What Impact do VR Controllers Have on the Traditional Strategy Game Genre

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Abstract

With Virtual Reality (VR) technology becoming more accessible and popular, video games have been taking advantage of its uses. Racing games such as '*Driveclub VR'*, allows the player to have a higher level of interactivity than compared to their regular screen counterparts. This paper will investigate the impact VR technology can have on the Real Time Strategy (RTS) game genre.

This paper will give game developers who wish to develop a strategy game for VR, a list of recommendations that can help guide and influence their design process. The use of these recommendations will give the developer a template on how to create their VR strategy game, that has been guided by focus groups and research and will improve the quality of their control schemes and input mechanisms.

The project found that VR controllers can have an impact on the strategy game genre, but further development of the recommendations would be needed to see if they can be used in a fully developed game. Taking influence from various sources such as non-VR video games, VR Games/ Applications and tabletop games, a control scheme for VR games was created and made into a list of recommendations. The research into this found that participants design decisions were heavily influenced by Google Products such as Google Earth VR and Google Tilt Brush, this can be seen in the recommendations, especially when examining the recommendations for the UI. Other influence can be seen such as traditional strategy game style 3D spaces.

Keywords: Strategy game, Virtual Reality, VR, Controls, HTC Vive, Oculus Rift.

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Contents

Introduction

With the advent of VR technology and the influence that it is having upon the games industry, games such as "*Onwards*" showcase how VR technology can influence video game genres such as First-Person Shooters, allowing the player to move in the real world and affect the virtual world. Actions such as reloading a magazine in a weapon would traditionally be a button press on a controller or a keystroke on a keyboard, but with VR, players have to manually change the magazine, doing the required actions such as pressing the release button on the weapon and moving their hands down to pick up a new magazine brings a new level of immersion to the shooter game genre. However, an area not yet explored is the strategy game genre, strategy games are a genre of games that allow the player to command units, build units, collect resources and use tactics on a large scale to ultimately defeat their opponents.

The research questions can be summarised as

- How can VR affect the Real Time Strategy genre of games?
- Can VR technology be fused with games such as Command and Conquer and StarCraft?
- With the use of VR technology becoming more common amongst gamers, will VR become the standard way to play games that are in the strategy game genre?

The Aims and Objectives of the Project

This project sets out to research "What Impact do VR Controllers Have on the Traditional Strategy Game Genre" and how VR can influence strategy game design, with the aim of creating recommendations on how players could interact with a strategy game if one were to take forward into production. Looking into areas such as game mechanics, UI and control mechanisms and finding out what is the most user-friendly and intuitive way of

bringing these mechanisms and mechanics across to the VR platform, if they should be brought across at all.

Chapter One – Contextual Review

Section 1- Literature review

With the aim of the project in mind, the project will explore various avenues for potential research, looking for how VR has been applied in different ways and how their application helped/improved what it was applied to. Currently, no research is primarily aimed at creating a control scheme for a VR RTS game or looking at the impact that VR can have on the genre, but there is research around various other subjects that could influence this project, subjects such as applying VR to real-world applications. The project has selected the research as they cover the games industry and how VR fits into it, in addition to this it also covers VR in more depth, examining how players who interact with VR, can have their play experience influenced.

With *"Grand Theft Auto V"* (GTA) being reported as the most profitable entertainment product of all time, reportedly making $6 Billion in revenue (Batchelor, 2018), Its sign that the games industry is large part of today's western society, James Cameron's *"Avatar*" did not make half the money that GTA did, bringing in 2.8 billion (Batchelor, 2018).

The Game Developer Conference (GDC) is a conference that video game developers can attend to discuss the industry side of creating video games. In 2018 GDC surveyed nearly 4000 developers about their opinions on the state of the games industry, the majority of the respondents were European and North American with 20% identifying as female (GCD, 2018). Primarily the GDC asked developers what they were developing for, for the question "Which platform(s) was your *last completed* game released on?", 50% respondents answered PC, followed by 32% on smartphones/tablets. VR headsets came in 5th with 15% of developers working on a VR game, some developers worked on games that released across

multiple platforms. It's a shame this number is not higher, but with VR only releasing to the mainstream public in 2016, this is not surprising, though the next question on "Which platform(s) are you *currently developing* games for?" the percentage does rise to 19%, so this does show a growth on the platform, possibly showing that in the future VR could become a more mainstream platform. The question after though shows a decline in the number of developers aiming for VR releases in the future, dropping down to 17%, this percentage may rise or decrease depending upon how much revenue that in development VR games make. GDC go onto analysis their date, stating that "Faith in the long-term sustainability of the VR/AR business is slipping" and based upon the previous data there is evidence for this. The GDC did not just have quantitative data, they asked questions on the matter and got the following responses "Until there is a 'must have' game for VR (at the same level of interest as saying, Minecraft or Halo for the original Xbox), there just won't be a large enough player base to support full-time VR/AR dev". On the opposite to this though, Roettgers (2017) reports that the use of VR is up, with up to 49 million people expected to have experienced VR once a month in 2019.

Though it could be problematic that some developers are moving away from VR/AR, there are other signs that it will keep growing, with second generation VR/AR devices coming out such as the HTC Vive Pro, VR or AR could still become mainstream. Immersion is a key selling point of VR; Chris Barraclough describes VR as "Immersive tech" (2018) and Tom Bruce says that VR has "plenty of immersive games to choose from" (2017) but what does immersion in a video game actually mean? In 2004 Emily Brown and Paul Cairns did a study to try and define this, stating that there was an "absence of a clear, transferable definition of immersion", to find out what gamers thought immersion was they took the approach of "actually talking to gamers about what they meant by immersion". They interviewed seven gamers, four of which were men and three were women, all over the age of

18. They got these gamers to play their favourite game for 30 minutes with the intention of making “gamer more aware of what it is that they enjoy about gaming and also what it is about a particular game that they enjoy”. After the play session they interviewed the gamers in a semi structured way with questions that were designed not to “put words into the interviewees mouths”. The study found that gamers had 3 levels of immersion (“Engagement”, “Engrossment” and finally “Total Immersion”), the levels were in a order and had barriers that needed to be opened by the gamer, the game or both, and once opened it does not necessarily mean that the player will move into that level. In the future work section, the authors say that the “many avenues of research” one of these avenues could be manipulating interfaces such as UI. One of the questions not answered by Emily Brown and Paul Cairns is how can a person quantify immersion? Pausch, R., Proffitt, D., & Williams, G. (1997) did a study with the aim of “Quantifying Immersion in Virtual Reality”. The study aimed to “show that users with a VR interface complete a search task faster than users with a stationary monitor and a hand-based input device”. The study put 24 participants into a virtual environment with the objective of finding a letter on a wall; this letter was hidden amongst many other letters to camouflage it. They did this using a VR headset. Another 24 did the same task but using a desktop Personal Computer (PC) configuration, but to keep the test fair because desktop PC’s of the time had a higher resolution, the authors bolted the headset to the roof, making so the user could not turn their head or make use of the VR capabilities such as movement.

It found that “VR users did not do significantly better than desktop users”, but when a participant was asked if they had searched the entire room and decide if a target existed at all, VR participants were “significantly” better than their desktop counterparts, with desktop participants taking 41% longer. Leading to the belief that the VR users could build a better “mental frame-of-reference for the space” that lead to the participants avoiding “redundant

searching". To further test this hypnosis the authors put the participants who did VR through the same task but using the desktop style set up, they found that the desktop users who used VR first improved, stating that "This underscores that something occurred in the user's mental state and could be transferred to using a different interface", to further back this up they did the same again but had desktop users move to VR and found that it "Hurt their performance" and could "imply problems with using desktop 3D graphics to train users for real-world search tasks."

The project was done in 1997, VR technology has since advanced, looking at this specification of the Head Mounted Display (HMD) is an example of this, the study used an HMD with a resolution of 240x120 pixels, compare that to an Oculus Rift that was released in 2016 which has 1080×1200 resolution. The results if done today might change, but they are still useful to the project as it shows that two of the effects that VR can have.

First is the ability to build a mental image of the environment, this allows players to know what is in their environment and the second is the ability to retain/transfer that information more efficiently. In RTS games, players must keep track of multiple units across large environments, if the hypothesis presented by the study is correct, then VR RTS gamers should be able to track and keep a mental image better than their desktop PC equivalents. Meaning that a VR RTS game could have its place alongside or even replace non-VR RTS games. Magerkurth, C., Cheok, A.D., Mandryk , R.L., & Nilsen , T. (2005) test the use of VR/ AR in a strategy game when they talk about pervasive gaming, in their article "Pervasive Games: Bringing Computer Entertainment Back to the Real World", pervasive gaming is where developers take real-world games such as 'Tag' and argument them with computing functionality. The article targets a sub-genre of pervasive gaming, looking at "smart toys, affective games, tabletop games, location-aware games, and augmented reality games".

Though the aim of the project is VR, the article does go onto discuss the use of Augmented Reality (AR) games. AR games are where the game augments the real world; this is commonly done by showing a projection of a 3D environment onto the real world, which the user then views through a 2D screen such as a TV or mobile phone device, they describe this as a "window into augmented space".

The article talks about an AR strategy game called "*AR Tankwar*", stating that the objective of the AR game was to "blend elements from popular real-time strategy games and miniature table-top games". The player views the world through an HMD () and has multiple approaches for interactions, the primary being a controller that the player uses, similar to that of a console controller such as the Xbox One. The second is voice commands, stating that "This proved quite effective for some players, but has been under-utilised due to difficulties with training our speech-recognition software."

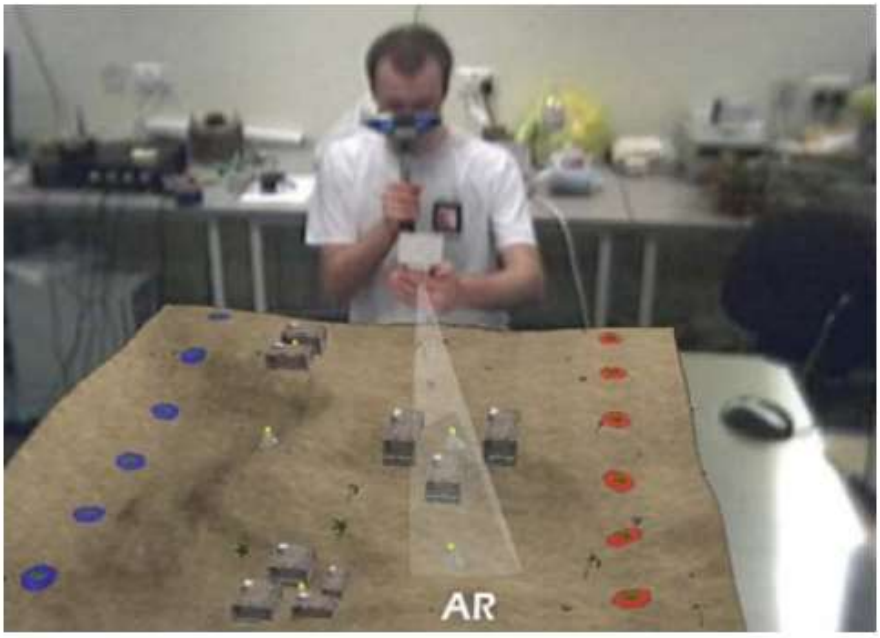


Figure 1: AR Tank War (MAGERKURTH, C., CHEOK, A.D., MANDRYK , R.L., & NILSEN , T. 2005)

In his article "Tankwar - AR Games at GenCon Indy 2005", Nilsen (2005) talks about taking *AR Tankwars* to GenCon Indy 2005, a games convention held in Indianapolis. During this convention, Nilsen showed *AR Tankwars* to "about 300" attendees who got to play it for

10 minutes. After he asked them to fill out a survey on their experience, two questions are of interest. When asked how easy it is to control their units, answerers replied with an average of 3.34, with one being hard and five being easy. The second question was “Cost notwithstanding, how willing would you be to play multi-player tabletop games augmented using headsets?”, Nilsen received an average of 4.08, (5 being willing to play).

Though the tests that Pausch, R., Proffitt, D., & Williams, G did may have been influenced by a variety of factors, in Grantcharov, T. et al. (2003) article called the “Impact of hand dominance, gender, and experience with computer games on performance in virtual reality laparoscopy”, is an article designed to measure factors such as gender in a virtual surgery environment. The authors set out to find “The impact of gender and hand dominance on operative performance”, they did this because it is “reportedly leading to discrimination and lack of professional promotion” within their field.

To test this, they tested 25 surgeons were registered to take part, these participants all had a range of genders, hand dominance, experience with computer games and had limited experience in the field of laparoscopic surgery. They were put through a VR training simulator called the Minimally Invasive Surgical Trainer, they performed six tasks within the simulator to find out if their gender, hand dominance and experience with computer games affected their results.

The study found that men completed tests faster than women, but there was no statistical difference in mistakes made and unnecessary movements between the two genders. Additionally, they found that right-handed participants made fewer mistakes than their left-handed counterparts and that participants who have played video games made fewer errors than participants who have not, though when these two data sets are removed from the equation, the time to completion and errors made “between male and female surgeons became nonsignificant”.

Conclusion

The Literature review has found a range of issues with the games industry and VR. As the project concentrates on VR, the VR the findings from the review are of primary interest. The findings from Grantcharov, T. et al (2003) show that experience in playing video games beforehand does influence new users to VR, combining that with Pausch, R., Proffitt, D., & Williams, G. (1997) findings of players being able to build a mental image of a virtual world more efficiently, the author believes that a VR RTS game has potential. Players could more easily keep track of the world they are in, remembering where units are in that world which would lead to a better experience for the player when compared to the flat screen counterparts. This all does not matter though if there are no players to play it, the findings did find that VR usage is going up with consumers, but there was hesitation from developers to consider using developing on the platform. With the number of consumers rising the author would predict that developers would start to move back towards the platform.

Reflecting upon *AR Tankwars* being an AR game, its findings are useful, especially the questions asked at the convention. Knowing that Nilsens control scheme was easy to use needs to be taken into consideration in the future, though new VR headsets do have controllers that come with them, this may conflict with the application of this finding. The second question about someone's willingness to play an AR RTS game proves that the project has a future. VR and AR are not so different, and the author would argue that the answerers of this questionnaire would also be willing to play a VR version of an RTS.

Taking the project forward, if it does use interviews or focus groups during its creation to design, the project will need to be aware of how it could be influenced by the participants that are involved. Could having an all-male participant group lead to a more effective result? The author would argue not because as stated earlier, once the outside factors were removed there was no significant difference in results.

One note that should be considered is the difference between right- and left-handed participants, Grantcharov, T. et al. (2003) made the point that “There is no doubt that each junior doctor entering a surgical training program should be evaluated as an individual, and not as a member of a certain group. However, differences in performance between left- and right-handed individuals should be considered by those responsible for the training activities in a surgical department”. If the project creates a control scheme or something similar, should this be taken into consideration? The authors of the study would argue yes, but that is within their chosen field, and that is them measuring response times not creating something new.

Section 2 - Existing Strategy Games

A strategy game is a "video game that centres around using resources to build units and defeat an opponent" (Techopedia 2016). Examples of strategy games are the *Age of Empires* series, *Total War* series, *StarCraft* series, *XCOM* series, *Supreme Commander* series, *Civilization* series and the *Command and Conquer* series. Strategy games will put the player in a commander like role, instead of being a soldier the player leads the soldiers, giving them orders from a 3rd person perspective.

To understand how VR can impact the RTS genre, this project will breakdown various strategy games, taking apart their game mechanics and UI. Later the project will look at how the player interacts with these mechanics and UI.

Real Time Strategy Game Mechanics

Game mechanics are what makes gameplay; the player uses these mechanics to play the game successfully. Game Designing (2016) says that "Game mechanics help provide gameplay by providing a construct of methods or rules designed for the player to interact with". An example of a game mechanic is in the video game, '*Gears of War'*. Released in 2006 '*Gears of War'* is a 3rd person shooter game, the game featured a cover mechanic that allows the player to take cover behind an object, such as walls and cars, to avoid damage, Gamespot (2007) described that "The cover mechanics work very naturally, making it easy to stick to a wall, pop up or around to take shots at the enemy". The player can use this mechanic to their advantage, taking cover and firing while being safe. The primary objective of this project is to find how VR controllers can impact the traditional strategy game genre, to understand how one can interact with a strategy game using VR, one needs to understand how strategy games

work because interacting with a strategy game means that a player is using those game mechanics.

Different game genres have different mechanics, racing games will have different mechanics to a strategy game, and a strategy game will have different mechanics to a First-Person Shooter. Since the project is targeting strategy games, the project will look exclusively at military strategy games such as *'Company of Heroes 2', 'Wargame Red Dragon'* and *'Command and Conquer'*. (Note: How the player executes these game mechanics are examined later).

To find out what game mechanics are present in strategy games, the project has researched 10 different strategy games (*Company of Heroes 2, Wargame Red Dragon, Command and Conquer 3, Sins of a Solar Empire, Age of Empires 3, Total War: Attila, Dawn of War 2, World in Conflict, StarCraft and Rise of Nations*) with the aim of finding out the core mechanics that links all the games together, this will enable the project to use these identified core mechanics to shape its development and recommendations better. These ten games were chosen as they represent a wide range of strategy games, the strategy game genre itself has many sub-genres such as Real Time, 4X, City Builders and Turn Based. The project is going to focus upon Real Time military strategy games. This is because they place the player under much stress compared to Turn Based, City Builders and 4X. Turn Based games allow the player to take their time to initiate their plans and actions, they are not pressured into making quick decisions that go wrong. If the project can design a way for gamers to use VR in these real-time-based games, then its most likely that the findings can also be used for other games such as City Builders.

The games were chosen because of their high Metacritic rating, all the games are above a 75 on Metacritic with the lowest being, '*Wargame Red Dragon'* at 78 and the highest '*StarCraft II: Wings of Liberty'* at 93 (Metacritic, 2010). There are other games available as stated, especially in other sub-genres of the strategy game genre, but by keeping the research group to a tight select group of games that have all scored high on the Metacritic rating system, it is expected that the study will get high-quality results from games that have been released for a reasonable period of time, and have a high average Metacritic amongst them.

Identified Game Mechanics

Select

In a strategy game the player is put into a commander like position, given the ability to give orders such as move and attack, but before this can be done the player must be able to give these orders to a unit or units of their choice, this is where selecting is used. Selecting a unit is where the player tells the game that they only wish to interact with a particular unit. Once this is done, that unit is "selected", and the following orders will only be applied to that unit. Figure 2 shows a unit that is selected and a unit that is not selected. The selected Unit has a white outline around it.

Figure 2. Wargame Red Dragon Selection, (Eugene systems, 2014).

Move

Once a Unit is selected a player might want to order that Unit to move to a location. Moving allows players to relocate their Units around the 3D environment, allowing them to gain ground, capture more resources, close the range to attack an enemy or explore an area. In Figure 3 the player wants to move the selected Unit to a new location. With the Unit selected the player orders the move.

Figure 3. Wargame Red Dragon move order, (Eugene systems, 2014).

Figure 4 shows that the Units have now moved to the requested location. The speed of the action depends on the Unit, some Units maybe faster than others.

Figure 4. Wargame Red Dragon move order two, (Eugene systems, 2014).

Combat

Strategy games typically focus on combat. It allows the player to win the game by defeating the opposition. Units in RTS games have health and damage output; these will vary from Unit to Unit. When a Unit attacks another, they do damage, do enough damage and the opposing Unit will eventually die and be removed from play. How much damage they do is decided by the damage stat of the Unit. Figure 5 shows combat in the game '*Total war: Attila'*; the Romans are attacking an eastern nation.

Figure 5. Total War: Attila, (Creative Assembly, 2015).

Morale

Morale is a gameplay mechanic that tries to mimic the real-life effect of soldiers panicking in battle. Units in games such as '*Total War'*, have a certain amount of morale, and when morale drops low enough a Unit will panic and try to leave the battle. Low morale will also have effects on the Unit such as fewer combat capabilities.

Retreat

Players may choose to retreat when they cannot win a battle but wish to save their forces for a later one. In games like, '*Wargame Red Dragon'* retreating is like a 'move order'. A player issues a 'move order' to a safe place out of combat, other games like '*Company of Heroes'*, 'Retreat' is a specific order that the player can give to a Unit. Figure 6 shows the player about to order a retreat in' *Company of Heroes'*, with the Unit they wish to retreat selected the player then orders the 'Retreat'.

Figure 6. Company of Heroes retreat order, (Relic entertainment, 2013)

Figure 7 shows the 'Retreat' underway. The Unit is retreating to a safe place.

Figure 7. Company of Heroes retreat order 2 (Relic entertainment, 2013).

Economy

To build a Unit in the game, the player may require 'Resources', which are the type of in-game currency that the player can use to build bases, build Units or carry out research. In '*Company of Heroes*' the player has three different 'Resources' that are gained over a slow rate. This is called their 'Resource Income'. Figure 8 is a section of the UI that the player sees in '*Company of Heroes 2'*; this counter shows their current 'Resources' and how much income they have. Figure 8 shows that the player currently has three munitions, and is gaining six every minute, this means that in one-minute time the player with now have nine munitions

Figure 8. Company of Heroes economy, (Relic entertainment, 2013).

To increase the amount the player is earning, the player must capture positions in the 3D environment. A flagpole is shown in Figure 9, to capture this flag the player must move a Unit into the area.

Figure 9. Company of Heroes. Flag capturing (Relic entertainment, 2013).

Figure 10 shows the flag that has been captured; the flag has changed to blue to show that the player owns this flag.

Figure 10. Company of Heroes. Flag captured, (Relic Entertainment, 2013).

Figure 11 shows the after the player has captured the position their income has increased, meaning that the player will now have bigger ‘Resource’ income per minute.

Figure 11. Company of Heroes economy 2 (Relic entertainment, 2013).

Building a base

Base building is a mechanic where the player builds a ‘Base’. This Base is the centre of the player’s operations. Gameplay in certain RTS games is based around a ‘Base’, if a player’s Base is destroyed the player will lose the game. Expanding the players Base will cost them resources but will allow them to build different Units with different advantages.

Figure 12 shows the player with only one building in their Base. The player can only build Units from this building which can limit the player. So, the player may want to expand their ‘Base’. To do this, the player is going to use a ‘Builder Unit’ to expand their ‘Base’.

Figure 12. Company of Heroes base building, (Relic entertainment, 2013).

Figure 13 shows that with the ‘Builder Unit’ selected (in this case the ‘Pioneer Squad’) the player can choose which building they wish to build. The player has chosen the building and now gets to choose where to place it, they do this using a ‘Ghost’ tool.

Figure 13. Company of Heroes base building two (Relic entertainment, 2013).

Figure 14 shows that the ‘Builder Unit’ has moved to the position that the player chose and has begun construction on the required building.

Figure 14. Company of Heroes base building three (Relic entertainment, 2013).

Figure 15 shows the building has now been completed, thus allowing the player to use it to their advantage.

Figure 15. Company of Heroes base building four (Relic entertainment, 2013).

Build Units

A Unit is a person/vehicle or anything that the player can issue an order. An example of this might be Tank or an Infantry Squad. The Unit depends on the universe/game the player is playing. Building Units will cost the player 'Resources', how much depends on the Unit and its skills. To build a Unit the player uses the UI and orders the Unit they require.

Figure 16. Command and Conquer 3: Tiberium Wars, build units. (DICE Los Angeles, 2007).

In Figure 16 and Figure 17 the player wants to build a ‘Rifleman unit’, they click the UI element on the right side of the screen.

Figure 17. Command and Conquer 3: Tiberium Wars, build a rifleman unit. (DICE Los Angeles, 2007).

The player has ordered the building of the Unit and a set amount of time passes

Figure 18 Command and Conquer 3: Tiberium Wars. Build a rifleman unit 2. (DICE Los Angeles, 2007).

Once built, they will appear from a building or off the map depending on the game. Once in the play space, the player can use them, ordering them to move and attack. Figure 18 shows that the player's rifleman has been built and are ready to receive commands.

Research

RTS games allow the player to upgrade their Units to make them better. The player can do this through researching 'Upgrades'. Researching would cost the player 'Resources'. Figure 19 shows the research 'Tree' for '*Total War: Attila'*. Researching different technology of this research tree will give benefits and advantages to the player. Figure 19 shows the player going to research the 'New Aristocracy' technology, after a certain amount of time the research will be complete, granting the player the advantages and possible disadvantages that come with it.

Figure 19. Total War: Rome 2 Technology tree. (Creative Assembly, 2013).

Line of Sight/ Fog of War

In games, such as '*Call of Duty'* a player can only see what they are looking at, meaning that walls and other objects block line of site. Since RTS games give players a satellite-like view of the environment, this means they would be able to see everything that is happening, to combat this issue, RTS games use a mechanic called 'Line of Sight' or 'Fog of War'. What this mechanic does is limit the player to only seeing what their units can see, meaning that if an enemy Unit is outside their line of sight it cannot be seen by the player, and thus attacked or planned against. Figure 20 shows that how 'Fog of War' is represented in the game '*Rise of Nations'*, the black parts of the screen show where the player has not explored, so they do not know the terrain or what is there. The grey areas show where the player has explored in the past but currently does not have 'Line of Sight' on that area, and the lighter parts are where the player has current 'Line of Sight' on, meaning that enemies in that area will be spotted.

Figure 20. Rise of Nations, fog of war (Big Huge Games, 2003).

Unit Special Abilities

The selected Unit might have special abilities. An example might be to capture an enemy building or use a ‘Special Attack’. ’Special Attacks’ may apply more damage than a regular attack. Figure 21 shows a spaceship in the game ‘*Sins of a Solar Empire*’, using a special ability it can rapidly regenerate its shields.

Figure 21. Sins of a Solar Empire special ability one (Stardock, 2012).

Figure 22 shows that after activating the ability, the player sees the ability active visually. The ship in the game now has stronger and faster recharging shields.

Figure 22. Sins of a Solar Empire *special* ability two (Stardock, 2012).

After using the ability, the ability enters a “Cooldown Period” where it cannot be used. The “Cooldown Period” is shown on the UI in Figure 23

Figure 23. Sins of a Solar Empire special ability three (Stardock, 2012).

Passive abilities

Units in games might have ‘Passive Abilities’, described by Wowepdia (2016) “A passive ability is an ability that is always active and does not require user interaction to use”. This means that the ability is active in the background, and the player does not need to press a button to activate it, making them different from special abilities. An example of this is the

'General Unit' in the '*Total War'* series, any Unit near the General will have a boost to their morale.

Weather Effects

'Weather Effects' are a gameplay mechanic where the weather can directly affect the player's choices. The '*Total War'* series of games feature snow; this will cause casualties to Units if they are left exposed to it for an extended period. As seen in Figure 24

Figure 24. Total War: Attila. Snow causing casualties through attrition (Creative Assembly, 2015).

Diplomacy

Strategy games will have more than one 'Faction' in them, these Factions might be player controlled, or controlled by Artificial Intelligence (AI). The player can interact with these Factions using 'Diplomacy', this allows the player to declare war, ask for peace, ask for a trade and many other diplomatic options.

Off Map Abilities

'Off Map Abilities' are a game mechanic which allows the player to use some force or ability that was not originally in the play area. Examples of this could be an 'Artillery Strike' or an 'Air Strike'. Normally for a player to create an Artillery Strike, they would require an

‘Artillery Gun’ that was in the play area and in range of the target area, but with an off-map Artillery Strike it is presumed by the player that there is nearby Artillery Gun, but they are not in the play space.

In Figure 25 the player has identified the buildings that might have enemies in them, and the player wishes to remove those enemies from play.

Figure 25. World in Conflict. Possible enemy locations (Massive Entertainment 2007*).*

The player decides to use an ‘Off-Map Ability’ to remove the buildings.

Figure 26 shows the player ordering the Artillery Strike. A red marker has appeared to show the impact zone

*Figure 26.*World in Conflict. Artillery strike marker. (Massive Entertainment 2007).

Figure 27 shows that after a short period of time, an Artillery Strike lands, destroying the area and buildings. The player paid for this strike using an in-game Resource.

Figure 27. World in Conflict. Artillery strike (Massive Entertainment 2007).

Cover/ Building Garrison

'*Company of Heroes'* allow units to take cover, taking cover gives an advantage to the Unit, such as more damage resistance or more health. '*Command and Conquer'* allows players to

order a Unit to ‘Garrison’ a building. Doing this will also give the Unit a buff such as more health. Figure 28 shows units in the game ‘*Halo Wars’*, taking cover behind a destroyed vehicle

Figure 28 Halo Wars. Units in cover (Ensemble Studios, 2009).

Identified Game Mechanics Table

Table 1 shows a list of strategy games and which mechanics they do and do not have. Allowing the project to narrow down which mechanics are required to be considered. It would be impractical to try and create VR controls for every game mechanic, so the project will focus on those that are common between the various games

	Select	Move	Combat	Morale	Retreat	Economy	Base building	Build units	Research	Unit Special abilities	Diplomacy	Line of Sight/ Fog of War	Weather Effects	Off-map abilities	Cover/ Building Garrison
Company of Heroes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓
Wargame	✓	✓	✓	✓	✓	✓	✗	✓	✗	✗	✗	✓	✗	✗	✓
StarCraft	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	✗	✓	✗	✗	✓
Command and Conquer	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓
Age of Empires	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓	✗	✗	✓
Total war	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓
Dawn of War 2	✓	✓	✓	✓	✓	✓	✗	✓	✗	✓	✗	✓	✗	✓	✓
World in Conflict	✓	✓	✓	✗	✓	✓	✗	✓	✗	✓	✗	✓	✗	✓	✓
Sins of a Solar Empire	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Rise of Nations	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗

Table 1 Identified game mechanics

Identified Core Game Mechanics Table

A ‘Core Game Mechanic’ is a game mechanic that most of the games in that genre will have. Exploring the chosen games for similarities in game mechanics that can be used in the final recommendations. Some RTS games will add mechanics that are exclusive to them; the project is looking for the mechanics that are found across all RTS games. Table 2 has narrowed it down to just the core mechanics

	Select	Move	Combat	Economy	Build units	Line of Sight/ Fog of War
Company of Heroes	✓	✓	✓	✓	✓	✓
Wargame	✓	✓	✓	✓	✓	✓
StarCraft	✓	✓	✓	✓	✓	✓
Command and Conquer	✓	✓	✓	✓	✓	✓
Age of Empires	✓	✓	✓	✓	✓	✓
Total War	✓	✓	✓	✓	✓	✓
Dawn of War 2	✓	✓	✓	✓	✓	✓
World in Conflict	✓	✓	✓	✓	✓	✓
Sins of a Solar Empire	✓	✓	✓	✓	✓	✓
Rise of Nations	✓	✓	✓	✓	✓	✓

Table 2. Identified core game mechanics

Conclusion

Strategy games have a wide range of mechanics, some are for basic tasks such as selecting units, and others are for more extensive gameplay experiences such as economy. Certain games such as *'Company of Heroes'* and the *'Total War'* series features game mechanics that are not common across the entire RTS genre, an example of this is game alternating weather mechanics. Although it would be beneficial to include these in the final recommendation as it would allow for more direct translation for certain games, taking just the 'core' game mechanics seen in Table 2 forward in the project will enable a wider range of application for the final results. Using this approach, future developers would not have to look through unnecessary data. I do find some of the findings of Table 2 interesting as I do not agree with them, the main example is research, research is staple of the RTS games such as '*Age of Empires'* and the '*Total War'* series, these games have iterations that run back into the late 90s and early 2000s with games such as '*Rome: Total War'* and '*Age of Empires 2'.*

The findings from this section will help develop the end recommendations, these core mechanics are critical to any RTS game, and if they were to be missed out, it could ultimately damage the results.

Real Time Strategy UI/UX

A ‘User Interface’ (UI) is an interface that allows the player to navigate and give them information. In video games, they are used for different purposes such as menus and showing feedback to the player on their health and ammo. A significant part of modern video games is the UI. Without some sort of UI in the game the player would not be able to understand everything that is happening. UI allows the player to navigate the world and receive feedback from it in a way that the player can quickly understand. While genres such as FPS use their UI in a way that quickly shows relevant information, RTS games have the player interact with the UI; the players will find themselves clicking the UI to execute game mechanics such as ordering a move or triggering a special ability. With UI being an essential feature to the RTS series, it is critical to the project that they are correctly explored and analysed so that such UI elements can be replicated or changed in VR. Before analysing UI that is found in RTS games, researching the different types of VR is essential because they show the same data in different ways, some might be more appropriate than others for use in VR. These types of UI are listed below.

Diegetic

Diegetic UI is UI’s that are in the 3D space that can be seen by everyone and are part of the environment. Marcus Andrews (2010) a designer at DICE EA, describe them as “Interface that is included in the game world”. They are designed to increase immersion in the universe and the game itself. An example of this is in the game ‘*Dead Space’*. To show health they have it on the actual model of the player, the light on the player goes up and down depending on player health as seen in Figure 29

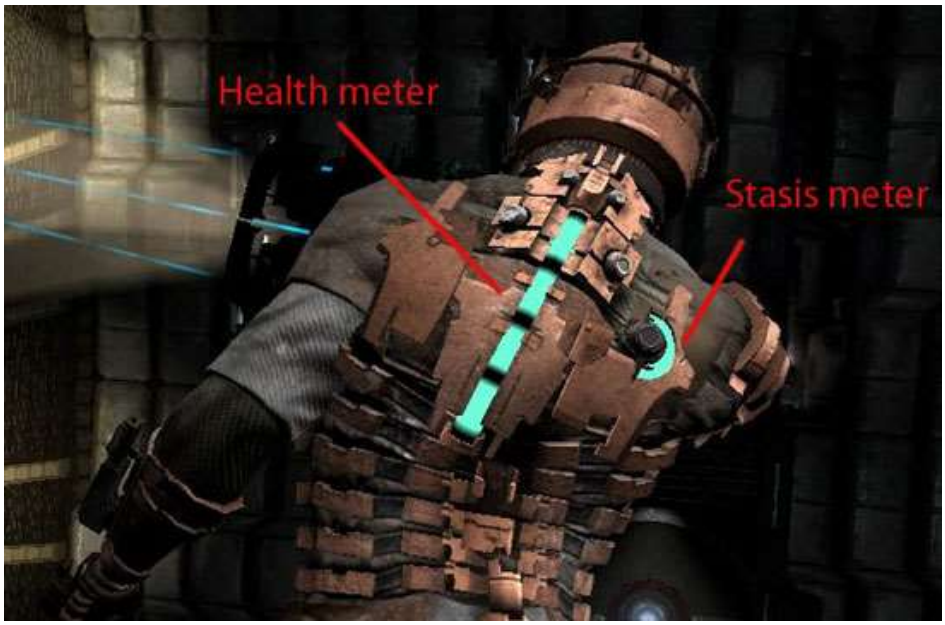


Figure 29. Dead Space UI (Andrews, M. 2010)

Non-Diegetic UI

Described by Unity (2016), Non-diegetic UI is where the UI is "Overlaid on top of the screen". Its commonly used to show player status such as 'Health and Ammo'. The menus of a game where players select gameplay and load levels are part of the UI, but the most recognisable is the one in game. Non-Diegetic UI in game gives player's information quickly so they can keep their main attention on the actual game. Figure 30 shows the UI for '*Call of Duty 3'*, a First-Person Shooter (FPS), you can see that it offers information such as ammunition, a map and current score. The UI for the game is always on the screen, overlaid on top of the game.

Figure 30. Call of Duty 3. HUD. (Treyarch, 2006)

Spatial UI

'Spatial UI' is where the UI is represented within the 3D environment but are not part of the world; they can only be seen by the player. An example of this is in the game '*Ghost Recon Advanced Future Solider'* when the player goes to throw a grenade, a UI element appears in the game space, indicating where the grenade would land. In Figure 31 the Spatial UI element even interacts with the environment and shows how it would bounce off walls.

Figure 31. Tom Clancy's Ghost Recon: Future Soldier. Spatial UI (Ubisoft, 2012).

How do Strategy Games make use of a User Interface (UI)?

RTS games use their UI to allow the player to interact with the games. Looking at how current RTS games use their UI will allow the project to know what is required in VR. Examining the games for common elements between the games is the objective. Certain UI elements are game specific and thus examining multiple games will allow the project to narrow it to the required core UI elements. In this section, the project is looking at UI when the player is 'In-Game', meaning this is the screen the player will see when playing the game, not while exploring menus. Certain UI elements may be found in different parts of the game or might be hidden and cannot be shown while other UI elements are in use if this is the case another image underneath will show this.

Wargame Red Dragon

The latest instalment in the '*Wargame*' series, '*Wargame Red Dragon*' has a modern but themed UI for the player to use and experience. Wargame uses a combination of Non-Diegetic and Spatial UI. Figure 32 through Figure 34 are a breakdown of the UI

Figure 32. Wargame Red Dragon. UI breakdown. (Eugene systems, 2014).

*Figure 33.*Wargame Red Dragon. UI breakdown two (Eugene systems, 2014).

Figure 34. Wargame Red Dragon. UI breakdown three (Eugene systems, 2014).

Command and Conquer 3

'*Command and Conquer 3'* is a strategy game set in a fictional universe with a strong Sci-Fi setting. '*Command and Conquer'* uses a combination of Non- Diegetic and Spatial UI. Figure 35 is a breakdown of Command And Conquer 3's UI

Figure 35: Command and Conquer 3: Tiberium Wars, build units. (DICE Los Angeles, 2007).

Company of Heroes 2

'*Company of Heroes* 2' is set during World War 2. The player takes command of either Allied or Axis forces. '*Company of Heroes 2*' uses a combination of Non-Diegetic and Spatial UI. Figure 36 is a break down of Company of Heroes 2's UI.

Figure 36. Company of Heroes UI breakdown. (Relic Entertainment, 2013).

Total War

Due to the way '*Total War*' games are played, they have two different sets of UIs. The first is for the 'Grand Campaign' where the player builds Units and buildings; the second is for the battles, where the player's pre-made army clashes with others. For the research to properly examine the entire game, both will be looked at and compiled into the same data. There will be a crossover between the two different UI styles. Figure 37 and Figure 38 is a breakdown of the two different UI's.

Campaign Screen

Figure 37. Total War: Attila. Campaign map UI breakdown. (Creative Assembly, 2015).

Battle Screen

Figure 38. Total War: Attila. Battle screen UI breakdown. (Creative Assembly, 2015).

Identified UI Elements

Cursor

The cursor is the primary way the player interacts with the game. The player can move it around the screen using a mouse, and it allows the player to execute most game mechanics such as ordering a move or attack. For example, if a player puts the cursor over a unit and clicks it, then that unit become selected. The cursor is contextual to what the player already has or has not got selected. It also allows the player to click on UI elements, allowing them to give orders and order 'Special Abilities'. As stated, the cursor is contextual to what the player is doing; it changes depending on what the player chooses to do. Figure 39 shows the different cursor states for '*Wargame Red Dragon'*; the other games also have a similar system.

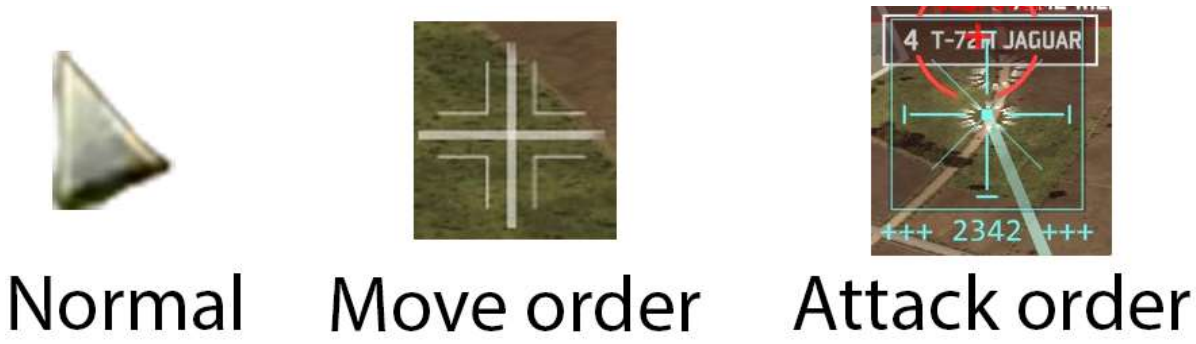


Figure 39 Wargame Red Dragon. Cursor breakdown. (Eugene systems, 2014).

Selected Unit/s

The selected Unit's UI elements let the player know which Unit they have selected. Typically it comes with a visual portrait of the Unit. Letting the player easily know what they have selected, even when the camera is not focused on the unit. This is primarily used for player reference, as strategy games often require the camera to not always be looking at the

Unit the player has selected, so that the player can focus on a different part of the 3D environment, this UI element allows the player to know what they have selected no matter where they have their attention.

Figure 40: Selected Units UI (Eugene systems, 2014, Relic entertainment, 2013 DICE Los Angeles, 2007*).*

Highlight around Selected Unit

The currently selected unit will have a highlight around it in some form; this commonly looks like a ring around the base of the unit, as seen in Figure 41. It acts much like the selected Unit UI element, but it is a Spatial UI that is placed in the game's environment. It also helps narrow down which Unit/s the player has selected.

Figure 41: Unit highlight (Eugene systems, 2014, Relic entertainment, 2013).

Minimap

The 'Mini Map' gives a general overview of the current situation in the game, on a small scale. It is designed to give the player a quick reference of the entire environment, and

as such it does not show as much detail compared to the actual in-game environment. Units are represented by squares on the map which can be seen in Figure 42

Figure 42: Mini Maps (Eugene systems, 2014, Relic entertainment, 2013 DICE Los Angeles, 2007*).*

Flares/Alerts for Team

'Flares/Alerts' are designed to allow the player to place a beacon or 'Flare' in the 3D space; this is done to allow a player to alert their team members of an event. An example being a surprise attack or asking for help. Figure 43 shows the UI element for "*Company of Heroes 2"* and "*Wargame: Red Dragon."*

Figure 43: Flares/Alerts for team UI (Eugene systems, 2014, Relic entertainment, 2013)

Time

The Time UI element shows how long has passed. In single player games, individual games allow the player can speed up and slow down time using this UI element. Games such as '*Total War: Attila'* use this element to show the current date and season details in the game. It commonly appears as a timer

Victory Points & Victory Progression

For a player to win the game, they must fulfil a set number of requirements such as destroying all enemies or capturing more zones depending on the game type. Figure 44 shows an example of this element, "*Company of Heroes 2"* uses a bar style UI, whereas "*Wargame: Red Dragon"* uses a number.

Figure 44: Victory Condition UI (Eugene systems, 2014, Relic entertainment, 2013)

Special orders

The 'Special Orders' UI element, allows the player to make use of the Unit's 'Special Abilities' game mechanic. What is shown here is contextual to the unit selected. For example, if the player has an artillery piece, then a special order to fire smoke rounds will appear

3D Environment

The 3D environment is the arena or area the player plays in. "*Wargame*" is set in countries such as North and South Korea, as such the 3D environments show this. "*Company of Heroes 2*" is set in World War 2, so it shows a WW2 style environment, this will change depending on the game.

Airport Panel

'*Wargame Red Dragon'* features military jets; the jets are not kept in the 3D environment constantly. They come in off map when the player requests them. This tab allows the player to select and bring selected aircraft into the battle rapidly; this UI element is exclusive to "*Wargame Red Dragon*".

Available Points/ Resources

The ‘Resource/Economy’ mechanic is present in many strategy games such as “*Command and Conquer*” and “*Wargame: Red Dragon”*, this UI element shows the player how much of the resources they have. “*Company of Heroes*” also shows the income rate the player has.

Quick Build

Quick build allows the player to rapidly build the units they wish no matter where their camera is pointing. In older generation RTS games, players would have to return to their base to build new units, whereas quick build allows them to do it no matter where they are.

Unit Description

The ‘Unit Description’ is a UI element that describes the currently selected Unit in depth. Giving stats such as health and weapon range. Some games such as “*Wargame*” have this information hidden, so it does not block the user's view of the 3D environment. Figure 45 Shows “*Company of Heroes 2’s*” approach to this element. Figure 46 “*Wargame: Red Dragon”,* you can see how “*Wargame: Red Dragon’s”* shows more information such as weapon range but does not show general background information.

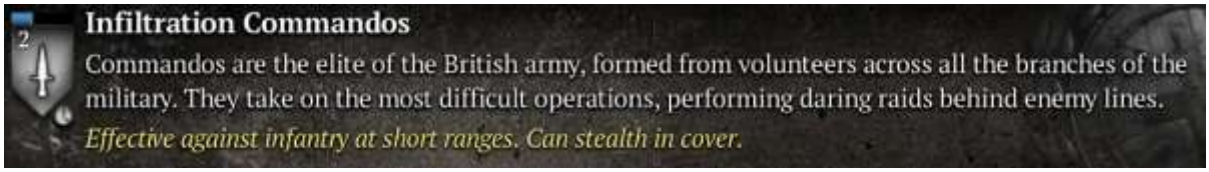


Figure 45: Unit description example (Relic entertainment, 2013

Figure 46: Unit description example 2 (Eugene systems, 2014)

Quick Unit Select

This UI element enables the player to rapidly select units no matter where they are in the game. This can become extremely useful for players who find themselves looking at different parts of the 3D environments a lot.

Population Cap

Many RTS games such as "*Company of Heroes*" feature a 'Population Cap'. It limits how many units the player can have at one time. This UI element features a counter that goes up and down depending on how many units the player has.

Off-Map Abilities

This UI element allows the player to call in 'Off-Map Abilities'. Usually, the player will find this in a square or tile-based UI element. If the player hovers over the icons within the UI element, the game will tell the player what each 'Off-Map Ability' will do.

Identified UI Elements Table

The table below shows the identified UI Elements for an RTS game

	Cursor	Play Area/ 3D environment	Mini map	Resources	Selected unit	Quick Unit Selection	Unit Special order/abilities	Selected unit description	Highlight around to show selected unit	Unit previewer	Victory points/ Victory progression	Flares/ Alerts for team	Date/ Season details	Quick Build unit/ building	Date/Season Details/ Time
Company of Heroes 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wargame: Red Dragon	✓	✓	✓	✓	✓	✕	✓	✓	✓	✕	✓	✓	✕	✓	✓
Command and Conquer	✓	✓	✓	✓	✓	✕	✓	✓	✓	✕	✕	✕	✕	✓	✓
Age of Empires 3	✓	✓	✓	✓	✓	✕	✓	✓	✓	✕	✕	✓	✕	✕	✓
Total war	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✓	✓	✕	✓
Dawn of War 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✓	✕	✕	✓
World in Conflict	✓	✓	✓	✓	✓	✓	✓	✕	✓	✕	✓	✕	✕	✓	✓
Sins of a Solar Empire	✓	✓	✕	✓	✓	✓	✓	✕	✓	✕	✕	✓	✕	✕	✓

Table 3. Identified UI Elements.

Identified Core UI Elements Table

Table 4 shows the identified Core UI Elements. These are the UI Elements that were found across all the researched games. These will be taken forward when creating a VR strategy game.

	Cursor	Play Area/ 3D environment	Resources	Selected unit	Special orders	Highlight around 3D model to show selected unit	Victory points/ Victory progression	Date/Season Details/ Time
Company of Heroes 2	✓	✓	✓	✓	✓	✓	✓	✓
Wargame: Red Dragon	✓	✓	✓	✓	✓	✓	✓	✓
Command and Conquer	✓	✓	✓	✓	✓	✓	✓	✓
Age of Empires 3	✓	✓	✓	✓	✓	✓	✓	✓
Total war	✓	✓	✓	✓	✓	✓	✓	✓
Dawn of War 2	✓	✓	✓	✓	✓	✓	✓	✓
World in Conflict	✓	✓	✓	✓	✓	✓	✓	✓
Sins of a Solar Empire	✓	✓	✓	✓	✓	✓	✓	✓

Table 4. Identified Core UI Elements.

Conclusion

UI is a critical part of RTS games, compared to other genres players interact with the UI more than any other genre of games, the UI does not just support the player, it's fully interactable and has a wide range of elements that help the player execute the game mechanics. '*Call of Duty'* has a Hardcore mode for its multiplayer, in the game mode they change the mechanics from the base game modes, but one of the significant changes is the remove all the UI elements such as health and ammo. This would not be possible in RTS games, how would a player build a unit? Know which unit is selected? Without a UI correctly designed in VR, the project will struggle a lot. The author does not see how a VR RTS game would exist without one in some form or another. It will be interesting though once the project gets into the design phase to see if it is possible to play an RTS game in VR without one, it is a possibility that cannot be ignored. The idea should be explored and developed if possible.

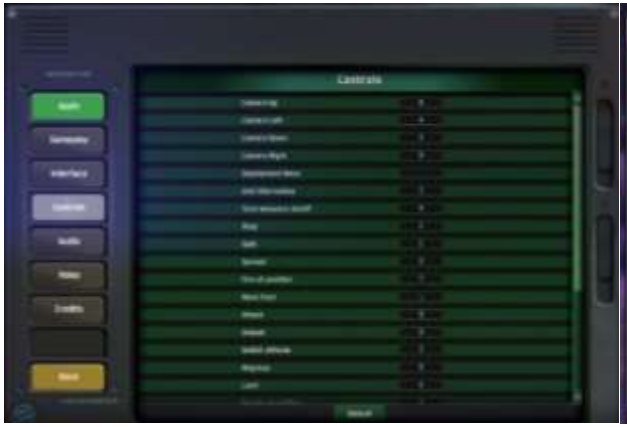
If the final recommendations try a replication style approach to UI, where it tries to mimic traditional RTS games as much as possible, what styles could be implemented? What style of UI would be more prevalent? Non-diegetic, diegetic or spatial? Is it a combination of all 3?

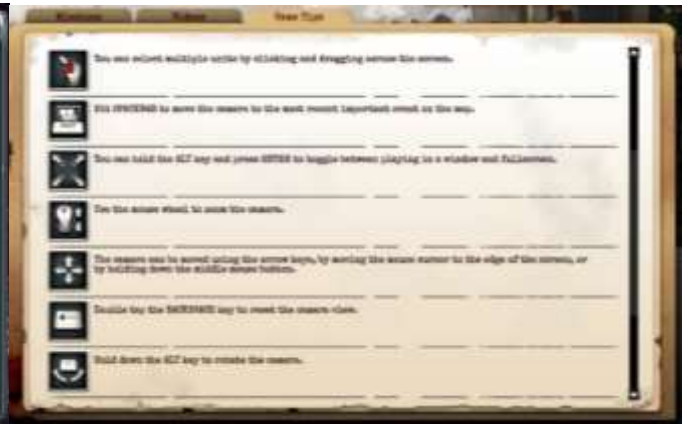
Section 3 – Understanding Current Strategy Games Control Mechanisms

Current Control Mechanisms

To operate/play a Strategy game a player normally operates a camera and commands Units through the use of a mouse and keyboard, though this is not the only way. Strategy games have found themselves on consoles such as the "*Xbox*" and "*PlayStation"*. Finding the common control schemes and inputs across the various strategy games will help find the ones needed for VR. To find the standard controls, the project shall look at the control schemes Strategy games use and identify common controls that are found across multiple games. This section is not looking at what buttons or inputs the player is pressing but at the commands needed to play Strategy games. Some commands might be the same but have a different or similar name; if this happens, they will be collated under the same name later.

