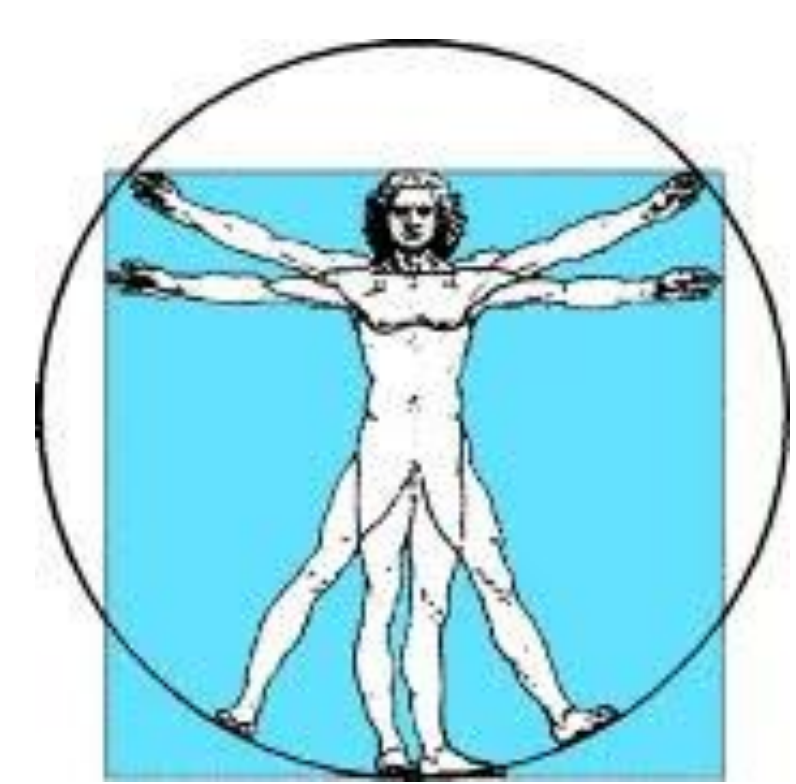
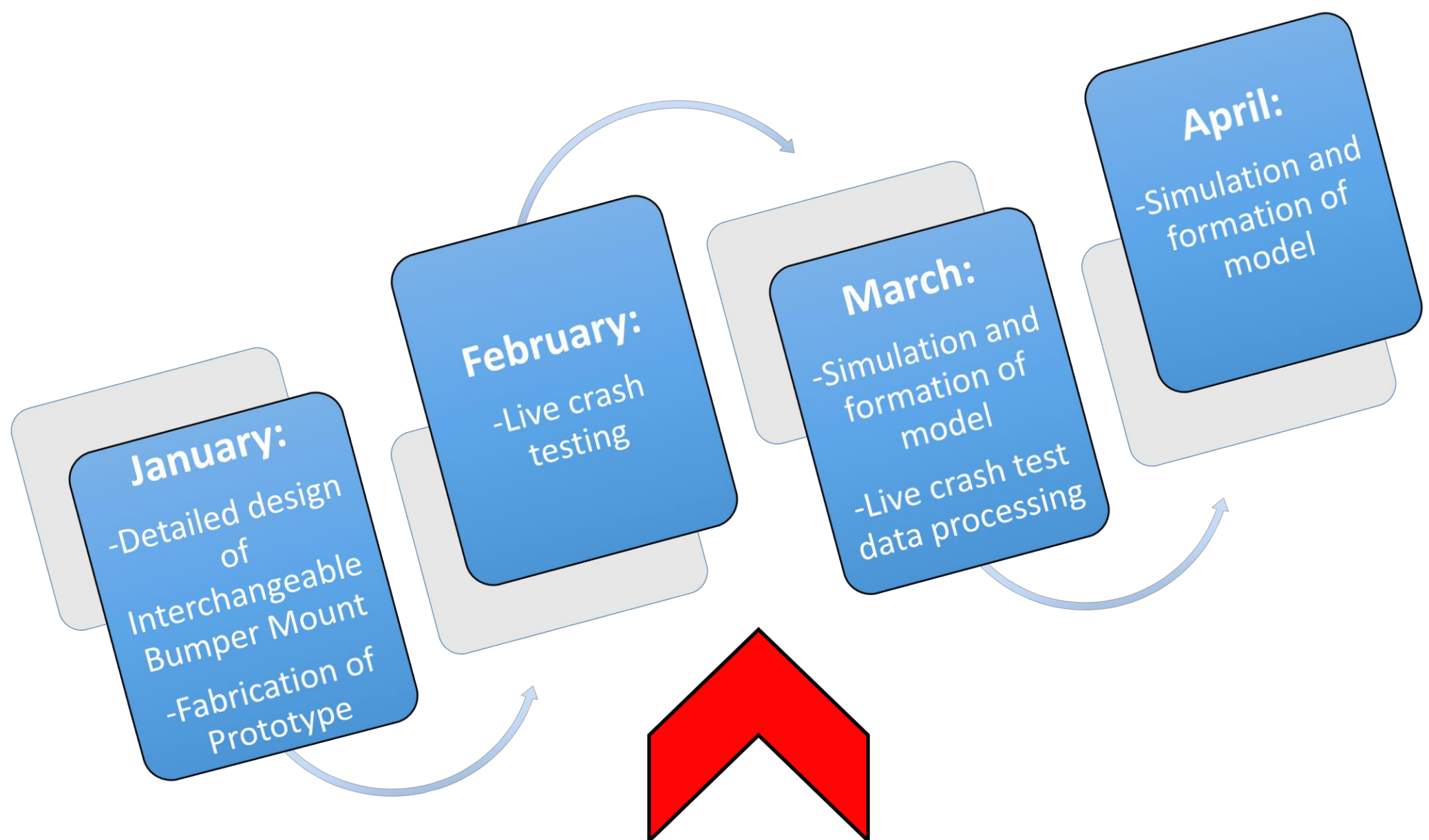


