

# InfraDrone Android Application

PROJECT PLAN

Team Number 07

InfraDrone

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# 1 Introduction

## 1.1 PROJECT STATEMENT

For this project, we are to design an Android/IOS application to display data that has been collected by a drone. The types of data to be displayed are images, reports, and 3D models. The application should also have the capability to function on mobile VR devices.

## 1.2 PURPOSE

As drones become more advanced and capable, their uses can become more engineering focused. With high-end drones having the ability to carry advanced imaging equipment we can use their mobility to get data and images from otherwise hard to reach viewpoints. Once the data is collected it would be useful to be able to analyze the data anywhere, especially on site. We hope to create an application that can be used to quickly and easily access the data collected from these drones from a mobile source.

## 1.3 GOALS

Since this project is based on creating a mobile application, by the end of the project we hope to become familiar in visual studio as well as app development in general. We also want to be able to deliver a fully functioning application that meets all of the requirements given to us, and we want to meet those requirements on a timely basis. By working as a team we hope to gain experience in teamwork, communication, and knowledge sharing, not only within the team but with our clients as well.

# 2 Deliverables

Our final deliverable should be a fully functional application that displays the data collected by a drone. The application should meet the following requirements:

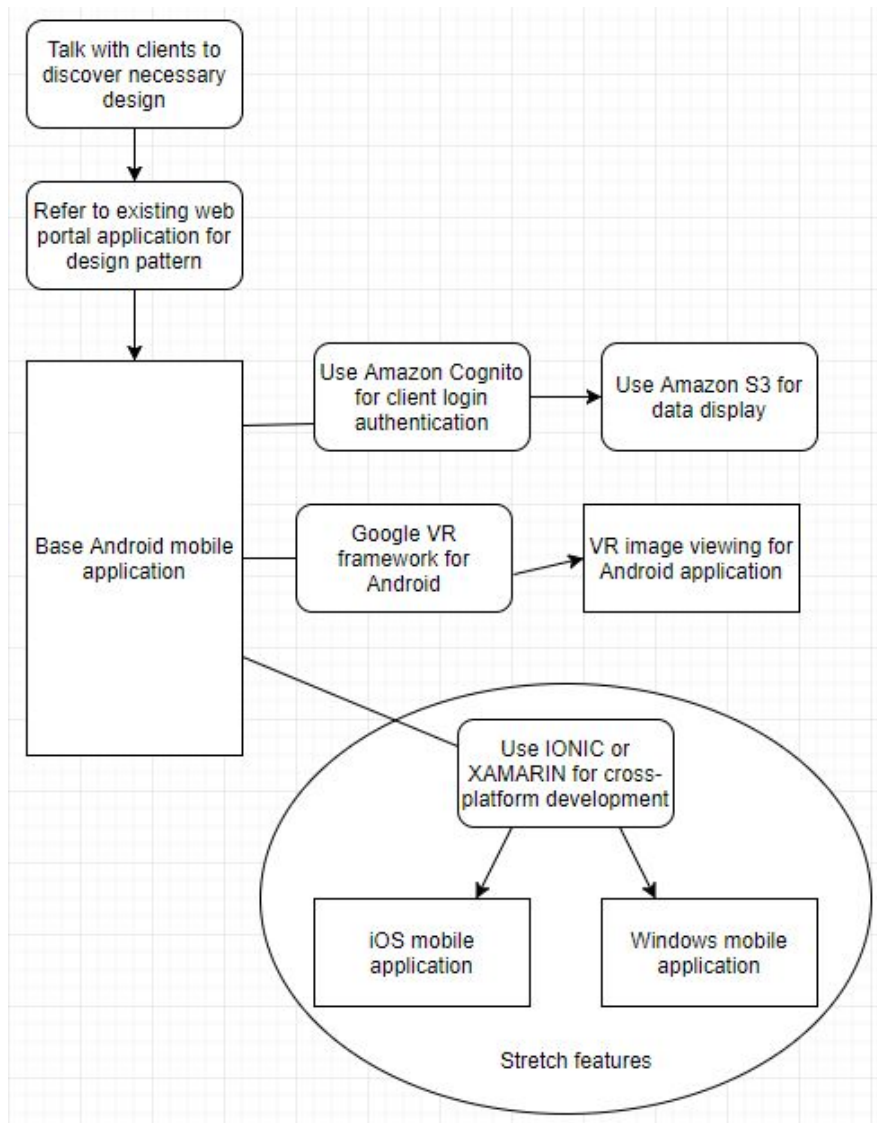
- Similar display features as current InfraDrone web portal.
- Standard InfraDrone style GUI and design.
- Data should be extracted from AWS folder structure.
- User friendly 3D model viewing on application.
- Ability to view images, reports, and locations on application.
- VR visualization using Google Cardboard or Daydream system.

