THE UNIVERSITY OF ROCHESTER

UREAD BRAILLE

2014 MARK AIN BUSINESS MODEL COMPETITION

BUSINESS PLAN

Team Members:

CHRISTINA KAYASTHA
SAMANTHA PICCONE
DOUGLAS MILLER
NICHOLAS GEKAKIS
TIANYI LIU
JOEL HOWARD

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1. EXECUTIVE SUMMARY

We propose a full page refreshable braille display—an ebook for the blind—that will allow the visually impaired community to stay informed and connected in this modern digital age.

COMPANY AND TECHNICAL BACKGROUND

URead Inc. aims to empower individuals with little or no vision by granting them access to up-to-date and virtually limitless reading material. Focusing on building an inexpensive full page refreshable braille display—an ebook for the blind. URead Inc. promotes braille education and encourages the blind and visually impaired of all ages to learn to read in braille. We propose the **Braille Shape**, a full page refreshable braille display.

While traditional Braille displays currently available on the market use piezoelectric actuators in order to actuate braille pins, this technology is both expensive and not compact. We have developed a new technology that uses solenoid actuators built into a printed circuit board allowing for a cheaper and more compact device. This patentable technology makes our product unique in comparison to those available on the market.

MARKET OPPORTUNITY

There are approximately 16 companies that produce up to 70 kinds of braille displays. They function as note takers, text message viewers, computer monitors, etc. The difference between the Braille Shape and products is that we are the only multiline braille reading device on the current market. Instead of displaying only one line at a time, our product proposes 10 lines of refreshable text allowing for users to skim through documents, easier link navigation. Furthermore, while the devices on the market are about $4000 a piece for one line, at mass production our device will reach a cost of $2000-$3000 for a full page making it more accessible.

The target Market includes:

- Individual Braille users
- Non-profit organizations for the blind often purchase assistive devices for people in need
- Schools for the Blinds can use Braille Shape as textbook readers and use our website as assistive teaching resources
- Libraries for the blind can loan Braille Shape to readers rather than mailing those heavy-duty books out

Based on data given by American Printing house, 8.8% of children who engage in the program for the blind are learning and using braille and according to a representative of the National Blind Foundation, we are experiencing a downtrend of people learning in braille. We can assume that about 10 percent of legally blind people use braille as a primary reading method and the market size of existing potential buyers is 0.47 million. However, as the government is pushing braille education and technology is more accessible and affordable to the public, we are expecting another come back for braille among the blind.

In order to break into this market, we will start by selling to the Non-profits, schools and libraries in our first few years and advertise at these institutions. Marketing to individual braille users will occur after this stage.

MANAGEMENT TEAM

Primary team leaders include:

- Christina Kayastha, Computer Science 2014, University of Rochester Hajim School of Engineering
- Samantha Piccone, Computer Science, Math 2014, University of Rochester Hajim School of Engineering

URead Inc. consists of a talented interdisciplinary team of professionals who are supportive and cooperative. We all come from different majors and backgrounds bringing unique sets of skills to the table. Christina and Samantha have been deeply involved in the project since 2013 and have the technical skill necessary to lead technical development of the device.

INVESTMENT SUMMARY

To date we have participated in the Cornell Cup 2013 Competition (received Honorable Mention award) and are currently participating in the Cornell Cup 2014 competition. We have received funding from the competition over the past two years totaling $4000 plus other supplies and discounts. We have also received funding from the UofR Computer Science department totaling approximately $8000 for travel to the competition and materials. The funds have been used to test and experiment with various different technologies for creating the device and have resulted in the technology we are currently using.

FINANCIAL SUMMARY

The following table is a summary of the financial forecast URead expects:

SUMMARY OF FINANCIAL FORECAST					
	YEAR	**YEAR**	**YEAR**	**YEAR**	**YEAR**
Executive Summary Table	**1**	**2**	**3**	**4**	**5**
Sales	$0	$500	$29,500	$59,000	$141,000
Gross Margin	($199)	($48)	$19,888	$39,947	$96,984
Operating Profit	($1,399)	($2,503)	$14,483	$32,377	$79,594
Percent of Sales	*0%*	*-501%*	*49%*	*55%*	*56%*
TOTAL HEADCOUNT	6	12	24	34	72
Cumulative Stock Sold - Venture Capital	$1,900	$4,100	$4,100	$4,100	$4,100

MISSION STATEMENT AND VISION

In the age of technology there is a digital divide between those that can use all the availably technologies, and those who cannot. While the sighted can use tablets, e-readers, computer screens and access the internet, for the blind community this technology is still out of reach. A full page refreshable braille device would make braille more convenient and accessible for the blind and make available the on-demand access to information that the rest of the modern world takes for granted. Our mission is to bring this technology to the visually impaired community and by doing so bridge that digital divide.

2. COMPANY SUMMARY

URead Braille Inc. aims to empower individuals with little or no vision by granting them access to up-to-date and virtually limitless reading material. Focusing on building an inexpensive full page refreshable braille display—an ebook for the blind, URead promotes braille education and encourages the blind and visually impaired of all ages to learn to read in braille. We propose the **BrailleShape**, a full page refreshable braille display.

The formal name of the company will be URead Braille Inc. and will be formed as a corporation based in New York. A corporation was chosen so that the business in the future can go public and new owners can easily be admitted.

2.1 COMPANY OWNERSHIP

URead Braille Inc. will be owned by its founders Christina Kayastha and Samantha Piccone on an equal basis. Both owners will be actively involved in the company's decision making process.

2.2 COMPANY HISTORY

Because URead has not been formed as a company yet, and is currently being proposed as a startup, we suggest the project history and start-up summary in the following sections.

2.2.1 PROJECT HISTORY

The URead Braille project was started in September 2012 as an entry for the Cornell Cup competition[1]. During the Cornell Cup 2013, the team received an honorable mention[2]. Currently the URead Braille project is being continued for the Cornell Cup 2014 competition that will take place in May.

The URead Braille project has be publicized in the University of Rochester's Campus Times[3], Ithaca College's Ithaca Week[4], and mentioned in the Huffington Post blog[5].

2.2.2 START-UP SUMMARY

The following chart summarizes the expected financials for the startup:

SUMMARY OF FINANCIAL FORECAST					
	YEAR	YEAR	YEAR	YEAR	YEAR
Executive Summary Table	1	2	3	4	5
Sales	$0	$500	$29,500	$59,000	$141,000
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Cumulative Stock Sold - Venture Capital	$1,900	$4,100	$4,100	$4,100	$4,100

[1] For more information please see: http://www.systemseng.cornell.edu/se/intel/
[2] For more information please see: http://www.pinterest.com/pin/271060471295012550/
[3] For full article please see: http://www.campustimes.org/2013/11/07/two-teams-selected-for-cornell-cup/
[4] For full article please see: http://www.ithacaweek-ic.com/cornell-competition-addresses-real-world-needs-with-braille-e-reader-entry/
[5] For full article please see: http://www.huffingtonpost.com/gary-m-kaye/college-seniors-designing_b_3272748.html

3. PRODUCTS AND SERVICES

While traditional Braille displays currently available on the market use piezoelectric actuators in order to actuate braille pins, this technology is both expensive and not compact. Our products and services rise up to meet the demand for an inexpensive and compact multiline refreshable braille display. We have developed a new technology that uses solenoid actuators built into a printed circuit board allowing for a cheaper and more compact device. This patentable technology (Patent Pending) makes our ereader, the BrailleShape, unique in comparison to those available on the market.

URead inc. will be the only company on the market to be able to offer a multiline braille display. Our main product is the BrailleShape, but furthermore we will offer services such as tutorials, and customer service to help users get accustomed to the device. We will also offer services such as text to braille translation and offer translation of traditional ebook formatted books to braille.

