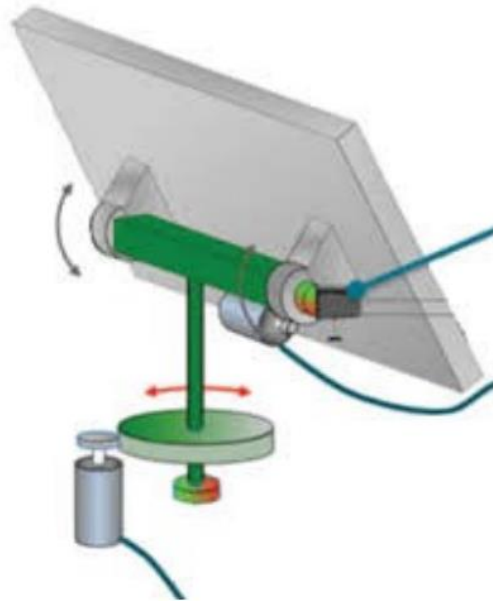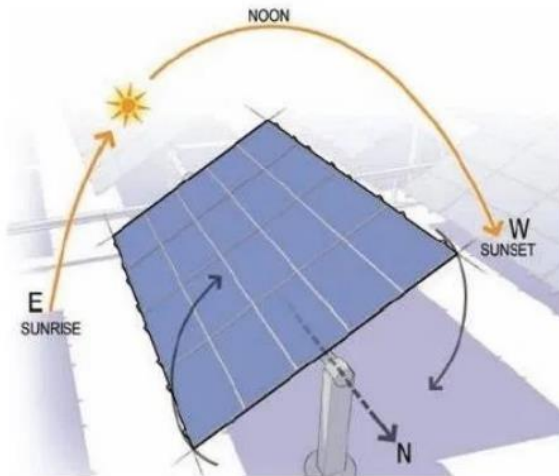# SUN-TRACKING DEVICE

1.- OBJECTIVES

Main objectives:

· Learning which processes are needed in order to develop this project.

· Design a mechanism able to move the solar panel.

· Study and select which actuators are needed from calculations and design.

· Studying the state of the art of this project.

· Select the appropriate material in order to fit the mechanical and electronical specifications of our project.

· Craft the mechanism

· Develop a software able to track the sun depending on our time and global position.

· Do not exceed the budget.

Secondary objectives:

· Study which sensors are needed for track where light is

· Develop a software able to track where light is.

· ((Store the energy captured from the solar panel.))

2.- TASKS LEADERS

Leader: Nin Codinachs

Co-leader: Xavier Micó

Mechanics Leader: Nico Scipione and Nin Codinachs

Electronics Leader: Xavier Micó and Xavier Platas

Software Leader: Xavier Platas and Nico Scipione

3.- MANAGEMENT TOOL

As a management tool, it was decided to use GitLab which is a website that offers people to create project which contains many tools and functions. The advantage is that more than one member can contribute to the same project. That's why we decided to use this web site. Also, it's free for all users.

4.- SCOPE

Our Scope on this project, is to design and craft a mechanism, that depending on the position of the sun it will track all the sun ((path)). This project can be set up in places where the sun is cleared all day. Places like farms which can use it to feed the animals fixing some hours a day. Or a business which may need energy the whole day like a parking meter, etc. Always in small mechanisms which don't need a lot of energy.

Our project can focus our work on three parts, mechanics, electronic and programming. The mechanic team, formed by Nico and Nin will have to study about which mechanism in order to complete our objectives, also study about the forces which is submitted. The electronics team formed by Micó and Xavier will need to study how can we receive and how to process the information given from the photoelectric diodes. Finally, the software team, formed by Xavier and Nico will have to process the information given by the sensors and send this information to the motors to position the solar panel to the optimized situation.
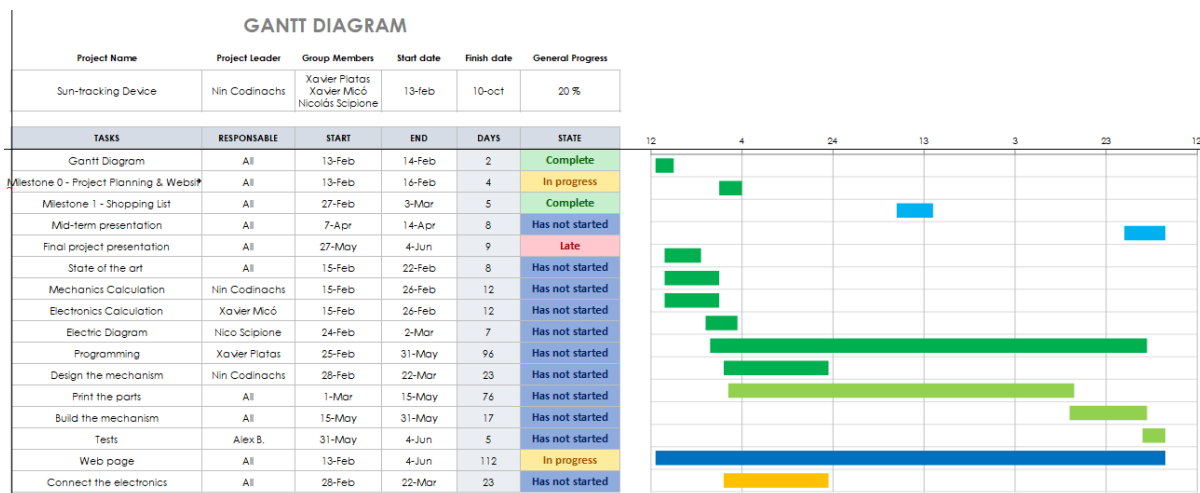
5.- WORK PLAN

On this project, we will spend the first weeks, searching information related to our project. About how can this project be used, thinking ways so can the sun be tracked, etc. Then we well split the teams defined previously depending on the skills of each member of the group.

