

# Redefining the Use of Augmented Reality

A Project Proposal For  
**LUMINARY**

Version 1.0  
25 March 2015

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# 1.0 Introduction

## 1.1 Project Background

Announced on 2 March 2015, four AUT students ('the group,' see 1.2) were selected to work with Luminary Promotions ('the client,' see 1.3) on a BCIS Research and Development project.

Luminary Promotions (hereinafter 'Luminary') require a system to streamline their deployment process for Augmented Reality (AR) content. Luminary's previous development practices required the creation of an entirely new application (app) for each client, and users were not engaged with the app longterm — resulting in a lack of use and quick deletion of the app.

Luminary's original project proposal defined a system which would be "created within the Unity 3D engine following Luminary standards." They explained, "It will be a base shell so that it can be built upon and evolve with the technology around it."

Luminary also mentioned how the use of GPS/geolocation services would allow the user to "point [their] mobile phone at a building/environment and it will display information about it." Luminary described the application as a "platform for AR content which has a GPS component". The scope of the project was otherwise undefined.

After two meetings with the client and six collaborative group meetings, the group suggested to the client that the platform may require a utility function in order to solve the user engagement issues experienced with their past offerings. Luminary agreed with this idea and tasked the group with the challenge of discovering a new utility purpose for AR as part of the scope of the project.

To account for the possibility that a utility purpose was not discovered, the group also offered an alternate development approach. In this alternate approach, rather than creating an AR platform which groups together AR content, an app plugin would be created which could be added to pre-existing apps. This would allow an extended functionality of apps already in use.

Luminary were pleased with both suggested application approaches. The creation of the AR platform is considered viable only if a utility purpose (or purposes) can be discovered by the group. It is planned that if no utility purposes are found, the group will instead start development on the app plugin extension approach.

Luminary informed the group that their intentions were to expand their user and client base, while improving their customer's experience and satisfaction. Luminary wish to position themselves as the leader in AR technology in New Zealand, and are more concerned about having a strong brand than profiting in the short term. They expect to make a loss with the system initially due to marketing and development costs.

The group will be offered support by Luminary's Managing Director, Ahmed Almukhtar and developers as necessary. The group will not be required to produce any of the AR content, as this will be created by Luminary's in-house development team, inline with Luminary's standards.

This project plan is to be presented to a panel of judges on 25 March 2015 for approval.

## 1.2 The Group

### AUT STUDENTS

Name	Student ID	Area of Study	Email	Phone
Jason Gerbes	1274664	Major in Computer Science, Minor in Software Development	srr2206@aut.ac.nz	027 543 7237
Joshua Son	1388288	Major in Computer Science	hpg4759@aut.ac.nz	021 187 9608
Paul Lee	1264218	Major in Software Development	rjr3664@aut.ac.nz	021 025 04866
Sean Young	1302108	Major in Software Development	crp8296@aut.ac.nz	021 113 6388

### SUPERVISOR

Name	Email	Office	Phone
Roopak Sinha	roopak.sinha@aut.ac.nz	WT408	09 921 9999 ext. 6256

## 1.3 The Client

### LUMINARY PROMOTIONS

Luminary Promotions LTD are a marketing and experiential agency based in Auckland CBD. They are a young company consisting of twelve full-time employees. 'Luminary' is a noun and defined as "a person who inspires or influences others, especially one prominent in a particular sphere" (Oxford Dictionaries, 2015).

Luminary's sole focus, as stated by the founder Ahmed, is "to deliver outstanding campaigns for our clients through experiential campaigns and Augmented Reality marketing app development." Luminary believes in order to achieve their goals they must continuously evolve business operations with creative "out-of-the-box" ideas, introducing new technologies at a high standard.

Luminary aims to be the forefront leader in the New Zealand advertising market, by using new technologies, like Augmented Reality, that people have not seen before. Luminary has a strong emphasis on using the latest advanced technology as a part of their digital strategies to meet brand communication objectives. Luminary has delivered results for several iconic kiwi and international brands such as AA Insurance, LG and Twentieth Century Fox. Luminary also reference traditional advertising media, such as TV, billboards, radio and print.

