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Team 502: Underwater Glider

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Abstract

The abstract is a concise statement of the significant contents of your project. The abstract should be one paragraph of between 150 and 500 words. The abstract is not indents.

Keywords: list 3 to 5 keywords that describe your project.

Disclaimer

Your sponsor may require a disclaimer on the report. Especially if it is a government sponsored project or confidential project. If a disclaimer is not required delete this section.

Acknowledgement

These remarks thanks those that helped you complete your senior design project. Especially those who have sponsored the project, provided mentorship advice, and materials. 4

- Paragraph 1 thank sponsor! (Boeing)
- Paragraph 2 thank advisors. (Direct Professor Advisor)
- Paragraph 3 thank those that provided you materials and resources. (TBD)
- Paragraph 4 thank anyone else who helped you. (Other teachers? idrk)

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Appendix A: Code of Conduct

This document will serve as the guidelines and team contract for Senior Design Group T502 from Fall 2024 until Spring 2025.

Mission Statement

Team 502's mission statement is to innovate and deliver solutions that improve upon underwater gliders for Boeing. This team will use the engineering practices learned during our undergraduate studies at FAMU-FSU College of Engineering and industry experience. Each team member is expected to act in accordance with the Code of Conduct, sponsors, advisors, and all other faculty that may be resourced during the project.

Outside Obligations

Senior Design Team 502 will meet twice weekly after the hours of Senior Design Lecture on Tuesdays and Thursdays at a minimum. These will act as general team meetings where weekly tasks, upcoming deadlines, and technical discussions will take place. Additional meetings, including those with sponsors and advisors, will be communicated through the Microsoft Office suite. Any changes to an individual's schedule must be communicated promptly either verbally or electronically. These changes must be communicated at least 24 hours in advance of the scheduled team event. In the event of an emergency and an event must be missed within the 24-hour window, communication must be made with the team as soon as possible so that actions can be taken to compensate. All team members are expected to be present for all general meetings and sponsor and advisory meetings. Team members will be expected to outline their weekly commitments in the code of conduct. Weekly commitments are subject to change.

Jake Burns's outside obligations include performing research at the AME department of the FAMU-FSU College of Engineering (5-10 hours/week), performing TA duties (20 hours/week) and attending classes at the College of Engineering (9 hours/week).

Tristan Hardy's outside obligations include attending classes at the FAMU-FSU College of Engineering (14 hours/week) and attending various Veterans Association appointments (1 hour/week).

Nicolas Lorin's outside obligations include his senior class load at FAMU-FSU College of Engineering which consists of (14 hours/week).

Justin Sepulveda's outside obligations include Naval Reserve Officer Corps (15 hours/week). Weekends and extra hours during the week are committed as needed.

Martin White's outside obligations include interning remotely with Northrop Grumman (10 hours/week) in addition to his senior class load at the FAMU-FSU College of Engineering (13 hours/week).

Team Roles

Each team member has selected a role aligned with their strengths and desires for the project. Any duties that do not explicitly fall under a particular team member's role will be evenly divided amongst team members. Group projects concerning project status (Project Scope, Functional Decomposition, etc.) will be divided evenly among group members as seen fit. Table 1 shows each member's specific role in the project.

Table 1: Team Member Roles

Team Member	**Team Role**
Jake Burns	Simulations Engineer, Point of Contact
Tristan Hardy	Modeling Engineer
Nicolas Lorin	Controls Engineer
Justin Sepulveda	Systems Engineer
Martin White	Materials Engineer

Simulations Engineer: The job of Simulations Engineer entails using Computational Fluid Dynamics (CFD) to create a computer model of the glider. Simulations should account for energy consumption, hydrodynamic forces, and buoyancy control. In addition, data should be processed and presented in an easily understandable manner. The models should align with customer needs and project specifications. Simulations should be shared with the group and explained so the group can better understand what design parameters are important

Modeling Engineer: The modeling engineer is responsible for designing, developing, and implementing mathematical or computational models to simulate real-world scenarios the glider would be placed in, using size constraints, materials, weight, and other factors to create a design that is in line with the objective and goals.

