



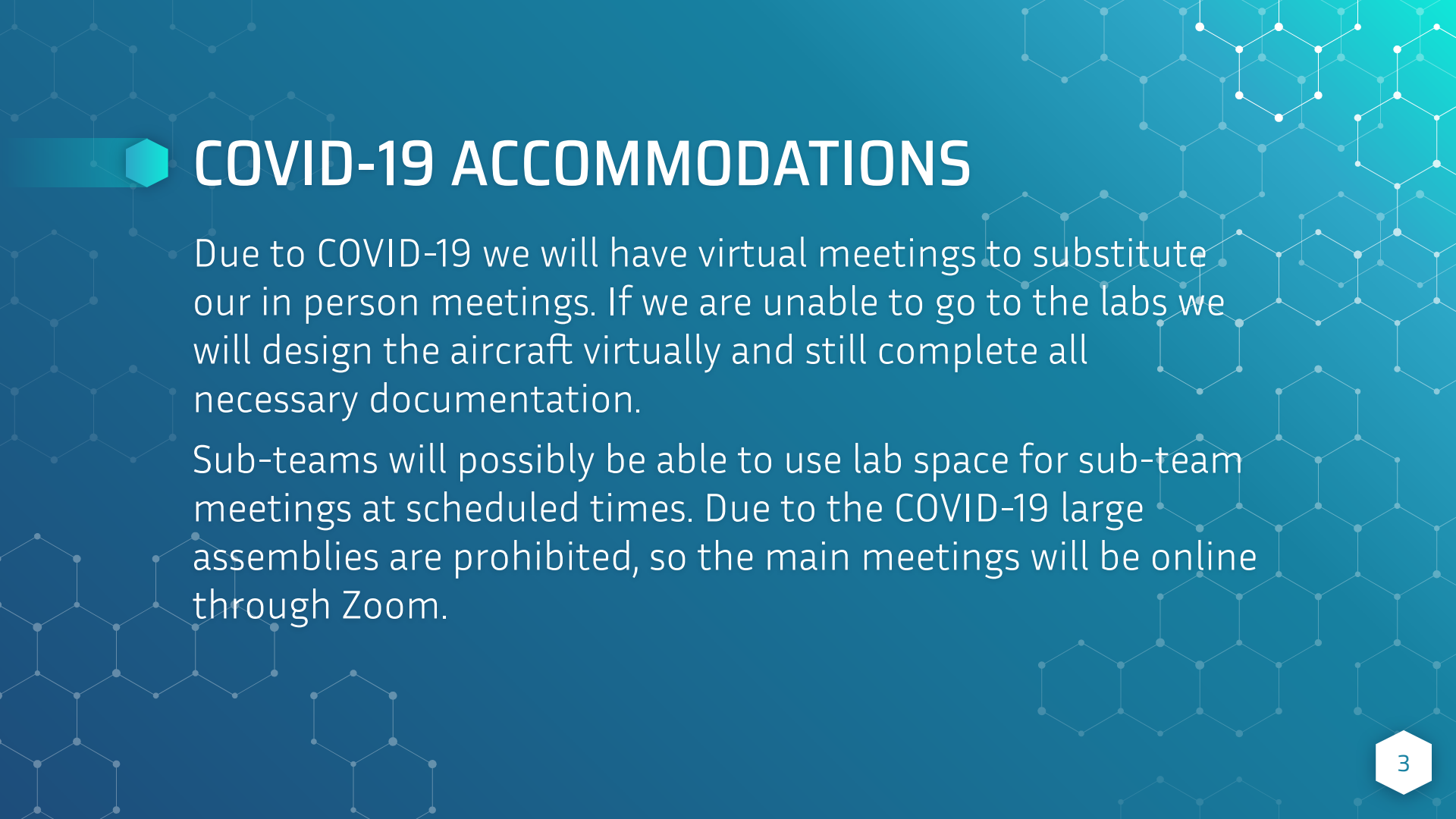
SPACE CITY UAV TEAM

HELLO!