PC Gaming Controls





From left to right

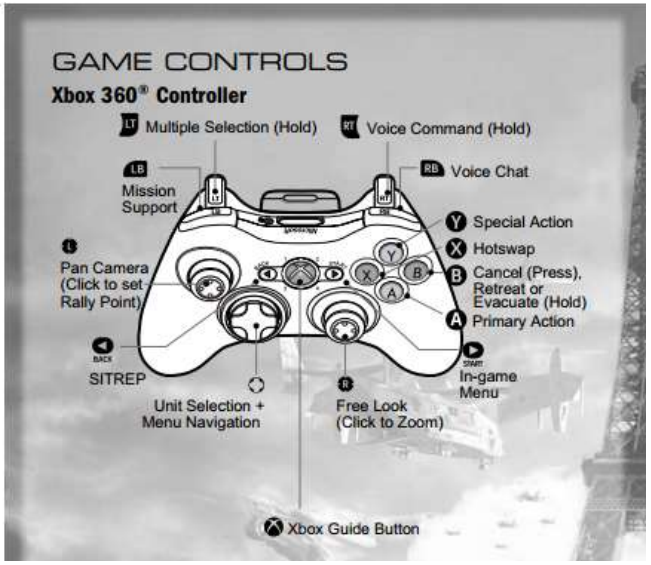
Figure 47. Wargame Red Dragon. Controls list. (Eugene Systems, 2014).

Figure 48. Sins of a Solar Empire. Controls list (Stardock, 2012).

Figure 49. Company of Heroes. Controls list. (Relic entertainment, 2013)

Figure 50. Total War: Attila. Controls list (Creative Assembly, 2015).

Console Gaming Controls



Left to Right

Figure 51. Halo Wars. Controls (Ensemble Studios, 2009).

Figure 52. Command and Conquer 3. Controls. (DICE Los Angeles, 2*007).*

Figure 53. Tom Clancy's End War. Controls (Ubisoft, 2008).

Identified Commands

The project has identified the common control schemes used in strategy games. Listed below are the most common commands and the description of what they do.

Camera move forward

Moves the player camera forward, allowing the player to move around the world.

Camera move left

Moves the player camera left, allowing the player to move around the world.

Camera move right

Moves the player camera right, allowing the player to move around the world.

Camera move backwards

Moves the player camera backwards, allowing the player to move around the world

Rotate Camera

Allows the player to rotate their camera, can be useful if a building, for example, is blocking the player's ability to view what they want to see.

Zoom the camera

Zooming the camera inwards or outwards depending on which the way the player wants it

Select Unit

Selecting a Unit allows the player to select their desired Unit in the 3D environment, they can then do what they want with it, being a move order or other game mechanics.

Select multiple units

Allows the player to select multiple units instead of just one.

Order move

Tells the selected Unit to move to the location that the player desires. This allows the execution of the game mechanic that the research found earlier.

Order Attack

Tells the selected Unit to attack the players desired target. This allows the execution of the game mechanic that the research found earlier.

Jump to most recent Alert

Pressing this button will take the player to the most recent ‘Alert’. This is used in conjunction with the UI element that also shows ‘Alert’. A player will see an ‘Alert’ saying they are being attacked then press this button and the camera will jump to the corresponding area.

Select all Units

Allows the player to select all the Units in the 3D environment, even if they cannot see them.

Retreat shortcuts

Certain strategy games allow players to set a predefined rally point or ‘Retreat’ point. If a player presses a particular button, the selected unit will go to this location.

Use special ability

Pressing this button will make the selected unit use its ‘Special Ability.’

Stop/Cancel

When pressed the ‘Stop/Cancel’ command, will make the selected Unit stop what it is doing. For example, if the Unit is moving and the stop/cancel order is given, the Unit will stop still where it is.

Hotkeys

Although not on the controls screen of the games examined, a hotkey is a button press that has a specific action applied to it, that is designed to speed up the players and give them a shortcut to specific actions. An example of this could be a hotkey that when pressed selects a particular set of units. Hotkeys are sometimes set up by the designers of the game; other games allow the player to create and assign their own.

Voice commands

Voice commands allow the player to interact with the game using their voice, in the examined game "*Tom Clancy's Endwar"*, the game has the player using set phrase such as "Unit 1" as way of interacting with the game, different phrases can be chained together, so the player could say "Unit 1", "Attack" "Alpha" or "Move to" "Bravo". The game recognises each smaller phrase and places it in a broader context. Identified in the literature review, there are issues with voice commands, such as players having to learn set commands that feel unnatural to the player

Identified RTS controls table

Table 5 shows the identified controls from the examined games

	Camera move forward	Camera move left	Camera Move right	Camera move Backwards	Rotate camera	Select unit	Select multiple units	Order move	Order attack	Jump to most recent alert	Select all units	Retreat Shortcut	Use special ability	Stop/ Cancel	Hotkeys	Voice commands
Company of Heroes 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕
Wargame: Red Dragon	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✕	✓	✓	✓	✕
Command and Conquer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✕	✓	✓	✓	✕
Age of Empires	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✕	✓	✓	✓	✕
Total War	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✓	✓	✓	✓	✕
Dawn of War 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✓	✓	✓	✓	✕
World in Conflict	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✕	✓	✓	✓	✕
Sins of a Solar Empire	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✕	✓	✓	✓	✕
Halo Wars	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✓	✓	✓	✕
R.U.S.E (Console version)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✕	✕	✓	✓	✕	✕
Tom Clancy's End war	✓	✓	✓	✓	✓	✓	✓	✓	✓	✕	✕	✓	✓	✓	✕	✓

Table 5. Identified RTS controls.

Core RTS controls Table

The research found a wide range of commands that strategy games use, some are game specific and to help narrow the research the project will consider only the core commands as seen in Table 6

	Camera move forward	Camera move left	Camera Move right	Camera move Backwards	Rotate camera	Select unit	Select multiple units	Order move	Order attack
Company of Heroes 2	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wargame: Red Dragon	✓	✓	✓	✓	✓	✓	✓	✓	✓
Command and Conquer	✓	✓	✓	✓	✓	✓	✓	✓	✓
Age of Empires	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total War	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dawn of War 2	✓	✓	✓	✓	✓	✓	✓	✓	✓
World in Conflict	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sins of a Solar Empire	✓	✓	✓	✓	✓	✓	✓	✓	✓
Halo Wars	✓	✓	✓	✓	✓	✓	✓	✓	✓
R.U.S.E (Console version)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tom Clancy's Endwar	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 6. Core RTS controls table

Conclusion

Fifteen commands were identified in the research for the controls of RTS games nine of those were found across all input devices, making them a ‘Core’ RTS control. Table 5 and Table 6 show the commands that were removed when compared. Hotkeys were removed out of the process, which is a shame as they have become an important part of PC RTS gaming, but without them being a core mechanic it would not be proper to take them further. This could be a negative side of this approach to finding information, Hotkeys are a known feature within RTS gaming communities, Keast (2010) in his article “How to play RTS games competitively - for newbies” said “The first foundation of becoming faster is to learn hotkeys”, they are part of the gaming RTS gaming community, especially in the Esports side of the community, where a players average Actions Per Minute (APM) can cost them the game. A different approach could be taken where the project includes mechanics if they have a majority. Allowing for a broader range of mechanics that some ‘core’ RTS gamers would miss if not present.

How do players interact with the identified control mechanisms?

Players have different 'Control Mechanisms' and peripherals that allow them to play and interact with current Strategy games. The project aims to find how VR can improve upon these. Investigating these peripherals will allow the project to understand how the introduction of VR can impact them. This section aims to identify how players from different platforms identify each command from the previous section

Players on PC

Playing on a Personal Computer (PC) is the most common way of playing a Strategy game. With most Strategy games being on PC, the project should examine their input devices and methods.

Visuals

Screens or monitors are used when playing on a PC. They show a 2D image that moves around the screen. Due to the nature of 2D, it limits how the player interacts with the strategy game. This is the oldest form of visually seeing a digital Strategy game.

Figure 54. Gaming Screen. (What HI-FI, 2015).

Mouse and Keyboard

Figure 55. Mouse and Keyboard (Clilfox. 2004).

Mouse and Keyboard are the most common form of interaction with Strategy games. The combination allows the player to effectively move the camera and control units within a 3D environment. The Mouse and Keyboard both have different input styles and functions, but they work in conjunction with each other.

How do players using a Mouse and Keyboard trigger the Identified Control Mechanisms?

Identified earlier in Section 3, the project found a range of control mechanisms that the players use to affect the Strategy game they are playing. How do they input these commands to trigger these mechanisms? The section below will link the identified mechanisms and peripherals.

Camera Movements (Such as camera move Forward, Back, Left, Right)

To move the camera the player uses the keyboard, it is typical for modern Strategy games to use the WASD buttons on the keyboard. Each key is representing a direction for the

camera to move, while older Strategy games might use the arrows on the keyboard. Strategy games also allow the player to move the camera by moving the cursor to the edge of the screen. For example, if the player moves the cursor to the top of the screen, the camera will move forwards.

Rotating the Camera

The player can rotate the camera using the keyboard on some games such as '*Total War*' (Using Q and E to rotate the camera respectively), other games though have the camera rotation done using the mouse. They can do this by moving the cursor to the edge of the screens. While certain games do this, some others use this function for camera movement, as stated above.

Zoom the Camera

To zoom the camera players on mouse and keyboard use the mouse wheel. Scrolling the mouse wheel forward will zoom the camera in. '*Company of Heroes'* has the camera zoom in from its current location, other games such as '*Wargame Red Dragon*' has the camera zoom in on the cursor's current location.

Moving the Cursor

To move the cursor the player uses the mouse. If the player moves the mouse to the right the cursor in the game will also move to the right. Figure 56 shows the cursor in the centre of the screen.

Figure 56. Wargame Red Dragon. Moving the cursor. (Eugene Systems, 2014).

The player decides to move the cursor to the right of the screen. The player in the real world moves the mouse to the right, and in the game, the cursor follows. As seen in Figure 57. Note that the camera does not move with the cursor.

Figure 57. Wargame Red Dragon. Moving the cursor 2. (Eugene Systems, 2014).

Interacting with UI Elements

Clicking on UI elements is done by moving the cursor over them and left clicking on the mouse.

Select Unit

Selecting a Unit on a keyboard and mouse is done by using the mouse which moves the cursor. The player moves the cursor over the Unit they wish to select and presses the left mouse button.

Select Multiple Units

To select multiple Units a player has multiple options that depend on the situation the player is trying to manipulate. The most common way is called ‘Drag Selecting’. This is where the player ‘draws’ a box around the Units they wish to select. For example, Figure 58 shows a large group of Units that the player wants to select.

Figure 58 Wargame Red Dragon. Units to be selected. (Eugene Systems, 2014).

To select them all at once, the player moves the cursor to a suitable position and then holds down the left mouse button, the player then proceeds to drag the mouse across the screen, where a box will then start to appear, as seen in Figure 59

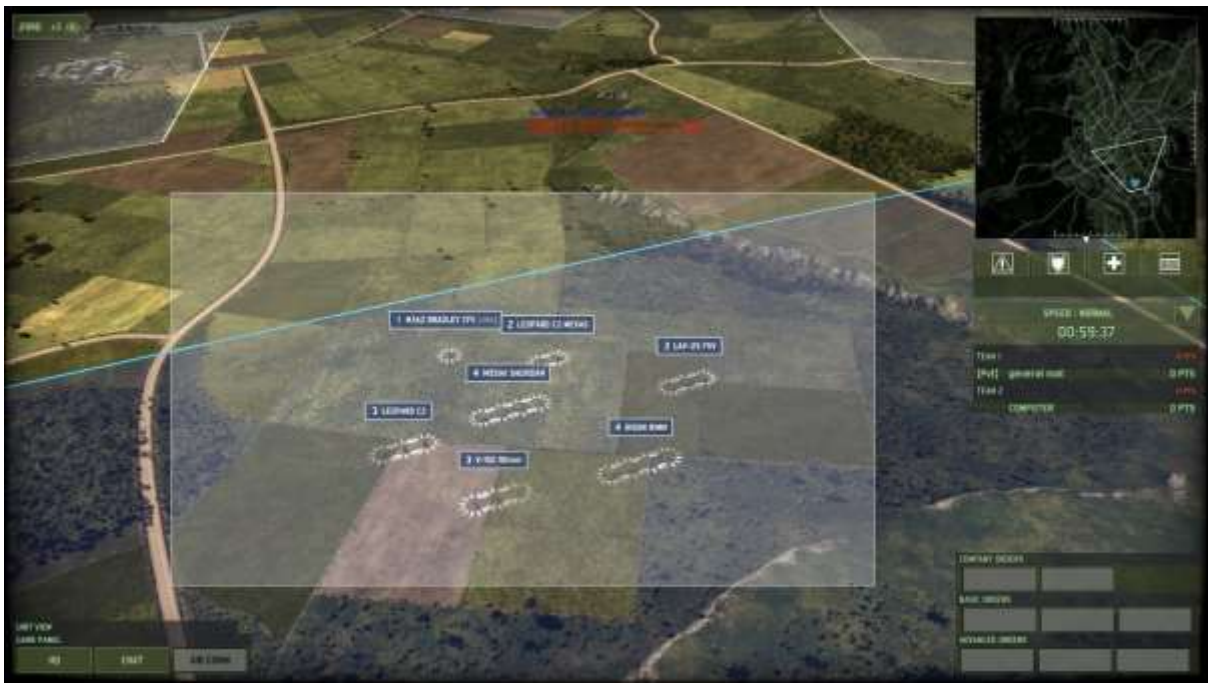


Figure 59 Wargame Red Dragon. Box select example. (Eugene Systems, 2014).

Once all the Units the player wants to select are underneath that box, the player lets go of the left mouse button, where at this point all Units underneath the box will be selected, note the UI changes that can be seen in Figure 60

Figure 60 Wargame Red Dragon. Box selection complete. (Eugene Systems, 2014).

Order Move

The player selects the Unit that they wish to give the move order to, they then move the camera to the general location of the move order, then the player moves the cursor to the specific location they wish the Unit to move to and right click.

Order Attack

The player selects the Unit that they wish to give the attack order to, they then move the camera to the general location of the attack order, then the player moves the cursor to the specific enemy that they wish to attack and right clicks.

Mouse and Keyboard Inputs Table

Note: These are the default controls for mouse and keyboard, most games allow the player to remap these as they seem fit

	Camera move forward	Camera move left	Camera Move right	Camera move Backwards	Rotate camera	Zoom camera	Move cursor	Select Unit	Select multiple Units	Order move	Order attack
Company of Heroes 2	Arrow Up/Move mouse to edge	Arrow left/Move mouse to the edge	Arrow right/Move mouse to edge	Arrow down/Move mouse to edge	Hold ALT and move the mouse	Scroll mouse wheel	Move mouse	Left click	Left click and drag or hold shift and click	Right click	Right click
Wargame: Red Dragon	W /Move mouse to edge	A /Move mouse to edge	D /Move mouse to edge	S/Move mouse to edge	Hold the mouse wheel and move the mouse	Scroll mouse wheel	Move mouse	Left click	Left click and drag or hold shift and click	Right click	Right click
Command and Conquer	Arrow Up/Move mouse to edge	Arrow left/Move mouse to the edge	Arrow right/Move mouse to edge	Arrow down/Move mouse to edge	Hold the mouse wheel and move the mouse	Scroll mouse wheel	Move mouse	Left click	Left click and drag or hold shift and click	Right click	Right click
Age of Empires	W /Move mouse to edge	A /Move mouse to the edge	D /Move mouse to the edge	S /Move mouse to edge	Hold ALT and move the mouse	Scroll mouse wheel	Move mouse	Left click	Left click and drag or hold shift and click	Right click	Right click
Total War	W /Move mouse to edge	A /Move mouse to edge	D /Move mouse to edge	S /Move mouse to edge	Q, E/ Move mouse to edge	Scroll mouse wheel/ X, Z	Move mouse	Left click	Left click and drag or hold shift and click	Right click	Right click
Dawn of War 2	Arrow Up/Move mouse to edge	Arrow left/Move mouse to the edge	Arrow right/Move mouse to edge	Arrow down/Move mouse to edge	Hold ALT and move the mouse	Scroll mouse wheel	Move mouse	Left click	Left click and drag or hold shift and click	Right click	Right click
World in Conflict	W	A	D	S	Hold mouse wheel and move mouse/ move mouse to the edge of the screen	Scroll mouse wheel	Move mouse	Left click	Left click and drag or hold shift and click	Right click	Right click
Sins of a Solar Empire	Arrow Up/Move mouse to edge	Arrow left/Move mouse to the edge	Arrow right/Move mouse to edge	Arrow down/Move mouse to edge	Hold right mouse button and move the mouse	V, B/ Scroll mouse Wheel.	Move mouse	Left click	Left click and drag or hold shift and click	Right click	Right click

Players on Game Consoles

Talking about strategy games on consoles when compared to PC, Games Radar (2016) said, “PC is still a cut above in the strategy genre”, “but consoles and handhelds still manage to hold their own with some creative strategy games.” Even with more players playing on PC than compared to consoles, they will still be examined as some of their control inputs may be of use.

Controllers

Figure 61 Xbox 360 Controller (Microsoft. 2005).

Unlike PC players who use a keyboard and a mouse, the controller is just one peripheral. Looking at an example such as the Xbox 360 controller seen in Figure 61, they have fewer buttons than a keyboard and mouse due to their design. This does have a knock-on effect in gameplay as players have to press multiple buttons to do a single command.

Visuals

Visuals for console players are the same as PC players

How do players using a controller trigger the Identified Control Mechanisms?

Identified earlier in Section 3, the project found a range of control mechanisms that the players use to affect the Strategy game they are playing. How do controller-based players input these commands to trigger these mechanisms? Below will link the identified mechanisms and the peripherals.

Camera movements (Such as camera move Forward, Back, Left, Right)

On the keyboard, the player uses multiple peripherals to move the camera around. On the controller, the players use the left stick for all the directions that they need. If a player needs to move the camera forwards, they will push the left stick forwards. If they need to move the camera to the right, then the player moves the stick to the right.

Rotate the Camera

To rotate the camera, the player uses the right stick. Much like using the left stick for camera movement, using the right stick, in the same way, will result in similar results but for rotating the camera.

Zoom the Camera

To zoom the camera, players on console use the right stick. Moving the right stick forwards will zoom in, move the right stick backwards will zoom out.

Moving the Cursor

One of the main differences between PC strategy games and console games is how they handle moving the cursor, on PC strategy games that use mouse and keyboard they all use the same approach to move the cursor, on the console, there are different approaches.

Locked Cursor

'*Halo Wars'* and '*Command and Conquer*'(The console version), approach moving the cursor by locking it to the centre of the screen(Seen in Figure 62), whereas on PC the cursor is individual to the camera and can move freely around it. On console the cursor is locked to the centre of the camera, so to move the cursor the player must move the entire camera.

Figure 62 Halo Wars Cursor (Ensemble Studios, 2009)

Automatic cursor

The console game ‘R.U.S.E uses a different approach’. In ‘*R.U.S.E’* the game does not feature a permanent on-screen cursor like other Strategy games. Instead, the game has an invisible cursor that is near the centre of the screen which automatically jumps to nearby units. Figure 63 shows how the cursor as automatically jumped to an M1 57mm Anti-Tank Gun.

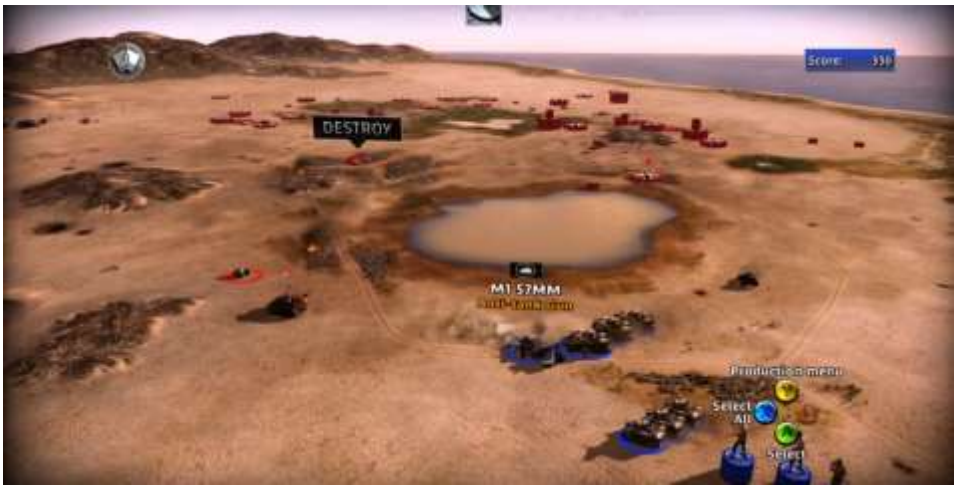


Figure 63. R.U.S.E. Automatic Cursor Example (Eugen Systems, 2010)

Interacting with UI elements

Without being able to move the mouse around the camera players on the console cannot interact with the UI. To counter this, console games have two different approaches.

Radial Wheel

The use of a ‘Radial Wheel’, a radial wheel is where the UI is collapsed into a circle that the player can open by holding a button. Figure 64 shows a ‘Radial Wheel’ in use; in this example, the player is playing the game ‘*Halo Wars’*, they want to select the ‘Fortress’ upgrade. By pressing the right stick forwards, it is selecting the ‘Fortress’ upgrade. Upgrades or building orders that are already in progress are highlighted in green

Figure 64. Halo Wars. Radial Wheel UI. (Microsoft. 2009).

Category menus

'*R.U.S.E'* uses a menu system consisting of boxes that each show a different set of categories of the unit. Figure 65 shows the player wanting to build a Unit from the Artillery and Anti Airbase in the game '*R.U.S.E'* on the Xbox 360. The player presses the menu button to show the menu, then uses a stick to move through the menus, moving right and left will change category and pressing down will let them cycle through the units available to build in that category.

Figure 65 R.U.S.E. Category Menu Example (Eugen Systems, 2010)

Select Unit

To select a Unit, the player moves the cursor over the Unit they wish to select and press the select button. This button may differ from game to game.

Select multiple Units

Like the cursor, console games have multiple approaches to selecting more than one Unit.

Paint selection

Seen in Figure 66 '*Halo Wars'* uses a painting system, where the player 'Paints' the Units that they want to select. Holding down the 'A' button changes the player cursor to a circle. Any Unit that the player 'Paints' under this circle is then selected.

Figure 66 Halo Wars. Painting selection (Microsoft. 2009).

Selecting by Unit type

Another method of selecting multiple Units is where the player selects them via Unit type. It can take a lot of time to individually select all the units. So instead the player selects them by choosing what type of Unit they are. In '*Halo Wars'* if the player double clicks the 'A' button rapidly, it will select all the units of that type, for example, double clicking 'A' on a Scorpion Tank will select all the Scorpion Tanks on screen while leaving other Units untouched.

Order Move

With the Unit selected, the player moves the cursor to a location and presses the 'Move' button. This button may differ from game to game.

Order Attack

With the Unit selected the player moves the cursor over an enemy unit and presses the 'Attack' button. This button may differ from game to game.

Controller Table

Table 7 shows how players interact with a Strategy game using a controller

	Camera move forward	Camera move left	Camera Move right	Camera move Backwards	Rotate camera	Zoom camera	Move Cursor	Select unit	Select multiple units	Order move	Order Attack
Command and Conquer 3	Left stick	Left stick	Left stick	Left stick	Right stick	Right stick	The cursor is moved with the camera	A	Hold Left Bumper and press A	A	A
Halo Wars	Left stick	Left stick	Left stick	Left stick	Right stick	Right stick	The cursor is moved with the camera	A	Hold A	X	X
Tom Clancy's End War	Left stick	Left stick	Left stick	Left stick	Right stick	Right stick click	The cursor is moved with the camera	A	Hold Left Trigger and press A	A	A
R.U.S.E.	Left stick	Left stick	Left stick	Left stick	Right stick	Right stick	Cursor auto locks places of interest	A	Zoom out until all wanted units are close enough together and press A	A	A

Table 7. Controller Table.

Players on Touch/Mobile Devices

Wijman (2018) makes the point that the mobile games market was worth 137.9 billion in 2018, with a market share of over 50% of all games industry sales. With such a high percentage of sales, the mobile marketplace should be also examined.

Visuals

Figure 67. Mobile Phone (Dobie, A. 2013).

Seen in Figure 67, Players on touch devices can interact with the screen by pressing it with their fingers.

How do players using touch do the necessary commands and interact with the UI?

Identified earlier in section 3, the project found a range of control mechanisms that the players use to affect the Strategy game they are playing. How do mobile phone-based players input these commands to trigger these mechanisms? Below will make the link between the identified mechanisms and the peripherals.

Touch input

With touch, based games players press directly onto the screen using their fingers or sometimes a touch pen. This means that the player is not using a physical button or key when compared to PC and Console players.

Camera movements (Such as camera move Forward, Back, Left, Right)

To move the camera, the player puts a finger on the screen and drags in the opposite direction to the way they want the camera to move. This creates a dragging like effect to the player; it feels to the player that they are dragging the camera. If the player wishes to move the camera right, they then drag their finger to the left.

Rotate the Camera

To rotate the camera players on touch, get their thumb and their index finger in a line and then proceed to rotate them around a central axis. Doing this will rotate the camera in the direction of their choosing.

Zoom the Camera

To zoom the camera players, use a method called ‘Pinching’, where the player typically uses their thumb and their index finger, they move these fingers closer or further away from each other to zoom. Moving the finger and thumb closer to each other will zoom, moving them away from each other will zoom out

Moving the Cursor

Games on mobile phones remove the cursor as there is no need for one because your finger is the cursor. To move the cursor, the player moves their fingers.

Interacting with UI elements

To interact with the UI elements, players need to just press on the screen. If a UI element is in the top right of the screen and player wishes to click on it. They just put their finger onto the top right on the screen.

Selecting a Unit

To select a Unit, the player presses their finger onto the Unit they wish to select.

Select multiple Units

There are multiple ways for players to select more than one Unit in touch input Strategy games.

Multiple individual selects

One approach is to have player select all the Units they have individually. Every single press on a Unit means that it is added to the selection.

Box Selection

Similar to how it’s done on the PC. The player pushes their finger down on the screen and holds it there for a second. Doing so will change the player's inputs to create a box selection, once the box selection mode is active, the player then drags their fingers across the screen in a similar fashion to movement.

Order move

With a unit selected a player will press their finger down on an empty space in the environment. This will order the move instantly.

Order Attack

With a Unit selected, the player then their finger down on an enemy Unit to order the attack.

Touch Screen Controls Table

	Camera move forward	Camera move left	Camera Move right	Camera move Backwards	Rotate camera	Zoom camera	Move cursor	Select unit	Select multiple units	Order move	Order Attack
Age of Empires 2 HD edition	Finger Swipe	Finger Swipe	Finger Swipe	Finger Swipe	Thumb and index finger rotating around a central axis	Thumb and index finger pinched inwards or outwards	The cursor is not a constant on the screen; it is only there when the player presses down on the touch screen. It will appear where pressed	Tap finger on the unit	Press one finger down on the screen and draw a box with finger	Tap on desired move location	Tap on enemy
R.U.S.E.	Finger Swipe	Finger Swipe	Finger Swipe	Finger Swipe	Thumb and index finger rotating around a central axis	Thumb and index finger pinched inwards or outwards	The cursor is not a constant on the screen; it is only there when the player presses down on the touch screen. It will appear where pressed	Tap finger on the unit	Put two different fingers on different points on the screen to create a box	Tap on desired move location	Tap on enemy

Table 8. Touch Screen controls table

Tabletop Strategy Games Players

As VR will give the player the ability to stand amongst the 3D environment, it makes sense to examine how players who play tabletop strategy games move their models and interact with tabletop games. Information from tabletop games could be used to influence the use of VR controllers and Strategy games.

Warhammer Fantasy

Figure 68. Warhammer Fantasy (Dakka, D. 2011).

Camera movements (Such as camera move Forward, Back, Left, Right)

'*Warhammer Fantasy*' is not a digital product; the player has to physically move around the table/area that the models are on. An example of this can be seen in Figure 68

Interacting with UI elements

There is no UI in '*Warhammer Fantasy'*. Instead the player has to make one themselves. Whereas a digital game will show a UI element to a player, in Tabletop gaming, the player has to remember or write down anything relevant. For example, in '*Warhammer Fantasy*' players can have 'Hero Units' which are singular Units with high amounts of health and damage. In a digital game, this would be shown with a UI element such as a health bar, in a Tabletop game the player might put counters down next to the model.

Select unit

To select a Unit to move or attack a Tabletop strategy games, players must verbally declare to other players that they are doing so.

Select multiple units

To select multiple Units to move or attack on tabletop strategy games, players must verbally declare to other players that they are doing so.

Order move

'*Warhammer Fantasy*' by 'Games Workshop' focuses on a fantasy world with weapons and tactics like the 18th century. Due to the scale of the battles, large models are placed on plates so that the player can move a group of models all at the same time; this is to save time and keep the models together. The player can move these plates by picking them up or pushing them.

Order Attack

Player declares to the opposing player that their unit is going to attack. The players then roll dice to see if the attack is successful. If successful, the units that have been attacked and eliminated are removed from the board.

Warhammer 40K

Figure 69. Warhammer 40k (Games Workshop. 2015).

Seen in Figure 69 '*Warhammer 40k*' is a similar game to '*Warhammer Fantasy'*, they are created by the same company and are designed to be accessible to players switching between both games. Only one difference was found between '*Warhammer 40K*' and '*Warhammer Fantasy'*, that was ordering the movement of units.

Order move

'*Warhammer 40K'* by Games Workshop focuses on a Sci-fi future. The gameplay focuses around small squad-based tactics. Unlike '*Warhammer fantasy'*, '*Warhammer 40k'* doesn't have a plate that the player can put the models on. Instead the player moves each model individually with their hands.

Tabletop controls Table

	Camera move Forward	Camera move Left	Camera Move Right	Camera move Backwards	Rotate camera	Zoom camera	Move cursor	Select unit	Selecting multiple units	Select multiple units	Order move	Order attack
Warhammer Fantasy	Player physically moves	Player physically moves	Player physically moves	Player physically moves	Player physically moves	Player physically moves	N/A	Player tells opposing player/s of their intention	Player tells opposing player/s of their intention	Player tells opposing player/s of their intention	Player physically moves plate that supports multiple models	Player tells opposing player/s of their intention, then roles dice
Warhammer 40K	Player physically moves	Player physically moves	Player physically moves	Player physically moves	Player physically moves	Player physically moves	N/A	Player tells opposing player/s of their intention	Player tells opposing player/s of their intention	Player tells opposing player/s of their intention	Player physically moves model	Player tells opposing player/s of their intention, then roles dice

Table 9. Tabletop controls table

Section 4 – Virtual Reality (VR)

Virtual reality (VR) is a virtual world. Described by Britta O'Boyle (2016) as a world "created by computers that allows you to experience and interact with a 3D world that isn't real". The user interacts with this world by "putting on a head-mounted display and some form of input tracking" (2016). The player can move and look about this 3D world. Dr Jackson (2015) says that "the position of the user's eyes is located within the simulated environment. If the user's head turns, the graphics react accordingly". This means that unlike traditional 3D games where the player uses a controller or other input devices to look around, the player themselves physically moves their head to look around the space instead of moving a stick on a controller.

Visuals

To interact with a VR world, the player will always need a VR headset such as the one seen in Figure 70, referred to as a Head Mounted Display (HMD). These act as their visual portal to the world, using screens to do so, Sophie Charara (2017) says "VR headsets use either two feeds sent to one display or two LCD displays, one per eye" to achieve this. As stated earlier the main advantage that VR has over more traditional visual viewing methods is that it also tracks where the user looks. If a user looks to the right in the real world, then the camera then the player will look that way also in the game world.

Figure 70. H.T.C. VR Headset Headset (*Vive, H.T.C.* 2015)

Controls

Controls for VR are optional but improve the experience, games and experiences have been created that concentrate exclusively on what the player sees. The player can use a regular game controller such as the Xbox 360 controller or the PlayStation controller. These allow the player to interact with a 3D world in a similar fashion to the games that work on regular screens. For the full VR experience, the play would use VR controllers such as the HTC Vive controllers (Figure 71 and Figure 72) These controllers track motion as well as button presses.

Figure 71. HTC Vive Controllers (Vive, H.T.C. 2015).

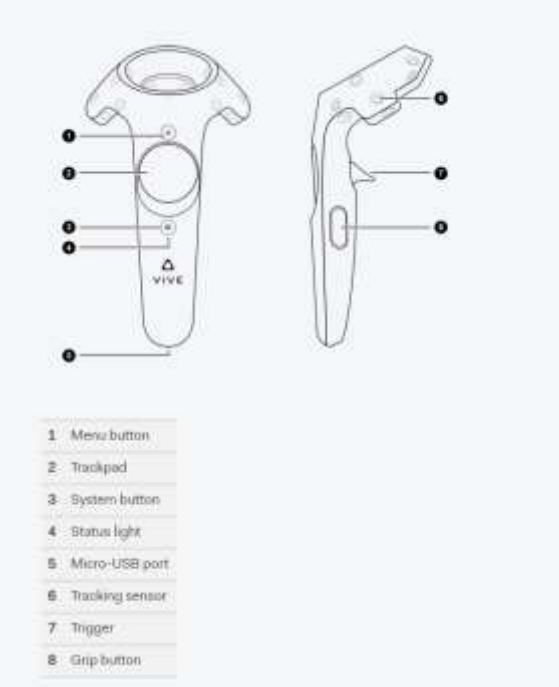


Figure 72. HTC Vive Controllers Schematics (Vive, H.T.C. 2015).

When used in conjunction with sensors virtual reality controllers allow the player to almost mimic hand movements. Players hold the controllers in their hands, typically one per hand. As stated, VR controllers have both standard buttons and motion controls in them. Individually these components allow the players to interact with the world in their ways, but it is when these input techniques are combined with a VR headset that allows VR to enhance the user's experience. The controllers typically act as a player's hands in a VR world, allowing them to mimic real-life movement, the controller in the players left hand will mimic their left hand and the one in their right hand will mimic their right hand. If the player raises their left controller in real life, in the game the player's hand or whatever object they are holding would have moved in the same fashion. A way this could be used would in a medieval-like game, where the players left hand could be there shield, and their right hand could be their sword, allowing them to sword fight enemies in VR.

Identified Problems with VR

Non-Diegetic UI in VR

While researching different types of UI, the project found that Non-Diegetic UI cannot be used in VR. Described by Unity (Unity), Non-diegetic UI is where the UI is "overlaid on top of the screen". Its commonly used to show player statuses such as Health and Ammo. This approach does not normally work in VR though, as "our eyes are unable to focus on something so close", to it. Which could lead to the player getting nausea, this should be avoided if possible because it would affect gameplay, and more extended sessions would not be realistic.

Bringing VR controls to the Strategy game genre

After identifying what a strategy game is (Chapter 1 Section 1) and what its control mechanisms are (Chapter 2 Section 3). The challenge that is now in presenting itself to the project is how to bring the VR controls identified in chapter 3 to a Strategy game. My personal predictions can be found in the next chapter.

Existing VR Games and How the Player Interacts with Them

With VR games and applications already being sold on stores such as '*Steam*' and '*Oculus*', the project will look at some of the more popular games and applications. The project will as stated look at non-games called "Apps" as they have their own take on UI's and interaction that the project could learn from.

Google Tilt Brush VR

Google's '*Tilt Brush VR*' is a virtual painting game; it is designed to allow the player to paint in VR using a wide range of painting tools. Painting in VR allows the user to see their creation in not only 2D but full 3D, allowing them to walk around and even through their creations. Figure 73 shows a user creating a tree-like painting that is in full 3D.

Figure 73: Google Tilt Brush Creation (Google, 20016)

Camera movements (Such as camera move forward, Back, Left, Right)

Google's '*Tilt Brush VR'* only uses walking as its movement methods. Meaning that the player can be limited to the size of their real-world play space. If the player wishes to move forward, they walk forward in the real world

Rotate the Camera

To rotate the camera in the Google Tilt Brush VR, the game makes use of the capabilities of VR. Meaning that if the player wishes to rotate the camera, they need to rotate their head in the real world.

Zoom camera

To zoom the camera the player needs to move their head physically forwards and backwards to zoom in or out.

Cursor

Traditionally because players are interacting with a 2D screen, a cursor makes sense, but due to now standing in a 3D space with no mouse, a new alternative is needed. VR games have taken to attaching a laser to the end of the HTC Vive controller in the virtual space, where the laser ends correspond to where the player's cursor would be if it was a non-VR game.

Figure 74. Cursor example (Daniel Hardcastle, 2016).

UI

Google's '*Tilt Brush VR'* allows the player to paint like in real life but in a virtual space, it is done by "using a simple controller that mimics the gestures of painting" (Aouf, R.S. 2016). To allow the player to choose different brushes and different paints, Google's '*Tilt Brush VR'* uses spatial UI to mimic a paint pallet, the player in game, looks down at their left hand and can choose what they need using a laser pointer in their right hand, this can be seen in Figure 75.

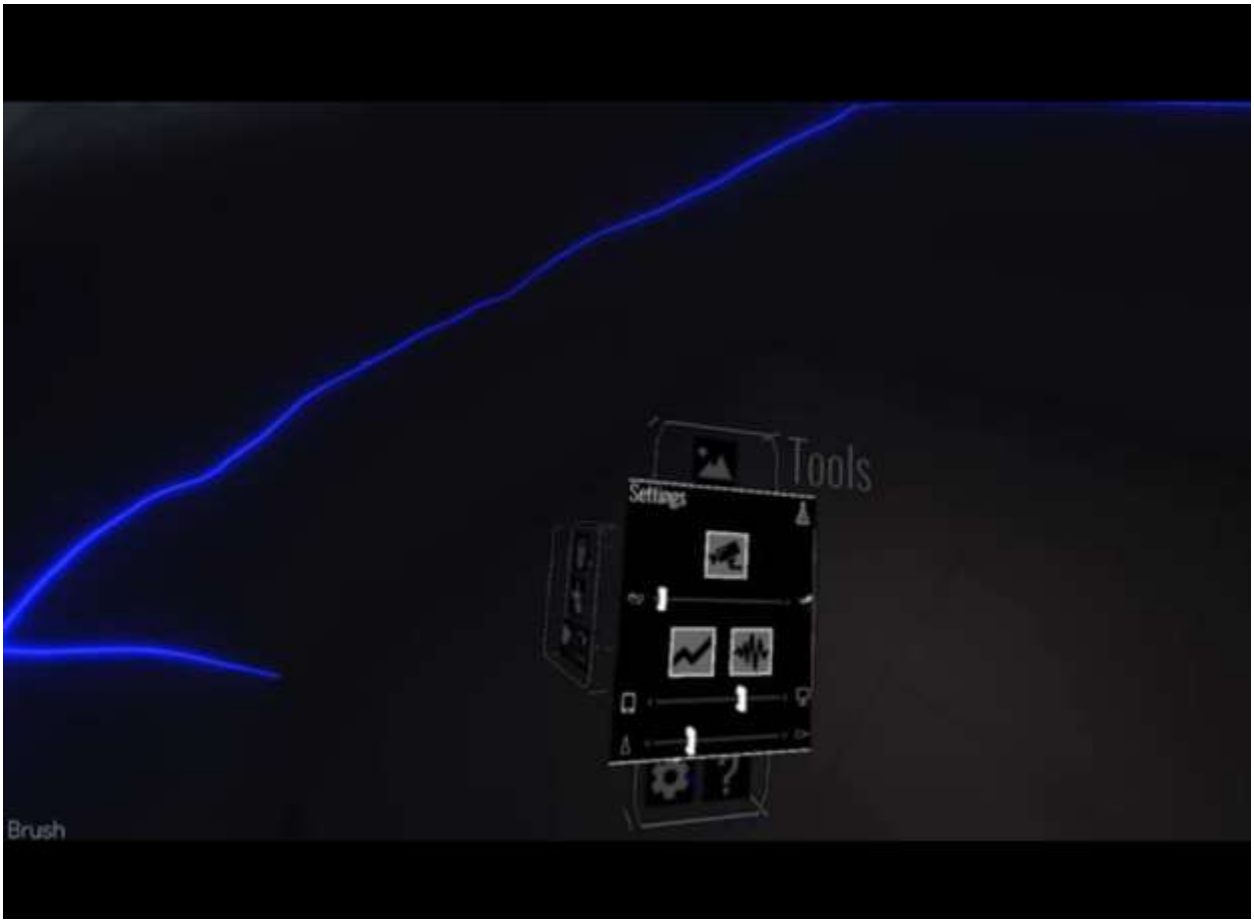


Figure 75. Holding UI example (Daniel Hardcastle, 2016).

The Lab

'*The Lab*' was released by '*Valve*' (2016) in 2016. The game itself is a collection of mini-games designed to show off the capabilities of the HTC Vive. Featuring mini-games such as archery, catapult and environment exploration.

Figure 76 A player playing the catapult mini-game (Valve, 2016)

Camera movements (Such as camera move Forward, Back, Left, Right)

'*The Lab*' allows the player to move about in the virtual space by allowing them to walk about in the real world. Sensors track the player, their controllers and their headset. This allows some movement in the virtual space, but the virtual space in '*The Lab*' can be bigger than the real-world, restricting how far a player can move in both the virtual world and the physical world. To counter this, '*The Lab*' allows the player to teleport.

Teleport

This method allows the player to navigate the virtual environment by teleporting. The player presses a button on the controller to activate the teleportation, then a UI element which is a 45-degree arc will appear out of the player's controller, this shows where the player will teleport to in the virtual space. Once teleported to that location the player can then walk around it.

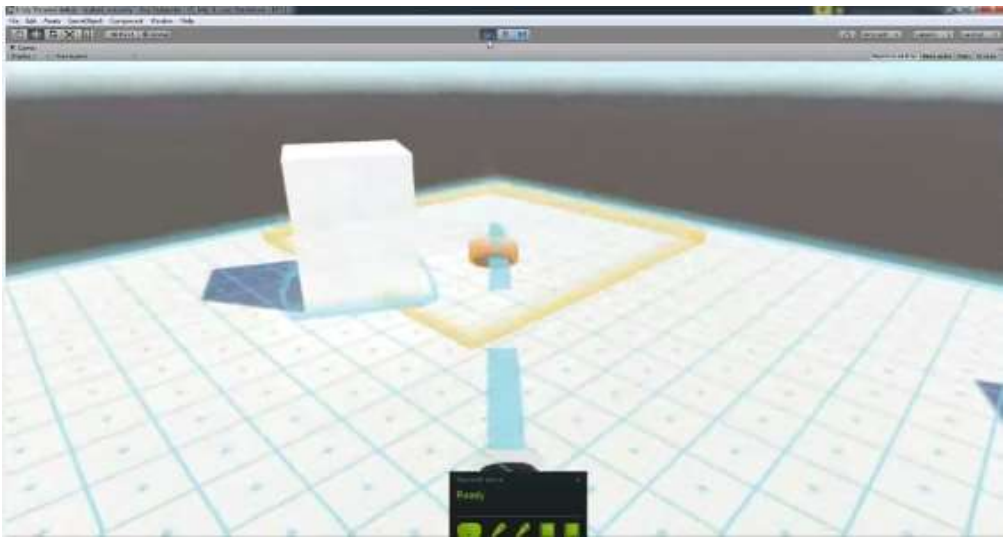


Figure 77. Teleportation Example (Flafla2.2016).

Rotate the Camera

Same as identified in a previous game

Zoom Camera

Same as identified in a previous game

Cursor

'*The Lab*'does not have a cursor; it instead '*The Lab*' use the controllers to mimic hands in real life. This allows players to pick objects up in the virtual world. In the default state, the players "hands" are the HTC Vive controllers.

Figure 78. The Lab controls (Valve. 2016)

When they pick up an object, the controllers become that object.

UI

'*The Lab*' approaches UI be using objects in the real world as its UI. Figure 79 shows that the player has picked up a clipboard in the game and it gives the data or information that the player needs.

Figure 79. The Lab UI example (Valve. 2016)

Google Earth VR

'Google Earth VR' (2016) was released in 2016, it is '*Google Earth'* which is typically found on a desktop web browsing environment, but it has been ported and updated to work in a VR environment with its controls and navigation style.

Camera movements (Such as camera move forward, Back, Left, Right)

In *'Google Earth VR'*, the player gets to use '*Google Earth'* but in a VR experience. The player/user can visit anywhere on earth. Once the player has chosen a place that they wish to visit, the player is put into that position in the virtual world. They can then walk around the place of their choosing, but that place might be bigger than their place space, to get around this issue, *'Google Earth VR'* has two different movement styles, one allows the player to fly around the second is where the player drags the floor to move

Flying

It's here that the player/user can fly around their chosen place, Machkovech (2016) described the experience as "like a guy in a jetpack flying over a city and checking it out". This is done by pressing down the forward button on the trackpad and pointing the controller in the direction the player wishes to go. If the player faces the controller to the right, the player will fly in that direction.

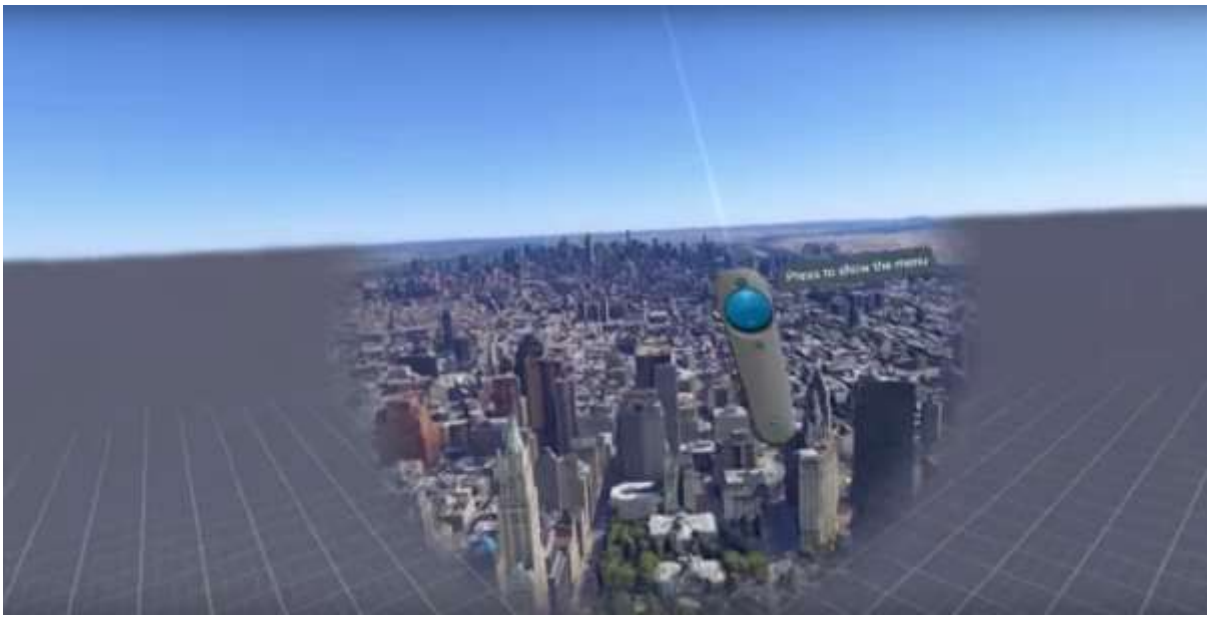


Figure 80. Flying example (Many A True Nerd, 2016).

Moving the ground

This method allows the player to move around by moving the environment, the player stays stationary and then drags the environment in a direction allowing them to move. If a player wishes to move forward, they will press and hold a button while holding the controller out in front of them, and then they would pull the controller closer to them which would pull the environment closer to the player thus moving them forwards.

Rotate the camera

To rotate the camera in *'Google Earth VR'* the player has two options, the first is to rotate themselves in real life physically, the second is by holding down the grip button on the rear of the controller. When the grip button is held down the player can then rotate the world around them by moving the controller. In this method the player does not move; it rotates the world around them.

Zoom camera

'Google Earth VR' does not have a zoom option. Instead, the player moves closer to the object they wish to see.

Cursor

The cursor is the same laser system identified on Google's '*Tilt Brush VR.'*

UI

Like Google's '*Tilt brush VR', 'Google Earth'* uses a spatial UI. This UI expands when interacted with, enabling the user to navigate by using their cursor. Different menus allow the user to do different in-game mechanisms/mechanics, such as travel to different parts of the globe and go to set areas such as Yosemite California.

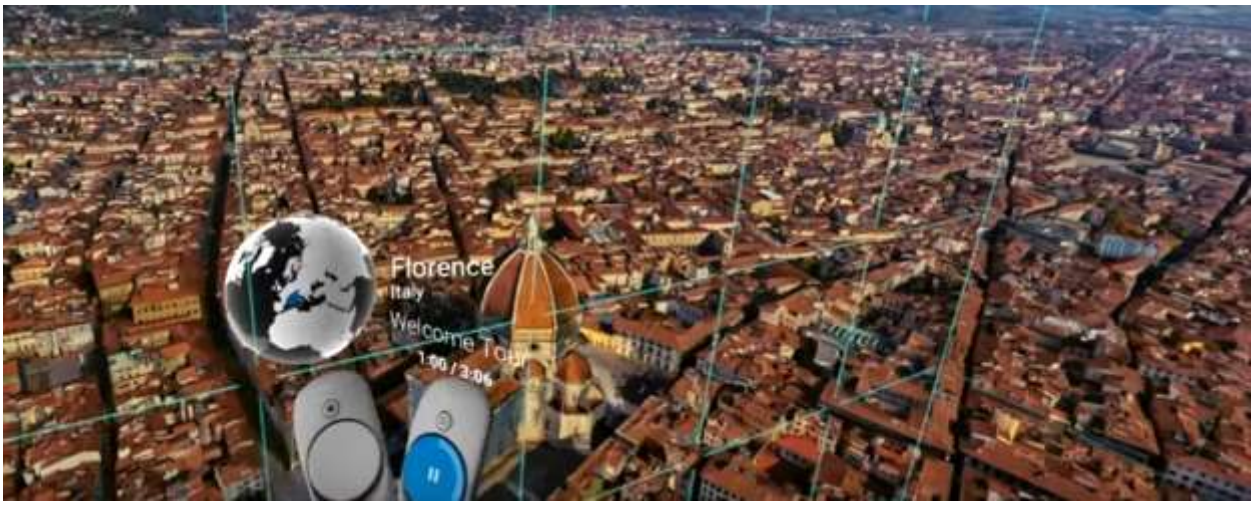


Figure 81. Google Earth UI example (Many A True Nerd, 2016).