3.1 PRODUCT AND SERVICE DESCRIPTION

The key products and services that URead will offer are listed below:

1. BrailleShape—The braille shape is a 15 line, 32 character wide refreshable braille display. This ebook will have inbuilt functionalities to translate pdf or text files to braille that can be added onto the device through a standard usb drive. The device will also have inbuilt features such as audio assistance and help menus. Section 4.2.1 Market Needs summarizes the capabilities of the BrialleShape.
2. Electronic Braille Books—URead will provide a library of books specifically translated to braille with the correct formatting. Through this service the user of the device may order a request for a specific book and URead will ensure that the book is translated and formatted correctly. As opposed to importing a pdf which may not always be properly formatted.
3. Advertisements—URead will also sell advertising space on the device. Due to the nature of the device, the screen can be set to some text and the device can be turned off while maintaining this text. Similarly to the Kindle's model of selling advertising space when the device is turned off, the BrailleShape will be able to sell the advertising space of the screen when the device is powered down.

3.2 COMPETITIVE COMPARISON

While there are currently over a dozen braille devices on the market, these devices are limited to one line displays that stretch to a maximum of 32 characters. Due to the resolution of braille, this display may fit an average of 4-6 words at a time. Speaking with local braille users[6], we have noted the need for a higher resolution screen. Our BrailleShape aims to solve exactly this problem that none of our competitors are offering.

With our full page display, the BrailleShape is able to offer a wide range of functionalities. Above offering only the ability to display one line of text at a time, the braille shape will be able to show 6 pin braille, 8 pin braille, graphics and maps as necessary. These functionalities exceed those of our competitors.

Furthermore, the price range for a one line display on the market currently is around $4000-$6000. With our current technology, we can reduce the manufacturing cost of raw materials down to $1500 per device when mass produced. This competitive cost will help us compete with this market.

[6] Please see Appendix A for examples of interviews taken

Lastly, it should be noted that currently the BrailleShape does not offer the ability to type in text as many of the braille displays on the market currently do. However, the technology for adding the typing functionality has been explored, and we believe that within the first year of R&D we will be able to offer the typing on the BrailleShape.

3.3 SALES LITERATURE

In order to sell the device we will be using a combination of audio and visual advertisements. Due to the target market, the primary form of advertisement will be through audio based advertisements on the radio and television[7]. Secondary forms of advertisement will be through pamphlets and brochures[8] that have braille text and information imprinted on them. These will be target distributed to libraries, schools and centers for the visually impaired in order to reach our focus market.

3.4 TECHNOLOGY

The basic operation of the BrailleShape can be boiled down to a high density solenoid actuator array with a solenoid actuator per braille dot. For every braille dot on the device, the BrailleShape is able to control the position of the pin individually because there are solenoid actuators corresponding to each pin.

However due to the density of standard braille, the BrailleShape uses an innovative methodology to create the solenoid actuators. Instead of physically winding the actuators individually and then compiling them, we used a Printed Circuit Board in order to create the coil. By using an interconnected multi-layer printed circuit board, we are able to put a loop of copper on each layer to create a coil like structure. The unconventional use of the printed circuit board allows us to drastically reduce the manufacturing process.

In the recent years, the technology involved with manufacturing printed circuit boards has become more and more efficient, reducing the overall cost of manufacturing these boards. As time passes, this technology will only become more accessible and cheaper. This will directly affect our manufacturing costs—as the technology for printed circuit boards improves, the cost of raw materials of our device drops. Rather than becoming obsolete, the technology that we are using will only become more and more practical in the future.

3.5 FUTURE PRODUCTS AND SERVICES

The BrailleShape currently acts as an e-book and only translates text to braille, however in the future additional functionalities to the device may include but are not limited to:

- Translation from other sources to braille. Other formats include popular e-book formats such as the KF8 or AZW, images or scanned pages, websites/webpages, audio etc.
- Translation to other formats. Currently the device translates the input English text to Grade 2 English braille. There are many other dialects of braille for which functionality to translate can be added such as Grade 1 English braille or international braille. Furthermore translation software can be added to translate the text to other languages. Lastly, we can also add the functionality to not just output braille but to also read out text on the speakers.

[7] Please see Appendix B for drafts of these advertisements
[8] Please see Appendix B for drafts of these advertisements

- External keyboard. In the future we would like this device to act more as a monitor for a computer screen rather than just an e-reader. Due to this we would create an external keyboard in order to allow the user to take notes on the device.
- Browser capabilities. The long term dream of URead Braille is to create a device that will bridge the digital divide between the visually impaired community and those who easily can access resources on the World Wide Web. As such, our long term goal is to be able to fluently represent websites including navigation through the sites with the BrailleShape.

The first three future services can all be accomplished in the first two years of development of the e-book, whereas the last service is a 5-year goal for the company.

4. MARKET ANALYSIS SUMMARY

There are approximately 16 companies that produce up to 70 kinds of braille displays currently on the market. They function as note takers, text message viewers, computer monitors, etc. The difference between the BrailleShape and these products is that we are the only multiline braille reading device on the current market. Instead of displaying only one line at a time, our product proposes 10 lines of refreshable text allowing for users to skim through documents, easier link navigation. Furthermore, while the devices on the market are about $4000 a piece for one line, at mass production our device will reach a cost of $2000-$3000 for a full page making it more accessible.

Naturally, four target market segments have been identified:

1. Individual Braille users
2. Non-profit organizations for the blind often purchase assistive devices for people in need
3. Schools for the Blinds can use Braille Shape as textbook readers and use our website as assistive teaching resources
4. Libraries for the blind can loan Braille Shape to readers rather than mailing those heavy-duty books out

In these sections we examine the marketing segmentation for consumers of the BrailleShape as well as analyze the current market and industry for Braille e-reader devices.

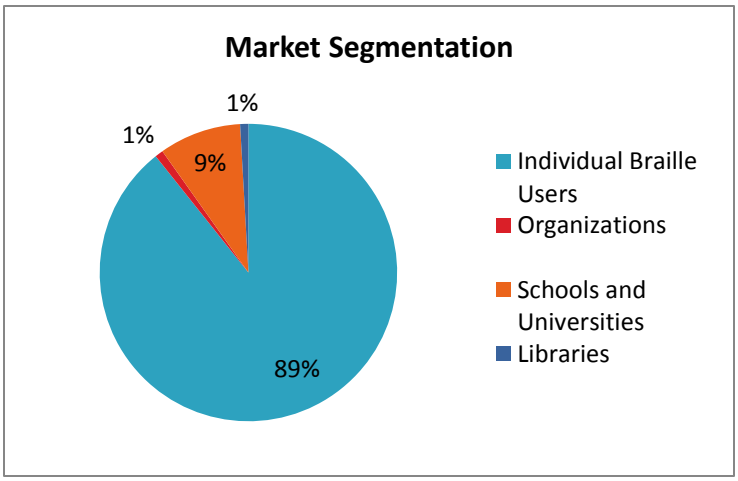
4.1 MARKET SEGMENTATION

We have identified 4 segments of the population that will use the BrailleShape. The table below summarizes the predicted growth and percentage of our market that each one of these segments occupies. Note that these years begin after sales are started and do not include the two years of research and development before the product is brought to the market.

Market Analysis							
		Year 1	Year 2	Year 3	Year 4	Year 5	
Potential Customers	Growth						CAGR
Individual Braille Users	100%	5000	10,000	25,000	50,000	100,000	80.00%
Organizations	100%	200	400	600	800	1000	40.00%
Schools and Universities	100%	500	1000	2000	5000	10,000	80.00%
Libraries	100%	200	400	600	800	1000	40.00%
Total	100%	5,900	11,800	28,200	56,600	112,000	80.00%

There are approximately ~300,000 Braille Users in the United States. Note that this is not the total population of users that already use braille. We estimate that we will be able to reach approximately 30% of this population—a total of 100,000 users. In the future as we expect the usage of Braille to increase, this target market will also increase. Due to the versatility of the BrailleShape, the market will target all age groups. In the future we might distribute devices with different braille spacing, such as jumbo braille[9] to target the 5-15 age group as well as the 65+ age group in order to allow them to more easily learn braille or to cater to desensitized feeling resolution for seniors. The pie chart below shows the segments of our target market divided between these segments.

