Important Safety Instructions

- Be sure to read all warnings and operating instructions before using the chair. Improper use could result in injury to the user or the device itself.
- The seat belt and harness should be worn at all times while operating the chair in order to keep the rider securely in the seat. It is recommended that the auto-leveling system be active at all times, but if necessary, it can be disabled and controlled manually.
- Before using the chair on hilly terrain, one should get acquainted to the handling and control of the chair on a smooth, flat surface.
- This all-terrain power chair features an auto actuation system that self-levels the seat of the chair. This makes the chair more capable of traversing hilly terrain, however, it is not invulnerable to tipping over so the user must use care not to drive on excessively steep slopes, and to only drive straight up or down a slope seen as the actuator only controls the front-to-back tilt of the seat.
- The auto-leveling system has a buzzer that will sound when the chair is on a slope that is too steep. Avoid extremely steep slopes and if the buzzer begins to sound, the operator must decide whether to continue or to back the chair away from the slope as to maintain control and prevent tipping the chair.
- Do not attempt to drive the chair over large rocks or other obstructions because this will increase the chances of the chair tipping over and could cause damage to the chair.
- Be sure to avoid tugging on any of the electrical wires because this could cause damage to the electrical components of the chair or cause harm to the user.
- The majority of the weight of the chair is in the rear and the seat can only tilt back, therefore it is best to travel uphill on the shallowest slope possible, while traveling downhill on steeper slopes is safer with the auto-leveling system.
Parts and Accessories

- Casters and Front Wheels

- Footrest
- Motors

- Rear Wheels
- Chassis

- Actuator
• Batteries

• Anti-tip Wheels
• Seat

• Seatbelt
• Harness

• Joystick
- Auto-leveling Circuitry Box

- PCB
Features

- Auto-leveling seat for hilly terrain
- Manual tilt option
- Buzzer to alert operator of a steep slope
- Large treaded tires for improved traction on rough terrain
- Joystick swing arm for easy entry/exit from the chair
- Two deep cycle batteries for extended use
- Seat belt and harness for operator safety
- Powder coated
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1 Introduction

1.1 General Overview

The main power source for the chair is the set of two deep cycle batteries that are located in the rear of the chair. They can be accessed and replaced through the battery housing directly. Open the housing and slide out the battery tray. If checking for charge, simply use a digital multimeter or other voltage meter on the terminals of each battery individually. If replacing, loosen the cable attachments and remove them from the battery terminals, being careful not to short out either of the batteries. Then remove the old batteries from the tray, place the new batteries in, reattach and tighten the cables, push the battery tray back into the chair and seal the enclosure.

The joystick controls the power and movement of the chair. The power switch for the chair is located on the back side of the joystick, next to the speed control knob.

The auto-actuation circuitry box is mounted on the right armrest, behind the joystick. There are two toggle switches and a dual push button switch mounted on the box cover. The right hand toggle switch controls the power to the circuit inside. The left hand toggle switch allows the user to choose automatic or manual actuator control. If the switch is pressed forward, the seat will auto-level itself (assuming the power switch is also pushed forward). If the switch is set to manual, the dual push button switch can be used to control the actuator. Pressing and holding the front button will raise the seat (tilt it back), and pressing and holding the back button will lower the seat (tilt it forward). This unit is powered by two 9 V batteries. The batteries can be accessed by opening the electronics box. To open the box, first remove the four Philips head screws (one at each corner) from the cover of the box. Then, slowly lift the cover vertically and
forward from the box while simultaneously feeding the two grey wire bundles through the hole at the back of the box. Push the grey wire bundles through the hole until the zip tie touches the gasket on the box, this allows the greatest freedom in accessing the internals of the box. The batteries are held into place with two battery clips on the bottom of the box. Replace both batteries when they die, they are in parallel so they should drain evenly. Inside the box, one can also see the buzzer mounted next to the batteries. The buzzer can be disconnected from the circuit to disable it, though this is not recommended as it is a built in safety feature. If for any reason the PIC microcontroller gets damaged or is loosened from the socket, it can be re-seated or replaced while the box is open. When troubleshooting, the circuit can be left on when the box is open, however, be sure to shut off the auto-leveling switch because the seat accelerometer is attached to the cover and moving it will cause the PIC to think the seat is not level.