The UI is in the environment in front of the player. It follows the player's controller.

Existing VR Strategy Games Control Schemes

AirMech: Command

During the creation of this project Strategy games using VR controls did start to be made and released. One of these was called *'AirMech: Command'*. *'AirMech: Command'* was released upon the 9th March 2017. In his article "Strategy games in virtual reality: I am a mighty but overworked god", Ben Popper (2016) when talking about the controls of the game says that he's "not convinced virtual reality added new wrinkles to this game, and it certainly made it more difficult than playing with a full map and a keyboard". A similar review is by YouTuber Martin Risby VR, in his video "Using Touch Controls | *'AirMech: Command'*| Oculus Rift" at 7:20 he talks about the controls, he says that "This is so hard to control" and at 10:11 he states, "The controls are really weird on this" (Martin Risby, 2017). The project should be able to improve upon these controls based on feedback it will receive.

'AirMech: Command' is technically an RTS game but it's missing some of the features that more traditional RTS games have, this does make the game more approachable for new players. This RTS 'lite' approach is interesting but the project is concentrated on the more traditional RTS games such as '*Command and Conquer'*, meaning that some of the research found in games such as '*AirMech; Command'* might not apply to the final project but is still worth investigating for possible avenues of research.

Figure 82Airmech: Command UI (Martin Risby, 2017)

UI

The UI for the game uses a UI style that is diegetic, the UI is in the world and is interacted with by the player, it appears upon command over the top of a selected building, above you can see a player attempting to order the creation of a unit, prior to this they have clicked on a building.

Figure 83Airmech: Command Selecting a Unit (Martin Risby, 2017)

Cursor

The cursor for *'AirMech: Command'* hovers slightly above the ground and has an arrow that points to its exact location. This floating approach gives a much more natural feel to the cursor bringing it more into line with cursors found on traditional RTS games.

Figure 84Airmech: Command Cursor (Martin Risby, 2017)

Selecting a Unit

To select a Unit, a player must first move the cursor over the desired Unit, where it will then change into a circle like a cursor.

Figure 85Airmech: Command UI 2 (Martin Risby, 2017)

Out of Ammo

'*Out of Ammo'* is a VR game on both '*PlayStation VR'* and PC based VR systems. The game has players defending a base from waves on enemies. The main selling points of this game are that it allows players to assume direct control of their units, manually aiming and firing weapons. Much like *'AirMech: Command',* the game is an RTS 'lite', it is missing some of the mechanics identified in section 1, this does mean that some of the necessary actions for the project are not in the game, selecting multiple units is one of these. In this game a player can only order a unit to certain spots and when they do it pulls them randomly out of a pool of units.

Figure 86 Out of Ammo cursor (Nathie, 2016)

Cursor

The cursor in the game is represented by hands; the player can point one of their fingers from this virtual hand to select objects. The player can use both sets of hands to interact with the game and world.

Building new buildings/units

Figure 87 Out of Ammo cursor (Nathie,2016)

Unlike other games '*Out of Ammo'* doesn't feature a UI, whereas in traditional RTS games players would select something off a UI to build, in '*Out of Ammo'*, players build new buildings by clicking on supply crates on the floor and then dragging them across the floor to the desired build location.

Chapter Two- Research Methodology

This chapter will examine how the project will find the required information. Two different main approaches will be examined. The project will be the researching a approach that will examine both qualitative and quantitative research methods; it will also be researching a autoethnographic approach, where the author gives their own predictions on the project. The findings from this section will help guide the project in how it will find and gather the required research.

Section 1- Autoethnographic

Why choose an Autoethnographic approach

Described by Holt, N. L. as "a genre of writing and research that connects the personal to the cultural, placing the self within a social context" (2003), an autoethnographic approach allows an author to give their own opinion on a subject, with the aim of describing and systemically analysing personal experience (Ellis, C., Adams, T.E., & Bochner, A. 2011). They have their benefits, Carolyn Ellis in her book "Revision", describes them as "flexible", "reflexive" and have "the potential to expand scholarship" (2009).

In their journal of Virtual Worlds Research, Dumitrica, D., & Gaden, G. (2009) used an autoethnographic to "experience and performance of gender online in Second Life". Using a collaborative autoethnographic approach, both Dumitrica & Gaden were able to experience the virtual world themselves, doing this enabled them to give a detailed journal entry that benefited from their own personal experience. In reflection upon the autoethnographic approach,

Dumitrica & Gaden wrote that they “have a lot to offer to understanding online environments in general, and gender online in particular”. Although the project is not concentrating upon online environments, this reflection is evidence that autoethnographic approaches are a viable way of researching a subject.

Autoethnographic introduction

As an avid player of RTS games myself, I will make predictions on how a VR RTS game would work. For the example of how an RTS could work in VR. I will theorise how the game ‘*Company of Heroes 2’* could be remade into a VR environment. This will be drawing on my personal experience of ‘*Company of Heroes 2’*, RTS games in general and the researched VR games/experiences.

Figure 88. Company of Heroes 2 Logo. (SEGA. 2013)

Equipment

The predictions will be made presuming that a user will be using the HTC Vive. The reason behind this is that the VIVE gives the user a fuller VR experience, with the full headset, sensor and controller combination, the player fully tracked, allowing more dynamic use of VR and its capabilities. It is also because controllers are standard with the HTC VIVE, whereas on the oculus rift they are not.

Figure 89. HTC Vive logo (HTC, 2016).

Presentation of the 3D environment/play space

Released in 2010 the video game '*R.U.S.E*' was an RTS success. The game was based in World War 2 and had the player command one of the nations from the war. What was interesting about the game was how the 3D environment was presented to the player. The 3D world was put on a table in front of the player, and in the background, you could see an almost war office like environment (Figure 90). The game then featured a normal RTS camera and movement, but in VR I believe that this approach could be used. Having the '*Company of Heroes 2'*, 3D environments in front of the player on a table, it would allow them to look down at it and allow the player to move around it.

Figure 90. Ruse Table (Eugen Systems, 2010).

Below is a mock-up of what it could look like

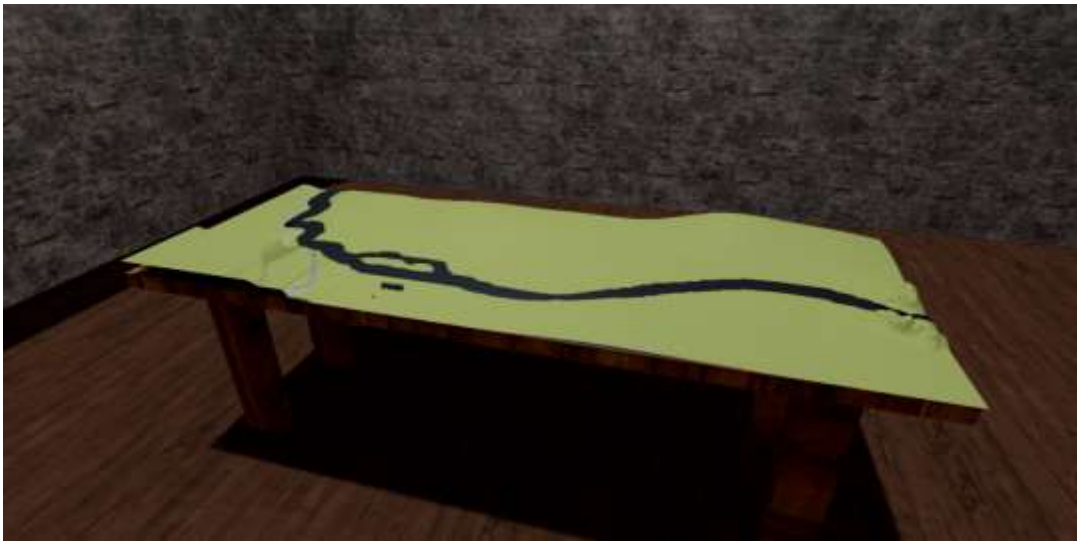


Figure 91. VR strategy game table mock-up.

Cursor

The research identified using a laser to replace the cursor. Using a laser cursor will allow the player to rapidly look and select the units they want exactly. The image below is a mock-up of a laser cursor.

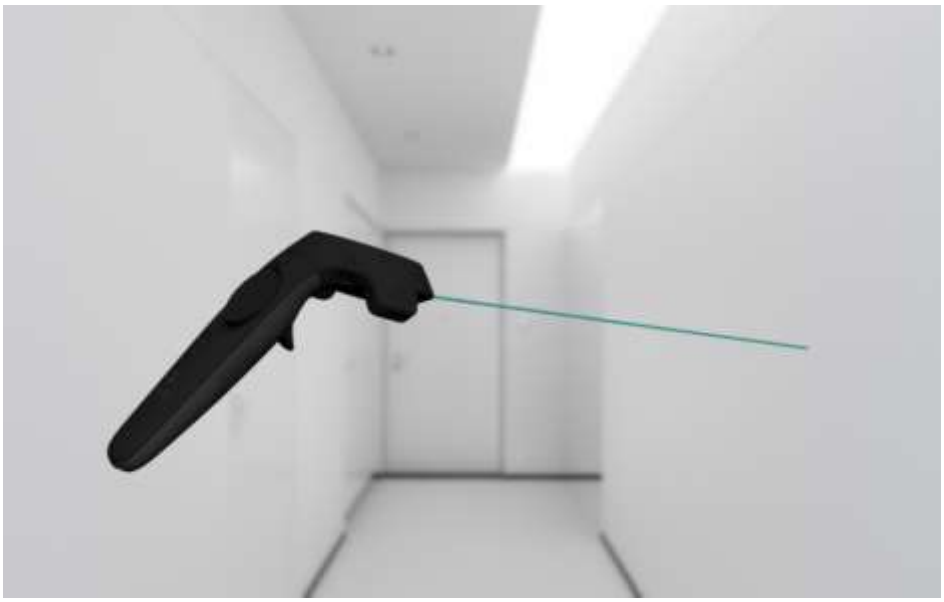


Figure 92. VR Cursor mock-up.

Controls mechanisms

With the possible game using VR controllers like the ones found on the HTC Vive, a VR Strategy game would have to adapt existing controls of Strategy games (such as the ones found in the contextual review) to VR, below are my predictions of how this would work.

Camera movements (Such as camera move Forward, Back, Left, Right)

Because the HTC Vive features full-body tracking, the player will be able to walk around the environment as if it was physically there. The table with the environment will be placed in a virtual environment, for the player to move around this environment they must physically walk around in the real world, where it will then be translated into the VR world. If the player had

Units on the other side of the environment, they would walk over to interact with them. The table in the environment won't have any collider applied to it, essentially allowing the player to walk through the table. Allowing them to navigate not only around the table but also through it. The reasoning behind this is that it allows players to quickly see other parts of the environment if they need to.

Moving beyond the size of the physical play space

If the player's physical play space is smaller than the VR world, the player will need a way of moving about it. To counter this, I would recommend using an optional teleport system. The player would press a button on the controller to activate the teleport mode, then point it where they would want to go. This movement system would be very much like the one found in *'Valve's' 'The Lab'*.

Rotating the Camera

For camera rotation, the player needs to turn their head and/or body in the real world to see the 3D environment from a different perspective.

Zoom the camera

To zoom the camera, the player moves closer to the place they wish to see. Physically moving their head and body as required to get closer.

Moving the Cursor

To move the cursor, the player will need to move their hands in the real world. The movement detected in the Vive controllers will then be translated into the VR world. This includes every direction and rotation of the controller.

Select a Single Unit

To select a unit, the player will point the laser at the unit they wish to select and then presses the trigger once. The player presses the trigger on the controller that the selecting laser is originating from. For example, if the player points the laser originating from the right-hand controller, then they will have to press the trigger on the right-hand controller.

Select Multiple Units

To select multiple Units, the player will draw a lasso around the Units they wish to select. This will be like how players on PC draw a box around the Units they wish to select. To draw the lasso, the player holds down the trigger on the controller they wish to use for selection. Once the trigger is held down, the player aims the laser at the ground that the Units are on, then proceed to draw around all the Units they wish to select. Once all the Units the player wishes to select are inside this lasso, the player lets go of the trigger, and those Units become “selected”.

Ordering a Unit to Move

With the Units the player wants to move selected, the player needs to point the laser at the location they wish to order the Units to move to, and then press the controller trigger in once.

This is not controller contextual, for example, if the player was to select the units with the right controller, they could then order the move with the left controller

Ordering a Unit to attack

The same as ordering a move but the player puts the laser over the enemy instead of open ground. Once the laser is over the Unit they wish to attack; the player presses the controller trigger in.

UI

Identified in the contextual research, Spatial UI is where the UI is in the game world but can only be seen by the player. Using a Spatial UI would be an effective way of showing the required UI. Identified in the application Google's '*Tilt Brush'*, the application uses a box like spatial UI that hovers above the player's controller, it can be rotated by the player. The player rotates the box to see its different sides of the box, and each side of the box shows different information. This approach to a UI would be appropriate for a VR version of '*Company of Heroes'*.

In the desktop version of '*Company of Heroes'*, it uses a Non-Diegetic UI, this means that it is always available to the player no matter where the camera is pointing, but in VR this will not be possible due to Non-Diegetic UI being hard to focus on. The game should try and keep this approach of the UI always being available to the player because how much the UI is used by the player. To counter this issue, the UI will be available to the player whenever wants it; the UI will have to be summoned by pressing the grip button on the controller. Although the UI

isn't on the screen all the time like the PC version of the game, it does mean that the player can summon it instantly keeping their play space clean and efficient.

The UI itself would take influence from both '*Google Sketch-up'* and Google's '*Tilt Brush*', using the box style UI that allows the player to interact with different UIs rapidly.

Below is a mock-up of how the UI would look in game.

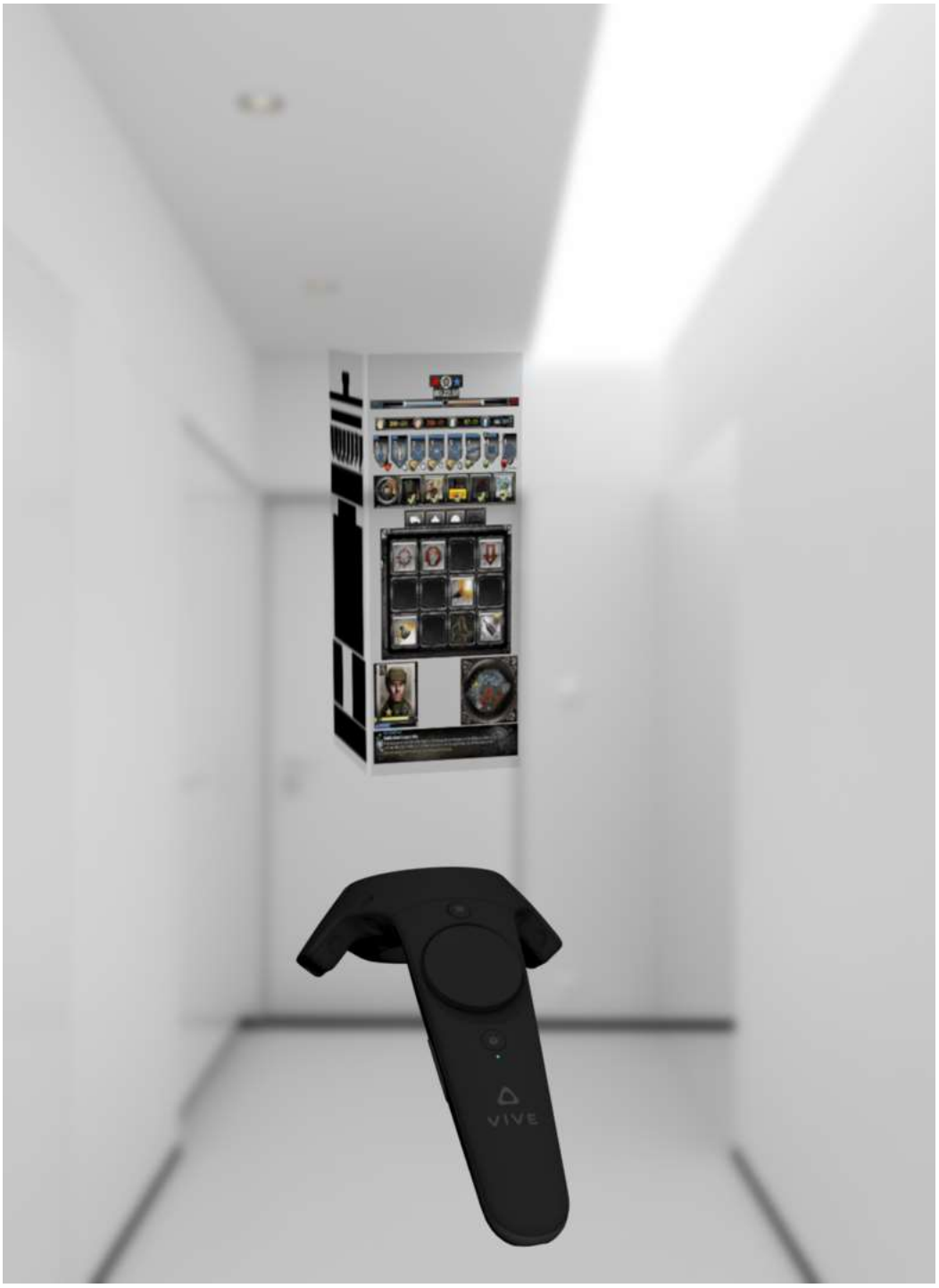


Figure 93. VR game UI mockup

Figure 94. VR UI Mockup 2.

Above are the three sides of the UI.

UI Split

The UI on every page/side is split into two different halves; the top half would be called the constant UI section. This constant is featured on every part of the UI. If the player rotates the UI to a different side, this would still be shown.

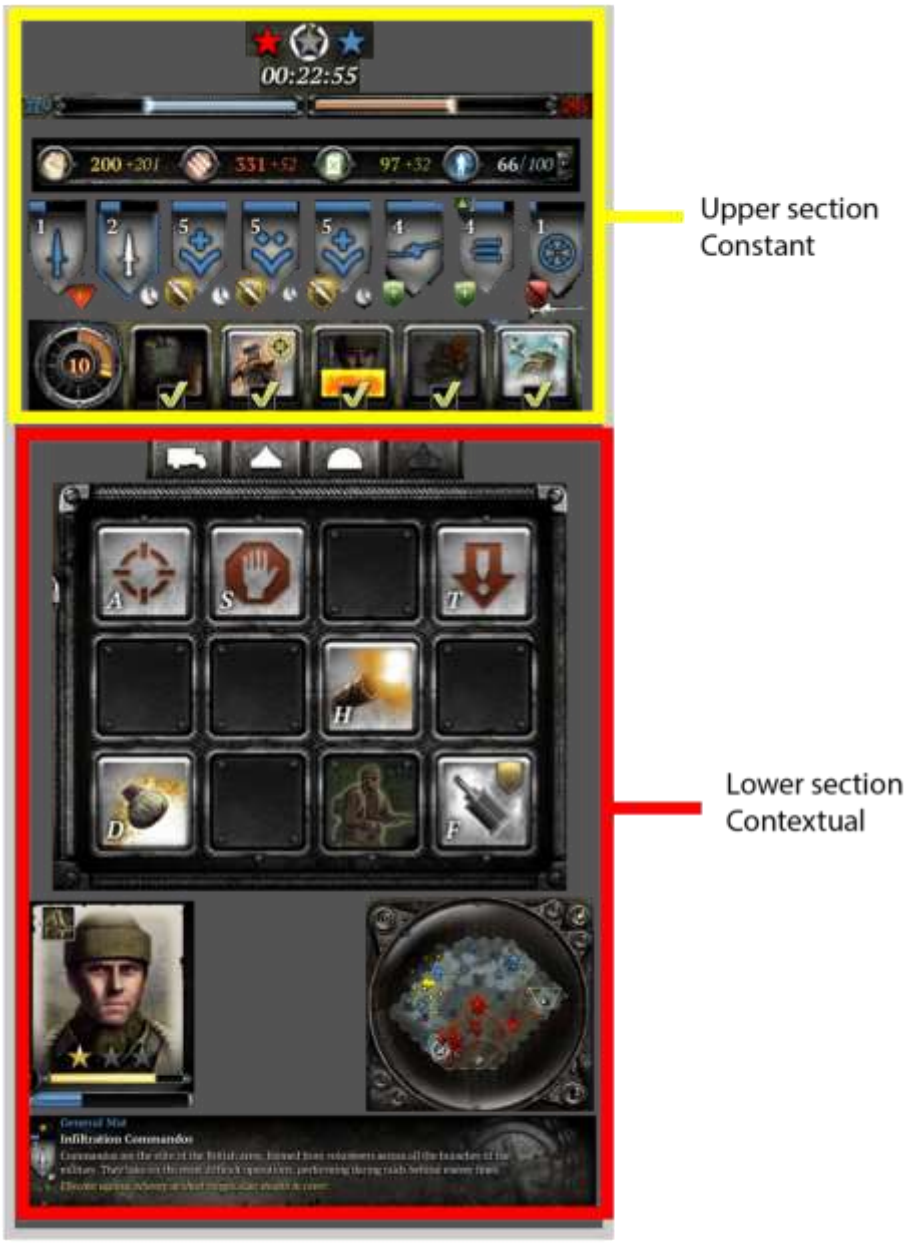


Figure 95. VR Mockup 3

The lower section would be the contextual UI. What the lower section would show is dependent on which side of the "box" the player is on. For example, the 3rd side of the box would show the menus of the game.

Upper Section- ‘Constant UI’

This part of the UI is what will always be available for the player to view, even if the player rotates the box to another side, this will still be found at the top of the UI. These UI elements have been chosen for the constant section as they have been identified as important, these are the sorts of commands that the player will always need available to them

Victory points/ Victory progression

Date/Season Details/ Time

Resources

Quick select

Lower Section- Contextual

Selected unit

Special orders

Spatial UI elements

Lower section – Contextual UI

The lower section is contextual to which side it is on.

Side 1

Side 1 features the currently selected unit, map and orders for that selected Unit.

Side 2

Side 2 features the player list. The player list shows which players are in the game. Here the player would be able to send messages also.

Side 3

Side 3 is the menu. The player can click on any of the menus for it to expand. Showing more options.

Interacting with the UI Elements

To interact with the UI Elements, the player will have to press the grip button on the controller. For example, if the player presses the grip button on the left controller, a UI will appear above the left controller, if the player presses it on the right controller, it would appear above the right controller. This allows the player to pick which controller they want to use.

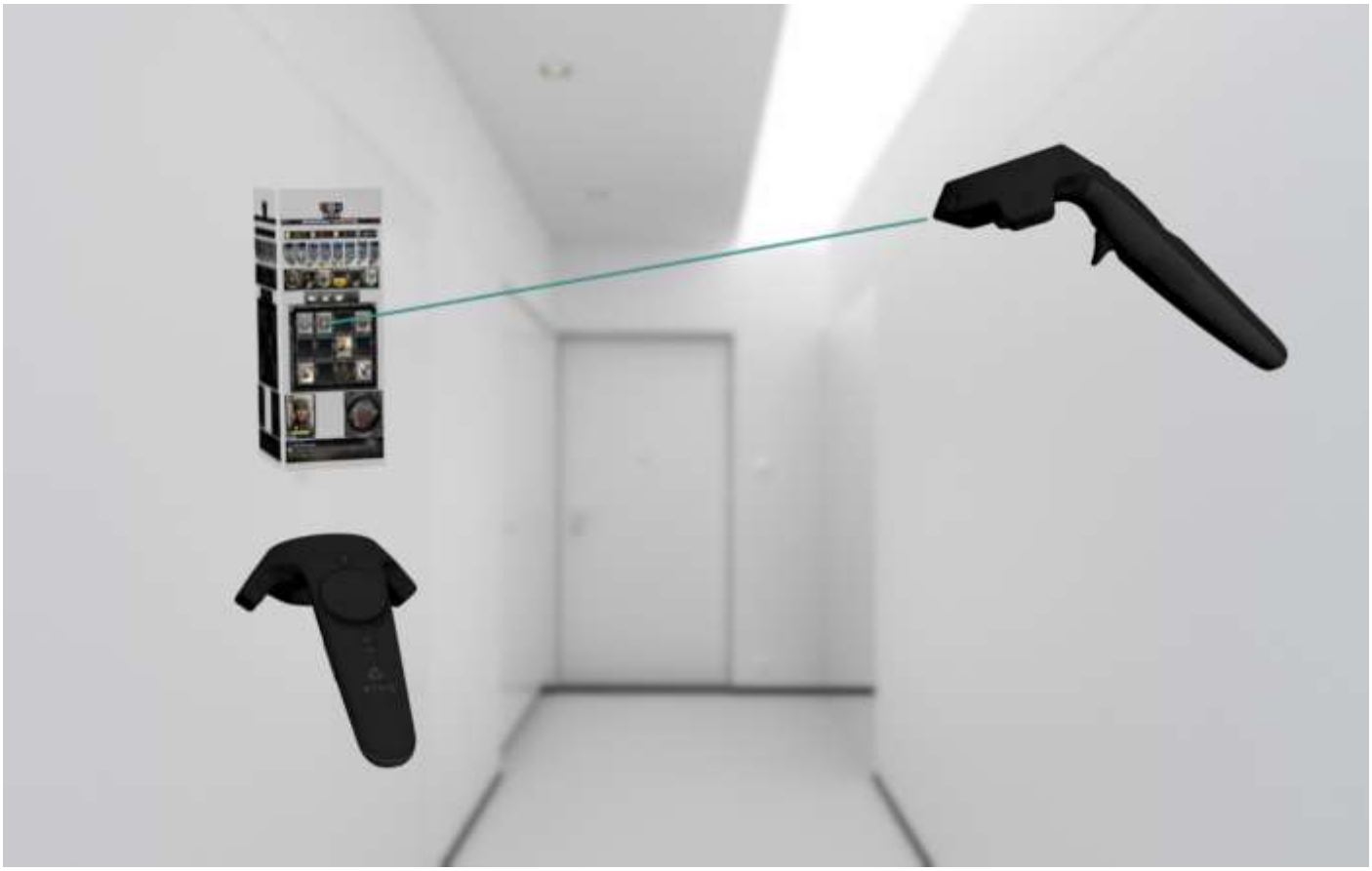


Figure 96. VR Mockup Interacting with UI.

While the UI is active, the player will then use the opposite hand, to guide the laser over the UI dominant hand, and use the trigger for selection and any needed navigation.

Highlight around 3D model to show selected Unit

This will work much like how it works in a non-VR game. The selected Unit shall have a highlight around them to identify them. The research identified that non-VR Strategy games had a highlight around the 3D models which have been selected by the player. This would be easy to replicate in a VR Strategy game and would be able to act the exact same.

Autoethnographic Controls Table

Table 10 is a table of the controls for a theorized VR RTS game.

	Camera move forward	Camera move left	Camera Move right	Camera move Backwards	Rotate camera	Zoom camera	Select unit	Multi-select	Order move	Order attack
Prototype	Player Physically moves	Player Physically moves	Player Physically moves	Player Physically moves	Player Physically moves	The player moves head closer to the desired location	Trigger click	Vive controller trigger click held down and drew a lasso around the units	Trigger click	Trigger click

Table 10. Autoethnographic Table

Section 2- Research Design

To find out which way is the most effective to collect the data required, the project will look at different ways of collecting qualitative research and data. By examining the different methods such as interview and focus groups, the project can find the most effective way of collecting this data. The section will also cover any other matters that might affect the project such as Ethics and the collection and storing of data.

Interviews

'*The Business communication'* (2015) describes interviews as a "meeting between people when questions are asked and answered". The process has an interviewer who asks the questions and an interviewee who answers them.

How to run an interview?

The one to one interview part of the study will be running in an effective and timely manner. The Open University (2013) suggests that there are three different ways to run an interview for quantitative research.

Unstructured interviews

An unstructured interview is more like a conversation then a structured interview; the interviewer will just use some light notes to keep them on track. With questions been answered "freely". (2013)

Semi-structured interview

In a semi-structured interview, the interviewer has a “list of questions or key points” (2013) that will need to be covered. The questions are answered by the interviewees “however they like”.

Structured interview

In a structured interview, “the interviewer asks the interviewee a series of specific questions, to which a fixed range of answers are possible ('ticking a box')”. Purposely limiting the answers.

Advantages

Focus

An interviewer would be able to keep the answers on the topic by asking another question, meaning that the project will not get data that is not relevant to the question being asked. Wyse, S. (2014) says that “keep the interviewee focused and on track to completion”.

Precise answers

The “respondents' own words are recorded” (Evalued, 2006). This gives the interviewee’s honest opinions and can give more precise answers.

Removes outside influences

“Interviewees are not influenced by others in the group” (Evalued, 2006). The project is after their own opinions and having others there could influence the way interviewees thought the process and their answers.

Disadvantages

Removes group discussion

Although having group discussion could be a disadvantage as it could influence individuals thought processes, not having it could also be a disadvantage. Having group thoughts and discussion could help foster new ideas that could assist the project, not having these could mean ideas are not as well developed as interviewees cannot build each on each other's ideas.

Focus Group

Gibbs, A. (1997) describes a focus group as a "group of individuals selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the research".

How to run a focus group?

A focus group needs to run in a certain way so that I do not influence the data. The Experience Business (2017) states that running a successful focus group the facilitator needs to keep certain things in mind when asking questions, it states that the facilitator should "Ask open-ended questions.", this is because if the project asks questions that can be answered yes or no, participants are more likely to answer "yes to please you" (2017). WikiHow (2016) states that the project should have the participants introduce themselves, this allows the participants to be more "comfortable" around each other, and thus they are more willing to share their ideas with each other.

Advantages

Adds group discussion

Having group thoughts and discussion could help foster new ideas that could assist the project. Focus group members can create ideas on their own and then have other members improve upon them. This is the main advantage of a focus group.

Can encourage and empower focus groups members

Gibbs, A. (1997) says that focus groups "can be empowering for many participants. If a group works well, trust develops, and the group may explore solutions to a particular problem as a unit". This can be good for the project because if a member of the group feels like they are involved in the project, then they might be more willing to say thoughts and ideas that occur to them.

Direct interaction

Having direct interaction with the group members can allow the researcher to ask questions directly to the focus groups. Allowing the project to get direct answers

Disadvantages

Can intimidate some focus groups members

For some members, the focus group could be intimating for them, being surrounded possibly by their peers could make them feel less likely to talk about ideas that they feel might be stupid or wrong.

Outside influences

The group discussion can be a good thing, but it can influence other members of the group so that they do not generate their own ideas.

Difficult to Control

A focus group can be hard to control if a subject accidentally gets introduced that isn't relevant to the discussion. Talking about the disadvantages of focus groups Stan Mack (2016) said that "group discussions can get out of hand quickly, straying from the original topic and getting lost in useless tangents".

Questionnaire and Surveys

Questionnaires and surveys are the processes of giving out questionnaires or surveys to participants. Participants will then get the opportunity to answer a series of questions about the subject.

Advantages

Can reach a lot of participants

The main advantage of the questionnaire and surveys is that they can reach a lot of participants. The project could put a questionnaire out online, and then use social media and ask people to fill it in. This means that the project can reach a wide and varied audience.

Disadvantages

Can't control the target audience easily

If the project is after a specific target audience, then using a questionnaire can make it difficult to reach that specific audience. Putting it out on social media means that anyone can answer the questions.

False answers

Some people may give a false answer. Without a moderator, participants might answer the question with an answer that is entirely unrelated to the question. This would waste time and damage the results of the questionnaire.

Observation

Observation is the process of "participant observation as a way to collect information" (Kawulich, B.B. 2005). The participant will take part in an activity and will be given little to no input from the observers.

Advantages

Removes outside influences

Seeing how participants do the activity without outside assistance can lead to exciting results. It can be the participants first ever interaction with the subject, meaning that the project can collect their initial and authentic interactions with it.

Disadvantages

Not interfering might have adverse effects

If the participant gets lost on the activity and doesn't know what to do, it can stall the progress. If they are lost to the point where they cannot proceed it can stop the observation and effect results. If the observer gets involved, it could also affect the results.

Pilot study

A pilot studies purpose is to "examine the feasibility of an approach that is intended to be used in a larger scale study". The project could use a focus group to determine what is needed in

the focus group stage. Naturally, the project could make a mistake, generate or ask unneeded questions that may only be found out if used in a live environment. By using a pilot study, the project can "identify modifications needed in the design of a larger, ensuing hypothesis testing study" (Leon, A.C., Davis, L.L., & Kraemer, H.C., 2010).

Ethics

Due to working with sensitive data and having to interview people, I will need to work within the standard of the University of Huddersfield ethics.

Security of Data

Under the University of Huddersfield ethics guidelines, all data gathered must be "Kept Securely" (2015). If data is physical, consideration should be given so that its kept safe by keeping it "in a lockable room with controlled access" or in a locked drawer or filing cabinet" (2015). If the data is digital, then the data needs to be "Password protected."

Data destruction/ Disposal

Under the University of Huddersfield ethics guidelines (2015), data must be disposed "in a way that protects the rights and privacy of Data Subjects" such as "shredding, disposal as confidential waste, secure electronic deletion".

Conclusion

After examining all the possible options used to collect the required data. The project will go with a combination of an individual interview and a focus group. The reasoning behind this is

that a focus group will allow the project to get a well-developed idea/design, but this idea/design might be influenced by one overpowering voice in the focus group stage. To counter this, before the focus group, participants will also have an individual interview first, allowing the project to gather the participants own non-influenced answers.

To help test these methodologies a small-scale pilot study will take place, this pilot study will only concentrate on the interview stage of the study; this will help guide the project and remove any unnecessary data from the results that could affect the final focus group results.

Section 3- Individual Interview and Focus Groups Plan

The aim of the interviews and focus groups is to find out how players would interact with a VR Strategy game. The interviews and focus groups will be trying to find out how players would do the common RTS game-based interactions that have been identified in the research. This section will cover how the participants will be gathered for the interviews and how the interviews and focus groups will be run.

Demographic of the Focus Group and How Participants Will Be Gathered

The demographic for the players would be gamers that have extensively played strategy games already. Because the project is about finding out how strategy games can be interacted with in VR, prior knowledge of strategy games is required. These players will have little to no experience with VR because the project wants what players feel natural, their first ideas. Age and gender are not being targeted, but it would be beneficial to have a range of both, allowing for a wider range of results that come from different backgrounds. The project will be using the online form website called '*Google Docs'* to gather participants; the form will have three questions. This will help me control the types of participants that take part. This will be done because the project will want participants who are experienced with strategy games; these questions will help the project identify these participants. The questions are below.

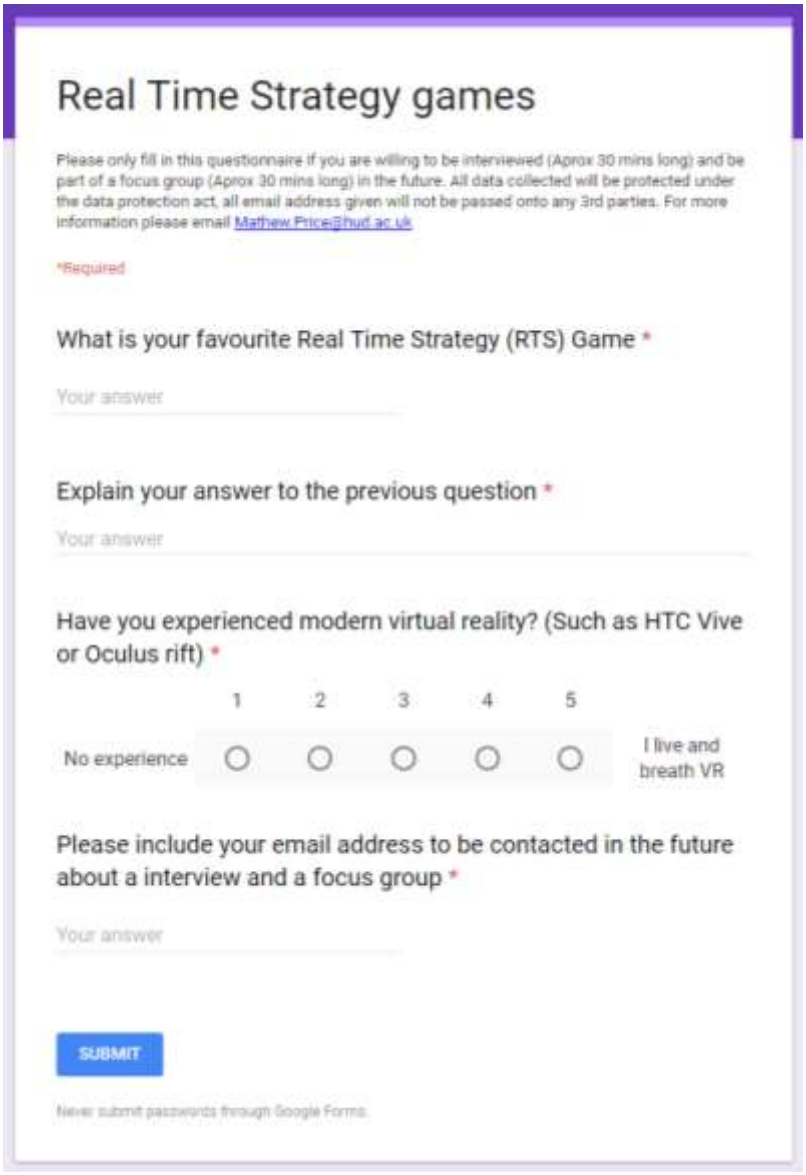


Figure 97. Google Docs questions

What is your favourite real-time strategy game (RTS)?

Here the possible participant writes down their favourite RTS game. This is done to set up the next question. Although this does not add any real detail to the data, it does enable me to see if they have played RTS games, if an applicant were to answer something such as '*Call of Duty',* then that individual can be removed from the potential applicants.

Explain your answer to question one?

This is where a decision will be made about if this person will be chosen. Here they will be explaining why the game they chose in the previous question is their favourite. The more in-depth their answer, the more likely they are to be chosen. For example, an answer that says because “I like it” is less likely to be chosen against someone who says, “I like the in-depth mechanics because they create varied and interesting gameplay.”

Have you played VR before?

This is going to be a choice out of 5. 1 being no experience and 5 being a lot of experience. The demographic calls from someone who hasn’t played VR that much before. So, possible participants who answer 1 are more likely to be chosen.

Ethics and gathering participants

Keeping in line with the Huddersfield University Ethics rules, the data gathered by the Google Docs form will be exported and then deleted.

Plan for the Focus Groups and Interviews

Here you will see the projects approach to the interviews and the focus group. The participants will first have their individual interviews. They are having the interviews first so that they aren't influenced by outside ideas. Once the interviews are completed, the participants will be put into two different focus groups to gather and discuss their ideas.

Overviews

Below is a general overview of the two groups. The individual interview components are inside the black square. The focus groups components are inside the red square.

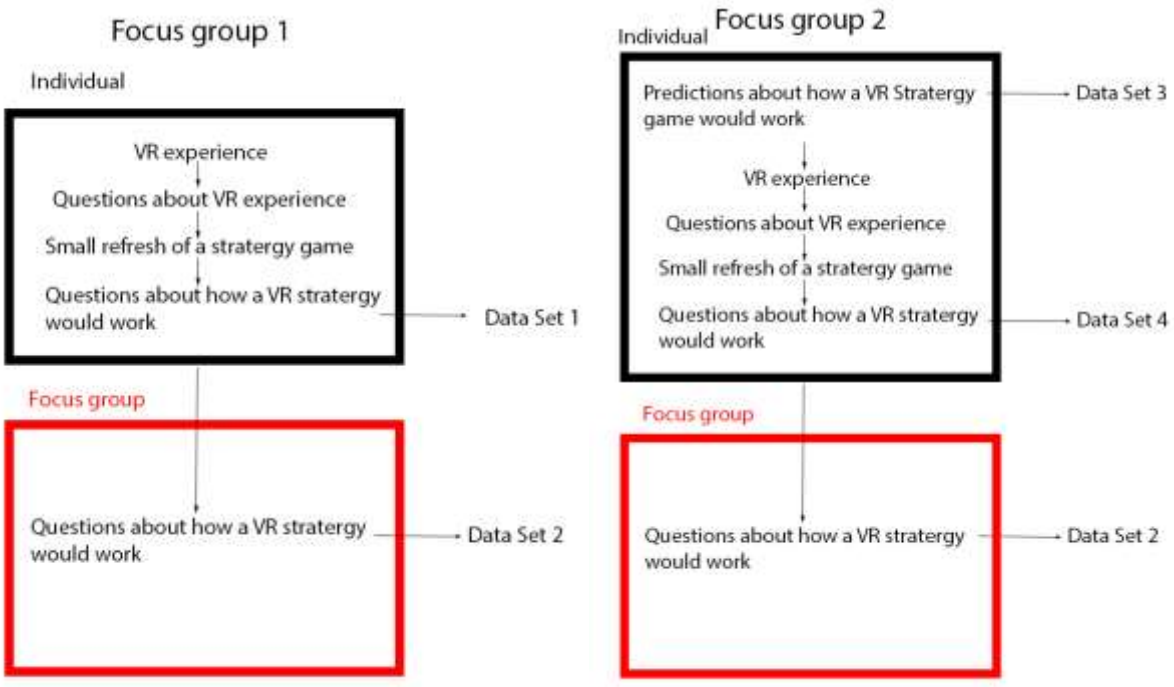


Figure 98. Focus group overview (Left)

Figure 99. Focus group overview 2 (Right)

Data Sets

In totality, the project will generate 4 different data sets. Each one relates to the questions that are asked. These questions can be found later.

Date Set 1

Data set 1 is the answers that will come out of focus group 1 individual interview. Focus group 1 does not make the predictions about VR.

Data Set 2

Data set 2 is focus groups 1 and 2 answers. This means all the participants in focus group 1 and 2 have had their individual interviews and have now been brought back together to take part in a focus group. There are two different focus groups, but the questions are the same, so the answers will be brought together in this scenario.

Date Set 3

Data set 3 is focus group 2 individual predictions. Here even though they haven't played any VR, they will make predictions about what a VR strategy game will look like. These will later be compared to data set 4.

Date Set 4

Date set 4 is the same as data set 1; it is not rolled into that data set though. This is so the answers can be compared to data set 3.

Question Overview

When a question is asked to the participant, it will be asked in an open-ended manner. This is so the project can gather their ideas that others might not have thought of before. After they have answered the open question, they will then be told about alternatives that are pre-

generated. Once told the participant will then be asked to list them in order of preference. The participants in focus group 2 will not be told about alternatives during the predictions stage.

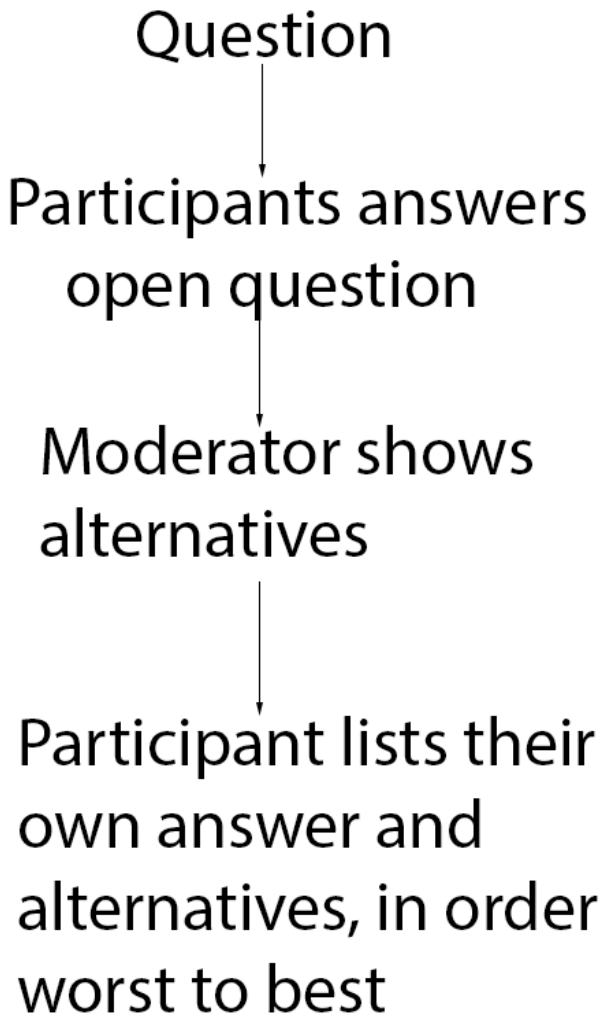


Figure 100. Question overview

Interviews and Focus Groups Questions

Below are the questions and events that the participants will experience taking part in the interviews and focus groups. This is done in chronological order. These questions may change depending upon the results of the pilot study (the Pilot study is found in the next chapter).

1 (Event) Introduction

Talking about the aim of the interview and the focus groups and introduce myself to the participant. Here I would have to careful not to introduce any bias to the group, and not to tell them any specifics. The participant will sign the consent form.

2 (Focus group 2 exclusive questions) Predictions on a VR Strategy game

Only members in Focus Group 2 will do this part. This section is where the participants of Focus Group 2 will try and predict what a VR strategy game will be like. At this point, they will have little to no experience of VR. The questions that they will be asked will be the same ones they will be asked after they have played VR. They will not be shown any alternatives here

3 (Event) VR Experience

Here the participants will play VR games and applications. They will play multiple VR games, such as '*Job simulator*' and Google's '*Tilt Brush*'. The participants will not be told why they are playing these certain specific games, so it is not to influence the data, their ideas or introduce bias, but these reasons are listed below.

3.1 (Event) 'Job Simulator'

The participants will play '*Job Simulator'. 'Job simulator*' is a comedy game where players do jobs such as a car mechanic. This game will be chosen because it allows the players to experience picking things up in VR.

3.2 (Event) Google's 'Tilt Brush'

Google's '*Tilt Brush*' uses spatial UI effectively. This game will be shown so participants can see the possibilities of this method.

3.3 (Event) 'The Lab'

'*The Lab*' is a collection of mini-games developed by '*Valve*'. This will show the players how they can move around VR environments that are larger than the real-world play space. The participant will play one of these mini-games.

4 (Event) In-Depth Examination of the Controllers

Here the participant will spend a small amount of time just looking at and learning what the VR controllers can do. Participants will also be told more in-depth about the tracking capabilities of VR. So as not to introduce bias, the participant will be shown how the controllers work with a layout of the controllers on a piece of paper. The image below shows an example.

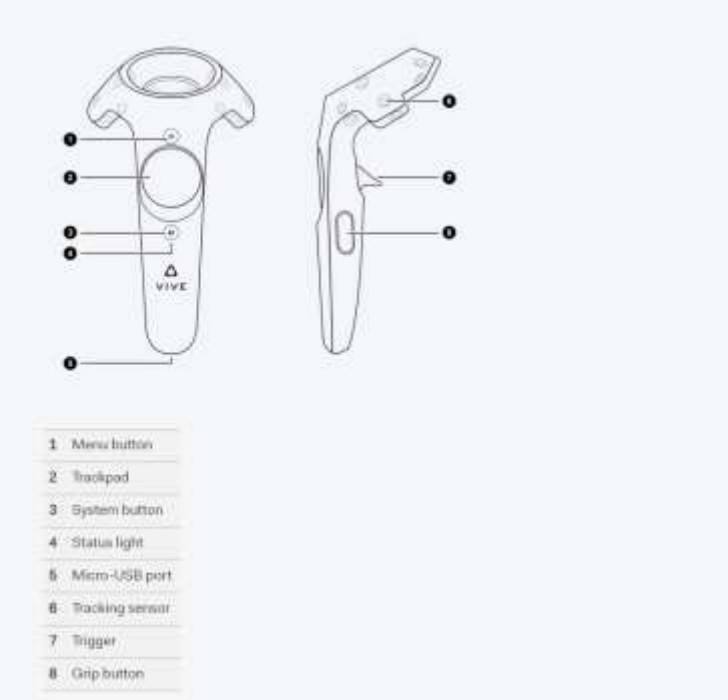


Figure 101. HTC Vive Controllers Schematics (Vive, H.T.C. 2015).

5 (Observation and Question) Did the Controls in the Games Feel Intuitive and Easy to Use?

During the VR experience, the observer will take notes if the participant needed any help playing the games. If they did, the participant should be asked why they needed help. If they did not, they would be asked how easily they picked up the game's controls.

6 (Open Question) Was the UI Easy to Use?

The participant talks about what they thought about the UI of the VR games they played, and possibly explain how they feel they could be improved or made more user-friendly.

7 (Open Question) How was it when compared to the traditional 2D monitor, was it better or worse?

Participants discuss if it was better or worse in comparison to a normal screen. If they felt any nausea when playing due to the placement of UI and any improvements, they feel could be made.

8 (Event) Small refresh on strategy games

After the participants have played VR, they will then play a Strategy game. This is done to refresh the participant's memories on what a Strategy game plays like. The game '*Command and Conquer Red Alert 2'* will be played. Released in 2001 '*Command and Conquer Red Alert 2'* has a Metacritic (2001) score of 84, in keeping with the high standard that was previously mentioned.

9 (Event) The participants would be shown the full list of identified RTS game mechanics and features

This will be done, so participants do not get ahead of the questions; they will be asked to keep their answers on the question at hand. They will be shown the mechanics that were identified in the research, such as selecting a Unit or building a Unit.

10 (Open Question) How would the environments be presented to the player?

This question will be asked first as it instantly gets the focus group thinking about how VR affects the presentation of any game.

11 (Ranking Question) Alternatives for the participants to see and rank

Here the participants are shown alternative answers to the question above. They then rank these. The participant's answer is included in this;

A. The environment on a table

B. The player walks around a large environment

C. Environment presented to them on a screen

12 (Open Question) How would a player move about the environment/ Move the camera?

The group discuss how the player moves about the environment.

13 (Ranking question) Alternatives for the participants to see and rank

Here the participants are shown alternative answers to the question above. They then rank these. The participant's answer is included in this;

A. Player walks around the environment. It's scaled so that they never need to teleport

B. Teleportation and walking

C. Scaling the environment

D. Floor dragging

14 (Open Question) How would the Line of Sight/ Fog of War be presented?

Previously identified as a core game mechanic, Fog of War limits the player to only being able to see as far as their Units can see. In traditional Strategy games, this could be seen as fog,

or the unseen areas are blacked out. The focus group will discuss how a VR game would present it.

15 (Ranking Question) Alternatives for the participants to see and rank

Here the participants are shown alternative answers to the question above. They then rank these. The participant's answer is included in this;

A. No fog of war
B. Visually like how non-VR RTS games show Fog of War (Black fog)
C. No difference to where the player can and cannot see. Enemy units will appear when spotted

16 (Hidden open question) Does the player need a cursor? And 17 (Open question) how would a player select a single unit?

Question 16 is, ‘Does the player need a cursor?’ This will not be asked to the participants, by not asking the participants if they need a cursor directly it doesn’t influence their answer, letting the participants come up with more creative alternatives. The participants will discuss how they would select an individual unit, not multiple. This discussion would get the participants to think about if they need a cursor.