### STAFF

Name	Position	Email	Phone
Ahmed Almukhtar	Managing Director	ahmed@luminarygroup.co.nz	021 844 522
Alexis Rabadan	Lead Developer	alexis@luminarytech.co.nz	021 065 3537

Ahmed is a former University of Auckland student, completing study with a bachelor, majoring in computer science and information systems. He is the founder and managing director of Luminary Promotions, which he founded in March 2013. Ahmed sees himself as a visionary and wishes to ensure business sustainability and growth for Luminary.

Alexis is Luminary's Lead Developer. He has overseen many of Luminary's past projects, and will be one of the groups main contact points during development.

## 2.0 Rationale for the Project

### 2.1 Complications with Current Approach

As part of their experiential advertising options, Luminary offer tailor-made Augmented Reality applications. The app is built from the ground up, and often consists of a very simple user interface and a very limited amount of content.

Historically, the app is built in unison with a larger campaign. For instance, Luminary created an app for the January 2015 issue of M2 magazine. Several pages of the magazine were linked to an augmented experience of the accompanying application. The app was intended to enhance the users experience and engagement with the magazine.

The issue with Luminary's current approach of development is that each campaign requires a new app to be built from the ground up. Also, if more content needed to be added (e.g. a new issue of M2 magazine), then a new version of the app must be downloaded by the user.

Luminary have discovered that their app's usage drops significantly shortly after the campaign, and the user often deletes the app once it is no longer being used. It is also possible that some users choose not to participate in the campaign as they wish not to download a new app.

### 2.2 Need for a Streamlined Approach

Luminary would like to implement a more systematic and streamlined approach to the use of AR. This new system would allow Luminary to address the complications they are facing with their current development regime.

Creating a new application for each marketing campaign involves a large workload and limits the number of clients Luminary can service at any given time. The current development practices used by Luminary vary for each application, making development specific to each app (cannot be reused for other apps).

Implementing a streamlined development system would allow Luminary to focus less on the technology and more on the promotional content. Development would be standardised, allowing for more rapid expandability and deployment. This system would also have the side effect of creating a well known brand for Luminary, positioning them as a 'top player' for Augmented Reality development.

The requirement of a standalone AR app is also a discouraging factor for the user. The appeal of the limited content of each app is not long-standing, causing users to quickly lose interest . Each app requires a significant amount of storage space (around 50 - 70mb), making retention of the app unappealing to the user.

Users would immensely benefit from a streamlined system for the consumption of Augmented Reality content. Removing the need of downloading a campaign specific application would improvement customer retention, and assist in expanding the user base. This less intrusive approach would also improve the customers experience and enhance their engagement.

The usage data of the application would provide Luminary valuable and strategic insight into the ways that the user engages with the content. The potential implementation of GPS services would also allow for the gathering of foot traffic information. These valuable metrics would give Luminary a strategic and competitive advantage when expanding their marketing client base.

## 3.0 Project Approach

### 3.1 Research Methodology - Action Research

Action Research process follows the principle of “learning by doing” (Kemmis *et al.* 1988)— a group of people identify a problem, do something to resolve it, see how successful their efforts were and if not satisfied, try again. Developed by Stephen Kemmis, Action Research follows a “simple model of cyclical nature of the typical action research process” (Web.net. 2015).

Action Research tends to be:

- Cyclic — similar steps tend to recur, in a similar sequence.
  - Participative — the clients and informants are involved as partners, or at least active participants, in the research process.
  - Qualitative — it deals more often with language than with numbers.
  - Reflective — critical reflection upon the process and outcomes are important parts of each cycle.
- (Dick, B. 2000).

#### RATIONALE

- Action Research enforces collaborative work.
- Each participant in the project is considered a co-researcher, so everybody researches solutions to a given problem.
- Every participant’s ideas are equally significant and should be discussed and negotiated.
- Action Research avoids skewing from the idea-holder.

Our project requires a significant amount of creative, collaborative and critical research. Action Research enables the group to work independently to form ideas, and then critically refine the ideas collaboratively.

Action Research results in solutions to a given problem that have been verified.