Figure 2: Image highlighting the chassis mounted accelerometer, as well as the electronics box mounted to the seat armrest.
1.2 Operating Instructions

1. Ensure that the batteries are charged, tires are properly inflated, and motors are engaged.

![Figure 3: Switches used to engage and disengage the motors.](image)

2. Passenger should enter or be placed in the chair, safety belt and harness and foot restraints should be secured.

![Figure 4: Seatbelt, harness, and foot restraints to be secured before operation.](image)
3. Turn on the power to the chair by pressing the toggle switch on the joystick down once. Turn on the auto-actuation circuit (right toggle switch) and then enable the auto-leveling feature (left toggle switch).

![Figure 5: Joystick and auto-actuation box mounted on the chair.](image)

4. Adjust the speed of the chair using the speed control knob on the lower left of the joystick

5. Push the joystick in the desired direction of movement.

6. If manual actuation is desired, disable the auto actuation feature (left toggle switch on auto-actuation box) and use the dual push button switch to adjust the seat.

7. When done, disable the auto-leveling feature, turn off the auto-actuation circuit, and turn off the chair by pressing the toggle switch on the joystick down once.

2 Maintenance

- Casters and Front Wheels
  - Remove casters from the chair every few months and grease the axle in the caster housing to prevent rust and physical degradation caused by friction.
  - Be sure to tighten the casters sufficiently as to avoid wobbling.
  - Check tire pressure on a regular basis or if the wheels appear to be flat. This will ensure optimal performance and traction at all times.

- Motors
  - When in need of a tune up, bring the chair (or motors) to a licensed mechanic as opposed to performing maintenance oneself.

- Rear wheels
  - Remove the wheels from the motors every few months and grease the axles in order to prevent rust and physical degradation caused by friction.
  - Make sure the lug nuts are fastened tightly before use.
Check tire pressure on a regular basis or if the wheels appear to be flat. This will ensure optimal performance and traction at all times.

- **Chassis**
  - Be sure all electrical connections are secure before use.
  - Clean the frame of the chair periodically by wiping it clean of dirt or other debris. DO NOT submerge the frame in water because it could damage electrical components.

- **Batteries**
  - Recharge the batteries when their charge is low. Do not charge after every use, unless they are low. Charging too often without draining the batteries shortens their lifespan, however, do not allow the batteries to die completely, as this will make them un-chargeable. Ideally, charge the batteries shortly after or just as the indicator on the joystick turns red.
  - Replace the batteries if they die and the chair does not turn on after charging.

- **Seat and Safety Restraints**
  - Adjust the seat and headrest to ensure proper posture and comfort for the user.
  - If the safety restraints tear or begin to deteriorate in any way, replace them immediately as this compromises the safety of the chair.

- **PCB**
  - The printed circuit board mounted in the electronics box is the auto-leveling system. The PIC microcontroller is mounted to this board and controls the circuit. When the chair and seat are both level and the circuit is turned on, pins 1, 11, and 32 should be at approximately 5 V. Pins 12 and 31 should be 0 V, as these are the ground/reference pins. Pins 2 and 3 are the input from the chassis and seat accelerometers, respectively, and when level, they should be at approximately 1.63 V. All voltage measurements should be taken from the minus terminal of either of the batteries as this is the reference line.

### 3 Technical Description

The main custom feature of this power chair is the auto-leveling system. It is comprised primarily of a printed circuit board (PCB) that holds all the electrical components, excluding one of the accelerometers which is mounted on the chassis of the chair. The PCB is mounted to the underside of the electronics box cover. The system gets power from two 9 V batteries that are held in place in the electronics box. The batteries are connected in parallel to extend the life of the device in between battery replacement. The batteries feed into two separate voltage regulators, one 5 V regulator and one 3.3 V regulator. The 5 V regulator is used to power the PIC microcontroller which controls the circuit. When the chair and seat are both level and the circuit is turned on, pins 1, 11, and 32 should be at approximately 5 V. Pins 12 and 31 should be 0 V, as these are the ground/reference pins. Pins 2 and 3 are the input from the chassis and seat accelerometers, respectively, and when level, they should be at approximately 1.63 V. All voltage measurements should be taken from the minus terminal of either of the batteries as this is the reference line.
used to sound the buzzer. If the chair is on a slope of greater than approximately 30°, the buzzer will be sounded. If pin 30 is turned on, the seat will recline and if pin 29 is activated, the seat will lean forward. The buzzer and actuator are not controlled directly from the output pins of the PIC, but rather through three relays controlled by the output pins. When any of the relays is activated by the PIC, the circuit is closed and causes the actuator to move or the buzzer to sound. The buzzer and accelerometers are powered by the 3.3 V regulator as they are not rated for 5 V and could not be powered from the same one. Resistors are connected in series to the input pins and reset pins in order to limit the current flow to the pins in case of a short or other malfunction.