Age	Total Population	Braille Users
5-15	417,759	41,776
16-20	211,006	21,101
21-64	1,727,327	172,733
65+	510,247	51,025
Sum	**2,866,339**	**286,634**



There are a total of approximately 1700[10] Braille organizations in the United States alone. We estimate that we will be able to 1000 of these organizations. It should be noted that each organization may purchase more than a single BrailleShape in order to make it available to the community.

There are currently over 100,000 schools[11] in the United States. Of these schools over 5000 are Post-secondary institutions. Many schools offer assistance to the visually impaired population of their school. We expect to reach approximately 10% of this segment 10,000 schools. Approximately 10,000 public libraries exist in the United States[12] to date. We expect to reach 10% of this segment 1000 libraries. As with the organizations, each school or library might purchase more than a single BrailleShape.

It should be noted that the goal of the URead Business Model is to dominate the market in the first 5 years. In order to do this we plan on partnering with existing Braille producers. After the first 5 years, the growth and CAGR will drop drastically and the goal will be retention rather than growth. Because we will be the only company producing a multiline display on the market this strategy is sound.

4.2 TARGET MARKET SEGMENT STRATEGY

In order to determine our target market, we looked at marketing needs and trends as well as interviewed potential customers for the product. In this following spread we summarize the market's needs, trends and growth over the next 5 years.

[9] Braille dot to dot spacing is at a standard 2.5mm, jumbo braille is 3 – 3.5 mm in between dots

[10] Please see this for more details: http://www.afb.org/directory.aspx?action=results

[11] Please see this for more details: http://nces.ed.gov/fastfacts/display.asp?id=84

[12] Please see this for more details: http://www.ala.org/tools/libfactsheets/alalibraryfactsheet01

4.2.1 MARKET NEEDS

Speaking with Braille users and a local Rochester Braille professional, we determined that the market is looking for the following specifications for the BrailleShape. The following tables summarize the research performed to determine the needs of the Market for the product, other competitive products were referenced in order to determine these requirements.

BRAILE SHAPE REQUIREMENTS

	Measure	Goal	Limit	Method of Measurement
Affordability	Price	$2000	$4000	Total of parts, plus manufacturing estimates.
Resolution	Columns Rows	40 25	20 15	Simple count. Negatively affects portability and price.
Portability	Length Width Height Weight	10 in 8 in .75 in 4 lbs	14 in 10 in 1.5 in 7 lbs	Simple measurement. Comparable to a laptop or tablet.
Robustness	Strength Stability	The device should not break if dropped. The components should stay in place if the device is shaken.		
Usability	Learnability Efficiency Memorability Errors Satisfaction	The goal is to maximize each measure of usability to ensure the average user can pick up and easily and enjoyably use the device.		Usability testing will be done with common HCI techniques. User testing will be done with primarily paper prototypes before constructing final device due. Interface testing will also be done with the final device.

	Measure	Performance
Pin Strength	Flexural Strength	The pins do not break under reasonable conditions. Measured with MTS Criterion™ Universal Test Systems.
Pin Stability	Force	The pins stay up and down. The pin must be able to withstand the force a person can exert with his or her finger. The pin must also not fall into the on position when the device is flipped.
Pin Control	Error Count	The movement of the pins can be controlled accurately and reliably. The pins always move when sent the signal to move. The pins are always in the intended positions. The pins are up when signaled to be on, and down when signaled to be off.
Refresh Speed	Seconds	The whole page refreshes within 4 seconds.
Energy Consumption	Power	The power consumption is reasonable compared to current technology. Measured with a kilowatt meter.
Heat	Temperature	The device does not get too hot to touch comfortably. Measured with an infrared thermometer.

4.2.2 MARKET TRENDS

Over the past few years, there has been a rise in the usage of Braille readers to interface with apple products such as the Macbook or IPad.[13] We recognize this need to interact with computers and such technologies and as a result we are suggesting the full screen braille display. While the one line display is able to show the information on a computer screen line by line, our device would allow the user to have a more immersive and valuable experience when using this device.

URead believes that the marketing trends towards interfacing the BrailleShape with these devices will more positively influence the BrailleShape as a full page display in contrast with our competitor single line displays.

4.2.3 MARKET GROWTH

Based on data given by American Printing house, 8.8% of children who engage in the program for the blind are learning and using braille and according to a representative of the National Blind Foundation, we are experiencing a downtrend of people learning in braille. We can assume that about 10 percent of legally blind people use braille as a primary reading method and the market size of existing potential buyers is 0.47 million.

However, as the government is pushing braille education and technology is more accessible and affordable to the public, we are expecting another come back for braille among the blind. Furthermore with the advent of new Braille technologies we expect this usage to increase over the years.

One of the main missions and values of URead is to aid in this Market growth and to increase accessibility for the visually impaired population.

4.3 INDUSTRY ANALYSIS

The industry for refreshable braille displays is a relatively new and growing one. The first braille display was developed in 1980 with piezoelectric actuators[14]. This has remained the dominant technology on the market to this day. Because of this there are only over a dozen popular braille display producing companies.

In order to position our brand, we have computed a detailed industry analysis for the device. The following table summarizes the Strengths, Weaknesses, Opportunities and Threats that URead faces when compared to our competitors.

Strengths	• BrailleShape will open up a new branch of a mature braille display market. This will cater to a new marketing segment in comparison to the existing companies on the market. • We will offer one of the few devices on the market that can cost around $3000 and offer these functionalities. This gives us a price advantage over existing companies. • Unlike a lot of European based companies selling in the United States, our company will be a domestic manufacturer and supplied that is more connected to our target market. • Government programs, funds and charities exist to promote the usage of braille devices. This could further enable us to subsidize the device and lower cost.
Weaknesses	• URead is entering a market that is currently shrinking. With the advent of screen readers the usage of braille is on the decline. We expect this to go back up in the future.

[13] Please see this for more information: https://www.apple.com/accessibility/ios/braille-display.html
[14] Please see this for more information: http://kscitech.com/BC/D/Becker.htm

	• As a start-up, URead lacks the capital to start developing and prototyping products. We have much fewer resources than existing braille companies for R&D. • Our current technology is currently in the process of being patented, however we suspect that the device could easily be reverse engineered suggesting that IP might be difficult to protect. • Because this is a mature market, there is a risk that the current customers are already dedicated to the brands and products that are currently on the market.
Opportunities	• Government Law gives a lot of support to special education so our target customers such as schools and institutions will be subsidized in order to meet the needs of special students. • The BrailleShape can potentially substitute printed braille books. The bulk and expense of full page braille books is overwhelming and a full page display would be economically smarter to use. • Many braille schools could use the BrailleShape as a substitute for existing teaching materials and allow for a larger variety of teaching material. • Derivative services such as a book store and the advertising space can also bring profit to URead.
Threats	• Currently we are facing an unstable supply chain and fluctuated cost of product parts. This can be improved by developing the product parts by ourselves, but would require initial setup costs. • Larger companies experience higher economies of scale in comparison to a start-up such as URead. We expect that as the company grows over the years this threat will diminish. • If the intellectual property is not properly protected, dominating companies in the market coule easily replicate our technology and release the same product at a lower price.

