STRUCTURES

Balloon

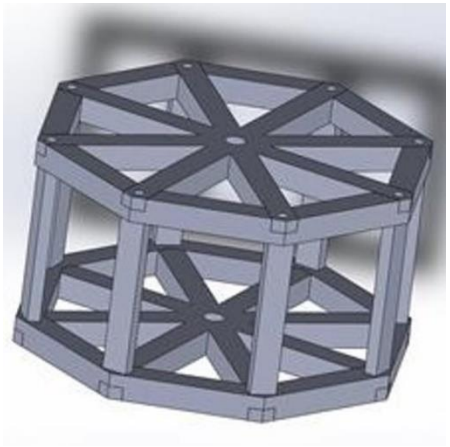
The aim of the balloon sub-team is to determine the best envelop material for the rover's balloon. To do so, the team will do in-detail analysis of potential materials. They will conduct loads analysis, which is the determination of the effects of loads on physical structures and their components. They will also refine the structure and design of the balloon. They will work on failure criteria and do a parametric analysis, which is the study of the influence of different geometric or physical parameters or both on the solution of the problem.

#MaterialAnalysis, #StructureAnalysis, #FluidDynamics

Quote:

Working on the balloon sub-team is like traveling in space with a floating balloon, enjoying the astonishing things our cosmos has to offer. You don't only apply geometry to make shapes but also you get to know about art and materials. It feels like if you were a tour guide designing an efficient and sturdy balloon which will make the Star Rover feel like a tourist on Titan, let's make the Star Rover feel welcome on Titan.

Rover



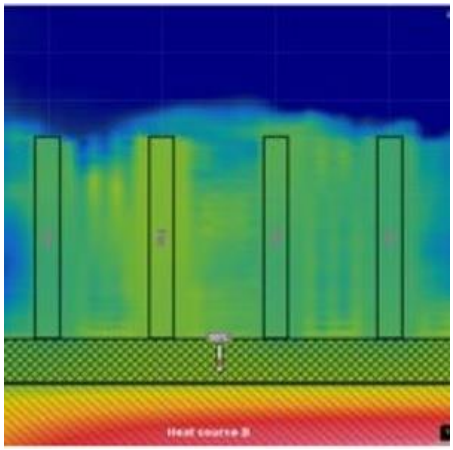
The aim of the rover sub-team is to refine the structure of the rover. Once the team will be settled on a design, they will create a CAD version. They will also be designing the landing sequence of the rover. On top of that, this team is responsible for the integration of other team's systems. Like for example the integration of the chemical unit to the rest of the rover. They will also conduct a failure criteria analysis and a load analysis to ensure that the rover will operate nominally in case of problems or in load-intensive phases.

#CAD, #MaterialAnalysis, #StructureAnalysis

Building the Star Rover's structure is like going on a trip with your family. You have to build your own transportation, making space for each member of the family. I think that's what our goal is all about, making space for every team in the rover, it definitely feels like gathering your whole family to go to Titan, where you also face different challenges but that's what makes us a stronger family in our way to Titan.

CHEMISTRY & HEAT TRANSFER

Heat Transfer



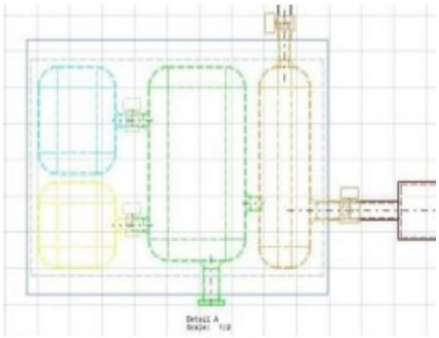
The aim of the Heat Transfer sub-team is to work on the thermal conditions of the rover. This includes designing a heat control mechanism to ensure that the conditions inside the rover are optimal for all components and sub-systems. This mission also includes the definition of the sensors needed to measure all the data the sub-team needs for its mission. Finally, the Heat Transfer sub-team will work on a thermal simulation for the chemical unit as well as a thermal simulation for the entire rover.

