



TurtleTech



Date: 2018-09-01
Location: [illegible]
Sex: Female
Assigned: [illegible]
Size: Unknown
Number: [illegible]

SPRINT 2

F

360

1

A large sea turtle with a brown and orange patterned shell is swimming horizontally across the frame. Below it is a sandy ocean floor with scattered coral and small rocks. The water is a deep blue, and sunlight filters down from the surface, creating a bright, hazy area in the upper right corner where the text is located.

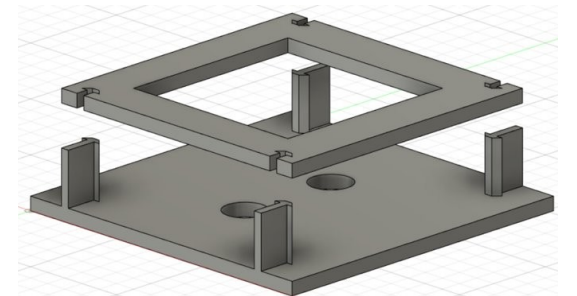
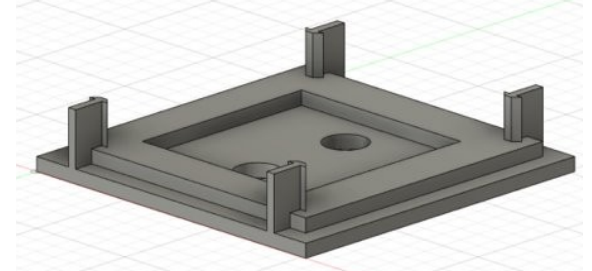
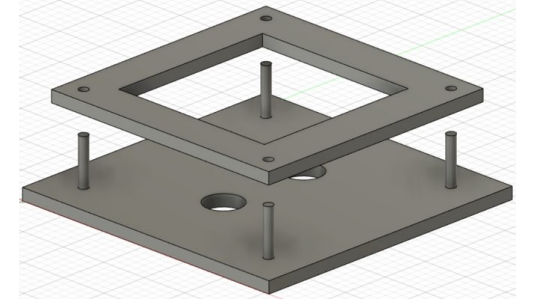
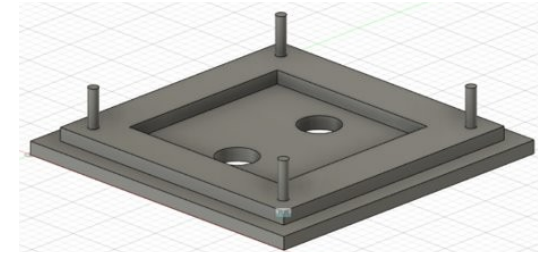
Vision

Our goal is to maintain functionality of the neural network software and hardware payload, while creating a framework and instructions to transition the payload between several UAVs to increase the ease of deployment of the system.

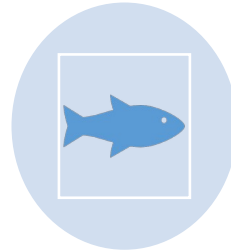
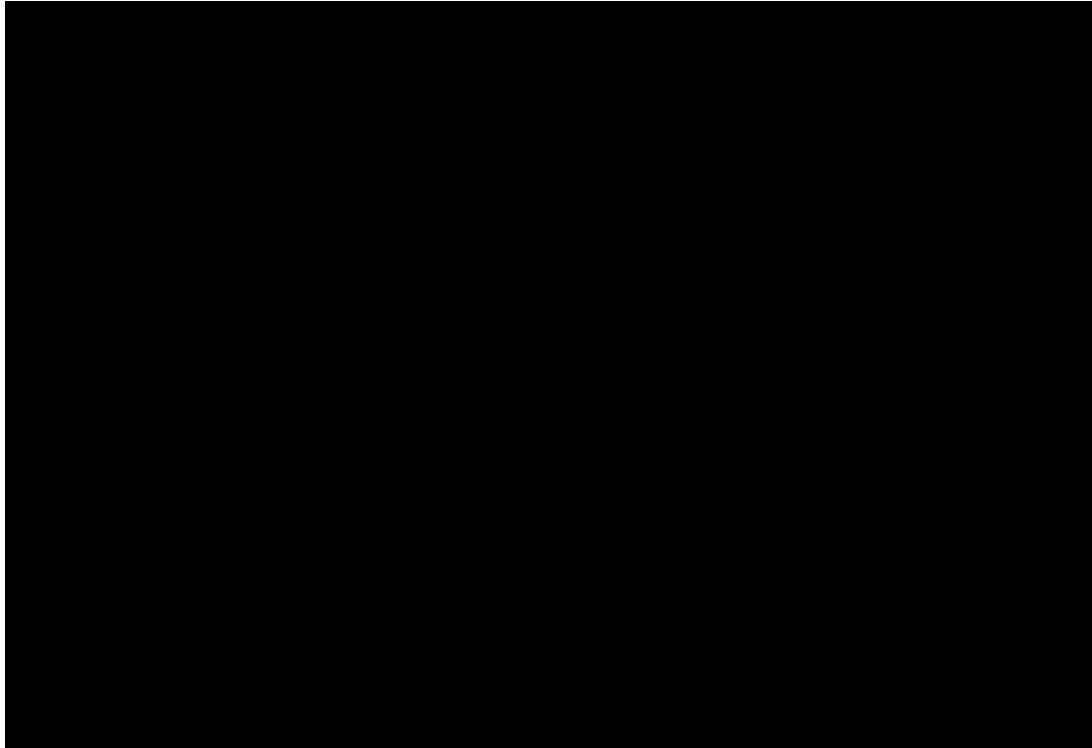
Retrospective

