

# Implementation of a New, Innovative Product Design Software for Senior Projects

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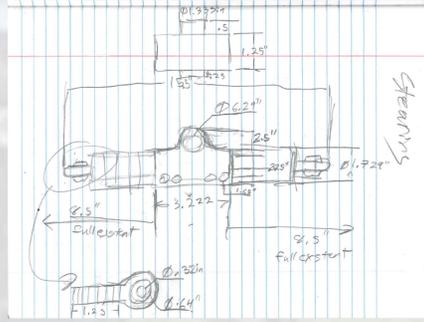
## Problem Statement

Many Oregon Tech MMET students participate in either the Baja SAE or Formula SAE competition for their year-long Senior Projects. These students are also supported by underclassmen from both the MMET Department and from other departments such as Management, EERE and CSET. Each team will spend up to 10,000+ hours during the academic year designing, building, testing, creating marketing studies, and finally racing their finished vehicle. The design of these vehicles is complicated, involves many different components, and is constantly being revised to meet new rules and team goals. The rules for each competition vary from 116 – 175 pages. Keeping track of the vehicle design, making sure the vehicles meet the rules, and documenting this information for future teams was proving to be an ever-increasing challenge.



## Previous Student Documentation

Previously students documented their ideas in bound notebooks and in design reports. With hundreds of parts in the manufacture of the Baja SAE and Formula SAE cars it was becoming increasingly difficult to manage all of the design ideas.

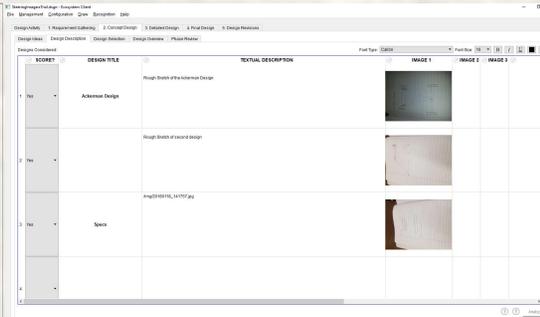


## Ecosystem for Design Assessment and Verification Software

The Ecosystem for Design Assessment and Verification Software was developed by Imagers LLC. This software guides designers through the design process in a structured fashion, supports the learning of proper design techniques, and helps eliminate design oversights. Other benefits of using this software include:

- supports learning outcomes derived from the ABET learning objectives for engineering design;
- offers automatic & objective scoring of design concepts relative to the design requirements;
- provides multiple features aimed at facilitating communications within design teams;
- facilitates project and part management, along with the project schedule;
- serves as an electronic notebook of the comprehensive design history;

See <http://www.imagers.com/> to request a trial version of this software.



## 2017 - 2018 Imagers Beta Testing

Oregon Tech Racing (OTR) was one of several university racing teams that Beta tested the Imagers software during the 2017 – 2017 Competition season.

Some of the main reasons why OTR adopted the Imagers Software were to:

- Help guide the students through the design process. Both the Baja SAE and Formula SAE competitions place a high importance on students following all of the necessary steps of the design process.
- Help to document the work that the students did so that future teams will both have a copy of the part designs, plus all of the background on why the particular design was used.
- Serve as a presentation platform at the competitions during the Design Judging. For the 2018 Baja SAE competition the team was awarded extra points for using the Imagers software; plus it helped organize their material during the design judging, which also earned them additional points.
- To help with component integration. With many different vehicle systems involved (engine, frame, suspension, drive train, braking, steering, ergonomics, electrical, etc; each with their own Imagers file), a new System Integration group was formed. This group was responsible for making sure that all of the vehicle systems worked together; and each system having their own Imagers model helped make this successful.

## Future Plans

For the 2018 – 2019 academic year it is planned to continue using the Imagers software. To increase the effectiveness of this software the following actions will be taken:

- The software will be used starting at the beginning of Fall 2018 term. During the previous year it was not fully implemented until later in the year.
- An example design is being created during the summer of 2018; it is planned to use this example design to give weekly lectures of the various features of this software during the academic year. Students will be required to update their files weekly, which will hopefully help them adhere to their project's schedule.
- The design software will be used to create posters for each major component of the vehicles; these posters will be brought to competition and shown to the design judges.

## References

- Ecosystem for Design Assessment and Verification 1.12 User Manual (Designer Version) <  
<http://www.imagers.com/UserManual-Ecosystem-1.12.pdf>>  
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- Ulrich, K.T. and Eppinger, S.D. *Product Design and Development*, 5<sup>th</sup> Edition, McGraw-Hill, 2012.
- 2017 – 2018 Formula SAE Rules <  
<https://www.fsaonline.com/content/2017-18%20FSAE%20Rules%209.2.16a.pdf>>. Accessed 2018 Aug 13.
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## Acknowledgements

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