Project Proposal

Introduction

The purpose of this project is to provide the client, CAE, with a design proposal to implement their Asgard mission planning system into a Virtual Reality (VR) environment. The artefact was developed in the Unity Engine (2021.3.15f) as most of the team has a strong background in game development. It is built to an android apk for installation on a VR Head Mounted Device (HMD). This is accompanied with documentation that aims to educate the user on how to operate the features, as well as replicate algorithms for the client's own project.

Objectives

Our team aims to build a clear, learnable, and modular user interface for the Asgard Mission Planner that allows efficient interaction within a VR environment. These goals are separately evaluated to determine their success:

1. **Clear**
   a. A maximum of 2 interfaces should be viewable at once.
      i. This reduces visual clutter, allowing the user to focus on the simulated environment.
      ii. These should be able to be hidden at any point for a cleaner interface
   b. Short labels to limit excessive text
      i. Reading text in eXtended Reality (XR) environments causes accelerated eye strain
   c. Group functions by category
      i. Allows the user to focus on one action at a time, creating a step-by-step method to follow in order to create a complex simulation.
      ii. Coordinate menus, entities, and, buttons by colour
2. **Learnable**
   a. Reuse interactions
      i. Improves time to understand tasks by learning from prior, perhaps unrelated practises
      ii. Reduces the number of skills to understand before being proficient
   b. Streamline tasks
      i. Limit the number of actions to complete before finishing a task. This improves user efficiency, while reducing the chance of a critical mistake.
      ii. The user should be able to achieve their next immediate goal with a minimal amount of input.

3. **Modular**
   a. Repeat menu layouts
   i. Users learn quicker by following patterns
   ii. Much quicker to implement new features
   b. Easy to edit layouts
   i. Allows the client to quickly adjust our product to suit niche decisions
   ii. Much simpler to implement new features by copying patterns from previous iterations

Methodology

The project will use fortnightly sprint plans focusing on one feature at a time. All going smoothly, this will begin on the 17th of July and finish on 9th of October. Using an Agile approach will consistently improve the product as new features are completed, reviewed, and iterated upon before repeating the process.

We will have 4 release plans, each accompanied by corresponding sprints. The outcome of each sprint determines the iterative requirements to be achieved in each release plan. Additionally, each release plan will have distinct characteristics and features. Release plans are relatively more abstract compared to sprint plans because we can observe what needs to be released and accomplished through the sprint plan. For internal releases and external releases, since the sprint plan is typically aimed at completing a relatively complete feature, it can be considered an internal release. Therefore, we only have external release plans:

The project will begin on Monday, 17 July 2023

Release 1.0: Monday, 14 August 2023
Release 1.1: Monday, 28 August 2023
Release 1.2: Monday, 11 September 2023
Release 1.3: Monday, 9 October 2023

We have estimated the release timeline but are also aware of the various risks or unexpected events that may arise during development. Therefore, the actual timeline may be subject to changes. As a result, we have set a conservative start time to provide a buffer in case of any unforeseen circumstances. All User Stories and Sprint plans are in the Appendix.

(Approach and procedures for executing the project, often broken down into phases or tasks.)