## 3 Design

### 3.1 PREVIOUS WORK/LITERATURE

As a part of SE 329 (software project management) and SE 339 (software architecture), Evan Snitkey and Blake Agey worked together in groups on two android applications. One of them was a caloric nutrient calculator application and the other was an online shopping application. Both of these were developed in Java using the Android Studio IDE. David Schmadeke and Yangxiao Wang are currently enrolled in CPRE 338 (Android development) which will help in developing our base Android application.

### 3.2 PROPOSED SYSTEM BLOCK DIAGRAM



The base Android mobile application will be built using Java in Android Studio. We have determined that due to time and ability constraints, cross-platform development on iOS and Windows Phone will now be a stretch goal and is not a client deliverable requirement. We will be using Amazon Web Services for all of the backend data connections. We will use Amazon Cognito for the account login security and Amazon S3 to pull company data to be displayed in the application. We will be using the Google VR framework for the virtual reality component closer to the end of the semester when we start initial development on that piece.

### 3.3 ASSESSMENT OF PROPOSED METHODS

There are many approaches we could take when developing this application; many different ways to store and display data, implement VR capabilities, cross-platform develop, and follow design standards. For cross-platform development, we looked into two different frameworks; XAMARIN and IONIC. XAMARIN is implemented directly into Visual Studio so we are going to follow that path if we have time to implement cross-platform development. We were told by the clients that Amazon S3 is the platform that we will be using for data management so we are required to use this. For basic design standards, we were told by the client to follow the design of the existing web portal application as close as we can.

### 3.4 VALIDATION

As a group, we have selected David Schmadeke to be our quality assurance expert. With this title, he will be expected to extensively test all developed code to ensure that everything we create works as it is intended. We plan on creating and attending many technical information sharing meetings during the later half of the semester to address testing and project validation as well. To further the success in our validation process, we will be meeting with our clients weekly to demo our week's progress and note any improvements that we can make going further.

## 4 Project Requirements/Specifications

### 4.1 FUNCTIONAL

List and explain the functional requirements of the project. This would include all the technical requirements you fulfil during your senior design project.

- create an application equivalent to display features of Web-Portal
- apply the company's GUI and design styles
- navigate a user friendly application
- view images, reports, and locations
- interact with user friendly 3D models
  - display three types of 3D models
  - ability to rotate and zoom 3D models
  - user can click on points on 3D model to view notes/annotations
- application will extract the necessary data from Amazon Web Services folder structure
- ability to use Google Cardboard or Daydream System for VR visualization

### 4.2 NON-FUNCTIONAL

List and explain the non-functional requirements of the project. This is where you would enlist non-technical requirements. This may still be a fundamental deliverable that your client needs at the end of the semester.

- secure login and logout of user's account
- application works for iOS, Android, and Windows appliances
- Friendly user interface
- optimized loading times for application

### 4.3 STANDARDS

Discuss the standard protocols that you follow in your lab or for writing code. Are these approved by standard organizations like IEEE, ABET etc. Will any of your practices be considered unethical by such organizations? Discuss how standards are applicable to your project.

