ACKNOWLEDGEMENTS

A SECURE DOCUMENT TRACKING PLATFORM

Contents

Executive Summary

The construction industry is notoriously slow at adopting new technologies which could revolutionize even their most standard processes and result in substantial and immediate cost savings. One of these processes is that of tracking and approving technical drawings. As a project is completed, drawings finalized through the collaboration of many different stakeholders. These include the architects, engineers, clients, sub-contractors and the general contractors themselves. The general contractor is responsible for managing the approval of these documents and assuring that all document are not only approved, but approved quickly such that the sub-contractors are not waiting idly. Efficiency is especially crucial in now prevalant design-build projects where construction is started before the building is finalized. In such projects, entire build schedules can be delayed - costing tens of thousands of dollars per day - waiting for a critical drawings to be finalized and approved. Any such delays can result in massive costs to be borne by either the client or contractor.

Acknowledgements will revolutionize this process by providing a full document approval and tracking system. By migrating document management to a single online service, the process of sharing drawings will be greatly simplified. Robust version control will assure that all parties are working from the same document revisions, and that no one is ever working from an out of date drawing. Not only will document revisions be managed, but the entire process of having stakeholders approve revisions of documents will be managed from a single dynamic interface.

At the beginning of a project, the general contractor will create a new *Acknowledgements* project. During this process they will select the different users responsible for aspects of the project, and the standard flow of documents during approval processes. *Acknowledgements* will be accessible not only by the general contractor, but also to the architecture, engineering and other related firms who will all login to the central system. Once the project is initialized, drawings will be added to the system. Drawings can then be automatically "delivered" to different stakeholders though *Acknowledgements* rather than by standard mail or E-mail. Revision notes and communications will be associated with each drawing in *Acknowledgements*, assuring that all communications are not only visible to stake holders, but also archived as per legal requirements. Since drawing revisions will always be transmitted through *Acknowledgements*, the state of each document will be known at all times.

General contracting companies will be the initial target clients for *Acknowledgements*. As the company coordinating a construction project, they have the most to gain by implementing *Acknowledgements*. If a general contractor is using *Acknowledgements*, all associated contractors will also be de facto required to use the interface. This will expedite the expansion of *Acknowledgements* throughout the industry as multiple general contractors will use the same architecture or engineering firms. While *Acknowledgements* will be initially designed specifically for the construction industry, many other possible application exist

in industries where technical drawings are prevalent and undergo constant revisions (i.e. manufacturing).

As a web application, the distribution of *Acknowledgements* is greatly simplified. The application will be managed from a central hosting facility, with client and technical support located in close proximity. Being centrally hosted has the additional benefit of relieving the client of most technical support issues. Any issue will be quickly resolved by *Acknowledgements* specialists.

There are currently no large document approval management systems commercially available. While revision control or document sharing applications exist, none integrate an approval system capable of meeting the strict legal liability requirements of the construction industry. *Acknowledgements* will integrate the approval process while simplifying the user's management of the entire process. Although no large commercial solutions exist, there are some instances of comparable systems developed internally by general contractors for use within their respective companies. Sources within the industry report that these systems are outdated and cumbersome to use. This clearly demonstrates the need for a system such as *Acknowledgements*, except one developed professionally by a firm which has the technical resources to perform continuous improvement as web technologies evolve.

Due to the widely varying size of general contractors, the pricing scheme for *Acknowledgements* will be very flexible. The benefit of using *Acknowledgements* to a company grows proportional to the number of currently active projects as well as the specific set of features required by the company. As such the pricing of *Acknowledgements* will also increase proportional to the number of active projects for a company and requested features. While more complicated than standardized pricing schemes, this model will be attractive to companies no matter the size of the contracts. Companies will also be able to mitigate perceived risk by scaling the use of *Acknowledgements* within their company as they realize the benefits of using the system.

Acknowledgements will be led by an executive team of engineering graduates with extensive experience in both the construction industry as well as in the development of web applications for a variety of other industries. The team will leverage this extensive experience to bring best practices from other industries to make *Acknowledgements* a truly revolutionary product. The team's technical experience is complemented by applied managerial and supplier relations experience.

Acknowledgements is currently in its early development phases. Initial application designs have been completed and will be implemented in the next four months. With the application implemented, rigorous process validation as well as user testing will begin in September 2013. User testing will be facilitated by the hiring of a user interface design specialist. Once the product is ready for market, clients will be sought throughout the industry. Client development will initially be focused in Ontario, and will expand throughout Canada over the following year.

The Problem

Market Overview

The construction industry is a notoriously slow moving and with few exceptions a laggard in the adoption of new technologies. While selling a new product is initially hard in this environment, there is huge potential to expand once ealy adopters have been found and proven the product's value. The Canadian Construction Association estimates the value of all current Canadian building permits to be $5.85 Billion as of January 2013. While this is an enormous industry, there are still many opportunities to make processes more efficient and greatly increase project profits.