#### PHASES / TASKS

Each cycle of Action Research has four phases (see Fig 1):

1. Plan
2. Act
3. Observe
4. Reflect

(Web.net. 2015)

#### DELIVERABLES

Action Research deliverables include:

- Recommendations
- Action plans
- Procedures, protocols, guidelines and programmes
- Prototypes and models

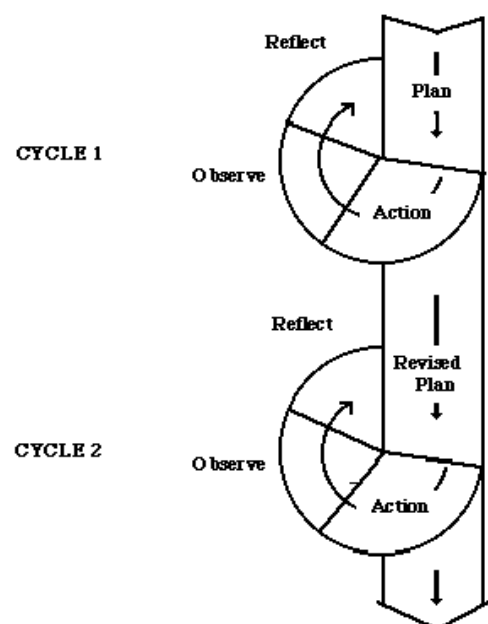


Fig 1: Action Research Development Cycle  
(Source: MacIsaac, 1995)

## 3.2 Development Methodology - Extreme Programming

Extreme Programming methodology (XP) was originally designed for small team working with uncertain and changing requirements. Other approaches were considered to be 'overkill' for such small development teams. XP was developed for small teams without discarding most of the ideology of other methodologies. It focuses on the "timely delivery of software that meets users' requirements" (Hunt, J., 2006).

It is very lightweight meaning you can "take what you think you need from XP and create something which is neither XP nor particularly agile." (Pierce, D., 2002)

### RATIONALE

- XP allows for uncertain and changing requirements — our requirements will not all be discovered in the early stages in development, so the ability to change and add requirements essential.
- XP targets small development teams — e.g. our development team of four students.
- XP is adaptive — It adjusts to the needs of the group.
- XP is simple — It has clear and concise values and practices
- XP utilises small processes — planning, then lifecycle of designing coding, testing and listening.

XP is an agile development methodology. It adapts to suit the needs of the group, enforces collaboration and follows simple, clear and concise processes. XP allows for development amongst small teams with limited time and limited certainty around the requirements of the project.

XP suits our clients requirements as it allows them to have a hands on influence on the application implementation. The client will be kept up-to-date, and will be able to make changes as needed. The processes of development will be divided into sub processes in order to have more frequent deliverables for the clients' input.

XP has a customer focus. Customers are involved right throughout the development process. Our project relies on customer satisfaction, making XP an ideal fit.

### PHASES / TASKS

1. Planning — Requirements elicitation and user stories. Time and cost are usually estimated between each iteration.
2. Designing — Simplicity is the main ideology during the design phase of each iteration.
3. Coding — Using agreed coding standards allows for a more fluid collaboration between the group. Pair programming occurs at this phase, adopting the collective ownership policy.
4. Testing — Testing code against unit tests eliminated bugs while acceptance tests ensure the intended functionality of the system meets the requirements.
5. Listening — Feedback from customers ensures that the customer is satisfied with the features and functionalities of the iteration.

Bright Hub Inc. (2012).

### DELIVERABLES

Extreme Programming uses User Stories, Acceptance Tests, and planning documentation as deliverables. CRC cards are also used occasionally.

XP delivers frequent iterations of a system, giving the client and customer the ability to provide input throughout the development.

## 4.0 Project Plan

### 4.1 High Level Overview

#### APPROACH A: AN AUGMENTED REALITY PLATFORM APPLICATION

Approach A will result in a singular Augmented Reality platform application. The application will group together AR content from all of Luminary's clients, and may allow the creation of content by the platforms users.

It has been decided that the usefulness of the application depends on the discovery of a new utility purpose for the Augmented Reality technology. Approach A is preferred by Luminary.

#### APPROACH B: AN AUGMENTED REALITY APP PLUGIN EXTENSION

Approach B will result in an Augmented Reality plugin extension which adds AR capabilities to pre-existing applications. This technology will allow app developers to implement Augmented Reality technology into their app without having to invent the technology.

The plugin would allow developers to focus more on the AR content and less on the technology. Luminary would be wholly satisfied with this approach, but it is to be considered a backup plan.