4.3.1 INDUSTRY PARTICIPANTS

There are 8 major competitors in the braille market. Four of major manufacturers and suppliers are from Europe. With a large take over by the European company, the biggest competitor, for us, is a domestic company called Humanware.inc. Here are the following reasons:

1. Their website is the most up-to-date among all the braille manufactures. Shown by its website design, it is a fast developing technology company where it releases new product at a fast rate. Their website design also reveals their focus on human interface.
2. Humanware has a relatively low price in the braille display market and our product's catch is low price. Besides the price, a full range of assistive products give the customer a suggestively better experience.
3. The company has a large base of loyal customers that are more likely to buy products from them because they believe they have better quality and more reliable services.

For more details about the major competitors please see the 4.3.4 Main competitors section.

4.3.2 DISTRIBUTION PATTERNS

Currently there are two main forms of distribution of Braille devices. This includes but is not limited to:

1. The main distribution system for current Braille devices on the market is through their website and online stores. Humanware and Perkins, the two leading companies, have extensive online stores for the devices that they offer.
2. The secondary form of distribution is through stores. The leading companies such as Perkins have their own store through which they can distribute products. Other companies use local vendors to distribute their products.

For our BrailleShape, the primary form of distribution will be through an online accessible store. We will also offer sales through phone calls to the company in case that is more efficient for the consumer.

In order to reach our target market, we plan on selling devices through contracts with Associations for the Visually Impaired and through schools. Using these existing networks we will be able to more efficiently reach our target demographic.

4.3.3 COMPETITION AND BUYING PATTERNS

The Braille Display industry is matured and so there are already many brands that take up a large part of the market. Because of this, in order to break into this market, we have analyzed the major buying patterns of the consumer market. The following points summarize the major factors that affect buying patterns of individuals:

- Price—The largest influencing factor for individuals seems to be price. A lot of customers that we interviewed seemed very price sensitive. The average price that the users we interviewed were looking for was $1000, however it should be noted that this was for only supplying the reader interface. After the first two years of development we would be able to add the keyboard functionality with minimal additional cost to the raw materials costs of the device.
- Brand—From speaking with our local Braille contact it seems that many people are dedicated to the brand that they are currently using. This is because of the learning curve associated with learning to use a new product. In order to alleviate this disadvantage with the BrailleShape, we are spending resources on user experience to make the device usable and easily learnable allowing users to switch to our brand.

4.3.4 MAIN COMPETITORS

The following lists the major competitors that we will be facing:

- HumanWare
- Perkins
- Freedom Scientific
- ALVA
- BAUM(europe)
- HIMS
- Handy Tech
- Eurobraille Esys

For example: Perkins[15] was founded in 1829, has $280M net assets and in 2011 received over $6M revenue from sales of braille devices and accessories for the visually impaired.

[15] Notes from 2011 Financial statements: http://www.perkins.org/assets/downloads/giving/perkins-audited-financial-statements-2011-12.pdf

5. STRATEGY AND IMPLEMENTATION SUMMARY

The market that we are entering into already has many large companies and competitors that we will be facing. The goal of our strategy and implementation is to maximize the areas of competitive advantage that we have by using specific differentiation and positioning techniques. The aim is to enter the market fast enough that these competing companies do not have the resources to produce the goods or services comparative to the ones we are offering.

5.1 STRATEGY PYRAMIDS

The following strategy pyramid shows an outline of the goals for the strategy and implementations of URead.

5.2 VALUE PROPOSITION

The proposed BrailleShape will give our target customers an immersive reading experience that none of our competitors can provide. After the first few development years, when the product reaches the market, we expect to provide not just a reading experience but also the ability to take notes on the device with an extensive library of books that the user can buy or request from us.

The BrailleShape will be cheaper than 80% of the displays currently on the market giving the consumers high value for low cost. Furthermore, compared to printed braille books, which can cost thousands for a single novel, the BrailleShape will provide an alternative. Through our pricing strategy, we aim to reach the more price sensitive consumers on the market.

5.3 COMPETITIVE EDGE

The BrailleShape has several points of competitive advantage over existing technologies available to the customer currently. The following lists some of these advantages:

- Price: The BrailleShape has an approximate cost of goods per device of
- Functional Flexibility: The BrailleShape has the ability to not only display 6-pin braille, but also 8-bin braille, graphics and even maps. With the large grid of dots we are able to use the same technology for multiple purposes. On top of these features, we plan on implementing many of the features that existing displays use such as screen reader audio, file import from USB drives etc.
- Resolution Flexibility: Due to the technology we are using to actuate the braille pins, the resolution and dimensions of the screen can easily be modified. While currently we are marketing a full page display, we can further offer different versions such as a half-page display that would be more portable. We can also easily adjust the size and spacing of the dots to provide other (larger) braille standards.

These features and strengths of our device gives URead a strong competitive advantage over competing firms.

5.4 MARKETING STRATEGY

The following diagram portrays the main values that URead braille values when marketing the BrailleShape:

As can be seen in this diagram, we value our Customer, and our marketing strategy strongly depends on what our customer want. In order to differentiate ourselves from the other companies, our marketing strategy varies in each one of these subsections.

5.4.1 PRODUCT STRATEGY

It was mentioned in the previous section that our product has a very flexible range of functionalities and resolutions. This can be used towards our advantage in order to horizontally and vertically differentiate our products. Some of the editions of the BrailleShape that can be produced in the future are:

Horizontal Differentiation (display resolution)	Vertical Differentiation (braille resolution)
Full Page display (original)	Standard braille spacing (2.5mm between dots)
Longer line display for table top	Jumbo braille spacing (3mm between dots)
Half-page portable display	
Single or double line display	

Using horizontal deepening we can market specifically to the different professionals that use braille—an on-the-go professional might want a more portable Half-page display in comparison to the full page display. An office work desk might want a longer display for faster reading.

Using vertical deepening we can market to the different age groups of the braille demographic—a young child learning braille might prefer the jumbo braille display that has lower display resolution but is easier to read, similarly a braille user that has desensitized feeling might prefer jumbo braille for reading clarity.

5.4.2 POSITIONING STRATEGY

For organizations that provide high braille accessibility and availability to people who read braille, BrailleShape is a technology that offers affordable device that give instant access to open reading resource such as pdf and txt. Unlike other existing technology companies, URead offer a combination of fastest access to reading material and affordable price.

For example, for World Wide Web users who enjoy books, Amazon.com is a retail bookseller that provides instant access to over 1.1 million books. Unlike traditional book retailers, Amazon.com provides a combination of extraordinary convenience, low prices, and comprehensive selection. Similarly URead aims to enter the market specializing in a large library of reading materials and imported materials.

5.4.3 PROMOTION STRATEGY

The BrailleShape was built keeping the customer in mind. In order to promote the product we plan on including key customers in our development process. All the promotions in first year are going to advertise for our product and to test human interface for the future project. By setting up a reward system such as product discounts for usability testing volunteers we can engage the community in an exciting new technology.

On a secondary way by observing how customers interact with the device earlier on will help us test systems quickly and bring in features as needed.

5.4.4 PRICING STRATEGY

The product will be competitively priced. Currently the projected cost of the raw materials for the device is $1500, if the device is sold at $3000 then the net profit from sales will be approximately $1000 (subtracting the manufacturing cost). The price of $3000 was based on the price of our top competitor's products. The following table summarizes this research:

Company	Product	Cells	Cost	Functionality
Perkins	Braille Display	40	$2595	Only Display
	Braille Mini	16	$1549	Keyboard Input
HumanWare	BrailleNote Apex	32	$6350	Note taking
	Brailliant	40	$3450	Note taking
Freedom Scientific	Focus Blue	40	$2795	Keyboard Input
	PAC Mate	40	$2695	Only Display

This rate is healthy for company growth but is competitive in comparison to the products currently offered considering that these are one line displays. Note that the price for the device will change depending on the number of pins displayed on the screen similarly to the products offered on the market.