Timeline

Summation of the total planned effort time is viewed in the burndown chart. This table is also editable, and the future actual work time will change the planned total time compared to the actual total time. Each user story is for one internal release plan and integrates one linked functions group.
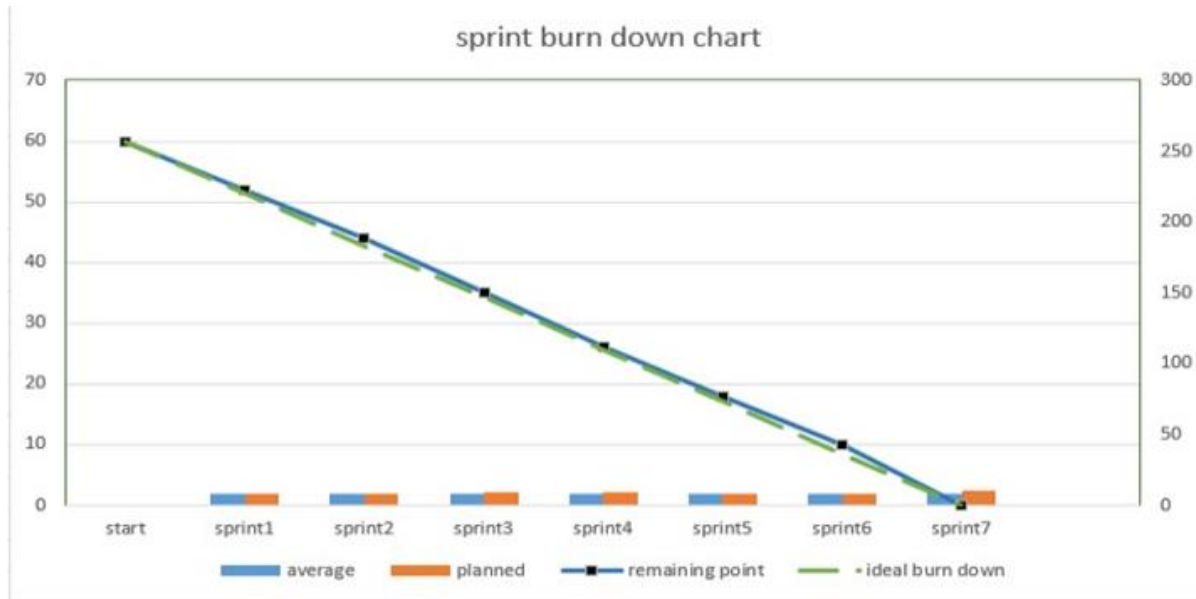
The current burndown chart is being created for future use and can also serve as a reference. In the next semester, when the team completes a user story or finishes a sprint, we will update the chart accordingly. This will allow us to observe how far we are from the planned progress and determine the effort needed for the upcoming sprint. It will provide a visual representation of our project's completion progress, allowing us to easily track our progress.

Team and resources

(Team member information, roles and responsibilities, list of human resources and tools.)

The Team	Roles
Jeremy Winch	Programmer, Designer, Client Contact
Kyle Lim	Programmer, AI Designer/Developer
Haotian Ouyang	Project Management, Programmer
Cameron Dougan	Concept Artist, UI Designer

Human Resources and Tools:

- Meta Quest 2
- Unity (2021.3.15f)
- GitHub

Risk assessment

Since the majority of the team members are currently borrowing our Meta Quest 2 Headsets from QUT, this can pose as a potential risk due to the due date. With some of us having to return our headsets to QUT earlier than expected, we would have to accommodate for that issue by forcing us to develop and polish much sooner.

The team skillset is the strongest factor for determining priorities. To ensure consistent and quality work, we intend to focus on areas of development that relate to our education at QUT - programming mechanics, user interactions and 3D modelling. The project may occasionally need to be delayed for the team to make headway in other unit assignments. This is especially important as we are all in our final year of university with the highest workload to balance.

Risk	Type	Probability	Time	Consequences
Get sick	Strategic	80%	3 - 15 days	Time delay
Hardware Damaged	Operational	30%	2 - 4 days	Device disabled, increased cost and time delay
Incompatible Software	Operational	50%	1 - 3 days	Time delay
Transport Failure	Hazard	90%	< 1 day	Time delay
Project Over-scoped	Operational	40%	2 - 3 weeks	Time delay, poor quality deliverables
Unsatisfied Client	Strategic	50%	3 - 6 days	Decreased stakeholder satisfaction
Lack of skills	Operational	60%	2 - 3 weeks	Decreased stakeholder satisfaction, poor quality deliverables

