View results

Respondent

3 BILL Waltz

27:34
Time to complete

1. Date of this semester progress report submission *

12/19/2024

2. Name of project exactly as it was listed in your award letter *

Part 6 Illini Solar Car

3. Date of original award letter *

12/4/2023

4. Date of expiration listed on award letter (or on scope change approval if more recent) *

12/3/2025

5. How much was your award (i.e., original award plus any approved budget increases)? *

$62,000

6. How much of your award has been spent to date (in dollars)? *

$62,000

7. Date of forecasted project completion *

July 2025

8. Have you submitted one or more semester progress reports previously? *

- ○ YES
- ◉ NO

9. Describe, in detail, what has been completed on the project since the last semester progress report (or since the project commenced if you have not yet submitted a semester progress report)? *

Development on numerous Calypso systems to both repair and improve has been undertaken during the semester. The three largest projects underway are the battery enclosure design, rear suspension design, and battery sensor testing and cycling. Around 20 or so more minor projects are underway on less critical car systems as well. The battery enclosure involves a full redesign of the system to incorporate a different battery, including a redesign of ventilation systems, structural components, and battery mounting. Part of the manufacturing will include the creation of new fiberglass components. The rear suspension needed fixes for the shock mount and caliper-trailing arm mount, as we discovered slight issues with both. Battery sensors have had extensive testing to prove their reliability and functionality and ensure their validity for the race. Numerous other systems have been worked on, including fairing door mounting, canopy hinging, and braking systems.

10. Describe, in detail, the project's challenges/obstacles since your last semester progress report (or since the project commenced if you have not yet submitted a semester progress report)? *

One of our first major challenges was fixing the braking system. The challenging design of the brake pedal and a loose insert in the belly pan of the car resulted in a great challenge to remove the braking assembly from the monocoque of the car. To fully remove the braking system, we had to fully drain the brake system, remove several components from the assembly, and remove the master cylinder assembly to take a look at issues experienced during the race.
Another challenge is a lack of a proper datum to reference mounting positions for the top shell hinge redesign. Due to the lack of datum we've needed to develop the hinge as its own system and then create a jig to accurately position the hinge. This makes locating the potted inserts required to mount the hinge through carbon fiber critical.
Finally, the last major obstacle we've experienced is incorporating a different battery assembly into the existing car. The battery assembly comes as a unit so we've needed to accommodate the design to the existing area designated for the battery. As a result the packaging of the battery has been a major challenge and has required some sacrifices and challenging fixes to incorporate.

11. Describe, in detail, the project's successes since your last semester progress report (or since the project commenced if you have not yet submitted a semester progress report)? *

For our third-generation car, Calypso, we have been working on upgrading and refining the car for the upcoming race this summer. The main projects are updating the brake system, making composite repairs, replacing the battery pack, and creating a new battery box. As far as brakes, we have swapped out the master cylinders and are working on attaching the brakes to the top of the driver compartment. We have to remove the brakes non-destructively, removing the cylinders, putting in new ones, and attaching them to the top to make serving the brake more accessible.
During the race last summer, we had many composite parts fail or get damaged. The main were the chassis panels that held the top shell hinge. These panels sheared where the steel bolts were attached, creating new chassis panels. This led to our composite lead creating fiberglass sandwich panels. The process was long and intensive. The result is a major success of the project. Over 25 members helped work on layups to create parts for the team. The other big success of the teams was creating a new battery box for Calypso. This was a big endeavor for the team, as we created a design for a new pack in one semester. This new battery pack will allow the team to race Calypso for another race. It is one of the most important projects of the semester and the fact that we were able to make it in such short notice is a major success. On the electrical side, we have made many successes to further improve the electrical system in the car. We have implemented advanced techniques on charged curve characteristics and modeling for the battery, to accurately determine state of charge. We have also made many improvements to our current printed circuits boards.
From our race this summer, we have gathered a lot of testing data in order to further optimize the way we race our solar car and minimize the energy used. Our team has started working on data analysis projects to determine the various energy losses in the solar car in order to improve on them in our future endeavours. We have had great success with building our digital twin model of the solar car to test out different strategies for more energy efficient methods to race the solar car with.

12. Did your project have any changes to its team that SSC should know about (e.g., project lead, faculty/staff advisor, departmental financial contact)? *

NOTE: If yes, please complete the SSC Project Contact Information Change Form located at this link: https://forms.office.com/r/uBjx9nmNpG

- ○ YES
- ◉ NO

13. Complete and upload the semester financial documentation for your project. You should reflect all expenditures since your last semester project report. We strongly suggest that you also upload supporting financial documentation from Banner for your award CFOP. NOTE: When your project is completed and/or expired (whichever comes first), any remaining project funds will be transferred back to the SSC.

    https://studentengagement.illinois.edu/sites/default/files/2024-09/SSC-Budget-Timeline-SEMESTER-PROGRESS-REPORT-template.xlsx
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    Part 6 Illini Solar Car Budget Semester Repor_BILL Waltz.pdf

    Banner_BILL Waltz.pdf

14. (OPTIONAL FOR SEMESTER REPORT) Upload project marketing and/or media not previously submitted in semester progress reports.

    NOTE: Project marketing and/or media must include SSC's logo and/or a statement of which fee(s) funded the project.

    Part6Media_BILL Waltz.pdf

    battery sponsors 2_BILL Waltz.jpg