Figure 6: PCB mounted to the cover of the electronics box.

Figure 7: Printed circuit board (PCB) layout.
```c
#include <htc.h>
__CONFIG(FOSC_XT & WDTE_OFF & BOREN_OFF & LVP_OFF & WRT_OFF & DEBUG_ON & CPD_OFF & CP_OFF);
#define _XTAL_FREQ 4000000

void main(void)
{
    TRISD = 0x00;
    PORTD = 0x00;

    unsigned int level = 83; // Digital representation of analog 1.63 V (8-bit ADC)
    unsigned short chair = 0;
    unsigned short seat = 0;
    unsigned short upHillLimit = 92;
    unsigned short downHillLimit = 75;

    while (1)
    |
    |
    ADCON1 = 0b00000000; // ADC registers are left justified, PORTA is all Analog input
    ADCON0 = 0b00000001; // Select pin AN0 for analog input, A/D conversion module is powered on
    __delay_us(30); // Delay 30us to allow A/D converter to settle
    GO = 1; // Begin A/D conversion
    while(GO); // Wait for A/D conversion to finish
    chair = ADRESH;
    |
    ADCON0 = 0b00000010; // Select pin AN1 for analog input, A/D conversion module is powered on
    __delay_us(30); // Delay 30us to allow A/D converter to settle
    GO = 1; // Begin A/D conversion
    while(GO); // Wait for A/D conversion to finish
    seat = ADRESH;

    /* Activate RD5 to sound buzzer */
    if(chair<downHillLimit||chair>upHillLimit) // Chair at unsafe incline/decline
    |
    { // Chair at unsafe incline/decline
      RD5 = 1; // Sound Buzzer
    }
    else
    |
    { // Chair at unsafe incline/decline
      RD5 = 0; // Do nothing
    }

    /* Activate RD7 to raise seat */
    /* Activate RD6 to lower seat */
    if(seat>level) // Seat leaning forward
    |
    { // Seat leaning forward
      if(RD7!=1) // Reset actuator if changing direction
      |
      { // Reset actuator if changing direction
        RD6 = 0;
        RD7 = 0;
        __delay_ms(1000);
      }
      RD7 = 1; // Lean seat back
    }
    if(seat>level&&seat>chair) // Seat leaning backward
    |
    { // Seat leaning backward
      if(RD6!=1) // Reset actuator if changing direction
      |
      { // Reset actuator if changing direction
        RD6 = 0;
        RD7 = 0;
        __delay_ms(1000);
      }
      RD6 = 1; // Lean seat forward
    }
    if(seat==level) // Seat is level
    |
    { // Seat is level
      RD6 = 0;
      RD7 = 0;
    }
    } // Seat is level
} // main
```
4 Troubleshooting

The chair won’t start
- Ensure that the batteries are connected and charged
- Check to make sure all cables are connected properly to the joystick and other components

The chair won’t move
- Ensure that the chair is turned on and that the joystick is connected properly
- Check to make sure the motors are engaged and not in neutral

The seat belt and/or harness are too tight
- Ensure the belt and harness are not caught on any part of the chair
- Loosen the straps if necessary
- If the user has outgrown either, they must be replaced

Actuator won’t respond to manual input
- Ensure the auto-actuation switch is disabled
- Be sure that the chair’s deep cycle batteries are charged
- Check to see if the manual switch wires have become pinched, frayed, or otherwise obstructed or destroyed

The auto-leveling system won’t work
- Ensure that both the power and auto-actuation switches are enabled
- Ensure that the 9 V batteries are not dead and are plugged in properly
- Be sure to no press the manual actuation buttons while the auto-leveling system is active
- Ensure the PIC microcontroller is securely seated in its socket
- Check for burn marks or other indications that a short may have occurred compromising the circuit board

Buzzer does not sound on steep inclines
- Ensure that the buzzer is connected to the circuit properly
- Ensure that the circuit is powered on
- Ensure that the 9 V batteries are not dead and are plugged in properly
Important Safety Instructions