Quote:

In the heat transfer sub-team our goal is to manage all the heat exchanges between the different parts of the rover and between the rover and the outside. In doing so, we have to find the best ways to ensure a well-functioning rover and to avoid every risk due to a too high or too low temperature on the components. We are working with simulations, and we have to pay a special attention to all the components the other teams plan to have.

#Themodynamics, #Electronics, #Simulations

Chemistry



The aim of the Chemistry sub-team is to focus on the chemical reaction to produce di-hydrogen. Their work is centered on the design of the chemical unit to produce this gas as efficiently as possible. This includes work on the chemical reaction needed, the conditions needed for the reaction, what materials can resist those conditions, and which sensors can measure these conditions. The sub-team will have to define the release mechanism for the reactant into the chemical unit as well as the disposal of any waste products coming from the reaction.

Quote:

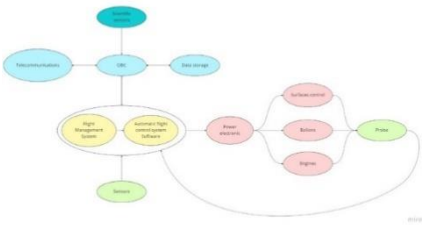
The chemistry sub-team aimed to manage the working fluid production. This fluid that is H2 will be used for the propulsion and to filling the balloon. We have to choose which chemical reaction is the most suitable to produce this H2 thanks to theoretical and experimental research. Once this is done, we have to design a small but powerful chemical unit where the reaction will be produced.

#InorganicChemistry, #CAD, #MaterialsAnalysis

ELECTRONICS

Control

The Control sub-team is in charge of the on-board computer. They are responsible for all the movements and workings of the rover, such as when to fire a thruster, when to release gas from the balloon, when to deploy a mechanism, or when to use a sensor. They have to choose an operating system and an on-board computer based on the computational requirements they will define in order to be able to control the entire rover. In addition, the sub-team will be responsible for the handling of the data sent by the instruments.



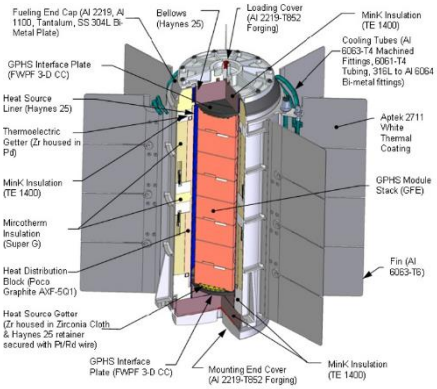
Quote:

This sub-team is in charge of defining the control algorithms for the rover during all mode of operation. It must work closely with the system engineering team as mission profile and objectives have a direct impact on how the rover should operate. This sub-team is also in charge of defining the onboard computer for the rover, considering all the computational needs of each team.

#Electronics, #OBC, #Control

Power Generation

The Power Generation sub-team is in charge of the power unit of the rover. As such, they have to confirm and define the choice of the power unit. They also need to work on a potential auxiliary power generation method in case of a problem on the main power unit. To design the power source, they have to keep an eye on the power consumption needed by the other sub-teams of the project. They will also have to work with the Heat Transfer sub-team if the power generator functions as a heat source as well, as it is currently the case.



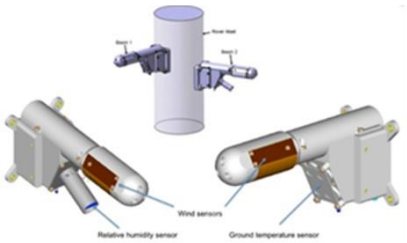
Quote:

This sub-team works on the power distribution system for the rover. We work with power electronic components to design a system capable of managing power between an MMRTG, a battery pack and all the subsystems within the rover. We are in constant communication with the other teams to understand what their power needs are so that we can correctly share the power among all components.