I AM ANDREW HILBURN

I am the chief engineer for
the space city UAV team
and a proud member of
space city AIAA





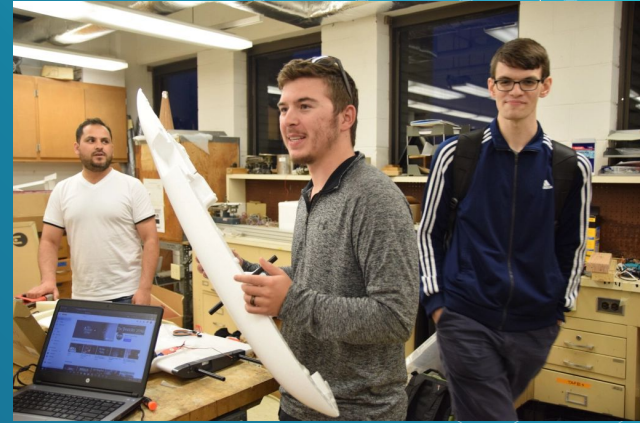
COVID-19 ACCOMMODATIONS

Due to COVID-19 we will have virtual meetings to substitute our in person meetings. If we are unable to go to the labs we will design the aircraft virtually and still complete all necessary documentation.

Sub-teams will possibly be able to use lab space for sub-team meetings at scheduled times. Due to the COVID-19 large assemblies are prohibited, so the main meetings will be online through Zoom.

ABOUT THE TEAM

Let us start with a bit about who we are

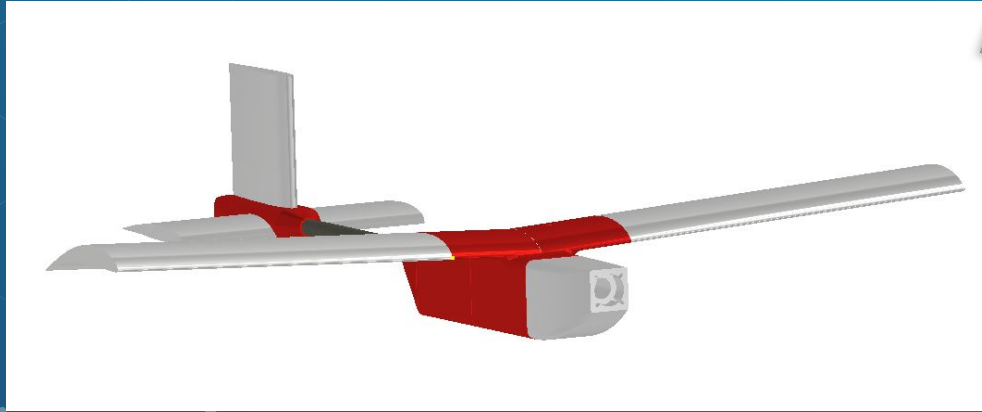




ABOUT THE TEAM

The Space City UAV team is a group of students who work on researching, developing and building unmanned autonomous vehicles. The team serves as part of the AIAA University of Houston Student Branch. The team is composed and managed by students with a professor to sponsor. The Space City UAV was started by a group of students in 2018 and are looking to compete in the Design/Build/Fly competition in 2022. This year we will be focused on doing a mock version of the 2021 Design/Build/Fly competition including a formal proposal and aircraft.

Previous Competition Vehicle



2019-2020

Plankton

- ◆ Made to be light weight and cost effective plane that is easy to manufacture and be able to have foldable wings.

Wing Span: 5 ft

Total Length: 4.5 ft

Materials Used: PLA and Carbon fiber

HOW THIS YEAR IS DIFFERENT



Traditionally the design build fly contest is pretty restrictive on the plane designs by rules, but this year it is almost entirely open ended as long as it can hold the payload(s) so we wanted to use this to our advantage to gain as many points as possible by having a gigantic flying wing and many sensors as possible deployable by the aircraft.

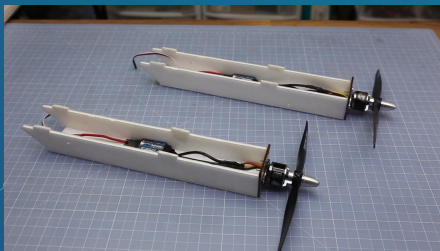


GOALS

This year we plan to have a very competitive design build fly plane, and even though it is only a mock competition our goal is to be able to place in the top 5 next year.