#### PHASE ONE: INVESTIGATE POTENTIAL USES OF AUGMENTED REALITY

Phase One will reference Action Research methodology to discover, investigate and verify possible uses for Augmented Reality technology. The creation of an Augmented Reality platform (Approach A) relies on the discovery of a utility purpose of the technology.

Phase One will be concluded after four weeks, or once an appropriate use for the AR technology has been discovered.

#### PHASE TWO: DETERMINE THE APPROACH TO BE IMPLEMENTED

Phase Two will include the deciding of the approach we are to implement. This decision will depend entirely on the outcome of Phase One. We will implement Approach A only if a utility purpose was discovered in Phase One, or we will instead implement Approach B if Phase One was unsuccessful.

The outcome of Phase One will be discussed with the project supervisor and the client, and a decision will be jointly made about which approach will be implemented.

Phase Two is expected to be concluded after one week.

#### PHASE THREE: IMPLEMENT THE DECIDED APPROACH

Phase Three will implement the approach decided at the conclusion of Phase Two. We will follow the Extreme Programming methodology for the planning, execution and evaluation of the software system.

Phase Three will result in a completed implementation of either Approach A or Approach B.

The exact timeframes for Phase Three must be decided after Phase Two's completion, but the expected overall duration of Phase Three is fourteen weeks.



## 4.2 Group Roles

**Disclaimer:** The roles and responsibilities of each group member are indicative only and may not encompass the entirety of the students workload. It is expected that the roles and responsibilities are subject to change throughout the duration of the project.

Below are the group member's roles, as of 25 March 2015:

Name	Roles	Responsibilities
Jason Gerbes	Project Leader, Project Team Member	Head of communications, organisation of meetings, document creation & general project team member.
Joshua Son	Risk Manager, Project Team Member	Head of risk management & general project team member.
Paul Lee	Project Task Coordinator, Quality Control, Project Team Member	Task delegation, quality assurance/control & general project team member.
Sean Young	Researcher, Analyst, Project Team Member,	Head of research and analysis & general project team member.

### PROJECT TEAM MEMBER RESPONSIBILITIES & EXPECTATIONS INCLUDE:

- Research
- Group communication
- Attendance of meetings
- Attendance of project workshops
- Meeting minutes recording (rotational task)
- Maintaining a log book record of all meetings, workshops and tasks.
- Peer review
- Implementation / coding
- Meeting given deadlines

## 4.3 Work Breakdown Structure

**Disclaimer:** The processes stated are indicative only and subject to change later into development. It can be expected that some sub-processes cannot yet be accounted for.

Below is a high-level work breakdown structure in tabular form with PMI numbering:

1. Phase One: Investigate Potential Uses of Augmented Reality
  - 1.1. Individual Research (based on Action Research Methodology)
    - 1.1.1. Plan
    - 1.1.2. Act
    - 1.1.3. Observe
    - 1.1.4. Reflect
  - 1.2. Collaboration of Ideas
    - 1.2.1. Presentation of Individual Research
    - 1.2.2. Group Discussion
    - 1.2.3. Prioritisation of Ideas
  - 1.3. Proof of Concept
    - 1.3.1. Qualitative Assessment
    - 1.3.2. Prototyping
    - 1.3.3. Determination of Viability of Ideas
2. Phase Two: Determine the Approach to be Implemented
  - 2.1. Determine the Viability of an Augmented Reality Platform
    - 2.1.1. Assess the Discovered Uses of Augmented Reality
    - 2.1.2. Discuss the Discoveries with the Client
    - 2.1.3. Assess the Risks of the Platform
  - 2.2. Compare the Viability of the Two Approaches
    - 2.2.1. Determine the Risks of the App Extension Approach
    - 2.2.2. Compare the Risks of the Two Approaches
  - 2.3. Decide Which Approach to Implement
3. Phase Three: Implement the Decided Approach (based on Extreme Programming Methodology)
  - 3.1. Plan
  - 3.2. Design
  - 3.3. Coding
  - 3.4. Testing
  - 3.5. Evaluate (Listening Through Feedback)