Appendices

Sprint 1		
TUSP:8		Total Hours: 84 hrs
current velocity:8		
11|As a user, I want to be able to overlay the latest satellite images on the map so that I get satellite information at any time to update the basic terrain of the map.		
30	Create a toolbar on the wrist or hand.	8hrs
31	Create a button that will apply the latest satellite images on the map	4hrs
32	Connect to open source data provider	8hrs
33	Overlay images onto the terrain	10hrs
34	Create different layers, ground, clouds, IR/thermal	8hrs
35	Uses the Rust API	8hrs
36	Verify story is complete	8hrs
usp: 8		TH:54 hrs

Sprint 2			
TUSP:8			TH: 78hrs
CV:8			

2|As a user, I want to be able to select the units I want to place in one interface to confirm and change the units I want to place.			
37	Create a "entities"/"units" button on toolbar	4hrs	
38	Create a "entities"/"units" interface that contains military entities	6hrs	
39	Select the unit in the "units" interface.	4hrs	
40	The units in interface could be grabbed and to place on the map	4hrs	
41	The units in the interface could be clicked and shows details	4hrs	
42	Verify story is complete.	6hrs	
USP:3		TH:24HRS	
3|As a user, I want to be able to delete units already added to the map so that I can place new units on the map.			
43	Add click on event	4hrs	
44	Create a pop-up window for units' operation's and parameters	4hrs	
45	Create a delete button in pop-up window	4hrs	
46	Delete the entity on the map	2hrs	
47	Verify story is complete	4hrs	
USP:2		TH:18HRS	

4|As a user, I want to create a timeline for a mission so that I can track and modify the actions of units on the timeline.			
48	Create a "timeline" button on toolbar	4hrs	
49	Create a timeline for the mission of map	4hrs	
50	Create a parameter form for initiate timeline	6hrs	
51	Implement that units move corresponding to the time changes on timeline	8hrs	
52	Move the pointer on the timeline can change the time on mission map	6hrs	
53	add the close button on the timeline component	2hrs	
54	verify story is complete	6hrs	
usp:3		36hrs	

Sprint 3		
TUSP:9		TH:92
CV:9		
5|As a user, I want to define movement paths for deployed units so that I can change the position of the unit's time on the timeline.		
55	Create a "Path" button on the unit's operation and parameters window	2hrs
56	Create a "Path" interface for the entity(close size and design with parameters window)	4hrs
57	Create and "add a path" button in "Path" interface	4hrs
58	Create a slots that stores time periods on each entity's path interface	4hrs
59	Create time period input bars that define the start time and end time for one "add a path" action.	2hrs
60	Create an input bar that define the time of unit run the path for one "add a path" action.	2hrs
61	Create a delete button on time periods/paths components which in slots	2hrs
62	Create a play button on timeline component	2hrs
63	Making entity moves along with paths and time.	6hrs
64	Verify story is complete	6hrs
usp:4		34hrs
6|As a user, I want to see the parameters of the time required for entity movement so that I can record time and make decisions accordingly.		

65	Create a "parameter" information section in pop-up window when click on the unit	2hrs
66	retrieve data from timeline for time parameters display	4hrs
67	update information if any changes happens	4hrs
68	Verify story is complete	2hrs
usp:1		12hrs

7|As a user, I want to see the parameter table of entities containing fuel and other parameters so that I can make decisions based on parameters.		
69	Add another following information object in pop-up window when click on the unit	2hrs
70	retrieve data from unit for general parameters display	4hrs
71	update information if any changes happens	4hrs
72	Verify story is complete	2hrs
usp:1		12hrs

8|As a user, I want to create annotations on the map so that I can better plan the mission and help remember certain tasks.		
73	Add a "Annotations" button on the toolbar.	4hrs
74	Add a click event on annotation button that makes all unit on map include map can be add a annotations	8hrs
75	Add a "plus" button for all objects on the map.	4hrs
76	Create a new pop-up window for annotation.	8hrs
77	Conncet to databse, save annotation to database.	8hrs