HOW WE WILL ACHIEVE VICTORY!

Fully modular and swappable avionics module.



Budget friendly “FPV” or live video feed from the aircraft.

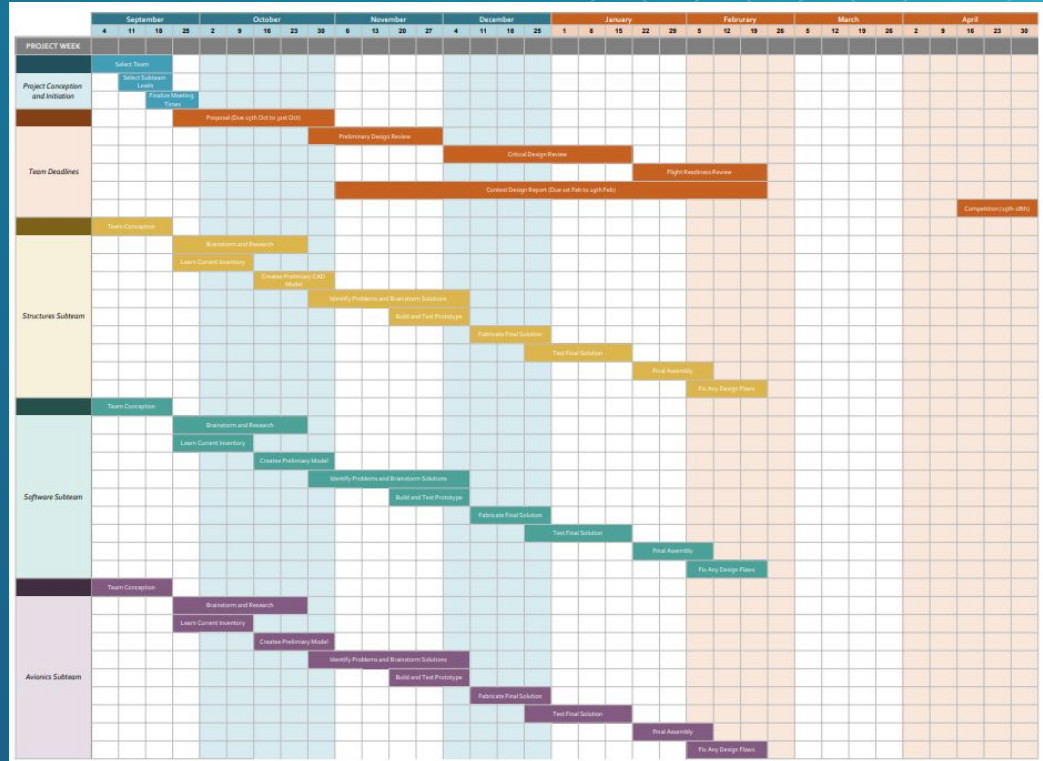


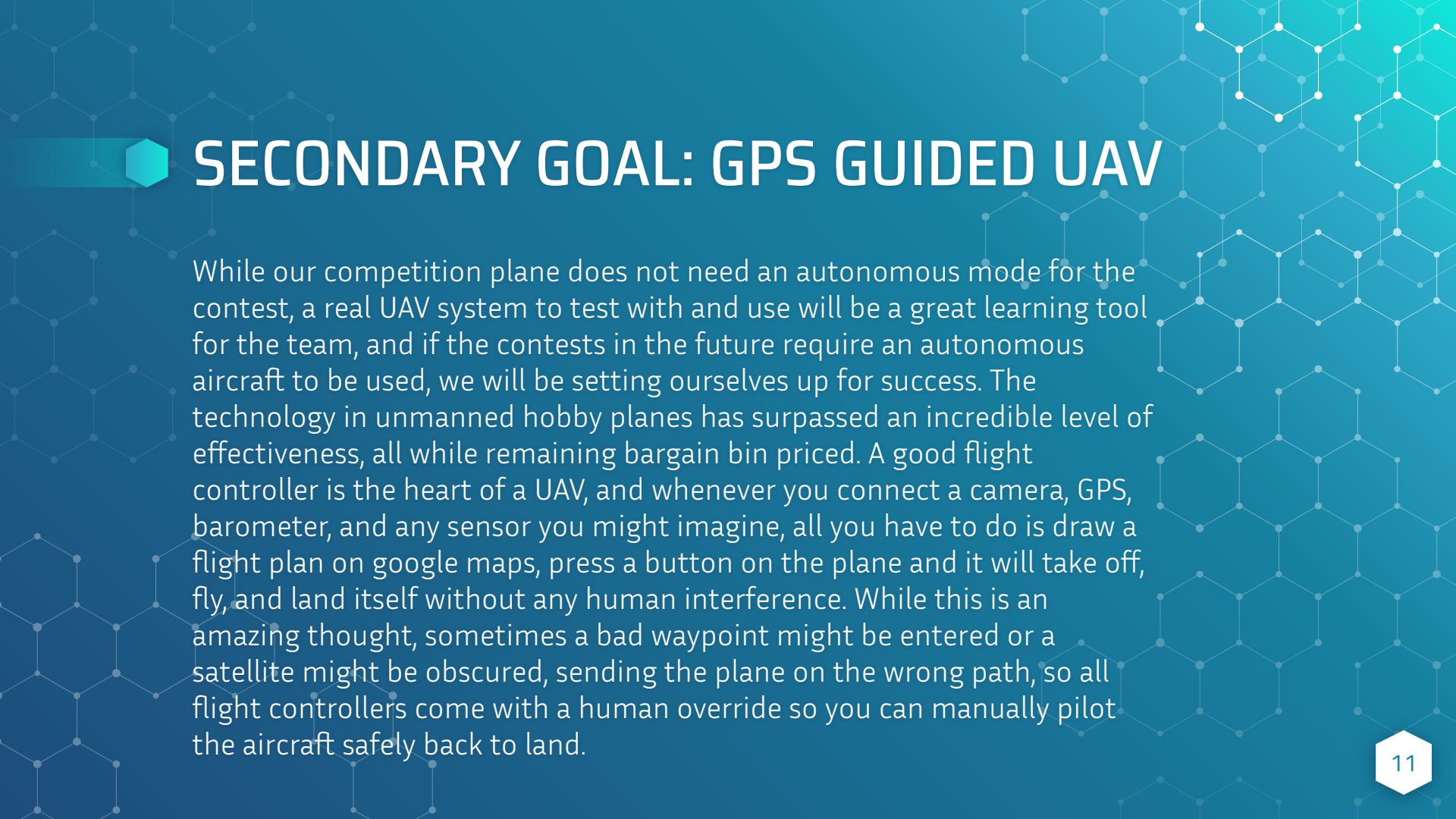
Telemetry system to assess plane performance.



OUR TIMELINE

Our plan is to have an early rush to complete as many tasks as possible, so we have a lot of time the month before competition to refine our plane instead of a rush to build it.