Controls Engineer: The job of the Controls Engineer entails using Control Algorithms to computationally model the motion of the glider. The Controls Engineer must address the development and integration of control systems to manage the gliders' orientation and movement. Common factors and variables include pitch, roll, and yaw to ensure a stable gliding motion. These variables will be used to optimize the energy efficiency, stability, and reliability of the glider.

Systems Engineer: The systems engineer is responsible for integrating all subsystems and components designed and developed over the project**.** This can include developing project requirements and creating plans for how innovative solutions can be implemented into the project.

Materials Engineer: The materials engineer is responsible for researching and selecting materials to improve efficiency, reduce weight, and enhance the durability of the underwater glider design. The role involves developing and overseeing the fabrication and assembly of components that can withstand underwater conditions, such as pressure and corrosion. Additionally, the role includes collaborating with other leads to make necessary modifications to the design throughout the project, ensuring the glider performs optimally in various marine environments.

Communication

Team 502 will use Microsoft Teams for all file sharing requirements, scheduling, and primary communication. All team members are expected to check teams at least once per day to

remain up to date will all projects related tasks. A text message group chat will be used by team members for informal communication and emergency schedule changes. All communication with sponsors and advisors will be through email. If no response has been made between team members after 24 hours a follow-up email must be sent by the original sender, and 48 hours for sponsors/advisors. Although all members of the team shall be CC'ed in emails, the designated point of contact will be Jake Burns.

Dress Code

During meetings with sponsors and advisors or presentations, all team members must wear a polo-style shirt with khaki pants to uphold professionalism. Close-toed shoes are required for any sponsor and advisor meetings.

General meetings are considered informal, and each team member may choose to wear clothes of their choosing if it follows FAMU-FSU dress code policies. Any meetings or events not listed above will be communicated prior to the start to coordinate attire.

Attendance Policy

All team members are expected to attend lectures and general team meetings. All team members must attend sponsor meetings, advisor meetings, virtual design reviews, and senior design day. If a team member cannot attend lecture or team meeting, they should communicate via teams or text message chat at the earliest convenience of that team member, but no less than 24 hours before the meeting. If a team member cannot attend a sponsor meeting, advisor

meeting, or virtual design review, that member shall promptly inform the team in a timely manner.

General team meetings will occur during the scheduled senior design time, Tuesdays and Thursdays from 3:30pm to 7:45pm. Each meeting will have outlined goals and if goals are not met during the meetings plans will be made to accomplish the goals outside meeting hours. If meeting goals are met before the allotted time is up, meetings can be adjourned **early.**

How to Notify Group

Any event or meeting brought about by the team or sponsors shall be communicated through Microsoft Teams. If the sponsor or advisor needs to notify the group, they may email the team members through the university's email.

Amendments

For an amendment to be made to the Code of Conduct all team members must attend a general meeting to discuss the code in question. A unanimous decision must be made for the amendment to pass. Amendments can be made during any point of the project's duration and requires all team members to resign the Statement of Understanding.

Jung Typology Test Results

To better understand each other's personality each group member completed a personality test. We expect that by understanding different aspects of each team member's personality we will be able to work more effectively and efficiently. Table 2 displays those results.

Table 2: Jung Typology Test Results

Group Member	**Result**
Jake Burns	INTP
Tristan Hardy	INTJ
Nicolas Lorin	ISTJ
Justin Sepulveda	INFJ
Martin White	ENTP

Prior Work Before Dr. McConomy or TA Intervention

If an event occurs where there is an internal conflict in the team, an open and accepting environment shall be in place and the conversation shall remain civil. If the conflict is not solved initially, the group shall turn to a voting system and the option that holds the majority vote shall be the decision the team goes with. Regardless of the outcome after voting, all members of the team shall respect the decision the majority voted for.