#Electronics, #Automation, #PowerSource

Instruments

The Instrumentation sub-team is in charge of designing everything related to gathering data. With the help of the Science sub-team, they work on the instruments collecting data for the scientific objective. They are also responsible for the sensors allowing the rover to gather data needed to survive and work on Titan. They have to keep an eye on any new advances from the other teams to help them manage their sensors. Finally, they will participate in the definition of the computational requirements for the Control sub-team based on the instruments used.



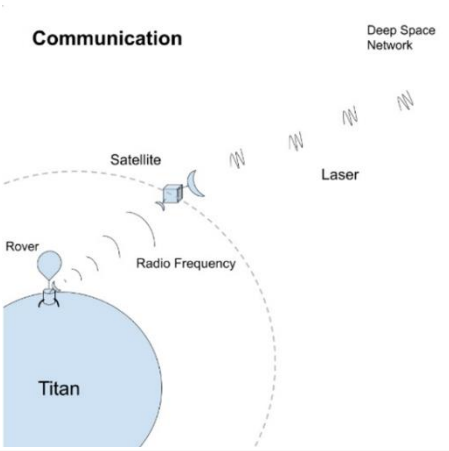
Quote:

Working on the instrumentation sub-team means that you will be involved in converting scientific questions into actual instruments! This team is in charge of conceptualizing, designing, converting requirements and selecting specific components to fulfil the science requirements. If you like constantly learning new things, new challenges, and building and testing instruments, this is the sub-team for you.

#Electronics, #Data, #Instrumentation

Communication

The Communication sub-team is in charge of the data exchange between the rover and a receiver. They have to choose a communication technology and to define all requirements associated with their choice. They have to determine the frequency range, the data budget, and how often the rover will be able to communicate. They will also work on the interfaces between the onboard computer and the communication system. Finally, they have to find or design all components of their systems such as the transceivers or the antenna.



#Electronics, #Data, #Communication #RadioFrequency #LinkBudget

Quote:

Communication in space missions is key to success, it is necessary to be able to send and receive information such as commands, rover status, data collected, location, among others. People who work in the communication subgroup are people who love electronics and especially telemetry, who love research, challenge themselves and acquire new knowledge in data transmission technology. Develop the communication systems for this project is a big challenge since telemetry is a huge area of knowledge.

ADMINSITRATIVE TEAM

The Admins

The Advanced Program is a unique opportunity to test your entrepreneurship skills in an intercultural aerospace environment. Imagine being at the top of NASA, ESA, or JAXA and having to deal with people, partners, the industry, and all kinds of challenges. Polaris's admins do something similar in search of building one space!

As an admin you will work with four different sectors for the Oct-21' – Sept-22' period. Supervised by AREX, you will work with other admins to lead the entire program. You will be periodically assigned a team to monitor. You will meet with its director and heads (one per sub team) on a regular basis to understand the difficulties they face and how they are holding up. Finally, as an admin, you will have to be the face of the project for many of our partners in both the academy and the industry.

The Head of Informatics

Part of the administrative team, the Head of Informatics manages the project's GitHub repository and enforces programming and documentation standards for any software produced. To do this, the HOI acts as the link between each team's Programming Coordinator and approves software produced by members of the project.

Quote:

Being an admin of this project allows me to learn about international project management. This is the best opportunity I could have ever found as a student. Today, I'm part of a 7-person-team leading 99 students from all over the world to work on a space project; a dream came true. Working on my passion while learning how to get along with other cultures and organizing a lot of events all over the world is the best school!

#Leadership, #Entrepreneurship, #Innovation

HOSTING & TRAVEL

Hosting Sub-team

The Hosting sub-team is in charge of finding suitable host families for the students travelling abroad. It is important to note that next year students will be travelling to Costa Rica during the summer and to France during the fall for the International Astronautical Congress. As such, families must be found in both countries. The sub-team will also be responsible of matching students and families according to affinities and location. Finally, this sub-team should look for partners that could help find host families.