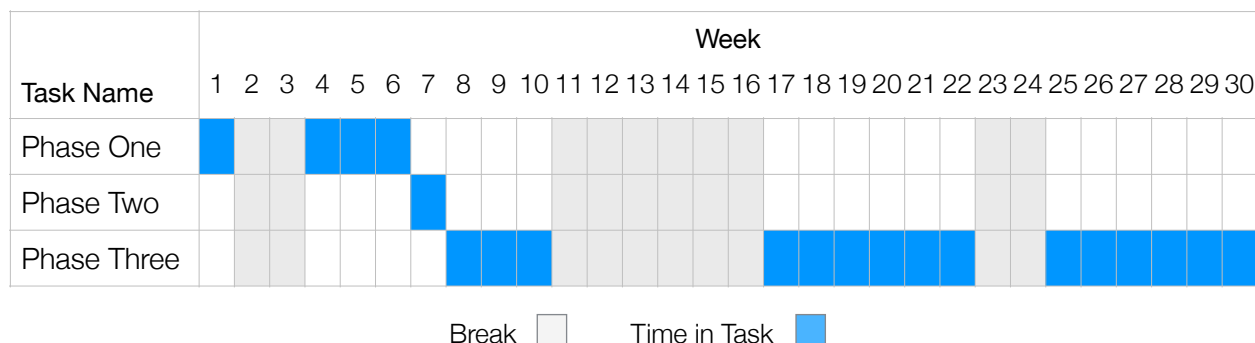
## 4.4 Time Management

### PROJECT SCHEDULE

**Disclaimer:** This project schedule is indicative only and subject to change. It is to be interpreted as a high-level overview of the project tasks only and will be refined later into development.

**Project Start Date:** 30 March 2015 (week 1)

**Project End Date:** 25 October 2015 (week 30)



#### Phase One: Investigate Potential Uses of Augmented Reality

Duration: 4 working weeks

- Start Date: 30 March 2015
- End Date: 10 May 2015

#### · Phase Two: Determine the Approach to be Implemented

Duration: 1 working week

- Start Date: 11 May 2015
- End Date: 17 May 2015

#### · Phase Three: Implement the Decided Approach

Duration: 16 working weeks

- Start Date: 18 May 2015
- End Date: 25 October 2015

### MILESTONES

Each of the three phase end dates will be considered a major milestone of the project, as will the project start date and end date. As the phases are broken into smaller sub-processes, minor milestones will be set during each phase (especially during the implementation - Phase Three).

These milestones will be agreed with the supervisor and client, and will usually result in a deliverable of some description. The final deliverables of each phase are crucial for the following phase, with Phase Three resulting in the completed project.

## 4.5 Scope

The project is split into three phases: an investigation phase, a decision phase and an implementation phase. The result of the investigation phase will determine the outcome of the decision phase.

The decision phase will then determine which approach will be followed in the implementation phase. The scope of the implementation phase will be determined after the decision phase as many of the requirements have not yet been determined.

**Disclaimer:** The information below is a current, incomplete view of the scope as of 25 March 2015. It is expected that the scope will change throughout the projects' phases.

### OBJECTIVES

We aim to create a system which:

- Implements Augmented Reality in a new way.
- Provides value for the user.
- Is bug-free.
- Can handle multiple content types.
- Efficiently manages storage and cellular data usage.
- Is expandable — can be developed by Luminary further.

### HIGH-LEVEL REQUIREMENTS

The high-level requirements of the system are below. These requirements will be refined throughout the project.

- We need to complete a methodical investigation of the possible uses of Augmented Reality.
- We need to collaboratively determine with Luminary the viability of the two proposed approaches.
- We need to implement an Augmented Reality system based on the chosen approach.

### MAJOR DELIVERABLES

Each phase will result in a key deliverable:

- Phase One — Research findings document for discussion with client and supervisor.
- Phase Two — An overview of the assessment of the viability of the two approaches. Luminary will provide us with a letter of confirmation of their chosen approach.
- Phase Three — The completed application will be delivered at the conclusion of this phase.

### BOUNDARIES

The boundaries of the scope are as follows:

- We will not be creating the Augmented Reality content. This will be done by Luminary.
- We will not be responsible for marketing the application.
- The UI and UX design will be decided by Luminary (in part).
- We will not be creating the Augmented Reality technology itself. Vuforia will instead be used. Our focus will be on the implementation of the technology.

## 5.0 Communication Plan

**Disclaimer:** The communication plan below is indicative only and may not encompass the entirety all communication protocols. It is expected that the communication means are likely to change throughout the duration of the project.

