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# Spacecraft Design-Build-Fly Lab

16/18-873



Fall 2023 – Spring 2024

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# First Assignment

1. Join the course Slack workspace (CMU-SpacecraftDesignLab-f23) and briefly introduce yourself in the #introductions channel.

# First Assignment

The screenshot shows a Slack workspace named "CMU-SpacecraftDesignLab-123". The left sidebar contains navigation options: Home, DMs, Activity, and More. The "Channels" section lists "# general", "# introductions" (selected), "# logistics", "# random", and "# staff". The "Direct messages" section lists several contacts. The "Add coworkers" section is also visible. The main content area shows the "# introductions" channel header with a search bar, a "Add a bookmark" button, and a description: "@Brandon Lucia created this channel on August 27th. This is the very beginning of # introductions". Below the description are buttons for "Add people" and "Forward emails to this channel". A date separator indicates "Sunday, August 27th". A message from "Brandon Lucia" at 1:25 PM states: "joined #introductions. Also, Neil Khera and 17 others joined." The message input area at the bottom includes a rich text editor with various formatting options and a "Send" button.

CMU-SpacecraftDesignLab-123

# introductions

+ Add a bookmark

# introductions

@Brandon Lucia created this channel on August 27th. This is the very beginning of # introductions [Add description](#)

[Add people](#) [Forward emails to this channel](#)

Sunday, August 27th

**Brandon Lucia** 1:25 PM  
joined #introductions. Also, Neil Khera and 17 others joined.

B I

Message #introductions

[+](#) [Aa](#)

Free trial in progress

# First Assignment

1. Join the course Slack workspace (CMU-SpacecraftDesignLab-f23) and briefly introduce yourself in the #introductions channel.
2. Make sure you are a member of the GitHub organization “cmu-spacecraft-design-build-fly-2023” and join your team on GitHub.

# First Assignment

Teams · cmu-spacecraft-design

github.com/orgs/cmu-spacecraft-design-build-fly-2023/teams

Incognito (2)

Flexible repository access

You can add repositories to your teams with more flexible levels of access (Admin, Write, Read).

Request to join teams

Members can quickly request to join any team. An owner or team maintainer can approve the request.

Team mentions

Use team @mentions (ex. @github/design for the entire team) in any comment, issue, or pull request.

Learn more






Find a team...

New team

5 teams in the cmu-spacecraft-design-build-fly-2023 organization

Visibility ▾

Members ▾

<div>avionics</div> <div>Avionics and Embedded Software</div>		2 members	0 teams
<div>gnc</div> <div>Simulation and Guidance, Navigation, and Control</div>		2 members	0 teams
<div>mechanical</div> <div>Structure and Deployables</div>		2 members	0 teams
<div>ops</div> <div>Mission Operations and Groundstation</div>		2 members	0 teams
<div>vision</div> <div>Computer Vision</div>		2 members	0 teams

# First Assignment

The screenshot shows a web browser window displaying the GitHub page for the 'avionics' team within the 'cmu-spacecraft-design-build-fly-2023' organization. The browser's address bar shows the URL 'github.com/orgs/cmu-spacecraft-design-build-fly-2023/teams/avionics'. The page header includes the GitHub logo, the organization name, and a search bar. Below the header, there are tabs for 'Members', 'Teams', 'Repositories', and 'Projects'. The 'Members' tab is active, showing a list of team members. A search bar labeled 'Find a member...' is positioned above the list. The list contains two members: 'Brandon Lucia' (blucia0a) and 'Zac Manchester' (zacmanchester). On the right side of the page, a 'Request to join' button is circled in red. A tooltip below the button states 'Requires approval from an owner or team maintainer'. The left sidebar shows the team's name 'avionics' and an 'About' section with the text 'Avionics and Embedded Software'.

avionics · cmu-spacecraft-design-build-fly-2023

github.com/orgs/cmu-spacecraft-design-build-fly-2023/teams/avionics

cmu-spacecraft-design-build-fly-2023 / Teams / avionics

Find a member...

2 members 0 child team members

Brandon Lucia blucia0a

Zac Manchester zacmanchester

Request to join

Requires approval from an owner or team maintainer

avionics

About

Avionics and Embedded Software

# Teams

## GNC

Zach Mason

Atharv Pulapaka

Shivam Tripathy

Sachit Goyal

Luyi Tang

Elakhya Nedumaran

Hongyang Li

## Ops (Comms)

Angie Bu

Akshat Sahay

Jason Smith

David Morvay

Tim Mayer

## Vision

Melissa Pan

Weihaio Zeng

Rohit Bangal

Eddie (Yilei) Li

Nathan Zhu

Tong Jin

## Mechanical

Colm Barry

Joey Wildman

Ashley Kline

Mrinali Nakhre

Allison Weller

Colton Amos

## Avionics

Rohan Raavi

Nischal Mahadeshwar

Harry Rosmann

Karen Abruzzo

Nischal Mahadeshwar

Mindy Hsu

Gordonson Yan

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3. Take a look at the issues on the Kanban.



# First Assignment

The screenshot shows a web browser window displaying a GitHub project board for 'Argus-1'. The browser's address bar shows the URL `github.com/orgs/cmu-spacecraft-design-build-fly-2023/projects/1/views/1`. The page header includes the GitHub logo, the project name 'cmu-spacecraft-design-build-fly-2023 / Projects / Argus-1', and a search bar. Below the header, the project name 'Argus-1' is displayed with a globe icon. A dropdown menu shows 'View 1' and a '+ New View' button. A filter bar allows filtering by keyword or by field, with 'Discard' and 'Save' buttons. The main content area is a Kanban board with three columns: 'Todo' (7 items), 'In Progress' (0 items), and 'Done' (0 items). Each column has a description: 'This item hasn't been started', 'This is actively being worked on', and 'This has been completed' respectively. The 'Todo' column contains five items, each with a green circle icon and a title: 'documentation #1 Requirements Definition', 'documentation #2 Interface Definition', 'avionics #2 Camera Survey', 'avionics #3 Computer Survey', and 'avionics #1 Power Budget'. Each column also has a '+ Add item' button at the bottom.