Quote:

The Hosting sub-team is of great importance to the project, because we are in charge of making participation for Action Stages possible for everyone who wants it! Together with the Travel sub-team, we take care of forming alliances with different organizations and families in the country that guarantee an optimal stay for students. Students will be warmly welcomed by families throughout the central area of the country!

#HostFamilies, #Exchange, #Matches

Travel Sub-team missions

The Travel sub-team is in charge of everything the students need from the beginning of the year to their arrival in their host country. They will have to create and maintain a database about the students travelling and planning to travel. The sub-team can then work on organizing travel groups for the students, allowing to buy the plane tickets in bulk and reduce the price for the individual students. The Travel sub-team will also be responsible for finding internships in the host countries for all students. They are the one that will contact companies.

Quote:

Three words for the Travel team: Forecast, Adaptability and Sociability. We need you to be able to plan thing that fulfill the different needs of everyone. You will also need to have B-plan and reactivity for all the unknowns that may happen. This demands to react quickly and always try to find a solution so everyone will remember their travel! Lastly, you will have to negotiate with peoples to find the best deals!

#Trips, #Internships, #Activitie

C3

Content

Are you a creative person, passionate about space and looking for a new challenge? Join the Content sub-team from C^3! We are looking for creators and designers to help us share what Polaris is about and what we are doing. Your job will be to create posts, videos, and animations to share on our social medias and website. If you are a graphic designer, an audiovisual creator, an animator, or a web editor by trade or by passion, we are waiting for you!

Quote:

Our goal is to create, coordinate, and edit quality content following a marketing strategy to inform people about the stages of the project and attract potential investors. We must have direct

communication within the sub-team and with all other teams so that our content is accurate and up to date. To work in the communication sub-team, you need to love working with social medias and you have to like marketing strategies related to these social medias.

#GraphicDesigners, #audiovisualscreators, #animators, #webeditors, #socialmediamanager, #posts, #video, #animations, #webpages, #creative

Community

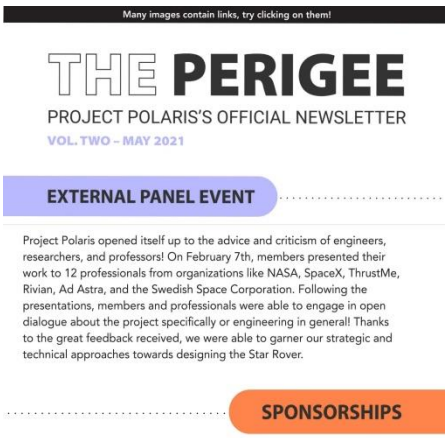
The aim of the community sub-team is to help create a Polaris team spirit and make sure everyone is having a great time working on the project? Then the Community sub-team from C^3 is made for you! As a member of the Community sub-team, you will be at the core of the organization of our social events and all teambuilding activities. We have already many ideas from this year that we want to continue, and we hope to find many more with your help!

Quote:

In the community sub-team, we take care of the project general mood. We want everyone to feel at ease and help each team and member to work in the best environment possible. Here we mainly create events to bond with each other and to make everyone feel included in the project. Any idea is a good one, if you are full of ideas, curious, motivated and you want to create event you'll be welcomed. If we should describe this sub-team in few words, it will be communication, fun, hard work and imagination.

#SocialEvents, #teambuilding, #discord, #proactive

Communication



The aim of the communication sub-team is to share the work from Project Polaris all over the world. If you love communication, we have a job for you! The Communication sub-team from C^3 is all about sharing what is going in inside of the project with the rest of the world! We are looking for people who like having their voices heard, whether it be written on our blog, our newsletter, or our social media, or even aloud on our brand-new podcast! Are you ready to share Polaris with the world?