Notification of Dr. McConomy

After the team has brought an issue to a vote, if there are still any discrepancies or doubts, the team shall exhaust all options before contacting Dr. McConomy. If advisors or sponsors are showing continuous inactivity to communication, the team shall go to Dr. McConomy to choose the next best course of action. Regarding a team member showing lack of care or work, and the team has discussed their actions with the individual, the team shall approach Dr. McConomy to inform him of the issue along with evidence if applicable.

Advisor Expectations

We expect to provide Dr. McConomy with a clear and unbiased outline of the occurring problem in hopes for his honest feedback and input.

Statement of Understanding

Statement of Understanding

X _____ Date: 9-10-24

Jake Burns

X _____ Date: 09/10/2024

Tristan Hardy

X _____ Date: 9/10/2024

Nicolas Lorin

X _____ Date: 9/10/2024

Justin Sepulveda

X _____ Date: 9/10/2024

Martin White

Appendix B: Work Breakdown Structure

Milestone	Work Packet	Task	Assigned to:	Status	Projected Date of Completion:	Notes
Project Scope	Establish Foundation	Create Description of Project	Tristan	Upcoming	9/17/2024	
		Define the key goals of the project	Nicolas	Upcoming	9/17/2024	
	Background Research	Identify the market for the project	Justin	Upcoming	9/17/2024	
		Identify the assumptions for the project	Jake	Upcoming	9/19/2024	
		Identify the operating assumptions	Martin	Upcoming	9/19/2024	
		Identify the stakeholders	Jake	Upcoming	9/19/2024	
	Complete Assignment	Edit and Review Assignment	Martin	Upcoming	9/20/2024	
		Submit Assignment	Nicolas	Upcoming	9/20/2024	
Customer Needs	Gather Information	Develop questions to send to customer	Jake	Upcoming	9/24/2024	
		Communicate with customer and collect needs	Martin	Upcoming	9/24/2024	
	Establish Needs	Interpret need from customer	Tristan	Upcoming	9/26/2024	
		List customer needs	Nicolas	Upcoming	9/26/2024	
	Complete Assignment	Edit and Review Assignment	Jake	Upcoming	9/27/2024	
		Submit Assignment	Martin	Upcoming	9/27/2024	
VDR1	Gather Content	Review Rubric	Nicolas	Upcoming	9/18/2024	
		Review Previous Deliverables	Justin	Upcoming	9/18/2024	
		Discuss key points	Jake	Upcoming	9/18/2024	
	Create Slides	Upload Presentation Template	Nicolas	Upcoming	9/19/2024	
		Break-up Content into Slide Structure	Martin	Upcoming	9/19/2024	
		Insert Content onto Designated Slides	Justin	Upcoming	9/19/2024	
		Format Slides	Tristan	Upcoming	9/24/2024	
		Animate Slides	Martin	Upcoming	9/24/2024	
		Save File using Naming Convention	Jake	Upcoming	9/24/2024	
	Practice Presentation	Proofread	Nicolas	Upcoming	9/26/2024	
		Practice Timing and Delivery	Tristan	Upcoming	9/26/2024	
		Edit Presentation if necessary	Tristan	Upcoming	9/26/2024	
	Deliver Presentation	Submit Assignment	Nicolas	Upcoming	9/26/2024	
		Present Assignment	Jake	Upcoming	9/30/2024	
Functional Decomposition	Establish Functions	Generate different functions based on needs	Justin	Upcoming	10/1/2024	
		Integrate function with system	Nicolas	Upcoming	10/1/2024	
		Discuss how each function relates to the project	Justin	Upcoming	10/3/2024	
	Complete Assignment	Edit and Review Assignment	Tristan	Upcoming	10/3/2024	
		Submit Assignment	Jake	Upcoming	10/4/2024	