**Created
documentati
on on how to
power on
the jetson**

**Brainstorme
d and drew
mounting
concepts in
CAD**



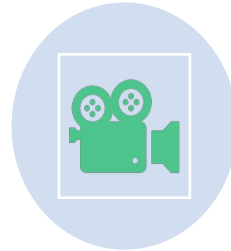
Sprint Outlook



**Whale AI
detection**



**Learn
about the
current
TurtleTech
neural
network**



**Video
Walkthrough**



**Collaborati
on with
the
hardware
team**



CAD design

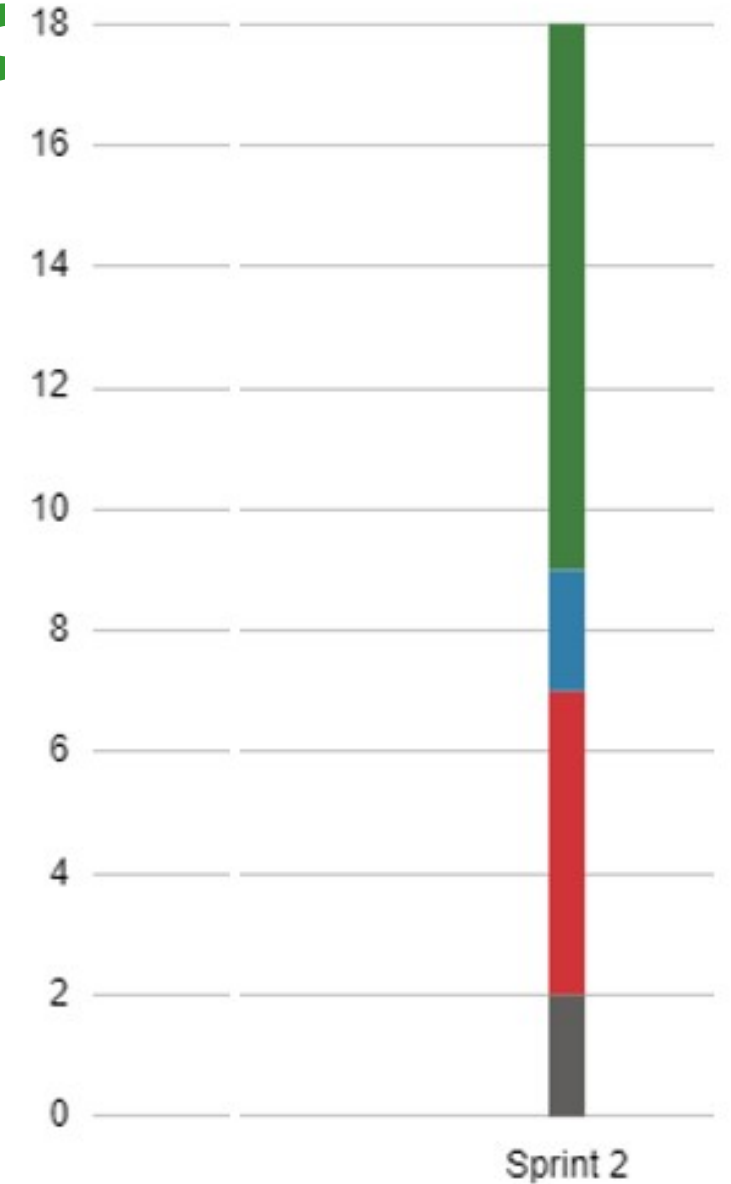
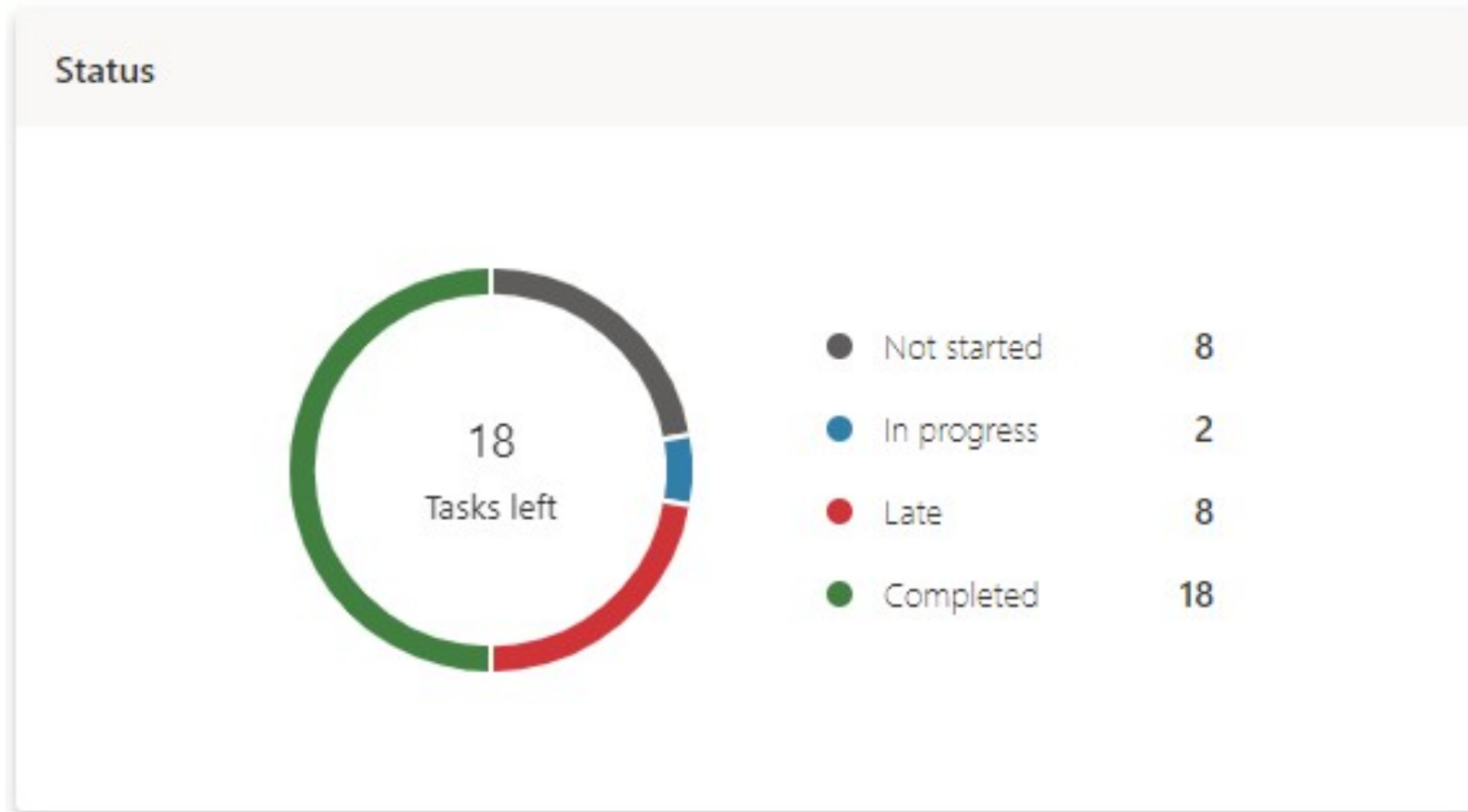
Accomplishments

