Sinister Six

exposeum

Software architecture documentation

Estimote's iBeacons

iBeacons are low energy bluetooth devices that broadcast universal unique identifiers. iBeacons can be used in different scenarios for various purposes, Team Sinister Six's app Exposeum will implement this technology in order to uniquely identify points of interest placed inside a building. The beacons will be used to provide contextual information on the point of interest to which they are associated. The following highlights some of the specifications of the Estimote iBeacons as seen on the estimote website:

- Default battery life 3 years; maximum life 5+ years: this reduces hardware maintenance cost.
- Configurable packet type and identifiers + UUID rotation mode, allowing the beacon to broadcast a wide array of information to end-users.
- Omnidirectional antenna with configurable range, up to 70m: the high range allows for a greater radius of interaction and for strong signal.
- Over-the-air firmware and security upgrades
- SDK used by vibrant community of 45.000+ developers: this ensures better support of iBeacon technology in our app and a more robust code libraries.

In short, Estimote is the largest and most well-known beacon manufacturer, already more than 45000 developer kits have been distributed,

Estimote SDK

The Estimote SDK enables developers to quickly integrate iBeacons into any iOS or Android project. The SDK requires mobile phones running Android 4.3 or higher / iOS 7 or higher and devices equipped with bluetooth low energy. The following highlights some of the relevant features granted by the SDK[1]:

- Beacon Ranging (scans beacons and optionally filters them by their properties).
- Beacon Monitoring (monitors regions for those devices that have entered/exited a region).
- Beacon characteristic reading and writing (proximity UUID, major & minor values, broadcasting power, advertising interval).

[1]https://components.xamarin.com/view/estimotesdkandroid

Xamarin Framework

The Xamarin Framework is one that provides a complete set of tools with which developers can build cross-platform mobile applications thereby eliminating the need to duplicate work for each mobile platform. Rather than developing a Java Android app in parallel with a Swift iOS app, Xamarin allows a team to write a single app in C# that can be deployed to either platform. Moreover, unlike similar solutions like PhoneGap and Cordova, the code generated by Xamarin is native which allows for faster execution of the application and use of native UI elements and animations.

Risk Assessment & Risk Management Plan (RMP)

This section enumerates risks that we foresee in the undertaking of the project along with possible risk management strategies addressing the impact of those risks.

Summary

The table below identifies the risks, their probability & their impact as well as the strategy that Sinister Six will adopt to tackle each risk. The risk is assessed in qualitative manner following the criteria below:

High: Extremely likely to occur / Represents a high adverse impact
Significant: Very likely to occur / Represents a significant adverse impact
Moderate: Somewhat likely to occur / Represents a moderate adverse impact
Low: Unlikely to occur / Represents a low adverse impact

Risk Assessment				Risk Management	
ID	**Description**	**Probability**	**Impact**	**Strategy**	**Contingency**
Technology Risks					
TE01	Team Sinister Six has no experience with the use of beacon technology (such as Estimote iBeacons).	High	Low	Mitigation	The team can familiarize themselves with the iBeacon technology by trying out previously installed beacons in the library and watching / reading tutorials. **Status:** Mitigated at Sprint 0 **The team has purchased an extra set of Estimotes with which to practice prior to Sprint 0.**
TE02	The format of the map data is yet	High	High	Elimination	The class as a whole plan to tackle this risk

	unknown and team Sinister Six must wait for consensus to be reached				ASAP by discussing a standard schema which will be used by all teams producing a 390 project.
Tools Risks					
TO1	Some members of team Sinister Six are unfamiliar with Visual Studio (one IDE option for Xamarin development).	High	High	Mitigation	Members with experience with VS can offer assistance / tutorials to those who are not. **Status:** Mitigated at Sprint 0 **The team has practiced with visual studio, installed helpful extensions (ReSharper) and have subscribed to an online tutorial website using our academic accounts (PluralSight)**
TO2	All members of team Sinister Six are unfamiliar with Xamarin Studio (the other IDE option for Xamarin development)	High	High	Avoidance	Have all team members of Sinister Six agree to use Visual Studio instead, an IDE which we are more familiar with on average **Status:** Avoided at Sprint 0 **The team has agreed to use Visual Studio for development.**
TO3	Using both Visual Studio and Xamarin Studio for app development concurrently may lead to incompatibility and/or communication issues amongst team members	Low	Significa nt	Avoidance	Have all team members of Sinister Six agree to use solely one IDE rather than a combination of two. **Status:** Avoided at Sprint 0 **The team has agreed to use Visual Studio for development.**

