TEXAS A&M UNIVERSITY at QATAR

ECEN403
Senior Design Lab

EMERGENCY DRONE

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Outline

- Introduction
- Emergency Drone
- Customer Needs & Ethnographic Study Analysis
  - Interviews
  - Survey
- Main Functions
- User Interface
- Mechanical Aspects
- Unauthorized Access Prevention
- Components
- Benchmarking
- Functional Model
  - Upper Level Functional Model
  - Detailed Functional Model
  - Branch Functional Model
- Concept Generation and Selection
- Conclusion
- Questions

Introduction

Emergency Drone

- ❑ Structure
- ❑ Software
- ❑ Network
- ❑ Autonomous

Customer Needs & Ethnographic Study Analysis

Interviews:

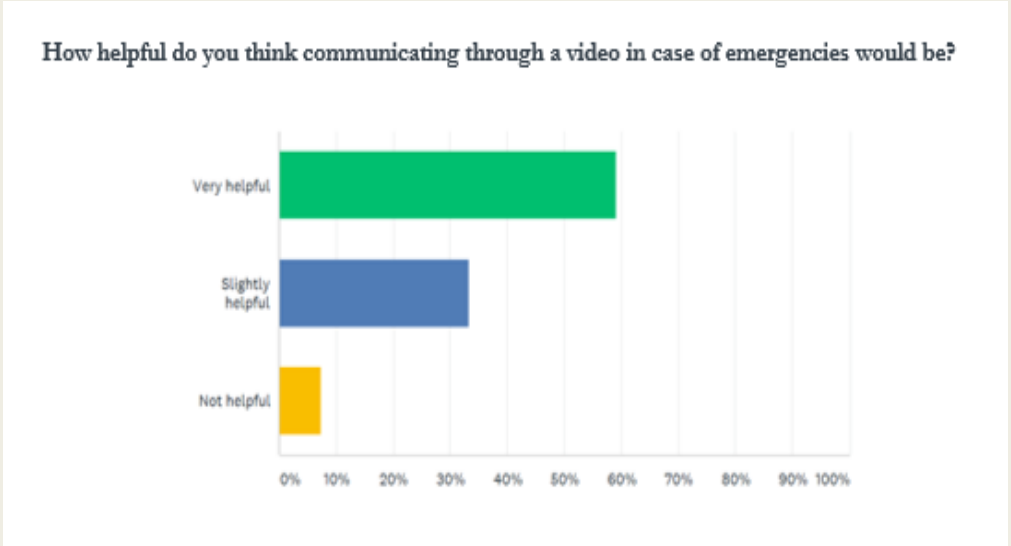
- ❑ What challenges do you believe that emergency drone may face?
- ❑ What kind of features would you want to add to the drone?
- ❑ What kind of emergencies would you want to use the emergency drone for?

Ethnographic study video on our website

Continued

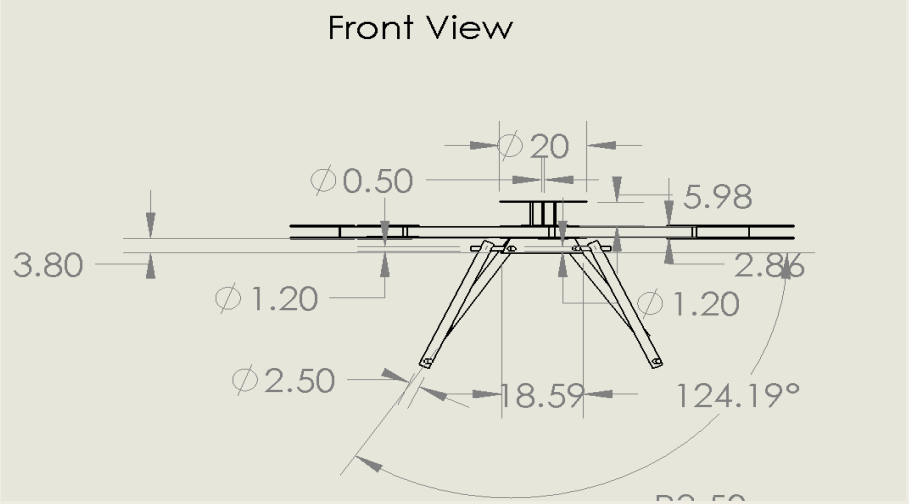
Survey:

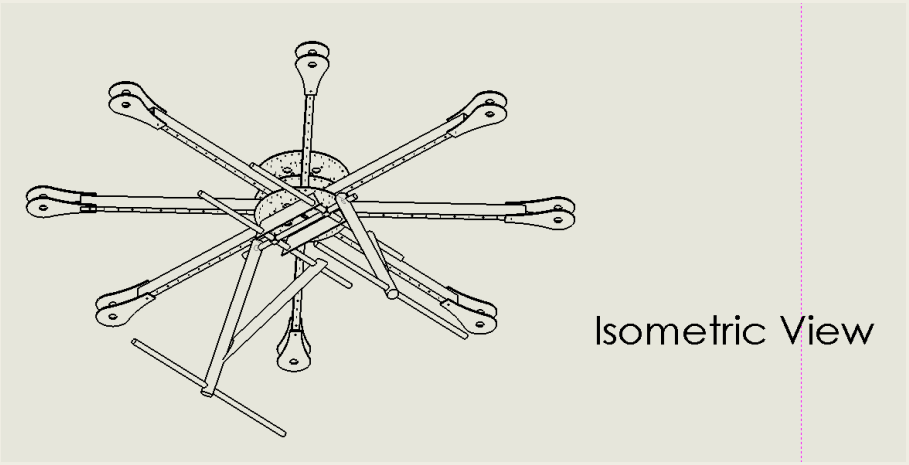
- Do you think that the emergency drone will contribute significantly in saving people lives?
- What kind of difficulties do you think the emergency drone can face from the community?
- How helpful do you think communicating through a video in case of emergencies would be?



Main Functions

- ❑ Deliver items
- ❑ Pickup supplies
- ❑ Release supplies
- ❑ Authorized access to the supplies
- ❑ Communication with recipient



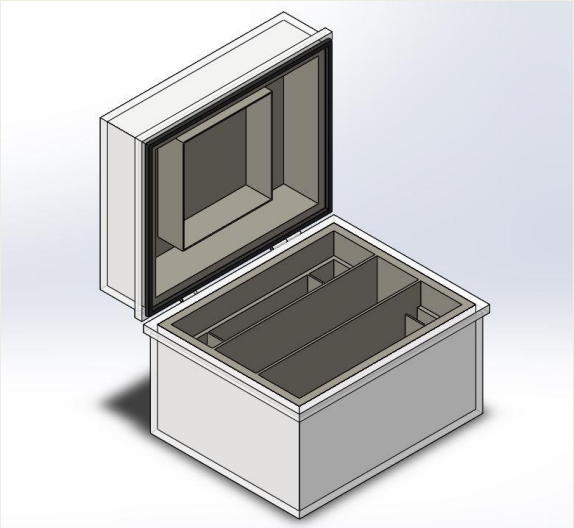


User Interface

- ❑ Pick and release supplies
- ❑ Opening and closing the box
- ❑ Turning the camera on/off