Despite being such a large industry, major general contractors still fail to take full advantage of full electronic document management and approval systems. Instances of completely paper based systems exist across the industry while few companies have migrated to electronic systems which have been utilized in other industries for over a decade. Despite general contractors being responsible for the management of hundred of technical drawings per project, many either fail to make use of electronic document tracking, or rely on management systems developed within the company. While systems developed within a company are highly customizable, these companies simply do not have the capabilities in-house to develop and maintain systems which take advantage of constantly evolving web technology.

Market Challenges

The construction industry is very stable industry which has exhibited significant growth over the past decade despite a slow global economy. Statistics Canada estimates that the value of building permits issued across Canada have grown from $ 24.5 Million in 1995 to $ 61 Million in 2009. As the industry and the size of its corporations grow, assuring internal efficiency does not suffer is critical to remaining competitive. It is because of this growth that a system such as *Acknowledgements* is critical for large corporations to maintain document approval efficiency across hundreds of concurrent projects.

While large corporations dominate the market, Defence Construction Canada estimated that 90% of construction firms still employ fewer than 20 people. These firms manage only few projects at any one time, but organizational efficiency is just as critical to these small companies due to their limited resources. With a slow economy hurting industries across Canada, everyone is looking to streamline their internal processes and come out on top.

Market Opportunity

Positioning itself to help a growing industry that is trying to improve efficiency, *Acknowledgements* will revolutionize electronic document tracking and approval processes. By migrating processes from traditional paper based systems and bulky in-house developed systems, firms will be able to realize significant improvements in document approval times. The benefits of these efficiencies will greatly outweigh the project based cost of using *Acknowledgements*.

Document management is not only a problem for a general contractor, but for all of their dependent partners as well. While a general contractor must coordinate a project, they are constantly managing documents as they move between:

- Clients
- Architects
- Civil Engineers
- Sub-contractors

Coordinating the movement of these documents and their current status in the approval process is a very complicated and time consuming process. By centralizing the state of each document as it is passed between stakeholders, *Acknowledgements* will greatly simplify this process without compromising integrity. This coordination will be performed via a secure web-based application, where each stakeholder will be able to access a unified interface and thus quite literally be "on the same page".

The Solution

Acknowledgements is a web-based document tracking platform, facilitating secure sharing and approval of technical documents. In an industry where liability is paramount, having a clear record of a documents evolution is critical for assuring the safety and integrity of the end product. A simple unified web interface will allow for efficient systematic approval and archival of each document. The system will allow for collaboration within an organization as well as with external partners, many of whom must approve each document multiple times throughout its life-cycle.

Acknowledgments differentiates itself from existing solutions by emphasizing simplicity and ease of use. Most solutions on the market are made in-house by companies and are rarely complete, effective or user-friendly. Significant improvements have been made in web application technologies and *Acknowledgements* will leverage these technologies to simplify the user's experience. User acceptance has been identified as a significant challenge to be overcome by *Acknowledgements*, and as such a new user must realize the advantages of using *Acknowledgements* quickly before them become discouraged.

Development Plan

Acknowledgements will primarily be a document management application with the ability to automate document distribution between many parties. This core functionality will be complemented by enhanced security which will allow users to approve documents, while maintaining all industry legal accountability requirements.

The initial release of *Acknowledgements* will only contain this core functionality. However each company will have new and unique requirements for *Acknowledgements* which arise from their specific structure and client base. These additional features (or "modules") will be developed for each company for an additional charge. Once an additional module has been developed, it will also be available to other clients, again for an additional charge. As such the capabilities of *Acknowledgements* will grow with industry requirements, without exponentially increasing development costs.

Competition

Acknowledgements will be entering an industry largely lacking competition. As such, it will be important to enter the market with a fully developed product that will capture market share quickly. Once a company has adopted *Acknowledgements*, it will be difficult to switch from Acknowledgements which has become entrenched in the company's work processes due to employee retraining. As such it will be difficult for an alternative product to enter the market after Acknowledgement and compete with what will have become and industry

standard. Since *Acknowledgements* will not only be used by general contractors, but also the many third parties working under the general contractor (architects, engineers and sub-contractors), switching applications will only be made more difficult once these third parties adjust to *Acknowledgements*.

Business Model

Acknowledgements is a technical document management system, capable of handling the construction industrys document approval, distribution and archival needs. Clients using *Acknowledgements* will benefit from greatly a simplified process of managing drawings as they are sent between multiple firms and contractors, while assuring that all revisions and associated communications are archived in case they are ever needed. Since drawings and communications will exist within Acknowledgements secure online repository, they can be accessed 24/7 from anywhere in the world whether its from a desk in Toronto or the 100th floor of Hong Kong construction site.

Partnerships

In the near future, *Acknowledgements* will seek partnerships with A Small Orange (web hosting company), LibreOffice (software development company) and Mint.com (secure web application development company). These companies each provide services which can aid the development of *Acknowledgements* either through providing a service or experience.