People Risks					
PE01	Personnel conflict / conflicting personalities	Significant	Significant	Mitigation	Implementing open dialogue between team members and ensuring the hierarchical structure of the team is always respected. **Status:** Ongoing
PE02	Scheduling conflicts leading to limited time slots in which the team can meet to work in tandem	Low	High	Acceptance	Work around everyone's schedules, using different scheduling technologies like Doodle to help find a common free slot to all team members. **Status:** Ongoing
PE03	Team member dropping class.	Low	High	Acceptance	Redistribute the workload between remaining team members. **Status:** Ongoing
PE04	Team member performing sub-par compared to other team members.	Significant	High	Avoidance	Team leader addressing team members performance on a weekly basis. **Status:** Ongoing
Requirement Risks					
RE01	The stakeholder's experience with technology and vision of the product is not firmly set thereby leading to unclear and volatile requirements.	Moderate	High	Avoidance	Asking stakeholders all possible questions and explaining to them clearly the abilities and limitations of the technology in use before at the beginning of the project. **Status:** Ongoing

Impact					
	High	PE02 / PE03	RE01	PE04	TE02 / TO1/ TO2
	Significant	TO3		PE01	
	Moderate				
	Low				TE01
		Low	Moderate	Significant	High
		Probability			

Fig 1.2: Impact VS Probability of occurrence

User Stories Backlog

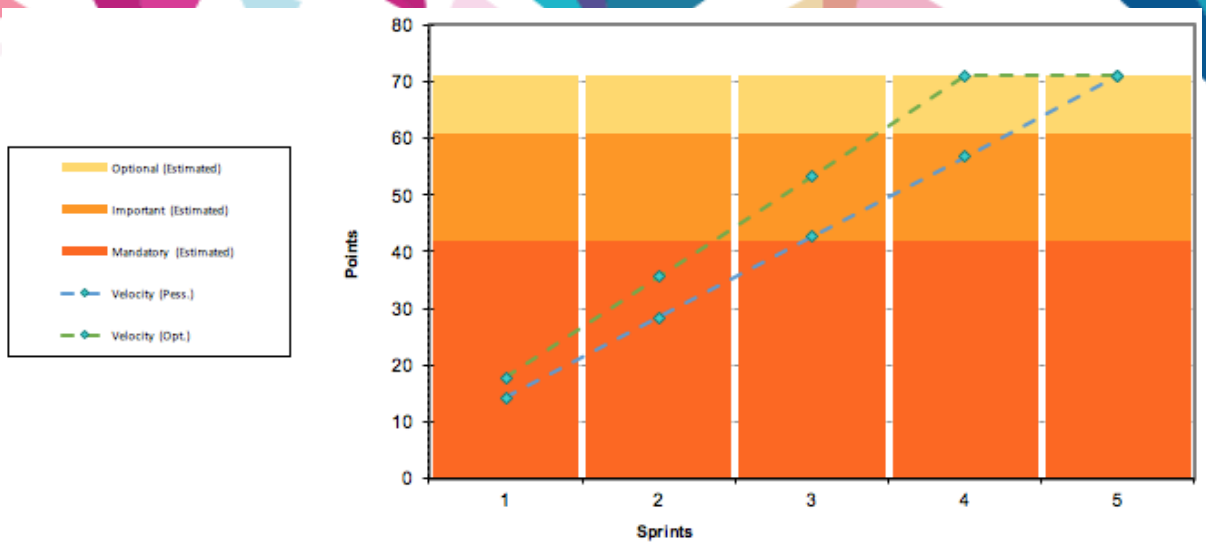
ID	As a	I want to	so that	USP	Priority
US-1	Visitor	specify my preferred language (english or french) at any time.	I get the information in a language I understand.	2	Mandatory
US-2	Visitor	view a list of up to date storylines available	I select the one that is most interesting to me.	3	Mandatory
US-3	Visitor	preview a selected storyline before starting it	I have an an idea of what the story is about before I start it.	1	Optional
US-4	Visitor	specify my age group (child or adult)	I have a narrative that is appropriate to my age.	1	Mandatory
US-5	Visitor	follow guided tours (storylines)	I can get contextual information in the form of a narrative.	2	Mandatory
US-6	Visitor	engage a free tour mode of the building	I can visit all POIs in an unrestricted way.	2	Mandatory
US-7	Visitor	select any point of interest and view its summary when in free visit mode	I that I know if the POI is of any interest to me.	3	Optional