As we already decided who is going to be the leader on each group, that is going to be the one who is going to make sure his team is working well. That doesn't mean we don't care about the other teams, because to keep improving the project for sure we will need information and data about other teams.

5.1.- Gantt Diagram

We have divided

GANTT DIAGRAM

Project Name	Project Leader	Group Members	Start date	Finish date	General Progress
Sun-tracking Device	Nin Codinachs	Xavier Platas Xavier Micó Nicolás Scipione	13-feb	10-oct	20 %

TASKS	RESPONSABLE	START	END	DAYS	STATE
Gantt Diagram	All	13-Feb	14-Feb	2	Complete
Milestone 0 - Project Planning & Website	All	13-Feb	16-Feb	4	In progress
Milestone 1 - Shopping List	All	27-Feb	3-Mar	5	Complete
Mid-term presentation	All	7-Apr	14-Apr	8	Has not started
Final project presentation	All	27-May	4-Jun	9	Late
State of the art	All	15-Feb	22-Feb	8	Has not started
Mechanics Calculation	Nin Codinachs	15-Feb	26-Feb	12	Has not started
Electronics Calculation	Xavier Micó	15-Feb	26-Feb	12	Has not started
Electric Diagram	Nico Scipione	24-Feb	2-Mar	7	Has not started
Programming	Xavier Platas	25-Feb	31-May	96	Has not started
Design the mechanism	Nin Codinachs	28-Feb	22-Mar	23	Has not started
Print the parts	All	1-Mar	15-May	76	Has not started
Build the mechanism	All	15-May	31-May	17	Has not started
Tests	Alex B.	31-May	4-Jun	5	Has not started
Web page	All	13-Feb	4-Jun	112	In progress
Connect the electronics	All	28-Feb	22-Mar	23	Has not started

5.2.- Communication of weekly progress

Every week we are going to have a group meeting.

In this meeting the topics will be the tasks for the week, to inform about the issues in the development of this project and to ask for help if it is needed.

Also, the leader and the Co-leader of the team will have to keep teachers informed about how the project is getting improved, also ask them for a meeting so we can ask for any doubts.

5.3.- Communication of job stoppers

We are going to communicate each other through WhatsApp, because is the fastest way.

If we must inform to the teachers, we will use the e-mail, or the management tool.

6. WEB SITE

In order to see the progress of our project, we will create a web page which it will continuously uploading information and all information we got from other sources which helped us so set up the sun-tracking. There's going to be a section in which we will explain who we are and how we split the group in order to work everyone to the section he was doing better.

Also, there will be a part of the cost of the project, for people who may wanted to create one.

After checking which ways could we do the web site, we found out that one of the most used webpages is WIX, so we started by doing a test, and after start building the fundamentals of the web site.

7.- COSTS

On the mechanical part the main idea is to use servomotors, strips and some other small pieces to position the solar panel.

On the electronical part, some photoelectric diodes without case for detect where is the sun in each moment.

On the control part, one micro controller based in Arduino to receive the information of sensors (photoelectric diodes) and send information to servomotors for the optimized position in case of do the sun tracking with this method.

If we do the sun tracking depending on our time and global position, we don't need sensors. We develop an Arduino code based on track the sun depending on our global position and time.

8.- POSSIBLE PROBLEMS AND SOLUTIONS

As the project takes shape and all the ideas are being set, it starts to be possible to detect some of the future possible external problems the team might have to face.

Since the project is a solar panel, it must be placed in the outside making the wind and the rain, two different external factors to have into consideration since them both can be harmful for the mechanism. The solution to that, might be to build a protective case with would be used to cover the panel, that can be also used to store the mechanism at night.

Another possible problem might be the mechanism being stuck due to a small branch or stone. One possible solution could be to set a signal to let the user know something is wrong with the movement, and to stop the movement before the motors are overloaded.

If the photodiodes are finally implemented, it might be a good idea to think about some problems they might have.

If one of the photodiodes is covered for whatever reason or it malfunctions, it could be great to let the user know about it and try to use the remaining one as the reference. To set the now the positions, the barrier between the diodes will have to block the light totally and slowly correct the positions until the photodiode receives the full light again and generates the maximum power.

9.- REFERENCES

The references you find at this point help us to develop our mechanism to track the sun and do a well web page.

First three web pages are a general idea about how to develop a mechanism that tracks de sun with LDR (Light Dependant Resistor) sensors, a servomotor and different kinds of microcontrollers.

Next two web pages are an idea about how to develop our web page and the tool that we decided to use to develop this web page that will contains our project.

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