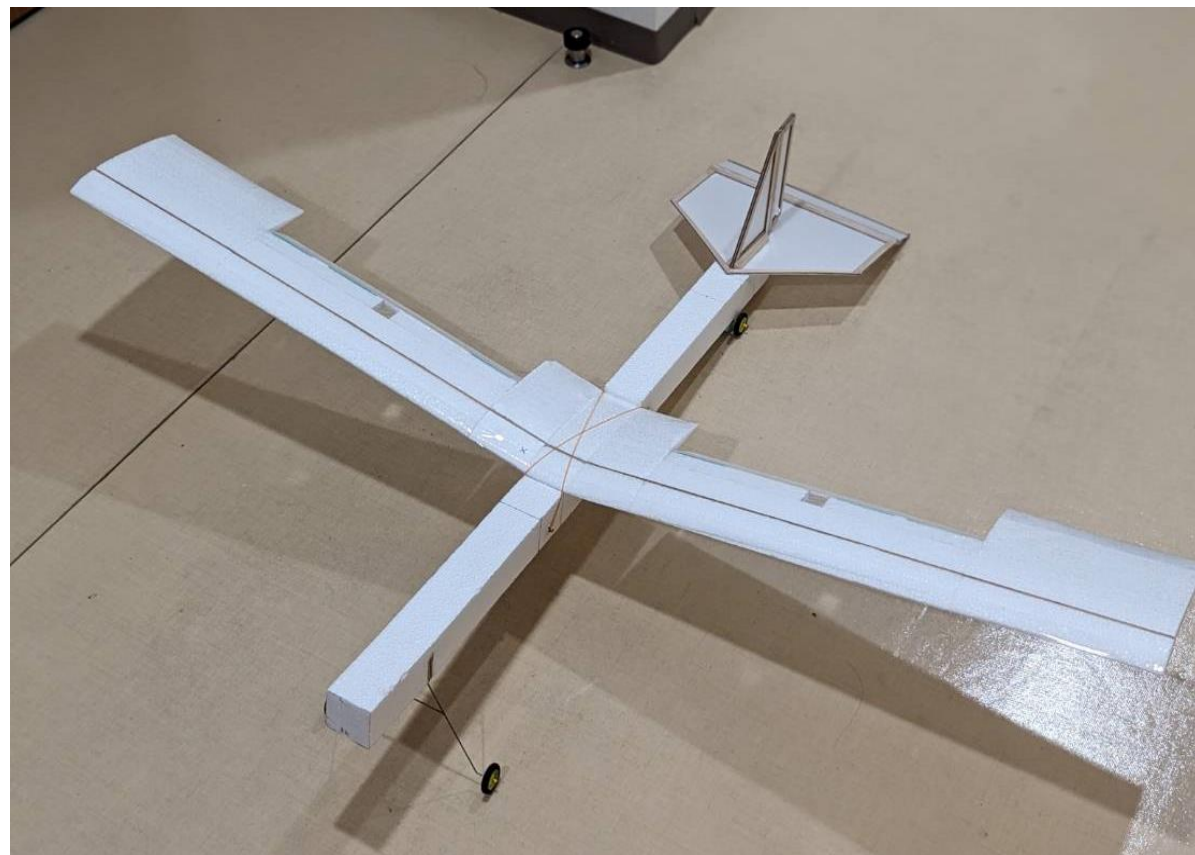
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print('forward in ' + str(SLEEP_TIME_STRAIT) + ' sec')
time_end = time.perf_counter()
sent = sock.sendto('rc {} {} 0 0'.format(rc_com_lr, rc_com_fb))
time.sleep(0.1)
if(time_end-time_sta > SLEEP_TIME_STRAIT):
    break
keepheight_cont = 0
hoop_cont = hoop_cont + 1
sent = sock.sendto('rc 0 0 0 0'.encode(encoding='utf-8'), TELLO_AD)
time.sleep(0.1)
mark_pos = UNKNOWN
print('Complete over hoop')
#detect ID and set lr_position
if(hoop_cont==5):
    sent = sock.sendto('cw 90'.encode(encoding='utf-8'), TELLO_AD)
    print('ccw')
    time.sleep(1)
    sent = sock.sendto('down 50'.encode(encoding='utf-8'), TELLO_A)
    print('down 30')
    time.sleep(5)
    while not (np.any(ids == hoop_cont+1)):
        rc_com_lr = LOW_SPEED
        sent = sock.sendto('rc {} {} 0 0'.format(rc_com_lr), encode)