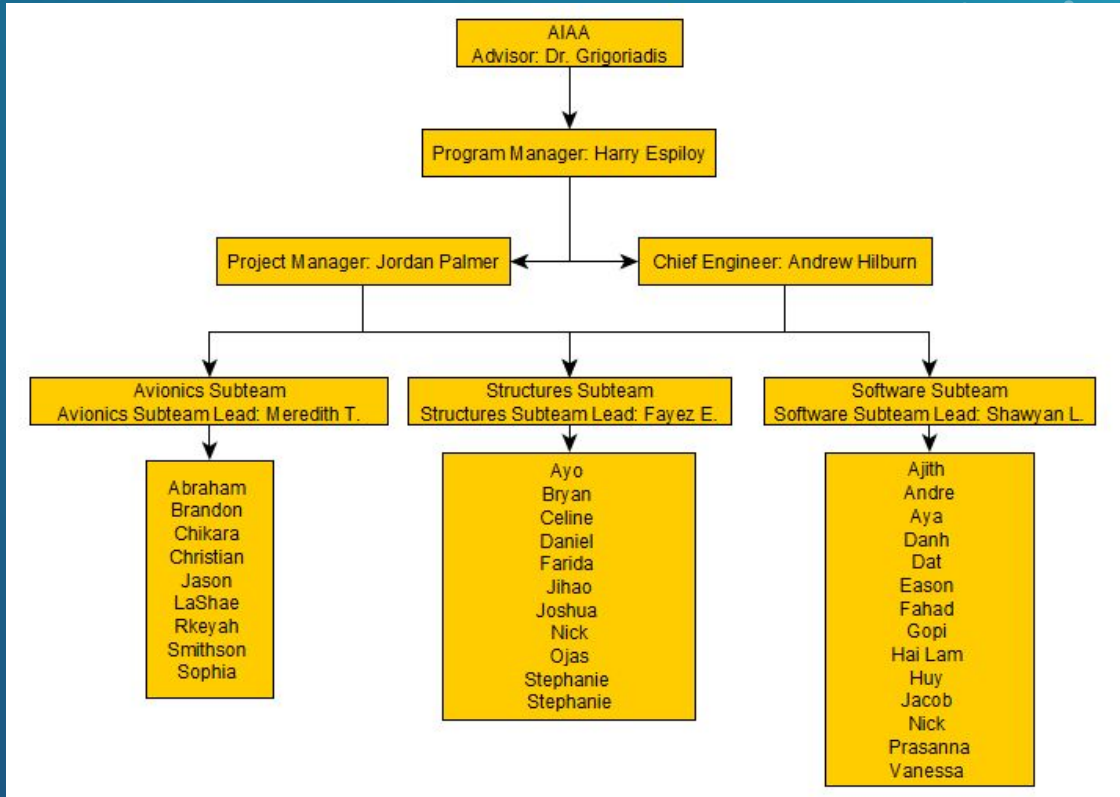


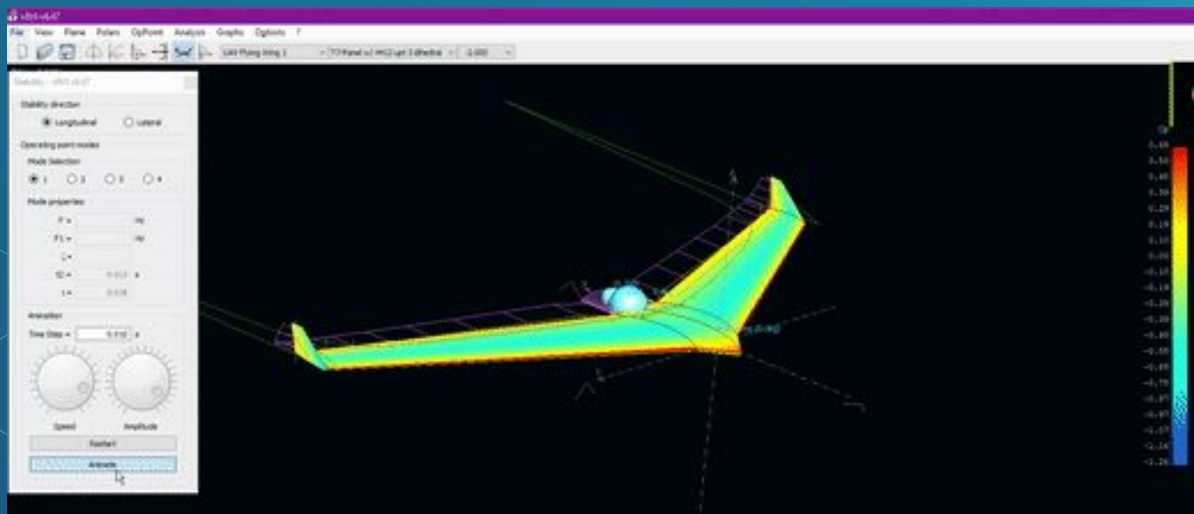


SECONDARY GOAL: GPS GUIDED UAV

While our competition plane does not need an autonomous mode for the contest, a real UAV system to test with and use will be a great learning tool for the team, and if the contests in the future require an autonomous aircraft to be used, we will be setting ourselves up for success. The technology in unmanned hobby planes has surpassed an incredible level of effectiveness, all while remaining bargain bin priced. A good flight controller is the heart of a UAV, and whenever you connect a camera, GPS, barometer, and any sensor you might imagine, all you have to do is draw a flight plan on google maps, press a button on the plane and it will take off, fly, and land itself without any human interference. While this is an amazing thought, sometimes a bad waypoint might be entered or a satellite might be obscured, sending the plane on the wrong path, so all flight controllers come with a human override so you can manually pilot the aircraft safely back to land.