5.4.5 PLACE STRATEGY

Initially URead will target the US market starting in Boston MA and Rochester NY where the company will have the most contacts. In the future URead can explore international geographic locations such as India, China, or Europe. Targeting government and school buyers in developing countries will open up a new target market in the long term.

5.5 SALES STRATEGY

The Sales strategy for the BrailleShape involves two key components:

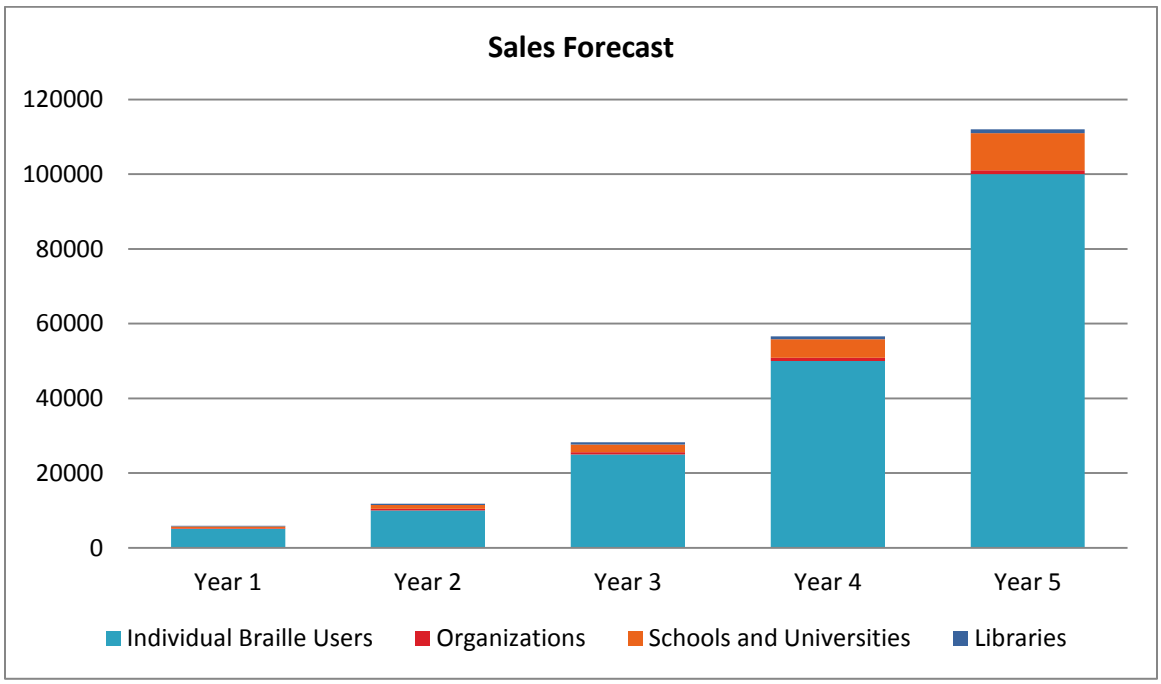
1. Sales through promotional events and existing institutions

   By reaching out to existing institutions for the visually impaired, we are able to advertise the device to the market through sources that we trust. This will involve strong ties with such existing institutions.
2. Sales through stores both online and physical

Furthermore, sales will also occur for advertisement space on the device. This will also be advertised through existing braille institutions and channels.

5.5.1 SALES FORECAST

The following graph summarizes the sales of the braille e-reader over the first 5 years of the company. This shows the number of expected units sold and the expected target market.



5.5.1 SALES MODEL

The following graph summarizes the Sales Model

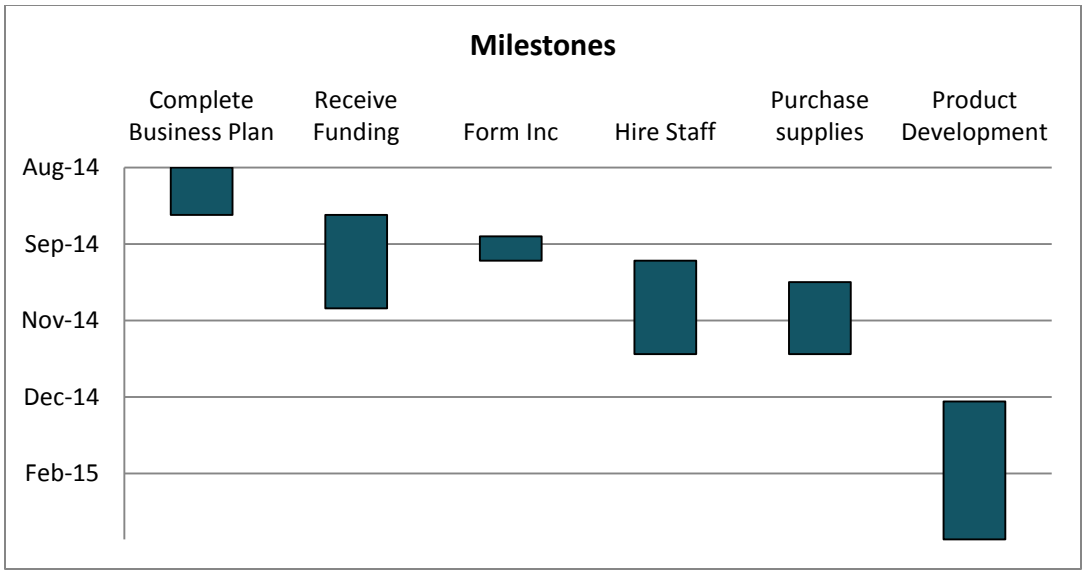
Uread Braille Inc.	$ in 000				
Year	1	2	3	4	5
SALES MODEL					
SALES: Products					
Average Sales Price $ per Unit	$4.00	$4.00	$4.00	$4.00	$4.00
Sales Units in 000	0	100	5,900	11,800	28,200
Sales: Products	$0	$400	$23,600	$47,200	$112,800
SALES: Advertising on Product					
Nr. Of viewers in 000	0	100	5,900	11,800	28,200
Average Ad Price $ per Unit	$1.00	$1.00	$1.00	$1.00	$1.00
Sales: Ads	$0	$100	$5,900	$11,800	$28,200
Sales All	**$0**	**$500**	**$29,500**	**$59,000**	**$141,000**
COST OF GOOD SOLD					
Production Cost per Unit Sold $/Unit	$1.50	$1.50	$1.50	$1.50	$1.50
Sales Units in 000	0	100	5,900	11,800	28,200
Production Cost of Units Sold	$0	$150	$8,850	$17,700	$42,300
Manufacturing/Ops/Website - Headcount	1	2	4	8	10
Mfg/Ops/Website - $/HC	$130	$130	$130	$130	$130
Manufacturing / Operations - Dept Expenses	$130	$260	$520	$1,040	$1,300
Other Expenses - Mfg/Ops/Web	$1	$2	$3	$4	$5
Cost of Goods/Services Sold	**$131**	**$412**	**$9,373**	**$18,744**	**$43,605**
Year	1	2	3	4	5
Sales All	$0	$500	$29,500	$59,000	$141,000
Cost of Goods/Services Sold	$131	$412	$9,373	$18,744	$43,605
Gross Margin	**($131)**	**$88**	**$20,127**	**$40,256**	**$97,395**
Sales All	0%	100%	100%	100%	100%
Cost of Goods/Services Sold	0%	82%	32%	32%	31%
Gross Margin	**0%**	**18%**	**68%**	**68%**	**69%**

5.6 STRATEGIC ALLIANCES

As a startup URead is currently not partnered with any company. However in order to break into this existing market, we would like to partner with one of our top competitors that already has a strong hold on the market. We believe that of our competitors Perkins School for the Blind will benefit from a partnership with us as their braille displays are popular but fall behind HumanWare. Because Perkins offers many external services, it would help URead in order to reach the same goals.