78	Verify story is complete	2hrs
usp:3		34hrs

Sprint 4		
TSUP:9		TH:98
CV:9		
9|As a user, I want to draw on the map so that I can draw lines and other shapes to simulate the plan.		
79	Add a "draw" button on the toolbar	2hrs
80	create and add draw function that make user could draw on the map	8hrs
81	create a draw toolbar on the left hand.	4hrs
82	add "color" to the draw toolbar, add 7 basic color to choose	4hrs
83	add "thickness" to the draw toolbar, add a drag bar to adjust thickness	4hrs
84	add "opacity" to the draw toolbar, add a drag bar to adjust opacity	4hrs
85	add "last action" button to draw toolbar to recall the draw action	4hrs
86	add "back" button to draw toolbar to back to normal toolbar	2hrs
87	Verify story is complete	6hrs
usp:5		38hrs
13|As a user, I want to present the mission so that I can explain the key points of the mission.		

94	Create a "mission" button on the toolbar	2
95	Create a mission window	4
96	Create a "add mission" button in mission window	2
97	Create a "mission detail" form for creating new mission	4
98	Create a mission card for show the context of mission detail.	4
99	Create a click event for clicking on each mission card for editing mission detail	4
100	Create a order number for ascending order and apply order to each mission card.	2
101	Make card be draggable and automatically change the order number on card	4
102	Create a tick box for confirm mission status.	2
103	Verify story is complete	6
usp:4		34

Sprint 5		
TSUP:8		TH:66
CV:8		
14|As a user, I want to progressively present key points in the presentation so that the presentation is more logical and planned.		
104	Create a "presentation" button on the toolbar.	2
105	add a click event presentation for navigating to presentation mode	4

106	Create a "presentation" toolbar for presentation mode.	4
107	Add a start presentation button to "presentation" toolbar	2
108	add a next slide button to "presentation" toolbar	4
109	add a "slides" button for showing multiple plan to "presentation" toolbar.	4
110	Add a slides slot for slides button to brief view on plans	4
111	Add a "new slide" button for new a plan	4
112	Add a "title" text bar for new slide after click "new slide"	2
113	Verify story is complete	8
5		38
12|As a user, I want to attach files to the map in real-time so that I can view them as a reference while editing the map.		
88	Create a "Files" Button on the toolbar	2hrs
89	Add a click event	2hrs
90	Create a pop-up window for importing files	4hrs
91	Create a another window for holding imported files	4hrs
92	Add a function that we can drag file window to move around	8hrs
93	Verify story is complete	4hrs
usp:3		26hrs

Sprint 6		
TSUP:8		TH:62
CV:8		
17|As a user, I want to ask AI questions during the mission so that I can get effective help.		
119	Create a "AI" button on toolbar	2hrs
120	add a click action that pops an AI dialogue window	4hrs
121	create an AI dialogue window	8hrs
122	create a send button for message send to AI	4hrs
123	Create function that AI only replys military and plan related question.	8hrs
124	confirm AI framework or library	4hrs
125	develop AI model and practice	12hrs
126	make interface between AI and our app	12hrs
127	verify story is complete	8hrs
8		62

Sprint 7		
TSUP:10		TH:78
CV:10		
18|As a user, I want to use AI as my mission navigator so that I can get information about the next steps.		
128	create an "AI tutor" button in AI dialogue window	4
129	create an "AI mission guide" window for holding AI generate mission guide	4
130	create a function that AI takes current plan's information to generate recommandation	30
131	create card for holding steps of AI-generated suggestion in AI mission guide window	8
132	verify story is complete	12
8		58
10|As a user, I want to place NATO symbols on the map so that I can confirm the department to which the mission belongs.		
133	create a "symbols" button on toolbar	2
134	create a symbols window for saving symbols.	4
135	create a click event that user click on the symbols.	2
136	create a function that symbols can be apply on the map	4
137	create an "import" function to import symbols images.	4
138	verify story is complete	4