OCCUPANT AND VEHICULAR RESPONSES TO LOW SPEED COLLISIONS



Acknowledgement:
 The team would like to thank Cummings Scientific, LLC for their sponsorship of this project. Specifically, Team 2 would like to acknowledge Mr. Beau Biller, the project liaison engineer, for his dedication to the success of the project.
 Team 2 additionally extends thanks to Dr. Shayne McConomy for his guidance as a course instructor and as the project's faculty advisor.

Spring Semester Plan:



Concept Selection:
Method: -Pugh Charts for each component driven by functions and target
Selected concept: -Shown in Figures 1 and 2
 -Interchangeable connectors for mounting different bumper types
 -Slotted middle piece that allows for width adjustment

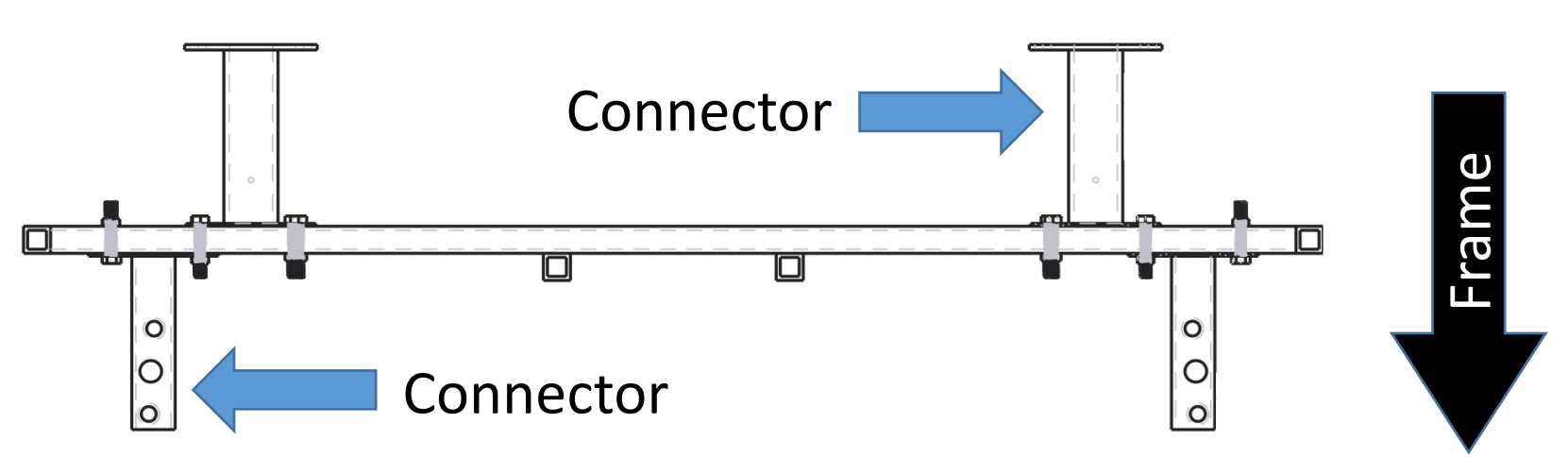
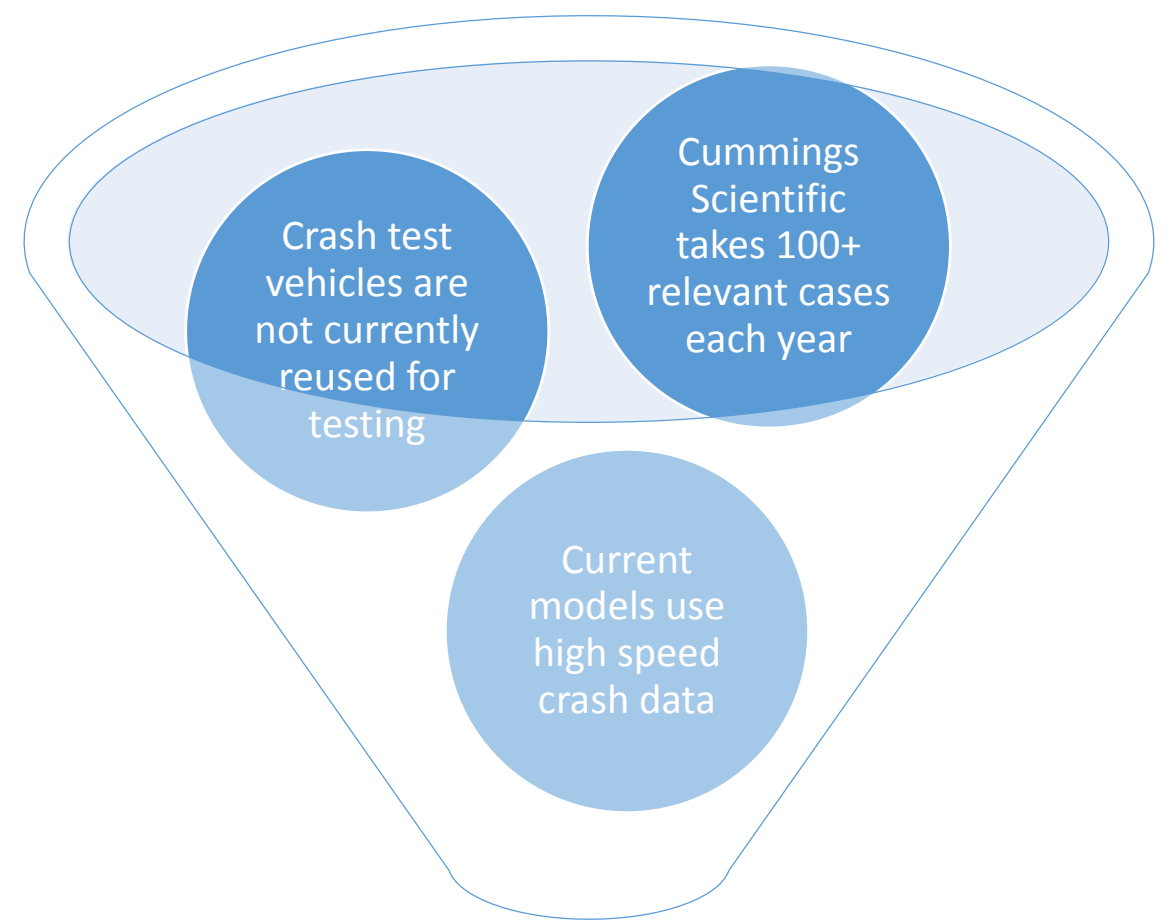


Figure 2. Final Interchangeable Bumper Mount Design

Motivation:



Project Scope

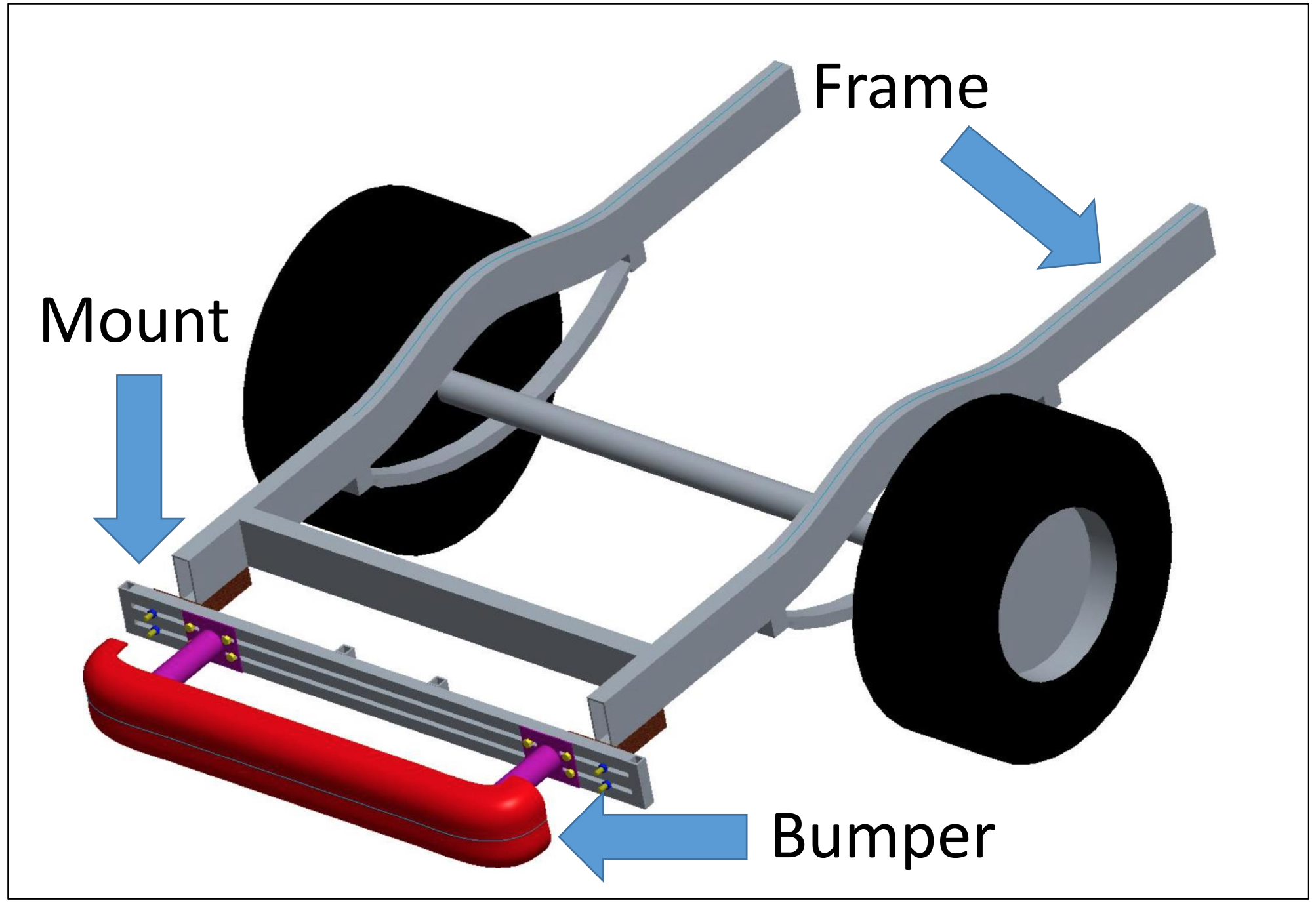


Figure 1. Final Interchangeable Bumper Mount design attached to a vehicle frame with a piston isolator bumper on the front.

Concept Generation:
Initial Phase: -System and sub-system components
 -Group and individual ideation
Evaluation Phase: -Simplistic analysis against functions and targets
Final Phase: -Created new designs based on high scoring designs from evaluation phase

Project Scope:
 The intent of this project is to create an empirical model for the occupant and vehicular responses to a low speed rear-end vehicular collision. Data will be gathered from live crash testing. An interchangeable bumper mount will be designed to test the effect of different bumper structures on these responses. This model will primarily benefit Cummings Scientific.

Functions and Targets:

	Mount	Testing
Functions	<ul style="list-style-type: none"> ★ Attach multiple bumper types to test vehicle for rear-end impact testing ★ Transfer dynamic response of impact to vehicle and passenger ★ Withstand multiple crash tests ★ Allow sensor integration for measurement of crash parameters 	<ul style="list-style-type: none"> ★ Capture occupant response to low-speed impulse ★ Capture vehicle response to low-speed impulse ★ Avoid permanent deformation to test vehicle
Targets	<ul style="list-style-type: none"> ★ ★ ★ Mount yield strength of 36 ksi ★ ★ Test 4 different bumper types ★ ★ Minimum of 15 impacts sustained ★ ★ ΔV at less than 4 mph for tests 	<ul style="list-style-type: none"> ★ ★ ★ Accelerometer range of ± 25g ★ ★ Minimum of 3 accelerometers ★ ★ ★ Accelerometer sampling minimum of 100 Hz ★ ★ 15 tests conducted at minimum ★ ★ ★ ΔV at less than 4 mph for tests

Stars indicate correlation between functions and targets