Targets	Initial steps	Define project targets	Nicolas	Upcoming	10/15/2024	
	Identify Targets	Discuss how targets were defined	Tristan	Upcoming	10/15/2024	
		Discuss validation of targets	Jake	Upcoming	10/15/2024	
		Identify Critical Targets	Justin	Upcoming	10/17/2024	
	Complete Assignment	Edit and Review Assignment	Justin	Upcoming	10/17/2024	
		Submit Assignment	Martin	Upcoming	10/18/2024	
Concept Generation	Initial steps	Generate concepts	Tristan	Upcoming	10/22/2024	
	Organize Concepts	Identify Medium Fidelity Concepts	Jake	Upcoming	10/22/2024	
		Identify High Fidelity Concepts	Nicolas	Upcoming	10/24/2024	
	Complete Assignment	Edit and Review Assignment	Justin	Upcoming	10/25/2025	
		Submit Assignment	Justin	Upcoming	10/25/2024	
Concept Selection	Analysis of Concepts	House Of Quality	Nicolas	Upcoming	10/29/2024	
		Pugh Charts	Martin	Upcoming	10/29/2024	
	Selection of Concepts	Analytical Heirarchy Process	Justin	Upcoming	10/31/2024	
		Discussion and Final Selection	Jake	Upcoming	10/31/2024	
	Complete Assignment	Edit and Review Assignment	Martin	Upcoming	11/1/2024	
		Submit Assignment	Tristan	Upcoming	11/1/2024	
Risk Assessment	Job Hazard Analysis	Analyze Possibilites of Failure	Justin	Upcoming	11/5/2024	
		Accident Identificaiton	Jake	Upcoming	11/5/2024	
	Establish Action Items	Steps to Avoid Hazards	Martin	Upcoming	11/7/2024	
		Edit and Review Assignment	Tristan	Upcoming	11/7/2024	
	Complete Assignment	Submit Assignment	Nicolas	Upcoming	11/8/2024	
VDR2	Gather Content	Review Rubric	Tristan	Upcoming	11/2/2024	
		Review Previous Deliverables	Martin	Upcoming	11/2/2024	
		Discuss Key Points	Jake	Upcoming	11/2/2024	
	Create Slides	Upload Presentation Template	Justin	Upcoming	11/5/2024	
		Break-up Content into Slide Structure	Tristan	Upcoming	11/5/2024	
		Insert Content onto Designated Slides	Martin	Upcoming	11/6/2024	
		Format Slides	Jake	Upcoming	11/6/2024	
		Animate Slides	Justin	Upcoming	11/8/2024	
		Save File using Naming Convention	Tristan	Upcoming	11/8/2024	
	Practice Presentation	Proofread	Jake	Upcoming	11/10/2024	
		Practice Timing and Delivery	Martin	Upcoming	11/10/2024	
		Edit Presentation if necessary	Nicolas	Upcoming	11/10/2024	