5.7 MILESTONES

In the first two years of the startup we plan on continuing to develop the BrailleShape and make it ready to use in the market. The following chart shows the key milestones for the project for the first year of development.



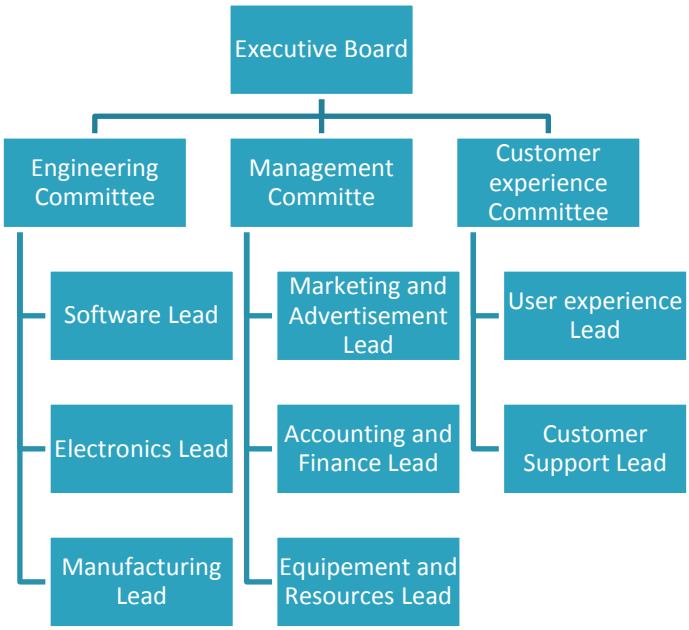
Product Development will continue for the next two years. At the beginning of the product development period a milestones or timeline chart will be created for the development of the product over the course of the next years.

6. MANAGEMENT SUMMARY

URead Inc. consists of a talented interdisciplinary team of professionals who are supportive and cooperative. We all come from different majors and backgrounds bringing unique sets of skills to the table. Christina and Samantha have been deeply involved in the project since 2013 and have the technical skill necessary to lead technical development of the device. They will be the founders of the company.

6.1 ORGANIZATIONAL STRUCTURE

URead Braille uses a decentralized Organizational Structure in order to promote constant innovation through research and development. Because of this the structure of the company is tightly and closely organized. The main branches of the company are listed in the figure to the right:



The following spread will examine the three pillars of structure corresponding to the organizational Structure.

1. Decision Rights
   Decision Rights at the company are localized to each branch of the company. For example, if a software engineer wants to make a change to the software that will benefit some algorithm for the device, that engineer should have the power to make the decision with approval of the Software Engineering lead. This allows the decisions regarding software to be exclusive to that branch of the company. Each employee will have the ability to make decisions that affect only their level or hierarchy of the company. The following table summarizes the duties and structure of each one of these committees and teams:

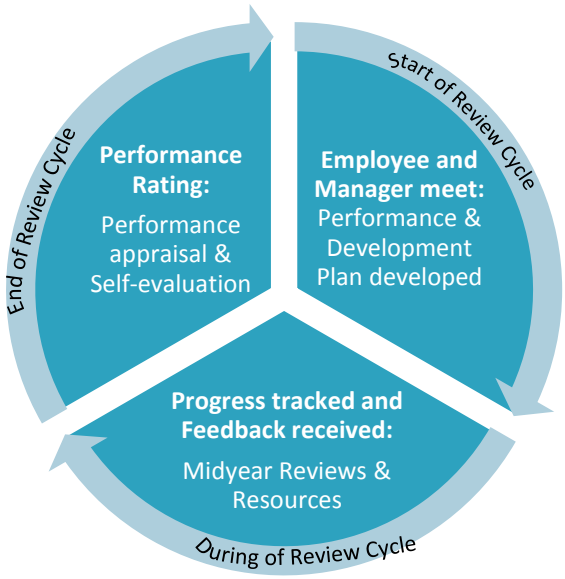
Executive Board	Makes decisions regarding the overall future of the company. The Executive board is responsible for interacting with investors and banks in order to receive funding as well as being in charge of the three branching committees.		
	Engineering Committee	The Engineering Committee consists of the Leads of t Software, Electronics and Manufacturing. The purpose of the committee is to collectively be able to decide on the major changes and decisions in each of the three branching teams.	
		Software Lead	The Software Lead is a developer that is in charge of all the software engineers. Each software lead has the decision rights to make changes to software that does not influence the other components of the device.
		Electronics Lead	Similar to the Software lead, but in charge of the electronic engineering for the device.
		Manufacturing Lead	Similar to Software Lead but in charge of manufacturing process of the device.
	Management Committee	The Management Committee is in charge of the organizing the resources of the company. The committee consists of the leads for each of the subcategories of this branch.	
		Marketing and Advertisement Lead	This lead is in charge of marketing and advertisement of the BrailleShape as well as sales made to customers. This lead will be responsible for a team of Marketers and Advertisement Designers.
		Accounting and Finance Lead	This lead is responsible for all accounting and financial decisions for the company. This person would lead a team of people that keep track of all of the logistics and resource allocation of the company.
		Equipment and Resources Lead	Because the company will invest in manufacturing machinery as well as office equipment, a team of experts that are able to take care of the equipment will be needed. This lead is in charge of the team.
	Customer User	One of the major ways that other companies differentiate themselves is through their well-known and trusted brands. In order to position	

	Experience	ourselves from these competitors, we will focus on excellent customer experience and this will be a large part of the company. This will enable the customers to switch over to our device as they like.	
		User Experience Lead	In order to optimize learnability and usability o the device, a team of user experience professionals will be put together to do research on this usability. The lead for this team will be in charge of this group.
		Customer Support lead	As the amount customers increases, a base of quality customer support call centers will be set up. This support system will be led by this lead.

2. Performance Assessment

In order to increase the productivity of each employee, several forms of the performance assessment are used. These are summarized in the list below:

- Annual performance appraisal forms. The main form of performance assessment will use the annual performance evaluation. The diagram below shows the process of the appraisal.



At the beginning of the review cycle each employee sits down with his or her manager and writes up a performance plan and a development plan. The performance plan contains information of what goals the employee has over the course of the next review cycle (year). The development plan outlines skills that the employee can develop in over the next year. URead recognizes the ability of employees to continue growing in their fields, because of this the development plan is created.

Throughout the duration of the year the employee receives feedback about their performance and development judged against the plans developed at the beginning of the year. This is done through midyear reviews and biweekly meetings with the manager.

At the end of the year the employee fills out a self-evaluation form and the manager fills the employee appraisal form. Through these two review criteria the employee know where he or she can continue developing and receives feedback from their manager.

- The secondary form of appraisal is through quarterly peer evaluation forms. Every quarter peers working in the same group will fill out anonymous evaluation forms in order to list the strengths and weaknesses of the employee.

3. Reward System
   The reward system for employees is used to create short and long term incentives for employees. In the long term, employees with good performance reviews and development are eligible to earn raises and bonuses. In the short term each subsection of the organizational hierarchy has an annual budget to organize reward challenges for employees. This will be decided by each department to increase either company profitability or reach localized goals.

In combination, the organizational structure allows URead to build a strong foundation for company growth and development. Spending time to work out these plans is useful in the long run to keep employees efficient, organized and motivated.

6.2 MANAGEMENT TEAM

Currently the members of the URead Braille team include:

- Christina Kayastha, Computer Science 2014, University of Rochester Hajim School of Engineering
- Samantha Piccone, Computer Science, Math 2014, University of Rochester Hajim School of Engineering
- Douglas Miller, Computer Science, Math 2015, University of Rochester Hajim School of Engineering
- Nicholas Gekakis, Electrical and Computer Engineering 2016, University of Rochester Hajim School of Engineering
- Tianyi Liu, Mechanical Engineering 2016, University of Rochester Hajim School of Engineering
- Joel Howard, Physics 2016, University of Rochester Hajim School of Engineering

Because the members other than Christina and Samantha on our team are not graduating this year, they will have the option of joining the company once they graduate. However for the startup we will need to recruit more engineers and professionals to the management team.