18 (Ranking Question) Question 16 Alternatives for the participants to see and rank

A. Hands
B. Laser pointer
C. WW2 Croupiers' Rakes

19 (Ranking Question) Question 17 Alternatives for the participants to see and rank

These alternatives will heavily depend on the participant's answer to question 16

1) Pick unit up
2) Hover laser over and press
3) Put Croupiers' Rakes behind the desired unit

20 (Open Question) How would a player select multiple units?

The group would discuss how they would select multiple units in VR, not singular.

21 (Ranking Question) Alternatives for the participants to see and rank

A. Pick all units up that the player wishes to select
B. Draw a laser outline around all the units
C. Put the Croupiers' Rakes behind all the units

22 (Open question) How would a player order a Unit/s to move?

The participants would discuss how they would order unit/s to move to a location.

23 (Ranking Question) Alternatives for the participants to see and rank

A. After selecting a unit/s, the player would “drop” them where they wanted them to go
B. Point laser and click where the player wants them to go

C. Push the Croupiers' Rakes to the location

24 (Open question) How would a player order a unit to attack?

The group would discuss how they would order a unit to attack another unit

23 (Ranking Question) Alternatives for the participants to see and rank

A. After selecting a unit/s, the player would "drop" them where they wanted them to go
B. Point laser and click where the player wants them to go
C. Push the Croupiers' Rakes to the location

25 (Open Question) Do you need a UI? If so, what would the UI look like in a VR Strategy game and how would a player interact with it?

First, the participants will be told that the Non-Diegetic UI isn't ideal in a VR game. The participants discuss what would the UI look like for a VR strategy game. They would discuss how it would look, discussing its appearance. The focus group would also discuss how a player would interact with it.

26 (Ranking Question) Alternatives for the participants to see and rank

A. Hologram UI (Similar to Google's '*Tilt Brush'*)
B. I built into the world (Like '*The Lab'*)

27 (Open Question) How would a player build a Unit?

Identified as a core game mechanic, building Units allows the player to bring more Units into the player area. Here the participants will think about how a player would do this.

28 (Ranking Question) Alternatives for the participants to see and rank

A) Using the UI, they chose in question 25

B) A radial wheel that appears above the selected building

29 (Question) How would a player know what Unit is currently have selected?

This is based on the identified UI element of the selected Unit and highlight around the 3D model. These two questions are combined into one so as not to give the participants answers or ideas.

30 (Ranking Question) Alternatives for the participants to see and rank

A) A virtual screen on the wall in the environment tells the player

B) On the UI

C) Highlight around the Unit

31 (Open Question) How would a player order a Unit to use a 'Special Ability'?

How would a player order the selected Unit to use an ability or a particular order?

32 (Ranking Question) Alternatives for the participants to see and rank

A) A virtual screen on the wall in the environment tells the player

B) On the UI

C) Highlight around the unit

33 (Open Question) How would a player see the Victory Progression

Knowing how close a player is to victory is essential. Especially in game modes such as conquest. How would a player know how close or far away they are?

34 (Ranking Question) Alternatives for the participants to see and rank

A) A virtual screen/clock on the wall in the environment tells the player

B) On the UI

35(Open Question) How would a player see time/date/season details?

Participants would discuss how would time/date/season details be shown.

36 (Ranking Question) Alternatives for the participants to see and rank

A) A virtual screen/clock on the wall in the environment tells the player

B) On the UI

Why Are These Questions Asked?

Below is the justification for each question being asked.

Question	How would the environments be presented to the player?	How would a player move about the environment/ move the camera?	How would the line of Sight/Fog of War be presented?	How would a player select a single Unit?	How would a player select multiple Units?	How would a player order a Unit/s to move?
Why was it asked?	This question is asked because the research identified that the gameplay happens inside an environment.	The research identified that the environments in RTS games are large and require a camera to move around.	The research identified that RTS games have Line of Sight/Fog of War.	The research identified that before a Unit can be given orders, it needs to be selected. This question is asked to meet these criteria	RTS games have multiple Units on the field at one time. The research identified that selecting multiple Units is different from selecting just one	The research identified that the Units in an RTS game move around the environment after been given an order to. This question is asked to meet this requirement

Table 11. Why were these questions asked?

Question	How would a player order a Unit to attack?	Do you need a UI? If so, what would a UI look like in a VR strategy game and how would a player interact with it?	How would a player build a Unit?	How would a player know what Unit is currently have selected?	How would a player order a Unit to use a special ability?	How would a player see the Victory Progress?	How would a player see time/date/season details?
Why was it asked?	The research identified combat as a core game mechanic. Ordering units to attack allows this mechanic to happen. This question is asked to meet these identified criteria.	UI elements were identified in the research. This question is asked so that a UI can be theorised.	It was identified in the research that not all RTS games had base building, but all of them had a Unit building.	Identified in the research, current RTS games have a way of letting the player know which Unit they have selected.	Units in RTS games have special abilities such as firing smoke or recharging shields.	The research identified this UI element. This is reflected in the core UI table found earlier.	With time in game passing at real time. Having a timer is necessary and was identified in the research.

Table 12 Why were these questions asked continued

Additional Design Notes

Focus group

As stated earlier, the focus groups will have the same questions as the interviews; the only difference is how the question is presented. In the focus groups, the question will be shown with the collected data from the individual interviews. This will start a debate amongst the participants where they will debate about any new ideas and then how they will order all the ideas.

How will the data be recorded?

The data will be recorded using a camera. The camera will allow me to record all the interviews and focus groups and will remove human error if I hand write all the records. There could be a chance of the interviewer making a mistake. The use of a camera will allow the project to do a "retrospective analysis" (1994) of the footage.

Why the Project is Using Existing Strategy Games and VR Applications to Test

To test the ideas generated, the project is going to make use of existing Strategy games and VR games/applications instead of creating its own; this is because I do not have the skills to create the various assets needed. I lack the coding knowledge that would be required to create any digital mockups. Using existing games does have its advantages as it allows the project to be based on existing proven games/applications. Bringing in tested assets and mechanics allows users who have previously played games such as '*Company of Heroes 2'* to imagine what a VR version would look like. By using these existing games in conjunction with other methods such as interviews and focus groups, the project can gather the required information.

Section 4- Pilot study

To perfect the study, the project did a pilot study. The study was done so that the interviews and focus group could be as good as possible. The pilot study helped remove a lot of unnecessary content from the study making it more streamline and more effective. Below is what happened from the pilot study. The pilot study did not consist of a focus group due to time constraints.

What happened

The pilot study consisted of three participants and would average about 30 minutes long excluding the VR play time. The participants were asked all the questions that were generated and then asked them to answer and rank them from worst to best. This included their own answers.

What went right

The study found that people were interested in VR and they were interested in how the technology could be applied to the strategy game genre. The ideas generated were exciting and creative.

The project was able to develop further because of this pilot study. Learning what went wrong enabled the project to remove unnecessary parts. They are listed below;

What went wrong

After finishing the pilot study and meeting with my supervisor, we found that the ranking system was not required. This was due to it not generating any useful data; it was also making

the interviews go on for a long time, which was making it hard for participants to stay and participate.

The University only has a demo of the game '*Job Simulator'*. This limited the experience that the participants could have. The demo only allows the user to have 5 minutes of play time. This confused participant a little, but they still talked about it in the interview stage afterwards with some praise.

The interviews were too long. With the combination of the VR experience and the interviews, participants were spending roughly an hour and forty minutes for the entire study. This was taking up a lot of time, and some participants weren't happy because of it.

For the pilot study, the project was not able to get a camera. Instead, the project used an audio recorder.

What will be changed

The participants will still play the demo of '*Job Simulator',* but afterwards they will also play *'Google Earth VR'. 'Google Earth VR'* has a lot of different movement options and UI styles. This will help show the participants due to being exposed to more VR games.

Another change is the removal of the ranking system and the alternatives. This was added so that the project could collect quantitative data. It was designed so the project could see which one the best is out of ideas that I had generated and the participant's ideas. Due to the participants not being able to see each other participant's answers, it meant that the alternatives were seen more by the participants thus having a higher chance of being voted for. Instead, the alternatives and ranking system will be only used in the focus groups; this way the participants can use rate the different ideas in terms of preference after all the ideas have been collected. The

ideas that the users will be rating are the ones created by the users in the individual interview stage.

To keep the time down on the interview's parts will be cut. The strategy game refresh will be removed as all participants will already have played strategy games a lot. The removing of the alternatives also shortens the study.

Instead of using a camera the project will instead use an audio recorder. The pilot study found that a camera was not necessary and that an audio recorder gathered all the necessary data.

Chapter Three- Implementation of Research

Section 1- Individual Interviews Results

To gather the required data to take forward into the Focus Group stage, 14 participants were interviewed in a one to one environment. They were asked the refined questions from the pilot study which consisted of 15 questions. The interviews would average around 20 minutes excluding the VR play time. The participants were recorded with an audio recording device. All participants signed a consent form (Appendix E) before taking part stating that they are consenting to be recorded and to take part in the study.

During the individual interviews, some participants gave the same answers as other participants, to counter having to repeat the same question during the focus group stage, the answers that were the same were merged into one answer, this saved time during the focus group stage and to stop confusion amongst the participants. To see a collection of all the answers, please look at Appendix D, to see a summary of each interview, please look at Appendix G (Please note that Appendix G is not a transcript, it was a summary of each other the person answers that was then entered into Appendix D). Below is an evaluation of each questions answer below. (The number of answers given is after duplicate answers have been combined).

Participant overview

The 14 participants who were interviewed had a wide range of gameplay experience; they were narrowed down from the 21 that applied through the online form (Appendix F). All

participants were males with a range of experience with Strategy games. This was established with the question “What is your favourite Real Time Strategy (RTS) Game”.

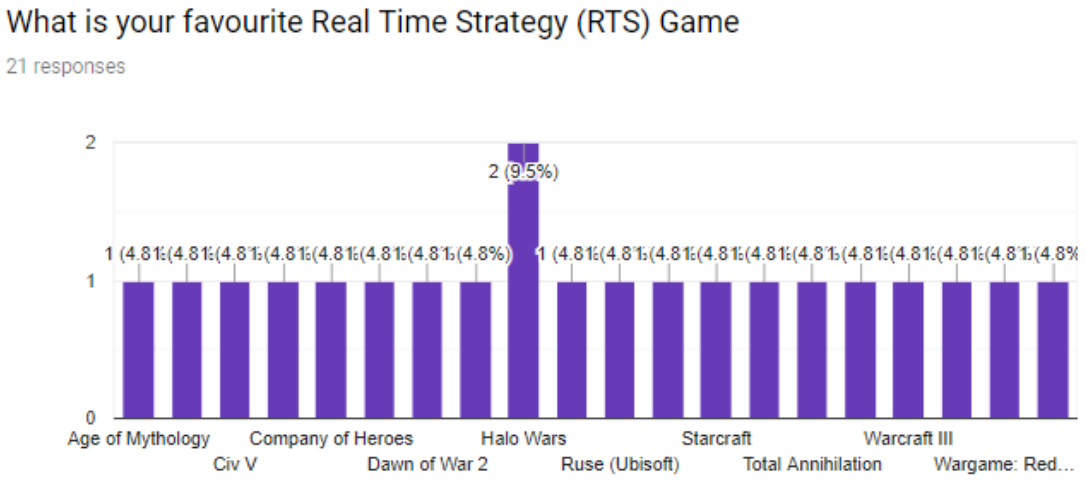


Figure 102: Online form response summary Q1

You can see that I had a range of answers to this question, ‘*Warhammer 40k: Dawn of War*’ has the most response to this question with 3, ‘*Age of Mythology’*, ‘*Halo Wars’*, ‘*StarCraft*’ and ‘*Wargame: Red Dragon’* has 2 and a range of other games such as ‘*Company of Heroes’* had 1. Showing a wide range of taste in Real Time Strategy games. (Note: If a user had a minor spelling difference in the name they submitted, ‘Google Forms’ counts it as a different name; thus the bars shown on the image are not accurate unless a user investigates further.

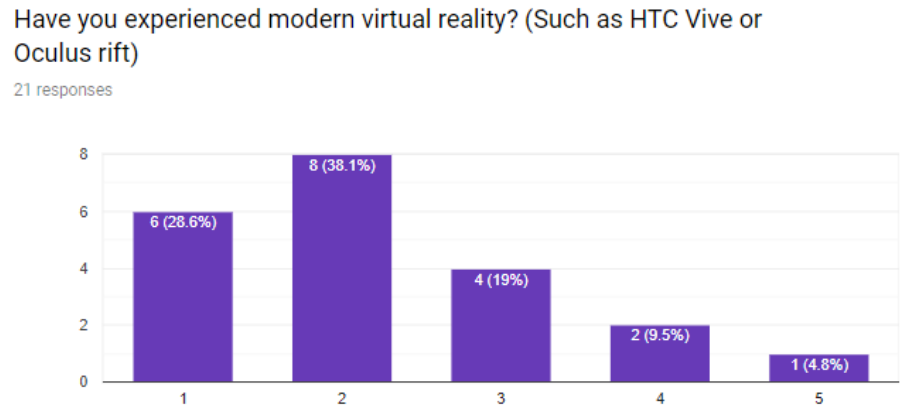


Figure 103: Online form response summary Q3

Participants had a range of experience of VR, on a scale of 1 – 5 (1 being no experience and five being "I live and breathe VR"). You can see from the results that the project has had a wide range of applicants, with the majority having little to no experience VR. The project wanted this sort of range of applicants, people with a lot of VR could have had their answers already influenced, with people that are new to the platform, the project might get different responses.

Results Analysis

How would the environments be presented to the player?

This question received five answers: 2 of those answers were relating to '*Google Earth VR'*. Two of those link to an existing traditional RTS and one answer is unique. It is interesting that '*Google Earth VR'* is featured in two of the possible answers. This might have something to do with the fact that the way it displays environments is very similar to traditional RTS games such as '*Wargame: Red Dragon'*. Participants possible see a link there and as such are recommending it.

Figure 104: (Right)Wargame comparison (Eugene systems, 2014)

Figure 105 : (Left) Google Earth VR comparison (Many A True Nerd, 2016)

Looking at Figure 104 and Figure 105 you can see the comparison side by side and how participants may believe that they look similar.

How would a player move about the environment/ Move the camera?

This question received seven answers. Four of the answers are influenced by '*Google Earth VR'*, two are influenced by existing VR game '*The Lab*', and traditional Strategy games influence one. The movement systems that came out of the interviews have a range of ideas, some such as D include some game mechanics in there which would add to the play experience, though it may not be applicable for all future RTS games.

With four answers being influenced by '*Google Sketch Up'* it is probable that at least one of them making it into the final design. This could be good for the project, '*Google Earth VR'* is made by Google; the company has much experience in user interfaces and users interacting with platforms. So, taking their experience into the project can be beneficial.

How would the Line of Sight/ Fog of War be presented?

This question received one answer that was influenced by traditional RTS games. It is a shame that participants could not design any alternatives to this.

Does the player need a cursor?

This question received two answers; one was influenced by Google's '*Tilt Brush',* and the other was influenced by console RTS games such as '*Halo Wars'*. This is another question where I expected a lot more answers, I thought that this would be one that would take much time for participants to create, but the participants liked the Google's '*Tilt Brush*' laser cursor. Overall this could affect the findings of the project, cursors are a massive part in RTS games, with only two

recommendations on something so core to their design, it could limit the answers of the focus group.

How would a player select a single Unit?

This question received three answers, Answer A is influenced by a range of VR Apps and games such as Google's '*Tilt Brush'*, but other influences are present like laser pointers in real life.

Answer B influences games such as '*Tom Clancy Endwar*' and modern virtual assistances such as Apple's '*Siri*' with voice commands. The author does not think this answer will be picked in the final stages as voice commands have had issues in the past, possibly putting off participants from choosing this option.

Answer C influences traditional RTS games such as '*Company of Heroes 2*' that gives the player a list of what units they have on the field available for them to select.

Answer A seems the most logical answer; I could see a range of issues arising with voice commands and only having a list. Users could have an issue knowing exactly what Unit to select off the list, especially if the user has created multiple Units of the same type in the game.

How would a player select multiple Units?

This question received four answers; Answer A was possibly influenced by modern art and design apps such as '*Adobe Photoshop'*, where they have a lasso style tool that enables them to select everything within a custom design shape.

Answer B was influenced by mobile phone interfaces and standard PC interfaces, the contextual review found that mobile phones have a pinch style mechanism that allows the user to

zoom in and out, I believe that this is the influence here, in this answer a square appears between the two controllers and the player would do a pinch style action to make the box bigger or smaller.

Answer C is a painting style tool that is influenced by games such as '*Halo Wars 2'*. An interesting system that the Autoethnographic did not agree with, this has some great potential especially considering it could be an easy and accessible mechanism for the user.

Answer D is a copy of a traditional RTS box selection system. The participants are influenced by that tried and tested design.

How would a player order a Unit/s to move?

This question received six answers. Answer A is a copy of traditional RTS systems. A very convenient system that users would be able to pick up quickly.

Answer B is very similar to answer A but is expanded. The issue with this answer for the project is that it is too similar to answer A, it could be taken out of the results or combined under answer A, but that could skew the results so it will be kept under a different answer.

Answer C seems like it could hurt a user, moving the actual controller all the way to a location in the game world to then order a move could be much movement for no reason, it does not make use of a cursor, so it is also a prolonged process. A user could not select a unit and then just press go to that location like with a cursor-based system. This amount of movement would take much time and slow the user.

Answer D has some minor influence from traditional RTS games like '*R.U.S.E'*. The significant difference though is that the cursor and this movement arc are different from the

cursor; they are two different UI elements. I can see this leading to confusion for newer players. I would argue that answer A is faster.

Answer E takes influence from '*Tom Clancy's EndWar*' and games such as '*XCOM*' which use a grid-based movement system. It has been stated earlier the issues that arise with voice commands, but the voice and the grid command system could be an interesting combination. '*Tom Clancy's EndWar's*' voice system worked off predefined voice phrases, a grid-based system combined with predefined phrases such as "Unit X move to G4" could work, the main issues with this though is how would this work with a RTS, grid-based movement could work with a real-time game (Games such as 'Hearts of Iron' do this) but would require a minimal and tight grid system to enable that same level of accuracy for the user, one that I do not believe would be possible.

Answer F takes influence from modern military plans, or at least how media portrays. The user draws a line from the unit to the final desired location; this creates a path for the unit to follow. The second part of this answer is the same as answer A. This has many benefits to RTS games, "pathing" in RTS games has had issues, Units going somewhere the player did not expect and possibly getting destroyed, this would avoid that and allow players to say exactly where they want them to go. It is a simple fix to a rather complex problem, and even if it does not get used in the final recommendations, it should still be considered.

How would a player order a Unit to attack?

This question received four answers. Answer A is very similar to answer A of the previous question; it shows evident influence of traditional RTS design.

Answer B will have the same issues as answer C of the previous question.

Answer C is very similar to answer D of the previous question, though additional issues may arise. An arced line UI element may work for a movement order, but for an attack that may cause issues with accuracy, in addition to this the player must press an additional button to activate this arc, this goes against the traditional methods identified in the contextual review.

Answer D takes influence from modern RTS games and makes use of the VR capabilities. Very similar to Answer A but before the unit is ordered to attack the player has a UI appear that lets them decide what sort of order should be executed. Although a good idea I believe that it will slow down players input in the game, which in turn will slow down gameplay.

If so, what would a UI look like?

This question received five answers in total. Three of them have design inspirations from Google *'Tilt Brush'.* Answer A is a direct copy of Googles '*Tilt Brushes'* UI. The UI impressed enough that the participants wanted a copy. The UI is extremely fluid and easy to use, though it can be initially difficult to use, once learned it could be exceptionally natural to use.

Film or concepts of the future inspire answer B. A floating UI that is docked to the side player could be approachable for new users. Depending upon how this is implemented it could strain the user having to turn so much during extended play sessions.

Answer C is inspired by Googles '*Tilt Brush'* but has clear influences from UI's from the Mass Effect series of games. The Mass Effect games feature what is called an 'Omni Tool', this tool is UI that wraps around the user's arm. This would enhance immersion is futuristic style RTS games where the UI itself could be part of the world building, but games such as "*Age of Empires"* might struggle to integrate it effectively.

Answer D is again a direct copy of Googles '*Tilt Brushes'* UI, but this time the UI cannot be turned off. I imagine that this might get in the way a lot, having the UI constantly on could block line of sight to specific Units.

Answer E is inspired by Valve's '*The Lab',* identified during the research stage, '*The Lab'* features a UI that is on a clipboard. This approach works for information that might not need to change but what about constant UI changes. Bringing the clipboard up might also cover a large portion of the player's view.

How would a player interact with it?

This question received two answers, Googles '*Tilt Brush*' inspired one and the other was inspired by VR applications that do not feature a cursor, and instead uses the control as one. It is a shame that no one was able to figure out a different way of approaching the question of interacting with the UI.

How would a player build a unit?

This question received two answers that were inspired by current UI systems in RTS games. The first is a contextually based system that changes the UI so that the player can build a unit. The majority of modern RTS games do this at the moment, Company of Heroes, Command and Conquer and Age of Empires already do this. This could be the best option, sometimes a port to VR is going to be the best way; players may expect it to work like this and be surprised when it does not.

Answer B has inspiration drawn from mobile games, with limited space on the screen; mobile games have the UI appear above the building in a diegetic styled UI. Could be a VR friendly UI that is easy to use for new players.

Answer C influences mobile games and traditional RTS games. A game such as Wargame: Red Dragon has a similar system where the player clicks on the desired unit and then places it into the 3D environment when the unit is made it automatically goes to that location.

How would a player know what unit is currently have selected?

This question received six answers has a range of answers that pulls inspiration from multiple sources. Answer A would be hard to use for the user, a separate UI would appear with the currently selected unit, but why would a UI not have the current UI on it? Why have two different UI's that could confuse the user?

Answer B, C, D and E are inspired by current RTS games. Traditional RTS games have the current unit selected on the main UI and then have a banner above the unit and a highlight as well. These UI elements could not exist on their own; they work together to inform the player which unit they currently have selected.

Answer F could be useful depending upon how its implemented, a small icon showing the currently selected at the end of the cursor is a unique way of making use of the VR capabilities, though it may cover some units underneath making it hard for the user to select the correct Unit.

How would a player order a unit to use a special ability?

This question received five answers, two answers use the UI of the game, 2 uses a button on the controller and 1 uses gestures. The two that make use of the UI are similar to previous answers. Nothing too imaginative but are a safe option that will more than likely be chosen.

The ones that use the controllers take inspiration from PC RTS games and console RTS games that make use of Hotkeys or shortcuts. A quick button press and the ability is activated, this approach could be useful in trying to legitimise VR controls, traditional RTS gamers might be looking for speed of order execution, this could help bring around a higher average rate.

How would a player see the victory progression?

This question received seven answers. 3 make use of the UI, 3 make use of in-game diegetic UI, one is audio based, and the last one is gesture based. It was good to see a broader range of answers come out of this question, I think that the diegetic UI answers such as C, D and E have the greatest protentional, though not all of them make use of VR capabilities (C) I think it's a more creative way of showing the user information.

The UI ones follow answers from previous questions such as it is on the main UI. Again, a safe option that will work exceptionally well, but it does not make use of that VR capability that help sell the product.

The audio option is useful to the project; it will free up commands on the controller and in game, it also means the player can hear it mid-action without having to stop.

How would a player see time/date/ season details?

This question received five answers, three are UI based one is audio based and one is hand gesture based. The hand gesture based on sticks out the most in this scenario, for this answer the player, rolls the controller on to its back they can see the information, in my opinion, this is a quick and easy gesture that is not intrusive.

Interview Stage Reflection

The interview stage allowed the project to gather the required answers. It served its purpose, and the answers that came out of it will legitimise the results of the Focus Group. Reflecting on the answers themselves, they have been creative and varied. The only question that was lacking is the question "*How would the Line of Sight/ Fog of War be presented?"*. All the participants answered in the same manner, stating that it should be the same as how it is in current RTS games.

An observation of the individual interviews was how many participants linked their answers to '*Google Earth VR'*, it seemed popular amongst the participants and guided many their answers primarily in the UI answers, the UI in the game is very intuitive and quick to use. It also has the Wow Factor that feels like you're using something out of the future, with its hologram style interface it could be easily adapted for RTS games.

Section 2- Focus Groups Results.

This chapter will explore what the suggestions would look like if taken into production. The chapter will show a range of mockups that are based on the results of the focus group. Taking forward the results and ideas from the interview stage, on the 11/06/2017, 3 of the interview members came together to form a Focus Group. Though all members of the interview stage were messaged and asked to join, only three responded and came to the focus group.

The Focus Group was located at the University of Huddersfield in a room with no public access. As stated, the idea of the Focus Group previously is to allow the participants to discuss the possible answers; this discussion leads to the generation of new possible answers that were not on the original question list. Appendix A shows the answer sheet that the focus group wrote on; this answer sheet was then interpreted by the project into the answers below. Appendix B and C are the transcriptions of the Focus Group; the focus group had a break halfway through the event, so the transcription of the event is broken into two pieces.

Focus Group Member Breakdown

Three members of the interview stage came together. These three members applied through the Google Docs form (Chapter two, section three) that was circulated the internet (Facebook groups and online forums). The three focus groups participants are Strategy game players in some form or another; this was established in the Google Docs form. The member breakdown has anonymised to protect the identity of the members, if more personal information is required, please email Mathew.Price@hud.ac.uk. This includes some of the information such as playtime; this was taken from the online participant profiles and talking to the participant.

Participant A

Participant A is a 23-year-old male that is primarily a console-based player but does on occasion use PC. The participant plays strategy games such as '*Halo Wars*' on the console, but also regularly branches out to other genres such as shooters, playing games such as '*Battlefield 4*' and '*Battlefield 1*'. On PC the participant plays games such as '*Sins of a Solar Empire*' and '*XCOM Enemy: Unknown*'. The participant plays roughly anywhere between 24-30 hours a week on their chosen gaming platform. The participant ranked themselves as a two on the question of "Have you experienced modern Virtual Reality? (Such as HTC Vive or Oculus Rift)" on the Google Docs form.

Participant B

Participant B is a 23-year-old male that primarily plays on PC. The participant plays a wide range of strategy games such as '*Tropico 5*', '*Hearts of Iron 4*', '*Wargame: Red Dragon*' and '*Total War: Warhammer*'. The participant ranked themselves as a one on the question of "Have you experienced modern Virtual Reality? (Such as HTC Vive or Oculus Rift)" on the Google Docs form. The participant plays roughly 15-20 hours a week.

Participant C

Participant C is a 24-year-old male that has played a wide range of strategy games across both PC and console. The participant primarily plays on the console and plays games such a '*Player Unknown Battlegrounds*', they enjoy playing games such as '*Cities Skylines*' and '*Mount and Blade: Warband*'. They average roughly 20 hours+ of gaming each week.

Results and Evaluation

Controller overview

Figure 106. Controller Mockup (Vive, H.T.C. 2015).

The controller will be the primary way of interacting with the game. Figure 106 shows an overview of the controller. These are further explained in the next pages. The controllers are two independent controllers that can operate on their own and with each other.

Recommendations on how to present the environments.

The focus group for this question chose answer E. Answer E was the following "The environment is presented on a table in front of the player at chest height. The edges of the table represent the area of play."

The recommendation for how to present a playable area/ environment is to present it in a table environment. The edges of the table would represent the end of the playable area, thus meaning units could not progress any further. The table would get bigger/ change shape depending upon the playable area. An example of this can be seen in Figure 107.

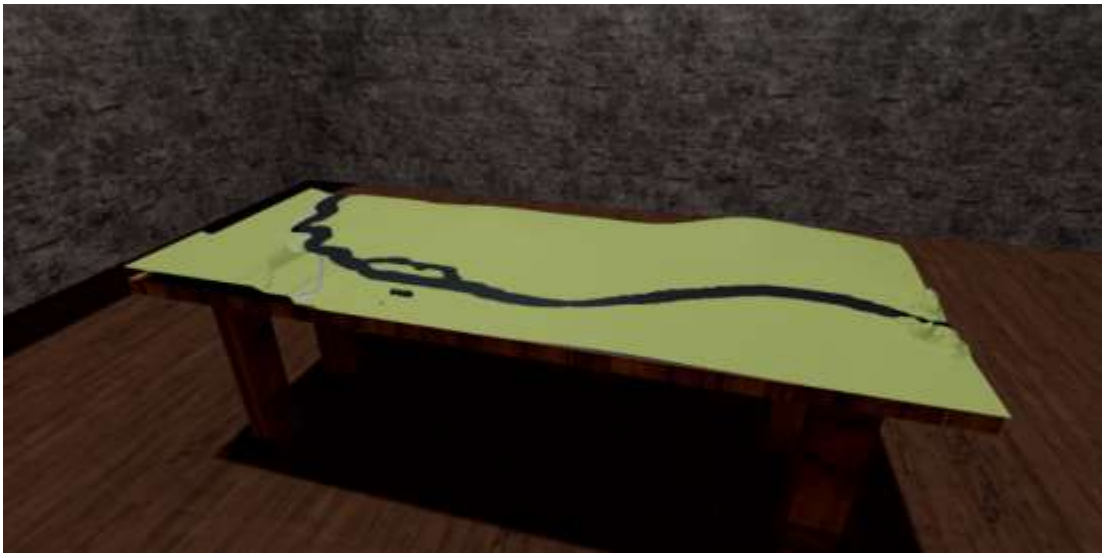


Figure 107. Playspace mockup

The area outside the table (A.K.A. the background) can be designed to the developer's needs, but it is recommended that it is turned into a command room, this is done to further immersion into the game.

Evaluation

The answer to this question is not surprising. During the Autoethnographic, I correctly predicted that this would be the way that the environments would be presented. The environment has been presented on a table is reminiscent of the British World War 2 strategy planning and tabletop games such as '*Warhammer 40K'* and '*Warhammer Fantasy*'. This method of presenting the environment gives many options also if the environment is presented at the player's feet, the player may need to bend down a lot which could eventually hurt them. This answer was chosen because of two reasons, first being immersion bringing in that feeling of being a general or playing tabletop games, the second being one out of health. Other answers such as D had the player in a 360-degree capsule that was displaying the environment, they had potential and could have been an exciting but the focus group described it as "I think that sphere one would be very disconcerting." (Appendix B).

Recommendations on how the player moves around the play space

The focus group for this question had a discussion and decided to create their own answer to this question. The focus group described their answer as a combination of "Minimap, dragging for larger scale, trackpad for minor changes, zoom to cursor".

To move around the environment, the player can use multiple movement techniques; these techniques should all be used in conjunction with each other for efficient navigation. The first is moving and physically walking around the table. The player will be able to walk through the table; this is to allow them to select units that are out of reach.

The second movement method is using the minimap to teleport their location to a new one. On the UI of the game the player will have a minimap (Similar to those already found in Strategy games), if the player points their cursor (explained later) on an area of this minimap and presses the corresponding button, the player will teleport instantly to this new area.

The third movement recommendation is expected to be the primary way of navigating around the play space. The player drags themselves to their cursor; the player points their cursor at a location that they want to go to, press the grip button on the Vive controller and then make a pulling motion with their hand, the player is then pulled towards that location. Here is a video example of my explanation; (https://youtu.be/6NsI6XgzSn8?t=205)
The user pulls themselves using this technique at 3.25. It is expected that the player would use this dragging to make large movements across the map.

The fourth is zooming to cursor and scaling your view on the world. The player points their cursor at a location in the play space then zooms in on it. The further they zoom in, the bigger in scale the play space gets compared to the player, another way of putting this is that the

player gets smaller compared to the world, allowing them to go from almost satellite-like view of the play space, to a more life-like view, where they are the same scale as the environment itself. The next page has 3 mockups of the zoom and scaling in action, note how the scale of the world is changing as the player gets down to ground level. Figure 108 through Figure 110 show mock-ups of this.

Figure 108. Zoom to cursor mock-up (Eugen Systems, 2010)

Figure 109. Zoom to cursor mock-up 2 (Eugen Systems, 2010)

Figure 110. Zoom to cursor mock-up 3 (Eugen Systems, 2010)

Evaluation

The movement answer had multiple parts to it. Parts of the focus group choices are what was expected, '*Google Earth VR*' very clearly influenced the answers. '*Google Earth VR*' has multiple movement techniques, and one of them (the floor dragging) made it into the final recommendations. I believe this is due to how '*Google Earth VR*' gives a satellite view of the battlefield, one that the participants probably felt this was like how modern non-VR RTS games show their environments. The movement system in '*Google Earth VR*' allows players to move across large pieces of terrain with high accuracy rapidly but the group said that they would want additional movement options for "fine-tuned movement" (Appendix B). During the contextual review, the project targeted games such as '*R.U.S.E'. 'R.U.S.E*' was brought up during the focus group with members referencing its camera zoom in the system and how they thought it would be a good system for players to use. Taking the answer into consideration it's interesting to note how certain games and applications such as '*R.U.S.E*' and '*Google Earth VR*' dominated the conversation in the focus group, their movement systems are being combined heavily in this

answer, even though '*R.U.S.E*' was released in 2010, 6 years before the first mainstream VR kit came out.

The Focus Group have possibly conceived a useful movement system; the ability to drag the game for long moves will be easy for new players to pick up, I would expect this to be one of the main ways that players will move around. Though I do worry about its placement on the controller, with '*Google Earth VR*', the player presses the controllers to trigger in to activate this mechanic, from personal usage I have found that the Vive's grip buttons are hard to press in and causes some minor cramp during longer sessions, I have also found external evidence on this, on Reddit VR players have asked are "Vive grip buttons are they uncomfortable", with comments such as "The problem is it takes too much pressure to keep them pressed, and even a slight shift in how you hold the wands will release them." (u/Dal1Dal, 2018). Long play sessions might find users not enjoying them, so this may need to be moved to the trigger for a more enjoyable experience.

The walking movement technique I would expect players to use in small amounts, from watching and observing the interview stage most players never walked around too much even in '*Google Earth VR*', with most players opting to use the in-game movement methods, I would expect this will be the case also with this, though this movement method must be in the project, it's a cornerstone of VR and as such needs to be included even if not used.

I would question how much the minimap would be used for VR, with the focus group answering to question one that they would have a 3D table as the environment, how much would it be needed? If the player can see the entire environment unless zoomed in on default, then why is it needed?

How would the Line of Sight/ Fog of War be presented?

The Focus Group agreed on Answer A for this question. Answer A was the following "Similar to modern RTS games (EG black fog)"

The recommendation for Fog of War is that it should be presented similar to how it is already done in modern strategy games. A black fog or something similar will be present over the play area. Areas that are seen by friendly units are in full colour, areas that are not seen are shrouded in this fog. Figure 111 shows the fog of war in the VR setting, note the far side of the table is greyed out to represent the hidden areas.

Figure 111. Fog of war mock-up (Eugen Systems, 2010)

Evaluation

Only one recommendation came out of the interview stage. This was how Fog of War is currently done in RTS games. Although it would have been beneficial for the project if more

alternatives had been suggested, in this scenario it's something that works well already, so changing it would be a waste of time that can be spent elsewhere. The lack of alternatives may have been due to how defined this is in the genre. Fog of War has been a mechanic in RTS games from the start with games such as the original '*Command and Conquer*' having it back in 1995 and continues to this day, there are some games such as '*R.U.S.E*' that have a variation of Fog of War (The player can see everything in the play area, but the player must still move units near it to identify it) but in some form or another it's still present. Possibly the answer could have been split into minor variations such as the '*R.U.S.E*' example, but the project is trying to make a more generalised answer that can be applied to a wide range of RTS games, not specific ones.

Cursor recommendations

The Focus Group chose Answer A to this question, which followed Google's '*Tilt Brush*' style of laser/cursor.

The recommendation for the cursor is the use of a laser coming out of the end of a controller. The end of the laser is where the cursor will be. Allowing players to select and interact with UI elements. The cursor comes out of both controllers. Figure 112 and Figure 113 show a mock-up of the laser, note its placement on the end of the controller.

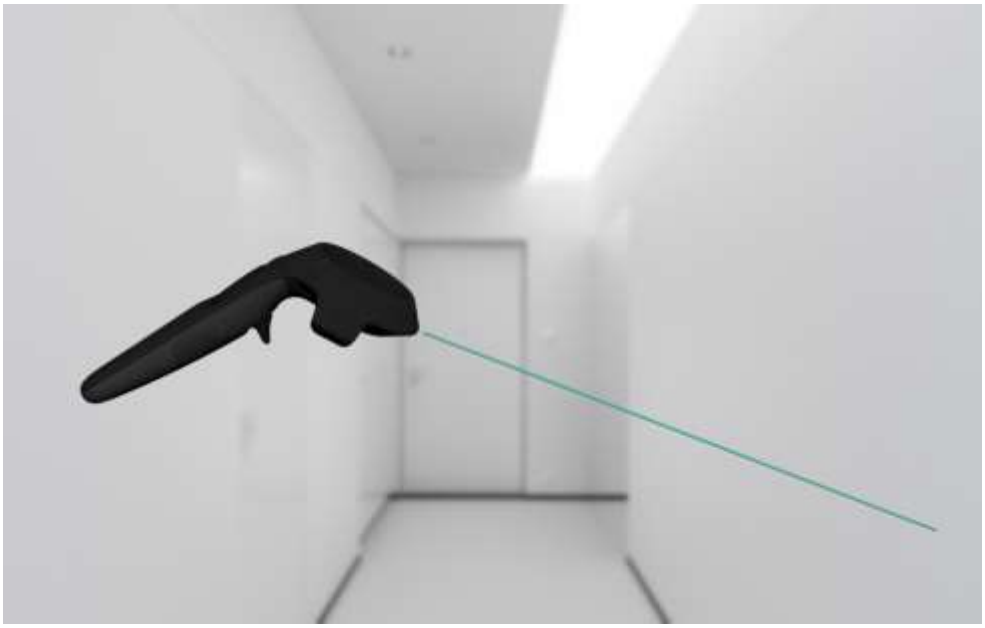


Figure 112. Laser Mockup 1

Figure 113. Laser Mock-Up 2

Evaluation

It was clear that the participants were going to say yes to this question. The participants were not able to come up with a way of not having a cursor. Though it would have been great to

see how a player could interact with a strategy game without a cursor, the use of a cursor is just too critical to the core mechanics of the RTS genre. Even games like '*Tom Clancy's End War*' that included voice commands, still had a cursor as the primary method of selecting and ordering a Unit.

How the actual cursor looks though was correctly predicted by Autoethnographic, this cursor style is influenced by '*Google Earth VR*' and modern-day laser pointers. Using Google's laser pointer though is a good idea as it would have had much development for it already. Users would be able to understand what it is very quickly. The only alternative to this question was a dot in the centre of the screen, this alternative I feel would have gone against what the research found with Non-Diegetic UI (Chapter 1, Section 2), having a dot in the centre of the screen would have been very off-putting for many users and may cause some head strain or nausea as they have to keep trying to move and point in their head in the correct direction with complete accuracy.

Recommendations on how to select a single Unit

The Focus Group for this question had a discussion and decided to create their own answer to this question. The Focus Group described their answer as a combination of a cursor and a UI element.

The recommendation for selecting a single Unit is that the player would point the cursor at that unit and press the trigger. Figure 114 shows the player using the cursor to select a Tank, note that the laser is ending on the Tank.

Figure 114. Single unit select mock-up (Relic entertainment, 2013)

Evaluation

Here the Focus Group is trying to mimic the non-VR RTS games as much as possible. At this point in the questions the Focus Group already have their cursor choice, so this would influence their decision for this question, if the Focus Group was to be done again, the question order could be flipped and ask this question before the cursor question to see the results.

The project was purposely set up to try and avoid answers like this, the project wanted to find answers that are an entirely new way of interacting with an RTS game, but the focus group seem to want to go with what is comfortable, this answer is an example of that.

Recommendations for selecting multiple units

The Focus Group for this question chose answer C. Answer C was the following "Painting tools like those used in '*Halo Wars'*. At the cursor, a circle shape will appear around the cursor, allowing the player to "Paint" the units they wish to select".

The recommendation for the cursor is the use of a painting system. Upon pressing a button on the controller, a paint tool will appear at the end of the cursor. With this the user "paints" over the Units they wish to select. The painting tool is slightly see-through, to allow the user to see still what is below the painted area.

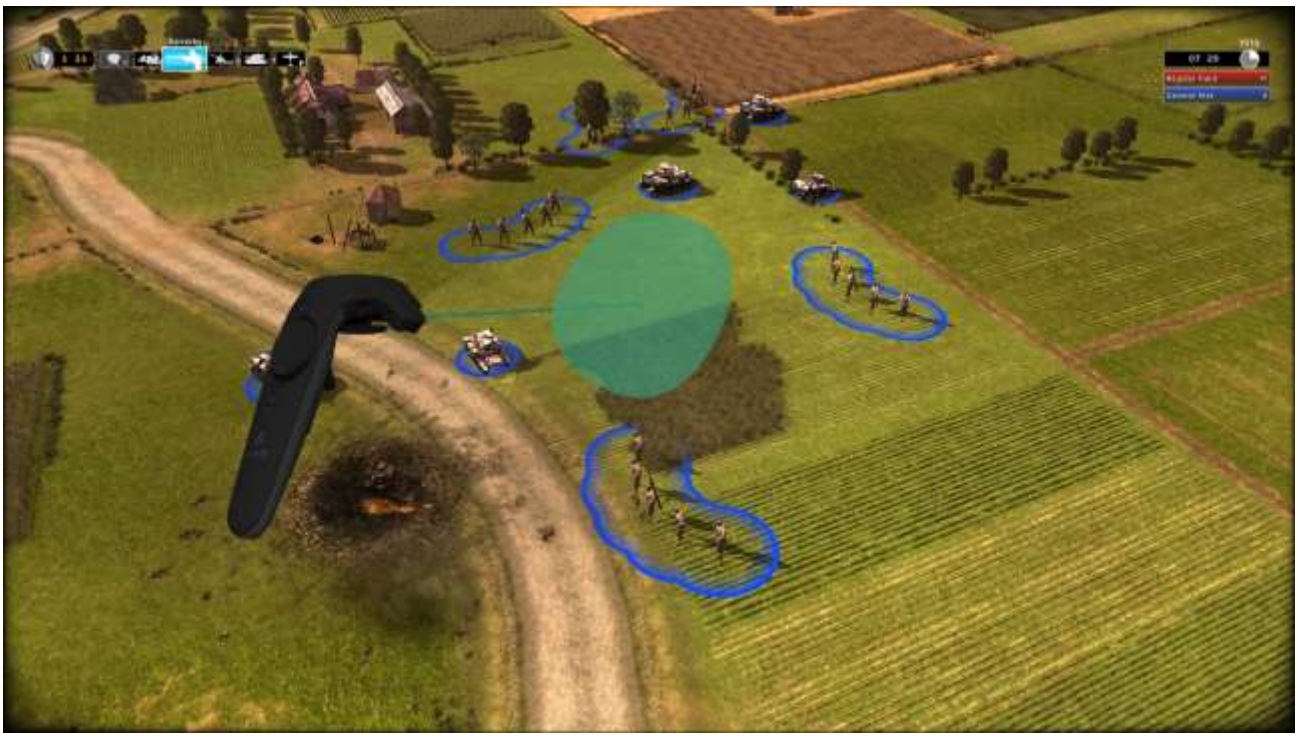


Figure 115. Multiple unit select mock-up (Eugen Systems, 2010)

In addition to this, the player can also use an element on the UI. Allowing them to select the Unit out of a list that is on the UI. Like the keyboard and mouse counterparts, it is recommended that the player can make a control group (A group of Units that all come under one command, allowing them all to be selected by typically pressing a single button on the keyboard).

Evaluation

The Autoethnographic did not correctly predict this answer. The Autoethnographic called for a lasso system where the player would draw a line around the Units that they want to select. Reflecting upon this the Focus Group made a better choice; this system will be faster at selecting than a lasso. It draws influence from console based RTS games, which is interesting because players feel that console is the worst place to play RTS games (See chapter 1), but with the painting system the player can very simply swipe over a unit, and it becomes part of the selection, so it's a suitable method for VR. Although using this method, issues with accuracy could arise especially if there are multiple units close to each other? Other answers such as the free shape/lasso creation could have had potential; the ability to draw an utterly unique shape to select multiple units would have been unique to VR. In reflection I believe that this would have been the better choice as it would have taken full advantage of VR capabilities, but the Focus Group felt that it would be too hard to use, saying that if a player "missed that one over there" (Appendix B) then it could be really hard for the player to then redraw the selection to get the missed unit, a valid point that in the creation of the Autoethnographic the author missed.

Recommendations on ordering a unit/s to move?

The Focus Group for this question had a discussion and decided to create their own answer to this question. The Focus Group described their answer as a combination of answers B and F.

The recommendations for ordering a Unit to a new location the player has multiple options. First, each scenario listed requires the Unit to be already selected and it is recommended that the player will use these different methods depending on the situation in the game. The first

is to point the cursor at a location and press the trigger in. It is expected that the player would use this method when they are in a hurry to get a Unit moving. With this method the Unit will auto path find a route to the new location; this is similar to the current method employed by modern RTS games. The player will also be able to interact with the UI to give a different version of the order. For example, instead of merely just moving to the new location, the player could give the Unit the order to 'Attack' move instead ('Attack' move is the process where the Unit will move forward and physically stop to attack all Units along the way). This is done before the order is given. Another example of a variation is to make the Unit reverse to a location instead.

The second method is to draw the route the Unit will take, the player presses the trigger and holds it, they then proceed to draw the path that they wish the Unit to take, allowing the player to make the Unit take a possible better path, although this takes longer than the auto-path method it gives the player more precise commands, allowing them, for example, to make a unit move around a building in a certain way. Like the previous method, the player can interact with the UI beforehand and make a variation to the move order.

Evaluation

I feel that this recommendation tried to stay close to non-VR games methods as possible. While the pointing and clicking method is quick and efficient. The second method where the player can draw the line is a good use of VR capabilities. Auto-pathing can sometimes be unreliable, and this is where manually drawing a line can be useful, but would it be useful in a fast-paced game? It would probably take too much time to draw lines all the time, so a combination of the both was agreed upon by the Focus Group.

Recommendations on ordering a Unit to attack?

Again, Answer A was the Focus Groups choice. Answer A was; “Point cursor at an enemy unit and press trigger.”

To order a Unit to attack, the recommendation is that with the attacking Units selected, the player points the cursor at the enemy unit and presses the trigger in. The colour of the laser would change colour to represent an attack order being made.

Evaluation

Here, I find that the Focus Group is trying to mimic the non-VR RTS games as much as possible. This suggestion though did not need any changing. This method has been tried and tested over many strategy games, so it is no surprise that this was their answer. The Focus Group discussed other options, answer B was discussed, but one member said that physically touching the unit was “the worst” out of the possible choices. Due to this question following the movement question it could have influenced the Group’s answers. In the future, the question order could be changed to put a gap between this question and the movement one, this might not influence the answer as much because some time has passed, but at the same time traditional RTS games have got a very similar system, same button click but it contextualises to what the player has the cursor on.

UI recommendations

The Focus Group for this question, chose answer A. “Google’s ‘*Tilt Brush*’ style, allowing the player to swipe through different sides of the UI. The Player brings up the UI by pressing the corresponding button”.

The suggestion for the UI is that it is inspired by the UI from Google’s ‘*Tilt Brush’*. The UI has multiple different sides to it. Each side rotates to show different information. One of the sides should be the minimap for ease of player movement. The UI is contextual to what is currently selected, for example, selecting a Unit will make the UI display that Unit’s stats (Health, etc.).

Figure 116. UI Mockup

Evaluation

Strategy games rely upon their UI. As this is how players execute many their orders in traditional strategy games, this was the best option for the Focus Group, the UI for Google's '*Tilt Brush*' is well made. It also has much development already behind it, so it makes sense to take inspiration from this.

This decision was made very quickly by the Focus Group; the other options were almost forgotten about; the main discussion was about whether the UI should all always be visible or does the player have to press a button to see it. There was some discussion about whether to go with the clipboard approach that was raised by one member, but this was quickly disagreed with.

Again, the Google's '*Tilt Brush'* approach dominated the conversation, it is interesting that this keeps happening, in reflection this was the choice I went within the Autoethnographic and I agree that this is the best UI that game could use. Examining UI in current use such as the one in '*Airmech: Command*', one of its issues is the lack of a consistently placed UI. Traditional RTS games have a UI that rarely moves and is commonly found at the bottom of the screen, with this not being possible due to the issues with Non-Diegetic UI in RTS games, I think the Focus Group made an excellent choice that combines and overcomes the issues that could arise. A UI that is always in one place (but only when the player chooses to see it) and one that is not in the players face making them feel motion sickness.

How would a player interact with the UI?

The Focus Group found once again, that Answer A was most comfortable, to stick with Google's '*Tilt Brush'* style of dual controller usage, with one controller displaying the menu, and the other being used for navigation.

Using one controller as a cursor, the other for the UI display, the player uses both controllers to navigate through the UI successfully. Using the trackpad on the receiving controller, the player can swipe through the various pages of the UI, swiping left and right as the player needs. Using the cursor, the player can select UI elements on those pages, allowing the player to, for example, build a new Unit.