Whale Ai
Prototype
designs
for payload

Video

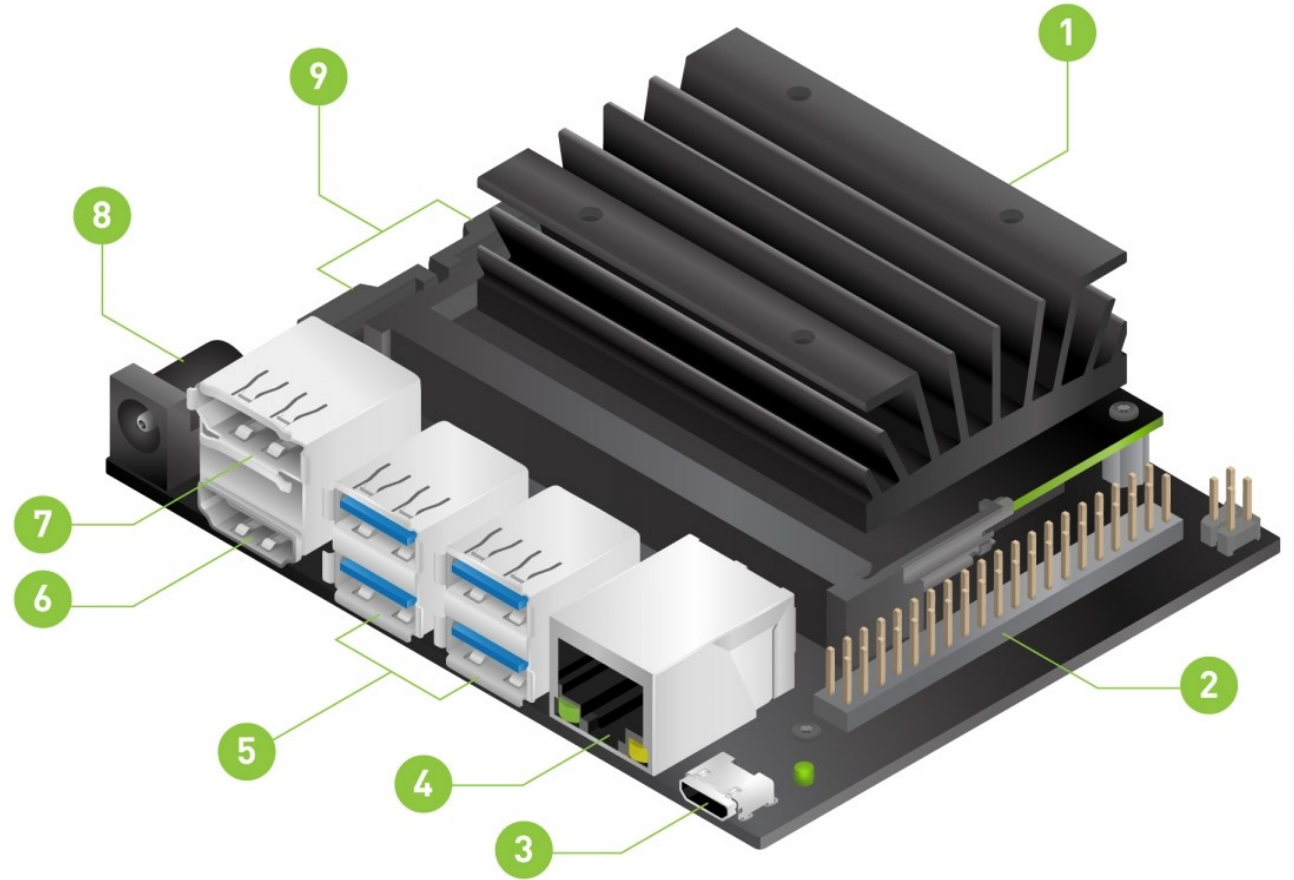
```
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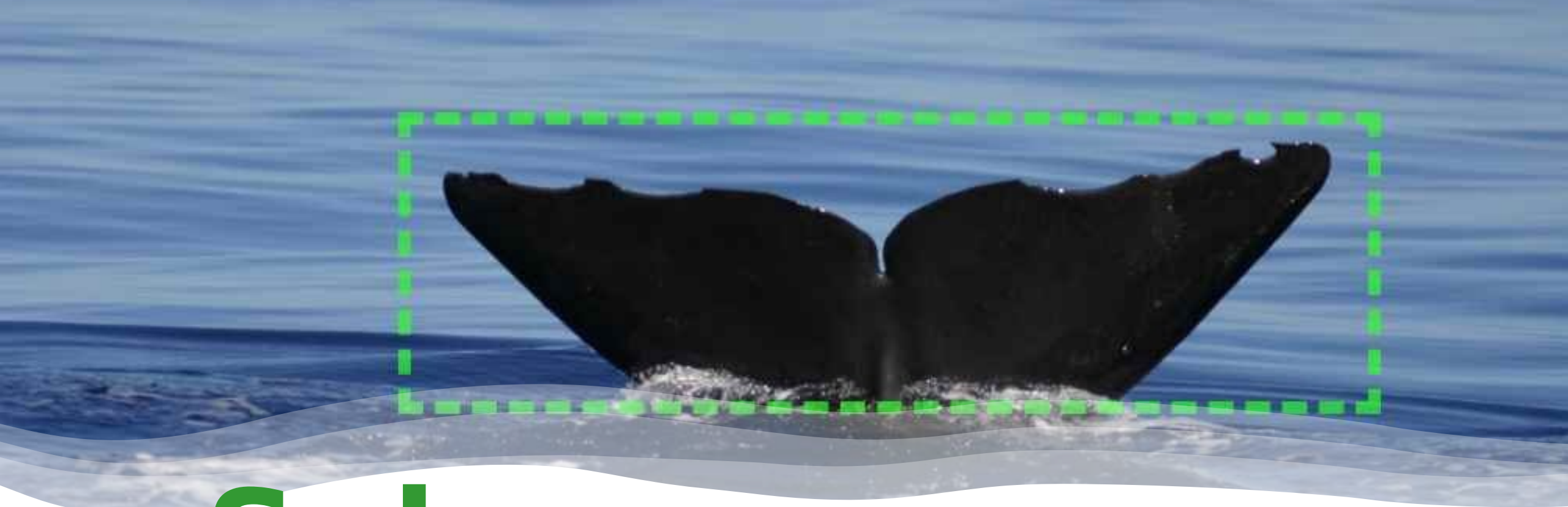
Burndown Chart



Aspects of System Design

- Ability of operators to easily start and run the Jetson
- Applicability of current program; can run other AI on the hardware
- Mobility between systems; ease of working with the physical payload





Sub- Systems Overview

Jetson Directives