6.3 MANAGEMENT TEAM GAPS

As a start-up we currently are starting with the two founders. In the first year we will be recruiting employees in order to fulfill the organizational structure of the company.

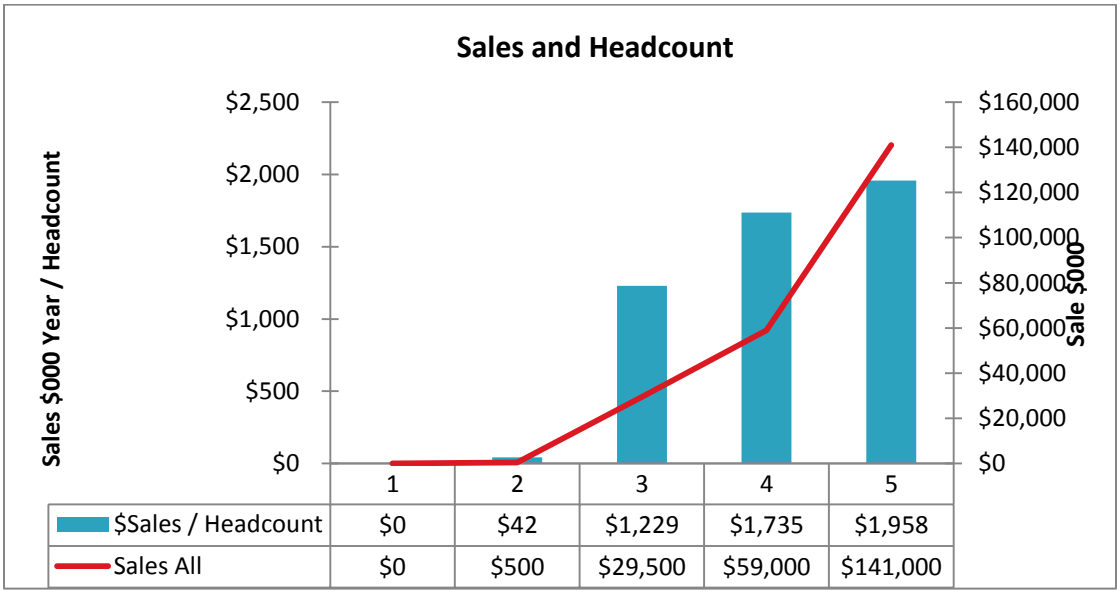
6.4 PERSONNEL PLAN

This Decision Rights structure allows the company to rapidly evolve in its earlier stages. In the earlier years of the company, each Lead will not have a team working under them, however the same organizational structure will be kept. As the company expands, each lead will be able to handpick and hire a team of professionals that could serve under them.
For example, the software lead, once the company is developed, will be able to have a full set of development team behind them. However in the first two years of the company, they will be the only developer on the team.

This allows us to minimize the number of employees in the early years of the company, and expand as we have the resources.

The table below summarizes the projected number of employees:

	YEAR	YEAR	YEAR	YEAR	YEAR
PEOPLE SUMMARY	**1**	**2**	**3**	**4**	**5**
Headcount	Headcount: End of Year				
Manufacturing / Operations / Website	1	2	4	8	10
R&D/Engineering	2	4	8	12	36
Sales & Marketing & Customer Support	2	4	8	8	16
Finance General & Adminstrative	1	2	4	6	10
TOTAL HEADCOUNT	6	12	24	34	72
$Sales / (Total Headcount)	$0	$25	$738	$1,041	$1,175



It should be noted that the Organizational structure will change and evolve alongside the company. Because of this the personnel plan will change as the years go by.

7. FINANCIAL PLAN

Our financial plan depends strongly on investors and loans received. Because the BrailleShape has not been completely developed and we are currently in the stage of the first prototype, the first two years of URead will be spent on developing the device. We expect to break even at the end of the second year of the company.

7.1 IMPORTANT ASSUMPTIONS

The following assumptions were made when calculating financials

1. Provision for Income Taxes is taken as 40% of the operating profit
2. Cost of Goods Sold is decreased each year
3. R&D/Engineering is targeted to double each year till five years
4. Number of employees is targeted to double each year till five years

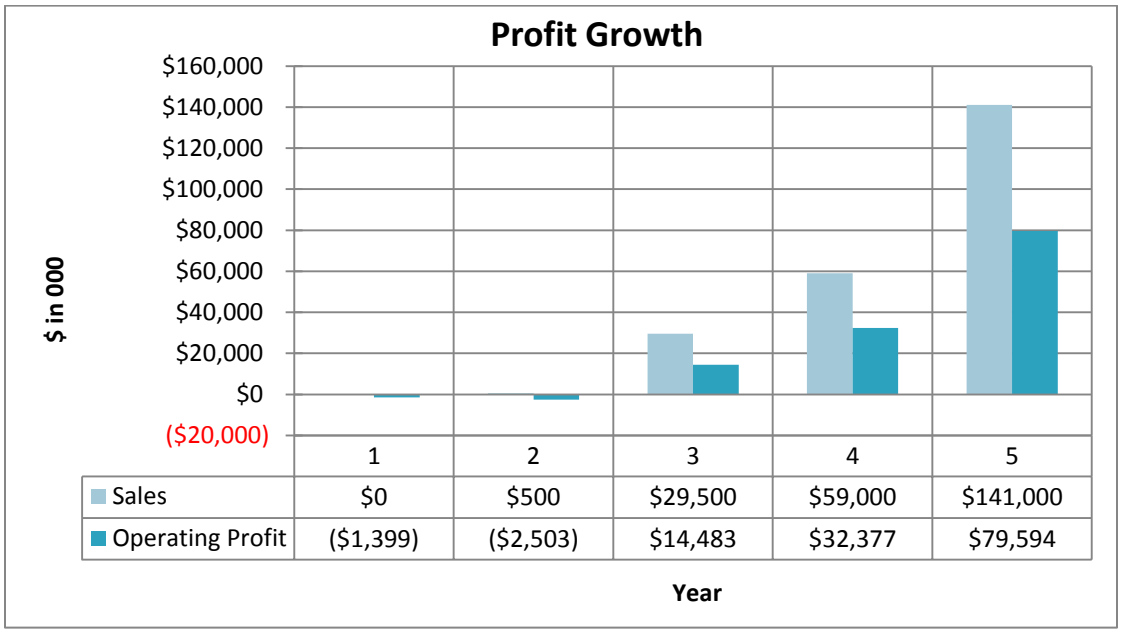
5. Inventory is calculated as 30% of the cost of the goods.
6. Balance Sheet Assumption (number of days):
    a. Receivables, to collect from customers—45
    b. Payables, to suppliers of goods and operating expenses—30
    c. Inventory, cost of goods sold on hand—15
    d. Tax payable—90

7.2 PROJECTED INCOME SATEMENT

Year	1	2	3	4	5
Income Statement	$ in 000				
Sales	**$0**	**$500**	**$29,500**	**$59,000**	**$141,000**
Cost of Goods Sold	$199	$548	$9,612	$19,053	$44,016
Gross Margin	**($199)**	**($48)**	**$19,888**	**$39,947**	**$96,984**
Percent of Sales	*0%*	*-10%*	*67%*	*68%*	*69%*
R&D/Engineering	$320	$680	$1,320	$1,920	$5,760
Sales & Marketing & Customer Support	$580	$1,175	$3,285	$4,570	$9,830
Finance General & Adminstrative	$300	$600	$800	$1,080	$1,800
Operating Expenses	$1,200	$2,455	$5,405	$7,570	$17,390
Operating Profit	($1,399)	($2,503)	$14,483	$32,377	$79,594
Percent of Sales	*0%*	*-501%*	*49%*	*55%*	*56%*
Total Interest Expense	$20	$38	$64	$0	$0
Income Before Taxes	($1,419)	($2,541)	$14,420	$32,377	$79,594
Provision for Income Taxes	0	0	4,207	12,951	31,838
Net Income	($1,399)	($2,503)	$10,276	$19,426	$47,756
Percent of Sales	*0%*	*-501%*	*35%*	*33%*	*34%*