- Do not drive the Power chair without reading this instruction manual.
- Do not use the joystick in an erratic manner when going up or down an incline.
- Do not carry passengers or exceed the maximum user weight.
- Do not use on the road.
- Always stop fully before changing forward or reverse direction.
- Always engage a slow speed when going down gradients (move the joystick slowly towards center position to reduce the speed).
- Always use the safety belt.
- Always keep the feet on the footrest while driving.
- Always make sure the batteries are fully charged before setting out on a long trip.
- Avoid exposure to rain, snow, ice, salt or standing water whenever possible. Maintain and store in a clean and dry condition.
- Avoid sudden stops and starts.
- Limit usage in the rain to emergencies only.
- Do not operate in the dark.
- Routinely make sure all the bolts are secured and aren’t loosening.
- Avoid touching electrical components when the power chair is powered on.
Parts and Accessories

Figure 1: Front wheel and caster

Figure 2: Rear wheel, motor, and spring suspension
Figure 3: Chair frame

Figure 4: Footrest
Figure 7: Deep-cycle battery

Figure 8: Bottom battery box with circuitry
Figure 9: Seat

Figure 10: Right armrest
Figure 11: Right armrest and joystick

Figure 12: Headrest
Features

• Sturdy-wide frame

• Seat release for easier transport

• Fully adjustable headrest

• Two battery boxes: top for battery, bottom for circuitry

• Four-wheel independent suspension

• Two Independent motors

• Two free-swivel casters

• Removable/adjustable footrest

• Safety harness and two-point buckle for safety

• Removable Seat (for transport)

• Robust joystick

• Adjustable Armrests

• Rugged Tires

• Powder coating for corrosion resistance
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1 Introduction

1.1 General Overview

This power chair is designed to be a safe, comfortable, and stylish mode of transportation for Nathan Lamb to move about his yard and the surrounding landscape. This manual contains important information on how to safely operate this power chair. Please read through the entirety of this manual and understand all of the instructions before you begin operating this power chair.

Figures 13 & 14: Completed power chair, front and rear views
Preparation For Use

This power chair has many adjustable features to give the user maximum comfort:

- Armrests can be raised or lowered (hex head bolt) [A]
- Joystick can be extended or retracted (hex head bolt) [B1], and removable (Allen wrench) [B2]
- Headrest angle and height can be adjusted (Allen wrench) [C]
- Footrest height can be adjusted (Allen wrench and gravity) [D]

Make sure that the battery is connected and charged before use. A fully charged battery is ideal for maximum power chair efficiency, usually taking 6-8 hours to charge.
Assembly/Disassembly Instructions

For easy transportation, there are many removable features that allow the chair to fit into automobiles easier. This power wheel chair features a quick release mechanism of the seat to make transport or storage of the power wheel chair easier. Both left and right sides of the power wheel chair have a seat frame attachment to keep the seat secure. To move the seat, first remove both of these screws on the left and right sides of the wheelchair seat frame attachment. Once they are removed, push down the quick release bar in the front of the wheel chair and left the front of the chair. Tilt chair back and lift out of the side chair holders.

Figure 15: Seat front with quick-release bar
To attach chair, position chair onto the right and left side holders with the chair tilted back. Once in position the chair should be resting on the front release bar. Push down on the release bar and the mechanism should lock. Test to see if the chair is secure in the front. Put the two screws in the side holders of the chair.

For added safety the operator of the wheelchair should be firmly secured in the wheelchair with the harness and two-point buckle. Adjust each to provide a comfortable but firm fit.
Battery & Battery Charging

The power chair is powered by a 12 volt deep-cycle battery. This chair comes with an appropriate battery charger for when the battery charge gets low.

Figure 7: Deep-cycle battery

Figure 18: Power chair battery charger
1.2 Operating Instructions

The joystick has a 360-degree range of motion for the power chair to operate on. To move, simply point the joystick in the direction that you want to go. The further you push, the faster the chair will move. Releasing the joystick will automatically stop the power chair from moving.

![Joystick](image)

Figure 19: Joystick

**Getting Ready to Drive**

Step 1: Flip the power switch located at the top of the top battery box to ON.  
Step 2: Secure the user into the chair via the harness and safety belt.  
Step 3: Push the joystick to control the speed and direction of the power chair. Begin at slow speeds to get comfortable with the chair operation.