Our team plans to follow standard industry practices to reduce defects in code as well as improve overall quality. If we find any changes that need to be made to the production process, the team will meet and review the changes. We plan to use regression testing to ensure that new components do not mess with the previously working ones. We will also try our best to do code reviews of each other's work to further reduce the chance for errors. Our team will also work to adhere to the standards created by organizational standards like IEEE and ABET. So far, none of the practices we plan to use would be unethical to these organizations.

## 5 Challenges

From the discussion with our client, we found that we can potentially face three challenges/risks that may slow or hinder your plan.

- Extract data from AWS (Amazon Web Service)
- Show 3D model on mobile device
- Application with VR (Virtual Reality)

Since we are all unfamiliar with Amazon Web Service and have no experience with Virtual Reality, those may become challenges and slow our project development process.

## 6 Timeline

\*Milestones listed described in more detail in section 6.1 & 6.2\*

Milestones	Description	Milestone Criteria	Planned Date
M0	Start Project	Meet with client	09/11/2017
	Project goals and scope defined	Project plan created	09/24/2017
	Team web site	Team website created	09/24/2017
M1	Start Planning		09/24/2017
	Development plan created	Initial UI created	09/26/2017
M2	Start Execution		10/01/2017
	Begin development of project	Project design document created	10/06/2017
M3	Data extraction		10/9/2017
	Begin development of data link from AWS and back end scripting	Extract data from AWS and start back end script	10/13/2017
M4	Improve project development		10/23/2017
	Project development process improved and continue working on AWS	Project plan reviewed	10/27/2017
M5	Data displaying and VR		11/9/2017

	Implement the data viewing function (PDF and Image)	Show PDF and Image data extracted from AWS	11/9/2017
	Implement the data viewing function (3D model)	Show 3D object in the mobile app	11/9/2017
	Begin VR development	Start VR development, simple app display data using VR	11/9/2017
M6	Finalized Product without VR		11/27/2017
	Final UI design	Generalize UI design	11/27/2017
	End of project testing and bug fixing	Final product created and released	11/27/2017
	Project plan final version	Project plan final version created	11/27/2017
	Project demo	Wrap up development of Iteration-1 & Demo to InfraDrone	11/27/2017
	Import partial VR function	Attempt to integrate the simple VR app with our finished app	11/27/2017
M7	Close Project for first semester		12/04/2017
	Design document and Team website	Design document and Team website updated	12/08/2017
			12/08/2017
M8			

## 6.1 FIRST SEMESTER

Milestone	Work	Members
Mo	Create and review project plan	Entire team
Mo	Contact client and meet with them	Entire team
Mo	Team website updated	Yangxiao Wang
M1	Initial UI design	Entire team



M2	Development of application	Entire team
M2	Project design document	Evan Snitkey
M3	Data extraction from Amazon Web Service	Entire team
M4	Discussion and improve project plan	Entire team
M5	Data displaying for PDF and Image	David Schmadeke
M5	Data displaying for 3D model	Blake Agey
M5	Prototype VR app	Yangxiao Wang Evan Snitkey
M6	Discussion and finalize project plan	Entire team
M6	Test product and bug fixing	David Schmadeke
M6	Demo product to InfraDrone	Entire team
M6	Continue VR development	Yangxiao Wang Evan Snitkey
M7	Update team website	Yangxiao Wang
M7	Update Design document	Evan Snitkey

## 6.2 SECOND SEMESTER

\*Second semester milestone will be created after milestone M6\*

Milestone	Work	Members
M8		
M9		
M10		
M11		
M12		
M12		

M13		
M14		
M15		
M16		
M16		
M16		
M17		
M17		

## 7 Conclusions

The main goal of this project is to be able to deliver a functioning application that can easily display data collected from a drone. To complete our project we need to effectively work together as a team to meet our goals and requirements.

## 8 References

List all the sources you used in understanding your project statement, defining your goals and your system design. This report will help you collect all the useful sources together so you can go back and use them when you need them.

## 9 Appendices

If you have any large graphs, tables, or similar that does not directly pertain to the problem but helps support it, include that here. You may also include your Gantt chart over here.