        time.sleep(0.1)
        if(np.any(ids == hoop_cont+1)):
            sent = sock.sendto('right {}'.format(DETECT_ARUCO_DIST))
            break
else:
    rc_com_val = 0
    rc_com_fb = -1*LOW_SPEED
    sent = sock.sendto('rc 0 {} 0 0'.format(rc_com_fb, rc_com_val),en
    print('down')
else:
    rc_com_val = 0
    rc_com_fb = -1*LOW_SPEED
    sent = sock.sendto('rc 0 {} 0 0'.format(rc_com_fb, rc_com_val),en
    print('down')
```

× 1.3

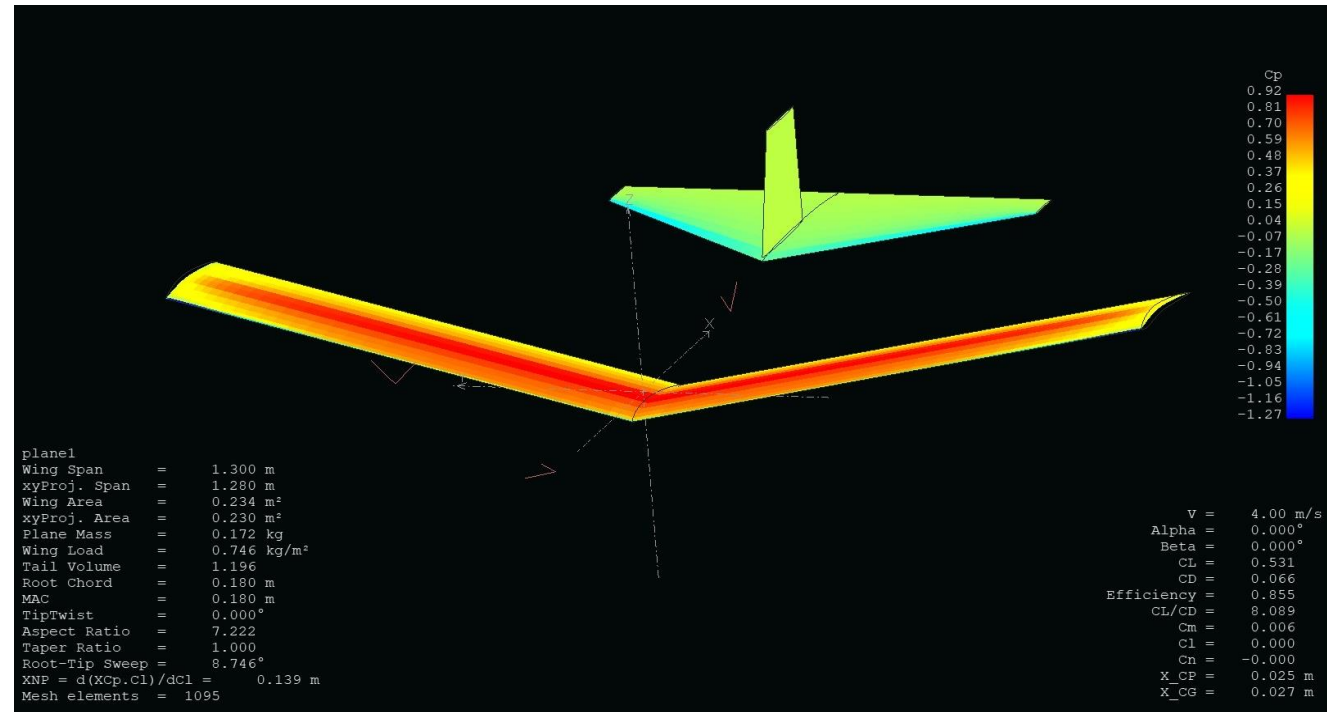
CURRENT ACTIVITIES

Design and make new UAV

- Reflect the points of improvement
- Aim to win the flying robot contest 2024



New UAV in progress



New UAV in analysis software

OUTLOOK

Planning to ...

make our club a place for many students to learn about aerodynamics and craftsmanship

participate in General division and Multicopter division in the indoor flying robot contest 2024

Thank you for your kind attention !!