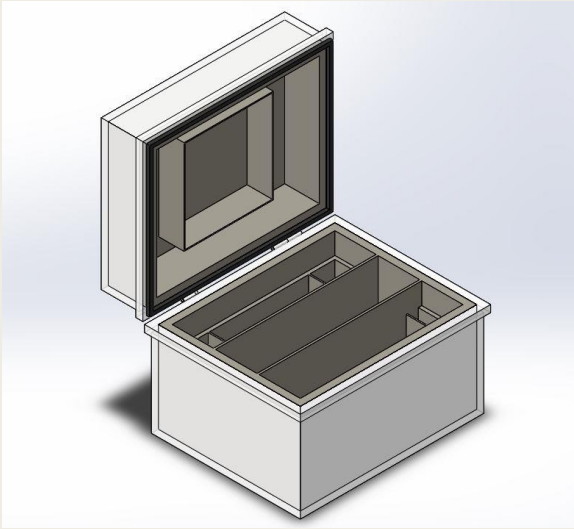
Mechanical Aspects

- A box met absolute and relative criterion best
- Material selected: Polycarbonate
- Key Properties
- Density: 1.2 g/cm^3
- Ultimate Tensile Strength- 72.4 MPa
- Tensile Modulus: 2.2 GPa
- Shear Strength: 63.4 MPa
- Thermal Conductivity: 0.20 W/mK

