

Open Source Medical Solutions: The Blind Vision Project

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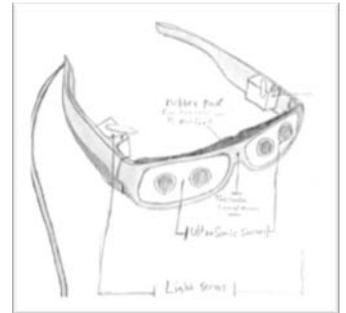
Portland State University

Social Problem Addressed – The Social Business Opportunity

Over 285 million people globally are struggling from visual impairment and 40 million are completely blind. In the US alone, the numbers are 25 million and 3 million, respectively. Blindness it is not just an inconvenience; it can dramatically shorten life expectancy due to other health conditions including depression, diabetes and high cholesterol. While there are endless efforts to assist the blind, technology in this area is still expensive and not comfortable, reliable, or stylish. Open Source (OS) Medical Solutions addresses this problem by open-sourcing the development of glasses with sensors to help visually impaired people navigate the world around them. This “Blind Vision Project” (BVP) is the first application of our open-source approach to solve medical problems in a cost effective way.

Solution Proposed – Product/Services/Programs

OS Medical is one of the first open source communities dedicated specifically to the development of medical devices. In keeping with open source principles, the design and specifications will be published freely. In the first two years of operation, OS Medical will focus on launching the Blind Vision Project, where the resulting product is worn like standard sunglasses. The user is made aware of surrounding physical objects with a gentle pulsing of their temples. The BVP will be constructed of commonly used electrical components and will not need FDA approval.



Market Analysis and Strategy

OS Medical must address two target markets to successfully produce and distribute these devices: the builders of the devices, who are engineering students; and the users of the devices, the visually impaired. Currently, engineering students are constructing a variety of kits as part of their curriculum as they learn basic engineering skills, but those kits have minimal social value and are thrown away at the end of the class. OS Medical will make and sell the device hardware as kits for these students. Once the devices are fully developed and ready to be used, OS Medical will distribute them to the blind community and charge a modest fee for service support. Adoption by the blind community is crucial and depends on four factors: affordability, functionality, appearance and comfort. The blind community will be reached with assistance from various advocacy organizations. Moreover, we will offer service support to both engineering schools and the blind to ensure the quality of the device.

Launch Strategy and Requirements

Currently, we have a working prototype and we are in discussions with Professor Phillip Wong to develop a pilot program in conjunction with the engineering-freshmen curriculum at Portland State University. The Version 1 kits of the BVP have been tailored to Dr. Wong’s particular course and will be implemented for real world testing by the end of April 2013. Ideas and improvements from the students will be documented on the website, and contributors will be publicized, which should help their employment prospects. The website will also serve as an OS forum for sharing design improvements and programming ideas between developers. Furthermore, local blind advocates such as the Oregon Commission for the Blind have expressed their interest in testing and distributing the BVP. OS Medical is exploring partnerships with such organizations as the National Federation of the Blind, American Foundation for the Blind and Mercy Corps. These organizations would receive the device on a donation basis to distribute to users, and in turn provide feedback and product recommendations to further develop the device.

Financial Plan and Sustainability

OS Medical will be structured as a non-profit, 501c3 organization. This will allow the organization to function as a tax-exempt organization, and allow for funding to be acquired through tax-deductible donations. Initially, OS Medical plans to raise \$30,000 to cover the first two years of operation costs, which includes 150 devices and establishment of the OS Medical website. The primary targeted source of start-up funding will be the National Collegiate Inventors and Innovator's Alliance IdeaLab. The NCIIA provides grants of \$20,000-\$50,000 for student driven inventions and business concepts, with a focus on medical and sustainability.¹ Secondary funding will be sought from the Center for the Integration of Medicine and Innovative Technology (CIMIT). CIMIT provides grants of up to \$200,000 for medical innovations with market potential.² Beginning in 2015, OS Medical will take on employees in partnership with Portland State University to expand product offerings beyond the BVP.

Version 2 Kit Total Cost

Part	Quantity	Price
Ultrasonic sensors	2	\$25
Micro-controller	1	\$3
Li-Ion Battery	1	\$25
Voltage Regulator	1	\$5
Charging circuitry	1	\$20
Glasses	1	\$5
Servos	2	\$1
PCB	1	\$10
Misc.	1	\$5
Case	1	\$6
Total		\$131

Blind Vision Project Financial Projections

	2013	2014	2015	2016	2017
	Version 1	Version 2	Version 3	Version 4	Version 5
Units of Kits	50	100	200	400	800
Cost / unit	\$90	\$131	\$200	\$200	\$200
Raw materials	\$4,500	\$13,100	\$40,000	\$80,000	\$160,000
Personnel	\$0	\$0	\$20,000	\$40,000	\$80,000
Website	\$500	\$1,000	\$2,000	\$2,000	\$2,000
Manufacturing Equipments	\$2,700	\$1,000	\$3,000	\$0	\$0
Software	\$700	\$200	\$1,200	\$500	\$200
Space	\$0	\$800	\$800	\$1,200	\$1,200
Total expense	\$8,400	\$16,100	\$67,000	\$123,700	\$243,400
Per Kit Revenue	\$100	\$150	\$250	\$250	\$250
Per Kit Distribution & Service Support Revenue	\$50	\$50	\$100	\$150	\$200
Net Income	(\$900)	\$3,900	\$3,000	\$36,300	\$116,600

Impact Summary – The Social Benefits

In interviews, blind people indicated acceptance of the functionality of current aids, but younger blind individuals expressed frustration and interest in affordable technological solutions. Canes are inexpensive, lightweight and easy to use but are not proactive, have a short range and draw attention to disability. In addition to guidance, guide dogs offer companionship and protection. However, they require two years of preparation and come with the responsibility and the expense of maintaining an animal. The BVP addresses these drawbacks by offering an affordable solution alerting the user to objects three meters in advance, which facilitates moving in crowded and dynamic environments. It is not the first glasses-based product to be marketed to the blind, but all previous efforts have either failed or existed only in concept drawings. As a result, blind people are hesitant to adopt new technologies, which is why blind advocacy organizations will assist in connecting OS Medical with potential users of BVP. In addition to academic partnerships, which are essential to product assembly, OS Medical is also active in the general open source community and will use these contacts to attract developers and cultivate a robust medical device open source community.

¹ <http://nciia.org/idealab>

² <http://www.cimit.org/grants-typesofgrants.html>