

This document outlines various definitions about our proposal solutions. It is important to present them in a way to be pictured in the reader's mind. Furthermore, it includes all costs.

- **Base Wheel Chair:** This is the main tool for the mobility of the user, it includes an electric system to allow him to independently transport himself small distances with moderate speed, also can include several interfacing accessories that could dramatically improve the user's freedom and interaction capabilities; the chair will not be included into the proposal but is mentioned because some modifications might be needed. **Cost:** not available
- **Wireless (Inductive) Charging System:** This system wirelessly transfer electrical charge to the electrical chair's battery. The system requires some minor modifications in the battery nevertheless the main cost would be the acquisition of the charging base and the fact that is recommended to acquire a minimum of 2 units so he can charge while at home or also while at the office. **Cost:** 1500\$ - 3000\$ each base.
- **Specially designed connector-less charging station:** The charge of the battery is a critical fact to the user mobility and interaction capabilities, hence it is strongly recommended to have several charging units to avoid any accidental blockage due to malfunction or not availability (traveling, short charging time availability or even device breakdown), to avoid the cost constraint of every station, or even for emergency cases a low cost "plugless" charging station can be designed, and even when its an additional initial cost, the lower price of each unit can amortize the prize. **Cost:** (estimated)
 - Development 2000\$ - 3000\$.
 - Each unit 200\$ - 500\$.
- **Centralized interfacing Unit:** The CIU is used to make the interfaces between peripherals and the environment as easy as possible, every specialized peripheral is embedded into the wheelchair and plugged to the CIU and this one is the one in charge of sending specifically designed messages to the desired computer which will only need to deal with these (with the use of a specially developed driver) instead of different messages coming from several different interfaces. **Cost:** 400\$ - 1500\$
- **Visualization System:** Set of devices configured to show to information and feedback from the CIU or even from the linked computer or network, this should be part of the modifications to the wheelchair in case some particular peripherals are requested or even in case of some special feedback requirements. **Cost:** 200\$ - 500\$
- **Image Capture System:** It is a set of devices installed and configured in order to acquire images from the environment of the chair, and maybe in some cases about the chair or the user himself, it can be used for several cases including normal videoconference or even for the augmented reality capability. **Cost:** 50\$ - 500\$

- **Augmented Reality:** A layer of augmented reality can be used to increase the interaction capabilities of the user, the basic proposal includes the use of a highly customized solution that creates a virtual keyboard projected in the visualization system of the chair, and an arm position tracking system to identify the desired key to allow the user to communicate as if he was using a physical keyboard. **Cost:** 700\$ - 2000\$
- **Google Glass:** This device is a wearable computing component which allows several different actions by the use of voice commands, among those it can be done: google searches, take pictures, share content online, get information from internet and also has an embedded set of sensors that can in theory be used as input devices by for instance moving the head, ideally this device can also be used as visualization and image capture device, but only under certain particular conditions. **Cost:** 700\$ - 2000\$
- **Speech recognition system:**
Speech recognition is a system that allows the user to interact with the machine only with the use of voice commands, with this he can make dictates as well as make any particular command; which makes it a very flexible option for this case, with the possible disadvantage that it might be intrusive with the environment (co - workers). **Cost:** 100\$ - 500\$
- **TrackBall Device:** It is a standardized pointing solution with a function principle very similar to the one in a standard mouse, but with much more flexibility in certain movement constrained scenarios. **Cost:** 50\$ - 100\$
- **Sip and Puff System:** Is a method used to send signals to a device using air pressure by inhaling or exhaling on a straw, tube or "wand." The mouth-controlled input provide users a simple and effective way to control mouse movement. **Cost:** 200\$ - 1500\$

Transportation

- **Autonomous Vehicle:** is a robotic vehicle that is designed to travel between destinations without a human operator. To qualify as fully autonomous, a vehicle must be able to navigate without human intervention to a predetermined destination over roads that have not been adapted for its use. **Cost:** around 320.000\$ (still experimental).
- **Public transportation system:** this makes references to the standardized public transportation system that is, most of the times, handicapped friendly, this is a good option because it doesn't require much interaction from the user and allows him to move freely in the city. **Cost:** 0\$

- **handicapped friendly Van:** this option makes reference to an originally standard equipped vehicle that is specially modified to allow the user to get comfortably inside with his wheelchair without external help, nevertheless it is to highlight that this system still will need a driver to be able to be a complete transportation solution. **Cost:** 13.000\$ - 76.000\$.

Workplace

- **Automatic doors:** the user of automated opening doors is an standard issue in many different buildings over the world, it is used both for health/accessibility and comfort reasons, it mainly is a wide door that uses an engine to be mechanically displaced in the moment that is required, the signal to open can be generated even by an automatic device like proximity sensors or even by user interaction like the push of a button . **Cost:** 400\$ - 900\$.
- **Handicapped friendly buildings:** Nowadays most of developed countries have very clear legislation about accessible constructions and environments, the main idea is to make the spaces available for free mobility of people with some sort of disability, This regulations include many different topics like: Pathways should be 90 cm wide and free , Obstacles with minimum parameters to be easily detected, overhanging signs minimum height, information panels location, all the floor should be smooth, continuous, non slip and even, maximum slope of ramps, handicapped parking spaces number, size and location, drop off and pick up zones and a giant amount of considerations to apply in a building to make it accessible for everyone, these requirements should be (and mostly are already) implemented with no regard of the particular solutions the company decide to acquire, hence the cost is not going to be evaluated in this proposal.
- **Handicapped accessible elevators:**The elevator is one of the main points of the building preparation due to the fact that it's the only possible way for the user to vertically be transported without the physical help of his colleagues, it has to comply with the minimum entrance size, the precision stop, dimensions and even the control system which for this particular case cannot be an standard modification but a tailor made solution to allow him correctly and independently interact with the machinery.

Office

- **Biometrical Access Control Systems:** the security to control the access to the doors is a special matter in here, the automatization of the doors highly reduces the security on

the premises, hence it is a very interesting idea to use biometrical security systems, it can be retina scanners, iris scanners, face recognition systems, and even speech recognition, this has to be implemented in the offices that are needed to secure like for instance his office, but for cost reasons, probably wont be implemented in every access in the building, for these other cases maybe building security will be enough. This will be implemented in his office entrance door. **Cost:** 1000\$ - 3000\$.

- **Presence Detection System:** the system is required in order to make all the equipment including lights and computers to be automatically turned on and shut down when we comes in the office in the morning and leaves to his home in the night respectively, the way to do it can vary from the use of biometrics combined with daytime, up to proximity detection with the use of a wireless indicator like bluetooth or even RFID and a central detector in the office. **Cost:** 650\$ - 2000\$