TEAM STRUCTURE





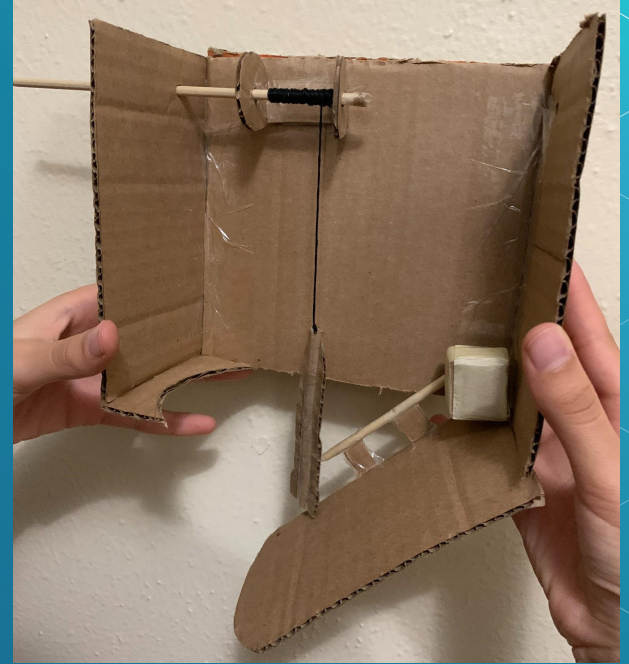
Calculated polar for: NACA 4412

1 1 Reynolds number fixed Mach number fixed

xtrf = 1.000 (top) 1.000 (bottom)
Mach = 0.000 Re = 0.100 e 6 Ncrit = 9.000

alpha	CL	CD	CDp	Cm	Top Xtr	Bot Xtr	Cpmin	Chinge	XCp
-1.000	0.2696	0.01905	0.01246	-0.1000	0.8569	0.7329	-0.7531	0.0000	0.6226
-0.500	0.3557	0.01838	0.01170	-0.1041	0.8392	1.0000	-0.6685	0.0000	0.5428
0.000	0.4362	0.01775	0.01068	-0.1074	0.8257	1.0000	-0.7252	0.0000	0.4956
0.500	0.4914	0.01771	0.01039	-0.1066	0.8020	1.0000	-0.7681	0.0000	0.4656
1.000	0.5461	0.01784	0.01032	-0.1059	0.7794	1.0000	-0.8119	0.0000	0.4419
1.500	0.6038	0.01791	0.01019	-0.1055	0.7584	1.0000	-0.8613	0.0000	0.4222
2.000	0.6699	0.01774	0.00979	-0.1063	0.7415	1.0000	-0.9194	0.0000	0.4055
2.500	0.7184	0.01822	0.01023	-0.1047	0.7181	1.0000	-0.9671	0.0000	0.3921
3.000	0.7683	0.01885	0.01080	-0.1036	0.6971	1.0000	-1.0196	0.0000	0.3806
3.500	0.8257	0.01921	0.01104	-0.1033	0.6791	1.0000	-1.0842	0.0000	0.3704
4.000	0.8780	0.01973	0.01153	-0.1023	0.6593	1.0000	-1.1521	0.0000	0.3614
4.500	0.9253	0.02061	0.01251	-0.1009	0.6393	1.0000	-1.2318	0.0000	0.3533
5.000	0.9821	0.02110	0.01295	-0.1005	0.6216	1.0000	-1.3715	0.0000	0.3461
5.500	1.0312	0.02176	0.01368	-0.9991	0.6010	1.0000	-1.5351	0.0000	0.3393
6.000	1.0773	0.02266	0.01471	-0.9973	0.5798	1.0000	-1.7230	0.0000	0.3329
6.500	1.1291	0.02323	0.01539	-0.0960	0.5585	1.0000	-1.9420	0.0000	0.3271
7.000	1.1823	0.02352	0.01566	-0.0948	0.5341	1.0000	-2.2018	0.0000	0.3215
7.500	1.2303	0.02373	0.01589	-0.0926	0.5055	1.0000	-2.4594	0.0000	0.3159
8.000	1.2729	0.02396	0.01628	-0.0896	0.4743	1.0000	-2.7253	0.0000	0.3103