Quote:

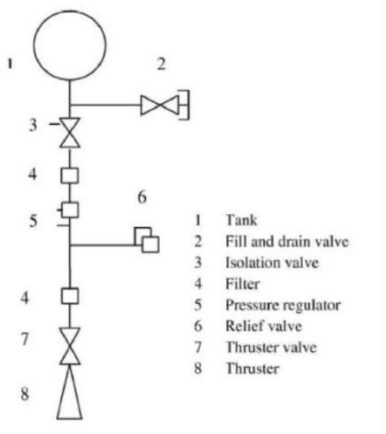
On the communication team, our goal is to inform others about what's going on in Project Polaris. We do this in several different ways, whether it's through blogs, newsletters, or podcasts. We try our best to be creative with our ideas and capture the attention of those both involved and not involved with Project Polaris. We like to be open-minded with ideas and accept everyone, regardless of their background. To be a part of this team you need to love communicating with others and spreading messages.

#Podcasters, #writers, #blog, #captions, #newsletter

PROPULSION

Feed System Sub-Team

The aims of the Feed System sub-team are to define all the requirements and create the feeding system of the Propulsion team to ensure a perfect flow control. They have to define all the constraints for the valves and the pipes. Moreover, they have to design the totality of the components to fulfill the requirements. They will have to work with simulation software to ensure a proper integration of all the systems. The Feed System sub-team is recommended for those who likes propulsion and does not have high space propulsion knowledge.



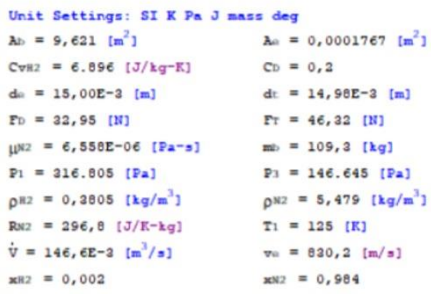
Quote:

To be a part of the Feed System Sub-team, you need to love propulsion and know about cold gas thrusters. The feed system needs to be tested, designed, and built. This includes CAD-Modelling, scientific paper research, programming (for the valves and sensors) and practical building of the system. Some possible tasks might also include fluid-dynamics calculations, stress-calculations for the tank or similar. In this team you need a lot of knowledge on these subjects, and on CFD.

#FeedSystem #Propulsion #FlowControl #Valves #Pipes #Software&Simulation

Thrusters

The aims of the Thrusters sub-team are to finish the definition of all the requirements and create the nozzle design of the Propulsion team. They have to create proper CFD simulation to determine the flow in the trust chamber and nozzle. They also have to improve the precision of the trust calculation and simulation. This sub-team will also have to choose the manufacturing method of the chamber and nozzle. This sub-team is recommended for those who has high space propulsion or computation knowledge.



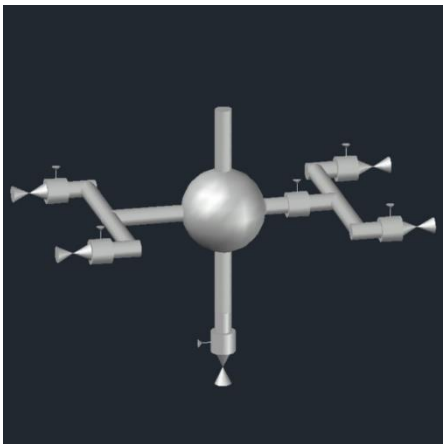
Quote:

The sub-team will be responsible for designing each thruster according to thrust simulation results. The idea is to use isentropic and incompressible flow equations to calculate the volume of the chamber, as well as the shape of the thruster based on the thrust and velocity needed. This means that the members of this team will need to familiarize themselves with different tools such as the method of characteristics or CFD simulations.

#Thrusters #Propulsion #Nozzle

Impulse Control

The aim of the Impulse Control sub-team is to integrate the thrusters into the rover. They will have to arrange the thrusters and define the characteristics of the propulsion system (e.g., define how many thrusters should be used). This sub-team will define the overall layout of the propulsion system and work in cohesion with the other two teams as well as the other team such as the Structure team. The Feed System sub-team is recommended for those who likes propulsion with medium or high space propulsion knowledge.