	Deliver Presentation	Submit Assignment	Jake	Upcoming	11/12/2024	
		Present Assignment	Martin	Upcoming	11/12/2024	
Bill of Materials	Planning of materials	Consider What Materials are Needed	Martin	Upcoming	11/13/2024	
		List All Materials	Martin	Upcoming	11/13/2024	
	Acquisition of materials	Measurement of Materials	Justin	Upcoming	11/15/2024	
		Organize Materials	Justin	Upcoming	11/15/2024	
Spring Project Plan	Engineering Design Day	Complete VDR4	Nicolas	Upcoming	2/7/2025	
		Complete VDR5	Justin	Upcoming	2/8/2025	
		Complete VDR6	Tristan	Upcoming	2/9/2025	
		Collect Feedback Form Advisors/Sponsors/TA's	Jake	Upcoming	3/10/2025	
		Practice the presentation	Martin	Upcoming	4/11/2025	
		Finalize presentation	Nicolas	Upcoming	4/12/2025	
	Finals	Study class finals	Jake	Upcoming	5/13/2025	
		Take Finals	Justin	Upcoming	5/14/2025	
		Teams Finals Collected to Fill Out Team Schedule	Tristan	Upcoming	5/15/2025	
	Graduation	Graduation Checks Completed	Martin	Upcoming	5/16/2025	
		Grad Photos	Jake	Upcoming	5/17/2025	
		Cap and Gown	Justin	Upcoming	5/18/2025	
VDR3 Prototype	Gather Content	Review Rubric	Tristan	Upcoming	11/19/2024	
		Review Previous Deliverables	Martin	Upcoming	11/20/2024	
		Discuss key points	Jake	Upcoming	11/21/2024	
	Create Slides	Upload Presentation Template	Justin	Upcoming	11/22/2024	
		Break-up Content into Slide Structure	Tristan	Upcoming	11/23/2024	
		Insert Content onto Designated Slides	Martin	Upcoming	11/24/2024	
		Format Slides	Jake	Upcoming	11/25/2024	
		Animate Slides	Justin	Upcoming	11/26/2024	
		Save File using Naming Convention	Tristan	Upcoming	11/27/2024	
	Create Prototype	Review Prototype Design	Tristan	Upcoming	11/28/2024	
		Gather Necessary Materials	Martin	Upcoming	11/29/2024	
		Assemble Prototype	Jake	Upcoming	11/30/2024	
		Test and Evaluate Prototype	Martin	Upcoming	11/30/2024	
		Make Necessary Adjustements after Testing	Justin	Upcoming	11/30/2024	
	Practice Presentation	Proofread	Jake	Upcoming	12/1/2024	
		Practice Timing and Delivery	Martin	Upcoming	12/1/2024	

		Edit Presentation if necessary	Nicolas	Upcoming	12/1/2024	
	Deliver Presentation	Submit Assignment	Jake	Upcoming	12/2/2024	
		Present Assignment	Martin	Upcoming	12/3/2024	
Poster	Organize information	Consider Poster Content	Nicolas	Upcoming	12/3/2024	
	Design Poster	Determine Poster Layout and Colors	Tristan	Upcoming	12/4/2024	
		Choose Pictures and Graphs	Justin	Upcoming	12/4/2024	
	Review Poster	Review Poster	Jake	Upcoming	12/6/2024	

Appendix C: Target Catalog

Appendix A: APA Headings (delete)

Heading 1 is Centered, Boldface, Uppercase and Lowercase Heading

Heading 2 is Flush Left, Boldface, Uppercase and Lowercase Heading

Heading 3 is indented, boldface lowercase paragraph heading ending with a period.

Heading 4 is indented, boldface, italicized, lowercase paragraph heading ending with a period.

Heading 5 is indented, italicized, lowercase paragraph heading ending with a period.

See publication manual of the American Psychological Association page 62

Appendix B Figures and Tables (delete)

The text above the cation always introduces the reference material such as a figure or table. You should never show reference material then present the discussion. You can split the discussion around the reference material, but you should always introduce the reference material in your text first then show the information. If you look at the Figure 1 below the caption has a period after the figure number and is left justified whereas the figure itself is centered.

Figure 1. Flush left, normal font settings, sentence case, and ends with a period.

In addition, table captions are placed above the table and have a return after the table number. The second line of the caption provided the description. Note, there is a difference between a return and enter. A return is accomplished with the shortcut key shift + enter. Last, unlike the caption for a figure, a table caption does not end with a period, nor is there a period after the table number.

Table 3
The Word Table and the Table Number are Normal Font and Flush Left. The Caption is Flush Left, Italicized, Uppercase and Lowercase

Level of heading	Format
1	**Centered, Boldface, Uppercase and Lowercase Heading**
2	**Flush Left, Boldface, Uppercase and Lowercase**
3	***Indented, boldface lowercase paragraph heading ending with a period***
4	***Indented, boldface, italicized, lowercase paragraph heading ending with a period.***
5	*Indented, italicized, lowercase paragraph heading ending with a period.*

References

There are no sources in the current document.