- Detailed instructions to make system understandable, even to a layperson

Whale Ai

- Focused on Whales - a transition to a different animal to identify, using new AI

Payload Framework

- 3D Model for ease of handing hardware and swapping important equipment



Subsystem- Jetson Directives

- Video tutorial of starting and running the Jetson with its current program
- Learned more about the current neural network operations and the file system setup

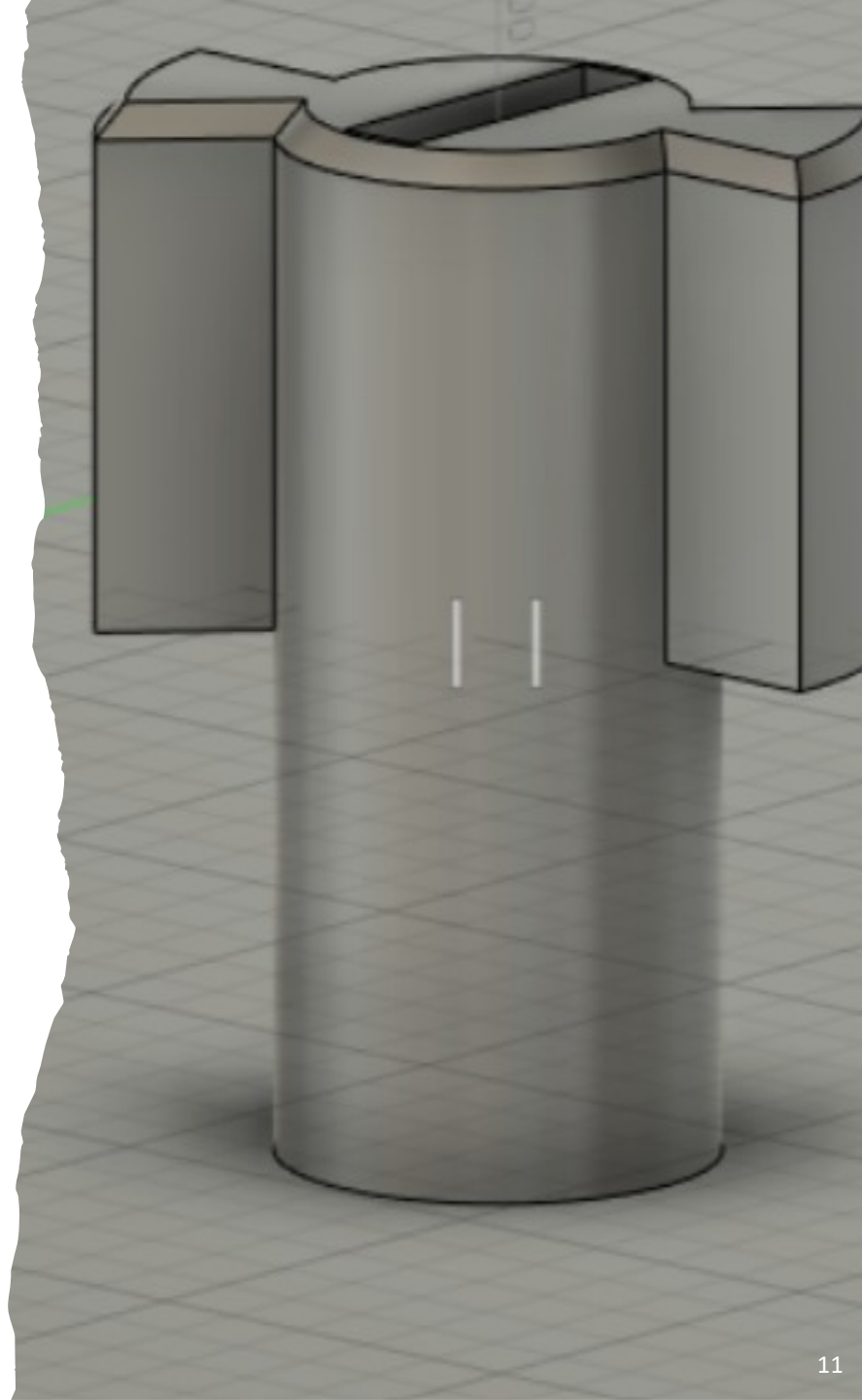
Subsystem - Modified Whale AI