1. **Mint.com** will be our first partnership. Security is an important part of our clients' workflow. Mint.com is experienced in creating secure applications, and they will be able to help us ensure that our application is secure.
2. **A Small Orange** will be our second partner, and will be pursued once our product is done development. All our services will be hosted on their servers. They offer great prices and great services and will be a valuable part of our business.
3. **LibreOffice** will be a long-term partner. Once our product is established with a starting client base, we will expand the offerings of our product to include a fully integrate office suite in our online software.

Distribution

The distribution of *Acknowledgements* is greatly simplified as a web application. The service will in general be accessible by multiple clients from a single central location. If a client would prefer to host the service on-site for security or other client-specific reasons, this will be possible however additional support costs will be charged for servicing the remote server. Assuming a client is using the centrally hosted option, the cost to *Acknowledgements* per additional client will be negligible during early stages of deployment. Common web hosting solutions are capable of serving hundreds of clients without the need to upgrade.

As *Acknowledgements* grows, distribution costs will increase marginally, but be only a small percentage of the additional revenue per client.

While hosting *Acknowledgements* centrally will greatly reduce distribution costs, it also increases risk since there will be a single physical failure point. This risk will be mitigated by utilizing a large hosting company such as Amazon, which allows the deployment of *Acknowledgements* to be managed centrally, but have redundant hosting centers in case of server failure.

Pricing

While *Acknowledgements* will become a critical system for the client, they will be initially unaware of their need. As such Acknowledgement's pricing scheme will emphasize initial low entry costs, with costs growing proportionally with the client's dependence on the application. Client revenue is proportional to the size of the company's current contracts. As such the cost of *Acknowledgements* will increase on a per-project basis. This scheme will be logical to a client since all drawings and other document will all be project specific.

Acknowledgements pricing will therefore be divided into three categories:

- **Trial** - All potential clients will be eligible for a trial of the software, free of charge. During this trial the client will have full application functionality for the scope and period of the project. The trial will allow a potential client to try the software concurrently with their established practices, thus minimizing risk while realizing the benefits of *Acknowledgements*.
- **Ongoing Fees** - Upon completion of the trial, the company will be charged a fee based on the current number of projects being managed through *Acknowledgements*. This pricing scheme will allow companies to slowly adopt *Acknowledgements*, without large upfront costs. As user acceptance grows, the application will become critical to the client's business model.
- **Extended Functionality** - The development of additional features will possible at any point after the client has become an ongoing *Acknowledgements* client. Additional features will be available for an upfront development cost in addition to a small ongoing yearly fee.

Product and Technology

Acknowledgements will rely heavily on state-of-the-art web application technologies such as HTML5 and new scripting languages. These tools will allow *Acknowledgements* to be developed quickly and minimize the development cost of additional features. While significant time and effort was required to implement standard functionality such as "drag-and-drop" only a few years ago, this cannot be implemented in minutes with new tools available. These new web technologies will however merely be tool to accomplish the user-friendly interface *Acknowledgements* will be known for.

Acknowledgements will use dynamic scripting to generate a customized home interface for each user. This customized interface will display only the projects and functionality relevant to that user's role. While additional functionality (given proper permissions) will be easily accessible, the selected core functionality will be all that is readily displayed to the user. By focusing on the user's experience, *Acknowledgements* will be able to gain popularity not only with individuals involved in the procurement process, but gain popularity with the employees who will use *Acknowledgements* every day. Client loyalty will be critical in not only retaining existing customers, but also soliciting referrals to new potential clients.

Since all document processes will be managed through *Acknowledgements*, many analytics are possible which are infeasible using paper based systems. In today's online world, data is currency. Companies using *Acknowledgements* will be able to leverage system data to further streamline their procedures. *Acknowledgements* will be able to provide analytics identifying trends and outliers at the user, project and even company level. This data can help managers identify bottle-necks in the process and determine the root cause. While these reports can be run manually, *Acknowledgements* will be monitoring project progress, and will be able to notify a supervisor if a specific task is taking longer than normal for the given company.

These unique features will be based on proprietary algorithms which are capable of identifying issues early in their development, so that they can be fixed before the client is severely affected.

Marketing and Sales

The Competition

There is little publicly availiable quantitative data regarding existing solutions since they are designed by specific general contractors solely for internal use. To evaluate the competition and find our foothold in the market, Table 1 shows our competition profile.

Table 1: Defining the Competition

Competitor	**Type of Competition**	**Strengths**
Previously established approval software contracts.	Economic	Strength: Our product will be easier to justify using in their current budgets.
Document revision control schemes (ie: Google Docs)	Direct	Strength: Our product will focus specifically on the professional challenges associated with establishing a secure approval process.

Acknowledgements will differentiate itself from its competitors by providing a product that helps develop a productive and frustration-free work environment. Seeking approval from the architect or engineer should not be a cumbersome process. *Acknowledgements* allows users to quickly draft a Request for Information or other document and send it off in minutes whether the user is in their office or the 100th story of a building under construction.