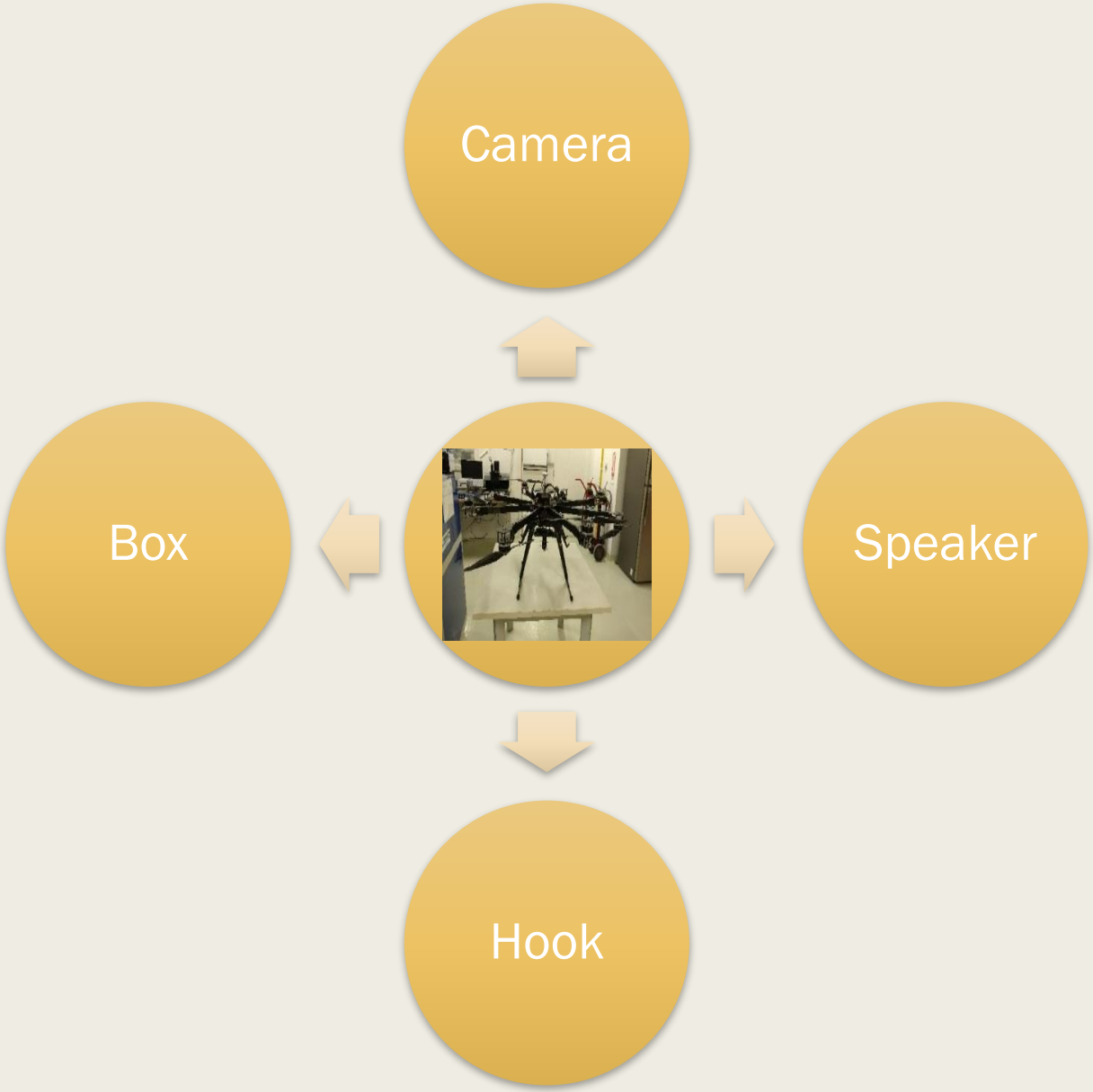


Unauthorized Access Prevention

- A solenoid lock with spring bolt action
- Size: 5.2x2.6x2.3 cm^3
- Power: 12 V, 0.6 A, 7.2 W
- 1cm bolt action
- On time: 10 seconds
- Weight: 0.15 kg



Components

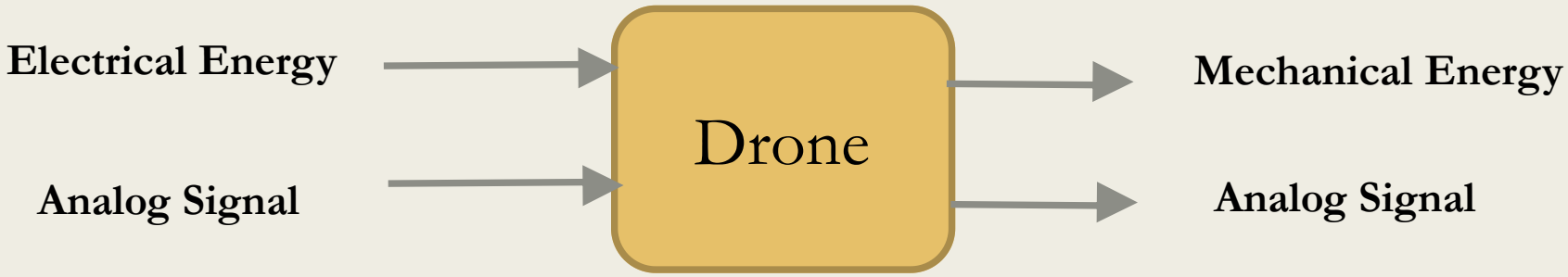


Benchmarking

Criteria / products	Minoru 3D Webcam	GoPro-Hero5	Logitech V10	Pyle PLMR51W
Image				
Price	$29.99	$399	$76.71	$12.44
Quality and Resolution	800p30	1080p240	Clear and smooth audio by micro drivers	Quality protection from water and has a sound distortion-free
Weight	250g	117g	455 grams	900 grams
Communication	USB port	3x5Ghz Wi-Fi	USB connection	Wired connection

Functional Model

Upper Level Functional Model



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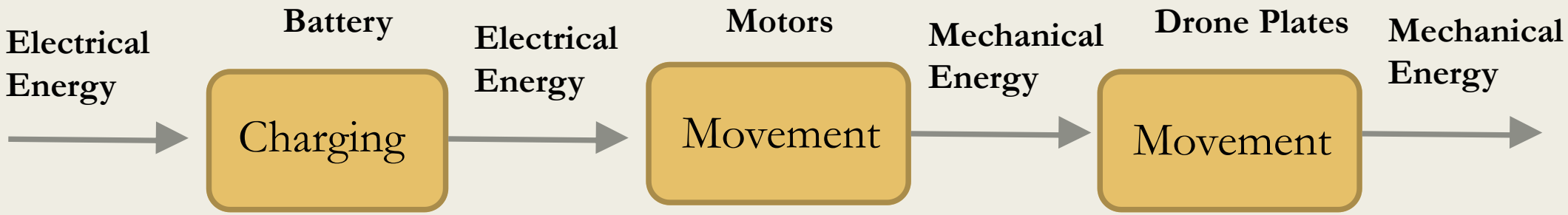
Detailed Functional Model