```
269 def handle_begin(self):
270     self._start_new_mb()
271
272
273 def handle_result(self, res):
274     self.current_batch.append(res)
275
276     if 'x' in res:
277         #print 'chu', self.current_mb_size, self.mb_size
278         self.mb_x[self.current_mb_size] = res.x
279
280     if 'y' in res:
281         self.mb_y[self.current_mb_size] = res.y
282
283     self.current_mb_size += 1
284
285     if self.current_mb_size == self.mb_size:
286         res = self._get_res()
287         self._start_new_mb()
288         return res
289     else:
290         return None
291
292 def handle_end(self):
293     print 'handle_end'
294     if self.output_partial_batches:
295         print 'OK', self.current_mb_size
296         if len(self.current_batch) != 0:
297             return self._get_res()
```

- Using WildMe.ai and Deepsense.ai
- Dependencies on OpenCV, Keras, Python, and TensorFlow
- Currently outputting text-form bounds and weights
- Plan to use TensorFlow Lite to transfer to Jetson to avoid memory constraints

Subsystem- Payload Swap Framework

- The payload framework needs to hold the Jetson with the USB port available, while maintaining the correct angle for the cameras
- Durability and ease of use
- Partnership with the hardware to ensure design meets all standards for aircraft
- Using Fusion 360 Software

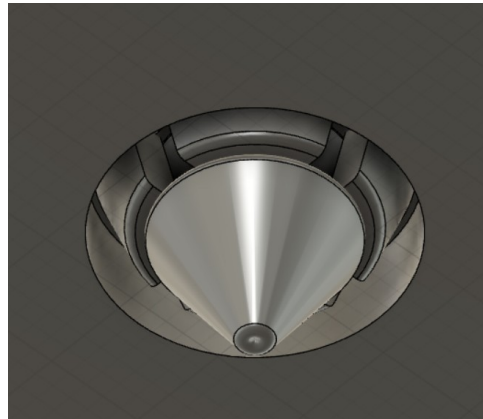
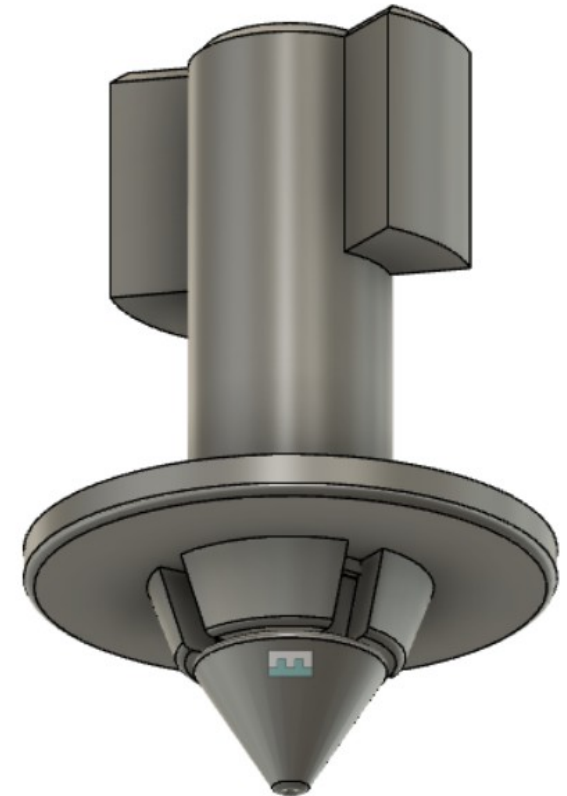
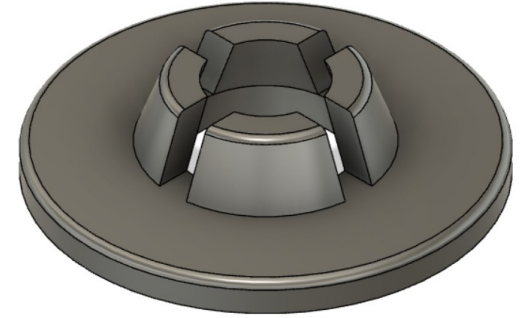
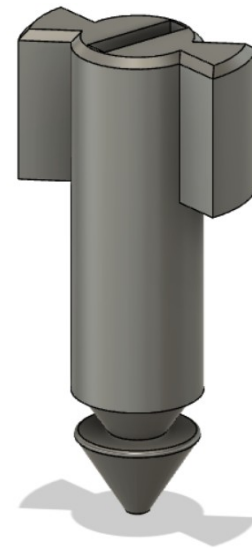


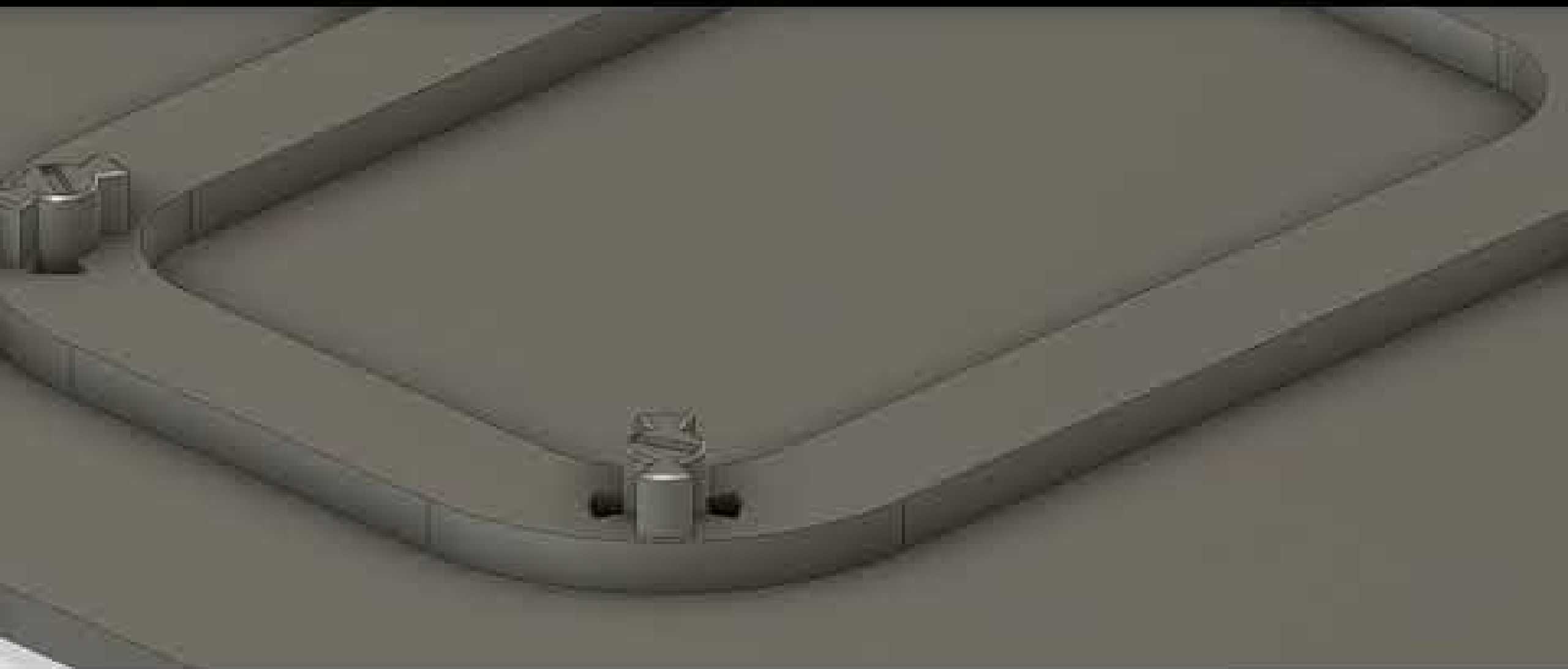