Every aspect of *Acknowledgements* will focus on helping the customer have a hassle-free experience. The interface will be uncluttered and easy to use. Mobile and desktop web applications will allow for a user's *Acknowledgements* account to be easily accessible from anywhere. Finally, the *Acknowledgements* development team will be available to help create custom functionality to serve a clients ever-changing needs.

The value curve in Figure 1 shows how *Acknowledgements* differentiate itself from an example competitor.

Go-to-Market Strategy

Our go-to-market strategy involves seeking initial clients in August of 2013. The entire development plan from the early stages to the revenue-earning phase is detailed in Figure 2.

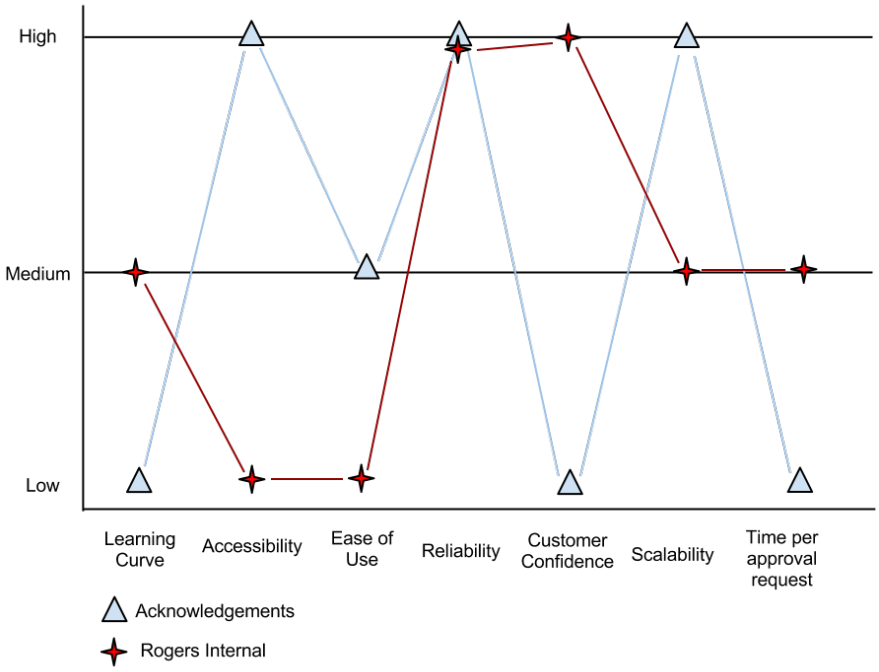

Figure 1: Value Curve

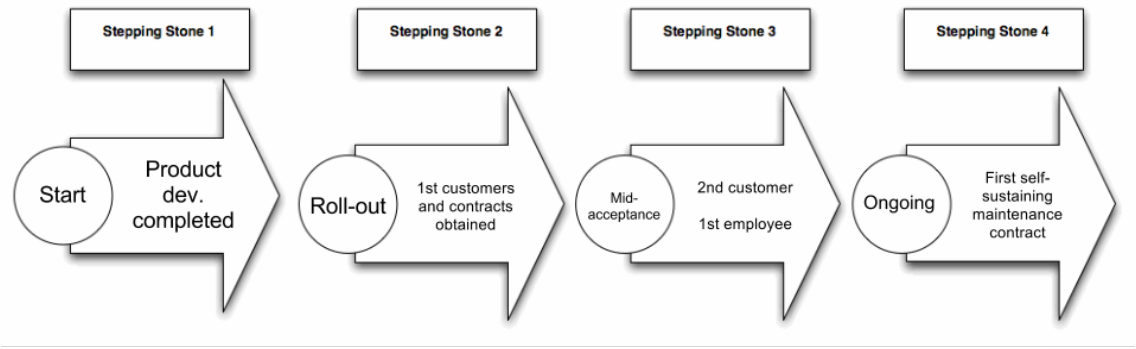

Figure 2: Growth Cycle

Acknowledgements will enter the product development stage by early May 2013. With an experienced founding team, an initial release of *Acknowledgements* will be ready by late-August 2013.

An intial beta version of *Acknowledgements* will enter on-site client testing phases by the

end of August 2013. Our next set of customers will be obtained by end-of-year 2013.

Once a solid customer base is established, *Acknowledgements* will enter the ongoing growth phase. Self-sustaining maintenance contracts will be the main source of revenue for the company, and further funding will not be required.

Customer Retention

Acknowledgements will have high customer retention not only because it will offer an exception product, but also because of the large cost to a company to switch an application which is so tightly tied into that company's operations. One of the most significant challenges in acquiring a client will eventually benefit *Acknowledgements* in terms of client retention. Research shows that companies tend to invest in a particular approval software solution, and then stick with it. This is exemplified by the problem we are trying to address: Companies have blindly stuck with their unacceptable approval software for years because the hassle of changing was undesirable.