Quote:

The members of this sub-team will be in charge of creating the attitude control system, which allows the rover to successfully change its direction and even remains

still if the mission objective requires so, as well as to sort possible obstacles that the rover could be encountering such as rocks or small dunes. To achieve this objective, the team will need to decide where the thrusters need to be located and how many of them, as well as if they are stationary or able to rotate.

#ImpulseControl #Thruster #PropulsionSystem

SYSTEMS ENGINEERING

Connectivity

The aim of the Connectivity sub-team is to ensure all the teams are working in a cohesive way. They should create and manage a centralized database of decisions, technical data and hypothesis. Moreover, they will be in charge of the standardization of the naming convention and organization of the files within Teams and all the other applications we may use. Finally, the Connectivity team will act as a "referee" between the technical teams to ensure a correct integration of all the rover's systems. This team is recommended for those who likes organization and communication.

Quote:
The Connectivity sub-team goal is to make sure everyone in the projects progresses in a coherent and cohesive way. They will have to ensure the links between people and their work. For that they will create and manage a centralized database to identify any potential conflict between the work of the other teams. They will make sure that the different constraints of each team and of the project in general are respected. This sub-team will be working very closely with the logistics and risks management sub-team as their work is a very important part in the conflict's evaluation.
#DataBase #SystemsEngineering #Integration

Logistic & Risk Management

The aims of the Logistics & Risk Management team are to manage all the suppliers and the out-of-project manufacturing as well as the transport of the rover. They will also manage the disposal of the materials and the physical integration of the rover in the different laboratories. They are in charge of defining the risks of the project and managing them. Finally, they should ensure the safety of the members working with the physical components, as such, they will be in charge of all the final verifications of the rover's systems. This team is recommended for person liking external communication and safety measures.

Quote:
“The Logistic and Risk Management sub-team takes over the task of analyzing each technical decision to know the risk that could have for the rest of the rover. Hence, the people on this sub-team will work together with all the technical teams and sub-teams to achieve good integration. Furthermore, this sub-team is in charge to managing all the logistic challenges when the manufacturing and assembly begin in the labs. The above, to achieve a good physical integration between the different rover's systems.”

#RiskManagement #Logistic #RoverSafty

Mission Profile:

The aim of the Mission Profile sub-team is to finish the definition of the scientific objectives of the rover. They will define all the characteristics of the mission such as the objectives, the location, the altitude, etc.… This team will be in charge of collecting data for each team to sort out common objectives. They will also be in charge of writing and compiling all the documentation of the project into a complete scientific paper. This team is recommended for person seeking to oversee the project and works with every team.

The mission profile sub-team is in charge to research to define the scientific objective for the mission according to Titan’s conditions and the capabilities of the different systems and subsystems of the rover. The people of this sub-team will explore different interesting features of Titan and how they could be studied in our mission. Furthermore, this sub-team works together with other teams to define important aspects of the mission such the duration, and rover operations.

#ScientificObjectives #CollectingData #MissionProfile

FINANCIAL

Funding and accounting

The aims of the Funding & Accounting sub-team are to manage the crowdfunding website and the rewards. They will also have to find more funds for the project (sponsors, merchandising, etc.). Finally, this sub-team will also be responsible of the accounting of the project. This team is recommended for person liking external communication and numbers. Moreover, the members should be creative in their way to find more fund. There is no requirement of technical knowledge.

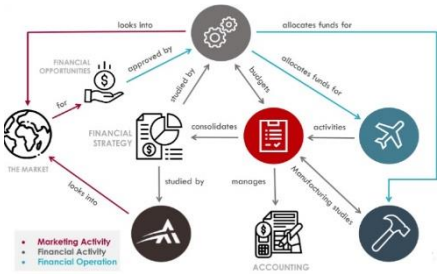
Quote:

Working in the funding and accounting sub-team is incredible and a very important part of the project because we work with all the teams that need to buy parts and the process is incredible. We also track the crowdfunding campaign and every time you see how the backers grow it is an incredible feeling because we are closer to the goal!
Being part of this sub-team is a unique opportunity in life that you cannot miss, you will learn a lot!

