

Company Information

Company Name	<i>US Legend Cars International</i>	Date Submitted	<i>3/16/2021</i>
Project Title	<i>Research and Design for Improved Engine Performance (USLCI ENGINE)</i>	Planned Starting Semester	<i>Fall 2021</i>

Senior Design Project Description

Personnel

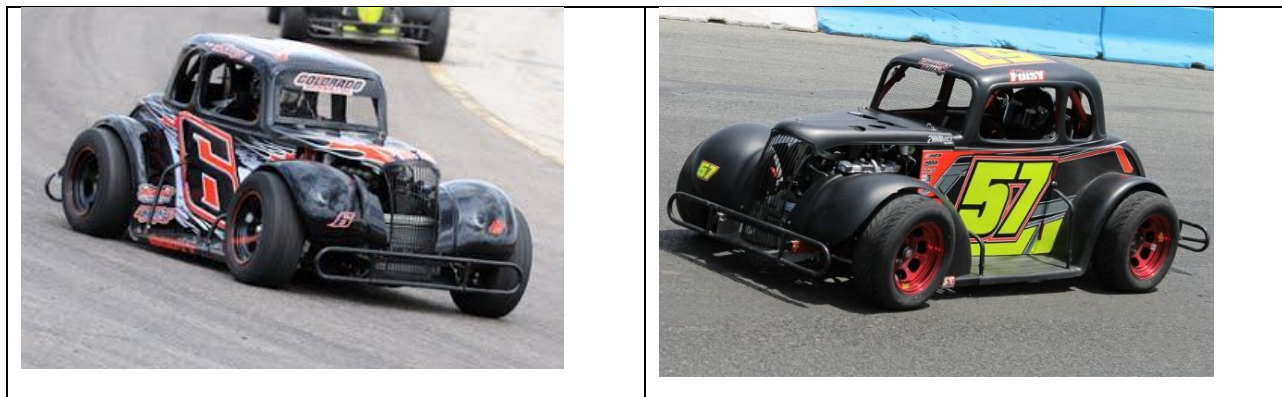
Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	4	Electrical	
Computer		Systems	
Other ()			

Company and Project Overview:

The Legend Car, Bandolero Car and Thunder Roadster are manufactured by U.S. Legend Cars International and internationally sanctioned by INEX to provide a fun and affordable racing opportunity in which anyone can compete. This series is an attempt to fight the high costs involved in racing, and the rules are strictly enforced to ensure fair competition and cost control.



Located in Harrisburg, N.C., U.S. Legend Cars is a subsidiary of Speedway Motorsports, LLC., a leading marketer and promoter of motorsports entertainment in the United States. USLCI facility features 68,000 square foot manufacturing facility in Harrisburg, N.C., capable of producing as

many as 40 cars a month. USLCI has manufactured more than 9,000 race cars since 1992 and is the largest manufacturer of race cars in the world.

History

In 1992, the officials at Charlotte Motor Speedway began noticing a great need all across North America. This need was very simple: an affordable racecar with a unique design that requires little maintenance time and cost. This was brought about because many short tracks have allowed the cost of their competing racecars to escalate out of control with "loose" rules.

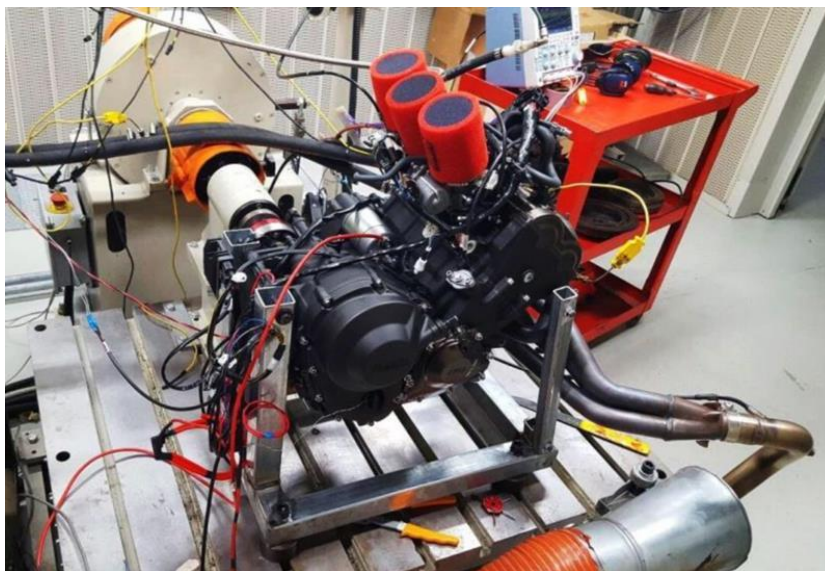
Car counts began to drop drastically, and at that moment, track officials estimate that 30% to 40% of the racecars in North America were not in competition because of cost. After further research, track officials noticed that when car costs went over \$20,000, participation dwindled. Tracks featuring cars in the \$10,000 to \$15,000 price range with low maintenance expenses (cost of racing a car per race) had significantly increased car counts.

As a result of this research, in January 1992, U.S. Legend Cars International was launched and so began a highly-accelerated R&D program of a new race car that would be affordable, race on smaller tracks and have low maintenance costs.

It was then in April of 1992 that the first Legend Car was unveiled at the then Lowe's Motor Speedway (now Charlotte Motor Speedway). The concept of creating a fun and affordable "spec" class of racing for anyone to participate in was born.

Project Requirements:

The Legend car uses a Yamaha FZ09 engine as its power plant.



The student team will conduct research to further optimize the ECU mapping to increase power and optimize air/fuel and exhaust temperatures. The second part of the project will be to evaluate the current



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cylinder head re-design it for additional power and then map the ECU to match the new cylinder head design (working to increase power and optimize air/fuel ration and exhaust temperatures. Team will be provided with the engine hardware and current ECU map for the project.

Expected Deliverables/Results:

- Test plan for current engine configuration.
- ECU testing and re-mapping with current configuration to optimize for power and fuel efficiency
- Re-design of cylinder head
- ECU map optimization for new cylinder head design

Disposition of Deliverables at the End of the Project:

Hardware developed is the property of the Industry Supporter. All equipment to be returned to the sponsor at the end of the project.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Motorsports concentration
- Interest in engine design and testing