Below are the group communication plan, as of 25 March 2015:

### 5.1 Internal Communication

Purpose	Parties Involved	Frequency	Communication Method	Initiator
Discussion of research and analysis	Group Members	Weekly	Organised meeting, Skype or Facebook Group.	Group Members
Progress Update of Given Tasks	Group Members	Weekly	Organised meeting, Skype or Facebook Group.	Group Members
General Discussion	Group Members	When Required	Facebook Group, Email, Skype or SMS.	Group Members
Update of project progress	Group Members & Supervisor	Weekly	Organised meeting at AUT or Facebook (last resort)	Team Leader
Personal Issues	Group Members & Supervisor, Other AUT staff	When Issues Arise	Email, Calls, or Organised Meetings	Group Members
Mid Project Review Presentation	Group Members & Supervisor, Anne Philpott	One-off	Email, Calls, Organised Presentation	Team Leader, Supervisor, Anne Philpott
Project Closure Presentation	Group Members & Supervisor, Anne Philpott	One-off	Email, Calls, Organised Presentation	Team Leader, Supervisor, Anne Philpott
General Queries/ Discussion	Group Members & Anne Philpott	When Required	Email, Calls, or Organised Meetings	Group Members or Supervisor

### 5.2 External Communication

Purpose	Parties Involved	Frequency	Communication Method	Initiator
Supervised meeting to discuss project progress.	Group Members & Supervisor, Luminary	Fortnightly (Temporary)	Organised meeting at AUT or Luminary's offices.	Team Leader or Supervisor
Unsupervised meeting to discuss project progress.	Group Members & Luminary	Fortnightly (Future meetings)	Organised meeting at AUT or Luminary's offices.	Team Leader
General Discussion	Group Members & Luminary	When Required	Email, SMS, Calls or Organised meetings.	Group Members
Change Requests	Group Members & Luminary	When Required	Email, SMS, Calls or Organised meetings.	Luminary
Training or Collaborative Working	Group Members & Luminary	When Required	Organised meeting at Luminary's Office, Email, Calls.	Luminary or Group Members

## 6.0 Skills and Knowledge Involved

### 6.1 Skills and Attributes Present

Name	IT Skills	Personal Skills & Attributes	Technical Skills
Jason Gerbes	Java, Basic Objective C & Swift, Word Processing, SQL, Algorithm Design & Analysis, Data Structures.	Perfectionism, Reliability, Communication, Determination, Dedication, Creative & Critical Thinking.	Project Management, Design, Collaboration, Time Management, Research, Literacy.
Joshua Son	Java, Word Processing, SQL, Algorithms, Data Structures, Mathematics.	Accuracy & Detail, Communication, Reliability, Creative Thinking.	Design, Research, Literacy, Time Management, Logical Thinking.
Paul Lee	Java, Word Processing, Excel, SQL, File Systems, HTML, PHP, CSS.	Cooperative, Hard Working, Communication, Open Minded, Flexible, Determined, Attentive.	Visual Learner, Time Management, Research, Prioritisation, Planning & Preparation.
Sean Young	Java, Basic Objective C, SQL, HTML, PHP, SQL, Basic CSS.	Communication, Optimistic, Loyalty, Determination, Creativity, Adaptability, Assertiveness, Team Work.	Time Management, Physical Learning, Project Management, Quality Control, Design.

### 6.2 Skills Required

#### IT SKILLS

Skill	Rationale
3D Modelling	Augmented Reality displays in 3D space, we need to understand 3D modelling techniques in order to develop AR content.
Android Development	It is possible that the application will be deployed on Android. We may need to understand Android development techniques.
API Use	We will need to understand the use of APIs when developing for a mobile platform. This will include accessing hardware systems, e.g. the camera.
Bitbucket	Bitbucket is a web based hosting service for projects that use revision control systems. We will use it to host our project code.
Data Storage and Deployment	We need to develop a deployment technique for the system which likely includes locally stored data and remotely accessed content.
GPS/Geolocation Implementation	The application may have a location based component. We will need to be able to implement GPS services if this comes to fruition.
iOS Development	It is possible that the application will be deployed on iOS. We may need to understand iOS development techniques.
UI / UX Design	We will need to be able to use effective UI and UX design techniques when developing the mobile application.
Unity Development	Unity will likely be our primary development program. Unity can deploy both iOS and Android versions of an application concurrently.
Vuforia Development	Vuforia is an open-source mobile vision platform used for interactive 2D and 3D AR applications. We will be using this as an extension of Unity Development.
Word Processing	We will be required to produce professional documentation through the project's development. Strong word processing skills are required.