View 1 · Argus-1

github.com/orgs/cmu-spacecraft-design-build-fly-2023/projects/1/views/1

cmu-spacecraft-design-build-fly-2023 / Projects / Argus-1

Search Type to search

Argus-1

View 1 + New View

Filter by keyword or by field

Discard Save

**Todo** 7

This item hasn't been started

- documentation #1  
Requirements Definition
- documentation #2  
Interface Definition
- avionics #2  
Camera Survey
- avionics #3  
Computer Survey
- avionics #1  
Power Budget

+ Add item

**In Progress** 0

This is actively being worked on

+ Add item

**Done** 0

This has been completed

+ Add item

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4. Each team has to define their level 2 requirements and propose a test to verify that each requirement is satisfied.

# First Assignment

Mission Requirements · cmu-sj x +

github.com/cmu-spacecraft-design-build-fly-2023/documentation/wiki/Mission-Requirements

cmu-spacecraft-design-build-fly-2023 / documentation

Type to search

Code Issues 2 Pull requests Discussions Actions Projects Wiki Security Insights Settings

## Mission Requirements

Zac Manchester edited this page 39 minutes ago · 7 revisions

Edit New page

### Level 1

1. The spacecraft shall conform fully to the latest version of the 1U CubeSat Design Specification.
2. The spacecraft shall be capable of operating in a 450-700 km altitude sun-synchronous orbit.
3. The spacecraft shall be capable of detumbling to a residual angular velocity of at most 3 degrees/sec.
4. The spacecraft shall demonstrate attitude determination errors less than 15 degrees.
5. The spacecraft shall demonstrate orbit determination errors less than 50 kilometers.
6. The spacecraft shall downlink at least one image of the Earth in at least VGA (640x480) resolution.

### Level 2

#### Mechanical

1. Requirement
- Verification/test
2. Requirement

Pages 5

Find a page...

- Home
- Camera Survey
- Computer Survey
- Interfaces
- Mission Requirements
  - Level 1
  - Level 2
    - Mechanical
    - Avionics
    - Simulation and GNC
    - Ops and Groundstation
    - Vision

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5. Each team has to define their interfaces with every other team. Try to think of all hardware and/or software interactions.

# First Assignment

16/18-783 Interfaces - Google

docs.google.com/spreadsheets/d/1nsa1JrG1fLDQOmjCro6FkN9ER-d2qjo1OLyPmk2wly8/edit#gid=0

16/18-783 Interfaces

File Edit View Insert Format Data Tools Extensions Help

100% | \$ % .0 .00 123 | Default... | - 10 + | B I | A | | | | | | | | | |

A1 | fx Avionics

	A	B	C	D	E
1	Avionics				
2					
3					
4					
5					
6					
7	Ops				
8					
9					
10					
11					
12					
13	Vision				
14					
15					
16					
17					
18					
19	GNC				
20					
21					
22					
23					

Sheet1

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6. Everyone must make at least one git commit.

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6. Everyone must make at least one git commit.
7. Each team will present their requirements and interfaces next Wednesday.

# Weekly Quad Chart

Concrete update *with images / figures w/ caption?*

What are your team's blockers, and which tasks are those blockers associated with?

What are your (new) tech requirements? What tools/software/etc do you need access to?

What were the major milestones achieved?

What are you doing this week, as concretely as possible and which milestones are those tasks attached to.

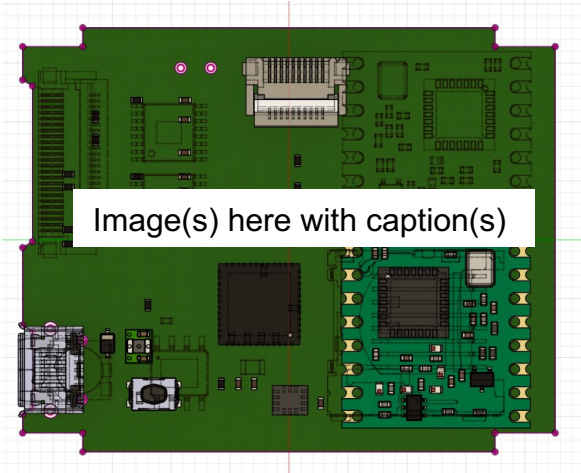
Is everything on schedule?

What are the cross-team issues and interfaces that require communication between your team and other teams?

What is your plan and timeline for communicating and merging your teams' plans?



# Team Name / Week # / 16/18-873F23



## Blockers

- No access to Pittsburgh Supercomputing Center for ML training
- Can't make camera work with test driver
- Two teammates out of town for 5 days

## Requirements

- Need login information for PSC ML training cluster
- Need Ansys thermal modeling tool for chassis thermal evaluation

## Weekly Results

What you did

Things that worked, things that didn't

## Next Week

What's next on your plate?

## Updated Key Milestones (past + present)

Milestone #1

MM/YY

Milestone #2

MM/YY

Milestone #3

MM/YY

Milestone #4

MM/YY

etc

## Interfaces

Other Team 1

None

Other Team 2

Antenna placement

Battery testing

Other Team 3

Integration of sensor calibrations into software

Other Team 4

Need magnetic moment values for sim

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**Fill out this whenisgood:**  
**<https://whenisgood.net/zn595yw>**

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