Target Customers

Our target customers are the major Canadian general contractors. The approval process is entrenched in their company's work flow and it is often the case that the software they use for this task is many years outdated.

Our largest target customers include many of the members of the Canadian Construction Association including:

1. AECON Buildings
2. Hamilton-Halton Construction Association
3. Infrastructure Ontario
4. PCL Constructors Inc.
5. Pennecon Ltd.

There are hundreds of general contracting firms across Canada, each of which is a viable client. While initially *Acknowledgements* will be targeted at the Canadian construction industry, it will quickly expand internationally once a client base is established. Industry regulations and other legal requirements will be significant considerations when expanding outside of Canada.

Management Team

The *Acknowledgements* management team is composed of two University of Waterloo alumni, with thorough experience working in a variety of technical and managerial roles. With diverse technical and managerial backgrounds, Brock and Karl have proven themselves able to adapt to the variety of situations with which *Acknowledgements* will be confronted.

Brock Kopp, Co-founder

Brock is a University of Waterloo Mechatronics Engineering graduate. Brock has developed various process management software applications for a wide assortment of industries. Most notably Brock was the lead developer for a proprietary product management application, used in the Canadian precast concrete industry. This system was capable of managing the production, quality control and yard management procedures of a large scale production facility. Brock has also experience developing for a product lifecycle management system in the print/publishing industry. This diverse experience will allow Brock to combine best practices from many backgrounds into *Acknowledgements*. Brock has also gained practical experience building and managing relationships with external corporations through his experience planning and executing a week long orientation event. In this role Brock was able to secure funding from various industrial sources. Brock has a strong financial background, gained through his role as Director for an $11 Million endowment foundation over the past 2 years.

Karl Price, Co-founder

Karl is the driving force behind *Acknowledgements*. As a graduate from the University of Waterloo, Karl has extensive experience in product development, gained through his work with the Toronto Sick Children's Hospital. Here Karl lead the development of multiple tools to be used in the medical industry. Looking to broaden his horizons, Karl will use his experience developing in the highly regulated medical industry to further improve the security and quality assurance of *Acknowledgements'* processes. Karl has a background built upon many years of web application development . Working on web development projects for Rogers telecommunications and Sears Canada as well as various freelance projects, Karl has gained many contacts in the web development industry which can be leveraged to support the growth of *Acknowledgements*.

Future Key Hires

The founders of *Acknowledgements* bring extensive technical and industrial background to *Acknowledgements*. This technical experience will facilitate the development of an industry leading document management system. While the security, robustness and reliability of *Acknowledgements* will be assured with the team of co-founders, further staff will be required to build a user interface that is not only industry leading, but as one of the top web application interfaces in the world.

This will be achieved by hiring a specialist in user-interface design and user testing. This specialist will be responsible for refining the user interface of *Acknowledgements* to assure the upmost client efficiency and ease of use. They will then focus on user testing of the application with users who are both familiar with competing solutions as well as individuals in the construction industry having no experience using document management systems. Testers will be recruited not only from general contracting companies but also from architecture and engineering firms. These testers will be recruited both through potential clients as well as externally through known industry contacts. Once the application has undergone an initial release, this interface specialist will be responsible for ongoing application improvement as well as liaising with current clients to identify and manage software issues.

As further clients are acquired, the executive team is expected to grow to include a VP for client development. This VP will hired with established connection within the construction industry and be responsible for seeking and establishing new clients. This role will become necessary as the number of clients grows to a point where the current staff can no longer effectively maintain relationships with existing clients while seeking new opportunities.

Finances

Basic Costs

The first step in identifying initial required funding was to establish the basic operation costs during the starting phase of *Acknowledgements*. The following table shows the anticipated initial setup costs and deadlines.

Task	Responsibility (Name) Internal	External	Estimated cost ($)	Due date
Incorporating your business		Legal (Help from Communitech & UW)	$100	July/2013
Renting office space	Karl		$0 - Work from home	
Finding and engaging key vendors	Brock		$100 – Mostly Gas	May/2013
Setting up accounting and payroll systems	Karl		$50	August/2013
Securing employment agreements and key personnel	Brock		$20 – Printing/Gas	June/2013
Filing legal and taxation documents		Accountant (Help from Communitech)	$100	August/2013
Purchasing insurance policies		Accountant (Help from Communitech)	$5000	August/2013
Setting up your website	Karl/Brock		$30	April/2013

Figure 3: Task Breakdown

Growth Plan

The stepping stones described in the Go-to-Market Strategy section of the plan are reiterated in the following financing roadmap. The necessary funding required for each step is presented

underneath the appropriate stepping stone.

