B Adrian Muelle, Sebastian Estrada, Nicholas Misiunas, Brian Iglesias, Enrique Groso

1) Problem Definition

Jorge grapples with the challenges imposed by Coffin- Syndrome (CLS), impacting his mobility, communication, and focus. His attention struggles to center on a singular focus, and it has become evident that his solace lies in a toy car. Unfortunately, existing vehicles in the market fail to meet his unique mechanical and physical requirements, consistent and reliable remote control, lacking nocturnal lighting, and providing inadequate space. To address these issues, we propose a custom modification kit with features that will prevent Jorge from steering on his own and that will prevent him from overriding parental controls. This specialized conveyance will possess the necessary power and suspension for traversing the challenging terrains around his home. Encouragingly, our efforts have garnered support from other families facing similar circumstances, who believe that this customized vehicle will provide comparable benefits to their children.

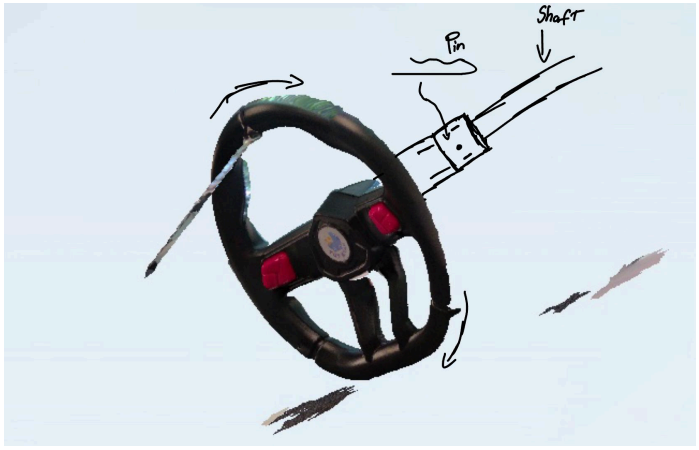
2) Concept Development

1. Concept Design #1 Adrian Muelle
    a. To fix the problem of Jorge steering on his own, we will create our own steering wheel and shaft.
    b. The shaft will have a hole where a pin will be able to be removed. When the pin is removed, the steering wheel will have no function and will not be able to turn the car.
    c. Additional Research
        i. “When you turn the steering wheel, it rotates the steering column. This column, in turn, moves the steering box or rack and pinion. As the steering box or rack and pinion moves, it causes the tie rods to push or pull the wheels, making them turn left or right, aligning the car's direction with your input.” (Autozone)
    d. The function of this concept is to prevent Jorge from steering on his own, eliminating the possibility of Jorge driving off into the road.

e. This is a strong solution because the wheel will still be able to rotate, so Jorge will continue to have the entertainment of steering while staying safe.

2. Concept Design #2 Sebastian Estrada

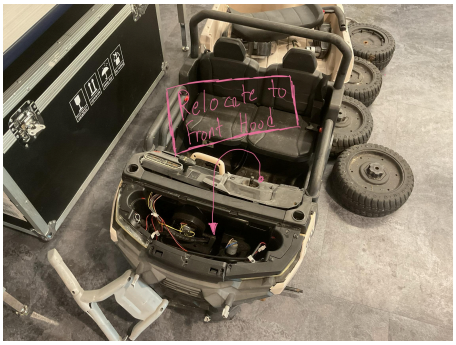
    a. To fix the problem of the steering wheel, we decided to model the steering wheel and 3D print a piece to allow for a freely rotating wheel for him to fidget with.
    b. The steering wheel would need an extra piece onto the steering column in order for there to be a freely rotating steering wheel,
    c. This is a great way for Jose to prevent Jorge from taking control while he is controlling remotely as well as prevent the gears to break when Jorge is trying to take contol