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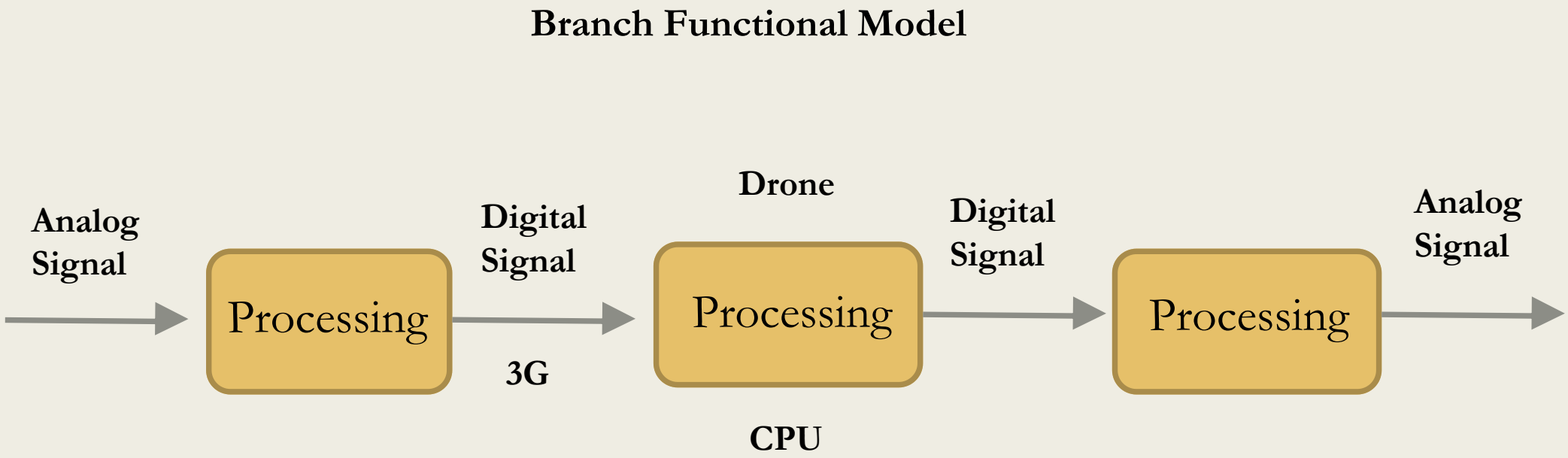
Branch Functional Model
Analog Signal
Processing
Digital Signal
3G
Drone
Processing
CPU
Digital Signal
Processing
Analog Signal

Concept Generation and Selection

Selection Criteria	Weight	Rating	Weighted score
Balance of the emergency drone	15%	5	0.75
Cost	15%	3	0.45
Quality	20%	4	0.8
Usability	15%	3	0.45
Speed of the emergency drone	15%	2	0.3
Accuracy	20%	4	0.8
Total score	100%	21	3.55

Conclusion

Month	November				December				January				February				March				April		
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Tasks																							
Receiving all the items needed for the emergency drone																							
Coding process																							
Testing																							

Planned	
In Progress	
Completed	

Website: ecenmeen2018.wixsite.com/drone

References

- https://www.amazon.com/Minoru-3D-Webcam-Red-Chrome/dp/B001NXDGFY
- https://www.amazon.com/Pyle-PLMR51W-Waterproof-Marine-Speakers/dp/B000MCEKVG
- https://www.amazon.com/GoPro-CHDHX-502-HERO5-Black/dp/B01M14ATO0
- https://www.amazon.com/Logitech-V10-Notebook-Speakers-970194-0403/dp/B000G0JD0C
- iLab Parcel Delivery by drone for QPost Project v1.5.pptx
- Autonomous Vehicle Data & Design.vsdx
- InnovationLabDroneUseCase_moi.pptx
- InnovationLabDroneUseCase_MME.pptx

Questions

Thank you!