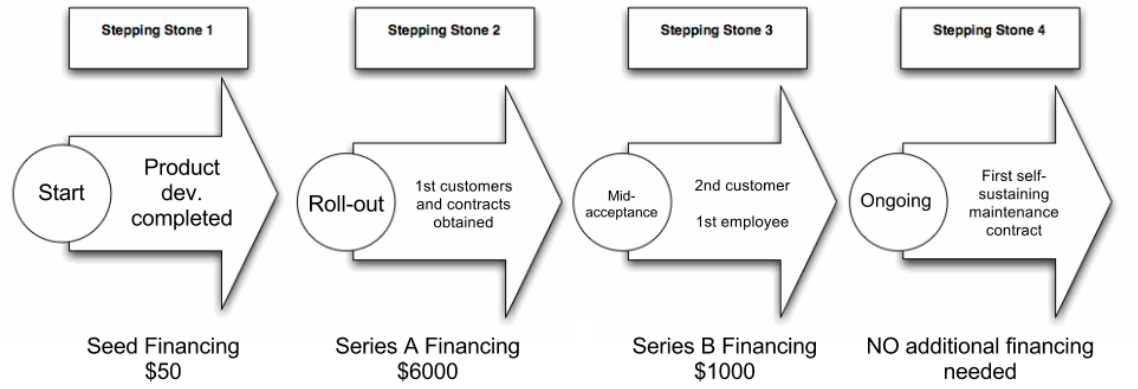

Figure 4: Financing Roadmap

Initially only $150 seed financing will be required. This will cover menial costs associated with working from home and developing *Acknowledgements*. This cost does not account for compensating founders during the initial development phase as the co-founders will not be compensated until the first clients have been established.

Series A financing entails purchasing the required server space to host our application for our client to access it before we have started to receive revenue. The rest of the costs associated with this stage of financing are associated with travel to and from client meetings.

Series B financing is again to cover small costs that have to do with client meetings. All necessary expansion costs are covered by the revenue obtained by initial client membership fees.

During the ongoing phase, *Acknowledgements* is self-sustaining based on revenue and does not need additional financing.

Accounting

The *Acknowledgements* Balance Sheet for the first year is presented in the following table. This Balance Sheet does not account for the development hours worked by the founders, who will not initially be compensated for their work.

Table 2: The Balance Sheet

Item of Service	**Cost per Unit ($)**	**Quantity in First Year**	**Cost for First Year ($)**
Office (Work from home)			
Computers	1,500	2	3,000
Internet Service	60	12	720
Office Supplies	300	1	300
Printer	150	1	150
Product			
Web Hosting	150	1	150
Development Hours (unpaid)	0	750	0
Development Hours (paid)	30	1000	30,000
Client Meetings			
Lunches	50	50	2,500
Gas	50	20	1,000
Legal			
Incorporation	300	1	300
Insurance	5,000	1	5,000
Total			**43,120**

Current status, use of proceeds and milestones

Current Status and Milestones

Acknowledgements is currently in the product development stage, described in the Financing Roadmap. Development of *Acknowledgements* will be finished by late-August, which will constitute the "Start" Milestone of the Financing Roadmap (Figure 4).

With a complete initial product, the integration of *Acknowledgements* into client systems will begin. Upon successful deployment of *Acknowledgements*, immediate financial return is expected from clients. Revenue will grow proportionally to the number of clients and their respective projects using *Acknowledgements*.

Funding and Use of Proceeds

Acknowledgements is currently in need of $2000 in seed money. This will fund small costs associated with setting up a home office. The majority of the funds will pay for web servers to host our product for our first client and any meetings required while liaising with potential clients.

Once *Acknowledgements* has been successfully deployed in a live environment, significant resources will be attributed to testing and continuous improvement of features which are not optimized for a live environment. The deployed system will greatly elevate the value of *Acknowledgements* and act as a case study for acquiring new clients.

Depending on initial interest in *Acknowledgements*, additional funding for sales and marketing may be required at this stage to further promote *Acknowledgements* within the industry. Funds would be used to fund communications and meeting travel expenses to meet with general contractors across Canada to promote the benefits of implementing *Acknowledgements*.

Risk Analysis

Acknowledgements is positioned to enter a niche market with currently sparse competition. While this may be true now, with the success of *Acknowledgements*, competition is sure to quickly enter the market. As such three critical success factors have been identified to assure that *Acknowledgements* evolves into a market leader for technical document tracking and approval.

The industry reputation of *Acknowledgements* will be based on a clean and user-friendly interface which allows a user to easily utilize the powerful and secure management and tracking system that corporations will rely on. As such it will be paramount that all releases of the software are thoroughly tested not only for process integrity, but also ease of use. Many software applications have started with a simple and clean user interfaces, only to become cluttered and confusing as further functionality is added. User testing and closed-loop user feedback will be crucial to not only gaining, but sustaining a reputation as the most productive product on the market.

One of the largest weaknesses of web-applications is server failure. Any down-time will have a significant negative impact on the reputation of *Acknowledgements*. Risk of application down-time will be mitigated by using a distributed hosting service, where *Acknowledgements* is hosted by one company, but across various geographic locations. This will result in a much more robust hosting solution that will be resistant to technological failures or "acts of god".

