Drone Conversion Appliances (DCA)

- Date: 10 February 2023
- DCA Team
- Project Advisor: Dr. Yongcan Cao, ECE
- Team Sponsor: USL Lab, UTSA
- Team Members: **Ehab Afsoonko, Conrad Obeng, Lexi McMinn, Mark James Jr., Matthew Moubray**
- “Expanding the world of Modifiable Drone Transit.”

Background/Overview Slide

Every UAV, drone, or RC plane on the market is a single modality kit and constrained to a single flight pattern. Our project aims to expand the number of vehicle transportation modalities for the ModiFly Quadcopter through the addition of a VTOL Fixed-Wing module. This will allow for user to take the mainframe from the Modifly Quadcopter and attach the VTOL Fixed-Wing module without the need to purchase and build a whole entire kit. The VTOL-Fixed WIng module features are:

- Longer flight duration
- Reduced battery consumption
- Vertical-Takeoff and Landing capability
- Higher forward propulsion
- Increase payload

Tasks Completed Slide

- Finalized the following parts:
  - Forward Propeller and Forward Propeller ESC
  - Final Servo Count
  - 4in1 ESC
- Finalized Frame Design
- Setup new meeting cadence

Current Problem or Obstacles Slide

- Creating an aerodynamically stable design
- ModiFly Extended base
  - Weight distribution and overall calculation
  - Component Placement
  - H-Frame vs X-Frame
  - 3D Printing Resizing
- Airframe Selection
  - How to connect VTOL Booms?
  - How to connect our ModiFly Base to VTOL Fixed Wing Module

Week 3 Team Project Contribution Report

Team Name:	Drone Conversion Appliances (DCA)
Team Number:	14
Week Number	4
Week Start Date:	06 Feb 2023
Week End Date:	10 Feb 2023

Task Number:	Task Description:	% Complete on Start Date:	% Complete on End Date:	% Progress
Task 1	Areodynamic Stability Design	0%	0%	0%
Task 2	Updated ModiFly Base	0%	75%	75%
Task 3	Finalized Frame Design	93%	93%	0%
Task 4	Weekly TSRP	0%	100%	100%
Task 5	Modify firmware for ModiFly Drone	0%	0%	0%
Task 6	Modify firmware for VTOL Module	0%	0%	0%

Team Role	Team Member Name:	UTSA ID:	Total hours worked:	Task Set
Program Manager	Conrad Obeng	fxy380	3	2, 3, 4
Secretary/Firmware Engineer	Ehab Afsoonko	czu525	3	4, 6
Systems/Software Engineer	Lexi McMinn	yva363	3	4, 5
Software/Robotics Engineer	Mark James jr	Eve717	2	4, 6
Hardware Engineer	Matthew Moubray	yrb578	3	1, 4

Week 4 Team Project Contribution Report

Team Name:	Drone Conversion Appliances (DCA)
Team Number:	14
Week Number	4
Week Start Date:	06 Feb 2023
Week End Date:	10 Feb 2023

Task Number:	Task Description:	% Complete on Start Date:	% Complete on End Date:	% Progress
Task 1	Areodynamic Stability Design	0%	0%	0%
Task 2	Updated ModiFly Base	0%	75%	75%
Task 3	Finalized Frame Design	93%	93%	0%
Task 4	Weekly TSRP	0%	100%	100%
Task 5	Modify firmware for ModiFly Drone	0%	0%	0%
Task 6	Modify firmware for VTOL Module	0%	0%	0%

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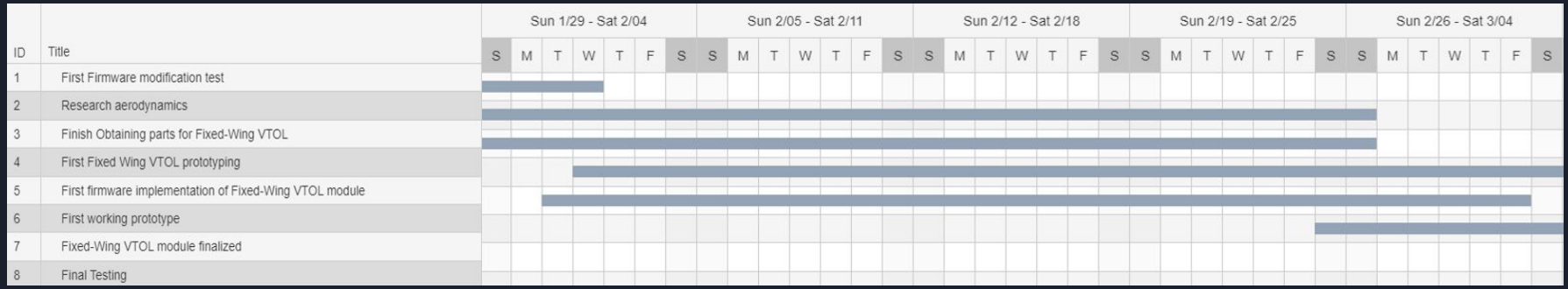
Work Breakdown Structure



ID	Title
1	First Firmware modification test
2	Research aerodynamics
3	Finish Obtaining parts for Fixed-Wing VTOL
4	First Fixed Wing VTOL prototyping
5	First firmware implementation of Fixed-Wing VTOL module
6	First working prototype
7	Fixed-Wing VTOL module finalized
8	Final Testing

Ongoing and Upcoming Tasks

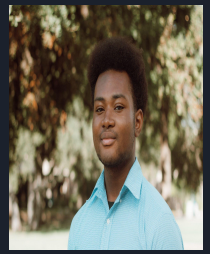
1. Put in order for frame and servos
2. Modify ArduPlane firmware for our specific frame
3. Modify frame with extra propellers for VTOL capabilities
4. Begin prototyping modified firmware for VTOL

Budget Slide

Item	Description	Cost
PixHawk 2.4.8	Flight Controller	~$160
iFlight Xing-E Pro 2207(4pcs)	VTOL Motor	~$66
HAKRC 45A 2-6S BLHeli_S 4in1 ESC	Motor ESC	~$49.99
Turnigy Aerodrive SK3	Forward Propeller Motor	~$43.99
ZTW Mantis 85A ESC	Forward Propeller ESC	~47.90

Biographies Slide

- Ehab Afsnooko - Firmware Engineer - C++, Python, Verilog, embedded systems
- Conrad Obeng - Engineering Manager - Python,Drone Engineering,Drone Firmware
- Lexi McMinn - Systems/Software Engineer - C++,Python,Verilog,VHDL
- Mark James Jr. - Software/Robotics Engineer- Python,C++,Java
- Matthew Moubray - Hardware Engineer - C++, Python, LabView, eCalc, Solidworks


Questions?