I. Alternative Design One

Track

In this design the structure of the slide will be made entirely of wood. This will be the most basic of the designs and will keep the costs at a minimum. The platform will be supported by wooden beams and the top sheet will also be made of wood. There will be an on/off push button on the slide and a timer on the winch. The winch hook will not, however, automatically disengage and will require the operator to engage and disengage it. There will not be any indents made into the track; instead two “walls” three to four inches high will be installed on the wood track on the outer edges and on the inside three inches from the edges on each side. These “walls” will serve as the track for the cart. There also will not be a platform lift motor. Therefore the cart will have to be given a push to begin descent. This will also cut the cost of getting and securing a lift motor on the slide. A depiction of the track design one can be seen in figure one below.

Figure 1: Track design #1.
**Car**

In the first design for the slide car, the car will be equipped with handrails, an integrated head support, trunk and hip restraints, and leg restraints. The seat recline angle will be 10 degrees for user comfort. The seat and backrest will be made of foam padding covered with nylon fabric. The hip and trunk supports will be made of nylon and will be fully adjustable to adequately fit to the user’s body. The head support will be an extension of the backrest, and will not be adjustable. The leg supports will be Velcro straps on the foot rest and on the lower leg rest portion of the car. These supports will be adjustable to allow for a snug fit for the user’s safety during descent and retraction. In this design, the winch hook must be manually disengaged from the rear of the car upon retraction to the top platform.

The frame will be made out of 1/4” thick rectangular steel tubing. The shaft for the wheels will be made out of stainless steel, 304 grade. The wheels will be 6” diameter with a plastic hub with an outer rubber tread. The width of the tires will be two inches. These wheels are typically found on common outdoor equipment such as lawnmowers and wheelbarrows.

**Controls**

The controls of this design are very minimal. A 12V DC winch motor will be used to pull the car to the top of the slide. The winch motor will be turned on and off by an RF wireless remote control and by a safety switch on the back of the motor itself. In order to operate the winch, the safety switch will need to be in the on position. The winch cable will extend the length of the slide, and the remote will have two buttons, start and stop, to control the motor retraction. Once the start button is depressed, the motor will retract the cable and remain on for a designated number of counts. These counts will be programmed based on how long it takes for the car to reach the top of the slide. The motor will be turned off by pressing the stop button on the remote, flipping the safety switch on the back of the motor, or automatically at the top of the slide once the system has finished counting. Lastly, when the winch motor is on, a red LED light located on the top of the slide will illuminate, signaling that the winch mechanism is in use. A microcontroller will be used to program all of the controls, including processing signals from the RF wireless remote and the automatic timing on the motor itself.