Acknowledgements down-time could also result from an application update which causes an unforseen critical failure. In order to mitigate this potential issue, all updates will be performed with a full live backup of the previous software release ready to be reinstated. As such, if there is an issue with the update, the old version will be reintroduced within minutes of the error being detected. Update cycles will also make use of weekends to assure that updates are performed during periods of minimal application use.

Due to the nature of liability in the construction industry, *Acknowledgements'* approval system will only truly be tested in the event of legal action undetaken against a client. It will be during these circumstances where it is critical that *Acknowledgements* is able to produce a full report of exactly which documents were approved by whom and in what sequence. This will assure that liability can be assigned clearly and accurately. Failing to provide an accurate report of the approval process will significantly undermine the reputation of *Acknowledgements* and could immediately put the company's reputation in disrepute. Integrity testing will be constantly undertaken with ongoing projects selected at random. This will assure that any issues are discovered internally before they come to light.

Risk	**Mitigating Strategy**
Product does not have required functionality	This possibility has been deemed very unlikely due to the foreseen simplicity of implementation. If the product is not deemed ready according to development schedule, more time will be taken before deployment - rather than rushing an incomplete product to market.
Client not interested in trying *Acknowledgements*	Contacts within existing companies will be leveraged to assure the product meets client requirements before release.
The existing market is smaller than anticipated	Thorough market research has proven an existing market for *Acknowledgements*. *Acknowledgements* also has a potential market in the related industries such as manufacturing, where technical drawings also require constant revisions and approval.
Insufficient funds to develop or sustain *Acknowledgements*	Development plans minimize development cost to avoid this. Alternative financing will be sought from financial institutions should this occur once clients have been established.
Acknowledgements is the first corporation for this management team.	The *Acknowledgements* executive team have worked together for years on various initiatives. They will supplement their knowledge with help from industry advisors.

Appendix

Contents:

- Resume of Brock Kopp, Co-founder
- Resume of Karl Price, Co-founder

Brock Kopp

Waterloo Mechatronics Engineering

(226) 868-9297
brockkopp@gmail.com
103 University Ave W, Waterloo, ON

QUALIFICATIONS SUMMARY

- Experience identifying needs and initiating change as Director of an $11M endowment fund
- Excellent project management developing an inventory management system
- Effective communications skills strengthened as an organizer of Waterloo Engineering's Orientation
- Broad leadership experience expanded through various on-campus positions
- Extensive conceptual understanding of mechanical systems from experience as mechanical designer
- Able to manage multiple tasks as a student leader, while maintaining high academic performance

RECENT EXPERIENCE

Aug. 2011 - Dec. 2012

Director, Waterloo Engineering Endowment Foundation (WEEF)

A student run endowment fund, focused on improving Waterloo undergraduate engineering

- Elected by the undergraduate engineering student body to administer the largest student-run endowment fund in the world ($11 M)
- Completely redesigned the proposal submission process, using electronic document handling to greatly simplify the process while increasing funding transparency
- Liaise with the student body and faculty to gather funding proposals and oversee disbursements
- Coordinate with university student teams to adapt WEEF's funding policies to better suit their evolving needs while maintaining the integrity of the fund

Oct. 2011 - Oct. 2012

Organizer, Waterloo Engineering Orientation

Part of a group of 4 students selected by the University to run all aspects of Engineering Orientation

- Coordinated all aspects of the Waterloo Engineering Orientation Week 2012
- Consulted with new suppliers as procurement lead and ultimately saved over $1000 on a single item (hard hats); developed a relationship which can be leveraged in future years
- Assembled a team of approximately 500 engineering leader volunteers to run the week, including hiring and assuring that all necessary training and payments were completed prior to the week

May - Aug. 2012

Lab Engineer, University of Waterloo

Department of Mechanical and Mechatronics Engineering
Waterloo, ON

- Designed and implemented an inventory system for reusing student project parts and equipment, resulting in significant savings for undergraduate students
- System effectively tracks equipment location and condition, allowing for greatly increased student access to expensive lab equipment
- Created all work procedures for system and associated system management software

Jan. - May; Sept. - Dec. 2011

Mechanical Designer, Department of National Defence

Branch of the Canadian government responsible for defending Canada and Canadian interests.
Ottawa, ON

- Designed and manufactured unique products which could not be outsourced to external companies as part of the "Special Products Development" group
- Gained hands-on experience implementing manufacturing processes and subsequently learned to design for cost-efficient manufacturing
- Acquired extensive experience working with and understanding (manual and CNC) mills, lathes and EDM machines; exposed to sheet metal, welding, plastics and CMM processes

EXTRA-CIRRICULAR EXPERIENCE

Jul. 2012 - present

Chair Nominating Committee, University of Waterloo

Member of a department committee charged with nominating the next Mechanical Department Chair