Mounting System Design

**Accessi
ble in
tight
spaces**

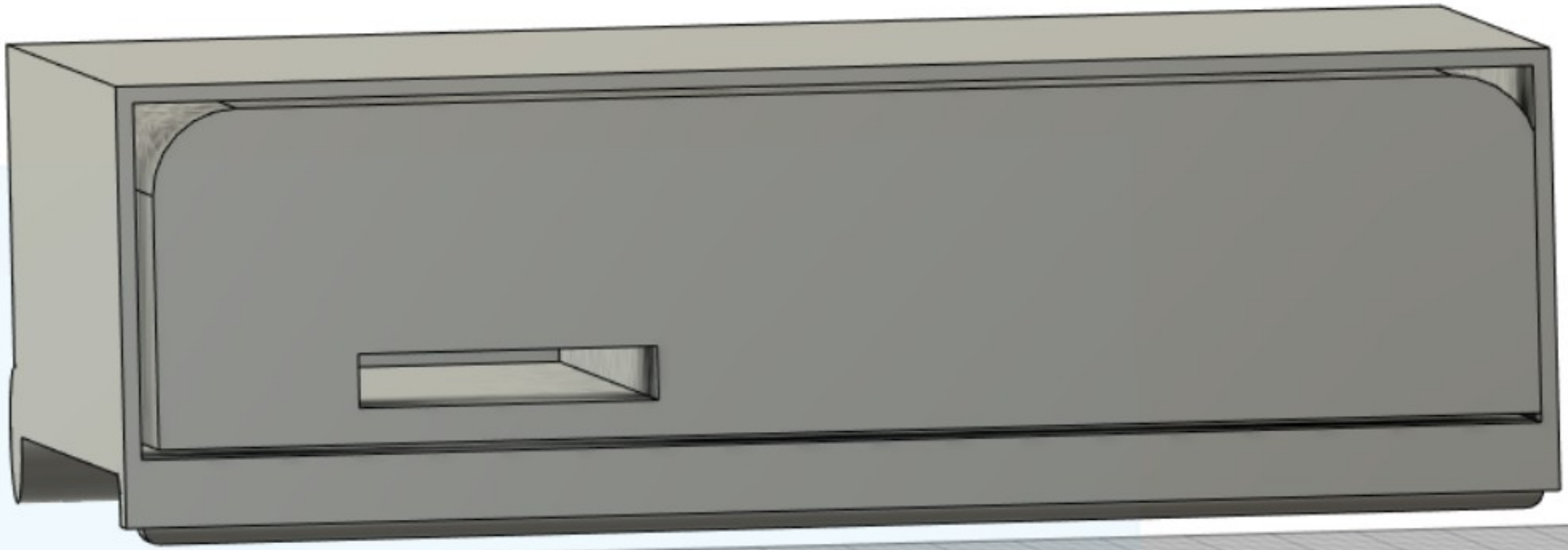
**Pin
style
locking**

**Durabi
lity**

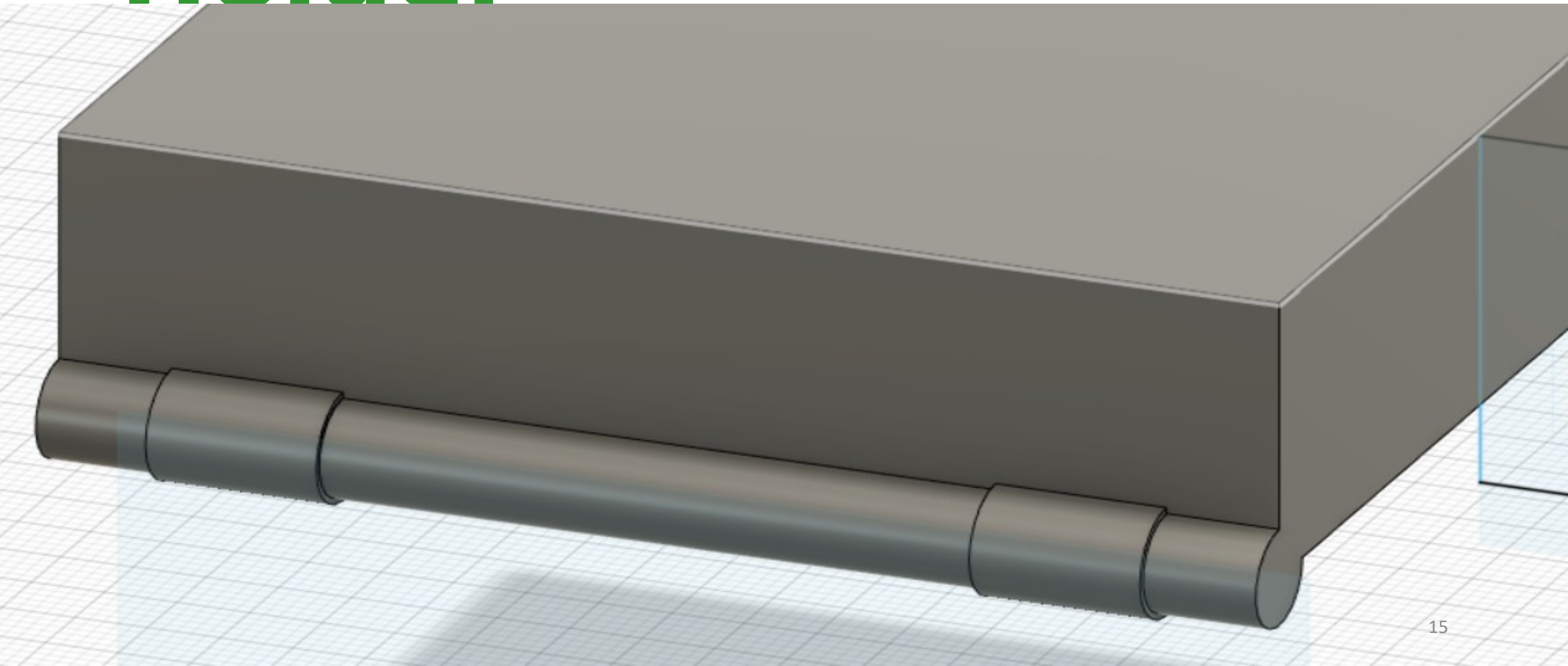




Pivoting Battery Case Holder

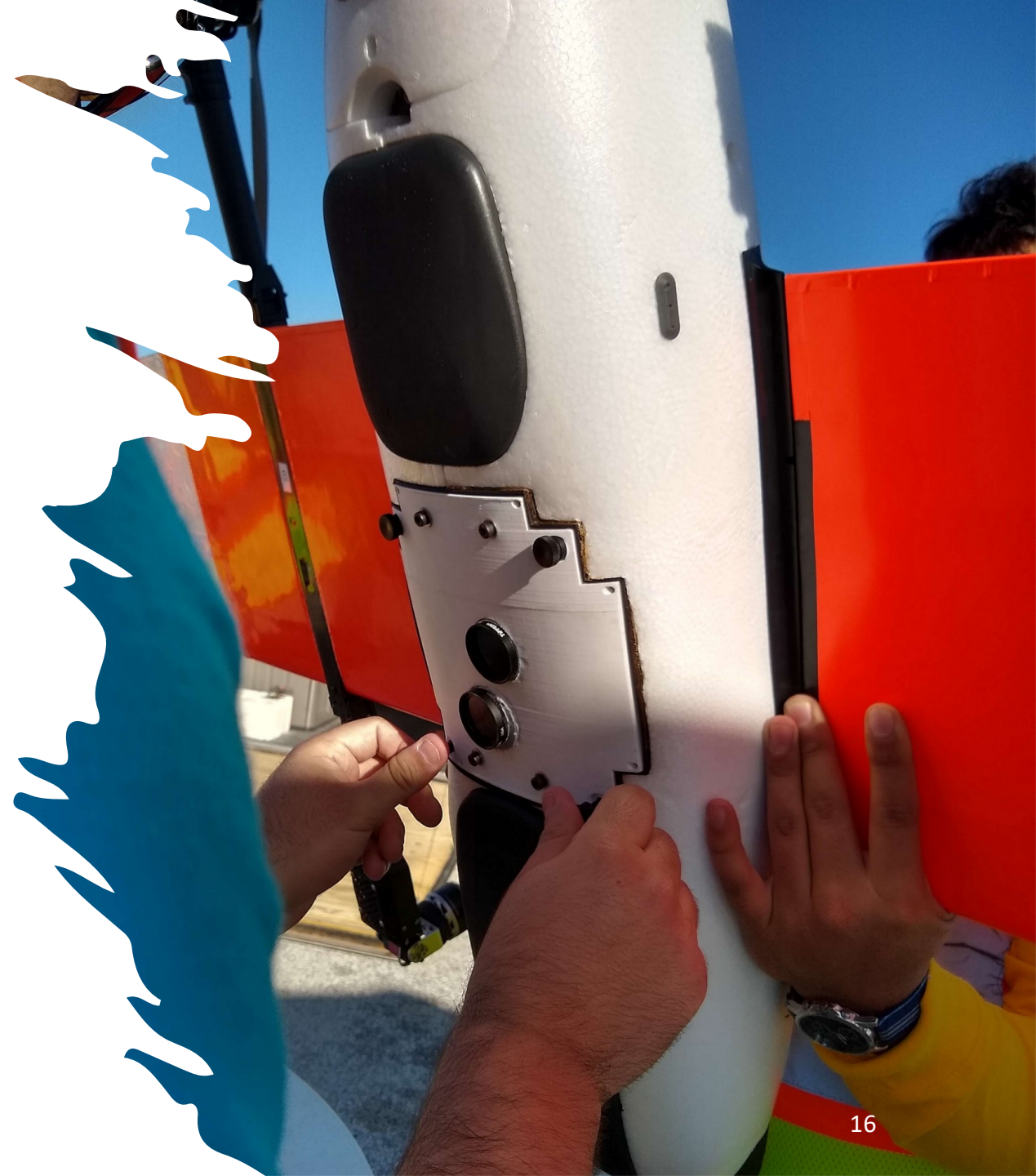


Pivoting Battery Case Holder



Interface & Exports

- **Interface on software side is currently shell scripts running python files**
- **Taking in image files and outputting data of bounding boxes and weighting of whale likelihood, exporting that data to .csv file**
- **Currently trying to get image output instead for easy checking**
- **Hardware side, inputs are components to mount; Jetson, Cameras, battery, potential on/off switch**
- **Output is a printed plastic case for containing mounted items**



Lessons Learned