#Funding #accounting #financial #crowdfunding

Budgeting:

The aims of the Budgeting sub-team are to establish a proper project budget. They will have to work with all the teams create and update the proper throughout the year. They will also be responsible with the administrative team of approving the financial requests from the different teams. This team is recommended for person liking internal communication, numbers, and organization. Some knowledge in the technical field will be appreciated.



Quote:

Working on the Polaris budget is a crucial responsibility because we have to make sure that donated money will be spent in the best possible way. When we have to look for the price of a component, we have to look at every supplier to find the best option that fits our needs. We always have to consider if we really need to buy something or if we could build it ourselves at a better price without losing quality.

#Budgeting #Financial #ProjectBudget

Admin

The Admin team is in charge of the whole program and is responsible for all the different sub-teams. Supervised by AREX. The admin team works to lead the entire program, they act as the board of directors of Project Polaris. Each admin is assigned a team to monitor and has to meet with its heads and director on a regular basis to ensure their progression. The admin team needs to keep an eye on every team. Finally, they also have to represent the project in front of current and future partners both in the academy and the industry.

Quote:

Being an admin of this project allows me to learn about international project management. This is the best opportunity I could have ever found as a student. Today, I'm part of a 7-person-team leading 99 students from all over the world to work on a space project; a dream came true. Working on my passion while learning how to get along with other cultures and organizing a lot of events all over the world is the best school! As an admin you need leadership and a love for management.

#Management, #Leadership, #Monitoring

Director

A “Director” is the unique chief of one team. They are chosen by the Administrative Team and should report to them on a regular basis. They should ensure the smooth working and cohesion of their team. Thus, they will be in charge of keeping the deadline and resolving any issues that may occur in their team. They will have a weekly or biweekly meeting with all the directors to keep track of other teams ‘s work and ensure all team’s choices are compatible. The “Director” is in charge of the good documentation of each decision. For those looking for responsibilities, here is your job!

#Teamwork #Chief #cohesion #leadership

Head

A “Head” is the unique chief of one sub-team. They are chosen by the Administrative team and the Director of the concerned team. They are in charge of leading their sub-team and should ensure the smooth working of their members. They will be in charge of reporting all the progress to their Director on regular basis. They should work with the other Heads of the team to create coherent and compatible systems. This position is recommended for those seeking some responsibilities while keeping a technical work.

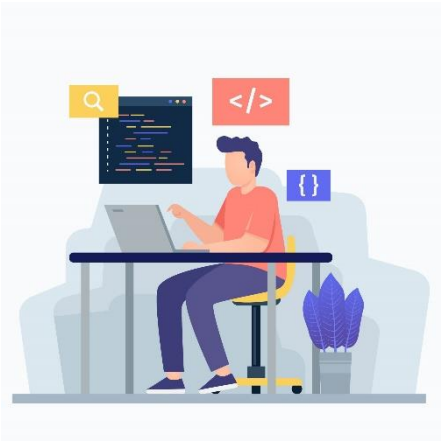
#Teamwork #Chief #cohesion #leadership

Programming Coordinator

A “Programming Coordinator” is in charge of all the codes and simulation inside their team. There is only one Programming Coordinator per team. They work with the Director of their team and reports to the Head of Informatics. They are in charge of creating coherent codes and simulation inside their team while respecting the same programming standards. They are also in charge of keeping track of the programming capacities of the members of their team to assign efficiently the workload. This position is recommended for those with medium or high computing knowledge seeking responsibilities.

#Teamwork #Chief #cohesion #leadership #Programming #Software

Head of Informatics



The “Head of Informatics” will be responsible of all the codes and simulations of the project. They will be in charge of updating the GitHub and verifying that all the codes respect the same programming standards. Therefore, they will conduct the last check. They will also be in charge of managing the simulations and their documentations, more specifically they will lead the creation of the full mission simulation. Finally, the “Head of Informatics” will be responsible of the good communication between the different “Programming Coordinators” and divide them in the different teams.

#Teamwork #Chief #cohesion #leadership #Programming #Software