US-8	Visitor	stop a storyline in progress and begin a new one	I am not forced into completing a storyline if if it does interest me.	3	Important
US-9	Visitor	receive push notifications when the app is not on focus	No POIs go unnoticed.	3	Optional
US-10	Visitor	pause a storyline in progress and resume it at a later time	So that I can complete a storyline at my own convenience.	1	Important
US-11	Visitor	see which points of interest I have already visited	I don't visit the same POI twice.	3	Optional
US-12	Visitor	view a progress map when in guided tour mode.	I know how many POIs are left in my guided tour.	5	Important
US-13	Visitor	receive full contextual information about a point of interest in my proximity.	I get more educated about each POI I visit.	8	Mandatory
US-14	Visitor	view the entire map of every floor with all points of interest when in free visit mode	I can choose which POI to visit.	8	Mandatory
US-15	Visitor	hear ambient or audio in between POIs.	I get more immersed in the storyline.	8	Important
US-16	Visitor	scan QR codes	I have more information about certain POIs.	3	Mandatory
US-17	Visitor	be presented with a game/quiz during my guided tour	I test my knowledge and make my visit more engaging and fun.	2	Important
US-18	Visitor	I want directions for the shortest path between two POIs	I can quickly travel from one POI to another.	13	Mandatory

Release Planning

-Sunset Graph:

Our release plan will be based on the estimations highlighted in this section. Based on the user stories identified above, we have 42 USP attributed to mandatory user stories, 19 USP attributed to important user stories and 10 USP attributed to optional user stories, for a total of 71 USP. We estimate that, in the worst case, we can achieve a velocity of 14.2 USP/sprint allowing us to complete the project within the given maximum of 5 sprints. In the best case, we estimate that we can achieve a velocity of 14.2 USP/sprint allowing us to complete the project in 4 sprints. The following sunset graph illustrates these estimations.



