Process Raport

EE4 : Elektromechanical engineering

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1. Designing the Small Solar Vehicle (SSV)

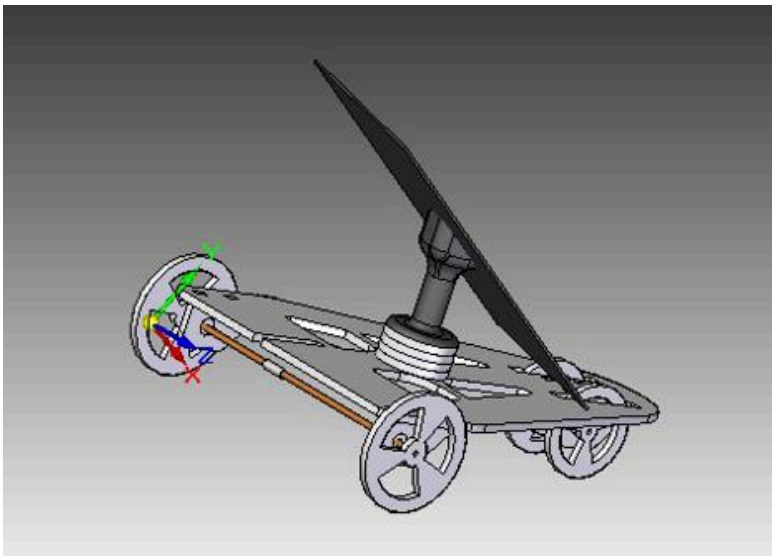
First we started with establishing basic rules and methods for cooperation and communication (rules as defined in the cooperation contract). We made the documents for the first deadline and then we encountered our first problem: we had made all the documents in Dutch but as our coach didn't understand Dutch we had to rewrite them in English.
In the first meeting with our coach we got feedback about the gantt chart and the plan of approach. We also got our DC motor and the solar panel and were able to determine the diode factor.
In week 3 we got some more information during the seminar and the work that was pending became clearer. The gear ratio, aerodynamics,… has to be calculated. We met every week and made a meeting report each time (see documents).
In week 4 we encountered some problems, we had to make some choices about the materials, a system to stay on the rail, wheel size,… We divided the tasks and started working. In week 5 we had a basic view on what the problem exactly was and what we had to do to solve it. We chose plexiglass for the wheels and the baseplate. We will fix the solar panel on the car with a ball and socket joint. Our baseplate is a triangle with some parts cut out to save weight. We bought 4 bearings and an axis of 1 meter and still have to attach it to the car. We also simulated in matlab and simulink, did the calculations for the gear ratio and the numerical calculations.
Now that we did our calculations and met with deadline 2 we could start focussing on building the car. The diameter of the axe was too small for the gear. To solve this we made small rings in fablab that fitted over our axe and in our gear, this way it did work. Secondly we knew which gears we wanted, now we just had to get them. This last part has proven itself harder then we expected. But we managed to order them and get them delivered in time. We used a rear-view mirror from a car to place our solar panel on, this way we had a cheap rotating piece.
Now that we had most of our materials we started assembling the car, it took us a while to decide which parts we would assemble first so that everything was perfectly in place. We glued most parts together (everything apart from pieces that have to rotate). Now, we had our car.
The next challenge we got was the attachment to the rail, after testing it was obvious that we had quite a lot of friction with our system, we also noticed that our car drives quite straight. So we got rid of the old system.
The tests on the track were really good, we completed the track in less than 4 seconds. Ofcourse we had a battery of 9 volts so with the solar panel it will be slower. But by our simple design we had no hesitation that everything was in good working order.

2. Description of the car at the moment

The car has:

- plexiglass wheels, baseplate and attachments for the other parts
- all non-moving parts are glued together
- the solar panel stands on a rear-view mirror so that it can rotate
- the front wheels will, if needed, keep us on the rail
- metal bearings and axe with little ring connectors to the gear

Drawing of the car:



3. Documents

Cooporation contract:
http://commons.wikimedia.org/wiki/File%3ASamenwerkingscontract_-_Solar_Cell_Racing_(210).pdf
Gantt chart:
http://www.2shared.com/file/aAo-Op25/Gant_Chart_-_Solar_Cell_Racing.html
Work breakdown structure:
http://en.wikiversity.org/w/index.php?title=File:Work_Breakdown_Structure_-_Solar_Cell_Racing_(210)_-_eng.pdf&page=1
Plan of approach:
http://en.wikiversity.org/w/index.php?title=File:PlanOfApproach.pdf&page=1
Meeting reports:
1: http://commons.wikimedia.org/wiki/File%3AMeeting_1.pdf
2: http://commons.wikimedia.org/wiki/File%3AMeeting_2.pdf
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