NOTE: choose an area with plenty of open space and relatively smooth terrain
2 Maintenance

Tools Needed

- Phillips screwdriver
- Flathead screwdriver
- Pliers
- Allen wrenches
- Ratchet

It is recommended to do a monthly inspection on the power chair to make sure all of the nuts and bolts are still tight. If any are loose, they should be tightened before use.

Cleaning

Use a damp cloth and a mild, non-abrasive cleaner to clean the plastic and metal parts of the power chair. Do not use any products that will damage the chair finish. Never use a hose to clean the chair or place it in direct contact with water.

Motors

Maintenance of the motors should be left to a professional should any problem with them arise.

Tires

The tires should not have any cuts or holes in them. If they do, replace them before the next use. Make sure both sets of tires are always secured to their respective suspension apparatuses. Check for any tire wear, and if there is replace the tires before the next use.

Batteries

Fully discharge the battery before recharging to ensure optimal performance of the power chair. Always make sure the switch on the battery box is left in the OFF position when not in use. Under no circumstances should you cross the active leads.

Circuit Box

Make sure the lower circuit box never takes on any water, as this will cause shorts to occur. If necessary, clean the inside of the box. Before each use, make sure that the box is tightly secured to the chassis.

Seat Belt and Safety Harness

Make sure they are properly secured. If the harness is loose, it can be tightened on the back of the seat.
Suspension

If the shocks are not stiff enough to support the user weight while moving, tighten the nut located at the top of each shock absorber.

Wires

All wires should be contained or covered. Periodically check to make sure there are no exposed wires. If one is found, make sure the power is off before touching the wire. A professional should replace any defective wiring.

3 Technical Description

Figure 13: Complete power chair, front view
Specifications

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<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair Length</td>
<td>46”</td>
</tr>
<tr>
<td>Chair Width</td>
<td>30”</td>
</tr>
<tr>
<td>Chair Height</td>
<td>51”</td>
</tr>
<tr>
<td>Seat Dimensions</td>
<td>20.5” x 20” x 29.5”</td>
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<td>Seat Angle</td>
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<td>Suggested Maximum User Weight</td>
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<tr>
<td>Speed</td>
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<tr>
<td>Battery Life</td>
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<tr>
<td>Storage Temperature</td>
<td>18-25°C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-18-38°C</td>
</tr>
<tr>
<td>Restraint</td>
<td>5-point harness and lap belt</td>
</tr>
</tbody>
</table>

4 Troubleshooting

If the chair doesn’t move:
- Check to make sure the power switch is in the ON position
- Make sure the battery is charged
- Make sure the motors and the rest of the circuitry is connected

If the seatbelt or harness is uncomfortable:
- Loosen or tighten the straps on the back of the seat until they are comfortable

If the armrests aren’t tall enough:
- Adjust the height by removing the screws of the sides of the armrests and replace them in the desired holes.

If the back wheels seem loose:
- Check to see that the center wheel screw is tight

If the casters don’t swivel freely:
- Add lubricant/oil to the caster rods

How should I store my power chair and its battery?
- Charge batteries at least once per week if it is not being used regularly
- If stored for an extended time, fully charge battery and disconnect it
- A cold or frozen battery should be warmed for several days prior to recharging

How can I safely transport the power chair?
- The seat can be easily removed (see instructions above) and the footplate can be removed
• For easy transport and maintenance the pins on the lever arms may be removed with a rubber mallet, and the shock absorbers detached from the frame. Inside the motor wire tubing the connectors to the motors may be disconnected, and the entire lever arm removed from the chair.
Operator’s Manual

Beach Wheelchair
Project 23.1 for Danielle Giroux

Team 1
Stephen Elovetsky, Steven Rogers

Client Contact:

David & Suzanne Giroux
53 Charlotte Drive
Tolland, CT
860-870-4249 (Home)
860-604-0893 (Mobile)
giroux@sbcglobal.net
Important Safety Instructions

• Do not leave user unsupervised

• Make sure user is strapped in

• Make sure all assembled pieces are secured

• Keep polyurethane tires away from open flames

• Do not leave chair unsupervised in open water, as it has potential to float away

• Make sure adjustable seat nuts are secured

• Do not move wheels across sharp rocks/objects

• Do not use in the dark

• Make sure seat is secured to frame

• Make sure caster collar bar is secured over the caster rods

• Make sure wheel pins and secured
Parts and Accessories

Figures 1 & 2: Aluminum stroller frame, expanded and collapsed

Figure 3: Polyurethane balloon tire with bearing, front tire
Figure 4: Polyurethane balloon tire in plastic swivel caster and aluminum plate interface, rear tire