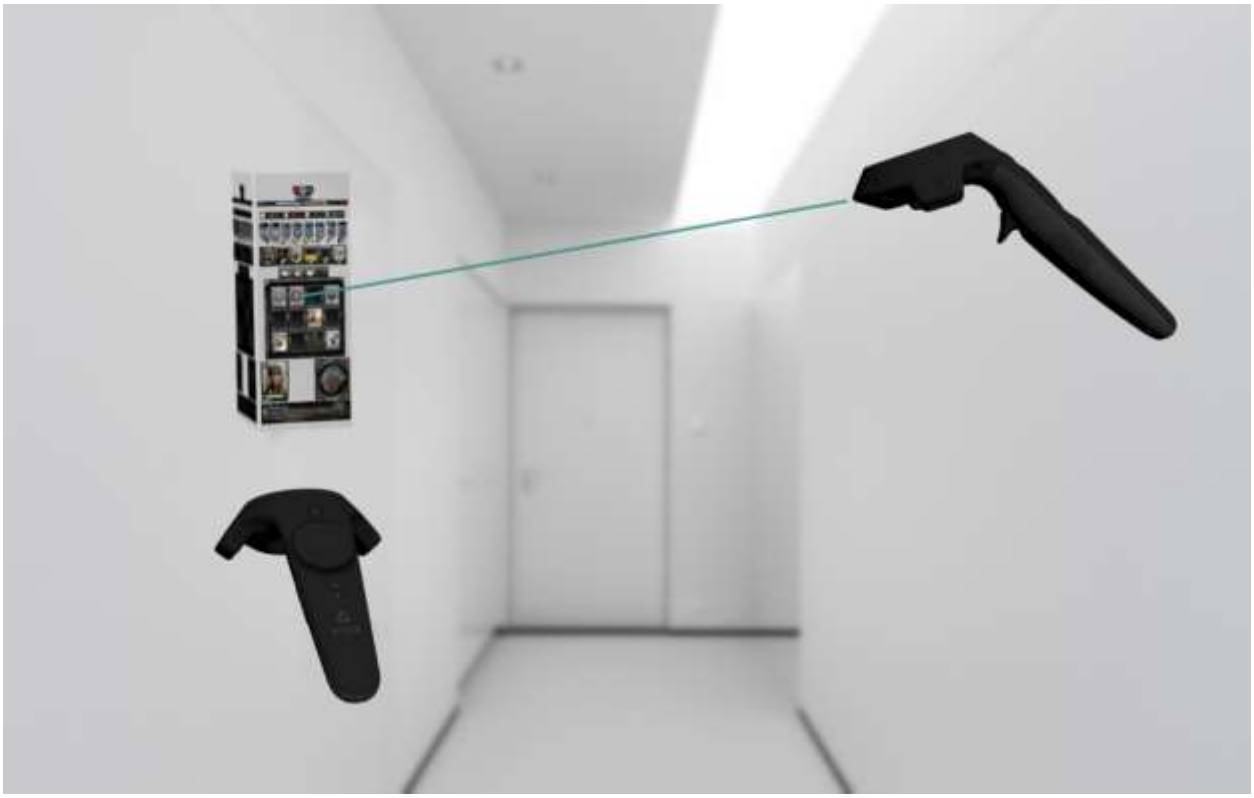


Figure 117. Interacting with UI mockup

Evaluation

This answer was expected, due to how the previous question was answered, this is an issue but one I cannot see an avoidance too, the Focus Group was heavily influenced here by their previous answer and the gameplay experience they had. In future, I could split up the questions so this question is asked at another point, but an issue with this is that the participants may forget what they wanted to say if this change were to be implemented.

Recommendations on building a Unit

For this section, the Focus group chose the option of; "The player selects a building then they use the main UI to make changes to that building. Allowing the player to build a Unit of their choice."

To build a Unit the player selects the building they wish to build from. Once this is done the UI automatically opens and switches to the building; at that point the player can interact with UI and build the Units that they wish.

Evaluation

Again, the Focus Group is trying to stick to what they know with the non-VR RTS games as much as possible. In addition to the UI, it will be interesting to see how game developers use this information when deploying the Units. Games such as '*Wargame*' have the player deploy the Unit to where they want, so when it is built, it automatically moves itself to that location. With VR the player could have it, so they build a Unit and then do something like that of '*Wargame*', having to drop the unit where they want it to build to.

How would a player know what Unit is currently have selected?

For this question, the Focus Group interestingly decided to create their own answer. A combination of "B+C+E with D as an option".

The recommendation for knowing what Unit is currently selected has multiple parts to it, like current modern RTS games. A designer should consider using all the following in conjunction with each other.

The first is that the units that are selected have a small portrait hovering above the selected units. Around the bottom of the Unit would be a highlight. This can be found on current non-RTS games such as '*Command and Conquer'* and '*Company of Heroes'*.

The second suggestion is having something on the main UI that tells the player.

The third suggestion has the option to jump to the selected unit via a button press or UI element. This could be done by having the player click on the UI element mentioned earlier.

Evaluation

Again, the Focus Group is sticking with what they know with Non-VR RTS games, most-likely because it is so effective. One of the issues that could arise with having a small portrait above the unit that is selected is it could be hard for players to identify what unit they have selected, if there are lots of Units together. The portraits could overlap and cover units below them.

How would a player order a Unit to use a special ability?

The Focus Group felt that to order a ‘Special Ability’ when a Unit is selected, the UI should change accordingly and the player would then interact with the main UI to order any ‘Special Abilities’, this fell closest to Answer B

Evaluation

This is very similar to the methods we see in existing Non-VR RTS games. Using the UI to order Abilities is one of the better ways of executing this mechanic, that way other areas in the player's vision are not blocked or cluttered, though one of the issues that could arise is that it could be slow to execute.

How would a player see the victory progression?

The Focus Group for this question had a discussion and decided to create their own answer to this question. This was described as a combination of “G + Bar for victory next to game area + F, victory could be on UI but only when nothing is selected + E.”

The recommendations for showing progress towards victory are the following. The first is via audio. The player receives updates via audio telling them the information they need.

The second is in its UI. If the player has nothing selected, then there is a very minimal UI designed to show just the critical information. (this also links in with the question, how does a player see time/date/season details). This smaller UI is designed not to intrude the player's view area.

The third is a hand gesture. The player roles their hand on to its back and a new UI will be visible that is different from the main UI.

Additional note from this was that the pop alerts (that was an option for this question), should be used to show messages that are no victory progression, such as if your Units are under attack.

Evaluation

We see the Focus Group sticking to what they're comfortable with in Non-VR RTS games, using the UI to see progression is one of the better ways of executing this mechanic, that way other areas in the players vision are not blocked or cluttered. A issue that may arise with this approach is that it takes time to see, rather than in exiting RTS games where the UI is there at a glance.

How would a player see time/date/ season details?

The Group members again decided to create their own solution to this question, the best way to describe it would be, "Similar to the way you would see the Victory conditions."

Evaluation

As with non-VR RTS games, the Focus Group once again chose to use UI to see these details. As it is possibly the best way to execute this mechanic, as the more vital areas would not be obscured when needed. Although an issue could be again that it is time consuming rather than being seen at a glance.

Chapter Four- Project Conclusion

VR Controllers and Their Impact on the Strategy Game Genre

This project found that VR can have an impact upon the Strategy Game Genre, using VR controls such as the ones found on the HTC Vive. Not only does it have an impact, but it also found that this impact is a positive one. Through the Focus Group and the interviews, participants who had never played or had little previous VR experience, frequently said how excited they were for VR and its possibilities. They frequently spoke about how immersive it was and searching online for reviews of VR products; it's a talking point that comes up multiple times, writing about 'G*oogle Earth'* Daniel Terdiman (2016) said that he "as immersed in a demo" of '*Google Earth'*. Multiple pieces of media over recent years have imagined a VR like command structure, with a commander using something similar to what this project suggests, (For example '*Tom Clancy's EndWar'* "https://www.youtube.com/watch?v=CyYNBYedzqw). Taking inspiration from the project and pieces of media, VR for Strategy games could become a new way to play the genre in the future. Not only because the control schemes could be fun and immersive to use, but it could also allow for a situational awareness greater than their mouse and keyboard counterparts, adding much variety to the genre of strategy games.

Could VR become the new way to play strategy games in general? Personally, the author believes that it could, but not right now. VR technology itself needs further development to allow for large scale battles to take place and better body is tracking to enable the player to interact with VR in more creative ways. Once VR goes through further iterations/generations, it could become a way for players in the future to play the Strategy game genre.

The recommendations made by this project are useful ones but they need further development (See next section for further explanation), but they are a template or a foundation of a control scheme for a strategy game in VR. The main recommendation was the UI, several of the answers were based around it and a lot of exciting recommendations were found during the interview stage, the majority of the time Google's '*Tilt Brush*' style UI was the most agreed upon answer and although it is not an original answer, the research found that it was the best and the author agrees.

Results analysis

The exciting part of the results was comparing the results of the project, the Autoethnographic and current VR applications to each other. Projects such as Google's '*Tilt Brush'* had a large team and development behind them and, yet this project was able to correctly predict some of the answers that the Focus Group would choose. Some answers though are more obvious than others, specifically the use of Google's '*Tilt Brush*' UI. Considering how user-friendly and advanced the UI is, makes it a clear choice for participants to choose. Most of the answers had some Google's '*Tilt Brush*' design influence,

It would be interesting to do the Focus Group again but not introduce Google's '*Tilt Brush*' to the VR experience, seeing if anything similar would be mentioned, and if not, what option would be considered the most viable option.

It is interesting that the answers always seemed to try and keep as close to how current RTS games do certain elements. An example of this is the cursor when asking the questions about the cursor the participants were purposely asked, "Does the player need a cursor", this was done to try and bring out more creative answers. Though ultimately it did not affect the outcome

of the project, the author wished it had, allowing for answers that did not merely re-organise data or how we see something, but are entirely new and take full advantage of VR.

What was Learned?

The outcome of this project says that VR can impact the traditional Strategy game genre, but in what way? Immersion, I believe is the biggest one, VR controls and technology in their current state cannot compete with mouse and keyboard. A player can execute commands at a rapid pace on mouse and keyboard, a rate that VR can't currently keep up with, but maybe VR shouldn't be trying to replace mouse and keyboard, maybe it should try to exist alongside it, slower inputs but more immersion, being a commander on a VR battlefield would be incredibly enjoyable, it would be similar to playing the game '*War*' as a child, but instead of moving around green and tan plastic army men, players would be immersed in a full living and breathing battlefield. The main issue though is that current attempts at this have led to an RTS 'lite' approach, fewer mechanics, fewer inputs for the player to deal with, '*Airmech: Command*' and '*Out of Ammo'* are a key example of this. VR controls will not be fully taken seriously until a complex VR RTS game is made, one along the line of '*Wargame: Red Dragon'* or *'Company of Heroes 2'*. The VR system and its control scheme for RTS games, but they both need the right complex VR Strategy game to prove it.

What Potential Impact Could This Have on Industry

This project could have an impact on the industry, with VR games becoming more mainstream, it may one day become the standard way of playing a game, though this idea may be far in the future more recent releases of new hardware and games have proven that VR is here to

stay. The control scheme designed could affect the RTS VR genre and possibly the broader industry, many games take inspiration from each other daily, the proposed VR control scheme designed could affect other sub-genres of the Strategy game genre such as City Builders, '*Cities Skylines'* in VR could one day be a reality, using the UI designed by the research they could have players building their cities. With influences from apps like '*Google Earth'*, this project could also influence other non-game applications, users could use the control schemes for planning building sites, with a virtual mock-up of the building site on the 3D space, users could quickly pull premade assets off the UI and place them, helping the user to create and visualise what they are making.

Future development

The suggestions for this project have come from interviews and a Focus Group, but they need further research, with the end goal of the development of a strategy game for VR, the project would benefit with creating multiple small prototypes, such as a VR table or a wall chart to help further test the recommendations. As a test for further development, a developer could mod a game such as '*Company of Heroes'* or a similar Strategy game that could allow it. This way it can use as a starting point and allow players to compare between the VR and non-VR controls. This would allow the developers to rapidly iterate and change based on feedback.

Applications such as Google's '*Tilt Brush*' have a large company behind them, and as such would have had an extensive research and development team. It would be interesting to see how a large company could develop these ideas. Allowing them to take these recommendations and bring them into development, testing them with a live build where they can iterate upon each success.

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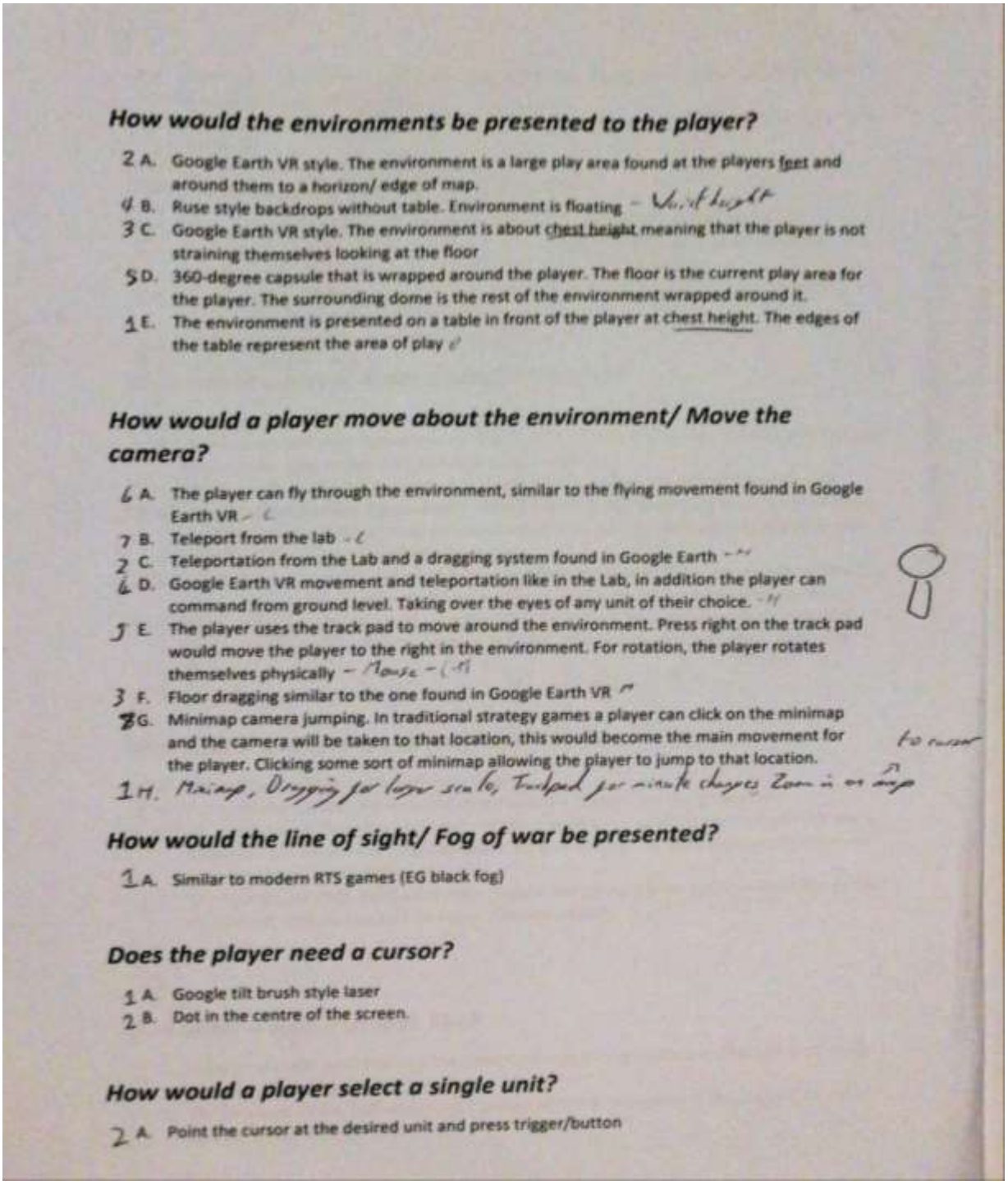
Appendices

Appendix A: Focus Group Answer Sheet Scans



How would the environments be presented to the player?

2 A. Google Earth VR style. The environment is a large play area found at the players feet and around them to a horizon/ edge of map.
4 B. Ruse style backdrops without table. Environment is floating – Mid height
3 C. Google Earth VR style. The environment is about chest height meaning that the player is not straining themselves looking at the floor
5 D. 360-degree capsule that is wrapped around the player. The floor is the current play area for the player. The surrounding dome is the rest of the environment wrapped around it.
1 E. The environment is presented on a table in front of the player at chest height. The edges of the table represent the area of play

How would a player move about the environment/ Move the camera?

6 A. The player can fly through the environment, similar to the flying movement found in Google Earth VR
7 B. Teleport from the lab
2 C. Teleportation from the Lab and a dragging system found in Google Earth
6 D. Google Earth VR movement and teleportation like in the Lab, in addition the player can command from ground level. Taking over the eyes of any unit of their choice.
5 E. The player uses the track pad to move around the environment. Press right on the track pad would move the player to the right in the environment. For rotation, the player rotates themselves physically – Mouse – (R)
3 F. Floor dragging similar to the one found in Google Earth VR
8 G. Minimap camera jumping. In traditional strategy games a player can click on the minimap and the camera will be taken to that location, this would become the main movement for the player. Clicking some sort of minimap allowing the player to jump to that location.
1 H. Minimap, Dragging for large scale, Trackpad for minute changes, Zoom in on map

How would the line of sight/ Fog of war be presented?

1 A. Similar to modern RTS games (EG black fog)

Does the player need a cursor?

1 A. Google tilt brush style laser
2 B. Dot in the centre of the screen.

How would a player select a single unit?

2 A. Point the cursor at the desired unit and press trigger/button

4 B. Player can use both the cursor and voice commands. Player points cursor at the unit and then gives commands via voice

3 C. A UI element has a list of all units the player owns in the play area. Allowing them to select of this list

1 10. Cursor and UI list option

How would a player select multiple units?

3 A. Draw a free shape around the desired units. This shape can be any shape or size

5 B. A square appears between the two controllers, pulling the controllers apart makes the square bigger. Place the square over the units and they are selected

1 C. Painting tools similar to Halo wars. At the cursor, a circle shape will appear around the cursor, allowing the player to "Paint" the units they wish to select.

3=>4 for Tom

2 D. Drag box out. Like how current strategy games do it

4 E. Vision based box

How would a player order a unit/s to move?

2 A. Put cursor on location and press trigger

4 B. Point cursor and click. Before the order is given the player is given the chance to change the move order type, to one such as attack move or retreat.

6 C. Put controller on to the location and press button. The actual controller not the cursor.

5 & D. Arced line comes from the controller. Where it lands in the position they will go (This line is different from the cursor) must be activated via button press. Meaning that selection and ordering a unit to move are different buttons.

7 E. Point cursor at location and press button. In addition, the map has a grid over the entire play area. Once a unit has been selected the player can verbally say go to this grid reference

3 F. Draw a line from the unit to the location allowing for precise movement, in addition the player can also point cursor at location and click, the unit will auto path their way to the location

1 4. Combo of F and B but with order before the move.

How would a player order a unit to attack?

1 A. Point cursor at enemy unit and press trigger

4 B. Put controller on top of enemy unit and pressing a button. Not using the cursor

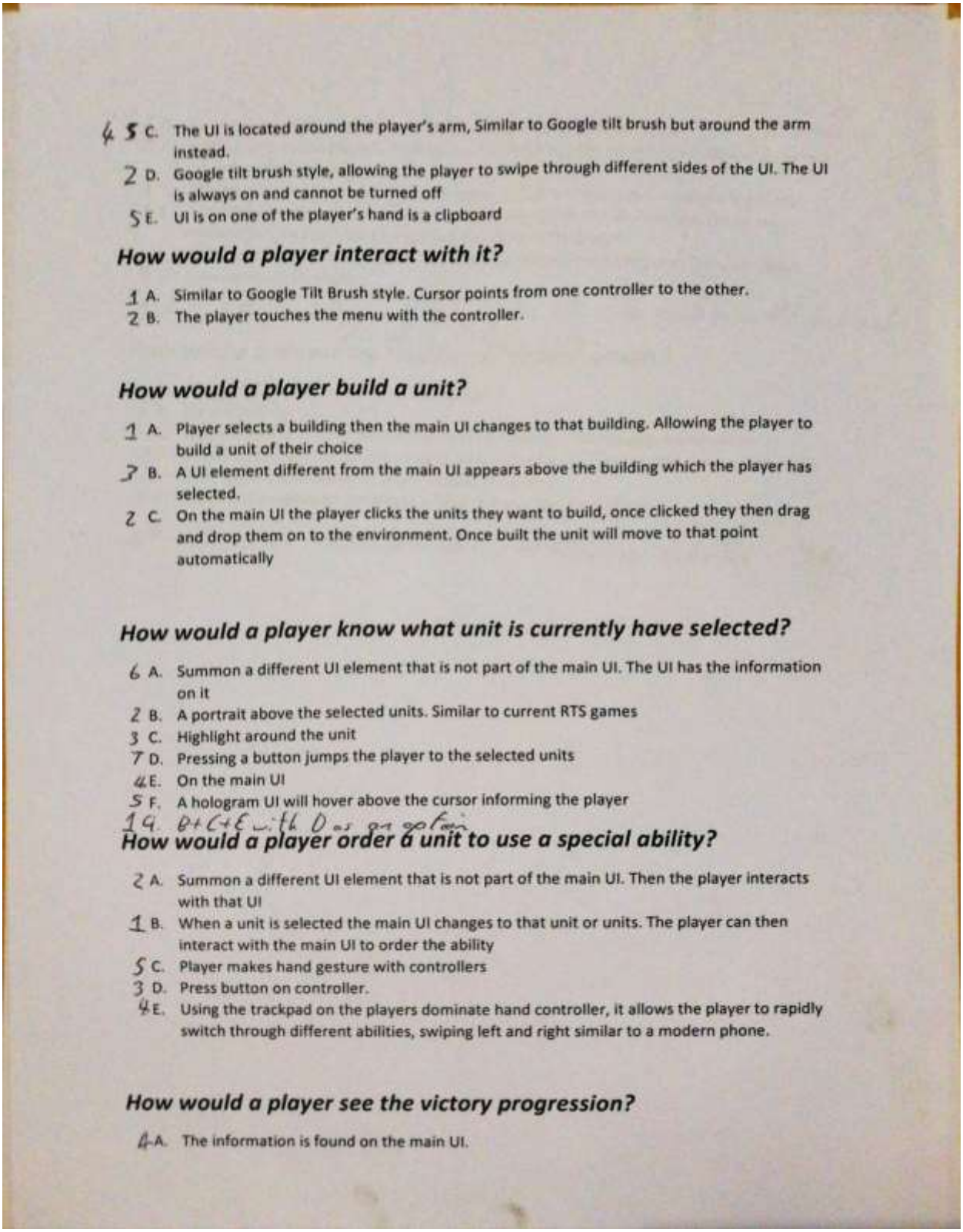
3 C. Arced line comes from the controller. Where it lands in the position they will go (This line is different from the cursor) Has to be activated via button press. Meaning that selection and ordering an attack are different buttons.

2 D. Point cursor and click. Before the order is given the player is given the chance to change the move order type, to one such as attack move or retreat.

If so what would a UI look like?

1 A. Google tilt brush style, allowing the player to swipe through different sides of the UI. Player summons the UI by pressing button

3 B. The UI is summoned and appears as a square hovering to the side of the player (The side is decided by the player).



4 5 C. The UI is located around the player's arm, Similar to Google tilt brush but around the arm instead.

2 D. Google tilt brush style, allowing the player to swipe through different sides of the UI. The UI is always on and cannot be turned off

5 E. UI is on one of the player's hand is a clipboard

How would a player interact with it?

1 A. Similar to Google Tilt Brush style. Cursor points from one controller to the other.

2 B. The player touches the menu with the controller.

How would a player build a unit?

1 A. Player selects a building then the main UI changes to that building. Allowing the player to build a unit of their choice

3 B. A UI element different from the main UI appears above the building which the player has selected.

2 C. On the main UI the player clicks the units they want to build, once clicked they then drag and drop them on to the environment. Once built the unit will move to that point automatically

How would a player know what unit is currently have selected?

6 A. Summon a different UI element that is not part of the main UI. The UI has the information on it

2 B. A portrait above the selected units. Similar to current RTS games

3 C. Highlight around the unit

7 D. Pressing a button jumps the player to the selected units

4 E. On the main UI

5 F. A hologram UI will hover above the cursor informing the player

19. B+C+E with D as an option

How would a player order a unit to use a special ability?

2 A. Summon a different UI element that is not part of the main UI. Then the player interacts with that UI

1 B. When a unit is selected the main UI changes to that unit or units. The player can then interact with the main UI to order the ability

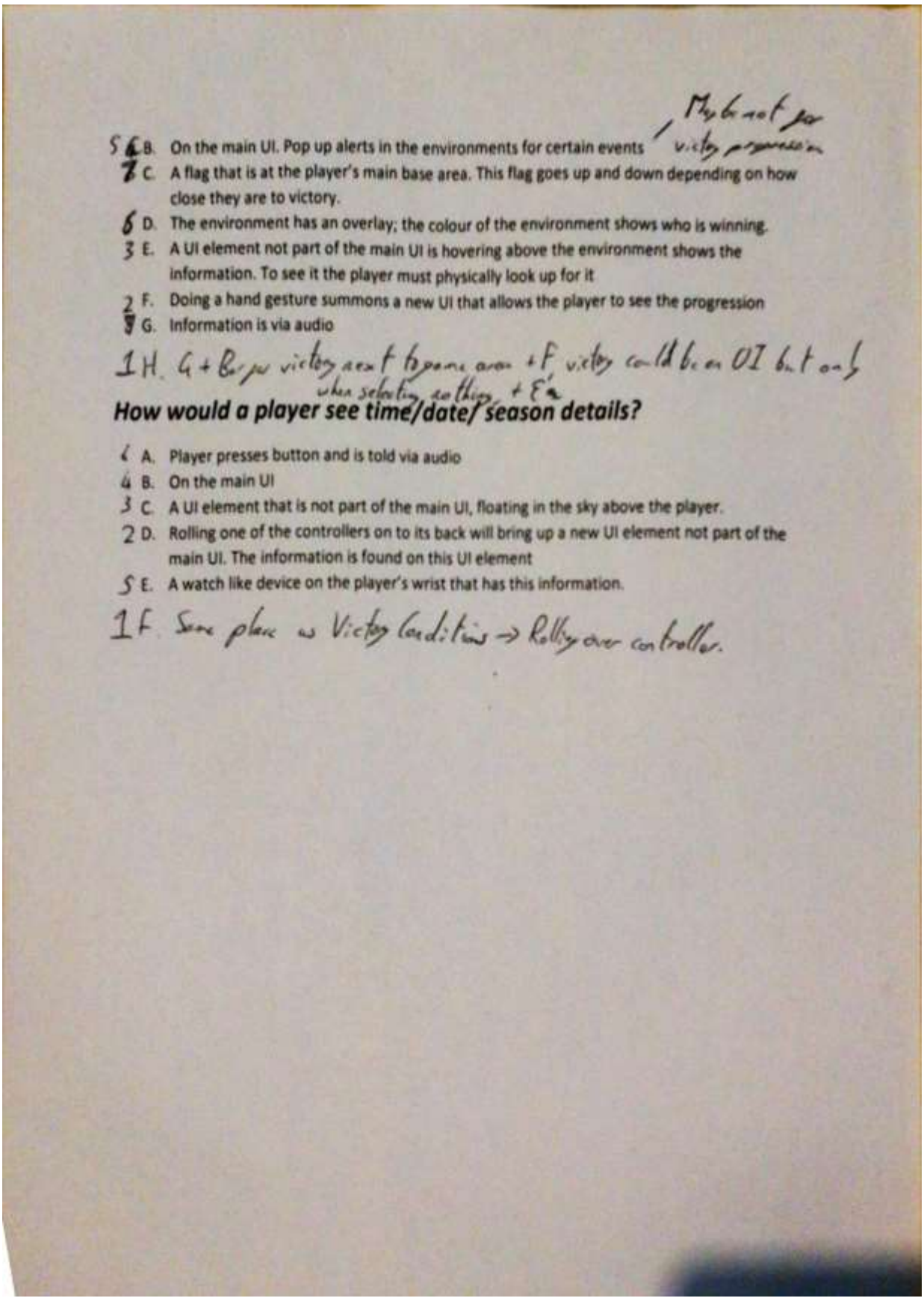
5 C. Player makes hand gesture with controllers

3 D. Press button on controller.

4 E. Using the trackpad on the players dominate hand controller, it allows the player to rapidly switch through different abilities, swiping left and right similar to a modern phone.

How would a player see the victory progression?

4 A. The information is found on the main UI.



5 6 B. On the main UI. Pop up alerts in the environments for certain events / May be not for victory progression

7 C. A flag that is at the player's main base area. This flag goes up and down depending on how close they are to victory.

6 D. The environment has an overlay; the colour of the environment shows who is winning.

3 E. A UI element not part of the main UI is hovering above the environment shows the information. To see it the player must physically look up for it

2 F. Doing a hand gesture summons a new UI that allows the player to see the progression

9 G. Information is via audio

1 H. G + B as victory won't happen often + F victory could be on UI but only when selecting anything + E's

How would a player see time/date/ season details?

6 A. Player presses button and is told via audio

4 B. On the main UI

3 C. A UI element that is not part of the main UI, floating in the sky above the player.

2 D. Rolling one of the controllers on to its back will bring up a new UI element not part of the main UI. The information is found on this UI element

5 E. A watch like device on the player's wrist that has this information.

1 F. Same place as Victory Conditions → Rolling over controller.

Appendix B: Focus Group Transcript Part 1

S1 Focus group leader

S2 Unidentified male

S3 Unidentified male

S4 Unidentified male

Timecode	Speaker	Transcript
00:00:01	S1	Yeah. Focus group will do. So…
00:00:04	S2	Feels like we're doing a podcast.
00:00:05	S1	…everyone already knows all the questions (sic) 'cause you've already done them all and you've already seen them all. So we're just gonna go through them. What happened this (sic) is I'm gonna read out some more…I'm gonna…I'll tell you the question, tell you some of the answers that I've got during the interviews and then you guys can then actually then discuss your own idea and that…your own idea can be a combination of anything, really. So in the end you can actually instead of choosing one of the ideas written down, if you want you can make your own idea and if you think that's all better rule then you can go with that idea if instead (sic) so…bit of free frow (sic)…free flow and you can do **whatever you want.** Okay. So question one is how would the environment be presented to the player? The first one is just Google Earth VR. You all played it, I believe and, you know, it looks like with the ground on the floor. So essentially instead of Google Earth at the bottom of your feet, it would be the actual play space, you know, Command & Conquer or whatever at your feet. Number two is a **R.U.S.E.** style, but there's no table. The environment is kind of just like floating at sorta waist sort of height. The third one is another Google Earth style where the environment is about chest height instead. So, you know, Google Earth when you're playing it, you're actually standing on the environment. This one is…the actual environment is about chest height again. The next one is a 360-degree capsule that is wrapped around the player. So the environment, the actual play space…like, imagine if you're playing this on a 2D monitor. Obviously the environment's bigger than the actual screen space, but in this one the floor space immediately around you is the play space and then the rest of the environment is wrapped around you in a big 360…
00:01:45	S2	Like Inception?
00:01:48	S1	Yes, I guess?
00:01:49	S3	Yeah.
00:01:50	S4	Yeah, yeah. So you're in a bu…you're in a bubble.
00:01:51	S1	You're in…
00:01:52	S4	And the map is around…
00:01:54	S1	Yeah, and the map wraps around you and then…
00:01:57	S2	So like a Halo?
00:01:59	S1	But like…and then to move onto the actual play space…so, you know, if you wanna move the actual play space around, you kind of…kinda jumping ahead to the next question a little, but you kinda like drag the play space down.
00:02:09	S2	Yeah.
00:02:10	S3	Okay. Okay.

00:02:11	S1	Well, you don't drag. Sorry. You like point and click. That was it. You point and click at it and then it'll change the floor space to be that area that you've put…clicked to.
00:02:17	S2	Okay.
00:02:17	S1	And the next one is for the people that have played R.U.S.E. which is just a table in front of you and the environment is on the table.
00:02:24	S2	So the only difference between B and E is that one's at chest…
00:02:26	S1	One's…
00:02:27	S2	…and one's at waist?
00:02:29	S1	B and E, did you say?
00:02:29	S4	At the…
00:02:30	S1	Sorry.
00:02:30	S2	Yeah.
00:02:30	S4	At E it would be physically represented out…
00:02:32	S1	Yeah, it's physically represented…
00:02:33	S4	…like you're in a war room.
00:02:34	S1	…as a table, like…
00:02:35	S2	Okay.
00:02:35	S1	…on a war room sorta scenario. That one's E. Sorry. And then B is just kind of…it has the backdrops, but there's no table, essentially.
00:02:42	S2	Okay.
00:02:46	S1	Okay? Well, discuss, discuss.
00:02:50	S2	What do you think, Tom?
00:02:51	S3	I think that sphere one would be very disconcerting.
00:02:53	S4	Yeah, it'd be quite disorienting.
00:02:54	S3	It'd be…yeah. And also that'd be really nauseous as well, I think.
00:02:58	S2	I think it would be too difficult to…if…
00:02:58	S3	Especially if you think of a Command & Conquer of like pace game.
00:03:02	S2	Yeah.
00:03:03	S3	You gonna be constantly all over the place.
00:03:05	S4	But if you're trying to think like okay I'm in the middle. I need to go to the top left and you've got to like look around you in the entire thing. If it's a flat board, it's not necessarily continuous that bit and that bit wouldn't necessarily continue straight on. So you gotta like try and find where it is and drag yourself into it. It can be a bit…
00:03:23	S2	Yeah. I think it'd be too…if you're trying to find…a unit on the other side of the map. You don't wanna be looking up.
00:03:30	S4	And behind you.
00:03:31	S2	And like trying…
00:03:31	S4	Like…no, no.
00:03:33	S1	Just a note; you've already done it, but essentially you rate these one to four and then like I said if you add…
00:03:38	S2	Five.

00:03:38	S3	Okay.
00:03:38	S1	…[inaudible 00:03:38] at the end…
00:03:39	S3	One to five. Okay.
00:03:40	S1	Or you know how many there is.
00:03:41	S3	Yeah.
00:03:41	S1	If there's two options, it'd be one to two.
00:03:43	S3	So if I'm the [inaudible 00:03:43].
00:03:44	S1	Yeah, but if you generate your own idea, just write participant's idea underneath and top…that at the top.
00:03:49	S2	Okay.
00:03:49	S1	Or focus group's idea, but yeah, we'll have number one as the best.
00:03:52	S3	Okay.
00:03:53	S2	So if we…so we're gonna say just before discussing the rest do we think that's definitely a bad idea?
00:03:58	S3	I think that's…
00:03:59	S4	That's my fourth.
00:03:59	S3	I think that's the worst. That's the worst one, in my opinion.
00:04:01	S2	Okay. Yeah. I agree. So our other options are R.U.S.E. at chest height, R.U.S.E. without like the table with just the…
00:04:09	S3	I think…
00:04:10	S2	…environment, the waist height.
00:04:10	S3	I think having played the lab which I thought my personal one and the other one was the one where you've got the table in front of you and you got the ar…the arc thing.
00:04:18	S2	Yeah.
00:04:19	S3	That was where you got the table around…you had the whole screens up and yeah, you simulate a room. I think that sort of style will be best, in my opinion.
00:04:26	S2	Yeah.
00:04:26	S3	'Cause you…yeah, it gives you the atmosphere of, you know, playing it and you can have like…you'll…like you've had the board. I think one of the mentions…one of the mentions when we're discussing it was, you know, understanding of time and battle points and that sort of thing. If you, in a room, you could have that on the wall. So you just always know that okay, if I look over my right shoulder, I can see the battle time going down, that sort of thing. And it's just…it's, rather than just hovering in the air like as you would in like a normal game, I think. It's just there.
00:04:51	S2	I think information like that should always be visible without you having to turn, though.
00:04:57	S3	Yeah.
00:04:57	S2	Because it would get frustrating to have to keep turning around to look for stuff.
00:05:00	S4	But it'd be…you can make the screen clustered if you've got it on the screen 'cause you've got to have it somewhere where it's not a fixed point to stop it.
00:05:06	S1	Well…
00:05:07	S2	Yeah.
00:05:07	S1	Just to jump in, that all comes with the UI stuff.

00:05:09	S3	Okay.
00:05:10	S1	…[inaudible 00:05:10] of course.
00:05:10	S3	We'll leave that…we'll leave that.
00:05:11	S1	Obviously, if it's a point you want to discuss, that's fair enough, but…
00:05:14	S2	Well, I mean, like I'm not saying it should always be fixed in your vision. It should just be fixed in the room somewhere where it's gonna be.
00:05:19	S3	One thing…
00:05:20	S2	Within sight.
00:05:21	S3	One thing I did…[inaudible 00:05:21]. What was the painting when I came over here named trim brush?
00:05:24	S1	Tilt brush.
00:05:24	S3	Tilt brush.
00:05:24	S1	Trim brush?
00:05:26	S3	Where you have the one controller was like a notepad to work off of.
00:05:30	S2	Yeah.
00:05:30	S3	Was like an artist pallet. That was quite good 'cause then you could…
00:05:32	S2	Yeah.
00:05:32	S3	…interact with the other controller on that. That'd be a good way of…that was…the…my [inaudible 00:05:36] thinking of that like calling in…and this is probably moving ahead 'cause I've already done the questions, but calling units was easier on that, with that sort of style.
00:05:42	S2	Yeah.
00:05:43	S3	But you wouldn't want that clustered with any other thing.
00:05:47	S2	Okay. But…
00:05:48	S3	Okay.
00:05:48	S1	Stay on point.
00:05:49	S3	Stay on topic. Stay on topic.
00:05:51	S2	Okay. So what do we think of the environment being presented on a table with a room around it…
00:05:56	S3	I think that's a better idea.
00:05:57	S2	…at chest height?
00:05:58	S3	In my opinion…in my opinion, I think that's a better idea. But I don't th…but it…
00:06:00	S2	But chest height is quite high though.
00:06:03	S1	Well, we'll just, you know, round here sort of [inaudible 00:06:06]…
00:06:06	S3	You know like…
00:06:06	S4	Height is…height is…
00:06:08	S3	Depending on the game. It depends.
00:06:09	S4	…arbitrary, really.
00:06:09	S1	Yeah, yeah.
00:06:11	S2	Yeah, well…

00:06:11	S3	I th…
00:06:11	S2	…I mean; you probably adjust it based on height…
00:06:12	S3	I think it's…
00:06:13	S2	…of the player.
00:06:14	S3	But if there's a game…the game map in a simulated room is my opinion is…will be the best way to do it. That's…'cause you could do it as like, you know, on the bridge of a ship somewhere or, you know, it doesn't have to be a ta…flat table.
00:06:27	S2	Yeah.
00:06:28	S3	But, you know…
00:06:29	S2	So it…hypothetically, that's one of the better ones?
00:06:31	S3	In my…in my opinion.
00:06:32	S4	Yeah.
00:06:33	S3	Whatever [inaudible 00:06:33].
00:06:33	S2	Okay. I'll just write for now just so we can go back to that... I'll write a little B. What about without the table? We don't like that one do we?
00:06:41	S3	I think depending on the game. It honestly does depend on the game.
00:06:43	S2	I think it could create nausea if you…
00:06:45	S3	Without a sense of perspective.
00:06:46	S2	…just have open space. Yeah.
00:06:47	S3	Without a sense of perspective.
00:06:49	S4	I just prefer the…I prefer the one with the table just 'cause of the immersion through it.
00:06:54	S2	Yeah.
00:06:54	S3	Well, that…
00:06:54	S4	That's what I quite like about R.U.S.E. is that when you zoom all the way out, you are actually like around a table.
00:06:58	S2	Yeah.
00:06:59	S3	Yeah.
00:07:00	S2	So what are we…so we…what do we think? Should we put that one…
00:07:02	S4	It's not about…
00:07:03	S2	…as our four? Or do w…okay, before we do that…
00:07:06	S3	That's the other one. What was the other one?
00:07:07	S2	Our other two options are Google Earth VR style.
00:07:09	S3	Where you fly around the map or something?
00:07:11	S2	Yeah, where you fly around the map.
00:07:12	S3	I think that'd be…that'd be cool if you're like a Total War sorta turn based, you know…so you have, you know, you can explore…rather than moving the map around of that, you can just fly around like Google Earth. That'd be really cool. So you can get right a sense of [inaudible 00:07:24]. That'd be pretty cool.
00:07:26	S4	It might make a good like map view, but I don't know how good it would make of a like…

00:07:31	S3	[Inaudible 00:07:31].
00:07:31	S4	…moving things around. Like if you had it as the turn based part.
00:07:35	S3	Yeah.
00:07:35	S4	If you were playing a Total War game where you were doing that and then the next bit you were working from a table so a bit…going back to the last one.
00:07:42	S3	Yeah.
00:07:43	S2	'Cause then the other Google Earth VR is…so that one has it at your f…at your feet.
00:07:47	S3	Yeah. Okay. Okay.
00:07:48	S2	And then the other one has it at about chest height so you're not having to look down all the time.
00:07:54	S4	If you don't look down, you might as well just do it in a bed.
00:07:58	S2	So you just look up. So gotta rank these four now. So we have the one that we liked; the table.
00:08:07	S3	I think the no perspective one where…I agree. When it's just a black…like a…
00:08:11	S4	A floating background.
00:08:12	S3	Floating background. That'd be four for me.
00:08:14	S2	That's…is that [inaudible 00:08:14]?
00:08:15	S4	I'd probably agree with that, yeah.
00:08:16	S3	I mean, the two…the two Google ones. Which one do you think will be the…my opinion, the best one'd be the first one; A.
00:08:22	S2	The…at the feet?
00:08:23	S3	Yeah.
00:08:24	S2	Do you not think that…
00:08:24	S4	I think the chest height one would probably be better 'cause you don't wanna be like that all the time 'cause that can…
00:08:28	S3	So do you mean…you mean…so the two different modes…
00:08:30	S4	Doing that all the time can make you feel…
00:08:31	S3	…on Google Earth, do you mean where the one where you have the screen like that so you're looking across it or the one where you got it up?
00:08:38	S2	No, it's just not…it's not really a screen, right?
00:08:40	S1	The…just like to add some clarity to that. So the one at the feet is exactly how it was in Google VR…
00:08:45	S3	Okay. Fair enough.
00:08:46	S1	…essentially. So you're kinda like Godzilla walking on the environment. The other one that…the one where it's more like kinda like here-ish and you kinda like ghost through the environment.
00:08:54	S3	Okay. Fair enough. Okay.
00:08:55	S4	Or in that case you have that. I think that one's a bit better.
00:08:59	S2	Than this one?
00:09:00	S4	The…yeah.
00:09:00	S2	Yeah, I would agree.
00:09:01	S4	'Cause if you're just ghosting through everything it can…

00:09:03	S2	It'd be weird.
00:09:03	S4	Yeah. You'd need like the…
00:09:05	S3	Yeah.
00:09:05	S2	You're gonna end up seeing like the inside of stuff that's gonna look like crap.
00:09:08	S1	Well, it's gonna be like here-ish. You're not gonna have…you know, you aren't gonna have…be eye level with the environment, you know?
00:09:13	S3	No, no.
00:09:14	S1	The environment's gonna be more…
00:09:14	S2	Yeah.
00:09:15	S3	I…in my opinion, I think it'd be A will be…my number…my number for two at number three.
00:09:23	S2	You think A is worse than the chest height one?
00:09:27	S3	No, I think feet better than the chest height one in my opinion, but…
00:09:29	S2	Okay. And then we agree the table is the best one?
00:09:31	S3	Yeah.
00:09:32	S4	I think so.
00:09:33	S3	But obviously how you have…do you…do you feel the same way 'cause myself I prefer to be above it so I got perspective…
00:09:39	S4	Yeah, I prefer to be above it.
00:09:40	S3	…looking down.
00:09:41	S2	Okay. That's….so that's that question. Done.
00:09:43	S1	Cool. Next question is…and it'll obviously quite heavily tie in with what you just answered with the environment, but it's how you move about that environment.
00:09:50	S3	Yeah.
00:09:51	S2	Right.
00:09:51	S1	So you've kind of decided that… (Irrelevant background noise)
00:10:15	S1	So yeah. As I was saying the next question will kind of also bounce off the question that you just answered. So it's how you'd move about that environment. So obviously take forward with you that the fact you've all kind of chosen the table as your definitive answer for the last one. So the…so A is…the player can kind of fly (sic) around the environment. You know, when you could actually fly on Google Earth and you just pointed forward and you kinda just pointed the stick and you flew. The next one is obviously teleportation from the lab, similar system [inaudible 00:10:40]. Next one is the combination of the lab and the dragging system in Google Earth. So obviously you like teleport to a location, then if you want that finer bit of control you can kinda just drag. Yeah. So the next one is the Google Earth movement and the teleportation for the lab and in addition, the player can kind of like go down to ground level like in Earth, but they can also command from the ground level also and then kind of walk around a bit. The next one was they just use the track pad for the environment. So if they kind of just…
00:11:15	S2	So like a mouse?
00:11:16	S1	…point. Yeah, it's like a mouse, essentially. You know, you push it to the right, you're gonna kind of move to the right. Just purely floor dragging system. Some people just want, you know…just pure, like…we discussed it, but just pure floor dragging on its own. The next one is a mini map and the only way to move around was just the mini map. So essentially the guy said that somewhere on the UI, which we'll discuss later, there's a mini map and you can only move around by just clicking on that mini map to move.

00:11:42	S3	Okay.
00:11:43	S1	And that's all.
00:11:45	S3	I was a quite a big fan of the…is it the labs teleport system?
00:11:49	S4	I don't…I don't like the last one. That's all I want to say.
00:11:52	S3	No, I don't like the mini map system.
00:11:52	S2	The mini map camera?
00:11:53	S3	No, mini map. No.
00:11:54	S2	Do you not think it would reduce accidentally doing commands and stuff like that?
00:11:58	S4	It might, but it's gonna be a bit difficult to move about.
00:12:00	S1	Like I said guys you can generate your own idea in this focus group. You aren't locked to the ones on the paper.
00:12:04	S2	Yeah.
00:12:04	S3	The w…I was…moving around. So, if…depending on…if we mean by moving around does it move around the environment and all…for example, the room…movement at the table.
00:12:12	S2	Yeah.
00:12:12	S3	I think that teleport was very u…very handy because if you moved over to it, right, you stayed then on that place and you only ever moved if you meant to?
00:12:23	S2	Yeah, but why can't…surely, mini map camera is in every single strategy game I can think of.
00:12:31	S3	Yeah.
00:12:32	S2	So why not have it as an option? And then also have…so I quite like the teleporting. I think you need that for long distances rather than…
00:12:39	S1	You need the teleport one for long distance.
00:12:40	S2	Yeah, but the…I don't like…[inaudible 00:12:43], but…we'll come back to that, but I also like the track pad for like finer…
00:12:48	S1	That…yeah, that was…
00:12:48	S2	…movement.
00:12:49	S1	Yeah, def…
00:12:49	S2	So if it's…'cause if you can teleport you can track and you can click the [inaudible 00:12:53] if you really want.
00:12:54	S1	Yeah, yeah.
00:12:55	S2	Like that seems…
00:12:56	S4	There we go. That's better.
00:12:57	S3	Yeah.
00:12:59	S4	It's just a bit of a rough idea what we're all thinking about.
00:13:03	S1	That's…that was…that…we mentioned if you were in that environment. So there's [inaudible 00:13:06]…
00:13:06	S4	You'd be clicking on the map to move to somewhere on the map, wouldn't you? So…and then maybe tele...when…once you're a bit more zoomed in, you can teleport about and…
00:13:14	S2	Yeah.

00:13:15	S4	…drag yourself around.
00:13:17	S2	'Cause the combination of those three…I don't like dragging. I don't think you should ever have…
00:13:23	S4	Dragging…
00:13:23	S2	…unnecessary movement.
00:13:24	S3	No.
00:13:25	S4	It's…for fine movement, though. It's a bit easier. Just…
00:13:29	S2	But tracking is fine for fine movement, right? If you just go like I want to go slightly that way.
00:13:36	S4	Possibly.
00:13:37	S3	Well, the th…well, the thing with the…we'll say the vive…especially was that you could…you had like a limit amount of movement yourself. So you only ever track…you only ever teleported to an area. [Inaudible 00:13:47] where we're standing now, if you look at this picture now, if we teleported over the left hand side of it, you could then, you know, move and have a look and you've got that finer detail on it. That…you know, it's that…all you're going to be doing is just moving your control box.
00:14:04	S1	[Inaudible 00:14:04] table idea? It's…
00:14:05	S3	Just using the la…using the lab, but that's [inaudible 00:14:06] thinking about it. Obviously if you did something where it was a bit more free floated in terms of where, your environment you're in having that finite ability to move your camera view a little bit more so you've got…you can see round mountains or whatever.
00:14:23	S2	Yeah.
00:14:23	S3	It'd be obviously very useful, but in that sort of environment you wouldn't necessarily need it. Just in my opinion.
00:14:28	S2	Yeah. Yeah.
00:14:30	S3	Anyway I'll…
00:14:32	S2	If we're assuming the table thing, then yeah, the rotation's not really necessary.
00:14:35	S3	But if you were doing something…
00:14:37	S1	Just going around…jump in…you also got…you [inaudible 00:14:38] remember you can't always walk around the environment too with VR.
00:14:41	S3	Yeah.
00:14:41	S2	Yeah.
00:14:43	S3	Yeah.
00:14:43	S1	So I mean you can get it up to 20…I think it's like 20 metres. Not 20 metres.
00:14:48	S3	Which is you know…
00:14:48	S2	20 feet squared.
00:14:49	S1	20 feet. Sorry. 20 feet squared. So that's quite a big environment.
00:14:52	S3	Yeah.
00:14:52	S1	You can walk around in, but obviously also it depends on people's [inaudible 00:14:56] real world play space so…
00:14:57	S3	Yeah, yeah.
00:14:58	S2	What about flying?