```
E ~
Copying skeleton files.
These files are for the users to personal
They will never be overwritten nor automa

'./bashrc' -> '/home/admin//.bashrc'
'./bash_profile' -> '/home/admin//.bash_
'./inputrc' -> '/home/admin//.inputrc'
'./profile' -> '/home/admin//.profile'

admin@DESKTOP-VSG4HAC ~
$ bash /home/init.sh

admin@DESKTOP-VSG4HAC ~
$
```

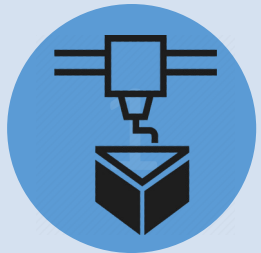
Jetson has very low memory and no MicroSD slot, so any programs loaded onto it are limited

Overtightening screws on payload case can lead to plastic cracking under stress

Ensure people are aware of team deadlines and not just syllabus deadlines

Bad idea to try to use an API call to a preset AI (especially for us trying to get the setup running on a Jetson)

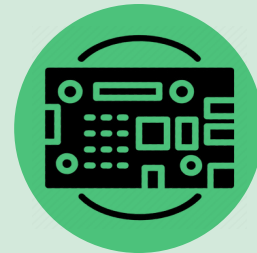
Next Steps



**Print to-
scale model
of single
peg
mounting
for proof of
concept**



**Get images
outputting
from the
whale AI**



**Attempt to
move Whale
AI to Jetson**



**Trial run of
having
someone
else run the
Jetson
during a
flight test**



Questions?