Figure 5: Dual caster collar bar
Figure 6: PVC seat with mesh fabric & safety belt

Figure 7: Circular pin to secure front wheels
Features

- Lightweight aluminum frame
- Collapsible design
- Adjustable seat
- Swivel casters
- Removable polyurethane wheels, collar bar, and PVC seat for transport
- Powder coating for corrosion resistance
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1 Introduction

1.1 General Overview

This beach wheelchair is based off of the client’s old collapsible stroller frame. It employs heavy-duty polyurethane tires with a wide base that ensures that it does not sink into the sand when moving. It is designed for easy and safe maneuvering across the unstable sand at the beach. This manual contains important operation and safety features for this beach wheelchair.

Figure 8: Completed prototype of beach wheelchair
1.2 Operating Instructions

To assemble the beach wheelchair from the individual pieces:

- Expand the aluminum frame and secure the clasps near the handlebars
- Turn the frame over
- Slide each of the large front balloon tires onto the axle rod and secure it in place with the provided circular pin
- Slide the collar bar over the rear bars of the frame
- Insert each caster onto the rear bars and secure it in place with the provided nut and bolt
- Flip the chair so it is right side up and slide the collar bar over the caster rods
- Insert the PVC seat by sliding the back end onto the non-painted aluminum bar and clamp the other end to the front non-painted bar
- Secure the user into the seat with the lap belt
- To disassemble, reverse the above procedure

Figure 9: PVC seat mount
2 Maintenance

Tools needed
- Adjustable wrench
- Allen wrench set
- Ratchet
- Flathead screwdriver
- Phillips screwdriver

Cleaning

Use a damp cloth and a non-abrasive cleaner to clean off the metal parts of the chair, or use a hose for a quick cleaning.

Collapsible Frame Bolts

Before each use, make sure that each of the nuts and bolts that govern the moving parts of the collapsible design are secure so they don’t become lost while in use. Use the above tools to secure them.

Tires

If the balloon tires are going flat, use the provided air pump to get them to a relatively full volume. Make sure the cap screws on the tires are secured. If the tires have holes, replace the tire before the next use.

Pins

If pins and securing bolts are damaged or lost, replace them right away before next use.

PVC Seat

Adjustable wing nut screws require 12 washers for each connector in order for the wing nuts to function. If any are lost, replace them right away for proper chair function. If the mesh fabric tears, depending on the severity either sew it back together or install a replacement piece.

Powder Coat

Do not drag the frame against the ground or scratch it against the wall for fear of scratching the paint coat and risking metal corrosion.

Safety Belt

If safety belt becomes worn or damaged, replace it right away before the next use.
3 Technical Description

Figure 8: Completed prototype of beach wheelchair
Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>44”</td>
</tr>
<tr>
<td>Width</td>
<td>34”</td>
</tr>
<tr>
<td>Height</td>
<td>61.5”</td>
</tr>
<tr>
<td>Collapsed Length</td>
<td>38.5”</td>
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<tr>
<td>Seat Dimensions</td>
<td>16” x 13”</td>
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<tr>
<td>Seat Angle</td>
<td>Adjustable; Maximum 125°</td>
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<tr>
<td>Materials</td>
<td>Aluminum Frame, Polyurethane Balloon Tires</td>
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<tr>
<td>Weight</td>
<td>~ 40 pounds</td>
</tr>
<tr>
<td>Maximum Load</td>
<td>~ 200 pounds</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>120° F</td>
</tr>
<tr>
<td>Restraint</td>
<td>Lap Belt</td>
</tr>
</tbody>
</table>

Front tires contain bearings that allow for free turning.

4 Troubleshooting

If frame doesn’t expand or collapse smoothly:
- Check to see if all nuts and bolts are in place and secured
- Make sure no parts are interfering with collapsing

If balloon tires go flat:
- Use provided air pump to fill them

If bolts, nuts, or washers go missing:
- Replace them before next use

If lap belt becomes loose:
- Tighten buckle until secure and comfortable for user

If sand gets into the internal structure of the chair:
- Wash out inside with running water to clear out obstruction

If paint comes off the chair:
- Contact Central Connecticut Coating for touch up to prevent metal corrosion