00:15:00	S3	I think it depends on the game for that. If you did a…what's it called? Like an RTS sort of style. The game which came to mind was [inaudible 00:15:08]. If you did that sort of style where it's tower defence and you're trying to defend it and you're trying to get that you wouldn't want it a specific point. You'd want, you know, want to fly over to the right, fly over to the left.
00:15:17	S2	Yeah.
00:15:18	S3	Which a track pad would be very useful for.
00:15:19	S2	What do you think, Will?
00:15:21	S4	I'll agree with that. I don't have an issue with it. My main thing was that I just thought the last one wasn't the best one of all those. Just purely jumping off the mini map.
00:15:29	S3	The problem I have with the mini map is if you've got the mini map permanent, you have to have it as a permanent reference point. So if your field of vision say for example is that way, you'd have to have this mini map which is hover somewhere there so you can always select it to do the movement.
00:15:41	S2	Yeah.
00:15:41	S3	And I think just get pain in the ass [inaudible 00:15:43].
00:15:43	S2	Should we put that one as the worst one, then?
00:15:44	S3	In my opinion…yeah. I would. That jumped out to me as a bit pain in the ass. [Inaudible 00:15:50].
00:15:51	S2	Okay. So the flying we're all right with.
00:15:54	S3	It…
00:15:54	S2	Depending on the game.
00:15:55	S3	Depending…it depends on the game.
00:15:58	S2	What about the floor dragging? So when you click somewhere and kinda pulled. Is that right? Is that the right concept?
00:16:04	S1	Yeah, yeah.
00:16:05	S3	Yeah, like…
00:16:06	S1	It was on Google Earth.
00:16:08	S2	I didn't get it to…
00:16:08	S3	Which…
00:16:08	S2	I had…I was watching, but…
00:16:09	S3	I think that would be...if it was gonna be a VR Total War game, that'd be the one I'd want so you can just pull yourself and drag to where you wanna be.
00:16:17	S2	But if you wanna…if you've got a big empire and you're…
00:16:19	S4	It's a grand scale.
00:16:20	S2	…dragging yourselves across the [inaudible 00:16:20]…you're…
00:16:22	S4	The dragging one's a bit more of a grand scale thing, I think.
00:16:24	S3	That'd be…yeah, [inaudible 00:16:25].
00:16:25	S4	Because it can be a bit disorien…not necessarily nauseating so much as disorienting just having...'cause they sort of gotta put that small circle into stop…getting motion sickness. You might find it a bit easier to lose where you are sometimes.
00:16:37	S2	Yeah.
00:16:37	S3	Okay. Fair enough. I…

00:16:39	S2	I would agree.
00:16:40	S3	You wouldn't need something on that side if you were in just a war room you wouldn't want the dragging bit because it might…
00:16:45	S2	Yeah.
00:16:45	S3	That'd be…
00:16:46	S2	But, I mean, when you like zoomed in, I think…
00:16:48	S3	Yeah, yeah. I'd probably say if you…if you did zoom in on the map…so for example the map was started, but you could just like you know do the button just to scroll in on the map a bit or something. I don't know. Having that drag ability just to move the map point of view a bit would be useful. So as I could…not so much the whole movement of the game, but as like a…
00:17:05	S4	More of a fine movement?
00:17:06	S3	Yeah, fine-tuned movement. Or if you did have like a board. And the other would be for…
00:17:10	S2	But why not just use a track pad for that?
00:17:12	S3	Yeah. That [inaudible 00:17:13].
00:17:13	S2	So you can go, I wanna go that way.
00:17:14	S3	That's the point. That's the point. If you could just [inaudible 00:17:16] then you could have a bit more fidelity of it.
00:17:18	S2	Yeah.
00:17:18	S4	The thing with the dragging on the track pad is that pretty much it's [inaudible 00:17:20] won't they?
00:17:21	S3	Yeah. 'Cause if the…
00:17:22	S2	Yeah.
00:17:22	S4	It just depends.
00:17:23	S2	Although tra…
00:17:25	S3	The trackpad would be more integral.
00:17:25	S2	Trackings are easier to do…
00:17:27	S3	Yeah, and you don't have to change.
00:17:27	S2	…without really paying attention to what you're doing.
00:17:29	S3	Precise…'cause you could…you could concentrate then on where you're moving your units and then just as a…
00:17:32	S2	Yeah.
00:17:32	S3	…matter of…like the same way when we were doing that pirate thing when you have…you know, just changing the weapon type. After you've done a couple of games, you just end up of going like…and it's fully automatic and you can tw…
00:17:41	S2	Yeah.
00:17:41	S3	You can switch on the fly 'cause you know where they are. The same one would be like shit, I need to go left and you can just track across left.
00:17:46	S2	Yeah.
00:17:48	S1	Just to jump in and get a bit of clarity for my audio notes here is are we saying that the environment is on the table as we said and then you can then zoom down to a smaller scale to make the environment…so you make yourself smaller in a way?
00:18:01	S3	Basically just a scale of the map. So the…the map type is there, but you just…say you want to zoom in on the table.

00:18:06	S1	Yeah, so the table gets bigger in a way almost.
00:18:08	S3	The table's…in terms of…
00:18:09	S4	Well, that's pretty much what's happening in R.U.S.E. isn't it? It's…you're not…
00:18:11	S1	Yeah.
00:18:11	S4	You're not getting down to unit level. You're just zooming in on the table.
00:18:14	S1	Yeah.
00:18:15	S3	Yeah and rather than the table getting bigger, you're…area or concentration just zooms down to that. So it makes the… the map changes. That's what…that's what we've…I think that's what I was getting at. Is that what we were getting at?
00:18:24	S2	I think so.
00:18:25	S3	That was my reading of it.
00:18:26	S1	Yeah.
00:18:27	S4	It was a zoom more than…
00:18:29	S3	Yeah.
00:18:29	S4	…an enlargement of scale or something.
00:18:31	S3	Yeah, basically.
00:18:31	S4	[Inaudible 00:18:31].
00:18:32	S3	So reducing the scale of the map rather than suddenly getting down to individual Johnny marine.
00:18:40	S2	Okay. So we're suggesting that mini map is an option, but probably not the dominant one.
00:18:50	S3	Yeah, definitely.
00:18:50	S4	It's an option. It…yeah. But I wouldn't…I wouldn't have that as the only way to move around.
00:18:54	S3	It could…I th…
00:18:54	S2	Do we have the teleport?
00:18:55	S3	I thought of…the only way I'd prefer that mini map is if you did some [inaudible 00:18:58] empire. Having that mini map as a, you know, point [inaudible 00:19:02] so if you're in the galaxy, you know [inaudible 00:19:04].
00:19:04	S1	Like, I said guys you can make your own ideas.
00:19:06	S3	Yeah, I was just…I was just [inaudible 00:19:06].
00:19:07	S1	And your own ideas could be a combination of all the ideas.
00:19:09	S2	Yeah.
00:19:10	S3	It'd be how you treated different things 'cause the way I'm thinking of is you'd want a different user interface for…you can use Total Wars 'cause Total War just as RTS and turn based and if you want a different UI for the turn based than you would for the battle [inaudible 00:19:25]. So if I was playing the battle one, I'd prefer that…
00:19:28	S1	Try and keep…let's just say battle. Just…
00:19:31	S3	Okay.
00:19:31	S1	You know, a Command & Conquer 3 sort of…
00:19:33	S3	Okay. Fair enough.
00:19:33	S1	Or [inaudible 00:19:33] or…

00:19:35	S3	So for…if you wanted to do a…for a like a Total War turn based map, I prefer something where, you know, you could…you can see the entire area like a map like this or use like a Google Earth drag sort of thing so you can just drag them, the ground beneath you and that sort of thing so you can see your empire whereas if you're in a map sort of…like a Command & Conquer or Age of Empires sort of set up I'd prefer to be able to fly around a bit. That'd be…
00:20:02	S2	Okay.
00:20:03	S3	That's me. What about you, Will?
00:20:05	S2	That makes sense. Like, if you're doing it on, like, a big...big map scale, dragging might be a bit easier than tracking in that case. It's a bit faster to track.
00:20:12	S3	Yeah. And also you'd get...
00:20:15	S1	So I'm gonna write this down as H. So we've got mini map, dragging for the larger scale.
00:20:26	S2	So essentially, we've got all the ideas.
00:20:26	S3	(laughs)
00:20:28	S2	All the ideas.
00:20:28	S3	But the one we...have you ever watched [Inaudible 00:20:31]
00:20:28	S1	And then...yes.
00:20:33	S3	You know when they've got that big battle going on in that big holographic sphere? When we're were talking about the sphere, we were talking about different map environments in the interview, that was the one thing that came to mind like, it'd be pretty cool if you could just go around in that fleet. **Like, isn't that there?** Then, you don't have to pass it. And then, when you enlarge it, you can actually walk around and see the whole battle going on in front of you. That was the thing that's come to mind maybe because I'd watched [Inaudible 00:20:56].
00:20:58	S1	Okay, shall we try and rank these?
00:20:59	S3	Okay, cool.
00:21:00	S1	So I'm gonna change the **G to 8** because we're coming around **out here.** So mini map, dragging for larger scale and track pad for minute changes?
00:21:06	S3	Yes. Yeah.
00:21:08	S1	And I guess you zoom in on the map?
00:21:10	S3	Yeah.
00:21:13	S1	Yeah, you're also adding in a zooming option. Kind of like how you play War Game and Rouge, almost. Because on War Game and Rouge, you can kind of move around the map while zooming, can you...can't you?
00:21:20	S3	Yeah.
00:21:22	S1	You can zoom to the other side of the map.
00:21:24	S1	What do you mean?
00:21:25	S2	It zooms in...
00:21:25	S1	On your cursor.
00:21:26	S2	Yeah, if you had some kind of pointer and you could just zoom into the pointer.
00:21:30	S1	But you can even have...the pointer looks like a magnifying glass. Well, just put for now...if you wanna add that to one of the options, just call that zoom to cursor.

00:21:42	S3	Well, the main thing you've got with VR is you've got two controllers rather than just having a mouse, which, you know. You can do a certain...one action, but you've got two. So you've got...we've got...
00:21:49	S1	So you don't have to use both of them.
00:21:52	S3	No, no. But you can use both in conjunction if you want to.
00:21:55	S1	You mean like doing this...
00:21:56	S3	Yeah.
00:21:57	S1	...to zoom in? I think you'd get annoyed doing that to zoom. You just want to do it, like, over there.
00:22:02	S3	[Inaudible 00:22:06] if you got the globe going on, you can just do like that and it opens up a window so you can look into zoom and then close out again.
00:22:12	S1	Hmmm.
00:22:13	S3	Just so you can get, like, a perspective zoom. That's just something...that's just something...yeah. You can use both in conjunction while just think...because rather than just thinking of just one control function [inaudible 00:22:30] where you can use the two controls together to interact with each other.
00:22:33	S1	Okay, so let's rank. So are we gonna rank our own idea as the best?
00:22:38	S3	I think we have to, really.
00:22:43	S1	So what about floor dragging? Just floor dragging.
00:22:46	S3	Just floor dragging?
00:22:46	S2	I don't think there's such a thing as just floor dragging because that's...there's lots of movement in it.
00:22:51	S1	Yeah.
00:22:52	S3	I don't think it's a bad idea.
00:22:52	S2	It's lots of quick movement. It's not a terrible idea.
00:22:53	S3	I think it's somewhere in the middle. Probably somewhere in the middle. Somewhere in the middle.
00:22:58	S1	What about just teleportation? That sounds very annoying.
00:23:01	S2	Yeah, there's no fine control in teleportation.
00:22:04	S3	I think the fine control would be the second. Fine control teleport would be the second one. And then...but teleporting itself could be very...
00:23:11	S1	So you mean the teleporting and the dragging system?
00:22:14	S3	Yeah. That'd...that'd be my second choice, honestly.
00:23:17	S1	But what about the Google Earth VR movement and teleport? And the player can come out from ground level so they can take over the eyes of the unit.
00:23:32	S3	I guess that's my number three.
00:23:34	S1	That's your number three?
00:23:35	S3	Yeah.
00:23:35	S1	What do you think, **Noel**?
00:23:49	S2	I'd put that somewhere around there, maybe three or four. But I'd need to think about the other ones first. It's...it's a...
00:23:48	S1	Hm.
00:23:49	S3	I do think our one is the best.

00:23:52	S1	Okay, so these two.
00:23:53	S2	Ours is a combination of all of them in one.
00:23:54	S3	All of them, yeah.
00:23:56	S1	Well, that's just the flying from VR Google Earth.
00:24:00	S3	I don't really...I don't really rank that in honesty.
00:24:03	S1	I think it would be annoying to try and get somewhere accurately.
00:24:05	S2	Flying through...I wouldn't have **wanted** to use the track pad to just track about like that one. But were you flying through the world, that could take awhile to try and find something in it.
00:24:17	S1	Yeah. Yeah.
00:24:20	S3	You also haven't got much control, either, in my opinion. It'd...it'd very, like, cool to watch, but you wouldn't...you'd get bored a bit quickly...
00:24:26	S1	Yeah.
00:24:27	S3	...in my opinion. So...
00:24:28	S1	Okay. So we think that's low. And then just the track pad.
00:24:38	S3	I don't think you'd be able to get to anywhere fast enough.
00:24:41	S1	Yeah, unless you have an acceleration on it.
00:24:43	S2	Yeah. You'd have to look at [inaudible 00:24:45]
00:24:45	S1	But then it's annoying because you don't know when the acceleration kicks in.
00:24:48	S3	Yeah. Yeah.
00:24:49	S1	So low?
00:24:51	S3	Yeah, I'd say that.
00:24:52	S2	I'd say mid-low.
00:24:53	S1	Mid-low?
00:24:55	S2	Or low-mid, yeah. It'd shouldn't be, like, the bomb.
00:24:58	S1	Yeah, because it's a classic.
00:24:59	S3	So what have we got? We've got...
00:25:00	S1	So we've got...
00:25:01	S2	Tracking with the track pad, since you're just mousing around.
00:25:06	S1	And what about just teleporting? Do we like that?
00:25:09	S2	There's no fine control on that.
00:25:10	S3	Yeah, there's no fine control.
00:25:10	S1	Okay.
00:25:11	S2	That's...
00:25:12	S1	Except for the fact that you can walk around.
00:25:13	S3	Yeah.
00:25:14	S2	Yeah, but you've gotta, like...you're just ever so slightly out, you gotta teleport over the contain of it.

00:25:19	S1	Okay. So we've got these two as low. So which one do you want as seven and six? So we've got flying and just teleport.
00:25:29	S2	I'd say that one's lower than that one, but, like, one down.
00:5:31	S3	I agree.
00:25:34	S1	Okay. I agree, too. Okay, so we then got this one, which is the mouse, which is low middle. So I presume we're gonna put that as five.
00:25:41	S3	Yeah.
00:25:41	S2	Yeah, yeah. All right.
00:25:44	S1	Okay. And then we have teleport and drag...no, sorry. We have floor dragging as middle. So four?
00:25:51	S3	Yep. Yeah, yeah.
00:25:55	S1	Because then it leaves the teleport and the dragging.
00:25:56	S3	What's the difference between teleport and dragging system from Google Earth and Google Earth beyond movement in teleportation? Oh, and going down to the Oasis.
00:26:04	S3	Yeah, the one that's on.
00:26:07	S2	I'd put...I'd put that one lower than that one, personally.
00:26:11	S1	Okay.
00:26:12	S2	Because I think it can be a little disorienting, going down to, like, an individual man's level with your VR goggles on.
00:26:16	S1	I mean, it could be like Rome where you kind of hover above the, you know.
00:26:21	S3	That was...that was mine.
00:26:22	S2	Or the old Total War games where you're actually physically inside the character model with a camera.
00:26:30	S3	Look to your left and you'll see a Roman on it. So we've got three left.
00:26:34	S2	I think it'd make a decent mechanic, but I don't know how good a way of commanding it could be.
00:26:39	S1	Yeah, so...
00:26:40	S2	Moving about the environment around it.
00:26:42	S1	So how do you wanna rank these? So effectively we've got a one, two, three choice.
00:26:49	S2	A one, two, three, four choice.
00:26:52	S1	Oh, yeah, but...
00:26:54	S2	I would say two.
00:26:57	S3	Yep.
00:26:58	S2	Three, four.
00:26:59	S3	Yeah, I agree with that.
00:27:00	S1	Yeah, well, I agree with that.
00:27:04	S2	So rated your own as the highest?
00:27:05	S1	Yeah.
00:27:06	S3	Yeah.

00:27:08	S1	Because they're all geniuses. Probably an easier question, then. Moving on. Which is how [inaudible 00:27:15] be presented? This one is the only option that came out of the focus… the interviews for this was purely how it's already done, which is just kind of a black fog. You know that when you're playing online.
00:27:29	S2	It should still be tangible, though. Kind of like how civilisation...well, you might not...
00:27:31	S3	No.
00:27:32	S2	...put in the new one. It's kind of cloudy, and then it has civilisation written on it. And slowly disappears as you reveal more of it. It shouldn't be, like, black.
00:27:41	S3	It's still fog of war.
00:27:43	S1	It's still the traditional way. Just some sort of fog or cloud or something.
00:27:45	S3	Yeah, you can usually see through the bits you've already explored, but it's still fogged out.
00:27:50	S2	Yeah, but I mean, like, it shouldn't just be, like, black. There should be something there. That's...that's...
00:27:57	S3	Well, what I just [inaudible 00:28:01] you knew there was, like, three areas. But you start in the one area and obviously there's two more tables that you've got the blank. And you have to go find that was mine. But...
00:28:11	S2	But how do you join all that map together?
00:28:14	S3	It's more like a Total war thing. [Inaudible 00:28:18]
00:28:19	S4	It can work if you do something like Empire of War where there were three maps.
00:28:22	S1	Yeah, where there were three.
00:28:22	S2	Yeah, that was my thinking. It's ready to fit between the other different maps and [inaudible 00:28:26] map tables.
00:28:27	S1	So does anyone else...do you guys...
00:28:29	S3	I have no issue with the way it's currently done.
00:28:32	S2	No, not at all. I think it makes sense.
00:28:33	S3	I think that's the best way to do it.
00:28:34	S1	Are you just going to go with that?
00:28:35	S2	Yeah.
00:28:36	S3	My-my only issue would be the other line of sight thing where if you can't see it. Just like an example. I'm trying to think what it is. Even though you can see that area of the map yourself. If your unit doesn't get there, you can't see it. How that...
00:28:52	S2	On Command and Conquer, I believe, you have a fit black, which is you haven't explored it all.
00:28:55	S3	Yeah. It's...
00:28:56	S1	Then there's, like, a slightly less grey...
00:28:58	S2	But I think...
00:29:00	S1	You can see the floor, but you can't see if there's anything there.
00:29:02	S2	I think Tom means when you're down looking at the map.
00:29:08	S3	Because the bit I was thinking of was more, you know, when you just got a set line of sight distance. And as a result, you'll see an open field. War games **are better than** some other things. But if you've got, like, an open field and then suddenly this tank appears in the middle of the field, you've...you've...
00:29:25	S1	Oh, yeah. So like on War Game. On War Game, you can always see the entire map, but you just can't see if there's anything there.

00:29:29	S3	Yes. You can't. You wait until it gets closer, you can't see what it is. Whereas, it says how they handle that sort of line of sight where...where your camera is what your unit can see. And if you...obviously, you can fly around, you know. If you're overlooking it, you should be able to see, like, a dark movement or, you know, or move...yeah. How that's transitioned across.
00:29:47	S2	Like [Inaudible 00:29:47] Rouge. You can tell there's something moving there. You...you can tell it's a vehicle, probably. You don't know what type of vehicle it is.
00:29:54	S3	Yes, precisely. How that's handled would be the key thing of Fog of War. So you know the area because you know...like, you've been there. Your units have been there, but because your units can't see, clearly, you should be able to see that there's movement there.
00:30:07	S1	So it's kind of difficult to represent.
00:30:09	S3	It's...it's difficult to explain, but...
00:30:10	S2	That's the kind of...it's a game mechanic at the same time.
00:30:12	S3	It's...it's more...it's more because of where your camera will be.
00:30:16	S2	It's like in Come Hear Us you can see the entire map in Come Hear Us. It's just fogged out. You can't see it.
00:30:21	S1	Yeah.
00:30:22	S2	Which is a system I tend to like. I like that you can see the paths through the map, but you can't necessarily see everything.
00:30:30	S1	Well, you can almost have, like, a colour change so that the stuff you can actually see...
00:30:36	S2	Yeah, that's what it's like. That's what it's like. That's what it's like in Come Hear Us. If you can directly see it, it's in colour but only if you can't it's, like, grey fogged out.
00:30:45	S3	You know, just good **advice**. Steel Division, Steel Division is one which is quite good. You can see the map change. You can see the battle lines move. But you can't...until you get a scout unit there to see it, you can't actually see it.
00:31:03	S3	Is that it?
00:31:04	S2	No, no, no.
00:31:05	S3	Yes, that's it.
00:31:06	S2	No, that's not it. You can see everything. It's just the floor. Let's put Fog of War in and see what comes up. There you go.
00:31:16	S3	There.
00:31:19	S2	It's really dark on the screen, but you can see how...
00:31:20	S2	You can see the buildings and...
00:31:22	S3	You see how this building here...In Come Hear Us there is true line of sight. So this unit is spotting down this road. But because this building here is in the way, it can't see. But you can still see the environment. It's just fogged out.
00:31:36	S1	Yeah.
00:31:37	S2	That's what I meant when I was saying I think we need to have some kind of true line of sight there.
00:31:40	S3	Yeah. That...that makes...
00:31:43	S1	But for other games...So if you were doing Civilisation, I think you shouldn't be able to see all the map because that's kinda half the point of the game is that you explore everything. Well, that kind of still just comes under...
00:31:53	S2	It's...it's a game mechanic more than anything.
00:31:55	S1	Yeah, similar originals. Can we just...
00:31:58	S3	Yeah, just agree with that.
00:32:00	S1	Accept it.

00:32:01	S3	Yeah, just agree with that.
00:32:01	S1	Okay.
00:32:02	S2	Agree with the wine that's given to us.
00:32:04	S1	(laughs) Next question is...now, normally in the interviews, I don't actually ask you this question directly because I...I want you to generate the idea for the cursor yourself.
00:32:13	S3	Yeah.
00:32:14	S1	But it's not does the **pain** need the cursor. It's now...well, actually if you wanna say no, you can. But realistically...[inaudible 00:32:25]. Does the **pain** need the cursor, yes or no. We'll start with that first. Yeah, okay. What does it look like? We've got Google tilt brush style laser. You know, just put the laser. It comes out the end of the controller. And the next one is someone recommended a dot in the middle of the screen. It's just kind of there.
00:32:46	S2	A fixed point in the middle of the screen.
00:32:47	S1	Yeah. So something so small you can kind of get away without making player specific because it's just.
00:32:51	S3	You mean like a...
00:32:52	S2	You move the screen too [inaudible 00:32:53].
00:32:54	S1	Yeah. So if you...if you...you can see...I can see everything. Like I said, this is my line of sight, right? I wanna select this as a tank. I physically look at that tank or it's a dot and I look at that dot.
00:33:07	S2	I think that'd give you an issue if you're trying to select something.
00:33:10	S1	Yeah. I think it'd be quite hard to get...
00:33:13	S2	Because if you've got a cursor you can point and click, I want that one. I want it to go there.
00:33:16	S1	Yeah.
00:33:17	S3	Yeah. I think that'd be...I don't like the idea of that. I'd...I'd prefer to actually...in the same way, you know...you know, use the laser, click and point, move that way.
00:33:28	S1	So we like the laser?
00:33:30	S3	Yeah.
00:33:31	S1	Cool.
00:33:32	S3	But I think it might as well be...you have to have, like, a fight, you know. Rather than just being pointing at something a mile away, you have to have a certain within reach sort of thing. And then just might...because you don't wanna...if you gonna try...
00:33:43	S1	'Cause you might miss something.
00:33:44	S3	Because if you try select multiple units, you only want stuff immediately in your area.
00:33:48	S1	Yeah.
00:33:49	S3	Rather than...
00:33:50	S1	What happens if a player does want something in the distance though...
00:33:53	S3	After moving, honestly. I just think you'd be more...
00:33:55	S2	Unless you have the two...you have the controller for selecting the control to move.
00:34:00	S3	Yeah. That's good. Yeah.
00:34:01	S2	You can right click left to move.
00:34:04	S1	Then you'd have to keep your eye on two different.

00:34:07	S2	It's too hard to keep your own with both hands, are they?
00:34:09	S1	Yeah.
00:34:10	S3	No.
00:34:11	S1	But you've...like, two lasers would probably...yeah.
00:34:15	S2	But you don' need, necessarily, a laser for the dragging one. There wasn't...
00:34:19	S1	Dragging?
00:34:20	S3	Yeah, there was on...
00:34:21	S2	Oh, there was one? There was.
00:34:24	S3	If you have a laser, it kind of...it lets the player know that point of origin, if you get me.
00:34:28	S2	Right. It's an orientation thing. Yeah.
00:34:30	S3	Yeah, laser.
00:34:32	S2	Okay, next one.
00:34:33	S1	Road laser the highest, yeah?
00:34:35	S2	Yeah.
00:34:36	S1	The next question is how would a player select a singular? So singular only here unit.
00:34:41	S3	Point, click.
00:34:43	S1	Point with the laser and click?
00:34:44	S3	Yeah.
00:34:45	S1	Yeah.
00:34:46	S2	After you've got voice commands...and if Defend Wars has taught me anything, those voice commands work one-third of the time.
00:34:51	S1	Okay.
00:34:52	S2	And those are the two thirds of the time you're screaming at...
00:34:55	S1	(laughs) Okay. And then the third option...so...so the third option is, like I said...well, the first option is the laser, the second option is voice command similar to [inaudible 00:35:04]. But the actual player doesn't...you know, [inaudible 00:35:06] war is unit one and then obviously whatever was one was selected. On this, you point the cursor at them and then you say, like, I want that unit or, you know, select unit. So its...its voice commands can set a contextual to your cursor. And then, the final one is the player has, like, a list somewhere. Somewhere in the UI or something like that. And you can kind of select from that list your units. I think you should be able to do both.
00:35:40	S3	I think...I think...
00:35:41	S2	The UI, like, in...**sense**...[inaudible 00:35:44]
00:35:44	S1	Well, like, so I think...this came up in my interview. Well, so... (Overlapping Conversation)
00:35:54	S2	Or, like, how they are in Sims.
00:35:58	S1	Well, that causes nausea.
00:36:07	S3	[Inaudible 00:36:07]
00:36:07	S1	You don't always have that. But the thing with UI's is it causes nausea. I think I talked about this in interview, so the way I imagined it was like the tilt brush thing.
00:36:16	S3	Yeah, yeah.

00:36:17	S1	So you can flip between different menus. So then you can flip to a unit one.
00:36:19	S3	That was...
00:36:20	S1	And you can point and click on that one.
00:36:21	S3	That...that would be...that was what I was going to say.
00:36:22	S2	So, like a list like this?
00:36:24	S3	Yeah. Well, more...
00:36:26	S2	But on your wrist that you're saying.
00:36:29	S1	Well, yeah. Well, the next question, you know, further down the line is the discussion of the UI. So you can just say...you can say it now and then obviously it'll be wrapped under that UI later.
00:36:38	S2	I like that tilt brush.
00:36:40	S3	That tilt brush style for me was brilliant.
00:36:41	S1	Yeah.
00:36:42	S2	Especially if you've got, like, little selections that you select a unit and all the stats come up on that.
00:36:46	S1	Yeah.
00:36:47	S3	That...
00:36:48	S1	We're kinda want a combination of the UI thing and the pointing.
00:36:50	S3	Yeah.
00:36:51	S1	Because if you look at the map, you wanna just be able to point at the U...
00:36:54	S2	You want...yeah, 'cause you need some, like, a quick select if they're miles away and you...
00:36:58	S1	Yeah.
00:37:02	S3	So…you're going with the idea of…you point and select, but you also have a list of your units somewhere.
00:37:06	S4	Yes.
00:37:06	S2	Yeah.
00:37:06	S4	Yeah. Doing both because then that way gives you the…it gives you the effect of the…
00:37:11	S3	Pretty much exactly like Sins of a Solar Empire really.
00:37:11	S2	Yeah. But it's not…obviously not always there. [Overlapping conversation.]
00:37:15	S4	[Inaudible 00:37:15] mouse click.
00:37:18	S3	So, you can summon and hide this…
00:37:19	S2	Yeah. We want to…do we want to be able to hide it?
00:37:24	S3	Well, it'll come under the UI later, so you can discuss that bit.
00:37:24	S1	Okay. Yeah, yeah, yeah. Okay, so I'm going to rank our idea as first, and then…do we like voice commands or no?
00:37:33	S3	I don't like voice commands. Voice commands…the…the issue with voice commands is you've got to like rely on it picking up on your voice and it's always just an extra hassle in it…
00:37:43	S4	You know, you can click the forces tablet there, and you can bring the dropdown…
00:37:49	S3	Oh, yeah, yeah, yeah.

00:37:49	S4	I mean, it's there. That sort of thing on the clipboard…you won't be able to find it.
00:37:52	S2	Yeah.
00:37:53	S4	But it should [inaudible 00:37:55] list of how many units and, you know…
00:37:57	S3	Well, it's pretty much what we discussed…what you have discussed.
00:37:58	S4	Yeah, but it's that sort of thing [inaudible 00:38:00] so you can switch them.
00:38:04	S1	Yeah. Okay, so do we like voice commands?
00:38:08	S4	Voice commands?
00:38:09	S1	Because we've got to write these like one, two, three.
00:38:12	S3	Voice commands could work, could…I don't know. [Inaudible 00:38:17]. It's touch and go, honestly.
00:38:18	S1	Yeah.
00:38:18	S3	Because [inaudible 00:38:20] worked…
00:38:23	S4	One third of the time.
00:38:23	S3	…sometimes. Yeah, it wasn't consistent. But, again, it was…yeah, it just wasn't needed.
00:38:28	S4	It was quicker when using it on an Xbox because you didn't have a mouse to select it with. You don't need voice commands when you've got a mouse, because it's so much quicker to just go click, click.
00:38:36	S1	Yeah.
00:38:36	S3	Yeah, which again, if you had…if we were using the list [inaudible 00:38:38]…
00:38:39	S4	Because you've got a…you've got to say the unit and then wait 3 seconds for it to register and then select it or whatever, and then…yeah.
00:38:49	S3	But it would…actually, it would be quite good if you did…if you could use some voice command, such as being able to select all, and then you could select all units. That could be quite good. It'd be easier than [inaudible 00:38:57]…
00:38:58	S2	But you could have that as a menu on the UI thing.
00:38:59	S3	Yeah…yeah, but then…yeah, see, everything you can do voice command, you can just do with a button somewhere.
00:39:03	S2	Yeah. So, should we vote that as lowest?
00:39:06	S3	Lowest, yeah.
00:39:07	S2	Okay. So then we have just the UI option or just the cursor option.
00:39:09	S4	I'd rather just be able to click things than select them off a list. If my only option is one of the two, I would rather be able to click on that and move it than click this, click that, move it.
00:39:20	S3	Because, you know, honestly I'm just selecting from the list to move a little bit from…
00:39:26	S2	You don't get the context.
00:39:27	S3	You don't get…yeah, and you don't get the [inaudible 00:39:26] as well.
00:39:28	S1	Next question is how would the player select multiple units?
00:39:32	S2	What are our options?

00:39:36	S1	So, the first one is you draw a shape around the…around the units. The shape can be any size. So, in this…with you guys, you've…you've…you've selected the laser cursor, so you literally would be able to just go [inaudible 00:39:50], and as long as you kind of join that shape back up at the end, anything within that shape is selected, so it's like a lasso tool almost, you know.
00:40:00	S2	And then…
00:40:00	S1	The next one is a square appears between the two controllers, so it's kind of like how you do it on a traditional strategy game…
00:40:08	S2	Be like a pinch.
00:40:08	S1	…but it's two controllers, so you…you draw them out. So, it starts from the point between them and then you pull it out, and then you put that square over.
00:40:15	S4	Okay.
00:40:17	S1	The next one is a painting tool, similar to Halo Wars. So, at the end of your cursor, there's like a…you know, you press a button, and you know in Halo Wars, that circle appears.
00:40:24	S4	Yeah, [inaudible 00:40:24] selects and circle. [Overlapping conversation.]
00:40:26	S4	In Halo Wars, when…when you go to select, you can click A to select or you hold A and this like, paint tool…it comes down and you can paint the units you want to use.
00:40:37	S2	You know in paint tool, they…like…the cursor starts off small and then you can make it bigger. Basically, if you hold A, it makes the selection cursor bigger, so you can select more people, which I think could be…
00:40:46	S3	Okay. I've never…
00:40:44	S2	I think, like…
00:40:47	S3	I get…I get what it is. I just never…
00:40:49	S2	But I think…
00:40:50	S3	But yeah. It says…yeah, there it is.
00:40:53	S4	What?
00:40:53	S3	Scroll down. Down.
00:40:57	S2	Down.
00:40:57	S3	There it is. Get that.
00:40:59	S4	Yeah.
00:40:59	S3	That's really bad, but yeah, that sort of shape is a cursor…
00:41:01	S2	[inaudible 00:41:01].
00:41:01	S3	…and then you, like, paint it across the ground, and anything that it goes over is selected.
00:41:06	S2	Which, to be honest…if you were doing, like, multiple things, if you held it down like a [inaudible 00:41:09] round your controller.
00:41:10	S3	You can skip those units.
00:41:15	S4	You can't get real, like, fine control of it.
00:41:17	S2	No, you haven't. That is…that is my issue with it. It's all right to select all.
00:41:21	S4	Yeah.

00:41:21	S1	And then, the final option is you drag out a box…pretty much exactly how it's done on just mouse and keyboard controls, where you just point a laser, you click once, and then you hold that click, and then when you end, it like draws the box out from that point…you know, from that point to that point, and that box expands, obviously, as you make it, so...
00:41:41	S2	Two things that have just come to mind…double clicking on a unit. If you double…you know, where you click the unit once to select one, if you select that twice…
00:41:48	S4	Select all units of that type.
00:41:48	S2	…you select that twice. If you click the unit that you…double twist that unit, it selects all of that type that's one which could be used. Which is, again, just a PC thing that's been brought over. And another that would be everything that you can see, so obviously that square, where you place it down. Or rather, you just select that and then every unit you can see in that vision box is selected.
00:42:09	S3	So that's like D.
00:42:11	S1	Well, the idea is that you actually physically put the box onto the environment.
00:42:13	S2	Yeah. But this one is…this is just simply…it's like that, but you drag the square out, but then you just…you just [inaudible 00:42:19].
00:42:20	S3	So that's…so it's D.
00:42:20	S2	Which is similar to D, but you don't drag the square out.
00:42:23	S1	No, but D is…that…that…you do it on the environment again, so like you essentially click two points of the environment. I think Tom's saying it's vision-based, isn't it?
00:42:29	S2	Yes, basically.
00:42:32	S1	So it's anything that's captured when you do that over your vision. If I'm looking like this and I do that…
00:42:40	S2	Then every unit in the…in that vision square is captured, which would be, in my opinion, just quicker. You know, rather than [inaudible 00:42:44] fuck, missed one.
00:42:49	S3	Well, that's what I think about the free shape. Like **it's a cinching** idea, but I feel like I'm going to miss…mess it up.
00:42:53	S2	Yeah, because you take your time like…fuck, I missed that one over there.
00:42:57	S3	Yeah, and then you have to do it again.
00:42:59	S4	Or you get a twitch in your wrist and you're miles out.
00:43:02	S2	And then you don't match the lines up.
00:43:03	S4	I like the old box one. I like the idea of…the painting tool from Halo Wars seems to work quite well.
00:43:10	S2	Yeah. That's a good select all tool.
00:43:10	S2	So yeah, like I said, that would be found at the end of the cursor. So, your controller would be up here, this is the environment, and it would go down, and then the circle would appear at the point…
00:43:18	S3	Yeah, and just…
00:43:18	S2	…and then you'd…it'd obviously move [inaudible 00:43:21].
00:43:21	S4	And make that noise.
00:43:21	S3	I was going to say, and make that noise as well. You got an audio recording of that noise. Now, please, I hope to God you [inaudible 00:43:28].
00:43:28	S2	Okay. So, which one of these do we think is the worst? What about…so, we've got free shape, place in the square, the painting tool, just dragging the box out on the map…a vision-based box…

00:43:40	S4	I don't like the…the…doing that. Dragging a box out and placing it down. I don't like that.
00:43:46	S3	I…I don't…I don't like that.
00:43:46	S2	I think it would work for a really slow-paced game.
00:43:49	S4	Yeah, it's a bit too slow, a bit too faffy.
00:43:49	S2	Yeah.
00:43:54	S4	Compared to just, like, drag box.
00:43:55	S2	What do you think, Tom?
00:43:56	S3	I think A is…no, I don't think A'd work. The drag box might work…
00:44:03	S2	The one you place it.
00:44:07	S3	When you place it on the map. But, again, if you were playing an RTS game, that would be really annoying if the unit moves out of the box as you place it down.
00:44:13	S2	Yeah.
00:44:14	S3	That'd be really annoying.
00:44:17	S2	And then painting?
00:44:17	S3	I think the paint tool would be…is a really good idea.
00:44:18	S2	Yeah.
00:44:20	S3	In terms…just in terms…
00:44:20	S2	I've never heard that concept. [Overlapping conversation.]
00:44:20	S3	…it's…all it does is just [inaudible 00:44:25]
00:44:25	S4	It's…it's something they made to make non-mouse ones.
00:44:26	S3	It's…yeah, it is. Where…where on like an Xbox game [inaudible 00:44:29] in the middle of the screen.
00:44:34	S1	Just keep going. I'll try and find a point in the [inaudible 00:44:37].
00:44:35	S2	Okay. So shall we…it sounds like the placing the square and drawing the free shape were our worst ones. So which one do we think is the worst one?
00:44:45	S4	I don't like having to use both hands to draw a square. That's the thing.
00:44:49	S2	Yeah.
00:44:49	S4	At least when you're drawing a free shape, it can be quick, even if you're getting it wrong. Just two hands and then putting it down…I mean, it's good for, like, using it as a virtual space, I guess.
00:45:00	S2	Yeah.
00:45:00	S4	If you want to go, oh, I want to use this virtual reality to do everything. I want to be involved fully in the environment. I would rather do…I would rather have a free draw, just do a quick circle, and then these two points are near each other, so it connects. The start and the end are near each other, and they connect [inaudible 00:45:18].
00:45:18	S3	I personally…
00:45:17	S2	There you go. Just give it a sec, and he does it.
00:45:26	S1	It's a bit different than Halo Wars, too, I think. [Overlapping conversation.]

00:45:27	S3	Hold A. Hold A.
00:45:31	S1	Yeah, watch. Watch. There you go, and that's how it paints, and then that's good.
00:45:33	S4	That's quite a bit selection, and that's the problem.
00:45:36	S1	Well, I mean we're not talking about like the specifics here, but just the general concept.
00:45:41	S3	Yeah, that…that is…in terms of selecting multiple units on that sort of style, and if you think that was…if that was your VI, you'd just have a big circle of [inaudible 00:45:47] in the middle. You move that around, set where you want.
00:45:49	S2	So, we…oh, excuse me. We're going to rate the square where you place it as the lowest.
00:45:57	S3	Yeah. The free flow one, depending on how it works…
00:45:59	S4	I'd put that as the fourth.
00:46:02	S3	Yeah, depending on how it worked, I think that could be quite…
00:46:05	S4	But I want to know more about this vision-based box.
00:46:08	S1	Tom's idea.
00:46:11	S3	It'd just be simply…yeah, if you're looking at a battle and were like, okay, I want those, those over there…you'd just select those, those over there, and you just assume you're looking at…
00:46:15	S2	Well, isn't that just the same as that one, but you don't put…
00:46:17	S3	Don't place it down, basically.
00:46:22	S2	Yeah.
00:46:22	S4	I think I'd prefer that one to a free shape, to tell you the truth.
00:46:25	S2	So, the vision based…I prefer the vision based box to dragging the box, because I feel like thinking relative to the map is going to be really difficult in a 3D space to actually draw just a standard box.
00:46:41	S3	It'd be more [overlapping conversation]…
00:46:41	S1	Well, it'd be…it's a…it's a…
00:46:42	S4	Well, it's like a click and drag. Literally, like on Windows, it would be a…like that.
00:46:46	S2	But like, I think Tom's vision based one is actually what that means.
00:46:53	S4	No, this one is from…
00:46:53	S1	No, that's from drawing it on the map.
00:46:54	S4	So, let's say I'm on my table and I click point here, and then I click point here, it would draw the box over the environment, so it'd be ground based level. Whereas Tom's is…
00:47:08	S3	Yeah, as you say.
00:47:08	S4	…anything in this box…essentially, anything in this box…like this…I'm doing this…anything in this like this.
00:47:12	S2	But that's the same concept.
00:47:16	S4	No.
00:47:16	S3	No, it's not.
00:47:16	S4	No, no. It's not. This is like a screenshot from my point of view, the other one is locked to the ground.
00:47:19	S3	On the ground.

00:47:22	S4	But if you're…if you're zoomed in one times and you draw one that…so, it's…it's going to select more than if you zoomed in ten times and you draw one that size. Whereas if you draw between two points on the map, it's just…it's the same size, but you're not zoomed as much in.
00:47:36	S3	For instance, if I'm sitting here, and I want to select those, I'd just draw…like that, and I'd select those units there, which are in that box I can see.
00:47:40	S2	How are you drawing it?
00:47:44	S3	You just…the same way Matt was drawing the box out…
00:47:46	S2	Oh, okay.
00:47:46	S4	The thing I don't like…the thing I didn't like about the…the thing I didn't like about that place in the [inaudible 00:47:51] was having to use both hands to draw it out.
00:47:53	S2	Yeah.
00:47:53	S3	Yeah. That…or you…well, honestly, you don't have to do that. You could just simply do a…like, hold down, you'd just…
00:47:56	S2	And then…so the other drag box is you point and click at the map, and then just drag out a box.
00:48:01	S1	Yeah. So, it's…
00:48:01	S4	I'd prefer that to the vision based thing. If I'm numbering them, I'm going five, four, three.
00:48:07	S2	Okay. What do you think about it, Tom?
00:48:11	S3	The four and three switch around for me, but yeah. I'm…I'm…I agree with the…
00:48:16	S2	I've…I'm probably going to agree with Will, so…
00:48:19	S3	Okay. Yeah, well, I'll…I'll take that by general consensus.
00:48:17	S2	I'm going to put that four and three, but I'll put a little three-slash-four for Tom.
00:48:28	S4	Just put them as joint third.
00:48:33	S2	Okay. So now we have the painting and the dragging the box out.
00:48:37	S3	Oh, I think painting would be better than dragging the box out.
00:48:38	S4	I…yeah, but [overlapping conversation]…
00:48:39	S2	I think it depends on…
00:48:41	S3	It would depend on the game. It also depends on the game mode. The dragging would be more…
00:48:44	S4	Why would it…why would it depend on the game?
00:48:46	S3	If it's fast based like Ship Battle, for example.
00:48:48	S4	Every game is kind of fast paced.
00:48:54	S2	But that's not necessarily true.
00:48:55	S3	Not necessarily true.
00:48:55	S2	A lot of…a lot of strategy games let you increase the speed and stuff like that.
00:49:00	S1	So [inaudible 00:49:02] up the speed up.
00:49:03	S4	Well at the end of the day, like the select…the quickest selection…I've been…
		[Overlapping conversation]

00:49:08	S4	Or the games where you're using mice, you tend to be dragging boxes because that's a lot quicker to do with a mouse. Whereas I think if you're using…sort of where you're pointing it's quite a lot easier to go to there than to hold and then paint the units. And I've got to be careful because I don't want to get that one in with the rest of them.
00:49:31	S2	I think the painting could work, it just needs to be really…
00:49:33	S4	I mean, there is the also…obviously on PC there's something else you can add on PC you can always drag select one and then hold shift and then to drag select another set over here. There is always the option that you can select multiple times.
00:49:51	S3	Unless we're using the paint as kind of like a highlight and you just highlight the units you want.
00:49:56	S1	That's pretty much what it is.
00:49:58	S3	Yeah, but I was thinking about it like in the context of [inaudible 00:50:02] there's this big circle you made here. I quite like the painting one now, if I think about that.
		[Overlapping conversation]
00:50:09	S4	Because it's a lot easier if you just go touch, touch, touch, touch, touch. When you're just aiming and you don't have to drag it.
00:50:15	S2	Yeah, so that would be more if you were chasing something as well. So if you're trying to capture…I'm thinking…think if Halo Wars. If your war [inaudible 00:50:22] you'd have to zoom really far out for a box and capture everything to you have what was in it, but if you have a painting [inaudible 00:50:29].
		[Overlapping conversation]
00:50:34	S2	But the box is still very good.
00:50:36	S1	Okay. That was a particularly long question. Next question is how would a player order a unit to move. First one is just point cursor at location, press trigger. Trigger slash button. We're not talking very specific here **unless it's certain** things. The next one is you point and click, but before you point and click, you get given like a radial wheel appears somewhere and you kind of choose an option from that using the track pad. And those options could be like oh, I want an attack move to do it here or I want to just regular move or I want to do an attack or retreat or something like that. The next one is that you actually, physically put the controller on the location. So take away the cursor idea, you physically have to go and put the controller onto that location.
00:51:30	S4	Like when you're picking someone up in [inaudible 00:51:32].
00:51:32	S1	Yeah. The next one is that there's an arc line that comes from the controller lock like you know when you're going to teleport in the lab and you have the arc line appear. Like that, but just for selection. Yeah. And then the next one is point a cursor at a location…oh. This one is the idea that the map has a grid over it and it kind of ties into voice commands, is that it has a grid over it and you say move to grid five or whatever, you know? The next one is you draw a line from the unit to the location allowing for precise movement. So instead of, you know, normally you go this unit move here and then it will auto path around an object, but if you want, with this idea you say this unit I want you to zig zag, do anything that you want and you like paint a line essentially from the unit.
		[Overlapping conversation]
00:52:29	S4	You can do it in [inaudible 00:52:28]. If you hold shift, when you're in the unit you can do a line…
		[Overlapping conversation]
00:52:36	S1	Yeah. Like Rome 2 it's like waypoints, isn't it?
00:52:38	S4	You can free draw.
00:52:39	S1	Oh, you can free draw, okay. Well then yeah, exactly like that, then.
00:52:45	S2	I quite like that last one, but I'd also like…
00:52:47	S1	That last one also has the idea that if you do just click once it also just does a regular auto pathing.

00:52:53	S2	So I quite like that, but I'd also like the option to change the order type.
00:52:58	S4	I think maybe you select the unit or the group of units and then on that UI thing you can choose the type of move they do before they move rather than…because if you click on them and tell them to go…you click and tell them to go there and before they can go there which you might need them to do quite sharpish, you've got to go through another order thing, but if you select them and you want an attack move here then click. And the order's been…the type of move has already been given before the order for them to move.
00:53:25	S1	That's exactly…well said, but if you press up on…if you've had [inaudible 00:53:31] if you press like the top of the D pad for example, 12 o'clock position you still do a standard attack. Just move…and you just move straight to there and so it just moves on auto pass straight away. If you clicked like the war game where you've got a fast move then you can stick [inaudible 00:53:46] then you go fast how they jump on the road and [inaudible 00:53:50] and you've just got those…once you've played the game a little bit you get into a rhythm that this is quick and easy, quick and easy.
00:53:59	S3	So is that kind of a different one I guess?
00:54:01	S1	Combination.
		[Overlapping conversation]
00:54:03	S4	You know, your guys' idea is a combination of a multiple…
00:54:07	S2	So it's a combo of F and B? B, but with order before the move.
00:54:15	S1	So you select a unit and then what, do you click the location and then you choose the movement type?
00:54:23	S3	No, you would have chosen the movement type…
		[Overlapping conversation]
00:54:26	S4	Do the move and type and then click?
00:54:29	S2	You know that thing we were saying that the tilt brush thing where you can move over to maybe a page for moving or whatever. And then you can use the track pad to select the type of move you want them to do and the send them off or have it as a quick command maybe on the track pad.
		[Overlapping conversation]
00:54:53	S1	Whatever's on the track pad, you should probably just change the way you're doing. So if you've got a unit selected, you've have a different menu? Okay.
00:54:59	S2	Yeah, but I think that A and B are of all of them [inaudible 00:55:05] include in F, those are the most logical ones, just point and click.
00:55:10	S3	Like I said, just make your own.
00:55:11	S1	Okay. So what do we think about the verbal grid references?
00:55:14	S2	I don't like…I don't like the idea of a grid because you don't really have much fire control within the grid unless the grid is super like small. And at that point you've got to start saying lots of letters and lots of numbers and voice commands don't like it when you've got lots to say.
00:55:28	S4	I can tell you for a fact that having used and having to give references and that sort of thing as part of a radio course I did. If it was slow time then it wouldn't be that bad, but at the speed of an RTS you wouldn't be able to do it.
00:55:39	S3	Yeah, I agree.
00:55:41	S2	Not a quick environment.
		[Overlapping conversation]
00:55:45	S2	That is the worst idea.
		[Overlapping conversation]
00:55:57	S1	So what about the arced line?

00:55:58	S3	I quite like that, in all honesty, but I don't think it would work…
00:56:03	S4	It depends where you are…
00:56:03	S3	I quite like it, but I don't think it'll work.
00:56:06	S2	I think it could be difficult…
		[Overlapping conversation]
00:56:07	S2	[Inaudible 00:56:09] one say and we'd got the idea for **Empire Total War** where you've sort of got several tables and you're like I'd quite like to move there. Send them there.
00:56:17	S1	Yeah. So on the grand scheme of things.
00:56:17	S2	If it was on like a long distance movement, that would be fine. Like if you're moving them from here to somewhere at a set point distance…
00:56:22	S1	It would be good to see the arc…
00:56:24	S2	…but I wouldn't be putting them on a field, anywhere. Like if I was moving formations and stuff around or like individual little dudes around I wouldn't be like arcing around all the time.
00:56:35	S4	Yeah, so, yeah. I like it, but I don't think it would be very good.
00:56:40	S1	Okay. So should be put that at six?
00:56:42	S4	Yes.
00:56:44	S1	I'm going to presume we're going to put our idea as first?
00:56:48	S2	No, it's not, it's the worst one.
00:56:50	S1	Okay. So putting the controller on the location?
00:56:55	S2	I don't like that.
00:56:56	S3	I don't like it.
00:56:59	S4	I might actually say that that might be worse than the arc.
00:57:01	S2	That's worse than the arc.
00:57:03	S3	Yeah. I think yeah, six. I think that a six and the arc as five.
00:57:07	S1	Okay.
00:57:10	S4	Just think how if you want to do like a long range move, for example, of a plane. You'd have to go select the plane in the airfield, move the cursor all the way over to there.
00:57:21	S2	Speed might be my four.
00:57:23	S1	Your four. So the point and click and change the…
		[Overlapping conversation]
00:57:31	S2	Yeah. That [inaudible 00:57:31]. I agree.
		[Overlapping conversation]
00:57:37	S4	Yeah, I'd agree with that one.
00:57:39	S1	Okay. Okay so then the last two are put the cursor, point and click.
00:57:44	S2	I think that's number two.
00:57:45	S1	Or draw the line.

00:57:47	S3	I'd say three and two. Because pointing the cursor and clicking is just standard mouse RTF [inaudible 00:57:53].
00:57:55	S2	Point and click you can't really go wrong with it.
00:57:58	S1	The only reason why I say number one is the higher one is because it includes the ability to do more, you've got more.
00:58:05	SX	Are we done?
00:58:07	S1	Right, just give me a second.

(00:58:07)

(End of Audio)

Duration 58 minutes

Appendix C: Focus Group Transcript Part 2

S1 Facilitator

S2 Participant 1

S3 Participant 3

S4 Participant 3

Timecode	Speaker	Transcript
00:00:00	S1	Focus group part two, yay. Okay. Where were we? So, how would you play it out ordering it to attack? Again, the scenario, you already have the unit selected. So, number one is just, well, A, sorry, it's just point the cursor and click, press trigger button, whatever. Next one is, you put the controller on top of the enemy unit and press a button not using the cursor, again, using the physical controller. Next one is arced line, again, comes from the controller and the final one is similar to the one where you can...it's pretty much the exact same as the one where you choose kind of the order type before you execute it.
00:00:38	S2	But you choose it after you've clicked?
00:00:40	S1	So, you select the unit. It's the same what you...yeah. So, on this one, you selected the unit, then you choose the order, and then you click to[inaudible 00:00:47]
00:00:48	S3	It's essentially just...
00:00:51	S1	It's the same as the movement one, but in an attack version.
00:00:54	S3	I can put myself pretty clearly into this one.
00:00:57	S1	Okay.
00:00:58	S3	Like a four, three, two, one.
00:01:01	S4	So, was that A, B...
00:01:02	S3	B, C, D, A
00:01:03	S4	B, C, D, A
00:01:04	S1	So, you put the controller on top of the unit. I don't like that.
00:01:07	S3	That would be pretty good if you're playing something, like, black and white, where you're god, you know, die. But that's not this.
00:01:15	S1	What do you think, Tom, about this?
00:01:19	S4	Controller, yep, worst. B's the worst.
00:01:21	S2	Physically touching the unit.
00:01:24	S1	Maybe we're all just lazy.
00:01:25	S4	I think an arc can be quite good for just a...yeah, if you had, like, artillery, the arc would be pretty cool.
00:01:33	S2	But that could just be, that could just be something that shows up on screen.
00:01:36	S1	Well, yeah. That's just kind of, like, a more game room where the cursors change.
00:01:41	S3	It looks like they're closing at 5:00, so if I could make a quick exit at quarter to five, please?
00:01:44	S4	Yep. Will do.
00:01:47	S2	15 minutes. Quick, crawl.