7.4 PROJECTED PROFIT AND LOSS

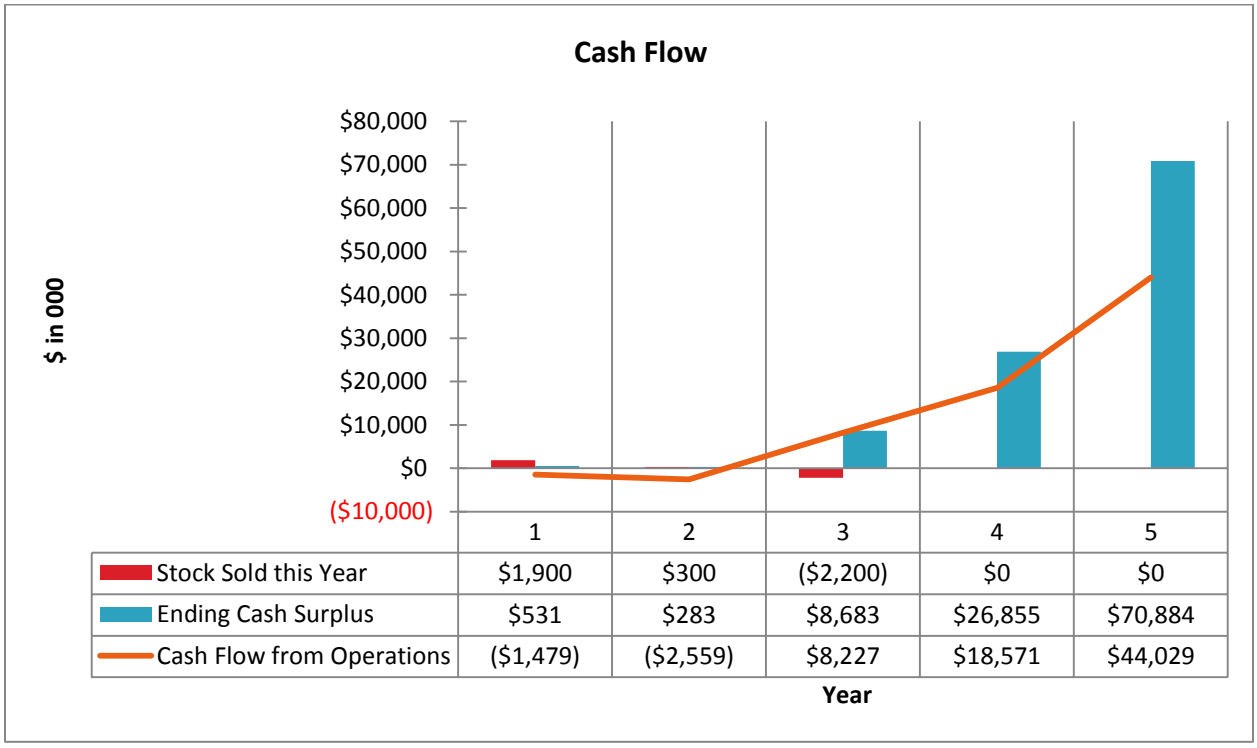
The Profit will break even at the end of the second year. At the end of 5 years, the projected profit is 80,000



7.5 PROJECTED CASH FLOW

The following table and graph shows the projected cash flow:

Year	1	2	3	4	5
Cash Flow	$ in 000				
Checking Account	$2	$3	$4	$5	$6
Balancer: Surplus Cash	$531	$283	$8,683	$26,855	$70,884
TOTAL CASH	$533	$286	$8,687	$26,860	$70,890
Change in Cash	**$533**	**($247)**	**$8,401**	**$18,173**	**$44,029**
Financing:					
Change in Stock Sold	$1,900	$2,200	$0	$0	$0
Change in Bank Debt	$0	$0	$0	$0	$0
Change in Leasing	$112	$112	$174	($398)	$0
Change in Financing	**$2,012**	**$2,312**	**$174**	**($398)**	**$0**
Cash Flow from Operations	**($1,479)**	**($2,559)**	**$8,227**	**$18,571**	**$44,029**



7.6 PROJECTED BALANCE SHEET

Year	1	2	3	4	5
Balance Sheet	$ in 000				
Assets					
Checking Account	$2	$3	$4	$5	$6
Balancer: Surplus Cash	$531	$283	$8,683	$26,855	$70,884
Receivables	$0	$62	$3,637	$7,274	$17,384
Inventory	$8	$23	$395	$783	$1,809
Current Assets	**$541**	**$370**	**$12,719**	**$34,917**	**$90,082**
Equipment	$224	$448	$796	$1,236	$1,888
Cumulative Depreciation	$75	$224	$489	$827	$1,307
Net Equipment	**$149**	**$224**	**$307**	**$409**	**$581**
Total Assets	**$691**	**$594**	**$13,026**	**$35,326**	**$90,663**

Liabilities and Equity					
Bank Debt	$0	$0	$0	$0	$0
Leases - Current Portion	$37	$75	$133	$0	$0
Accounts Payable	$115	$247	$1,234	$2,188	$5,047
Taxes Payable	$0	$0	$1,052	$3,238	$7,959
Current Liabilities	**$115**	**$247**	**$2,286**	**$5,426**	**$13,006**
Leases - Long Term Portion	$75	$149	$265	$0	$0
Total Liabilities	**$190**	**$396**	**$2,551**	**$5,426**	**$13,006**
Stock Sold - Venture Capital:					
Preferred Series A	$1,900				
Preferred Series B		$2,200			
Preferred Series C			$0		
Preferred Series D				$0	
New Stock Sold in This Year - Venture Capital	$1,900	$2,200	$0	$0	$0
Cumulative Stock Sold - Venture Capital	$1,900	$4,100	$4,100	$4,100	$4,100
Beginning Retained Earnings	$0	($1,399)	($3,902)	$6,374	$25,801
Net Income this period	($1,399)	($2,503)	$10,276	$19,426	$47,756
Cumulative Retained Earnings	($1,399)	($3,902)	$6,374	$25,801	$73,557
Total Shareholders' Equity (Stock + Retained Earnings)	**$501**	**$198**	**$10,474**	**$29,901**	**$77,657**
Total Liabilities and Equity	**$691**	**$594**	**$13,026**	**$35,326**	**$90,663**
Total Liabilities and Equity	$691	$594	$13,026	$35,326	$90,663
Total Assets less Surplus Cash	$160	$311	$4,343	$8,471	$19,780
Difference	$531	$283	$8,683	$26,855	$70,884
Difference goes to Surplus Cash.					

7.7 RETURN ON INVESTMENTS

URead will sell stock to investors in order to return a profit. The following table shows a summary of this:

STOCK AND INVESTORS SUMMARY	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**
Cumulative Stock Sold - Venture Capital	$1,900	$4,100	$4,100	$4,100	$4,100
"Post-Money" = Total Company Value in Millions	$12,000	$55,000	$135,000	$265,000	$350,000
Post-Money Co Value / Share Fully Dilluted	$1.01	$3.17	$7.79	$15.29	$20.19
Investors' Return on Investment					
Investors' ROI (Percent per Year) % p.a.	111%	85%	61%	32%	0%
Investors' Multiple (Times $1 Invested)	20.0	6.4	2.6	1.3	1.0