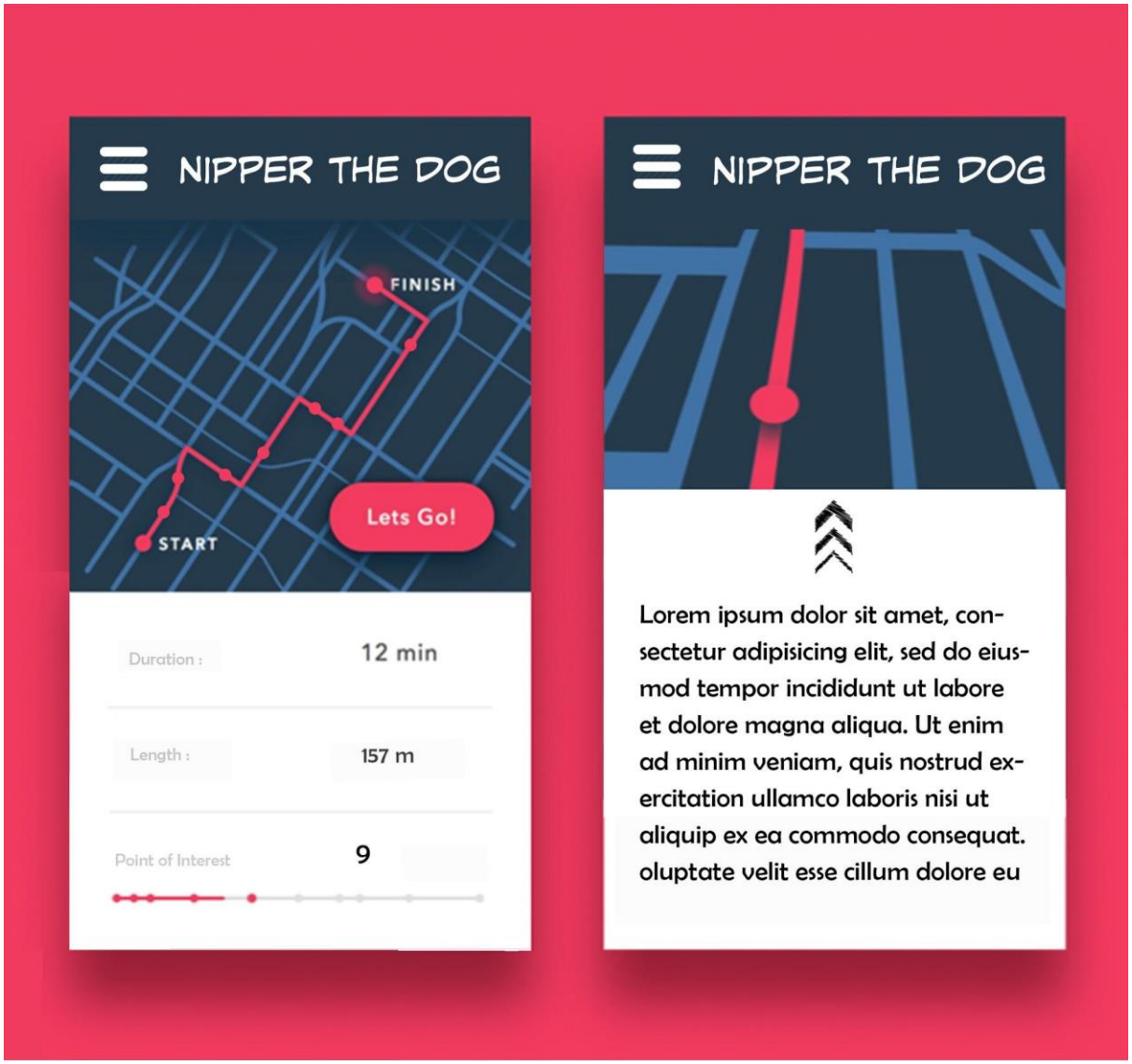
-Sprint #1 plan:

The iteration plan of our first sprint will go as follows will implement the following user stories:

ID	Description	Start	End
RP-1	Sprint 1	Jan.26 2016	Feb.8 2016
RP-1.1	(US-5) As a visitor I can follow guided tours (storylines) so that I can get contextual information in the form of a narrative.	Jan.26 2016	Feb.8 2016
RP-1.2	(US-6) As a visitor I can engage a free tour mode of the building so that I can visit all POIs in an unrestricted way.	Jan.26 2016	Feb.8 2016
RP-1.3	(US-18) As a visitor I want directions for the shortest path between two POIs so that I can quickly travel from one POI to another.	Jan.26 2016	Feb.8 2016

These user stories will allow us to achieve a velocity of 17 USP/sprint for our first sprint which correspond to our optimistic velocity. These user stories were selected based on the fact that they allow us to build a functional map system which is the basis of our solution. They were also selected based on their priority, and the amount of of USP the each have.

UI Mockups



The above shows a preliminary mockup of the main view our Exposeum. Although not final, this mockup captures the main ideas of the app.
The most important element of these mockup is the splitted view where two types of information are displayed to the visitor. The first half gives the user visual information about the current location of the POIs and the route of the different storylines. The second half, is a multipurpose expandable section that gives directions to the visitor, contextual information about POIs and information about a specific tour. User preferences such as languages will be accessible in the drawer menu on the left. Floor selection will also be available in this menu.