## TECHNICAL SKILLS

Skill	Rationale
Collaboration	As with any group initiative, collaboration is vital to the success of the project. We must work as an effective team to deliver at a high standard.
Communication	Communication across the group must be frequent and professional. Communication is a key element of collaboration.
Creative Thinking	We have been tasked with creating a system based on all-new idea. We must think creatively to discover new uses for AR.
Critical Thinking	The success of the AR system will depend on its usability and usefulness; if the system adds no value for the user, they will not use the app. We must think critically about our ideas to determine their worth.
Presentation	We will need to present our intentions, discoveries and progress to the panel of judges and to our client throughout the project.
Professional Conduct	As we are working with an external client, we must ensure that we conduct ourselves professionally.
Research	Research will be a key component of this project. We must employ effective researching techniques in order to develop our ideas.
Time Management	The duration of the project is relatively short. Good time management will ensure that we are able to deliver the product within our given timeframe.

## 6.3 Skills Currently Absent

Listed below are the skills currently absent from the group's combined skills and attributes:

- 3D modelling (marginal skills present)
- Mobile Application Development
  - Unity Development
  - iOS Development
  - Android Development
  - API Use
- GPS / Geolocation Implementation
  - Associated APIs
  - Accuracy Limitations
- Bitbucket
- Data Storage and Deployment Techniques
  - Local Data Storage
  - Remote Data Access
  - Data Compression Techniques
- UI / UX Design (marginal skills present)
- Vuforia Development
  - Vuforia SDK Usage
  - AR Content Management

## 6.4 Plan to Acquire Absent Skills

### AUT STUDY

Relevant papers will be studied by members of the group at AUT during semester 1 and 2 of 2015. The skills, knowledge and experience gained will directly benefit the development of the project throughout the year. Lecturers will also be valuable resources of information and advice.

A breakdown of the AUT study plan is below:

Paper	Semester	Student(s)	Rationale / Relevant Skills
Distributed & Mobile Systems	S1	Jason Gerbes Joshua Son	Teaches skill relevant to mobile application development and data storage & deployment.
Applied Human Computer Interaction	S1	Jason Gerbes Joshua Son Paul Lee	Broadens understanding of how human behaviour impacts the use of computer technology. Improves UI / UX design skills.
Software Engineering	S1	Paul Lee Sean Young	Develops understanding of concepts and methods required for development of software intensive systems.
Software Development Practices	S2	Jason Gerbes	Extends software development skills into a team environment.

### ONLINE MATERIAL

Online tutorial videos, courses and guides will be referenced to gain skills. Group members will complete training material independently, and then teach the rest of the group the new skill.

- Lynda.com - provides end-to-end courses to AUT students for free.
- iTunes U - provides courses from around the world (including top universities) for free.
- YouTube - has an endless amount of instructional videos from IT professionals.
- Khan Academy - provides free educational videos of all types.

### RESEARCH

Traditional research sources will be referenced to gain valuable skills. We will access reputable, scholarly sources of research to strengthen our understanding. These sources include:

- AUT Library
- Auckland Public Library
- University of Auckland Library
- Google Scholar
- Science Direct (online)
- IEEE

### LUMINARY PROMOTIONS

Luminary Promotions will provide education and assistance on development related queries. Ahmed will also be able to strengthen our marketing-related skills, which will be invaluable when designing the application.

Alexis and other developers will assist in the design of the UI and UX of the application, and will help to ensure that our outputted work is aligned with Luminary's strategy and brand image.



## 7.0 Estimated Costs Incurred

**Disclaimer:** The cost break-down below is indicative only and is subject to change. Values are accurate or based on reasonable estimates as of 25 March 2015.