00:01:50	S4	So, bud, fastest.
00:01:51	S1	We can always continue this back at yours.
00:01:53	S3	Yeah. That's fine.
00:01:54	S4	So, yeah…arc…yeah, fair enough. Yeah. That's number three.
00:02:02	S1	I would agree.
00:02:03	S4	B, number two, and A, number one.
00:02:04	S2	Okay. Yeah. I agree with all of those.
00:02:07	S4	Again, you can't go wrong with point and click.
00:02:08	S2	Yeah. It is just so intrinsic and simple. If the library closes at 5:00, why would you have to get out at quarter to?
00:02:17	S3	Because they've got to shut the rooms.
00:02:19	S2	But then it doesn't close at 5:00. It closes at quarter to…
00:02:23	S1	Next question, next question is, so…
00:02:29	S2	What would the UI like?
00:02:30	S1	Yeah. What would the UI look like? Well, number one, really, does the game need a UI? I think the answer's yes.
00:02:36	S2	Yes.
00:02:36	S1	And then, what would it look like? The number one is a tilt brush style similar to, you know. On this one, you can summon it and make it disappear. So it's just exactly like tilt brush, but if you want it gone, you can get it gone.
00:02:53	S3	You mean, like, when you can bring it over your shoulder?
00:02:55	S1	Well, no. You just press a button and it makes the tilt brush disappear.
00:02:58	S3	Okay. That's fair enough.
00:02:59	S1	The next one is, the player…the UI is summoned as a square hovering into the side of the player. The direction is decided by the player. If they want it to be left, they can put it on the left, they can put it on the left, on the right. But, essentially, it's like a hologram, but it's always…it's not directly in front of them. It's slightly to the side of them and then that's got all their information on. The next one is, the UI's located on the player's arm. It's similar to tilt brush…well, obviously, tilt brush is on the controller. On this one, it's like a minority report, I think, or something like that. You know, it's like rotate around the arm instead of around the controller.
00:03:31	S4	Mass effects omni tool, basically.
00:03:32	S1	Mass effects omni tool. There you go.
00:03:36	S2	So, like, a wrist thing?
00:03:37	S4	Yeah.
00:03:37	S1	Yeah. The next one is just Google tilt brush, but it can't be turned off, so it's, you know, different to A, but it…the same as A, but it can't be turned off. It's always on. And then the next one is, it's a UI and it's on one of the players' controllers, not both, and it's a clipboard. So you, like, hold it up and it's, like, down like this, essentially.
00:03:59	S4	I'd probably say that, really.
00:04:02	S2	The clipboard?
00:04:03	S4	You know the clip…the…no. What's always on, the tilt brush sort of style which is always on. So that way, you've always got one as your reference, really.
00:04:12	S3	But we could always…you could always just have it on whenever you touch the track pad.
00:04:16	S4	Yeah. We could because then you could use the trigger as, like, a select.
00:04:19	S3	I don't like the one where it's around your arm because that's lots of scrolling.
00:04:23	S4	Yeah, and you've got to go, like, all the way around.
00:04:27	S3	I think you use that robot mechanic thing where you're spinning stuff around it. It does tend to go have a bit of a will of its own. I do like the idea of it being a clipboard just for sematic purposes, but I think that the tilt brush is the best one to go.
00:04:45	S4	I think the tilt brush is definitely…

00:04:46	S3	Summoned at will.
00:04:47	S4	…because you can have three screens, three clipboards almost around and you can track that across between these that you do already, but yeah, that's how I would want to do it. But I think that's the best one
00:04:56	S1	Okay. So we like the tilt brush one, I think?
00:04:59	S4	Yeah.
00:05:00	S1	Because I would agree, the tilt brush is the best idea. But do we want it to be summoned or do we want it to be always on?
00:05:05	S4	Always on.
00:05:05	S2	I'd have it summonable.
00:05:07	S4	I'd have it as always on.
00:05:08	S1	I would agree with summonable, to be honest.
00:05:09	S2	Because then you've got…
00:05:10	S3	This isn't…this doesn't say, by the way, that it's summoned as in you have to hold the button. You could just have it as, you tap it on, you tap it off. Like in, you know.
00:05:20	S4	Summonable would probably be…yeah, okay.
00:05:23	S1	I'd rather have the option to not have it than have no option to not…
00:05:25	S4	I quite like the idea of if you have to [inaudible 00:05:27] and then activate it. So it's like a gesture movement, but like a gesture movement.
00:05:32	S2	But if you just touch the track pad, yeah.
00:05:33	S3	Button falls out.
00:05:35	S4	If you have that sort of thing, you might do back.
00:05:38	S3	Well, you just press the button.
00:05:39	S1	Or you just let, leg it out the trap.
00:05:41	S4	Anyway, yeah, that's summonable. It's only one of those two…
00:05:47	S1	Okay. So I'm going to say…
00:05:47	S3	That's the worst one.
00:05:49	S1	So you think that around the arm is the worst one?
00:05:50	S3	Yeah.
00:05:52	S4	I think it would be cool, but…
00:05:53	S1	I would agree. It's quite hard to rotate round it…
00:05:56	S4	I think clipboard…
00:05:57	S1	…unless you use the track pad to scroll it.
00:06:00	S4	Clipboard would be the worst one.
00:06:02	S1	You think clipboard's the worst one?
00:06:03	S4	Yeah. I think it's permanent, like, if you do actually like the clipboard, if it was a clipboard that you had to, you know, select.
00:06:09	S3	Yeah. Actually, I might agree with that. I like the semantics of…
00:06:11	S1	Yeah. I'm kind of in between, so I'll go with it. And then, so you want to put this one as four?
00:06:16	S4	Yep because I think that would be cooler than a clipboard. That's the only reason I'm saying it.
00:06:21	S2	Is the square one always on? This square by the side of the player?
00:06:28	S1	It's summoned, so…
00:06:29	S4	If it says summoned…
00:06:30	S1	So no.
00:06:31	S2	I'm torn between D and B, then.

00:06:33	S1	I don't like the idea of it being a square because it's just going to, just become this big thing, part of your vision which you can no longer see.
00:06:43	S4	I wouldn't mind if…
00:06:44	S3	Imagine you do the Google Earth one, you know, when you press the menu button it came up with where you can jump to, you know, the different cities. It would be like that, but, like, hereish.
00:06:53	S4	I wouldn't mind if you looked down.
00:06:56	S2	I like the idea of having it…I think I prefer the idea of having it there. So at least I can, like, move it out of the way and then bring it back up again. We just have a square that comes on and off.
00:07:07	S1	Do we want the square to be three?
00:07:09	S2	I'd put the square as three.
00:07:10	S1	And then the summoned one is one or the non-summoned one is one?
00:07:16	S2	I'd say summonable is one
00:07:17	S4	Summonable one and then non-summonable…
00:07:21	S3	We're going with the Google tilt brush style?
00:07:23	S1	Yep.
00:07:25	S1	Okay. Next question is, is just how does the player interact with it? Number one is similar to Google tilt brush. You use one controller to touch the menu. And the other one is that you physically touch the menu with the controller, so you jab it kind of, you know, jab the menu.
00:07:39	S3	So you have a cursor or you touch it with the controller?
00:07:41	S2	I prefer the cursor.
00:07:42	S1	Yeah. Same. Well, the laser.
00:07:47	S2	Well, yeah. Laser cursor.
00:07:47	S1	Tom?
00:07:48	S4	I honestly in terms of, I call it the tilt brush one. I call it the actually, you know, when you can't scroll across it, just because it felt natural to select stuff.
00:07:56	S3	Wait, I'm confused. So we're just selecting things off that UI?
00:08:02	S1	That's how you interact with it.
00:08:03	S2	I'm presuming we have the tilt brush UI already, so…
00:08:06	S4	Oh, okay. Fair enough.
00:08:07	S2	So do you want to point and click or do you want to actually touch it?
00:08:10	S4	Point and click.
00:08:12	S2	Okay. I would agree. Yeah. Touching it just seems unnecessary.
00:08:17	S1	Next question is how would the player build the unit? So first one is, players select a UI and then the…sorry. Player selects the building, so, you know, if you want to build a tank, you click the tank factory. At that point, then, the main UI then switches to it, so it becomes a contextual menu allowing the player to build the unit of their choice. The next one is a UI element different from the main UI, so you have your main UI, but in this scenario, a different UI appears somewhere and it appears above the unit, above the building. So you click on the building and then above that building, a new UI appears. So the next one is, it's on the main UI again, but what you do is, once you built it, you can then drag those units into the world and that kind of sets them a rally point like on war game, you know, when you build in a war game, you click them into the world and work it like you build and then move into that…
00:09:10	S3	…world when you line up something from space.
00:09:12	S4	Yeah. That's pretty good.
00:09:16	S3	I like the idea of keeping it contextual, having it, all your UIs on that thing there. So you click the building and then it comes up and you choose from that.
00:09:25	S1	So, like, on a tilt brush, it would, like, switch to that side.
00:09:28	S3	Yeah. You could have, like, a unit selection thing and it's got stuff like rally points and that.

00:09:36	S2	Yeah. I really like the idea of having it all just consistently where you know it's going to be. It's almost like having a UI.
00:09:43	S3	Yeah. I'd rather do that because you can click the building and then do that and while you're doing that, you can be looking off at something else.
00:09:48	S4	Yeah. I think A, C, B for me, personally. In my opinion.
00:09:53	S2	Yeah. So that's...it comes up on your tilt brush and then...
00:09:56	S3	Yeah. In descending order, A, C, B.
00:10:00	S2	Okay. I would agree. I'm not a massive fan of it popping up because I feel like it's going to be fiddly trying...
00:10:07	S3	If you're playing a game where you're going to make a unit, it's like in war game. C would be the better choice, I think.
00:10:13	S1	Well, even on Company Heroes where mainly, you know, Company Heroes mainly you do...
00:10:16	S3	Yeah, kind of reinforcing the same thing.
00:10:18	S1	But in Company Heroes, you mainly click the building and then build off the building. But, in Company Heroes, you do actually have that option in the corner at all times. People just don't notice it. Okay. So the next one is...
00:10:28	S2	We're probably not going to be able to finish this today.
00:10:30	S1	...how would a player know what unit is currently selected? So the first option is, they summon a new UI element that's not the main UI and it just has that information telling them where it is. Next one is a portrait above the unit. You know, some games, Company Heroes, have it where there's just a little floating icon above the unit that you have selected. Next one's a highlight around the unit. Next one is just you press a button and it jumps to that unit. It physically moves your camera to that unit so you know. Next one is on the main UI and the next one is a hologram UI that is above the cursor. So at, like, the end of your cursor, you're halfway up the laser cursor or whatever, there's just a little teeny thing that says.
00:11:13	S3	I would go for a combination of B, C, and E because I think when you select a unit, it should be up on your thing there so you can do stuff with it.
00:11:24	S4	Yeah. B, C, and E. Yep. A combination of them three and then, in terms of B, C, and E, I definitely think, probably B, C, and E in that order if we're going to organise them. So the best one would be a combination of all three, but B, C, E in that order in that order of one, two, three.
00:11:42	S3	I think you can have...I think in Company Heroes, they have the portrait and a highlight round them as well.
00:11:48	S2	Okay. So we'll put that as one.
00:11:51	S3	Say one, two, three, four.
00:11:54	S2	Two, three, four. And then...
00:11:58	S4	I think a hologram of the unit would be really annoying.
00:12:04	S2	I think D might...we could have it as an option on the UI.
00:12:07	S3	That could be an option on the UI anyway.
00:12:10	S4	But in terms of...
00:12:11	S3	I wouldn't want that to be the only way. I think that's the worst way of knowing that's how I've got...the only way to know you've got something to access is to jump to it if you're doing something here and then there.
00:12:20	S2	Yeah. But should we say that D should just be an option if you want to do that?
00:12:24	S4	Yeah, with D as an option.
00:12:28	S2	So if that's the only way of ordering it, should we put it low?
00:12:33	S4	Yes.
00:12:35	S2	That is the only way we know that's the unit we've selected.
00:12:40	S4	The hologram. I think that could be really irritating. If a hologram unit appeared above the cursor.
00:12:46	S3	I would rather have the hologram than a different UI element.
00:12:51	S4	Okay. Fair enough.
00:12:53	S3	So we figured that one out.
00:12:55	S4	Yep.
00:12:56	S3	Four minutes.

00:12:58	S1	How would a player order a unit to use a special ability? The first one is the player summons a new UI element that is not part of the main UI and then they interact with that. The next one is, when a unit is selected, the main UI changes to that unit, so it's kind of, like, unit contextual and then on that, like, unit, selected unit, it has a specific interface that they can use on the main UI. The player makes a hand gesture with the controllers when it came up, so, you know, yeah. So if they want to fire a missile, they draw the shape of a missile, something, just a hand gesture in general. Next one is, they press a button on the controller. Next one is, the player uses, using the track pad on the dominant hand controller, it allows the player to rapidly switch through different abilities left and right similar to a mobile phone and they can kind of select off that. The last one is possible it could clash, if you think about it, with your flicking through UI.
00:13:53	S3	I think the main UI change into the unit one and then selecting it like it's tilt brush.
00:13:59	S4	Yeah. That's what I was going to say.
00:14:04	S3	Maybe the last question we can do after again.
00:14:07	S1	There's only two more questions after this so we'll just stay. We can do it.
00:14:12	S2	Okay. So what do we think is last? The hand gesture is kind of cool, but I feel like you can either accidentally do it or it's not going to work.
00:14:19	S4	One word. Gimmicky.
00:14:20	S3	Five, four, three, two, one.
00:14:22	S4	I think C's the worst
00:14:24	S2	So C's the worst and then you say using that because I don't like that work with our UI.
00:14:29	S3	With our UI. We've invented a game.
00:14:32	S4	We've been doing this in this place.
00:14:34	S2	And then the button or the different UI element.
00:14:36	S4	I think push a button probably the second best option is pushing a button.
00:14:39	S3	I'd rather a different UI element.
00:14:42	S2	Yeah because it's the eye. You've got limited, you've got limited buttons on this thing anyway.
00:14:46	S4	Yeah. More for example, if you add, I don't know, like a movement radial wheel, for example, on a track pad as your main thing. [Inaudible 00:14:52]
00:14:54	S2	Well, that's our UI, right?
00:14:55	S3	That's the UI
00:14:56	S4	Yeah. So that would be going down, then up.
00:14:58	S3	Two minutes.
00:14:59	S4	You could just have it say pull the trigger.
00:15:01	S2	We could just do this...I'm worried about them getting a bit annoyed.
00:15:07	S4	It doesn't take us 15 minutes to leave the fucking building.
00:15:08	S1	There's only two more questions anyway. Have you done...you finished special ability?
00:15:12	S2	We've done that. So now we're on the victory progression.
00:15:15	S1	So our victory progression. The information is just found on the main UI. Next one is on the main UI, but you also have pop-up alerts in the environment for certain special events such as if a position is captured. The next one is, there's a flag in your main base that goes up and down depending on how close you are to victory. The environment has an overlay. The colour of the environment shows who is winning which is similar to...
00:15:37	S3	Steel Division.
00:15:38	S1	Steel Division. Yeah. That is the best spelling ever. Similar to that. There's a new UI element that is not part of the main UI that is hovering above the environment that shows us information. The player must physically look to see it, so it could be up in the air, so they physically go, boop. There's another one which is doing another hand, doing a hand gesture that, like, reveals a new UI that shows their progression. Or the final one is information is via audio.
00:16:13	S3	I don't like the idea of having to do a hand gesture and I don't like the information being solely audio.
00:16:17	S2	No. I don't like either of those.
00:16:18	S4	I think combination.

00:16:21	S2	So you want an audio cue but you don't want it to just be audio.
00:16:24	S4	Don't abuse audio. That's the worst one because it's like…
00:16:28	S2	That's the worst one.
00:16:29	S3	If you get distracted for half a second, you have no idea what's going on.
00:16:31	S2	I'm going to start on H, then, and say G pull us. So seven, the hand gesture thing, what do we think?
00:16:40	S4	Hand gesture to find out, to find out what you want to do, you have to go through [inaudible 00:16:43]
00:16:44	S2	No, but if you just do like that, then you flick out your victory progression, you go, oh, that's what I need to do, and then you flick it back.
00:16:49	S4	The one I thought like…
00:16:54	S2	Because you're never going to do that unless you're specifically doing…
00:16:58	S3	I mean, to back that idea up, I can say this, is that it works well in that pirate game as you saw. It was responsive to doing that.
00:17:07	S4	The thing is, once you do that, does it fill the screen and then you have to flick it back again?
00:17:12	S2	I think it pops up on the UI when you do that.
00:17:14	S4	Personally, I prefer it, if I was in that route, for example, the route it's sort of set in, all right? I prefer it…if I was like, if I looked on my wall and it had, like, a bar moving across it, I'd prefer to go like shit, how's the game? Good. All right, okay? Good. And then it doesn't have to do anything…
00:17:30	S2	I feel like you get annoyed…
00:17:32	S3	You can't look away from it and then you're going to have that in that same spot.
00:17:36	S4	It would be a couple of seconds.
00:17:37	S3	Yeah, but if you've moved around the board…
00:17:41	S4	Or it could just be hovering above the board. Anyway, you just look up.
00:17:45	S1	He's trying to say it's always in a fixed location.
00:17:47	S4	It's just always there. It's just always there.
00:17:49	S1	Are you say that no matter what your orientation is, it's always kind of there?
00:17:52	S4	Yeah. It's just always there.
00:17:53	S3	It's just above you.
00:17:54	S4	It's just above you. It's just there.
00:17:55	S3	Look away from what's happening to see…
00:17:57	S2	Yeah. I don't like that.
00:17:59	S4	But I'd rather have that than do having to do anything.
00:18:03	S2	I quite like the idea of just pulling it out from behind your shoulder and then throwing it back.
00:18:08	S4	I think that'd be…it wouldn't be a button as such, but it'd just be something you'd have to, you know, it's just something to do rather than just looking at something.
00:18:22	S2	So let's have a look at some of the other ones.
00:18:23	S4	I think you definitely need…because you need to have audio.
00:18:28	S2	What about the overlay?
00:18:30	S4	Overlay over current UI…don't know.
00:18:38	S3	I don't think…if you've got all the other stuff on there, maybe if you had, if you hadn't selected anything, it is on one of the pages.
00:18:47	S1	We've got time. It's cool.
00:18:51	S2	So what? You mean don't have it on the main UI?
00:18:55	S4	It's a difficult one to get right.
00:18:56	S3	I don't know. I can't…I need a lot of time on this one.
00:19:00	S4	It's port. Let's have a recess now and discuss it on the way home back to… Matt's.
00:19:05	S1	So we've got the victory progression and the time date…

00:19:12	S4	We returned that, returned that story now here that's now read the paper.
00:19:17	S2	Must have gone during the orgy. So now we're seeing our victory progression. Are we seeing it…so we've got the, on the main UI, on the main UI and we have pop-up alerts in the environment, a flag that goes up and down depending on how close you are, the environment has an overlay, UI, a UI element not part of the main UI is hovering above the environment, and to see the plan, you must look at it, and hand gesture summons a new UI.
00:19:47	S3	I like the hand gesture thing. I like having it a bit available on the main UI. Like, if you had nothing selected, it's the thing that's up there. But, if you've got something selected, you don't necessarily want to completely deselect everything to see it. So you might have to flick over the top and it just comes up in front of your face for a bit and you flip it out.
00:20:09	S4	So you're saying you…you flip it over and it's like a new UI element? It doesn't…
00:20:13	S3	Like a semi-translucent…
00:20:14	S4	And it **just** pops…
00:20:15	S3	…UI element…
00:20:15	S4	…up in front of you.
00:20:16	S3	…so you can sort of see through it.
00:20:17	S4	Yeah.
00:20:17	S3	It's not like looking away.
00:20:20	S2	What do you think Tom?
00:20:21	S4	I…'cause…I'm thinking of current **RTS**, you don't actually do anything to see the, you know, progression. Like, it'll be at the top of the screen, it'll be like a bar at the top of the screen or…
00:20:34	S2	Mm-hm.
00:20:34	S4	…it'll be, like, under the mini map, off to the side. It's just something you glance at and I think that should be replicated and you shouldn't have to do anything to activate it to see it. 'Cause if you think about it, when you're, like, on, for example, Battlefield, for example, where you have to…and you press the start button to see how many points you got on parkour, for example, it gets quite annoying and that sort of thing. But that's my thinking, I…I think it should be just hovering there in the environment that you just glance at.
00:20:59	S2	Hmm.
00:21:00	S4	It's a personal opinion, but I do like the gesture thing, having considered it. The gesture thing could work, but I think it'd have to be done well…
00:21:07	S2	Yeah.
00:21:09	S4	…for it to work properly and it should have a timer or something so it doesn't…it's not always in front of you.
00:21:12	S2	Okay. So what do we think…so let's pick a sixth. So what…
00:21:17	S4	Okay. So the worst ones I think…
00:21:21	S3	The flag's not great.
00:21:23	S4	I think…no…
00:21:24	S2	Yeah.
00:21:25	S3	I might put the flag lower than…**just over** the audio thing to tell the truth.
00:21:30	S2	I dunno 'cause the audio thing…
00:21:31	S4	No, I think the audio thing **is**…
00:21:31	S2	…if you're deaf then you kinda…I would put the flag pretty low as well.
00:21:38	S4	I think flag, yeah, okay. Flag is **six**.
00:21:41	S2	Okay. **And do you** agree?
00:21:43	S3	Yeah.
00:21:43	S4	I think…I think the next one (would) probably be environment as an overlay.
00:21:50	S2	Hmm.
00:21:53	S4	Mm-hm. 'Cause it…

00:21:53	S2	Well, if you zoom…
00:21:53	S4	…I don't think…
00:21:53	S2	…really far out…
00:21:54	S4	Yeah, but as…as an overlay, it doesn't really tell you who's winning.
00:22:03	S2	Hmm.
00:22:07	S4	It doesn't really tell…it just gives you an indicator to say, you know, you **earned** this, really. That's all it can really show.
00:22:12	S2	Hmm.
00:22:13	S4	Unless there's like…as an overlay…if you had, for example, down the side of the table edge, you just thought you'd see like a bar moving…swing…like a who's winning…
00:22:21	S2	Yeah.
00:22:22	S4	…victory bar, so that, you know, obviously, if you've killed more units it's towards your side. That would be a good overlay, in my opinion, but…
00:22:27	S1	But if you zoomed all the way in you wouldn't be able to see it.
00:22:30	S4	You wouldn't be able to see it. 'Cause you…
00:22:31	S3	That's…
00:22:31	S4	…oh, 'cause you're focusing on the fight not that.
00:22:33	S2	Yeah.
00:22:35	S4	Then…but then again…but then it…
00:22:35	S2	I like that idea though.
00:22:36	S4	…but then it falls under the same category of, it's somewhere in the game, I have to look at.
00:22:40	S2	Yeah, but it's not, like, on a separate wall.
00:22:42	S4	Yeah.
00:22:44	S2	It's next to the game area.
00:22:44	S4	Yeah, fair enough. It could just be…you know Tron? The film. I'm thinking of the film, where you just look and it's on the roof, you know, a tile on the roof.
00:22:52	S3	You don't wanna move your head round lots though.
00:22:54	S4	**No**.
00:22:55	S3	That's the thing.
00:22:55	S4	**Yeah, no**, but I do know what you mean. But I…that…that's my thing. I don't think the overlay's very good. So the overlay is fifth for me.
00:23:03	S3	I…I could agree with that.
00:23:03	S2	Yeah. But I do like the idea of having a bar down the side of the…
00:23:07	S3	Mm-hm.
00:23:07	S2	…map.
00:23:08	S4	That could work for me, but…
00:23:09	S2	Should we put it in our separate one?
00:23:12	S4	Could do. So it's…you know, it's a bit of an overlay, sort of thing.
00:23:15	S2	Yeah, but it's not really over the…
00:23:17	S4	No. No…
00:23:17	S2	…area…
00:23:17	S4	…it's like…
00:23:18	S2	…it's like extra.
00:23:19	S4	Yeah, extra to…

00:23:19	S2	Yeah.
00:23:20	S4	…the game area.
00:23:20	S3	Overlay extra to game area.
00:23:22	S4	Yeah.
00:23:32	S2	Okay. So then we have the other options of the hang gesture, the UI element, not part of the main UI's, hovering above the environment…
00:23:40	S4	See I think…I…I think…I…I like that idea myself.
00:23:45	S2	Yeah.
00:23:46	S4	So however you…I've personally thought I'd like that in the…which one was the one which you quite liked? The…was it on the main UI?
00:24:00	S2	I liked the hand gesture.
00:24:00	S4	Was it A? The hand gesture one?
00:24:00	S2	Like flipping it on and then just throwing it away.
00:24:03	S4	That could actually be quite good for…as an **all H** as well of it. So you get the audio prompt, it's just down the side of it, but if you need it in a hurry you can do a hand gesture and it pulls out a quick…
00:24:11	S2	Mm-hm. Okay.
00:24:12	S4	I quite like that. I think that **could work**.
00:24:15	S1	Yeah.
00:24:17	S2	What about the popup alerts? See, I kinda think…
00:24:20	S4	I think…
00:24:21	S2	…that would be…
00:24:20	S4	…that would…
00:24:21	S2	…a useful extra…
00:24:22	S4	I think the…
00:24:23	S2	…if…
00:24:23	S4	…pop alerts in the environment for certain events.
00:24:25	S2	Yeah, but…
00:24:27	S4	They could…
00:24:27	S2	…if you have, like, something like, it says, there's contact.
00:24:32	S4	Yeah.
00:24:32	S2	So…
00:24:32	S4	Yeah. Yeah. Okay. Fair enough**.**
00:24:33	S2	…your unit's getting shot and it pops up and you can just click on it…
00:24:36	S4	Yeah.
00:24:37	S2	…and that takes you directly to…
00:24:37	S4	Yeah. Yeah.
00:24:37	S2	…that area.
00:24:38	S4	Okay. Granted, yeah that's…granted, that could work.
00:24:40	S3	But you don't necessarily want that for victory progression.
00:24:42	S4	No.
00:24:42	S2	No.
00:24:43	S3	**Other than**…
00:24:43	S4	So I can understand it as, like, it would work as, like, a UI prompt…

00:24:48	S2	**Hmm.**
00:24:49	S4	…but as a way of tracking victory progression, I don't think it would work.
00:24:54	S2	Okay. So I'll write down...
00:24:56	S4	Like, for example, the…
00:24:59	S2	…maybe not…
00:24:58	S4	…popup saying…
00:25:00	S2	…for victory progression.
00:25:00	S4	…it's like a popup saying you're losing over your base when you're looking at the…
00:25:04	S2	Right.
00:25:04	S4	…enemy base…
00:25:04	S2	Yeah.
00:25:04	S4	…wouldn't be very useful.
00:25:06	S3	It's not **unit space**…
00:25:08	S2	So shall we put that as four? The popup alerts?
00:25:12	S3	Yeah, I think I would.
00:25:14	S1	We could always include the popup alerts into your idea, just…just to like…
00:25:16	S2	Well, we just think it shouldn't be part of the victory progression is all.
00:25:20	S1	Yeah. Fair enough.
00:25:21	S4	Yeah. So, yeah, I agree with Jeff.
00:25:26	S2	So then we got the hand gesture, the other UI element hovering above the environment and finding the information on the main UI for our three last options.
00:25:32	S4	I…I think the…
00:25:35	S3	I think looking away…of those…of those three, looking away from it's the worst one. I would say three and then joint first for those two.
00:25:46	S4	I…so I…obviously our new one…our H…H1 is probably the top one in my opinion.
00:25:51	S2	Yeah.
00:25:53	S4	And then I'd…I…me, personally, UI in the environment, hand gesture and then on the main UI.
00:26:02	S2	As in? Is that going from best to worst?
00:26:03	S4	Yeah…
00:26:03	S3	**Reaching on**…
00:26:04	S4	…yeah, from best…that's myself 'cause I'd prefer to have it just as a point of reference so I can…I know that if I look…
00:26:09	S3	I would like if it was a thematic thing. So you could look up and there's a clock above you or whatever.
00:26:15	S4	Yeah.
00:26:16	S3	That's all right, but its…as a…as an…like it…
00:26:18	S4	Or for example…
00:26:19	S3	If I had the ability to look up and see a clock or hand gesture and it comes up, I'd do the hand gesture.
00:26:23	S4	Well, for me, for example, if you had, like, points that you had to win, so victory points to win, if you just looked up and there was a timer and 1,000…
00:26:30	S3	Mm-hm.
00:26:30	S4	…1,200, you could just, at a glance, go, shit, I'm losing, bad. It's the same way…
00:26:34	S2	So it's not…but that's not hovering above the environment?
00:26:36	S4	That…it would be hovering above the environment 'cause you have to just look…

00:26:39	S3	Yeah, I'm imagining this, like, in the middle of the table.
00:26:41	S4	That's...that's my...**yeah**...
00:26:42	S3	So wherever you look...
00:26:42	S2	Okay.
00:26:42	S3	...from the table it's up.
00:26:44	S4	That's...that's what **I**...
00:26:44	S2	Okay.
00:26:46	S4	Like, so it's, you know, in the environment, like, hovering above the...above the environment shows information.
00:26:51	S2	I just don't wanna have to look away from what I'm currently looking at.
00:26:54	S3	Well, that's why I put it as third.
00:26:56	S4	Mm-hm.
00:26:55	S2	Yeah.
00:26:57	S4	Okay. Fair enough.
00:26:57	S2	Do you...no...
00:26:58	S4	Yeah. Yeah, fair enough.
00:26:58	S2	Like, do you see where I'm coming from?
00:27:00	S4	Yeah. Yeah. Yeah.
00:27:00	S2	Like, 'cause if you're thinking, oh, should I build this unit, do I actually need to...
00:27:06	S4	Yeah.
00:27:06	S2	...or can I build something else...
00:27:07	S4	Also, we've gone...
00:27:07	S2	...**in the end**...
00:27:07	S4	...we've got three options left, but we've got four options left.
00:27:09	S2	I know, I need to change those.
00:27:10	S4	Yeah.
00:27:20	S3	So four for E?
00:27:23	S4	Yeah. Okay. I'd...I see there...can we put them as joint? So **overlay**...
00:27:27	S2	I think we could put...I think, to be honest, you could have the hovering of both and have ...
00:27:32	S4	On the main UI.
00:27:33	S2	...the hand gesture thing.
00:27:34	S4	Yeah.
00:27:36	S2	'Cause the hand gesture thing just...it's kind of like...so I don't want it to be on...personally, I don't want it to be on the main UI 'cause I don't wanna clog it.
00:27:44	S4	Yeah, that...
00:27:44	S2	**So** I don't want...
00:27:45	S4	...that was...
00:27:45	S2	...I don't want information in the main UI...
00:27:46	S3	Yeah.
00:27:47	S2	...that we don't need.
00:27:47	S4	That's my thought. I think it'd be a good place to put it, but I think it would clog it up.
00:27:50	S2	Yeah. What do you think Mark?

00:27:52	S4	So I agree with Will when he says about the...
00:27:53	S3	Agree with that.
00:27:54	S4	...when he's like...when he's deselected everything, when you've got nothing else selected and you're just watching the battle for example...
00:27:59	S3	It's...your quick your stats, time to go...
00:28:01	S4	Yeah.
00:28:01	S2	Yeah.
00:28:01	S3	...points.
00:28:02	S4	That would be a good thing on the main UI, but I think that would clog up if you had...
00:28:06	S2	Yeah.
00:28:07	S4	...if you had it as, like, a permanent thing on the top...
00:28:08	S2	Yeah.
00:28:08	S4	...bar of the UI.
00:28:10	S2	So victory could be on UI, but only when selecting nothing.
00:28:18	S3	When nothing else is there.
00:28:22	S2	And then what **would we think are** the last two?
00:28:28	S3	Hmm. Three and two I think. I think the hand gesture's the best one out of having to look away.
00:28:37	S2	Mm-hm.
00:28:38	S3	That and the having to look away one.
00:28:39	S4	I'd...I'd put those two joint, in my opinion, just **'cause**...
00:28:42	S2	I think...
00:28:42	S4	...you can't...
00:28:42	S2	...we can have both.
00:28:43	S4	I...
00:28:45	S3	I think you could have both, but of...
00:28:44	S2	Yeah.
00:28:45	S3	...those two...
00:28:45	S2	Of those two, I would prefer the hand gesture thing.
00:28:48	S4	And I'd prefer to look away, just because I wouldn't want to do the hand gesture.
00:28:50	S2	Well, I'm gonna add those both into our...I've already got F in.
00:28:54	S4	Mm-hm.
00:28:56	S3	That's...in this one, we want a bit that and a bit...
00:28:58	S2	(Laughs). Well, that's fine, right?
00:28:58	S3	...c, d, e, f and g.
00:28:59	S2	Okay. But shall we put an order on these. So I'm gonna say because two of us...well, we could just put them joint.
00:29:08	S4	Just put them joint third.
00:29:09	S2	Is that gonna be a problem?
00:29:09	S1	Don't do joint, no.
00:29:10	S3	No, don't do joint.
00:29:11	S4	Okay. Fair enough.
00:29:12	S2	So...

00:29:12	S4	Seeing as it's two to one, put hand gesture…
00:29:14	S2	Hand gesture second.
00:29:15	S4	…hand…
00:29:15	S1	Yeah.
00:29:15	S4	…gesture second.
00:29:17	S2	Okay. Last question.
00:29:18	S3	Hmm, it's on record.
00:29:20	S4	There's a record. (Laughs).
00:29:21	S1	How do players see time, slash, date, slash, season details; first one is press a button and you are told by audio, next one is on the main UI, next one is a UI element that is not part of the main UI, is floating in the sky above the player consistently, next one is rolling one of the controllers onto its back, so if you're holding the controller like this, you're actually physically turning it onto its back. With some of the new part of the UI, information is found on there, so it's just kind of like hand gesture really.
00:29:47	S3	I would put time and that with the victory conditions.
00:29:50	S4	Hmm. Yeah.
00:29:51	S2	Hmm.
00:29:51	S3	If you're in game.
00:29:54	S1	Well…and the next one's just there's a watch on the player's wrist that has all the information. I agree, but **it's too late.**
00:30:00	S3	Like…hmm…
00:30:00	S1	…not an option…
00:30:00	S2	I would say, yeah, should we just have an extra option, just say, put it in the same place as the victory…
00:30:04	S1	**Yeah, put**…
00:30:05	S2	…conditions?
00:30:05	S4	Yeah.
00:30:06	S1	Yeah.
00:30:06	S2	Yeah?
00:30:08	S4	Yeah, same place as victory…'cause you'd wanna know that in there really.
00:30:13	S2	Yeah, you don't really care about the time…
00:30:15	S4	No.
00:30:15	S2	…if you don't…or you, like, whenever you care about the time, you'd probably care about the victory.
00:30:19	S4	Yeah, like, oh, shit, I need 3,000 points to win, but I've got, you know…
00:30:23	S2	Yeah.
00:30:24	S4	…ten minutes left which…
00:30:25	S3	Got two and a half seconds.
00:30:25	S2	So then, watch…how else should we rank these? So the audio option…
00:30:29	S3	I don't like the watch.
00:30:32	S2	You don't like the watch?
00:30:32	S3	No.
00:30:33	S2	Is it worse than just the audio?
00:30:34	S3	If you're pressing a button to hear it on the audio, you can press it again if you miss it.
00:30:37	S2	Yeah. Yeah, but it seems like a bit…
00:30:43	S3	Hmm, I just don't like…
00:30:45	S2	…it's better to just read it than to…

00:30:47	S3	Mm-hm, but it's something extra to…
00:30:49	S4	I think player press…
00:30:50	S3	…fuss about with.
00:30:51	S4	…a button and told via audio if…nah…
00:30:53	S2	Well, there's not that many buttons on the controller anyway.
00:30:56	S4	So it's…that was...that was exactly what I thought.
00:30:59	S1	Good point.
00:30:58	S2	So, personally, I would vote that lowest.
00:31:01	S4	It could be good. It could be good.
00:31:03	S3	I think the watch should be the one under it then.
00:31:05	S4	It could be the other way around.
00:31:06	S3	If…if A is six, I think E is five.
00:31:09	S4	If you just said…
00:31:10	S2	Yeah.
00:31:11	S4	…time…just said time and it came up…
00:31:12	S3	I don't…no voice commands, man.
00:31:13	S4	Voice command.
00:31:14	S3	No voice commands. No Russian.
00:31:16	S2	Okay.
00:31:12	S4	No Russian.
00:31:17	S2	What do you think? Six and then five?
00:31:18	S4	Yeah. Yeah, just because the **clogging of** the buttons just so that you could hear the time, **nah, it's not**…
00:31:23	S2	Yeah.
00:31:23	S4	…yeah, **that's what I thought**. And then having a watch is a bit…
00:31:27	S2	Okay.
00:31:28	S4	…a bit…
00:31:28	S2	So then we have on the main UI, so I think we…
00:31:30	S4	You…yeah, you could have it on the main UI.
00:31:31	S2	Yeah, but we don't wanna clog it up. Like, is it necessary information? (Whispered conversation).
00:31:40	S4	Rolling one of the controllers onto the back, I quite like the gimmick…the…I don't know. Quite like the idea of that.
00:31:44	S2	Well…but let's address **why**…
00:31:46	S3	I think it on the…
00:31:47	S4	On the main UI.
00:31:47	S3	…main UI. I don't think if…having it on the main UI is probably the second best idea.
00:31:52	S4	I think…a UI element, not part of the main UI, floating in the air above the player is…
00:31:57	S2	That's the same…
00:31:57	S4	…worse…
00:31:58	S3	As looking away.
00:31:58	S2	…context as the victory conditions.
00:32:00	S4	Yeah.

00:32:00	S3	**As** looking away.
00:32:03	S4	Yeah, so…
00:32:03	S3	But if you could just have, just at the top, just a little time left thing. You don't necessarily have to have the victory conditions on. That's…that's, I think, the second best…
00:32:11	S4	Or if you looked up…
00:32:12	S3	…**option**…
00:32:12	S4	…and there was a sun going across the sky, that could be something. It's a non…as a visually…yeah and hint towards it, but it's not a UI element. So…
00:32:19	S1	Hmm.
00:32:21	S4	…it's different.
00:32:21	S2	So what do we think of the main UI?
00:32:23	S4	I think…
00:32:24	S3	I think it's the…
00:32:24	S2	Which one of these…
00:32:24	S3	…second.
00:32:24	S2	…do we think is the…
00:32:24	S3	I…
00:32:25	S2	…fourth? So, like, the bottom one.
00:32:27	S3	Hmm, **it's not bothering…floating**…maybe the one where you gotta look away again. C, maybe, as four.
00:32:34	S2	See, I'd lean to putting B as four and then C as three.
00:32:39	S4	Yeah, I'd agree with Josh.
00:32:41	S2	Just because I don't wanna clog up the…the unit selection stuff…
00:32:45	S4	Yeah, I would…
00:32:45	S2	…with an extra…
00:32:46	S4	…I would agree…
00:32:46	S3	You could just have a little clock at the top of the UI.
00:32:49	S2	Yeah, but with the amount of stuff…you're gonna have, like, squares and tiles of all these different units and probably pictures of the units so you know who they are and then you're suddenly squeezing all this information.
00:33:00	S4	It'd probably be quite small or it could distract you from what the UI is.
00:33:04	S3	Fair enough.
00:33:05	S4	I…I agree with Josh…
00:33:07	S3	I can see the argument. I disagree, but I'm willing to…I'm willing to seed it.
00:33:11	S2	Okay. So we're two to one. So we'll go four on that. And then the environment one; are we…
00:33:16	S3	I don't…yeah…
00:33:16	S2	…**under**…
00:33:17	S3	I just don't like the idea of looking away.
00:33:18	S2	Okay. I would agree. I think, actually, the rolling the controller over is a pretty good idea.
00:33:23	S4	I think that's a good idea.
00:33:23	S2	Yeah.
00:33:25	S4	Because, yeah, you're not gonna always want to know the time, but…
00:33:27	S3	It's probably not gonna be something that you do accidentally either, is it? So…
00:33:29	S4	No.

00:33:30	S2	Yeah. So if we…so…
00:33:31	S4	But I…I think it'd just be awkward.
00:33:33	S2	Is that a good idea to put the victory conditions on as well?
00:33:36	S4	Could do, in all honesty.
00:33:38	S2	Because it's easier than throwing it over your hand if…
00:33:40	S4	Yes, **it's a**…
00:33:41	S3	Well, it's a hand gesture.
00:33:41	S4	…hand gesture. It's a hand gesture.
00:33:43	S2	Yeah.
00:33:45	S4	Doing a hand gesture.
00:33:45	S2	Yeah, so that's fine.
00:33:48	S4	Mm-hm.
00:33:50	S2	Rolling over controller.
00:33:53	S1	Is that getting rolled up into the hand…
00:33:55	S2	Into the victory conditions…
00:33:56	S3	Well, the victory…
00:33:56	S1	…as well?
00:33:57	S3	…conditions…the victory…
00:33:57	S1	So, to now summon the victory conditions you also have roll the controller…
00:34:00	S3	Yeah, but that's a hand gesture, isn't it? So…
00:34:01	S1	Yeah. Yeah. I'm just…
00:34:02	S2	Yeah.
00:34:03	S1	…it's just for audio purposes. So I have it…
00:34:04	S2	Yep.
00:34:04	S1	…written down and…
00:34:05	S2	So shall we say the UI element hovering is three…
00:34:08	S3	Three.
00:34:09	S2	…and then the…
00:34:09	S4	Yeah.
00:34:09	S2	…rolling it over is two?
00:34:10	S4	Yes. Yeah.
00:34:12	S2	Okay. Okay. Cool.
00:34:14	S1	Cool.
00:34:14	S2	Done.
00:34:15	S4	Is that it?
00:34:15	S2	I think we're done, yeah.
00:34:16	S4	Brilliant**.** Massive hit.
00:34:17	S1	Thank you very much guys. Thank you for coming and all that.

(00.34.20)

(End of Audio)

Duration 35 minutes

Appendix D: Individual Interview Results

How would the environments be presented to the player?

A. '*Google Earth VR'* style. The environment is a large play area found at the player's feet and around them to a horizon/ edge of map.
B. Ruse style backdrops without table. Environment is floating
C. '*Google Earth VR'* style. The environment is about chest height meaning that the player is not straining themselves looking at the floor
D. 360-degree capsule that is wrapped around the player. The floor is the current play area for the player. The surrounding dome is the rest of the environment wrapped around it.
E. The environment is presented on a table in front of the player at chest height. The edges of the table represent the area of play

How would a player move about the environment/ Move the camera?

A. The player can fly through the environment, similar to the flying movement found in '*Google Earth VR'*
B. Teleport from the lab
C. Teleportation from the Lab and a dragging system found in Google Earth
D. *Google Earth VR'* movement and teleportation like in the Lab, in addition the player can command from ground level. Taking over the eyes of any unit of their choice.
E. The player uses the track pad to move around the environment. Press right on the track pad would move the player to the right in the environment. For rotation, the player rotates themselves physically
F. Floor dragging similar to the one found in *Google Earth VR'*
G. Mini map camera jumping. In traditional strategy games a player can click on the mini map and the camera will be taken to that location, this would become the main movement for the player. Clicking some sort of mini map allowing the player to jump to that location.

How would the line of sight/ Fog of war be presented?

A. Similar to modern RTS games (EG black fog)

Does the player need a cursor?

A. Google's '*Tilt Brush'* style laser
B. Dot in the centre of the screen.

How would a player select a single unit?

A. Point the cursor at the desired unit and press trigger/button
B. Player can use both the cursor and voice commands. Player points cursor at the unit and then gives commands via voice
C. A UI element has a list of all units the player owns in the play area. Allowing them to select of this list

How would a player select multiple units?

A. Draw a free shape around the desired units. This shape can be any shape or size
B. A square appears between the two controllers, pulling the controllers apart makes the square bigger. Place the square over the units and they are selected
C. Painting tools like '*Halo Wars'*. At the cursor, a circle shape will appear around the cursor, allowing the player to "Paint" the units they wish to select.
D. Drag box out. Like how current strategy games do it

How would a player order a unit/s to move?

A. Put cursor on location and press trigger
B. Point cursor and click. Before the order is given the player is given the chance to change the move order type, to one such as attack move or retreat.
C. Put controller on to the location and press button. The actual controller not the cursor.
D. Arced line comes from the controller. Where it lands in the position they will go (This line is different from the cursor) must be activated via button press. Meaning that selection and ordering a unit to move are different buttons.
E. Point cursor at location and press button. In addition, the map has a grid over the entire play area. Once a unit has been selected the player can verbally say go to this grid reference

F. Draw a line from the unit to the location allowing for precise movement, in addition the player can also point cursor at location and click, the unit will auto path their way to the location

How would a player order a unit to attack?

A. Point cursor at enemy unit and press trigger
B. Put controller on top of enemy unit and pressing a button. Not using the cursor
C. Arced line comes from the controller. Where it lands in the position they will go (This line is different from the cursor) Has to be activated via button press. Meaning that selection and ordering an attack are different buttons.
D. Point cursor and click. Before the order is given the player is given the chance to change the move order type, to one such as attack move or retreat.

If so, what would a UI look like?

A. Google's '*Tilt Brush'* style, allowing the player to swipe through different sides of the UI. Player summons the UI by pressing button
B. The UI is summoned and appears as a square hovering to the side of the player (The side is decided by the player).
C. The UI is located around the player's arm, Like Google's '*Tilt Brush'* but around the arm instead.
D. Google's '*Tilt Brush'* style, allowing the player to swipe through different sides of the UI. The UI is always on and cannot be turned off
E. UI is on one of the player's hand is a clipboard

How would a player interact with it?

A. Similar to Google's '*Tilt Brush'*. Cursor points from one controller to the other.
B. The player touches the menu with the controller.

How would a player build a unit?

A. Player selects a building then the main UI changes to that building. Allowing the player to build a unit of their choice
B. A UI element different from the main UI appears above the building which the player has selected.

C. On the main UI the player clicks the units they want to build, once clicked they then drag and drop them on to the environment. Once built the unit will move to that point automatically

How would a player know what unit is currently have selected?

A. Summon a different UI element that is not part of the main UI. The UI has the information on it
B. A portrait above the selected units. Similar to current RTS games
C. Highlight around the unit
D. Pressing a button jumps the player to the selected units
E. On the main UI
F. A hologram UI will hover above the cursor informing the player

How would a player order a unit to use a special ability?

A. Summon a different UI element that is not part of the main UI. Then the player interacts with that UI
B. When a unit is selected the main UI changes to that unit or units. The player can then interact with the main UI to order the ability
C. Player makes hand gesture with controllers
D. Press button on controller.
E. Using the trackpad on the players dominate hand controller, it allows the player to rapidly switch through different abilities, swiping left and right like a modern phone.

How would a player see the victory progression?

A. The information is found on the main UI.
B. On the main UI. Pop up alerts in the environments for certain events
C. A flag that is at the player's main base area. This flag goes up and down depending on how close they are to victory.
D. The environment has an overlay; the colour of the environment shows who is winning.
E. A UI element not part of the main UI is hovering above the environment shows the information. To see it the player must physically look up for it
F. Doing a hand gesture summons a new UI that allows the player to see the progression
G. Information is via audio

How would a player see time/date/ season details?

A. Player presses button and is told via audio
B. On the main UI
C. A UI element that is not part of the main UI, floating in the sky above the player.
D. Rolling one of the controllers on to its back will bring up a new UI element not part of the main UI. The information is found on this UI element
E. A watch like device on the player's wrist that has this information.

Appendix E: Consent Form example

VR In Strategy Games Consent Form

Researcher: Mathew Price

Contact details: Mathew.Price@hud.ac.uk

I am a researcher at the University of Huddersfield. The aim of the study is to find out how VR can impact the strategy game genre. The research is subject to the University of Huddersfield ethical guidelines. These include the right to anonymity and that participation in this study is voluntary, you have the right to withdraw from the study at any point while keeping your anonymity. If you have any questions about the study, please feel free to contact me via email or ask the question directly.

The study will be split into two parts, an individual interview and a focus group, these will be done at a different time. During the interview stage, you will be asked to play VR games. These games have flashing images, if this affects you please let me know. VR is also a physical activity, where the participant will have to walk around.

All data collected is protected under the data protection act and the Huddersfield university ethical guidelines and will be destroyed 6 months after its use.

The participant will be audio recorded. Photos will also be taken of the answers given.

Thank you for your time, I am grateful.

By signing below, I understand that

1) The health and safety risks of playing VR (Dizziness, nausea, falling over etc)
2) That your personal data will be protected
3) The data collected from this study will be destroyed in 6 months' time
4) You consent to be recorded (Audio only)

Participants name (Print)

…….

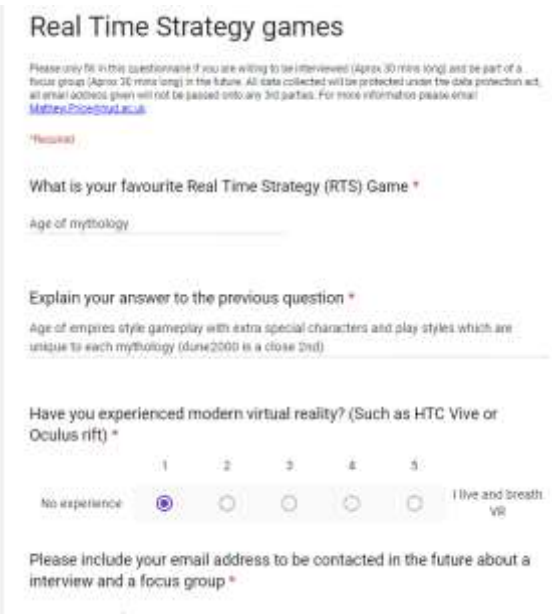
Participants Signature Date

……..

