

# **Jorge's Dream Car: Creating an Upgrade Kit for Off-the-Shelf Ride-On Toys for Special Needs Children**

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## **1. Executive Summary**

The purpose of this Request for Proposal (RFP) is to develop an upgrade kit for off-the-shelf ride-on toys designed specifically for special needs children. Current ride-on cars present significant limitations in terms of safety and control for both the children and their families. Our goal is to provide enhanced safety features, improve usability, and ensure the ride-on car becomes a reliable and enjoyable tool for mobility and recreation.

This RFP seeks proposals to upgrade ride-on cars to meet specific safety, functional, and usability requirements, taking into consideration real-world scenarios like traveling to church, crossing streets, and navigating theme parks. Solutions must prioritize safety and control while accommodating the unique needs of children such as Jorge.

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## **2. Current State and Use Cases**

Currently, off-the-shelf ride-on cars have several limitations that affect their usability for special needs children and their families. These limitations primarily revolve around safety and control, which are crucial when the car is used in various real-life environments.

### **Use Case 1: Traveling to Church**

One use case scenario is Jorge driving his car to church with his sister as a passenger. This requires the vehicle to travel a couple of blocks, cross streets, and traverse various terrains such as grass, pavers, rocks, driveways, and asphalt streets. Ensuring safety while transitioning between these different surfaces and crossing streets is a top priority.

### **Use Case 2: Theme Park Visits**

Another important use case is using the car in theme parks like Disney World or the children's museum. In these environments, the ride-on car must fit into a standard elevator and have features preventing Jorge from driving into crowds, off a ledge, or into traffic. Lockout controls must ensure the adult has full control at all times.

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## **3. Critical Requirements**

The following are critical requirements that must be met in the upgraded ride-on car to ensure safety and reliability:

### **Critical Requirement 1: Steering Lockout**

The ride-on car must provide a lockout of the steering mechanism, allowing the remote control driver to prevent the passenger (Jorge) from providing any steering input. This feature is crucial for safety when the vehicle is in environments with potential hazards such as roads or theme parks.

### **Critical Requirement 2: Drive Lockout**

The remote control driver must be able to cancel, prevent, or override any attempt by the passenger to engage the drive mechanism. This could be implemented as a parking brake mode or a complete lockout that disengages the throttle, ensuring that the passenger cannot control the vehicle while the lockout is engaged.

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## **4. Optional Features**

In addition to the critical requirements, the following features are considered highly beneficial for the upgraded ride-on car. These are not mandatory but would significantly enhance the usability and appeal of the product:

### **Optional Feature 1: Hot-Swappable or Upgraded Batteries**

The ride-on car should support hot-swappable batteries or have an increased battery capacity, allowing for extended usage without needing frequent recharging.

### **Optional Feature 2: Custom Decals**

Custom decals should be designed to identify the car as a medical device or wheelchair replacement, using the standard handicap blue color. This visual distinction will aid in navigating public spaces where accessibility is a concern.

### **Optional Feature 3: Project Management Website**

A dedicated website should be created to tell the story of Jorge's Dream Car, provide links to purchase compatible ride-on cars and upgrade kits, and feature instructional videos on how to install the upgrade kits.

### **Optional Feature 4: 3D Renderings of Upgraded Parts**

Using Computer-Aided Design (CAD), the project should include 3D renderings of key upgraded parts, such as the steering gear, door locking mechanism, and a mount for an Augmentative and Alternative Communication (AAC) device.

### **Optional Feature 5: Computer-Controlled Cutting**

The upgrade kit should involve the production of improved components such as locking mechanisms and upgraded seatbelt attachment points, using computer-controlled cutting techniques.

### **Optional Feature 6: Electronics Production**

Upgraded electronics should enhance the range of the remote control, and the system should allow features like a switch or remote control to activate any critical improvements, such as lockout mechanisms.

### **Optional Feature 7: 3D Scanning and Printing**

Using 3D scanning and printing technologies, components such as the steering gear could be upgraded to stronger or lighter materials (e.g., converting from molded plastic to carbon fiber).

### **Optional Feature 8: Embedded Programming**

The upgrade kit should include embedded programming that allows a remote button or switch to activate specific features in the car, such as turning on lights or sounds.

### **Optional Feature 9: Output Devices**

The vehicle should be able to react to inputs like button presses, activating features such as lights or sounds.

### **Optional Feature 10: Mechanical Design Solutions**

Mechanical solutions such as a rod that physically engages or disengages the steering input from the passenger should be explored to meet safety requirements.

### **Optional Feature 11: Networking and Communications**

Enhancements to existing communication controls should allow one-handed operation or increased distance of communication between the remote driver and the car.

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## **5. Signature Page**

By signing below, we acknowledge that we have reviewed the RFP and agree to the outlined requirements and optional features. We commit to adhering to these specifications throughout the project.

<b>Student Name</b>	<b>Signature</b>	<b>Date</b>
[Student 1 Name]		
[Student 2 Name]		
[Student 3 Name]		
[Student 4 Name]		

### **Academic Advisor**

<b>Name</b>	<b>Signature</b>	<b>Date</b>
[Advisor's Name]		

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