### 7.1 Staffing Costs

Staff Member	Hourly Rate	Hours per Week	No. of Weeks	Total Cost
Jason Gerbes	\$ 20.00	10	20	\$ 4,000.00
Joshua Son	\$ 20.00	10	20	\$ 4,000.00
Paul Lee	\$ 20.00	10	20	\$ 4,000.00
Sean Young	\$ 20.00	10	20	\$ 4,000.00
Total Staffing Cost				\$ 16,000.00

### 7.2 Software Licensing Costs

Software Item	Notes	Annual Cost	Actual Cost
Android Developer Account	Already paid by Luminary	\$ 33.50	\$ 0.00
Bitbucket	Free for 5 users	\$ 0.00	\$ 0.00
iOS Developer Account	Already paid by Luminary	\$ 132.67	\$ 0.00
Lynda.com	Free with AUT account	\$ 250.00	\$ 0.00
Unity 5 Basic	Free version	\$ 0.00	\$ 0.00
Unity 5 Pro*	Free for 30 days	\$ 900.00	\$ 0.00
Vuforia	Open-source	\$ 0.00	\$ 0.00
Total Software Licensing Cost			\$ 0.00

- The features of Unity 5 Pro will likely not be needed during the development of the application. If for some unforeseen reason we do need Unity 5 Pro, the 30 day free trial should suffice.

### 7.3 Total Costs

Expense	Total Cost	%of Total
Staffing Costs	\$ 16,000.00	100%
Software Licensing Costs	\$ 0.00	0%
Total Overall Cost	\$ 16,000.00	100%

## 8.0 Glossary of Terms

Term	Definition
Agile (methodology)	A methodology for the creative process that enforces the need for flexibility and applies a level of pragmatism into the delivery of the final product.
Android	Android is a mobile operating system developed by Google.
API	Application Protocol Interface, is a set of routines, protocols and tools for building software applications.
Application / App	A software implementation which can be run on a device.
Augmented Reality / AR	A technology that superimposes a computer-generated image on a user's view of the real world (an overlay on the cameras view in our usage).
AUT	Auckland University of Technology.
BCIS	Bachelor of Computer and Information Sciences - an undergraduate study program provided by AUT University.
Client (Luminary's client)	A company who pays Luminary Technologies to market a product or service.
Client (the group's client)	The client of the BCIS Research and Development Project - Luminary Technologies.
Customer	A customer of the project — the user of the end application.
Deployment	All of the activities that make a software system available for use.
GPS / Geolocation	A space based satellite navigation system that provides location information.
Group	Jason Gerbes, Joshua Son, Paul Lee and Sean Young - the four AUT students working on the project.
iOS	iOS is a mobile operating system developed by Apple.
Luminary Promotions	An Auckland-based promotions company and client of the BCIS Project.
Project	Usually referring to the BCIS R & D project being proposed.
Research and Development / R&D	A general term for activities related to the investigation of activities that a business chooses to conduct, & the resulting development of new products.
Supervisor	Roopak Sinha - A senior lecturer at AUT who supervises the project.
UI / User Interface	The system's human-computer interaction interface.
Unity	A cross-platform game creation system developed by Unity Technologies.
User	The user of the system. See customer.
UX / User Experience.	Referring to the experience that the user has with the software.
We	Usually referring to the group and perhaps other people (see group).
Wi-Fi	Wireless local area technology that allows computer networking.
SDK	Software Development Kit. A set of software development tools.
Vuforia	A mobile vision platform developed for Qualcomm to display AR content.

## 9.0 References

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## 10.0 Disclaimer

**Clients should note the general basis upon which the Auckland University of Technology undertakes its student projects on behalf of external sponsors:**

While all due care and diligence will be expected to be taken by the students, (acting in software development, research or other IT professional capacities), and the Auckland University of Technology, and student efforts will be supervised by experienced AUT lecturers, it must be recognised that these projects are undertaken in the course of student instruction. There is therefore no guarantee that students will succeed in their efforts.

This inherently means that the client assumes a degree of risk. This is part of an arrangement, which is intended to be of mutual benefit. On completion of the project it is hoped that the client will receive a professionally documented and soundly constructed working software application, some part thereof, or other appropriate set of IT artefacts, while the students are exposed to live external environments and problems, in a realistic project and customer context.

In consequence of the above, the students, acting in their assigned professional capacities and the Auckland University of Technology, disclaim responsibility and offer no warranty in respect of the “technology solution” or services delivered, (e.g. a “software application” and its associated documentation), both in relation to their use and results from their use.