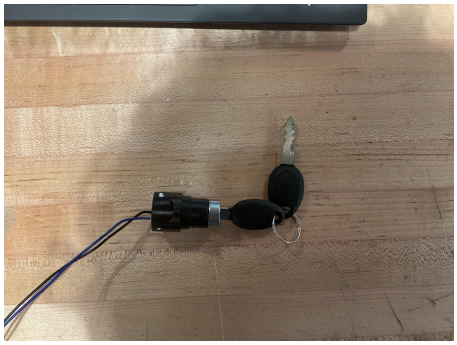


3. Concept Design #3 Nicholas Alexander Misiunas
    a. To relocate the switch that turns on the vehicle to a location the driver cannot access because if the driver turns off and on the start switch, the remote control for the vehicle is no longer connected and the driver can operate the vehicle freely.
    b. To fix this issue, we will replace the start switch with a key switch to make the car more aesthetically pleasing, and place that key switch under the front hood of the vehicle so the driver is no longer able to access the switch, allowing the operator of the remote control to maintain control of the vehicle.
    c. This is a strong solution for the issue because it completely eliminates the drivers ability to reset the remote control from the driver seat when he is strapped in,

while maintaining the functionality of the start switch and still giving the father easy access to turn the vehicle on and off.

d. The keys are made of metal and plastic, and both function in the keyhole. The key switch is made of metal and plastic and is about 2 inches in diameter and will be wired into the vehicle's start switch and will be screwed into the bottom of the car's plastic tub.





3) Concept Analysis

Jorge grapples with the challenges imposed by Coffin- Syndrome (CLS), impacting his mobility, communication, and focus. His attention struggles to center on a singular focus, and it has become evident that his solace lies in a toy car. Unfortunately, existing vehicles in the market fail to meet his unique mechanical and physical requirements, consistent and reliable remote control, lacking nocturnal lighting, and providing inadequate space. To address these issues, we propose a custom modification kit with features that will prevent Jorge from steering on his own and that will prevent him from overriding parental controls. This specialized conveyance will possess the necessary power and suspension for traversing the challenging terrains around his home. Encouragingly, our efforts have garnered support from other families facing similar circumstances, who believe that this customized vehicle will provide comparable benefits to their children.

	Concept 1 (Sebastian Estrada)	***Concept 2 (Nicholas Misiunas)***
Problem Statement	The car Jorge rides in has a remote control that Jose uses to control the car at times. Jorge is strong enough to override the remote controlled steering, and drives off on his own. This puts him in dangerous situations as he can drive off into the road.	Jose uses a remote control to steer the car. Jorge found the car's on and off switch, so he is able to reset the car and remote control by turning the car off and back on. Jose is no longer able to control the car with the remote control.
Purpose/Function	To fix the problem of the steering wheel, we decided to model the steering wheel and 3D print a piece to allow for a freely rotating wheel for him to fidget with. This still allows Jose to control the car with the remote control.	To fix this issue, we will replace the start switch with a key switch to make the car more aesthetically pleasing, and place that key switch under the front hood of the vehicle so the driver is no longer able to access the switch, allowing the operator of the remote control to maintain control of the vehicle.

4) Solution Selection

- Out of 10 Scale

Criteria	Idea #1	Idea #2
Cost		
Durability		
Function		
Aesthetics		

Skill Required to Operate		
Safety		
Total Score		

5) Detailed Design

IN PROGRESS

6) Cost Estimation

1. Estimated Prototype Production Cost

The estimated total prototype production cost combines the base vehicle purchase, additional materials, and labor.

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2. Research and Documented Costs of Each Component

Component	Function	Supplier	Unit Cost	Quantity	Total Cost
Base Car	Main vehicle frame	Amazon	$379.99	1	$379.99
Battery Pack	Power supply	[Supplier C]	$60.00	1	$60.00
Suspension Upgrade	Enhanced terrain handling	[Supplier F]	$75.00	1	$75.00
Additional Hardware	Screws, nuts, bolts	[Supplier H]	$15.00	1	$15.00

Total Materials Cost: $575.00

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3. Labor Time and Cost Estimation

Task	Estimated Time (Hours)	Hourly Rate	Cost
Frame Adjustments	1	$20	$20.00
Motor Installation	1	$20	$20.00
Battery Installation	0.5	$20	$10.00
Lighting Installation	0.5	$20	$10.00
Suspension Installation	1	$20	$20.00
Control Adjustments	1	$20	$20.00

Total Labor Cost: $100.00

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4. Total Prototype Production Cost (Materials + Labor)

- **Materials Cost**: $575.00
- **Labor Cost**: $100.00
- **Total Estimated Production Cost**: $675.00

7) Presentation and Communication