8.500	1.3113	0.02421	0.01666	-0.0860	0.4403	1.0000	-3.0175	0.0000	0.3048
9.000	1.3448	0.02444	0.01698	-0.0816	0.4021	1.0000	-3.3030	0.0000	0.2991
9.500	1.3675	0.02502	0.01764	-0.0757	0.3564	1.0000	-3.5575	0.0000	0.2930
10.000	1.3728	0.02632	0.01882	-0.0676	0.2982	1.0000	-3.7544	0.0000	0.2861
10.500	1.3587	0.02924	0.02142	-0.0580	0.2299	1.0000	-3.8741	0.0000	0.2787
11.000	1.3385	0.03387	0.02552	-0.0500	0.1754	1.0000	-3.9555	0.0000	0.2725
11.500	1.3284	0.03878	0.03018	-0.0443	0.1399	1.0000	-4.0543	0.0000	0.2677
12.000	1.3292	0.04340	0.03466	-0.0401	0.1163	1.0000	-4.1832	0.0000	0.2636
12.500	1.3396	0.04766	0.03890	-0.0367	0.0996	1.0000	-4.3607	0.0000	0.2600
13.000	1.3690	0.05143	0.04254	-0.0339	0.0866	1.0000	-4.6347	0.0000	0.2566
13.500	1.3823	0.05586	0.04739	-0.0312	0.0789	1.0000	-4.8309	0.0000	0.2535
14.000	1.4014	0.06067	0.05232	-0.0290	0.0708	1.0000	-5.0678	0.0000	0.2509
14.500	1.4004	0.06643	0.05856	-0.0268	0.0664	1.0000	-5.1954	0.0000	0.2484
15.000	1.3998	0.07268	0.06516	-0.0252	0.0630	1.0000	-5.3228	0.0000	0.2463

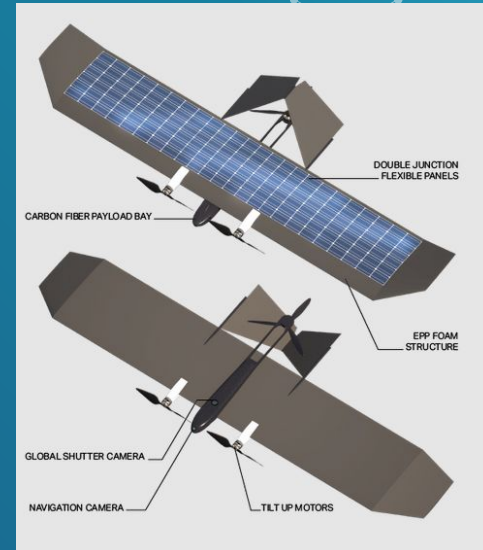
Some amazing work from our structures team on airfoil/wing analysis



Joint project with Avionics and Structures to find the perfect release mechanism

DOME COLLABORATION

- Assisting in the structural analysis of the system.
- Receive help on GPS Navigation systems.
- Receive help on Image tracking, recognition and machine learning
- Help in the create of Radio Beacons that can be sustain on Mars.
- Co-developing new ideas, research and application of UAVs on Mars.





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THANKS!

ANY QUESTIONS?

You can also ask me at any
time at
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