- Nominated by the Director of Mechatronics to represent all department undergraduate students during the process of selecting a new department Chair
- Conducted information sessions and online questionaries for undergraduate students to gather feedback and criteria for selecting a new Chair

Sep. 2012 - present

Ambassador, Waterloo Engineering

Selected by the fauculty to liaise with potential students and help them prepare for university life

- Developing a program to focus on extracurricular interests of incoming students and assure that new students have the opportunity to pursue their interests when they arrive on campus
- Liaise electronically and in person with potential students and introduce them to both University and campus life

Aug. 2009 - Feb. 2010

Junior Design Competition Director, Ontario Engineering Competition

Annual Provincial undergraduate engineering competition

- Organized aa competition attended by engineering students across Ontario who had won their University's qualifying event
- Supervised event and assured that all issues that arose were dealt with effectively
- Developed competition problem, rules and acquired all necessary resources while balancing academic and workplace commitments

EDUCATION

2008 - present

Bachelor of Applied Science (Candidate), University of Waterloo

Engineering program, focused on the design of computer-controlled electromechanical machines

Courses

- Organizational Design and Technology, Electromechanical Machine Design
- Microeconomics, Technical Entrepreneurship (Winter 2013)

Projects

- Work in a small team to automate an endoscopic suturing tool for use in automated surgery. The project will implement precision actuation techniques to produce a research ready tool for our commercial partner.
- Built a real-time operating system as part of a group of 4 students, which required significant collaboration to coordinate work and balance academic commitments

ACTIVITIES AND INTERESTS

- Wilderness tripping, with numerous canoe trips around Ontario and a month-long sea-kayaking trip on the Labrador coast.
- Solo white-water paddler, including annual trip to Smokey Mountains, TN
- Greatly enjoy travelling, including France, Hong Kong and 6 months living in Australia
- Recreational cycling and indoor bouldering

Karl Price

University of Waterloo Mechatronics Engineering

226 339-5275
karldprice@gmail.com
48 Parkview Ave. Toronto, Ontario

SKILLS SUMMARY

- Robotics engineering background and hands-on work experience
- Extensive mechanical design skill set
- Applied machine shop manufacturing experience
- Broad CAD experience using Solidworks
- Strong MATLAB and SIMULINK knowledge

RELEVANT EXPERIENCE

Engineering Culminating Design Project, University of Waterloo *Sep. 2012 - present*
Redesign of MDA's KidsArm surgical robot, on contract for CIGITI

- Identified problems present in original KidsArm prototype
- Designed and manufactured two functional prototypes addressing the identified problems
- Performed all machining and assembly work for the prototypes

Surgical Robotics Intern, The Hospital for Sick Children, CIGITI research group *Apr. 2012 - Aug. 2012*
Implementation of 7 degree of freedom control of a DENSO industrial robotic arm

- Implemented low-level remote center of motion control of a 7 degree of freedom robotic arm
- Derived Jacobian, as well as forward and reverse kinematic models of the robot
- Implemented control scheme in MATLAB SIMULINK
- Designed and manufactured robotic forceps tool extension for robotic arm

Robotic Tool Developer, The Hospital for Sick Children, CIGITI research group *Jan. 2011 - Dec. 2011*
Design and prototyping of robot for minimally invasive neurosurgery

- Lead mechanical and electrical design of world's smallest neurosurgical robot
- Extensive Solidworks modeling and MATLAB simulations
- Machined three, to-scale functional prototypes of the robot
- Authored specifications report which was used as basis for contractual talks regarding clinical-grade manufacturing

EDUCATION

Candidate for Bachelor of Applied Science, University of Waterloo *Sep. 2008 - present*
Undergraduate engineering - design of electromechanical systems

- Focus on team design projects ranging from 3 to 5 team members with timelines of up to eight months
- Acquired experience in many engineering software packages including MATLAB and Solidworks
- Learned machining skills through the use of the student machine shop

Courses of Study

- Four courses in controls, including SISO and MIMO systems
- Introduction to Micro-Electromechanical Systems (MEMS) manufacturing
- Four circuits courses including signal conditioning, power electronics and motor control
- Dynamics, statics and mechanics of deformable solids courses

ACADEMIC ACHIEVEMENTS

- **University of Waterloo President's Scholarship -** Entrance scholarship recognizing students of strong academic potential.
- **Cumulative average of 85.6% in third and fourth year of undergraduate program**
- **Excellent Academic Standing Designation -** Excellent academic standing recognition received in six of seven completed terms of undergraduate engineering.

REFERENCES

Dr. James Drake, Head of Neurosurgery, The Hospital for Sick Children

415-813-6125
james.drake@sickkids.ca

- Supervisor while working with CIGITI
- Collaborator on minimally invasive neurosurgical robot
- Proposed supervisor for Master's thesis

Thomas Looi, CIGITI Lab Manager

415-813-7654 x28074
thomas.looi@sickkids.ca

- Co-Supervisor while working with CIGITI