……

Appendix F: Applicant Application Form Responses

Below is the application form that participants filled in, 21 people responded. Their email has been cut off from the final question for data protection reasons



Real Time Strategy games

Please only fill in this questionnaire if you are willing to be interviewed (Aprox 30 mins long) and be part of a focus group (Aprox 30 mins long) in the future. All data collected will be protected under the data protection act, all email address given will not be passed onto any 3rd parties. For more information please email Mathew.Price@hud.ac.uk

*Required

What is your favourite Real Time Strategy (RTS) Game *

Age of mythology

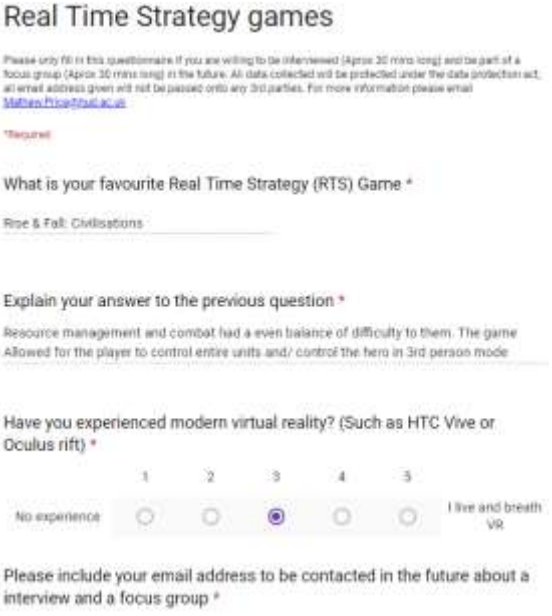
Explain your answer to the previous question *

Age of empires style gameplay with extra special characters and play styles which are unique to each mythology (dune2000 is a close 2nd)

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	◉	○	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Rise & Fall: Civilisations

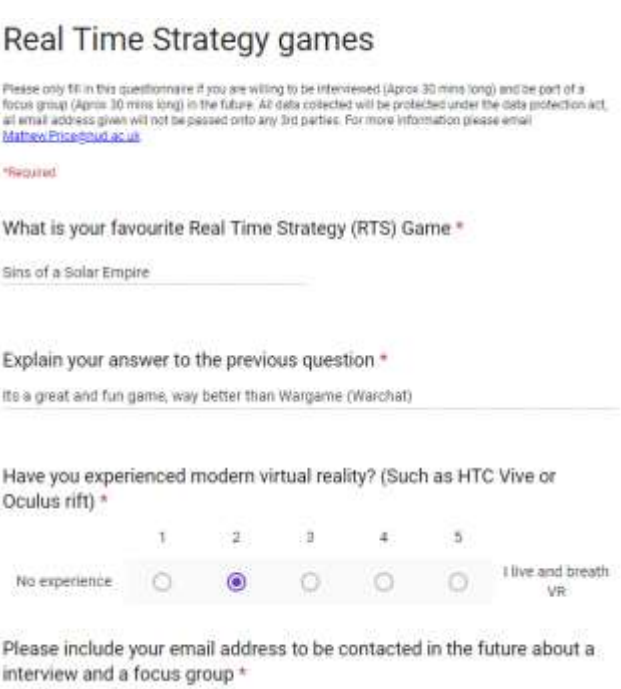
Explain your answer to the previous question *

Resource management and combat had a even balance of difficulty to them. The game Allowed for the player to control entire units and/ control the hero in 3rd person mode

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	○	◉	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Sins of a Solar Empire

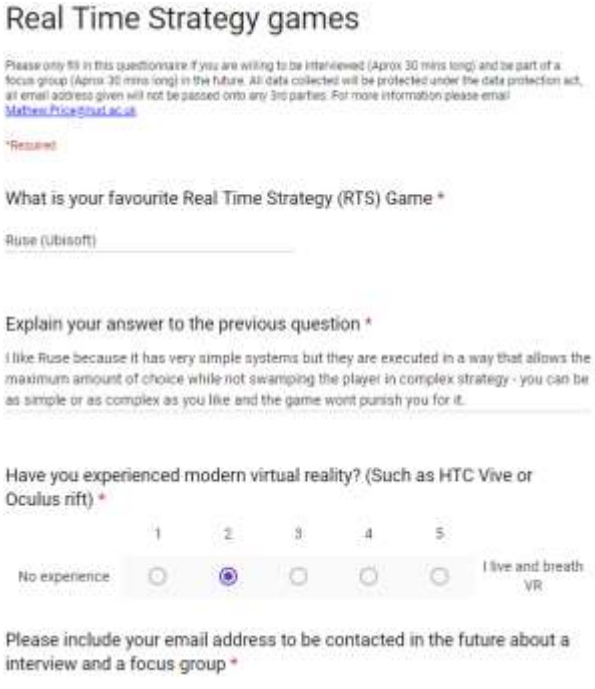
Explain your answer to the previous question *

Its a great and fun game, way better than Wargame (Warchat)

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	◉	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



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*Required

What is your favourite Real Time Strategy (RTS) Game *

Ruse (Ubisoft)

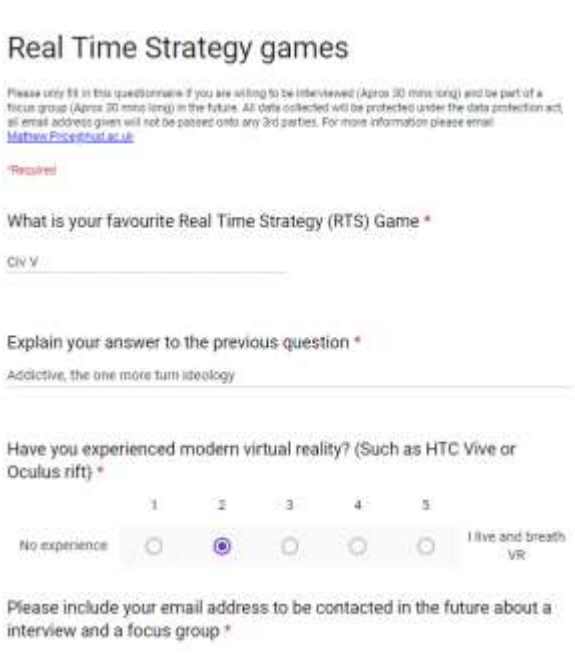
Explain your answer to the previous question *

I like Ruse because it has very simple systems but they are executed in a way that allows the maximum amount of choice while not swamping the player in complex strategy - you can be as simple or as complex as you like and the game wont punish you for it.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	◉	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Civ V

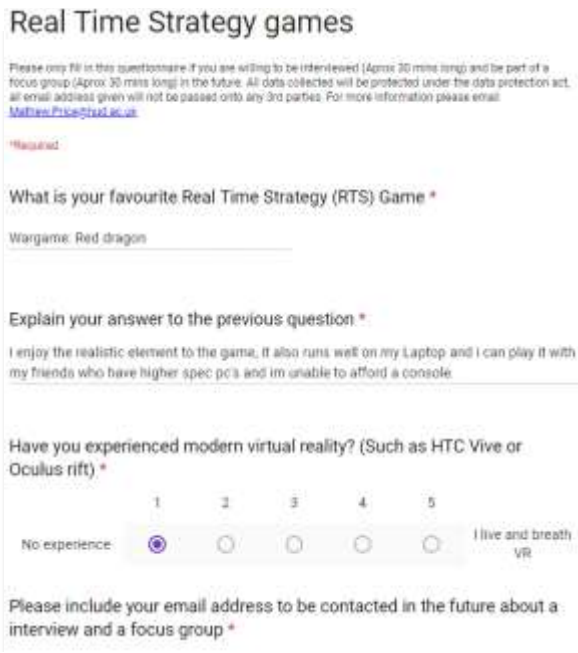
Explain your answer to the previous question *

Addictive, the one more turn ideology

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	◉	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



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*Required

What is your favourite Real Time Strategy (RTS) Game *

Wargame: Red dragon

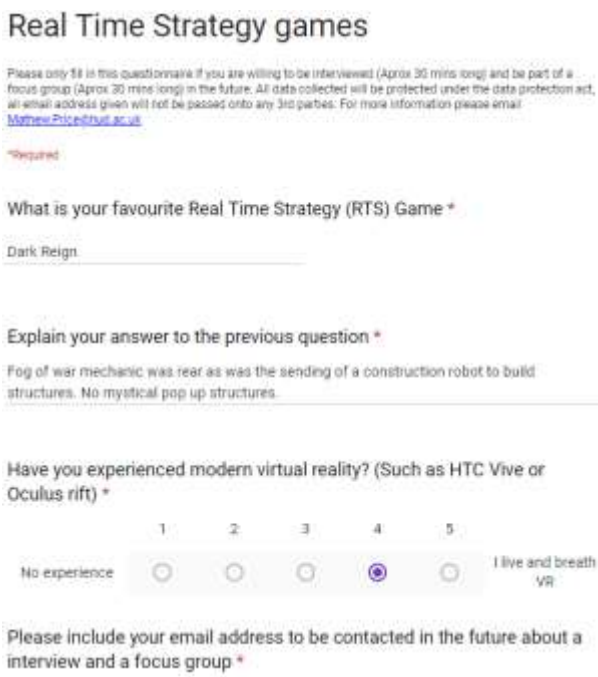
Explain your answer to the previous question *

I enjoy the realistic element to the game, it also runs well on my Laptop and I can play it with my friends who have higher spec pc's and im unable to afford a console

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	◉	○	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



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*Required

What is your favourite Real Time Strategy (RTS) Game *

Dark Reign

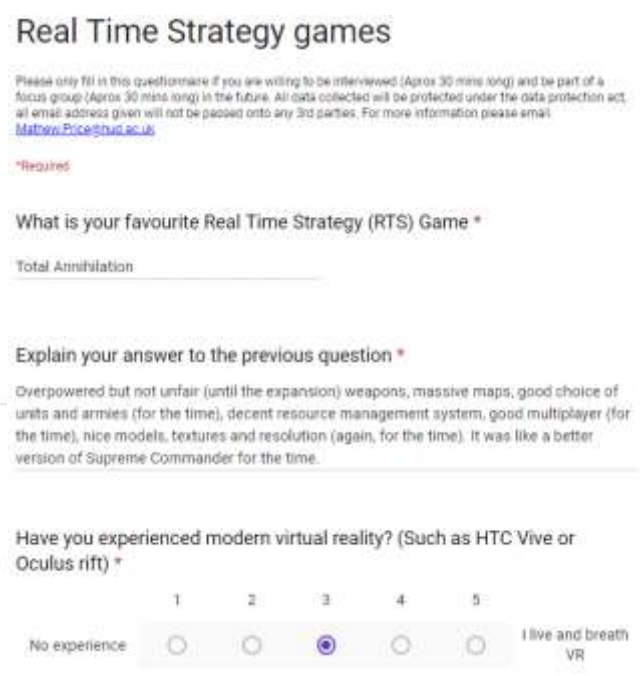
Explain your answer to the previous question *

Fog of war mechanic was rear as was the sending of a construction robot to build structures. No mystical pop up structures.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	○	○	◉	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



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*Required

What is your favourite Real Time Strategy (RTS) Game *

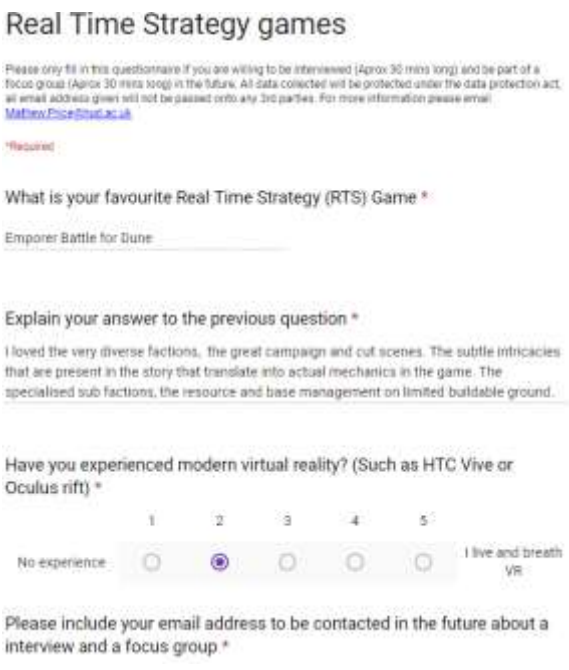
Total Annihilation

Explain your answer to the previous question *

Overpowered but not unfair (until the expansion) weapons, massive maps, good choice of units and armies (for the time), decent resource management system, good multiplayer (for the time), nice models, textures and resolution (again, for the time). It was like a better version of Supreme Commander for the time.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	○	◉	○	○	I live and breath VR



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*Required

What is your favourite Real Time Strategy (RTS) Game *

Emporer Battle for Dune

Explain your answer to the previous question *

I loved the very diverse factions, the great campaign and cut scenes. The subtle intricacies that are present in the story that translate into actual mechanics in the game. The specialised sub factions, the resource and base management on limited buildable ground.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	◉	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *

Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Halo Wars

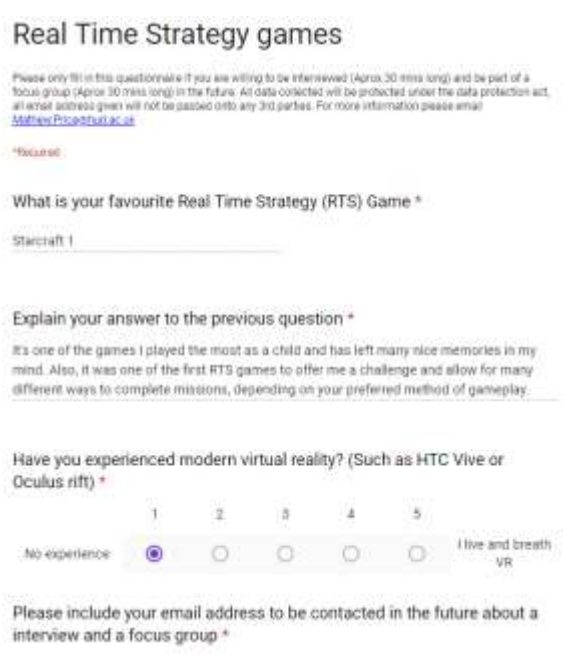
Explain your answer to the previous question *

Rare genre in Xbox 360 the game offers different playable overlords that offer different units and powers

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	○	◉	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Starcraft 1

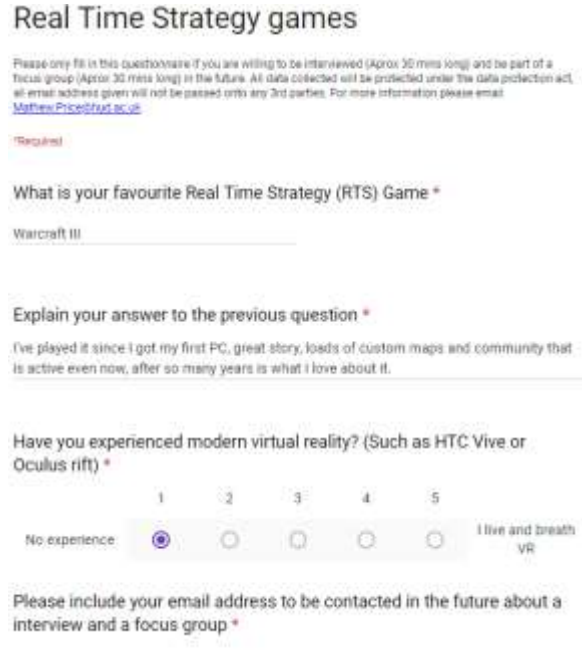
Explain your answer to the previous question *

It's one of the games I played the most as a child and has left many nice memories in my mind. Also, it was one of the first RTS games to offer me a challenge and allow for many different ways to complete missions, depending on your preferred method of gameplay.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	◉	○	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Warcraft III

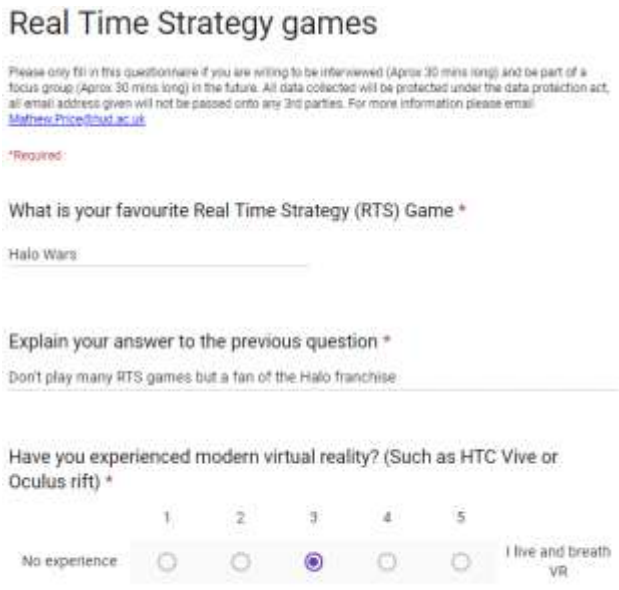
Explain your answer to the previous question *

I've played it since I got my first PC, great story, loads of custom maps and community that is active even now, after so many years is what I love about it.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	◉	○	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Halo Wars

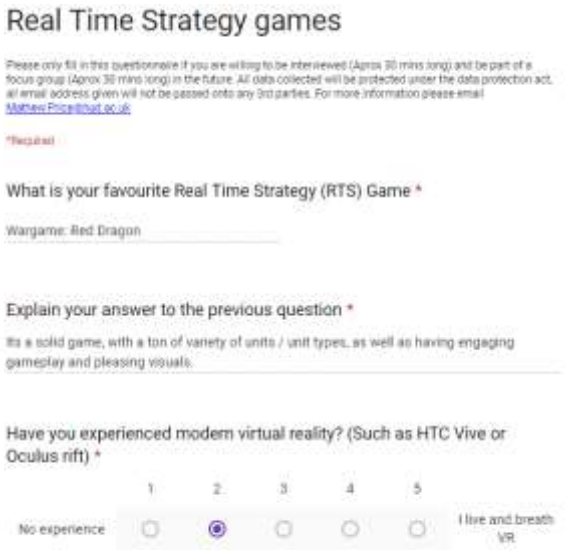
Explain your answer to the previous question *

Don't play many RTS games but a fan of the Halo franchise

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	○	◉	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Wargame: Red Dragon

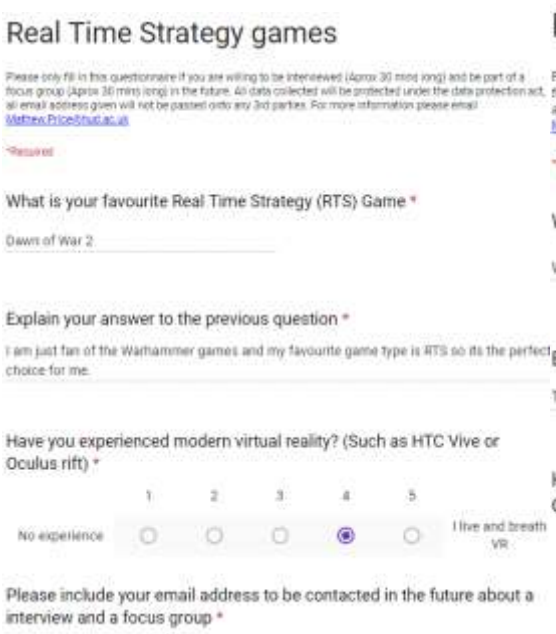
Explain your answer to the previous question *

Its a solid game, with a ton of variety of units / unit types, as well as having engaging gameplay and pleasing visuals.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	◉	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Dawn of War 2

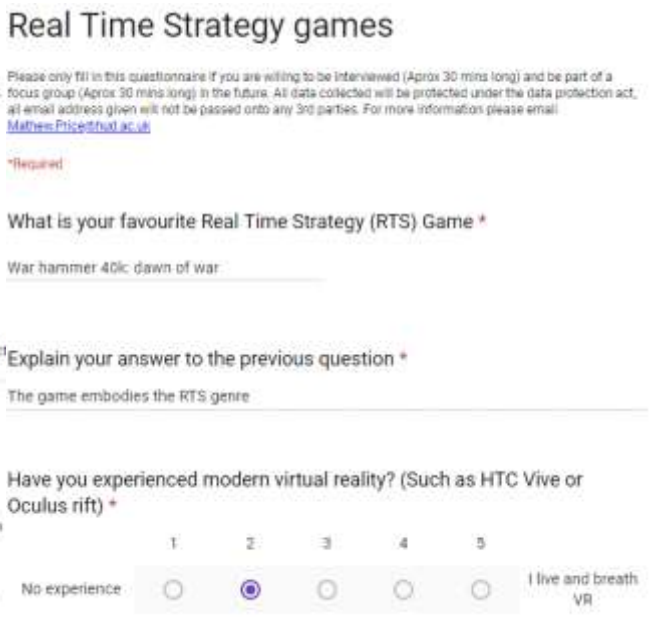
Explain your answer to the previous question *

I am just fan of the Warhammer games and my favourite game type is RTS so its the perfect choice for me.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	○	○	◉	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

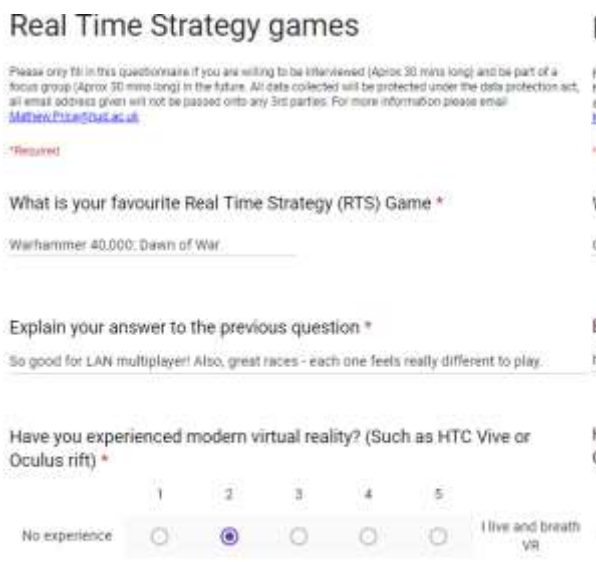
War hammer 40k: dawn of war

Explain your answer to the previous question *

The game embodies the RTS genre

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	◉	○	○	○	I live and breath VR



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Warhammer 40,000: Dawn of War

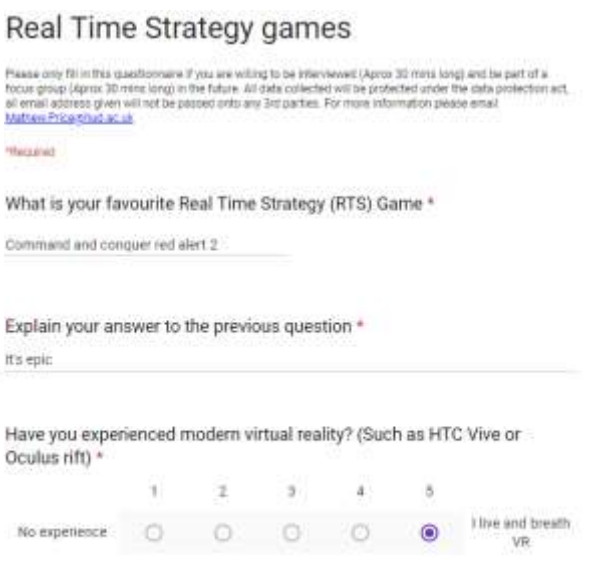
Explain your answer to the previous question *

So good for LAN multiplayer! Also, great races - each one feels really different to play.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	◉	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



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*Required

What is your favourite Real Time Strategy (RTS) Game *

Command and conquer red alert 2

Explain your answer to the previous question *

It's epic

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	○	○	○	◉	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *

Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Age of Mythology

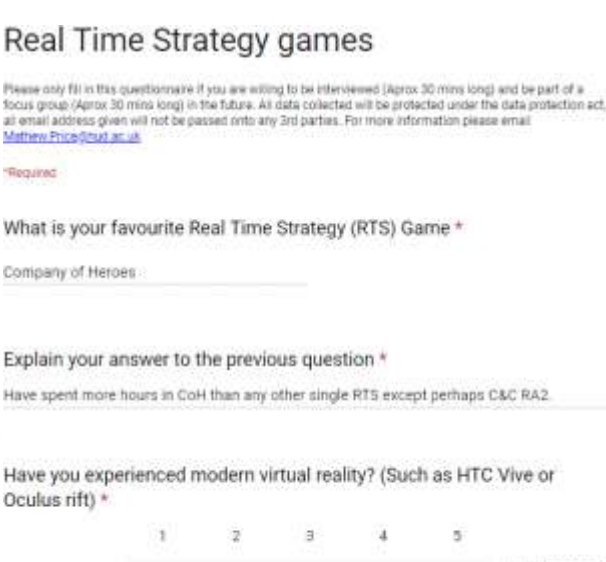
Explain your answer to the previous question *

Bit of a weird one, but I bought Age of Mythology when I was younger before I bought Age of Empires, so it's more just a sentimental thing. I'm also quite a casual player, so not all too familiar with everything in the genre (played Age of Empires, the LOTR one, and a bit of Civilization).

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	○	◉	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *



Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Company of Heroes

Explain your answer to the previous question *

Have spent more hours in CoH than any other single RTS except perhaps C&C RA2.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	◉	○	○	○	○	I live and breath VR

Please include your email address to be contacted in the future about a interview and a focus group *

Real Time Strategy games

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*Required

What is your favourite Real Time Strategy (RTS) Game *

Starcraft

Explain your answer to the previous question *

My experience with RTS began with the early blizzard and bullfrog titles. I feel that while more modern concepts such as asymmetrical forces, a notion somewhat flagshipped by red alert/command and conquer to an extent (While core symmetry was arguably maintained), and championship audiences reaching into the 10s of thousands, were only truly realised/achieved in starcraft 1.

Have you experienced modern virtual reality? (Such as HTC Vive or Oculus rift) *

	1	2	3	4	5	
No experience	◉	○	○	○	○	I live and breath VR

Appendix G: Individual Interviews Summaries

Below are the summaries of all the individual interviews. For clarification these are summaries, the author wrote these as a way of collating the answers for the latter focus group stage. They are not transcripts of the interviews.

1

How would the environments be presented to the player?

The environment is presented on a table in front of the player at chest height. The edges of the table represent the area of play

How would a player move about the environment/ Move the camera?

Walking around and using a trackpad to move the player.

How would the line of sight/ Fog of war be presented?

A cloud of fog that covers the unseen areas

Does the player need a cursor/What does it look like?

Laser pointer like tilt brush

how would a player select a single unit?

Hover cursor over unit and press a button or trigger. In addition, the player has a UI element that lists every unit they currently have available to select

How would a player select multiple units?

Draw a box around the units, similar to current strategy games

How would a player order a unit/s to move?

Use the cursor to point to a location and press a button/trigger.

How would a player order a unit to attack?

Pointer cursor and press button/ trigger.

Do you need a UI?

if so what would a UI look like?

A big hologram that appears in front of the player that is large and takes up a large amount of view in front of the player. It can be summoned and disappeared at the players will. The player also has a small constant UI that looks like a tablet (IPad) that is always available (This tablet UI is a small context sensitive UI)

how would a player interact with it?

Using the cursor, the player points at the UI and presses a button/ Trigger

How would a player build a unit?

On the UI

How would a player know what unit is currently have selected?

Ring around the unit's base. In addition the player has a UI element that shows what unit is selected.

How would a player order a unit to use a special ability?

Using the trackpad on the players dominate hand controller. It allows the player to rapidly switch through different abilities, swiping left and right similar to a modern phone.

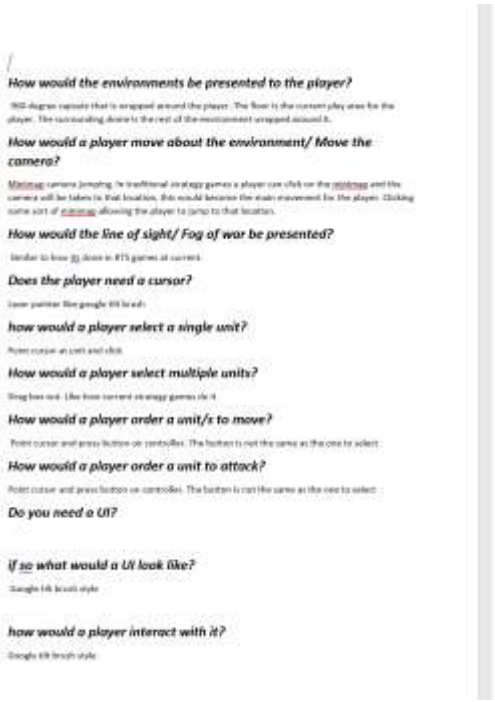
How would a player see the victory progression?

Doing a hand gesture summons a new UI that allows the player to see the progression

How would a player see time/date/ season details?

Season details and times effects the environments. Details are on UI

2



How would the environments be presented to the player?

360 degree capsule that is wrapped around the player. The floor is the current play area for the player. The surrounding dome is the rest of the environment wrapped around it.

How would a player move about the environment/ Move the camera?

Minimap camera jumping. In traditional strategy games a player can click on the minimap and the camera will be taken to that location, this would become the main movement for the player. Clicking some sort of minimap allowing the player to jump to that location.

How would the line of sight/ Fog of war be presented?

Similar to how its done in RTS games at current.

Does the player need a cursor?

Laser pointer like google tilt brush

how would a player select a single unit?

Point cursor at unit and click

How would a player select multiple units?

Drag box out. Like how current strategy games do it

How would a player order a unit/s to move?

Point cursor and press button on controller. The button is not the same as the one to select

How would a player order a unit to attack?

Point cursor and press button on controller. The button is not the same as the one to select

Do you need a UI?

if so what would a UI look like?

Google tilt brush style

how would a player interact with it?

Google tilt brush style

How would a player build a unit?

Player selects the building or something that builds units, then a contextual UI will appear on the UI.

How would a player know what unit is currently have selected?

When a unit is selected a hologram, UI will appear above the cursor.

How would a player order a unit to use a special ability?

Player uses trackpad to switch through selected unit's special abilities

How would a player see the victory progression?

Scoreboard that hovers in the environment somewhere

How would a player see time/date/ season details?

On the UI

3

How would the environments be presented to the player?

Environment is below the player. Like the total war games

How would a player move about the environment/ Move the camera?

The player drags the floor to move

How would the line of sight/ Fog of war be presented?

Visually similar to how its done in most RTS games (Black fog)

Does the player need a cursor/What does it look like?

Laser pointer

how would a player select a single unit?

Above the controller over the unit they player wants to select

How would a player select multiple units?

Draw a box around them using a singular controller. Similar to a mouse

How would a player order a unit/s to move?

Point the cursor to the location and press trigger.

How would a player order a unit to attack?

Point cursor to enemy and press trigger

Do you need a UI?

if so what would a UI look like?

UI is mostly context sensitive, the UI hovers above the everything. For example, above a factory there would be a UI element. Above units it might have special orders for that unit.

how would a player interact with it?

Play moves cursor over UI and presses trigger

How would a player build a unit?

Click on the building that creates the desired unit, the UI will appear above it then click on the units you want

How would a player know what unit is currently have selected?

Highlight around the unit that is selected

How would a player order a unit to use a special ability?

Use a button on the controller.

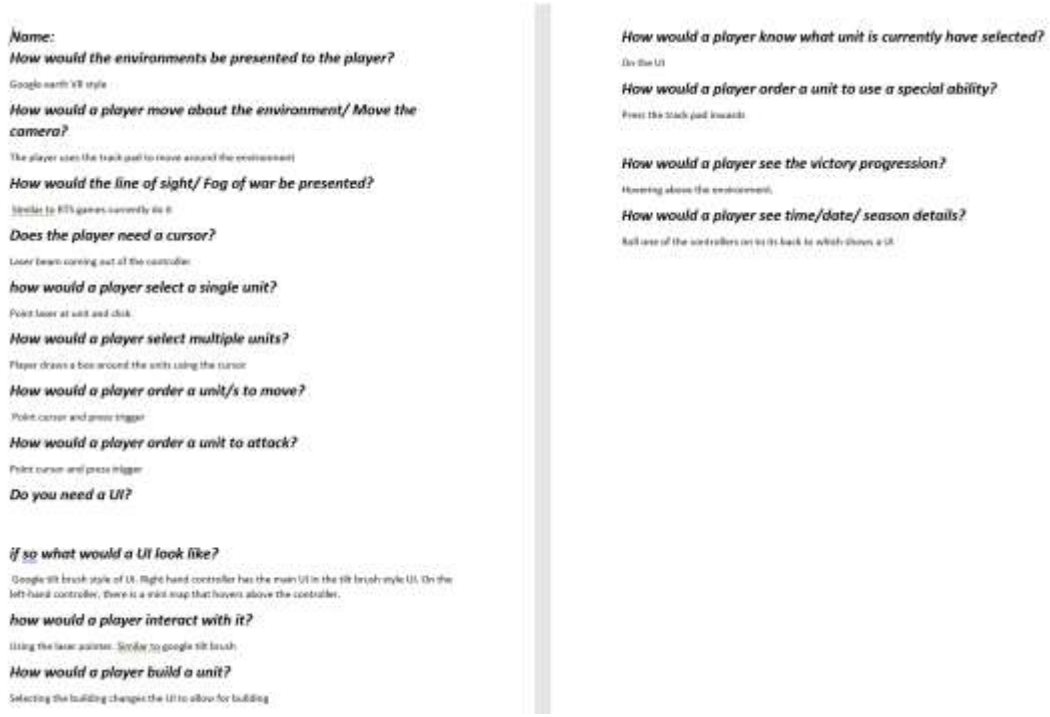
How would a player see the victory progression?

On the UI

How would a player see time/date/ season details?

A watch like device on the players wrist that has this information.

4



Name:

How would the environments be presented to the player?

Google earth VR style

How would a player move about the environment/ Move the camera?

The player uses the track pad to move around the environment

How would the line of sight/ Fog of war be presented?

Similar to RTS games currently do it

Does the player need a cursor?

Laser beam coming out of the controller

how would a player select a single unit?

Point laser at unit and click

How would a player select multiple units?

Player draws a box around the units using the cursor

How would a player order a unit/s to move?

Point cursor and press trigger

How would a player order a unit to attack?

Point cursor and press trigger

Do you need a UI?

if so what would a UI look like?

Google tilt brush style of UI. Right hand controller has the main UI in the tilt brush style UI. On the left hand controller, there is a mini map that hovers above the controller.

how would a player interact with it?

Using the laser pointer. Similar to google tilt brush

How would a player build a unit?

Selecting the building changes the UI to allow for building

How would a player know what unit is currently have selected?

On the UI

How would a player order a unit to use a special ability?

Press the track pad inwards

How would a player see the victory progression?

Hovering above the environment.

How would a player see time/date/ season details?

Roll one of the controllers on to its back to which shows a UI

E

Name

How would the environments be presented to the player?

Google Earth VR style

How would a player move about the environment/ Move the camera?

Floor dragging similar to google earth vr

How would the line of sight/ Fog of war be presented?

Thick fog over the unseen areas

Does the player need a cursor?

Laser cursor, similar to google tilt brush with the ability to turn it off and on

how would a player select a single unit?

Draw shape around singular unit using cursor

How would a player select multiple units?

Draw shape around units using cursor

How would a player order a unit/s to move?

Draw a line from the unit to the location allowing for precise movement, in addition the player can also point cursor at location and click, the unit will auto path their way to the location

How would a player order a unit to attack?

Point cursor and press button

Do you need a UI?

if so what would a UI look like?

Google tilt brush style UI. Can be summoned and made to disappear at the players will

how would a player interact with it?

Similar to tilt brush

How would a player build a unit?

Click on the building that you want to build from. It changes the UI to that the building screen for that buildings, then the player can build a unit from that building

How would a player know what unit is currently have selected?

On the UI

How would a player order a unit to use a special ability?

A UI element that is different to the main UI

How would a player see the victory progression?

UI element that is not part of the main UI

How would a player see time/date/ season details?

On the UI

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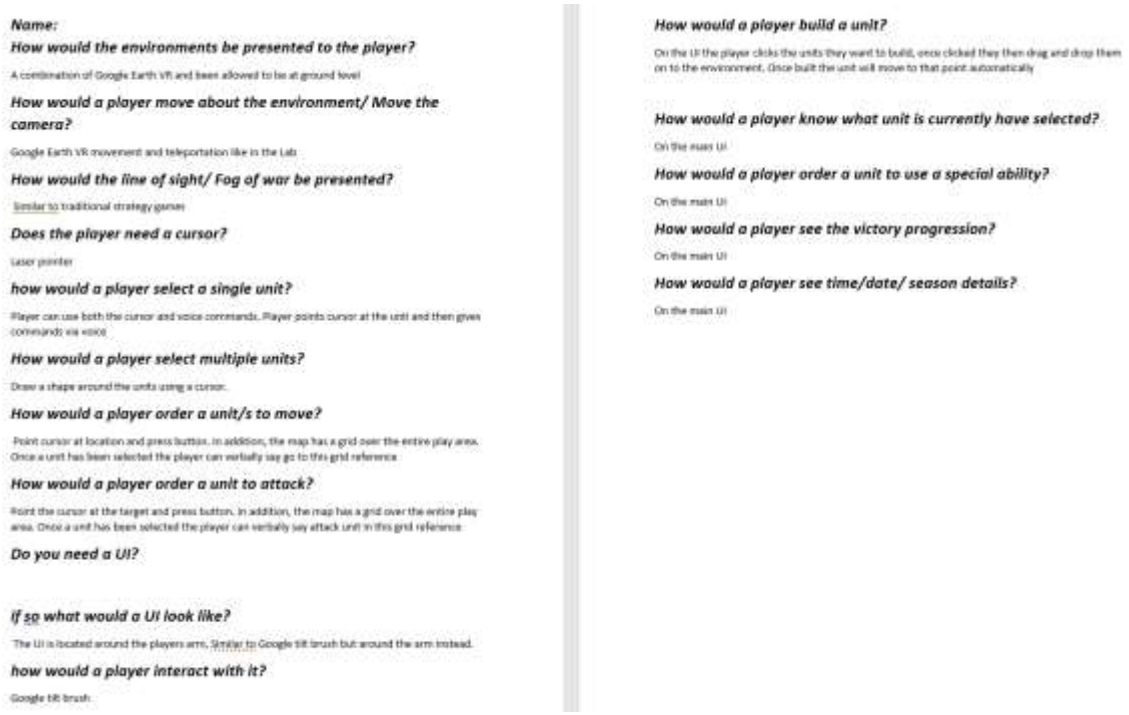

Name:

How would the environments be presented to the player?

A combination of Google Earth VR and been allowed to be at ground level

How would a player move about the environment/ Move the camera?

Google Earth VR movement and teleportation like in the Lab

How would the line of sight/ Fog of war be presented?

Similar to traditional strategy games

Does the player need a cursor?

Laser pointer

how would a player select a single unit?

Player can use both the cursor and voice commands. Player points cursor at the unit and then gives commands via voice

How would a player select multiple units?

Draw a shape around the units using a cursor.

How would a player order a unit/s to move?

Point cursor at location and press button. In addition, the map has a grid over the entire play area. Once a unit has been selected the player can verbally say go to this grid reference

How would a player order a unit to attack?

Point the cursor at the target and press button. In addition, the map has a grid over the entire play area. Once a unit has been selected the player can verbally say attack unit in this grid reference

Do you need a UI?

if so what would a UI look like?

The UI is located around the players arm, Similar to Google tilt brush but around the arm instead.

how would a player interact with it?

Google tilt brush

How would a player build a unit?

On the UI the player clicks the units they want to build, once clicked they then drag and drop them on to the environment. Once built the unit will move to that point automatically

How would a player know what unit is currently have selected?

On the main UI

How would a player order a unit to use a special ability?

On the main UI

How would a player see the victory progression?

On the main UI

How would a player see time/date/ season details?

On the main UI

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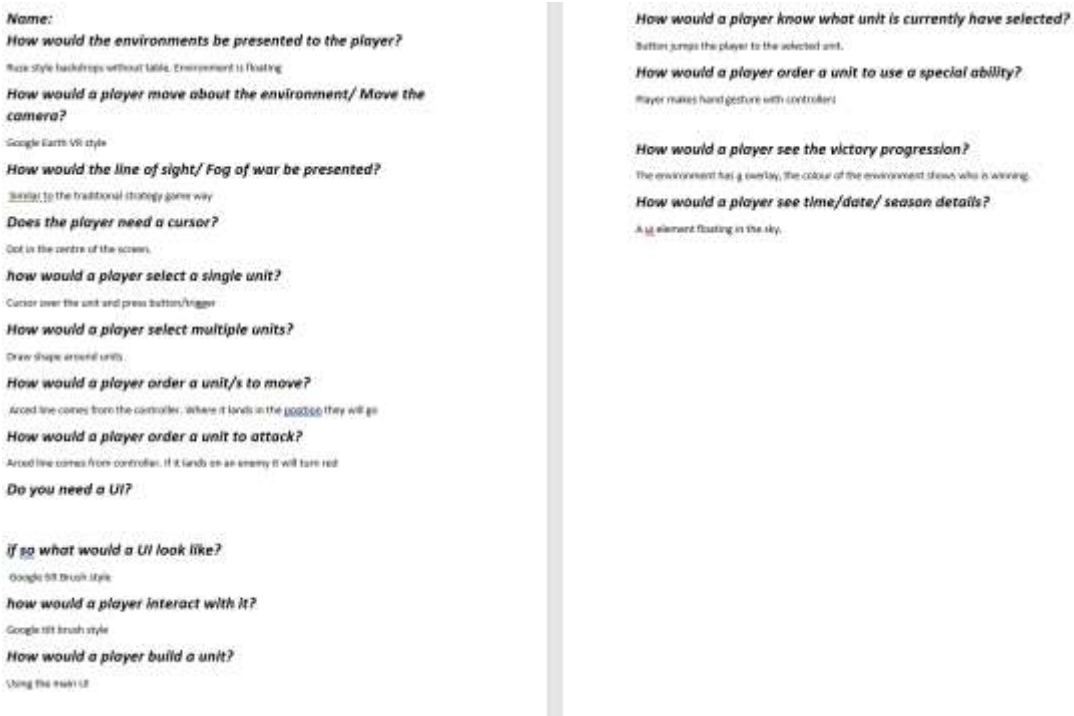


Name:

How would the environments be presented to the player?

Rose style backdrops without table. Environment is floating

How would a player move about the environment/ Move the camera?

Google Earth VR style

How would the line of sight/ Fog of war be presented?

Similar to the traditional strategy game way

Does the player need a cursor?

Dot in the centre of the screen.

how would a player select a single unit?

Cursor over the unit and press button/trigger

How would a player select multiple units?

Draw shape around units

How would a player order a unit/s to move?

Arced line comes from the controller. Where it lands in the position they will go

How would a player order a unit to attack?

Arced line comes from controller. If it lands on an enemy it will turn red

Do you need a UI?

if so what would a UI look like?

Google tilt brush style

how would a player interact with it?

Google tilt brush style

How would a player build a unit?

Using the main UI

How would a player know what unit is currently have selected?

Button jumps the player to the selected unit.

How would a player order a unit to use a special ability?

Player makes hand gesture with controllers

How would a player see the victory progression?

The environment has a overlay, the colour of the environment shows who is winning.

How would a player see time/date/ season details?

A ui element floating in the sky.

H

Name:

How would the environments be presented to the player?

Google Earth VR style

How would a player move about the environment/ Move the camera?

Teleportation from the Lab and a dragging system found in google earth

How would the line of sight/ Fog of war be presented?

Similar to how traditional RTS style

Does the player need a cursor?

Laser pointer style form Google tilt brush

how would a player select a single unit?

Point laser at unit and click

How would a player select multiple units?

A square appears between the two controllers, pulling the controllers apart makes the square bigger. Place the square over the units and they are selected

How would a player order a unit/s to move?

Put controller on to the location and press button. The actual controller not the cursor.

How would a player order a unit to attack?

Put controller on top of enemy unit and pressing a button. Not using the cursor

Do you need a UI?

if so what would a UI look like?

Google tilt brush style

how would a player interact with it?

Google tilt brush

How would a player build a unit?

A UI element different from the main UI appears above the building which the player has selected.

How would a player know what unit is currently have selected?

Highlight around the unit

How would a player order a unit to use a special ability?

When a unit is selected the main UI changes to that unit or units. The player can then press buttons on then use the UI to select the special ability for use

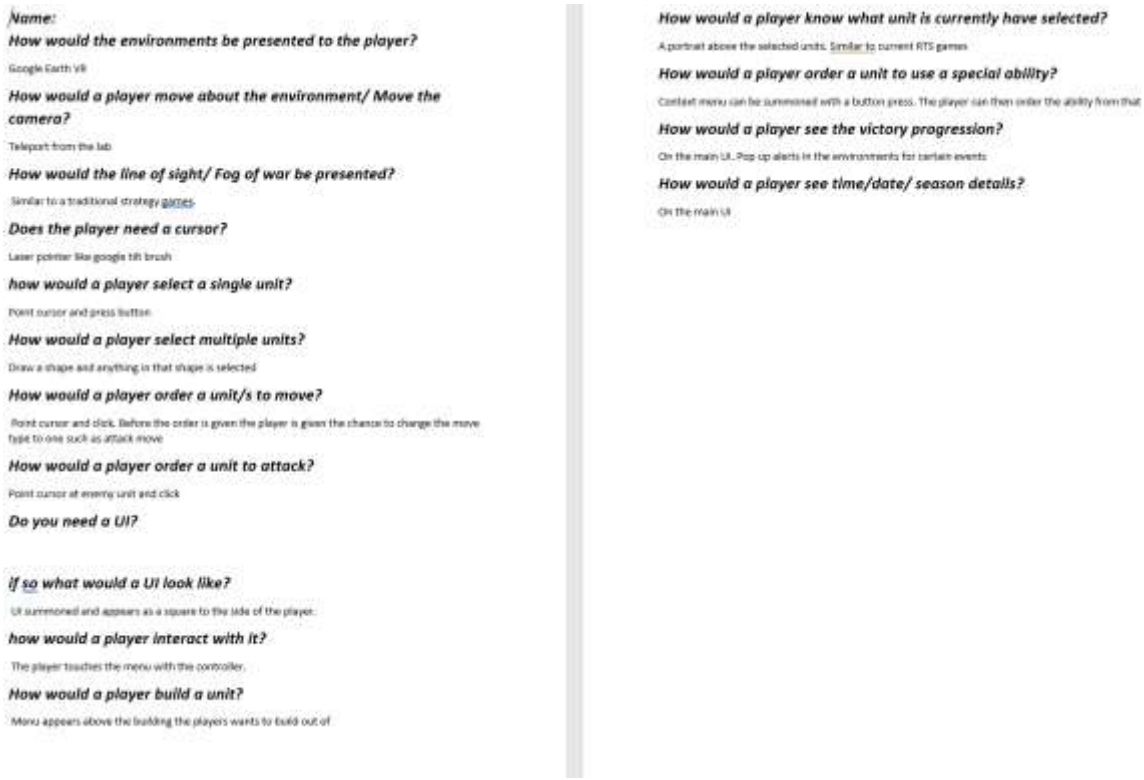
How would a player see the victory progression?

a flag that is at the players main base area. This flag goes up and down depending on how close they are to victory.

How would a player see time/date/ season details?

On the main UI

I



Name:

How would the environments be presented to the player?

Google Earth VR

How would a player move about the environment/ Move the camera?

Teleport from the lab

How would the line of sight/ Fog of war be presented?

Similar to a traditional strategy games.

Does the player need a cursor?

Laser pointer like google tilt brush

how would a player select a single unit?

Point cursor and press button

How would a player select multiple units?

Draw a shape and anything in that shape is selected

How would a player order a unit/s to move?

Point cursor and click. Before the order is given the player is given the chance to change the move type to one such as attack move

How would a player order a unit to attack?

Point cursor at enemy unit and click

Do you need a UI?

if so what would a UI look like?

UI summoned and appears as a square to the side of the player.

how would a player interact with it?

The player touches the menu with the controller.

How would a player build a unit?

Menu appears above the building the players wants to build out of

How would a player know what unit is currently have selected?

A portrait above the selected units. Similar to current RTS games

How would a player order a unit to use a special ability?

Context menu can be summoned with a button press. The player can then order the ability from that

How would a player see the victory progression?

On the main UI. Pop up alerts in the environments for certain events

How would a player see time/date/ season details?

On the main UI

J

Name:

How would the environments be presented to the player?

Google Earth VR style

How would a player move about the environment/ Move the camera?

Google Earth VR flying

How would the line of sight/ Fog of war be presented?

Similar to modern RTS games

Does the player need a cursor?

Google tilt brush laser

how would a player select a single unit?

Point cursor and press trigger

How would a player select multiple units?

Draw shape around units

How would a player order a unit/s to move?

Put cursor on location and press trigger

How would a player order a unit to attack?

Put cursor and enemy unit and press trigger

Do you need a UI?

if so what would a UI look like?

Google tilt brush style. Player summons the UI

how would a player interact with it?

Similar to tilt brush

How would a player build a unit?

Player selects a building then the main UI changes to that building. Allowing the player to build

How would a player know what unit is currently have selected?

Summon a different UI element that is not part of the main UI.

How would a player order a unit to use a special ability?

Summon a different UI element that is not part of the main UI. Then click on that

How would a player see the victory progression?

On the main UI

How would a player see time/date/ season details?

Player presses button and is told via audio

K

How would the environments be presented to the player?

Table in the environment like TI/SE

How would a player move about the environment/ Move the camera?

Teleportation from the Lab

How would the line of sight/ Fog of war be presented?

Traditional strategy games

Does the player need a cursor?

Laser cursor from google earth

how would a player select a single unit?

Point cursor and click

How would a player select multiple units?

Draw shape

How would a player order a unit/s to move?

Once unit is selected the player presses the track pad and selects move. Then points the cursor and clicks

How would a player order a unit to attack?

Once unit is selected the player presses the track pad and selects attack. Then points the cursor and clicks

Do you need a UI?

if so what would a UI look like?

Clipboard style UI on one of the controllers

how would a player interact with it?

Using the cursor

How would a player build a unit?

How would a player know what unit is currently have selected?

Symbol above selected units

How would a player order a unit to use a special ability?

Button on the controller

How would a player see the victory progression?

Via audio

How would a player see time/date/ season details?

UI element in the environment. Fixed location

L

Name:

How would the environments be presented to the player?

Google earth VR

How would a player move about the environment/ Move the camera?

The lab teleportation

How would the line of sight/ Fog of war be presented?

Similar to traditional RTS games

Does the player need a cursor?

Laser like google

how would a player select a single unit?

Point cursor and click

How would a player select multiple units?

Box drag

How would a player order a unit/s to move?

Point cursor at location and press button

How would a player order a unit to attack?

Point cursor at enemy and press button

Do you need a UI?

If so what would a UI look like?

On one of the controllers there is a clipboard style UI

how would a player interact with it?

Google tilt brush pallet

How would a player build a unit?

Click building and UI changes

How would a player know what unit is currently have selected?

Highlight around the unit

How would a player order a unit to use a special ability?

On the UI

How would a player see the victory progression?

Object in the environment has the information on it

How would a player see time/date/ season details?

Object in the environment has the information on it