Shallow-Opening Camaro Door

Overview
Currently, the coupe doors on a Chevrolet Camaro span about 14 feet when open. Standard parking spaces are about 8-9 feet wide and the Camaro coupe doors are prone to bumping into cars in adjacent parking spots. The doors also provide minimal leg room for entering and exiting the vehicle when they are in confined spaces.

Objectives
The goal is to reduce the wingspan of the coupe doors by at least 3 feet to give the Camaro a comparable wingspan to that of a standard four-door sedan. To accomplish this goal, the hinge of the coupe door was completely redesigned to change the opening and closing motion of the door.

Approach
- Our sponsor communicated with the team on a weekly basis to discuss design approaches
- Patent research was conducted to discover prior art and ensure that our concepts were original
- We were informed of specific customer needs, such as functionality, ease of use, and durability
- Design concepts were generated and selected based on customer needs and target specifications
- Rough sketches and kinematic calculations set the foundation for the hinge design
- SolidWorks was used to design the prototype hinge
- An alpha prototype was constructed from cardboard and balsa wood to mimic the door’s motion
- The working prototype was constructed from high-strength materials and components (i.e. 4140 alloy steel)
- The design was mounted to the car and any issues or deflections were noted
- Refinements to the prototype were made to alleviate most issues
- The open position of the door was measured and compared to the Camaro’s standard wingspan

Outcomes
- The open door wingspan of the Camaro coupe was reduced by 3’-4”
- General Motors would be able to manufacture the hinge prototype for less than $370 (our material cost)
- The hinge design can be sold as an after-market kit because it bolts only to existing mounting locations on the car frame and door with minimal modifications to the body of the car
- The hinge prototype can be implemented on a future Camaro model or any General Motors vehicle